SAS® Visual Investigator 10.4: Tutorials and Examples

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SAS® Visual Investigator 10.4: Tutorials and Examples

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1

About This Documentation

Tutorials, Examples, and Other SAS Visual Investigator Resources 1

Tutorials, Examples, and Other SAS Visual Investigator Resources

The documentation included in *SAS Visual Investigator: Tutorials and Examples* highlights some of the features of SAS Visual Investigator to help you get started. To access all documentation for SAS Visual Investigator and see more details about these and other tasks, go to http://support.sas.com/documentation/prod-p/visgator/index.html.

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Scenario Authoring, Alerts, and Investigation Management

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Reviewing Alert Details

This SAS Visual Investigator tutorial describes one method of accessing details related to a specific alert.

Navigate the online slide show for an interactive overview of reviewing alert details.

View the slideshow in SAS Help Center.

There is no one way to review and investigate alerts, but here is a high-level procedure that describes a general process of alert review, originating from the **Alerts** page.

1 On the **Alerts** page, select the strategy with the alerts that you want to see.

   By default, the alerts are presented in priority order by score.

2 From the alert list, select the alert of interest.

3 Review the summary information related to the selected alert.

4 To open an alert, double-click it.

   The alert is checked out and is opened in Edit mode.

   Note: If you open the alert from a search results list, the alert is not checked out. It is opened in View mode.

   The **Alert Details** tab is displayed, and if an associated network is assigned, then the network is added to the **Workspace** tab by default.

   The **Alert Details** tab is a custom view of the alert. Administrators can also define the **Alert Details** tab to open other tabs containing more details or a different view of existing details.

5 Explore the information available at the **Alert Details** tab and any other associated tab that is open in this view.

In general, investigation of an alert and the associated details can be followed by applying an alert action (that is, a disposition method or assignment). Alternatively, you might continue the investigation by evaluating the alert in other views.

Applying a Disposition Method

This SAS Visual Investigator tutorial describes the process for applying a disposition method to determine how an alert is handled.

1 To apply a disposition method, do one of the following:

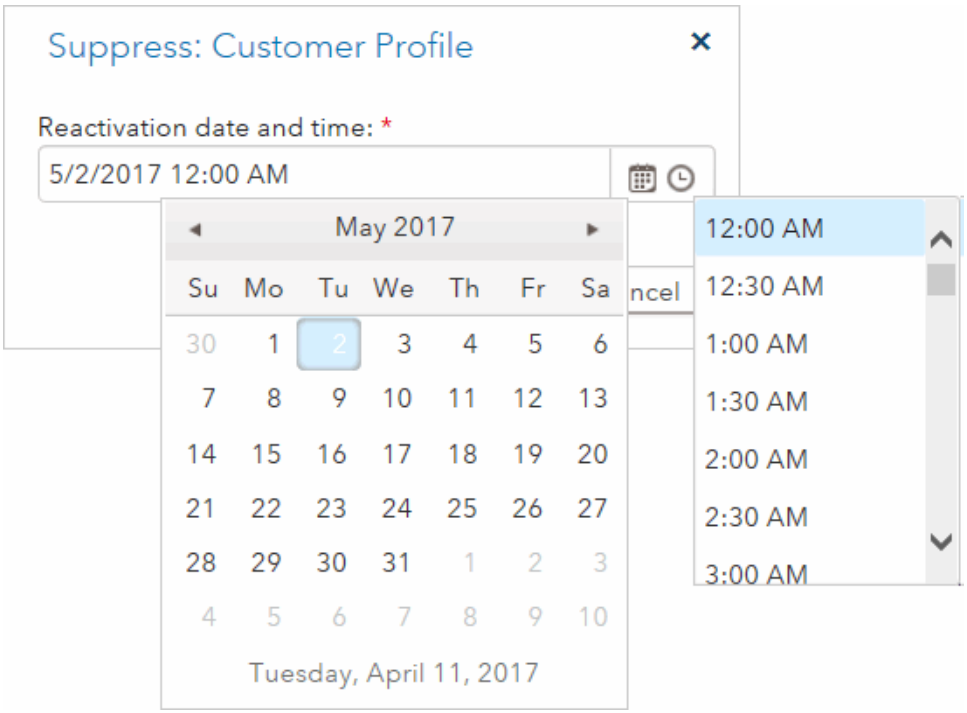
- To disposition a single alert, with an alert selected in the alert list pane or opened on an **Alert Details** page, expand the options in the **Disposition** menu and select the disposition to apply.
- To disposition one or more alerts, on the alert list, you can select one or more alerts, and then right-click. In the pop-up menu, select **Disposition**, and then select the disposition to apply.

Note: If another user has a selected alert open, a message indicating that the alert is currently being edited by another user is displayed at the top of the page. The alert is opened as read-only.

Note: If you select more than one alert on the **Alerts** page, only those dispositions that can be applied to all of the selected alerts are enabled. If the alerts do not have any dispositions in common, the **Disposition** menu is not enabled.

2 If prompted, enter any extra information that is required by the disposition. For example, if you are applying a disposition that suppresses an alert, you might be prompted for the date and time at which the alert should be reactivated.

Note: If a date and time are required, if you do not select a time, a default time of 12:00AM is added to the entry.



3 Click **OK**.

If an alert is open and you apply a disposition that closes or suppresses that alert, the **Alert Details** page closes. If an alert is open and you apply a disposition that keeps the alert in an active state, the alert is checked in but the **Alert Details** page remains open.

Adding Attachments to Objects

You can add and manage object attachments from within SAS Visual Investigator.

Adding and Managing Object File Attachments

This SAS Visual Investigator tutorial describes the procedures for adding an attachment to an object.

The **Attachments** pane enables you to attach one or more files to the current object. Attachments can be used to provide supporting information for the entity. They could include court documents, reports, images, or audio or video recordings. By default, EXE, MSI, and ZIP file types cannot be attached to objects. However, this restriction might vary depending on your SAS Visual Investigator deployment. By default, each attachment can be a maximum of 100 MB in size.

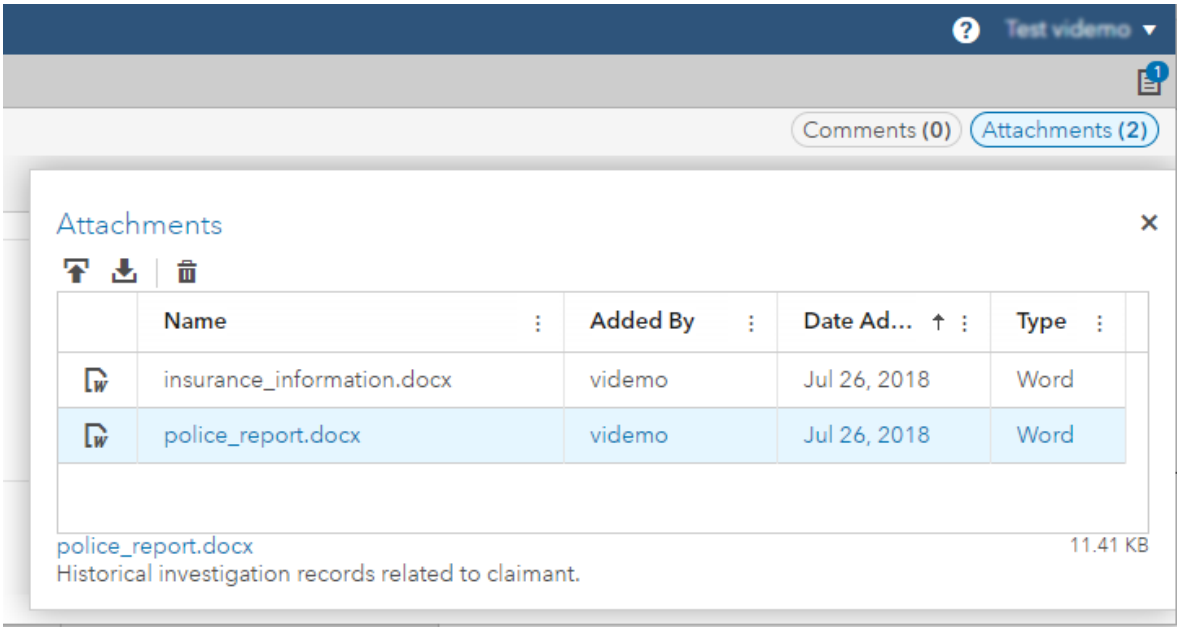
See also "Adding a PDF of an Object as an Attachment" on page 9.

Your solution administrator determines the entities that support attachments. If you can attach files to an object, the **Attachments** button appears in the toolbar. The button displays the number of attachments the object has.

To add an attachment to an object:

1 Click the **Attachments** button.

An **Attachments** pane like the following one appears.



2 Click **Upload Attachment** ( ) and select a file from an accessible location. You can change the name displayed in the **Name** field and add text to the **Description** field if you want to.

3 Click **OK** to continue.

Note: When you select an attachment in the list, the filename, size, and description appear below the list.

To download an attached file:

- Select the attachment that you want to download. Click **Download Attachment** (). If prompted by your browser, indicate the desired option, either open or save, for the attachment.

To delete an attachment:

- Select the attachment that you want to remove. Click **Delete Attachment** (). At the Delete Attachment window, select **Yes** to continue with the deletion. The attachment is no longer associated with this object.

Adding a PDF of an Object as an Attachment

Depending on a combination of your user role, entity access rules, and permissions, you might be able to add a PDF file of the current object, structured using a print template, to the object itself as an attachment.

To add a PDF of the current object as an attachment:

1 Open the object to which you want to add an attachment.

2 Click **Print**) and choose **Attach as PDF** from the menu.

Note: **Attach as PDF** is available only for entities with the **Attachments** button on the toolbar.

3 From the list of available templates displayed at the Select Print Template window, choose the template that you want to use. The **Preview** pane displays how the PDF from the selected template will look.

4 Click **Select**.

The Export to PDF dialog box is displayed showing the default PDF options.

5 Update any PDF options that you want to change (for example, paper size, margin size, document title, and so on).

6 Click **Export**.

The Attachments window is displayed with the new PDF attachment listed.

Adding and Viewing an Object Comment

This SAS Visual Investigator tutorial describes the procedures for adding and viewing an object comment.

The **Comments** pane enables you to add comments to the current object. Your solution administrator determines the entities that support comments. If you can add a comment to an object, the **Comments** button appears in the toolbar. The button displays the number of comments that have been added to the object.

To add a comment to an object:

1 Click the **Comments** button.

The **Comments** pane is expanded.

2 Enter text in the comment text box in the **Comments** pane.

You can use the built-in formatting functionality to choose how your comment is displayed.

3 If the administrator has enabled categories, then you can indicate the category to which a comment should be assigned.

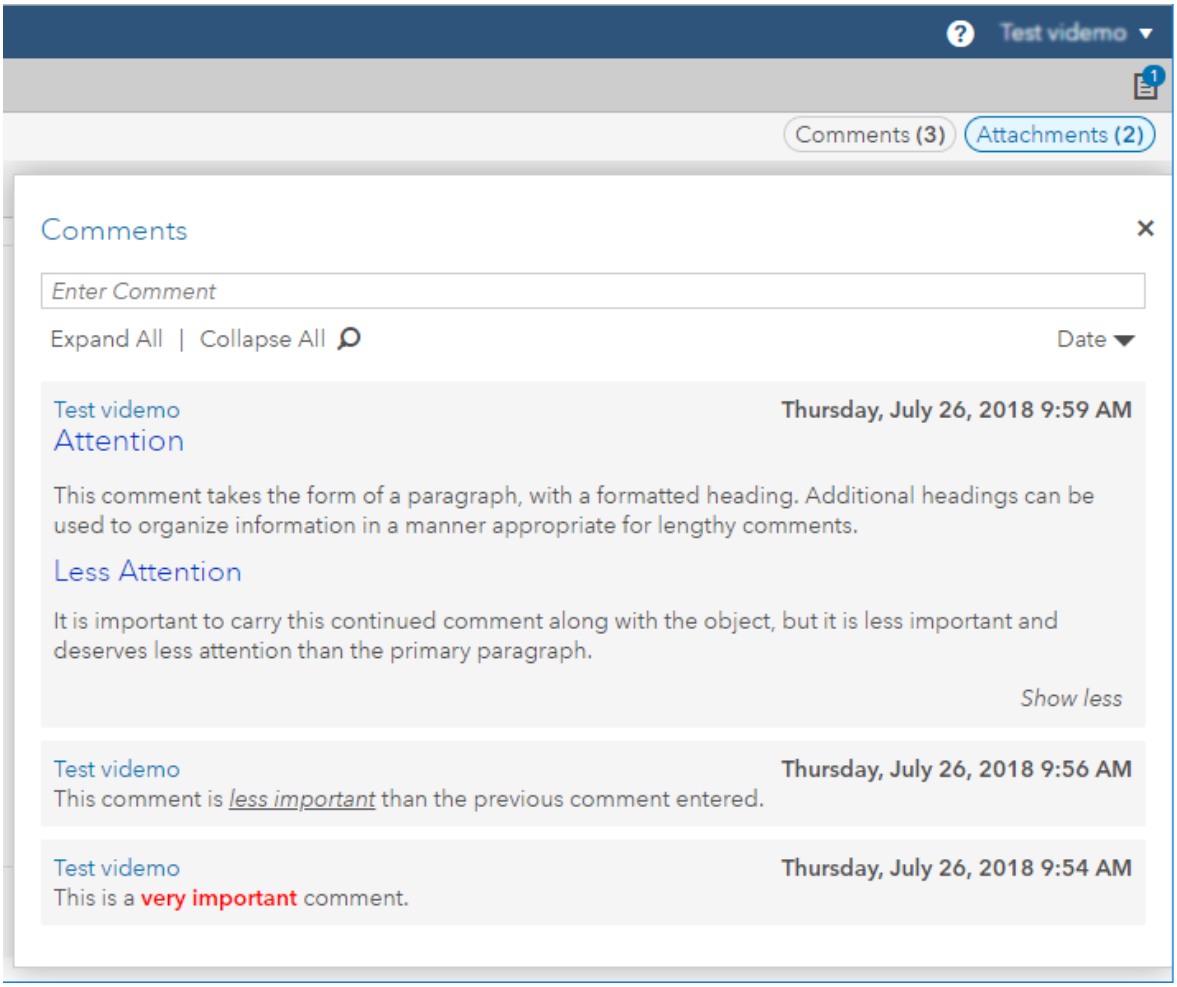
4 Click **Post** to add the comment to the object.

When you save the object, your comments are indexed and are searchable within SAS Visual Investigator.

Note: You do not have to obtain a lock on an entity in order to add a comment.

Here is an example of the **Comments** pane populated with several comments that are presumably relevant to the associated object.

Figure 2.1 *Populated Comments Pane*



To view a comment associated with an object:

- Click the **Comments** button.

  The associated comments are revealed and are marked with the user name of the person who made the comment and the date and time at which the comment was added.

TIP Click **Date** to choose whether the comments are ordered in descending or ascending date order

If the Categories function is enabled, then the comments are grouped by category and can be accessed by selecting the name of the category to which a comment is assigned.

Creating a Manual Alert

This SAS Visual Investigator tutorial describes the method for creating a manual alert.

If the option is available, perform the following steps to create an alert:

1. Open the object that you want to base the alert on.

   Note: You can create an alert based an internal or external entity, but not for a child entity.

2. Click **Create an Alert** (⚠) on the toolbar.

3. In the Create an Alert window, select the queue in which to create the alert.

   Note: The list of queues includes only those queues that accept manual alerts and which belong to strategies to which you have been granted access. Your solution administrator determines which queues accept manual alerts.

4. In the **Note** field, you can provide text to accompany the alert.

5. Click **OK** to save the alert.

   The system creates an alerting event and treats it the same way it would one that is sent to SAS Visual Investigator from any other source. The system infers the appropriate alert domain from the queue that is selected when the alert is created. The system then looks to see whether an alert already exists for the selected entity and follows standard routing rules.

For each strategy, your system administrator determines whether a workspace is created for the alert and the number of levels that are expanded in the network.

Using Workspaces to Explore Data

This SAS Visual Investigator tutorial describes a workspace and includes instructions for managing workspaces as well as objects within workspaces.

What Is a Workspace?

A workspace enables you to gather together items of interest to your investigation from your data repository. Within your workspace, you can visualize your data in multiple ways, enabling you to see relationships between objects and information from different perspectives. You can update your workspace as your investigation progresses, adding to it as new information comes to light, or removing items that have proved to be irrelevant.

A workspace is a living object. If the underlying data changes, the information displayed in your workspace also changes. If you need to keep a snapshot of your investigation at a single point in time, you can create an **Insights** tab to capture this.

For more information about insights, see “Using Insights to Document Investigation Findings ” on page 16.

A workspace is always associated with an existing object within SAS Visual Investigator, typically one that represents an investigation or an alert. This object keeps the information together for a particular investigation, and can have multiple associated **Workspace** tabs and **Insights** tabs as the investigation develops. Your solution administrator configures which types of objects can have workspaces added to them.

By default, the data is displayed in **Detail View**, but you can choose to view your data in a variety of views. The **Workspace** tab has its own menu, including options for adding information to other workspaces and **Insights** tabs and options for managing the workspace itself.

Creating a New Workspace

To create a new, blank workspace:

- From within an eligible open object, click **Add Sheet** (+) and select **Add Workspace**.

A new workspace opens.

Note: You can add as many workspaces to your investigation as you need.

Adding Objects to a Workspace

You can add objects to a workspace to enable you to develop your investigation.

When you identify a piece of information that you want to add to a workspace:

1. Select one or more objects and click **Add object to Workspace** (.) on the menu.

   For example, if you have search results displayed in the **Search** page, you can select one or more of the results and click **Add object to Workspace** (.) on the menu to add the selected results to a workspace.

   The Add Objects to a Workspace window is displayed, listing all available workspaces.

2. Select the workspace to which you want o add objects.

3. Click **OK**.

   The objects are added to the indicated workspace and, by default, are shown in the **Detail View** display.

TIP From within your workspace, you might want to investigate a subset of the data still further, or perhaps take your investigation in a slightly different direction. You can select objects on the **Workspace** tab and add them to either a new workspace or to an existing workspace.

After an object has been added to a workspace, the object can be visualized in a variety of views, thereby enabling you to see relationships between objects and information from different perspectives.

Renaming a Workspace

To change the name of a workspace:

1. Select **Rename Workspace** from the **Workspace** tab's **More** (☰) menu.

   The **Rename Workspace** dialog box is displayed.

2. Update the workspace name.

3. Click **OK** to save the new name, or click **Cancel** to discard your changes and keep the original name.

Removing Objects from a Workspace

If you decide an object is no longer relevant to the path your investigation is taking, you can remove it from the workspace.

To remove an object from a workspace:

- Select the object and select **Object** ▶ **Remove the object from the Workspace** from the **Workspace** tab's menu.

Deleting a Workspace

If you decide that a workspace is no longer relevant to the path your investigation is taking, you can delete it.

To delete a workspace:

1. Select **Delete Workspace** from the **Workspace** tab's **More** (☰) menu.

2. Click **OK** to confirm the `Delete Workspace` message, or click **Cancel** to retain the workspace.

Using Insights to Document Investigation Findings

This SAS Visual Investigator tutorial describes an **Insights** tab and includes instructions for managing **Insights** tabs as well as items and cells within **Insights** tabs.

What are Insights?

Insights are static representations of selected parts of an investigation at a specific point in time. The **Insights** tab acts as a container for information from within your data repository and from external data sources. This information might include objects, maps, network diagrams, text, and images. These items can be moved around and resized as needed. Your solution administrator configures which types of objects can have **Insights** tabs added to them.

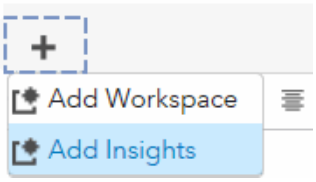
Even if the underlying data changes, the information displayed in your **Insights** tab remains the same. If you want to work with evolving information, you can create a workspace to track your investigation as it progresses.

For more information about workspaces, see “Using Workspaces to Explore Data ” on page 13.

Create a New Insights Tab

To create a new, empty **Insights** tab:

- Click **Add Sheet** and select **Add Insights** from the menu.



You can add as many **Insights** tabs to your investigation as you need.

Adding Information to an Insights Tab

You can add many types of information to an **Insights** tab to represent your investigation at a particular point in time. If you are viewing information from your data repository in **Detail View**, **Timeline View**, **Table View**, or **Text Analytics View**, you can add the specific rows or items that you have selected. However, when in **Map View** or **Network View**, you can add the map or network diagram only.

Objects added to an **Insights** tab are always added to cells. That is, objects are added to a rectangular bounding region to help control the layout of the objects on the page.

To add information to an **Insights** tab:

1. Click **Add *object* to Insights** (.) on the menu. For example, if you have search results displayed in the **Search** page, you can select one or more of the results and click **Add tile to Insights** on the **Insights** tab's menu to add the selected results to an **Insights** tab.

   The Add tile to Insights dialog box appears. This dialog box lists all the currently open objects that support insights and, for each of these, offers you the option to either create a new **Insights** tab or add to an existing **Insights** tab if one already exists. If you do not currently have an object open that supports insights, you can choose to create a new object from a list of objects that support insights.

   Note: The dialog box name changes depending on which view you have selected. For example, in **Detail View**, it is named Add tile to Insights. However, in **Map View**, **Network View**, **Timeline View**, and **Text Analytics View**, it is named Add map to Insights, Add network to Insights, and Add row to Insights, respectively.

2. Choose the **Insights** tab to which you want to add the objects and click **OK**.

   The relevant **Insights** tab is displayed.

When you have an **Insights** tab already open, you can also add information to it from external sources to further support your investigation. This can be in the form of your own notes, which you can enter directly onto the **Insights** tab, or you can add images or paste information that you have gathered from elsewhere.

To add notes to an **Insights** tab:

- Click anywhere in an empty cell and simply start typing.

To add an image to an **Insights** tab:

1. Move your mouse pointer over an empty cell and click **Add Image** ( ).

   The Open dialog box is displayed.

2. Navigate to the image that you want to add, and click **Open**.

   The image is displayed in the selected cell.

To paste data from the Microsoft Windows clipboard into an **Insights** tab:

- Move your mouse pointer over an empty cell and click **Paste** ( ).

  The data from the clipboard is displayed in the selected cell.

Copy Specific Insights Content to a Different Insights Tab

From within your **Insights** tab, you might want to copy a subset of the data to another **Insights** tab, either new or existing.

To copy existing content to a different new or existing **Insights** tab:

- Select cells on the **Insights** tab and click on the **Insights** tab's menu, or right-click a cell and select the **Add *object* to Insights** option from the pop-up menu.

  Note: The button name and menu option change depending on which type of cell you have selected. For example, if you have a map selected, they are labeled **Add map to Insights**, whereas if you have a network diagram selected, they are labeled **Add network to Insights**, and so on.

Renaming an Insights Tab

To change the name of an **Insights** tab:

1 Select **Rename Insights** from the **Insights** tab's **More** (☰) menu.

  The **Rename Insights** dialog box is displayed.

2 Update the name of the **Insights** tab.

3 Click **OK** to save the new name, or click **Cancel** to discard your changes and keep the original name.

Removing Cells from an Insights Tab

If you decide that specific content is no longer relevant to the path your investigation is taking, you can remove the cell containing the content from the **Insights** tab.

To remove a cell from an **Insights** tab:

- Select the cell and click **Delete Cell Contents** (🗑), and then select **Yes** from the Delete Cell Contents window to remove the cell from the **Insights** tab.

Deleting an Insights Tab

If you decide that an **Insights** tab is no longer relevant to the path your investigation is taking, you can delete it.

To delete an **Insights** tab:

1 Select **Delete Insights** from the **Insights** tab's **More** (☰) menu.

2 Click **OK** to confirm the `Delete Insights` message, or click **Cancel** to retain the **Insights** tab.

Printing and Exporting Objects

Sending the Object Page to a Printer

This SAS Visual Investigator tutorial explains how to print an object.

Depending on a combination of your user role, entity access rules, and permissions, you might be able to print objects in SAS Visual Investigator.

To print an object:

1. Open the object that you want to print.
2. Click and choose **Print to PDF** from the menu.
3. From the list of available templates at the Select Print Template window, select the template that you want to use.

   Note: The **Preview** pane displays how the output from the selected template will look.
4. Click **Select**.
5. Specify your required print settings at the Print window, including the print destination.
6. Click **Print** to send the object page to the destination printer that you indicated.

Exporting an Object as a PDF File

This SAS Visual Investigator tutorial explains how to export an object as a PDF file.

Depending on a combination of your user role, entity access rules, and permissions, you might be able to export the current object, structured using a print template, to a PDF file. You can then save and work with the PDF file later.

To export an object to a PDF file:

1 Open the object that you want to export as a PDF file.

2 Click and choose **Export to PDF** from the menu.

3 From the list of available templates at the Select Print Template window, select the template that you want to use.

Note: The **Preview** pane displays how the output from the selected template will look.

4 Click **Select**.

5 At the Export to PDF window, update any PDF options that you want to change (for example, paper size, margin size, document title, and so on).

6 Click **Export**.

The resulting PDF file is downloaded to your computer.

About Alert Assignments

This SAS Visual Investigator tutorial describes the different assignment options that can be applied to an alert. See also,

If your solution administrator has enabled the alert assignment feature for a domain, the **Assignment** menu and an assignment filter appear on the **Alerts** page toolbar for the strategies that belong to that domain. Similarly, when you open an alert that belongs to that domain, the **Assignment** menu appears on the alert details page toolbar.

