

# Using i2 Analyst's Notebook

Welcome to the i2 Analyst's Notebook documentation, where you can find information about how to use i2 Analyst's Notebook in your investigations.

## Licensing information

i2 Analyst's Notebook 10 is a licensed product and requires a valid software license. Depending on your organization's arrangements, you might need to provide a license directly or connect to a license server.

### Activate Analyst's Notebook

There are a number of ways you might provide your license information in order to activate Analyst's Notebook.

#### Standalone licenses

Standalone licenses are stored on the same workstation as your installation, and are provided in the form of license keys or license files.

#### Network licenses

You can use a floating license when your workstation is connected to a license server on your network. These licenses can also be borrowed for offline access, and returned when no longer required.

#### Internet licenses

When you have internet access, you can use a license from i2's internet license server.

For detailed information about licensing, refer to the i2 Software [licensing guide for users](#).

If you need help with Analyst's Notebook licensing, contact your system administrator or [i2 Support](#).

## Contacting i2 Support

i2 Support provides assistance with product defects, answers FAQs, and helps users to resolve problems with the product.

After trying to find your answer or solution by using other self-help options such as technotes, you can contact i2 Support. Before contacting i2 Support, your company or organization must have an active software subscription and support contract, and you must be authorized to submit problems to i2.

To contact i2 Support about a problem:

1. Define the problem, gather background information, and determine the severity of the problem.
2. Gather diagnostic information.
3. Submit the problem at <https://i2group.com/support>.

If the problem that you submit is for a software defect or for missing or inaccurate documentation, i2 Support creates an issue report. The report describes the problem in detail. Whenever possible, i2 Support provides a workaround that you can implement until the issue is resolved and a fix is delivered.

## Analyst's Notebook data

To build up a full picture of an investigation, Analyst's Notebook can access data from a range of sources. Within Analyst's Notebook, data is stored as entities, links, and properties.

Analyst's Notebook entities represent real-world objects such as bank accounts and telephones, or events such as meetings or appointments. Links represent the relationships between entities, such as associations between people, ownership of vehicles, transactions between bank accounts, or meetings between people. In Analyst's Notebook, entities and links are known as items.

Properties are used to store information that is known about an item, such as whether a person has a criminal record, or the date and time of a meeting. It is important to think about where to store each piece of information. The choices that you make affect the type of analysis that you can do or how you present the information. For example, you might choose to store information, such as the date of birth of a person or model of a vehicle, as an attribute rather than in a card. You can then display that property on the chart surface and use it in your analysis.

You can also add annotation to your chart in the form of a label or legend. Labels are used to add annotation, such as adding a title for a presentation. They are not used for analysis. Legends provide a key for the information on the chart surface.

## Entities

Entities represent real-world objects such as a people, locations, and bank accounts, or they represent events such as meetings.

Each entity has a representation to determine how it is displayed on the chart surface and a type to categorize it. An entity contains properties, which store information about the object or event. For example, a person might have a name, date of birth, and eye color and a meeting might have date, time, and duration.

### Representation

You can choose how to display entities on your chart surface by using different entity representations, for example icon, event frame, or theme line.

**Table 1: Different entity representations.**

Entity representations: different ways of displaying entities.

Representation	Description
Icon	An image or picture.
Theme line	A line that is used to represent a key element of an investigation, such as a suspect, or bank account. Theme lines are often used with event frames to represent a sequence of events over time.
Event frame	A representation of an occurrence that is used to emphasize date and time information, such as a meeting, or an appointment. Event frames are often used with theme lines.

Representation	Description
Circle	Typically used for textual intelligence on the chart surface or to indicate an organization or a group visually. A circle is sometimes used to enclose other entities.
Box	Typically used to enclose other entities on a chart to indicate an organization or group visually.
Text block	Any piece of information. Often used for textual intelligence on the chart surface.
OLE object	An object that is created in another application and incorporated into your chart, for example a spreadsheet, word-processor document, video clip, or graphic file.

## Type

Each entity has a type to categorize it, for example Person, Bank Account, Meeting, or Vehicle. This type categorization means that you can locate and analyze information more efficiently.

The template that is used to create the chart contains a set of entity types. If you need an alternative entity type, you can create your own by customizing your chart. However, before you create a new entity type, make sure that a suitable one does not exist. You can merge any new entity type that you create back into the standard template.

Entity types have characteristics that define the type such as icon image and name.

### Table 2: Analyst's Notebook entity type characteristics.

The different characteristics that each entity type defines.

Characteristic	Description
Icon	The image that is used on the chart, when the entity is represented as an icon, theme line, or event frame. You can load custom icons into the system for specialized entities.
Name	The name that is used to identify the entity type.
Line color	For representations that use a border, the color of the line that is used for entities of this type. You can also change the line color on a per entity basis.
Shade color	The dominant color of the icon that is used for entities of this type when represented as icons, event frames, or theme lines. You can also change the shade color on a per entity basis, for example, to show if a particular car is red.

Characteristic	Description
Semantic type	A category that defines the real-world meaning of data, and therefore defines how applications interpret that data. For example, Person is a semantic type that might be assigned to entity types such as Male, Offender, and Subscriber. You can search for entities that are assigned a Person semantic type. Using this search criteria, Analyst's Notebook finds entities that have an entity type of Male, Offender, Subscriber, and any other types that have the semantic type Person assigned. You can also change the semantic type on a per entity basis.
User palettes	The palettes that contain the entity type.

### Related tasks

[Adding items](#) on page 30

You can add entities and links to your chart. The items on your chart represent real-world objects and relationships.

### Related reference

[Item type definitions](#) on page 23

Entity types and link types categorize the information on your chart and are part of a chart's properties. If the existing item types are not suitable for your data, you can add or edit entity types and link types.

## Links

A link represents a relationship between two entities, such as ownership of a vehicle by a person or a transaction between two bank accounts. It is represented on the chart surface by a line between the two entities.

Links might have an arrow for direction to indicate a flow of commodities or transaction, or they can be without direction, representing some general association.

All links have the same representation of a line between the two related entities. The style of the line can indicate confidence in the relationship. For example, a solid line might represent an established relationship such as the documented ownership of a vehicle. The template that is used to create the chart contains a set of line strengths that associate a confidence level with a line style. For example, a solid line to represent confirmed information, a dashed line to represent unconfirmed information, and a dotted line to represent tentative information. You can also create your own by customizing the chart.

If there are several relationships or transactions between the same two entities, you can choose to display them as one single link, a link for each direction, or as separate links. This link multiplicity setting is part of a link's style.

A link contains properties, which store information about it. For example, a transaction might have an amount and a date and time.

### Type

Each link has a type to categorize it, such as Owner, Transaction, or Subscriber. This type categorization means that you can locate and analyze information more efficiently. For example, if a

chart contains vehicles and their owners, you can use an owner link type. You can then search for the owner of a vehicle by specifying an owner link type in Visual Search.

**Note:** If you are adding a link of a specific type to a data source, for example if you are using i2<sup>®</sup> Analyst's Notebook Premium to add a link to an iBase database, there might be restrictions on the types of entity that can be linked.

The template that is used to create the chart contains a set of link types. If you need an alternative link type, you can create your own by customizing your chart. However, before you create a new link type, make sure that a suitable one does not exist. You can choose to merge any new link type that you create back into the standard template.

Link types have characteristics that define the type such as name and color.

**Table 3: Analyst's Notebook link type characteristics.**

The different characteristics that each link type defines.

Characteristic	Description
Name	The name that is used to identify the link type.
Color	The color of the line that is used to represent links of this type. You can also change the color on a per link basis.
Semantic type	A category that defines the real-world meaning of data, and therefore defines how applications interpret that data. For example, Organization Link is a semantic type that might be assigned to link types such as Employee or Director. When you search for a link with an Organization Link semantic type, Analyst's Notebook search the types Employee, Director, and any other types that have the semantic type Organization Link assigned. You can also change the semantic type on a per link basis.
User palettes	The palettes that contain the link type.

#### Related tasks

[Adding items](#) on page 30

You can add entities and links to your chart. The items on your chart represent real-world objects and relationships.

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## Properties

Entities and links contain properties, which are used to store information about that entity or link.

Selecting the correct type of property to store information is essential for both visualization and analysis.

Properties can describe the following characteristics of a chart item:

- Information that is known about the chart item such as its label and description.
- Provenance details, such as the source or reliability of the chart item or of an individual piece of information.
- Settings to do with how the chart item is displayed such as line strength, fill color, and other visible elements.

Information about an item might come from multiple sources, such as databases, witness statements, or external documents. This information can be stored in cards, attributes, or when it comes from a connected data source, in data records.

**Note:** By default, only the item label is displayed on the chart surface. Apart from information that is held on cards or data records, all other properties can be selected for display.

## Identities

An identity uniquely identifies an item on a chart or provides a unique link back to entity or link information in a data source.

Two types of identities apply in different situations:

- An Analyst's Notebook identity uniquely identifies entities in the chart (entities only).
- For items created from one or more connected data sources, database identities uniquely identify the original source records (entities and links).

An entity can have an Analyst's Notebook identity, one or more database identities, or both. Alternatively, an entity can have no identity.

Identities are used to match items when you add new items to the chart by copying and pasting, importing, or adding them from a data source. If the item that is being added has an identity that matches the identity of an item that is already on the chart, the items are merged. The item that you are adding to the chart might have more than one identity, for example two database identities, so it might match more than one item on the chart. You can decide what to do, based on information that Analyst's Notebook provides.

### Analyst's Notebook identity and label

Typically, an entity has a label and an identity. By default, the label is the same as the identity but can be changed. The label is displayed on the chart and does not need to be unique, whereas an entity's identity, if it has one, must be unique within a chart. Analyst's Notebook identities are case-sensitive.

It is important to use an identity that uniquely identifies an item, such as a car's license plate, or a person's name together with their date of birth. An entity's identity means that you can copy entities back and forth between charts without unwanted duplication.

If you do not have enough information to uniquely identify an entity, you can leave its identity blank. For example, you might receive several reports that each involve a John Smith but that include no further identifying information. In this situation, you might add several entities to your chart that are labeled John Smith and have a blank identity.

Links do not have Analyst's Notebook identities.

**Note:** Do not use hyphens in entity or link labels to separate numeric and text values, for example `Smith-100` or `100-SMITH`. Analyst's Notebook interprets the hyphen as a minus symbol if it is adjacent to a numeric value. This results in a negative value for the analysis attribute label value. If this is not the intended interpretation either use a tilde (~) or en dash (–) instead.

## Database identity

Entities and links can have one or more database identities. The database identity uniquely identifies the item in the data source. When you are connected to the data source, you can view the live database information that is associated with the item.

If you chart an item from a connected data source, the Analyst's Notebook identity might be set to blank because a database identity is assigned to the item. Whether the identity is set to blank depends on how the connection to the data source is configured.

### Related tasks

[Setting the identity](#) on page 32

An entity's identity uniquely identifies it on the chart, regardless of how it is displayed. Analyzing charts is typically based on the identity of entities.

[Displaying data records](#) on page 113

Depending on the data source, data records are attached to items when you add data from a data source. Data records contain data that is copied from the source record, so that you can view any copied data that is not displayed on the charting surface.

### Related reference

[Label behavior](#) on page 20

Behavior options determine how labels are handled when links are created or items are merged. Set the behavior for your needs within your standard template.

## Data records

When you chart information from a data source, Analyst's Notebook creates a reference back to the information in the data source. It can also create a record that contains a copy of the item's data from that data source.

The creation of a data record is controlled by the product that you are charting from. For example, if you are charting from i2® iBase, this option is configured in the charting scheme.

The data record that is created forms part of the item. It contains the information that was in the data source at the time that the item was created on the chart.

You cannot edit the content of a data record. If the original data source is updated after the data record was created, the record is not updated to reflect those changes.

If an item contains information from more than one connected data source, it has a data record for each data source. For example, two data sources might contain different information about the same person. When you view a data record, it indicates which data source the information is from.

An item that is charted from a data source has a database identity that links back into the data source. When you are connected to the data source, you can view the data in the data source from within Analyst's Notebook. Depending on the data source and the connection to it, in some cases you can also edit the data to update the data source. When you edit the data source in this way, the item on the chart is charted again and the data record in the chart is refreshed.

## Style

To highlight key aspects of your investigation or key pieces of information on your chart, you can configure the style or appearance of an item.

The style of an item controls how it is displayed on the chart surface. By modifying style properties, you can:

- Set the shade color of an entity. For example, you can set the color of a vehicle icon.
- Set the line color of a link.
- Display a picture in place of an icon. For example, you can display a photo of a person.
- Add a frame around an entity to draw attention to it.
- Choose which pieces of information are displayed on the chart surface. For example, you can display item grades and source type information.
- Indicate the confidence of an item's data by making the displayed line dashed or solid.
- Set the properties of an item's font.
- Select the link multiplicity of a connection between two entities. For example, you can emphasize that there are several associations between two entities by showing the connection as multiple links rather than a single link.

## Display

What information you can choose to display for an entity and how you display it on the chart surface depends on which representation you use.

**Table 4: Available information for display on a chart surface**

Display	Used by
Date & Time	All items
Description	All items
Grades	All items
Label	All items
Link Area	Diverting event frames
Picture	Icons, theme lines, and event frames
Frame	Icons and theme lines
Pin	All entities and any links that link 2 theme lines
Source Reference	All items
Source Type	All items
Type Icon	Event frames only. Always displayed for icons and theme lines.
Type Name	Event frames only

## Fonts

You can set the font type, size, style, color, and shading for a chart item. For event frames, text blocks and text labels, you can also set the text alignment.

Changing the font of an item updates:

- Label text
- Description text
- Grade and source information text



- Date and time text

You cannot change the font of an individual word or phrase.

**Note:** A font change does not apply to attribute text. Attribute text properties are specified per attribute class in the **Edit Attribute Class** page of the **Chart Properties** window.

### Link multiplicity

When multiple links are present between two entities, link multiplicity determines how these links are displayed. Link multiplicity can be:

- **Single:** The connection between two entities is shown as a single link. This single link represents an association between two entities, which might in reality, comprise many different instances of that association.
- **Directed:** The connection between two entities is represented by one link for each possible direction. A directed connection has therefore a maximum of four links. Each of those links might represent several instances of the association, all in that same direction such as several transactions from one bank account to another.
- **Multiple:** Each link between two entities is displayed individually.

## Cards

You can add descriptive unstructured information to items by putting the information into cards and add provenance information to them. Typically one card is used for each piece of supplementary information. You can use information in cards during analysis, such as searching.

Card information cannot be displayed on the chart surface.

You can store the following information on a card:

- A single line of text that summarizes the information.
- The main information that you want to include about the entity or link.
- Date and time, including a time zone. Use the date and time that the event or information in the card occurred, the date and time that the information was obtained, or the date and time that you added it to the chart item. Your organization might have guidelines for you to follow. You can choose to add a description of the date and time if the exact date or time is not known such as about 4 pm or around lunchtime. Alternatively you can also use the description to indicate what is represented by the date and time that you entered.
- Provenance information such as the source, reliability of the source, reliability of the information, or its privacy rating.

To make it easier to manage cards or assign provenance information, add one card per piece of information or one card for each set of information from a specific source. The choice that you make depends on, for example, whether you want to assign different grades to different pieces of information.

## Provenance information

The ability to track information to the original source and to assess the reliability of the information or the source is important in investigations.

Some examples of the types of information are listed:

- The source and type of the information such as a witness statement that has a document reference number. When you chart an item from a data source, it contains a database identity that links it back to the original data source.

- The reliability of the source that provided the information or the reliability of the information itself. For example, you might request information from an agency that concerns the registered owner of a vehicle. This information might be considered reliable whereas an overheard conversation that leads you to believe that a relationship exists between two suspects might not be accurate.
- The privacy rating or classification of the information, that is, who is allowed to know about the information.

You can add provenance information to chart items and to individual pieces of information in cards. For example, you might have several pieces of information about a specific person. You can add each piece of information to a card and include provenance information on each card.

The chart template controls what rating scale is used. Many organizations adopt their own grading system. You can customize the rating scales to meet your requirements.

### Related tasks

[Setting the description & grades](#) on page 33

All chart items are given grading information. Grades on an item classify or provide an evaluation of some quality of the information that is represented by that item. For example, if the information is reliable, confidential or from a trustworthy source.

## Attributes

You can store specific discrete pieces of information on chart items as attributes. Attributes are often displayed as part of the item on a chart surface for presentation purposes and are also used in analysis, such as filtering.

Analyst's Notebook has two types of attributes:

- Attributes store information about an item such as a person's date of birth or the make of a particular item. You can add attributes manually or you can import information into attributes from a file or a data source.
- Analysis attributes are automatically generated and store calculated information such as the day of the week that an event occurred or whether an item has any cards.

Attributes are useful during analysis. For example, you can filter on attributes to choose which items to display on the chart surface. When you list the items on the chart, you can sort based on attributes.

### Attributes that are imported or created manually

You can use attributes to show specific characteristics about items on your chart. Attributes are typically displayed below a chart item as a symbol and value.

An attribute has three key components:

- An attribute class: Defines the kind of information that is stored. Each attribute class has a name, symbol, and a type that defines the kind of information that the attributes can contain.
- An attribute value: The actual information.
- A semantic type: Allows information to be classified to give a real-world meaning.

### Attributes that are automatically calculated

Analysis attributes contain calculated, dynamic information that is taken from an item's context in the chart. Analysis attributes provide useful statistical information about chart items, which might help your analysis. For example, which entity has the most links, which item has the earliest date and time, or which transactions occurred on a Friday. You cannot edit analysis attributes.

Analysis attributes cannot be displayed on the chart surface in the same way as other attributes but you can choose to include them in Infotips.

**Note:** If the label values in your analysis attributes incorrectly display negative numeric values, replace hyphens in item labels with either a tilde (~) or an en dash (–).

#### Related reference

[Attribute definitions](#) on page 23

Attribute classes categorize the information that is stored as attributes on chart items and are part of a chart's properties. If the existing attribute classes are not suitable for your data, you can add or edit attribute classes. Attribute entries are preset values for attributes of a specific attribute class. For values that you reuse regularly, define attribute entries and add them to the appropriate palettes.

## Semantic types

To benefit from the visualization and analysis capabilities of Analyst's Notebook, assign semantic types to items or attributes to identify their meaning.

Analyst's Notebook recognizes the semantic types that are assigned to data, enhancing the amount of analysis that is available. Item types that have a common semantic parent type are recognized as being related and might be returned in search results.

i2 provides the i2 Semantic Type Library, which consists of a set of entity, link, and property semantic types. These semantic types can be assigned to the entity types, link types, and property types. Some of these semantic types are used specifically by Analyst's Notebook to match entities, for example a national identifier for a person, or a license plate for a vehicle.

If you cannot locate a suitable semantic type, you can derive your own custom semantic type from the appropriate generalized semantic type. A custom semantic type is treated as a specialization of its recognized parent semantic type.

## How to chart data

The decisions that you make on how to model your data and where to store it in Analyst's Notebook affect how you can present and analyze the information.

### Entities or properties

When you put your data into Analyst's Notebook, it is important to decide when to create separate entities and when to store information in a single entity. For example, you might have the following information about a person:

- Name
- Date of birth
- Nationality
- Address
- Bank account details
- Name of the organization where they work

Name, date of birth, and nationality are characteristics of a specific person and can therefore be stored as properties on an entity that represents a person.

An address is a separate real-world object. Several people might live at the same address. Add it to the chart once as a separate entity and link each person who lives there to that address. This method

avoids including the same information several times on the chart and reduces the potential for entering the same information inconsistently.

A bank account is also a separate real-world entity. By creating a separate bank account entity and linking the person to it, you can then show transactions between specific bank accounts rather than between the bank accounts' owners. This model leads to more effective analysis, particularly if the person has more than one bank account.

The organization where the person works is again a separate real-world entity. You can enable analysis of which people work at various organizations by creating links between the people and the organizations where they work. However, for presentation purposes, sometimes it is sufficient to represent an organization as a box that encloses the people who work at that organization.

### Example charts

Several example charts are provided with Analyst's Notebook. They show examples of how you might want to chart and store information. The charts are typically in `C:\Users\\Documents\i2\i2 Analyst's Notebook 9\Example Charts`. They include examples of:

- Storing and charting financial data in different ways.
- The use of types and styles to highlight differences in the data.
- The use of different entity representations to present your information, such as event frames when you want to display the date, time, and description of events.
- Storing and charting geographical data.
- Handling data that contains hyperlinks, pictures, and different language alphabets.
- Combining different chart styles (association and timeline) in a single chart.

If you open these charts in Analyst's Notebook, they contain annotation that helps you to understand more about storing and charting data.

## Charts

Charts display the intelligence that relates to an investigation. You can create charts both manually and automatically by using information from various sources. This information might be personal knowledge, written reports, photographs, video clips, spreadsheets, email, word-processing files, and databases.

Analyst's Notebook displays and analyzes this information in visual form. Charts can depict:

- Associations between entities such as people, places, vehicles, and organizations
- The flow of data such as telephone calls and financial transactions
- How related events unfold over time

## Creating a chart

A new Analyst's Notebook chart is based on a template. When you create a chart, you can choose between the standard template and other templates.

A template provides entity types, link types, and attribute classes for you to use in your chart. A template also contains preset values for chart settings such as background color, page setup, and default item style.

The standard template contains a wide range of item types and attribute classes, and is suitable for general use. When you start Analyst's Notebook, it automatically creates a blank chart that is based on the standard template. To make the template more suitable for your needs, you can customize it.

Other templates can provide a smaller or more specialized set of item types and attribute classes that are appropriate to a specific domain. To ensure that a specific logo or box of standard text is present on charts, you can use a template that includes them as items on the charting surface.

- To create a chart that is based on the standard template, click **File > New > New Standard Chart**.
- To create a chart that is based on a different template:
  - a) Click **File > New > New from Template**.  
The **New From Template** window opens.
  - b) In the **Create a** area, click **Chart**.
  - c) In the **Based on** area, select a template from the list. To use a template that is not in the list, click **Browse**, locate then select the template, then click **Open**.

**Note:** To create a chart that contains no entity types, link types, or attribute classes, select **Empty Template** from the list.

- d) Click **OK**.  
Analyst's Notebook creates a chart that is based on the chosen template.

#### Related reference

[Viewing and maintaining chart summary properties](#) on page 26

Summary and custom properties contain user-defined and automatically generated information about the content and use of the chart. Some of these properties are used in the chart Cover Sheet, which can be set to display on opening a chart.

## Opening charts

Analyst's Notebook can open Analyst's Notebook charts (.anb), and Analyst's Notebook Exchange charts (.anx).

To open a chart, use the following steps:

1. Click **File > Open**.
2. In the **Open** window, navigate to the directory that contains the chart you want to open.
3. Double-click the chart that you want to open. You can select multiple files to open several charts at the same time.

If a chart is closed abnormally, for example as a result of a power failure, Analyst's Notebook might save recovery files. These charts are recovered next time that you start Analyst's Notebook.

#### Related concepts

[Share details about charts](#) on page 14

You can add information about a chart to its cover sheet. The cover sheet can help recipients of the chart to understand the purpose of the chart and identify the author.

## File types that can be opened in Analyst's Notebook

You can open charts and templates that are created with Analyst's Notebook. Charts that are created in XML format can also be opened.

The different file types that can be opened in Analyst's Notebook are listed in the following table.

**Table 5: File types that can be opened in Analyst's Notebook.**

Extension	Description
.anb	A chart that is created in Analyst's Notebook.
.ant	A chart template that is created in Analyst's Notebook.
.anx	A chart in XML format that can be opened in Analyst's Notebook and i2 <sup>®</sup> Chart Reader.

## Copying charts

When you copy a chart, all of the chart items are copied along with the legend. You might want to create a copy of a chart and then add more information to it.

To copy charts, complete the following steps:

1. Click anywhere on the background of the chart that you want to copy to clear any selected items.
2. Click the **Home** tab, and then in the **Clipboard** group, click **Copy > Copy Chart**.
3. Open a new blank chart. Right-click anywhere on the chart background and click **Paste**.
4. You can paste the chart into a different application as an OLE object.

## Share details about charts

You can add information about a chart to its cover sheet. The cover sheet can help recipients of the chart to understand the purpose of the chart and identify the author.

Viewing the contents of a chart or its file name is not always a reliable way of establishing the sensitivity of a chart. Recipients of your chart might use the information on the cover sheet to assess whether they are cleared to view the chart before they open it.

The cover sheet contains the following types of information:

Summary property	<p>Standard information about the chart. The cover sheet contains the following summary properties, which you can add information into:</p> <ul style="list-style-type: none"> <li>• Title</li> <li>• Subject</li> <li>• Author</li> <li>• Keywords</li> <li>• Category</li> <li>• Comments</li> </ul>
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**Custom property**

Information about the chart that is not included in the summary properties. You can use custom properties to store chart characteristics that are specific to your organization.

Two custom properties are created automatically when you create a chart from the `Standard.ant` template. These custom properties are **Case** and **Classification**. You can enter values for these properties and add your own custom properties.

The headers and footers of your printed chart can contain information from the cover sheet. For example, if your chart runs over a number of pages you might stamp each page with a security classification, chart title, and publication status such as 'draft'.

**Editable cover sheet**

To prompt you to enter information, Analyst's Notebook can display the cover sheet in an editable state when you save charts. You can choose whether the editable cover sheet is displayed only when you first save a chart, or every time you save, or never. To choose an option, click **File > Options**, and then on the **Save** page select the appropriate option in the **Cover Sheet** area.

To open the editable cover sheet of an open chart at any time, click **File > Cover Sheet**. You can edit the same information on the **Summary > Description** and **Origin** pages of the **Chart Properties** window.

**Read-only cover sheet**

You can choose to display a read-only cover sheet to recipients of the chart when they open it. To turn on this feature, select the **On Open** check box on the editable cover sheet.

The read-only cover sheet is displayed before the chart loads. After the recipient reads the cover sheet they can proceed to open the chart, or they can cancel the operation.

**Related tasks**

[Opening charts](#) on page 13

Analyst's Notebook can open Analyst's Notebook charts (.antb), and Analyst's Notebook Exchange charts (.anx).

**Adding information to the cover sheet**

You can add information to the cover sheet, and configure it to open when the chart is opened. You can edit the cover sheet when you create or edit a chart.

To add information to the cover sheet of a chart:

1. Click **File > Cover Sheet**.

The **Cover Sheet** window opens.

2. Add information to the summary properties.

**Tip:** To help other users to find the chart, enter information that they might search for. For example, you might enter the name of the investigation in the Subject property.

3. To create a custom property, click **New** in the **Custom** area.
4. To configure the cover sheet to open when the chart is opened, select the **On Open** check box.
5. Click **OK**.

## Saving charts

Analyst's Notebook can save any open chart in Analyst's Notebook (.anb) format. The option to include and customize a cover sheet is available when you save the chart. The cover sheet provides a brief overview of the chart's contents and purpose. Properties of the cover sheet can be customized just before the chart is saved.

It is good practice to save your chart with a meaningful file name when you first create a chart and add something to it. You can then search for and view the charts that are related to an investigation.

To save a chart:

1. Click **File > Save**, or **Save As**.
2. If the **Cover Sheet** window is displayed, click **OK** on the Cover Sheet.
3. In the **Save As** window, navigate to the directory where you want to save the chart.
4. Type a file name in the **File name** box.
5. Click **Save**.

**Note:** If a chart with the same name exists in the specified location, the application asks whether to overwrite the previous chart. If you click **No**, you must specify a new location or name for the saved chart.

When you save a chart, it is validated for any significant compatibility issues with earlier versions. If the application finds a problem, a relevant warning is displayed.

## Saving a chart as a template

To reuse the chart settings in other charts, save the chart as a template. Saving charts as a template can help save time and improve work efficiency if data used in multiple charts is similar and do not require different chart specifications.

To save a chart as a template:

1. Click **File > Save As**.  
The Cover Sheet might be shown.
2. If the Cover Sheet is shown, click **OK** to save the Cover Sheet details, or click **Cancel** to close the Cover Sheet.  
The **Save As** window is shown.
3. Select the folder to save the template and type a file name in the **File name** box.
4. Select **Analyst's Notebook Template (\*.ant)** from the **Save as type** list.
5. Click **OK**.

All of entity types, link types, attribute classes, and any chart items on the chart are saved in the template.

## Chart and application settings

When you save a chart, either as a chart or as a template, many of the definitions, options, and settings are also saved.

### Saved with the chart

The following are all saved with the chart:

- All the settings in the **Chart Properties** window:



- Display settings: chart background color, grid size, theme line wiring options
- Behavior options: label paste and merge rules, blank link labels
- Definitions: entity types, link types, attribute classes, attribute entries and their semantic type assignments, grading system, line strengths, and date and time formats
- Time Bar display settings
- All the default styles for each entity representation and for links
- User palettes and their membership
- The legend
- Snapshots
- Page setup settings
- Whether entity types and attribute entries, or both are available in the palette bar
- Display of the grid and page boundaries

### **Not saved with the chart (application settings)**

The following settings are application settings. Application settings persist in Analyst's Notebook until changed, regardless of which chart is opened.

- All the settings in the analysis tools:
  - Visual Search criteria
  - List Items Options settings
  - Find Linked and Find Path Setup options
  - Find Text criteria
  - List Cards Options settings
- Layout settings, unless saved by using the **Save Layout Setup to Chart** command.
- Zoom settings (for example, the last zoom level). The initial view of a chart is always fits the chart in the window.
- Insert from Palette pane and Add Links pane set up
- Keyboard shortcuts

## **Managing user palettes**

User palettes are used to group item types and attribute classes. You can modify existing user palettes or add new ones to match the type of data you work with.

The default user palettes contain types and attributes that are commonly used in particular kinds of investigation. For example, the finance palette contains all the relevant entity and link types that might be used in a financial investigation. You can quickly choose the required type from the limited set in the palette.

You can create a user palette and assign all the relevant entity and link types to this palette.

To manage user palettes:

1. Click **File**, point to **Chart Properties**, and then click **User Palettes**. The **User Palettes** window opens. This window shows the name of the user palette, and whether it contains:
  - Entity types

- Link types
- Attribute classes
- Attribute entries

2. Modify a user palette in one of the following ways:

Option	Description
<b>New</b>	Creates a user palette.
<b>Duplicate</b>	Creates a copy of the user palette that is selected. A copy of this palette is created which includes all assigned item types, attribute classes, and attribute entries.
<b>Rename</b>	Rename a user palette. Double-click the name of a user palette to rename it.
<b>Delete</b>	Deletes the user palette.  <b>Note:</b> When you delete a user palette, you do not delete the entity types, link types, or attributes that belong to that palette. A user palette just displays a subset of the types and attributes that the chart contains.

3. Click **OK**.

## Modifying user palettes

User palettes contain item types, attribute classes, and attribute entries. You can change the contents of a user palette. Modifying the contents and appearance of the user palette can help organize their content to make finding item types and attributes easier to speed up chart creation.

To modify the content of an existing user palette:

1. Click **File > Chart Properties**.

The **Chart Properties** window is shown.

2. Click **Definitions** and then select the page that you are interested in:

- Entity types
- Link types
- Attribute classes
- Attribute entries

3. Select the entity types, link types, attribute classes, or attribute entries that you want to add to or remove from the user palette.

4. Click **Properties** and select the palettes to add the types and attribute entries.

5. Click **OK**.

The modified user palette is shown in the list of palettes in the **Insert from Palette** pane, and in the **User Palettes** window.

**Tip:** To set up user palettes that you want to use in many different charts, save your chart as a template.

## Changing chart properties

Chart properties are a collection of settings and options that apply to a chart, such as the default date and time for items. Chart properties also specify the item types and attribute classes that are available for use in that chart.

Chart properties are saved along with your chart. These properties mean that when you distribute your chart, the recipient sees the chart that you saved, in the same format. Similarly, when you open a chart that you are sent, all the properties are as they were when the chart was saved.

You can set up templates to include chart properties that you use often. You can then create new charts that are based on these templates.

## Setting display options

Display options control the appearance of the chart surface. You can control the size of the grid, background color, and link separation.

### Setting the grid size

The grid size determines the spacing between grid points on the chart. You can specify the horizontal and vertical distance between grid points on your chart separately.

Enter the required value in each box. The units that are used are determined by your Windows environment.

You can enable snap to grid mode on this page.

### Setting the link spacing value

The link spacing value determines the distance between multiple links on the same connection. This value is used when you:

- Add a link to a connection that already has a link. The new link is separated from existing links by this distance.
- Use the **Compress Connection** command. All links on the connection are rearranged so that they are separated by this value.
- Import data with multiple links between entities into your chart.

### Setting theme line wiring values

You can set the following values for theme line wiring:

<b>Near</b>	Sets the straight-line width of a theme line on either side of an event frame, where the theme line diverts through it.
<b>Far</b>	Sets the width of a diagonal segment of a theme line.
<b>Separation</b>	Sets the vertical distance between theme lines as they enter an event frame.

**Height**

Sets the distance between the top of the event frame and the top theme line when it enters the event frame.

Select the **Use for Theme Line Icons** check box to position the theme line relative to the theme line icon. The greater the value, the lower the theme line is positioned.

## Label behavior

Behavior options determine how labels are handled when links are created or items are merged. Set the behavior for your needs within your standard template.

### Specifying label merge and paste rules

Entities are merged when:

- An entity is pasted into a chart that contains an entity with a matching identity
- You use the **Merge Entities** command

Links are merged when:

- You use the **Merge Multiple Links** command
- Their connection style is changed, resulting in fewer links on the connection
- You merge entities that are linked to the same entity. For example, if you merge two telephones that are linked to the same person, the links are merged.

When two or more items are merged into a single item, you can specify what happens to the labels of an item:

**Merge**

Labels are merged if the following conditions are true:

- One label is contained within the other, and
- The matching text is a complete line of the label

If both these conditions are not met, the labels are appended (one is added to the end of the other).

**Append**

One label is appended to the other. The label of the item that is pasted, or the last item that is selected is appended to the end of the original label.

**Discard**

The label of the item that is pasted or the last item that is selected is discarded. The label of the original chart item is retained.

### Summing numeric links

When the labels on your links are numeric or a number is contained within them, select **Sum Numeric Links** to add the numbers together when links are merged.

Labels can have numbers that are embedded within them, that is, only part of the label is a number. Analyst's Notebook can recognize that a label contains an embedded number.

To see the numeric value that Analyst's Notebook interprets from the link label, you can view the link's Label Value analysis attribute. This attribute, contains the numeric value of the link, as extracted from the label:

The rest of the label, that is to the left and right of the numerical part, is still merged.

### Creating new links with a blank label

Select the **Create Links with Blank Labels** check box to create new links on your chart without a label.

#### Related concepts

[Identities](#) on page 6

An identity uniquely identifies an item on a chart or provides a unique link back to entity or link information in a data source.

## Setting icons options

The icon set that is used within the chart is configurable. You can use icons from the new icon set or legacy icons.

You can open charts that contain icons from the new icon set in earlier versions of Analyst's Notebook. However, these new icons cannot be displayed and are represented by the legacy icons.

**Note:** The new icons are not overwritten if you save the chart in versions later than Analyst's Notebook 6.

## Identifying when events take place

The time bar is a visual aid to help you identify when events take place on your chart. It shows the passage of time from left to right across your chart, and provides an overview of when events occur in time in relation to each other.

The time bar comprises three main bands:

Band	Description
Interval	The interval band shows the intervals in which the time bar is displayed. For example, hours, days, or months.
Tick	The tick band consists of major and minor ticks. Major ticks represent, for example, days or hours, and depend on the rate of time flow. Minor ticks show times between major ticks. Minor ticks do not have labels. When you move your mouse pointer over a minor tick, hover help is displayed that shows the date and time of the chart at that position.
Marker	The marker band contains marker symbols that indicate controlling items on the chart. Controlling items are ordered and have both a date and time.

To edit the time bar:

1. Click **File > Chart Properties > Options > Time Bar > Display**.
2. Select the interval band:
  - a) Optional: Select **Show** in the Interval Band area, and select a color from the Line Color list.
  - b) Optional: Select **Show** in the Tick Band area, and select a color from the Line Color list.
  - c) Optional: Select **Show** in the Marker Band area, and select a color from the Line Color list.
3. Choose the interval label and tick label alignment.
4. In the General area, select the border and background color.
5. To change the style of the text in the time bar, modify the settings on the **Interval Font** page and the **Tick Font** page.
6. Click **OK** to close the **Chart Properties** window.

## Time zones

When you create a chart that contains events that take place in different time zones, you can specify in which time zone each event took place.

Each item on your chart with a date and a time has a time zone. This time zone might or might not be the same as the time zone of the chart.

**Note:** Date and time attributes do not have a time zone.

### Chart time zone

The time zone of the chart is typically your local time, that is, the time where you are working. Analyst's Notebook reads the time zone in the date and time properties of your computer and applies that time zone to the chart. You can, if required, specify a different time zone for the chart.

The time zone of the chart is used:

- In the time bar
- As the default time zone when you create items with a date and time. The time zone of an item can then be changed to any other time zone.
- When you set up features such as visual search

### How do I find out which time zone the chart is in?

To view the time zone of the chart, follow one of these steps:

- In the **Chart Properties** window, click **Defaults > Date & Time**. The Time Zone list displays the time zone of the chart.
- Point the mouse pointer at any tick in the time bar. The tooltip that is displayed contains the time zone of the chart. To display the time bar on your chart, click the **View** tab, and then in the **Show** group, select the **Time Bar** checkbox.

### Item time zone

All chart items with both a date and a time have a time zone that is associated with them. When the date and time are first set on a chart item, the time zone is the same as the time zone of the chart. The time zone of the item can then be changed to any other time zone.

The date and time of an item is displayed on the chart in its own time zone, by using the specified date & time format. The date & time format might or might not show the time zone name.

**Related tasks**

[Setting the date & time](#) on page 32

A chart item can have both a date and a time, or just a date or a time. It can also have a description of approximately when it occurred, if the exact date and time is not known.

**Item type definitions**

Entity types and link types categorize the information on your chart and are part of a chart's properties. If the existing item types are not suitable for your data, you can add or edit entity types and link types.

**Entity type definitions**

Entity types have characteristics that define the type, including icon, name, line and shade color, and semantic type. When you are defining an entity type or editing an existing type, you can further customize the following characteristics:

- In addition to the icons available in Analyst's Notebook, you can load your own custom icons for specialized entity types.
- If there is no suitable semantic type in the type library, then to provide an accurate classification of your data you can derive a custom semantic type from an existing semantic type.

You can also choose which user palettes contain the newly defined entity type.

**Link type definitions**

Link types have characteristics that define the type, including name, line color, and semantic type. As part of a link type definition, if there is no suitable semantic type in the type library, then to provide an accurate classification of your data you can derive a custom semantic type from an existing semantic type.

You can also choose which user palettes contain the newly defined link type.

**Related concepts**

[Entities](#) on page 2

Entities represent real-world objects such as a people, locations, and bank accounts, or they represent events such as meetings.

[Links](#) on page 4

A link represents a relationship between two entities, such as ownership of a vehicle by a person or a transaction between two bank accounts. It is represented on the chart surface by a line between the two entities.

[Custom semantic types](#) on page 276

You can derive custom semantic types based on the ones in the i2 Semantic Type Library, then use them in other charts and share them with colleagues. Deriving a custom semantic type is appropriate when you need a more accurate classification of your data than the standard type library provides.

**Attribute definitions**

Attribute classes categorize the information that is stored as attributes on chart items and are part of a chart's properties. If the existing attribute classes are not suitable for your data, you can add or edit attribute classes. Attribute entries are preset values for attributes of a specific attribute class. For values that you reuse regularly, define attribute entries and add them to the appropriate palettes.

## Attribute class definitions

The standard template contains several attribute classes that you can use when you are creating a chart, for example, Nationality or Date of Birth. However, if you are working with specialized data, you can define your own attribute classes to categorize your data. You can then use these attribute classes in your chart or to create your own template.

An attribute class has the following characteristics:

**Table 6: Analyst's Notebook attribute class characteristics.**

The different characteristics that each attribute class defines.

Characteristic	Description
Symbol	The symbol that can be displayed on the charting surface when an attribute of this class is added to a chart item, for example a red triangle. An attribute class symbol does not have to be unique. You can use your own custom symbols.
Name	The name that identifies the attribute class.
Type	The data type: Text, Flag, Number, Date & Time.
Semantic Type	A category that defines the real-world meaning of data, and therefore defines how applications interpret that data. For example, Crime Type is a semantic type that might be assigned to the attribute class Offense. You can select a semantic type from the i2 semantic type library or you can derive your own custom semantic type from a semantic type that is stored in the library.

When you define an attribute class, you can configure its style and format and choose which user palettes contain that attribute class. For example, you can choose to display a symbol, prefix or suffix on the charting surface and set the font properties of an attribute class.

**Note:** If you add a prefix or suffix, such as a dollar sign for a monetary value, Analyst's Notebook does not leave a space between the value and the prefix or suffix. You must enter a space as part of the prefix or suffix.

You can also choose whether to display the attribute value itself. For example, when you use a flag attribute, displaying the attribute name alone might be sufficient. The display options vary depending on the type of the attribute class.

## Attribute entry definitions

The standard template contains several preset values for some attributes, such as Nationality, for example Spanish, Dutch, and Italian. These preset values are known as attribute entries. You can define your own attribute entries with values that you use regularly. You can then use these attribute entries in your chart or to create your own template.

When you define an attribute entry, you must select the attribute class, then enter a value and select the user palettes on which you want the attribute entry to appear.



## Related concepts

[Attributes](#) on page 10

You can store specific discrete pieces of information on chart items as attributes. Attributes are often displayed as part of the item on a chart surface for presentation purposes and are also used in analysis, such as filtering.

[Custom semantic types](#) on page 276

You can derive custom semantic types based on the ones in the i2 Semantic Type Library, then use them in other charts and share them with colleagues. Deriving a custom semantic type is appropriate when you need a more accurate classification of your data than the standard type library provides.

## Defining a grading system

Grades provide an indication of quality of the information that is represented within an item. For example, if the information is accurate or reliable.

To allow the quality of information to be evaluated consistently, the same grading system should be applied to charts of the same type. You can use the **Grading System** page to define the grades that are used within your template.

To define the grading system:

1. Click **File > Chart Properties > Definitions > Grading System**.  
The grading system is displayed.
2. Select the **Grade** list to which you want to add a grade, then click **New** below the list.  
A new grade is created below the selected grade with the default name of "New Entry".
3. Select this grade and type the letter, number, or name that is required for this grade.
4. To move the grade up or down the list, click the new grade and drag it to its new position.

## Adding a line strength

Line strengths are a useful way of indicating the general status or quality of information that is represented by an item. The line strengths that you define depend on the convention that is adopted by your organization.

Line strengths can be used to indicate the quality of information that is available for items on your chart. By default, the following line strengths are available:

### Confirmed

Indicated as a solid line, this line strength is applied as a default to all created items. A line strength is confirmed if the information is of a high quality.

### Unconfirmed

Indicated as a dashed line. A line strength is unconfirmed if the information is not of a high quality.

### Tentative

Indicated as a dotted line. A line strength is tentative if the information is hypothetical.

You can update these defaults and add more line strengths if required. Any changes that you make are stored with the chart properties and available to others when you share the chart.

To modify the available line strengths:

1. Click **File > Chart Properties > Definitions > Line Strengths**.
2. Click one of the following options:

Option	Description
<b>New</b>	Create a line strength, when the default line strengths are not suitable.
<b>Duplicate</b>	Duplicate a line strength. The selected line strength is duplicated and a line strength is created with the following properties: <ul style="list-style-type: none"> <li>• A name of "Copy "n" of Line Strength", where "n" is the lowest unused number.</li> <li>• The same strength as the selected line strength</li> </ul>

a) Type a name for the line strength.  
For example, hypothesis.

b) Change the line style, by selecting a style from the Strength list.

**Tip:** You can delete line strengths that are no longer used. You cannot delete a line strength that is in use on the chart.

3. Optional: To modify an existing line strength, click the down arrow in the Strength list and select the line strength to use.

4. Click **OK**.

## Viewing and maintaining chart summary properties

Summary and custom properties contain user-defined and automatically generated information about the content and use of the chart. Some of these properties are used in the chart Cover Sheet, which can be set to display on opening a chart.

Use the Description and Origin pages in the Summary folder of the **Chart Properties** window to:

- View the chart summary and custom properties
- Edit the chart summary properties
- Create new chart custom properties
- Edit an existing chart custom property
- Delete an existing chart custom property

### Chart summary properties on the Description page

Use the **Description** page to view and edit file information about the chart file, such as its title and subject. You can amend all the following fields.

Field	Description
Title	Enter a title for this chart. On saving your chart for the first time, the Title is used as the standard file name, however you can change the title as required.

Field	Description
Subject	Enter the subject of the chart. You can use the subject field to group similar types of chart together, for example, all those charts that pertain to a particular investigation.
Keywords	Use keywords to help readers identify the purpose of your chart.
Category	A broad term, for example <b>Surveillance</b> , to allow your chart to be grouped with other similar charts.
Comments	Use comments to record useful information about the chart.

For every new chart that you create from the Standard template, two custom properties are displayed, to which you can add or delete values.

Field	Description
Case	The name of the operation or case or criminal investigation to which the chart relates.
Classification	The sensitivity level of the information that is contained in the chart, for example, Restricted.

### Chart summary properties on the Origin page

Use the **Origin** page to view the history details of the chart, such as when it was last saved or printed. You can amend only the **Author** field; all other fields display read-only information.

Fields	Description
Author	The name of the person who created the chart.
Template	The template on which this chart was based. You can select the full path of the template. Click anywhere in the box and drag to the right to see the full path. You can then copy the path to the clipboard. <b>Note:</b> The Template property is not available for printing in the headers and footers of your chart.
Editing Time	The total amount of time this chart is open for editing.
Created	The date and time that this chart was created.
Last Saved	The date and time that the chart was last saved.
Last Printed	The date and time that the chart was last printed.
Revision Number	The number of times the chart is modified and saved.

## Editing chart summary properties

You can change the summary properties on the **Description** page and the **Author** box on the **Origin** page by selecting all of the text in the field, and typing over the selection with your new text entry.

After you make your changes on either the Description or Origin pages, click **OK** to close the **Chart Properties** window.

**Note:** Changes to custom properties are not saved until you confirm your changes on the **Chart Properties** window, and save your chart.

## Creating and editing a chart custom property

Create a custom property if you want to add information to the Cover Sheet that is not covered by the summary properties. To create a custom property:

1. Click **New** in the Custom area of the **Description** page. The **New Custom Property** window is shown.
2. In the **New Custom Property** window, enter a name for the custom property in the **Name** box and custom property information in the **Value** box.

**Note:** You must enter both a Name and Value to create a custom property. The new custom property Name must be unique in the list. Values that are entered in the **Value** box are interpreted as plain text.

3. Click **OK** to close the window.

To edit a custom property Name or Value, you can:

- Select the custom property row in the list, click **Edit**, and change the Name, Value, or both, displayed in the **Edit Property** window.
- Double-click either the Name or Value cell of the custom property that you want to edit and enter your new Name or Value, and either click away from the table or press the Enter key.

When you create new custom properties or edit existing custom properties, you can sort the properties in alphabetical order by their name or value. To do this, click either the **Name** or **Value** column header. Sorting is not case-sensitive and numbers come before letters.

**Note:** Changes to custom properties are not saved until you confirm your changes on the **Chart Properties** window, and save your chart.

## Deleting a chart custom property

To delete an existing custom property from the Cover Sheet:

1. In the Custom area of the **Description** page, select an existing custom property from the custom properties list.
2. Click **Delete** or press the Delete key.

**Note:** Changes to custom properties are not saved until you confirm your changes on the **Chart Properties** window, and save your chart.

## Related tasks

[Creating a chart](#) on page 12

A new Analyst's Notebook chart is based on a template. When you create a chart, you can choose between the standard template and other templates.

## Creating a template

A template contains preconfigured chart properties, and lists of permitted entity types and link types. When you base a chart on a template, the appearance and meaning of data in the chart are consistent with other charts based on that template.

After making changes to the properties of a chart, or adding additional item types, a template can be saved. Saving a chart as a template allows other charts to be produced that use these properties and types

To create a template, use the following steps:

1. Update your chart properties.
2. Click **File > Template > Create Template**. The **Create Template** window opens.
3. In the **Create Template** window, select the **Location** to store the template:

Option	Description
<b>Local template</b>	Local templates are designed to be used to ensure consistency between the charts that you create when working independently. Templates should be stored locally when working on chart types that are not used by the rest of your team.
<b>Workgroup template</b>	Workgroup templates are designed to be used by the wider team. <b>Note:</b> When there is no workgroup template path set, this option is not available.
<b>Standard</b>	Sets this template as the default template to use for new charts.

**Note:** The paths that are used to store templates are defined in **File > Options > Templates**.

4. Optional: To create a template which contains all of the chart items and the legend, select **Include Chart Items and Legend**.
5. Click **OK** to create the template.

## Applying a template to a chart

In normal operations, a template is selected when a chart is first created. You can however apply chart properties as defined in a template at any point.

Use the Merge Template window to import chart properties and settings from a template into your chart. This is a way of making certain features in your chart consistent with those defined in a template.

To add chart properties that are stored in a template to an existing chart:

1. Click **File > Template > Merge Template**.  
The **Merge Template** window appears.
2. Choose the template to apply.
3. Select the types of chart property to apply.
4. Use **Replace Existing Features** to overwrite existing properties.
5. Click **OK** to apply the chart properties.

## Add information to a chart

To represent the information that you receive, you can add entities and links to your chart, then add information to chart items. Items can store information in properties such as identity and date and time, in attributes, and in cards.

For example, to represent a telephone call, you might perform the following actions:

- Add two telephone entities to the chart
- Add a link between the telephones to represent the call
- Enter a telephone number into the identity property of each entity
- Enter the call date and time into the date and time properties of the link, and add the call duration as an attribute

To emphasize specific items that you add to the chart, you can modify item appearance. You might identify which items are of interest directly from the information that you receive. Alternatively, you might identify items of interest after you use Analyst's Notebook to analyze your data.

After you add information to a chart, you can use a label to annotate the chart, add a summary, or add a title.

## Adding items

You can add entities and links to your chart. The items on your chart represent real-world objects and relationships.

The user palette drop-down lists show your current palette at the top, other available palettes, and items such as People, Crime, Documents, Finance and so on. You also have the option to filter the Entities, Links, and Attributes displayed. Choose from Recently Used, Most Popular and Currently on Chart. The Links and Attributes menu gain an additional 'Relevant to Selection' option. When you select an entity and choose 'Relevant to Selection', all the palettes that the selected type appears in are listed, with the exception of the Common palette.

To add an item to the chart:

1. To display the **Insert from Palette** pane, click the **Home** tab, and then in the **Palettes** group, click **Insert from Palette**.
2. To add an entity, select a representation at the top of the **Entities** section, select a palette from the drop-down list, then drag an entity type onto the charting surface.

**Tip:** To add multiple entities of the same type, double-click the entity type, then click the charting surface to add entities. To stop adding entities, press **ESC**. You can add multiple links in the same way, in the **Links** section.

3. To add a link between two entities, select a palette from the drop-down list at the top of the **Links** section, click a link type, then drag between the entities.

### Related concepts

[Entities](#) on page 2

Entities represent real-world objects such as a people, locations, and bank accounts, or they represent events such as meetings.

[Links](#) on page 4

A link represents a relationship between two entities, such as ownership of a vehicle by a person or a transaction between two bank accounts. It is represented on the chart surface by a line between the two entities.

## Searching item types

If you know the name of the item type that you are looking for, you can search the palettes for it. Searching palettes can save time when compared to browsing.

To search for an entity type:

1. In the **Insert from Palette** pane, click the **Search** button at the top of the **Entities** section.
2. In the **Search entity types** box, type the first few characters of the entity type that you are looking for. As you type, the list updates to display entity types that match the search text.

**Note:** You can search for link types in the same way in the **Links** section.

## Adding information to items

You can add information that you have about a chart item into the properties of the item. You can use analysis tools to gain insight from property values, and they can be displayed on the charting surface.

- To edit the properties of an item, click the item on the charting surface, click the **Home** tab, and then in the **Edit Properties** group click **Data**, **Attributes**, or **Cards**. In the **Edit** window, Analyst's Notebook opens the corresponding folder of property pages.

**Tip:** To add the same information to several items at the same time, select them all, right-click on one of the items, then click **Combined Properties**. For example, several telephones might have the same area code. If some of the items already have a value for the property that you want to edit, Analyst's Notebook displays blue hatching instead of a property value. You can collectively modify date and time, description and grades, attributes, and style properties.

- To add an attribute:
  - a) In the **Edit** window, click **Item Properties > Attributes**.
  - b) Click **Add**.
  - c) Select an attribute class from a palette, then enter information.

Alternatively, in the **Attributes** panel of the **Insert from Palette** pane, click an attribute class, enter or select a value, then click **OK**.

- To add a card:
  - a) In the **Edit** window, click **Cards > Card List**.
  - b) Click **New**.
  - c) Enter the information that you have.

You can include provenance information that is specific to the card, such as the source, reliability of the source, reliability of the information, or its privacy rating.

- The **Edit** window contains a **Style** folder. You can use the properties in that folder to add an image to the item. You can also use the pages in that folder to modify aspects of item appearance.

## Setting the identity

An entity's identity uniquely identifies it on the chart, regardless of how it is displayed. Analyzing charts is typically based on the identity of entities.

No entities can share an identity. If you enter a value that is already used by another entity, the text changes to the error text color.

You must edit the entity identity so that it is unique before proceeding.

**Note:** Identities are case-sensitive. "Brian GREEN" and "Brian Green" are both allowed as different identities on the same chart.

To set an identity:

1. Right-click an item, and select **Edit Item Properties**. The **Edit** window is shown.
2. Select **Item Properties > Label & Identity**.
3. Enter the identity of the chart item in the Identity box.
4. To set a label that is different from the identity, select **Label is Different from Identity** then enter a label.
5. Optional: If an item has a database identity, it is shown in the **Database Identities** box.
6. Click **OK**.

### Related concepts

[Identities](#) on page 6

An identity uniquely identifies an item on a chart or provides a unique link back to entity or link information in a data source.

## Setting the date & time

A chart item can have both a date and a time, or just a date or a time. It can also have a description of approximately when it occurred, if the exact date and time is not known.

To set the date & time:

1. Right-click an item, and select **Edit Item Properties**.  
The **Edit** window is shown.
2. Select **Item Properties > Date & Time** and complete the **Date & Time** page.
3. Select the **Date** and **Time** check boxes and enter the date or time.
4. If you do not know the date or time, enter a description about when the event occurred.  
For example, "In the afternoon".
5. Set the time zone for the item.
6. Select how the item is ordered on the chart:

Option	Description
<b>Free</b>	An item is free when it is not ordered and can be moved anywhere on the chart.
<b>Ordered</b>	An item is ordered when it cannot be moved to the left and right of other ordered items.
<b>Controlling (Ordered with Date &amp; Time)</b>	An item is controlling when it is ordered and has both a date and time.



7. Click **OK**.

### Related concepts

[Time zones](#) on page 22

When you create a chart that contains events that take place in different time zones, you can specify in which time zone each event took place.

## Setting the description & grades

All chart items are given grading information. Grades on an item classify or provide an evaluation of some quality of the information that is represented by that item. For example, if the information is reliable, confidential or from a trustworthy source.

To set descriptions and grades:

1. Right-click an item, and select **Edit Item Properties**.  
The **Edit** window is shown.
2. Select **Item Properties > Description & Grades**.
3. Enter the description.
4. Select the grades to add to an item from the lists in the Grades area. The following system is an example of one such system, but this grading system might differ in your organization:

Option	Description
<b>Grade 1</b>	A to E and Ungraded Used for the reliability of the source of the information, where A signifies that there is no doubt of the trustworthiness and competence of the source. E signifies that there is considerable doubt.
<b>Grade 2</b>	1 - 5 and Ungraded Used for the confidence in this particular piece of information that is provided by the source, where one signifies that the information is known to be true. Five signifies that the information is suspected to be false or malicious.
<b>Grade 3</b>	1 - 5 and Ungraded Used for the privacy rating of the information, that is, its confidentiality status, where one signifies that it can be freely disseminated to other suitable agencies. Five signifies that it must not be disseminated to anyone without explicit permission.

5. Select the source type.  
For example, a source type might be Informant, Witness, or Officer.
6. Select or enter a source reference.
7. Click **OK**.

**Related concepts**

[Provenance information](#) on page 9

The ability to track information to the original source and to assess the reliability of the information or the source is important in investigations.

**Adding an image**

You can replace the standard icons that Analyst's Notebook uses for icon, theme line, and event frame representations with custom images. An image can help to provide extra information.

When you add an image to an entity, it is shown instead of the entity type icon. Images can be used on the Representation Types: icons, theme lines, and event frames. For example, you can use photographs to show people, or CCTV images to chart a sequence of events.

To add an image to your selection:

1. Right-click an item, and select **Edit Item Properties**. The **Edit** window is shown.
2. Select **Style > Picture**.
3. Locate the image that you want to add. If you know where the image is stored, you can browse to this location. You can also paste an image from the clipboard.

**Tip:** The **Picture Preview** area of the **Edit** window shows how the picture appears.

4. Set the size of the image by selecting one of the following options:

Option	Description
<b>Enlargement</b>	Set the enlargement size of the picture.
<b>Custom</b>	Use the slider to change the size of the picture.

5. Click **OK**.

**Adding a chart label**

You can use labels to add annotations, chart summaries, or titles to an Analyst's Notebook chart.

To add a chart label:

1. Click the **Home** tab, and then in the **Insert Entities** group, click **Label**.
2. Move the pointer where you want the label to be positioned. When it is over the charting surface, the pointer changes to show that you are adding a label to the chart.

**Tip:** To cancel Insert mode, press Esc.

3. Click to add the label.
4. To change the label text, click the label. Enter the text, then click anywhere else on the chart.

**Tip:** Press Ctrl+Enter to enter a new line of text.

**Using selection sets**

You can group chart items into sets to create networks that you uncover as part of your analysis.

You can group and regroup entities and links into one of 10 available selection sets. This is a useful way to organize and compare items on the chart. Imagine, for example, you want to differentiate the data from a series of imports and find specific entities that are present in several import files. You can assign the data from each import to a different selection set, such as **Selection Set 1**. All members of the set gain a number **1** under their label on the chart, and Selection Set 1 is highlighted in the ribbon menu, to

show it is in current use. Similarly, when you assign **Selection Set 2**, members gain a number **2**, and so on up to **Selection Set 0**. You can have all 10 selection sets in use at the same time.

To assign a set, select items from the chart, click the **Select** tab and choose an available set from the Selection Sets area on the ribbon menu.

Individual sets are managed from the drop-down menu next to the set. The **Manage Set Membership** and **Use Set** lists of options allow you to control and work with your sets.

This table describes the functions available for **Manage Set Membership**:

Manage Command	Description
Define Set	Add the selected chart items to the current selection set. If the selection set already contains items, they are removed from the set.
Add to Set	Add the selected chart items to the current selection set. Existing set members are retained.
Remove from Set	Remove the selected chart items from the current selection set.
Invert Membership of Selected Items	Remove current members of the set and replace with all selected chart items that are not already part of the set.
Clear Set	Remove all items from the current selection set.

This table describes the functions available for **Use Set**:

Use Command	Description
Select Members of Set	Select all the members of the current selection set.
Add Members to Selection	Add members of the selection set to selected items on the chart.
Remove members from Selection	Remove all set members from the selected items on the chart.
Invert Selection of Members	Deselect all currently selected members of the set, and select all unselected members.
Intersect Selection with Set	When the current chart selection contains members of this set and other sets, only the members of this set remain selected on the chart.

You can clear the contents of individual sets from each list, or you choose to **Clear All Sets** from the **Selection Sets** area.

## Import data

Data in formats such as text files or spreadsheets can be directly imported into Analyst's Notebook using import specifications. You can run imports using existing specifications or create your own designs by using the step-by-step import wizard. Import designs give you control over how Notebook converts data into entities and links that are placed on the chart surface for analysis.

Before you start importing data, it is important to understand the different paths that you can follow to achieve a successful result. You can begin the import process with your source data or with an import specification. It is also important to note that the appearance and behavior of the user interface changes, depending on your application and server connections. If you are not connected to an i2 Analyze server, you are working unaligned to a schema and this is referred to as 'classic' mode. Data that is imported in classic mode cannot be uploaded as a new record in the Information Store.

When you are connected to an i2 Analyze server, the user interface gains more options. The import process is aligned to your server's schema and the properties and values available depend on the schema the server is using. Schema-aligned import data can be uploaded to the Information Store. When you are creating or editing an import specification, you also have the option to create custom item and property types. This is useful if the data that you want to import is not already represented in your server's schema. Custom item and property types cannot be uploaded to the Information Store, however they can be saved on the chart and in import specifications. When charts and import specifications are shared, existing custom types can be selected and used by other analysts.

After your import runs you can click the **Undo** button in the Quick Access Toolbar, should you want to undo the import. Undo removes the imported items from the chart, reverts any matching with items on the chart and in the Information Store, and removes custom item and property types from the chart and from the palette. Undo is available when you are connected to an i2 Analyze server. There is no option to undo an import in 'classic' mode.

## Import data formats

Analyst's Notebook can import data from spreadsheet files, XML files, and from any text file in which each line describes a similar but discrete piece of information. For most formats, you create an import specification to describe how the data is interpreted as entities and links on the chart surface. Some formats are recognized by Analyst's Notebook and the data is imported without a specification.

Analyst's Notebook can import text and spreadsheet data in the following formats. To import data in any of these formats, you need to use an import specification to define the entities that are represented by the data and the links between those entities. An import specification might exist for the format you want to import, or you can create a new specification to interpret your data. You should convert XML data in to CSV or XLS format, or transform the data into ANX XML.

Format	Description
Text files (.txt, .csv, .tsv)	In text files that are suitable for import, the lines of data have a consistent format. The data for one item is never broken across lines. Data can be separated by tabs or with a syntactical separator such as a comma. Some text file formats are predefined, for example a tab-separated value file (.tsv) or a comma-separated value file (.csv).
Clipboard	Analyst's Notebook can import text data from the Windows clipboard in any of the supported formats.
Microsoft Excel spreadsheet file (.xls, .xlsx)	Analyst's Notebook interprets the rows and columns of a spreadsheet in the same way that it interprets the lines and separators of a text file.

If the data is in an XML file format that is recognized by Analyst's Notebook, such as an Exchange file, an import specification is not necessary.

**Note:** Data imports from XML files cannot be used to create records in i2 Analyze.

Format	Description
Analyst's Notebook Exchange file (.anx)	Exchange files contain a standardized XML representation of the data on an Analyst's Notebook chart.

## Importing with a specification

An import specification defines how Analyst's Notebook interprets data imported from other file formats and converts the data into entities and links for analysis on the chart surface.

An import specification controls how your data is imported and displayed. You can work with import specifications in three distinct ways, depending on what is appropriate for your data. You can run your import with an existing specification, edit an existing specification, or create a new specification.

When you choose your data source, which can be a text file, data on your clipboard, or a spreadsheet, Analyst's Notebook inspects the data and lists any import specifications that are compatible. You do not have to use a suggested specification and can create a new specification for any of these data sources.

**Note:** Depending on the application you use, and whether you are connected to an i2 Analyze server, there are different types of import specifications. The 'classic' unaligned specifications that are used in Analyst's Notebook have a file extension of `.ximp`. The import specifications in Analyst's Notebook Premium, are aligned to a schema and have a file extension of `.oimp`. The schema controls what items are available when you define your import, which is different from a standard template in Analyst's Notebook. You cannot convert `.ximp` specifications into `.oimp` files or upload them to the Information Store.

## Starting from a data source

Analyst's Notebook supports data import from a number of sources. When you select the data source for your import, Analyst's Notebook examines the data and searches for compatible import specifications.

To locate files for import:



1. Click the **Home** tab, and then click **Import**. A list of options is displayed in a drop-down menu.

Option	Description
<b>Import from File</b>	Opens the <b>Select Data File to Import</b> window.
<b>Import from Clipboard</b>	Opens the <b>Clipboard Preview</b> window and shows any text data on your clipboard.
<b>Import from Excel Spreadsheet</b>	Opens the <b>Select Data File to Import</b> window and shows any spreadsheet files.

2. Select the option from the menu that describes the data you want to import.
  - a) If you select a text file format such as `.txt`, the **Select How to Import the File** pane opens.
  - b) If you select a spreadsheet file format such as `.xls`, the **Select How to Import the File** pane opens with an extra option to select a worksheet. If your spreadsheet contains only a single worksheet, that worksheet is selected automatically.

- c) If you want to select data from your clipboard, you need to copy the data to the clipboard. The **Clipboard Preview** window shows the contents of the clipboard. If the clipboard contains the correct data, click **Continue**.

If Analyst's Notebook identifies any suitable specifications, they are listed in the **Select How to Import the File** window. A flag next to each specification indicates the quality of the match:

<p>No flag</p>  	<p>Column headers in the specification match column headers in the data source you are importing. You can use this specification to import the data in the same way that you imported previous data with this specification.</p> <p>No column headers are defined in the specification. The specification is a match for the data, based on a comparison between the format of the data in the first few rows of the file and the format that is expected by the specification.</p> <p>You can use this specification as a template to create a new specification. The new specification might not require any changes or only minor changes to be suitable for your data.</p> <p>There are incompatibilities between the data source and the specification. Successful import is not possible.</p> <p><b>Note:</b> Specifications in this category are not listed unless you clear the <b>List only specifications that match the import data</b> check box.</p>
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3. To use a specification that is listed to run the import, click **Use existing specification**, select the specification, then click **OK**.

The application displays the **Importing** window to report on the progress of the import process. The window contains the following information:

- The duration of the import process
- An indication of whether the process was successful
- A count of how many entities and links were created

4. Optional: In the **Importing** window, click **Save Report** to save detailed information about the import process as an HTML file.

**Note:** If you do not take this opportunity to save a report, you do not have a permanent record of the import process.

If your data is not compatible with an existing specification, you can import your data with a new specification or you can use an existing specification as a template.

## Starting from an import specification

You can import data into Analyst's Notebook from a location that is defined by an import specification rather than starting from the data source.

You can view existing specifications and decide on the importing tasks that are appropriate for the data you want to import.

1. To use an existing specification to import data from the same location as the last time the import was run:
  - a) From the **Home** tab, click **Import > Saved Specifications**. The **Import Specifications** window is displayed.
  - b) Select a specification from the list in the **Import Specifications** window.
  - c) In the **Importing Tasks** pane, select **Import with selected specification & last file**.
2. To use an existing specification to import data in the same format at the last time the import was run:
  - a) From the **Home** tab, click **Import > Saved Specifications**. The **Import Specifications** window is displayed.
  - b) Select a specification from the list in the **Import Specifications** window.
  - c) In the **Importing Tasks** pane, select **Import with selected specification**. The **Select Data File to Import** window is displayed.
  - d) Find the file that contains the data that you want to import, and then click **Select**.

After either of the first two steps, the application displays the **Importing** window to report on the progress of the import process.

3. Optional: In the **Importing** window, click **Save Report** to save detailed information about the import process as an HTML file.

**Note:** If you do not take this opportunity to save a report, you do not have a permanent record of the import process.

If you want to import data that requires you to create or edit an import specification, you can start from the **Importing Tasks** pane. Follow the procedure for creating or editing an import specification.

## Creating or editing an import specification

An import specification defines how Analyst's Notebook converts data into entities and links that it can analyze. When you import data from spreadsheet or text files, you must either create an import specification, or amend an existing specification to suit your needs.

Importing data into Analyst's Notebook involves choosing a source file and then finding a compatible specification, or choosing a specification and applying it to one or more source files. If you need to create or amend an import specification, both paths lead to a step-by-step wizard that allows you to see how your specification processes the data in a particular source file.

As part of creating or editing an import specification, you provide the wizard with information about the structure of the data in the source file. The wizard then gives you a fine level of control over how the data in the file turns into entities and links on a chart. In particular, the wizard allows you to:

- Specify the format, the separators, and the meaning of white space in the data to be imported
- Include or exclude rows in the incoming data, individually or through rules
- Combine values in the data to be imported, or make bulk adjustments to them
- Specify the types of the entities and links to generate from each row of data
- Define mappings from the incoming data to the properties of entities and links

- Choose how Analyst's Notebook determines whether two incoming entities or links are the same

Depending on whether Analyst's Notebook is connected to an i2 Analyze server, the specifications that you create are different, and those differences are reflected in the steps of the wizard. The sequence and the purpose of the wizard, however, do not change.

## Setting the import data structure

When you specify a source file (or the clipboard) to the import wizard, it analyzes the contents and tries to deduce its structure. If the table that the wizard displays is not a good representation of your data (for example, if the columns do not contain discrete values), you can adjust the settings manually.

To define the structure of the incoming data:

1. On the **Define Columns** page of the import wizard, set how your data is structured.

Option	Description
<b>Delimited</b>	<p>Within each row, fields in the data are separated by particular characters called <i>delimiters</i>.</p> <p>Select any combination of the <b>Comma</b>, <b>Semicolon</b>, <b>Tab</b>, or <b>Space</b> check boxes. Optionally, select <b>Other</b> and enter your own character.</p>
<b>Fixed Width</b>	<p>Within each row, every field has the same width as the equivalent field in the other rows. Each field within a row might have a different width, but the width of a specific field is consistent throughout every row of the data.</p> <p>Click the displayed data, and specify where each field begins:</p> <ul style="list-style-type: none"> <li>• To insert a column break, click in the ruler area at the position where you want a break.</li> <li>• To move a column break, drag its vertical line to a new position.</li> <li>• To delete a column break, double-click it.</li> </ul>

By default, the wizard assumes that the incoming data uses the same text encoding as your operating system. If the table contains characters that you do not recognize, you can tell the wizard to try a different one.

2. Click **Encoding**. In the **Encoding** area, select an encoding option.

Option	Description
<b>Plain Text</b>	The incoming data contains only ASCII text, which includes only punctuation marks, uppercase and lowercase Latin alphabetic characters, and digits 0 - 9.



Option	Description
<b>Regional Settings Default</b>	The incoming data uses the encoding that the operating system specifies as the system default.
<b>Other Encoding</b>	The incoming data uses the encoding that you select from a list.

