IBM Cloud Identity Service

Ad hoc Reporting and Dashboard Guide

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Cloud Identity Portal Reports Guide

Contents

Chapter 1. Reports overview

Cloud Identity Service provides reporting capabilities on all audit event data within the Cloud Identity Service audit repository. You can use a number of predefined reports, define your own ad hoc views and reports, dashboards, and schedules.

Home

The Home page provides access to your most frequently used, and recently viewed reporting features.

Library

The Library page contains the ad hoc views, reports, and dashboards that you can view and work with.

Repository

The repository contains reports, analysis views, and related files. The repository is organized as a structure of folders that contains resources, much like a file system.

Dashboard

A dashboard displays several reports in a single, integrated view. You can create and use as many dashboards as you need.

Ad Hoc Editor

The Ad Hoc Editor is used to create and edit report views for different types of reports, including tables, crosstabs, and charts. You can evaluate your design, save the view, and create a report.

Report Viewer

The Report Viewer is used to view reports, export reports in different formats, and to apply formatting, sorting, and filters to control how data is displayed. You can also schedule reports to be run and distributed to recipients at specified times.

Browsing the repository

The repository is used to store reports, analysis views, and related files. The repository is organized as a structure of folders that contain resources.

About this task

From the Repository page, you access the reports, themes, and other files stored in Cloud Identity Service. You can browse the repository contents that you have permission to view by expanding the icons in **Folders**. Click a folder name to view its contents. Depending on your access permissions, you can run, edit, open, and delete items in the repository.

Procedure

Select **View** > **Repository** from the menu.
Use the **Sort By** controls to sort items in the repository.

Searching the repository

You can search the entire repository, subject to permissions, or narrow the search by using filters. Depending on your access permissions, you can run, edit, open, and delete items in the repository.

About this task

Use filters to restrict a search by name, person that changed the resource, type of resource, modification date, and schedule.

Procedure

1. Select **View** > **Search Results** from the menu.
2. Use the **Filters** pane or **Search** field to filter for, and find resources. The search results page displays results of searches and filters.
   a. Select one of these filters: **All available**, **Modified by me**, or **Viewed by me**.
   b. Clear the search field of any search term.
   c. Select **All types**.
   d. Click the search icon .

   The search results appear listing files that your account has permission to view. Use the **Sort By** controls to sort the results.

Chapter 2. Running reports

When you run a report, it opens in the Report Viewer. You can format and sort reports. Reports that have input controls, can be run to return different sets of data. You can also schedule reports to run at specified times.

Viewing a report

You can view reports from the library or the repository.

Procedure

1. Locate your report in the library or repository by selecting **Library**.
2. Click the report, or right-click the report name and select **Run**.

   You can filter the report using any defined input controls. For table based reports, you can also filter and sort the report using column headers.

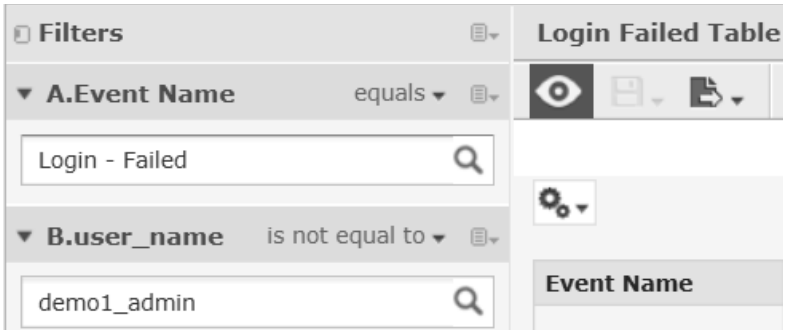
Filtering reports with input controls

When you run a report that defines a filter, you can use the filter to limit the data in the report.

Procedure

1. Select the filter values that you want to use, in the **Filters** pane.

   In this example, a report is limited to returning the login failures for a specified user.