The assignment feature identifies which alerts are being worked on and who is working on them. It is particularly helpful for alerts that need an extended investigation or require more than one user’s input.

Using the **Assignment** menu, you can perform the following activities:

- **Claim an alert:** When you claim an alert, the Assigned User ID column is updated with your user ID. The Assignment Datetime column is updated with the time that you claimed the alert. These columns indicate to other users that you are currently working on this alert.

  Note: Claiming an alert does not lock the alert or prevent other users from working on it. Claiming an alert indicates to other users that you are currently investigating the alert.

- **Release an alert:** When you release an alert, the Assignment User ID and Assignment Datetime columns are cleared. This indicates to other users that no one is currently working on the alert.

- **Assign an alert to another user:** Assigning an alert to another user updates the Assignment User ID column with the other user's user ID. The Assignment Datetime column is updated with the time that you made the assignment. If you are performing a joint investigation on a particular alert, you can use this option to indicate to the other user that they can start their work.

Note: On the **Alerts** page, you can claim, release, or assign multiple alerts at the same time.

On the **Alerts** page, you can use the assignment filter to display all the active alerts, all the unassigned alerts, or all the alerts that are assigned to you. By default, the selected option is **All Active Alerts**.

Keep the following in mind when you are working with the assignment feature:

- If another user has an alert checked out, you cannot claim, release, or assign the alert.

- When an alert is closed, the assignment information is retained. It is set to unassigned if a new version of the alert is created. You cannot change the assignment state of a closed alert.

- You can change the assignment state of a suppressed alert on the alert details page.

For the procedure to assign an alert, see

Assigning Alerts

This SAS Visual Investigator tutorial explains how to assign alerts. See also, “About Alert Assignments ” on page 21.

Claim an Alert

To claim an alert:

1 Access the strategy containing the alert that you want to claim.

2 Do one of the following:

- From the alert list, select the alert that you want to claim.

  Note: Make sure that the alert filter option is either **All Active Alert**s or **Unassigned Alerts** so that you can select an unassigned alert.

- Open the alert that you want to claim.

3 From the **Assignment** menu, select **Claim Alert**.

Release an Alert

To release an alert:

1 Access the strategy containing the alert that you want to release.

2 Do one of the following:

- From the alert list, select **My Alerts** from the alert list and then select the alert that you want to release.

- Open the alert that you want to release.

3 From the Assignment menu, select **Release Alert**.

Assign an Alert to Another User

To assign an alert to another user:

1 Access the strategy containing the alert that you want to release.

2 Do one of the following:

- From the alert list, select **All Active Alerts** from the alert list and then select the alert that you want to assign.
- Open the alert that you want to release.

3 From the **Assignment** menu, select **Assign Alert**.

The Assign Alert window is displayed.

4 Select a user from the **To** list.

5 Click **OK**.

The alert is assigned to the indicated user.

Exploring Alert Activity

This SAS Visual Investigator tutorial explains how to explore the **Alert Activity** tab to learn information about alerting events that are associated with an open and selected alert.

You can use the alert version and the alerting event drop-down lists to select the alerting event that you want.

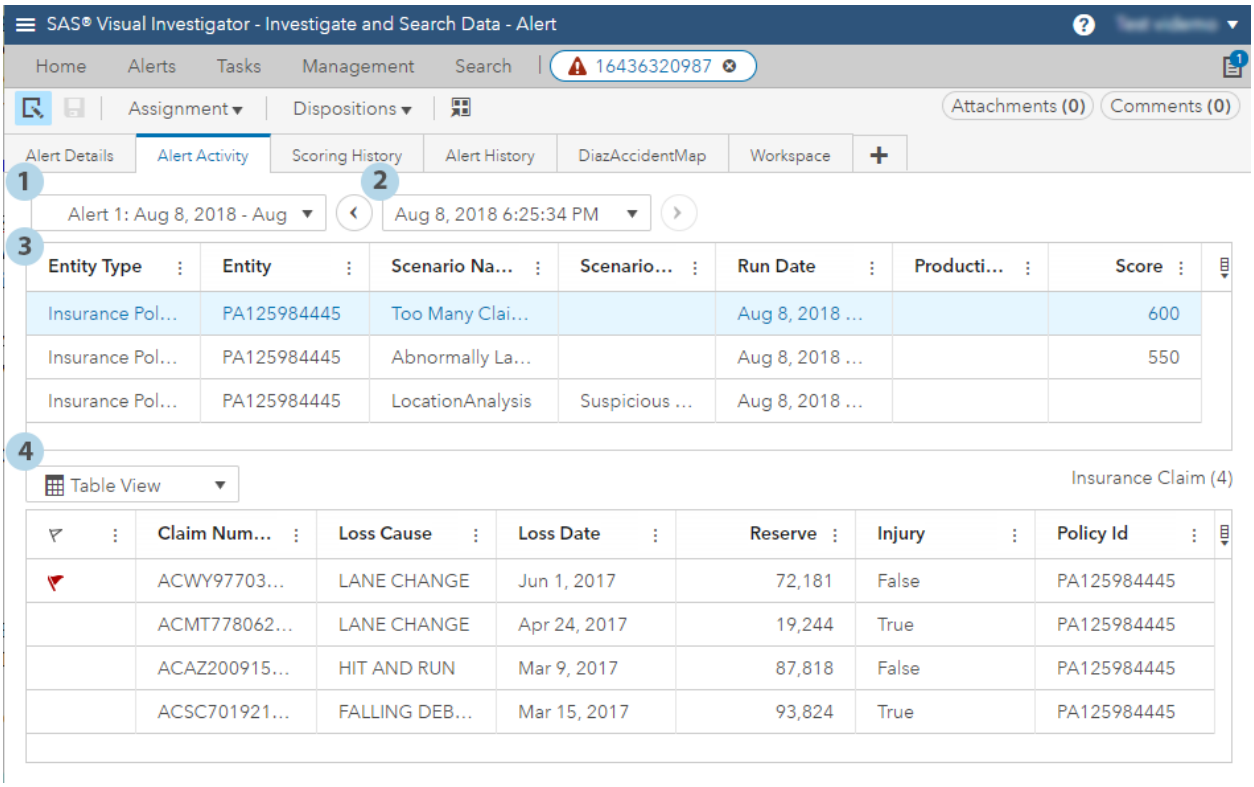


Table 2.1 *Alert Activity Tab Features*

Item	Name
1	alert version drop-down list
2	alerting event drop-down list
3	alerting event
4	scenario-fired events

To review an alert version or alerting event activity:

1 Open the alert of interest and navigate to the **Alert Activity** tab.

2 Examine version-related activity by selecting an option from the alert version drop-list.

The alert version list entries display the following information:

- an icon that indicates the productivity rating for the alert, if it has been dispositioned.
- the alert version number.
- the date on which the alert was created and the last date on which this version of the alert was updated. If the alert was created and closed on the same date, only that date appears in the entry.

3 Examine alerting event information by selecting an option from the alerting event drop-down list.

The scenario-fired events that make up the selected alerting event are listed in a table on the tab. The table includes a **Productivity Rating** field and a **Comment** field. If productivity ratings were assigned to the scenario-fired events when the alert was dispositioned, the ratings and any optional comments appear in these fields.

To open associated alert context data:

1 Open the alert of interest and navigate to the **Alert Activity** tab.

2 Make sure the version list and the alerting event drop-down menus reflect your desired choice.

3 Locate the event of interest in the list and double-click it to open it.

Double-clicking a scenario-fired event opens a page with information about the entity on which the scenario was fired.

4 Review the information, including stepping through any additional tabs to continue your evaluation.

To view associated alert context data in **Map View**, **Timeline View**, or **Table View**:

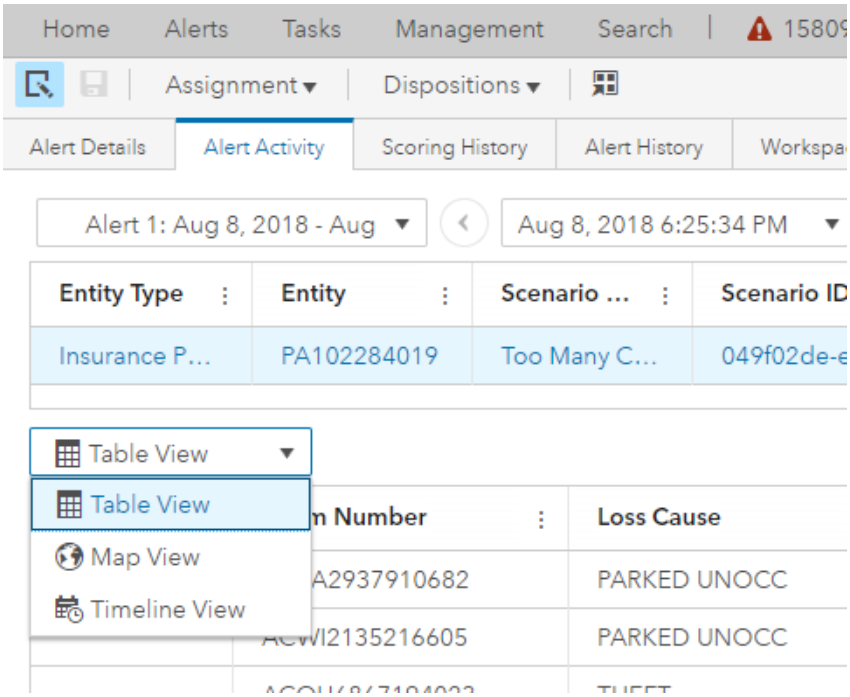
1 Open the alert of interest and navigate to the **Alert Activity** tab.

2 Make sure the version list and the alerting event drop-down menus reflect your desired choice.

3 Locate the event of interest in the list and select it.

Depending on how SAS Visual Investigator is configured, if a scenario-fired event has associated context data, that data appears below the scenario-fired events. Context data consists of the transactions or objects that were examined by a scenario. By default, this data appears in a table, and transactions or objects that contributed to the scenario firing are indicated with red flags.

4 Select **Table View**, **Map View**, or **Timeline View** to have the information displayed in the indicated view.



Relating One Object to Another

This SAS Visual Investigator tutorial explains how to link objects in SAS Visual Investigator to show relationships between them. The information in this section refers to social links. It does not apply to transaction links.

Link to Existing Object

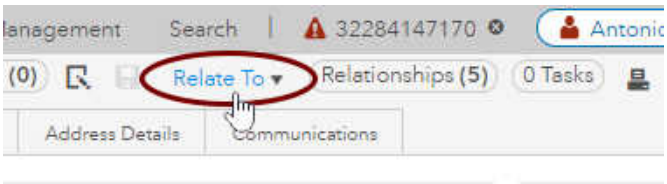
Depending on a combination of your user role, entity access rules, and permissions, you might be able to link an object in SAS Visual Investigator to an existing object in order to show a relationship between them. Your solution administrator configures which types of objects can be linked.

To link an object to an existing object:

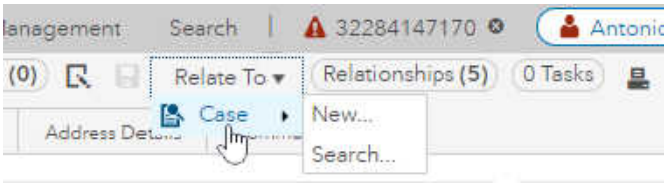
1 Open the object that you want to link to another.

Note: Linking is available only if the object is in View mode. If the object is in Edit mode, click **Cancel Edit** ( ) to return the object to View mode.

2 Click **Relate To** on the toolbar.



3 Select the object type from the drop-down menu and select **Search** from the pop-out menu.



4 At the displayed window, enter search criteria to enable you to find the object that you want to link the current object to and click .

See also “Perform an Object Search ” on page 45.

5 Select the required object from the search results.

Note: Only objects of types that can be linked to the current object are returned.

6 Click **Relate To Selected**.

The window is updated to show the proposed relationship between the objects.

7 If the solution is configured to allow multiple types of relationship between these two types of objects, select the required relationship from the drop-down list. If there is only one possible relationship, it is pre-selected.

Note: Depending on the relationship type, there might also be additional attributes.

8 Click **Save** to create the relationship between the objects, or **Cancel** to return to the object's tab without linking it to anything.

You can view the new relationships in network diagrams, the **Relationships** pane, **Relationships** page control, or the **Related Objects** page control.

Link to New Object

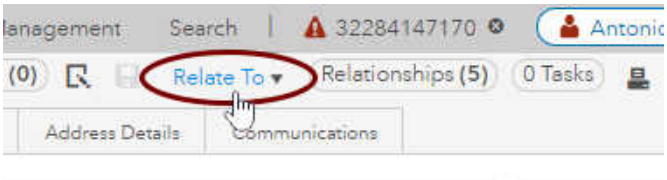
Depending on a combination of your user role, entity access rules, and permissions, you might be able to link an object in SAS Visual Investigator to new object that you create in order to show a relationship between them. Your solution administrator configures which types of objects can be linked.

To link an object to a new object:

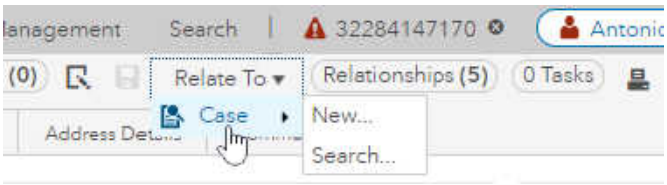
1 Open the object that you want to link to another.

Note: Linking is available only if the object is in View mode. If the object is in Edit mode, click **Cancel Edit** ( ) to return the object to View mode.

2 Click **Relate To** on the toolbar.



3 Select the object type from the drop-down menu and select **New** from the pop-out menu.



4 At the displayed window, indicate and enter the information that defines the new object.

If the solution is configured to allow multiple types of relationship between these two types of objects, select the required relationship from the drop-down list. If there is only one possible relationship, it is pre-selected.

See also “Perform an Object Search ” on page 45.

5 Click **Save** to create the relationship between the objects, or **Cancel** to return to the object’s tab without linking it to anything.

You can view the new relationships in network diagrams, the Relationships panel, **Relationships** page control, or the **Related Objects** page control.

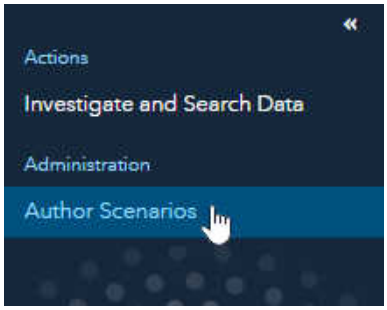
Performing Flow and Scenario Tasks

This SAS Visual Investigator tutorial provides high-level details to support developing flows and scenarios using the scenario authoring administration feature of the product. Not all users are granted permissions to access this feature.

The following list includes the high-level tasks that you perform to create flows and scenarios in order to detect behaviors of interest.

Prerequisite

To develop and manage flows and scenarios, you must be a member of an authorized group. If you are authorized to author scenarios, you will have access to the **Author Scenarios** menu item from the navigation sidebar. All scenario creation, testing, and management tasks are performed from the Author Scenarios interface.



To create, test, and publish one or more scenarios, select **Author Scenarios** from the sidebar navigation menu and then follow these steps.

1 Create a scenario flow.

   Create a flow and assign one or more data sources. The Scenario Administrator uses this data during the scenario design, test, and flow run process.

   See “Create a Flow and a Scenario” on page 33.

2 Specify a scenario type.

   Depending on the needs and desired outcome, determine the type of scenario to design.

   Design a scenario by completing the necessary configuration parameters and assigning a rule that detects activities or behaviors of interest. You can select one of the following types of scenarios.

   a Record-level

   b Aggregation

   c DATA step

See “Create a Flow and a Scenario” on page 33.

3 (Optional) Create a scorecard, which performs further processing on the scenario-fired events that are generated by the scenarios.

Note: If desired, you can repeat steps 2 and 3 to create additional scenarios.

4 Validate and optimize.

Run a test of the scenario against the assigned data. This enables you to verify the effectiveness of the scenario configuration.

Review the scenario-fired events and examine statistical information that is associated with the test results.

If necessary, you can fine-tune the scenario by modifying its configuration. You might do this if, for example, the scenario produces too many scenario-fired events. In this case, you could change the rule to be more restrictive.

See “Test a Scenario” on page 34.

5 Publish and run the flow.

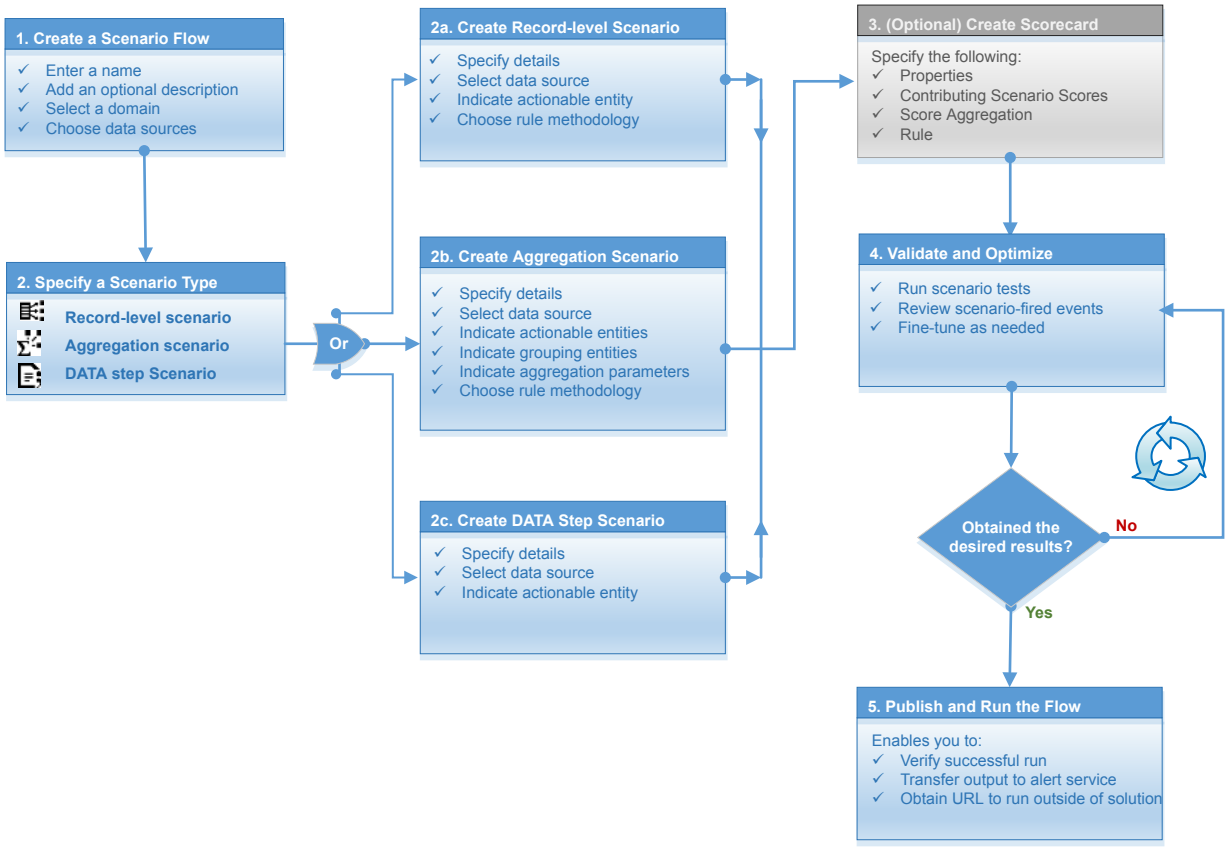
See “Publish and Run a Flow” on page 35.

Publishing and running the flow enables you to do the following:

- verify that the flow runs successfully
- transfer the output of the flow to the alert service
- obtain a URL to run the flow outside of the solution

When the flow execution is complete, you can perform further review and analysis of the output in the applicable locations.

Figure 2.2 *The Scenario Administrator Flow Process*



Create a Flow and a Scenario

This SAS Visual Investigator tutorial explains how to create a Scenario Administrator flow and scenario.

Navigate the online slide show for an interactive overview.

View the slideshow in SAS Help Center.

In summary, to identify behavior of interest, you create and work with flows, scenarios, and, if desired, scorecards.

A flow is a top-level container that consists of the following items:

- one or more data sources to be evaluated for the behaviors of interest
- one or more scenarios in which parameters, properties, rules, and other items are defined
- optionally, one or more scorecards, by actionable entity

Test a Scenario

This SAS Visual Investigator tutorial explains how to test a Scenario Administrator scenario and read the results.

Navigate the online slide show for an interactive overview.

View the slideshow in SAS Help Center.

In summary, before you publish and run a flow, you can test its scenarios and scorecards to assess their effectiveness. Be aware of the following information about running tests and reviewing results:

- When a test is running for a scenario, you cannot modify that scenario.
- Test results remain available only for an assigned period of time.
- If you start a test and then sign out from SAS Visual Investigator, the test continues to run.
- When running multiple tests simultaneously:
  - You can start a test in one scenario and then, before the test run is complete, switch to the other scenario to run another test.
  - If multiple users perform a test on the same scenario simultaneously, only the test that was executed first will complete.
- If you duplicate a scenario for which test results exist, they are not included with the duplicated scenario.

- If there is no score value for the scorecard to apply, the scorecard test will fail.

Publish and Run a Flow

This SAS Visual Investigator tutorial explains how to publish and run a flow.

Navigate the online slide show for an interactive overview.

View the slideshow in SAS Help Center.

You use the **Published Versions** page to publish and run flows. The page shows all of the published versions that exist for the flow. A version represents the configuration of a flow when it was published. Each time a flow is published, a new version is added.

When you run a flow, the Scenario Administrator executes the active scenarios in the flow and captures the resulting scenario-fired events. These scenario-fired events are grouped by actionable entity and then sent to the alert service for further processing. If an alert is generated as a result of the scenario-fired events, you can view the associated alert activity details in SAS Visual Investigator.

3

Search and Discovery

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Perform a Free-Text Search

This SAS Visual Investigator tutorial describes using the free-text search.

Depending on how your solution administrator has configured your system, you might be able to perform your search from the **Search** page, or you might enter your search directly into the **Search** box on your **Home** page.

To find information from the **Search** page:

1 Click **Search** on the main menu.

The **Search** page is displayed.

2 Enter your search term into the **Search** box.

3 Press **Enter**, or click .

Your search results are displayed in the currently selected view. Choose a different view to see your results displayed in that view.

To find information from the **Search** box on the **Home** page:

1 Enter your search term into the **Search** box.

2 Press **Enter**, or click .

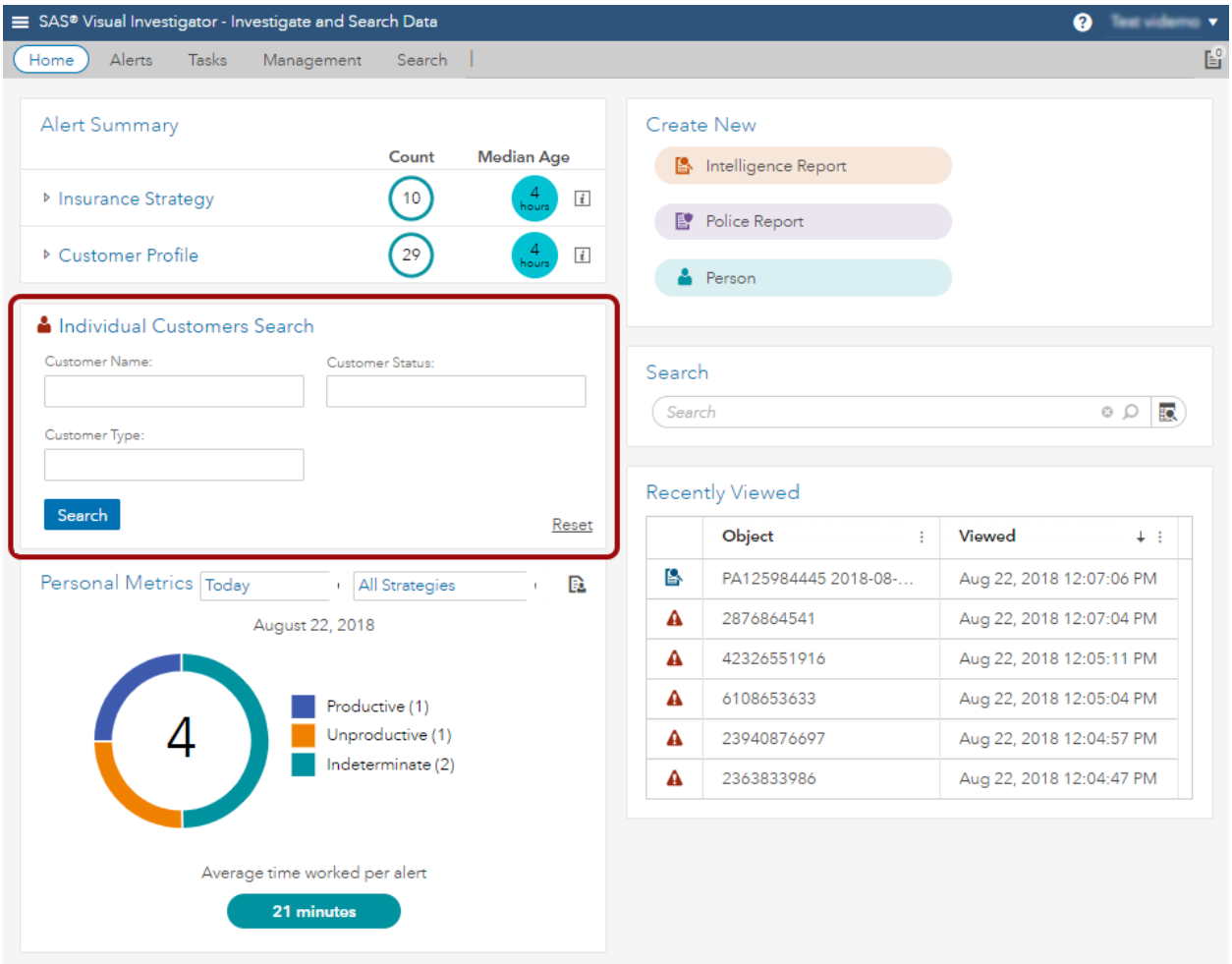
Your search results are displayed in the currently selected view. Choose a different view to see your results displayed in that view.