The result of using the selected encoding for the incoming data is displayed in the **Preview** box. If characters are not correctly displayed, select a different encoding. Otherwise, click **OK**.

- When the table in the import wizard displays correctly formatted tabular data, click **Next**.

## Selecting rows for import

If a row in the incoming data is not intended for import, you can configure the import wizard to exclude it. For example, a row in the data might contain column headers rather than values, or a particular row might be invalid.

If a row in the incoming data contains column headers instead of values to be imported:

- Select **Extract column headers from row** and enter the row number in the adjacent field. The column headers above the table in the wizard change to display the names from the data.

If some rows in the incoming data are prefixed with a particular character to indicate that they do not contain values:

- Select **Ignore rows starting with** and enter the character in the adjacent field. Every row that begins with that character is excluded from the import.

After the rules do their work, you can exclude or reinstate individual rows:

- To exclude specific rows from the import, select the rows in the table and click **Exclude Selected Rows**.
- To reinstate excluded rows, select the rows in the table and click **Include Selected Rows**.

Rows that are excluded from the import are struck through in the table. The application does not import excluded rows when you reach the end of the wizard.

## Transforming incoming data

It is unlikely that all the incoming data is in the right format to be imported straight away. You might need to join values in the source together so that they align with properties in the schema. You might need to format particular values in a certain way. Or, you might need to tell Notebook what to do when it detects a missing value. For these and similar reasons, you can specify actions that transform the incoming data.

## Combining columns

You can create new values in the incoming data by combining values from the existing columns. For example, you might combine an "Area Code" column and "Local Number" column to create a "Full Telephone Number" column.

You combine columns by adding a new column, choosing which existing columns to combine, and specifying how to combine them. User-defined data columns are identified in the data preview table with a highlight color.

To merge columns:

1. On the **Column Actions** page, click **New**.  
The **New Column** window is displayed.
2. Enter a name in the **Enter the name of the new column** field.  
For example, you might enter "Full Telephone Number".
3. From the **Source Columns** list, double-click a column or a separator to add it to the **Joined Columns** list.  
The **Joined Columns** list specifies the columns and separators that are used in the new column, and the order that they are used in.  
For example, you might combine an "Area Code" column and a "Local Number" column and separate them with a space:
  - a) Double-click "Area Code" in the **Source Columns** list.
  - b) Double-click ( *space* ).
  - c) Double-click "Local Number".
4. To change the position of a column or separator in the new column, select the column or separator in the **Joined Columns** list and click **Up** or **Down**.
5. Click **OK**.  
The new column is created.

## Modifying values

You can use column actions to modify incoming data values. For example, you can remove specific characters, or change the capitalization of text. You can also configure a column action to modify data only when specific conditions are met.

Through column actions, you can change the text in a column to uppercase, prefix it, or replace it with a value from a substitution file. Equally, you might decide to remove ordinal suffixes such as *st*, *nd*, *rd*, and *th* from (English-language) dates. These transformations are *actions*, and you can apply any number of them to individual data columns. The wizard indicates modifications in the data preview table with a graphic symbol.

The wizard applies actions sequentially, in the order that they are displayed in the **Actions Applied** list.

If the **Stop processing subsequent actions when conditions are met** checkbox is selected, a column action is applied to any value in the column that meets the conditions, but no further actions are applied to those values.

To create a column action and apply it to a column:

1. Select the column that you want to modify.
2. From the **Available Actions** list, select a column action and then use the arrow buttons to move it to the **Actions Applied** list.  
The wizard displays an icon in the header of the selected column to indicate that a column action is set.
3. Configure the settings for the column action.  
The configuration for each action is different.  
For example, if you select the **Add Prefix** action, you must enter the prefix that you want to add.
4. Optional: Configure the column action to modify values only when specific conditions are met.  
You can create more than one condition.
  - a) In the **Condition** list of the **Apply only when the following conditions are met** box, select a condition.

- b) Enter an appropriate value into the **Value** field.
- c) Optional: To stop processing subsequent actions when the conditions are met, select the **Stop processing subsequent actions when conditions are met** checkbox.

The table at the top of the page reflects the effect of your new column action on the incoming data.

#### Column actions

The Analyst's Notebook import wizard provides column actions that can modify incoming data in several different ways. The following table contains a complete list of the available actions.

Action Name	Description
Add Prefix	Adds characters immediately before the existing value. For example, if you know that all the telephone numbers in the data have the same area code, but that code isn't in the data, you can add it.
Add Suffix	Adds characters immediately after the existing value.
Change Capitalization	Changes the case of text. You can change case to lowercase or uppercase, capitalize initial letters, or reverse the current capitalization.
Compress Repeated Characters	Replaces a repeated character with a single instance of that character. For example, automatically generated data might contain extra space characters that you can use this column action to remove.
Copy Value from Previous Row	Replaces the value in a column with the value from the same column in the row above it.
Extract Text using Fixed Widths	Extracts a range of text from the value in a column by specifying the fixed positions of its first and last characters within the value. For example, you might use this action to extract only the hours and minutes from time values that contain seconds in the incoming data.
Extract Part using Separators	<p>Splits column values into parts that are separated by a particular character. You can extract one or a range of parts from the value by specifying their position within it. For example, using space as the separator character, the value <code>Andrew Peter Smith</code> is made up of three parts. To extract the middle name from the value, you type 2 in the <b>Extract part number</b> box. To extract multiple parts, you can use the <b>Up to and including part</b> option. Decide which direction you want the count to begin from and click the corresponding button.</p> <ul style="list-style-type: none"> <li>• From the beginning of the column, you can only include part numbers that are greater than your first part. For example if your first part is 3, you cannot include parts 1 and 2.</li> <li>• From the end of the column, you can only include part numbers that are less than your first part. For example, if your first part is 4, you can include parts 1, 2 and 3.</li> </ul>
Find and Replace Text	<p>Replaces a sequence of characters with another sequence of characters. For example, to remove English ordinal suffixes, you can replace <code>st</code>, <code>nd</code>, <code>rd</code>, and <code>th</code> with a sequence of zero characters.</p> <p><b>Note:</b> This column action can cause unintended changes. For example, if you replace the <code>st</code> date ordinal suffix with zero characters, words such as August might be modified too.</p>

Action Name	Description
Prefix with Another Column	Adds the value from another column to the beginning of the value in the selected column. For example, you can prefix time values with date values to create a combined date and time column. You can also specify a separator character to use between the values.
Remove Characters	Removes all occurrences of the specified characters from each value. You can configure the column action to remove spaces or tabs, and enter custom characters to remove. For example, to remove ) and ( from telephone numbers like ( 863 ) 555 0140, enter ( ) in the <b>Remove other characters</b> field.
Remove Prefix	Removes characters only when they appear at the beginning of values. For example, you might remove "MR " from names like MR SMITH.
Remove Suffix	Removes characters only when they appear at the end of data. For example, you might remove " Esq" from Andrew SMITH Esq.
Replace from Substitution File	Replaces specific sequences of characters with other sequences of characters. For example, if your data contains marital status codes, you can replace them with words: S=Single, M=Married, D=Divorced. <ul style="list-style-type: none"> <li>• The substitution file can have the extension .csv, .tsv, or .txt. The file contains pairs of character sequences on each line.</li> <li>• Each pair consists of a sequence of characters to find in values, a separator, and a sequence of characters to replace the found characters with. The separator can be a tab, a comma (,), an equals sign (=), or a colon (:).</li> <li>• To use a separator character as part of a character sequence, enclose it in double quotation marks (") or precede it with a backslash (\). To make the Analyst's Notebook disregard text in the file (to include a comment, for example), precede it with a semicolon (;).</li> </ul>
Replace Value	Replaces a whole value with another value.
Suffix with Another Column	Adds the value from another column to the end of the value in the selected column. For example, you can suffix date values with time values to create a combined date and time column. You can also specify a separator character to use between the values.
Trim Characters	Tabs and spaces are trimmed by default. You can trim other unwanted characters from the beginnings and ends of values. For example, to trim { and } from {Jelicos Restaurant}, click <b>Trim other characters listed below:</b> and enter { } in the field. If you modify the default selections, or specify other characters to trim, the cogs icon is displayed in the column header. Import specifications created in previous versions do not have these default trim actions applied.

## Column action conditions

In the Analyst's Notebook import wizard, you can configure column actions so that they run only when specific conditions are met. The following table contains a complete list of the available conditions.

Condition	Description
Contains	Where the field contains the exact portion of text, which can be at the start, middle or end of the field.
Does not contain	Where the field does not contain the specified sequence of characters.
Does not end with	When the field does not end with the specified sequence of characters.
Does not start with	When the field does not start with the specified sequence of characters.
Ends with	Where the field ends with the specified sequence of characters.
Is blank	Where the field is blank.
Is not blank	Where the field is not blank.
Length equal to	Where the field length (in characters) is equal to the specified number.
Length greater than	Where the field length (in characters) is greater than the specified number.
Length less than	When the field length (in characters) is less than the specified number.
Regular expression	When the data meets a general pattern set by the specified expression. For example, the expression [0-9] will match on 1, 2, 3, 4 up to 9.
Starts with	When the data starts with the specified sequence of characters.

#### Regular expressions in import action conditions

You can use regular expression parameters to define matching patterns that will be used to apply actions. A regular expression is written as a sequence of characters. The syntax combines text with special characters to define the pattern.

**Table 7: Supported regular expression characters**

Character	Description
.	Matches a single character. For example, ABC 123. matches ABC 1234 and ABC 1235.  <b>Note:</b> This character is equivalent to the '?' character when you are searching for files by name in Windows Explorer.
^	Matches the start of a line. For example, ^ABC matches ABC 1234 and ABC 2345 but not 1234 ABC.
\$	Matches the end of a line. For example, 1234\$ matches ABC 1234 and CBA 1234 but not 1234 ABC.
*	Matches zero, one or more repeats of the previous character. For example xx* matches xx, xxxxxxxx

Character	Description
[ ]	Matches any character inside the brackets. You can specify a range of characters, for example [0-9], [a-z].
[^ ]	Matches any characters except the characters in the list. For example: [^ABC] matches any character other than "A", "B", or "C".
	Matches either the expression before the bar OR the expression after the bar. For example 1234\$   1235\$ matches any license plates that end in 1234 or 1235.
\	Ignores the special meaning of the next character. For example, abc\$   def\$   \   \$ matches any text that ends in abc, def or  .

Analyst's Notebook does not support extended regular expression combinations ( ), \(\), \>, \<, \{, \}, and \digit.

## Exporting transformed data

When your import specification includes column actions that transform incoming data, you might need to track the differences between the data in its source and the data you imported. The import wizard allows you to export the modified data to a text file before you import it.

You can export the data that was modified by column actions to a comma-separated value file or a tab-delimited text file.

To export your data:

1. In the **Column Actions** page, click **Export**.  
The **Save Data As** window is shown.
2. In the **Save Data As** window, select the folder to save the exported data in.
3. In the **File name** field, enter a file name for the exported data.
4. From the **Save as type** list, select the type of file \*.txt or \*.csv.
5. Click **Save**.  
A file that contains the exported data is created with the specified file name in the selected folder.

## Import designs

When you create an import specification, part of the process is to specify an import design. The import design defines the structure and types of the entities and links that the import wizard creates from each row in your data.

Creating an import design has up to three stages:

1. If you are working with a classic specification, you can use the **Select Design** page of the wizard to select a representation of the relationships between the items you are importing. Otherwise, the wizard moves straight to the **Assign Columns** page.
2. The import design appears on the **Assign Columns** page as a small entity and link chart. You can edit the small chart to select which types of entity and link are created in the chart when you import your data.

3. The **Assign Columns** page is also where you provide the instructions that govern how values in the incoming data become the property values of entities and links. The Property and Value table, next to the import design chart, is key to building and creating records.

**Note:** For a schema-aligned specification, the available entities, links, and properties depend on the i2 Analyze schema on the server that you connected to most recently. You can add custom item and property types to model data that is not supported in your current schema.

## Adding entities and links to the import design

The entities and links that you add to the import design in an import specification should accurately represent the real world data in the import file. A good design results in the creation of appropriate entities and links in the chart.

The default import design on the **Assign Columns** page contains two entities that are connected by a link. You can add entities and links to this basic design to reflect each row of data you want to import and represent on your chart.

For example, an import file might contain telephone call data that also includes the names of telephone owners. To represent calls in that situation, you might set the type of each entity in the default design to Telephone (or Communications Device, or similar), and set the type of the link to Telephone Call (or Communication). To represent the owners, you might go on to add two Person entities to the design, and Owner links between each Person and Telephone.

1. To add an entity, click **Add New Entity** above the import design. Within the import design, the mouse pointer becomes an empty circle; click the left mouse button to add an entity.
2. To add a link, click **Add New Link** above the import design. Within the import design, drag a link between two entities.

## Setting entity or link types in the import design

Every entity and every link in an import design must have a type. The default import design contains two entities and a link as examples to help you set types that reflect your incoming data. To use an import design, you must set the type for each entity and link it contains.

The entity or link types that you can set depends on the import specification. For a classic specification, they match the types in the Analyst's Notebook template and you cannot add custom types. For a specification that is aligned with an i2 Analyze schema, they match the entity and link types in that schema, unless you set custom types for your import.

- To set a type for either a classic or an i2 Analyze aligned specification:

- a) In the import design, click an entity or a link.
- b) In the table next to the import design, select a type from the **Type** list.

In the aligned case, any types that are invalid because of link end constraints have a red cross next to them.

When you select a type, the import design displays the entity or link type name. If you selected an entity type, the entity type icon is displayed in the import design. Link types are numbered according to how many links you are including in the import design. You cannot change the summarization of links set by the current schema from the **Assign Columns** window, however you can run the import and use **Link summarization** on the records bar. For more information, see [Link summarization](#).

Once you have set types for your incoming data, you can configure property values for the entities and links. If you are working with an i2 Analyze aligned specification, you can also create new custom types

and properties to work with data not supported in your schema. For more information, see [Creating custom entity or link types](#), and [Setting custom properties](#).

## Creating custom entity and link types

When you are using schema-aligned import specifications, you can create your own custom entity and links types to help model data that is not supported in your schema.

Usually the chart items you create as part of the import process, are governed by your charting scheme. Sometimes the values of the incoming data that you want to import might not have a type defined in your schema. For example, you want to import data about dog thefts that includes "dog owners", "breeders", and a "purchased from" link, however you cannot find suitable types to use from your existing schema. You can create new custom types so that your import design more closely represents your data. You can also use custom types that you, or other analysts, have created and saved in charts and import specifications. Custom types do not have to be created as part of the import process. For more information about creating custom types from the palette, see [Custom types](#).

- To create a new custom entity type:
  - a) In the import design, click an entity or **Add New Entity**.
  - b) Below the table next to the import design, click the **New Custom Type...** option. The New Custom Type dialog box opens.
  - c) Type a name for your new custom entity type in the Name field.  
Name is not the label displayed on the chart, it is the identifier for the new custom entity type.
  - d) Click **Select** in the Icon box. From the **Choose Icon** box, select a suitable icon for your custom type. You can add your own custom icons to the folder. For more information, see [Custom icons](#).  
If you do not select an icon, your custom type has the default icon shown.
  - e) Click **OK**.  
You cannot edit the name or icon of a custom type once you click **OK**. If you want to change the name or icon, you need to delete the custom type on the chart and create another. Alternatively, you could use [Duplication](#) as an easy way to create new types, and carry over custom properties you have already created.
- To create a new custom link type:
  - a) In the import design, click a link or **Add New Link**.
  - b) Below the table next to the import design, click the **New Custom Type** option. The New Custom Type dialog box opens.
  - c) Type a name for your new custom link type in the Name field.  
Name is not the label displayed on the chart, it is the identifier for the new custom link type.
  - d) Select the default summarization for your custom link from the options Single, Directed or Multiple.  
If you select link summarization of Single or Directed, the link label is the number of records of the type that the link contains. This is shown as <record count> in the import design. If you create custom properties on the link type and choose to include the properties in the label, the label is visible in the record inspector after you run the import.

Your custom entity and link types are available to use in your import and can be saved as part of the import specification. New types created as part of import designs are saved to the **Custom** palette. For more information about managing custom types from the palette, see [Managing custom types](#).



**Note:** Records of custom types cannot be uploaded to the Information Store or used as seeds for External Searches in i2 Connect.

## Duplicating custom entity and link types

When you are using i2 Analyst's Notebook Premium aligned with an i2 Analyze schema, you can duplicate custom entity and link types.

You might want to create new custom entities and links that share a number of properties with types you have already created. The custom type duplication feature means you can use existing custom types to create new types, as part of the import process. For example, you create a custom type of "Sports Utility Vehicle" and add properties for "Make", "Model", "Color", "Engine Size", "License Plate", and "Chassis Number". You want to import data for a custom type of "Truck" that includes the same properties as those you selected for your "Sports Utility Vehicle", and you might want to add more that are specific to trucks. Duplication is a useful way to save the time and effort of creating similar types from scratch. You can also duplicate custom types that you, or other analysts, have created and saved in import specifications. System types, that is the entities and links defined in your schema, cannot be duplicated.

**Note:** Records of custom types cannot be uploaded to the Information Store or used as seeds for External Searches in i2 Connect.

- To duplicate a custom entity type:
  - a) In the import design small chart, click **Add New Entity** or choose an existing entity that has a label of (no type selected). You cannot duplicate an entity that has already been assigned a type from your palette, unless it is a custom entity type.
  - b) In the panel next to the import design, scroll down the list of available item types and select the custom type that you want to duplicate.  
The new entity name and icon become the same as the type you chose, and the custom properties are displayed.
  - c) With the new entity selected, click the glyph



that represents the **Duplicate Type** option, next to the custom type label.

The Duplicate Entity Type dialog box opens and the **Name** field is blank.

- d) Type a name for your custom type in the **Name** field. You cannot use the name of an existing type. From the **Choose Icon** box, select a suitable icon for your custom type. You do not have to choose a different icon, however you will not be able to change the icon once you click **OK**. You can add your own custom icons to the folder. For more information, see [Custom icons](#).
  - e) Add more custom properties if required.
  - f) Click **OK**.
- To duplicate a custom link type:
    - a) In the import design small chart, click a link that has a label of (no type selected) or **Add New Link**.
    - b) In the panel next to the import design, scroll down the list of available item types and select the custom type that you want to duplicate.  
The new link name becomes the same as the type you chose, and the custom properties are displayed.

- c) With the new link selected, click the glyph



that represents the **Duplicate Type** option, next to the custom type label. The Duplicate Link Type dialog box opens and the **Name** field is blank.

- d) Type a name for your new custom link type in the Name field. You cannot use the name of an existing type.
- e) Select the default summarization for your custom link from the options Single, Directed or Multiple.

If you select link summarization of Single, the link label is the number of link records of the same type, and is displayed as `<record count>` in the import design. If you create custom properties on the link type and choose to include the properties in the label, the label is visible in the record inspector after you run the import.

- f) Add more custom properties if required.

## Using existing custom entity and link types

You can use custom types that have been saved in other charts and import specifications.

You are investigating organised dogfighting for example, and want to create a new import specification. Some of the data in the import is not represented in your schema, however you recently created some custom entity and link types for a dog theft case that might be useful in your import design. Types from your **Custom** palette are available to select, and you can search through saved specifications and select from any of the custom types they contain. You can choose to use existing custom types as they are, or as the basis for new types. This can save you the time and effort of creating new types and properties, where existing types already contain the same or similar properties.

**Note:** Records of custom types cannot be uploaded to the Information Store or used as seeds for External Searches in i2 Connect.

1. In the import design, click **Add New Entity**, or **Add New Link**.
2. Choose a custom type from the list of item types. The custom type and its properties appear on the import design.
3. To search import specifications, click **Existing Custom Type...**, below the list of available item types. A window opens showing any saved specifications that contain custom types, and details about them such as author and date of last modification.
4. Click a specification to see the custom types and properties that are present in that specification. You can resize the columns if required.
5. Click to highlight the name of the custom type you want to use.
6. Click **OK**.  
The custom type and its properties appear on the import design.

## Setting custom properties

You can set custom properties for both the entity and link types supported in an i2 Analyze schema, and for custom types created by you and other analysts.

Usually the chart items you create as part of the import process, are governed by your charting scheme. Sometimes the values of the incoming data that you want to import might not have a property setting defined in your schema. For example, you want to import data about dog thefts that includes "types of

dog" and "microchip identity numbers", however you cannot find suitable properties to represent this data. You can create new custom properties so that each of these columns can be assigned in the import process. It is important to understand how to build and create records outside of the charting scheme. Entity chart items use the icon of the entity type you choose in the design, and the label is the record label of the lead record. The link summarization setting for link chart items decides the label, which is either the record label or record count. For both custom entity and link types, no attributes are created or chart item properties mapped to. You must also specify logical types to tell the import wizard what sort of data it is processing. These are usually determined by the logical types in your schema, however you need to specify a logical type for a new custom property at the time that you create one.

1. In the import design, click an entity or a link.  
The record or item properties are displayed in a table next to the import design. If you are working with a new custom type, only the type is displayed because other values have not yet been specified.
2. Click **New Custom Property**.
3. Type a name for your new property, and click the checkbox if you want to include the property name in the item's label.  
You cannot create a new property with a name that you have already used in this import specification, even if you choose a different logical type.
4. Select a logical type and variant. The default is a single-line text string.  
In all instances, other than single-line text, the logical type is displayed in brackets next to the property. For example `Microchip number *(Integer)`.
5. Click **OK**.  
The property is created with a \* next to the name, to indicate it is a custom property. The value remains (not set) until incoming data is assigned.
6. Repeat the process until you have created the required properties for the item. You can delete custom properties, toggle the label inclusion option and move properties up and down in the list, using the buttons beneath the list.

Once you have created the properties you need to model the incoming data, you can assign columns to the relevant values in the import wizard. You can return to the Assign Columns page to add or delete custom properties at any time before running the import.

**Note:** Custom properties on i2 Analyze schema types cannot be uploaded to the Information Store or used when present on seeds for External Searches in i2 Connect.

#### Logical types and variants

When you set custom properties in i2 Analyst's Notebook Premium, you need to define logical types and variants to determine the type of data stored in the property.

Usually logical types are defined by your schema, however you override the schema settings when you set custom properties in the import wizard. It is important to select the correct logical type for the data that you would like to store, and the type of analysis that is needed.

These are the logical types you can specify and when you might use them:

Logical type	Variant	Description
Text	Single-line string	Use this option for properties such as names or categories. The default length for single-line strings is 250 characters.
	Multiple-line string	Use for descriptive sections of text, up to 32,700 characters.

Logical type	Variant	Description
Number	Integer	Use Integer for counting numbers. Integers are whole numbers and values can be positive or negative.
	Double	Use Double for measurements other than financial values.
	Decimal	Use Decimal for financial values.
Date & Time	Date & Time	Use for values that occur at a specific instant. The time zone can be selected on the Date & Time Format page.
	Date	Use for properties where the value is the entire day.
	Time	Use for time only values that don't apply to a specific date.
Boolean	Boolean	Use for properties whose values are either "Yes", "No", or "No value".

### Assigning incoming data to entity and link properties

After you create an import design, you can configure how the property values of imported entities and links are set from the incoming data.

You can use values from incoming data as the property values of the entities and links that Analyst's Notebook creates during the import process. For example, you might set the Call Duration property of a Telephone Call link from a value in the Duration column of an import file.

**Note:** The details of assigning data are different, depending on whether you are working with a schema-aligned or a classic import specification:

- In a classic specification, you can assign values to the properties of Analyst's Notebook items, and to cards and attributes on those items.
- In a schema-aligned specification, you can assign values to the properties of i2 Analyze records.

In some cases, you can assign values from more than one column of import data to a property. For example, a Full Name property might consist of data from a **Given Name** column and a **Surname** column.

To configure how a property value is set from incoming data:

1. In the import design, click an entity or a link.  
The record or item properties are displayed to the right of the import design.
2. Drag a column from the preview table at the top of the wizard to a cell in the **Value** column of the property list.  
The column name is displayed in the property table within square brackets. For example, [Duration].

3. To assign more than one column to a property value, hold the Shift key and drag a second column to the cell in the **Value** column of the property table. The second column is also assigned to the property value, and is separated from the first column by a space.  
For example, [First Name] [Surname].

**Note:** You can use this technique to assign multiple columns to single-line text, multiple-line text, or 'suggested from' properties (lists that you can type other values into). To achieve the same effect for other properties, use column actions to create columns that contain multiple values before you reach this point.

4. If you are working with a classic specification, then you must assign a column to the "Identity" property of an entity that uniquely identifies it on the chart.  
Depending on the data, you might use the number of a telephone, or the license plate of a vehicle, for example.
5. Choose what action to take when the import wizard encounters a blank value in a column.
  - a) Select the property name, and then click the browse button that appears next to the value.
  - b) In the window that opens, choose whether to replace a blank value with a fixed value.
  - c) If you are working with a classic specification, and the blank value is for the identity of an entity, choose one of the following options:
    - **Do not create the entity**
    - **Create the entity with a blank identity**
    - **Create the entity and set its identity to**, then enter a value.

## Setting the direction of links

By setting the direction of the links that you import, you can show the flow of money in a financial transaction, for example, or the instigator of a telephone call. You can give every link the same direction, or you can set the link direction from values in the incoming data.

To set the direction of an imported link:

1. Select a link in the import design.  
The property table is displayed to the right of the import design and contains the **Direction** property.
2. In the property table, browse in the **Direction** row.  
The **Edit** window opens.
3. To assign the same direction to each link that is imported as a result of the design, select **Direction from...** and then choose a direction from the list.
4. To assign direction from values in the incoming data:
  - a) Click **Single column**, and select the column that contains the data that determines link direction.
  - b) In each **Value** field, enter the value that indicates that the link direction is set as illustrated. The **Value** field is case-sensitive.
  - c) In the **Any other value** list, select a direction to assign any link that is not assigned a direction as a result of the previous step.
  - d) Click **OK**.

## Setting the strength of links

If you are working with a classic import specification that is not aligned to an i2 Analyze schema, you can set the strength of imported links. You can give each link the same strength, or you can set link strength from values in the incoming data.

Setting the strength of the links that you import can provide a visual representation of your confidence in the data. For example, if you set the link strength to `Tentative`, the links display as dotted lines instead of solid ones.

To set link strength:

1. Select a link in the import design.  
The property table is displayed to the right of the import design and contains the `Strength` property. Unless previously modified, the property has a default value of `Confirmed`.
2. In the property table, select the `Strength` row, and then click the browse button that appears. The **Edit** window opens.
3. To assign the same strength to each link that is imported as a result of the design, click **Strength** and select a link strength from the list.
4. To assign strengths from values in the incoming data:
  - a) Click **Single column**, and select the column that contains the data that determines link strength.
  - b) Optional: Select the **Replace blank value with** check box, and select a strength to assign when no values are present in the data.
  - c) Click **OK**.

## Setting grades for imported items

If you are working with a classic import specification that is not aligned to an i2 Analyze schema, you can set the grades of imported items. Grades typically indicate source quality and information quality; each chart has its own grading scheme.

To set a grade:

1. Select an item in the import design.  
The property table is displayed to the right of the import design and contains the `Grade` properties. Unless previously modified, each grade has a default value of `(lowest)`.
2. In the property table, select each grade row in turn, and click the browse button that appears. The **Edit** window opens.
3. To assign the lowest grade to every imported item, select **Lowest grade**.
4. To assign the same grade to every imported item, select **Grade** and then choose a grade from the list.
5. To assign a grade from values in the incoming data:
  - a) Select **Single column**, and select the column that contains the data that determines the grade.
  - b) Optional: Select the **Replace blank values with** check box, and select the grade to assign any item that does not receive a grade as a result of the previous step.
  - c) Click **OK**.

## Setting date and time formats

Often, the data that you import into Analyst's Notebook contains date and time information. In general, this information can come in a range of different formats. If your data contains dates and times, your import specification must tell the application how to interpret them.

You must specify how the values in each date, time, or date & time column that you assigned on the **Assign Columns** page are formatted. To provide location context for date & time values, you must select a time zone. If you do not specify the correct format, the application might import the data incorrectly or fail to import the data at all.

As soon as you assign an incoming column to a date, time, or date & time property in the design, the import wizard gains a **Date & Time Format** page. To set a date and time format:

1. Click a column in the table at the top of the page.

As you click through each column, the **Custom format** field reflects the format of your data, along with an example. If your data contains 10 Dec 2018, the notation in the format field is `dd MMM YYYY`. If the values in the column do not match the selected format, a yellow triangle is displayed in the column header. A yellow triangle is also displayed next to any values for which the format is invalid.

**Note:** A *valid* date format might not be the *correct* date format because sometimes the day and month are transposed. For example, 10 December 2018 can be expressed as 10/12/2018 or 12/10/2018. If your import data expresses 10 December 2018 as 10/12/2018 within a column, the `mm/dd/yyyy` date format is valid however October 12 2018 is *incorrect*. Be aware of how the numerical expression of days and months in your import might be interpreted.

You can change the display codes available to suit your data such as removing the leading zero in single digit days, hours and months. You can switch to a 12 hour clock format, a two digit year and have longer day and month names if required. Click the relevant checkbox beneath the **Custom format** field. If you want to include words in your column data, you can use quotation marks to differentiate the text. For example, if the value in your column is Date 10/12/2018, the notation in the **Custom format** field should be `"Date" dd/MM/yyyy`.

**Note:** If you think you have the correct format but the yellow triangle still appears, check the values in your date and time columns for extra characters such as spaces. You can remove unwanted characters by using **Trim Characters** on the **Column Actions** page.

2. Change the time zone of the source data, unless you want your import to default to the same time zone as the chart.

If you are working with Analyst's Notebook Premium, and have set new *Date and time* only custom properties, you can select time zones on the **Date & Time Format** page. You can have a number of columns that contain date and time properties, therefore you can set different time zones for each if required. If your columns are *date* only or *time* only, the time zone drop-down option is unavailable.

3. If you set custom types with date and time, or date, or time properties in your import design, you can enable copying to timeline charts on the **Date & Time Format** page. This function is available for custom types only. The charting scheme sets the item date and time for you when you use types specified in your i2 Analyze aligned schema.
4. If you are working with a classic import specification, the **Date & Time Format** page displays a **Make the first item controlling when multiple items have the same date & time** option. This is useful if you want to chart a timeline for presentation purposes, and have events that occur at the same time. Click the checkbox to select the option.

**Note:** When working with controlled items, you can also use the [Grouped by Time layout](#) as an alternative way to display temporal data. The settings in this option give you a fine level of control over the distance between items. The layout allows you to position items within a second of each

other, so all the items with the same time for example, close together by selecting the **All Items** options then setting a small distance into the **Separate Items By** value, and a larger value into the **Separate Groups By** setting.

Date and time properties in the import design can now receive values from the incoming data correctly.

## Matching records using system rules

When you are creating or editing an import specification that is aligned with an i2 Analyze schema, you can tell the import wizard to use system match rules to identify duplicate system records on your chart, and in the Information Store.

When you use system rules to identify and resolve duplicate information, you limit the unnecessary creation of new records. For example, your incoming data might contain details about a person that match with a record in the Information Store. If that record was ingested from an external source, it is regarded as *system-governed*. Analyst's Notebook selects the system record for that person entity rather than creating a new record. If your data matches with a record that is uploaded by another analyst, that record is used instead of creating a duplicate. Missing values in *analyst-governed* records can be enriched by a range of incoming data, whereas system-governed records gain security and source reference updates. The system rules are defined by your system administrator. For link matching, the rules are set to exact matches on link direction, and match with the same pair of end records.

### 1. Click the checkbox to select **System Matching**.

The wizard compares the property values that you assigned in Assign Columns to the system rules. If the system rules require further assignments, a flag appears next to System Matching.

### 2. Hover your mouse pointer over the flag to see a detailed message about your import.

You can proceed with your import without assigning the required property values, although revisiting your import design at this stage can improve the quality of your record matching. For example, in your import design you might have assigned a property value of Last Name to a Person entity. If you have a system rule that looks for a match on Last Name, this identifies matches in your import data and in the match locations you select. However, if the system rule specifies Last Name and Passport Number, the wizard tells you which value is not assigned. You can return to Assign Columns and add more property values to satisfy the requirements of the system rules before you run the import.

### 3. Click the checkboxes to select the locations to include in record matching. The import process uses the system rules to identify matches in the incoming data, with Information Store records, and on your target chart.

**Note:** When imported records match with multiple records in the Information Store, Analyst's Notebook resolves matches in the following order of preference:

- System-governed records
- Records with the greatest number of properties used by the rule(s) conditions
- Records with the greatest number of properties
- The record with the earliest created time stamp.

When you run the import, a progress window is displayed. If matches are found, the import is paused. Another window is displayed that shows you the number of matches between the imported data and records from the locations you selected. This information is to help you understand what is happening to your records during the import process and what other actions you might take. For example, if your import data matches with records in the Information Store, you might want to use the **Get Matches** function to identify them.



Click **Continue** to proceed with the import. When the import completes, a message is displayed to show timing details and the numbers of records that were created or replaced. Alternatively, you can click **Cancel** to end the import and return to the chart.

## Matching records locally

When you are creating or editing an import specification that is aligned with an i2 Analyze schema, you can tell the import wizard to use local matching to identify duplicate records in your incoming data, and with records on your chart.

Local matching is useful for identifying multiple records in the incoming data and on the chart. For example, a file that contains telephone call data is likely to refer to the same telephone more than once. In that case, you probably want the chart to contain a single telephone entity with links to other telephones, rather than lots of separate one-to-one relationships. Analyst's Notebook also tells you if information in your data import already exists on your target chart. If you do not need to search for duplicates in the Information Store, local matching gives you more control over the properties you are most interested in, as you define the matches during the import process. Also custom types cannot be matched with records in the Information Store. If system matching is unchecked on the **Record Matching** page, you can use local matching for system and custom types. Alternatively, you can check system matching to run at the same time as local matching. System types are matched against the rules defined by your system administrator, while custom type matching is defined by you. Note that for custom types to match, they must have the same name *and* identifier.

1. Examine the **Imported types** box, which contains a list of the entities and links in your import design. The list includes both system and custom types. If you click the check box for system matching, any system types that are used in system matching rules are removed from the list.

2. Select the type that you want to work with.

The available options are different, depending on whether you choose an entity type or a link type.

For entity types, you specify which property values must match in order for two incoming entities to be considered as duplicates. When the values of all the selected properties match, only one of the entities is imported. If a selected property has no value (but all of the other values match), you can decide whether to treat it as a duplicate.

For link types, you have the additional option never to consider two links as duplicates, regardless of any property values. Furthermore, the list of properties implicitly includes the direction of a link. When two links have different directions, they are never treated as duplicates.

3. Decide which property values determine what constitutes a match in your data.

For example, it might be reasonable in some cases to match Person entities according to the combination of their given names and surnames. For data from a different source, you might use a passport number or social security number instead.

4. Click the check boxes in the **Identity** column to specify the properties to use for matching.

Imported types without any selected properties have a yellow triangle next to their name. If properties are selected, the triangle changes to the icon for that type. This is the case for both system and custom types.

5. To prevent the import of less complete records, click the check box for **Do not import a new record if any of the selected properties have blank values**. This means that if any of the properties you select for matching have blank values, the import wizard ignores those records. This option is unchecked by default.

When you run the import, a progress window is displayed. If matches are found with records on the chart, the import is paused. Another window is displayed that shows you the number of matches between your imported data and charted records. This information is to help you understand what is

happening to your records during the import process. Duplicate records in the incoming data are not imported, if you chose to match on a specific property. For example, if your data contains 1000 records for the same main telephone number and you chose to match 'Main number', only 1 record for that telephone number is placed on the chart. If your incoming records contain more properties than the matched record on the chart, that record is enriched so the data is not lost.

Click **Continue** to proceed with the import. When the import completes, a message is displayed to show timing details and the numbers of records that were created or replaced. The Analyst's Notebook records bar gives more information about the types of records now on your chart. Alternatively, you can click **Cancel** to end the import and return to the chart.

## Complete import details

On the **Import Details** page of the import wizard, you can specify summary information about the import specification so that you can review it quickly in future. It also gives you the ability to provide some global settings for the import process.

On the **Import Details** page, you can:

- Add summary details for the specification, such as subject, author, or category information.
- Include custom details, such as codes or classifications that are specific to your organization or investigation.
- Determine whether entities and links are imported to the current chart or a new chart.
- Set whether new chart items are also selected, and whether the selection should add or replace an existing one.
- Choose a layout to apply to the new chart items.
- Place minimum and maximum limits on the number of links between any two entities.
- Enable a "verbose" mode that performs and reports on the import process row-by-row.
- Remove blank entity records and blank link records.
- For a specification that is aligned with an i2 Analyze schema:
  - you can specify the security setting that all imported records receive.
  - you can add source references to records as they are imported to the chart and choose to be prompted to update the values each time you run the import specification.

These features are either not mandatory or they have default settings. If the other pages of the wizard are complete, you can import data with your specification.

## Setting the occurrences of imported links

Depending on the nature of the incoming data, you might not want to create connections between entities when the number of links falls outside a defined range. You can also decide not to import entities that are connected to only one other entity.

1. On the **Import Details** page, select **Link occurrences removed** to open the **Link Occurrence Options** window.
2. Select a check box and enter values in the corresponding boxes, as follows:

Option	Description
<b>Remove links with occurrences below</b>	Connections are not created (and their links are not imported) when they would contain fewer

Option	Description
	than the specified number of links. The value must be greater than or equal to one.
<b>Remove links with occurrences above</b>	Connections are not created (and their links are not imported) when they would contain more than the specified number of links. The value must be greater than or equal to zero.
<b>Remove single connections</b>	Entities are not imported when they have only one link within the incoming data. Both the entity and the link are discarded.

**Important:** Use the **Link Occurrence Options** with caution. In removing entities and links during the import process, you might discard information that is crucial to the analysis.

3. Click **OK**.

Your changes are confirmed on the **Import Details** page. You can change this option before you run the import.

## Removing blank records

Sometimes the data you want to import is incomplete, resulting in the creation of records that contain no properties. On the **Import Details** page, you can choose whether or not to remove blank entity and link records.

Your incoming data might not have values for some of the assigned properties in your import specification. To prevent the unnecessary creation of these chart items, the default setting for new import specifications is to remove blank entity records. You can set the options in your import details to also remove blank link records. You can also decide to only remove blank link records, or you can deselect both options.

1. On the **Import Details** page, look at the blank records options in the central column. The check box next to **Remove blank entity records** is already selected. The option to **Remove blank link records** is not selected.
2. Set the options to suit the requirements for your import specification, or leave them unchanged to remove only blank entity records.
3. When the **Import Details** page is complete, click **Import** to run the import specification.

## Applying a layout to an import specification

On the **Import Details** page of the import wizard, you can apply automatic layouts to the chart that receives any new items. Layouts are applied in the sequence in which they are displayed in the list, with the layout at the top of the list applied first.

The layout properties in the **Select Layouts** window are similar to the properties that are displayed if you click the **Arrange** tab, click **Layout Setup**, and then select a layout from the list. However, any changes that you make in the **Select Layouts** window are saved only in your import specification. The layouts that you can select for your import are guided by the type of chart you generate.

To set the layout of the chart that contains new items:

1. On the **Import Details** page, click **Change in Layout imported items using**.
2. Double-click a layout in the Available Layouts list. The layout is added to the Layouts Applied List.
3. Set the properties for the selected layout. The available properties vary from layout to layout.

4. Optional: Select the **Layout imported items only** checkbox to apply the layout only to the new items, rather than the whole chart.
5. Click **OK** to return to the **Import Details** page.

## Setting the security of imported records

An import specification that is aligned with an i2 Analyze schema must include the security dimension values that records receive as they are created. Initially, the values in the specification match the defaults in your user settings, but you can change this behavior on the **Import Details** page.

For a schema-aligned import specification, the **Import Details** page includes a list of all the dimensions in the security schema of the i2 Analyze deployment.

The procedure for providing default values is different for single-value and multi-value dimensions:

1. In the **Security for imported records** section of the **Import Details** page, choose the security dimension for which you want to change the default value.

**Note:** Your system administrator can add, remove, and restore values in the security dimensions on the i2 Analyze server. When they remove a dimension value, it becomes possible for an existing record to have a value that the server no longer uses. If that situation occurs, the 'Specified values' option displays a warning icon and the affected values show as **(suspended)**. You can deselect any suspended values and remove the warning. If you run the import specification without changing the suspended values, the import completes with a warning count of the number of records created with suspended security.

2. For a multi-value dimension, click the button to display the edit window, select all the dimension values to use, and then click **OK**. The default setting for multi-value dimensions is "Any" and this means other users who have access to *any* of the selected values can view the record. If a security dimension is set to "All" it means users must have access to *all* the selected values to view the record. In this scenario, selecting more values means fewer users are able to view the record.
3. For a single-value dimension, use the drop-down list to select a default security value.
4. Click the **Update matched analyst governed records** checkbox to apply the selected import specification security values to incoming records that match either Information Store records, or records on the chart. If the setting is left unchecked, Analyst's Notebook applies the existing Information Store security setting to incoming matches. This setting applies to records that are created and uploaded by Analysts, *not* to system-governed records that are ingested automatically.

## Saving an import specification

Analyst's Notebook supports saving import specifications during and after the creating and editing processes. You can use a saved specification to import an updated version of the same data, or to import new data that has a familiar format.

To save a new import specification, or to save changes to an existing specification:

- On any page of the **Edit Import Specification** window, click **Save**.

If you are creating an import specification, the application prompts for a name.

To create an import specification from one that is already open for editing:

- On any page of the **Edit Import Specification** window, click the arrow next to **Save**, and then click **Save As**.

The application prompts for a name for the new specification, and then opens the duplicate for editing.

## Managing import specifications

Analyst's Notebook supports a range of facilities for managing and organizing the import specifications that you and others in your team create. As well as using the standard functions for renaming and duplicating specifications, you can configure local and shared storage locations.

The tools for managing import specifications fall into two categories. You can change the behavior of the application for all specifications, or you can operate on particular specifications.

Analyst's Notebook supports storing import specifications in two locations that it calls "local" and "workgroup". When you save a specification, you can choose which location it is stored in. You can use configuration settings to change the target of both locations.

- Change the physical folders that the application uses as the "local" and "workgroup" folders:
  - a) In Analyst's Notebook, click the **Home** tab, and then click **Import > Saved Specifications**. The **Import Specifications** window is displayed.
  - b) In the **Other Tasks** pane, select **Change Local Folder** or **Change Workgroup Folder**. The **Browse For Folder** window is displayed, with any current setting selected.
  - c) Select or create a target folder, and then click **OK**.

**Note:** The intention is for the "workgroup" location to be a shared folder, but the application does not enforce that guideline.

Analyst's Notebook displays import specifications from the "local" and "workgroup" locations in a single list. The list of operations that you can perform then changes according to which (and how many) specifications you select.

- Perform file system operations on one or more import specifications:
  - a) In Analyst's Notebook, click the **Home** tab, and then click **Import > Saved Specifications**. The **Import Specifications** window is displayed.
  - b) Select one or more import specifications.
  - c) In the **Specification Tasks** pane, select one of the commands:

Option	Description
<b>Edit</b>	Open the import specification for editing.
<b>Rename</b>	Edit the name of the import specification that you (and potentially other users) see in the <b>Saved Specifications</b> window.
<b>Duplicate</b>	Create a duplicate of the import specification. The new specification has the same name as the original, with the prefix "Copy of ".
<b>Copy to Workgroup Folder</b>	If the import specification is in the "local" location, copy it to the "workgroup" location.
<b>Show data file in Explorer</b>	Open Windows Explorer at the location of the data file that is stored in the import specification.
<b>Show specification in Explorer</b>	Open Windows Explorer at the location of the import specification.
<b>Delete</b>	Delete the import specification.

By default, the **Import Specifications** window displays specifications that are relevant to your context. In Analyst's Notebook, you see classic specifications. In Analyst's Notebook Premium with Opal services, you see schema-aligned specifications. However, you can also work with classic specifications in Analyst's Notebook Premium:

- In the Options pane of the **Import Specifications** window, select **Show classic specifications**. Any classic specifications in the "local" or "workgroup" locations are added to the list.

## Automating file imports

If you have files in the same format that you regularly import, you can automate the process with a command prompt utility. The import process can create items in a new or an existing chart.

Series Import is a command prompt utility that opens Analyst's Notebook if it is not already open. It then automatically runs a named import specification to load data into the chart.

This utility allows multiple import specifications to be run without manual user intervention. A batch file (.bat) can call the Series Import utility as many times as you need. Your import specifications and batch file must be in the same directory as the SeriesImport utility.

**Note:** To use Series Import with schema-aligned import specifications, you must include the file extension .oimp when you create a batch file. For example, `SeriesImport -b filename.oimp -c`.

1. Create import specifications by using the standard import wizard.
2. Create a batch file that references your import specifications.
3. From a command prompt, run the batch file.

If you receive an error when running the batch file, check the directory containing the import specifications and batch file. The directory should contain the SeriesImport utility. By default, the SeriesImport utility is found in the `Utils` directory, for example `C:\Program Files\i2 Analyst's Notebook 10\Utils`. You can either move your import specifications and batch file to the `Utils` directory, or copy `SeriesImport.exe` and `SeriesImport.exe.manifest` into the same directory as the import specifications and batch file.

## Example single file import

You can automatically run a single import specification against its associated data source. This example creates a chart and adds the example data to it.

```
SeriesImport -b Example 1 Specification -c
```

Running this command results in the following actions:

- A new chart is created from the Standard template and given a default name, for example `Chart1`.
- The Example 1 Specification import specification is run, importing the data file `Example 1.txt` (set in the import specification).

## Example batch import

Using a batch file, you can run a series of imports that add data into multiple charts.

```
SeriesImport -b Example 1 Specification
SeriesImport -b Example 2 Specification -i Example 2.txt -c
SeriesImport -b Example 3 Specification -p Military.ant -c
SeriesImport -b Example 4 Specification -p Standard.ant -f
```

Running these batch files results in the following actions:

1. The `Example 1 Specification` import specification is run, importing the data file specified within the specification. If a chart is already open, the data is imported into the existing chart.
2. The `Example 2 Specification` import specification is run, importing the data file `Example.2.txt`. The data is imported into a new chart.
3. The `Example 3 Specification` import specification is run, importing the data file specified within the specification. The data is imported into a new chart that is created from the `Military` template.
4. In the same chart, the `Example 4 Specification` import specification is run, importing the data file specified within the specification. The `Standard` template is merged with the original `Military` template.

## Importing data in XML format

Analyst's Notebook can import data that is stored in XML files if the files are converted to another format or you provide a style sheet that transforms the data to a compatible format.

You could convert XML files to CSV or XLS format and build a specification to import your data. Alternatively, you can transform XML data into Analyst's Notebook Exchange files with an XSLT style sheet. XML data that is converted into ANX XML structure can be imported into Analyst's Notebook without an import specification.

- To import XML data in Analyst's Notebook Exchange, you specify the location of the source file and some processing instructions.
  - a) Click the **Home** tab, and then click **Import > Import from Analyst's Notebook Exchange File**.
 

**Note:** Despite its name, this command supports importing data in any XML format, not only Analyst's Notebook Exchange files.
  - b) In the **Select Data File to Import** window, locate the file that contains your data, and then click **Open**.
  - c) In the **Import XML** window, configure the behavior of the XML import wizard:

### Apply Style Sheet

If you are not importing an Analyst's Notebook Exchange (.anx) file, select this option and specify an XSLT style sheet. The style sheet must transform the XML so that it validates against the Analyst's Notebook schema.

### Create New Chart

Select this option to import the data into a new chart instead of the current chart.

### Layout Imported Items

Select this option to apply a peacock layout to the imported data. Any items that are already on the chart are not affected.

**Enable Enhanced Validation Rules**

Select this option to perform more careful validation before the data is imported.

d) Click **OK** to import the data from the XML file that you selected.

When the import process finishes, the application displays a message that indicates the success or failure of the process. If the import fails, the message includes the location of a log file.

**Note:** Data imports from XML files cannot be used to create records in i2 Analyze.

## Working with i2 Analyze

If you are using Analyst's Notebook Premium, you can connect to i2 Analyze and, depending on your deployment, access intelligence data from within your organization and from external sources.

An installation of i2 Analyze can contain an Information Store, that is a structured store for intelligence data, a framework for connecting to and retrieving intelligence data from external sources, and a searchable store for Analyst's Notebook charts that analysts can use for storing, and for sharing work with their peers.

## Create i2 Analyze chart items

You can create chart items that contain i2 Analyze records. These records can contain information that you receive from other sources, or information that you assert based on your analysis.

When you first create a chart item that contains an i2 Analyze record, the record only exists in the chart item on your chart. When you are ready to share this information, you can upload the record into the Information Store.

You can create duplicates of a chart item that contains an i2 Analyze record, to use as the basis for a similar record. Duplicate records gain a new record identifier but retain all properties, source identifiers, source references, notes and security classification. It is useful to use duplicate records if you want to create a series of similar records on the chart, for example you are charting a number of vehicles of the same make.

Analyst's Notebook Premium includes a record bar beneath the ribbon to provide information about the numbers and types of records on your chart, and their state. You can use the record bar to select the records that you want to work with quickly.

### All records

<b>Entity records</b>	Entity records for the most recent i2 Analyze server
<b>Link records</b>	Link records for the most recent i2 Analyze server
<b>Analyst-governed records</b>	Records for the most recent i2 Analyze server that were created by analysts
<b>System-governed records</b>	Records that were preloaded into the most recent Information Store
<b>Chart only</b>	Records for the most recent i2 Analyze server that are not in its Information Store
<b>Information Store</b>	Records that are in the most recent Information Store



<b>New or edited</b>		
	<b>Not uploaded</b>	Records that are aligned with, but not in, the most recent Information Store
	<b>Edited; can be uploaded</b>	Records that have been edited and can be uploaded to the most recent Information Store
	<b>Edited; upload is blocked</b>	Records that have been edited but are blocked from upload by changes in the most recent Information Store
	<b>Unaligned</b>	Records for the most recent i2 Analyze server that are not aligned with its Information Store
<b>Changed in store</b>		
	<b>Changes available; no chart edits</b>	Records with changes in the most recent Information Store but no edits on the chart
	<b>Changes available; edited on chart</b>	Records with changes in the most recent Information Store and edits on the chart
	<b>Orphaned</b>	Records that are no longer available from the most recent Information Store

## Creating i2 Analyze entities

i2 Analyze entities store their important information in records. To create entities that contain records, drag your selection from the Information Store palette and enter property values in the Record Inspector.

In a chart, the first time that you connect to the Information Store, a new palette is created that contains all of the types in your Information Store.

When you create an i2 Analyze entity, that item contains an i2 Analyze record. You can enter values for some or all of the record properties, and you must enter values for mandatory properties. You can

1. Ensure that the Information Store palette is displayed. This palette contains the entity types that correspond to the types in your Information Store.

If the **Insert from Palette** pane is not visible, click the **Home** tab, and then click **Insert from Palette**. If there is more than one palette, you can select the Information Store palette from the palettes list at the top of the entity section of the pane.

2. Optional: To create an entity that has a representation other than icon, select the representation at the top of the **Insert from Palette** pane.

**Note:** You cannot create an i2 Analyze entity with the OLE Object entity representation.

3. Drag the entity type that you want to create from the palette onto the chart. The Record Inspector displays the record that you created. The property types that are initially displayed correspond to the following property types from the Information Store:

- Properties whose values are used in the record label
- Mandatory properties

4. Enter values on the **Properties** page of the Record Inspector.

You can enter values for properties that are not listed by using the plus button on the **Properties** page. As you create further entities, the Record Inspector remembers which properties you typically use.

5. Optional: To create a duplicate entity, select the target entity on the chart. On the **Ribbon** menu, click **Copy > Duplicate**, from the **Home** tab or right-click on the selected entity and choose **Duplicate** from the screen menu.

When you save your chart, the i2 Analyze entity that you created is saved.

When you are ready to share information, you can upload the records that you create to the Information Store.

## Creating i2 Analyze links

i2 Analyze links store their important information in records. To create links that contain records, drag your selection from the Information Store palette and enter property values in the Record Inspector.

In a chart, the first time that you connect to the Information Store, a new palette is created that contains all of the types in your Information Store.

When you create a link that has one of these types, an i2 Analyze record is created in the item. You can enter values for some or all of the record properties, and you must enter values for mandatory properties.

To create an i2 Analyze link, the entities that you connect must contain i2 Analyze records, and the link type that you use must be permitted between the two entities according to the rules of the Information Store. For example, it might be permitted to connect two people by an association link but not by an owner link.

When a chart item contains multiple i2 Analyze records, such as when two i2 Analyze entities are merged, one of the records is assigned to be the lead record. When you create an i2 Analyze link that is connected to an i2 Analyze entity, the link record is connected to the entity's lead record.

1. Ensure that the Information Store palette is displayed. This palette contains the link types that correspond to the types in your Information Store.

If the **Insert from Palette** pane is not visible, click the **Home** tab, and then click **Insert from Palette**. If there is more than one palette, you can select the Information Store palette from the palettes list at the top of the link section of the pane.

2. If either of the entities that you want to connect contains multiple i2 Analyze records, ensure that the appropriate record is assigned as the lead record in each entity before you create your link. To assign a new lead record:

- a) Double-click the entity to display its records in the Record Inspector.
- b) Select the record to assign as the lead record in the list view.
- c) Click **More actions**

...

( **> Set as lead** )

The lead record is changed. As a result, the label and the icon on the chart might also change.

3. In the palette, click the link type that you want to create, then drag between the two entities that you want to link.

**Note:** If you try to create a link that is not valid between the two entities, you are prompted with a list of valid link types to select from.

The Record Inspector displays the record that you created. The properties that are initially displayed correspond to the following property types from the Information Store:

- Properties whose values are used in the record label
- Mandatory properties
- Link direction

**4.** Enter values on the **Properties** page of the Record Inspector.

You can enter values for properties that are not listed by using the plus button on the **Properties** page. As you create further links, the Record Inspector remembers which properties you typically use.

**5.** Optional: To create a duplicate link, select the target link on the chart. On the **Ribbon** menu, click **Copy > Duplicate**, from the **Home** tab or right-click on the selected entity and choose **Duplicate** from the screen menu.

When you save your chart, the i2 Analyze link that you created is saved.

When you are ready to share information, you can upload the records that you create to the Information Store.

### Related concepts

[Multiple records in one chart item](#) on page 78

Chart items in Analyst's Notebook Premium can contain multiple i2 Analyze records. If you merge two entities that contain records, the result is a single entity that contains two records. If there are several link records that connect the same two entities on the chart, you can choose to represent them as a single link item.

## Chart Store

The i2 Analyze Chart Store provides server-based, secure storage for the charts that you create. You can share charts from the Chart Store with your colleagues, or take advantage of the organizing and indexing features that make charts easier to find.

Analyst's Notebook Premium has features that help you to interact and work with charts in ways that enable you and your team to gain insights and collaborate on investigations. Everyone with authorization can quickly access the latest intelligence and add to the data, ensuring that the most up to date information is available to all team members.

### Discovering charts

How you search for charts in the Chart Store depends on the deployment of i2 Analyze that you connect to:

- If your i2 Analyze server includes the Chart Store and the Information Store, you can use Quick Search to find charts by specifying terms that they might contain. The returned results include records and charts that match the search terms. You can then refine your search or use filtering to focus on finding charts.

Other search tools in Analyst's Notebook Premium do not support the discovery of charts.

- If your i2 Analyze server includes the Chart Store but not the Information Store, use the Shared Charts button on the Home tab to search for charts.

### Opening charts

Analyst's Notebook Premium provides two ways to open charts from the Chart Store:

- You can open charts from the returned results window. When you select **Open**, you are presented with the **Save As** window. You must save a local version of the chart, and then the chart will open.
- The File menu maintains a list of the most recently saved charts. If you previously uploaded a chart to the store and it appears in the list, you can open it from the File menu. If changes have been made to the chart by another user, you are notified to get the latest version.

### Sharing charts

You can share charts by uploading them to the Chart Store. By doing so, you benefit from access to all the information that accompanies the chart in the store, such as notes, source references, and version history.

To upload or update the current chart in the Chart Store, click **Upload Chart** on the Publish tab. If the chart has not been uploaded before, Analyst's Notebook Premium displays the Chart Inspector, where you can provide a name and other information for the uploaded chart.

If the Chart Inspector is already open, you can click **Upload** to achieve the same result.

**Note:** If you have a large number of charts to share, and you have permission to do so, you can use the **Upload from Folder** feature to [upload charts to the Chart Store in bulk](#).

The status of the current chart is displayed in a number of places to help you, including in the application header. You can click **Check for Updates** on the Publish tab to ensure that you are working with the latest version.

If another user causes a chart to change in the Chart Store while you edit a local version, you cannot upload your changes until you accept the update from the store. A good strategy for working with the Chart Store is to save the local version regularly, and to upload a new version of the chart when your edits become significant.

**Note:** You can continue to share .anb files with colleagues, but if the charts you share have also been uploaded to the Chart Store, those files can quickly diverge from the versions in the store. Reconciling the differences between such charts can be a time-consuming process.

### Chart identifiers

All charts created since the introduction of the Chart Store receive a unique identifier that does not change when you save or upload them. This identifier powers the Chart Store's versioning feature and helps to prevent duplicate charts from being uploaded.

However, if you want to use an existing chart as the basis for new, distinct work, then you need to create a duplicate file with a new identifier. To do so, use **Save As Copy** from the **Save As** menu. You can then upload the new chart to the Chart Store independently from the original.

### Chart Inspector

The Chart Inspector is available from the Publish tab. Chart Inspector provides everything you need to view and edit information about your chart. You can use the Chart Inspector to add properties, notes, security settings, and source references to your charts; to check for updates; to upload a new version; or to delete it from the store.

### Security

You can assign security settings to charts in the Chart Store in the same way as for records in the Information Store. However, security conflicts can occur if the chart has different settings from the records it contains. For example, a chart with unclassified settings might contain controlled records.

When you upload a chart that exhibits a security conflict, Analyst's Notebook Premium provides the option of proceeding with the upload by clicking **Upload anyway**. Alternatively, you can abandon the upload by clicking anywhere else on the screen and returning to the chart.

### Version history

The version history of the current chart is available from the Publish tab and from inside the Chart Inspector. The most recently uploaded version is listed at the top, and you can click **Get latest** to open it if you don't already have that version. You can also select an earlier version of a chart from the list and click **Make latest** to work with it as the latest version.

If you do reinstate an earlier version of the chart, it moves to the top of the list and all the previous versions are retained in the version history.

You can delete specific, previous versions of the chart from the list, but not the latest version. If you want to use a previous version as the basis for new work, use the **Open as copy** option from the **Version History** window. (The **Save As Copy** command from the **Save As** menu works in exactly the same way.)

### Deleting charts

When you delete a chart through the Chart Inspector, you remove *all* versions of the chart from the Chart Store. If other users have downloaded the chart, their copies become orphaned, as do any files that you have saved locally. To delete specific versions of the chart, use the version history instead.

## Uploading charts in bulk

If you have a large number of charts to upload to the Chart Store for the first time, you can use **Upload from Folder** from the Publish tab. The operation can be resource-intensive, and so it is prudent to use it in line with the recommendations here.

In order to upload charts in bulk, you must be granted permission to do so. If you do not see the **Upload from Folder** button but think that you should, contact your system administrator.

When Analyst's Notebook uploads charts, it indexes their contents and generates images of them. The more charts there are, and the larger they are, the more significant the amount of processing becomes. Charts that contain images are especially demanding.

If you have a large number (hundreds or thousands) of charts to upload, and especially if some of those charts have the characteristics above, i2 recommends uploading in batches rather than all at once.

1. In the ribbon, on the Publish tab, click **Upload from Folder**.  
Analyst's Notebook displays the **Upload Charts from Folder** dialog.
2. Specify the path to a folder that contains the charts you want to upload to the Chart Store.  
From this dialog you can click the checkboxes to **Include subfolders** in your upload, and **Add Chart Store identifiers to chart files**. When you add identifiers, Analyst's Notebook maintains relationships between the charts on disk and the charts in the store. These relationships drive the version control mechanism, for example.
3. Click **Edit** to provide common information for the uploaded charts, such as notes, security settings, and property values.
4. Click **Upload** to start the upload process.

Analyst's Notebook displays a dialog that reports progress and provides the option to view a more detailed log file.

All the charts from your selected folders and subfolders are uploaded to the Chart Store. In the root folder of the upload, the `BulkUploadSummary.log` file lists the actions, status and record identifier for each uploaded chart. The `BulkUploadSummary.log` file indicates both successful uploads and errors if any uploads failed. Each folder that contains at least one uploaded chart gains a file named `BulkChartUpload.dat`. Analyst's Notebook uses the `BulkChartUpload.dat` files to ignore charts that have been successfully uploaded, should you want to run bulk upload from these folders again.

## Palettes in i2 Analyze

You can create records using entities and links from a choice of user palettes, depending on your type of deployment.

Your i2 Analyze deployment might have access to data in the Information Store, external data through the i2 Connect gateway, or both. When you connect to the Information Store, you have a default user palette that contains the entity types and link types defined by your schema. You can also create custom item types that more closely represent your data, if they are not available in your schema.

If the **Insert from Palette** pane is not visible, click the **Home** tab, and then click **Insert from Palette**. The Information Store palette is at the top of the palettes list in the entity section of the pane.

As well as the Information Store, you might have one or more connections to external data sources whose record types are not mapped to your Information Store schema. In the **Insert from Palette** pane, there is a palette for the Information Store and each of your unaligned connectors. When you create entities and links from these palettes, they are categorized as "Unaligned" in the record bar and cannot be uploaded.

You might be using a number of different aligned and unaligned connectors at the same time. In the **Insert from Palette** pane there is a palette for Information Store, an External palette for the gateway, and a palette for each connector. All aligned records can be uploaded, while unaligned records cannot.

If you are using the i2 Connect gateway only, you can see the External palette for the gateway in the palettes list. You can create new entities and links using the External palette but you cannot upload any records or the chart. You can save a local copy of your chart.

You can upload and share charts that contain unaligned records, however the records remain unaligned.

## Custom types

The entity and link types in the palettes that are governed by an i2 Analyze server might not always closely represent the entities and links in your data. You can create, import, and manage custom item types, and create custom property types for both schema-aligned and custom item types.

If your investigation involves the charting of items that are not available from the palette, you can create your own item types and define properties that are appropriate for them. For example, you might be analyzing the illegal trafficking of wildlife commodities, but you cannot find suitable types that represent species of interest. To enhance the visualization of your analysis, you can create new entity types for each species, along with new link types to the trafficking gangs involved.

You can choose to add your custom types to other open charts, *and* to charts that you open or create in future. When you save custom types to charts and import specifications, other analysts can use them too. However, you cannot upload unaligned records to the Information Store, or distribute them using the [Share Records](#) function.

When you upload or share schema-aligned records, custom property types are not saved to the record.

**Note:** i2 Analyze users with the correct permissions can create custom types and properties. If you are unable to access the palette options, contact your system administrator. Users working with a Chart Store only, or with an i2 Online deployment, are *not* able to create custom types.

## Working with custom types

If the i2 Analyze server that you're connected to doesn't provide item types that represent the items in your data, you can create custom entity and link types for use in Analyst's Notebook charts.

### Procedure

To create a custom entity type:

1. If the Insert from Palette panel is not visible, then from the **Home** tab, select **Insert from Palette**.
2. In the panel, click the **Custom Item Types**



drop-down in the entity pane, and then select **New Custom Entity Type** to display the New Custom Entity Type dialog.

3. Type a name for your new custom entity type in the **Name** field.

When you finish creating the type, Analyst's Notebook adds a code to the end of the name to ensure that it's unique.

4. If you select **Automatically add to opened charts**, the new type is added to the **Custom** palette in this chart, in other open charts, *and* in charts that you open or create in future.
5. To provide an icon for the custom type, click **Select** in the Icon box and choose one.

If you want to use a custom icon, see [Custom icons](#) for more information. If you do not select an icon, your custom type uses the default icon shown.

6. Click **OK** to finish creating the type.

**Note:** You cannot edit the name or icon of a custom type after you create it. If you're not happy with a new custom type, you must delete it and create another.

To create a custom link type:

1. If the Insert from Palette panel is not visible, then from the **Home** tab, select **Insert from Palette**.
2. In the panel, click the **Custom Item Types**



drop-down in the entity pane, and then select **New Custom Link Type** to display the New Custom Link Type dialog.

3. Type a name for your new custom link type in the **Name** field.

When you finish creating the type, Analyst's Notebook adds a code to the end of the name to ensure that it's unique.

4. If you select **Automatically add to opened charts**, the new type is added to the **Custom** palette in this chart, in other open charts, *and* in charts that you open or create in future.

5. Select the default summarization for your custom link type from the options available: **Single**, **Directed**, or **Multiple**. To find out more, see [Link summarization](#).

### Results

Your new entity and link types are available for creating items on the chart, and can be easily located in the **Custom** palette. If you selected **Automatically add to opened charts** or saved the chart, your custom types are available the next time you open Analyst's Notebook.

Records created with custom types are not aligned to the i2 Analyze schema. They cannot be uploaded to the Information Store, or distributed to other analysts using the **Share Records** function.

**Note:** If you have a custom entity or link type in the palette that is not configured to be automatically added, or is not used anywhere on the chart, it is not saved to the palette and will not be available the next time you open the application.

## Importing custom types

You can locate and select custom types that were saved in import specifications, and import them into your custom palette.

### About this task

Import specifications define how imported data is converted into entities and links in Analyst's Notebook. When custom entity and link types are created as part of the import process, they can be saved with the import specification. Your local and workgroup designs can be a good source of previously created custom types, and can save you time in needing to create them from scratch.

### Procedure

To import custom types from import specifications:

1. If the Insert from Palette panel is not visible, then from the **Home** tab, select **Insert from Palette**.
2. In the panel, click the **Custom Item Types**



drop-down in either the entity or the link pane, and then select **Import Custom Entity** (or **Link**) **Types** to display a list of the available import specifications.

3. Select a specification. The custom types that it contains are listed, along with their property types.
4. Select a custom type from the list. Hold the *Shift* key to select multiple types. Click **OK** to import them into your custom palette.

### Results

Your imported custom entity and link types are saved in their respective palettes, and available to use on the chart.



## Managing custom types

You can create and control custom entity and link types from the **Custom** palette in your current chart, across multiple Analyst's Notebook sessions.

### About this task

The facility for managing custom types from the **Insert from Palette** panel provides combined views of all your custom entity and link types, including those created through import designs. It indicates if types are automatically added to open charts, and gives you the option to toggle that option on or off. You can also add new types, duplicate existing types, and delete types.

Duplication is a helpful way to save time in creating types without starting from scratch. For example, you might want to create a custom type that shares the same or similar properties with a type that you or another analyst has already created.

### Procedure

To manage custom types:

1. If the Insert from Palette panel is not visible, then from the **Home** tab, select **Insert from Palette**.
2. In the panel, click the **Custom Item Types**



drop-down in either the entity or the link pane, and then select **Manage Custom Entity (or Link) Types** to display an alphabetical list of custom types.

3. Either click **New** to create a custom type, or select one to work with from the list.
4. Custom types that are added to all opened charts are indicated by a blue dot



in the list, and the checkbox is selected.

If you clear the checkbox, the indicator is removed and the type is no longer automatically available in new charts. You can reinstate the behavior by re-selecting the checkbox.

5. Click **Duplicate** to use an existing custom type as the basis for a new one.
6. Click **Delete** to delete a custom type from the chart.

If you accept the warning, the type is deleted from the **Custom** palette, along with any records of that type on the chart. The type is not removed from other charts, but it is no longer automatically added to them.

## Working with custom property types

You can create and manage custom property types for the entity and link types defined in i2 Analyze schemas, and for the custom item types that you and other analysts create.

### About this task

Sometimes, the items in the data you're investigating might have properties that aren't represented by the property types in the schema. For example, you might want to include information about account holders' banks, and need to add a Bank Name property type to the Account entity type in your current

schema; or if you created a custom type called Dog, you might want it to have a Microchip Number property type.

When you upload a record to the Information Store that has a value for a property of a custom type, that value is not uploaded with it. For example, imagine adding a custom property type named Hair Style to the Person entity type. You might then create a Person record and enter "Curly" as the value for the Hair Style property. In that situation, the **Upload Records** dialog warns you that custom properties will not be uploaded. If you later search for that record and add it to another chart, it will not have a Hair Style value.

## Procedure

To create a custom property type, and a custom property:

1. Select an item on the chart and open the Record Inspector.
2. On the **Properties** tab, click **Add**. The **Add Properties** list opens.
3. Click **New type** and then select **Create custom property type**. The **Create property type** dialog opens.
4. Enter a unique name for your new property type.
5. Choose the **Logical type** that values of properties with your type will have. For more information, see [Logical types and variants](#).
6. Select **Create in all open charts** if you want the new property type to be available in all open charts.
7. Select **Add to record label** if you want the value of a property with this type to form part of the record label.

**Note:** This option is not available when you add a custom property type to an item type from the i2 Analyze schema.

8. Select **Use in record matching** to specify that records can match each other only when they have the same value for a property of this type.

**Note:** This option is not available when you add a custom property type to an item type from the i2 Analyze schema.

9. In the **Insert after** field, choose where you would like properties of your new type to appear in the Record Inspector's property list.

10. Click **OK** to confirm the settings of the new property type.

The Record Inspector uses the **Custom property type** icon



to indicate custom property types whenever they appear.

To remove a custom property:

1. Select an item on the chart and open the Record Inspector.
2. On the **Properties** tab, click the **Actions** button (...) next to the property you want to remove.
3. Click **Remove**. The property is removed from this record, but properties of the same type remain on other records. You can replace the property from the **Add properties** dialog.

To edit a custom property type:

1. Select an item on the chart and open the Record Inspector.

2. On the **Properties** tab, click the **Actions** button (...) next to the property whose type you want to edit.
3. Click **Edit property type**, make your changes, and click **OK**.

To delete a custom property type:

1. Select an item on the chart and open the Record Inspector.
2. On the **Properties** tab, click the **Actions** button (...) next to the property whose type you want to delete.
3. Click **Delete property type**. A warning is displayed.

**Note:** If you delete a custom property type, all properties with this type are removed from *all* records on the current chart. You can re-create a deleted property type by copying a record with a property of the same type from another chart.