Perform a Form-Based Search

This SAS Visual Investigator tutorial describes the use of a form search, when available at the **Home** page, to retrieve specific results.

Depending on how your solution administrator has configured your system, a form-based search (represented by a custom search form) might be available.

Here is an example showing a form search area on the **Home** page.



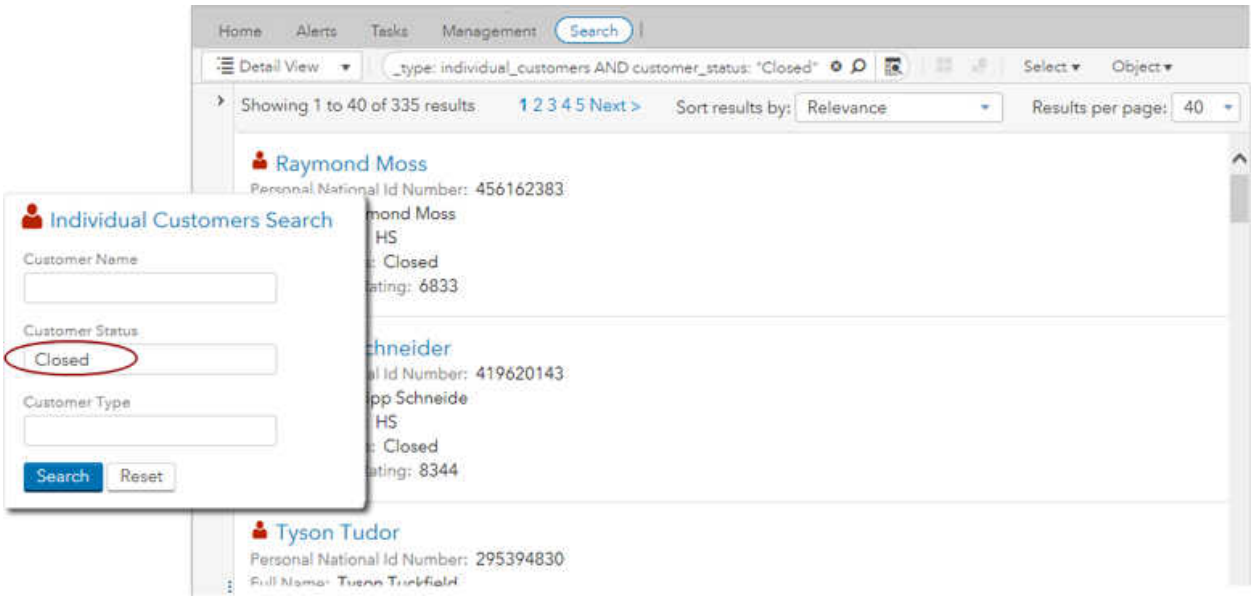
The form search functionality enables you to search directly from your **Home** page, using criteria specified in fields, rather than accessing the **Search** page to initiate a free-text search. Initiating a form-based search from the **Home** page takes you directly to the **Search** page, which displays your results.

To use a search form displayed on the **Home** page:

1 Populate the fields needed in order to specify the criteria for the search.

2 Click **Search** to initiate the search.

Here is an example showing an **Individual Customers Search** form populated with ‘Closed’ as the **Customer Status**. Clicking **Search** initiates the search and displays the search results with the list of matches.



At the top of the **Search** page that displays the search results, the **Search** box contains the search criteria derived from the form and can be edited to refine the search if needed.

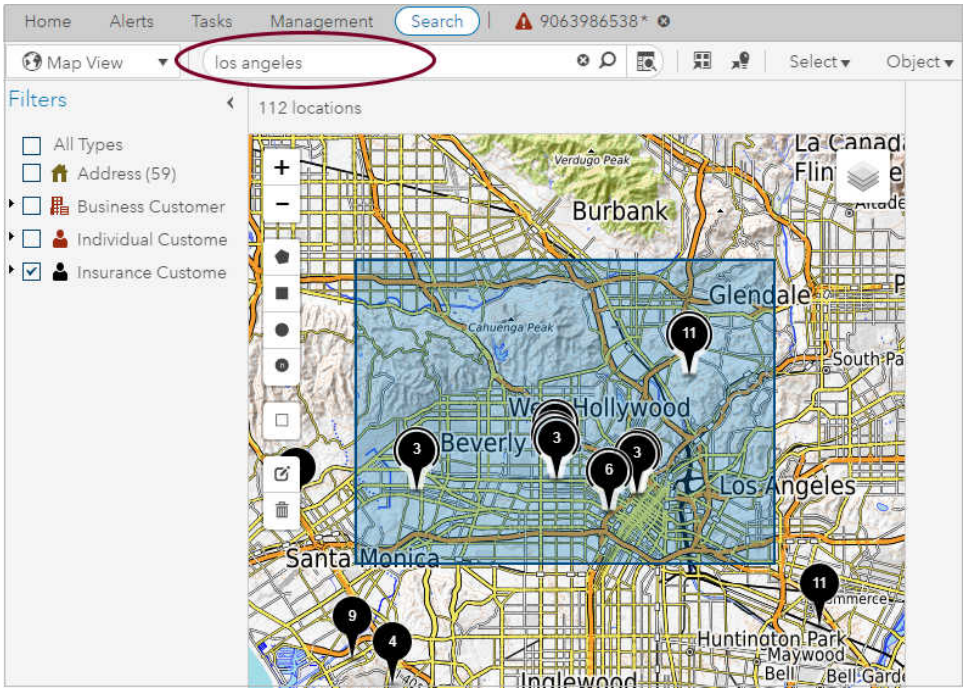
Perform a Map–Based Search

This SAS Visual Investigator tutorial describes using the map–based search feature.

The **Map View** enables you to perform unbound searches as well as to conduct searches that are restricted to a specified area.

To search within boundaries, you can perform either of the following.

- If a standard search indicates some areas of particular interest, you can draw shapes on the map to mark those areas, and then search again to return only locations within the boundaries of the shapes.



- You can start from a map with no search results displayed, draw your search shapes, and then enter your search terms to search only in the selected areas.

Note: The query that you enter in the **Search** field applies to all shapes on the map.

Here is a list of the map controls and the actions that you can use to search and manage search results displayed on the map.

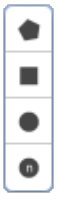
Table 3.1 *Map and Search Control Actions*

Map Control	Action
+	Zoom in
−	Zoom out
⬟	Search inside polygon

Map Control	Action
	Search inside rectangle
	Search inside circle
	Search inside a radius
	Select the results inside a rectangle
	Edit shapes
	Delete shapes

To draw a shape to mark an area in which to search:

- Click the **Search inside** buttons.

  These buttons enable you to draw a polygon, a rectangle, or a circle in which to search. If you choose to draw a circle, you can either draw the circle manually or select a radius and then position a circle of your chosen size in the required location.

Table 3.2 *Image and List Showing the Available Circle Radii Choices*

- 100m
- 500m
- 1km
- 5km
- 10km
- 20km

TIP You can position multiple shapes on the map before searching.

To edit your shapes:

- Click **Edit Shapes** from the floating menu.

  The shapes on the map are outlined in dotted lines, with handles for manually drawn shapes and center markers for circles of a set radius. In addition, the **Edit shapes** pop-up menu is displayed.

  To re-size or move a shape:

  1. Click and drag the handles or shape markers to make your changes.
  2. Select **Save** from the pop-up menu to save your changes, or click **Cancel** to discard your changes

If you want to delete a shape from the map:

1. Click **Delete shapes** from the floating menu.

   The **Delete shapes** pop-up menu is displayed.

2. Click each shape that you want to delete, and then select **Save** from the pop-up menu to save your changes, or click **Cancel** to discard your changes.

Perform Advanced Search

This SAS Visual Investigator tutorial describes using the advanced search feature.

Advanced Search enables users to create advanced searches without knowledge of how to construct a query using specific syntax for logical operators, fuzzy searching, proximity searching, and so on.

At its simplest, a query requires a field to search against, an operator, and term to search. To begin creating your query, you must select the entity type that you want to search against; you can choose a specific entity type, or All Object Types. The selection that you make determines which fields and operators are available as you continue to build the query.

To create an advanced search query:

1 Next to the **Search** field, click .

Note: The **Advanced Search** button is displayed next to the **Search** field on the **Homepage**, the **Search** page, and in the search results.

The Advanced Search window is displayed.

2 From the **Object Type** drop-down list, select either **All Object Types**, or a specific entity type, for example, Person.

3 From the **Category** drop-down list, select which category you want to run the query against. Depending on the object type that you selected, the options available in this drop-down list differs.

4 From the **Operator** drop-down list, select the operator to be applied to your search.

5 In the **Search text** field, enter your search term.

6 Apply any wildcard or fuzzy searching to your query.

Note: These options are displayed above the **Search text** field when a valid operator is selected.

7 Apply any modifiers to your search, by clicking the appropriate button next to the **Search text** field.

8 Click the **Add** button to add additional query parameters. Additional query parameters can be either AND or OR.

As you build up your query, a text area underneath shows the generated query text. You can clear all rows by clicking ⊗.

9 To perform the search, click **Search**. The query will be executed, and the search results are displayed for the currently selected visualization (Details, Table, or Map).

Your search results are displayed in the currently selected view. Choose a different view to see your results displayed in that view.

Perform an Object Search

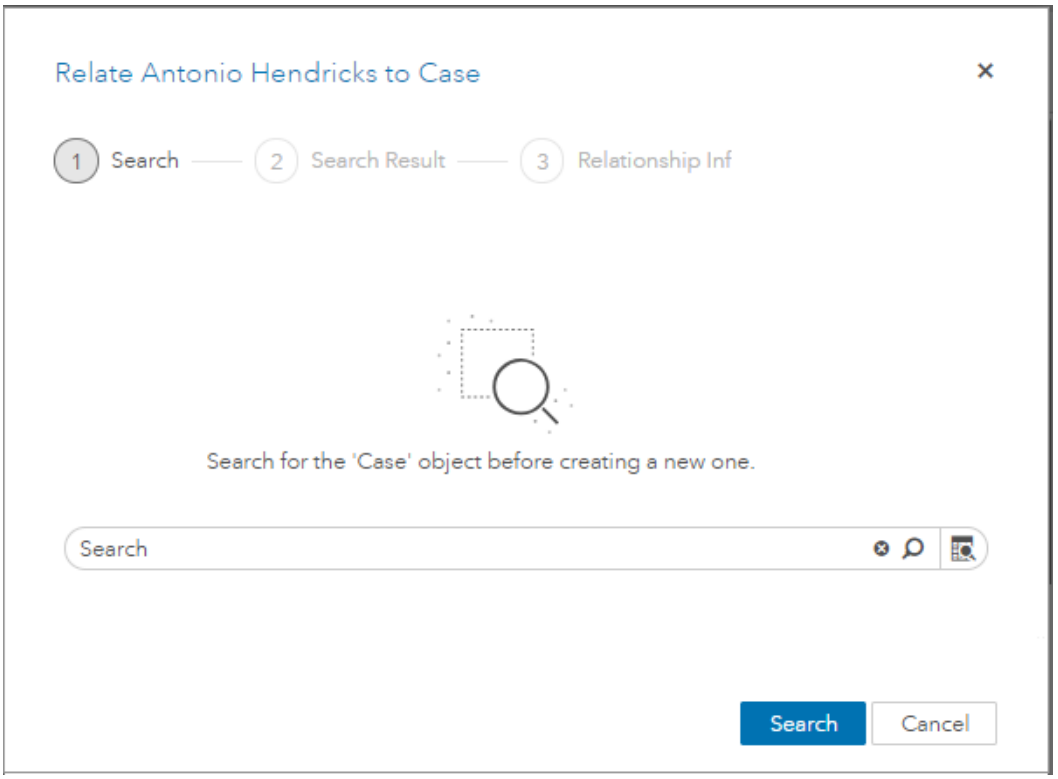
This SAS Visual Investigator tutorial describes using the object search feature, available as you relate objects to existing objects.

Depending on a combination of your user role, entity access rules, and permissions, you might be able to link an object in SAS Visual Investigator to an existing object in order to show a relationship between them. During the process of relating one object to another, you are presented with an option to search for an object to which to link.

Note: When creating a new object to which to link, you might also be presented with a search function. This ensures that you are not creating objects that duplicate the existing objects.

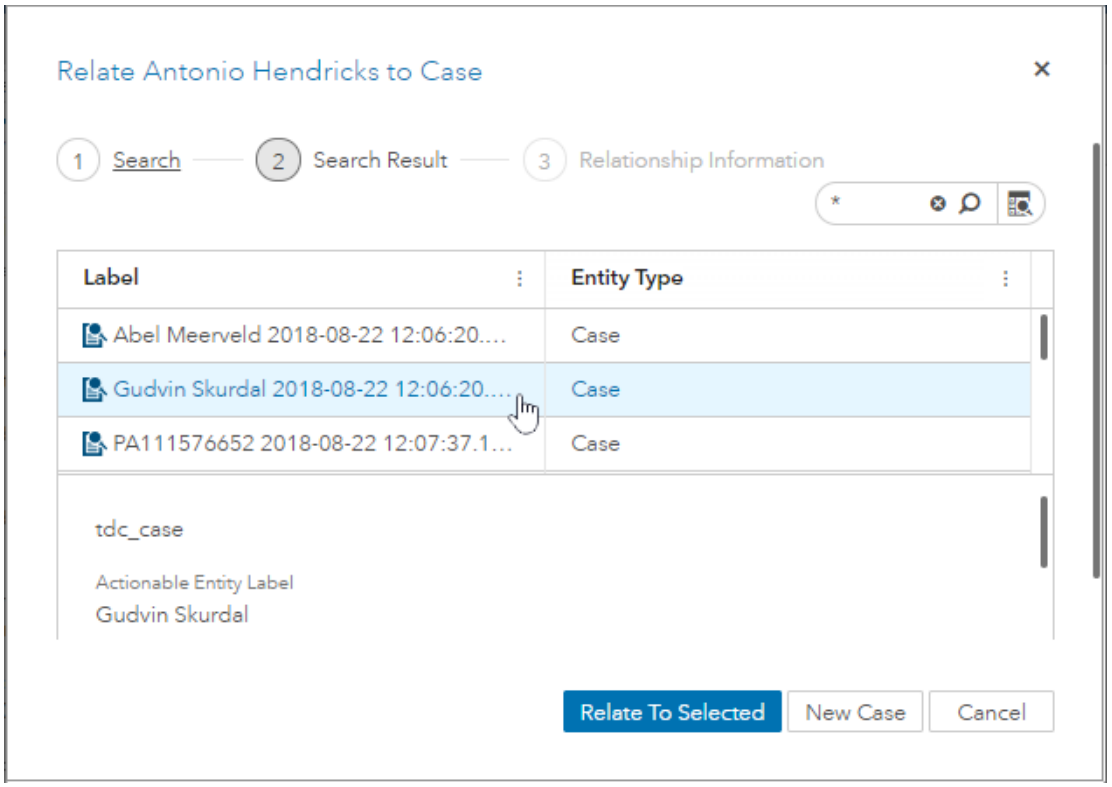
When presented with a Search window during the Relate To configuration process:

1 Enter search criteria to enable you to find the object that you want to link the current object to.



2 Press **Enter**, or click .

3 At the **Results** page of the window, to learn more about the displayed results, select an object to view details beneath the returned search results.



4 Select the required object from the search results, and click **Relate To Selected**.

Note: Only objects of types that can be linked to the current object are returned.

See also “Relating One Object to Another ” on page 27.

4

Data Views

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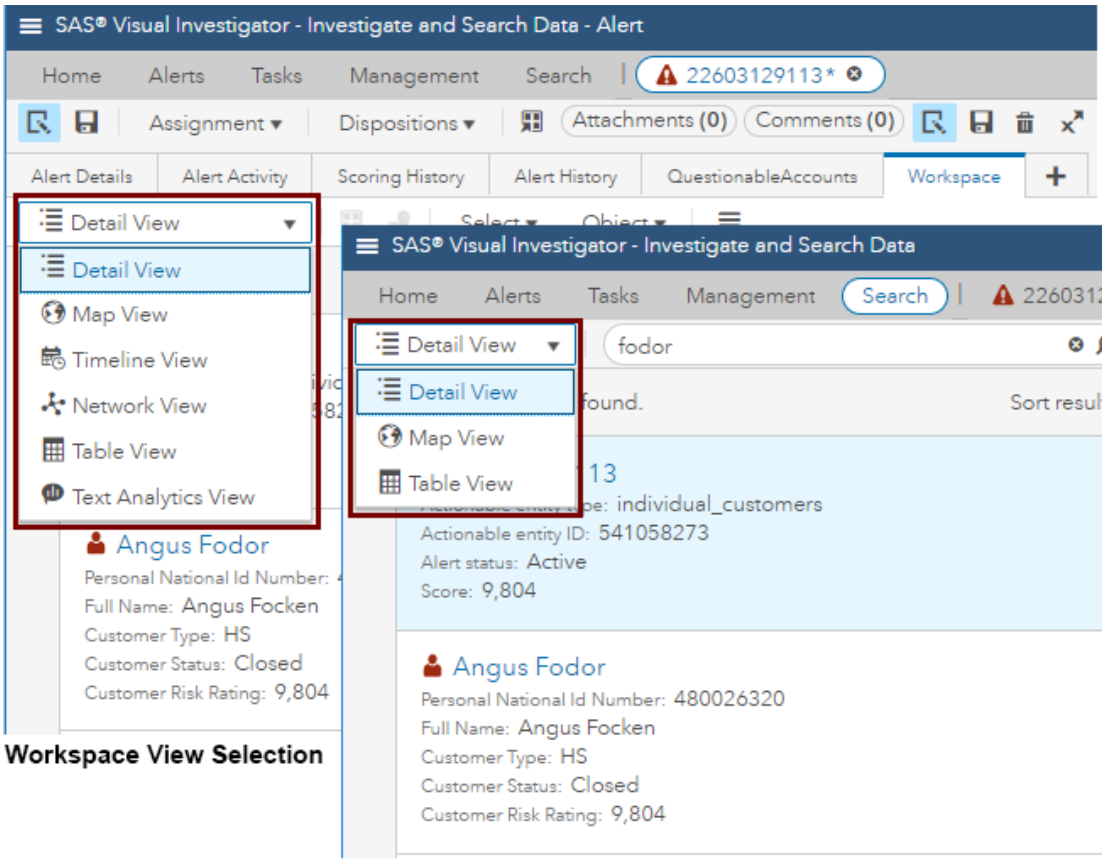
Understanding Data Views

This SAS Visual Investigator tutorial describes the different ways that you can view your data to get a better understanding of the investigation.

SAS Visual Investigator enables you to view your data, such as the results of a search or the contents of a workspace, in multiple ways.



Workspace View Selection

Search View Selection

Switching between different views can help you understand your data. When you change views, the layout of the details pane changes accordingly. Any items selected in the original view remain selected in the new view.

You can select the following views from the search results toolbar or from the **Workspace** tab's menu:

- **Detail View** is the default view. **Detail View** displays a summary of your data to enable you to easily see information relevant to your investigation.
- **Map View** enables you to view locations associated with your data plotted on a map.
- **Timeline View** enables you to view events associated with your data plotted on a timeline.

- **Network View** enables you to view relationships within your data and to expand connections for additional information.
- **Table View** enables you to view your data in table format.
- **Text Analytics View** enables you to analyze unstructured text from a selected object added to the workspace.

Not all views are available from all parts of SAS Visual Investigator.

View Data in Detail

This SAS Visual Investigator tutorial describes how to view your data in **Detail View**.

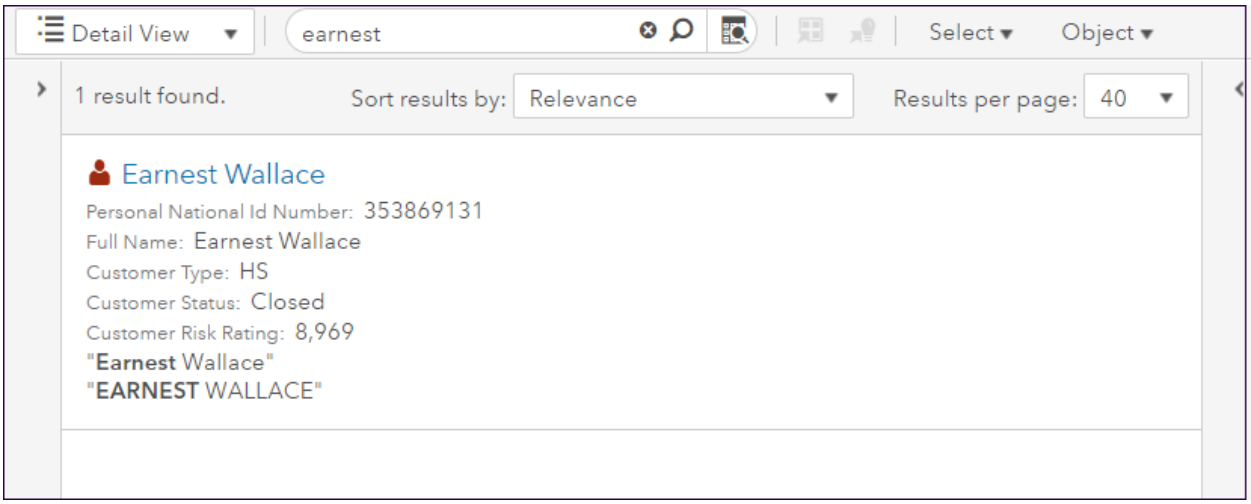
Detail View is the default data view for search results and in a workspace. In **Detail View**, the details pane shows the objects that you are viewing, with an individual tile that shows summary information for each object.

Each object has an associated icon as a visual indicator of its object type. If you are viewing search results, and if the information includes summary-type details, then any words that match your search terms are displayed in bold, enabling you to see your search term in context. You might also see a short synopsis of information about the object. The summary information displayed for each object type is configured by your solution administrator.

To display data in **Detail View**:

- From a search result or from within a workspace, select **Detail View** from the view menu.

The following figure shows the details pane for the search term *earnest*.



View Data in a Map

This SAS Visual Investigator tutorial describes viewing data in **Map View**.

In **Map View**, the objects that you are viewing are associated with locations on a map. This enables you to see your objects in relation to one another in a geographical context. If an object contains multiple pieces of geographical data (latitude and longitude), they are all plotted on the map. If you then select one of these items, all the other items associated with that particular object are also selected.

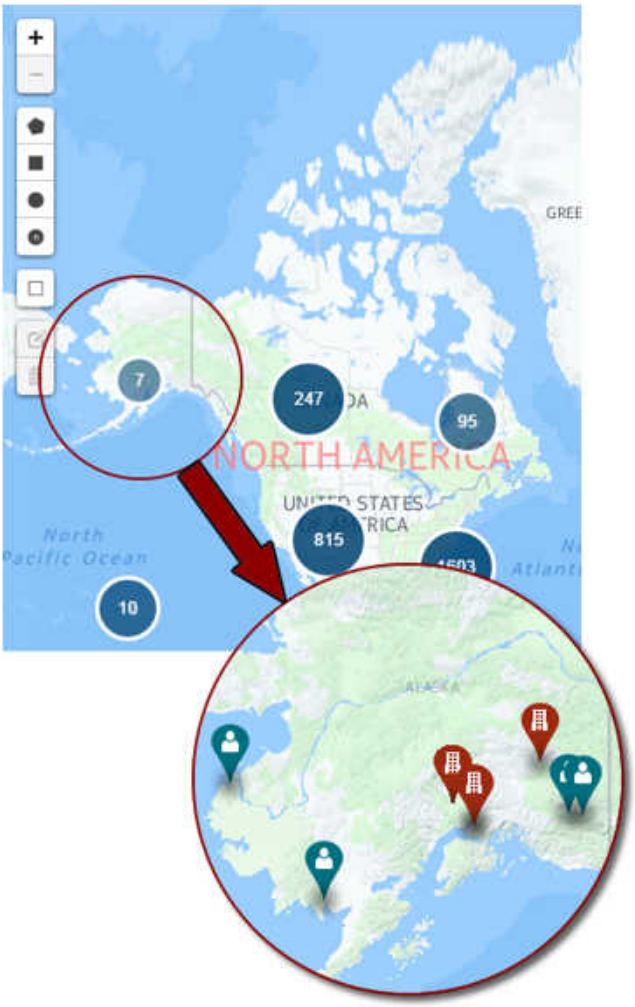
To display data in **Map View**:

- From a search result or from within a workspace, select **Map View** from the view menu.

  Data is displayed on the map either as individual points marked with pins or as clusters of points marked with blue circles.

  Note: If a displayed object does not have any associated geographical data, it is not displayed on the map. For example, if 16 items are returned from a search, and only three of those items have geographical data associated with them, then only those three items are displayed in **Map View**.