4. Click **Delete** to proceed, or **Cancel**.

## Working with an Information Store

Before you can search for, create, update, or delete the records in an Information Store, you must connect to and log in to it through Analyst's Notebook Premium.

1. If you do not already know them, find out the address (URL) of the Information Store and your login details (user name and password) from your system administrator.
2. Click **Change Connection Details**



in the upper-right corner of the application window.

3. Enter the URL of the Information Store and click **Connect**.
4. If you are prompted, enter your user name and password and click **Log in**. When you are logged in, a 'friendly' name for your server, *Training* for example, is displayed instead of the connection icon. This can be useful if you use multiple servers and want to check which environment you are working in. If your system administrator has not configured a friendly name for the server, the connection icon is shown.

**Note:** If you don't do anything, then after a short time you might be automatically logged out. If your connection to the server is lost, you are prompted to log in again.

## Settings

When you log in to the Information Store, you can choose to change some default settings. This gives you more control over application behavior.

### Procedure

1. Click the arrow next to your Username in the ribbon.
2. Click **Settings** to open the i2 Analyze Settings dialog.
3. Select the behavior you want to change.
4. Click **OK**.

## Double-click entities

When you double-click an entity record on the chart, by default the **Record Inspector** opens. You can change this behavior to perform **Expand** instead. Select the radio button next to **Expands Information Store Records**. When you double-click any entity record from the current Information Store, expanded records from the store are copied to the chart. If you double-click any selected record when multiple records are selected, the expand operation is applied to all selected Information Store records. You can hold `shift` when you double-click an entity record to use **Expand with Conditions** and filter your expand results. You cannot use double-click to expand records that are not present in the Information Store. If you double-click a link record, the **Record Inspector** opens. The behavior persists until you change it.

## Default charting scheme

When you create a new chart, the charting scheme defaults to the last used scheme. You can set the charting scheme for new charts to default to a particular scheme. Select your default charting scheme from the drop-down list in **i2 Analyze Settings**. This scheme persists until you select an alternative.

## i2 Maps

If your map provider is set to i2 Maps, the default behavior is to automatically add i2 Analyze records containing geospatial data to the map. The i2 Maps checkbox in **i2 Analyze Settings** is selected by default, matching the application's **Add records automatically** setting. You can choose to uncheck the option so that records are not added automatically for new charts.

- Charts created before the automatic add to map feature was introduced open with the same setting as **i2 Analyze Settings**.
- Charts created after the automatic add to map feature was introduced open with the setting that was saved with the chart.

When you create a new chart the automatic add to map feature adheres to **i2 Analyze Settings**. If you already have the option unchecked in the Settings dialog, records are not automatically added to the map.

The setting takes effect for any new charts you create, and persists until you change it.

## Display pictures

You can choose to use image URLs from source references as pictures for entities on the chart. The image from the lead record's most recent source reference is used in place of the entity's icon. Click the checkbox to select the option.

You can also choose to use this option on charts that have more than 1000 images, although this can affect performance.

## Key concepts

When you connect to an Information Store from Analyst's Notebook Premium, you can access the data that is contained in the Information Store, and share your own records.

The data in an Information Store is contained in entity records and link records. You can search for records uploaded by other analysts to use in your investigations. You can copy data from the store to visualize into new charts, and you can enrich existing charts with new intelligence. When you use Analyst's Notebook Premium to create records, you can upload them to the Information Store to share with other people who have the required level of access.

Depending on your deployment, you might have access to connectors that enable you to search for and retrieve data from external data sources. You can work with records from external sources, even if the connector or gateway schemas are not aligned with your Information Store schema. Charts that contain both aligned and unaligned records can be saved locally, or uploaded to the Chart Store for other analysts to work on. You cannot upload unaligned records to the Information Store. Analyst's Notebook Premium tells you if a record is unaligned in both the record bar beneath the ribbon menu and the **Record Inspector**.

**Note:** Your organization controls your access to the Information Store and you might not have permission to work with restricted data.

## Items and records

When Analyst's Notebook Premium is connected to an Information Store, the items that you add to a chart can contain i2 Analyze records. From the application's point of view, each record holds of a set of information about the item that contains it. The appearance of the item depends on the information in the records that it contains.

An i2 Analyze record can contain properties with values; details about its history and settings; and notes that you or other contributors have added to provide extra information.

### Properties

Properties are the primary mechanism for storing information in a record. Each property contains a piece of data about an entity or link record of a particular type. For example, a 'Person' entity record might have property types such as 'Given Name', 'Date of Birth', and 'Passport Number'. Adding information to property values allows that information to be categorized and analyzed in different ways. Some property values affect the appearance of the item that contains them, such as when they are used as the label.

### Notes

Notes allow you to add information to a record that is not dependent on its type. You can add a note to a record to provide information that is not included in any of the properties. Furthermore, you can add notes to records that were loaded into the Information Store from external sources without affecting the original information.

### Details

In addition to the property values, records contain information about who has permission to view them, who created or modified them in the past, and where they came from. These details might enable you to talk to the person who created a record, or to determine who else has access to it.

**Note:** Your organization controls your access to records in the Information Store. Based on your access level, you might not be able to access restricted records, or perform specific tasks such as [uploading records](#), [deleting records](#), and [accessing notes](#).

## Records in chart items

The chart always has all the data for all the records in all the items that it contains. You can work with the records on the chart even when you are not connected to the Information Store:

- When you search for and retrieve information from the Information Store to Analyst's Notebook Premium, the application creates chart items that contain copies of the Information Store records.
- If you create an item that contains an i2 Analyze record (through the Information Store palette), the application stores the new record in the chart until you can upload it to the store.

Analyst's Notebook treats items that contain i2 Analyze records differently from standard Analyst's Notebook items. For example, item properties such as the label are derived from property values in the record, and so some of the Analyst's Notebook options for editing these items are disabled.

Even when you are connected to an Information Store, charts can also contain items that do not use the Information Store schema. When you create these items, the properties that they contain are based on types that are defined in an Analyst's Notebook chart template. You cannot upload records to the Information Store from items that do not contain i2 Analyze records.

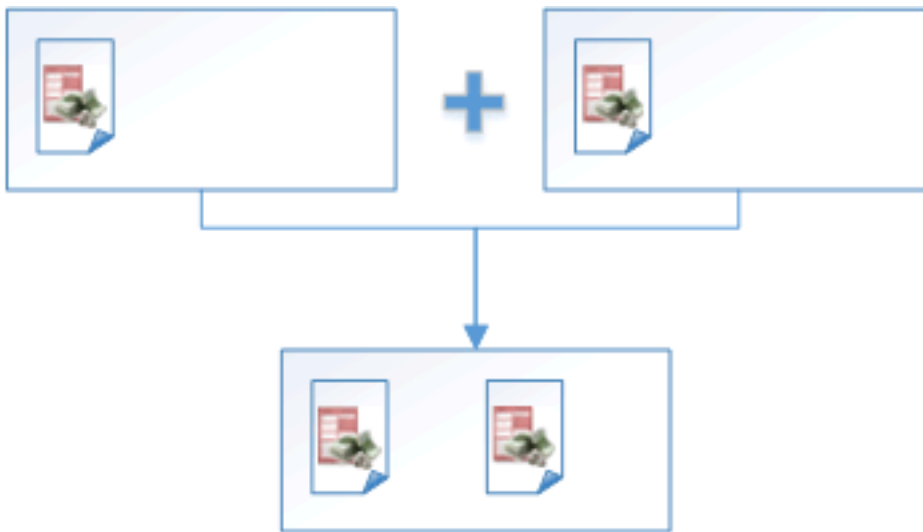
**Note:** Other chart items might originate from another data source such as iBase and contain data records.

### Multiple records in one chart item

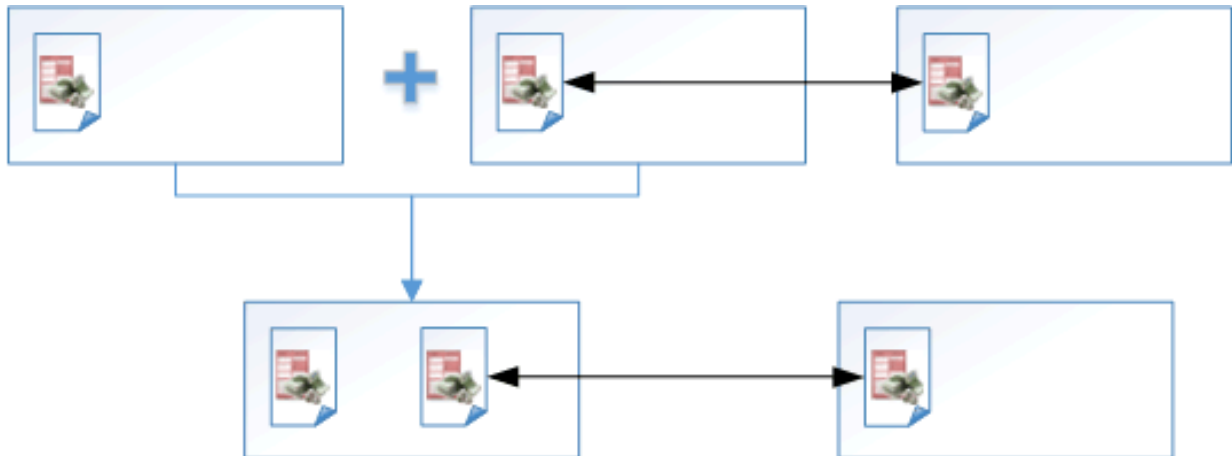
Chart items in Analyst's Notebook Premium can contain multiple i2 Analyze records. If you merge two entities that contain records, the result is a single entity that contains two records. If there are several link records that connect the same two entities on the chart, you can choose to represent them as a single link item.

### Merged entities and existing links

When you merge two i2 Analyze entities, the resulting entity contains the records from both entities:



Any links that were connected to the original entities are retained on the merged entity:



Each link is connected to the record in the entity to which it was originally connected.

In the Information Store, link records connect two entity records. Therefore, when you create an i2 Analyze link between two i2 Analyze entities on your chart, the link connects to a particular record in each entity.

### Lead records

When a chart item contains multiple i2 Analyze records, one of the records must be assigned as the *lead record*. The lead record is used in the following ways:

- Analyst's Notebook Premium bases the label that is displayed on the chart surface for an item on information in the lead record.
- When you create an i2 Analyze link, the link is connected to the lead record in each of its ends. When you upload the link to the Information Store, the link connects those records.

In entities that contain multiple records, the lead record is shown in the Record Inspector with a blue diamond



If you need to, you can change the lead record assignment before you create a link. Changing the lead record can also cause the label and the icon on the chart to change.

### Sharing information

When you work with the Information Store, you can share information and assertions with other analysts and discover whether other analysts have findings that are of interest to you. You can collaborate with other analysts by uploading new or edited records, and notes to the Information Store.

There are many reasons to share your information. For example:

- To share records that you have created
- To update shared information with new intelligence

- To add notes to new or existing records that provide more insight about an item, or provide operational information
- To benefit from the intelligence shared by other analysts

However, there are also times when you might not want to share or update information. For example, in evidential situations, you might not be allowed (or it might be inadvisable) to share your proposals for further investigation before they are confirmed.

The security settings and processes in your organization might constrain which records you can and cannot share.

## Searching the Information Store

You can find records of interest in the Information Store by searching for terms that they might contain, or by using a structured search to look for data in specific properties. You can also use a structured search to discover relationships.

Different search tools in the **Information Store** group on the **Home** tab of the ribbon fulfill different needs:

### Quick Search

Search for text that appears in the records stored in your Information Store. You can filter the results of a Quick Search after the search completes to help you to find the information you need.

### Visual Query

Create searches that allow you to find specific structures in the data. You can draw the structure that you are looking for and use conditions to constrain the search.

### Expand

When chart entities contain copies of records from the Information Store, you can expand to find connected records, and add items that contain copies of those records to the chart.

### Expand with Conditions

Instead of copying all the connected records to your chart, you can add conditions to the expand function so that you copy records only of particular types.

### Get Paths

You can select two entities on your chart and find the paths that connect them.

### Get Matches

You can find out whether selected records on your chart match with records in the Information Store.

## Using Quick Search

You can use Quick Search to find records and charts of interest in the Information Store by specifying terms that they might contain. After you receive the first set of results, you can refine them to find the information that you are most interested in.

You can use Analyst's Notebook Premium to find records and charts in the Information Store that match search terms that you enter. By default, the application finds records and charts that closely or exactly match all the terms that you enter. You can use operators and rules to change the default behavior.

**Note:** Other search tools do not support the discovery of charts. Use Quick Search to search for charts in the Information Store.

### Matching behavior

By adding special characters to your search term, you can control the level of specificity:



" "	To search for an exact word or phrase, enclose it in double quotation marks. For example, "John Doe" matches the phrase <i>John Doe</i> but not the word <i>John</i> .
" ~integer	To search for terms that are within a specified distance from each other, enclose two or more terms in double quotation marks followed by tilde (~) and an integer value. The integer specifies the distance limit, where the distance is the number of words that can be between each pair of terms. For example, "John Doe"~1 matches <i>John James Doe</i> but not <i>John James Simon Doe</i> .  To match terms in a different order, changing the order of the terms counts as a distance of 2 towards the total distance value. For example, "Doe John"~1 does not match <i>John James Doe</i> , but "Doe John"~3 does.  To return a match, each word in the search term must be within the specified distance of any adjacent words in the search term.
?	Matches a single unknown character. For example, J?n matches <i>Jan</i> and <i>Jon</i> but not <i>Jean</i> .
*	Matches zero or more unknown characters. For example, J*n matches <i>Jn</i> , <i>Jan</i> , <i>Jon</i> , and <i>Jean</i> .

### Logical operators

By default, when you search for multiple words, the results must match all the words that you enter. For example, John Doe (no double quotation marks) searches for items that contain words like *John* and words like *Doe*. You can change the search behavior and build more complicated searches by using the following logical operators:

AND	Searches for records that contain all words or phrases. For example, <i>Offense</i> AND "John Doe" searches for records that contain words like <i>Offense</i> and also contain the exact phrase <i>John Doe</i> .
OR	Searches for records that contain at least one word or phrase. For example, <i>Offense</i> OR "John Doe" searches for records that contain words like <i>Offense</i> , or the exact phrase <i>John Doe</i> , or both.

NOT

Searches for records that do not contain the word or phrase. For example, *Offense* NOT "John Doe" searches for records that contain words like *Offense* but do not contain the exact phrase *John Doe*.

### Search scope

You can use the **Advanced**



option to specify where term matches are found.

1. On the **Home** tab of the ribbon, in the **Information Store** group, click **Quick Search**. The **Information Store Quick Search** window opens.
2. Type the terms that you want to search for, and press Enter.

When you type the search terms, Analyst's Notebook Premium explains how it interprets the search expression. For example, it shows the locations of implicit AND operators, and inserts parentheses to make operator precedence explicit.

When you press Enter, Analyst's Notebook Premium searches the Information Store, and displays the records and charts found, if any.

3. After you receive results, you can refine the search terms or use filtering to reduce the result set. To filter results based on record types, property values, or metadata, select a type and then choose one or more properties or metadata categories to filter by.

For example, a search for the word *Ford* might display results for people and cars. Select the *Person* type to display results for people, and then select properties that are related to the person's name to filter out everything except people whose name contains a word like *Ford*.

Each filter is displayed at the top of the window.

**Note:** To remove a filter, delete it by clicking the cross next to the filter. Clear the text in the search input field by clicking the **X**.

When the search results are displayed, you can copy one or more of the records that they represent to your chart or you can open a chart that has been saved in the store.

## Structured searching

You can use Visual Query to search for records in the Information Store based on the values of specific properties and on their relationships to other records. The records that you find depend on the structure of the queries that you create.

Two steps are involved in building a Visual Query:

- Define the structure of the query to indicate the types and relationships of the records that you are interested in.
- Add conditions to the items in the structure to define some of the values in the records that you want to find.

## Visual Query structure

Any query structure that you build defines the types of records that you are searching for and the relationships between them.

The query structure constrains the search by type and by relationship. It can consist of:

- A single query entity

For example, a query structure that contains only a Person can find people in the Information Store regardless of any relationships they might have.

- An entity-link-entity query combination

For example, a query structure that contains a Person and a Vehicle with an Owner link between them can find people who own vehicles.

- A more complex network of query items

For example, a query structure that contains a Person that is linked to a Vehicle through an Owner link, and also linked to an Account through an Account Holder link. This query can find people who own vehicles and are account holders.

When you define a query structure, you can:

- Specify link direction on any of the links in the structure. For example, you might want to search for transaction links *from* a particular Account *to* any other account.
- Indicate that multiple records of a type must be present to meet the query criteria, by adding a count condition on an item in the query structure. For example, you might want to search for accounts that are involved in transactions to at least two other accounts. You can specify the count condition using the **Greater than or equal to** operator with a value of 2, when you add query conditions.
- Where your query entity has links to two or more other entities, specify which relationship the count condition applies to.

**Note:** You cannot specify a count condition on more than one query item.

## Defining the structure of a Visual Query

The first part of creating a Visual Query is to define its structure by adding query items.

1. On the **Home** tab of the ribbon, in the **Information Store** group, click **Visual Query**.  
The **Information Store Visual Query** window opens. If you have used the Visual Query feature before, there might be a list of [saved queries](#) in the window.
2. Open a saved query, or click **New query** to create one.  
Analyst's Notebook opens a new tab in the **Information Store Visual Query** window.

For a new query, the **Edit query structure** window opens immediately.  
For a saved query, you can click the **Edit structure** button



3. In the **Edit query structure** window, add the query entities that represent the structure that you want to find. To add a query entity, drag an entity type from the query palette to the query surface.  
When you place or select a query entity on the query surface, the details about that entity are displayed. Query items must have unique labels. You can overwrite the default label should you want to change it.

4. Link the query entities in the structure with query links. To create a link, select the two query entities that you want to link.

If there are no suitable link types available between the selected entities, you see the `No valid link types` message.

5. From the **Multiple query items** window, select a link type.

When you select a link type, the options that you can apply to the link are displayed. Like entities, links must have unique labels, however you can overtype the default label should you want to change it.

6. Optional: To prevent results from being returned for a particular query item, deselect the **Include in results** box. For example, from your query structure of a Person, a Vehicle and an Owner link, you might want to see the owners but not the vehicle details. You should leave **Include in results** selected for the Person query entity. When you turn off the option for the Vehicle query entity, the link is automatically turned off too, and an icon is displayed next to all the query items that are not included.

Be aware that a link record can only be returned if both end records are present. When you choose to exclude entities, you also exclude their associated links.

7. Optional: To add a direction to a query link, choose an option from the Direction list.

8. Optional: To indicate that results must contain multiple records for a query item, set a count on the query item. For example, using your query structure of a Person, a Vehicle and an Owner link, you might want to find people who own a certain number of cars. Select the Vehicle query entity in the query structure, then click the **Count condition** button. Click **OK** and in the count condition structure, select **Equal to** and type the number.

You can set a count on only one item in the query structure. If you set a count on a second item, the first one is removed.

9. Optional: If you have enabled **Count condition** on a query entity that's linked to two or more query entities, you can select which relationship to apply the count condition to. By default, it applies to all relationships. Click the checkbox to deselect a query entity to which the condition does not apply. You cannot deselect all the query entities in the list.

10. Click **OK**.

After you click **OK**, you can edit the query structure at any time by clicking the **Edit structure** button



After you define the query structure, add conditions to the items in the structure, and then run the query.

### Related concepts

[Visual Query conditions](#) on page 84

You can constrain a search according to the properties and metadata of records in the Information Store by adding conditions to the Visual Query. You can add conditions to any of the items in a query structure.

## Visual Query conditions

You can constrain a search according to the properties and metadata of records in the Information Store by adding conditions to the Visual Query. You can add conditions to any of the items in a query structure.

A query condition is made up of a property or metadata type, an operator, and one or more values. The number of values depends on the operator that you choose.

By adding query conditions, you can look for records with specific values or ranges of values in their properties; and you can also involve metadata such as record identifiers or date of upload. You can narrow the focus of the search by gradually adding more conditions, increasing the complexity of the query. For example:

- If your query structure consists of a single Person type, you can narrow the focus to search for all people with the given name John and family name Doe.
- By adding query conditions to more than one query item, you can find people called John Doe who own a car with a license plate that starts ABC.
- By adding a count to a query structure, then entering a value of 2 for the count as part of the conditions, you can find people who own at least two cars.
- By adding a condition to return records with notes that contain a particular string, you can identify more records that might be relevant to your analysis.
- By specifying characteristics that are described by a link between two accounts, you can identify accounts that are involved in high value transactions, such as links that represent transactions of value greater than \$75000.

When you add conditions to a query, the first step is to select the query item, then the property or metadata type within that query item for which you want to add conditions. After you select the type, several operators are available to use. (For example, 'Between', 'Is exactly', 'Is not', 'Matches wildcard pattern'.) The 'Between' operator is inclusive (it includes the values that you enter). Not all operators are available for all types - for example, you can only select 'Is exactly' or 'Is not' for record identifiers.

When you add conditions to property and metadata types, there are several things to consider:

- Aspects of date and time types
- Use of wildcards
- Multiple values in a single condition
- Whether all conditions have to be met (AND), or just one of the conditions must be met (OR), or a combination of both

### **Date and time types**

For types that store date, time, or date and time values, you can create conditions such as 'Date of Birth equal to 15 Mar 1966' or 'Date first uploaded later than 01 Jan 2018'. However, you can also add conditions that use *aspects* of such values, which allow you to search for transactions that were made on any Monday, or dates of birth that are 1 Jan in any year.

When you create a date and time condition, you must choose an aspect to use. For example, Date of Birth might appear in the Add Condition window several times with different aspects: Date of Birth » Date, Date of Birth » Day of Week, Date of Birth » Month.

If you specify a time as part of a condition, you can choose how to deal with time zones. The choice that you make affects the search that takes place. When you select a time zone, all times are converted to that zone for comparison, so a time of 1pm GMT matches 8am EST. If you decide to ignore time zones, times are compared literally, so that a time of 1pm GMT matches 1pm EST, as well as 1pm in any other time zone.

### **Wildcards**

If the value is a string, the 'Matches wildcard pattern' operator is available. The following wildcards are supported:

?	Matches a single unknown character. For example, J?n matches Jan and Jon but not Jean.
*	Matches zero or more unknown characters. For example, J*n matches Jn, Jan, Jon, and Jean.

### Multiple values

By default, each line in the value of a condition is treated as a single value, including any spaces and wildcards. If the value is a string and you select 'Is exactly' or 'Is not' as the operator, you can enter several values. You can include more than one value by entering each value on a separate line. If a text file contains the values that you want to use, you can import values from the file. Any file that you use must have the file type `.txt` and must contain row-separated values.

### Combining conditions

After you create one condition, you can add another that uses the same type, or create another on a different type or a different query item.

- If you specify conditions on different items in a query structure, the conditions on the different query items must all be met (AND). For example, if the structure of your query contains a Person entity that is linked to a Vehicle entity, you might specify the following conditions:

- On the Person entity, Family Name is exactly Young.
- On the Vehicle entity, License Plate contains 123.

The query results then contain people with the family name Young who are linked to a vehicle whose license plate contains 123.

- If you add conditions involving different property or metadata types to the same query item, all of the conditions must be met (AND). On a Vehicle query entity, if you specify that License Plate contains 123 and Color is exactly Black, then the query returns only vehicles that meet both of those conditions.
- If you add several conditions involving the *same* property or metadata type to the same query item, then how the conditions are combined depends on the operators that you choose.

For example, if the same query item has Color *is exactly* Black and Color *is exactly* Blue, then vehicles are returned when either of those conditions is met (OR). However, if those conditions are Color *is not* Red and Color *is not* Green, then vehicles are returned only when both conditions are met (AND).

When you add conditions like these to query items, the editor displays **AND** or **OR** above the operator name to indicate how they'll be evaluated. Regardless of the order they appear, ORed conditions involving the same property or metadata type on the same query item are always evaluated together.

- If you specify multiple values for a single condition, at least one of the values must be met (OR).

### Adding conditions to a Visual Query

After you define the structure of a Visual Query, you can add query conditions to the items in the query structure to look for records with specific values in their properties and metadata.

This example describes the conditions that you might specify for the following query.

Imagine that you want to search for people who are called John Doe, own a car, and hold at least two accounts. The car is blue and the license plate starts with ABC. To achieve this query, the structure

must take the form of a Person that is connected to a Vehicle with an Owner link. The Person must also be connected to an Account with an Account Holder link. The Account must be given a count condition.

You must then set the following query conditions:

- On the Person query entity:
    - Given Name is exactly John.
    - Family Name is exactly Doe.
  - On the Vehicle query entity:
    - Color is exactly Blue.
    - License Plate starts with ABC.
  - On the Account query entity, the count condition must have the value greater than or equal to 2.
1. The **Query conditions** pane of a new or open query in the **Visual Query** window contains a list of all the items in the query structure. Click the plus icon



next to the item that you want to add the condition to.

The **Add or remove conditions** window opens. Property types are listed first, followed by metadata types.

2. Select the property or metadata type, or date and time aspect for which you want to add conditions and click **OK**.
3. For each property or metadata type, select the operator and enter or select the value. For some types and operators, you can enter multiple values. To enter multiple values:
  - a) Click the **Edit value list** button



next to the value.

- b) Enter each value on a separate line.
- c) Optional: If you have a text file that contains the values that you want to add, you can import it. Click **Import text file** and browse to the file. Any file that you import must have the file type `.txt` and must contain row separated values.

**Note:** Value fields in a condition have a maximum number of characters. If you try to import a file that contains too many characters, no text is inserted.

**Note:** Searches are not case-sensitive.

4. To add a second or subsequent condition with the same type, click the **Actions** button



next to the type, then click **Add Another**.

5. Repeat steps 1 - 4 for the other entities and links in the query structure for which you want to add conditions.

6. After you add the conditions, click **Run**.

Analyst's Notebook Premium executes the query and displays the results.

7. After you receive results, you can refine the search terms or use filtering to reduce the result set. To filter results, select a value (or a value range) for a particular property or metadata category.

For example, a search for people with the first name `John` who are linked to an address might display many results for the Person type. You might then select a property value range to filter out all results except people whose date of birth falls in the range 1959 - 1964.

Each filter is displayed at the top of the window.

**Note:** To remove a filter, delete it by clicking the cross next to the filter.

8. Optional: You can filter the results further using text search terms. Type your text into the input field and hit enter. If the text is found in the search results, it is highlighted. Click **X** on the input field to clear the text, or overwrite the text with a new search term.

9. **Include context** automatically includes the associated links when you copy entity records from the result set to the chart. For example, if your results include people and the cars that they own, when you copy a Person record to the chart, their Vehicle records and link records are also displayed. Click the button to deselect the option.

You can use **Include context** only with records returned in the result set. If you specify in your query structure that you do not want linked vehicles returned in the results, you cannot use include context to retrieve them.

When the search results are displayed, you can copy one or more of the records that they represent to your chart.

### Related concepts

[Visual Query structure](#) on page 83

Any query structure that you build defines the types of records that you are searching for and the relationships between them.

## Saving a Visual Query

You can save a Visual Query so that you can run it on multiple occasions without repeatedly specifying the same search structure and conditions. You can also arrange for a saved Visual Query to run automatically and alert you when its results change from one run to the next.

When you are creating or editing a Visual Query, you can save it with a name and a description that help you to find and run it again. The **Visual Query** window contains a list of all the available queries, and provides features for managing them.

When you enable *alerts* for a saved Visual Query, i2 Analyze monitors the query results to detect changes. If the query finds more records than it did when you activated the setting, or some records no longer match the query, Analyst's Notebook displays an alert. To view alerts and the records that caused them, click the **View alerts** button in the Analyst's Notebook title bar.

To save a new query, or to save an open query with a new name:

- On the same page as the **Query structure** pane, click **Save as**. The **Query details** window appears.
- Enter a name and a description for the new Visual Query.
- If you want this query to generate alerts, select the check box. You can change your decision later through the **Alerts** setting on the **Saved queries** tab.
- Click **Save**.



To save changes to a query that you opened from the list:

- On the same page as the **Query structure** pane, click **Save**. Analyst's Notebook updates the saved Visual Query.

Any Visual Query that you save is added or updated in the **Saved queries** list, and becomes available for you to use whenever you log in to the connected i2 Analyze server. If you also enabled alerts, and data that matches the query changes, then alerts appear in the **Alerts** list.

To filter alert results, select a category such as Person, or use text search terms. Type your text into the input field and hit enter. If the text is found in the search results, it is highlighted. Click **X** on the input field to clear the text, or overtype the text with a new search term.

## Adding geographic locations to a Visual Query

When records contain geospatial properties, you can define a Visual Query that locates records based on a search area in i2 Maps.

When you use i2 Maps as your map provider in Analyst's Notebook, you can define a search area by drawing a rectangle or polygon on your base map. You can also define a specific area, district, or region by using GeoJSON data from other applications.

For example, you might want to search for, and chart, people with connections to a particular location. You can create a Visual Query with a geospatial condition as part of your query structure. When you run the query, Analyst's Notebook finds the entity records that are linked to that area.

To get started, define the structure of your Visual Query in the usual way. You can add geospatial conditions for entities that have a property type of Geographic Location.

- To create a search area using **Maps**:
  - a) In the **Query conditions** pane of your Visual Query, click the plus icon



next to the entity you want to add the condition to.

The **Add or remove condition** window opens.

- b) Select a **Geographic Location** property and click **OK**.
- c) To edit the geospatial area, click the



icon.

The **Edit search area** window opens and displays the Map view. You can zoom in and out, and pan to different parts of the map.

- d) Optional: Click **Options** to see the base maps and overlay elements that are configured for your deployment.
- e) To draw a shape on the map, click either the polygon icon or the rectangle icon.

Polygon	Click to insert the first point, then click to add more points. Click on the first point again or the <b>Finish</b> option to complete the polygon.
Rectangle	Drag over the area and release the mouse button to complete the rectangle.

- f) Use the **Edit shapes** or **Delete shapes** options to make changes if required.

**Note:** When you draw a shape on the map, Analyst's Notebook calculates the GeoJSON coordinates and the feature collection object in the GeoJSON window.

- g) Click **OK** when you have finished drawing and editing your search area.  
The **Edit search area** window closes and a thumbnail graphic is displayed next to the entity.
- h) Optional: Click the **Actions** icon

...

to add or remove geographic locations.

- To create a search area using GeoJSON data:
  - a) To edit the geospatial area, click the



icon and click on **GeoJSON** to change the search area from **Map**.

- b) Paste or enter a GeoJSON feature collection object into the text area.
- c) Click on **Map** to view your GeoJSON data on the map or **OK** to return to **Query conditions**.  
A thumbnail graphic of the map view with an outline of your GeoJSON area is displayed next to the entity.
- d) Optional: Click the **Actions** icon

...

to add or remove geographic locations.

- e) After you add the conditions, save your query or click **Run**.

## Expanding entities

When chart entities contain copies of records from the Information Store, you can expand to find related records, and add items that contain copies of those records to the chart.

Three stages are involved in expanding entities that contain copies of records from the Information Store:

1. Examine the records that the selected chart items contain.
2. Find records in the Information Store that are directly connected to them.
3. Add chart items that contain copies of the directly connected records.

Rather than simply adding all the related information to your chart, you can also expand with conditions, allowing you to decide on the types of records to add. For more information, see [Expand with conditions](#) on page 91.

Any selected chart items that do not contain records are ignored in expand operations.

If an expand operation finds a record that was already copied to the chart, the application tests whether the record in the Information Store was updated since the copy was made. If a new version is available,

the record in the chart item is marked to indicate that changes are available. You can choose to get these changes.

**Note:** If a record was deleted from the Information Store since the copy was made, the copy is not deleted from the chart. Instead, the record is marked as orphaned, and its relationship to the Information Store is broken.

- To expand all selected entities that contain records:
  - a) On the chart, select the entities that you want to expand.
  - b) Click the **Home** tab of the ribbon, and then in the **Information Store** group, click **Expand**. Links and connected entities are added to the chart.

You can now use the Analyst's Notebook tools to analyze the items that contain the copied records.

## Expand with conditions

Rather than using expand to add all the available, related information to your chart, you can choose instead to expand with conditions. When you do so, you can select which types of records to copy to the chart.

In an expand with conditions operation, you can choose to filter by entity types, link types, or both. For example, if you select a Person entity on your chart, you might choose only to expand to records that have the Vehicle entity type. Alternatively, an Owner link type might be used to connect vehicles with people, and also accounts with people. But it might also be possible to connect accounts and people through an Access To link type. By filtering on entity and link type, you can choose only to expand to accounts that are owned by people.

**Note:** For information on how to expand without using conditions, see [Expanding entities](#) on page 90.

To expand with conditions:

1. On the chart, select the entities that you want to expand.
2. Click the **Home** tab of the ribbon, and then in the **Search Information Store** group, click **Expand with Conditions**.  
The **Information Store Expand with Conditions** window opens.
3. To choose the type of filtering to apply, click **Expand by type**



in the window header and select entity type, link type, or both.

A list of record types that are connected to the selected entities is displayed. If a large amount of connected records are found, you are asked whether you want to **Display** the list.

4. Select the record types and click **Copy to Chart**.

**Note:** To expand by a single type, you can hover over the type and click **Copy to Chart**.

A summary of records that were copied (or marked to show that changes are available) is displayed in the **Expand with Conditions** window. The relevant links and entities are added to the chart.

These entities and links are selected, together with any relevant existing entities and links on the chart. You can click a row in the summary to change the selection. For example, to select only the originally selected entities, click the **Seeds** row in the summary.

5. To close the **Expand with Conditions** window, you can do one of the following:

- Click **Finish**. The **Expand with Conditions** window is reset for next time that you expand.
- Click the **Expand with Conditions** ribbon button. Next time that you expand, the window opens on the last page that you used.

To continue expanding, select entities from the summary and click **Expand Again**.

## Get paths

You can discover if two entities on your chart are connected by finding the paths between them.

The Get Paths function in Analyst's Notebook finds connections in the Information Store between the lead records in two selected chart items.

1. On the chart, select the two entities that you want to find a path for.
2. Click the **Home** tab of the ribbon, and then in the **Information Store** group, click **Get Paths**.
3. From the drop-down list, select the shortest path or paths with a maximum length up to 8 steps. Paths that meet your criteria are displayed on the chart.

**Note:** You might see a message that the Information Store contains no paths that meet your criteria. This does not mean that no paths exist and you should try different maximum lengths to rule out connections. Be aware if paths exist that are greater than a maximum of 8, the Information Store returns no paths.

## Get matches

You can use the Get Matches function in Analyst's Notebook to compare the records on your chart with records in the Information Store.

You might have records on your chart that match with records in the Information Store. It might be useful to know more about real-world objects and relationships that are known to the system, even if you do not want to unite or merge the chart records at this stage of your analysis. Get Matches is a form of system matching that compares the records on your chart with the Information Store and identifies possible matches. If matching records are identified, you can either unite the entity records, or merge the link records on your chart.

**Note:** Link records can match only when their end records are contained by the same pair of entities.

- To find records that match with the Information Store:
  - a) On the chart, select the chart items that you want to check for matches.
  - b) Click the **Home** tab of the ribbon, and then in the **Information Store** group, click **Get Matches**. The **Matching Records Found** dialog displays the number of matches found for system-governed and analyst-governed records. You can see if they are entity records or link records, and the resulting action if you decide to proceed with getting the matches. You also see a warning message if the server exceeds the limit of the number of records that can be returned per seed. You could use Find Matching Records to reduce the number of records per seed before running Get Matches.
  - c) Click **Continue** to unite the matched entity records on the chart, or click **Cancel** to return to the chart. If you decide not to proceed with getting matched records, the chart records with matches are not updated but are selected. Matching link records from the Information Store are copied to the chart. You can use Find Matching Records to examine these matches, and merge them if required.

**Note:** It is possible for links between entity records to be lost, for example if an Information Store record matched with two linked chart records. Although this situation is unlikely, you can use Find Matching Records to resolve potential duplication before running Get Matches.

## Adding chart items

After any operation that finds records in the Information Store - Quick Search, Visual Query, or Expand with Conditions - you can create chart items that contain copies of those records. You can then use these items as the starting point for more searches of the Information Store.

Before you can use Analyst's Notebook tools to analyze search results, you must copy the records that they represent to a chart. Each chart item that you create in this way contains a copy of the record from the Information Store that provides a snapshot of the information at the time of charting. If the data in the Information Store is updated after you copy a record and you want that chart to reflect that change, you must use the **Get Changes** feature to update the records on the chart.

## Copying records to a chart

When the results of an Information Store Quick Search or Visual Query are displayed, you can choose to create chart items that contain copies of the records. To add information to a chart, you must select records from the search results and choose the chart that you want to target.

1. If the search results contain many records, you can filter the results by clicking one or more listed properties or types.
2. In the **Information Store Quick Search** window or the **Information Store Visual Query** window, select the check boxes next to the records that you want to chart. To select them all, select the check box at the top of the list.
3. Click **Copy to Chart**.  
The **Copy to chart** pane opens. A list of open charts is displayed with the current chart selected.
4. Click the chart in which to create items with copies of the selected records.  
If you click **New Chart** or select a chart that does not have a charting scheme, you must select the charting scheme that you want to use when the items are added to the chart. If you require changes to a charting scheme or want a new charting scheme, contact your administrator.
5. To close the **Information Store** window, you can do one of the following:
  - Click **Finish**. The **Information Store** window is reset. Next time that you search the Information Store, you must start from a blank search or query.
  - Click the relevant ribbon button (**Quick Search** or **Visual Query**). Next time that you start a search or query, the window opens containing the criteria from the last time.

To proceed with further search operations, click **Search Again**.

## Charting schemes

Charting schemes define what items that contain i2 Analyze records look like when they appear on your chart. A charting scheme maps the properties of records to properties on the chart item.

For example, a Date of Birth property might be mapped to a chart item, or Given Name and Surname properties might be mapped to a chart item label.

Specifying which attribute classes and labels to populate from different properties defines how those properties are displayed on the chart item. In addition, by using connection multiplicity, you can display multiple links between two entities as a single link, but still retain the information from the individual records in the chart item.

You can change the charting scheme that is associated with a chart at any time.

**Note:** If you change the charting scheme, or link summarization settings when there are more than 2000 records on the chart, the undo stack is cleared and the charting scheme change is not recorded. The undo limit is set to 2000 records to save on memory consumption. You can reselect the original charting scheme, or revert any changes made to link summarization should you need to.

## Changing the displayed information

The information from records that is displayed on a chart item is controlled by the charting scheme. When you are working with items that contain i2 Analyze records, you can control the appearance of the items by changing the charting scheme.

As part of the deployment of i2 Analyze, charting schemes are created that determine how the information stored in i2 Analyze records relate to item properties and attributes on the chart. Depending on the charting schemes that have been included, you can select different ways to display the information in your chart. You might want to change the display in the following situations:

- The chart is intended for multiple audiences who require different amounts of detail to be displayed.
- Charted items might need to show each link separately, or all links between two entities as one link, depending on the type of analysis you want to do. For example, if you change the chart from an association chart to a timeline chart, you might want to choose a different connection style.

In the bar below the ribbon, select the required charting scheme from the **Charting scheme** list.

**Note:** If the type of display that you require is not available in the list, you can request changes to a charting scheme, or new charting schemes, by contacting your administrator.

## Link summarization

You can override the charting scheme and control how your link records are summarized into links for display on the chart.

Usually the charting scheme you are using defines what items that contain i2 Analyze records look like on the chart, including how link records are displayed. You can view your current charting scheme or choose from available charting schemes on the records bar, below the ribbon menu. If there are multiple links between the same two entities on the chart, you can override the charting scheme setting and choose how to display those links. This is useful because you have greater control over the look of your chart and how it relates to the type of analysis you want to do. You might want to examine the relationships between entities in detail by including multiple links. Alternatively, you might want to combine links with the same direction, or you might choose to use single links to represent all connections of the same type, to improve the readability of your chart. You can also change the link summarization option setting for custom link types.

You might have a number of link types on your chart representing relationships such as 'Access To', 'Associate', 'Transaction', and 'Employment', for example. When you open link summarization with no links selected on the chart, the first type in the list is selected by default. In this example, 'Access To' is the default selection. However, if one link type is selected on the chart before you open link summarization, that type is the default selection. Where multiple link types are selected, 'Associate' and 'Transaction' for example, the setting defaults to 'Associate' as it is the first type in the list.

- To change link summarization for the current charting scheme and custom link types:
  - a) With your chart open, click the **Link Summarization** button in the records bar. The **Link Summarization Settings** window opens. Any link types from your schema and custom link types that are present on the current chart are listed, along with link summarization options. A

link type is selected by default, depending on whether you already have link types selected on the chart.

- b) To change the default selection, click a link type from the list in the side panel. Custom link types have a unique identifier displayed in brackets alongside the name.

The **Link Summarization Settings** window displays information that is relevant to the selected link, for example the link type's current setting and the implications of choosing a different setting.

- c) The current setting is selected by default, whether it is taken from the schema or from when the custom link was created. If you want to change the default setting, click the button next to your preferred setting. You can choose from Single, Directed or Multiple.

The Single option combines all links records between the same two entities into a single link, with a label of the record count. The Directed option combines all links records in the same direction between the same two entities, with a label of the record count. The Multiple option charts each link between the same two entities separately, labeled with the record's label. If you have many links, the Multiple option can make your chart difficult to read. When you override a link summarization setting, the link gains a blue glyph to indicate the change. The link summarization button is highlighted in orange.

- d) If you do not want to make changes to the link summarization settings, click **Cancel**, or click **OK** to confirm your changes.

## Exploring records using 360 View

You can use 360 View in Analyst's Notebook to explore relationships between Information Store records, both on the chart and in search results lists.

One of the main benefits of 360 View to your investigation is the time saved not having to copy multiple records to the chart and use successive expand operations. This can reduce the amount of information that is displayed on the chart, which can help you focus more clearly on areas of interest. 360 View relationships are built around *highlight queries*. For more information, see [highlight queries in 360 View](#).

You can access the 360 View function from a number of areas in Analyst's Notebook, and quickly visualize a chosen Information Store record in the context of some other records it is related to. Your selected record remains the focus of 360 View, until you open another record. You cannot select multiple records. You can use 360 View on records that you create from the palette when they have been uploaded to the Information Store.

**Note:** The **360 View** button on the **Home** tab of the ribbon, in the **Explore Records** group, can be used to show or hide the **Information Store 360 View** window.

### Context menu

- Select an Information Store record from the chart.
- Right click the highlighted record. The context menu opens.
- Click **Open 360 View**.  
The **Information Store 360 View** window opens and displays the record properties, some related records, and a panel containing details of those related records.

### Search results lists

- Run a Visual Query or a Quick Search. Records returned from the Information Store have a hyperlink.
- Click the hyperlink to display the **Information Store 360 View** window for that record.

**Note:** Records shown in the Alerts results list also contain a hyperlink to 360 View.

### Record Inspector

- Select a record on the chart.
- On the **Home** tab of the ribbon, in the **Explore Records** group, click **Record Inspector**.
- Click the hyperlink in the record label to display the **Information Store 360 View** window for that record.

#### **Infotips**

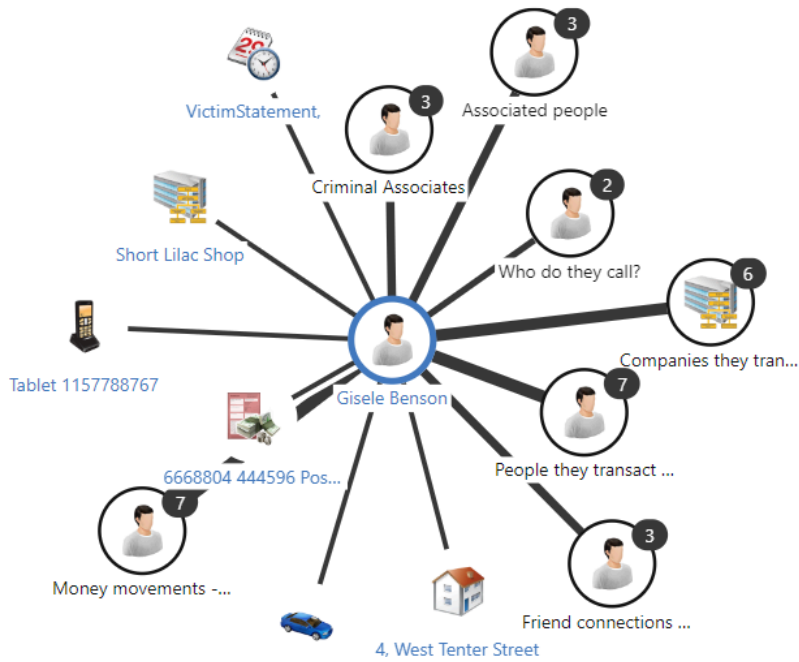
- Hover over a chart item. The Infotip summary of item data is displayed.
- Click the **360 View** hyperlink to display the **Information Store 360 View** window for that record.

When you have accessed the 360 View of a record, a Person for example, you can explore records connected to that individual without having to copy them to the chart. Each relationship in the visualization is a hyperlink that you can click to view more information. When a record has several relationships of the same type, Criminal Associates for example, this is indicated by a count in the visualization, and a corresponding count in the highlight pane. These connections are the result of the expand operations performed by highlight queries and might not represent simple links between end records. You can click the



on both query headers or on individual records, to copy the highlight query results to the chart.





Victorious Venom Holdings		2,532
People they transact with 5 of 7		
# of transacti...	Transaction t...	
1	Glenna Wilcox	180
2	Kristian Conway	70,105
2	Vanda Hickman	9,501
2	Noma Beck	57,822
2	Wallace Lamb	802

As you click records connected to the seed, the records remain open in 360 View. You can navigate forwards and backwards through the open records by clicking the arrows next to the record label. Click the



icon next to the label to copy the record to the chart. You can scroll through the side panel to see details of the multiple records, and click the hyperlinks to see the record properties and further connections.

## Highlight queries in 360 View

When you examine Information Store records with 360 View, the *highlight queries* set up in your i2 Analyze deployment are used. Highlight queries automatically navigate the data in the Information Store on your behalf, and present answers to the questions that you ask most frequently.

- If the subject record is a car, then a highlight query might find its recent owners or its recent sightings.
- If the subject is a cellphone, then a highlight query might find which other phones it calls most often - or *who owns* the phones that it calls most often.
- If the subject is a person, then a highlight query might return their bank accounts; or the bank accounts that the person's accounts transact with; or the owners of those transacting accounts.

Highlight queries perform multi-level conditional expand operations, maybe containing 5 or more steps. The results you see in 360 View are the entity records found by the final expand that the highlight query performs. In the Information Store, these records might be a number of links away from the subject record. The connections shown in 360 View might not represent simple links between end records. Both the highlight query headers, and all the listed records have a "Copy to chart" icon



Unless the highlight query has returned no results, this option can be used to copy the query results to the chart. This helps you to easily see the path between an entity of interest, and its connections.

Highlight queries are configured by your system administrator. You should work closely with them to ensure that the queries you need are available.

For more information, see the i2 Analyze documentation on [highlight queries](#).

## Editing records in i2 Analyze chart items

You can view and edit records in a chart item in the Record Inspector. Depending on the type of record, and your access permissions, you can upload your changes to the Information Store. You can view, edit, and create records even if you are not connected to the Information Store, but you must be connected to search the Information Store or upload any data.

You can edit the i2 Analyze records that you create before and after you upload them to the Information Store. For some other records, especially if they were loaded into the Information Store from an external system, you can edit notes but not property values. Other records still are read-only, and you cannot edit them at all.

After you make edits, you can upload them to the Information Store only if there have been no changes to the corresponding record in the store since you last uploaded or got changes. If changes are available, you must get those changes before you can upload any edits of your own.

When you view the records in a chart item that contains multiple records, or you select multiple items, the Record Inspector indicates how many records there are in your selection. You can page through each record to view and edit its properties or add notes. You can also view a list of the records that are contained in the selected items. Display the list or page view by clicking **List** or **Page**.

1. Click the chart item for which you want to view or edit i2 Analyze records.  
If the Record Inspector is not already open, double-click the chart item to open it. The records that the item contains are displayed.
2. If the item contains multiple records, one of the records is assigned as the lead record. To assign a different lead record:

- a) Select the record to assign as the lead record in the list view.
- b) Click the **More actions** button

...

then click **Set as lead**.

3. Select the relevant record in the list view, then click the **Page** button. There are now several ways that you can edit a record. For example:

- Edit its property values.
- Add notes to a record or edit existing notes.
- View or edit details about a record. For example, set its security information.

You can choose to enter values for properties that are not listed by using the plus button



on the **Properties** page to change which properties are listed. If you remove a property from the property list, any value that is contained in the property is deleted from the record. If you upload your edits to the Information Store, deleted values are also deleted in the Information Store.

**Note:** You cannot remove mandatory properties or any property that makes up the label.

## Working with notes in a record

Notes provide a way to add free-form operational data to i2 Analyze records in the Information Store. If you have access to the feature, then you can view the notes on any i2 Analyze record. If you have write access to a record, then you can add to, edit, and delete the notes that it contains.

Your organization controls access to notes based on the user groups that you belong to. If you need to use notes but you do not see the Notes tab in the Record Inspector, contact your system administrator.

Analyst's Notebook treats notes like the other properties of i2 Analyze records. If you update a record in a chart item with changes from the Information Store, any new notes from the store are added to the record. If you delete a note and upload the record, the note is deleted from the record in the Information Store.

In the Record Inspector, notes are sorted by when they were first uploaded, with the most recent note at the top of the list.

To add or edit a note:

1. Ensure that the record that you want to edit is displayed in the page view of the Record Inspector.
2. Click the **Notes** tab.
3. If the record has no notes, you can create one by typing into the empty field.
4. If the record already has notes, you can click **New** to add a note, or click an existing note to edit it.

The note is added to (or updated in) the record in the chart item, along with information about who added or edited the note, and when it was added or edited.

## 5. To delete a note, select **Actions**


  
 (
 
 next to the note, and then click **Delete**.
 )

When you complete your edits, upload the affected records to the Information Store. For more information about uploading records, see [Uploading records to the Information Store](#) on page 103.

## Editing record security

All i2 Analyze records have security settings that the system uses to determine whether you (and other users) can see them at all, or edit the information they contain. Permission to edit a record includes the ability to edit the security settings themselves.

In i2 Analyze, the server maintains a set of *security dimensions* whose *dimension values* are used to classify records. Your ability to view or edit a record is controlled by what kind of record it is, according to those values.

For example, there might be a security dimension whose values indicate the nature of the source for a record - whether it came from an informant, or from open-source intelligence, or from a call data record. There might be another security dimension whose values indicate whether the information in the record is top secret, or confidential, or restricted.

Sometimes, a dimension and its values can be as simple as a list of the teams in your organization, with the intention that the record is classified by the teams who should have access to it.

Every record in i2 Analyze has at least one value from each security dimension. To use the same examples, a record might contain confidential information that came from an informant, and be accessible only to people in Team B or Team E. (Whether it's accessible to an *individual* in Team B also depends on their permission to see confidential information.)

When you create an i2 Analyze record in Analyst's Notebook, it receives a default set of dimension values that allow you to upload it to the Information Store. Thereafter, anyone with permission to edit that record can add, remove, or change those values.

In some security dimensions, the values act as levels and records take a single value. For example, if a record is "Top Secret", it cannot also be "Restricted". In other dimensions such as the data source or teams list, records can take one or more values. The default setting for these dimensions is "ANY" and this means other users who have access to *any* of the selected values can view the record. If a security dimension is set to "ALL" it means users must have access to *all* the selected values to view the record. In this scenario, selecting more values means fewer users are able to view the record.

Information about the security settings of an i2 Analyze record is available on the **Details** tab of the Record Inspector. The **Security** section contains a list of security dimensions, together with the values that the record has from each dimension. If you can edit the record, the tab also contains controls for changing the settings.

**Note:** Your system administrator can add, remove, and restore values in the security dimensions on the i2 Analyze server. When they remove a dimension value, it becomes possible for an existing record to have a value that the server no longer uses. If that situation occurs, the value appears in the Record Inspector as **(suspended)**. Records might have one or more values that are marked as suspended. Any records on the chart that have suspended values show in a count on the records bar. You can type 'suspended' into the Security compartment search box to filter by suspended values and remove them, and you can edit records to remove the suspended values.

To edit the security settings of an i2 Analyze record, follow these steps:

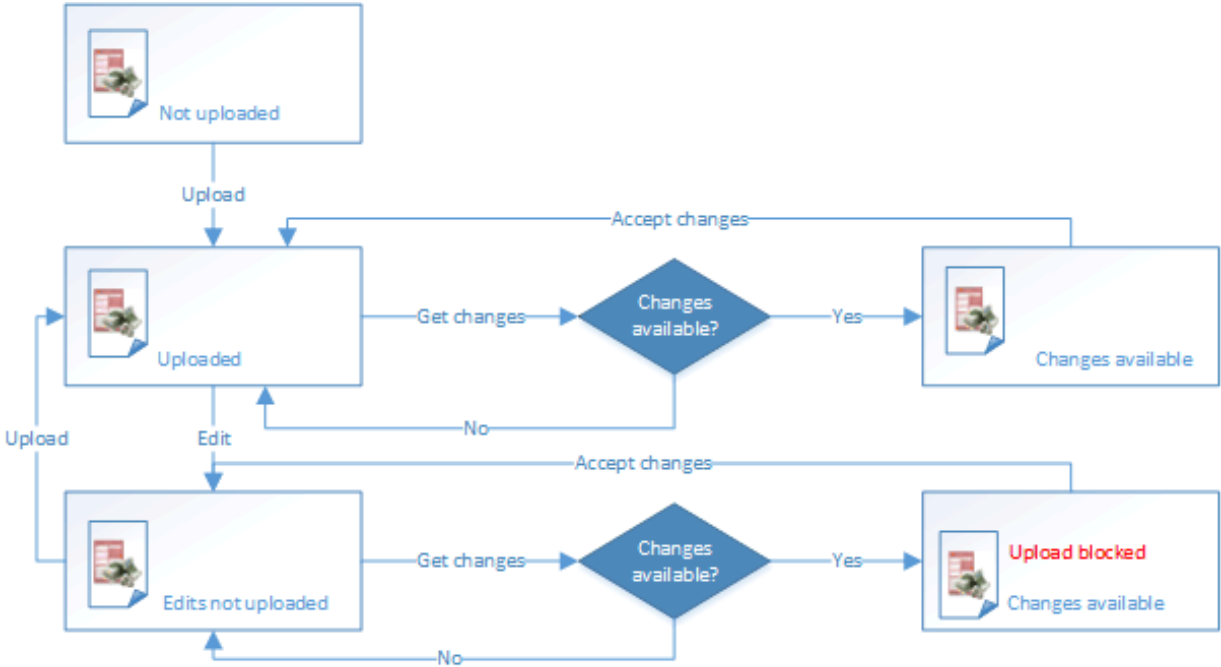
- 1. Ensure that the record that you want to edit is displayed in the page view of the Record Inspector.
- 2. Click the **Details** tab to display details about the record.  
In the Security section, you can see the current security dimension values for the record. If you can edit these values, **Edit** buttons and drop-down lists are visible.
- 3. Select the security dimension that contains the values that you want to edit.
- 4. Select the dimension values to apply to the record.

When you complete your edits, upload the affected records to the Information Store. You might be able to upload records that have suspended values, depending on your assigned security values and if the security dimension is set to "ANY" or "ALL". For example, where a security dimension is set to "ALL", users must have access to *all* in order to work with the record. For more information about uploading records, see [Uploading records to the Information Store](#) on page 103.

### Keeping records up to date

You must upload the records that you add to your chart to the Information Store before other people can access the information that they contain. When you are working with records that have been uploaded, you can check for changes and update the records in your chart with the latest information.

The following flowchart shows the possible states of records that have been added to your chart:



Where:

**Not uploaded**

The record has been added to the current chart, but it has not been uploaded to the Information Store. Any edits that you make to the record are also local to the chart.

**Uploaded**

The record has been uploaded to the Information Store, but it has not been edited in the chart or the Information Store since that upload (or since it was copied to the current chart).

**Edits not uploaded**

The record has been uploaded to the Information Store, and it has been edited in the chart since that upload (or since it was copied to the current chart). You can upload the record again to apply the edits to the record in the Information Store.

**Changes available**

The record has been uploaded to the Information Store, and it has changed in the Information Store since that upload (or since it was copied to the current chart). You can get the changes from the Information Store to update the copy of the record in the chart.

**Changes available - Upload blocked**

The record has been uploaded to the Information Store, and it has been edited in the chart and changed in the Information Store since that upload (or since it was copied to the current chart). Upload is blocked until you get the changes from the Information Store and reapply the edits.

**Orphaned**

The record has been uploaded to the Information Store, but it has been deleted from the Information Store since that upload (or since it was copied to the current chart). The record in the chart no longer has a counterpart in the Information Store.

**Getting changes to records**

To keep the chart copies of your records up to date, you can use the **Get Changes** function. You can get changes from the Information Store to individual records, to records in all the currently selected items, and to records brought together using the unite function. You cannot get changes to unaligned records.

When records are changed by other analysts and uploaded to the Information Store, your chart items might contain records that have been updated since you copied them to the chart. Using **Get Changes** ensures you are working with the latest version of a record. If a record on your chart is deleted from Information Store, your copy does not receive further updates. If your deployment contains both an Information Store and i2 Connect, you might be working with records on the chart that are not aligned to the Information Store schema. Unaligned records cannot be uploaded to the Information Store, and therefore are not updated when you use **Get Changes**.

1. Select the chart items whose records you want to update.
2. On the **Home** tab of the ribbon, in the **Information Store** group, click **Get Changes**.  
The **Get Changes** window opens with a summary of the records that contain updated versions in the Information Store.

**Important:** If you edited any of the records that have changes in the Information Store, the window provides the opportunity to copy information from those records to the clipboard. When you accept the changes, your edits are overwritten and you must reapply them afterward.

3. To accept the changes, click **Get Changes**.

If you copied any of your edits to the clipboard, you can retrieve that information to make your changes again to the updated records in your chart.

## Uploading records to the Information Store

If you have access to the feature, you can upload new or edited records to the Information Store. You can upload individual records, all the records in the currently selected items, or records brought together by the unite function.

Your organization controls your ability to upload records based on the user groups that you belong to. If you need to upload records but you are unable to do so, contact your system administrator.

Uploading new or edited records to the Information Store is subject to some rules:

- For records that have read-only properties in the Information Store, you can edit the copies on your chart, but you cannot upload them. You might be able to upload changes to notes and details of some read-only records.
  - For all other records in the Information Store, you can upload new records or edits to records. If you have access to them, you can also delete notes.
  - If there are changes to the record in the Information Store, you cannot upload your edits; the upload is blocked. Records must be up to date with the latest changes from the Information Store before you can upload them.
  - If you have selected united records on your chart, they are uploaded to the Information Store as separate records.
  - If your deployment contains both an Information Store and the i2 Connect gateway, you might be working with some records that are not aligned to the Information Store schema. The **Record Inspector** displays the "Unaligned" *badge* beneath the record label, while unaligned records are counted in the record bar beneath the ribbon menu. In the **Upload Records** window, you are told if there are records it is not possible to upload.
1. Select the chart items whose records you want to upload.
  2. On the **Home** tab of the ribbon, in the **Information Store** group, click **Upload Records**. The **Upload Records** window opens with details of how many records will be uploaded, any records that cannot be uploaded, and reasons why.
  3. To upload the records that can be uploaded, click **Upload**.

If a record could not be uploaded, it might be because there are changes to the record in the Information Store. When you close the **Upload Records** window, the records are marked **Upload blocked** in the Record Inspector. You can use **Get Changes** in the **Information Store** group to get the changes to these records from the Information Store, then you can upload your edits.

## Working with source references

Source references provide you with information about the origins of i2 Analyze records and connections to the sources of relevant data that is held in other locations.

Source references capture and preserve connections to data that persist throughout the lifecycle of the record. This is useful because you can easily locate information that is associated with the record. For example, you might want to know more about the spreadsheet from which the record was imported, or the witness statements connected with your investigation. You can view, create, modify, and delete source references on analyst-governed i2 Analyze records. These are records created by Analysts in the Record Inspector or through an ad hoc import. When you upload records to the Information Store, other users with access can view or amend the source references. If source references are added to records when data is ingested into the Information Store, they are system-governed. These records are displayed as read-only and you cannot edit them.

To work with the source references of an i2 Analyze record:

1. Select the record and double-click to open the **Record Inspector**.
2. Click the **Details** tab to display details about the record.
3. In the Source references section, you can see any current source references. You can edit a source reference if the Actions

...

button

is available. You can also add a new source reference by clicking Add



and completing the form.

- a) Complete all mandatory fields. Fields that are not mandatory are displayed only if a value is entered.
- b) To edit a source reference, click Actions

...

and click **Edit**.

- c) To delete a source reference, click

...

Actions

and click **Delete**.

- d) To add a link to an image, paste the URL in the **Image URL** field. A thumbnail of the image is included in the source reference, and replaces the icon in the Record Inspector when you select the record on the chart. The image is also used in 360 View, and on the Details tab in search results. Where you have loaded multiple source references, the image from the most recently added reference is used.

Upload the record to the Information Store.

**Note:** When you merge records or unite match sets, Notebook maintains source references by creating them on incoming records.

## Sharing records

You can share records with other analysts in your organization who use the same i2 Analyze server. Records can also be shared between Analyst's Notebook and i2 Notebook users.

You can select records from the chart to share with other users who are connected to the same i2 Analyze server. The data is packaged and shared using a URL with a time-sensitive unique ID. Shared records must be from your current i2 Analyze deployment. You cannot share records from a different i2 Analyze deployment or from non-i2 Analyze sources such as i2 iBase.

Records are shared for 7 days by default. If you want to change the number of days that records are shared for, ask your system administrator to change the value of the "chartlet lifespan" option.

The ability to share and view records also depends on your permissions. If you are unable to see or use Share Records, contact your system administrator to request a change to your sharing permissions.



- To share records:
  - a) Select a record, or records from the chart.
  - b) Click **Share Records** on the **Publish** tab of the ribbon, or right-click a selected record to open the context menu and click **Share records with others**. If you exceed the number of records that can be shared, you are prompted to select fewer records.  
Analyst's Notebook prepares the record (or records) for sharing and displays a dialog containing a URL, an option to copy to the clipboard, and an expiry time for the link. From this dialog it is also possible to view your sharing activity if you click **See all active links**.
  - c) Copy the URL. If you close the dialog without copying, the URL cannot be retrieved but you can create a new one. Also if you open **See all active links**, it is possible to locate and copy the URL from the list in the browser.
  - d) Send the URL to the intended recipient(s).
- To receive shared records:
  - a) Click the shared records URL and from the browser choose to 'Open in Desktop app'.  
The **Shared Records** results list opens in Analyst's Notebook Premium. The list is docked by default.
  - b) Select records and copy them to the chart in the usual way.

**Note:** In the default docked state, the **Shared Records** results stay open and available to copy. Do not close the **Shared Records** dialog until you have copied the records you want, as it cannot be reopened. If you undock the results list, the window automatically closes when you copy the records to the chart. Records are not available to copy after the URL expires.

## Deleting records from the Information Store

If you can access the functionality, and you have write access to the records in question, then you can delete i2 Analyze records from the Information Store through Analyst's Notebook. Record deletion is permanent, and it can have a broad impact that you must consider carefully before proceeding.

Your organization controls your ability to delete records from the Information Store based on the user groups that you belong to. If you need to delete records but you are unable to do so, contact your system administrator.

Sometimes, you might need to delete a record that you or a colleague has uploaded to the Information Store. For example, an investigation might have come to an end, or you might simply have made a mistake. If you have copies of the records that you want to delete on your chart, and provided that you have permission to do so, you can delete them from the Information Store.



**Warning:** Deleting records from the Information Store cannot be undone, and it has potential consequences for more records than you can see. All link records must have an entity at each end, so if you delete an entity record, you also delete all the links that are connected to that entity. This deletion takes place regardless of whether the affected links are on the current chart, or their security settings. Deleting a single, highly connected entity record might therefore affect many link records.

The first part of the process involves choosing the records that you want to delete, and deciding how you want to delete them.

1. On the current Analyst's Notebook chart, select the items that contain copies of the records that you want to delete from the Information Store.  
Analyst's Notebook populates the **Record Inspector** with information about all the records in the selected items.
2. On the **Home** tab of the ribbon, in the **Share Records** group, click **Get Changes**.

The records in the chart must reflect the latest versions of the records that you want to delete.

3. If you want to delete records one at a time, select the **Page** view in the **Record Inspector** and find the first record to delete. If you want to delete all the selected records, select the **List** view.
4. In the **Record Inspector**, open the **More actions** menu and select **Delete from Information Store** (or **Delete all from Information Store**).

The **Delete Records from Information Store** window opens.

The window contains a summary of the records that you selected and whether you can delete them. Common reasons why you might not be able to delete records from the Information Store include:

#### **New records**

These records have never been uploaded to the Information Store, so it is not possible to delete them.

#### **Blocked records**

The records in the chart do not reflect changes that have taken place in the Information Store.

#### **Controlled records**

The records in the Information Store are controlled by a process such as synchronization with an external source, and are therefore not yours to delete.

#### **Unaligned records**

If your deployment contains both an Information Store and i2 Connect, you might be working with some records that are not aligned to the Information Store schema. As unaligned records cannot be uploaded to the Information Store, it is not possible to delete them.

5. If you can delete any of the records that you selected, click **Delete permanently** to delete them from the Information Store, or **Cancel** to close the window.
6. If none of the records that you selected can be deleted, close the **Delete Records from Information Store** window.

When you close the **Delete Records from Information Store** window, Analyst's Notebook Premium updates the state of any of the selected records that remain on the chart. For example, records that were blocked from deletion are marked as having **Changes available**.

If you clicked **Delete permanently**, then the affected records are deleted from both the Information Store and the chart. If a deleted record was the only one in a chart item, then the item is also deleted from the chart. If you deleted an entity record, then all its connected link records are also deleted from the chart and the Information Store.

## **External searches**

Some i2 Analyze servers allow you to access information from external data sources, as well as or instead of the Information Store. The available data sources depend on how your system administrator configured the server for your organization.

You can use the **External Searches** feature in Analyst's Notebook Premium to search external data sources for information. Your system administrator can configure queries to accept parameters that help to fine-tune your searching, and allow you to select items on the chart to use as seeds in more complex search operations. You can also use Visual Queries to search external data in a similar way to how they are used to search the Information Store.

When the i2 Analyze server provides access to external data sources and the Information Store, you can upload the results of external searches to the Store as new records. You can use records from external sources to complement the analysis that you perform with any other i2 Analyze records. You cannot create your own queries for external data sources, only your system administrator can do that.

## Searching external sources

Your system administrator can enable you to search multiple external data sources for information that is relevant to your investigation, in various different ways. Analyst's Notebook Premium presents all of the available queries in the **External Searches** window.

In general, you can categorize queries for external data sources according to three criteria: Whether you can (or must) provide *parameters*, whether you can (or must) specify *seeds*, and whether you can define a structure for a Visual Query.

- When a query supports parameters, you can customize the query before you run it, with the aim of seeing more targeted results. For example, a query that searches for people might be configured so that you can specify ranges of birth dates. A query for cars might allow you to enter a partial license plate.
- When a query supports seeds, it changes its behavior when (or does not work until) you select items that are already on the chart. A query might use information from selected items for several purposes:
  - Some queries search for information in external sources that is related to information that is on the chart. For example, they might try to find bank accounts that are known to be operated by a selected person.
  - Some queries use the information from a selected item as a starting point. For example, they might search for telephone calls that happened at around the same time as a selected call.
- When a query in the External Searches window advertises itself as a Visual Query, *you* can control how it searches the external data source and what types of records it finds. Visual Queries enable you to look for data structures as well as for single records.

In Analyst's Notebook Premium, the **External Searches** window contains everything that you need in order to understand, configure, and run the queries that search external data sources.

1. On the **Home** tab of the ribbon, click **External Searches**.

The **External Searches** window opens, and the queries that your system administrator defined are listed on the **Queries** page. The list of available queries is displayed in up to three sections: **Available with the current chart selection**, **Available with or without a chart selection**, and **Not available with the current chart selection**. Sections are not displayed if there are no queries available.

2. Optional: Use the **Filter these queries** field to enter text that filters the list of queries by name.
3. Optional: If the list of queries is long, and you know there are some you'll never use, you can hide individual queries or whole connectors from displaying on the **Queries** page. Click the



icon to show a list of available connectors and queries. Clear the checkbox of any connector or query you want to hide, or select the checkbox of a hidden connector or query to show it again. Your choices are saved locally and persist until you clear your local storage.

4. Click a query to select it and display more information about it.

The pane on the right of the **Queries** page lists the actions that you can perform with the selected query. The same pane also describes what types of information the query can return, indicates whether the query supports or requires seeds, and might include a longer explanation of its behavior.

5. Unless the query **requires seeds** that you have not selected, you can click **Open**.

What happens next depends on whether the query supports parameters:

- If the query does not support parameters, it runs immediately and you see a new page that contains search results from the external data source.
- If the query does support parameters, you see a new page where you can [enter values for those parameters](#) before you run the search.

**Note:** Queries that have no mandatory parameters have an extra action: **Copy to chart**. This action copies any search results straight to the chart without first showing them in a list

6. You can delete your search results data from the i2 Analyze server. Click the menu icon

...

in the **Queries** page and choose **Clear search data**. If you want to proceed, click the **Clear data** button. All your search data is deleted and open tabs are automatically closed. This action cannot be undone.

After the query runs, the **External Searches** window gains a **Results** view that contains the search results. From here, you can select results and copy them to the chart surface. You can filter the results by type, or use the search bar for text filtering. This gives you several different ways to refine your search, and this is particularly useful when your searches yield a large number of results.

## Running a parameterized query

Opening a query that supports parameters from the **External Searches** window in Analyst's Notebook is different from opening one that does not. Parameterized queries prompt you to enter search condition values before you run them, with the aim of producing more targeted results.

1. Follow the general procedure for [searching external sources](#) as far as Step 4: Open the **External Searches** window, select a query, and click **Open**.

When a parameterized query opens, the **External Searches** window gains a new tab that contains a **Conditions** view.

The **Conditions** view can be different for every query. Its appearance depends on how your system administrator configured it. The main area of the view contains fields where you provide the condition values that customize the query when it runs.

2. Enter a value for every mandatory field, and as many of the other fields as you need.

Mandatory fields are initially colored red, and change color to indicate that your entry meets the rules for the value. If your entry is not valid, a message beneath the field advises you what change you need to make.

3. Click **Run** to start the query.

After the query runs, the tab in the **External Searches** window that has the **Conditions** view gains a **Results** view that contains the search results. From here, you can select results and copy them to the chart surface, or you can refine your search by filtering the results.

You can also switch between the **Results** view and the **Conditions** view by using the directional arrows on the information bar. In this way, you can rerun the query with modified parameters without returning to the **Queries** list.

## Running a seeded query

To run a query that supports seeds against an external data source, you must first understand the kinds of seeds that it requires, and select some on an Analyst's Notebook chart. When you satisfy the requirements, the query becomes available for use.

When a system administrator configures a seeded query on an external data source, they can place restrictions on the types, number, and origin of the seeds that they require. Before you can open a seeded query, you must select chart items that contain records that obey its restrictions, as indicated in the **Queries** tab of the **External Queries** window.

1. Follow the general procedure for [searching external sources](#) as far as Step 3: Open the **External Searches** window and select a query.

When a query supports or requires seeds, the pane on the right of the **Queries** page describes what you must select:

### Seed type constraints

The types of seeds that the query uses, and the number of each type.

### Seed semantic requirements

The semantic types of properties that seeds must have values for.

### Seed count limits

Lower and upper boundaries (if any) on the total number of seeds.

### Seed data sources

The data sources from which seeds must originate.

If one of these headings is not in the list, then the selected query has no requirements of that kind.

2. Select chart items that meet the requirements of the seeded query.
3. Select the query and then click **Open** or **Copy to chart**, depending on whether the seeded query also supports or requires parameters.

After this point, the seeded query behaves just like any other query against an external data source. You can [specify parameters](#) or browse search results, and then add results to the chart or filter them further.

## Running a Visual Query

When a query in the External Searches window advertises itself as a Visual Query, *you* can control how it searches the external data source and what types of records it finds. Visual Queries enable you to look for data structures as well as for single records.

In a Visual Query, the *structure* defines what record types and relationships you're interested in, while the *conditions* put limits on the property values of the records that the query finds. The more conditions and the more complex the structure you create, the fewer records will match your visual Query.

**Note:** Creating and running Visual Queries on an external data source is similar to using them on an Information Store, but not always the same. For example, you cannot save Visual Queries, and some sources will place restrictions on the types of records you can search for, and the kinds of conditions you can create.

1. Follow the general procedure for [searching external sources](#) as far as Step 3: Open the **External Searches** window and scroll to a Visual Query. You can identify Visual Queries from other types of query by the



icon.

2. Select the query and then click **Open**.
3. See [structured searching](#) for details about the structure and creation of visual queries.
4. Click **OK** to view the query structure and add conditions.
5. Click **Run** to start the query.

After the query runs, the tab in the **External Searches** window that has the **Conditions** view gains a **Results** view that contains the search results. From here, you can select results and copy them to the chart surface, or you can refine your search by filtering the results.

You can also switch between the **Results** view and the **Conditions** view by using the directional arrows on the information bar. In this way, you can edit the structure and rerun the query without returning to the **Queries** list.

## Matching records on the chart

When you copy a record from an external data source that matches with a record on your chart, Analyst's Notebook updates the chart record with incoming data instead of creating a duplicate record. This is a useful way to improve the quality of your data, as you can enrich your records with information from other sources and manage unnecessary duplication.

When you run a search query against an external data source, some of the returned records might match with the records on your chart. Record matching updates the data in both analyst and system-governed records. Analyst-governed records are those created and uploaded by Analysts, whereas system-governed records are ingested into the Information Store automatically and are read-only.

Record matching does not change record properties, it changes property values. For example, you create a person record for Sam Steele on your chart. You add property values for Sam's age and hair color, which is brown. You then run an external search query that finds a match with a record for Sam Steele. The incoming record has no property value entered for age and hair color is black. Analyst's Notebook updates your chart record with all the data from the incoming record, including changing hair color to black. Existing values on your chart record are maintained when the incoming record has blank properties. Updates for analyst-governed records can include security settings, source references, and source identifiers. Record matching can update source references and source identifiers for system-governed records, but does not change the security settings.

**Note:** Blank property values are not reported as matches.

1. On the **Home** tab of the ribbon, click **External Searches** and run your search query.
2. Select the records you want to copy to the chart.  
The **Copying records to charts** message is displayed. If matches are found, the **Matches Found Dialog** is displayed.
3. The number of system-governed and analyst-governed records with matches are reported in the **Matches Found Dialog**. You can choose to cancel the operation or continue.

If you choose to copy the matched records found in your external search, your chart records are updated with data from the matching external records.

## Add data from data sources

You can add data to your chart from data sources such as databases. If you have access to several data sources, you can collate the data that each source provides about an item of interest.

After you connect Analyst's Notebook to data sources, you can search for more information about items of interest. For example, you might find further details about people of interest, such as their aliases, and the links that form the networks that they are part of. Then, you can add the data to your chart.

Some data sources support data entry from within Analyst's Notebook. You can simultaneously add data to the data source and chart. For example, after you chart existing data source items that correspond to people of interest, you might add items from newly received intelligence, such as a witness report.

## Connecting to a data source

To use a data source, Analyst's Notebook must connect to it. When a data source is connected, you can access its data and use the features that the data source provides.

If the **Connect** menu that is in the **Data Sources** group of the **Home** tab is disabled, or does not contain commands for the data source that you want to connect to, you need to take more action. For example, to connect to iBase databases, you must install the iBase user application on your workstation, even if the database is stored elsewhere.

Analyst's Notebook connects automatically to some data sources.

1. Click the **Home** tab, and then in the **Data Sources** group, click **Connect**.  
Analyst's Notebook displays commands that connect Analyst's Notebook to data sources.
2. To connect to a data source, choose an appropriate command from the list, then if prompted enter further information such as a user name and password.

Analyst's Notebook connects to the data source. Commands that are provided by the data source are added to the **Connected Sources** and **Item Actions** menus.

If the **Data Sources** pane is displayed, and the data source provides access to its features through the pane, the source is selected at the top of the pane. Features that the source provides are displayed in the lower part of the pane.

## Finding data in a data source

You can search a data source for information about an item that is of interest to you. For example, you might search on the name of a person of interest, then after you identify them in the data source, you might search further to identify their associates.

The features that are provided differ by data source. To discover all the features that a data source provides, you must connect Analyst's Notebook to the data source, then look in the appropriate areas of Analyst's Notebook.

- To use features that are not item-specific, such as a search feature, click the **Home** tab, and then in the **Data Sources** group, click **Connected Sources**.
- To use features that are item-specific, such as a feature that adds items that are related to an existing chart item, select a chart item that originates from a connected data source, then follow these steps:
  - Click the **Home** tab, and then in the **Data Sources** group, click **Item Actions**.

- Right-click the selected chart item, then click the name of the data source in the menu that is displayed.
- Some sources provide access to their features through the **Data Sources** pane. To access these features, click the **Home** tab, and then in the **Data Sources** group, click **Connect > Data Sources Pane**. Select the data source from the list at the top of the pane. After Analyst's Notebook connects to the data source, the features that the source provides are displayed in the pane.

## Add chart items from a data source

After you find information of interest in a data source, you can add corresponding items to your chart. The new information extends the intelligence that the chart contains, and you can use the analysis capabilities of Analyst's Notebook on the information.

Some data sources provide the facility to configure the appearance of data source items when they are charted.

If the item from the data source has the same database identity as an item that is already present on the charting surface, then a duplicate item is not added. Depending on the data source, Analyst's Notebook adds properties to the chart item, and updates the data that is stored in other properties. Some data sources provide the facility to select which chart item properties Analyst's Notebook copies data to.

**Tip:** If an entity originates from a data source and is represented by a picture from the data source such as a photograph, you can use a different image. For example, you might have an alternative photograph stored on your workstation. You must change the entity to an icon, and then select a picture. To change the representation, click the entity, click the **Style** tab, then click **Change Representation**. To select a picture, click **Set Picture** in the **Entity Style** group.

## Changes to chart properties when data source items are charted

Charting items from a data source might change the properties of your chart. For example, Analyst's Notebook might automatically add new entity types and attribute classes to the chart.

When you chart an item from a data source, Analyst's Notebook checks whether the item's entity type or link type, and the attribute classes of the item, exist in the chart. These checks are on the item type or attribute class name. If they do not exist, Analyst's Notebook adds them to the chart.

If the chart already contains an item type or attribute class that has the same name, then they determine the appearance of the data source item. For example, the item type in the chart specifies the icon that represents the item, and the existing attribute class might specify a prefix.

Some data sources provide the facility to choose which item types and attribute classes are used when you chart items from the data source.

## Data source items that match chart items

If your chart already contains the data source item that you are charting, Analyst's Notebook can update the existing chart item. If your chart contains items that originate from other sources and represent the same real world object or relationship as the item that you are charting, you can merge the items to consolidate the multi-source data.

When a chart contains items from different data sources, your analysis might uncover potential duplicate data. For example, the top two people in a list of social network analysis results might originate from different data sources and have different names, but match on other key characteristics. To merge the entities, select them on the charting surface, click the **Analyze** tab, then click **Merge and Combine > Merge Entities**. You can also use the Find Matching Entities feature to detect duplicate entities.



## Displaying data records

Depending on the data source, data records are attached to items when you add data from a data source. Data records contain data that is copied from the source record, so that you can view any copied data that is not displayed on the charting surface.

You can view the data records that are attached to a chart item that has one or more database identities. A database identity uniquely identifies a source record in the originating data source.

To show the Data Records pages for an item:

1. Right-click the item on the chart and click **Edit Item Properties**.
2. Choose a database instance folder, and then click a data record in it.

**Note:** Data records are displayed only when one item is selected on the chart.

Analyst's Notebook displays the data in the data record. Data records are intentionally read-only.

A data source might provide the facility to view the current data about the item, in the data source. You can see changes that were made in the data source since the item was charted.

### Related concepts

[Identities](#) on page 6

An identity uniquely identifies an item on a chart or provides a unique link back to entity or link information in a data source.

## Selecting items that originate from a data source

After you connect to data sources and chart items from them, the **Data Sources** pane displays the number of chart items that originate from each source. After you select a source, Analyst's Notebook can select all the items that originate from that source.

1. At the top of the **Data Sources** pane, identify the row that corresponds to the data source whose items you want to select.

**Note:** Only the sources that provide access to their features through the **Data Sources** pane are listed.

2. Click the **Select chart items** button in that row.  
All chart items that originate from that data source are selected on the chart surface. You might choose to analyze the items collectively, for example you might add them all to the Activity View.

## Identifying the data sources that an item originates from

You can identify the data sources that an item on the charting surface originates from. After you connect to those data sources, you can use their features to gain more insight into the items of interest.

1. Right-click an item on the charting surface, and then select **Edit Item Properties**.  
The **Edit** window opens.
2. Click **Item Properties > Label & Identity**.  
The **Database Identities** list displays the name of the data sources that the item originates from, and the database keys that identify the source records.

Choose a data source and connect Analyst's Notebook to it, then use the features that the connected source provides for working with its data. For example, you might add the network that the selected item is part of to the chart.

## Detect and resolve duplicate data

To ensure that the quality of your analysis is not compromised by duplicate data, you can search for entities on the charting surface that might represent the same real world object. Analyst's Notebook provides a number of tools to help detect and resolve any duplication without the loss of critical data.

When you attempt to paste or import items into a chart or when you chart items from a data source, Analyst's Notebook automatically compares the identity of items already on the chart with the incoming items. If a match is found, the item is not copied to the chart. An item's label is not necessarily the same as identity, for example you can copy any number of Person entities with the same name to a chart. It is the database identity that is used to automatically detect duplicate data.

Multiple records with different identities often exist for the same entities, and they might contain different details that collectively give a broader view of an entity. The records might also be incomplete, contain errors, or alternative spellings. The difference in identity means that the duplication is not automatically detected, however you can conduct your own analysis to detect and resolve matching items without compromising your investigation.

## Resolve duplicate data that you identify

During your analysis, you might identify that some of the data you are working with represents the same information and you need to decide how to resolve the duplication. For example, you find that two entities are aliases for the same person and you do not want them both to appear on your chart.

Merging is one way to resolve duplication that is not automatically dealt with. To help you, Analyst's Notebook provides tools that manually merge entities, multiple links, and combine attribute classes. These tools are located in **Merge and Combine** on the **Analyze** tab.

## Merge chart items

You can manually merge items with different identities on your chart. You can merge entities, merge links in the same connection, and merge entities and their links that are connected to a common entity.

### Merging entities

It is useful to merge entities when you identify two or more entities on your chart that represent the same real-world object. For example, you might incorporate data into your chart from a source that uses different naming conventions or you might discover that several people on your chart are the same person with different aliases. You can find the **Merge and Combine** tools on the **Analyze** tab of the Notebook **Ribbon**. Select the entities you want to merge and use the **Merge Entities** option. Use **Undo** to reverse the merge action.

### Merging links

It is useful to merge links when you have several links between two entities that represent a number of events and you want to represent them as a single link. For example, you might want to represent several transactions from one bank account to another as a single link that indicates the total amount that is transferred. Select the links you want to merge and use **Merge Multiple Links** from the **Merge and Combine** tools on the **Analyze** tab.

The following actions might result in the automatic merging of links between entities:

- When you change the multiplicity of a connection, resulting in fewer links in the connection.

When you change the multiplicity of a connection from a Multiple connection to a Directed or Single connection or from a Directed connection to a Single connection, links might merge. Which links are merged depends on their arrowheads. For example, changing from a Multiple to a Directed connection merges links with arrows in the same direction.

- When two or more entities that are linked to a common entity are merged.

When two or more entities are merged that have a link to the same entity, those links are combined into one connection. The resulting multiplicity is the highest order of all the merged connections. A Multiple connection takes precedence over a Directed or Single connection. A Directed connection takes precedence over a Single connection. For example, if the existing connection is Multiple, links are always added to the connection.

Any corners on a connection that is being merged are retained and corners on the other connections are discarded.

- When a link is imported or pasted into a chart, where the entities at each end of the link already exist.

The highest multiplicity of the connections between the entities determines whether the pasted or imported link is merged or added. For example, if the multiplicity of the existing connection on the chart or the multiplicity of the connection for the link that is being pasted or imported is set to Multiple, the link is always added.

When entities with links between them are merged, the links are deleted:

- Any attributes on a link that is deleted are moved to the resulting merged entity.
- If a link contains information such as date and time or description, a card which contains this information is added to the resulting merged entity.
- Any link style information, such as link color, direction, strength, and width is lost.

### Selecting which is the resulting item

When you merge chart items, the order that you select the items to be merged is important. Analyst's Notebook merges the second and further selected items into the first item that is selected.

**Note:** When you merge a selection of items from List Items, the order of selection in List Items is preserved in the chart. Therefore, the correct behavior is used when the entities are merged.

## Combine attribute classes

You can combine one attribute class and its values with another attribute class, and optionally delete the source attribute class.

Examples of when you might want to combine attribute classes:

- You might incorporate data into your chart from different sources that use different attribute classes to represent the same information.
- You might want to make the values of an analysis attribute visible on the chart. You can make these values visible by combining the analysis attribute into an attribute class, which can be displayed.

To combine attributes, you must specify the source attribute class and the target attribute class:

- The source attribute class (Paste Values of Attribute) is the attribute class whose instances you want to convert. You can specify that this attribute class is deleted after the attribute classes are combined.

- The target attribute class (Onto Values of Attribute) is the attribute class to which you want instances to be converted. The target attribute class does not need to be in use on your chart. It is typically the same type as the source attribute class, for example Text or Flag, but rules also exist for combining attributes of different types.

Any source attributes on the chart are converted to the target attribute. If a chart item already has an attribute of the target attribute class, then the value is pasted according to the On Paste behavior that is defined for the target attribute class.

### Rules for combining attributes of different types

Typically, you combine attributes of the same type, for example, two Text attributes or two Number attributes. In this case, the values are pasted from the source attribute to the target attribute.

The following rules apply when you are combining attributes of different types.

Source	Target	Rules
Text	Number	Only possible when the source value can be interpreted as a number, that is, when the text contains numbers. For example, the value <code>Text 3</code> becomes 3.  Otherwise, it is not combined.
Text	Flag	When the source value begins with Y, y, T, t, or 1, then the target value is set to YES.  Otherwise, the target value is set to NO.
Text	Date & Time	Only possible when the source value is a valid date and time.  Otherwise, it is not combined.
Number	Text	Number is pasted as text.
Flag	Text	Pasted as YES or NO.
Date & Time	Text	Pasted as the date and time, formatted as it is displayed on the chart.

### Merged data

When data is merged as a result of a paste or import, or after you use one of the merge and combine tools, as much information as possible is retained.

The merged chart items retain the following information:

- Location on the chart.
- Chart item type, for example entity type Subscriber.
- Date, time, and ordered or controlling state.
- Semantic type assignment.

- Existing cards. The merged chart item also inherits any cards on the chart items that are merged into it.
- Data records

The resulting labels depend on the label merge and paste rules settings that you select on the **Options > Behavior** page of the **Chart Properties** window. For example, if the label of one vehicle entity is `ABC123` and the label of the other vehicle entity is `Blue articulated truck`, you can choose to append the labels, which results in `ABC123 Blue articulated truck`. For links, if **Sum Numeric Links** is selected, the resulting label is the total value of the merged link labels.

When merged items contain information that would otherwise be lost, a card that contains this information is added to the resulting item. Examples of information of this type are date and time, description, grades, source type, and source reference. A card is only created when a merged item contains information that is different from the item into which it is merged. When you are merging several items, a card is created for each item that contains different information.

If entities that are being merged both contain instances of the same attribute class, the attribute values are merged according to the rules that are specified in the attribute class definition.

When merged items contains data records, the data records are maintained separately in the merged item. Each data record is identified by its unique database key.

Resulting links also retain the position, strength, type, and width of the first selected link and incorporate the direction of the links that are merged into it.

Resulting entities inherit all links from the merged entities.

## Finding matches

There are a number of ways to find matches in Analyst's Notebook, so it is useful to understand when a particular feature might be suitable for the needs of your investigation.

### Find matching entities

- Is available to use in both Analyst's Notebook and Analyst's Notebook Premium.
- Works with entity chart items.
- Finds matches by examining item Property values. The Properties of entities with data records are automatically populated by the appropriate data record property values.
- Finds matches using pre-defined algorithms, not rules created by the user.
- Presents matching entities in a Matched Set panel. Members of the selected set are displayed in a diagram and given a score to indicate the strength of the entity match. A Card containing a summary of the match is displayed when the link is clicked.
- Users can choose to Merge the entities or add a link to connect the matching entities on the chart.

You should use **Find Matching Entities** when your chart contains just Analyst's Notebook entities, or a combination of these and i2 Analyze entity records. Although **Find Matching Records** is available, only i2 Analyze entity records on the chart are compared with each other. The other chart entities are not considered in the search. For more information, see [Find matching entities](#) on page 118.

### Find matching records

- Is available to use in Analyst's Notebook Premium.
- Works with data records contained in Entity and Link chart items.
- Finds matches by examining data record Property values.

- Finds matches using Match Rules. There are a common set of rules defined by the system administrator and users can create their own rules. Users can choose to activate all, none or some rules. The system rules cannot be edited or deleted.
- Users can choose to Unite or Merge entity records, this is configured in the Find Matching Records **Options** dialog. The Merge Records option can also be used to merge links between the same end records.

You should use **Find Matching Records** when you are working with i2 Analyze entity and link records. For more information, see [Find matching records](#) on page 127.

## Find matching entities

The Find Matching Entities feature helps you identify matching entities on the chart, inspect the results and resolve the potential matches.

When you add data to a chart, it is important to try to ensure that multiple items do not represent the same real-world object, event, or relationship. The Find Matching Entities feature in Analyst's Notebook compares chart items and identifies possible matches so you can decide how to resolve them. In addition to matching based on entity labels, you can also look for potential matching entities based on their semantic types, and the meaningful content. When you identify potential matches, you might want to select the matched entities for closer inspection, link the entities for inspection later, or merge the entities.

The following examples demonstrate some types of duplicate data that the Find Matching Entities feature might reveal and describe how you might choose to resolve it:

- Several entities that have similar labels, such as "Sam STEELE", "SAMSTEELE", and "SAM steele" might exist on your chart. If you have further evidence to support the supposition that these entities all represent the same person, you can merge the entities. All of the information in the entities' properties and all the links to these entities are then stored in a single entity.
- When you add information to a chart from different sources, data that is potentially the same might be formatted differently. For example, the entities 0123 456 7890 and 01234567890 might represent the same telephone number or a bank account.
- Many Address entities might have the same post code but have slightly different addresses. More investigation is required to determine whether they are duplicate locations. You can add Match links between the entities to record possible duplication and investigate further.
- Two Person entities on your chart might have different labels, but the same date of birth and national identifier. This information might indicate that the two names are aliases for the same person. You might choose to link them and investigate further or, if you already have information that indicates that are they same person, you can merge the entities.

## Finding and resolving matching entities

Identify possible matching entities on the chart and resolve the potential matches by inspecting the results and deciding what action to take.

1. Click the **Analyze** tab, and click **Find Matching Entities** on the ribbon menu. The **Find Matching Entities** pane opens.
2. Select the type of matching you want from the drop-down list.

Option	Description
<b>Smart Matching</b>	The semantic type that is assigned to the entity is used as the basis for the match. For example, the entity types Doctor, Male, and Anonymous might all be assigned the Person semantic type. Common properties of people such as national identifier and date of birth are then examined to find potential matches. Smart matching considers a broad range of criteria, including attribute instances and database properties that are assigned the same semantic types. You can specify a threshold to indicate how strong the match must be and you can choose which entities to include in the search.
<b>Smart Matching Against Selection</b>	Similar to <b>Smart Matching</b> , however chart items are matched only against the current selection on the chart surface. For example, if the entity Danny KENT is the only entity that is selected on the chart, matches are made only against Danny KENT.
<b>Label Matching</b>	A specialized form of entity matching that compares entity identities and labels. No two entities can have the same identity but identities can differ by letter case or by their digits only. For example, you can search for identities that have matching letters, excluding letter case and digits.
<b>Previously Linked Matches</b>	Search your chart to find matches that you previously found and preserved on the chart by adding a Match link between them. You can find matching entities, ignoring any previously linked entities, as many times as you like. When everything of interest is linked, use <b>Previously Linked Matches</b> to retrieve all the resulting links from your previous searches.

3. To set up the search criteria for the type of entity matching that you select, click **Setup**. The **Setup** dialog for your selected matching type opens.
4. Select your setup options, for example set the threshold for Smart Matching, or the character matches for Label Matching.
5. Click **Find**.  
Any matches are displayed in a tree view in the **Matched Sets** area of the **Find Matching Entities** pane.
6. Use the tools in the **Matched Sets** area to resolve the matches.

**Note:** You can run Find Matching Entities as many times as you like with different options and different setups.

## Label matching

Search for entities that might represent the same real-world object based on their identities and labels and on specified criteria. For example, you can compare letters only, digits only, or choose to ignore characters such as spaces or tabs.

Label matching is specialized form of entity matching that does not consider criteria such as attribute instances and database properties.

If the entity has an identity, it is used when searching for a match. If the entity does not have an identity, for example if the entity is charted from a data source, the label is used. To override this behavior, select the **Use All Identifiers** check box in the **Match Entities** area of the **Setup Label Matching** window. All identities and labels are compared.

To prevent matches based on identity and label alone, you can match only entities of the same type or of the same type and with a specific semantic type assigned. For example, matching "Sam STEELE (Male)" with "Sam STEELE (Female)" based only upon their identity and label would not be a good match.

Entity Matching works by comparing a set of characters between one entity and another. You can choose to include only letters, only digits, ignore certain characters, and ignore case. For example, one data source might represent telephone numbers as three groups of digits that are separated by a hyphen (123-456-789). Another data source might represent telephone numbers without separation but with an extension number (123456 ext 789). The digits are the same in both cases. You can use label matching to compare digits only, ignoring the hyphens to match the entities and merge them into a single entity on your chart.

Label matching reports the search results as sets of potential matches, which are known as matched sets.

## Smart matching

Search for entities on the charting surface that might represent the same real-world object based on their entity types and criteria such as attribute instances and database property values.

Smart matching uses a set of predefined rules for deciding whether two entities might represent the same real-world object. It examines entities and their associated links, and compares their property values to produce an overall score. A score of one indicates a weak match. A score of nine indicates a strong match. Smart matching reports the search results as sets of potential matches, which are known as matched sets.

You can choose the strength of match that you want smart matching to report by selecting a threshold. Depending on the threshold that you choose, you might get fewer but stronger matches, or more but weaker matches. Typically you start to search your chart with a threshold of 9 to find the strongest matches, and then repeat each search with lower and lower thresholds.

By changing the threshold, you can split sets of matched entities into more accurate matched sets. For example, you might have five entities on your chart, two assigned with a Gender attribute set to Male and three assigned with a Gender attribute set to Female. All entities have the same label but in slightly different letter case. Selecting a threshold of 1 and 6 in different searches matches the same entities in both searches but produces different matched sets, as shown in the table.

**Note:** The entity type is used for matching, and property values can be implied. For example, Analyst's Notebook recognizes that 'John' is usually masculine, and that names like 'Sam' might not be gender specific. This means that implied gender might affect the match strength even when entities do not have the gender property value specifically assigned.



Entities in chart	Threshold	Matched sets
Sam Steele (with Gender attribute: Male)	1	Sam Steele (5 Entities)
SAM STEELE (with Gender attribute: Female)		
sam steele (with Gender attribute: Female)		
Sam STEELE (with Gender attribute: Male)		
Sam steele (with Gender attribute: Female)		
Sam Steele (with Gender attribute: Male)	6	SAM STEELE (3 Entities)
SAM STEELE (with Gender attribute: Female)		
sam steele (with Gender attribute: Female)		
Sam STEELE (with Gender attribute: Male)		
Sam steele (with Gender attribute: Female)		
		Sam Steele (2 Entities)
		<ul style="list-style-type: none"> <li>Sam Steele</li> <li>Sam STEELE</li> </ul>

**Rules for smart matching**

Smart matching first determines whether entities are eligible to be matched by checking they meet the following criteria:

- Comparisons are made between entities that share semantic type behavior. For example, a comparison can be made between the Organization and Law Enforcement Agency semantic types because Law Enforcement Agency is a specialization of the Organization semantic type. A comparison cannot be made between Organization and Person semantic types.
- Comparisons are made between entities if they have some attributes that have the same property semantic type, or data record properties that have the same property semantic type.

Where eligible pairs of entities are identified, their properties values are compared and scored according to how closely they match. The scoring takes account of:

- Typographical errors; for example, Michael and Micheal.
- Common synonyms; for example, Richard and Dick.
- Phonetics; for example, Michael and Mikel.
- Titles; for example, Mr, Mrs, and Dr.
- Suffixes; for example, OBE and Phd.
- Numeric properties; for example, phone numbers match from the right to account for area codes that might be formatted differently.

Some entity types and property types have semantic behavior. For these types, higher scores are given for identifying property values such as a car license plate. Less significant facts such as car color contribute less strongly. Lower scores are also given where one piece of information contradicts another, for example Mr D KENT contradicts Mrs D KENT.

**Note:** Not all property values have semantic behavior. If they do not have semantic behavior, their values are ignored in semantic matching. For example, the Person properties that have matching

behavior are Title, First Name, Middle Names, Last Name, Full Name, Name Suffix, Gender, Date of Birth, Job Title, and Email Address. The other properties are ignored.

### Matches with database clashes

When you are using Analyst's Notebook with another database application such as iBase or i2® iBridge, entities that are extracted from the database have an associated database identity.

Matches involving database clashes can occur when two matching entities originate from a single database that does not support multiple database keys. These entities are included in a matched set and the set name is appended with the word Clash; for example, `<set name>: Clash (4 entities)`. These clashing entities can be merged, however, vital information might be lost. The information that is retained after clashing entities are merged depends on whether the entities have unique database keys and whether the database supports multiple database keys.

## Entity and property semantic types recognized by smart matching

Some entity and property semantic types are recognized and used by smart matching.

Each property plays a role in assessing the likelihood that two entities represent the same real-world object. Some properties identify the entity, such as a national identifier for a person or a license plate number for a vehicle. Other properties contribute additional information. At least one identifying property must be assigned to an entity for a match to occur.

This table lists the entity semantic types that are recognized by smart matching and the related property semantic types that are also considered.

**Note:** All of the recognized property semantic types can contribute to a match for a pair of entities but they contribute less than the property types associated with the entity type. For example, a phone number identifies a phone but it can also contribute to a person match.

The \ symbol in the table indicates a child semantic type.

Property semantic types in bold indicate identifying types or components of identifying types. For matching to take place, at least one identifying type must be assigned to an entity. For example, to match entities that are assigned the Car entity semantic type, the entities must have a Vehicle Identification Number (VIN) or a Vehicle License Plate Number or both. They might also have other information such as make and model of the vehicle.

The Culture column contains the following entries:

### Neutral

The matching behavior of these entity types is culturally independent. For example, Bank Card, Phone and Web Site entity types match regardless of the language and region of the data.

### Partial

The matching behavior of these entity types has some US/UK specific behavior, but matching these types is still effective in all languages and regions. For example, Motor Vehicle, Organization and Event.

### US/UK

The matching behavior of these entity types depends on the US/UK English culture. For example, Person and Location entity types assume US/UK English culture for names and addresses. You can match these entity types outside of the US/UK English language and region, however, the results might not be as expected.

Culture	Entity types	Property semantic types
Neutral	Bank Card \Credit Card \Debit Card	<b>Card Number</b> Card Type
Neutral	Bank Account	<b>Account Number</b> Account Routing Number (US) Bank Sort Code (UK)
Partial	Motor Vehicle \Bus \Car \Police Car \Motorcycle \Truck	<b>VIN</b> <b>Vehicle License Plate Number</b> Vehicle Model Vehicle Color Vehicle Make Vehicle Body Style Vehicle Year
Neutral	Event \Meeting \Crime	<b>Event Date Time</b> <b>Event Date</b> or <b>Event Start Date</b> <b>Event Time</b> or <b>Event Start Time</b> Event Title Event End Date Event End Time
US/UK	Person \Law Enforcement Officer \Offender \Person Alias	<b>National Identifier</b> <b>Person Full Name</b> <b>Person First Name</b> <b>Person Middle Names</b> <b>Person Last Name</b> Email Address Date Of Birth Person Title Person Suffix Gender

<b>Culture</b>	<b>Entity types</b>	<b>Property semantic types</b>
Partial	Organization	<b>Organization Name</b>
	\Company	
	\Bank	
	\Court	
	\Criminal Organization	
	\Government Agency	
	\Law Enforcement Agency	
	\Organization Name Alias	
Neutral	Phone	<b>Phone Number</b>
	\Cell Phone	<b>Local Number</b>
	\Fax Machine	<b>Area Code</b>
	\Pager	<b>International Code</b>
US/UK	Location	<b>ZIP Code</b>
	\ATM	<b>Full Address</b>
	\Mailing Address	<b>Address Line 1</b>
		<b>Address Line 2</b>
		<b>Address Line 3</b>
		<b>Address Line 4</b>
		<b>Address Line 5</b>
		<b>Apartment Number</b>
		<b>Building Number/Name</b>
		<b>Street Name</b>
		<b>City Name</b>
		<b>State Name</b>
		Post Office Box
	Country Name	
	Country Code	
Neutral	Website	<b>Web Address</b>
	\Web Page	

### Link semantic types recognized by smart matching

Some link semantic types are recognized and used by smart matching.

The following table lists link semantic types for which there is smart matching behavior.

Link types	Description
Is Equivalent To (and any type that is derived from this link semantic type)	When it is assigned to a link between two entities being compared by smart matching, this link semantic type is recognized by smart matching, and contributes positively to the overall score for the match.
Does Not Match	<p>This link semantic type is assigned to a link when you use the Exclude feature of Find Matching Entities.</p> <p>Link types that are assigned the Does Not Match semantic type are recognized by smart matching and prevent the entities at each end from matching. The link semantic type is used to indicate that the two entities are not representations of the same real-world object, even though there are similarities between the two entities.</p>
Possible Match Between	<p>This link semantic type is assigned to a link when you click the <b>Link</b> button in this window. It means that the links are not then found again when <b>Ignore Previously Linked</b> is selected.</p> <p>Links of this semantic type are found by the <b>Previously Linked Matches</b> option.</p>
Ignored by Matching	You can assign this link semantic type to any of the links on a chart to exclude them from Find Matching Entities. It does not prevent two items from matching but the link is ignored as a reason for matching. Links might otherwise be taken into account.

### Assumed semantic types for labels

There are some entity types for which the label text is used for matching in addition to the property values. Semantic types are assumed for the label.

The table indicates how the entity labels are treated during matching.

Entity semantic type	Assumed property semantic type
Person	Person Details *
Organization	Organization Name
Phone	Phone Number
Motor Vehicle	Motor Vehicle Details *
Location	Location Name
Event	Event Title
Bank Account	Bank Account Details *

Entity semantic type	Assumed property semantic type
Bank Card	Bank Card Details *
Web Site	Web Address
Mailing Address	Full Address
Bank	Bank Name

\* When one of these property types is assumed for a property value, smart matching analyzes the textual content to identify different details. For example, the Bank Account Details property value is analyzed to try to identify an account number and a bank name.

## Previously linked matches

You can build up your analysis by linking potential matches that you find. You can then retrieve all of your previous results when you are ready to further resolve those potential matches.

Typically you might choose to run **Find Matching Entities** with the **Smart Matching** options, setting different thresholds and the **Label Matching** option to find potential matches. As a result of these searches, you might be unsure whether the matches are real matches and you might want to do further analysis before you decide whether to merge the entities. You can choose to link the potential matches with links of type Possible Match Between and later use the **Previously Linked Matches** option to retrieve all the matches that you previously found and linked.

You can choose to retrieve previously linked matches for only entities of the same type or of the same type and with a specific semantic type assigned. You can also choose whether to include hidden entities.

**Note:** You cannot search background items. If required, use the **Send to Background > Foreground All** on the **Arrange** tab to bring all chart items to the foreground.

## Resolve matched entities

When you find matching entities, you can merge them or exclude the matches from further searches. If further investigation is needed, you can copy the Match links from the **Find Matching Entities** pane to the chart to record the potential duplication.

The results of a Find Matching Entities search are displayed as a list of matched sets in the **Find Matching Entities** window. When you select a set in the **Matched Sets** area, the entities that are contained in the set appear as a chart fragment in the **Members of Selected Set** area. Links between the entities represent the matches. You can view the properties of a matched entity or link between the entities by double-clicking it in the chart fragment.

For smart matching, each link also indicates the score that is given to the match between the two entities at each end of the link. Each link contains a card that describes the reason for the resulting score. To view this information, double-click the link and open the **Cards** page. The card description shows which properties were examined and what contribution they made to the match score.

In the **Description** area, several symbols are used to indicate what contribution the properties made to the score:

+	The property made a positive contribution.
-	The property made a negative contribution.

~	The property does not reinforce nor weaken the match.
!	The value for the property was contradictory, for example Mr Alison SMITH.

You can use the number score and the card description to help you decide whether to merge individual matches that are found. When you merge the matching entities, the details of the source entity are retained in the merged entity for future reference.

### Merging matched entities

To merge some or all of the entities in a matched set:

1. In the **Find Matching Entities** pane, select the matched set in the **Matched sets** area.
2. In the **Members of Selected Set** area, select the entity to merge into to make it the target entity. The target entity appears enlarged in the chart fragment.
3. Add all of the entities that you want to merge into the target entity to the selection by holding down the Ctrl key as you select them in turn.
4. Click **Merge**. The selected entities are merged in the chart fragment and on the chart surface. The target entity in your chart contains a card for each merged entity, which contains a description of the merge. The resulting label depends on the label merge and paste rules that are specified in the **Behavior** page of the **Chart Properties** window.

### Linking matched entities on the charting surface

To copy one or more Match links in a matched set to the chart:

1. Select the Match links in the chart fragment.
2. Click **Link**. The selected Match links are copied to the chart.

The link style is distinct from the other link styles that are used in Analyst's Notebook. It has a label of Match (for Label Matching) or a label of Match (Strength: N) (for Smart Matching where N is the match score). The link contains a card, which has a description for the match.

**Note:** A link is not copied to your chart if the entities are already connected with a link of type Match. It does not matter if the reason for the match in subsequent searches is different.

### Excluding matches

Excluding matches is useful to record that two or more entities are not duplicates, and prevents those matches from occurring in future Find Matching Entities searches. When you exclude selected Match links, the label on the link changes to Does Not Match.

1. Select the links on the chart fragment that you want to exclude from further Find Matching Entities searches.
2. Click **Exclude**. The Match label on each selected link in the chart fragment changes to Does Not Match. These links are then also copied to the charting surface.

## Find matching records

Sometimes your charts can contain multiple records that represent the same real-world objects and relationships. The Find Matching Records feature in Analyst's Notebook helps you to identify potential

matches and reduce the number of matching i2 Analyze records. This means you can keep key information together, uncover new connections and minimize duplication on your chart.

When multiple records exist for the same item, they are not necessarily populated with exactly the same information but do have some values in common. The likelihood of finding multiple records increases when you use data from a number of different sources, such as the Information Store and i2 Connect, and records that you create on the chart. For example, when you search sources for "Samuel Steele", you might find that records exist for "Sam Steele", "Sammy Steele", "S Steele", or other variations. You might have created your own *analyst-governed* records for "Samuel Steel" that include information that has not already been uploaded. It is possible that some or all of these records represent the same person and contain varying amounts of key information, source references, and notes. The match rules provided, along with the rules that you create, give you a fine level of control in searching out potential matches.

i2 Analyze records contain *source identifiers* that are used to identify the unique record in the source system that generated them. Although these source identifiers are not visible to analysts, Find Matching Records is able to match the source identifiers on records of the same type. Source identifiers can produce reliable matches because they are not subject to the possible inconsistencies present when property values are entered. For example, you might have two or more records for the same Person entity that are not discovered as a match, because the names are spelled differently. The rule provided for source identifiers can find these records, even when the property rules did not produce a match.

When relationships between entities are represented by multiple link records, your chart can become cluttered and difficult to read. For example, you might find matching links between Person entities and the property they have access to such as vehicles, addresses, or devices. You could improve the look of your chart by merging duplicate link records, as long as they link the same end record.

The presentation of the records in match sets allows you to easily compare the values that they have in common and examine any anomalies. You can then unite matching Information Store records behind a chosen target record on the chart, merge the information from chart records into a single target record, or resolve a combination of chart and Information Store records by both uniting and merging. For matching link records, the choice of which records to merge gives you the ability to control the links that you want to see on the chart, and those that you do not.

## Creating rules for matching entity records

When you create rules for matching i2 Analyze records, you decide what information Analyst's Notebook uses to identify matches in the records on your chart.

Depending on how your system administrator has configured Analyst's Notebook, you might have a number of rules that are available as defaults. You can activate or deactivate these rules but you cannot amend them. You can also choose to create and edit your own rules. Match rules consist of:

- A name and description.
- An entity type, for example a Person.
- The property or properties to use in setting conditions, such as Last Name.
- An operator that sets the kind of comparison for the match, such as Exact match.
- Refinements to ignore particular characters and white space, if required.
- The minimum conditions that must be met to report a match.

For example, in your data the combination of Passport Number and Date of Birth, or Last Name might provide strong evidence of a Person match. You can create a rule that tells Analyst's Notebook to identify the records on the chart with the same values for these properties. The example match rule would be:



- Entity type = Person
- Match all:
  - Property type = Passport Number
  - Operator = Exact match
- Match any:
  - Property type = Last Name
  - Operator = Exact match
  - Property type = Date of Birth
  - Operator = Exact match

**Note:** Analyst's Notebook maintains a separate set of match rules for each server. The rules that you create remain in the **Rules Overview** window until you delete them, or connect to a different server.

1. Click the **Analyze** tab, and then in the **Match** group, click **Find Matching Records**.  
The **Find Matching Records** window opens.
2. Click the **Rules** button, next to the **Find Matches** button.  
The **Rules Overview** window opens.
3. Click the **New rule** button.  
All the entity types from your current schema are listed.
4. Choose an option from the list, for example, Person.  
The **New person rule** window opens.
5. Enter a name for your match rule in the Name field. You cannot create a rule without a name.
6. Optional: Enter a description of your match rule in the 'Description' field.
7. In the next column, if you want to create conditions that records must meet in order to match, click the Add a condition button



The **Add conditions** window opens.

8. Select a property type such as First Name and choose an operator for the condition. The default operator is Exact match. Click the drop-down menu arrow to select other options.

Operator	Description
<b>Exact match</b>	The search identifies property values in the records that are exact matches. For example, if your condition is set to the 'Last Name' property, your match sets only contain records whose last names match exactly.
<b>Match first characters</b>	The condition is met when the opening characters of the property values match each other. For example, enter the number '3' to match with the first three characters.
<b>Match last characters</b>	The condition is met when the closing characters of the property values match each other. For example, enter the number '5' to match with the last five characters.

Operator	Description
Equal to	The condition is met when the property value matches the value that was specified.

**Note:** You can choose the operator for property values that contain text. Some properties such as age, height, date of birth, and weight are set to Exact match and cannot be changed.

9. Click the Refine condition button



next to the arrow to make further refinements to the conditions. Your system administrator might have selected some default options for value handling, such as when to ignore white space. You can change the default selection to suit your own rules. A dot icon appears next to the Refine condition button



to indicate when these refinements are modified.

10. In the last column, you can apply a number of conditions of which at least one must be met. You specify these conditions and refinements in the same way as you did for the previous column.

11. Click **OK**.

Your rule appears in the list on the **Rules Overview** window along with a summary of your chosen conditions.


You might want to create more rules before looking for matches. The Duplicate option in the **Rules Overview** window is useful for creating rules to edit, rather than starting from the beginning. When you are ready to begin matching, activate the rules that you want to search with, click **OK**, proceed to the **Find Matching Records** window and click **Find matches**.

## Resolving matched entity records

You can merge and unite matching entity records on the chart. This means that disparate information that is stored across multiple sources is brought together. Critical data remains easily accessible, helping you to uncover paths in the data and improve chart readability.

When you activate and run match rules for entity records, Analyst's Notebook returns the results in the Entities tab of the **Find Matching Records** window. The property values of the records in each unresolved match set are displayed in a table, with matches and clashes indicated by different icons. You can ascertain whether the records represent the same real-world object or relationship by comparing the values that match, and those that do not. For example, if the Passport number in four out of five of the records is a match, the anomaly might be that the number is missing from the fifth record, it has been input incorrectly, or the record belongs to a different person. Further investigation of the common property values can help you validate whether some or all of the records in the set are the same person. You can then decide how to combine the information and make it easier to manage.

The icons that are used in the **Find Matching Records** window, and their meanings are:

	Indicates that this property was specified in the conditions of the match rules used in this search.
---	--



Indicates that this value is unique in the match set. When there is no equivalent value in any other record in the match set, this might be a reason not to merge or unite this record.



Indicates that this value appears more than once in the match set. The color and hatching direction have no significance other than to denote more matches, commonly when comparing large numbers of records.

Merging records is particularly useful if you are working on a chart with records from the Information Store and records that have never been uploaded. The target record in a merge keeps its record identifier, version and security level. The properties, notes and source references of the other records being merged are copied to the target record and any duplicates are discarded. The links from the selected records are merged with the target record. You should be aware that if your selected records have different security levels, you might be merging data from records with a higher security classification than that of the target record. You can also use the **Merge Records** function in the **Match** group on the Analyze tab to merge selected records quickly. Use **Undo** to reverse the merge action. It is not possible to merge Information Store records with each other. The only option available is to unite these records.

Uniting records is used when you are working with Information Store records, or when you want to maintain all of the information on the records without any merging taking place. The records are brought together into a single chart item and the record selected as the target becomes the lead record. When you upload united records, all the records are kept separately in the Information Store and there is no indication in the store that the unite occurred. You can upload a chart that contains united records to the Chart Store and they continue to appear as united on the chart surface when you or another analyst opens the chart. You cannot unite entity records of different schema item types, for example you cannot unite Person records with Vehicle records.

If a match set contains both Information Store records and records that only exist on your chart (and the option to merge where possible is on), you are presented with the **Resolve** command. This function resolves matches by merging any records that can be merged and uniting the remaining records. When you resolve a match set, it is good practice to select an Information Store record as your target to preserve the network associated with that record. If links are transferred to a target record that is not from the store, the network can become more fragmented when you upload records. You cannot upload changes to the properties of system-governed records, however you can add notes and details. The **Upload Records** window provides information of changes that you have made to read-only records.

**Note:** If you make changes to records on the chart or delete records after finding matches, you might need to run Find Matching Records again. Analyst's Notebook detects the changes and displays a message on the Find Matching Records window. The Label row updates to show the stale or deleted records. These records cannot be selected or chosen as target records.

- To merge and unite entity records:
  - a) Click an unresolved match set from the list in the **Find Matching Records** window. The records in the set display in a table and the corresponding items are also selected on the chart.
  - b) Choose the records you want to include in the **Select** row.
  - c) Click the button in the **Target** row, under the record to use as the target.
  - d) Click **Options**.

The **Configure merge and unite** window opens.

- e) Click either **Merge where possible, otherwise Unite** or **Always Unite matching records**. You can also choose to create a note of any clashing property values under the merge action. If you click **Merge where possible, otherwise Unite**, records that are not in the Information Store are merged. An Information Store record can only be included in the merge is when it is selected as the target record. If you click **Always Unite matching records**, the selected records move into the same item as the target record. When you select the chart item, you can view the records it contains in the **Record Inspector** or if you hover over the selected chart item, you can view the records in the Data Record area of the Infotip.
- f) Depending on the match sets you select, you can choose to complete the merge or unite step in one action. The **Merge records in sets** and **Unite records in sets** functions perform in the same way as **Merge records** and **Unite records**. For example, you have four unresolved match sets that you have made changes to. The button updates to say 'Unite records in 4 sets'. This option saves you the time of uniting the match sets individually but it does not unite one match set with another.
- To resolve entity records:
  - a) Click an unresolved match set from the list in the **Find Matching Records** window. If your match set contains some records that can merged and others that can only be united, and you chose to **Merge where possible, otherwise Unite**, records and chart records, the option to **Resolve** the records in that match set is active.
  - b) Click the radio button in the **Target** row to select the target record. The Action column updates to show if the other records in the set will be merged or united.
  - c) Click **Resolve records**.

If you chose to merge records, the properties, notes, source references, and source identifiers from the records in your selection are copied over, unless they already exist on the target record. Duplicate records are removed from the chart. If the merge results in the target record containing more notes or source references than the set limit, Analyst's Notebook displays a message. If you are concerned about losing data, you should undo this action and curate the records you want to merge before repeating **Merge Records**. Additionally, you could contact your system administrator and have the count limits increased for notes and source references.

Records you choose to unite are brought together behind the target record, however all records retain their information and can be individually viewed in the **Record Inspector**.

The option to resolve records results in a combination of values being copied onto the target record, while Information Store records are united.

## Creating rules for matching link records

When you create rules for matching i2 Analyze link records, you decide what information Analyst's Notebook uses to identify matches between the same end records on your chart.

Depending on how your system administrator has configured Analyst's Notebook, you might have a number of link matching rules that are available as defaults. You can activate or deactivate these rules but you cannot amend them. You can also choose to create and edit your own rules based on the link conditions in your schema. Link match rules consist of:

- A name and description.
- A link type, Communication for example.
- The property or properties to use in setting conditions, such as the duration of the communication.

- The link direction that can either be matched exactly or ignored.
- An operator that sets the kind of comparison for the match, such as Exact match.
- Refinements to ignore particular characters and white space, if required.
- The minimum conditions that must be met to report a match.

For example, your chart contains a large number of links relating to communication between devices. You could improve the look and readability of your chart if you could identify and merge the matching links. You can create a rule that tells Analyst's Notebook to identify the link records on the chart with the same values for these properties. The example match rule would be:

- Link type = Communication
- Link direction = ignore
- Match all:
  - Property type = Communication Type
  - Operator = Exact match
  - Property type = Communication Start Date and Time
  - Operator = Exact match

**Note:** Analyst's Notebook maintains a separate set of match rules for each server. The rules that you create remain in the **Rules Overview** window until you delete them, or connect to a different server.

1. Click the **Analyze** tab, and then in the **Match** group, click **Find Matching Records**.  
The **Find Matching Records** window opens.
2. Click the **Links** button.
3. Click the **Rules** button, next to the **Find Matches** button.  
The **Rules Overview** window opens.
4. Click the **New rule** button.  
All the link types from your current schema are listed.
5. Choose an option from the list, for example, Communication.  
The **New Communication rule** window opens.
6. Enter a name for your match rule in the Name field. You cannot create a rule without a name.
7. Optional: Enter a description of your match rule in the 'Description' field.
8. In the next column, if you want to create conditions that records must meet in order to match, click the Add a condition button



The **Add conditions** window opens.

9. Select a property type such as Communication Type and choose an operator for the condition. The default operator is Exact match. Click the drop-down menu arrow to select other options.

Operator	Description
<b>Exact match</b>	The search identifies property values in the link records that are exact matches.
<b>Match first characters</b>	The condition is met when the opening characters of the property values match each

Operator	Description
	other. For example, enter the number '3' to match with the first three characters.
<b>Match last characters</b>	The condition is met when the closing characters of the property values match each other. For example, enter the number '5' to match with the last five characters.
<b>Equal to</b>	The condition is met when the property value matches the value that was specified.

**Note:** The default condition for **Link direction** is Exact match. To ignore link direction, click the drop-down menu arrow and select **Ignore**.

10. Click the Refine condition button



next to the arrow to make further refinements to the conditions.

Your system administrator might have selected some default options for value handling, such as when to ignore white space. You can change the default selection to suit your own rules. A dot icon appears next to the Refine condition button



to indicate when these refinements are modified.

11. In the last column, you can apply a number of conditions of which at least one must be met. You specify these conditions and refinements in the same way as you did for the previous column.

12. Click **OK**.

Your rule appears in the list on the **Rules Overview** window along with a summary of your chosen conditions.

**Note:** Link records that do not connect the same ends are never a match for each other.

You might want to create more rules before looking for matches. The Duplicate option in the **Rules Overview** window is useful for creating rules to edit, rather than starting from the beginning. When you are ready to begin matching, activate the rules that you want to search with, click **OK**, proceed to the **Find Matching Records** window and click **Find matches**.

## Merging matched link records

You can merge matching link records on the chart. This means that duplicate information is removed, preserving the data you need and improving chart readability.

When you activate and run match rules for link records, Analyst's Notebook returns the results in the Links tab of the **Find Matching Records** window. The property values of the records in each unresolved match set are displayed in a table, with matches and clashes indicated by different icons. Link match sets are listed using the linked end records as identifiers, for example associate links between Ben Steele and John Smith use both names in the match set list. Links are matched only between the same pair of ends.

Entities might have multiple matching links representing calls, relationships and other connections, that you can analyze in the **Find Matching Records** window. You can decide to keep the links that you

need to see, and merge others to reduce duplication and improve the look of your chart. You cannot unite any link records.

**Note:** If you make changes to records on the chart or delete records after finding matches, you might need to run Find Matching Records again. Analyst's Notebook detects the changes and displays a message on the Find Matching Records window. The Label row updates to show the stale or deleted records. These records cannot be selected or chosen as target records.

- To merge link records:
  - a) Click an unresolved match set from the list in the **Find Matching Records** window. The records in the match set display in a table and the corresponding items are also selected on the chart.
  - b) Click the radio button in the **Target** row to select the link record you want to keep.
  - c) Click



**Merge records** to bring the link records together.

When links are merged, source references and new notes (notes that have not previously been uploaded), are copied into the target record up to a limit. Analyst's Notebook displays a message telling you when this number has been reached and that some merged records might not contain all their notes and source references. If you are concerned about losing data, you should undo this action and curate the records you want to merge before repeating **Merge Records**. Additionally, you could contact your system administrator and have the count limits increased for notes and source references.

Link records are merged on the chart surface, and the target record keeps both its record identifier and security level. If the target record has blank properties, it is enriched with data from the most recently uploaded merged record. All unique source references, source ids and new notes are copied to the target record, up to the server count limit. Although the link records are no longer visible on the chart, they are not deleted from the Information Store. You can also use the **Merge Records** function in the **Match** group on the Analyze tab, to easily bring link records together.

## Copy and paste

When you copy and paste records between charts, Analyst's Notebook Premium identifies and resolves matches between the records copied from the source chart and the records already present in the target chart.

For incoming records, that is the records copied from the source chart, Analyst's Notebook Premium performs a series of checks to establish if matches exist among the records present in the target chart. When matches are found, Analyst's Notebook Premium determines the best way to combine or unite the source and target records. This is a useful way of limiting duplication that can affect the quality of your analysis and clutter your charts. To deselect default matching on copy and paste, refer to [Combining records on paste](#) on page 281.

Matching in copy and paste is based on three criteria, tested in this order:

- Record identifiers
- Source identifiers, provided by External Searches
- System matching rules configured by your system administrator.

If a source record and target record match according to a criteria, they are combined and not examined further.

For pairs of records that did not match on their record identifiers, the result on the target chart depends on whether either record has previously been uploaded to the Information Store. For example, if the source record has previously been uploaded to the Information Store, it is given priority over a target record that has not. If neither record has been uploaded, the source record is again given priority.

Source record	Target record	Record Identifier
Not uploaded	Not uploaded	The record identifier of the source record is kept and the records are combined.
Uploaded	Not uploaded	The record identifier of the source record is kept and the records are combined.
Not Uploaded	Uploaded	The record identifier of the target record is kept and the records are combined.
Uploaded	Uploaded	The records are united behind a lead record.

Sometimes multiple records are found that all match each other. Analyst's Notebook Premium determines the *best* source and target records based on:

- System-governed records are preferred over analyst-governed records
- The number of properties with values for system rule criteria
- The number of properties with values
- The record that was created first according to the time stamp.

When two records are brought together to form one record, their properties, notes, source references, and source identifiers are combined and any duplicate values are discarded. The security settings used belong to the record identifier that was kept. When records are united, one is assigned as the *lead* record, which is displayed on the chart. Each record grouped behind the lead record retains its own properties and values.

When you paste your copied records onto the chart, a status message tells you if matches are found and what action occurred, for example the number of pasted records that were combined with matching records. If some or all of your pasted records have multiple matches, the status message tells you that can resolve the matches by using Find Matching Records.

## Analytical chart layouts

Chart layouts can reveal groups and patterns in chart data. On association charts, you can identify highly connected entities and groups of entities that are interlinked. On timeline charts, you can identify groups of events that occurred close together in time.

### Identify highly connected entities

The Peacock layout and Compact Peacock layout group an entity's connections around it on the chart. Highly connected entities form visible areas of activity on the chart. The areas of activity that are formed by the Compact Peacock layout are closer together, which can result in a smaller chart.



### Identify groups of entities that are interlinked

The Grouped and Circular layouts can identify groups of entities that are interlinked on an association chart. The Grouped layout visibly distinguishes several groups within a single network, whereas the Circular layout arranges all members of a network in a circle. Both layouts can identify discrete networks in chart data.

The Peacock and Compact Peacock layouts identify highly connected entities, which might be connected to each other. For example, these entities might be the ringleaders of a gang. When the areas of activity that are formed by the Peacock layout and Compact Peacock layout are separated on the charting surface, the interlinking of the ringleaders is visible.

### Identify events that occurred close together in time

The Grouped by Time layout identifies bursts of activity on a timeline chart. If the time interval between two events is below a specified threshold, the events are separated by a small gap of a specified size. A large gap separates each group of events. You can set the threshold value, the size of the small gap, and the size of the large gap.

**Note:** The Grouped by Time layout only affects items that contain date and time information.

## Search for information

To find chart items that might be of interest to your investigation, you can search item properties for specific information. Different search tools on the **Analyze** tab fulfill different needs.

### Search across all chart items and their data

Use the **Search** pane to search for text, numbers, or dates in any property of any item on the chart. This feature is useful when you are not sure which property contains the information.

A text property match within the chart can be partial, and the search is not case-sensitive. The search does not match synonyms or misspellings. For example, 'Rob' matches 'ROBERT', but not 'Bob'. To provide matches for numeric data where values are rounded, or when the data has greater precision than the search value, a match can be fuzzy. For example, 32.5 matches 32 and 33, and 32 matches 32, 32.1, and 32.9.

Results are displayed in a table and ranked by how well they match the search terms.

### Search for text

Use Find Text to search across multiple properties that store textual information. You can limit the search scope to the selected items, and limit the scope to only entities or only links.

You can limit which properties are searched, so that Analyst's Notebook looks for the search text only in relevant parts of the item. For example, it would not be useful to search the Source Reference property for a vehicle license plate number.

A match within the chart can be partial. The search is not case-sensitive, unless you use wildcards or a regular expression to search for a text pattern. For example, you can use wildcards or a regular expression to search for a vehicle on a partial recollection of the license plate, such as the first and last character.

## Structured search

Use Visual Search to create a structured search, which searches for data in specific properties of chart items. You can specify multiple search criteria. For example, you can specify that you are looking for an entity that is assigned the Person semantic type, contains 'Tom Smith' in its label, and has 14 June 1982 for its 'Date of Birth' attribute value.

You can also specify characteristics that are described by a linked entity. For example, to find a Tom Smith who lives at 12 Main Street, you can specify that Tom Smith must be linked to a Location entity that has '12 Main Street' for its 'Address 1' attribute value.

You can search for relationships in your data. For example, to identify the accounts that are involved in high value transactions, you can search for links that represent transactions of value greater than \$75000. If a matching relationship is found, you can choose to select any part of the relationship such as the link, or a combination such as both entities and the link.

## Searching for text

One of the simplest kinds of analysis in Analyst's Notebook is to search for specific words or phrases in item information. For example, you can find all the chart items that contain a specific street name or telephone number.

To search for text in chart items, you specify the text to search for, how and where to search for it, and what to do with the items that contain it:

1. Click the **Analyze** tab, and then in the **Find** group, click **Find Text**.

**Tip:** Alternatively you can use the keyboard shortcut: Press `Ctrl+F`.

2. Type the text to search for in the **Find** box.

**Note:** Searching is not case-sensitive. A search for "smith" finds "SMITH", "Smith" and "smith".

You can then select any of the following options:

Option	Description
<b>Complex Searching</b>	Define a search by using wildcards or a regular expression.
<b>Find Items Not Matching</b>	Searches for items that do not contain the text in the <b>Find</b> box.
<b>Search Cards</b>	Enables card properties for searching in the <b>Coverage</b> list. <b>Note:</b> By default this option is selected.

**Note:** If you choose not to select any of these options, the same properties that are searched by the **Search** pane are enabled in the **Coverage** list.

3. Select the item properties that you want to search in the **Coverage** list.
4. In the Search Area section:
  - a) Select whether to search for text on both entities and links, entities only, or links only
  - b) To include hidden chart items in the search, select the **Reveal Hidden** checkbox.
  - c) To apply the search only to the chart items currently selected, select the **Selection Only** checkbox. This option is only available when items are selected on the chart.
5. In the **Action** area, specify the action that you want to use on the items found:

Option	Description
<b>Edit First</b>	Opens the <b>Item Properties</b> window for the first matching item at the page that contains the search term. The text is highlighted. Press <b>F3</b> to find any further matches within this item and then move to the next item.
<b>Select First</b>	Selects the first item that is found that contains the search term. Press <b>F3</b> to find the next matching item.
<b>Select All</b>	Provides a count of the number of matches. Selects all matching items, and clears any currently selected items that do not match the search result.  <b>Note:</b> Background items that contain the search term are included in the count, but cannot be selected on the chart surface.
<b>Add to Selection</b>	Provides a count of the number of matches. Adds any matching items to the current selection. Only available when items are selected on the chart.  <b>Note:</b> Background items that contain the search term are included in the count, but cannot be selected on the chart surface.
<b>Remove from Selection</b>	Provides a count of the number of matches. Removes any matching items from the current selection. Only available when items are selected on the chart.

6. Check **Select Sibling Links**.

This option selects all the links between two entities when one link matches.

**Note:** This option applies when you are using **Select First**, **Select All**, or **Add to Selection** as an action.

7. Click **OK** to run the search.

## Regular expressions

Regular expressions provide a way to search for a general pattern of text rather than a specific piece of text. For example, you can use a regular expression to search for license plates that are based on a partial sighting.

A regular expression is written as a sequence of characters. The syntax combines the text for which you are searching with special characters to define the pattern.

**Note:** Unlike a simple search, a regular expression search is case-sensitive.

**Table 8: Supported regular expression characters**

Character	Description
.	Matches a single character. For example, ABC 123. matches ABC 1234 and ABC 1235.  <b>Note:</b> This character is equivalent to the '?' character when you are searching for files by name in Windows Explorer.
^	Matches the start of a line. For example, ^ABC matches ABC 1234 and ABC 2345 but not 1234 ABC.
\$	Matches the end of a line. For example, 1234\$ matches ABC 1234 and CBA 1234 but not 1234 ABC.
*	Matches zero, one or more repeats of the previous character. For example xx* matches xx, xxxxxxxx
[]	Matches any character inside the brackets. You can specify a range of characters, for example [0-9], [a-z].
[^]	Matches any characters except the characters in the list. For example: [^ABC] matches any character other than "A", "B", or "C".
	Matches either the expression before the bar OR the expression after the bar. For example 1234\$   1235\$ matches any license plates that end in 1234 or 1235.
\	Ignores the special meaning of the next character. For example, abc\$   def\$   \   \$ matches any text that ends in abc, def or  .

Analyst's Notebook does not support extended regular expression combinations ( ), \(\), \>, \<, \{, \}, and \digit.

## Wildcard characters

Wildcard characters provide a way to make your search for text more general by standing in for unknown characters. Wildcard characters can match any character.

**Table 9: Supported wildcard characters**

Character	Description
?	Matches any single character. For example, Mari? n finds Marian, Marion, Marianne and Mariano, but does not find Mariee, or Maria.

Character	Description
*	Matches zero or more characters. For example, Ca* Finds Carmen JONES, and Caitlin FISK, but does not find CA 5680

**Note:** Unlike a simple search, a wildcard search is case-sensitive.

## Structured search

You can create a structured search, which searches for data in specific properties of chart items. You can find entities or discover relationships.

To describe the items that you are looking for, you create a search structure. The structure can consist of one entity type, or two entity types and a link type between them. For each part of the structure, you can specify that a chart item must be of a particular item type or semantic type to satisfy the query. Then, you can then use search conditions to add item characteristics to the query.

The characteristics of an entity can be described by its own properties and the properties of its linked items. For example, to find a Tom Smith who lives at 12 Main Street, you can use a linked entities structure. You can specify that one entity of a linked pair of chart items must have a semantic type of Person and a label that contains "Tom Smith". Then, you can specify that the other entity must have an entity type of House and have '12 Main Street' for its 'Address 1' attribute value.

You can use a structured search to find relationships. For example, to identify the accounts that are involved in high value transactions, you can search for links that represent transactions of value greater than \$75000.

**Tip:** To search for items that are indirectly linked through intermediate items, use **Find Linked Items** or **Find Path**.

To create a structured search:

1. Click the **Analyze** tab, and then in the **Find** group, click the **Visual Search** icon.
2. Select the type of search:

Option	Description
<b>Single Entity</b>	Searches for data in entities only.
<b>Linked Entities</b>	Searches for data in entities and links.

3. To select the item types or semantic types to search for, click each part of the search structure then select an entry from the **Type** list.

You can choose from the following options:

- To search for chart items that have any item type, select **(any)**.
- To search for items that have an item type from a specific palette, select **(is member of)** and then select a palette from the **Palette** list.
- To search for items that have a specific semantic type, select **(semantic types)**, select a type of match from the list, then click **Browse** to select a semantic type. The **Semantic Types** list contains semantic types that are used on the chart.
- To search for items that have a specific item type, select the item type from the **Type** list. The list contains item types that are used on the chart.

4. Optional: For each part of the structure, you can specify a search condition in each of the **Identity/Label**, **Date & Time**, and **Attribute Class** areas. To satisfy the query, an item must satisfy all the conditions.
5. To specify a link direction in a search for linked entities, click the link in the structure, then select a direction from the **Direction** list.
6. Specify the items to search in the **Search Items** drop-down. The option defaults to **All** unless some items are selected on the charting surface. Then the option to restrict the search scope to **Selected** or **Unselected** items becomes available. **Selected** only searches the currently selected chart items, and **Unselected** searches the items not currently selected. When searching for linked entities, the search returns the relevant link and both ends.
7. When you search for **Single Entities** or **Linked Entities**, you can choose what Analyst's Notebook does with the items that form the search results. Select an option from the **Matched Items** list. If items are selected on the charting surface, click **Add to Selection** to *add* the search results to the current selection, or **Remove from Selection** to *remove* the search results from the current selection. In any scenario, you can replace the selection with the search results.

**Note:** When you search for **Linked Entities**, **Matched Items** gains an **Apply to** option. Turn on one or more of the **Entity A**, **Link** and **Entity B** checkboxes to specify which item type the **Matched Items** setting should apply to. You must select at least one. When both ends of a link match the conditions specified for **Entity A** and **Entity B**, both are selected even if you specified "only A" or "only B" because both entities match the required conditions. You can then decide whether your selected **Matched Items** action applies to all search results, or only the items that match specific parts of the structure. For example, if you are searching for people who own vehicles, your results include a person, a vehicle, and the link between them. You can choose to further refine the results and select only the *people* in this relationship by selecting the relevant **Apply To** checkbox, **Entity A** for example. You should be aware that the **Apply To** option is not directly related to the **Search Items** option in Step 6, although can be used to further refine the selections resulting from such searches.

8. To include hidden chart items in the search and reveal them as part of the operation, select **Reveal Hidden**.
9. Click **OK**.  
Analyst's Notebook runs the search.

## Find networks

You can find the connections and intermediaries between items of interest, discover what is linked to a specific entity, and find groups of interlinked entities. These networks might contain entities and relationships that support the activity of items of interest.

### Find a network that connects specific chart items

The network that connects items of interest can identify important intermediary entities. The links between intermediaries, and between intermediaries and the entities of interest, might represent crucial interactions.

Use Find Path to find a network that connects two chart items, directly or indirectly. If your chart items contain date and time information you can search for a path that contains sequential events. For example, to follow the indirect communication of information between two people.

Use Find Connecting Network to find a network that connects several entities, directly or indirectly. To omit entities that are not of interest to your investigation, or to test hypotheses, you can exclude specific types of entity and link, and specific entities, from the search.

### Find the items that are linked to a specific entity

The entities that are directly connected to an entity of interest might be significant. For example, they might be accomplices. Indirectly connected entities and the wider network might contain items that form the other end of significant chains of activity. For example, the destination account for a chain of transactions used to launder funds.

Use Find Linked to find the network of the selected entities. You can use a search depth of 1 to identify the directly connected entities. You can use a higher search depth to identify the wider network. Also, you can follow connections based on criteria other than path length, such as sequence. For example, if your chart items contain date and time information, you can identify sequences of events by specifying that event date and time must advance as the network expands.

Use the Linked Entities pane to explore the selected entity's network. You can view a list of the entities that the selected entity is directly connected to, then choose the most significant of them and see what that entity is linked to. The Onward Entities column in the pane can help you to identify highly connected entities.

### Find groups of interlinked entities

A group of entities that interact with each other might be significant. For example, gang ringleaders might communicate with each other to coordinate activity.

Use Find Clusters to find groups of interlinked entities. Each group is a local center of activity and consists of entities that have more connections to each other than to entities outside the group.

Use the K-Core measure in the Social Network Analysis feature to find groups. A  $k$ -core is a group of entities that are each connected to at least  $k$  other entities in the group. So, the two-core group consists of entities that are linked to at least two other entities in that group. As  $k$  increases, the groups become smaller and more tightly interlinked. The highest core group might identify individual groups of tightly interlinked entities.

Use the Grouped layout to visibly distinguish groups of interlinked entities. The Peacock layout and Compact Peacock layout form visible areas of activity around highly connected entities. When these areas of activity are separated on the charting surface, the direct and indirect connections between highly connected entities are visible.

All the described features are on the **Analyze** tab, except for the layouts, which are on the **Arrange** tab.

## Find a connecting network

To discover whether several entities of interest are connected by a network, you can specify them as required entities in your search, then Analyst's Notebook can search for a network that connects them all, directly or indirectly. If a network is found, it might help you to identify important intermediaries.

Optionally, you can exclude specific types of entity and link, and specific entities, from the search.

For example, you might search for a network that joins several bank accounts that are involved in fraud. The result might identify an intermediate account that distributes money to those accounts and possibly plays a central role in the fraudulent activity. If you determine that the activity of that intermediate account is legitimate, you can exclude it from the search, then search again.

If no single network joins all the entities, then the result can consist of the following elements:

- One or more networks that include some of the required entities.
- Single required entities that are not associated with any other required entity.

These results might identify possible gaps in intelligence. Or, you can refute the suggestion that a known network joins all the entities.

## Exclusions

You can exclude specific types of entity and link, and specific entities, from a search for a connecting network. Use exclusions to configure or refine the search, and to test hypotheses.

To configure or refine the search, you might add exclusions in the following scenarios:

- A chart might contain telephone call and associate links between people. To discover whether a network of communication joins several people, you can exclude the Associate link type. You can exclude an item type at any time.
- You can exclude specific people that you know are not involved in an incident that you are investigating.
- You might know that several people are employed by the same company. To avoid this known association and search for an alternative network that connects the people, you can exclude the company.

You can test hypotheses such as whether freezing a specific bank account prevents the movement of funds between several other accounts of interest. After Analyst's Notebook identifies a connecting network, you can exclude intermediate entities that you suspect might play a central role, and then search again. The next search indicates whether an alternative network can join the entities of interest.

You can exclude a specific entity only after Analyst's Notebook identifies it as an intermediate entity in a connecting network.