Pins display an icon to indicate which type of object they mark. Clusters display a number to indicate how many points are grouped together in that area. If you zoom in on a cluster, it expands to display individual points where possible.



You can double-click on a cluster to zoom in on it. If there are multiple objects at the same exact location, the pin icon displays a number indicating how many objects are located there.

View Data in a Timeline

This SAS Visual Investigator tutorial describes viewing data in **Timeline View** and how to display data in the view.

In **Timeline View**, the details pane displays the date and time of events associated with the objects that you are viewing. This enables you to see the chronological relationship between the objects.

Note: **Timeline View** is available from a **Workspace** tab, and on the **Alert Activity** tab.

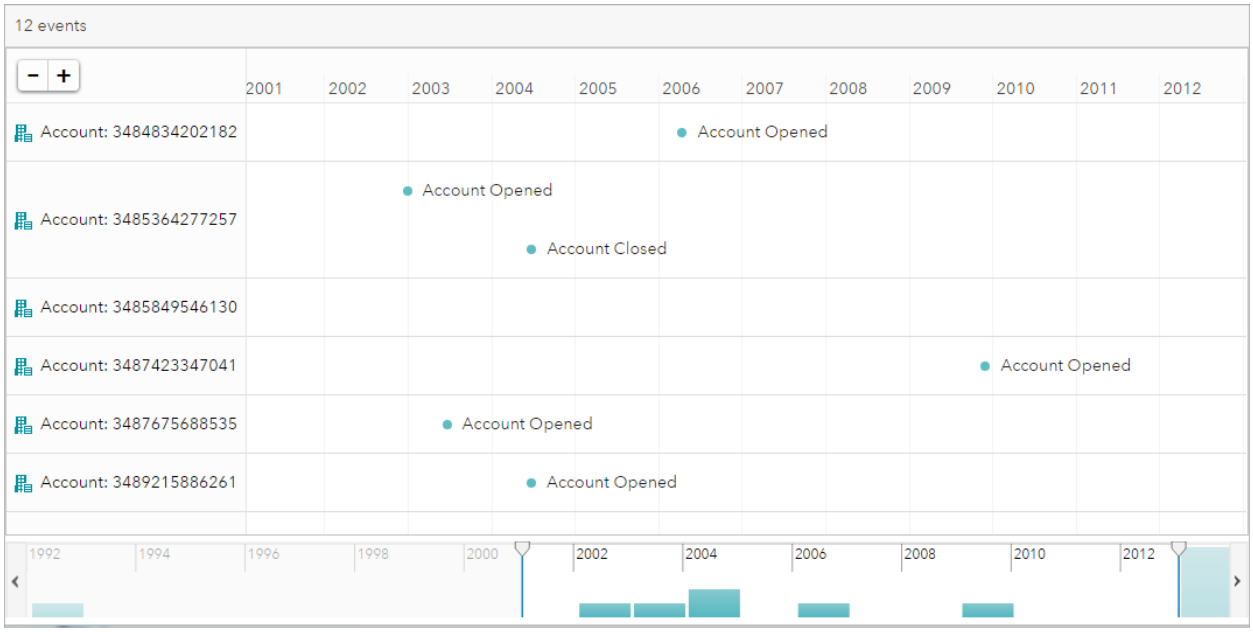
To display workspace data in **Timeline View:**

- From within a workspace, select **Timeline View** from the view menu.

  Data is displayed on the timeline as individual events marked with dots and labeled to describe the event.

  Note: If an object does not have any associated date/time data, it is not displayed on the timeline.

The following figure shows the details pane in **Timeline View** for several customer bank accounts.



You can use your mouse wheel to zoom in and out, or click the plus symbol to zoom in and the minus symbol to zoom out.

You can click on the timeline, hold the mouse button, and then move your mouse pointer to pan horizontally to another section of the timeline. The time slider at the bottom shows the currently displayed time period between two time bars.

To view additional information about an object, click an individual swimlane on the timeline to display the object in the object inspector. Or, alternatively, you can right-click a swimlane and select **Open** from the pop-up menu to open the object in its own tab.

Note: You cannot view information about objects on a timeline on the **Alert Activity** tab.

To select multiple swimlanes from the timeline to work with (for example, to add to a **Workspace** tab or an Insights tab), you can hold down the Ctrl key and click to select or clear individual swimlanes. In addition, you can use the **Selection** tool to make more complex selections.

View Data in a Network

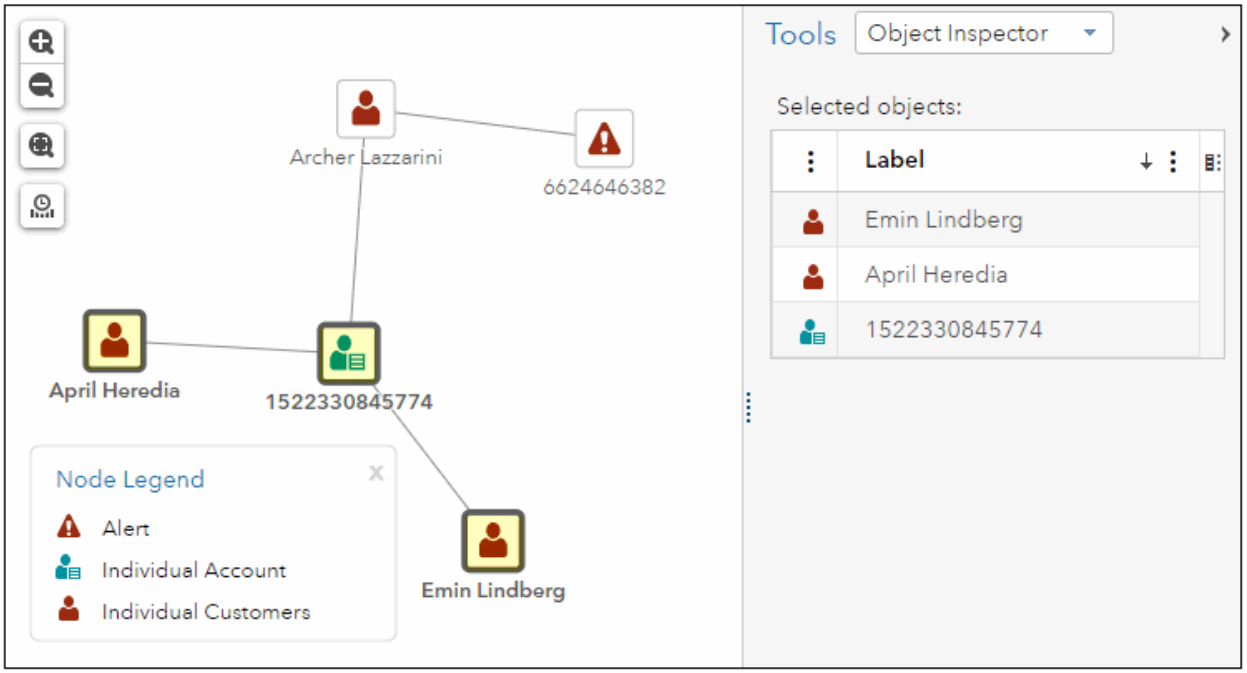
This SAS Visual Investigator tutorial describes using **Network View**.

Network View enables you to view and examine the connections and relationships within your data. You can focus in on areas of interest, expand nodes to see which other nodes they are related to, and manipulate the display of your data to provide additional information.

To display data in **Network View**:

- From within a workspace, select **Network View** from the view menu.

The following figure shows an example of a simple network in a workspace with three nodes selected.



Each object is displayed on the network diagram as a node, with an icon as a visual indicator of its object type. By default, each node has a label to identify it, although you can switch off the display of labels in the network properties tool.

Links are shown as lines between the nodes. There are two types of links: social links and transaction links. Social links show a connection between entities. For example, they can show the connection between an individual and their address, phone number, or employer. Transaction links show an action transference. For example, they might represent a deposit or withdrawal that an individual made to a specific account.

The Node Legend maps icons to the object types that each represents. If the Node Legend is not visible, you can use the network properties tool to display it.

Click **Open time slider** ( ) to display a time slider at the bottom of the network diagram. Click the button again to hide the time slider

To view additional information about an object, right-click the node and select **Object inspector** from the pop-up menu. Alternatively, select the object inspector tool on the **Tools** pane and click a node in the diagram.

View Data in a Table

This SAS Visual Investigator tutorial describes how to view data in **Table View**.

In **Table View**, the details pane displays your data in a table with one object in each row. Your solution administrator can configure which columns are available for each object type.

To display data in **Table View**:

- From a search result or from within a workspace, select **Table View** from the view menu.

The following figure shows an example of data, including multiple object types, displayed in a **Table View** in a workspace.

Label	Entity Type
Ella Fuller	Individual Customers
Ella Samuel	Individual Customers
Ella Samuel	Individual Customers
2693 ELLA STREET SAN FRANCISC US	Address
3516 ELLA STREET PALO ALTO US	Address
Catching Dinosaur Media Inc	Business Customer
Kneeling Horse Brewing NV	Business Customer
Raul Cole	Individual Customers

To view additional information about an object, click an individual row in the table to display the object in the object inspector. Alternatively, double-click an individual row to open the object in its own tab.

Note: If your table contains more than one type of object, only the common columns **Label** and **Entity Type** are available.

Note: You can use the Shift key and click to select multiple objects only on the currently displayed page of the table. In addition, you can use the **Selection** tool to make more complex selections.

View Text Analytics Data

In **Text Analytics View**, the details pane presents the results of analyzing unstructured text from the objects added to the workspace.

This view enables investigators and analysts to add an unstructured dimension to an investigation process by incorporating the latest advances in text analysis and visualization. These advances enable users to reveal people, places, and organizations, as well as topics and themes that previously would have required tedious manual analysis. The display can be controlled and filtered by the user to show a word cloud or a Sankey diagram. In addition, unique visualizations enable topics and relationships to be expressed in a graph that can be incorporated into investigation research and case documentation.

Display perspectives range from common phrases to potential entities by categories to statistically relevant phrases.

Note: **Text Analytics View** is available only from a **Workspace** tab.

Administrators determine the fields to be analyzed during the initial data analysis, and users rely on the interface features to control and refine the information in a manner that is revealing and helpful to the investigation.

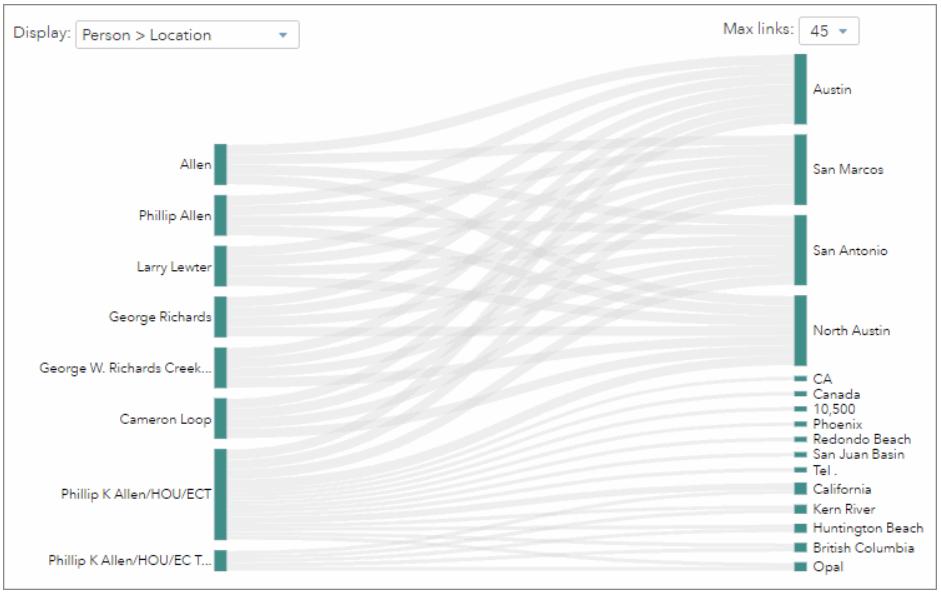
To display data in **Text Analytics View**:

- From within a workspace, select **Text Analytics View** from the view menu.

Here is an example of data displayed in a Sankey diagram that correlates Person entities with Location entities. Basically, the diagram shows the volume of documents

that contain a selected phrase in relation to potential person entities and potential location entities.

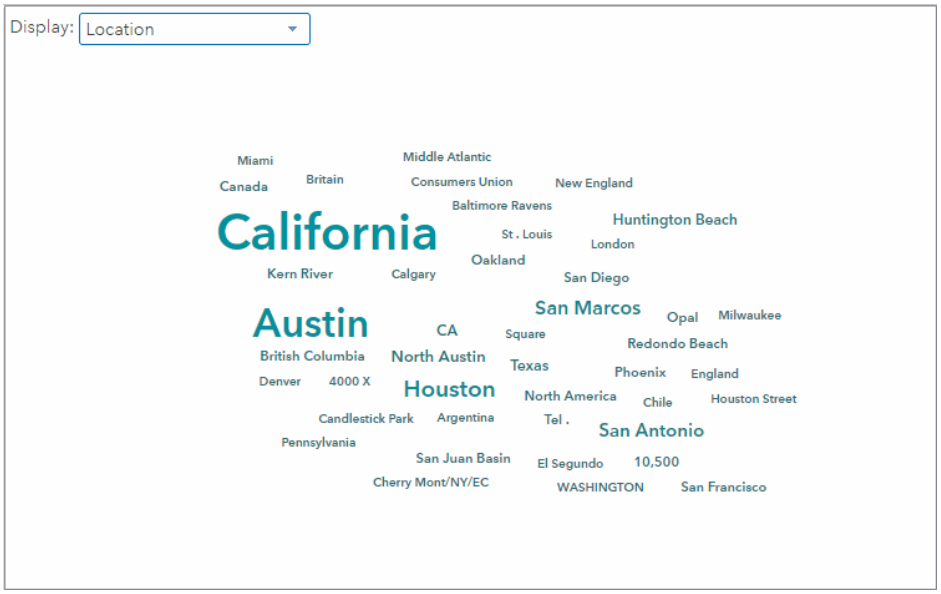
Figure 4.1 *Example of a Sankey Diagram Correlating Person Entities and Location Entities*



Note: Unlike a Sankey diagram, a word cloud focuses only on a single perspective.

Here is an example of the same information displayed in the previous diagram in a word cloud based on Location.

Figure 4.2 *Example of a Word Cloud Based on Location*



The **Text Analytics View** enables you to control the depth and type of text displayed by making various selections in the view. In addition, depending on how the view is configured for your deployment, you might be able to view details about a selected text source (for example, an email) by selecting the **Object Inspector** from the **Tools** pane.

5

Network Management

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Specifying Double-Click Behavior for Nodes

This SAS Visual Investigator tutorial describes how to specify what actions are performed as the result of double-clicking a node.

You can specify the results of double-clicking a node. The specifications are saved with the network and are active each time the network is accessed.

To specify the action that results when a node is double clicked:

1 Make sure that the network for which the double-click action preference is to be specified is displayed in the active **Workspace** tab.

2 Select **Network Properties** from the **Tools** menu.

3 At the **Double-click action** option, do one of the following:

- Select **Expand** to cause the node to expand to its maximum expansion level whenever a double-click action is applied.

  Note: If no further expansion can be performed, then double-clicking the node has no effect.

- Select **Open** to cause the node's associated form to open to show information about the node.

Specifying Node and Link Text Display Options

This SAS Visual Investigator tutorial describes how to show or hide node and link text.

Nodes might have associated text in the form of annotations or labels. Links might have associated text in the form of labels. You can indicate whether the text associated with nodes and links should be displayed in the network.

Note: Labels are not displayed for transaction links.

To manage node and link text options:

- From within a workspace with the **Network View** option selected, select the options that you want from the **Network Properties** of the **Tools** pane.

  Here are the actions that can be performed to accomplish a specific task.

Task	Action
Show node annotation	Select the **Show node annotation** option.
Hide node annotations	Deselect the **Show node annotation** option.
Show node labels	Select the **Show node labels** option.
Hide node labels	Deselect the **Show node labels** option.
Show link labels	Select the **Show link labels** option.
Hide link labels	Deselect the **Show link labels** option.
Show legend	Select the **Show legend** option.
Hide legend	Deselect the **Show legend** option.

When you make a selection, the network updates to reflect the change. The network is saved and retrieved with the options specified.

Applying a Timeline to the Network View

This SAS Visual Investigator tutorial describes using a time slider to view only particular nodes and links for a specified time interval.

In many instances, the nodes of a network represent the entry of a person into the investigative arena, the beginning of an activity, or another type of object for which a time stamp can be applied. Similarly, the addition of links can illustrate when new relationships between nodes were discovered as part of an investigation. When nodes and links have a time or interval component, it is helpful to view the nodes against a time slider. Adjusting the time slider shows the entrance and exit of nodes and links and enables you to see only the nodes that are active at a particular time.

To view nodes and links with respect to a time slider, where inactive nodes and links are dimmed:

1 Make sure that a network is displayed in a **Workspace** tab.

2 Make sure that the time slider is visible at the base of the network.

> **TIP** To toggle the time slider on and off, click **Time slider** ( ) in the network floating toolbar.

3 Select **Network Properties** from the **Tools** menu.

When the time slider is displayed, the **Network Properties** options include a **Time slider range** selection. This enables you to specify which nodes are included (visible) in the range indicated by the time slider.

4 Do one of the following:

- To indicate that inactive nodes should be dimmed, select the **Exclude nodes starting before** option in the **Time slider range** area.
- To indicate that all nodes should be active regardless of entry point, deselect the **Exclude nodes with dates earlier than the time slider range** option in the **Time slider range** area.

Expanding Nodes

This SAS Visual Investigator tutorial describes expanding nodes to view the connections between certain objects.

The expansion feature enables you to investigate and explore your data by following connections between objects.

Here is an example showing a single object, **Customer: ANGUS FOCKEN**, on an unexpanded network diagram. This customer is linked to eight other objects that are not yet visible on the diagram.

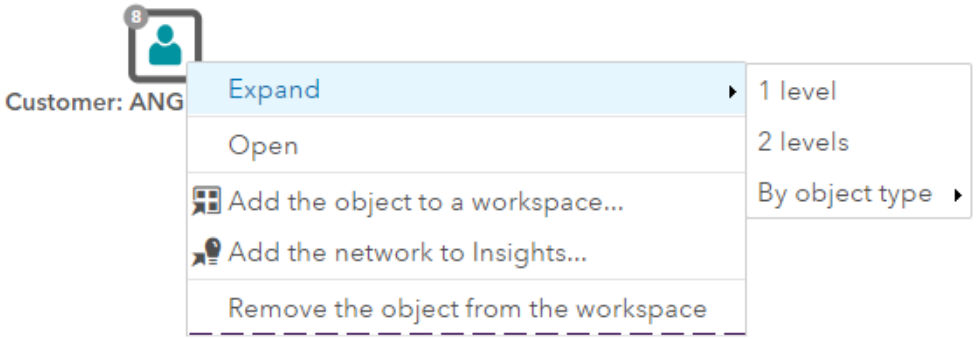
Note: If your system is configured so that linked object counts are not displayed on network diagrams, nodes will not show these numbers even if linked to other objects not visible on the diagram.

When an expansion of a node occurs, you might notice that the values of other unexpanded nodes have changed or been removed. This is normal and indicates that when the source node was expanded, it caused expansion of nodes associated with other nodes. The values attached to the nodes adjust to retain an accurate depiction of the state of the node relationships.

Note: The solution administrator can set a limit on the total number of objects an expansion can add to a network diagram. If you attempt an expansion that exceeds this limit, a prompt asks you to confirm that you want to proceed. Resolved entities with more than 2000 linked objects cannot be expanded. If the number of objects linked to a node exceeds this limit, the node displays “X” instead of the number of linked objects.

To display any objects linked to a node on the network diagram:

- Right-click the node, select **Expand**, and then select the expansion level that you want.

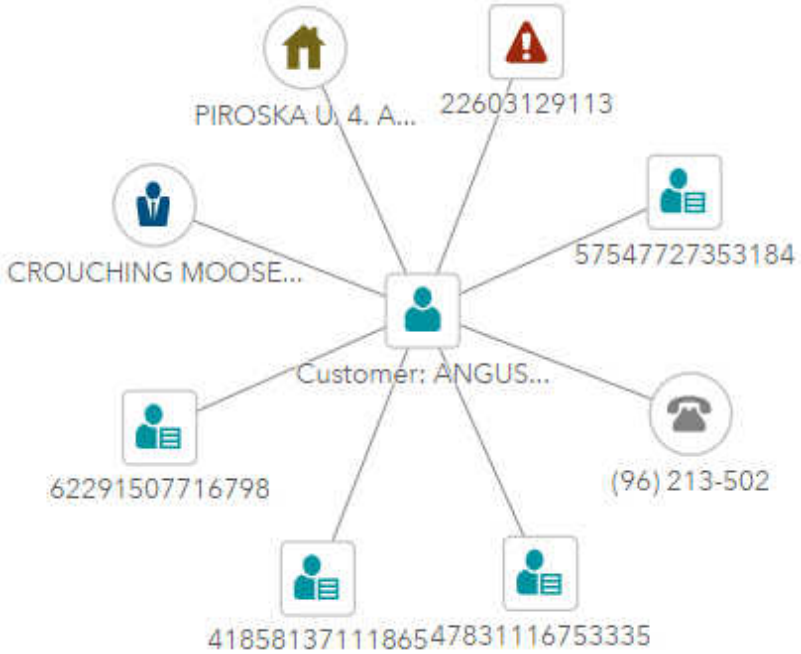


Note: The network diagram is refreshed and redrawn each time you expand a node in a workspace. If the underlying data has changed, the updates are reflected in the network diagram.

To display any objects directly linked to a node on the network diagram:

- Right-click the node and select **Expand** ▶ **1 level** from the pop-up menu.

  This image shows the **Customer: ANGUS FOCKEN** node expanded one level to show the eight linked objects.



To display directly linked objects and also objects directly linked to those objects in turn (that is, objects that are at two removes from the original node):

- Select **Expand** ▶ **2 levels** from the pop-up menu.

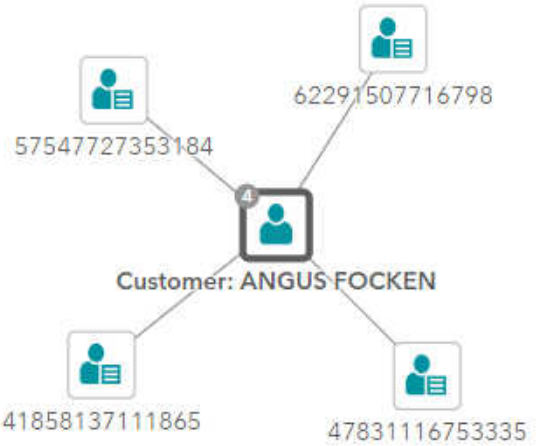
TIP If you select multiple nodes, you can expand them at the same time.

To expand by object type (that is, expand to display only links to nodes of a specified type):

- Select the nodes that you want to expand, and select **Expand** ▶ **By object type** ▶ ***required object type*** from the **Workspace** tab's menu.

  Only object types linked to the selected node and not already expanded are listed in the menu options.

  The following figure shows the node from the previous example expanded to show only the accounts linked to the customer. The number four indicates that there are four objects not yet displayed on the diagram that are linked to the same customer.



By default, you can double-click a node to expand it by one level. You can change this behavior in the network properties tool.

Applying Network Analytics

This SAS Visual Investigator tutorial describes the **Centrality** option and how to apply it to the network visualization.

In SAS Visual Investigator, entity analytics such as centrality measures can be applied to the network visualization when the **Centrality** option is enabled for your deployment.

If the **Centrality** option does not appear on the **Tools** menu, then the feature is not enabled for your deployment. Contact your solution administrator to enable the option if it is needed.

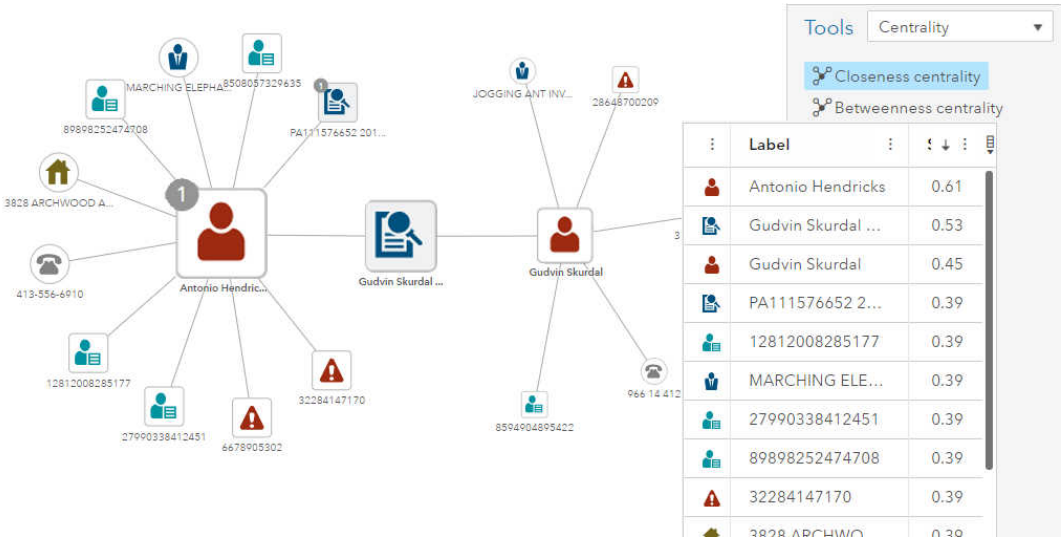
Standard available centrality measures include the following.