### Related tasks

[Configuring and running a search](#) on page 144

To configure a search for a connecting network, add required entities and set up item type exclusions if required. The search results indicate whether a connecting network exists.

[Refining the search](#) on page 146

After Analyst's Notebook generates results of a search for a connecting network, you can exclude item types and specific entities from the next search. You can exclude items in the current result that are not relevant to your investigation.

## Configuring and running a search

To configure a search for a connecting network, add required entities and set up item type exclusions if required. The search results indicate whether a connecting network exists.

1. Click the **Analyze** tab, and then in the **Find Networks** group, click **Find Connecting Network**.  
The **Find Connecting Network** pane opens.
2. To add entities to the search, select the entities on the charting surface. Then, in the **Find Connecting Network** pane, click **Add Selected Entities**.
3. To exclude item types from the search:
  - a) In the **Exclusions** area, click **Change**.  
The **Change Exclusions** window opens.
  - b) Select the entity types and link types to exclude, and then click **OK**.  
The **Exclusions** area summarizes the exclusions.
4. Click **Find Network**.



The **Network entities** list displays the required and intermediate entities that form the search result. The intermediate entities are displayed in bold.

If the result consists of a single network that connects all the required entities, it is selected on the charting surface and Analyst's Notebook fits it to the window.

If the result consists of smaller networks and unconnected entities, then the **Network entities** list separates each of these elements with a horizontal line. Every network and unconnected entity in the result is selected on the charting surface and Analyst's Notebook fits the result to the window.

To fit a specific network to the window, click a member of that network in the **Network entities** list.

**Tip:** A network might be obscured if the chart contains a lot of data, or the entities in the network are far apart on the chart surface. To make the network clearer, select the network, copy it to a new chart, then apply a suitable layout.

### Related concepts

[Exclusions](#) on page 144

You can exclude specific types of entity and link, and specific entities, from a search for a connecting network. Use exclusions to configure or refine the search, and to test hypotheses.

## Search process

To find a connecting network, Analyst's Notebook combines the shortest paths between pairs of required entities until a connecting network is produced.

### Process

When you search for a connecting network, Analyst's Notebook finds the shortest paths between pairs of required entities. Then, Analyst's Notebook gives each path a value. Direct links between required entities have maximum value. The value of an indirect path is determined by the following characteristics:

- The number of its intermediate entities that are shared with other shortest paths.
- The number of other shortest paths that pass through those shared intermediate entities.

To construct the connecting network, the highest value paths are added to the result. If the result contains all required entities, the process ends. Otherwise, the next highest value paths are added until a network that joins all the required entities is produced.

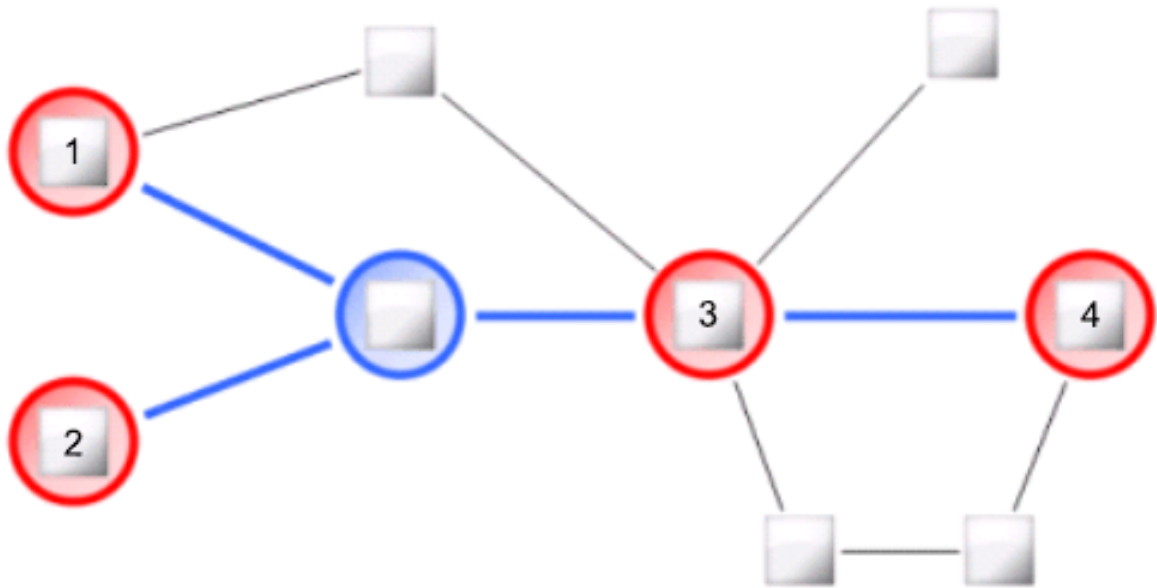
This process ensures that the resulting network contains intermediate entities that are on the greatest number of shortest paths between required entities, which helps you to identify important intermediaries in the network. Where several shortest paths exist between a pair of required entities, this process also ensures that the path with the most highly connected intermediate entities is added to the network.

### Example

The following diagram depicts a connecting network on a chart surface. Required entities are colored red. Intermediate entities, and links in the connecting network, are colored blue. All other items are not part of the connecting network.

The chart contains two shortest paths between entity 1 and entity 3. The path in the connecting network contains an intermediate entity that is shared with the path between entity 2 and entity 3.

Entity 3 and entity 4 are joined by their direct link.



## Refining the search

After Analyst's Notebook generates results of a search for a connecting network, you can exclude item types and specific entities from the next search. You can exclude items in the current result that are not relevant to your investigation.

1. In the **Exclusions** area, click **Change**.  
The **Change Exclusions** window opens.
2. To exclude item types, select the entity types and link types to exclude.
3. To exclude specific entities, select entities in the **Specific entities** list.  
The list contains intermediate entities in the current search result and entities that are already excluded from the search.
4. Click **OK**.  
The **Exclusions** area summarizes the exclusions.
5. Click **Find Network**.  
New search results are generated.

### Related concepts

[Exclusions](#) on page 144

You can exclude specific types of entity and link, and specific entities, from a search for a connecting network. Use exclusions to configure or refine the search, and to test hypotheses.

## Formatting search results

To emphasize the results of a search for a connecting network, you can format the items within a found network. The emphasis can make the outcome of your analysis clearer for recipients of the chart.

The entity formatting options apply only to entities represented by icons or theme lines.

Formatting search results modifies the existing format of chart items. If your chart already contains meaningful formatting, consider making a copy of the chart.

If you format a network, then modify and rerun the search, Analyst's Notebook restores the original format of the network so that out-of-date results are not emphasized.

**Tip:** If you want a network to remain formatted after you rerun the search, you must manually format it. For example, you might want to visually contrast a connecting network with an alternative network that you found by excluding intermediate entities then running the search again. To manually format a network, click a member of the network in the **Network entities** list, then on the charting surface right-click a member of the network and click **Combined Properties**. In the **Edit Chart Items** window, you can collectively format the network items.

1. In the **Network entities** list, click a member of the network that you want to format.
2. To format with the current settings, in the **Find Connecting Network** pane, click **Format Network**.
3. To configure formatting settings then format the network:
  - a) In the **Find Connecting Network** pane, click **Options**. The **Formatting Options** window opens.
  - b) Modify the settings.
  - c) To apply the settings to the network, click **Format Network**.
  - d) Click **OK**. The settings are saved and the **Formatting Options** window closes.

**Tip:** If the search result consists of smaller networks and unconnected entities, you can apply different formatting to each of these elements. Click another element in the **Network entities** list, then click **Options** to modify formatting options and format the element.

The network is formatted.

To later restore the network to its original formatting, in the **Find Connecting Network** pane, click a member of the network, and then click **Undo Formatting**.

## Searching for paths between two items

You can find out whether two items on your chart are connected, however indirectly, by searching for a path between them. You can set criteria for which items are allowed on the path.

A path is a specific route between two items on a chart and it includes both entities and links. Most commonly, a path is between two entities, but it can be between two links or an entity and a link. To find a path, you must select exactly two items on a chart. The order in which you select the items defines the direction in which Analyst's Notebook searches for the path. This order can be significant if you choose to follow link directions for example, or look for events that happened in chronological order.

By default, Analyst's Notebook finds the path between two items that has the fewest number of links. When two shortest paths are found, they are both selected. You can specify that the path found must also take account of:

- Link direction
- Entities or links with attribute values that match a condition that you specify
- Time flow (either forward or backward in time)
- The time gap between successive items on the path

1. Select an origin item first, and then select a destination item on the chart.
2. Click the **Analyze** tab, and then in the **Find Networks** group, click **Find Path**. The **Find Path** window opens.

3. Click the **General** tab of the **Find Path** window and specify the general criteria for finding a path between the two selected items.
4. Optional: To specify date and time criteria when you search for a path:
  - a) Click the **Date and Time** tab of the **Find Path** window.
  - b) Select the **Follow Date and Time** check box and specify the required criteria.
5. Click **OK** to search for a path between the two selected items.

**Note:** The **OK** button is displayed only when exactly two items are selected on the chart. If less than or more than two items are selected, the **Find Path Setup** window displays a **Close** button instead. To search for a path, click **Close** to save the settings, select two items, and follow the preceding steps to find paths between the items.

## General Find Path criteria

You can choose whether to take account of link direction and specify the items to include when Analyst's Notebook searches for a path. When a path is found, you can choose what action to take.

### Considering link direction

You can choose to consider link direction when Analyst's Notebook searches for paths by selecting **Use Link Directions** and selecting one of the following options.

Option	Description
<b>With Arrows</b>	Links are only traveled in the direction of their arrows.
<b>Against Arrows</b>	Links are only traveled against the direction of their arrows.

Nondirectional links and bidirectional links are always considered as part of the path, regardless of whether **Use Link Directions** is selected.

### Restricting which items are included in the paths

You can restrict the search so that it looks for paths that contain only entities and links with an attribute whose value matches a specified condition. Select the attributes from the **Include Entities with Attribute** and **Include Links with Attribute** lists and configure the conditions by using the controls that appear. To include entities or links with an attribute of any value, select the **Is Present** condition. To include entities or links that don't have the selected attribute, select the **Is Absent** condition.

If **(any)** is selected, attributes are ignored when Analyst's Notebook searches for a path.

You can choose whether to include hidden items when Analyst's Notebook searches for a path. To include hidden items, select the **Reveal Hidden** check box. All hidden items on the chart are revealed when a path is found.

**Note:** If the **Reveal Hidden** status in the main application is set to **Reveal Fully** or **Reveal in Gray**, this check box is selected by default.

### Resulting actions

You can choose the actions that Analyst's Notebook takes when it finds a path:

Action	Description
<b>Select Entities</b>	Selects all the entities on the path.
<b>Select Links</b>	Selects all the links on the path.
<b>Hide Others</b>	Hides all chart items that are not on the path.  This option is disabled when <b>Reveal Hidden</b> is selected.  <b>Tip:</b> To show all the hidden items, click the <b>View</b> tab, and then in the <b>Show and Hide Items</b> group, click <b>Show All</b> .
<b>Add Depth Attribute</b>	Adds an attribute to each of the chart items on the path, indicating how many entities removed they are from the origin entity. The origin entity has a depth attribute value of zero.  You can select an existing Number attribute to use, or specify a new one. Only Number attributes that are defined in your chart are available in the list. If you enter a new attribute, it is created as a Number attribute.  If you add a depth attribute to all items on the path, you can remove that attribute from any chart items that are not on the path by selecting the <b>Remove Attribute from Others</b> check box.

## Date and time Find Path criteria

You can set the rules for finding a path between two items based on the relative dates and times of chart items along the path.

### Searching forward or backward in time

You can search for a path along which the date and time of each successive item must be later (forward) or earlier (backward) in time than the previous item.

### Limiting the path to a specified period

You can limit a path to a fixed time period. Items with dates and times outside this period are not considered as part of a path.

When you select the **Earliest Date and Time** check box, the specified date and time defaults to the date and time of the origin item, if one is selected and it has a date and time. If no items are selected on the chart or the selected origin item does not have a date and time, it defaults to the earliest date and time of all items on the chart.

When you select the **Latest Date and Time** check box, the specified date and time defaults to the date and time of the destination item, if one is selected and it has a date and time. If no items are selected on the chart or the selected destination item does not have a date and time, it defaults to the latest date and time of all items on the chart.

### Selecting the type of path to find

You can choose whether Analyst's Notebook searches for the path with the fewest number of steps or the path, which arrives at the destination item at the earliest date and time. If more than one path meets the specified criteria, then all such paths are shown.

### Setting date and time options

When Analyst's Notebook searches for a path, you can specify whether the date and time is considered on entities, links, or both.

An item does not need a date or time to be considered in relation to the times of other items on the path.

If an item has only a date, it is still included in the path if its date does not contradict the specified flow of time. For example, the date must be the same as or after the date of the previous item on the path when the time flow is forwards.

You can specify the behavior for items without a date.

Option	Description
<b>Stop</b>	Stops the search along this path and the item is not included in the result.  This option might be useful for charts that contain telephone call data or financial transactions, when all links are expected to have both a date and a time.
<b>Continue</b>	Includes the item in the path.  This option might be useful when you want the path to continue through theme lines, which do not have a date.
<b>Continue if Ordered</b>	If the item is Ordered and is in the correct position relative to the previous item on the path, it is included in the path. Otherwise, the search is stopped along this path.

### Specifying each item on a path is within a certain time of the previous item

You can restrict the path to contain only successive items that have a date and time within a time gap that you specify. For example, you can specify that every link on a path must take place within an hour of the previous link. This option can apply to just links, just entities, or both entities and links, depending on the options selected in the **Date and Time** area.

## Listing linked entities

The **Linked Entities** pane lists the entities that are linked to the selected entity. To help you identify potentially significant entities, you can sort the list on different properties, and copy the results to the clipboard.

1. Select an entity on the charting surface.
2. Click the **Analyze** tab, and then in the **List** group, click **Linked Entities Pane**.  
The **Linked Entities** pane opens and lists the entities that are linked to the selected entity.

- To choose from the full list of properties that the list can be sorted on, click the **Sort** drop-down, then select a property from the list.

Property	Description
<b>Entity</b>	The label of the entity. The list is sorted in ascending alphanumeric order. If an entity has no label, its identity is used.
<b>Link</b>	The label of the link that connects the selected entity and the linked entity. The list is sorted in ascending alphanumeric order. If the connection consists of several links, then the number of links is displayed, for example (2 links).
<b>Direction</b>	The direction of the link. Links might have no direction, be outgoing from the entity, be incoming to the entity or bidirectional. The list is sorted in ascending order and can be switched to descending order clicking the column header.
<b>Onward Entities</b>	The number of other entities that the linked entity is connected to. The list is sorted in descending numerical order.
<b>Angle</b>	The positional angle of linked entities in relation to the selected entity. Entities that are positioned directly above the selected entity, at zero degrees, are listed first, and degree position increases down the list so that entities are listed in clockwise order.
<b>Position</b>	The list is sorted so that panning between entities is minimized. You can walk through the items, clicking them to view their position in the chart. The entities at the top of the list are typically the entities nearest to the selected entity.

- Click the **Copy** drop-down and select from the available copy options.

Command	Description
<b>Copy Entity Labels</b>	Copies entity labels to the clipboard. Places each entity label on a new line.
<b>Copy Table</b>	Copies entire table to the clipboard in tab separated format.

## Following a path of linked entities

To explore the selected entity's network, you can choose an entity in the Linked Entities pane and see what it is linked to.

To list all of the onward entities for a linked entity:

- In the list, identify an entity of interest, then click it. Analyst's Notebook pans the chart to center the entity in the window.

**Tip:** Entities that are connected to many other entities might be significant. The Onward Entities column helps you to identify these entities. To summarize the immediate network of a linked entity, hover over its label in the list. If the entity has 12 or fewer onward entities, a tooltip lists their labels. If the entity has more than 12 onward entities, a tooltip displays the label of the first 10 onward entities, and the number of other onward entities. If an entity has no label, its identity is used.

- To see what the entity is linked to, in the list, click the **List Linked Entities** button beside the entity label.

The content of the list is replaced.

3. To list the linked entities for your previous selection, click **List Linked Entities** again. The icon and identity of the previous selection is displayed again at the top of the **Linked Entities** pane.

## Finding items linked to a selection

You can extend the current selection of items on a chart to include entities that are linked to the selection, directly or indirectly, and, optionally, the links between them. You can set rules about which items are selected.

Options are available on the **Select** tab of the Analyst's Notebook ribbon, in the **Extend Selection** group. Use these options to extend your selection in a number of ways. Alternatively, you can use the **Find Linked Items** feature to further extend your selection.

Before you find linked items, you must select one or more items on the chart as a starting point for the search. Typically, you select one or more entities as the starting point. However, you can select links. When you select a link, Analyst's Notebook automatically selects the entity at one or both ends of the selected link, depending on other settings (for example, link directions). It then searches for linked items.

You can specify that the linked items found must take account of:

- Search depth
- Link direction
- Entities or links, with attribute values that match a condition that you specify
- Time flow (either forward or backward in time)
- The time gap between successive items on the path

1. Select one or more items on the chart.
2. Click the **Analyze** tab, and then in the **Find Networks** group, click **Find Linked Items > Find Linked Items**.

The **Find Items Linked to Selection** window opens.

**Note:** To use the current settings, select one or more items and click **Find Linked Items > Find Linked Items with Current Setup**.

3. Click the **General** tab of the **Find Items Linked to Selection** window and specify the general criteria for finding items that are linked to the selection.
4. Optional: To specify date and time criteria when you search for items that are linked to the selection:
  - a) Click the **Date and Time** tab of the **Find Items Linked to Selection** window.
  - b) Select the **Follow Date and Time** check box and specify the required criteria.
5. Click **OK** to find items that are linked to the selection.

**Note:** The **OK** button is displayed only when one or more items are selected on the chart. If no items are selected, the **Find Linked Setup** window displays a **Close** button instead. To find linked items, click **Close** to save the settings, select one or more chart items, and follow the preceding steps.



## General Find Linked criteria

You can choose how far removed from the original selection to search, whether to take account of link direction, and specify the items to include when Analyst's Notebook searches for linked items. When Analyst's Notebook finds linked items, you can choose what action to take.

### Setting search depth

You can choose how far removed from the original selection to search by setting a search depth. For example, by using a search depth of one Analyst's Notebook looks for only those entities that are linked directly to the original selection. By using a search depth of three, Analyst's Notebook looks for items that can be indirectly linked three levels away from the original selection.

Clear the **Search Depth** checkbox to search all entities that are linked to the original selection, regardless of how many levels of links there are between them.

### Considering link direction

You can choose to consider link direction when Analyst's Notebook searches linked items by selecting **Use Link Directions** and selecting one of the following options.

Format	Description
<b>With Arrows</b>	Only links that have an arrow pointing away from the original selection are searched.
<b>Against Arrows</b>	Only links that have an arrow pointing towards the original selection are searched.

Nondirectional links and bidirectional links are always considered when searching for linked items, regardless of whether **Use Link Directions** is selected.

### Restricting which items are included when searching for linked items

You can restrict the items that are included to only those entities and links with an attribute whose value matches a specified condition. Select the attributes from the **Include Entities with Attribute** and **Include Links with Attribute** lists and configure the conditions by using the controls that appear. To include entities or links with an attribute of any value, select the **Is Present** condition. To include entities or links that do not have the selected attribute, select the **Is Absent** condition.

If ( *any* ) is selected, attributes are ignored when Analyst's Notebook searches for linked items.

You can choose whether to include hidden items when Analyst's Notebook searches for linked items. To include hidden items, select the **Reveal Hidden** checkbox. All hidden items on the chart are revealed when linked items are found.

**Note:** If the **Reveal Hidden** status in the main application is set to **Reveal Fully** or **Reveal in Gray**, this check box is selected by default.

### Resulting actions

You can choose the actions that Analyst's Notebook takes when it finds linked items:

Action	Description
<b>Select Entities</b>	Selects all of the entities that are found by the Find Linked operation.

Action	Description
<b>Select Links</b>	Selects all of the links that are found by the Find Linked operation.
<b>Hide Others</b>	Hides all chart items that are not linked to the original selection. This option is disabled when <b>Reveal Hidden</b> is selected.  <b>Tip:</b> To show all of the hidden items, click the <b>View</b> tab, and then in the <b>Show and Hide Items</b> group, click <b>Show All</b> .
<b>Add Depth Attribute</b>	Adds an attribute to each of the linked items, showing how many entities removed they are from the nearest item in the original selection. Items in the original selection have a depth attribute value of zero. You can select an existing Number attribute to use, or specify a new one. Only Number attributes that are defined in your chart are available in the list. If you enter a new attribute, it is created as a Number attribute. If you add a depth attribute to all items that are linked to the selection, you can remove that attribute from any chart items that are not found by Find Linked by selecting the <b>Remove Attribute from Others</b> checkbox.

## Date and time Find Linked criteria

You can set the rules for finding items that are linked to the original selection based on the relative dates and times of chart items that are linked to the selection.

### Searching forward or backward in time

You can search for items that are linked to the original selection along which the date and time of each successive item must be later (forward) or earlier (backward) in time than the previous item.

### Limiting the search to a specified period

You can limit the items that are found to a fixed time period. Items with dates and times outside this period are not selected.

When you select the **Earliest Date and Time** check box, the specified time defaults to the earliest date and time on the chart.

When you select the **Latest Date and Time** check box, the specified time defaults to the latest date and time on the chart.

### Setting date and time options

When you find linked items, you can specify whether the date and time is considered on entities, links, or both.

An item does not need a date or time to be considered in relation to the times of other items.

If an item has just a date, it is included in the selection, if the date does not contradict the specified flow of time. For example, the date must be the same as or after the date of the previous selected item when the time flow is forwards.

You can specify the behavior for items without a date.

Option	Description
<b>Stop</b>	Does not find the item. No further items that are linked to this item are considered, but items up to the item without a date are found.  This option might be useful for charts that contain telephone call data or financial transactions, when all links are expected to have both a date and a time.
<b>Continue</b>	Finds the item and continues to look for further linked items, according to the <b>Search Depth</b> setting.  This option might be useful when you want to continue through theme lines that do not have a date.
<b>Continue if Ordered</b>	If the item is Ordered and is in the correct position, it is included. Otherwise, no further linked items are searched.

### Specifying each item on a path is within a certain time of the previous item

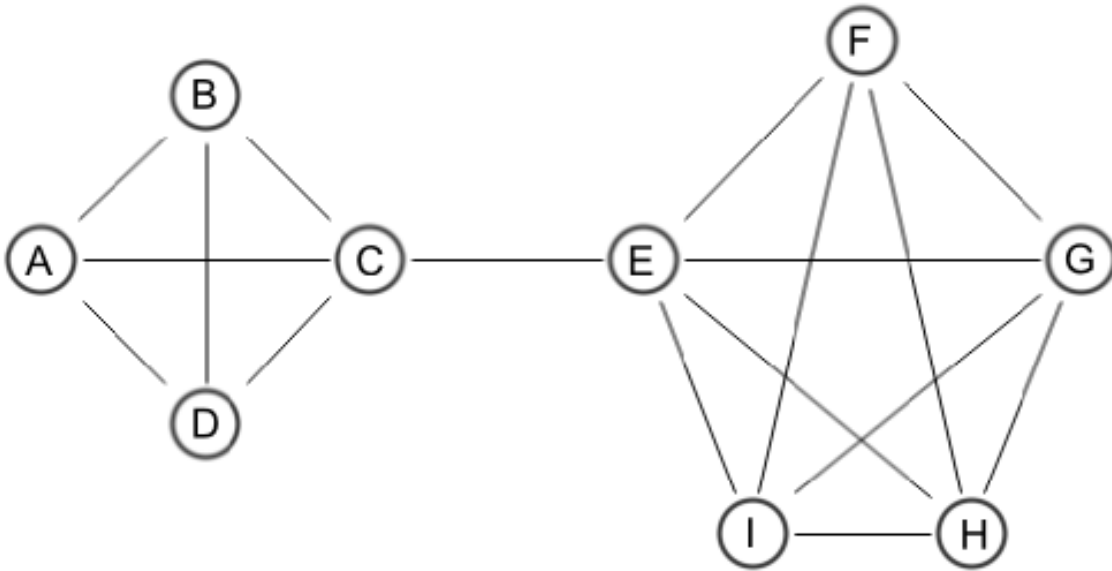
You can restrict the linked items to contain only successive items that have a date and time within a time gap that you specify. For example, you can specify that every link on a path must take place within an hour of the previous link. This option can apply to just links, just entities, or both entities and links, depending on the options selected in the **Date and Time** area.

## Searching for clusters of entities

A cluster is a group of entities that have more connections to each other than to entities outside the group. Finding clusters is useful in charts that contain high volumes of data with many interlinked entities to find potential groupings such as key players in a criminal investigation.

As part of the search process, Analyst's Notebook measures how interconnected each group of entities is. This measure of interconnectivity is known as the binding strength.

The method that Analyst's Notebook uses to calculate binding strength is based on link connectivity. In its simplest form, this method considers the binding strength of a group of entities to be the number of links that must be deleted to split the group into two distinct chart fragments. For example, the binding strength of the chart in the following diagram is 1. To split it into two, you need to delete only the single link between Entity C and Entity E.



Splitting the chart identifies two chart fragments. To identify clusters Analyst's Notebook continues to split the groups of entities, until it can no longer divide the chart any further. It assigns the highest binding strength that it can to each item during the process. Any connected group of entities that has a binding strength greater than its immediate neighbors is considered to be a cluster. In this chart, Analyst's Notebook finds two clusters, one with a binding strength of three (entities A, B, C, and D) and the other with a binding strength of four (entities E, F, G, H, and I). You can filter clusters by specifying a binding strength threshold. Any cluster with a binding strength below the threshold is not reported. In the example, if the binding strength threshold is set to three, both clusters are reported. If the threshold is raised to four, Analyst's Notebook reports only the cluster with a binding strength of four.

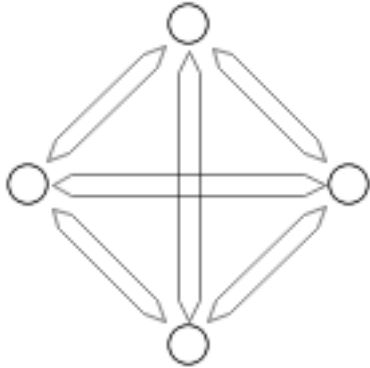
Every group of connected entities has a binding strength; the higher the binding strength, the more interconnected the entities. Link connectivity clusters cannot overlap, so entities cannot belong to more than one cluster.

To search for clusters of entities:

1. Click the **Analyze** tab.
2. Optional: To modify or review the search criteria, in the **Find Networks** group, click **Find Clusters > Find Clusters Setup**. The **Setup Clusters** window opens.
  - a) Enter a binding strength threshold.
 

The binding strength threshold determines the minimum binding strength a group of entities must have before Analyst's Notebook considers it to be a cluster.
  - b) When you enter a binding strength threshold, you can choose how Analyst's Notebook determines the binding strength when there are multiple links between entities or values on the links. This setting is known as the link weight.

Link Weight Setting	Description
<p><b>Connections Only</b></p>	<p>Treats each connection as a single link regardless of how many links there are between two entities. This setting is the most common option.</p>
<p><b>Connection Links</b></p>	<p>Counts all links between entities. For example, by using the <b>Connection Links</b> setting, this group of entities has a binding strength of six because six links must be deleted to split the chart in two.</p>
<p><b>Link Attribute</b></p>	<p>Adds the values of a specified Number attribute on each link in a connection. Select the attribute in the <b>Link Weight Attribute</b> list.</p>
<p><b>Connection Sum Links</b></p>	<p>Calculates the total value of all the numeric parts of the link labels between two entities.</p>



c) In the Cluster Members area, specify how Analyst's Notebook handles any clusters that it finds.

Setting	Description
<p><b>Select Cluster Members</b></p>	<p>Selects entities and the links between them that are found in a cluster. The selection of all other chart items is cleared.</p>
<p><b>Hide Others</b></p>	<p>Hides all entities and links that do not belong to a cluster.</p> <p><b>Note:</b> If Reveal Hidden mode is selected when you search for clusters, then the hidden items remain visible.</p>

Setting	Description
<b>Cluster Attribute</b>	<p>Assigns an attribute to every cluster member. You can select an existing Text attribute from the list or enter a new attribute name. Analyst's Notebook creates a new Text attribute with this name. Analyst's Notebook assigns attribute values to the cluster members:</p> <ul style="list-style-type: none"><li>• C1 for members of the cluster that has the highest binding strength.</li><li>• C2 for the cluster that has the next highest binding strength, and so on.</li></ul> <p>If two clusters have the same binding strength, the cluster with the most entities takes priority when the cluster attribute is assigned.</p>
<b>Binding Strength Attribute</b>	<p>Assigns an attribute to every chart item to indicate the binding strength that it would be assigned if it was part of a cluster. You can select an existing Number attribute from the list or enter a new attribute name. Analyst's Notebook creates a new Number attribute with this name.</p>

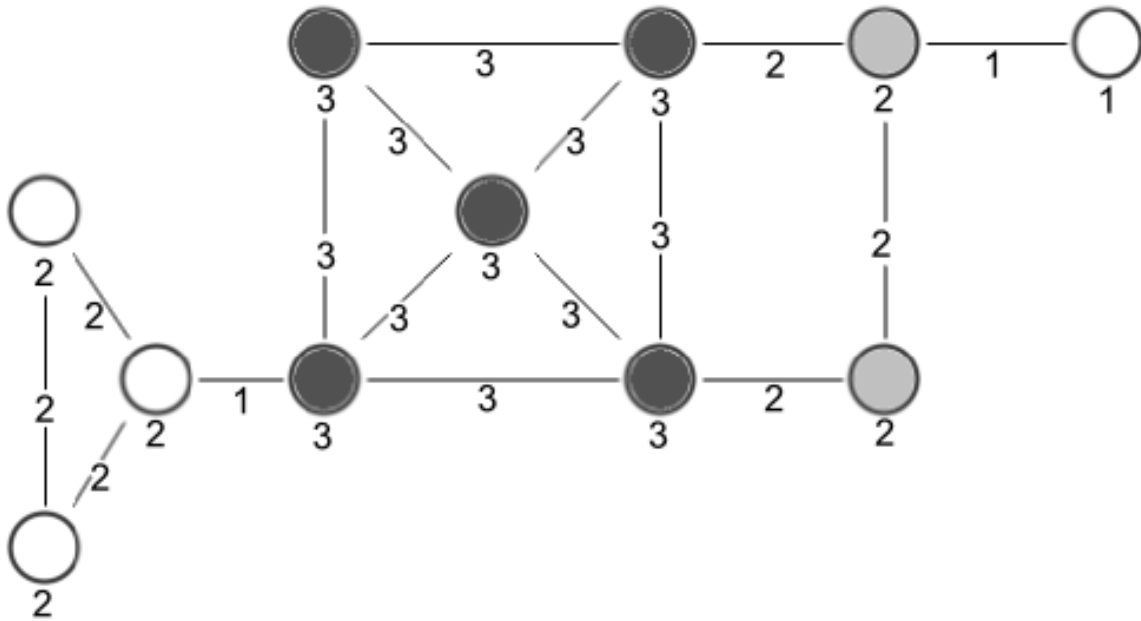
- 3. To search for clusters, in the **Find Networks** group, click **Find Clusters > Link Connectivity Clusters**.

To emphasize any clusters that are found, you can change the color or line width of the links in each cluster. To format the links in a cluster, select all the links in the cluster, right-click on one of the links, then click **Combined Properties**. In the **Edit Chart Items** window, you can collectively format the links.

### Extending clusters

Analyst's Notebook can extend selections to include entities that are connected to a cluster but that are not bound tightly enough to form part of the cluster itself.

If you add a binding strength attribute when you find clusters, you can then extend the cluster selection to include any neighboring entities that have a lower binding strength. For example, the chart in the following diagram has a central cluster with a binding strength of three. As part of your analysis, you might decide to select any linked entities that have a binding strength of two and then analyze the final selection further.



To extend the clusters selection to include more entities and links:

1. With the clusters selected, in the **Find Networks** group, click **Find Linked Items**.
2. From the **Include Entities with Attribute** list, select the binding strength attribute that you assigned when you searched for clusters, select a condition, and then enter any values.  
For example, in the chart that is shown, a single cluster is found, which has a binding strength of three. You might want to select entities that are linked to it that have a binding strength of two by links that have a binding strength of two. Select the condition `equal to` and enter a binding strength value of 2, then repeat the step for the **Include Links with Attribute** list.
3. Click **OK**.  
In the example chart, two entities and two links are added to the selection.

## Highlight chart items

You can use **Highlight Selection** to emphasize selected entities and links on the chart.

The **Highlight Selection** function in Analyst's Notebook helps to draw attention to selected chart items. This is particularly useful when your chart contains many items. The highlight feature is selected or cleared as you need it, and cannot be saved to the chart. When you highlight an entity, an animated colored circle increases and decreases in size around the entity. When you highlight a link, it is surrounded by a colored link that changes thickness. You can select multiple items to highlight, change the display color used by the feature, and you can turn the animation effect on or off.

1. Select the chart items that you want to highlight.
2. Click the **Analyze** tab of the ribbon, and click **Highlight Selection**.  
The selected items are highlighted.

3. Click **Highlight Selection** to clear the highlight function.

The highlight animation stops, and the chart items remain selected.

You can change the color that is used by **Highlight Selection**. Click **File > Options > User Interface**. The Highlight Selection Color is displayed. Click the drop-down arrow and choose a different color, then click **OK**. To change the animation setting, click **File > Options > General**. If Animation Effects is selected the highlight feature uses animation. Deselect the option if you want static highlighting and click **OK**.

## Map chart items

To help analyze items with location-based information, chart items can be visualized on map surfaces.

Mapping chart items can be used when investigating events that occur in a particular location or sets of locations.

## Map chart items in i2 Maps

You can create chart items that contain location data, and visualize them on map surfaces using i2 Maps.

When your i2 Analyze records contain data in geospatial properties, their geographic coordinates and map locations are displayed in the **Properties** tab of the **Record Inspector**.

You can add coordinates for entities that have the Geographic Location property configured in your schema. For example, location specific entities such as addresses support the inclusion of geospatial information. By default the coordinate system used is WGS84, where the first value is North (latitude) and the second is East (longitude). If you have coordinate values from a different system, such as Easting and Northing, you might be able to convert them to WGS84 datum when you create your new record.

To work with i2 Maps, go to the **Analyze** tab of the ribbon and click **Map Provider** in the **Gain Insight** group. Select **i2 Maps** from the **Map Provider** list, then click **Maps**. The i2 Maps window opens and Analyst's Notebook displays the base map configured by your system administrator. Click **Options** to see the base maps and overlays that are available in your deployment.

It is useful to add a number of different addresses to the map to understand more about their locations in relation to each other, or to events that occurred nearby. The default option for automatically adding records in i2 Maps is set to 'on'. This means that if records have coordinate values entered in the Geographic Location properties field, those records are added to the map even when the map view is not displayed. You can click the **Add records automatically** button to toggle the setting to either 'on' or 'off'.

Existing data is not affected by toggling the automatic setting. For example if you add geospatial data to the chart while the function is 'off', the new data is not added to the map when you later toggle it to 'on'. Similarly, data that you add to the map when the function is 'on' is not removed if you toggle the setting to 'off'.

i2 Maps must be your active map provider in order for Analyst's Notebook to automatically add records to the map. If you are working in i2 Maps, with **Add records automatically** enabled and you switch map provider, new markers are not added. For example, you switch map provider and copy new i2 Analyze records that contain geospatial data to the chart. The records are not added to the map because i2 Maps is no longer active. This is also the result if you add geospatial properties to i2 Analyze records that are already on the chart, after switching to an alternative map provider.



You can also add entities to the map from the chart surface. If a record has coordinate values entered in the Record Inspector, a small version of the map is displayed with a location marker. To manually add to the map, right-click the chart entity and select **Add to map** from the menu.

Marker clusters help you manage multiple markers by grouping them together, making the map easier to read. The option to use marker clusters in i2 Maps works in a similar way to adding records automatically, in that the default setting is 'on'. Click the **Use marker clusters** button to toggle the setting to either 'on' or 'off'.

**Note:** The **Add records automatically** and **Use marker clusters** settings are individual to each chart. When either of these settings is turned off, it remains set to off until reactivated, even after you save and reopen the chart. If you have multiple charts open, other charts are not affected.

## Map chart items in i2 Esri

To analyze Analyst's Notebook chart items that contain location data, you can visualize them on map surfaces in the **i2 Esri Maps** window.

You can connect to Esri ArcGIS Online and select any publicly available map in the Basemap Gallery. Alternatively, you might configure Analyst's Notebook to connect to your own internal Esri Portal for ArcGIS.

Chart items that contain location information in the form of coordinates can be displayed on the map. For example, you might decide to map chart items if you are investigating information about events that occurred in a particular location or set of locations.

Access the i2 Esri Maps feature from the **Analyze** tab of the ribbon in the **Gain Insight** group. Select **i2 Esri Maps** from the **Map Provider** list, then click **Maps**. The **i2 Esri Maps** window opens and Analyst's Notebook automatically displays the map.

**Note:** You must have an internet connection to connect to Esri ArcGIS Online and access the publicly available maps.

## Selecting maps

The maps available for selection depend on various security settings. The available maps are located in the Basemap Gallery.

When you open the **i2 Esri Maps** window for the first time, a default map is displayed. The other maps that are available to you are shown in a gallery at the edge of the window. If the map that you require is not visible in the gallery, you might need to log in to your ArcGIS portal instance.

When you select a map, it is associated with the chart. When you save your chart, if one or more chart items have been sent to the map, the association is saved with the chart. The extents and zoom level of the map are also saved.

If you create a new chart or open an existing chart, Analyst's Notebook displays the last open map unless another map is already associated with the chart that you are opening.

To display a map and associate it with the current chart:

1. Click any map in the gallery to select it. If the gallery is not shown, click **Map Gallery** to make the maps available for selection. To close the gallery, click **Map Gallery** again. Alternatively, double-click a map to select it and close the map selection at the same time.
2. Optional: If the required map is not visible in the gallery, you might need to log in to your ArcGIS portal instance. In the **i2 Esri Maps** window, click **Log In** and enter your user name and password. If you do not know your user name or password, see your system administrator. After you log in, more maps might become available for you to select.

3. If the map that you selected contains layers that are stored on a secure server, you might need to provide further credentials. If a Windows Security window opens, enter your credentials for the location where the map is stored. If you do not know this information, see your system administrator.

## Location information

For an entity to be mapped successfully in the **i2 Esri Maps** window, it must contain location information in the form of coordinates.

You can enter or store coordinates on entities in one or more of the following places:

- Labels
- Descriptions
- Cards
- Attributes with specific semantic type assignments
- Data records

An entity can contain several coordinates that are stored in different places. After mapping, if the coordinates are different, then the entity is displayed on the map in each location.

### Coordinates in text

You can enter coordinates in labels, descriptions, or cards as part of their summary or description.

Coordinates that are stored in text require an identifying prefix (LOC/) and suffix (/). For example, LOC/28°16'45.55"N 81°33'59.44"W/.

### Coordinates in attributes

You can enter coordinates in a single attribute, or you can split them into their constituent parts and enter them as a combination of attribute values. The prefix and suffix are unnecessary when you use attributes. For example, 28°16'45.55"N and 81°33'59.44"W.

Coordinates or the constituent parts of a location are detected in attributes that have the following semantic type assignments:

- Altitude
- BNG
- Datum Code
- Decimal Degree
- DMS
- Easting
- Hemisphere
- Latitude
- Longitude
- MGRS
- Northing
- UPS
- UTM
- UTM Zone

## Coordinates in data records

You can map items from data sources (for example, iBase), if the data records contain coordinates. Coordinates are detected in data records that use the prefix and suffix `LOC/` and `//`. The appropriate semantic types must be assigned to the data record properties that make up the location.

## Ellipse data

Ellipses or circles can be used to display the area around a set point on your map. If you would like to store ellipse or point radius data for an item, you must define the area to be displayed as a JSON string.

The area that you would like to display is defined by using JSON properties:

JSON Property	Definition
<b>centre</b>	The geographic location of the center of the ellipse, expressed in a <a href="#">supported coordinate format</a> .
<b>axisUnits</b>	The units to use for the axis definitions. The supported units are: <ul style="list-style-type: none"> <li>• kilometer/km</li> <li>• meter/m</li> <li>• centimeter/cm</li> <li>• millimeter/mm</li> <li>• statute mile/mile/mi</li> <li>• Nautical Mile/mi[naut]/NM</li> <li>• yard/yd</li> <li>• foot/ft</li> <li>• inch/in</li> </ul>
<b>semiAxis1</b>	This property defines the length of the major semi-axis of the ellipse, that is the longest distance from the center point to the edge (in the units that are specified in axisUnits).
<b>semiAxis2</b>	The length of the minor semi-axis of the ellipse, that is the shortest distance from the center point to the edge (in the units that are specified in axisUnits).  <b>Note:</b> If a minor semi-axis is not defined, a circle is drawn.
<b>rotation</b>	The angle from the X axis (horizontal) to the major semi-axis in a counterclockwise direction.
<b>rotationUnits</b>	The unit type you want to use for rotation, for example radians or decimal degrees.

JSON Property	Definition
<b>fill</b>	<p>The transparency and color values to apply to the ellipse. Fill uses ARGB values between 0 and 255 to fill the ellipse. There are default values, which are stored in the <a href="#">settings.xml file</a>. If you do not specify values, and the default is not changed, the fill is:</p> <pre data-bbox="857 464 1437 659" style="background-color: #f0f0f0; padding: 10px;"> &lt;Alpha&gt;100&lt;/Alpha&gt; &lt;Red&gt;127&lt;/Red&gt; &lt;Green&gt;127&lt;/Green&gt; &lt;Blue&gt;127&lt;/Blue&gt;</pre>
<b>maxPoints</b>	<p>The maximum number of points used to draw the perimeter of the ellipse. There is a default value, which is stored in the <a href="#">settings.xml file</a>. If you do not specify a value, and the default is not changed, the maximum number of points is set to 100.</p>
<b>maxSegLength</b>	<p>The maximum length expressed in the specified axisUnits between two points around the perimeter. There is a default value, which is stored in the <a href="#">settings.xml file</a>. If you do not specify a value, and the default is not changed, the maximum segment length is set to 10.</p>

For example:

```

{
  "Ellipses": [
    {
      "centre": "0, 52",
      "semiAxis1": 60,
      "semiAxis2": 40,
      "rotation": 1.5,
      "axisUnits": "mile",
      "rotationUnits": "rad",
      "fill": {
        "a": 255,
        "r": 255,
        "g": 255,
        "b": 255
      },
      "maxPoints": 1000,
      "maxSegLength": 8
    }
  ]
}
```

The minimum that is required to define a circle is:

```
{
  "Ellipses": [
    {
      "centre": "0, 52",
      "semiAxis1": 40
    }
  ]
}
```

The minimum that is required to define an ellipse is:

```
{
  "Ellipses": [
    {
      "centre": "0, 52",
      "semiAxis1": 60,
      "semiAxis2": 40,
    }
  ]
}
```

This definition is a JSON array that can contain the details for one or more ellipses. The definition must be stored either in an attribute that has the semantic type set to **Abstract Text > Geographic Area > Geographic Ellipse**, or you can enter ellipse information in labels, descriptions, or cards as part of their summary or description.

Coordinates that are stored in text require an identifying prefix (ELL/) and suffix (/). For example, ELL/ { "Ellipses": [ { "centre": "0, 52", "semiAxis1": 60, "semiAxis2": 40, } ] }//.

## Sending chart items to the i2 Esri Maps window

Items with location information in the form of coordinates can be sent to the **i2 Esri Maps** window.

When an entity contains coordinates, it is placed at that location on the map. If an entity contains multiple sets of coordinates, the entity is displayed on the map at each different location. If an entity does not contain coordinates, you can drag it to the map. The coordinates of the location where it is dropped are assigned to newly created Latitude and Longitude attribute instances.

1. Select the entities that you want to send to the map.
2. Click the **Analyze** tab on the ribbon.
3. In the **Gain Insight** group, check that **i2 Esri Maps** is selected from the **Map Provider** list, then click **Maps**.  
The **i2 Esri Maps** window opens.
4. Ensure that the correct map is open or select the required map.
5. Add entities to the map in one of the following ways:
  - In the **i2 Esri Maps** window, click **Add Selected Entities**. The selected entities that contain coordinates are added to the map. Entities that do not contain coordinates are not added and a message is displayed in the status bar of the **i2 Esri Maps** window.

- Right-click one of the selected entities on the chart and select **Add to Map**. The selected entities that contain coordinates are added to the map. Entities that do not contain coordinates are not added and a message is displayed in the status bar of the **i2 Esri Maps** window.
- Drag multiple selected entities onto the map. Entities that contain coordinates are added to the map at their coordinate locations. Entities that do not contain coordinates are not added and a message is displayed in the status bar of the **i2 Esri Maps** window.
- Drag a single entity on to the map. If it has coordinates, it is added to the map at that location. If it does not contain coordinates, the coordinates of the location where the entity is dropped are assigned to newly created Latitude and Longitude attribute instances.

The map pans to show the selected entities on the map.

If a problem occurs when you send entities to the map, a warning message is displayed at the bottom of the map. You can try the following resolutions:

- Look at the location information for an entity and check that it is in the correct format. Right-click the entity on the chart, and from the menu, select **Edit Item Properties**.
- The coordinates on a chart item might be outside the maximum valid extents of the current map. If you change to a map that has appropriate maximum valid extents, the chart items are displayed.

## Working in the i2 Esri Maps window

Navigate the map window, find or remove mapped items, and copy the map view as a picture.

### Navigating the i2 Esri Maps window

To zoom in, double-click the map. To zoom out, press Ctrl and double-click. If your mouse has a wheel, rotate the wheel forward and back to zoom in and out.

To pan to different parts of the map, drag the map to a different position or use the arrow keys.

### Mapped items

When a map contains large numbers of mapped entities, it can be hard to see how those entities correlate with the entities on your chart. To find an entity on the map, select it on the chart. The map pans to the corresponding entity on the map and selects it. If you select an entity on the map, the chart pans to the corresponding entity on the chart and selects it.

To remove entities from a map, select them, then press Delete. Alternatively, right-click one of the selected items and select **Remove Selected** or **Remove Unselected**. The items are removed from the map but they are not deleted from the chart. You can also remove all entities from the map by clicking **Remove All** at the top of the **i2 Esri Maps** window. Deleting an item on the chart also removes it from the map.

When you edit the display properties of an entity by editing its chart item properties, the display is updated on the corresponding entity on the map.

### Copy the map as a picture

You can put a copy of the current map into another document as a picture. For example, if you are writing a report in Microsoft Word, you can include a picture of the map. To copy a picture of the current map to the clipboard, at the top of the **i2 Esri Maps** window click **Copy as Picture**. The current extent of the map and any entities on the map are copied to the clipboard for you to paste into another document.

## Drawing shapes on a map

It is sometimes useful to highlight certain areas on a map by drawing shapes.

A number of shapes are available for you to draw, for example point marker, polygon, or arrow.

**Note:** Shapes are not geodesic, that is, they do not follow the contours of the map. They are flat drawings.

1. In the **i2 Esri Maps** window, right-click on the map and click **Draw** or click the drawing tool.



2. Click the shape that you require.
3. To draw the shape, do one of the following:

Option	Description
<b>Triangle, Arrow, Rectangle, Circle, Ellipse</b>	Drag an area and release the mouse button to complete the shape.
<b>Line, Polygon</b>	Click to insert the first point, then click to add extra points. Double-click to complete the line or area.
<b>Freehand Line, Freehand Polygon</b>	Drag a line or an area and release the mouse button to finish.
<b>Point</b>	Click the required position.

4. Optional: To delete a shape, select it and press Delete.

**Note:** You can close the drawing pane at any time by clicking the drawing tool.

## Opening a bar chart that shows distance from a selected entity

When a single entity is selected on the map, you can open a bar chart and see the distribution of other entities on your chart. Compare how far they are from the selected entity, based on their location information.

It can be useful to see how close other chart items are to a specified mapped entity and how the other chart items are distributed in relation to it. For example, if you know the location of a stolen car, you can look at other crimes that happened at a range of distances from this location. You can then add some or all of these entities to the map. If you then open a histogram that indicates the dates and times of those crimes, you can use filters to discover other crimes in nearby areas that occurred in a similar time period.

When you open a bar chart that shows the entity distribution, you can choose the number of steps (rows) for the bar chart and the distance range to use for each step.

You can open more than one bar chart to show a range of distances from different entities.

1. Select a single entity on the map, then click **Distance Bar Chart**.

The **Bar Charts** page of the **Bar Charts and Histograms** pane opens with a new bar chart. The bar chart shows a range of distances away from the selected entity and how many entities are located within each range.

**Note:** At any time, you can select the central entity that was used for the bar chart by clicking the select central item button



next to the **Steps** list.

- Optional: To change the number of rows, select the required number of steps from the **Steps** list at the top of the bar chart.

**Note:** By default, empty rows are not shown. To show empty rows, go to the **Options** page of the **Bar Charts and Histograms** pane and select the **Include Empty Rows** check box.

- Optional: To change the distance range for each step, select the required value from the list of distances next to the **Steps** list.

The bar chart shows how many entities are located in each distance range from the original entity. Any items that are located outside the furthest range are not counted.

Select a row of the bar chart to focus on entities that are in a specified distance range and filter out the other entities. The entities in the selected row are selected on the map and on the chart.

## i2 Esri configuration

When you work with i2 Esri as your mapping implementation, there are some configuration options that you might need to modify.

### Configuring an Esri Portal for ArcGIS

By default, i2 Esri is configured to connect to Esri ArcGIS Online. You can configure the connection to point to your own Esri Portal for ArcGIS.

To connect to your own Esri Portal for ArcGIS, you must edit the `portal.config` file. This file is located in the following folder:

```
%AppData%\Local\i2\i2 Analyst's Notebook 9\ESRI Portal
```

The Microsoft constant special item ID list (CSIDL) is used to represent the standard folder. The actual location might vary between different versions of Microsoft Windows.

The configuration file contains the following information:

```
<Portal>
<Uri>http://www.arcgis.com/sharing/rest</Uri>
<ItemId>c0a0cb9dbefb452b89f38ce4a9477834</ItemId>
</Portal>
```

Where:

Uri

Is the URI of the Esri Portal for ArcGIS that you want to connect to.

**Note:** This URI should be in the following format  
`http://<host name>/sharing/rest`



ItemID (optional)	Is the ID of the map that you want to connect to by default in your Esri Portal for ArcGIS.
-------------------	---

1. Locate the `portal.config` file and open it in your preferred editor.
2. Replace the URI with the URI of your Esri Portal for ArcGIS.
3. You can specify a map to open by default or use the first available map on your Esri Portal for ArcGIS:

- To specify a default map, replace the ItemID with the ID of the required map.

To obtain the ID of a map, go to the portal home page and click the map to open it. The ID is the number at the end of the address. For example, the map `http://www.arcgis.com/home/webmap/viewer.html?webmap=c0a0cb9dbefb452b89f38ce4a9477834` has an ID of `c0a0cb9dbefb452b89f38ce4a9477834`.

- To use the first available map, delete the following line:

```
<ItemId>c0a0cb9dbefb452b89f38ce4a9477834</ItemId>
```

4. Save the file.

You are now configured to connect to your own Esri Portal for ArcGIS. You must restart Analyst's Notebook for the change to take effect.

To return to the default settings after you edit the configuration file, delete the `portal.config` file. If the configuration file or the folder that contains it is deleted, a new configuration file is automatically created that contains the default settings.

## Setting up i2 Esri to use JSON definitions

If you plan on using ellipses to represent an area around a particular point, you can use a JSON definition. These definitions can use a set of default values for settings that are not location specific, the default values are stored separately.

Before you can start to work with the JSON definitions that describe geographic ellipses, you need to identify the attributes that are going to be used to store that information. In addition, you can modify the default ellipse behavior using the values stored in `settings.xml`:

```
<Settings>
  <GeographicPolygons>
    <GeodesicEllipses>
      <MaximumPoints>10</MaximumPoints>
      <MaximumSegmentLength>100</MaximumSegmentLength>
      <RotateClockwise>false</RotateClockwise>
      <MeasureRotationFromYAxis>false</MeasureRotationFromYAxis>
    </GeodesicEllipses>
    <DefaultFill>
      <Alpha>100</Alpha>
      <Red>127</Red>
      <Green>127</Green>
      <Blue>127</Blue>
    </DefaultFill>
  </GeographicPolygons>
</Settings>
```

- To set up an attribute class that supports the ellipse data:
  - a) Open a chart.
  - b) Select **File > Chart Properties**.
  - c) Select **Definitions > Attribute Classes**.
  - d) Choose a **Palette** to add the new attribute class to, and click **New > Text**.
  - e) Enter a **Name**, and ensure that the **Semantic Type** is set to **Abstract Text > Geographic Area > Geographic Ellipse**.
  - f) Select the **Display** options.

**Note:** JSON definitions can take up a large amount of space if they are displayed using **Show On Chart**.

- g) Choose the **User Palettes** that should include the class, and the **Behavior** to use when items containing the attribute are pasted or merged .
- h) Click **OK**.

When your attribute class is saved, you can create or modify a chart template to include it.

- To modify the default values for ellipse definitions:
  - a) Locate the `settings.xml` file, which is installed in `C:\ProgramData\i2\i2 Esri Maps\` and open it in your preferred editor.
  - b) Change the provided defaults to your preferred values:

Setting	Description
MaximumPoints	The maximum number of points used to draw the perimeter of the ellipse. If you do not specify a value, the maximum number of points is set to 100.
MaximumSegmentLength	The maximum length between two points around the perimeter. If you do not specify a value, the maximum segment length is set to 10.
RotateClockwise	Determines whether the provided ellipse rotation value is applied in a clockwise direction (true), or a counterclockwise direction (false). If you do not specify a value, the rotate direction is set to be counterclockwise.
MeasureRotationFromYAxis	Determines whether the provided ellipse rotation value is applied from the y-axis (true), or the x-axis (false). If you do not specify a value, the rotate direction is set to be applied to the x-axis.
Alpha	Sets the transparency level for the ellipse. This is a value in the range 0 - 255. If you do not specify a value, the alpha value is set to 100.
Red	Sets the red level for the ellipse. This is a value in the range 0 - 255. If you do not specify a value, the red value is set to 127.
Green	Sets the green level for the ellipse. This is a value in the range 0 - 255. If you do not specify a value, the green value is set to 127.
Blue	Sets the blue level for the ellipse. This is a value in the range 0 - 255. If you do not specify a value, the blue value is set to 127.

c) Ensure that the file with your changes is saved to `C:\ProgramData\i2\i2 Esri Maps\`.

You now have an attribute class that can be used to store the JSON definitions. Ellipse data can now be imported, and will be displayed when entities that contain that data are added to a map. If you are working as a part of a larger group you can consider:

- Storing templates that contain the attribute class in a network location, and set up as the default when new charts are created.
- Distributing the settings file to other machines.

## Export to KML/KMZ

You can export the mapping data from an Analyst's Notebook chart to a file that you can give to other users. Exporting the mapping data in this way, enables the exported item to display the entity icons and links in Google Earth or in any other mapping application that supports KMZ or KML files.

Other mapping applications might include:

- Google Maps
- Microsoft Virtual Earth
- ArcGIS Explorer

Analyst's Notebook can export data as a KMZ (Keyhole Markup Zip) file. This file contains:

- Mapping data that is converted to Keyhole Markup Language (KML), and saved in a file with a `.kml` extension
- Converted Analyst's Notebook icons

It can also export mapping data as a KML file, in which case the icons are not exported.

Successful interpretation of the mapping data in applications other than Google Earth depends on whether the application supports the KMZ or KML file formats.

## Using coordinates in item properties

Analyst's Notebook configuration options determine where coordinates and addresses are found when entities are exported to a KML/KMZ file.

Analyst's Notebook can be configured to restrict which entity properties it looks in for location information. Restricting the properties helps to ensure that specific data is used as the source of mapping information. For example, you might choose that Analyst's Notebook looks only for location information in the description because it is the standard place for your organization to store this type of information.

For successful exporting, entities must contain either coordinates or addresses.

**Note:** Coordinates or addresses are not required for links because their position is determined by the entities at each link end. Links are always plotted as a single line.

The following entity properties can be specified as holding location information:

- Labels
- Descriptions
- Card summaries
- Card descriptions

### Coordinates

Coordinates can be entered as text (identified by a prefix and suffix) or as attribute values. For example, you might enter the coordinates in the description and the datum as an attribute value. If you do not want to use the standard `LOC/` prefix and `//` suffix for text coordinates, you can change the values. Existing prefixes and suffixes on the chart are not updated.

**Note:** The prefix and suffix are not case-sensitive.

When you enter multiple coordinates for the same entity, consider how the chart item is displayed on the map. Each mapped chart item is displayed with the same label appended with a number, and has the same description. This description might be confusing where a chart item has coordinates in the label, description, and card summary.

### Addresses

To specify where Analyst's Notebook looks for addresses:

- Select or clear the **Labels**, **Descriptions**, **Card Summaries**, and **Card Descriptions** check boxes.

There are three types of address:

- Text that is enclosed in an ADDR/ prefix and // suffix is always an address. For example, ADDR/ My street, My city, My postal code//
- All of the text deriving the address from the label, description, and card properties as a whole
- The label of any chart item assigned the Mailing Address semantic type is always an address

**Note:** If required, you can change the address prefix and suffix. Existing prefixes and suffixes on the chart are not updated. The prefix and suffix are not case-sensitive.

Where an entity has multiple coordinates or addresses, at more than one location, then the entity is displayed at each of those locations on the map surface.

## Using coordinates in attributes

You can control where Analyst's Notebook looks for attributes, and how they are identified.

### None

Select **None** to prevent Analyst's Notebook looking for coordinates and addresses in attributes.

### Get coordinates automatically from the current chart

Analyst's Notebook uses attributes for coordinates and addresses that have the following characteristics:

- Is assigned a property semantic type derived from the Grid Reference and Address property semantic type.
- Is saved in the Locations palette.

Attributes of this type are automatically detected and listed in the relevant section. For example, if you add an attribute for 'altitude', you should assign the Altitude property semantic type and save to the Locations palette. This attribute is then automatically detected.

### Specify attributes that contain coordinates

You need to set up attributes that do not have a semantic type and are not part of the Locations palette.

- Select Specify attributes containing coordinates.
- Click **Add**.
- Select the attribute class from the list.
- Select the property that corresponds to the attribute. For example:

British National Grid	Complete BNG grid references
Datum	Datum codes. This is only necessary if you do not want to use the WGS84 datum. This datum applies to all coordinates that do not have a specific datum set.
Decimal Degrees	Latitude longitude pairs given in decimal degrees
Degrees Minutes Seconds	Latitude longitude pairs given in degrees, minutes and seconds
Easting	X coordinates (a measured distance eastwards) as part of a UTM, UPS or decimal BNG grid reference

Hemisphere	For a grid reference that requires the hemisphere to be specified
MGRS	Complete MGRS grid references
Northing	Y coordinates (a measured distance northwards) as part of a UTM, UPS or decimal BNG grid reference
UPS	Complete UPS grid references
UTM	Complete UTM grid references
UTM Zone	The UTM zone for UTM grid references that are split over several attribute classes

## Using coordinates in data records

You can export entities that have data records that contain coordinates and addresses.

Analyst's Notebook detects:

- Coordinates in any data record property that has a semantic type assigned to it that derives from the Grid Reference property semantic type.
- Addresses in any data record property that has the Mailing Address semantic type assigned to it.

You can toggle the Use Coordinates in Data Records option to either 'On' or 'Off'. When the option is On, any entities with coordinates and address in data records are included in the export. Toggle the option to Off if you want to exclude these entities from the export.

## Export items with coordinates

You can export the mapping data from an Analyst's Notebook chart to a file that you can give to other users. Exporting the mapping data in this way, enables the exported item to display the entity icons and links in mapping applications that support KMZ or KML files.

## When coordinates cannot be found

There are a number of areas to check if coordinates cannot be found when you export mapping data.

When you export chart items, you might see the `No coordinates found` message. To resolve the issue, you can try the following:

- For a single entity, right-click the selected entity, and from the menu, select **Edit Item Properties**. Browse the pages to find out where the coordinates are entered.
- For multiple entities, right-click the selected entities, and from the menu, select **Combined Properties**. This enables you to determine whether there are coordinates that are set, for example, as attributes.

**Note:** If the coordinates are correct, and are entered as attributes, check how the attributes are set in the **Specify Attribute Details** window.

## Mapping theme lines (virtual paths)

You can map theme lines, such as people or vehicles, that have links to chart items with dates and times. The items must have coordinates and not addresses.

In your mapping application, such as Google Earth:

- If the entity represented as the theme line has no coordinates, then, all the other mapped entities are displayed with the theme line icon. If the theme line entity has coordinates, then all the other mapped entities display with their own icon.
- Each link between the theme line and an entity is displayed as a single wide line provided the entity has a date and time.
- The label of the theme line is merged with the label of the entity that it is linked to.
- In the sidebar, each link is listed separately as a Virtual Path Link, which is appended with a number.

## Supported coordinate formats

Coordinates are entered in the appropriate format for the coordinate system that is used by your organization. When sent to Google Earth, these coordinates are converted into the corresponding WGS84 latitude and longitude values.

You can enter coordinates for the following coordinate systems by using Analyst's Notebook:

Coordinate system	Format Description	Example
British National Grid (BNG)	Grid reference (a two letter code), easting value (a three number code), northing value (a three number code).	NZ346134 Or with a datum code prefix: OGB-7*NZ346134
British National Grid (Decimal)	You can enter a pair of values up to six digits long. The values in the pair must have the same number of digits. You can also enter the grid letters.	500100 123099 Or, with a datum code prefix: OGB-A*500100 123099
Decimal Degrees (DD)	Degrees north, degrees east.	13.34 90.76 Or, with a datum code prefix: WGE * 13.34 90.76

Coordinate system	Format Description	Example
Degrees Minutes Seconds (DMS)	<p>DMS North, DMS East.</p> <p>You can enter degrees, minutes, and seconds in any of these formats:</p> <ul style="list-style-type: none"> <li>• 35:54:15 14:31:8</li> <li>• 35/54/15 14/31/8</li> <li>• 35°54'15", 14°31'8"</li> <li>• 52°14'36.61", 0°42'57.09"//</li> <li>• WGE * 12°34'56" 98°76'54"</li> </ul> <p><b>Note:</b> Do not leave spaces after the characters used for degrees, minutes, and seconds. Do not use 'd' for degrees or 'm' for minutes. For the minute and second symbols, use the plain quotation mark character (' or ") and the closing quotation mark character (' or ").</p>	<p>35:54:15 14:31:8</p> <p>35° 54'15" 14° 31'8"</p>
Military Grid Reference System (MGRS)	<p>Grid zone UTM zone Easting Northing</p> <p><b>Note:</b> Eastings and northings can be up to five digits long. You can also enter the grid and UTM zones.</p>	<p>4QFJ12345678 Or, with the datum code prefix: WGE*4QFJ12345678</p>
Universal Polar Stereographic (UPS)	<p>Hemisphere Easting Northing</p> <p>For example:</p> <ul style="list-style-type: none"> <li>• N 2500000 1850000</li> <li>• N 2500000E 1850000N</li> <li>• N 2500000 mE 1850000 mN</li> </ul> <p>The northern hemisphere is assumed if no hemisphere is specified. For example, these two coordinates give locations in different hemispheres:</p> <ul style="list-style-type: none"> <li>• 2001125.58678e 1666857.45654668n</li> <li>• S 2001125.58678e 1666857.45654668n</li> </ul>	<p>N 2500000 1850000</p>



Coordinate system	Format Description	Example
Universal Transverse Mercator (UTM)	Zone number Hemisphere Easting Northing  <b>Note:</b> There must be a space after the hemisphere.	11U 465586 3973426

## Indicating directions for coordinates

Unless you specify otherwise, the first value is North (latitude) and the second is East (longitude). The first meter value is the easting and the second meter value is the northing.

### Indicating directions for latitudes and longitudes

To specify a different direction or to indicate that the values are reversed, use the following (these values are not case-sensitive):

- N, North, or Y
- S, South or - (minus)
- E, East, or X
- W, West or - (minus)

These examples are for the same location:

35:54:15 14:31:8

35:54:15N, 14:31:8E

North 35:54:15, east 14:31:8

y35:54:15 x14:31:8

### Indicating directions for eastings and northings

To specify a different direction or to indicate that the values are reversed, use the following (these values are not case-sensitive):

- N, North, or Y
- S or South
- E, East, or X
- W or West

### Separating pairs of values

You can use these characters or separate pairs of values:

- Space
- Comma followed by a space.

For example:

- 34.138 118.354
- 34.138, 118.354

**Note:** If the thousand separator in your Windows regional settings is not a comma, then, you can also separate value pairs with just a comma.

## Work with a datum

By default, Analyst's Notebook uses the WGS84 datum. However, depending on the coordinate system, it might use a more suitable alternative, such as OGB-7, in the case of British National Grid coordinates. WGS84, is the only worldwide reference system currently in place, and it is the most common datum in place today. When the WGS84 datum is not applicable, you must specify the datum as part of the entered coordinates. To use an alternative datum, you can enter coordinates with an explicit datum code prefix. Coordinates cannot be accurate unless you also supply the reference geodetic system that was used to calculate them.

For example, for Degrees Minutes Seconds, you can enter coordinates with or without the datum code prefix:

WGE \* 12°34'56" 98°76'54"

35°54'15", 14°31'8" (the WGS84 datum is assumed)

Alternatively, you can create an attribute class to hold a different datum code prefix.

## List the contents of your chart

Listing items, cards, and records allows the information they contain to be sorted, filtered, and copied to spreadsheets or other external documents. This allows you to analyze data that is not necessarily visible on chart surface.

To open a list view, click the **Analyze** tab on the ribbon, and then in the **List** group select one of the following options:

Option	Description
<b>List Items</b>	A summary of all the items on the current chart separated into lists of entities and links. For more information, see <a href="#">Listing all the contents of your chart</a> on page 178.
<b>List Cards</b>	A summary of all the cards that the items on the current chart contain.
<b>List Records</b>	A summary of all the records on the current chart, filtered by type.
<b>List Most Connected</b>	Open the <b>List Most Connected</b> pane to list the entities with links on the current chart. For more information, see <a href="#">Listing the most connected items</a> on page 180.
<b>Linked Entities Pane</b>	A summary of all the entities that are linked to selected entities.

## Listing all the contents of your chart

In order to view and sort all the data that has been entered into chart items, you can list the items to display them in a separate dialog. Viewing the details in this manner allows you to see information that may not be present on the chart surface.

1. To open the List Items windows, click the **Analyze** tab, and then in the **List** group select **List Items**.

2. To work with these results you can:

Option	Description
<b>Options</b>	Set options that relate to the items in your list, and to the formatting of text when copied to the clipboard.
<b>Sort</b>	Specify the ordering of items based on specified columns.
<b>Filter</b>	Reduce the list of items to those that you have selected.
<b>Reveal</b>	Remove any filtering you have set.
<b>Copy</b>	Copy the information for selected items to the clipboard.
<b>Delete</b>	Remove items from the list view.

## Listing records

When you use **List Records**, you can view the properties of all chart items that contain data records in a table view.

The **List Records** feature in Analyst's Notebook gives you greater flexibility when it comes to exploring the property values of data records. The ability to view, sort and filter records and their properties in a table layout is useful for quick comparisons, and saves you the time of clicking through each record in the Record Inspector. From the **List Records** view, you can also change the selected record to another, and copy property values to the clipboard.

1. Select a record, or multiple records on the chart.
2. Click **List Records** from the record bar or from the **Analyze** tab on the ribbon.  
The **List Records** window opens. If no filters are applied, the record types and counts are listed. Selected records are shown as a subset of the total. For example, if you have 85 Person records on the chart and you select 27 of them, you see **Person 27 / 85**. The number "27" is coloured blue to indicate the selected records count.
3. Click a filter, such as Person. The Person records are displayed in a table view. Selected records gain an orange dot next to the Person icon. You can filter the records further depending on the secondary filter options available, for example Selected or Unselected.
4. You can sort the rows to three levels using the drop-down menus. For example, if you sorted your person records by Gender, you could further sort those groups by Date of Birth. The available sorting options reflect the column headings in your table. Click the column heading to reverse the order, and click again to deselect column sorting. You can also sort a column by clicking on the column heading, for example clicking on Family Name sorts the column alphabetically and places Family Name as the option in your **Sort rows by** field.
5. Click any value in the table view to move to the corresponding record on the chart.
6. Use the search field above the table columns to find text in any column. Matching text is highlighted in the table.
7. Use **Chart Item Selection** options to:
  - a) Select or deselect records on the chart.
  - b) Replace the records selected on the chart with those rows selected in the table.

- c) Extend the selection to include links and link ends on the chart for entity records, or add both end records to selected links.

You can right-click on a row and choose the select, deselect, or replace options from the menu.

**8. Use Copy options to:**

- a) Copy the table to clipboard as text.
- b) Copy selected rows to the clipboard as text.
- c) Customize your **Copy as Text Options** to include or exclude parts of the table. You can also specify whether to replace new lines and tabs with spaces or alternative characters.

You can right-click on a row and choose to copy cell values or copy the entire row to the clipboard as text.

- 9. Use Export** to export the file, or export selected rows as an `.xlsx`, `.csv` or `.tsv` file. If you have no primary filter selected, the option to **Export Selected Rows to File** is unavailable. If you have 2 or more rows selected in the table, you can right-click and select **Export Rows to File** from the menu.

## Listing the most connected items

Highly connected items are often significant in analysis. You can list the entities and the links between them based on the number of links present, then change the format of selected items to highlight them on the chart.

You can choose to list highly connected items according to several different criteria. For example, you can select links of a particular type, or concentrate on links in a particular direction.

After you list the entities that might be significant, you can change the format of these entities and relevant links on the chart to highlight them. For example, if you list entities based on total inbound links, when you click **Highlight Top 10**, the entity and its inbound links are formatted.

1. To list the connections on your chart. click the **Analyze** tab, and then in the **List** group select **List Most Connected**.
2. In the Counts pane, select the connection type you are interested in from the **Connected by** list. If you would like to list all the types of links, you can select **Links of type: Any**. To display only the links that contain records, select **Records of type: Any**.
3. Select the option to use to list items:

Option	Description
<b>Most links</b>	Lists entities based on the number of links.
<b>Most linked records</b>	Lists the entities based on the number of connections that contain records.
<b>Most connected entities</b>	Lists entities based on the number of entities to which they are connected.
<b>Most inbound</b>	Lists entities based on the number of links that are directed towards the entity, excluding bidirectional links.
<b>Most inbound records</b>	Lists entities based on the number of link records that are directed towards the entity, excluding bidirectional links.

Option	Description
<b>Most outbound</b>	Lists entities based on the number of links that are directed away from the entity, excluding bidirectional links.
<b>Most outbound records</b>	Lists entities based on the number of records that are directed away from the entity, excluding bidirectional links.
<b>Connections with the most links</b>	Lists entity-link-entity combinations based on the number of links in the connection.
<b>Connections with the most records</b>	Lists entity-link-entity combinations based on the number of records in the connection.

4. Optional: You can use the **Restrict** options to reduce the list to items that you have selected on the chart surface:
  - **Restrict Results to Selected Entities** - Only show entities that are also selected on the chart.
  - **Count Only the Selected Links** - Only count links that are also selected on the chart.

**Tip:** Analyst's Notebook shows active restrictions above the list of entities.
5. Optional: As you add items to the chart, you can use the **Update** option to refresh your list.
6. Optional: You can use the **Copy** options to export the contents of the list most connected window to the clipboard in different formats.

## Refining the list of connected items

In addition to filtering the most connected items based on link type, you can also use numerical values that are stored in either the link label, or a record's properties. You can filter based on the value of numerical properties of links, for example, to evaluate combined links that indicate multiple calls between to phones, or links containing information about financial transactions.

When Analyst's Notebook calculates numerical link label values, the first numerical element of a link label is used. For example, the following link labels all have a numerical value of seven:

- 7
- Calls: 7
- 7 transfers
- 7 and 8

Negative values are considered in the calculation. For example, the link label -7 has a numerical value of minus seven. So a negative value counts as seven links in the reverse direction of the link.

1. To list the connections on your chart, click the **Analyze** tab, and then in the **List** group select **List Most Connected**.
2. In the Values pane, select the connection type that you are interested in from the **Connected by** list. If you would like to list links of all types, you can select **Links of type: Any**.
3. Select the **Value** to use to refine your list.
4. Select the option that is used to list items:

Option	Description
<b>Total inbound</b>	<p>Lists entities based on the total value of the numerical link labels of the connected links that are directed toward the entity.</p> <p>Numerical values on bidirectional links are not included in the count.</p>
<b>Total outbound</b>	<p>Lists entities based on the total value of the numerical link labels of the connected links that are directed away from the entity.</p> <p>Numerical values on bidirectional links are not included in the count.</p>
<b>Net inbound</b>	<p>Lists entities based on the net inbound value of the numerical link labels of the connected links. The resulting value is the total of the numerical link label values for the inbound links minus the values for the outbound links.</p> <p>For example, if an Account entity has two Transaction links, one paying in 600 from Account1 and one paying out 400 to Account2, the net inbound value is 200.</p>
<b>Net outbound</b>	<p>Lists entities based on the net outbound value of the numerical link labels of the connected links. The resulting value is the total of the numerical link label values for the outbound links minus the values for the inbound links.</p> <p>For example, an Account entity might have three Transaction links, one paying in 600 from Account1 and two paying out a total of 1000, 500 to Account2 and 500 to Account3. The net outbound value is 400.</p>
<b>Total value of links</b>	<p>Lists the total of the numerical link label values for all links, including links with no directions and bidirectional links.</p> <p>For example, if an Account entity has two Transaction links, one paying in 600 from Account1 and one paying out 200 to Account 2, the total value is 800.</p>
<b>Totals with low net change</b>	<p>Lists the total of the numerical link label values for all links, where the net change is lower than a specified limit.</p> <p>For example, if an Account entity has two Transaction links, one paying in 800 from Account1 and one paying out 800 to Account 2,</p>

Option	Description
	the net change is 0, but total value is 1600. You can use this option to highlight accounts where large amounts of money are passing through without remaining in the account, which might be an indication of money laundering.
<b>Connection totals</b>	Lists entity-link-entity combinations based on the total of the numerical link label values for all links in a connection, including links with no directions and bidirectional links.  For example, Account1 and Account2 might have two Transaction links between them, one paying 400 from Account1 to Account2 and the other paying 600 from Account2 to Account1. The connection total is 1000.
<b>Connection net totals</b>	Lists entity-link-entity combinations based on the net total of the numerical link label values for all inbound and outbound links.  For example, Account1 and Account2 might have two Transaction links between them, one paying 400 from Account1 to Account2 and the other paying 600 from Account2 to Account1. The connection net total is 200.  Numerical values on bidirectional links are not included in the count.

5. Optional: You can use the **Restrict** options to reduce the list to items that you have selected on the chart surface:

- **Restrict Results to Selected Entities** - Only show entities that are also selected on the chart.
- **Count Only the Selected Links** - Only count links that are also selected on the chart.

**Tip:** Analyst's Notebook shows active restrictions above the list of entities.

## Highlighting connections on your chart

When you have a list of connected items in the **List Most Connected Pane**, you can use that list to navigate these items on your chart surface, and highlight information.

Ensure that you have the **List Most Connected** pane open, and that you have some results to view. For more information, see [List the contents of your chart](#) on page 178.

When you display items in the **List Most Connected** pane, each row contains the following information:

- **Highlighting status** - The color that is being used to highlight the connections on the chart surface.
- **Icon** - The icon that is being used to identify the entity.
- **Label** - The label text.
- **Count** - The number of links or link records of the selected type in the view.

- Distribution - How the count of the selected link or record type is reflected in the overall link count for the entity.
1. To locate items on the chart, you can select items in the list. To select items in the list and on the chart surface:
    - Label - Selects the entity.
    - Count or Distribution - Selects the links that are included in the current count (for record counts, this action selects links that contain those records).
    - Both - Selects both the entity and links.

**Tip:** You can select multiple items by holding either `Shift` or `Ctrl` while making your selection.
  2. To highlight items of interest, click the highlighting status indicator found to the left of the item's icon.
 

**Tip:** You can use the **Highlight Top 10** option to highlight the top ten connections in the list.
  3. Optional: To change the color scheme that is used to highlight items, select **Highlight Colors** .  
You can choose between 4 standard color schemes that allow you to specify up to 10 highlight colors. You can also edit these color schemes to match your color scheme. When you highlight more than 10 items, the color scheme entries are repeated.
  4. Optional: To further accentuate links that have been highlighted, you can use the **Set Line Width** to increase the line width of highlighted links.
  5. Optional: To remove all highlighting, select **Undo Highlighting**.

## Listing linked entities

The **Linked Entities** pane lists the entities that are linked to the selected entity. To help you identify potentially significant entities, you can sort the list on different properties, and copy the results to the clipboard.

1. Select an entity on the charting surface.
2. Click the **Analyze** tab, and then in the **List** group, click **Linked Entities Pane**.  
The **Linked Entities** pane opens and lists the entities that are linked to the selected entity.
3. To choose from the full list of properties that the list can be sorted on, click the **Sort** drop-down, then select a property from the list.

Property	Description
<b>Entity</b>	The label of the entity. The list is sorted in ascending alphanumeric order. If an entity has no label, its identity is used.
<b>Link</b>	The label of the link that connects the selected entity and the linked entity. The list is sorted in ascending alphanumeric order. If the connection consists of several links, then the number of links is displayed, for example (2 links).
<b>Direction</b>	The direction of the link. Links might have no direction, be outgoing from the entity, be incoming to the entity or bidirectional. The list is sorted in ascending order and can be switched to descending order clicking the column header.
<b>Onward Entities</b>	The number of other entities that the linked entity is connected to. The list is sorted in descending numerical order.



Property	Description
<b>Angle</b>	The positional angle of linked entities in relation to the selected entity. Entities that are positioned directly above the selected entity, at zero degrees, are listed first, and degree position increases down the list. Entities that are listed in clockwise order.
<b>Position</b>	The list is sorted so that panning between entities is minimized. You can walk through the items, clicking them to view their position in the chart. The entities at the top of the list are typically the entities nearest to the selected entity.

4. Click the **Copy** drop-down and select from the available copy options.

Command	Description
<b>Copy Entity Labels</b>	Copies entity labels to the clipboard. Places each entity label on a new line.
<b>Copy Table</b>	Copies entire table to the clipboard in tab separated format.

### Following a path of linked entities

To explore the selected entity's network, you can choose an entity in the Linked Entities pane and see what it is linked to.

To list all of the onward entities for a linked entity:

1. In the list, identify an entity of interest, then click it. Analyst's Notebook pans the chart to center the entity in the window.

**Tip:** Entities that are connected to many other entities might be significant. The Onward Entities column helps you to identify these entities. To summarize the immediate network of a linked entity, hover over its label in the list. If the entity has 12 or fewer onward entities, a tooltip lists their labels. If the entity has more than 12 onward entities, a tooltip displays the label of the first 10 onward entities, and the number of other onward entities. If an entity has no label, its identity is used.

2. To see what the entity is linked to, in the list, click the **List Linked Entities** button beside the entity label.  
The content of the list is replaced.
3. To list the linked entities for your previous selection, click **List Linked Entities** again. The icon and identity of the previous selection is displayed again at the top of the **Linked Entities** pane.

### Copying list information

You can copy any information from a list to the clipboard. For example, you can copy a list of items and paste it into a spreadsheet.

You can copy information from a list as tab-delimited text and paste it into any application that supports text. In addition, you can copy a list of most connected items as a picture, text, rich text, or HTML and paste it into an appropriate application.

- To copy information in a table as text:
  - a) Select the entries in the table that you want to copy. To select multiple entries, use the **Ctrl** or **Shift** keys.
  - b) Click **Copy**.
  - c) Open the application into which you want to paste the information, and press **Ctrl + V**.

- To copy a list of most connected items:
  - a) In the **List Most Connected** window, select an option from the **Copy** list.  
The displayed list of items is copied to the clipboard.
  - b) Open the application into which you want to paste the information, and press **Ctrl + V**.

## Statistical views of chart data

You can view data distribution and select and filter your data based on categories and ranges of data. Viewing distribution and filtering helps you to identify, for example, peak activity in your chart.

You can view the distribution of your data in different ways:

Bar charts	Useful for viewing the distribution of data across different categories. For example, in a chart that contains transaction data, you might want to look at the distribution of data across different account types.
Histograms	Useful for viewing ranges of data. For example, in a chart that contains transaction data, you might choose to look at the distribution of the data according to values of the transactions within specific ranges.
Heat matrices	Useful for comparing data distributions across two dimensions. For example, in a chart that contains transaction data, you might want to look at how many transactions fall into each combination of the hour of the day and the day of the week.

The categories or ranges that you focus on can apply to the ends (or entities), links, or both. For example, on a chart that contains bank accounts of different types with transactions between them, available bar charts might include:

- Ends - Account Type
- Links - Transaction date and time
- Both - Label text

You can then apply filters to focus on one or more categories or ranges of your data to gain a better understanding of specific parts of your data.

## Showing data distribution as bar charts and histograms

Using bar charts and histograms to look at the distribution of data in your chart and drill down into the contents to concentrate on information that is of interest.

To open a bar chart or histogram:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Bar Charts and Histograms**.  
The **Bar Charts and Histograms** pane opens.
2. Click the **New** tab.

Analyst's Notebook inspects the content of your chart and lists a useful set of bar charts and histograms that apply to your data. Any entry that would produce a bar chart or histogram with just one category or an even spread with just one entry in each category is not displayed in the list.

Each list entry includes up to three components.

Component	Description
Label	<p>A description of the bar chart or histogram. For example:</p> <ul style="list-style-type: none"> <li>• Link Type - lists the available types of link on your chart.</li> <li>• Label Value - lists the values of chart item labels.</li> </ul>
Count Summary	A count of the total number of items on the current chart that match the criteria. This count is split into ends (or entities) and links.
(as histogram)	Any list entry with this component can be opened as a histogram or a bar chart.

**Note:** To list all possible bar charts and histograms, select the **Show All** check box.

3. Enter the name of a property or attribute in the **Search properties** field. The list updates as you type to show the available bar charts and histograms that match your search text.
4. Click the label to open a bar chart or if **(as Histogram)** is appended to the label, you can click **(as Histogram)** to open a histogram.

You can open as many bar charts and histograms as you want. To open a bar chart but remain on the **New** page of the **Bar Charts and Histograms** pane, for example to add further bar charts or histograms, right-click an entry and select **Add Bar Chart**.

**Note:** If a bar chart is open for the histogram that you select, you cannot open it as a histogram without first closing the bar chart. In the same way, you cannot open a bar chart without first closing a corresponding histogram. Analyst's Notebook prompts you to change it from one to the other.

Each bar chart that you open appears on the **Bar Charts** page of the **Bar Charts and Histograms** pane. By default, if the value for a row in a bar chart is zero, the row is not displayed. To display rows that have a zero value, on the **Options** page of the **Bar Charts and Histograms** pane, select the **Include Empty Rows** checkbox under **Bar Chart Rows**.

Any histograms that you open appear in a separate **Histograms** window.

You can now focus on specific chart items or apply filters to investigate your data further. You can also look at combinations of properties by viewing heat matrices for the histograms that are open.

## View data on a heat matrix

Heat matrices visualize the relationship between the properties of chart items in a grid that shows the number of occurrences of different combinations of values.

Individual values in the heat matrix are represented by colors from a predefined range of colors. For example, the lowest value is displayed in the lightest color, through to the highest value, which is displayed in the darkest color.

Heat matrices can be used to quickly gain insight into your data, and identify areas for further analysis, such as peak periods when events occur. They are displayed below the histogram in the **Histogram** window.

**Note:** Show and hide heat matrices by clicking **Heat Matrix** at the top of the **Histogram** window. If no heat matrix is selected, when you click this option, a list of available heat matrices is displayed so that you can select one.

## Displaying a heat matrix

Heat matrices can help identify areas for further analysis, such as peak periods of activity. You can change the time scale to help identify any patterns or trends. You can see how events occur, for example, over days or months.

1. On the **New** page of the **Bar Charts and Histograms** pane, click the words **(as Histogram)** to open a histogram.
2. From the **Heat Matrix** list, at the top of the **Histogram** window, select a heat matrix to display. For example, the **Date & Time:Day of Week** heat matrix shows the number of occurrences of an event on days of the week.
3. Optional: Select a scale from the **Scale** list at the top of the **Histogram** window.

**Note:** The **Scale** list is available only when results contain date and time information without a predefined scale.

4. Optional: Select whether to convert values to the chart time zone or ignore time zones from the **Time Zones** options menu at the top of the **Histogram** window. If you choose to ignore time zones, values are displayed in their local time.

**Note:** The **Time Zones** options menu is available only when results contain date and time information.

5. Optional: Customize the display of the heat matrix by changing the heat matrix options.

## Heat matrix options

You can specify the way that your heat matrix is displayed. Display options might be color, spacing, whether to display all chart items or only selected items, and whether cell counts are displayed in the heat matrix cells.

### Changing the color palette

By default, the heat matrix colors are displayed from light to dark. You can select alternative colors and reverse the order by clicking the arrow to the right of the legend. Select **Reverse Colors** to display the color scale in reverse, from dark to light. Select a different color scale to change the palette of colors that are used.

### Spacing chart items by using a scale

Scales can be used to space chart items in heat matrices. A scale might be linear, logarithmic, or sequential. Scales apply to count values.

Click the arrow to the right of the legend and select an option to display values according to different scales.

Scale	Description
<b>Linear Scale</b>	<p>Map from the range of count values to the range of colors. Each color represents a similar sized band of the range of cell values.</p> <p>For example, a heat matrix contains count values in the range 3 - 22. A linear interval of 4 might be used to generate a series of scale color. These colors represent the ranges 1-4, 5-8, 9-12, 13-16, 17-20, 21-24.</p>
<b>Logarithmic Scale</b>	<p>Similar to the linear scale. The best linear interval between the minimum and maximum count value is found and mapped to a logarithmic scale. Each color represents a progressively smaller band of the range of cell values.</p> <p>This results in a scale where the first item covers many values, and subsequent items cover decreasing numbers of values.</p> <p>This scale is useful where you have few high count values and you want to emphasize this distribution. For example: 1-50, 51-75, 76-86, 87-93, 94-95.</p>
<b>Sequential Scale</b>	<p>The default option.</p> <p>Sort the cell count values into order and partition into roughly equal-sized groups, one group for each color. Each color represents a similar number of unique cell values.</p> <p>For example, if the ordered unique nonzero count values on the heat matrix are as follows: 1, 2, 4, 6, 7, 11, 13, 17, 18, 20, 27, 36, 51, 59, 60, 63, 68, 75, 80, 81, 90, and 99. The unique count value is a total of 22. The scale is broken further down into ranges that contain approximately the same number of unique values. In this example, approximately every four numbers are taken resulting in the following scale: 1-7, 11-20, 27-59, 60-75, 80-99. The generated scale is not contiguous.</p>

If your heat matrix is based on numerical values, you can choose to limit the number of rows in the heat matrix to a maximum of 10, 50, or 100. For example, if you open a date and time histogram and then create a heat matrix based on label value, you can choose to limit the number of rows.

**Display cell counts in matrices**

You can display cell counts in a heat matrix. Cell counts display the number of items on the chart that use the filter. Selected cells in a heat matrix are selected on the chart.

Change whether cell counts in heat matrix cells are displayed by clicking the down arrow to the right of the legend, and selecting **Show Cell Counts**.

### Displaying selected chart items

You can choose whether to display cells in a heat matrix for all chart items or only selected chart items by clicking the required **Count** option at the bottom of the heat matrix. The **Selected Chart items** option is only available if **Brush Selection onto Bars** is turned on in the **Options** page of the **Bars Charts and Histograms** pane.

**Note:** When you click **Selected Chart Items**, any individual cell selections that exist in the heat matrix are lost.

### Selecting ranges of cells

Select a range in the legend by pressing the Shift key and clicking the first range, then clicking the last range. Alternatively, click and drag a rectangle around the cells that you want to select. All cells that correspond to that range are selected on the heat matrix. Corresponding chart items and bars in the histogram are also selected. All other items on the chart are removed from the selection.

You can select a range of cells only when the **Count** option **All Chart Items** is selected.

## Focus on items of interest

You can focus on specific chart items or categories of data by viewing distributions for a selection of your chart data. For example, in a histogram you might want to see a count of only those items that are currently selected on your chart. You can also apply filters to bar charts and histograms to look at specific areas of interest.

### View selected chart items in bar charts and histograms

You can select chart items and see how selected data is distributed across any open bar charts or histograms. For example, you might select a number of transactions on your chart as a result of a Visual Search operation. By default, the distribution of these selected chart items is highlighted (brushed) back onto any open bar charts and histograms.

You can choose to turn off brushing in the **Options** page of the **Bar Charts and Histograms** pane.

### View selected chart items in heat matrices

When items are selected on the chart, you can choose whether to view all chart items on a heat matrix or only the selected items. Click the required **Count** option at the bottom of the heat matrix.

### Filtering data

You can apply (activate) filters in bar charts and histograms by clicking the bars. The resulting actions, such as whether chart items are selected and how filters are combined across the open bar charts and histograms, depend on the settings on the **Options** page of the **Bar Charts and Histograms** pane.

If the chart items that correspond to the filters are selected, by default the selection is brushed back onto any open bar charts and histograms.

You can choose what filters to apply across multiple bar charts and histograms. For example, you can select:

- A single bar on a single bar chart or histogram. Click a bar to select it.

- Multiple bars on a single bar chart or histogram. Press Ctrl and click to select multiple bars or Shift and click to select groups of bars. When you combine filters, this selection is treated as one filter.
- Multiple bars across multiple bar charts and histograms. Press Ctrl and click to select multiple bars. When you combine filters, this selection is treated as multiple filters, one filter per bar chart or histogram.

To deselect all chart items, click the background of your Analyst's Notebook chart. The chart items are deselected but the filters are retained in the bar charts and histograms. To clear the filters across all of the bar charts and histograms, click **Clear All Filtering** at the bottom of the **Bar Charts** page or **Histogram** window.

## Working with bar charts and histograms

You can choose to copy the information in a bar chart or histogram as a picture or as text to the clipboard. You can also manage the view of your bar chart or histogram, and drill down into the results of a histogram.

Several selection and copy options are available on the **Bar Charts** page of the **Bar Charts and Histograms** pane and in the **Histograms** window:

Option	Description
<b>Select All</b>	Selects all bars in the bar chart or histogram and all the cells in a heat matrix.
<b>Clear Selection</b>	Clears any bars or cells that are selected in the bar chart, histogram, or heat matrix.
<b>Clear All Filtering</b>	Clears any filters and reveals any chart items that were hidden.
<b>Copy as Picture</b>	Exports the bar chart or histogram and heat matrix (if one is displayed) as a picture to the clipboard. You can paste this picture into another application, for example Microsoft Word.
<b>Copy as Text</b>	Saves all the data in a bar chart, histogram, or heat matrix as text to the clipboard. You can paste this text into another application, for example Microsoft Word.
<b>Drill Down</b>	Drills down further into the results. This option is only available for histograms that have filters that are based on ranges such as label value or date and time. The range of values must be large enough to drill down into more detail.

You can copy the chart items that are selected as a result of one or more filters into a new chart by using the **Copy to New Chart** options on the **Analyze** tab of the Analyst's Notebook ribbon. Other options are available on the **Analyze** tab to list the selected chart items or their data records.

## Histogram and heat matrix animation

You might want to play through the values of your quantitative or temporal data, for example to see what activity occurred over a time period and how the chart changed over that time. You can play through the values by animating histograms and heat matrices.

You animate heat matrices and histograms in the **Histograms** window. To run an animation, select the bars or heat matrix cells of interest and click **Play**. When animation mode runs, the **Play** button changes to **Pause**. Click **Pause** to stop the animation.

Two animation modes, move and expand, are available to select from the list at the upper left of the histogram or heat matrix. You can choose to run the animation forwards or backwards.

Option	Description
<b>Move Forwards</b>	Use the selected bars or heat map cells as the starting point and move the selection across the x-axis. This action is the equivalent of selecting each bar or cell in turn. When the animation reaches the end of the sequence, it repeats from the selected starting point until you click <b>Pause</b> .
<b>Move Backwards</b>	Run the move animation in reverse from the selected starting point.
<b>Expand Forwards</b>	Use the selected bars or heat map cells as a starting point and expand the selection from there across the x-axis. This action is the equivalent of adding each bar in turn to the previous selection. When the animation reaches the end of the sequence, the selected items are cleared and the animation repeats from the selected starting point, until you click <b>Pause</b> . If you expand forwards from a bar or cell not at the beginning, all bars are added from that point until the end.
<b>Expand Backwards</b>	Run the expand animation in reverse from the selected starting point.

**Note:** You cannot expand forwards from the last bar or cell, and you cannot expand backwards from the first bar or cell.

By default, the animation ignores empty columns. To include empty columns in the animation, on the **Options** page of the **Bar Charts and Histograms** pane, select the **Include Empty Columns** check box under **Histogram Animation**.

**Tip:** Select a bar, heat matrix cell, or range of bars and cells and use the Left or Right arrow keys to move manually through a histogram.

## Drill down into histograms

You can analyze data by focusing on areas of interest. Drill down to examine data in finer detail. For example, if you are analyzing data about years, you can drill down further to find information about days of the week.

In a histogram, the **Drill Down** command is available for any type of data, but only if that bar has further information to drill down into.



Right-click a bar and select **Drill Down**. If you have more than one selection range in the **Histogram** window, the **Drill Down** command is unavailable.

**Note:** As you drill down, a path is displayed at the upper left of the **Histogram** window that describes the steps. Click any item that is displayed in blue in this path to return to the previous drill-down results. Click **All** to see all results before you drilled down.

## Bar chart and histogram options

When you click on bars in a bar chart or histogram, a filter is applied (activated). You can control how active filters are shown on a chart and how the results of multiple active filters are combined. The settings that you choose in the **Options** page remain set even after you close and restart Analyst's Notebook.

### Showing results on the chart

When you activate a filter on a bar chart or histogram, you can choose what is selected and displayed on the chart.

Option	Description
<b>Select Chart Items</b>	Selects the items on the chart that correspond to the active filters in the bar charts and histograms.
<b>Hide Other Chart Items</b>	<p>Hides all the items on the chart that do not correspond to the active filters in the bar charts and histograms. Chart item selection remains unchanged.</p> <p>Selecting the <b>Reveal Hidden in Gray</b> checkbox reveals the hidden items in gray.</p> <p><b>Note:</b> If a link passes the filter conditions, it can be displayed only if both of its ends are also displayed. As a result, some ends might be displayed that do not pass the filter conditions.</p>
<b>Select Chart Items and Hide Others</b>	<p>Selects the items on the chart that correspond to the active filters in the bar charts and histograms and hides all other chart items.</p> <p>Selecting the <b>Reveal Hidden in Gray</b> checkbox reveals the hidden items in gray.</p> <p><b>Note:</b> If a link passes the filter conditions, it can be displayed only if both of its ends are also displayed. As a result, some ends might be displayed that do not pass the filter conditions. However, these ends are not selected.</p>

### Combining active filters

You can control how active filters are combined.

Option	Description
<b>Match Any Entity Filters</b>	<p>Finds entities that pass ANY active entity filters. You can apply multiple filters across multiple bar charts and histograms, each filtering different types of information. Chart items that pass any of the active entity filters are found. For example, you might be looking for all bank accounts that were opened after a specific date OR that have a balance over a specific amount.</p> <p>If this checkbox is cleared, only those chart items that pass ALL of the active entity filters are found. For example, you might be looking for all bank accounts that were opened after a specific date, which also have a balance over a specific amount.</p> <p><b>Note:</b> In the case where any of your bar charts or histograms include both ends and links (rather than just ends or just links), any active filters in these bar charts or histograms, in combination with other active filters, impact on the results for BOTH ends and links. All ends and links that do not pass the filter are excluded. For example, on a Label text bar chart that includes ends and links, if you apply a filter that selects only links, all entities are therefore intrinsically excluded. If you now apply an extra entity filter on a different bar chart and the <b>Match Any Entity Filters</b> checkbox is cleared, no entities can match all the active filters. They are excluded by the filter on the original Label text bar chart that selected only links.</p>

Option	Description
<b>Match Any Link Filters</b>	<p>Finds links that pass ANY active link filters. You can apply multiple filters across multiple bar charts and histograms, each filtering different types of information. Chart items that pass any of the active link filters are found. For example, you might be looking for transactions on a specific day of the week OR of a specific amount.</p> <p>If this check box is cleared, chart items that pass ALL of the active link filters are found. For example, you might be looking for transactions on a specific day of the week AND of a specific amount.</p> <p><b>Note:</b> In the case where any of your bar charts or histograms include both ends and links (rather than just ends or just links), any active filters in these bar charts or histograms, in combination with other active filters, impact on the results for BOTH ends and links. All ends and links that do not pass the filter are excluded. For example, on a Label text bar chart that includes ends and links, if you apply a filter that selects only entities, all links are therefore intrinsically excluded. If you now apply an extra link filter on a different bar chart and the <b>Match Any Link Filters</b> checkbox is cleared, no links can match all the active filters. They are excluded by the filter on the original Label text bar chart that selected only entities.</p>
<b>Matching Entities with Matching Links</b>	<p>Matches link and entity combinations. Entities that pass the active entity filters, according to the <b>Match Any Entity Filters</b> option and links that pass the active link filters, according to the <b>Match Any Link Filters</b> option, are inspected. Only the entity-link combinations that pass the entity and link filters are found. For example, you might be looking for bank accounts with a balance over 40,000 that were involved in at least one transaction over 3000 on a Tuesday.</p> <p><b>Note:</b> In the case where your bar chart or histogram contains both ends and links, you might find that some or all, entities or links are excluded as result of matching all active entity or all active link filters.</p>

**Showing the distribution of selected chart items on bar charts and histograms**

If you select items on your chart, by default the selection is shown (brushed) onto the bars of any open bar charts and histograms. The distribution of the selected chart items is shown highlighted in the bars

of the bar charts and histograms. You can choose not to brush the chart item selection onto the open bar charts and histograms by clearing the **Brush Selection onto Bars** checkbox.

### Including empty rows or columns

You can control whether to include empty columns in histogram and heat matrix animation, whether rows that contain a zero value are displayed on bar charts, and if the case of values is ignored.

Option	Description
<b>Include Empty Columns</b>	Includes empty columns in a histogram or heat matrix animation.
<b>Include Empty Rows</b>	Displays all the rows in a bar chart, including any rows that have a zero value. For example, you might want to display rows that have a zero value to highlight periods of inactivity.
<b>Ignore Case of Values</b>	Changes whether rows in a bar chart are case sensitive. For example, your data contains one value for "Belgian" and another for "belgian". When the case of values is ignored you see one row with a value of either "Belgian" or "belgian" that has a count of 2, instead of separate rows with a count of 1.

## Working with the Time Wheel

The **Time Wheel** function in Analyst's Notebook is a highly visual way to analyze the time-based data on your chart.

The **Time Wheel** visualizes the relationship between the date and time properties of chart items, in a circular diagram made up of sectors and rings. This is useful because you can quickly identify when events occurred and with what regularity. For example, you are interested in the number of calls made between certain telephone numbers, and when those calls were made. Individual values in the matrix are represented by colors from a predefined palette, which you can customize. The sectors are shaded to show the amount of activity in the time period selected. When you hover your cursor over a sector, say between 17:00 and 18:00 on Saturday, Analyst's Notebook displays a summary of all the calls made during that hour. When you click that sector, the relevant records are highlighted on the chart.

By default the lowest value is displayed in the lightest color, through to the highest value, which is displayed in the darkest color. This setup shows high levels of activity as dark areas on the wheel. You can choose to change the palette of colors, and reverse the scale shading option, so that the highest values are represented by the lighter shades.

You can also select a linear, logarithmic, or sequential scale to change the color and what each color represents. The linear scale shows an even color distribution as each color represents a similar sized band of the range of cell values. For example, your count values are in the range 3-22. A linear interval of 4 might be used so the colors represent ranges of 1-4, 5-8, 9-12, 13-16, 17-20, 21-24.

The logarithmic scale is similar to the linear scale, but it emphasizes higher counts with each color representing progressively smaller bands of the range of cell values. This is useful where you have fewer high count values and want to emphasize the distribution. For example, 1-50, 51-75, 76-86, 87-93, 94-95.

The sequential scale is the default option and distributes color evenly across counts that contain data. Each color represents a group containing a similar number of unique cell values. For example, if the ordered unique nonzero count values are: 1, 2, 4, 6, 7, 11, 13, 17, 18, 20, 27, 36, 51, 59, 60, 63, 68, 75, 80, 81, 90 and 99, the unique count value is a total of 22. The range is broken down into ranges that contain around the same number of unique values. In this example, approximately every four numbers are taken resulting in the following: 1-7, 11-20, 27-59, 60-75, 80-99. The generated scale is not contiguous.

To use the **Time Wheel**:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Time Wheel**. The **Time Wheel** window opens.

Option	Description
<b>Property</b>	Shows available date and time properties.
<b>Sectors</b>	Shows a list of scales for use in comparison to Rings.
<b>Rings</b>	Shows a list of scales for use in comparison to Sectors.
<b>Options</b>	Turns Pan to Selection on or off. Selects either the chart time zone or ignore time zones.
<b>Copy</b>	Copies the <b>Time Wheel</b> to the clipboard.
<b>Scale</b>	Shows the colors available to select, gives the option to display the color scale in reverse, and changes the range options between linear, logarithmic and sequential.
<b>Count Chart Items</b>	Gives the option to change from all chart items being displayed in the <b>Time Wheel</b> to selected chart items.

2. Click **Property** and select the chart item properties that you want to investigate.
3. Click **Sectors** and set the time period for sectors, for example Hour of Day.
4. Click **Rings** and set the time period for rings, for example Day of Week. You should select different settings for sectors and rings.
5. Click **Options** to change the pan setting, and to change time zones from local time to the chart time zone.

When you enable Pan to Selection and click on a cell in the **Time Wheel**, the activity from that cell is panned to on the chart.

The **Time Wheel** time zone setting defaults to local time zones. If you change the setting to use the chart's time zone, values are normalized to that time. For example, if your chart is set to Eastern Standard Time (EST) and the local time is Greenwich Mean Time (GMT), the time in the **Time Wheel** is adjusted to -5 hours in line with EST.

6. Click the drop-down list on the **Scale** legend to see the available color options and spacing scales. Customize the colors used in the **Time Wheel** to suit your needs.
7. Change **Count Chart Items** to **Selected** if you want to focus on items you have selected on the chart, rather than all items on the chart.

The **Time Wheel** displays your data as selected. Hover over a sector to see a summary of the activity that occurred in that time period, and click the sector to highlight the activity on the chart. You can

use **Ctrl+Click** to select multiple cells. To select all or part of the **Time Wheel**, click on a cell, hold **Shift**, and drag the cursor until all the required cells are within the border. Click again to confirm the selection. All of the activity from the chosen area is highlighted on the chart.

## Investigate item activity

Any temporal data that is stored on an item can be described as item activity. You can investigate this information to discover common themes or discrepancies.

Activity information is displayed as either single occurrences, or as events that occur over a duration.

## Adding items to the Activity View

When you add items to the **Activity View**, any temporal data that is associated with them can be represented as activity indicators on the item timeline. The activity indicators provide greater visibility of timings and sequences, making it easier to compare items.

Each item is represented as a row in the **Activity View**. The dates and times of sightings, meetings, interactions, and other events, are represented by activity indicators within each row.

By adding several items to the **Activity View**, you can see how relationships proceed and develop over time. In addition, patterns in the data can be identified.

Temporal data for chart items can be stored in several places, for example on the item itself and in cards, data records, and attributes. You can choose which properties are used to generate activity indicators. For example, your data might contain date and time information for a series of messages and also date of birth information for the people involved. You can choose to include only the date and time information from the messages and exclude the dates of birth.

You can choose to include properties on the items that you add to the **Activity View** and on their connected links. You can also include properties on any items that are connected to the added items and on their onward links. For example, you might choose to include properties for the onward links if your primary items are people who are connected to telephones. Relating the call information on the onward links to the people might be important to you.

To add items to the **Activity View**:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Activity View**. The **Activity View** opens.
2. From the menu at the upper left of the **Activity View**, select the items to add:

Option	Description
<b>Add All Entities</b>	Adds each entity on the chart.
<b>Add Selected Entities</b>	Adds each entity that is selected on the chart.
<b>Add All Links</b>	Adds each link on the chart.
<b>Add Selected Links</b>	Adds each link that is selected on the chart.
<b>Add Ends of Selected Links</b>	Adds entities at the ends of selected links, without adding the link as a primary item.
<b>Add Ends Linked to Selected Ends</b>	Adds all the entities that are linked to the selected entities, without adding the selected entities or links as a primary item.

Option	Description
Add Items of Type	Adds all items of the type that you select.
Add Items of Semantic Type	Adds all items that are assigned the semantic type that you select.

**Tip:** You can also add items to the **Activity View** by right-clicking on an item on the chart and selecting one of the **Activity View** options.

3. Choose which temporal properties to use to generate activity indicators for the items that are added and any items that are connected to them. From the **Added Items** and **Items Linked to Added Items** lists, select each property that you want to use to generate activity indicators.

Only properties that contain date and time information are available for selection. If the same date and time data is contained in more than one property, select only one of those properties to generate the activity indicator. If you select two properties that contain the same information, the activity is counted twice. Any dates with a value of greater than December 31, 2499 are ignored.

**Tip:** The number next to each property list indicates how many properties are selected. To clear all the properties in a list, hover over the number and click the cross that appears.

Items are added to the **Activity View** and only the selected properties are used to generate activity indicators.

### Interpreting activity data


The **Activity View** displays information about item activity. It is important to understand the activities that the view detects and how to interpret the display when you analyze your data.









Each item that is added to the **Activity View** is represented by an individual row. If temporal data is selected for either an attached link or connected entity or onward link, secondary rows are added for each related item. You can choose whether these secondary rows are listed as groups of links in each connection or listed as separate links. To choose how the secondary rows are displayed, select or clear the **Group by Connection** options on the **Added Items** and **Items Linked to Added Items** lists where you select which properties to use.

For each row, each piece of temporal data is shown as a symbol that is placed against the timeline. The rows that belong to primary items contain indicators for all connected items, in addition to data stored on the primary item. Depending on the amount of activity and the scale of the timeline, the indicators might be merged to represent multiple properties.

**Note:** Some of these activity indicators, for example link direction, are only visible if the relevant **Indicator Colors** options are selected in the **Formatting Options** window.

**Table 10: Activity indicators**

Activity indicator	Description
	Activity with a single temporal value stored on an entity.

Activity indicator	Description
	Activity with start and end values that relate to two temporal values of an entity. When an invalid duration occurs, for example when the start date and time occurs after the end date and time, the duration bar appears in an error color.
	Activity with a single temporal value that is stored as a property on a bidirectional link.
	Activity with a single temporal value that is stored as a property on a nondirectional link.
	Activity with a single temporal value that is stored as a property on a link that is directed from the primary entity.
	Activity with a single temporal value that is stored as a property on a link that is directed to the primary entity.
	Multiple temporal values detected. <b>Note:</b> If more than nine temporal values are detected, this number is replaced by an asterisk.
	Activity indicator selected.
	Multiple temporal values, some but not all of which are selected.

Hover over an activity indicator or the label of an item row for more information about the temporal data that is associated with the item. The summary provides the item label, and the data that is detected. For example, John Smith (Date & Time) 12/12/2013 06:00.

## Changing the scale

When items are added to the **Activity View**, the linear scale is determined by the earliest and latest times that are detected. Changing the scale allows specific periods of the view to be investigated in more detail.

Zoom into and out from the **Activity View** timeline to analyze activity data at different resolutions.

The timeline is affected by the properties that you select to generate activity indicators. Ensure that you select the required properties before you change the scale. For example, if you are investigating specific events that relate to people, you might choose to clear the properties that contain their date of birth and date of death. Otherwise, these properties might affect the earliest and latest times on the timeline.

To change the timeline scale:



1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Activity View**.  
The **Activity View** opens.
2. In the **Scale** list, select one of the following linear scale values:
  - Milliseconds
  - Seconds
  - Minutes
  - Hours
  - Days
  - Months
  - Years

**Tip:** You can also change the scale by clicking in the timeline header and then by using the mouse wheel to zoom in and out.

The view is redrawn to use the selected scale. If the scale is such that all the activity indicators no longer fit in the view, a horizontal scroll bar is added to aid navigation.

### Looking for patterns of activity

You can study patterns of activity to identify trends and deviations in temporal data. To see these patterns, you can change the **Activity View** to compare activity over recurring time periods.

Areas of activity can be grouped by a set time period to look for patterns of activity. For example, you can examine meetings that occur every Monday, or on the second day of every month. Establishing regular patterns of activity is important in identifying suspicious behavior. For example, establishing the regular payments into a bank account can remove legitimate payments from further investigation.

To look for patterns of activity:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Activity View**.  
The **Activity View** opens.
2. From the **Scale** list, select a comparison scale from the **Repeating Scales** or **Repeating Scales with Grouped Rows** sections of the list.

Option	Description
<b>Every 60 Seconds</b>	Sets the timeline header scale to show the time in seconds of the minute. Rows that contain the secondary level items are grouped by minute.
<b>Every 60 Minutes</b>	Sets the timeline header scale to show the time in minutes of the hour. Rows that contain the secondary level items are grouped by hour of the day.
<b>Every 24 Hours</b>	Sets the timeline header scale to show the time in hours of the day. Rows that contain the secondary level items are grouped by date.
<b>Every 7 Days</b>	Sets the timeline header scale to show the day of the week. Rows that contain the secondary level items are grouped by week.

Option	Description
<b>Every Month</b>	Sets the timeline header scale to show the day of the month. Rows that contain the secondary level items are grouped by month.
<b>Every 60 Seconds by their Hour</b>	Sets the timeline header scale to show the time in seconds of the minute. Rows that contain the secondary level items are grouped first by minute of the hour, and then by hour of the date.
<b>Every 60 Minutes by their Day</b>	Sets the timeline header scale to show the time in minutes of the hour. Rows that contain the secondary level items are grouped first by hour of the day, and then by date.
<b>Every 24 Hours by their Day of Week</b>	Sets the timeline header scale to show the time in hours of the day. Rows that contain the secondary level items are grouped first by day of the week, and then by date.
<b>Every 24 Hours by their Day of Month</b>	Sets the timeline header scale to show the time in hours of the day. Rows that contain the secondary level items are grouped first by day of the month, and then by date.
<b>Every 24 Hours by their Year</b>	Sets the timeline header scale to show the time in hours of the day. Rows that contain the secondary level items are grouped first by day of the year, and then by date.
<b>Every Month by their Year</b>	Sets the timeline header scale to show the day of the month. Rows that contain the secondary level items are grouped first by month, and then by date.

Rows are added to each primary item in the **Activity View** that group secondary item rows by the selected comparison value. To zoom the view, click in the timeline header and use the mouse wheel to scroll.

## Configuring duration indicators

If activity occurs over a specific duration, the **Activity View** can indicate the duration as either a start time and a duration or as start and end time indicators. You can configure which properties are used to indicate duration.

When you configure duration information, you can specify as many start and end or start and duration property pairs as you like. If any attributes or data record properties exist that have the semantic type of Event Start Date & Time and Event End Date & Time, they are configured for you.

To configure a duration:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Activity View**.  
The **Activity View** opens.
2. Click **Durations**.  
The **Durations Setup** window opens.

3. To specify a duration that uses a start and end time, in the **Durations (Start and End)** table:

- a) From the **Start Property** list, select a property to use as the start date and time.
- b) From the **End Property** list, select a property to use as the end date and time.

To specify a duration that uses a start time and duration, in the **Durations (Start and Elapsed Time)** table:

- a) From the **Start Property** list, select a property to use as the start date and time.
- b) From the **Duration Property** list, select a number property to use as the duration.
- c) Select the units to use for the duration.

Any items in a list that have a value present on the chart, for example in an attribute or data record, appear in the list as bold. They are also moved to the top of the list.

**Note:** To delete a row, click the cross at the end of the row.

4. Optional: To specify the units for any duration property pairs that are automatically configured for you, select your chosen units from the **Units for automatic duration properties** list.

Duration property pairs are automatically configured for any attributes or data record properties that have the semantic type of Event Start Date & Time and Duration.

5. Optional: To use these settings for any new charts that you create, select **Set as Default**.

6. When you finish configuring all of the duration combinations, click **OK**.

Any pairs that you configure become available to select as properties on the appropriate property lists in the **Activity View**.

## Configuring indicator formatting

Activity indicators can use shading and color information from the associated item. Color can help highlight areas of related activity.

When activity of interest is identified, you can show the color of the indicator to signify related events. Activity indicators can reflect the colors of entity frames, entity shading, and links.

For example, by adding frames of the same color to the people at a meeting, you can highlight other activity that they have in common.

To set the Activity View to reflect item color:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Activity View**.  
The **Activity View** opens.
2. At the top of the **Activity View**, click **Formatting**.  
The **Formatting Options** window opens.
3. Select one or more of the following options:

Option	Description
<b>Show entity color</b>	Updates activity indicators to reflect the icon frame color, entity color, or entity shading color.
<b>Show link color</b>	Updates activity indicators to reflect the color of the link.
<b>Show link direction</b>	Indicates the link direction for activity information on directed links.

Option	Description
<b>Overlap indicator color</b>	Specify the color of the overlap indicator that is displayed when part of an activity's duration coincides with another.

- Optional: To use these settings for any new charts that you create, select **Set as Default**.
- Click **OK**.

## Handling activity with partial information

The **Activity View** needs temporal data that includes dates and times. You can configure the behavior for properties that contain a date but no time or a time with no date.

If the date and time information is contained in separate properties, Analyst's Notebook can recognize the properties as a combined date and time pair. To recognize them as a pair, the properties must be assigned the semantic types Event Start Date and Event Start Time, or Event End Date and Event End Time.

To configure how date-only and time-only properties are handled:

- Click the **Analyze** tab, and then in the **Gain Insight** group, click **Activity View**.  
The **Activity View** opens.
- Click **Partial Properties**.  
The **Partial Properties Setup** window opens.
- To configure how to handle properties that contain date-only information, in the **Date-only Properties** area, select one of the following options:

Option	Description
<b>Don't Show</b>	Ignores any date-only temporal data.
<b>Show At</b>	Assigns a time that you specify to date-only temporal data.
<b>Show over the entire day</b>	Assigns a default duration of 24 hours to date-only temporal data.

- To configure how to handle properties that contain time-only information, in the **Time-only Properties** area, select one of the following options:

Option	Description
<b>Don't Show</b>	Ignores any time-only temporal data.
<b>Show On</b>	Assigns a date that you specify to time-only temporal data.

- Optional: To use these settings for any new charts that you create, select **Set as Default**.
- Click **OK**.

## Interacting with items in the Activity View

Adding items to the **Activity View** provides a different view of the information that is present in the chart. Items can be selected, edited, and centered on the chart.

- To focus the chart on the selected item, right-click the item and select **Center on Chart**.
- To automatically focus the chart on an item when you select it in the **Activity View**, from the **Options** list, select **Pan on Selection**.
- To change the order of items in the **Activity View**, from the **Sort** drop-down list, select one of the following options:

Option	Description
<b>Most Active</b>	Moves the items with the most activities to the top of the grid.
<b>Earliest</b>	Moves the items that contain the earliest activities to the top of the grid.
<b>Latest</b>	Moves the items that contain the latest activities to the top of the grid.
<b>Alphabetical</b>	Sorts the items in the grid into alphabetical order, based on their labels.
<b>Least Active</b>	Moves the items with the fewest activities to the top of the grid.

Primary items are sorted according to the selected option. Within each primary item, secondary items are also sorted according to the selected option.

- To open and edit the properties of an item, right-click the item and select **Edit Item Properties**.
- To remove selected rows from the **Activity View**, select the rows, right-click an item and select **Remove Selected Rows**.
- To remove the items that are not selected from the **Activity View**, right-click an item and select **Remove Unselected Rows**.
- To remove all items, click the **Remove All** option next to **Add Selected Entities** at the top of the **Activity View** window.
- Right-click on any selected row or rows to see the options to **Select All Activity**, **Select Earliest Activity**, or **Select Latest Activity**.
- When you have an activity indicator selected, you can use the right **Arrow** key to move to the next latest activity or the left **Arrow** key to move the next earliest activity. Use the **Home** or **End** keys to move to the earliest or latest item in the entire view.

## Specifying the time zone

Depending on the information that is contained within the chart, you might have data that uses different time zones. The time zone that the Activity View uses for an activity indicator can come from either the data itself, or from the chart.

To specify which time zone to use in the **Activity View**:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Activity View**. The **Activity View** opens.

2. From the **Options** list in the **Activity View**, select one of the following options:

Option	Description
<b>Convert values to the chart time zone</b>	Converts the date and time values of activity indicators to the time zone of the chart.
<b>Ignore time zones</b>	Shows the date and time values in local time.

## Prefixing row labels

Within the **Activity View**, row labels can be prefixed with an attribute value. Adding an attribute prefix allows items to be sorted by that value.

The label for each row of the **Activity View** does not necessarily match the item label on the chart. By default:

- The label for an entity row matches the chart label of that entity.
- The label for a link row is constructed from the chart label of that link, and the labels of the entities at each end.

To categorize items in the **Activity View**, and to change their sort order:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Activity View**.  
The **Activity View** opens.
2. At the top of the **Activity View**, click **Formatting**.  
The **Formatting Options** window opens.
3. Select the **Prefix row labels with values of** check box, and choose the attribute class to use as a prefix from the list.
4. Click **OK**.

The labels are updated in the **Activity View**. The labels on the chart remain unchanged.

## Filtering the Activity View

Like items on the chart surface, data in the **Activity View** updates to reflect the status of any filters that are applied. Depending on the filter options that you select, you can control the visibility of data within the view.

When filters are applied to the chart, items that do not match the selected filters are hidden or become revealed in gray on the chart surface. In the **Activity View**, activity data that relates to hidden items is removed from the view. However, you can control the visibility of activity data that relates to items that are revealed in gray.

**Note:** To ensure that the required items are placed in a gray state when filters are applied, make sure that the filtering options are set up appropriately. Alternatively, to change the setting to show all hidden items in a gray state, click the **View** tab, and then in the **Show and Hide Items** group, click **Reveal > Reveal in Gray**.

To configure how to display items that are made revealed in gray as the result of a filter:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Activity View**.  
The **Activity View** opens.
2. From the **Options** list in the **Activity View**, select one or both of the following options:

Option	Description
<b>Include Revealed Hidden Items</b>	Show primary rows for entities and links that are revealed in gray.
<b>Include Revealed Hidden Activity</b>	For items that are shown on the chart, show activity of connected items that are revealed in gray.

## Presenting your findings

A picture of the information that is visible in the **Activity View** can be copied as an image. You can use images to present information from the Activity View in other applications for reporting.

To create an image of the current state of the **Activity View**:

1. In the **Activity View**, change the size of the view to ensure that all of the data that you want to report on is visible.
2. Click **Copy as Picture**.  
An image of the contents of the **Activity View** is copied to the clipboard.
3. Paste the picture into a document that supports images.

## Conditional formatting

You can use conditional formatting to change the appearance of items on the chart to emphasize information of interest to your investigation. You can change the appearance of both entities and links based on rules that you define.

You can use conditional formatting to emphasize significant information, and downplay or hide information of lower interest. Conditional formatting is useful for both analytical and presentation purposes.

### Specifications and rules

When you create a conditional formatting specification, you must add at least one rule. Each rule changes one style based on conditions that you specify. The following styles can be changed:

- To a specific style setting.
- To styles stored in a selected attribute or property by setting the style to the value of the attribute or property.
- To styles from a color spectrum that is based on a selected attribute or property.
- To styles from a gradual scale that is based on a selected attribute or property.
- To styles from a threshold or range that is based on a selected attribute or property.
- To styles from a lookup table that is based on a selected attribute or property.

## Applying a conditional formatting specification

When you open the conditional formatting pane, a number of default conditional formatting specifications are available. You can apply these specifications directly to the items on your chart.

To apply a conditional formatting specification:

1. To open the Conditional Formatting pane, click the **Style** tab, and then click **Conditional Formatting > Conditional Formatting Pane**.
2. In the **Conditional Formatting** pane, from the commands in the **Actions** panel at the bottom of the pane, select:

Option	Description
<b>Format with Selected Specification</b>	Use the specification that is selected in the upper part of the <b>Conditional Formatting</b> pane to format all items on the current chart.
<b>Format Selected Items with Selected Specifications</b>	Use the specification that is selected in the upper part of the <b>Conditional Formatting</b> pane to format items that are selected on the chart.
<b>Undo Formatting</b>	Remove the last conditional formatting specification that was applied.

Any items on your chart that meet the criteria will be modified, a [Formatting progress](#) on page 208 status window will notify you of the changes that are made.

3. Click **Close** to return to your chart.

## Formatting progress

When a Conditional Formatting Specification is running, a progress window will be displayed. You can see reports about the various stages of the conditional formatting process, including any errors that occur.

### Formatting started

As soon as the formatting starts, information about the formatting start time and current rule is displayed. During this stage, you can stop the formatting process by clicking **Cancel**.

### Error or errors occurred

If errors occur, formatting will be stopped and additional details will be displayed. For example, an error occurs if a rule is based on an attribute class or record value of one data type, but you try to apply it to a chart that has an attribute class or record value with the same name but a different data type.

If you encounter errors, edit the specification in the **Edit Conditional Formatting Specification** window before rerunning the specification.

**Note:** Any formatting changes that result from rules that were processed before the error occurred, are applied to the chart.

### Formatting completed

The end of the formatting process. A message is displayed to show the formatting end time, total formatting time, and the number of entities and links that were formatted. Any formatting changes are applied to the chart after the last rule in the specification is processed. Click **Close** to close the window.



## Creating and editing conditional formatting specifications

You can create conditional formatting specifications that contain rules that are specific to the work that you are currently undertaking. By creating your own specifications, you can ensure that the rules that are set up match the conditions that you would like to extenuate in your data.

To create, edit, delete, or duplicate a conditional formatting specification:

1. To open the Conditional Formatting pane, click the **Style** tab, and then click **Conditional Formatting > Conditional Formatting Pane**.
2. In the **Conditional Formatting** pane, from the commands in the **Actions** panel at the bottom of the pane, select:

Option	Description
<b>New Specification</b>	Create a conditional formatting specification to which you can add rules. The <b>Edit Conditional Formatting Specification</b> window is shown.
<b>Edit Selected Specification</b>	Edit the conditional formatting specification that is selected in the upper part of the <b>Conditional Formatting</b> pane. The <b>Edit Conditional Formatting Specification</b> window is shown.

The **Edit Conditional Formatting Specification** window opens.

3. Using the following options, you can add and modify the rules that the specification contains. In the **Rules** page, select:

Option	Description
<b>New</b>	To add a conditional formatting rule. The <b>New Rule</b> window is shown, in which you specify what the rule affects and what the actions of the rule are based on. For more information, see <a href="#">Adding rules to a conditional formatting specification</a> on page 210.
<b>Edit</b>	To edit an existing conditional formatting rule. The <b>Edit Rule</b> window is shown. You can edit the rule to change what the rule affects and what the actions of the rule are based on. For more information, see <a href="#">Adding rules to a conditional formatting specification</a> on page 210.
<b>Duplicate</b>	Duplicate a rule. By duplicating an existing rule, you have a copy to edit.
<b>Delete</b>	To delete a rule.
<b>Up</b>	To move a rule upwards in the order in the list of rules.  <b>Note:</b> Rule ordering is significant as rules are carried out sequentially, and previous rules may prevent subsequent actions.

Option	Description
<b>Down</b>	<p>To move a rule downwards in the order in the list of rules.</p> <p><b>Note:</b> Rule ordering is significant as rules are carried out sequentially, and previous rules may prevent subsequent actions.</p>

4. You can enter the following properties on the **Details** page:

- Subject
- Author
- Keywords
- Category
- Comments
- Custom properties

5. Click **Save**.

## Adding rules to a conditional formatting specification

Emphasize significant information or de-emphasize information of lower importance by adding rules to a conditional formatting. Applying a specification to your chart that contains rules changes the appearance of chart items, based on their properties.

A conditional formatting rule applies formatting to chart items, you specify what the actions are based on, and the action that you want to apply.

A conditional formatting rule is defined over four steps, involving:

- Choosing the type of item or representation to be formatted.
- Choosing the criteria to identify items, such as links with the Transaction attribute, or event frames with the Day of Week analysis attribute.
- Choosing a style to change, such as enlargement or shade color.
- Specifying how the style changes, by selecting a particular value, or by looking up a value in a table for example.

**Note:** The options available for changing the style depend on the choices you make in earlier steps.

To define a rule:

1. In the **Edit Conditional Formatting Specification** window, click **New** to show the **New Rule** window.
2. In the **Items to be formatted** section, select the item type to apply the rule to by selecting **Entities** or **Links**. If you select **Entities**, you also need to select the types of representation to apply the rule to.
3. In the **Item criteria** section, select what the rule is based on by selecting an option:
  - **All items** - create an unconditional rule that is applied to all items of the selected representation.
  - **Items that contain records** - set up rules that apply to items with records that contain specific property types.
  - **Items with attribute** - set up rules that apply to items with a specified attribute.

- **Items with analysis attribute** - set up rules that apply to items with a specified analysis attribute.
4. In the **Style to be changed** section, select the aspect of style to be changed.  
For example, the rule can change the enlargement of the icon on the chart, or the color of links.
  5. In the **Style will be changed to** section, specify how the style is changed by selecting an option.  
For some styles, you must click **Edit** to specify more options in another window.

You can set the style:

- To the value of the selected attribute or property type.
- To values from a color spectrum that is based on the selected attribute or property type. For more information, see [Changing the color of items based on a specific range](#) on page 212.
- To values from a lookup table that is based on the selected attribute or property type. [Setting styling based on specific values](#) on page 213
- To a specified value from a threshold or range that is based on the selected attribute or property type. [Setting styles for a range of values](#) on page 214

**Note:** To leave the style unchanged, select **Leave unchanged**.

6. Optional: In the **Options** section, you can specify the behavior of subsequent rules and the styling of items that do not match your rule:
  - **Prevent later rules changing the *chart item style*** - locks the style for items that are matched by the current rule. This locking information is listed in the **Edit Conditional Formatting Specification** window for the current rule.
  - **For *items which don't match the rule*, set the *chart item style to*** - select the behavior of items that do not match the rule:
    - To a specified value:
      - Select **Shown** or **Hidden** to set Visibility.
      - Select **Specified Value** and choose a style setting from the list set Font Style, Enlargement, Icon Frame Margin, Line Width, or Line Strength.
      - Select **Specified Value** and choose a color from the color picker to set shade or icon frame color.
      - Select **Specified Value** and click **Edit** to set an entity or link type.

To leave the style unchanged, select **Leave unchanged**.

7. To save the rule, click **OK**.

New rules are added to the end of the list of rules for the conditional formatting specification.

After you complete a rule, you can continue to add and edit rules until you are ready to apply the specification to the chart. See [Applying a conditional formatting specification](#) on page 207 for details.

## Changing the formatting style based on attribute or property values

If you decide to use an item criteria that uses attribute or property values to distinguish items, you can set a formatting style that uses a color spectrum or scale to display different values based on lookup

tables, thresholds, or ranges. The formatting emphasizes chart items according to the formatting style that is set.

## Changing the color of items based on a specific range

You can use color changes, based on the values of a selected attribute or property to indicate how data falls within a range. You can decide how different values determine which color to use from the color scheme.

Formatting changes can use a color scheme to visualize how data falls within a set range. The first and last colors in the scheme correspond to the lowest and highest or earliest and latest values of a selected attribute or property. Any items with values in between the two limits are then set by using either a linear or logarithmic scale.

**Note:** You can only use a color scheme in a rule whose criteria specify numeric or date and time values.

You can use a color spectrum to change the following styles:

- The dominant shade color of icons, event frames, and theme lines
- The icon frame color of icons and theme lines
- The item type of entities and links.

To specify how the lower and upper limits are set:

1. Follow the instructions in [Creating and editing conditional formatting specifications](#) on page 209 to create or edit a conditional formatting specification.
2. Follow the instructions in [Adding rules to a conditional formatting specification](#) on page 210 to create a rule, and in the **Style will be changed to** section, select **Values from a Color Spectrum based on rule basis**, and click **Edit**.
3. Specify how the lower limit of the scale is set:
  - a) If you select **From chart**, the lower limit is automatically set to the earliest or lowest value of the attribute or property on the chart.
  - b) If you select **Specified value**, enter a number, or date and time. Items with values at or below this value are mapped to the color on the left of the selected scale.
4. Specify how the upper limit of the scale is set:
  - a) If you select **From chart**, the upper limit is automatically set to the latest or highest value on the chart.
  - b) If you select **Specified value**, enter a number, or date and time. Items with values at or above this value are mapped to the color on the right of the selected scale.
5. If you change the link type, icon frame, or entity shade color, choose the type of scale you want to apply to the chart:
  - **Ordered** - A scale that increases in intensity towards one of the ends.
  - **Diverging** - To accentuate data that is at the lower and upper ends of the scale, you can choose to use a scale that either only modifies items that match the lower and upper ends of a scale, or scales that make this data more obvious.
  - **Categories** - For values that can be divided into discrete groups rather than on a particular rising scale, you can use categories to highlight specific bands of data.
  - **Legacy Spectrums** - To match charts that have been created in earlier versions of Analyst's Notebook you can select to use the legacy color scales.
6. Select the specific scale to be applied.

**Tip:** To reverse the scale, select the **Reverse** check box.

- 7. In the **Values of rule basis in between** section, select how color is applied to items with values between the lower and upper limits:
  - **Linear scale** - the values are spaced equally to determine which color is used.
  - **Logarithmic scale** - the spacing between smaller values is greater. This type of scale is useful when your attribute values cover a large range.
- 8. Click **OK** to finish defining the rule.

### Setting styling based on specific values

You can use a lookup table to change the formatting of items based on specific values of an attribute or property. Using a table of values allows you to specify multiple changes to a style in the same rule.

A table of specific conditions, values and formatting changes can be defined for specific attributes and properties.

You can use a table to change the following styles:

- The visibility of entities and links.
- The font style of entities and links.
- The entity or link type of any chart item except labels.
- The enlargement (icon size) of icons, event frames, and theme lines.
- The dominant shade color of icons, event frames, and theme lines.
- The icon frame color or margin size of icons and theme lines.
- The line width of links, event frames, theme lines, boxes, circles, text blocks, and OLE objects.
- The line strength of links, event frames, theme lines, boxes, circles, text blocks, and OLE objects.

To set a formatting style from a lookup table:

1. Follow the instructions in [Creating and editing conditional formatting specifications](#) on page 209 to create or edit a conditional formatting specification.
2. Follow the instructions in [Adding rules to a conditional formatting specification](#) on page 210 to create a rule, and ensure that you have selected an item record property or attribute to base your actions on, and a type of style change that supports lookup table values.
3. In the **Style will be changed to** section, select **Values from a Lookup Table based on rule basis** and click **Edit**.
4. Click **New**. An entry with a default condition and style setting is added.
5. Set a **Condition** and **Value** for the lookup entry:

Option	Description
<b>Contains</b>	Items with an attribute that includes the value.
<b>Doesn't Contain</b>	Items with an attribute that does not contain the value.
<b>Doesn't end with</b>	Items with an attribute that does not end with the value.
<b>Not equal to</b>	Items with an attribute that does not match the value.

Option	Description
<b>Doesn't start with</b>	Items with an attribute that does not start with the value.
<b>Ends with</b>	Items with an attribute that ends with the value.
<b>Equal to</b>	Items with an attribute value that matches the value.
<b>Starts with</b>	Items with an attribute that starts with the value.
<b>Is set</b>	If a property exists in a data record.
<b>Is not set</b>	If a property does not exist in a data record.
<b>Is absent</b>	If an attribute class instance is not present on the chart item.
<b>Is present</b>	If an attribute class instance is present on the chart item.

- Set the style requirement for matching chart items.

**Note:** The requirements that are listed change, based on the rule type.

- Enter additional entries by repeating steps 4 to 6.

**Note:** A chart item style is set according to the first matching entry in the list. Therefore, depending on the type of condition that is used, position more specific lookup table entries at the top of the list.

- Click **OK**.

## Setting styles for a range of values

When you are working with attributes and property types that have values that are chronological or numerical, you can set the style to change based on a specific range. This allows you to emphasize information before, after or between specific values.

You can use a threshold or range to change the following aspects of style:

- The visibility of entities and links.
  - The font style of entities and links.
  - The entity or link type of any chart item except labels.
  - The enlargement (icon size) of icons, event frames, and theme lines.
  - The dominant shade color of icons, event frames, and theme lines.
  - The icon frame color or margin size of icons and theme lines.
  - The line width of links, event frames, theme lines, boxes, circles, text blocks, and OLE objects.
  - The line strength of links, event frames, theme lines, boxes, circles, text blocks, and OLE objects.
- Follow the instructions in [Creating and editing conditional formatting specifications](#) on page 209 to create or edit a conditional formatting specification.
  - Follow the instructions in [Adding rules to a conditional formatting specification](#) on page 210 to create a rule, and ensure that you have selected an item record property or attribute to base your actions on, and a type of style change that supports lookup table values.

- 3. In the **Style will be changed to** section, select **A specified value for a Threshold or Range of rule basis**, and click **Edit**.
- 4. Choose whether to define a threshold, range, or specific value:

Option	Description
<b>Above, Below</b>	Define a threshold by using a number value.
<b>After, Before</b>	Define a threshold by using a date & time value.
<b>Equal to</b>	Define a specific value.
<b>Between</b>	Define a range.

- 5. Enter numbers in the edit boxes for a numeric attribute value. Alternatively use the date and time picker to specify dates and times for a date & time attribute.
- 6. Optional: Specify that the values you entered are included in the range or threshold by selecting the **Inclusive** checkboxes.
- 7. Select the style change that you want to apply to the chart by selecting an option.
  - Select **Shown** or **Hidden** to set Visibility.
  - Select **Specified Value** and choose a style setting from the list to set Font Style, Enlargement, Icon Frame Margin, Line Width, or Line Strength.
  - Select **Specified Value** and choose a color to set Shade or Icon Frame Color.
  - Select **Specified Value** and click **Edit** to set an entity or link type.
  - Select **Leave unchanged** if you do not want to change the style of items that match the condition.
- 8. Click **OK** to finish defining the rule.

### Using a conditional formatting style rule to change entity or link type

When items are added to a chart, depending on the available charting schemes, you might find that the items have been classified as a different item type to that which you expect. You can change conditional formatting rules to modify the item type of specific items on your chart.

The type of item that is used to describe data can be important for later analysis. You can modify the type of item using conditional formatting.

**Note:** Using conditional formatting to change the type of an item will only apply to items on the chart surface, these changes are not reflected in records.

To specify a type:

- 1. Follow the instructions in [Creating and editing conditional formatting specifications](#) on page 209 to create or edit a conditional formatting specification.
- 2. In the **Style to be changed** section, select **Type**, then in the **Style will be changed to** section, select **Specified value** and click **Edit**.
- 3. From the **Palette** list, select the user palette that contains the required entity or link type.
- 4. From the **Type** list, select an entity or link type.
- 5. Click **OK** to finish defining the rule.

## Importing a conditional formatting rule

You can copy rules from a conditional formatting specification into the specification you are currently defining. All specifications in your `Local` and `Workgroup` folders are listed in the top half of the Conditional Formatting pane.

To import a rule:

1. To open the Conditional Formatting Specifications window, click the **Style** tab, and then click **Conditional Formatting > Saved Specifications**.
2. Click **Format with new specification**, or select an existing specification and click **Edit** to show the **Edit Conditional Formatting Specification** window.
3. Click **Import**.
4. Locate and select the specification that you want to import from.

All rules in a selected specification are listed in the bottom half of the window.

5. Select the rules that you want to import by selecting the relevant check boxes.
6. Click **Import**.

The selected rules are copied to the **Edit Conditional Formatting Specification** window.

## Managing conditional formatting specifications

The **Conditional Formatting Specifications** window can be used to create a specification, apply an existing specification to the chart, and edit, rename, duplicate, or delete it. You can also manage where your specifications are saved by specifying folder locations, and copy specifications between folders, and browse your specifications in Windows Explorer.

To open the Conditional Formatting pane, click the **Style** tab, and then click **Conditional Formatting > Saved Specifications**.

## Copying specifications between local and workgroup folders

You can copy conditional formatting specifications between folders so that others can use them. For example, you can share the specification with other members of your workgroup, or copy it to a local folder.

You must configure a workgroup folder.

Right-click the specification, and from the menu, select **Copy to Workgroup Folder**. The specification is copied to your `Workgroup` folder.

**Tip:** To make a local copy of a workgroup specification, right-click the specification, and from the menu, select **Copy to Local Folder**.

## Changing the location of local and workgroup folders

You can specify where your conditional formatting specifications are saved. You might want to save your specification locally on your computer, or a shared folder.

A `Local` folder holds specifications that only you have access to. A `Workgroup` folder can hold specifications that are shared by other users.

Any specifications that are held in subfolders of the `Local` and `Workgroup` folders are also listed in the Conditional Formatting Specifications window. You can group specifications by folder.

The `Local` folder is typically set to `My Documents\i2\i2 Analyst's Notebook 8\Conditional Formatting Specifications`. The `Workgroup` folder is not set by default.



To change the location of your `Local` or `Workgroup` folders:

1. To open the Conditional Formatting pane, click the **Style** tab, and then click **Conditional Formatting > Saved Specifications**.
2. In the Other Tasks area, click **Change Local Folder** or **Change Workgroup Folder** to show the **Browse For Folder** window.
3. Select a folder or click **Make New Folder**.
4. Click **OK** to set the new folder location.

## Installing the example material

Example specifications are available so that you can update the appearance of your chart by using common item characteristics. Although these examples are installed by default, you can opt to reinstall the examples to remove any customizations you might have made.

To install the example specifications:

1. To open the Conditional Formatting pane, click the **Style** tab, and then click **Conditional Formatting > Saved Specifications**.
2. Click **Install example material**.

The example specifications are shown in the list of conditional formatting specifications.

## Live formatting

Live formatting in Analyst's Notebook changes the appearance of chart items, by applying conditional formatting specifications in real time.

Live formatting extends the capabilities of conditional formatting if your chart items contain i2 Analyze records. You can run specifications automatically when i2 Analyze records are changed, added, or deleted from the chart. The styles of items change to reflect the changing data. You need suitable conditional formatting specifications defined before you can set up live formatting and not all specifications are compatible, depending on your schema. Analyst's Notebook guides you to information about rules and how they might affect the chart, as you work through the setup process. When you run live formatting, changes are applied immediately unless the specification is incompatible.

The **live formatting** command is located in the **record** bar and is always visible. As you continue to work with your chart, live formatting can be stopped, edited, restarted, or reset by using a drop-down menu of commands.

## Setting up live formatting

When you set up live formatting, you specify which conditional formatting specifications Analyst's Notebook uses when live formatting is started, the order they run in, and what other formatting to override.

You must have access to suitable conditional formatting specifications before you can set up live formatting. You can create and edit specifications for your own use or to share with your workgroup. For more information, see [Creating and editing conditional formatting specifications](#). Live formatting applies style rules that are created as conditional formatting specifications, to items that meet the criteria you specify.

1. Click **Live Formatting > Set Up** to open the **Live Formatting Set Up** window.
2. Select one or more specifications from the **Available specifications** list and move them to the **Selected specifications** list by clicking the right arrow icon. If you see an information or warning

icon next to a specification, hover your mouse pointer over the icon to display the message. For more information about these icons, see [Live formatting system messages](#) on page 219.

3. Use the **Up** and **Down** commands to change the order that the specifications run. The order of specifications is significant as they run sequentially from the top of the list. Rules set further down the list might affect the specifications that you selected to run first.
4. Optional: You can override existing style changes and reset the items already on the chart to their default style. Click the **Reset all chart items to their default appearance before running specifications** check box.  
Chart items are reset to the appearance defined by your schema.