- Closeness centrality
- Betweeness centrality
- Degree centrality
- Eigen centrality
- Influence 1 centrality
- Influence 2 centrality

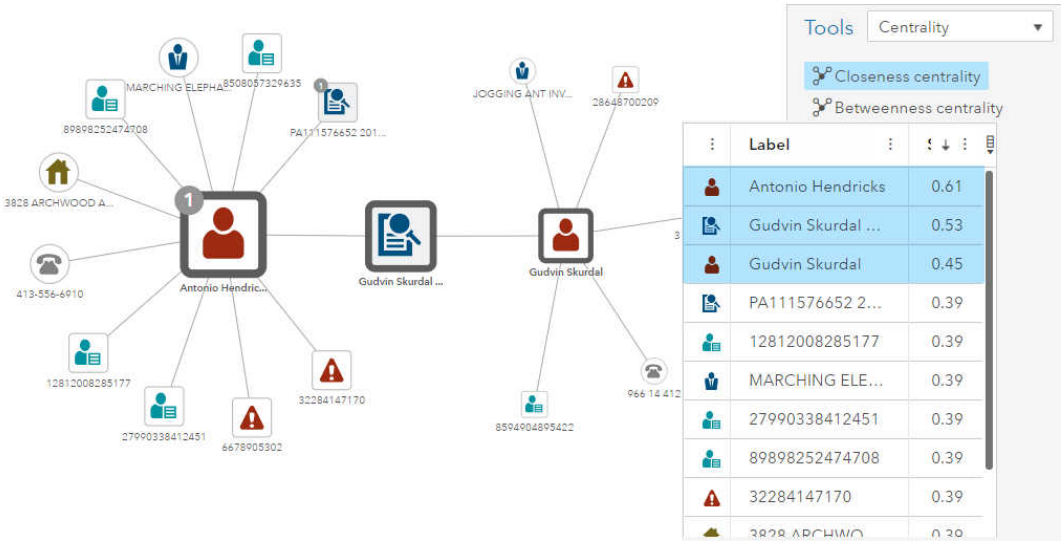
To apply a centrality measure to an active network:

1. Select **Centrality** from the **Tools** menu.
2. Choose one of the available centrality measures.

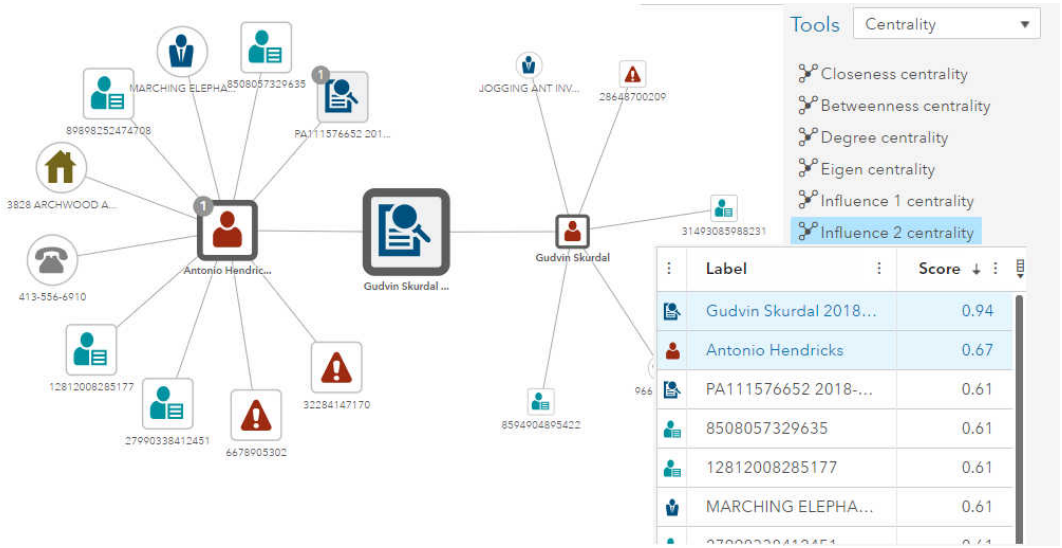
   The network diagram and the node table update to show the relationship significance with respect to the indicated centrality measure.



3 Select one or more nodes from the network diagram or from the node table to highlight the nodes of interest.



4 Select other centrality options to continue to investigate relationships with respect to other measures.



TIP To restore the default, no-selection view, either click a selected centrality measure to deselect it or click an empty area of the canvas.

Applying a Network Layout

This SAS Visual Investigator tutorial explains how to manage a network layout to make it easier to manage the view and accessibility of the nodes and links.

Stretching the Network Layout

The **Stretch Layout** option can be applied to unadjusted nodes, selected nodes, or all visible nodes. Unadjusted nodes are nodes that have not been moved in the current session and custom nodes that have been added to the network.

By default, the layout applied affects only unadjusted nodes; nodes that have been moved or added are anchored in place. This ensures that the modified node positions are not compromised if you reorganize the network diagram.

To cause the nodes in a diagram to stretch (pull away from all other nodes):

1. Make sure that a network is displayed in a **Workspace** tab.
2. Select **Network Properties** from the **Tools** menu.
3. From the **Apply layout** menu, choose **Unadjusted nodes**, **All nodes**, or **Selected nodes**.
4. Click **Stretch Layout**.

   Note: Each time you click the **Stretch Layout** option, the network attempts to force the nodes farther apart by adjusting the node repulsion (charge) and the link distance. Click the option multiple times, if needed, to achieve the effect that you want. If you are unable to reach your goal, consider using the **Advanced Layout** feature for more granular control over node placement. You can click **Reset layout** to return to the original layout at any point.

Contracting the Network Layout

The **Contract Layout** option can be applied to unadjusted nodes, selected nodes, or all visible nodes. Unadjusted nodes are nodes that have not been moved in the current session and custom nodes that have been added to the network.

By default, the layout applied affects only unadjusted nodes; nodes that have been moved or added are anchored in place. This ensures that the modified node positions are not compromised if you reorganize the network diagram.

To cause the nodes in a diagram to contract (move toward other nodes):

1. Make sure that a network is displayed in a **Workspace** tab.
2. Select **Network Properties** from the **Tools** menu.
3. From the **Apply layout** menu, choose **Unadjusted nodes**, **All nodes**, or **Selected nodes**.

4 Click **Contract Layout**.

Note: Each time you click the **Contract Layout** option, the network attempts to force the nodes to move closer to one another apart by adjusting the node repulsion (charge) and the link distance. Click the option multiple times, if needed, to achieve the effect that you want. If you are unable to reach your goal, consider using the **Advanced Layout** feature for more granular control over node placement.

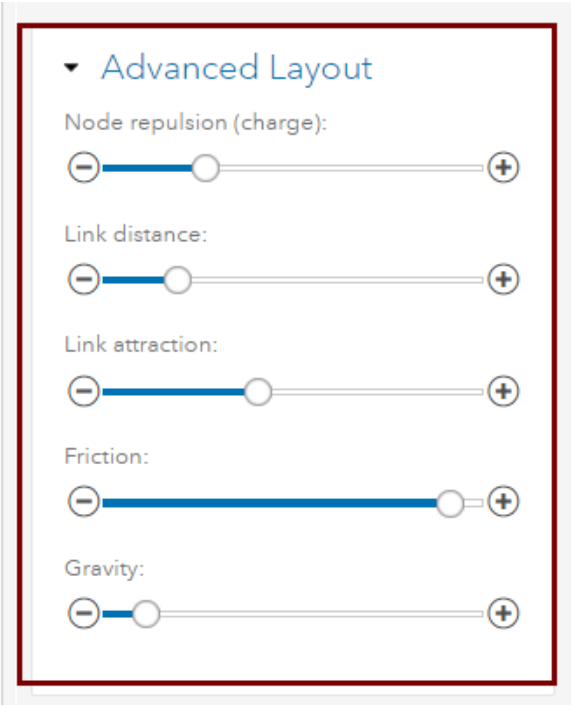
TIP Click **Reset layout** to return to the original layout at any point. Any custom nodes that have been added are also restored to their original positions.

Controlling Node and Link Response

The **Advanced Layout** option enables you to have some control over the layout display and behavior of nodes and links in a network diagram. By default, each network diagram is loaded with a typical set of layout parameters.

Here is a list of the default parameters along with a graphic showing the default settings.

- Node repulsion
- Link distance
- Link attraction
- Friction
- Gravity



Clicking the **Stretch Layout** or **Contract Layout** options generally affects the **Node repulsion** and **Link distance** options only.

For more granular control over the layout display and operation:

- Adjust the advanced layout parameters by dragging the associated slider left or right, depending on the desired results.

  Here are a series of adjustments applied to the same network.

Figure 5.1 *Default Layout*

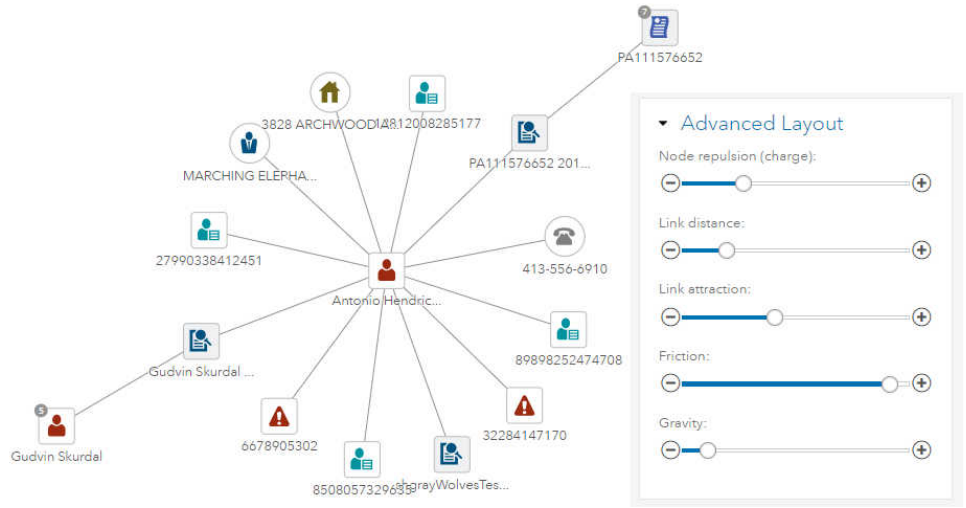


Figure 5.2 *Adjustments Applied to Increase Link Distance*

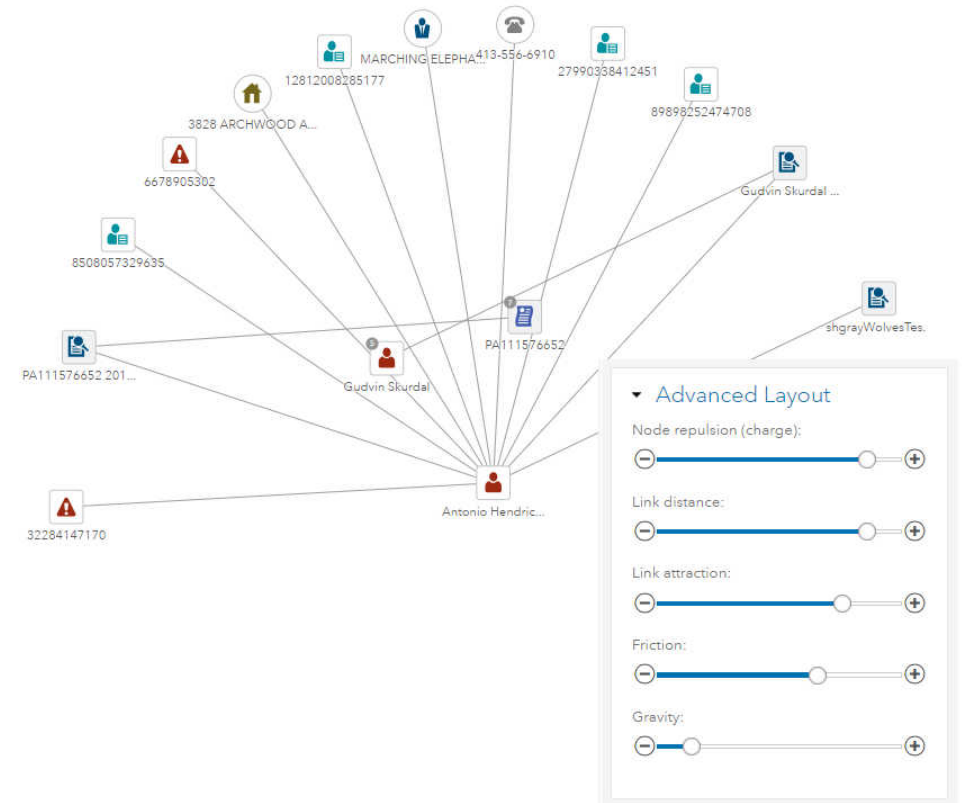
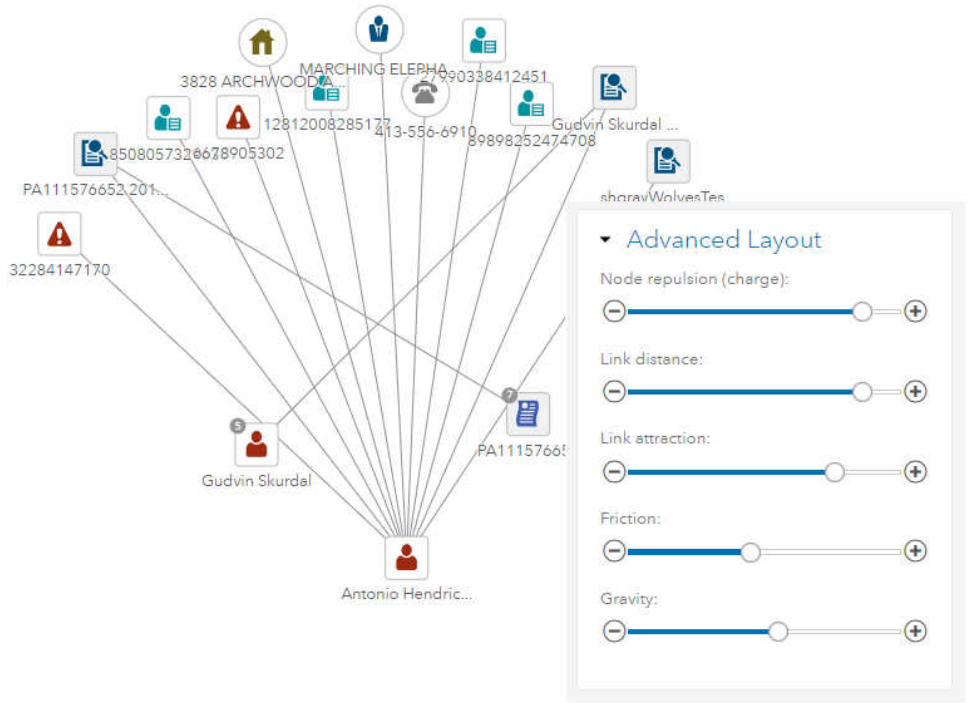


Figure 5.3 *Adjustments Applied to Decrease Node Distance*



Updating Node and Link Properties

This SAS Visual Investigator tutorial describes how to update node properties and link properties.

Note: The information in this tutorial applies to social links, not to transaction links.

1 Make sure that a network is displayed in a **Workspace** tab.

2 Select **Node Properties** or **Link Properties**, depending on the object of interest, from the **Tools** menu.

3 Select one or more nodes, or select one or more links whose properties you want to modify.

The **Node Properties** pane or the **Link Properties** pane displays the properties associated with the selected nodes or links.

Note: The ID displayed for either nodes or links is read-only and cannot be changed. When more than one node or link is selected, the **ID** field is replaced with a **Nodes Selected** or a **Links Selected**, as appropriate, field. This field then shows a value indicating the number of items selected instead of an ID.

Note: The **Label** field displays the label of the selected node or link. If the labels of all selected nodes or links are identical, then the label text is displayed in the **Label** field. If the label text of the selected nodes or links is not identical, then the **Label** field is not populated with text.

4 Modify the properties of interest.

5 Click **Update View** to apply the updated properties to the network.

6

Data, Page, and Object Manager Configuration

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Adding a Data Object from a File

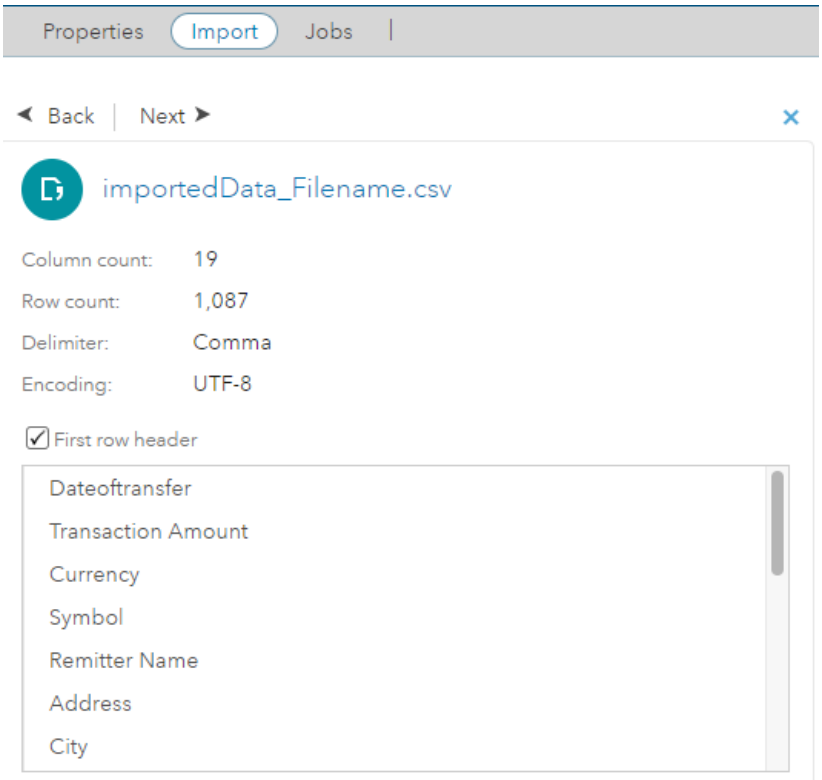
This SAS Visual Investigator tutorial explains how to import data objects from a flat file.

One way to import a data object is to upload a file containing data in a supported, delimited format. Supported delimited types are comma-separated, semicolon-separated, tab-separated, pipe-separated, and Microsoft Excel spreadsheets.

1. Make sure that you have a supported file accessible to SAS Visual Investigator.
2. Navigate to the **Import** page of the administration interface and make sure that the **Upload** option is selected.
3. Drag and drop a file onto the **Drop Data Here** area.

   You can also click **Browse Files** to select the file from the file system.

   When data import is initiated using a flat file as the source, data is analyzed to determine the data type of each column, and data details and a read-only list of the fields are displayed in the window.



Review the data details.

Note: The information that is displayed, including the column names, is read-only in this view.

The import feature makes an intelligent guess at whether the imported flat file contains a header row.

4 If the selection for **First row header** is incorrect, change the value of the **First row header** check box as appropriate.

Note: If you do not indicate a first row heading, columns are named **Var1**, **Var2**, **Var(n)**.

5 Click **Next** to go to a preview page that shows the data that you are importing.

Note: Icon indicators reveal information about the fields, such as data type, data associations, and unique field identifiers.

6 On the preview page, configure the data to be imported.

Configuration is done on a per-column basis by clicking the cell beneath the column heading of the column that you want to configure. This displays a window that enables you to view or modify field characteristics for the selected column.

If you want to omit columns from the import, click ⋮ in a column heading and select **Columns** to display the pop-up menu listing the included columns. Clear the check boxes associated with the columns that you want to omit, or click the cell beneath the column that you want to remove and click **Remove field**.

7 Click **Next** to configure additional properties of the new entity. Configuration properties include those related to entity identification, detail view fields, and table view fields as described in the following list:

- display labels for the entity type **Name** and **Label**.
- the icons and pin color for the entity. If you do not select icons, icons are assigned by default.
- the **Object** label. This is how individual entities of this type are labeled in places such as the node link diagram.
- the set of fields to display in search results for both **Detail View** and **Table View**.

8 Click **Finish**.

This creates a new object type in SAS Visual Investigator and starts indexing the new object in a background process.

You can access the object at the **Entities** tab of the **Data Objects** page, where you can continue to configure the entity.

Adding a Data Object from a Database

This SAS Visual Investigator tutorial explains how to add data objects from a database.

Besides flat files, you can also import new entities from database tables or views that are visible in a defined data store. Allowable databases include supported versions of PostgreSQL, Oracle, DB2, Teradata, SQL Server, and MySQL.

Note: The proper data sources must be defined before they can be imported into the new environment.

1. Navigate to the **Import** page of the administration interface.
2. Click **Connect**.
3. Choose a data store from the **Data store** drop-down menu, and click **Show Data**.

   Note: If the data store does not contain any tables, you are prompted to select another data store.
4. Select a table or a view, and then click **Connect** at the base of the list of tables and views.

   Note: Tables are indicated by an icon and views are indicated by an icon.

   In some instances, not all tables are presented. Tables where the names are greater than 30 characters long, the names contains characters such as $, #, or the names start with a number are not included in the list of displayed tables. Only tables that have not yet been imported through **Connect** or configured through the **Properties** page are available for selection. Tables that are partially imported appear on the **Resume** tab and are not available for selection.
5. On the preview page, configure the data to be imported.

   Note: Data store tables on remote customer sites can contain column data types that are not supported by SAS Visual Investigator. In those instances, those columns are not imported when the table is registered. Those columns are not displayed in the preview page.

   Configuration is done on a per-column basis by clicking the cell beneath the column heading of the column that you want to configure. This displays a window that enables you to view or modify field characteristics for the selected column. For tables and views, you can change only the field label, matching element, and field role value.

Note: When importing a view, you need to specify the primary key, because they are not already specified. You cannot click **Next** until a primary key is specified.

6 Click **Next** to configure additional properties of the new entity. Configuration properties include those related to entity identification, detail view fields, and table view fields as described in the following list:

- display labels for the entity type **Name** and **Label**.
- the icons and pin color for the entity.
- the object label. This is how individual entities of this type are labeled in places such as the node link diagram.
- the set of fields to display in search results for both **Detail View** and **Table View**.

7 Click **Finish**.

This creates a new object type in SAS Visual Investigator and starts indexing the new object in a background process.

8 Navigate to the **Data Objects** page and select the object that you imported from the list of entities. You can continue to customize the entity.

Create a New Internal Entity

This SAS Visual Investigator tutorial explains how to create an internal entity.

The steps in the following example require that data is available in the SAS Visual Investigator's internal data store.

To create a new internal entity:

1 Navigate to the **Data Objects** page of the administration interface.

2 On the **Data Objects** toolbar, click **Entities**.

3 Select **New** ▶ **New Internal Entity** from the menu.

The entity detail page appears.

4 On the **Settings** tab, enter the following information:

- **Name** – The system name of the entity. This field can contain alphanumeric characters and underscore characters only, cannot start with a number or an underscore, and must be no longer than 25 characters in length.
- **Label** – The entity display name.
- **Description** – The description of the entity. This field is optional.
- **Data store** – The data store used to populate the entity.
- **Table name** – The database table used to populate the entity.

Select **History enabled** if you want version history data to be stored for objects of this type.

Index for search is selected by default. Deselect this option if you do not want the entity data to be searchable by SAS Visual Investigator users. If **Index for search** is selected, you can click **Advanced Properties** to set the number of shards and replicas used for this entity.

Select **Require searching for an object before it can be created** to force SAS Visual Investigator users to perform a search for existing objects before creating an object of this type to avoid possible duplication of information.

The **Unique Reference Number** area enables you to specify how unique identifiers for objects of this entity type are generated:

- **System generated number (GUID)** — This is the default setting. This setting specifies that objects of this entity type have system-generated reference numbers.
- **Sequential generated number** — This setting specifies that the first object of this entity type has the **Starting number** as part of its reference number. The sequence increments by one each time a new object of this entity type is created. You can increase the **Starting number** value to change the number the sequence starts with.

Note: If the **Starting number** is changed in the future to a value smaller than the current highest number in the sequence, it will fail the validation.

- **Random generated number** — This setting specifies that objects of this entity type have randomly generated numbers as part of their reference numbers. You can select the length of the generated number from the **Length** drop-down list.

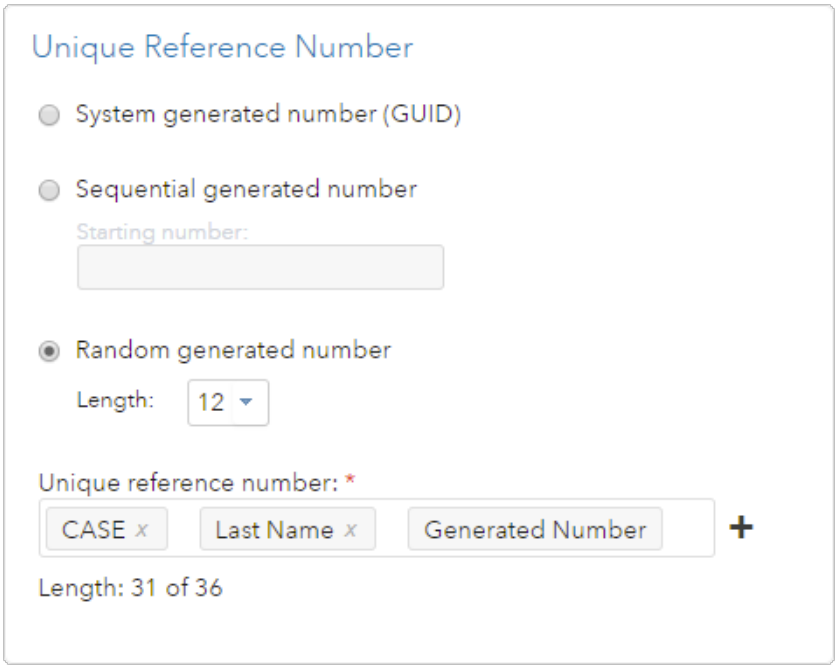
If you choose either a sequential generated number or a random generated number, you can add other elements to the reference number to make it more meaningful. Click **+** to add field values, text strings, or date elements to the reference number.