**Note:** If you use the **Stop and Reset Formatting** command, your chart items are reset to the appearance defined by your schema and not to any style changes that you applied previously.

Live formatting starts even if your chart surface is empty. The circle icon in the **record bar** changes color to orange to indicate that live formatting is running. You can see a summary of your selections by hovering your mouse pointer over the **Live Formatting** command. Live formatting continues to run until you select **Stop** or **Stop and Reset Formatting**.

## Defining a default set of specifications

You can save a set of conditional formatting specifications to use as your default list for running live formatting. This is useful if you regularly need to run the same specifications.

Ensure the conditional formatting specifications that you want to use in your default list are compatible with live formatting and are saved in your workgroup or local folder. For more information about compatibility, see [Live formatting system messages](#) on page 219.

You can save one set of default specifications. If you make changes and save the list as your new default, it overwrites the previous version.

1. Follow the instructions in [Setting up live formatting](#) on page 217 to select your specifications.
2. Click **Live Formatting > Save Current Settings as Defaults**.  
The list that you selected in **Live Formatting Setup** is saved as your default list.
3. If you make further changes to live formatting and want to restore your saved list, click **Live Formatting > Use Default Specifications**.
4. When you open a new or existing chart, click **Live Formatting > Use Default Specifications** if you want to run your saved list as the live formatting setup.

## Effects of live formatting

When live formatting runs, it impacts appearance settings and can override some style changes that you make in Analyst's Notebook. You can work with live formatting effectively by understanding the impact on other functions.

The default appearance of chart items is defined by your schema. You can reset all chart items to their default setting during live formatting setup. This clears any existing manual or conditional changes applied to chart items before you run live specifications.

When you run live formatting, the changes are immediate. At any point after starting live formatting, you can click **Stop and Reset Formatting** to return items to their default appearance.

If you add new i2 Analyze records, or expand records while live formatting is running, the specifications are applied to those items. If you stop formatting and add new items, the changes occur as soon as you start formatting again.

Live formatting overrides manual style changes if you apply them to any item that is modified by a conditional formatting specification. If you make manual changes from the **Style** tab, the affected chart items revert to the style specified by live formatting when it runs next.

When you copy altered entities and links onto a new chart, they retain their appearance. The style change that is invoked by formatting specifications persists unless you choose a different style or reset the style to default settings.




You cannot stop and start live formatting by clicking **Undo** or **Redo**. While you might restore or apply style changes through these actions, they are overridden as soon as you add or expand another record. You have more control over formatting by using specifications and the live formatting commands.

## Live formatting system messages

Not all conditional formatting specifications are compatible with live formatting. Analyst's Notebook provides information about specifications that need modifying and why some selections do not affect the chart appearance.

### Information and warnings

When you have available specifications listed in the **Live Formatting Setup** and no icon is displayed, the specification is compatible with live formatting. If there is an icon next to the specification, you can see the full message by hovering your mouse pointer over the icon.

Icon	Description
	When this icon appears next to available specifications in <b>Live Formatting Setup</b> , it means that if you select the specification it will not run. You can find out specifically why by reading the tooltip. When this icon appears next to selected specifications, it has a different purpose and points to rules in the specification that might not alter the chart in the expected way.
	If you select a specification that has an information icon and move it into the selected list, the icon changes to a warning triangle. The detailed warning tells you about changes that are not supported by live formatting and the actions you need to take if you want the specification to run.
	This icon only appears in the selected specifications list. It notifies you that a selected specification has been moved or deleted from your workgroup or local folder.

## Social Network Analysis

You can examine group structures and communication flows within a network chart by focusing on the relationships that exist between entities. This type of analysis is called social network analysis.

Organizational theories are combined with mathematical models to help you understand the dynamics of groups and organizations in which you are interested.

The structure of a network can determine:

- The performance of the network as a whole and its ability to achieve its key goals.
- Characteristics of the network that are not immediately obvious, such as the existence of a smaller subnetwork operating within the network.
- The relationships between prominent people of interest whose position might provide the greatest influence over the rest of the network.
- How directly and quickly information flows between people in different parts of the network.

## Centrality and centrality measures

A highly centralized network is dominated by one person who controls information flow. A less centralized network has no single point of failure. People can still pass on information even if some communication channels are blocked.

Analyst's Notebook calculates betweenness, closeness, degree, and eigenvector centrality measures to provide different perspectives on the social relationships within the network. You can also influence the centrality measures by taking into account the direction of links and the weightings that are applied to them.

### Betweenness

Betweenness centrality measures the number of paths that pass through each entity.

This measure might identify entities with the ability to control information flow between different parts of the network. These entities are called gatekeeper entities. Gatekeepers might have many paths that run through them that allows them to channel information to most of the others in the network. Alternatively, they might have few paths that run through them, but still play a powerful communication role if they exist between different network clusters.

Closeness centrality measures both direct and indirect closeness:

- Direct closeness is when two entities are connected by a link.
- Indirect closeness exists when information can pass only from one entity to another by way of a path that runs through one or more entities.

### Link betweenness

Link betweenness centrality measures the number of paths that pass through each link.

This measure can help to identify key connections of influence within the network. A link through which many paths pass might be a route for information exchange between entities.

### Closeness

Closeness centrality measures the proximity of an entity to the other entities in the social network.

An entity with a high measure of closeness centrality has the shortest paths to the other entities. This measure allows them to pass on, and receive communications more quickly than anybody else in the organization. Information travels further to and from an entity on the edge of a network that is attached to few other entities. They have a lower measure of closeness centrality.

## Degree

Degree centrality measures how connected an entity is by counting the number of direct links each entity has to others in the network.

This centrality measure can reveal how much activity is going on and who are its most active members.

## Eigenvector

Eigenvector measures how connected an entity is and how much direct influence it might have over other connected entities in the network.

The eigenvector scores of the entities it is connected to, is considered. For example, a person with a high eigenvector score is likely to be at the center of a cluster of key entities that themselves have high eigenvector scores. That person can communicate directly with those key entities compared with a person with a low eigenvector score on the periphery of the network.

Hubs and authorities are the terms that are used to describe the two eigenvector scores that are calculated in networks that contain directed links. Hubs see the scores for outbound links, and authorities see the scores for inbound links. A high-scoring hub has many outbound links to high-scoring authorities, and a high-scoring authority has many inbound links from high-scoring hubs.

## Link direction

Directed links can be considered as centrality measures. A link with arrows added to it represents the directed flow of information between entities; either in a single direction or in both directions. This measure might have an important bearing on how quickly information is passed from one part of the network to another. For example, a person might receive information from many others in the network but send information only to a select few. The centrality measures for an entity where information is channeled in both directions is higher than the measures for an entity through which information is channeled one way.

## Link weightings

Not all relationships in a network are equal. For example, the link between two people, that are connected through a family relationship might be stronger than a link between two business associates.

These links can be weighted so that they represent real-world strengths in social network analysis. Weighting key paths in the network might also infer that the entities by using them to channel information have key roles to play. For this reason, centrality measure results are affected by link weightings.

## K-Core

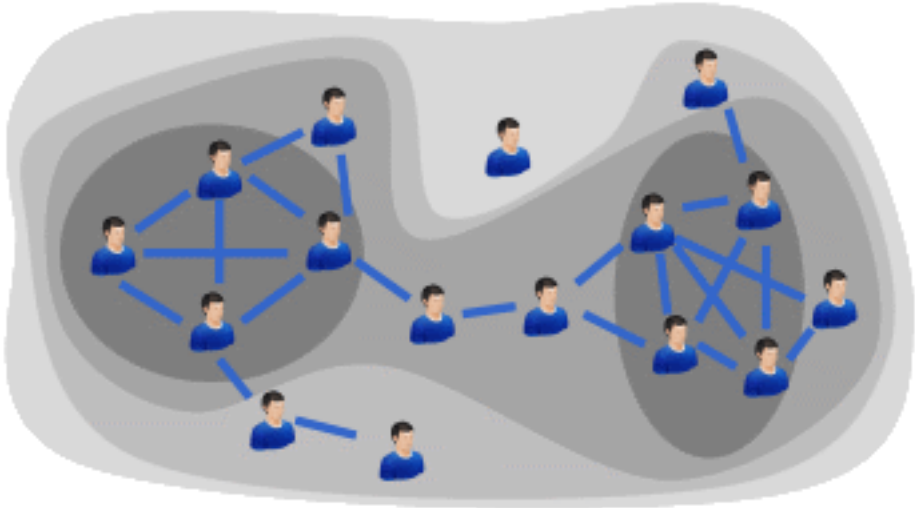
Coreness is a measure that can help identify tightly interlinked groups within a network. A k-core is a maximal group of entities, all of which are connected to at least  $k$  other entities in the group.

K-Core is a measure that can help identify small interlinked core areas on a network. To be included in the K-Core, an entity must be linked to at least  $k$  other entities in the group. The linked entities are regardless of how many other entities that they are connected to outside of the group. Maximal in the definition means that we are interested in the largest set of entities with the required minimum number of neighbors within the group. The value of  $k$  is sometimes referred to as the coreness of the group.

For example, a group is the two-core if it contains all entities that are connected to at least two other entities within the group. Similarly, a group is the three-core if it contains all entities that are linked to at least three other entities within the group.

Any entity in the three-core must have at least three links to all other members of the three-core. Clearly any such entity must necessarily have at least two links to every other member of the three-core. Put another way, the three-core is a subset (is contained within) the two-core. More generally, the K-Core form a nested hierarchy of entity groupings on the chart. The zero-core (entire chart) contains the one-core, which contains the two-core, which contains the three-core, and so on. As *k* increases, the core sizes decrease, but the cores become more interlinked. The K-Cores with the biggest coreness values (*k*-values) represent the most cohesive regions of the chart.

The following diagram illustrates the K-Core decomposition of a simple network, and shows a nested collection of zero, one, two and three-cores. Notice that the three-core actually consists of two separate groupings on the chart. Technically these groupings are regarded as a single three-core with two components.



### Setting clustering and centrality measures

Changing the centrality measure that is used to analyze a chart provides different information about your chart items.

To change the centrality measure:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Social Network Analysis**. The **Social Network Analysis** pane opens.
2. Click the **Options** tab.
3. Optional: In the Clustering section, select the **K-Core** checkbox to identify clusters of linked items.
4. In the Centrality section, select the check box for the measures that you want to calculate:

Option	Description
<b>Betweenness</b>	To find gatekeeper entities that might control information flow. This checkbox is selected by default. If betweenness is selected, you can also select <b>Betweenness for Links</b> to find links that might be the most influential connections in the network.

Option	Description
<b>Closeness</b>	To find entities that might access the rest of the network more quickly than others.
<b>Degree</b>	To find the entities with the highest number of direct links to other entities in the network.
<b>Eigenvector</b>	To find the entities with direct links to the most influential entities in the network.

**Note:** At least one check box must be selected for analysis to take place.

- Select the **Use Link Directions** checkbox if you want to take directed links into consideration when you calculate centrality measures. If arrows are not displayed on a link, it is assumed that information flows in both directions.
- Optional: Leave the **Enhanced Analysis** option selected to use the advanced mathematical algorithms to calculate results. If your chart contains several unconnected networks, or directed links that block paths between certain entities, Analyst's Notebook takes unconnected networks, or directed links into account and adjusts the calculations. The results reflect the relative importance of these entities and paths to those entities and links in the entire chart.

**Note:** The only time that you clear the **Enhanced Analysis** option is if it is important that you do not use the mathematical algorithms that are supported in Analyst's Notebook.

For example, to maintain a consistent set of results. No adjustment is made to take into account directed links that block paths between entities. The results that are calculated for separate unconnected networks reflect the relative importance of the entities within each network. The links are not relative to the entities on the chart.

- Normalize Results** to adjust the calculations and display them as percentages in the Results table. If you clear this option, no adjustment is made to the calculations and results are displayed as raw data. Normalizing the results makes it easier to compare the centrality results of items in different networks and charts. Click **Advanced Options** and choose between two different methods of adjustment. The adjustment applies to all the selected centrality measures:

Option	Description
<b>Use the standard method</b>	Results are calculated and then divided by what, in theory, is the highest possible result for each centrality measure. They are then expressed as percentages in the Results table. This method is the standard normalization method that is most commonly used in social network analysis.
<b>Normalize results relative to the maximum value</b>	Results are calculated and the highest result or actual maximum for each centrality measure is determined. This value is displayed as 100% in the Results table. Every other value is divided by the actual maximum and displayed as percentages relative to 100% in the Results table.

**Note:** The **Normalize Results** option is not available if you cleared the **Enhanced Analysis** option. Your results are calculated and adjusted by using the methods that are supported in Analyst's Notebook.

8. Use the Actions on Completion section to specify:
  - a) Whether the results are displayed on your chart by selecting **Show Results on Chart**
  - b) Whether the appearance of chart items changes based on the analysis by selecting **Apply Conditional Formatting**.

## Selecting centrality measures

The **Options** page is used to select centrality measures and specify how the results are displayed.

To select a centrality measure and specify how results are displayed:

1. Click the **Analyze** tab, and then in the **Gain Insight** group, click **Social Network Analysis**.  
The **Social Network Analysis** pane opens.
2. Click the **Options** tab.
3. Select the centrality measure that you want to calculate.  
You can choose to calculate betweenness for entities and links, closeness, degree, and eigenvector, and take into account the direction of links. You can also carry out enhanced analysis and normalize your results
4. Select how the results are displayed when calculations are complete.  
You can choose to show results and weightings as chart item attributes, and apply conditional formatting to them.

When the **Options** page is complete, use the **Weightings** page to set link weightings. Or use the **Results** page to calculate and analyze your results.

## Adding link weightings

Use the **Weightings** page to set weightings on links to represent the real-world strengths of connections between entities. Weightings are added to links as attribute values. You can set weightings manually, base them on existing custom attributes, and import them from a weightings file.

In the **Social Network Analysis** pane, click the **Weightings** tab. Select the **Use Link Weightings** checkbox.

The weightings are added to links as attributes with the following methods in order of priority:

### Setting link weightings manually

You can select links and add weighting attributes to them manually.

To manually add a weightings value:

1. Select the links to which you want to add weighting attributes.  
The same weighting attribute value is applied to all links selected.
2. Select the **Manually Set Value** check box.
3. In the text box, enter the numeric weighting attribute value, and then click **Set Weighting for Selection to**. An attribute with the class name Manual Weighting and the manually set value is added to the selected links.

### Weightings files

Use the details stored in a separate file with the special file format `.xwgt` to add link weightings to links based on link type or label text.

You create a file or import an existing one. Weighting values can be applied to:



- Links of a certain type, for example Associate links
- Links with a certain value, for example, links labeled "Brother Of"

To use a weightings file, select the **From a Weightings File** check box.

## Edit current weightings

A weightings value is shown on link to represent the real-world strengths of connections between entities. Once a file is created, this can be edited to allow changes.

To edit the weightings in use:

1. Click **Edit File**. The **Edit Weightings** window is shown.
  - To add or import new weightings, use the methods that describe how to create a weightings file.
  - To edit an existing weighting, select the weighting column entry and enter a new numerical weighting value.
  - To delete a weighting, select a row and click **Delete**.
2. Click **OK**.

## Create a weightings file

A weightings value is shown on links to represent the real-world strengths of connections between entities. You can create weightings that are based on the link types or link labels that exist on the chart.

To create a weightings file:

1. Click **Create a New File** to show the **Edit Weightings** window.
2. Optional: To create a weighting that is based on link type, select **Link Type** and then click **New** to enter edit mode. Enter the link type and numeric weighting value in the relevant columns and click **OK**. You can create a weighting that is based on link label with the same method.
3. Optional: To import weightings from an existing `.csv` file. Click **Import** and use the **Select Import File** window to browse to and select the file, and then click **Open**. Details from the `.csv` file are added to the **Weightings** window.
4. Optional: To add weighting that is based on link labels, select **Link Label** and then click **Add from Chart**. The Weightings table is populated with a list of the link labels and weightings that exist on the chart. By default, links that did not have a weighting value on the chart have a weighting value of one in the table. You can update this value manually if necessary.
5. Click **OK**.

## Importing existing weightings

A weightings value is shown on a link to represent the real-world strengths of connections between entities. If you already created a weightings file, it can be imported for use in other charts.

To import an existing weighting file:

1. Click **Select a File**, the **Select a Weightings File** window is shown.
2. Use the **Look in** list to go to and select the `.xwgt` file that you want to use, and then click **Open**.

The file path for the weightings file currently in use is displayed.

## Use link label values

You can select links based on the values in link labels that currently exist on the chart and use their link label values as weightings.

These weighting values can influence the centrality measure results for your social network analysis.

- Select the **Link Label Value** check box.

## Working with the Results page

The **Social Network Analysis** page is used to calculate and specify how results are displayed.

Use the **Results** page to:

- Calculate the centrality measures you selected in the **Options** page
- Display and analyze results in the Results table and on the chart
- Analyze results further by using the commands in the Actions Pane.

The **Calculate** command label displays the centrality measures currently selected on the **Options** page.

Click **Calculate** to start generating the social network analysis results. Progress is displayed in the status bar.

It takes Analyst's Notebook longer to calculate results for large charts. The length of time depends on the number of items in the chart and the number of centrality measures that need calculating. If a lengthy calculation is taking place, the chart is unavailable but you can still work with other charts while the calculation runs in the background. The chart must remain open for background calculations to take place; closing the chart cancels the calculation. The tab of a chart displays a progress wheel to show that a calculation is taking place. Progress of each centrality measure calculation is displayed in the **Results** page and can be canceled individually at any time. If the chart is not displayed when the calculation is complete, the tab of the chart starts flashing.

When results are calculated, they are displayed in the Results table and added to the chart items as attributes. A separate attribute class is created for each centrality measure. You can display these attributes on the chart by using commands in the **Action** panel. You can also display the attributes in the attribute classes table of the Attribute instances page. These attributes are displayed in the attribute classes table in yellow shading to show that they were added automatically by Analyst's Notebook.

If link weightings are used, an attribute that is called weightings is automatically added to links after calculation.

## Results table columns

The Results table automatically displays results when the calculation is complete. Results for entities and links are displayed in different tables, with the entity Results table displayed by default. The format of the displayed results might be the actual numbers that are calculated or the values that are adjusted and expressed as percentages. These results depend on the Enhanced Analysis and Normalization options that are selected in the **Options** page.

The available columns for the entity Results table are as follows (default columns are marked with \*):

Column heading	Column contents
Entity*	The entity icon followed by the label.

Column heading	Column contents
Betweenness	<p>A value that represents how many of the shortest paths pass through each entity. An entity with the lowest betweenness value has the lowest number of shortest paths that run through it compared with the other entities in the network. If</p> <p><b>Use Link Direction</b> is selected in the <b>Options</b> page, the arrow direction determines which paths can be measured between entities.</p> <p>Authorities (In) and Hubs (Out) do not have separate columns for betweenness results because the number of directed inbound paths are identical to the number of directed outbound paths if the arrows are reversed. The same connecting paths are used for the betweenness calculation regardless of direction.</p>
Closeness	<p>A value that represents how close each entity is to the others in the network. For example, an entity with the highest closeness value has the shortest paths to most other entities in the network. If <b>Use Link Direction</b> is selected in the <b>Options</b> page, the closeness result is displayed in two separate columns:</p> <ul style="list-style-type: none"> <li>• Closeness (In): how close an entity is based on the number of inbound paths</li> <li>• Closeness (Out): how close an entity is based on the number of outbound paths</li> </ul>
Degree	<p>The number of links between an entity to others in the network. If <b>Use Link Direction</b> is selected in the <b>Options</b> page, the degree result is displayed in two separate columns:</p> <ul style="list-style-type: none"> <li>• Degree (In): the total number of inbound links</li> <li>• Degree (Out): the total number of outbound links</li> </ul> <p>The degree of a result is affected if the links that connect it are weighted. Examples:</p> <ul style="list-style-type: none"> <li>• A link with a weighting of four is classed as four times more important than a link without a weighting. It counts as four links, whereas a link without an assigned weighting counts as one by default.</li> <li>• An entity that is connected by two links has a degree of five, if one link has no weighting and the other has a weighting of four.</li> </ul>

Column heading	Column contents
Eigenvector	<p>A value that represents how connected an entity is based on its direct links to the other influential entities in the network. An entity with the highest eigenvector score is directly connected to many other entities with high eigenvector scores. If <b>Use Link Direction</b> is selected in the <b>Options</b> page, two eigenvector results are calculated and displayed in two separate columns:</p> <ul style="list-style-type: none"> <li>• Authority (In): how connected an entity is based on its inbound links</li> <li>• Hub (Out): how connected an entity is based on its outbound links</li> </ul> <p>An eigenvector score is affected if the links that connect to other entities are weighted. For example, a link weighting of three means that the link is treated as three times more important than a link with no weighting.</p> <p>Note: Hub and authority results cannot be calculated for charts that contain certain configurations of entities and links. In such instances, a warning message is displayed. You might be able to calculate hub and authority results if you change your configuration, or edit your link weightings.</p>
K-Core	<p>A value that can help identify small interlinked core areas on a network. An entity with the highest K-Core is directly connected to many other entities with high K-Cores. The K-Core score of an entity is affected if the links that connect it to other entities are weighted. For example, a link weighting of three means that the link is treated as three times more important than a link with no weighting.</p>

To display results for links, select Links. The available columns are as follows (default columns are marked with \*):

Column heading	Column contents
Link*	<p>The link icon followed by a summary of the link in the format:</p> <p>Entity A label &gt; link label &gt; Entity B label</p>

Column heading	Column contents
Betweenness	A value that represents how many of the shortest paths pass through each link. A link with the highest betweenness value has the highest number of paths that run through it compared with the other links in the network.
Weightings	The weighting value that is assigned to each link.

## Commands to process results

Use the commands at the bottom of the **Results** page to specify what you want to do with your social network analysis results.

- **Show Results on Chart** to display the results as attributes of the entities and links on the chart. If you previously chose to show weightings and results on the chart in the **Actions on Completion** panel of the **Options** page, the results are displayed on the chart automatically.
- **Hide Results on Chart** to hide the results that are currently displayed as attributes of the entities and links on the chart.
- **Clear Results** to delete results from both the chart and the Results table.
- **Select Items with Top Values** to select the top 10 items based on their values for the measure that the results table is sorted by. If there are multiple items with the same value as the 10th item, they are also selected.
- **Hide Unselected** to hide the entities or links that are not selected in the Results table.
- **Show All** to display the entities or links that were hidden previously by selecting the **Hide Unselected** command.
- **List Items** to display the contents of the Results table in the **List Items** window. If subsets of results are hidden or cleared, those results are displayed in List Items.
- **Copy Results Table** to copy the column headings and contents of the Results table to Windows Clipboard. If a subset of results is hidden or cleared, those results are not copied.

## Focus on items of interest

To focus your analysis and visualization on items of interest, you can select them on the charting surface then remove all other items from view. Or to focus on the selection later, you can save it in a selection set, then recall the selection when you need it.

Ten selection sets are available. You might save different groups of items to different selection sets. For example, the results of different searches of your chart.

You can recall the selection that is saved in a selection set. To gather all items of interest for focused analysis, you can add the members of each selection set to the current selection.

To focus your analysis or visualization exclusively on the items of interest, you can copy the selected items to a new chart. The new chart does not contain any other items from the original source chart.

## Hiding chart items

If you are working on a complex chart, you might want to show or hide subsets of the data. Hiding chart items is useful if you want to emphasize areas of your chart or temporarily remove data that is irrelevant or inappropriate for certain audiences.

Analyst's Notebook typically treats hidden items as if they do not exist on the chart:

- Hidden items are not included in any selection, for example **Select All**.
- All links to a hidden entity are also hidden.
- Hidden items are unaffected by chart operations, for example layouts.
- Hidden diverted event frames do not cause the theme line to which they are linked to be diverted.
- Hidden items are only listed in the **List Items** and **List Cards** windows when the **Hidden Items** option is selected.

Hidden items are removed from view, but are not deleted, so you can reveal them on the chart when required. Revealing hidden items causes them to become visible temporarily, but they retain their hidden status. You can make items fully visible or visible with a grayed out appearance by using the **Reveal** options on the **View** tab. To remove hidden item status, you must show the items rather than reveal them.

For some chart operations, for example Visual Search, you can choose to include hidden items and reveal them as part of the operation by selecting **Reveal Hidden** in the appropriate window.

**Note:** Analysis attributes consider hidden items regardless of their reveal hidden status. For example, if an entity is linked to one visible entity and one hidden entity, the value for its Entity Links analysis attribute is always 2.

To hide items on your chart:

1. Select the items that you want to hide.  
The selection might be the result of an analysis operation, such as Find Text, Find Path, or Visual Search, or as a result of making a selection such as in List Items or List Cards.
2. Click the **View** tab.
3. If **Reveal Fully** or **Reveal in Gray** is selected, you must clear it. In the **Show and Hide Items** group, click **Reveal**.
4. To hide all selected items, in the **Show and Hide Items** group, click **Hide Selected**.

To hide all items that are not selected, in the **Show and Hide Items** group, click **Hide Unselected**.

To hide items, based on criteria that you specify:

- a) In the **Show and Hide Items** group, click **Show and Hide**.  
The **Show and Hide** window opens.
- b) Select an option, then click **Hide**.

Option	Description
<b>All</b>	Hide all chart items.
<b>Selected</b>	Hide selected chart items only.
<b>Unselected</b>	Hide only chart items that are not selected.
<b>With Any of the Attributes</b>	Hide all chart items that have attributes of any attribute class that you select in the list. Use

Option	Description
	the Ctrl or Shift keys to select more than one attribute class. All attributes that are used on the chart are listed.

If hidden items exist on your chart, you can choose to show hidden items that meet the specified criteria by selecting an option and clicking **Show**.

## Removing hidden items from a chart

If you publish or share a chart, any items that you want to conceal must be deleted. Hiding items does not prevent others from viewing them by using the Reveal operations.

To delete all hidden items:

1. You might want to save a copy of your original chart before you delete all of the hidden items to publish it.
2. Ensure that all hidden chart items are fully hidden on your chart (not visible). If **Reveal Fully** or **Reveal in Gray** is selected, click the **View** tab and in the **Show and Hide Items** group, click **Reveal**.
3. Press Ctrl+A to select all the visible items. Then, on the **View** tab, in the **Show and Hide Items** group, click **Reveal > Reveal Fully**.  
All of the hidden items are revealed but not selected.
4. Click the **Select** tab and in the **Select Items** group, click **Invert**.  
All previously selected items are unselected and the hidden items that were revealed are now selected.
5. Press the Delete key to delete the previously hidden items that are now displayed and selected.

## Copy items to a new chart

To focus on items of interest or to change the emphasis of your analysis, you can copy selected items to a new chart. To view the items from a different perspective, you can copy them to an association chart or to a timeline chart.

For example, during your analysis you might investigate activity over time, which results in a histogram with a large amount of activity in one particular time period. Selecting the period of interest in the histogram selects the relevant chart items that you can then copy to a new chart for further investigation.

The copy to new chart features are on the **Analyze** tab. When you copy items to a new chart, the new chart is based on the original chart that you copied the items from. Basing your new chart on the original chart avoids issues such as differing grading systems, and means that appropriate entity types, link types, palettes, and so on, are available for you to continue working.

You can copy only selected items, or include the direct links between the selected items. To include direct links, even if they are not selected, use the **with Connections** version of the relevant option. For example, after you select telephones on a chart, to copy the telephones and the calls between them, use **Copy to New Chart with Connections**.

If you select a link to copy to a new chart, the entities at each end of the link are also copied, even if they are not selected.

**Note:** If hidden items are selected as part of your analysis, they are also copied to a new chart. They retain their hidden status but are revealed in gray.

## Copy to New Chart

During your analysis, you might identify a set of chart items that you want to focus on specifically. For example, you might want to gather further information about particular people and add this new information to a different chart. Alternatively, you might want to concentrate your analysis on a subset of your original chart.

When you use the Copy to New Chart feature, the entity representations remain unchanged and the chart items remain in the same position relative to each other.

**Tip:** If you copy items that are spread across a large chart, you might want to arrange the chart items automatically in a more convenient layout. To rearrange chart items automatically, select the **Copy to New Association Chart** or **Copy to New Timeline Chart** feature that corresponds to your chart. The chart perspective does not change, but the items are automatically rearranged on the new chart.

## Copy to New Association Chart

If you have a timeline chart, you might identify a set of chart items that you want to focus on from a network perspective. You can copy the selected items to an association chart. For example, during your timeline analysis, you might identify a group of individuals and want to look at the relationships and associations between them.

When you copy items to a new association chart, on the destination chart:

- Any entities that have a representation of theme line are changed to icons.
- Controlling status is removed from any items that were set to be controlling. Their status is set to free.
- Any groups around items are removed and the chart items are arranged in a layout appropriate to network analysis.
- Display and printing of the time bar is turned off.

**Note:** If you select all of the items on the new association chart and copy them to a new timeline chart, previous settings such as controlling status are not restored.

## Copy to New Timeline Chart

If you are analyzing from a network perspective, you might decide that you want to look at the same set of data or a subset of that data from a timeline perspective.

This feature is useful if you are working with an association chart that contains many links between pairs of entities where each link is displayed individually - that is, with a multiple connection style. For example, there might be many transactions between two bank accounts with each transaction displayed as a separate link.

When you copy items to a new timeline chart, on the destination chart:

- All entity representations are changed to theme lines, except for:
  - Entities with a representation of event frame
  - Labels
  - Entities that have data in their date and time properties and have a semantic type that is derived from the Event semantic type
- The following chart items are set to controlling when they have data in their date and time properties:
  - Event frames



- Links between theme lines
- Entities that have a semantic type that is derived from the Event semantic type
- Any groups are removed
- The chart items are arranged in a layout appropriate to timeline analysis
- Display and printing of the time bar is turned on

**Note:** If none of the items that you try to copy to a new timeline chart has populated date and time properties, Analyst's Notebook displays a warning that arranging them in a timeline isn't possible. This situation commonly occurs when chart items contain i2 Analyze records, because the charting scheme must be configured to populate the *item* properties from date and time properties in the *records*.

To enable timeline analysis in these circumstances, ask your system administrator to use [Schema Designer](#) to make changes to the charting scheme on the i2 Analyze server.

## Modify item appearance

After you add an item to the charting surface, you can modify its appearance from the default style that is specified by the chart. You can emphasize items on the charting surface, and present only the most crucial data on the charting surface.

To emphasize an item, you might add an icon frame, increase the size of the item, or add a bold or italic style to the item text.

To present only the most crucial item data on the charting surface, you can select which properties are displayed. For example, you can choose to display only grades, source type, and the value of specific attributes.

To remove irrelevant or less important data from view, you might hide those chart items. To place a lower emphasis on those items instead of removing them, you can reveal the hidden items in gray.

## Displaying icon frames

You can add a colored frame around the border of entities that are represented by icons, including the icons on theme lines. If a picture is displayed on the entity instead of an icon, the frame is added to the picture in the same way.

Circular frames are created around icons and theme line icons; square or rectangular frames are created around pictures. Frames can be used to draw attention to key entities. Frames can highlight groups of entities and change the appearance of entities that are selected by using analysis tools such as filtering or Social Network Analysis. Frames can also indicate entities with shared attributes as a result of applying conditional formatting.

To add an icon frame to your selection:

1. Right-click an item, and select **Edit Item Properties**.  
The **Edit** window is shown.
2. Select **Style > Frame**.
3. Select **Display a Frame**. The Preview area contains an example of how the framed icon looks on the chart. The frame that is created is shaded blue with a margin width of two.
4. To change the color, select a color from the Color bar.
5. To change the width of the frame around the icon, select an option from the Margin bar.
6. Optional: Select **Set Default Style** to use the current settings as the default for the entity representation.

7. When you are happy with the icon frame that is shown in the Preview area, click **OK**

**Tip:** To remove an icon frame from the selected entity, clear the **Display a Frame** check box and click **OK**.

## Setting the font

You can set the font type, size, style, color, and the shading style of the text on the chart.

To set the font on an item:

1. Right-click an item, and select **Edit Item Properties**. The **Edit** window is shown.
2. Select **Style > Font**.
3. Select a font to use in the Font area.
4. Select the style of the font in the Font Style area.  
For example, you might want to show the font in bold, or italic.
5. Select the size of the font in the Size area.
6. Choose the font effects to use in the Effects area.
7. Set the font color by selecting a color from the Color list.
8. Set the shading style by selecting a shading style from the Shading list.
9. Optional: Select **Set Default Style** to use the current settings as the default for the link or particular entity representation.
10. When you are happy with the font that is shown in the Sample box, click **OK**.

## Setting display properties

When items are displayed on a chart surface, you can determine which properties to display. This allows you to include key information of interest to your investigation.

To set display properties:

1. Right-click an item, and select **Edit Item Properties**.  
The **Edit** window is shown.
2. Select **Style > Display**.
3. Select the options to use when items are shown:
  - Select **Default** to select the default display options.
  - Select **Clear All** to clear the display options.
4. Select how the date is shown in the "Displayed Date & Time" area. You can choose either:

Option	Description
<b>Description</b>	Shows the description of date and time that is entered in the <b>Date &amp; Time</b> page.
<b>Formatted</b>	Formats how the date and time that is entered in the <b>Date &amp; Time</b> page is shown. Select a format from the list. When the item has a date and time, a preview of how the date and time is shown in the Preview box.

5. Optional: Select **Wrap Text** and set a value to use when you wrap text.

6. Optional: Select **Set Default Style** to use the current settings as the default for the link or particular entity representation.
7. Click **OK**.

## Setting the default style

When you add new items to your chart, Analyst's Notebook uses the default style to display the item. You can set the default style for links and for each different entity representation. For example, you can set a default appearance for new theme lines or icons.

The default style is a group of settings that control the appearance of a chart item:

- Font
- Entity or link type
- Display options, such as which items properties are shown on the chart

Setting the default style applies only to new items that you add to your chart. It does not modify the appearance of existing items. However, if you are editing the appearance of an existing item, you can choose to make those current settings the default style by selecting the **Set Default Style** check box in the **Edit Item Properties** window.

1. Right-click on the background of your chart and select **Set Default Styles**.  
The **Set Default Styles** window opens. A folder is listed for each entity representation and for links.
2. Click the folder of the representation whose default style you want to change.  
Different style pages are available depending on which entity representation or link you choose.
3. Click to open a style page. The following options are available:

Option	Description
<b>Type</b>	Settings such as the entity or link types, semantic type, line strength and width, color, and enlargement. The type options are not available for labels.
<b>Display</b>	Settings such as which item properties to display on the chart and how the date and time are formatted.
<b>Font</b>	Font settings such as style, size, and effects.
<b>Frame</b>	Settings to choose whether to include a frame around an icon and to set its color and margin size. The frame options are only available for icons and theme lines.
<b>Connection</b>	Settings to determine link multiplicity, fan size, and how theme lines are diverted through event frames. The connection options are only available for links.

4. Edit the options that you want to change, then click **OK**.

## Displaying an attribute class on the charting surface

You can choose which item attributes are displayed on the charting surface. To show key item information to chart recipients, display the attribute that it is stored in.

1. Click **File > Chart Properties > Definitions > Attribute Classes**.
2. Select an attribute class, then click **Properties**.
3. Select **Show On Chart**, then click **OK**.
4. In the **Chart Properties** window, click **OK**.

If an item contains an instance of that attribute class, the attribute is displayed on the charting surface.

## Changing entity representation

You can change the representation of entities. You might want to change an entity from an icon to a text block, event frame, or theme line.

Entities added to the chart surface can change their representation. Changing the representation changes the appearance, and allows different types of analysis to be carried out.

When you change the representation, you can also change the ordering behavior to follow for entities that have date & time values.

1. Select the chart items that you want to change.
2. Click the **Style** tab, and then click **Change Representation**.  
The **Change Representation** window is shown.
3. Select a representation to change the chart items to.
4. Select the order behavior to apply to the chart items.

Option	Description
<b>Leave order unchanged</b>	Does not change the order and control of the date & time.
<b>Remove order from all chart items</b>	Sets items to be free - that is not ordered by date & time values.
<b>Add order to all chart items with date and time</b>	If a date & time is detected, the items are set to be controlling.

5. Click **OK**.

### Related concepts

[Apply layouts to association charts](#) on page 238

Layouts can be applied to association charts. You can use a layout to rearrange the chart for better presentation so that relationships are more visible.

[Apply layouts to timeline charts](#) on page 241

Layouts can be applied to timeline charts. Applying a layout rearranges your chart so that patterns might be revealed over a time period.

## Resetting style

Reset modified chart items to their default style and appearance by using the Reset Style option.

You might decide that changes to the style of items are no longer needed and you want to reset their appearance to the default style specified by the chart. When you reset items, you remove all the changes whether they are manually applied, modified by live formatting, or conditional formatting specifications. The option to reset the style is available when you select one or more items on the chart surface.

1. Select the item or items that you want to change.
2. Click the **Style** tab of the ribbon, and then click **Reset Style**.

The style of the selected items changes instantly. For example, if you select a Person entity that is larger than Person entities specified by the chart, the size decreases to match the default size.

**Note:** You can **undo** and **redo** your actions from the **Quick Access Toolbar** at the top of the screen.

## Arrange items

You can automatically move chart items so that their presentation suits the data, and so that items are uniformly positioned. You can improve the clarity of the chart, for example by shaping links so that they do not obscure other chart items.

To produce a clearer chart and to consistently space items, you can use chart layouts such as the Minimize Crossed Links layout and the Theme Line layout. Chart layouts automatically arrange chart items. Other layouts move items so that their presentation suits the data, for example the Organization layout.

To improve the uniformity of item positioning, you can use the features in the **Align and Space** group on the **Arrange** tab. Uniform positioning can help chart recipients to focus on chart data, rather than on inconsistent positioning.

To move items manually, you can select several of them on the chart and drag them together. When you make another selection, Analyst's Notebook discards the temporary group that you created. As an alternative, you can use the Group feature to create a permanent grouping of items. To move grouped items manually, drag the handle of the group.

To shape a link so that it does not obscure other items, you can add corners to it. For example, you can route the link around other chart items rather than over them. You can also add consistency to link alignment, so that all links run either horizontally or vertically.

## Chart layouts

Layouts provide a quick way of automatically rearranging the entities and links on your chart. Layouts improve the appearance of your chart and to help you analyze the structure of chart data. When a layout is applied, Analyst's Notebook automatically resizes the chart so that you can see all chart items without having to adjust your view.

Analyst's Notebook provides two main types of layout, depending on what data your chart contains:

- Layouts for association charts
- Layouts for timeline charts

For new charts, it is a good idea to try different types of layout to determine which provides the best view for your investigation. When you identify a layout, you can then try experimenting with the settings for this layout for even better results.

Layouts can be useful when new data is incorporated into the chart. You can rerun a layout on the whole chart to analyze what effect the new information has on the chart.

**Note:** After you manually arrange chart items for presentation, if you run a layout you will lose your changes.

## Apply layouts to association charts

Layouts can be applied to association charts. You can use a layout to rearrange the chart for better presentation so that relationships are more visible.

**Note:** When you apply a layout: Background and hidden chart items are ignored by all association chart layouts but might affect timeline layouts, and corners are removed from all links.

None of the layouts are suitable for charts that contain large entities. For example, boxes - often used to represent organizations - and large OLE objects, for example photographs.

To apply a layout, click the **Arrange** tab, and then in the **Network Layouts** group, click the layout.

### Related tasks

[Changing entity representation](#) on page 236

You can change the representation of entities. You might want to change an entity from an icon to a text block, event frame, or theme line.

## Circular layout

The Circular layout does not reveal the structure of your chart data in the same way as the Peacock or Grouped layout. It might be useful when you want to arrange a number of entities by type in a circular pattern.

A Circular layout can be used in charts with connected and unconnected entities. If the **Blocking Required** checkbox is cleared in the **Setup Layouts** window, all entities are arranged into a circle, even if they are not linked to any other entities.

**Note:** The entities in a Circular layout are sorted by type and not by the number or destination of links between them. Therefore, this layout might result in many crossed links inside the circle.

By using a Circular layout, you can:

- Specify the maximum width and height of the rearranged chart.
  - Note:** The height or width of the chart might exceed the height or width that you specify. For example, if your chart contains grouped items that are spaced far apart. Chart items in a group are not moved relative to each other.
- Position an entity in the center of the circle.
- Include an inner and outer ring.
- Specify several circles or a single circle.

A Circular layout might not be appropriate for charts that contain:

- Many ordered or controlling items. These items are not moved.
- Many theme lines, for example timeline charts.
- Boxes enclosing other entities. The relationship between the box and the entities within it is lost.

## Compact Peacock layout

The Compact Peacock layout is useful when you have many interlinked entities. It groups sets of entities that are linked to one entity on the chart.

Use the Compact Peacock layout for one of the following options:

- Identify entities at the center of much activity in high volume data, for example telephone data or financial transactions.
- Discern in more detail the activity within groups of interconnected entities.

The Compact Peacock layout is more flexible than the Grouped layout and the patterns it produces vary depending on the nature of your data. The chart items in a Compact Peacock Layout are more spread out than the standard Peacock layout, The Compact Peacock layout makes them much more legible. When you zoom in to an area of the chart, the links between the main areas of activity are also shorter. A more compact and legible final chart is provided.

By using a Compact Peacock layout, you can do one of the following options:

- Set the separation distance between entities
- Fix entities on the chart in their original location
- Animate the layout

A Compact Peacock layout might not be suitable for charts that contain:

- Many ordered or controlling items. These items are not moved.
- Mostly theme lines, for example timeline charts.
- Boxes that enclose other entities. The relationship between the box and the entities within it is lost.

## Grouped layout

The Grouped layout is useful when you have many linked entities. You can find out whether there are certain entities to which a number of other entities are linked. It helps to identify groups of interconnected entities and the relationships between them.

The Grouped layout is more rigid than the Peacock layout. It always attempts to rearrange your chart data into a similar pattern. This pattern has a group of interlinked entities at the center, and other groups 'fanning out' from this central group.

**Note:** Using a Grouped layout does not display the structure of the network within the groups clearly. To see more detail in the structure, use a Peacock layout.

By using a Grouped layout, you can:

- Set the maximum width and height of the rearranged chart
- Specify a minimum separation for items
- Position an entity at the center of the chart

A Grouped layout might not be appropriate for charts that contain:

- Many ordered or controlling items. These items are not moved.
- Mostly theme lines, for example timeline charts.
- Boxes that enclose other entities. The relationship between the box and the entities within it is lost.
- Only a few linked entities.

## Hierarchy layout

For charts that contain organizational structures, you can use the Hierarchy layout to visualize how key individuals control different operations. To show the relative status of entities, peers in the organization are aligned.

To use the hierarchy layout, one or more entities must be identified as root entities. The other items in the chart are rearranged in relation to the identified root items.

By using a Hierarchy layout, you can:

- Set the separation between entities. The depth is the separation between entities at different levels in the hierarchy from the root entity or entities. The breadth is the separation between entities at the same level in the hierarchy.

**Note:** If the **Legacy Mode** check box is cleared, sibling entities are grouped closer together, which might affect the breadth separation.

- Specify whether to arrange the entities from top-to-bottom or left-to-right.
- Choose how to determine the root entities of the hierarchy.
- Specify whether to use corners when you lay out the chart.
- Choose whether to revert to the legacy mode for the layout. Legacy mode does not allow for entity extents or allow animation. In addition, items on the same level of the hierarchy are not sorted to reduce crossed links in legacy mode.
- Choose whether to animate the layout. Animation is not available if you select the legacy mode.

A Hierarchy layout might not be appropriate for charts that contain:

- Many ordered or controlling items. Ordered and controlling items are not moved.
- Boxes that enclose other entities. The relationship between the box and the entities within it is lost.
- Mainly theme lines, such as timeline charts. Theme lines, and items that are directly connected to theme lines, are not moved by a hierarchy layout.

## Minimize Crossed Links layout

The Minimize Crossed Links layout is useful when you have many linked entities to arrange the entities into the clearest layout possible.

By using a Minimized Crossed Links layout, you can:

- Specify a minimum separation between chart items
- Set the orientation of the chart
- Select a link to position at the outside of the chart layout

## Organization layout

The Organization layout is useful for charts that contain organizational structures, and you can identify one or more key individuals who control different operations. To ensure that links between entities are visible, peers in the organization might not be aligned.

You can group and ungroup chart items and apply an Organization Layout. The items in the group are retained.

By using an Organization layout, you can:

- Set the separation between entities



- Specify the orientation of the chart
- Choose how to determine the root of the chart

## Packed layout

The Packed layout is useful for laying out chart items such that empty space is minimized on the chart. This layout can make your chart more compact to view and print.

A Packed layout can be used for charts that have many connected and unconnected entities. Other layouts often arrange chart items in a single row across the width of the chart. These layouts make wide charts that are difficult to see in a single view. When a Packed layout is applied, the items that have the most connected entities are grouped first on the left side of the chart. The remaining items are shown next to that group, in descending order of nodes, across and then down. Entities that are not connected to any other entity are shown in a row at the bottom of the chart

You can customize the behavior of a packed layout in the following ways:

- Specify the group separation value
- Animate the chart as the layout is applied

## Peacock layout

The Peacock layout is useful when you have many interlinked entities, because it groups the other entities that an entity is linked to.

A Peacock layout can be used to:

- Identify entities at the center of much activity in high volume data, for example telephone data or financial transactions.
- Discern in more detail the activity within groups of interconnected entities

The Peacock layout is more flexible than the Grouped layout and the patterns it produces vary depending on the nature of your data.

By using a Peacock layout, you can:

- Set the separation distance between entities
- Fix entities on the chart in their original location
- Animate the layout

A Peacock layout might not be appropriate for charts that contain:

- Many ordered or controlling items. These items are not moved.
- Mostly theme lines, for example timeline charts.
- Boxes enclosing other entities. The relationship between the box and the entities within it is lost.

## Apply layouts to timeline charts

Layouts can be applied to timeline charts. Applying a layout rearranges your chart so that patterns might be revealed over a time period.

Layouts for timeline charts only affect items that contain date and time information. To apply one, click the **Arrange** tab, and then in the **Timeline Layouts** group, click the layout.

**Note:** These layouts are not suitable for charts that use large entity representations such as boxes (which are often used to indicate organizations) and OLE objects (like photographs).

**Related tasks**

[Changing entity representation](#) on page 236

You can change the representation of entities. You might want to change an entity from an icon to a text block, event frame, or theme line.

**Ordered layout**

The Ordered layout is most useful when you have a chart with a sequence of events. It separates each event from the next horizontally by a distance you specify in the layout setup to read your data much more easily. The distance that you specify takes into account the width of chart item labels but not link labels.

An Ordered layout is useful:

- When you import a volume of data and must apply an initial layout.
- For analysis of high volume data, especially of events with date & time.
- For presentation and printing.

By using an Ordered layout, you can:

- Apply the layout to the entire chart, limit the layout to selected items, or limit the layout to items that are in a specified date and time range.
- Set the distance between successive items. You can choose to set the distance between all items or controlling items. For example, by selecting controlling items you can maintain the position of items such as textual annotation or theme line icons.

**Proportional layout**

The Proportional layout is most useful when you have a chart with a sequence of events. It displays an accurate representation of when items occur in relation to each other. This layout can help to gain an understanding of how events occur in real time, but can result in wide charts with items spaced far apart.

When you import data, for example telephone calls, the Proportional layout provides an initial view of how the events are spread in time before you apply other layouts.

By using a Proportional layout, you can:

- Apply the layout to the entire chart or just a selection of chart items
- Specify how the chart width is determined

**Theme Line layout**

The Theme Line layout is useful when you have many theme lines on your chart.

By using a Theme Line layout, you can:

- Sort the theme lines by a particular property, for example to place the theme line with the most connections at the top of the chart
- Specify the vertical separation between theme lines
- Change the order of the theme lines
- Align the theme line icons and event frames
- Arrange event frames that divert

A Theme Line layout is not appropriate for charts that do not contain controlling items.

## Grouped Theme Line layout

The Grouped Theme Line layout is useful when you have many theme lines on your chart and you want to minimize the number of links that cross the theme lines.

The Grouped Theme Line layout is a proportional layout. It is effective when you target part of a large network, for example after you filter a chart to find all of the transactions in a particular time period.

By using this layout, you can:

- Sort the theme lines to cluster your chart into groups of highly connected theme lines.
- Minimize the number of links that cross theme lines.
- Minimize the theme line extents.
- Position the theme line icons at the start of the theme lines, just before the first link. When a theme line has only one link, the theme line icon is placed at the time of the link.

A Grouped Theme Line layout is not appropriate for charts that do not contain controlling items.

## Grouped By Time layout

Grouped by Time layout arranges items from left to right across your chart in groups. Items that occur at similar times are displayed close together. For example, you can group telephone calls that occur within an hour of each other to find periods of high activity.

The Grouped by Time layout is useful for:

- High volume imported data with dates and times, for example telephone billings or financial transactions, to find bursts of activity that might be related.
- A timeline chart with many events that take place at irregular intervals.
- Reducing the widths of charts that are too wide when laid out proportionally. This layout preserves an indication of periods of high activity and periods of low activity.

Using a Grouped by Time layout results in a chart in which the distance between each subsequent item is defined by you. It is a non-proportional layout, as the gap between items is not equivalent to the time between them.

A Grouped by Time layout is not appropriate for charts that do not contain controlling items.

By using a Grouped by Time layout, you can:

- Apply the layout to the entire chart, limit the layout to selected items, or limit the layout to items that are in a specified date and time range.
- Set the maximum time difference between consecutive items to consider them to be in a group.
- Set the distance between groups.
- Set the distance between successive items in a group. You can choose to set the distance between all items or controlling items. For example, by selecting controlling items you can prevent other items from being spaced out to the right of each group and therefore produce a more compact layout. In this more compact layout, the separation between groups is always between controlling items.

## Changing layout settings

Chart layout settings determine how items are positioned when layouts are applied to charts. These settings can be modified to better match your needs.

To modify the layout settings:

1. Click the **Arrange** tab, and then click **Layout Setup**.  
The **Setup Layouts** window appears.
2. From the list on the left of the window, select the chart layout to modify.
3. Change the layout settings to suit your requirements:

Options	Description	Applicable layouts
<b>Size</b>	Specifies the chart area by dimensions or by minimum separation of entities.	Circular, Grouped
<b>Separation</b>	Specifies the distance between entities or groups of entities.	Hierarchy, Minimize Crossed Links, Organization, Packed, Compact Peacock, Peacock, Grouped by Time, Ordered, Theme Line
<b>Central Entity</b>	Arranges the other entities around a specified entity.  <b>Note:</b> This setting asks for the identity of the entity to be used. As such it is a chart-specific setting.	Circular, Grouped
<b>Entity Constraints</b>	Prevents the rearrangement of key entities, either based on selection status or a specified attribute.	Compact Peacock, Peacock
<b>Double Ring</b>	Arranges entities into two rings, one within the other.	Circular
<b>Blocking</b>	Arranges groups of related entities into multiple circles.	Circular
<b>Animated</b>	Specifies whether the view shows you the steps that are taken to transform your chart to the selected layout.	Hierarchy, Minimize Crossed Links, Organization, Packed, Compact Peacock, Peacock
<b>Apply To</b>	Specifies which items on the chart are grouped. You can group all items, the selected items only, or items associated with a particular time period.	Grouped by Time, Ordered, Proportional, Theme Line
<b>Group Items Within</b>	Sets the scale at which items are grouped.	Grouped by Time
<b>Root</b>	Selects the starting point for grouping within hierarchies and organizations.	Hierarchy, Organization
<b>Orientation</b>	Specifies the direction of the layout and the alignment of items within the layout.	Hierarchy, Minimize Crossed Links, Organization

Options	Description	Applicable layouts
<b>Add Corners</b>	Add corners to the links in a hierarchy so that they are arranged horizontally and vertically.	Hierarchy
<b>Outer Boundary</b>	Specifies the items to position at the boundary.	Minimize Crossed Links
<b>Width</b>	Specifies how the width of the layout is determined.	Proportional
<b>Order</b>	Specifies how the order of the theme lines is determined.	Theme Line
<b>Legacy Mode</b>	Uses the original Hierarchy layout, which does not allow for entity extents, order items within layers, or provide animation.	Hierarchy

4. Click **OK** to save your changes.

### Aligning and spacing chart items

Chart items can be aligned or spaced. You can align and space chart items vertically or horizontally. Aligning and spacing chart items rearranges them so that they are evenly spaced out or aligned on your chart. The buttons in the **Align and Space** group on the **Arrange** tab move preselected items around your chart so that they can be aligned with each other or be evenly spaced. You can align or space any number of selected items from a minimum of two chart items.

Click the **Arrange** tab, and then in the **Align and Space** group, click one of the following buttons:

Option	Description
<b>Align Vertically</b>	<p>Move selected chart items so that they are aligned vertically without moving each chart item up or down.</p> <p>The center of each chart item is moved to an invisible alignment line. If most of the selected items are on the same vertical line, the other selected items are centered on that vertical line. If none of the selected chart items are on the same vertical line, all selected items are centered on a line that is mid way between all of the selected chart items.</p> <p><b>Tip:</b> You might use <b>Space Vertically</b> after <b>Align Vertically</b>, to space out your aligned items evenly.</p>
<b>Align Horizontally</b>	<p>Move selected chart items so that they are aligned horizontally without moving each chart item to the left or right.</p> <p>The center of each chart item is moved to an invisible horizontal alignment line. If most of the</p>

Option	Description
	<p>selected items are on the same horizontal line, the other selected items are centered on that horizontal line. If none of the selected chart items are on the same horizontal line, all selected items are centered on a line that is mid way between all of the selected chart items.</p> <p><b>Tip:</b> You might use <b>Space Horizontally</b> after <b>Align Horizontally</b>, to space out your aligned items evenly.</p>
<b>Space Entities &gt; Space Vertically</b>	<p>Move automatically a number of selected chart items so that an even amount of white space is placed between them vertically. The chart items are not moved horizontally.</p> <p>For each selected item, an invisible box is drawn around the chart item. This box includes the height of the item and the full width of any labels and attributes. The selected chart items are moved to a set vertical distance from the top and bottom edge of each invisible box.</p> <p><b>Note:</b> The <b>File &gt; Chart Properties &gt; Options &gt; Display &gt; Snap to Grid</b> option has no effect upon chart items that are spaced vertically with this function.</p>
<b>Space Entities &gt; Space Horizontally</b>	<p>Move automatically a number of selected chart items so that an even amount of white space is placed between them horizontally. The chart items are not moved vertically.</p> <p>For each selected item, an invisible box is drawn around the chart item. This box includes the height of the item and the full width of any labels and attributes. The selected chart items are moved to a set horizontal distance from the left and right edges of each invisible box.</p> <p><b>Note:</b> The <b>File &gt; Chart Properties &gt; Options &gt; Display &gt; Snap to Grid</b> option has no effect upon chart items that are spaced horizontally with this function.</p>

## Grouping items

You can group or ungroup items on your chart. You can also copy groups and paste them into a new chart or application.

You can use grouping with the following layouts:

- Grouped

- Circular
- Peacock
- Compact Peacock
- Organization
- Hierarchy

You cannot use grouping with the following layouts:

- Grouped by Time
- Minimize Crossed Links
- Proportional
- Ordered
- Theme Line

**Note:** Analyst's Notebook tools do not use grouping.

To add chart items to a group, clear the group, or select the items in a group, select one of the following commands:

- Right-click a selection of chart items, and select **Group** from the menu.
- To clear the group, select the group, and then select **Ungroup**.
- To select all the items in the group, select the group, and then select **Select Grouped Items**.
- To delete a group, select the group, and then press Delete.

## Prepare a chart for publication

Before you present or publish a chart, you can check it for spelling errors, and remove data records. To aid understanding of your chart, you can add a legend, which is a key for the conventions that are used on your chart.

Some items on the charting surface might be displayed differently to chart recipients who use an earlier version of Analyst's Notebook. If you use visualization features that are not supported in earlier versions, Analyst's Notebook displays compatibility warnings when you save the chart.

## Check spelling

Spelling checks can run automatically as you type. Possible spelling mistakes are highlighted and suggestions are made for corrections. A spelling check can be run after you create a chart before it is published. When you finish creating a chart, it is searched for spelling and other errors. When a possible error is identified, you can correct it and then continue the check.

## Checking spelling of the completed chart

Spelling can be checked in a chart that you complete before it is published. The actions that are taken, might be to ignore, or change a word that is found with a spelling check.

To check spelling in a chart:

1. Click the **Publish** tab, and then in the **Prepare** group, click **Spelling**.  
The first spelling error is displayed in the **Not in Dictionary** box.
2. A suggested replacement is displayed in the **Change To** box. Select one of the following options in the Suggestions area:

Option	Description
<b>Ignore</b>	Leaves the error unchanged, but continues to identify any further instances of this error.
<b>Ignore All</b>	Leaves all instances of this error unchanged for the current session.
<b>Change</b>	To accept the suggested correction, click <b>Change</b> . To use another of the suggestions in the list, click the required word then click <b>Change</b> .  If none of the suggestions are the required word, type the correction in the <b>Change to</b> box and then click <b>Change</b> .  When the selected error is a repeated word, this changes to <b>Delete</b> so you can easily remove the second instance of the word.
<b>Change All</b>	Changes all instances of the word in the <b>Not in dictionary</b> box to the word in the <b>Change to</b> box. Changes all instances of the error in the active chart only.
<b>Add</b>	Adds the word in the <b>Not in Dictionary</b> box to the dictionary. When Analyst's Notebook encounters this word in future, in this chart or any other charts, it will not be identified as a misspelling.
<b>Close</b>	Closes the <b>Spelling</b> window without making the current suggested change, and stops checking the chart.

3. A message is displayed when the spelling check is complete. Click **OK** to close it.

## Setting spelling check options

You can set the options to use when you spell check a chart. You might want to ignore or specify certain types of text.

To show the **Spelling** page:

1. Click **File > Options**.
2. In the **Options** window, select the **Spelling** page.
3. You can choose to spell check entities, links, or both entities and links. Specify chart items to include in the spelling check, by selecting:

Option	Description
<b>Entities and Links</b>	Spell check all entities and links.
<b>Entities Only</b>	Spell check only entities.



Option	Description
Links Only	Spell check only links.

4. You can tell Analyst's Notebook to ignore certain kinds of text in your chart when you check spelling. You might want to ignore words with numbers. The spelling check can also suggest similarly sounding or similarly spelled words. Select or clear the following check boxes:

Option	Description
Capitalized words	For example, Canada.
Uppercase words	For example, ASAP.
Words with numbers	For example, Windows2000.
Mixed case words	For example, AstroTurf.
Domain names	For example, www.awebsite.com
HTML markup	For example, <p>
Report doubled words	For example, the the.
Case-sensitive checking	
Suggest similarly sounding words	Suggests "whose" and "hoes" for "hoose".
Suggest similarly spelled words	Suggests "house" and "choose" for "hoose".
Suggest split words	

## Checking spelling automatically as you type

You can check spelling automatically as you type information in to chart items. You can add an error as a word to the dictionary. You can also ignore an error.

To check spelling automatically as you type:

1. Select the **Check Spelling as You Type** checkbox.
2. When you type text on your chart or in any properties page, Analyst's Notebook uses wavy red underlining to indicate a spelling error. To correct an error, right-click a word with a wavy underline, and then click the correction that you want from the menu.

**Note:** The Coverage settings that are specified in the **Spelling** page of the **Options** window do not apply when spelling is checked as you type.

3. Select **Ignore All** to skip all instances of this error for the current session of Analyst's Notebook. When you close the application, the option to ignore this word is reset.
4. Optional: If you do not want to identify the word as an error in all charts, click **Add** to add the word to the dictionary. You might want to add a word to the dictionary when it is the name of a person or organization that you regularly use.

## Work with legends

A legend is a key for the conventions that are used on your chart. You can create a legend to explain the different entity types, link types, attribute classes, line properties, fonts, and time zones on your chart.

You can specify the shape of the legend and place it at a specific location on your chart.

A legend can have a title, chart summary information, and legend entries for the following items:

- Attribute symbols
- Entity icons (such as Male and Female.)
- Lines (for items such as event frames, theme lines, boxes, circles, and text blocks.)
- Fonts (describing the use of fonts on your chart)
- Links
- Time zones
- Icon frames

You can either populate the legend from the items on your chart, or create a blank legend and populate it manually.

## Populating the legend

Use the Populate Legend window to populate your legend with entries for items that exist on your chart. You can select which item types are added. If a legend exists for the chart, you can also specify how any new entries are added.

1. To open the Edit Legend window, click the **Publish** tab, and then in the **Prepare** group, click **Legend**. If your chart does not currently contain a legend, the Legend Population Option window is displayed.
2. Select the **Items** page on the Edit Legend window.
3. In the Add Entries For area, select the appropriate check boxes to select entry types you want included in the legend.
4. In the Action area, select the appropriate option to specify how new entries are added to an existing legend.

<b>Replace Existing</b>	Deletes all of the existing entries in the legend before populating it
<b>Append to Existing</b>	Adds the new entries to the entries already in the legend even if the legend already contains identical entries
<b>Merge with Existing</b>	Merges the new entries with the entries already in the legend

5. Click **OK** to populate the legend with entries for the chart items, by using the options specified.

## Adding legend title entry

Use the **Add Legend Title** window to specify the contents of the legend title. If the legend is populated from chart items, 'Untitled' is used as the first title entry that is displayed in the **Edit Legend** window.

1. On the **Edit Legend** window, click **Title**. To show the **Edit Legend** window, click the **Publish** tab, and then in the **Prepare** group, click **Legend**. If your chart does not currently contain a legend, the **Legend Population Option** window is shown.
  - a) To populate the legend from the items on the current chart, click **Yes** on this window. A legend is created by using the default settings for each entry.
  - b) To populate the legend manually, click **No** on this window. A blank legend is created.
2. In the **Text** box, enter the information that you want to include in the legend title such as name, date.
3. You can enter more than one line of text, by pressing the Enter key or by creating extra title entries. By default, each new title entry is added below any existing entries.
4. To change the font of the title, click **Font**. Use the **Font** window to select the font.

**Tip:** If you are editing an existing legend, the legend text box is populated with any previously created title (and other) entries. Use the **Edit Legend Title** window to edit title entries.

## Adding or editing a legend attribute entry

1. On the **Edit Legend** window, click **Attribute**. To show the **Edit Legend** window, click the **Publish** tab, and then in the **Prepare** group, click **Legend**. If your chart does not contain a legend, the **Legend Population Option** window is shown.
  - a) To populate the legend from the items on the chart, click **Yes**. A legend is created by using the default settings for each entry.
  - b) To populate the legend manually, click **No**. A blank legend is created.
2. In the **Description** box, enter the text to appear in the legend for that attribute.
3. Select the attribute symbol from the list that is displayed in the **Symbol** box. This list contains all available attribute symbols. You can use the scroll bar or use the up and down keys to access the attribute you require. If you know the name of the attribute, then click in the symbol list and type the name.
4. Click **OK** to confirm the entry and return to the **Edit Legend** window.

**Tip:** To edit an existing entry, either double-click the entry to be edited or select it and click **Edit**. The **Edit Legend Attribute Entry** window is shown. Edit the entry.

## Adding or editing a legend icon entry

1. On the **Edit Legend** window, click **Icon**. To show the **Edit Legend** window, click the **Publish** tab, and then in the **Prepare** group, click **Legend**. If your chart does not currently contain a legend, the **Legend Population Option** window is displayed.
  - a) To populate the legend from the items on the current chart, click **Yes** on this window. A legend is created by using the default settings for each entry.
  - b) To populate the legend manually, click **No** on this window. A blank legend is created.
2. In the **Description** box, enter the text to appear in the legend for that icon.
3. Select the icon from the list that is displayed in the **Icon** box. This list contains all icons available. You can use the scroll bar or use the pointer up and down keys to access the icon you require. If you know the name of the icon, then click in the icon list and type the name.
4. Click **OK** to confirm the entry and return to the **Edit Legend** window.

**Tip:** To edit an existing entry, either double-click the entry to be edited or select it and click **Edit**. The **Edit Legend Icon Entry** window is shown, in which you can edit the entry.

## Adding or editing an icon frame entry

The chart legend can contain icon frame entries that match the colors of icon frames on the chart. You can add descriptions to the legend entries to explain what the icon frame colors represent.

To add or edit a icon frame legend entry:

1. To show the **Edit Legend** window, click the **Publish** tab, and then in the **Prepare** group, click **Legend**.
  - a) To populate the legend from the items on the current chart, click **Yes**. A legend is created by using the default setting for each entry.
  - b) To populate the legend manually, click **No**. A blank legend is created.
2. Click **Icon Frame** to add a new icon frame entry or double-click an existing icon frame entry to edit it.
3. Enter the description for the legend entry.
4. Select the color to use for the icon in the legend entry.
5. Click **OK** to confirm the entry and return to the **Edit Legend** window.

## Adding or editing a legend line entry

Event frame styles and theme segments styles can be added to the legend as line entries.

1. On the **Edit Legend** window, click **Line**. To show the **Edit Legend** window, click the **Publish** tab, and then in the **Prepare** group, click **Legend**. If your chart does not currently contain a legend, the **Legend Population Option** window is shown.
  - a) To populate the legend from the items on the current chart, click **Yes** on this window. A legend is created by using the default settings for each entry.
  - b) To populate the legend manually, click **No** on this window. A blank legend is created.
2. In the **Description** box, enter the text to appear in the legend for the line.
3. From the **Strength** list, select the strength (line style) of the line. The list includes solid, dashed, and dotted lines.
4. From the **Color** list, select the color from the displayed palette.
5. From the **Width** list, select the thickness.
6. Click **OK** to confirm the entry and return to the **Edit Legend** window.

**Tip:** To edit an existing entry, either double-click the entry to be edited or select it and click **Edit**. The **Edit Legend Line Entry** window is shown. Use this window to edit the entry.

You create entries for each convention you are using in your chart.

## Adding a legend font entry

If you use fonts to highlight the importance of information on your chart, the meanings can be added to the chart legend.

To add font details to the legend:

1. To show the **Edit Legend** window, click the **Publish** tab, and then in the **Prepare** group, click **Legend**.
2. Select **Font**

The **Add Legend Font Entry** window opens.

3. In the **Description** box, enter the text to show in the legend for that font.
4. To change the font, click **Font**.
5. Click **OK** to confirm the entry and return to the **Edit Legend** window.

**Tip:** To edit an existing entry, either double-click the entry to be edited, or select it and click **Edit**. The **Edit Legend** window is shown in which you edit the entry.

## Adding or editing a legend time zone entry

Short time zone names on the chart (PST, BST, GMT, and so on) can be displayed in the legend in their full form: Pacific Standard Time, British Summer Time, Greenwich Mean Time. The **Populate** button on the **Edit Legend** window adds any short time zone names that are displayed on the chart to the legend automatically. Extra time zones can be added if required.

To add or edit a legend time zone entry:

1. On the **Edit Legend** window, click **Time Zone**. To show the **Edit Legend** window, click the **Publish** tab, and then in the **Prepare** group, click **Legend**. If your chart does not currently contain a legend, the **Legend Population Option** window is shown.
  - a) To populate the legend from the items on the current chart, click **Yes** on this window. A legend is created by using the default settings for each entry.
  - b) To populate the legend manually, click **No** on this window. A blank legend is created.
2. From the **Time Zone** list, select a time zone to add. The long names of the selected time zone are shown in the **Description** box.
3. To change the font of the legend entry, click **Font**. The **Font** window is shown, in which you can select the font.
4. Click **OK** to confirm the entry and return to the **Edit Legend** window.

## Adding or editing a legend link entry

You can populate a legend and add it to your chart by using one of the following steps.

Legend entries can be added and edited for legend link entries.

On the **Edit Legend** window, click **Link**. To show the **Edit Legend** window, click the **Publish** tab, and then in the **Prepare** group, click **Legend**.

- To populate the legend from the items on the current chart, click **Yes**. A legend is created by using the default settings for each entry.
- To populate the legend manually, click **No**. A blank legend is created.

**Tip:** To edit an existing entry, either double-click the entry to be edited, or select it and click **Edit**.

## Setting legend display properties

Use the Edit Legend Properties page to specify how the legend appears on your chart and to specify its location.

To display the legend on the chart, select the **Show on Chart** checkbox.

### Setting the legend shape

In the Shape area, select the appropriate option to specify the shape of the legend:

<b>Tall</b>	The legend is arranged in a rectangular box taller than it is wide
<b>Square</b>	The legend is arranged in a square box
<b>Wide</b>	The legend is arranged in a rectangular box wider than it is tall

### Positioning the legend

The legend is positioned relative to the currently defined pages of the chart, as specified in the Page Setup window. You might need to adjust the page setup before positioning the legend to achieve the wanted result.

In the Horizontal Chart Location area, select the appropriate option to specify the horizontal position of the legend:

<b>Left</b>	The legend box is placed on the left of all the currently defined pages, as specified in the Page Setup window.
<b>Free</b>	The legend box can be freely moved horizontally (by dragging it)
<b>Right</b>	The legend box is placed on the right of all the currently defined pages, as specified in the Page Setup window.

Similarly, in the Vertical Chart Location area, select the appropriate option to specify the vertical position of the legend box:

<b>Top</b>	The legend box is placed at the top of all the currently defined pages, as specified in the Page Setup window.
<b>Free</b>	The legend box might be freely moved vertically (by dragging it)
<b>Bottom</b>	The legend box is placed at the bottom of all the currently defined pages, as specified in the Page Setup window.

**Note:** The default **Horizontal Chart Location** and **Vertical Chart Location** options are **Free**. You can drag the legend anywhere on the chart.

### Setting the legend font

In the Description Text area, click **Font** to select the font to be used for descriptions. This font is also used as the default font for other textual entries such as titles and time zones. The Font workspace is displayed for you to select the required font. The panel to below the **Font** button displays sample text in the chosen font.

**Note:** If you specify a font for a particular legend entry, this font overrides the default font.

## Compatibility warnings

Support for the following features depends on the version of Analyst's Notebook that you are using. In versions earlier than Analyst's Notebook 8.5, icon frames, displaying pictures on entities, and setting icon options are not supported.

## Handling compatibility warnings

When you save a chart in this version of Analyst's Notebook, it is checked for any significant compatibility issues with earlier versions. A warning is shown so that you can see more information about the warnings.

To see more information about compatibility warnings:

1. In the **Compatibility Warning** window, select one of the following options:

Option	Description
<b>Details</b>	Displays a summary of the affected features.
<b>Full Report</b>	Generates a comma-separated value (CSV) file that contains further information.

2. Click **OK** to save the chart.

**Tip:** If you do not want to be warned about compatibility issues in the future, clear the **Show this Warning when Saving** check box. To see warnings again when you save, select the compatibility warning option in the **Setting saving application options** page.

## Analyst's Notebook version 6 compatibility warnings

Some features added to Analyst's Notebook 7 are not supported in Analyst's Notebook 6.

The following features that were added to Analyst's Notebook 7 are not supported in charts that are saved as Analyst's Notebook 6:

- Unicode text that is typically used to support multiple character sets in the same chart are converted to ANSI encoding.
- Changing the shading color of the icon is not supported, and revert to their default display settings.
- Database keys that link chart items to their source database items are deleted.
- When printing, headers and footers are deleted from page setup details.
- Cover sheet custom properties might be deleted.
- Time zones that were introduced at version 7, are replaced by the local time zone.
- The information that is stored in chart item SDK property bags is deleted.
- OLE objects might be removed if there is no version later than Analyst's Notebook 6 installed.
- Entity type properties that are created by users are deleted.
- Unicode

## Removing data records

For chart items that have database identities, you can choose to remove any associated data records. For example, if you want to clean the chart of sensitive or unwanted information.

You can remove the data records for a selection of chart items or for all chart items with associated data records. Removing data records removes all of the data on the Data Records pages, but leaves the database key and database instance intact.

**Note:** If you redact a chart to remove data records, the database key and database instance is no longer intact.

- To remove data records for a selection of chart items, click the **Publish** tab, and then in the **Redact and Purge** group, click **Purge Data Records**.
- To remove all data records, click the **Publish** tab, and then in the **Redact and Purge** group, click **Purge All Data Records**.

**Note:** You can undo the deletion of data records from your chart items by clicking the Undo button in the Quick Access Toolbar.

## Present and publish charts

To present the data on your chart effectively, you can build a sequence of chart items to step through, and you can zoom into multiple areas of the chart. If you publish the chart, you can save the chart in a format that is appropriate for the recipients, and you can print the chart.

When you present a chart to an audience, you can use the Pan through Selection pane to build and step through a sequence of chart items. Or, you can take snapshots to capture the appearance of a chart at particular points in time, then sequentially present the snapshots to show how your chart developed.

To focus attention on multiple areas of a large chart simultaneously, you can split the chart into two or four panes, then zoom each pane to a different area. To create the largest possible area to display the chart, you can enter full screen mode.

You can publish the .anb file that you are working on, if all the content is suitable for the audience. If the chart contains sensitive data, you can save a redacted copy of the chart in which sensitive information is removed. If recipients do not have Analyst's Notebook, you can publish your chart as a PDF file or as an image.

To publish chart data in text format, you can export chart information to a report.

## Presenting charts

There are several ways to change your view of a chart so that it is easy to present. If the whole chart does not fit in the application window, you can move around your chart with a keyboard or a mouse. Alternatively, you can zoom in or out to see more or fewer items.

## Splitting your chart window into panes

You can split the display of the chart into two or four panes. Splitting into panes means that you can work with smaller, more manageable areas of the chart.

You can display a different region of your chart in each of the panes, and zoom in and out or scroll in each pane independently. Splitting your chart into panes can make it easier to link entities that are far apart. You can display each of the remote entities in its own pane, then drag a link that crosses panes.



To split a chart window into panes:

1. Click the **View** tab, and then in the **Window** group, click **Split**.

Two-gray lines that cross at right angles are displayed on your screen, which you can move around by using the pointer.

To split your window into just two panes, drag the pointer to one edge or the bottom of the screen.

2. Double-click the split intersection in the middle of the panes to remove the split.  
When the pointer is over the intersection, it changes to four small arrows. The currently selected pane fills the entire window.
3. To move the position of the split, click **Split** and drag the split to a new location.

**Note:** You can click the vertical or horizontal split line to move the split along just one axis (left-right or up-down).

4. Click any of the panes to work with them.

## Moving between selected items on the chart

You can use the **Pan through Selection** pane to view a sequence of items without manually scrolling from one to the next. You can present a sequence of events to focus on each event in turn, or to compare each item to the next.

To define a list of items to browse:

1. Click the **View** tab, and then in the **Show** group, click **More Panes > Pan through Selection**.
2. Select the items that you want to browse. This selection might result from using one of the following analysis tools:
  - List Items
  - Visual Search
  - Find Linked

**Note:** You can select the items manually. If you have a theme line with many event frames attached to it, select all of the event frames that are attached to the theme line.

3. In the **List Options** list on the **Pan through Selection** pane (the second list), select one of the following options:

Option	Description
<b>Replace List with Selection</b>	Removes any existing items in the browse list before you add the current selection.
<b>Add Selection to List</b>	Adds the current selection to items already in the browse list.

4. Click **Apply Command**, next to the **List Options** list. Items are added to the browse list in the order in which they were selected, for example in the **List Items** window. The item that is added last is selected in the browse list.

**Tip:** To directly add items to the browse list when you click them on the chart surface, set **Lock/Unlock List** to off.

5. Optional: To sort the browse list, select an option from the **Sort Options** list, then click **Apply Command** next to the **Sort Options** list.  
The list is sorted.

6. To move between items in the browse list, click the following buttons:

Option	Description
<b>Browse to Next Item</b>	Moves to the next item in the list.
<b>Browse to Previous Item</b>	Moves to the previous item in the list.

The item is centered in the chart window. Its label is shown in the browse list. Entities are displayed by using their label. Links are displayed by using the link summary.

7. To clear the browse list, select **Clear List** from the **List Options** list (the second list), then click **Apply Command** next to the **List Options** list.

## Using snapshots

A snapshot is a view of your chart at a particular stage in its development. It captures the position and number of all visible chart items. The display settings, such as level of zoom and position of chart in the window are also captured. Snapshots freeze the appearance of your chart at a particular moment, for subsequent viewing.

You can take any number of snapshots of your chart as you build it and then later view each snapshot in turn. This snapshot shows how information is added to the chart over time. Snapshots are also a useful way of focusing on certain areas of your chart, for example a particular group of entities, or a particular period.

**Note:** Avoid scrolling and zooming your chart when you take a sequence of snapshots. Each snapshot saves the zoom level and current view of the chart. Also, avoid changing existing entities and links in later snapshots. A change might be changing the font style and size, as these changes are reflected in earlier snapshots.

Snapshots are saved with your chart.

Snapshots are taken, viewed, and maintained by using the **Snapshots** window.

To open the **Snapshots** window, click the **Publish** tab, and then in the **Snapshots** group, click **Take Snapshots**.

## Publish a chart

Analyst's Notebook provides a range of publication formats for a chart, and provides ways to ensure that chart recipients do not receive sensitive data.

When you are ready to publish your chart, you can take one of the following actions:

- Publish the .anb file.
- Save the chart in alternative formats such as an image or a PDF file.
- Produce printouts of the chart.
- Save a redacted copy of the chart in which sensitive information is removed.

**Note:** You can purge data records at any time, such as when you prepare a chart for publication.

## Saving as a picture

You can save a chart as a picture so that you can use it, for example, in documents or reports and publish them. You can save the entire chart, or a portion of a chart that displays chart items of interest.

To save a chart as a picture:

1. Click the **Publish** tab, and then in the **Save as Picture** group, click one of the following buttons:

- To save the view that is displayed by the current window, click **Current View**.
- To save the entire chart, click **Entire Chart**.

**Note:** When you save a chart as a picture, the following elements of the chart are also saved in the picture:

- Time bar
- Theme line icon bars

2. In the **Save as Picture** window, navigate to the folder in which you want to save the file.

3. Enter a file name for the picture and select a picture file type, then click **Save**.

You can save your chart as one of the following types of picture file formats:

- GIF (.gif)
- JPEG (.jpg)
- PNG (.png)
- TIFF (.tif)
- BMP (.bmp)

**Note:** Saving a chart as a BMP can produce large files. If the file is large, a prompt opens confirming that you want to save it as a BMP. If you select **No** you are returned to the format selection.

## Saving as a PowerPoint slide

You can save a snapshot of a chart as a PowerPoint slide so that you can use it in presentations. You can save multiple snapshots to show the process of your investigation.

You must [create a snapshot](#) before you can save it as a PowerPoint slide.

1. To save a snapshot as a PowerPoint slide, in the **Snapshots** window, select a snapshot and click **Export to PowerPoint**. The **Save As** window opens.
2. In the **Save As** window, navigate to the directory in which you want to save the file.
3. In the **File name** box, enter a name for the file to be saved.
4. Click **Save**. Analyst's Notebook saves the file, then displays the snapshot in a PowerPoint slide.

**Note:** If you do not want to view the snapshot in a PowerPoint slide, clear the **Open the Powerpoint file** check box.

## Printing to PDF

You can print a chart as a PDF document. To protect the document, you can set PDF security options.

1. Optional: Set security options for the PDF document.
2. To print the chart as PDF, click the **Publish** tab, and then in the **Print** group, click the arrow below **Print to PDF**. In the menu, click **Print to PDF**. The **Save As** window opens.
3. In the **Save As** window, navigate to the directory in which you want to save the file.
4. In the **File name** box, enter a name for the file to be saved.
5. Click **Save**. If you previously set a password, the **Confirm Password** window opens. Enter the password if specified, then click **OK**. Analyst's Notebook confirms that the PDF file was successfully saved, and displays options to open or share the file.

6. Select the option you require and click **OK**.

You can open the file, view it in Windows Explorer or create an email with the PDF as an attachment.

**Note:** Analyst's Notebook returns an "Unable to print to PDF" error if your computer has enabled the Windows Policy security option "System cryptography: Use FIPS compliant algorithms for encryption, hashing, and signing". The Print to PDF function employs the third-party component PDFSharp, which uses an MD5 algorithm that is not FIPS compliant. If you are unable to print to PDF, contact your system administrator.

## Setting PDF security options

When you print a chart as a PDF document, you can protect the document. You can password protect it, and control whether recipients of the PDF can print it, modify it, copy its contents, or add and edit notes.

1. Click the **Publish** tab, and then in the **Print** group, click the arrow below **Print to PDF**.
2. In the menu, click **PDF Security Options**. The **PDF Security Options** window opens.
3. Optional: In the **Document Open Password** field, type the password that the reader must enter to open the PDF document.

**Note:** Do not rely on PDF password protection to secure sensitive documents.

4. Optional: To control what the reader can do with the document, you must enter a permissions password then select which actions are permitted. If you do not enter a permissions password, all the actions in the **Permissions** group are permitted.
  - a) In the **Permissions Password** field, type the password that the reader must enter, and then modify which actions are permitted to the reader.
  - b) In the **Permissions** group, select actions.
5. To save the settings, click **OK**.

## Printing charts

Analyst's Notebook provides various options for printing an open chart, such as choosing the printer to use, and selecting which chart information to include in page headers and footers.

To print an open chart:

- Click the **Publish** tab, and then in the **Print** group, click **Print > Print**. You can pick a printer and choose how many copies to print.

Alternatively, if you would like to change the content that is printed:

- Click the **Publish** tab, and then in the **Print** group, click **Page Setup**.

The Page Setup options are displayed. Modify the page setup and click **Print**.

Option	Description
<b>Page</b>	Controls the size and layout options of the chart.
<b>Margins</b>	Add a margin to frame the items on the chart.
<b>Borders</b>	Add a visible border to the chart and determine whether background colors are included in the output.
<b>Annotation</b>	For timeline charts, you can specify where the time bar and theme line names are displayed.

Option	Description
<b>Header and Footer</b>	Add chart summary and custom property information to your chart. For example, page numbers, and a title.

## Saving a redacted copy of a chart

Redaction can be used to remove items, cards, and data records from a copy of your chart.

Sensitive information is removed from a redacted copy of a chart. As the redacted version of the chart is saved separately, you can run the redaction multiple times to tailor the redaction level for different audiences.

To specify a method to use:

1. Click the **Publish** tab, and then in the **Redact and Purge** group, click **Save a Redacted Copy**.  
The **Save a Redacted Copy Options** window opens.
2. Click **Add** to show the **Add a Redaction Method** window.
3. Select the methods to be used to redact the chart:

Option	Description
<b>Data Records based on their data source</b>	To remove data records from a specific data source, specify the name of the data source to which the data records are attached.
<b>Items and Cards based on their Grading</b>	To remove items and cards that are based on their grading: <ol style="list-style-type: none"> <li>a. Select the items to remove. Items can be chart items and cards, only chart items or only cards.</li> <li>b. From the "Based On" list, select a grade.</li> <li>c. In the "For Values" area, select one or more values.</li> </ol>
<b>Items based on a specified Flag Attribute</b>	To remove items that are based on Flag attribute classes: <ol style="list-style-type: none"> <li>a. From the "Remove items when" list, select the attribute class.</li> <li>b. Select the condition to use with items that have the attribute class assigned.</li> </ol> <p>For example, a condition might be that the attribute is present or absent, or has a value of Yes, or No.</p>
<b>Items based on a specified Text Attribute</b>	To remove items that are based on Text attribute classes: <ol style="list-style-type: none"> <li>a. From the "Remove items when" list, select an attribute class.</li> </ol>

Option	Description
	<p>b. Select a condition from the list. For example, a condition can be: equal to, contains, starts with, or ends with.</p> <p>c. Enter the value for the attribute.</p>

- Click **OK** to close the **Add a Redaction Method** window.
- Optional: To remove entities that no longer have links, select the **Remove entities which have all their links removed** check box.
- Click **OK**. In the **Save as** window, navigate to the directory in which you want to save the file. Enter a name for the redacted chart and click **Save**. The chart is saved as a redacted copy, and a **Cover Sheet** window is shown.
- Click **OK** to close the **Cover Sheet** window.
- A summary of the redacted chart is shown. Select the next steps, then click **OK**. For example, you can open the redacted chart.

## Report about charts

You can export chart information about entities, links, attributes, and cards to a report. Report specifications are useful if you want to create a report that contains the information in all or part of your chart. The generated report is created as a text file that can be then pasted into another application.

You define the items that you want to include in your report by using a report specification. A report specification is a series of settings that tells Analyst's Notebook what report to create and what you want to include in it. Use report specifications to define the items, content, and destination of your report. The report specifications are stored in a file called `Reporter.rep`.

## Opening the Reporter

You can open the Reporter to create, edit, delete, duplicate, and run report specifications.

To open the Reporter:

- Click the **Publish** tab, and then click **Reports**.
- In the **Report On** window, select one of the following options.

Option	Description
<b>New</b>	Create a report specification.
<b>Duplicate</b>	Duplicate the selected report specification.
<b>Edit</b>	Edit the selected report specification. For example, you might want to change the title, destination, content, and format of the specification.
<b>Delete</b>	Delete the selected report specification.
<b>Load</b>	Load a report specification.
<b>Run</b>	The selected report specification runs. You might be prompted for a file name and location.

Option	Description
	A report is generated by using the criteria that you selected.

## Creating report specifications

When you create a report specification, you can run it to report on data in your chart. You can choose whether to create a report that is based on the entire chart or one based on only selected chart items.

To create a report specification:

1. Click **New**.
2. The **Edit Report Specification** window is shown. Specify the destination, content, and format of the specification in the pages of the window.
3. In the Report on area, select one of the options for the generated report.
4. Click **OK**.

## Duplicating a report specification

You can duplicate a report specification. For example, to edit a copy of an existing report specification.

To duplicate a report specification:

1. Select a report specification to duplicate, and click **Duplicate**. An exact copy of the currently selected report specification is created. You might edit the duplicated report specification to change the title.
2. Optional: The duplicate report specification is added to the list of specifications. You can change the order of report specifications, select one, and drag it up or down in the list.
3. Click **Edit**. The **Edit Report Specification** window for the duplicated specification is shown where you edit the required properties.

## Editing report specifications

When you edit a report specification, you might change the destination, content, and format of it. You can edit the location of the generated output. You can specify the content of the output file, such as the chart items to include. You can also specify the format of the report.

To edit a report specification:

1. Click **Edit**.
2. Edit the name, destination, content, and format of the generated report.

## Default report specifications

Default report specifications are available. You can duplicate, edit, delete, and load these report specifications.

The following table describes the available default report specifications:

Option	Descriptions
<b>Full Report</b>	<p>Contains a list of entities and links, with the following information for each:</p> <ul style="list-style-type: none"> <li>• Identity</li> <li>• Label</li> <li>• Ends (for links only)</li> <li>• Type</li> <li>• Strength</li> <li>• Date and time</li> <li>• Description</li> <li>• Grades</li> <li>• Source type</li> <li>• Source reference</li> <li>• Attributes</li> <li>• Cards</li> </ul> <p><b>Note:</b> Empty fields remain blank.</p>
<b>List of Entities and Links</b>	<p>Contains a list of entities and links, with the Type, Label, and Ends (for links only) information for each.</p>
<b>List of Entities and Links (Tabbed)</b>	<p>Contains a list of entities and links, with the Type, Label, and Ends (for links only) information for each. Tabs are included between each field of information to make the report suitable to be pasted into a spreadsheet</p>
<b>Entity, Link and Card Grades (Tabbed)</b>	<p>Contains a list of entities, links, and cards with their Grade information. Tabs are included between each field of information to make the report suitable to be pasted into a spreadsheet.</p>
<b>Entity, Link and Card Descriptions</b>	<p>Contains a list of entities, links, and cards with their Label, Ends (for links only), and Description information. Cards are listed directly under the entity or link to which they belong.</p>



Option	Descriptions
<b>All Cards</b>	<p>Contains a list of cards, with the following information for each:</p> <ul style="list-style-type: none"> <li>• Chart item (the chart item to which the card belongs)</li> <li>• Summary</li> <li>• Time</li> <li>• Grade</li> <li>• Source type</li> <li>• Source reference</li> <li>• Contents</li> </ul>

## Loading report specifications

You can load report specifications, by selecting a report specification in the **Report On** window.

In the **Edit Report Specification** window:

1. Select **Load**.
2. Browse to the location of the report specification file.  
Report specifications are stored in a file named `Reporter.rep`. This file is typically found in: `C:\Users\USERNAME\Documents\i2\i2 Analyst's Notebook 8\Report Specifications\Reporter.rep`.
3. Select the required report specification and click **OK**.

**Note:** You can select more than one report specification by using the Ctrl or Shift keys. The **Select Specifications** window closes and you are returned to the **Report On** window where the loaded report specifications are listed. If a report specification exists with the same name as the one being loaded, it is not overwritten and both specifications are displayed in the list. For clarity, you might want to rename specifications to provide unique names.

## Specify the content of a report specification

The item information that you specify in your report might include all item information or just the information that is held in cards.

## Selecting chart items to include in your report

You can specify the chart items to include in your report. This information might include all the item information or just the information that is held in cards.

In the Chart Items area of the **Content** page of the **Edit Report Specification** window, select one of the following check boxes:

- **Icons**
- **Theme Lines**
- **Event Frames**
- **Boxes**
- **Circles**
- **Text Blocks**

- **OLE Objects**
- **Labels**
- **Links**

**Tip:** To select all chart items in the list click **Select All**. To clear the selected chart items, click **Clear All**.

## Selecting card information to include in your report

You can select card information for grades and keywords that can be included in your report.

In the Card Detail area, select one of the following check boxes:

Option	Description
<b>Minimum Grade</b>	<p>A specific minimum grade for any (or all) of the grades.</p> <p>Select the <b>Minimum Grade</b> checkbox and select the values that are required for the three grade types from the appropriate lists.</p> <p>The values that are available for the grades are defined in the grading system that is used for your chart.</p>
<b>Maximum Grade</b>	<p>A specific maximum grade for any (or all) of the grades.</p> <p>Select the <b>Maximum Grade</b> checkbox and select the values that are required for the three grade types from the appropriate lists.</p> <p>The values available for the grades are defined in the grading system that is used for your chart.</p>
<b>Keywords</b>	<p>Contain specific keywords. Select the <b>Keywords</b> checkbox and enter the required keywords in the box. Separate multiple keywords by commas or spaces. The keywords might be contained in the card summary, source type, source reference, or description.</p>

## Sorting card information in your report

You can sort the content of cards in your report by specifying the grade to sort on.

To sort card information by grade:

1. In the Sorted by list select one of the following options:

Option	Description
<b>Unsorted</b>	Cards are displayed in the order that they are included in the chart item.
<b>Grade 1</b>	Cards are sorted alphabetically by the value of Grade 1.

Option	Description
<b>Grade 2</b>	Cards are sorted alphabetically by the value of Grade 2.
<b>Grade 3</b>	Cards are sorted alphabetically by the value of Grade 3.

2. Click **OK** to save your changes and close the window.

## Selecting chart item information to include in your report

You can specify the item information to include in your report. This information might include all the item information or just the information that is held in cards.

In the Output area of the **Content** page of the **Edit Report Specification** window, select one of the following options:

Option	Description
<b>Everything</b>	All the item information (such as identity and label) and the card information that is associated with each item.
<b>Card Detail Only</b>	Only the card information.

## Defining the format of the generated report

You can enter the title of the report so that it describes what the report might be used for. The name of the chart can be included in the title.

Enter the title of the report in the **Title** box.

**Tip:** To include the file name of the chart in the report title enter @chart in this box.

For example, for a chart that is named 'Account Transactions', the title format: Report on @chart generates a report with the title 'Report on Account Transactions'.

## Chart item parameters

Information that is stored in chart items can be used when you create a report specification. For example, you might use this information to add a label or description property that can be displayed in the generated report.

The following entity parameters are available on the **Format** page of the **Edit Report Specification** window:

@itemDate	The date property of the chart item.
@itemDateTimeDescription	The date & time description of the chart item.
@itemDescription	The description of the chart item.
@itemGrade1	The Grade 1 information of the chart item.
@itemGrade2	The Grade 2 information of the chart item.
@itemGrade3	The Grade 3 information of the chart item.

@itemGrades	All Grades (Grade 1, Grade 2, and Grade 3) of the chart item.
@itemIdentity	The identity of the chart item.
@itemLabel	The label of the chart item.
@itemLabel1	The label of the entity at the first end of the link.
@itemLabel2	The label of the entity at the second end of the link.
@itemProfile	The identity of the entities at each end of the link and an arrow that shows the direction of the link between them.
@itemSemanticType	The semantic type that is assigned to the chart item.
@itemSourceRef	The reference of the source of the information that is represented by the chart item.
@itemSourceType	The type of the source of the information that is represented by the chart item.
@itemStrength	The line strength of the entity . For example, confirmed, unconfirmed, tentative.
@itemTime	The time of the chart item.
@itemTimeZoneLong	The long name of the time zone of the chart item.
@itemTimeZoneShort	The short name of the time zone of the chart item.
@itemType	The type of the chart item. For example, Male, Female, Child, Transaction, and Telephone Call.
@tab	A tab character.

## Attribute parameters

Information that is stored in attributes can be used when you create a report specification.

Attribute parameters are used to report on the attributes that are associated with the entities and links in your chart, and as such they are entered in the **Entities** and **Links** boxes of the **Format** page. You enter attribute parameters in the **Entities** box when you want to report on attributes for entities, and similarly, you enter attribute parameters in the **Links** box when you want to report on the attributes for links.

The @attributes parameter is always used to report on your attributes and can be entered in one of three forms:

Option	Description
@attributes	Use this form of the parameter to report on all your attributes by using a default format of Name Prefix Value Suffix.

Option	Description
@attributes {nameParam}	Use this form of the parameter to report on a specific attribute but by using the default format Name Prefix Value Suffix. You must replace the nameParam placeholder with the name of the attribute you want to report on, for example @attributes {Previous Convictions}.
@attributes {nameParam  formatParam}	<p>Use this form of the parameter to report on either a specific attribute or all attributes but with a specific format. You must replace the nameParam placeholder with either the name of a specific attribute, or the wildcard character * to report on all attributes. You must also replace the formatParam placeholder with any of the dedicated attribute format parameters. These parameters can be entered in any order (with no space) and with your own text additions, for example @attributes{Previous Convictions No.@Value@Suffix} where No. is your entered text.</p> <p>If you want to use format parameters, they must always be entered in the syntax:</p> <pre>@attributes{nameParam formatParam}</pre> <p>@attributes{formatParam} is invalid</p>

## Card parameters

Information that is stored in cards can be used when you create a report specification.

The following card parameters are available on the **Format** page of the **Edit Import Specification** window:

@cardDate	The date of the card.
@cardDateTimeDescription	The date & time description of the card.
@cardDescription	The description of the card.
@cardGrade1	The Grade 1 information of the card.
@cardGrade2	The Grade 2 information of the card.
@cardGrade3	The Grade 3 information of the card.
@cardGrades	All Grades (Grade 1, Grade 2, and Grade 3) of the card.
@cardSourceRef	The reference of the source of the information that is represented by the item to which the card is attached.
@cardSourceType	The type of the source of the information that is represented by the card.

@cardSummary	The summary of the card.
@cardTime	The time of the card.
@cardTimeZoneLong	The long name of the time zone of the card.
@cardTimeZoneShort	The short name of the time zone of the card.
@itemLabel	The label of the item to which the card is attached.
@itemProfile	The profile of the link to which the card is attached.
@tab	A tab character.

## Inserting page breaks

You can insert page breaks and commas, spaces, carriage returns, or other punctuation characters between parameters.

Depending on how page breaks are displayed in the report, select the following check boxes:

Option	Description
<b>Page Break After Each Item</b>	Insert a page break after each entity or link that is included in the report.
<b>Page Break After Each Card</b>	Insert a page break after each card that is included in the report.

**Note:** You can also separate information in the report by inserting the tab character (by using the @tab parameter), or by the use of commas, spaces, carriage returns, or other punctuation between parameter names in the Entities, Links, or Cards boxes.

## Accessibility

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

Users can change some elements in the user interface by customizing Analyst's Notebook and aspects of chart items. For example, color blind users and users with limited vision might want to change the following elements:

- Color of invalid data
- Color aspects of item type definitions
- Font of the text on the chart

## Accessibility features

Analyst's Notebook uses standard Microsoft Windows navigation keys. There are multiple ways to move around the user interface by using the keyboard.

Use the Tab and arrow keys to move through the interface and change focus.

You can also press Alt to activate keyboard shortcuts. When you press Alt, the application displays keytips to indicate what keyboards shortcuts are currently available. Press Alt and then the corresponding keyboard shortcut to complete an action.

The following table describes some common default keyboard shortcuts.

Action	Keyboard shortcut
<b>OK</b>	Press Enter
<b>Cancel</b>	Press Esc
<b>Delete</b>	Press Del
Move between items in a list, scroll down a menu, or select radio buttons	Press the Up Arrow or Down Arrow
Display the right-click menu	Press Shift+F10
Select checkbox	Press the Space bar

A list of more default keyboard shortcuts is given in the help. You can choose to customize these shortcuts to your own preference.

### Keyboard shortcuts

Analyst's Notebook provides a set of default keyboard shortcuts for performing common tasks. You can use the shortcuts to reduce the time you spend navigating the ribbon.

The shortcuts in Analyst's Notebook are:

Key	Command
F1	Opens Help contents window
F2	Rename the selected chart item
F3	Find next text
F4, Ctrl+F	Find text
Ctrl+F4	Close the current chart
Alt+F4	Exit Analyst's Notebook
F5	Visual Search
F6	Go to the next pane of a split window
Shift+F6	Go to the previous pane of a split window
Ctrl+Shift+F6	Go to the previous window of the current chart
F7	Check spelling
F8	Full Screen mode
F10	Display ribbon keytips
F11	List items

<b>Key</b>	<b>Command</b>
Ctrl+N	New standard chart
Ctrl+Shift+N	New from template
Ctrl+O	Open chart
Ctrl+P	Print chart
Ctrl+S	Save chart
Ctrl+T	Next snapshot
Ctrl+Shift+T	Previous snapshot
Alt+Enter	View properties of selected chart items
Page Up	Zoom in
Page Down	Zoom out
Right arrow	Pan right
Left arrow	Pan left
Up arrow	Pan up
Down arrow	Pan down
Shift+right arrow	Page right
Shift+left arrow	Page left
Shift+up arrow	Page up
Shift+down arrow	Page down
End	Fit chart in window
Shift+End	Fit height in window
Ctrl+End	Fit selection in window
Home	View at actual size
Ctrl+Tab, Ctrl+F6	Go to the next window
Ctrl+Shift+Tab	Go to the previous window
Ctrl+A	Select all
Ctrl+C	Copy
Ctrl+Shift+C	Copy with connections
Ctrl+D	Duplicate
Ctrl+V	Paste
0-9	Select members of set (0 - 9)
Ctrl+0-9	Define selection set (0 - 9) as the currently selected items
Ctrl+Alt+0-9	Add current selection to set (0 - 9)
Shift+0-9	Add members of set (0-9) to the selection



## Assigning a shortcut to a command

In addition to the default keyboard shortcuts that are available, you can assign shortcuts manually. Assigning a shortcut can change any default shortcut that uses that key combination.

To assign a keyboard shortcut to a command:

1. Click **File > Options**, and then in the Options window click **Customize > Keyboard**.
2. In the list of tabs, expand a tab name to view a list of all the commands in that tab.
3. Select a command in the list. A description of the command is displayed beneath the list. Any existing keyboard shortcuts are shown in the **Shortcuts** area.
4. Type the key in the **Press New Shortcut Key** box. As you press Ctrl or Shift, this part of the keystroke is automatically added.

You cannot assign:

- The Alt key as part of the shortcut (except when it is combined with Ctrl). Alt is reserved for access keys.
- The numbers 0 - 9, or Shift+, Ctrl+, Alt+ combinations with these numbers, as shortcuts. These numbers are reserved for Selection Sets commands.

5. Click **Add**.

**Note:** If you type a key or key combination that is already used by another command, the command to which this key is already assigned is displayed. You can continue to add this keystroke, but ensure that you remove it from the original command.

6. Click **OK**.

The shortcut can now be used. If you no longer require a particular shortcut, you can use **Remove**. Alternatively use **Reset All** to revert to the default shortcuts.

## Customize Analyst's Notebook

You can customize Analyst's Notebook. You can set application options, and manage files and plug-ins. You can also set up keyboard shortcuts and use utilities such as Series Import to import more than one data file.

### Infotips

When you hover over a chart item, an Infotip provides a summary of item data. You can configure Infotips to display the information that is of greatest interest to you.

You can choose which properties Infotips display, and you can configure the order of some of the information. For example, if you work with bank account data you might configure Infotips in the following way:

- Display the Account Type attribute at the top of the attribute list.
- Sort the Linked To list of accounts by the value of their transactions with the account that you hovered over.

If the item properties that you choose to display in Infotips contain hyperlinks, a small button appears in the Infotip. You can click this button to open a single hyperlink. If multiple hyperlinks are contained in the item properties, clicking the button opens a list for you to choose which hyperlink to open.

If you do not want to use Infotips, you can disable them and display tooltips instead. Tooltips contain the item label. For links, tooltips also contain the labels of the linked entities and an indication of the link direction.

## Data records in Infotips

You can choose to display data records in Infotips.

If multiple data records are attached to the item, click the left and right arrows to step through them.

For some source databases, you can

- Click the source icon to open the source record.
- Click the source label to open the data record in chart item properties.

## Configuring Infotips

You can configure Infotips to display the information that is of greatest interest to you. You can choose which properties Infotips display, and you can configure the order of some of the information.

The configuration applies to every Infotip that Analyst's Notebook displays.

To configure Infotips:

1. Hover over an item on your chart to display an Infotip.
2. Click **Configure** in the lower right of the Infotip.
3. Select which properties to display in Infotips:

Option	Description
<b>Attributes</b>	Displays attributes that have a value. To choose which attributes to display and to configure their order, click <b>Select</b> .
<b>Analysis Attributes</b>	Displays analysis attributes that have a value. To choose which analysis attributes to display and to configure their order, click <b>Select</b> .
<b>Date &amp; Time</b>	Displays the item's date and time.
<b>Line Strength</b>	Displays the item's line strength.
<b>Description</b>	Displays the item's description.
<b>Grades and Source</b>	Displays the grade and source information about the item. Grade and source information from cards is not displayed.
<b>Linked Items</b>	Displays a reference for each link to an entity. Clicking a reference pans to the linked item and centers it in the window.  Use the <b>Sort By</b> list to choose how the linked items are sorted, and the <b>Order</b> list to choose ascending or descending order.

Option	Description
<b>Cards</b>	Displays a summary and link for each card that is attached to the item. Clicking the link displays the card.
<b>Data Record Source Names</b>	Displays a list of the sources of the data records that are attached to the item.
<b>Data Record Properties</b>	Displays the properties of each data record that is attached to the item.

4. Click **OK** to save your changes.

## Selecting Infotip attributes

You can choose which attributes and analysis attributes that Infotips display. To give prominence to the most important information, you can configure the order of attributes in the Infotip.

To choose and order attributes:

- Follow the appropriate step according to whether you want to configure attributes or analysis attributes:
  - To configure attributes, in the **Configure Infotips** window, click **Select** below the **Attributes** check box.
  - To configure analysis attributes, in the **Configure Infotips** window, click **Select** below the **Analysis Attributes** check box.

A configuration window opens.

- Click the arrows to move the selected attributes into the appropriate columns:

Option	Description
<b>Show these attributes first</b>	If a value for an attribute in this list is present on an item, the attribute displays on the Infotip. To change the order of this list use <b>Move Up</b> and <b>Move Down</b> .
<b>Show these attributes next</b>	Attributes in this list will display after attributes moved into the <b>Show these attributes first</b> list, but only if the check box in the heading is selected.
<b>Don't show these attributes</b>	Attributes in this list are not displayed as part of an Infotip.

- Click **OK** to save your selection.

## Disabling Infotips

The Infotips displayed on the chart can be replaced with tooltips.

To disable Infotips and revert to tooltips, click the **View** tab, and then in the **Show** group, clear the **Infotips** check box.

## Custom icons

You can use your own images to supplement the icons that are provided with Analyst's Notebook. You can assign custom icons to entity types and attribute classes.

Images must meet the following specification:

- Bitmap (.bmp) format
- 8-bit color depth
- Size as specified in Table 1

Pixels that are colored magenta (RGB 255,0,255) are rendered transparent.

To make your custom icons available for use, copy the images to the appropriate folders specified in Table 1, then restart Analyst's Notebook.

**Table 11: Custom icon image sizes and folders.**

Type of icon	Use	Size (pixels)	Folder
Entity type	Screen	32x32	C:\Users\ <username>\Documents\i2\i2 Shared\Custom Images\Screen\Icons</username>
	Print	120x120	C:\Users\ <username>\Documents\i2\i2 Shared\Custom Images\Printer\Icons</username>
Attribute class	Screen	12x8	C:\Users\ <username>\Documents\i2\i2 Shared\Custom Images\Screen\Attribs</username>
	Print	45x30	C:\Users\ <username>\Documents\i2\i2 Shared\Custom Images\Printer\Attribs</username>

### Screen and print icons

Screen icons are displayed in the Analyst's Notebook window. Print icons are higher definition versions of screen icons and are used in printouts.

Creating custom print icons is optional; if a screen icon does not have a corresponding print icon, the screen icon is used in printouts. A print icon must have the same file name as the corresponding screen icon.

### Related tasks

[Embedding and extracting custom icons](#) on page 283

You can embed your custom icons into the charts and you can extract the custom icons that are embedded in charts that you open.

## Custom semantic types

You can derive custom semantic types based on the ones in the i2 Semantic Type Library, then use them in other charts and share them with colleagues. Deriving a custom semantic type is appropriate when you need a more accurate classification of your data than the standard type library provides.

When you derive custom semantic types and assign them to items on your chart, they are saved as part of your chart. You cannot delete the standard types from the i2 Semantic Type Library, but you can delete any custom semantic types that are not in use on the chart. After you remove all assignments of a custom semantic type, to access the **Delete** command you must first close and reopen the **Chart Properties** window.

**Note:** When you delete a custom semantic type, all descendants of the custom semantic type are also deleted.

### Related reference

[Item type definitions](#) on page 23

Entity types and link types categorize the information on your chart and are part of a chart's properties. If the existing item types are not suitable for your data, you can add or edit entity types and link types.

[Attribute definitions](#) on page 23

Attribute classes categorize the information that is stored as attributes on chart items and are part of a chart's properties. If the existing attribute classes are not suitable for your data, you can add or edit attribute classes. Attribute entries are preset values for attributes of a specific attribute class. For values that you reuse regularly, define attribute entries and add them to the appropriate palettes.

## Deriving custom semantic types

You can derive custom semantic types from semantic types that are stored in the standard library to provide more accurate classification of the data that you assign them to.

Search carefully for an available semantic type before you derive your own custom one. Defining a custom semantic type when the library already contains an appropriate semantic type can cause problems with information retrieval and matching.

Typically, you might derive a custom semantic type when you define an entity type, link type, or attribute class. You can also derive custom semantic types wherever you can assign a semantic type. For example, you can assign a semantic type to a single entity on the chart surface.

When you derive a custom semantic type, it is important to choose the correct parent semantic type, so that Analyst's Notebook interprets the data correctly. Some semantic types are used by Analyst's Notebook for entity matching. The Find Matching Entities feature uses semantic types that are assigned to entities, links, and attributes as part of its smart matching behavior.

To derive a custom semantic type:

1. In any window where you can select a semantic type, such as when you are defining an item type or attribute class, click the **Semantic Type** browse button. The **Select Semantic Type** window opens. The **Semantic Types** pane shows the entity, link, or property semantic type hierarchy.
2. Expand the hierarchy to find the semantic type from which you want to derive your custom semantic type. Right-click the semantic type, then click **New**.

**Note:** You cannot derive a custom semantic type from the Abstract Binary property semantic type. This special category of semantic type is reserved for internal use.

3. Enter a name for the custom semantic type in the **Name** box. The name must be unique within the semantic type hierarchy.
4. To improve your ability to search for this semantic type, add synonyms in the **Synonyms** box. For example, synonyms for the semantic type Mail in the i2 Semantic Type Library are Letter, Parcel, and Post. Use commas to separate the synonyms.
5. Describe what this semantic type is used for in the **Description** box. You can also include hyperlinks to further information.
6. Click **OK** to save the custom semantic type and assign it to the entity type, link type, or attribute class.

Custom semantic types are saved with your chart. Any custom semantic types that are not assigned to chart items, chart item types, and attribute classes are lost when you save and close your chart. To reuse custom semantic types in a new chart:

- Create a template based on your current chart and base your new chart on this template.
- Save your current set of custom semantic types in a new library file (.mtc file) which other Analyst's Notebook users can load and use.

## Share custom semantic types

You can share custom semantic types between Analyst's Notebook charts by saving them in a custom library file (.mtc file). Loading the file into another chart makes the custom semantic types available.

When you create a custom semantic type, it is saved with the current chart, but not in the i2 Semantic Type Library. Therefore, when you create a new chart, your custom semantic type is not available for you to use. You can, however, save the custom semantic types that you create in a custom library file with the file extension .mtc. The custom library file contains only the custom semantic types and the hierarchy of semantic types to which the custom types belong.

You can load a custom library file into a blank chart, which you can then save as a template. The custom semantic types are available for use in any new charts that you create from the template. You can also share your custom semantic types with your colleagues by sending them your custom library file, which they can then load into an Analyst's Notebook chart. When the file is loaded, any custom semantic types that the file contains are available for them to use.

To save a custom library file, click **File**, point to **Chart Properties**, and then click **Save Custom Semantic Types to File**.

To load a custom library file, click **File**, point to **Chart Properties**, and then click **Load Custom Semantic Types from File**.

You might want to load your custom semantic type file into your standard template. Your custom semantic types are then available whenever you create a chart based on your standard template.

**Note:** You cannot edit the i2 Semantic Type Library. It is maintained by i2.

## Using Drag Chart

By default, you can use the scroll bars (or overview pane) to see different areas of a chart, and use dragging to select items on the chart surface. To navigate more quickly around a large chart, you can put the application in drag mode.

When the application is in drag mode, the cursor changes from an arrow to a hand symbol. You can pan to bring different parts of the chart into view by dragging on its surface. Drag mode is enabled in the following ways:

From the right mouse button	Click and hold the right mouse button.
From the bottom menu bar	Click the <b>Drag Chart</b> option from the bottom menu bar.
From the <b>Ribbon</b> menu	Select the <b>View</b> tab and highlight the <b>Drag Chart</b> option with the cursor. Left-click to activate.
From the chart surface	Right-click on the chart surface and select <b>Drag Chart</b> from the menu.

From the space bar	Press the space bar to toggle <b>Drag Chart</b> on and off.
From the mouse wheel	Press the mouse wheel to toggle <b>Drag Chart</b> on and off.

## Selecting the user interface language

You can manually select which language Analyst's Notebook displays the user interface in. By default, Analyst's Notebook automatically selects a language, but you can override that selection.

By default, the Analyst's Notebook user interface language corresponds to the current **Format** setting, in your workstation's **Region and Language** settings. The **Format** setting determines the format of date, time, and numerical data. For example, if the current setting is French (Canada), then the Analyst's Notebook user interface is displayed in French. Translated templates, user help, and example materials are installed.

If you change the **Format** setting, the Analyst's Notebook user interface language changes when you next start the application. Alternatively, you can use the Analyst's Notebook language selector to manually select a language.

To manually select the user interface language:

1. If Analyst's Notebook is running, close the application.
2. From the **Start** menu, run the Analyst's Notebook language selector.
3. In the **Language Selector** window, select a language, then click **Select**.  
The window closes.
4. Run Analyst's Notebook.  
The Analyst's Notebook user interface is displayed in the selected language.

## Setting general application options

Use the **General** page of the **Options** window to specify general application options. Application options might be enabling and changing the color of hyperlinks, and error text color, and displaying the theme line icon bar.

Click **File > Options**, and then in the **Options** window click **Options > General**.

**Note:** These options are global application settings and are not saved as part of a chart or template. They persist until changed, regardless of what chart you are working on.

## Cut, copy, and paste chart items

When you cut or copy charts or parts of charts onto the clipboard, you can choose to make them available to another application in various forms.

Select one of the following options:

Option	Description
<b>Chart as OLE Object</b>	Copies a picture of the chart to the clipboard. You can then paste it into another application and still open and edit it in Analyst's Notebook

Option	Description
<b>Picture as Metafile</b>	<p>Copies a picture of the chart to the clipboard as a Windows metafile (.wmf). When you paste the copied chart into another application, it is no longer 'live'. It shows a picture of the chart when it was copied, but cannot be edited or opened as a chart.</p> <p>Metafiles contain both vector and bitmap information. Vector information is a series of instructions that tell the computer how to re-create the graphic. Bitmap information stores the graphic as a series of pixels.</p>
<b>Picture as Bitmap</b>	<p>Copies a picture of the chart to the clipboard as a bitmap (.bmp). It no longer behaves as a chart but displays a picture of the chart when it was copied.</p> <p>Most applications can handle bitmaps without problem, but might not handle metafiles.</p>

## Enabling hyperlink creation

You can enable the creation of a hyperlink and change the color that is used to display it.

To enable the creation of a hyperlink:

1. Select the **Enable** checkbox to enable the automatic hyperlink creation feature.
2. From the **Color** list that is displayed beneath the **Enable** checkbox in the Hyperlinks area, select the color to use to display a hyperlink.

## Enabling the theme line icon bar

You can choose whether to display the icon for a theme line as you move across a chart. As standard the theme line icon bar is displayed. It remains displayed as you pan across a chart so that theme lines can be quickly and easily identified.

Clear the **Enable** check box in the theme line icon bar area.

You can specify the color of the theme line icon bar. Select the color to use from the color picker.

## Enabling advanced analysis

Enable advanced analysis to use analysis attributes.

Select the **Advanced Analysis** checkbox to make analysis attributes available in:

- Visual Search
- List Items
- Find Path
- Combine Attributes



## Changing zoom effect behavior

By default, Analyst's Notebook animates the zoom effect when you zoom in and out of areas on the chart surface. You can change the option to remove the animated effect.

1. Click **File > Options** to open the **Options** window.
2. Click **General** and look for the check box next to **Animated Zoom Effect**.
3. If the box is checked, you must clear it to turn off animated zooming.
4. Click **OK**.

The animated effect is removed from the zoom option on all charts. This setting persists until changed, regardless of the chart you are working on.

## Enable drag hand throws chart

You can select a chart and use the drag hand to drag and throw the chart.

Select the **Drag Hand Throws Chart** checkbox.

## Enabling high-quality drawing mode

You can enable high-quality drawing mode. High-quality drawing mode might be used when you print a chart to PDF or use it in a presentation. It can also be used if you share the chart with other users.

Select the **High Quality Drawing Mode** checkbox so that the drawing uses a high quality.

## Changing the behavior of drag selection

By default, you can select items in Analyst's Notebook by touching them with the rectangle that opens when you drag on the chart surface. You can change this behavior so that items are selected only when the rectangle fully encloses them.

1. Click **File > Options** to open the **Options** window.
2. Click **General** and look for the check box next to **Drag Selects Only Fully Enclosed Items**.
3. If the check box is clear, you must select it to change the behavior of drag selection.
4. Click **OK**.

The behavior of drag selection changes for all charts. This setting persists until changed, regardless of the chart you are working on.

## Combining records on paste

By default, i2 Analyze records combine with matching records when you use copy and paste. You can choose to deselect this option.

This option combines i2 Analyze records from the same Information Store. If you chart records from one store and then connect to a different i2 Analyze server, records are not combined. For more information about using this option, refer to [Copy and paste](#) on page 135.

1. Click **File > Options** to open the **Options** window.
2. Click **General** and look for the check box next to **Combine Matching i2 Analyze Records On Paste**.
3. If you want to deselect the option to combine records, click the check box.
4. Click **OK**.

## Setting user interface options

Use the **User Interface** page of the **Options** window to change the color in which invalid values are displayed and to control the display of ribbon tooltips.

Click **File > Options**, and then in the **Options** window click **Options > User Interface**.

**Note:** These options are global application settings and are not saved as part of a chart or template. They persist until changed, regardless of the chart on which you are working.

## Changing the color of invalid data

When you enter invalid data into a field, the data is displayed in a specific color. You can choose which color is used.

Invalid data might be an identity that is already in use on the chart. Other invalid data might be a textual character in a numerical field, or a numerical value that is too large or too small. To move the cursor to a different field, or save the data or setting, you must correct the invalidity.

To change the color that invalid data is displayed in, select a color from the **Error Text Color** list.

## Changing auto hide animation

By default, when you auto hide panes in Analyst's Notebook they open and close quickly as you place the cursor over them. When you turn animated auto hide on, the panes slide open and closed more slowly.

1. Click **File > Options**, and then in the **Options** window click **User Interface**.
2. Look for the checkbox next to **Animate Auto Hide**. You must select the checkbox to activate animated auto hide or clear it to remove the animated effect.
3. Click **OK**.

The change takes effect immediately and persists until you change it again, regardless of the chart you are working on.

## Ribbon tooltip display options

When you hover over a button or command in the Analyst's Notebook ribbon, tooltips that provide help on the feature are displayed by default. You can choose to show the full tooltip, just their name, or turn them off.

**Note:** When you choose an option, to apply the change you must restart Analyst's Notebook.

Select one of the following options:

Option	Description
<b>Show names and descriptions</b>	Displays the entire tooltip, including the name, enhanced information, and any contextual links to the help.
<b>Show names</b>	Displays only the name that describes the feature. Enhanced information and contextual links to the help are not shown.
<b>Do not show</b>	No tooltips or links to the help are displayed.

## Setting icons application options

Use the **Icons** page of the **Options** window to select the icon that is set to use for every new and existing chart that is opened in Analyst's Notebook.

Select one of the following application-level options:

Option	Description
<b>New Icons</b>	New and existing charts use the latest, high-quality icons.
<b>Legacy Icons</b>	New and existing charts use the icon set available in releases before Analyst's Notebook v8.5
<b>As Saved in Chart</b>	By default, existing charts use the icon set that is selected in the chart last time it was saved. New charts use the latest, high-quality icons.

**Note:** You might want to override the application-level setting for the chart you are currently working on. To do this step, select **As Saved in Chart** and then change the icon set that is selected in the **Icons** page of the **Options** window.

You can open charts that contain new icons in earlier versions of Analyst's Notebook. The new icons cannot be displayed and are represented by legacy icons, but the new icons are not overwritten if you save the chart in versions later than Analyst's Notebook 6.

**Note:** If you save a chart that contains new icons in Analyst's Notebook 6, they are replaced and saved as legacy icons.

## Embedding and extracting custom icons

You can embed your custom icons into the charts and you can extract the custom icons that are embedded in charts that you open.

You can embed your custom icons into the charts that use them, so that recipients of the charts can see the icons on the charting surface. You can extract the custom icons that are embedded in charts that you open, so that the icons become available for you to use.

- To save custom icons so that they are embedded within the charts that use them, select the **Save Custom Icons in Charts** checkbox. If you clear this checkbox, other users see default icons instead of the custom icons. By default, this option is selected.
- To extract custom icons from charts that you open, select the **Extract Custom Icons from Charts** checkbox. By default, this option is selected.

### Related concepts

[Custom icons](#) on page 276

You can use your own images to supplement the icons that are provided with Analyst's Notebook. You can assign custom icons to entity types and attribute classes.

## Displaying, hiding, and resetting panes

You can display or hide any Analyst's Notebook pane from the **Options** window. If you repositioned or resized any panes during your analysis, you can set a single pane or all of them back to their default visibility, position, and size.

Click **File > Options**, and then in the **Options** window click **Customize > Panes**. Change the visibility or reset the visibility, position, and size of panes:

- To display or hide a pane, select or clear the check box next to the relevant pane. When you display a pane, it appears at the size and position it was last displayed.
- To set the visibility, size and position of a single pane back to its default setting, select the pane and click **Reset**.
- To set the visibility, size and position of every pane back to their default settings, click **Reset All**.



**Attention:** You cannot undo the outcome of the Reset functions. Before you click **Reset All**, make sure that you want to reset every pane.

## Setting saving application options

Use the **Save** page of the **Options** window to specify options when you save a chart. Saving options might be enabling and displaying the Cover Sheet, and setting the interval that is used for automatically saving a chart.

Click **File > Options**, and then in the **Options** window click **Options > Save**.

**Note:** These options are global application settings and are not saved as part of a chart or template. They persist until changed, regardless of what chart you are working on

## Display the cover sheet when you save a chart

The cover sheet describes the content and purpose of the chart so that other users can read this information before a chart is opened. A version is displayed when you save your chart, and can be used to change the description.

There are one of three options you can set to determine how often the editable version of the cover sheet is shown:

Option	Description
<b>Do not Display When Saving</b>	Prevents the cover sheet from being displayed every time that you save a chart.
<b>Displays on First Save</b>	Displays the cover sheet on the first save of a new chart. This option is the default.
<b>Display on Every Save</b>	Displays the version of the cover sheet every time you save a chart.

This option displays the read-only version of the cover sheet on opening a chart. It is set only on the editable version of the cover sheet, which is displayed by using either these options or by clicking **File > Cover Sheet**.

## Automatically saving charts

You can choose to automatically save the charts you are working on, and specify the time interval at which the auto save occurs.

1. Click **File > Options**, and then in the **Options** window click **Options > Save**
2. Select the **Auto Save** checkbox and enter the time period in minutes. The default auto save option is set to save every five minutes.
3. Select the folder in which you want Analyst's Notebook to keep the temporary files. Preferably choose a folder on your local hard disk, typically the C: drive.
4. Click **OK**.

All your open charts are saved automatically at the time interval you specified.

**Note:** Automatically saving your chart does not display the Cover Sheet. It is displayed only when you click **File > Save** or **File > Save As**, or the **On Save** checkbox is selected in the **Chart Properties** window.

The auto save files are only restored when you start Analyst's Notebook after a failure. They are deleted when you close Analyst's Notebook normally. If you want to keep these charts, you must save them normally before you close Analyst's Notebook.

## Archiving charts

For backup and record-keeping, you can configure the Analyst's Notebook archiving feature to make a separate copy of your chart every time you save it. You can decide how many copies to retain, and whether the application monitors their integrity.

1. Click **File > Options**, and then in the **Options** window click **Options > Save**
2. Select the **Archive on Save** checkbox.
3. Choose the number of copies of each chart you want to retain. The default option is set to five charts.
4. Optional: Select the **Test Archives for Corruption** checkbox to verify your archived files. Analyst's Notebook runs a background check and alerts you if the archive fails.
5. Click **OK**.

Every time that you save an open chart, a backup copy is saved in an i2 Chart Archives folder, up to the maximum number you specified.

## Display compatibility warnings

Analyst's Notebook warns you of significant compatibility issues with earlier versions, when you save a chart.

When you save a chart in this version of Analyst's Notebook, the chart is checked to see if there are any significant compatibility issues with earlier versions and a relevant warning is displayed. For example, new icons, pictures on icons and icon frames are not supported in versions earlier than Analyst's Notebook 8.5.

By default, the **Warn About Compatibility when Saving in Current Format** checkbox is selected. Check warnings regularly to ensure that you do not encounter unexpected incompatibility issues when you open charts in earlier versions. If you are familiar with the compatibility warnings when you save charts and no longer want to see them, clear the checkbox.

## Managing files and file locations

For a new installation of Analyst's Notebook, a set of template and specification files is installed to default locations on your computer.

### Types of files that are installed with Analyst's Notebook

Templates and specifications that are installed with Analyst's Notebook are used to create charts that can be used for different audiences.

The main template and specification files are:

Template	Description
Standard template (Standard.ant)	The template that is used as the basis for a new chart when you click <b>File &gt; New &gt; New Standard Chart</b> .
Flag template (Flag.ant)	A local template that contains only flag icons. Local templates are selected in the <b>New From Template</b> window, which opens when you click <b>File &gt; New &gt; New from Template</b> .
Report specification (Reporter.rep)	This file contains six standard specifications for generating reports by using the Reporter. The report specifications in this file can be used when you click the <b>Publish</b> tab and then click <b>Reports</b> .

As you use Analyst's Notebook you might update the template files. For example, you, might add new entity types, or when you want to create new report specifications. You might also move the location of some files. For example, to create central server copies for regular backups, or when you want to share templates and specifications with other users in your group.

Managing your files means that:

- Some key templates and specifications can be moved to new folder locations
- All files can be updated automatically at installation when there are newer versions, or where you edited the original versions
- You can choose to accept or reject an update where a 'notify' feature is selected
- The Standard template and Report specification file can be restored later where you either edit the original file or rejected an update at installation.

### Maintaining file versions

When you upgrade Analyst's Notebook to the latest version, old files are overwritten and new files are installed automatically.

If you changed the contents of your original installed templates or specification between versions, a **Replace** window is shown when you first start Analyst's Notebook.

You must select one of two options before you can use Analyst's Notebook:

Option	Description
Use the updated <file name> (the old file is backed up)	Creates a backup copy of your edited file with the name Backup <n> of <file name> in a Backup directory (for example, for templates, C:\Documents and Settings\<user name>\Templates\Backup), and overwrites your edited file with the latest version.
Keep the existing <file name>	Ensures that your edited version of the template or specification file is not overwritten and remains available for use with your latest version of Analyst's Notebook. If you choose this option while you update the Standard template or Report specification, you can reset these files with the installed versions later by using the Templates and Reporter pages of the <b>Options</b> window.

## Standard template file

When you click **File > New > New Standard Chart**, the template that is specified in this path is used.

To reset the current Standard template with the installed version of the template:

1. Click **Reset** in the Standard Template File area. The **Reset Standard Template File** window is shown. Note **Reset** is only available when either a more recent version of the template is installed (but you chose not to use it) or you edited the current installed version.
2. You can click **Details** on the **Reset Standard Template File** window to read a description of what happens when you reset the file.
3. Click **OK**. The latest version of the Standard template is installed to its default location.

## Local Template folder

The Local Template folder contains templates that are in the list of local templates when you click **File > New > New from Template**.

To reset the local template folder to the default local template folder, click **Reset** in the Local Template Folder area.

**Note:** **Reset** is only available if the default local template folder is changed.

## Workgroup Template folder

The Workgroup folder contains templates that are in the list of workgroup templates when you click **File > New > New from Template**.

## Using the Reporter page

You can use the standard installed report specification `Reporter.rep` to create and modify reports.

This specification is typically at `C:\Documents and Settings\<user name>\My Documents\i2\i2 Analyst's Notebook 8\Report Specifications`.

You can create your own `.rep` files, or revert to using the original installed `Reporter.rep` file if you changed it.

Use the **Reporter** page to specify the location of the report specification (\*.rep) file that you want to use in Analyst's Notebook, and to restore the original installed version of the Reporter.rep file.

To change the location of your report specification file, enter the path or click **Browse** to specify a different location.

To change the location of your report specification:

1. Click **Reset**. The **Reset Specifications File** window is shown. **Reset** is only available when either a more recent version of the specification file is installed (but you chose not to use it) or you edited the original copy.
2. You can click **Details** on the **Reset Specifications File** window to read a description of what happens when you reset the file.
3. Click **OK**. The latest version of the specification file is installed to its default location.

## Updating files

When you upgrade Analyst's Notebook to the latest version, old files are overwritten, and new files are installed automatically. However, if you change the contents of your original installed templates or specifications between versions, a **Replace** window is shown when you first start Analyst's Notebook.

You must select one of two options before you can update a file:

Option	Description
Use the updated <file name> (the old file is backed up)	Creates a backup copy of your edited file with the name Backup of <file name>, and overwrites your edited file with the latest version.
Keep the existing <file name>	Ensures that your edited version of the template or specification file is not overwritten and remains available for use with your latest version of Analyst's Notebook. If you select this option when you update the Standard template or Report specification, you can reset these files with the installed versions later by using the <b>Options</b> window that opens when you click <b>File &gt; Options</b> .

## Managing plug-ins

Analyst's Notebook is an application that can be extended with more functions which are part of a plug-in. A plug-in is a software component which might provide commands and ribbon buttons in addition to those commands provided as standard in Analyst's Notebook.

There are two types of plug-in:



Component	Description
Standard	<p>Standard components are provided by i2 and are present as part of the standard Analyst's Notebook software. Standard components are identified in the <b>Author</b> box by the phrase:</p> <p>Component authored by i2</p> <p>Some standard components are by loaded when the application starts. Others are only loaded when required, such as the Visual Search component.</p>
Extensions	<p>Extensions are third-party plug-ins that are not part of the standard Analyst's Notebook product. For more details about an extension, select it in the list and read the information in the <b>License</b> box.</p>

## Specifying available plug-ins

To list the installed plug-ins, expand either the Standard or Extension sections, and use the scroll bar to view the list of plug-ins for each type. The list of plug-ins for each type are grouped under the subsections Loaded and Unloaded showing those plug-ins that are successfully loaded or failed to load

To specify available and unavailable plug-ins:

- To enable a plug-in, select the plug-in in the displayed list, and select the **Load on Startup** check box.
- To disable a plug-in, select the required plug-in and clear the **Load on Startup** and **Protect against Plug-in Failure** check boxes
- You also select the **Protect against Plug-in Failure** check box to allow Analyst's Notebook to load properly even if the plug-in fails to load. The plug-in can then be reported in the Failed area when Analyst's Notebook is up and running.

## Glossary

This glossary includes terms and definitions for i2® Analyst's Notebook.

The following cross-references are used in this glossary:

- See refers you from a term to a preferred synonym, or from an acronym or abbreviation to the defined full form.
- See also refers you to a related or contrasting term.

## A

### **abstract semantic type**

A semantic type that only serves as the parent of other semantic types. Abstract semantic types categorize their child semantic types, but are never associated with real data.

### **aligned value**

A value that is used to interpret equivalent native values from different data sources. For example, the value Male can be used to align the native values M or Ma.

**analysis attribute**

A characteristic or trait pertaining to a chart item. Analysis attributes are never displayed on charts.

**association chart**

A chart that highlights the relationships between entities, rather than a chronology of events, by arranging data in a manner that emphasizes particular associations.

**attribute**

A piece of information that is associated with a chart item, such as a date of birth or an account number. An attribute is represented by a symbol, or a value, or both, that is displayed with the chart item.

**attribute class**

A descriptor of the characteristics of an attribute, including the type of its values, how its values are displayed, and the treatment of its values when they are merged or pasted on a chart.

**attribute entry**

An attribute with a preset value that can be associated with a chart item.

**attribute instance**

A single use of an attribute on a chart item.

**authority**

A measure of how well-connected an entity is, based on its inbound links. Authority is one of two eigenvector centrality measures used in social network analysis. See also [centrality](#), [eigenvector](#).

**automatic attribute**

An attribute that is created automatically by the application and added to a chart item.

## B

**betweenness**

A measure of how important an entity is, based on the number of paths that pass through it on an association chart. Betweenness is one of the centrality measures used in social network analysis. See also [centrality](#), [gatekeeper](#).

**binding strength**

A measure of the strength of a relationship between two entities that are directly or indirectly linked. See also [common neighbor](#).

**box**

An entity representation that can indicate an organization or group on a chart. A box is often used to enclose other entities. See also [circle](#), [representation](#).

## C

**card**

A record of information attached to an item. An item can have multiple cards.

**centrality**

The relative importance of one entity compared to other entities in social network analysis, as determined by its relationships. See also [authority](#), [betweenness](#), [closeness](#), [degree](#), [eigenvector](#), [hub](#), [social network analysis](#).

**chart**

A visual representation of real-world objects, such as organizations, people, events, or locations, and the relationships between them.

#### **chart fragment**

A view of a chart that highlights particular items of interest.

#### **chart property**

A characteristic of a chart, such as its summary description, time zone, grid size, background color, or merge and paste rules. Chart properties are saved with the chart. See also [chart template](#).

#### **chart template**

An object that is used for chart creation that contains preconfigured chart properties, and lists of permitted entity types and link types. See also [chart property](#).

#### **child**

In a generalization relationship, the specialization of another element, the parent. See also [parent](#).

#### **circle**

An entity representation that can indicate an organization or a group on a chart. A circle is often used to enclose other entities. See also [box](#), [representation](#).

#### **circular layout**

A layout in which entities are arranged by type around the circumference of a circle. See also [layout](#).

#### **closeness**

A measure of how quickly an entity can use links to get access to other entities on an association chart. Closeness is one of the centrality measures used in social network analysis. See also [centrality](#).

#### **cluster**

A group of entities that have more connections to each other than to entities outside the group.

#### **common neighbor**

An entity that is directly connected to at least two other entities. For example, if C is connected to A and B, then C is a common neighbor of A and B. See also [binding strength](#), [connection](#).

#### **compact peacock layout**

A layout in which complex groups of linked entities are arranged to highlight the structure of associations. It is most suitable for charts with many linked entities. See also [layout](#).

#### **condition**

A specified property, a value, and an operator that defines a comparison relationship between them. One or more conditions can be used to create a query or a conditional formatting specification.

#### **conditional formatting**

The process of defining and applying rules to change the appearance of chart items automatically, based on their properties. See also [conditional formatting specification](#).

#### **conditional formatting specification**

A collection of conditional formatting rules. See also [conditional formatting](#).

#### **connection**

A direct relationship between a pair of entities on a chart, represented by one or more links. See also [common neighbor](#), [connection multiplicity](#), [directed connection](#).

#### **connection multiplicity**

A setting that controls whether multiple links between the same items are displayed as a single line, as directed lines, or as multiple lines. See also [connection](#).

**controlling item**

A chart item whose position on the chart is defined by its date and time, and whose position affects the positions of other timed items. See also [free item](#), [ordered item](#).

**cover sheet**

A page on which the user can view and edit the summary and custom properties of a chart.

**D****degree**

A measure of how many direct relationships an entity has with other entities on an association chart. Degree is one of the centrality measures used in social network analysis. See also [centrality](#), [root entity](#).

**directed connection**

A connection between entities in which links that are in the same direction are represented as a single link on a chart. See also [connection](#).

**diverted theme line**

A theme line that is attached to an event frame such that when the event frame is moved, the theme line maintains its vertical position with respect to the frame. See also [event frame](#), [theme line](#).

**E****eigenvector**

A measure of how well-connected an entity is, based on its inbound and outbound links. Eigenvector is one of the centrality measures used in social network analysis. See also [authority](#), [centrality](#), [hub](#).

**end**

An entity that is attached to a link. See also [end constraint](#).

**end constraint**

A constraint on the types of entities that can be the end of a particular link. See also [end](#), [valid end type](#).

**entity**

A set of details that are held about a real-world object such as a person, location, or bank account. An entity is a kind of item.

**entity semantic type**

A semantic type that can be assigned only to an entity or an entity type. See also [semantic type](#).

**entity type**

A descriptor of the characteristics of an entity, including the properties it can contain and its appearance in visualizations.

**event frame**

An entity representation that emphasizes date and time information. An event frame is often used in conjunction with theme lines. See also [diverted theme line](#), [representation](#).

**expansion**

A process that searches for entities within a data source that are directly related to some selected entities.

## F

### free item

A chart item that is not ordered. Free items can be moved anywhere on the chart. See also [controlling item](#), [ordered item](#).

## G

### gatekeeper

An entity with a high measure of betweenness that may control the flow of information among other entities on an association chart. See also [betweenness](#).

### grade

A rating that indicates the accuracy of a piece of information or the reliability of an intelligence source.

### grading system

A rating scale that is used to classify information in a data store or on a chart. A grading system is a measure of reliability and accuracy.

### grouped layout

A layout in which entities are arranged to show groups of interconnected entities. See also [layout](#).

## H

### heat map

A graphical representation of data values in a two-dimensional table format, in which higher values are represented by darker colors and lower values by lighter ones.

### hierarchical layout

A layout in which entities are arranged to show organizational structures. See also [layout](#).

### histogram

A graphical display of the distribution of values for a numeric field, in the form of a vertical bar chart in which taller bars indicate higher values. See also [histogram filter](#).

### histogram filter

A filter that changes the appearance of a chart. When a histogram bar is selected, items that match the conditions defined by that bar are selected, while items that do not are hidden. See also [histogram](#).

### hub

A measure of how well-connected an entity is, based on its outbound links. Hub is one of two eigenvector centrality measures used in social network analysis. See also [centrality](#), [eigenvector](#).

## I

### icon

An entity representation that consists of a stylized image and an optional label. See also [representation](#).

### import design

A specification of how data from an external source will be transformed into chart or repository items during an import procedure.

### item

An entity or a link. Items are characterized by the values of their properties. See also [merged item](#), [ordered item](#).

## L

### **layout**

The arrangement of items on a chart. See also [circular layout](#), [compact peacock layout](#), [grouped layout](#), [hierarchical layout](#), [minimize crossed links layout](#), [peacock layout](#).

### **line strength**

An indication of confidence in the information underlying a particular link. Line strength is represented as a solid, dashed, or dotted line on a chart.

### **link**

An association between two entities, such as an ownership relationship between a person and a vehicle.

### **link direction**

An indication that the meaning of a link is different for each of its ends. For example, the direction of a telephone call makes one end the caller and the other the recipient. Link direction can influence the centrality measures used in social network analysis.

### **link semantic type**

A semantic type that can be assigned only to a link or a link type. See also [semantic type](#).

### **link separation**

The distance between adjacent links in a connection on a chart.

### **link type**

A descriptor of the characteristics of a link, including the properties it can contain and its appearance in visualizations.

## M

### **match**

The part of a result that met a condition during a search operation. A search can yield a perfect match or a partial match.

### **merged item**

An item that is created by merging the information held in two or more items. See also [item](#).

### **minimize crossed links layout**

A layout in which entities are arranged in a configuration where the fewest number of links overlap. See also [layout](#).

### **multiplicity**

See [connection multiplicity](#).

## N

### **network chart**

See [association chart](#).

## O

### **ordered item**

A chart item whose position is maintained within a sequence. The movement of an ordered item is restricted such that it cannot be dragged beyond neighboring ordered items. See also [controlling item](#), [free item](#), [item](#).

## P

### **parent**

In a hierarchy or auto-level hierarchy, a member that has one or more child members at the level immediately below.

### **path**

A route on a chart between two entities. A path may include intermediate entities.

### **peacock layout**

A layout where complex groups of linked entities are arranged to show the structure of associations. It is most suitable for charts with many linked entities. See also [layout](#).

### **property**

A container for a single piece of information about an item.

### **property semantic type**

A semantic type that can be assigned to a property type, a property in a data record, or an attribute class. See also [semantic type](#).

### **property type**

A descriptor of the characteristics of a property, including the type of information it can contain.

### **proportional**

Pertaining to an area of a chart in which the horizontal distances between items have a linear relationship with the time differences between them.

## R

### **representation**

The form in which an entity is represented on a chart. See also [box](#), [circle](#), [event frame](#), [icon](#), [theme line](#).

### **root entity**

An entity in a grouped layout that has the highest degree centrality in its group. Depending on the data, there can be more than one root entity. See also [degree](#).

## S

### **semantic type**

A category that defines the real-world meaning of data, and therefore how applications should interpret that data. For example, Person is a semantic type that could be assigned to entity types such as Male, Victim, and Witness. See also [entity semantic type](#), [link semantic type](#), [property semantic type](#).

### **snapshot**

A stored version of a chart that preserves its contents and layout at a particular stage of its development.

### **social network analysis**

A method of analyzing the structure of social relationships that uses mathematical metrics to make claims about social organization and social dynamics. See also [centrality](#), [weight](#).

**style segment**

A section of a theme line between adjacent items to which color and strength can be applied.

**T****theme line**

An entity representation that shows the interactions of an entity over time. A theme line can be used with event frames. See also [diverted theme line](#), [representation](#).

**theme line extent**

The distance between the beginning and end of a theme line

**theme line wiring**

The manner in which a theme line diverts from a horizontal trajectory in order to pass through and travel between event frames.

**timeline chart**

A chart or a portion of a chart that shows a chronology of events. For example, a series of meetings that occur over several days, or a set of transactions that occur over a period of time.

**V****valid end type**

An entity type that conforms to the end constraints of a particular link. See also [end constraint](#).

**W****weight**

A value that is added to a link on an association chart, to represent its importance relative to other links. Weight can influence the centrality measures used in social network analysis. See also [social network analysis](#).

**weightings file**

A file that contains information that can apply weighting values to links on a chart.

**wiring segment**

The section of a theme line between adjacent diverting event frames.



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