Note: Only mandatory fields that are either strings or reference data are available for selection. You can use the **Fields** tab to add fields as described in the next step, or return to configuring the reference number later after the necessary fields have been added.

You can re-order the format of the reference number by dragging and dropping the elements into new positions in the **Unique reference number** box, or you can click **x** alongside an element in the **Unique reference number** box to remove it. The total length of the reference number cannot exceed 36 characters.

Note: If you have multiple string elements alongside each other in the **Unique reference number** box, saving the entity joins these strings together into a single string.

This example shows a configuration of a unique reference number formed of a string ("CASE"), the value from the object's last name field, and a 12-character randomly generated number:



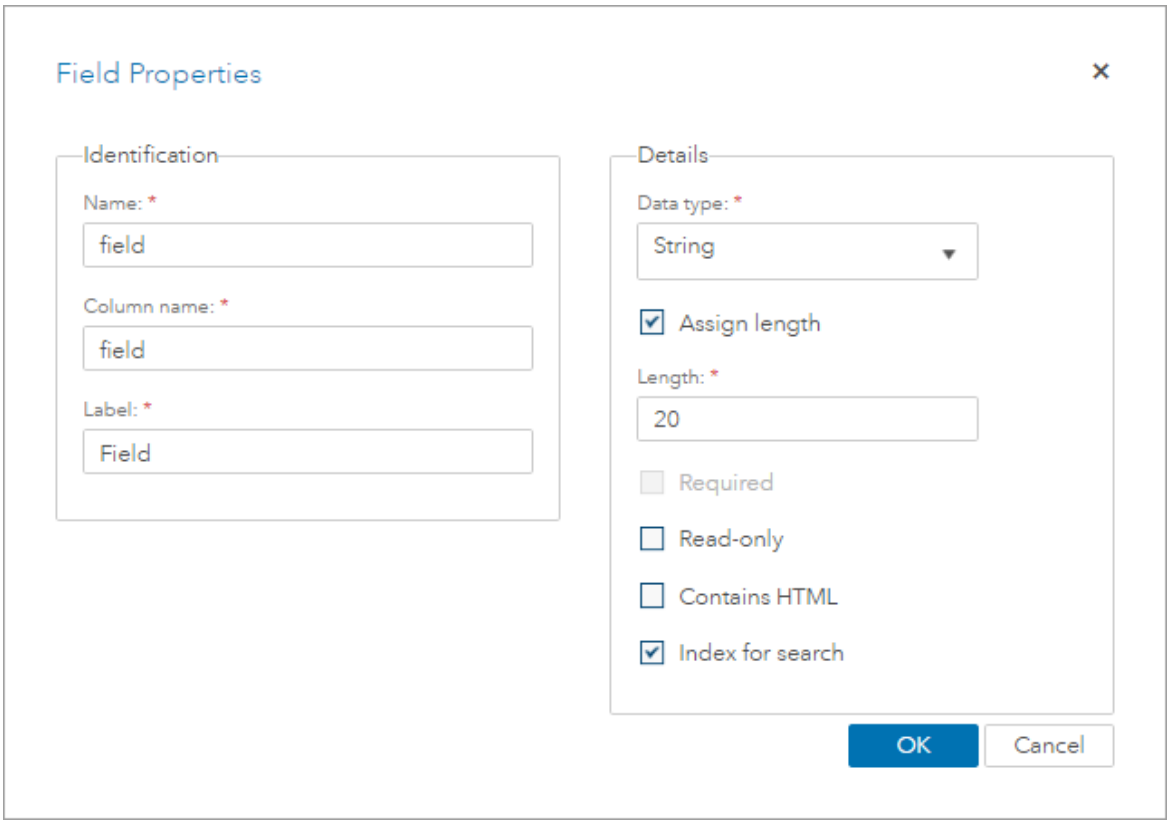
If desired, create child entities.

5 Click the **Fields** tab to configure the fields contained within an entity. The fields that you can choose from depend on the data store and table defined on the **Settings** tab.

6 Click to add a new field to the entity.

Note: An entity can have a maximum of 1000 fields, including system-reserved fields.

Alternatively, to edit an existing field, click . The Field Properties window is displayed:



7 Complete the **Name**, **Column name**, and **Label** fields.

8 From the **Data type** drop-down list, select the type of field you are adding.

Optionally, for string fields select **Assign length** and set a length for the field. For numeric fields, you can assign **Precision** and **Scale** settings. Select **Required** if this field is mandatory for inclusion in the entity.

Note: If you add a **Required** field and then save the entity configuration, you cannot subsequently add further mandatory fields to the entity.

You can now create a field that is read-only. You can do this by selecting the **Read-only** option for the field that you do not want a user to update. This option is ideal for updating the status of an object, such as a case. You can update the read-only field from the **Write to Entity field** option from either the **Start** element or the **User Task** element.

Select **Contains HTML** for any fields that contain HTML tags. Text values will have all HTML tags removed before being analyzed and indexed.

Note: Select **Contains HTML** for any fields to be used with Rich Text Input controls. Ensure that the field length is long enough to include HTML tags in addition to content.

By default, **Index for search** is selected for each field. Fields that are not indexed for search are not searchable, and as such are not available when configuring views (for example, detail and table views, dates and locations, or facets).

Note: This option is available at field level only if you selected **Index for search** at the entity level.

For user or group fields, select the option from the **User selection strategy** drop-down menu. Check **Allow multiple selections**, if you want to select multiple users or groups. Again, select **Required** if this field is mandatory for inclusion in the entity.

In addition, when you assign Reference Data as the type of data, you must select the source reference data from the **Reference Data** drop-down list.

Note: After you have saved the entity, you cannot delete fields.

9 When you have finished defining the field's properties, click **OK** to close the window. The new field is added to the end of the list of fields.

10 Click the **Views** tab to specify the parameters associated with the available views.

View Configuration	Description
Icons and Label area	In the **Icons and Label** area, select the icon to represent the entity when it is returned from a free-text search, as well as the map pin to represent the entity when it is returned from a map search. You can also upload new icons to SAS Visual Investigator to represent new entity types. In addition, in the **Object label** field, select the field values that display as labels for individual entities.
Network View	In the **Network View** area, select the shape and color used to represent the entity in a network diagram. You can also add custom JSON content to the **Network node annotation (JSON)** field to define where nodes of different types appear in a network diagram. Click ? to display example JSON syntax.

View Configuration	Description
Detail View	In the **Detail View** area, you define the fields to be included when the entity is displayed in detailed View mode as the result of a search.
Text Analytics View	In the **Table View** area, you define the fields to be included when the entity is displayed as a part of a table of results.

11 Populate the remaining tabs.

- Click the **Dates and Locations** tab to configure how dates and locations are represented when an entity is returned as part of a search.
- Click the **Filter Facets** tab to configure which facets are available to SAS Visual Investigator users to filter search results for this entity type.

  Note: You can select from fields that have **Index for search** enabled.
- Click the **Authorization** tab to configure which user groups are able to access this entity type. If you do not change the default configuration, all members of the sviusrs group have full access to objects of this entity type.

12 When you have finished configuring the entity, click 💾.

After you have saved the entity, the **Pages and Toolbar** tab becomes available. This tab enables you to configure the buttons that are displayed when a record is opened, as well as the template the record will use when it is accessed in different modes.

Configuring an Object Manager

This SAS Visual Investigator tutorial describes the process of creating and configuring object manager pages to extend the functionality of a deployment.

This Object Manager Configuration option enables administrators to add additional items to the SAS Visual Investigator menu bar. The pages associated with the additional

items enable users to view and work with the results of saved searches for specific entities.

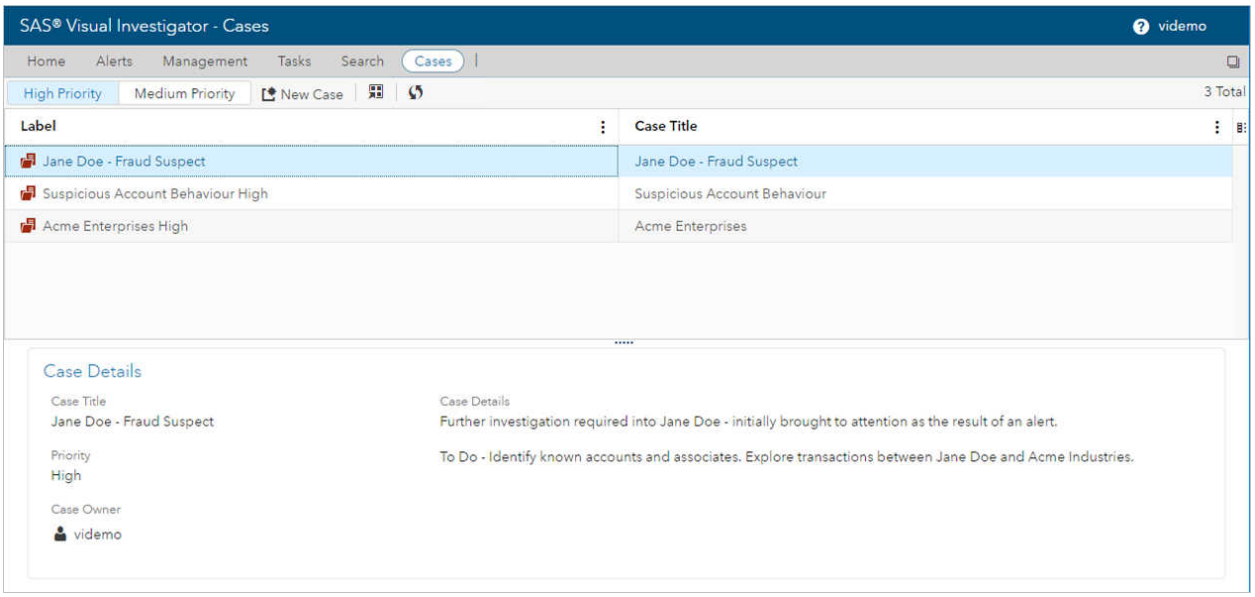
Note: When users view the search results in SAS Visual Investigator, clicking an object in the results list displays the page assigned to the summary context for the relevant entity. If the entity has no summary context page assigned, no details are shown.

To create an object manager:

1. Access the administration interface by selecting **Manage SAS Visual Investigator** from the navigation sidebar.
2. Navigate to **Properties** ▶ **Desktop** and double-click **Object Manager** to open the Object Managers window.
3. Click New and select the type of item you want to create:
   - **Primary object manager** – This option displays a primary object manager directly on the SAS Visual Investigator menu bar. It enables users to view the results of a single saved search only.
   - **Primary tab** – This option adds a new item to the SAS Visual Investigator menu bar as a container for one or more secondary object managers, each displayed in its own tab on this page.
   - **Secondary object manager** – This option adds a new sub-tab to a primary tab.

     Note: **Secondary object manager** is available only if you have a primary tab or if a primary tab's secondary object manager selected in the object managers list. By default, the new secondary object manager is displayed as the last object manager for the associated primary tab.

This figure shows how object managers are displayed to users in SAS Visual Investigator. In this example, **Cases** is a primary tab, and **High Priority** and **Medium Priority** are secondary object managers:



4 On the **Properties** tab, enter a value into the **Label** box.

When you create a primary object manager or a primary tab, this text is displayed on the SAS Visual Investigator menu bar (for example, **Cases** in the preceding figure).

When you create a secondary object manager, this text is displayed at the top of the associated primary tab when the user clicks the primary tab on the SAS Visual Investigator menu bar (for example, High Priority, and **Medium Priority** in the preceding figure).

5 If you are creating a primary object manager or a secondary object manager, you must select the **Entity type** to run your search against.

6 If you are creating a primary object manager or a secondary object manager, you can specify the fields that will be displayed to the user as columns in the results list for the specified search query. Click to open the Add Fields window and select the fields that you want displayed. You can select from the fields configured as Table View fields for the selected entity. Click **OK** to return to the Object Managers window.

You can select a field and click to remove it from the list. You can also select fields in the list and use the arrows to specify the order in which the columns are displayed in the results list.

7 If you are creating a primary object manager or a secondary object manager, you can choose to limit which users and groups can see this object manager in SAS Visual Investigator. Leave the **Permissions** box blank if you want all users and groups to be able to access the object manager. Add individual users or groups to the box to grant access to the object manager to those users and groups listed only.

8 If you are creating a primary object manager or a secondary object manager, you can choose to edit the query that runs when a user accesses the object manager in SAS Visual Investigator. By default, the search returns all objects of the selected entity type. On the **Query** tab, you can use the Advanced Search functionality to edit your query, or click **Switch to text editor** to edit the query manually.

9 Click **OK** to save your changes.

You can also configure existing object managers:

- To reposition an existing object manager on the SAS Visual Investigator menu bar relative to other object managers, select it in the list and click ⬆ to move the object manager to the left on the menu bar, or click ⬇ to move the object manager to the right on the menu bar.

  Note: Object managers are always displayed to the right of the **Search** page.

- To edit an existing object manager, double-click it in the list and update its properties as needed.

- To remove an object manager, select the required item in the list and click 🗑.

Click **OK** when you have finished your updates.

Creating User Standard Pages

This SAS Visual Investigator tutorial explains how to create page templates for desktop pages.

Creating new pages using Page Designer requires no computer programming knowledge, so new pages can be designed, created, and made available to SAS Visual Investigator users quickly and efficiently. In addition, changes to pages resulting from business process or legislative change can be implemented quickly and easily.

To create a new user standard page:

1 Since pages can be created by directly accessing Page Builder or by accessing Page Builder relative to an existing entity, do one of the following:

- Access Page Builder directly by selecting **Pages** from the navigation bar at the administration interface. The Template List interface is displayed.

  Make sure that the **Page Templates** tab is selected.

  Note: If your system includes a licensed version of SAS Mobile Investigator, the **Page Templates** tab is labeled **Desktop Page Templates**, and there is an additional **Mobile Page Templates** tab.

- Access Page Builder through the association with an existing entity by selecting **Data Objects** from the navigation bar at the administration interface.

  1 Double-click the entity of interest to open the **Settings** tab.

  2 Select the **Pages and Toolbar** tab.

    A list of the current pages is displayed in the **Pages** pane.

2 Click .

  The New Page window is displayed.

3 If you are creating a new page not yet associated with a data object, select a data source (entity) or choose **(none)**, enter a valid file name (without an extension) and click **OK** to continue.

Note: If you are creating a new page in association with an existing entity, you do not need to enter a data source; that association already exists.

Page Designer opens with a blank canvas.

4 Build the page by dropping layout options and controls, charts, and fields onto the canvas and then defining any related properties using the properties pane.

Note: Each time you add an item to the canvas, the properties pane updates, enabling you to configure parameters specific to that control. The information in the properties pane is specific to the item selected on the canvas.

5 Save and preview often as you work.

- To save the page, click .

  TIP To save a copy of the page click to save the page with a different name. The new page is now open in Page Designer.

- To preview the page, click Preview.

  Note: When you preview a page, functionality is limited, and in many cases the page is not populated from the assigned data sources. To view a true page rendering, search and then open the page in Page Viewer.

6 Continue to customize the page by completing any remaining page development tasks needed.

These remaining tasks enable you to fully customize the interoperability and functionality of the page and its association with a data object.

Table 6.1 Reference for Post-creation Page Development Tasks

User Standard Page Development Tasks	Description
Configure Page Properties	Specify workspace and insights functionality and additional page tabs.
Integrate Data Objects with User Pages	Associate a page with a specific data object.
Define Contexts	Define how the page is displayed (for example, in Create mode, as an edit-only page) when a user accesses the page. Different contexts can be displayed at different stages during a user's investigation efforts.
Specify Page Toolbars	Add extra functionality to an entity. Toolbars can be set to be available or unavailable if certain criteria are met.

Creating Mobile Pages

This SAS Visual Investigator tutorial explains how to create page templates for mobile pages.

Creating new pages using Page Designer requires no computer programming knowledge, so new pages can be designed, created, and made available to SAS Visual Investigator users quickly and efficiently. In addition, changes to pages resulting from business process or legislative change can be implemented quickly and easily.

Before users can view objects of a particular entity type in SAS Mobile Investigator, you must create a mobile-specific page for the entity. You must also decide whether the new page should be used in Create mode, View mode, or both, and assign the new page to the relevant mobile page contexts.

To create a new mobile page:

1. On the **Data Objects** page, double-click the entity that you want to create a mobile page for.

   The selected entity opens in Edit mode.

2. Click the **Pages and Toolbar** tab.

3. In the **Pages** area, click the **Mobile** tab to display any mobile-specific pages associated with the selected entity.

4. Click

   The New Page dialog box is displayed.

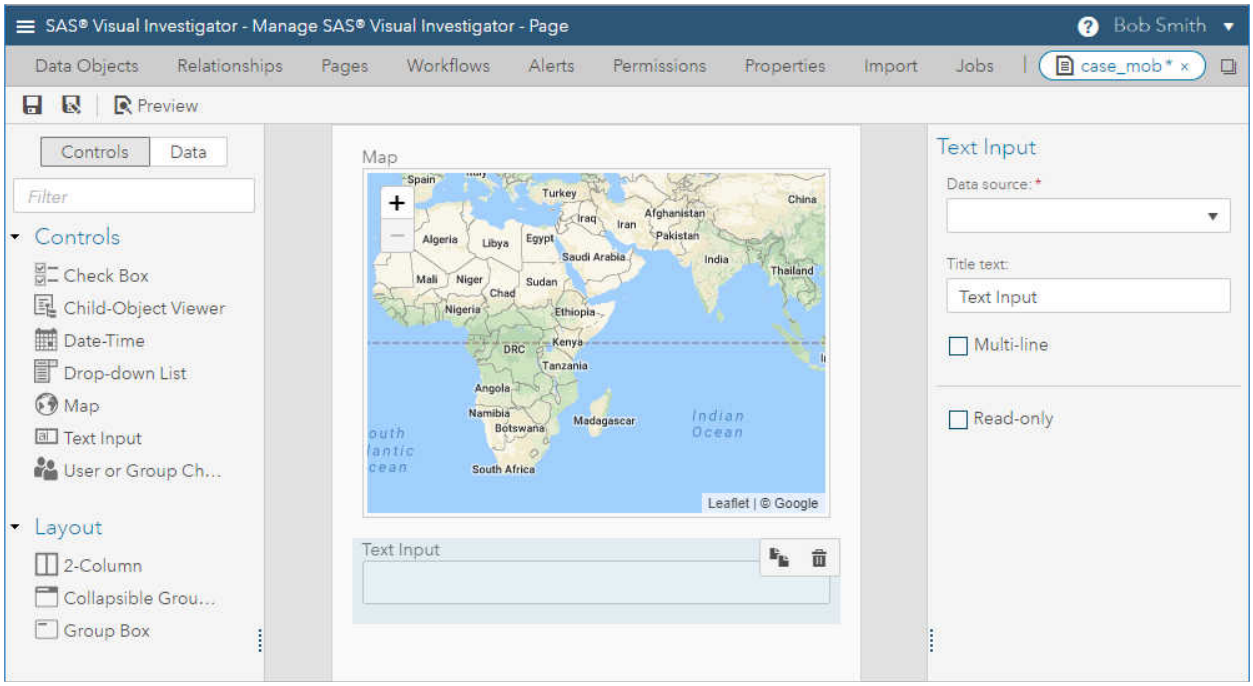
5. In the **Name** box, enter the name for your new mobile page.

6. Click **OK**.

   The new page opens in Design mode.

7. To design your page, drag layout options and controls or fields onto the canvas. Each time you add a new layout option or control, the properties pane updates, enabling you to configure parameters specific to that control.

A Text Input control is being added to this example page:



8 When you have finished creating your page, click Preview to view the page as it will be viewed by users of SAS Mobile Investigator.

Note: When you preview a page, functionality is limited, and little if any data is populated from data sources.

9 Click to save your mobile page.

Alternatively, click to save the page with a different name.

10 Return to the **Pages and Toolbar** tab for the selected entity.

11 In the **Page Associations** area, click the context that you want to associate your new page with in the contexts list.

Note: Mobile pages have only two contexts, Create and Open.

12 Click **Select Page**.

The Select Page window opens.

13 Select your new page from the list of available mobile pages for the current entity.

14 Click **OK** to return to the **Pages and Toolbar** tab.

The **Action** column in the contexts list is now populated for the selected context.

> **TIP** If you want to associate the same page with the other contexts, you can right-click on the contexts list and select **Assign page to remaining contexts**.

15 Click to save your changes to the selected entity.

Configure Page Properties

This SAS Visual Investigator tutorial explains how to configure properties for a page created using Page Builder.

Configuration of page properties includes specifying page events as well as related pages, generally accessible by tabs that open at the same time as the main page. Page events include indicating the use and display of workspace and insight creation functionality. Page properties are managed from an open page in Page Builder and are relevant to standard user pages only. That is, print templates do not have associated page properties.

To specify workspace and insights functionality and additional page tabs:

1 Make sure the standard user page for which you want to specify properties is open in Page Builder.

2 Click Page Properties. The Configure page window appears.

3 Using this window, configure the following:

Table 6.2 Page Configuration Property Options

Enable workspace creation	Select this option to enable users to create workspaces within objects of this type.
Enable insight creation	Select this option to allow users to create insights within objects of this type.
Tabs/Tab Settings	You can extend the functionality of the base page by adding one or more of the following types of tabs and indicating the settings. Here is a list of tab types available, along with a description of each one.

Tab Type	Description
Alert Activity	Adds a page that contains the scenario-fired event table and contributing objects section that appear on the default alert details page template. You cannot add additional layout options or controls to this page.
Child-Object Viewer	Adds a new page containing a summary of any child objects identified for the entity.
Iframe	Adds a new page containing an Iframe control, which allows HTML documents to be embedded in the current HTML document (current page template).
Related Objects	Adds an additional page that can be configured to display objects related to the base page using pre-configured traversals. Unlike a standard page, you cannot add additional layout options or controls to this page.
Relationships	Adds a new page containing a summary of any relationships that are associated with the entity.
Standard	Adds an additional page that can be designed using the Page Builder layout options and controls.

4 Click **Save** to implement the configuration changes and return to the previous page.

Integrating Data Objects with User Pages

This SAS Visual Investigator tutorial explains how to integrate data objects with user pages created using Page Builder.

Making a Data Object and Page Association

When configuring entities or resolved entities from the appropriate tab of the **Data Objects** page, you can create a new page or edit an existing page layout using Page Designer.

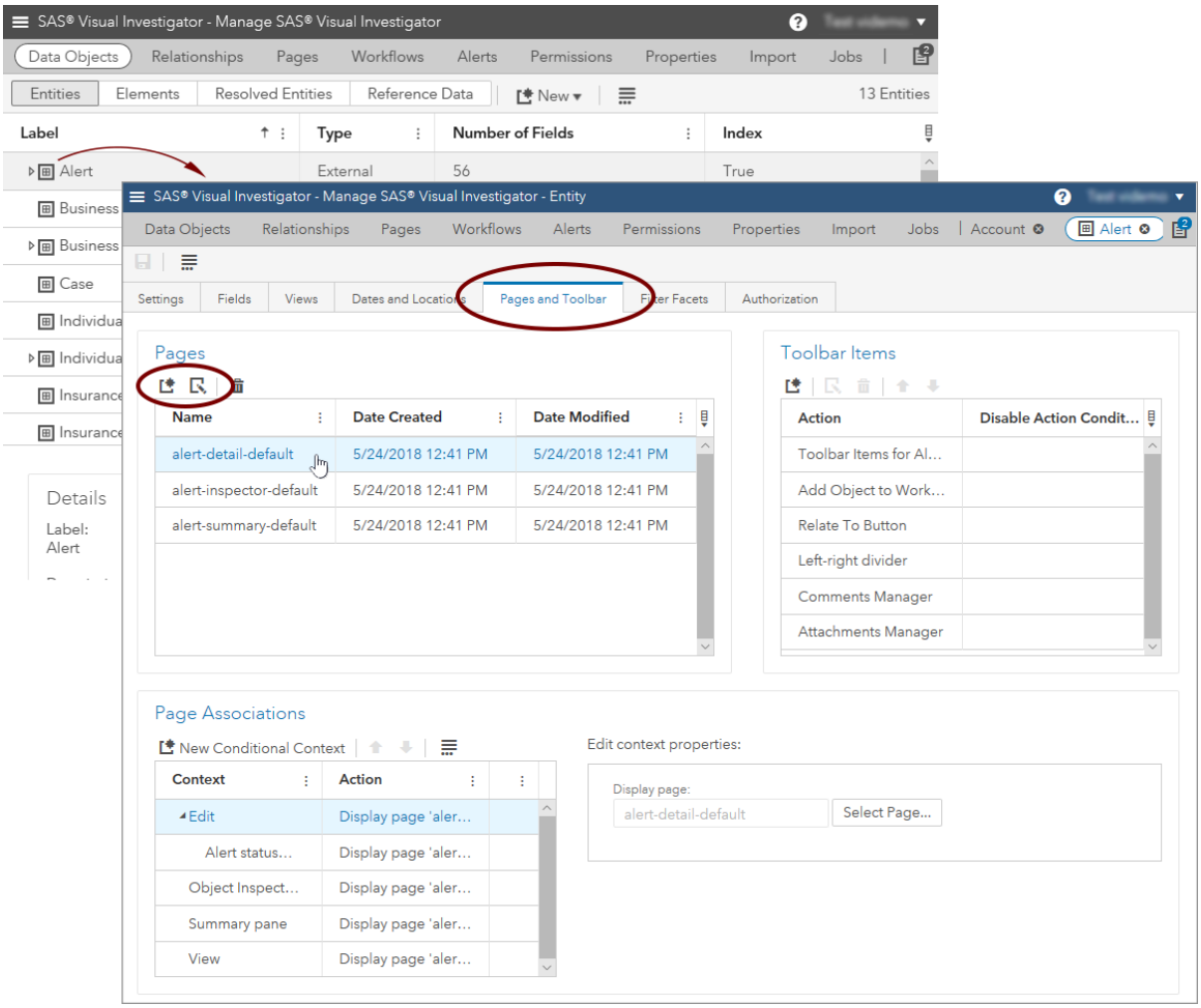
To create a page or edit a page associated with a specific entity:

1 At the **Entities** tab of the **Data Objects** page, double-click the entity of interest.

The entity is opened and a series of tabs is displayed along the top of the page.

2 Select the **Pages and Toolbar** tab from the open entity page.

The **Pages and Toolbar** tab displays lists of associated pages, contexts, and toolbars. Depending on your access rights and the item selected in the **Pages** area, a **Create** and an **Edit** button might be available.



3 Do one of the following:

- To create a new page based on the open entity, click in the **Pages** area. Complete the **Name** field in the New Page window, and click **OK** to continue.

  The Page Designer opens with a blank canvas.

- To edit an existing page, select the page name in the **Pages** area and click .

  The Page Designer opens with the indicated page ready for edit.

4 When you have completed developing or editing the page, click to retain your updates.

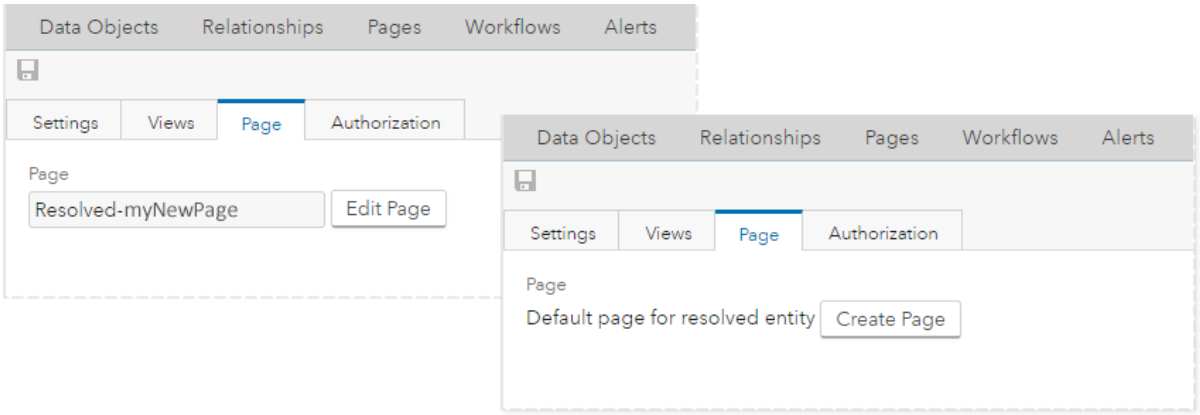
To create a page or edit a page associated with a specific resolved entity:

1 At the **Resolved Entities** tab of the **Data Objects** page, double-click the resolved entity of interest.

The entity is opened and a series of tabs is displayed along the top of the page.

2 Select the **Page** tab from the open resolved entity page.

If a page has not yet been created, you can create a new page. If a page already exists, you can edit the page.



3 Do one of the following:

- To create a new page, click **Create Page**.

  The Page Designer opens with a blank canvas.

- To edit an existing page, click **Edit Page**.

  The Page Designer opens with the indicated page ready for edit.

4 When you have completed developing or editing the page, click 💾 to retain your updates.

Understanding Page Associations and Contexts

In a SAS Visual Investigator deployment, each entity type can have multiple pages attributed to it. These pages can be displayed at different stages during a user's investigation efforts, and each page can have different modes and toolbars, depending on the context, as defined by the administrator. For example, the layout and controls available when the page is in Create mode can differ from the layout displayed when the page is in View mode. In addition, contexts can be configured which in turn have child contexts, allowing different pages to be displayed based on the data or field values.

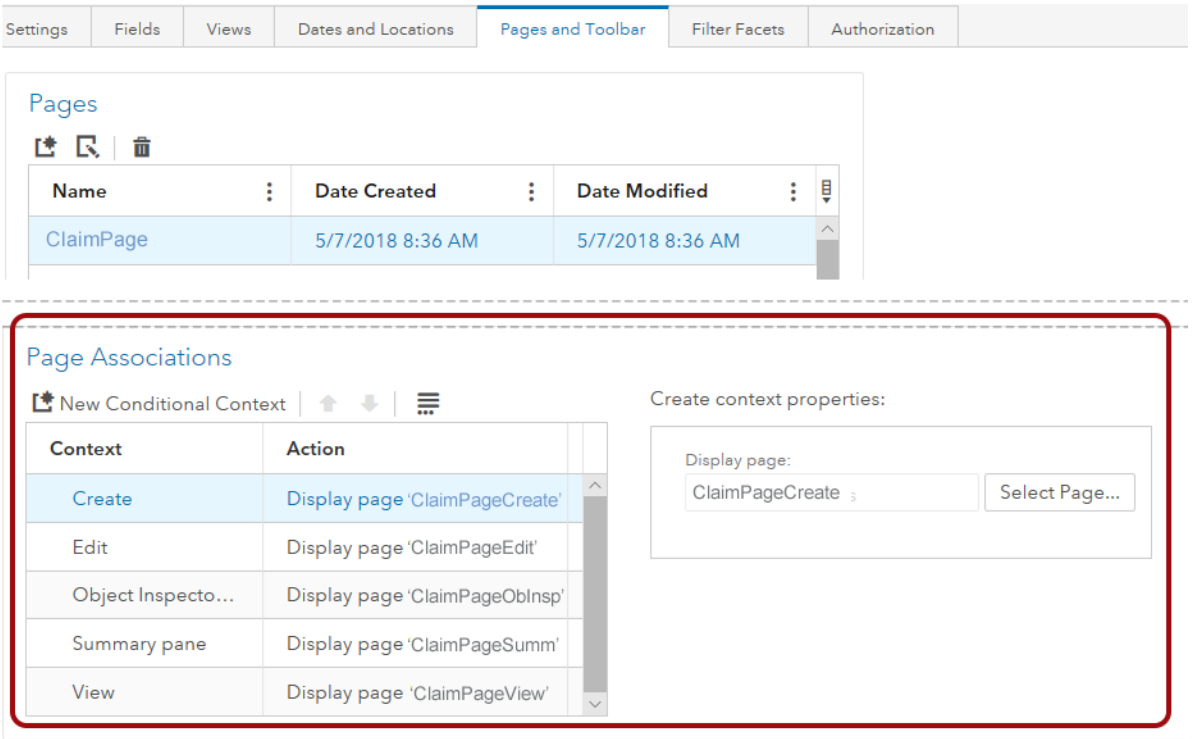
The following table lists the contexts that can be set.

Table 6.3 *Page Context Description*

Page Viewer Context	Description
Defined View	
View	Used for displaying records and does not allow the user to perform any Update operations.
Create	Enables the creation of new entities and enables users to enter data into the controls on the page.
Edit	Shows the page controls in their active state, enabling a user to interact directly with the page's component parts.
Pane–specific View	
Object Inspector	Displays a read-only page view in the **Tools** pane when the **Object Inspector** selection is active and a specific object is selected.
Summary	Displays a read-only page view as a summary depicting the current view.

Here is an example page showing the **Page Associations** pane, including Context implementation, accessed from the **Pages and Toolbars** tab of an entity.

Figure 6.1 *Example Page Associations and Contexts*

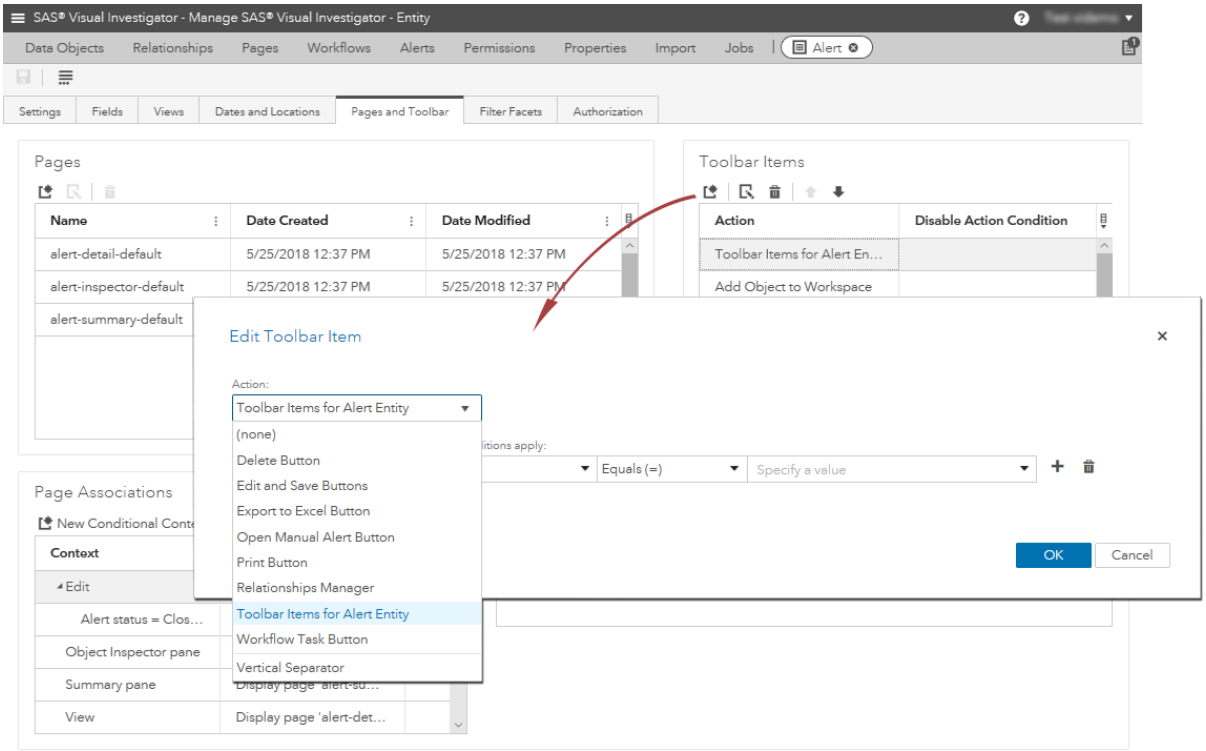


Specifying Enabled Page Toolbars

Page toolbars are used to add extra functionality to an entity and can be set to be available or unavailable if certain criteria are met.

Here is an example of items displayed within the **Action** field of the Add Toolbar Item window.

Figure 6.2 Example of Toolbar Items Added to an Entity Page



You can select page toolbar objects to be added to a page.

Creating and Enabling a Workflow

This SAS Visual Investigator tutorial explains how to create and enable a workflow.

Creating a Workflow

You can create a workflow for an internal entity that has previously been created.

1 Select the **Workflows** tab on the SAS Visual Investigator administration interface and make sure the **Workflow Templates** tab is selected.

2 Click New Workflow. Select an object from the list. An object is disabled if a workflow has already been created for that object. The New Workflow Template dialog box is displayed

3 In the New Workflow Template dialog box, the **Label** field displays a default name for the workflow. You can keep this name or change it. You can also enter a description for the workflow. Click **OK**.

Note: Changing the **Label** name or **Description** and then clicking **OK** does not change the version of the workflow.

4 In the workflow editor, select an element and drag and drop it into the workflow workspace. The **Start** element is already provided in the editor. Continue to drag and drop elements until you have the desired workflow.

You can also right-click an element already in the workspace to display an element menu . The displayed menu is based on the element on which you right-click. Click any element in the menu to add it to the workspace.

5 Add properties to your workflow elements.

6 Click to save the workflow. Workflows must be valid to be saved.

Enabling a Workflow

To enable a workflow, select the **Workflow Templates** tab. Highlight the workflow that you want to enable. Click and then select **Enable workflow template**. The value in the Enabled column changes from 'No' to 'Yes'. You can also right-click a workflow and select **Enable workflow template** from the pop-up menu.

A workflow template that is enabled runs when an instance of its entity is created.

7

Resource Management and Project Assets Review

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Reviewing Alert Reports

This SAS Visual Investigator tutorial explains how to access and review alert reports. The **Alert Reports** tab enables you to analyze the effectiveness of surveillance and operational activities and to identify over-performing or under-performing strategies.

Disposition Summary Report

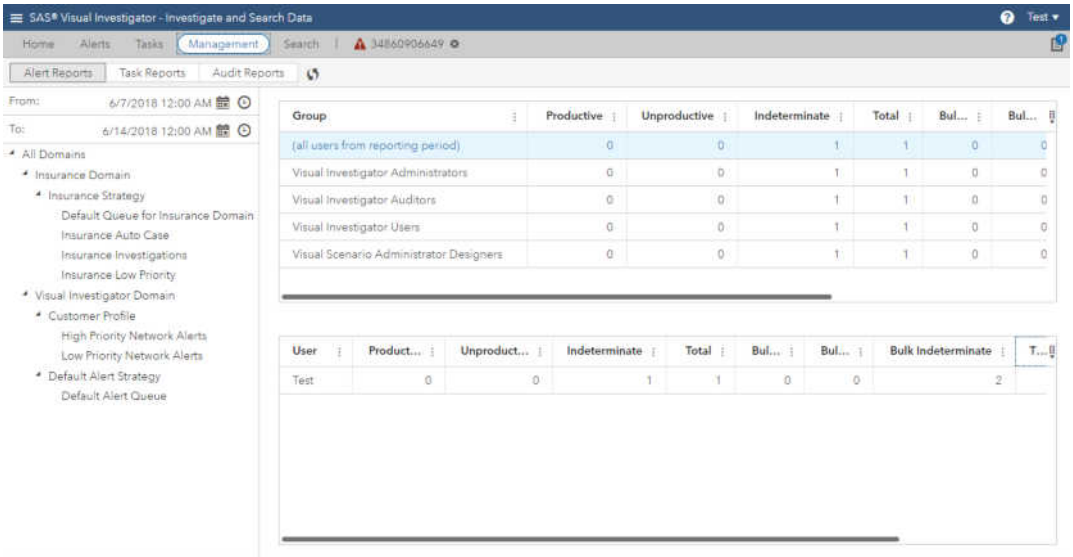
The disposition summary report displays disposition activity for groups and users during a specified time range. By default, the report shows a summary of past disposition activity.

To access a disposition summary report,:

1 Click **Management** from the navigation menu.

2 Make sure the **Alert Report** tab is in focus.

Note: To access the **Alert Reports** tab, your administrator must assign you the **Access alert management reports** capability.



3 Perform the following tasks to reveal summary information.

- Use the **From** and **To** fields on the left side of the report to modify the time range.
- Select a domain and strategy, appearing below the **From** and **To** fields, to filter the results by the selection.

  Note: If you have the ability to triage alerts and have been granted access to specific strategies, a hierarchy appears below the **From** and **To** fields.

- Click on a group in the group list to filter the list of users to include only those who are in the selected group.

  Note: Disposition activity for users who are removed from user groups is reflected in the **(all users from reporting period)** row.

In both the group and user lists, disposition activity is divided into non-bulk and bulk dispositions. Non-bulk dispositions are those that are applied to alerts that are checked out. Presumably, these are alerts that an analyst has spent some time investigating. Bulk dispositions are those that are applied to alerts that are not checked out.

Alert Disposition History Report

Using the alert disposition history report, you can view the dispositions that have been applied over a selected period of time.

To access the alert disposition history report:

- Double-click any user at the summary report to access that user's alert disposition history report.

  Note: Users can access their own reports from the **Personal Metrics** area of the **Home** page.

The report lists the domains, strategies, and queues in which disposition activity occurred during the selected time period. Each row displays the following information:

- the disposition name
- the ID of the alert to which the disposition was applied
- the alerted entity that is associated with the alert
- the domain, strategy, and queue that are associated with the alert
- the date and time at which the disposition was applied
- the median amount of time spent on that disposition

Reviewing Task Reports

This SAS Visual Investigator tutorial explains how to access and review task reports.

Task reports provide a way to analyze the effectiveness of the workflow tasks, based on how much time a user spends on a given task. In addition, you can compare different versions of a workflow to identify where efficiency gains can be made.

To access a task report:

1 Click **Management** from the navigation menu.

2 Select the **Task Reports** tab.

Note: To access the **Task Reports** tab, your administrator must assign you the **Access task management reports** capability.

3 Review the following areas to obtain task-related information.

- workflow tree. A workflow tree shows workflow labels, the versions of the workflow, and the tasks associated with each version.
- group grid. A group grid shows task metrics for the groups.
- user grid. A user grid shows task metrics for users in the selected group.
- user reports. User reports show user-specific, time-related information.

  Below the metrics is a bar chart that shows a given 24-hour period.

The group grid displays all groups that have access to that workflow and have performed tasks in the workflow. Clicking a row in the group grid displays all users who belong to that group and have performed tasks in the workflow. These users are displayed in the user grid.

Double-clicking a row in the user grid displays a report for that user. The report gives the following metrics:

- median time per task

- time on completed tasks
- time on incomplete tasks

Reviewing Audit Reports

This SAS Visual Investigator tutorial explains how to access and review audit reports.

Auditing enables you to view a list of some or all actions performed by users within SAS Visual Investigator. By creating queries, you target specific users, tasks, or specific dates or date ranges. Audit results can then be exported to Microsoft Excel.

To view audit records, you must first define your query using the Audit Search Query Builder.

1. Click **Management** from the navigation menu.
2. Select the **Audit Report** tab.

   Note: To access the **Alert Reports** tab, your administrator must assign you membership to the **Access task management reports** capability.
3. On the **Management Reporting** page, click **Audit Reports**. The Audit Search Query Builder appears.
4. From the first drop-down list, select the attribute of the auditable action that you want to search for. You can select the following attributes:
   - **Action** — The action performed.
   - **Date Created** — The date on which the audit record was created.
   - **Extra Data** — Any extra data associated with the action.
   - **HTTP Status Code** — The HTTP status code returned by the server (for example, 403 or 503).
   - **IP Address** — The IP address of the device used to perform the audited action.

- **Object ID** — The ID of the object that an auditable action was performed on.
- **Object Type** — The type of object that an auditable action was performed on.
- **Status** — Whether the action succeeded or failed.
- **User ID** — The user ID of the user who performed the auditable action.

5 From the second drop-down list, select the condition to apply to the query. Depending on the attribute you selected in the first drop-down list, you can select conditions such as **missing**, **contains**, **>=**, **=**, and so on.

Depending on the size of your database, selecting the **contains** operator might take longer.

6 In the text field, enter a value that you want to query. For example, if you selected **User ID** and **=**, you could enter the user ID of a user (case-insensitive) to return a list of actions performed by that user. However, if you selected a different set of options, for example, Action and **=**, you might have to select an option from a drop-down list.

Note: The list of available operators depends on the audit attribute selected. For example:

- If you select **Date Created**, a date-time picker displays. This is not a free text field; you must select times from 30-minute increments.
- If you select **Object Type**, **Status**, or **Action**, the **Specify a value** field enables you to select a value from a drop-down list.

7 Click **Search** to perform the search. Any audit records that match your search query are displayed.

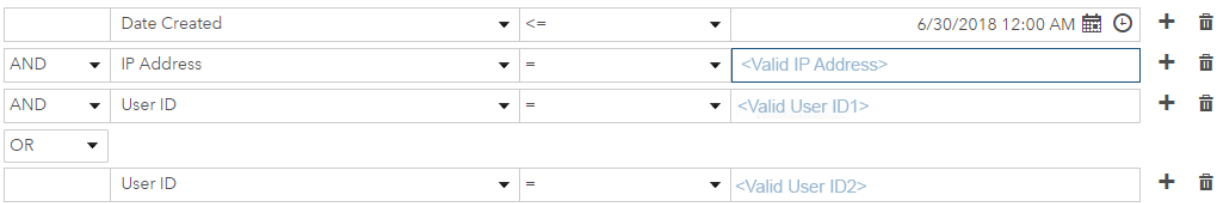
After searching for audit records, you can double-click an audit record to view additional information associated with the audit record. Alternatively, you can export the results to Microsoft Excel by clicking **Export to Excel**.

8 If too many audit records are returned, or if the original query was not specific enough, you can refine your audit query by clicking the **Add** button and defining an additional audit query. When you add additional conditions, you can use Boolean operators such as AND, OR , and OR+ to further refine your search.

Each of these logical operators has a different impact on the query created in the Audit Search Query Builder. For example:

- AND — When you use the AND logical operator, the conditions are evaluated in the order in which they are entered. For example:

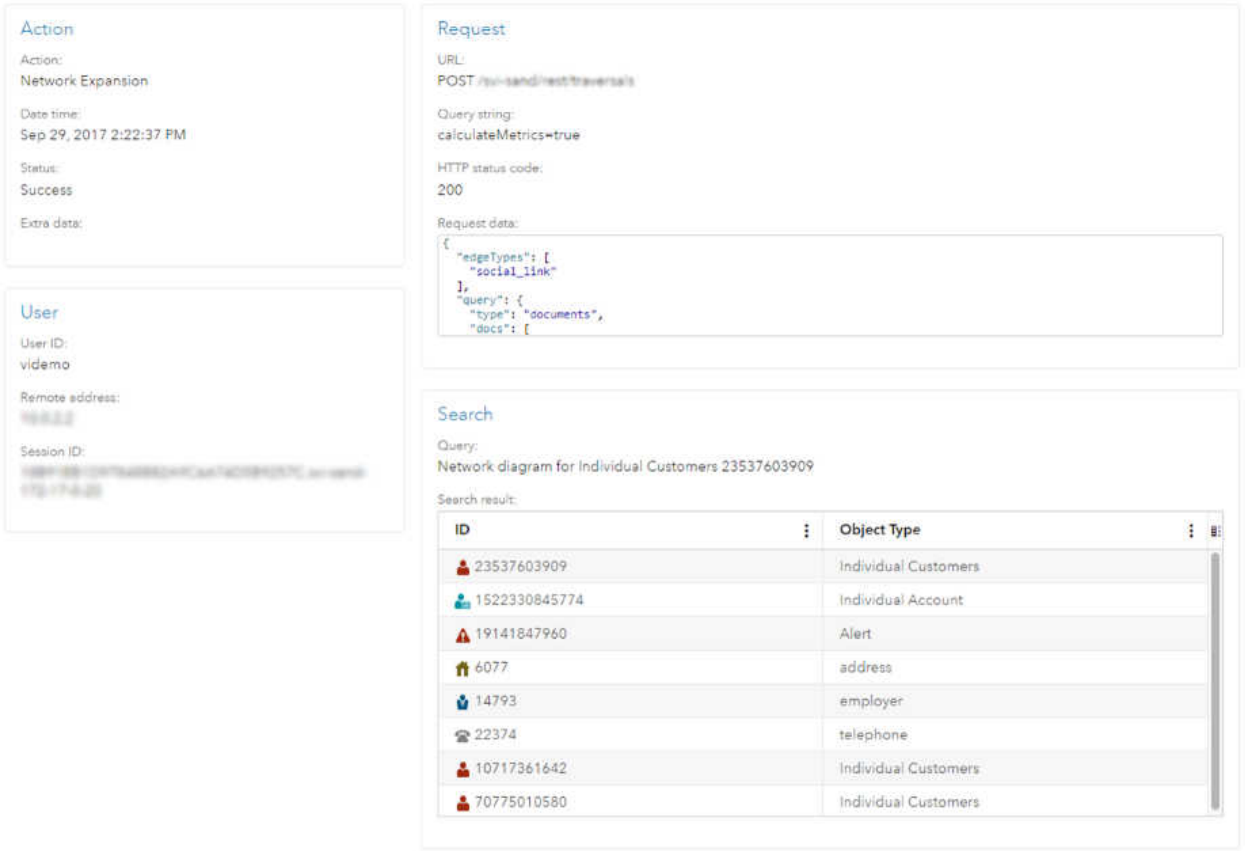
- OR — When you use the OR logical operator, that condition is added to a new group. This group is added just after the group that the rule was in. For example:



- OR+ — When you use the OR+ logical operator, that condition and any other conditions within that group are added to a new group. This group is added after the group that the condition was in. For example:

9 Double-click any row in the results table to display more detailed information. The details page contains information about the **Action**, **User**, **Object**, and **Request**.

The audit details page displays a read-only view of an immutable audit record. The page groups audit properties into panes, some of which are always visible, and some of which are visible only depending on the type of audit and audit logging level. The following figure shows an example of an audit details page:



Reviewing Jobs

This SAS Visual Investigator tutorial explains how to monitor the progress of various product and external jobs.

Re-indexing and resolving entities can be a lengthy process. The **Jobs** page enables administrators to monitor the progress of these jobs and to confirm when they have completed. Moreover, depending on the configuration of your solution, the **Jobs** page might also display the status of jobs scheduled and run from other SAS solutions or from external sources.

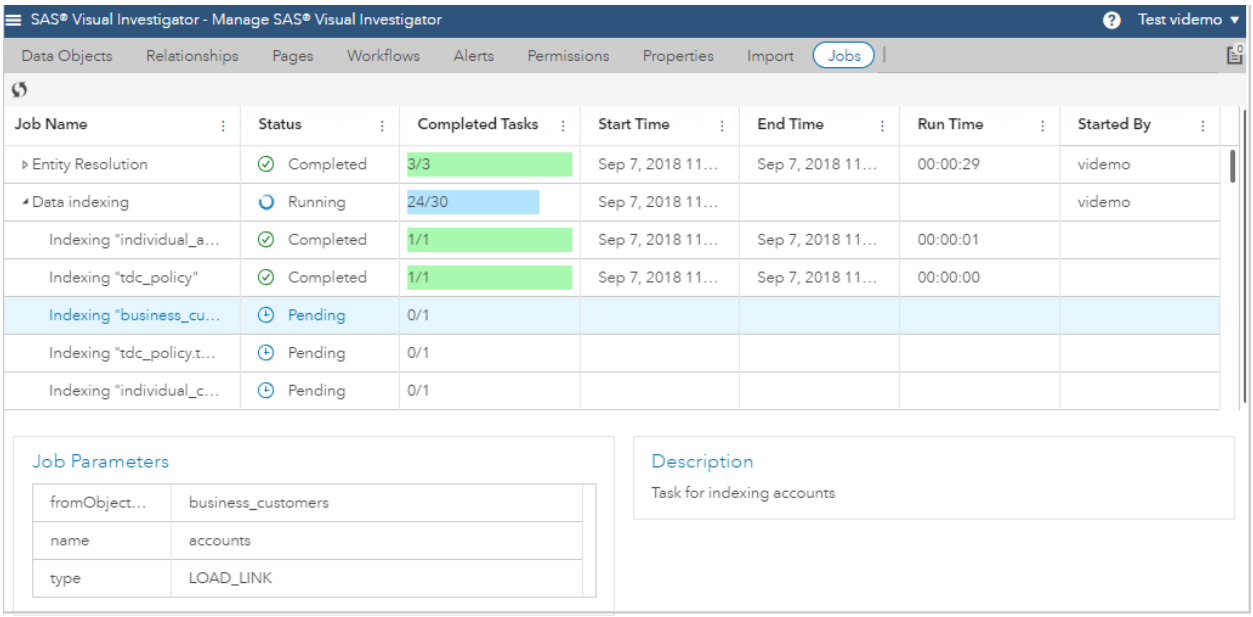
Within SAS Visual Investigator, several main jobs can be monitored. Jobs can have subtasks, and the progress of each task can be monitored in its own right:

- VI Indexing jobs include tasks for each entity being indexed.
- Entity Resolution jobs include tasks for data loading and indexing, each of which in turn has tasks for each affected entity.
- Configuration Import jobs include tasks for each component being imported, plus one for managing the ZIP file.
- The Scenario Administrator jobs include a task for each flow being run. The following subtasks are included:
  - loading data sources
  - processing each scenario in a flow
  - delivering events to the alert service

To view jobs:

- Navigate to the **Jobs** page of the administration interface.

The **Jobs** page shows the last 50 jobs that have run or are currently running. Here is an example of a **Jobs** page:



The jobs table lists each job; its status; its start, end, and run times; and the user that started the job. Click the arrow beside a job to display the job's subtasks. Further information about the selected task is displayed in the bottom section of the page. This section also displays any error messages if a job fails to complete.

Managing Users

This SAS Visual Investigator tutorial explains how to configure which users are members of which groups.

Users are created and stored externally in your organization's LDAP system. This means that you cannot create new users in SAS Visual Investigator, but can assign them capabilities and assign them to groups.

To manage the groups to which users are assigned:

1 Click **Permissions** on the application toolbar.

The **Permissions** page opens, displaying existing groups:

2 On the **Permissions** page , click the **Users** tab.

A list of all users displays, detailing user details, such as **Name** and **ID**, as well as a list of groups to which the user belongs.

3 To assign users to a group, click Add Group Membership.

4 To add user to a single group, enter the name in the **Quick Add** field and then click **Add**. You are prompted to confirm addition of the group to the capability.

Alternatively, to add the user to multiple groups, select them from the list of available groups and click **OK**. Confirmation of all the groups that were added displays when the operation completes.

Note: Groups managed in an external LDAP system use the following icon , whereas locally managed groups use the following icon .

5 To remove a user from a group, from the **Permissions** page, select a user in the **Group Membership** area, and then select the assigned group. Click Remove Group Membership.

6 You are prompted to confirm removal of the user from the group.

Managing Groups

This SAS Visual Investigator tutorial explains how to configure permission assignment to new or existing groups.

When SAS Visual Investigator is deployed, a standard set of groups are created with permissions allowing access to particular functionality in addition to standard SAS Visual Investigator functionality such as search and record creation.

You can assign users to these groups, assigning the required capabilities, or create new groups with the required capabilities and assign users to them. Groups can either be from an external source such as LDAP, or locally managed groups in the Identities

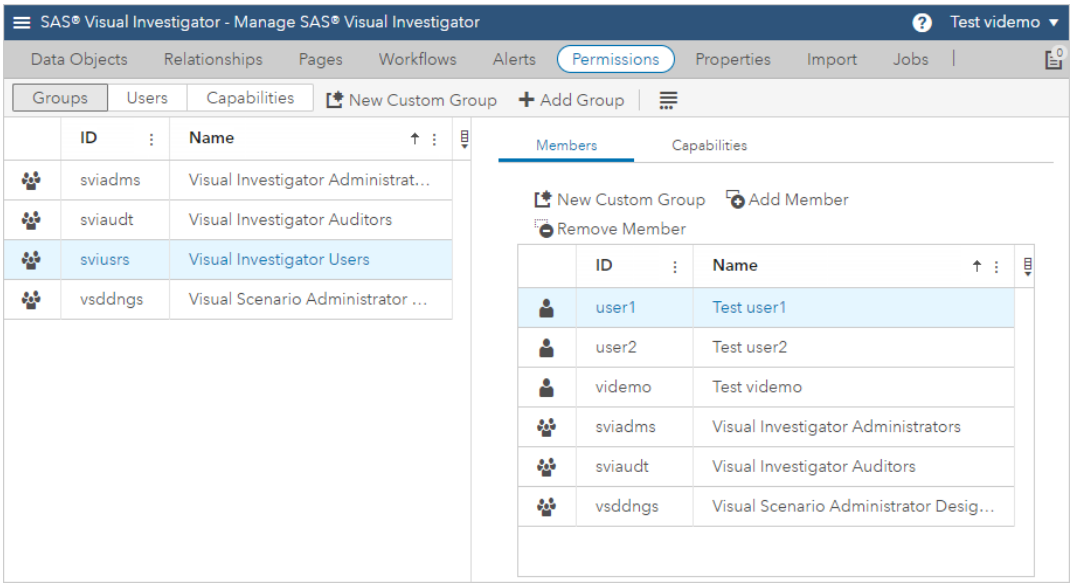
service. Administrators can manage local groups, but can view details of external groups only.

Note: Group management supports nested groups if they are created in an external provider such as LDAP.

To create a new group:

1 Click **Permissions** on the application toolbar.

The **Permissions** page opens, displaying existing groups:



2 Click **New Custom Group** to create a new locally managed group.

Note: Clicking **Add Group** enables you to add an existing group as a child of the currently selected group. This group can be either a valid group stored in your organization's LDAP store, or an existing locally managed group.

3 In the New Custom Group window, enter a **Group ID** and a **Group Name** for the new group. Optionally, enter a **Description** of the group.

Note: To edit the details of an existing group, click ☰ and select **Properties** from the drop-down menu.

4 Click **OK** to create the new group.

To add members to the group:

1 Select the group in the groups list, and then click **Members**.

2 Click Add Member. The Select a Member window is displayed, enabling you to add existing groups or users as members. To remove group members, click Remove Member.

3 Click **Users** and select one or more users to add to the group.

4 Click **OK**.

To add capabilities to the group:

1 Click the **Capabilities** tab.

2 Click Add Capability. The Add Capability window is displayed. To remove a capability from a group, click Remove Capability.

Note: To remove a group from SAS Visual Investigator, select the group and click and select **Remove Group** from the drop-down list. You can remove only locally managed groups, and cannot remove system reserved groups (sviadms, sviusrs, sviaudt, and vsddngs), or groups managed in an external LDAP system.

3 Select the capabilities that you want to assign to the group, and then click **OK**.

Capabilities are inherited from the parent group, as such parent groups need to have minimal access, and you then build up the different capabilities on the sub groups.

Note: The capabilities assigned to a group define what functions will be available to SAS Visual Investigator users. For example, not all groups require access to audit reporting, in which case they are not assigned the Access audit management reports capability. In addition, when creating administrative groups, SAS recommends that you create administrative groups as child groups of the default *sviadms* group. Members of groups who are assigned Administer group capabilities, but do not have *sviadms* as a parent or child group will not be able to add or remove capabilities or groups.

Note: If a user is added to a group while that user is logged in, the user must log off and log back in to have access to the group's capabilities.

Managing Capabilities

This SAS Visual Investigator tutorial explains how to configure assignment capabilities to groups to enable access to product functionality.

SAS Visual Investigator is deployed with a default set of capabilities, which can be assigned to groups allowing users within those groups access to SAS Visual Investigator functionality.

To manage the groups assigned to capabilities:

1. On the **Permissions** toolbar, click the **Capabilities** button.

   A list of all available capabilities displays, as well as the groups assigned to the capability.

2. To assign groups to a capability, select the capability, and then click Add Group. The Select a Member dialog box displays.

3. To add a single group to the capability, enter the name in the **Quick Add** field and then click **Add**. You are prompted to confirm addition of the group to the capability.

   Alternatively, to add multiple groups, select them from the list of available groups and click **OK**. Confirmation of all the groups that were added displays when the operation completes.

4. To remove a group from a capability, select the capability, and then select the assigned group and click Remove Group.

5. You are prompted to confirm removal of the capability.

8

Mobile Investigation

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SAS Mobile Investigator Data Search and Discovery

This SAS Visual Investigator tutorial explains how to retrieve SAS Mobile Investigator information by performing a data search.

Search for Information

Your SAS Mobile Investigator **Home** page might include buttons to run preconfigured searches. Your solution administrator can configure in advance which entity types these searches run against and can configure search terms to be included in the searches. Some searches prompt you for more information before searching. For example, if you

are searching for a person, you might be prompted to enter a surname. Alternatively, the search might run automatically without further input (for example, searching for all tasks raised by a specific department in the past week).

These searches are configured and maintained by your solution administrator. Although you can run these searches at any time, you cannot modify or remove them.

To run a search:

1. On the **Home** page, tap the button for the required search.
2. If prompted for additional information, enter information to help narrow your search, and tap **Search**.

   Your search results are displayed.

   Note: You can include simple wildcards and operators in your search query.

View Search Results

Search results are returned as a list of object summaries in order of relevance, with the most relevant results returned at the top of the list. Results are returned in a paged list; depending on the number of results, they might not all be displayed on a single page. The total number of results returned is displayed at the top right of the page. You can navigate between the pages of results by tapping the arrow buttons at the top or bottom of each page.

Note: The number of results displayed on each page is configured by your solution administrator.

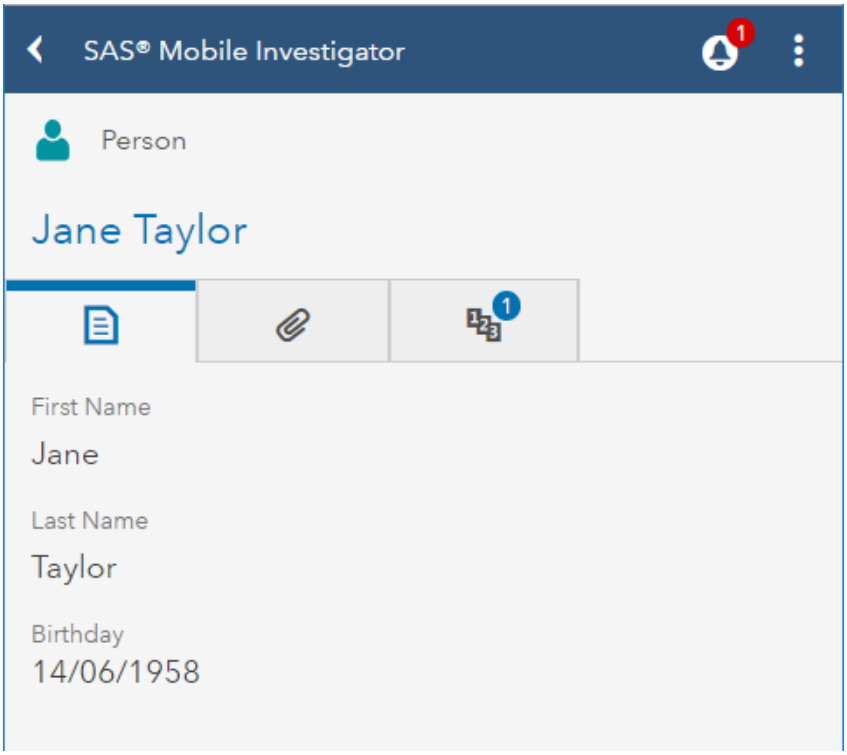
Tap an object summary in the search results list to open the object in View mode.

You can bookmark the URL for a specific object to return directly to that object later in the session, or you can share the URL with another user to allow them to access the object.

Note: Bookmarking an object of a resolved entity type is not supported.

Tap your browser's back button to return to the list of search results.

This example shows a simple Person object:



- The **Object** tab ( ) displays the contents of the object.
- The **Attachments** tab ( ) displays any attachments associated with the object.

  The number of attachments on the object is displayed on the **Attachments** tab label. For each attachment, the tab shows the file name, file type, file size, added date, and the user who added it.

  Note: The **Attachments** tab is not displayed if you are viewing an object of a resolved entity type.

  To download an attachment, tap beside the file. The download is subject to the limitations of your browser and mobile device.

  Note: To view a downloaded attachment on your mobile device, you must have an appropriate application installed on your device.

- If you have the appropriate capabilities, the **Workflow** tab ( ) displays any workflow tasks associated with the object. The number of available tasks is displayed on the **Workflow** tab label.

  Note: The **Workflow** tab is displayed only if you are viewing an object of an internal entity type.

Note: Objects in SAS Mobile Investigator are displayed differently from the same objects in SAS Visual Investigator. The information displayed in each case is configured by your solution administrator and might vary according to the needs of your organization. Any workspaces, insights, or comments associated with an object cannot be viewed in SAS Mobile Investigator.

SAS Mobile Investigator Data Entry

This SAS Visual Investigator tutorial explains how to data using SAS Mobile Investigator.

Your SAS Mobile Investigator **Home** page might include buttons to enable you to create objects. When you tap one of these buttons, a new object of the configured type is displayed so that you can enter information and save the object.

To create an object:

1. Before creating a record, it is good practice to perform a search to confirm that the information that you want to enter does not already exist on your system.
2. On the **Home** page, tap the button to create the required object.

   A new object is displayed.
3. Enter as much information as you can:
   - If the page includes a map, you can tap a point on the map to set a marker there. A map can display only one marker at a time. Tap another point on the map to move the marker to a new position, or tap the marker to delete it. Tap the plus

symbol to zoom in and the minus symbol to zoom out. To pan to another section of the map, press and hold, and then move the map in the required direction.

- If the page includes a user or group chooser, tap to view a list of all users and groups that are available for selection. You can enter a query in the box before tapping to narrow down the results.
- If the page includes a date-time component, the calendar works in the same way as other calendars on the device that you are using.

Fields with shaded backgrounds are read-only. You cannot enter any information in these fields.

Fields with red labels and asterisks are mandatory. You cannot save objects until all mandatory fields are populated.

4 Tap to save your new object.

5 Tap **OK** to confirm the object creation.

Your new object is opened for viewing.

Note: You can bookmark the URL for creating an object to navigate directly to that page later. In a browser, go to *server name*/SASMobileInvestigator/#/object/*object type*, where *server name* is the name of the server on which SAS Mobile Investigator was installed and *object type* is the type of object you want to create. You must be signed in to SAS Mobile Investigator.

Working with SAS Mobile Investigator Tasks

This SAS Visual Investigator tutorial explains how to claim, release, or take action on a SAS Mobile Investigator task.

Select a Task

If you have the appropriate capabilities, you can view open tasks that are available to you or to group that you are a member of—that is, open tasks that are either assigned to you or that you are a candidate for. You can select a task to work on either from a list of all tasks available to you or from the tasks available to you associated with a specific object.

View All Available Tasks

To view all tasks available to you:

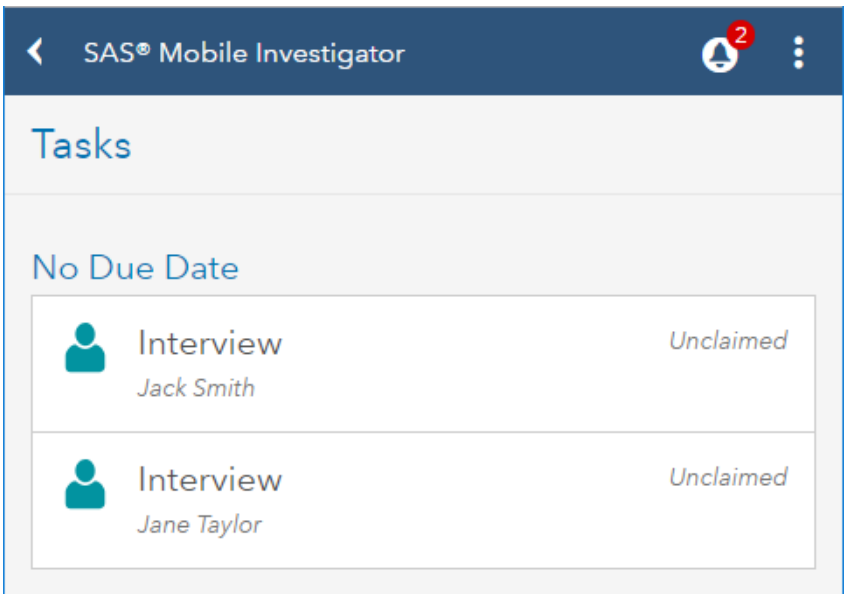
Tap the Notification shortcut ( ) on the header bar.

Note: The number of available tasks is displayed on the Notification shortcut.

The **Tasks** page is displayed, listing the tasks available to you. Tasks are listed in order of due date, with tasks with no assigned due date at the end of the list.

Note: Your solution administrator can limit the total number of tasks returned.

In this example, there are two active tasks:



To select a task to work on, tap the task in the list to open the relevant object on the **Workflow** tab.

View All Available Tasks for an Object

To view the available tasks associated with a particular object:

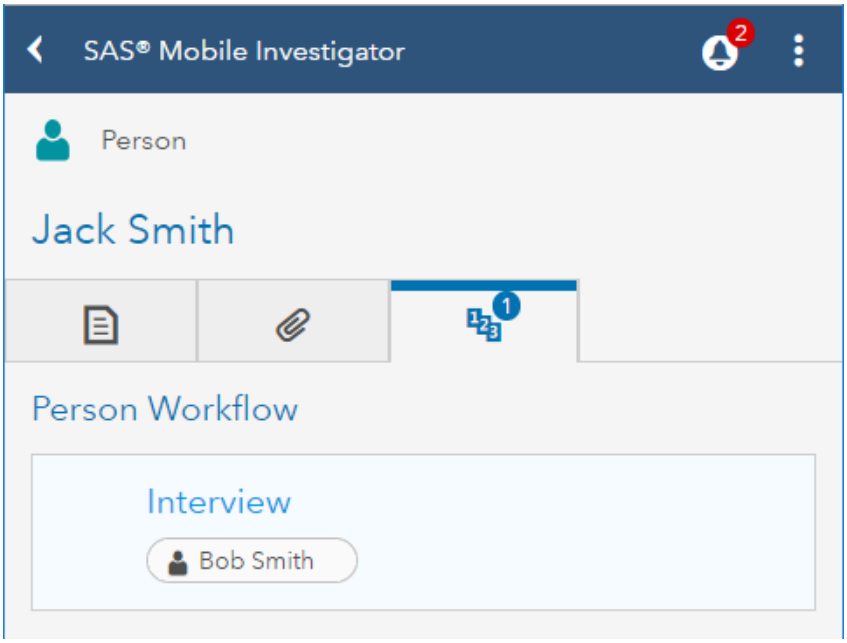
1 Navigate to the object. For example, from the **Home** page, search for the object that you are interested in, and then tap the required object in the results list to open it in View mode.

2 Tap the **Workflow** tab.

Note: The number of available tasks is displayed on the **Workflow** tab label.

Any tasks available to you are displayed.

In this example, there is one task available:



Note: The **Workflow** tab is displayed only if you are viewing an object of an internal entity type.

Claim a Task

These steps assume you have the associated object open on the **Workflow** tab.

To claim a task:

1 Tap the task in the **Workflow** tab's task list.

The available actions that you can take for this task are displayed in the Actions dialog box.

2 Tap **Claim**.

3 Tap **OK**.

The task is now assigned to you. If you view the tasks list on the **Workflow** tab, a blue user icon ( ) is displayed next to the task to indicate that it is assigned to you.

When a task is claimed, other participants can see the task but cannot claim or complete the task, although they can choose to release it. A gray version of the user icon alongside a task indicates that another user has claimed it.

Complete a Task

These steps assume you have the associated object open on the **Workflow** tab and have claimed the task.

To complete a task:

1 Tap the task in the **Workflow** tab's task list.

The available actions that you can take for this task are displayed in the Actions dialog box.

2 Tap a button to complete the task. The buttons available and their labels are configured by your solution administrator. For example, there might be a single **Complete** button or extra buttons such as **Return for Rework**.

3 Tap **OK**.

The task is now completed and moves to the next stage of the workflow.

Release a Task

These steps assume you have the associated object open on the **Workflow** tab and have claimed the task.

If you are a participant in a task, you can release a task claimed by anyone — not just those you have claimed yourself.

To release a task:

1 Tap the task in the **Workflow** tab's task list.

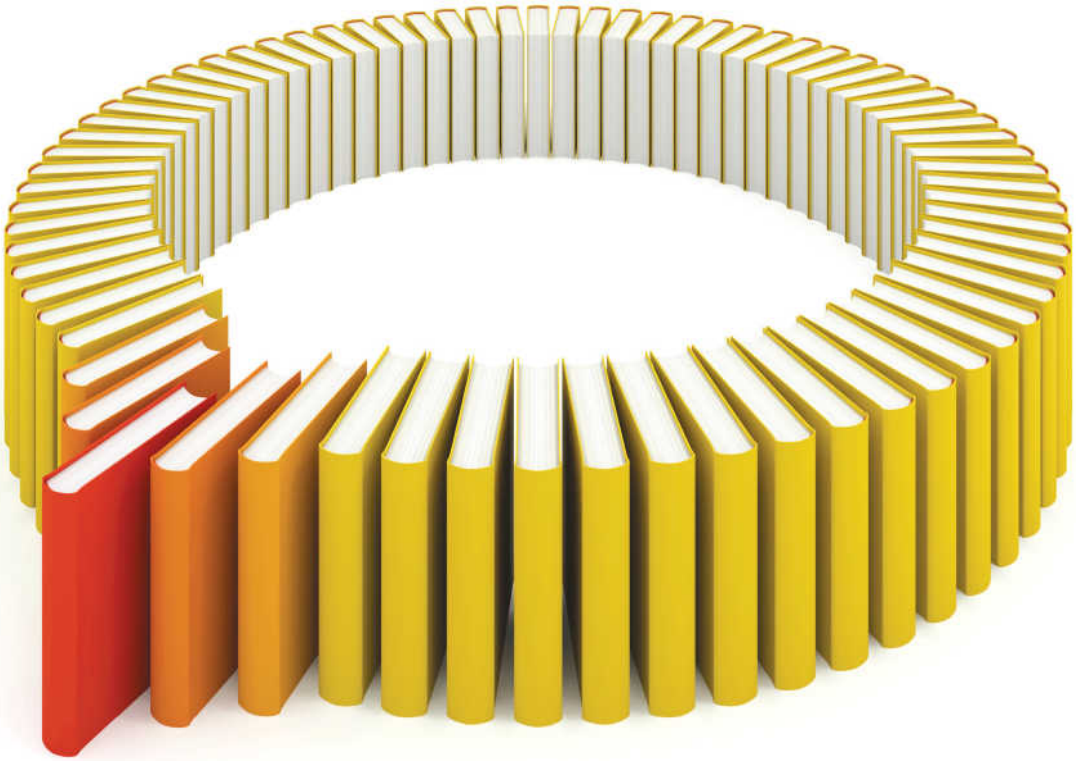
The available actions that you can take for this task are displayed in the Actions dialog box.

2 Tap **Release**.

3 Tap **OK**.

The task is no longer assigned to the previous owner and is available for claiming. If you view the tasks list on the **Workflow** tab, the user icon ( ) is no longer displayed next to the task.

Note: If the task was previously assigned to a user other than yourself, you must confirm that you want to release the task.



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