2. Click **Apply**, and click **OK**.

Filtering and sorting reports by column

If a report contains more information than you want, you can filter the report. You can also sort a report into ascending or descending order.

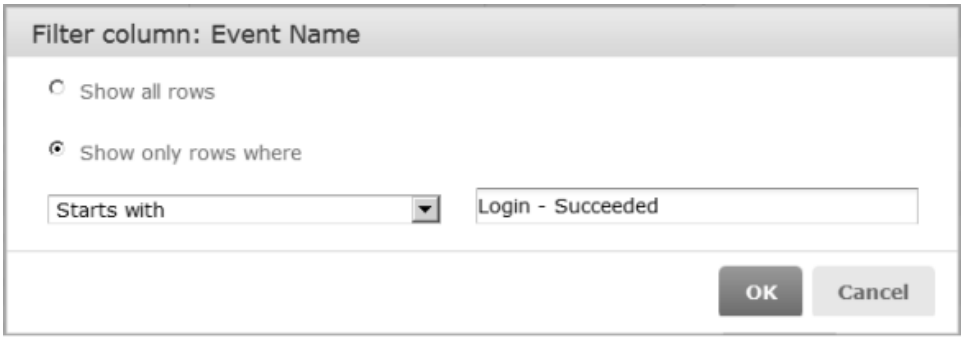
About this task

You filter and sort table-based reports. You conditionally filter report output by selecting the column to use as a basis for filtering. You enter a filter condition, then a value for comparison. You can see the conditions available for each type of column: numeric, date, and text.

Procedure

1. Run the report.
2. Click the column that you want to use to filter the report.
3. Click to open the Filter column window.
4. Select **Show only rows where**.
5. Select a comparison operator, and enter a comparison value.
6. Click **OK** to apply the filter to the column.

   In this example, a report is filtered by a column that is called `Event Name`, for an event called `Login - Succeeded`.



7. To clear the filter indicator, reopen the Filter column window and select **Show all rows**.
8. To sort a report into ascending or descending order, click the column that you want to sort by. Click or .

   In this example, a report is filtered by a column that is called `Event Name`, for an event called `Login - Succeeded`, and sorted by `date` and then by `time of day`.

User Name	Event Name	Subject User Name	date	time_of_day
Paul Smith	Login - Succeeded		Aug 23, 2017	9:00:00 AM
Paul Smith	Login - Succeeded		Aug 14, 2017	9:12:00 AM
Paul Smith	Login - Succeeded		Jun 26, 2017	3:17:00 PM
Paul Smith	Login - Succeeded		Jun 26, 2017	3:17:00 PM
Paul Smith	Login - Succeeded		Apr 3, 2017	9:28:00 AM

Creating a report

You create a report from an ad hoc view.

Procedure

1. Select **Create** > **Report** from the menu.
2. Browse the repository and select the ad hoc view that you want as the basis for the report.
3. Select a report template.

   To use a template other than the default, select **Custom Report Template**. Click **Browse** and select the template.
4. Click **OK** to create the report, and enter any input controls.

Results

The report opens in the Report Viewer. You can work with the report and you can save the report.

Report templates

When you create a report, the **Create Report** wizard displays template layout options for generating and exporting the report.

- Default Report Template. Applies the basic layout options to the report, normally the actual size template
- Custom Report Template. Browse to another template.
  - A4 Landscape
  - A4 Portrait
  - Actual Size
  - Letter Landscape
  - Letter Portrait

Report Templates for PDF

If you want to export a report to PDF, choose an option based on the size of the output.

- For most PDF exports, you can use Actual Size, which supports a maximum size of 14400px by 14400px.
- For reports with an output height that exceeds 14400px, use a paginated report template that is wide enough for your report. For example, if you have a long report with width less than 842px, you can use the paginated A4 Landscape theme.
- Reports with an output width that exceeds 14400px are truncated in PDF. Redesign your report or use a different export format.

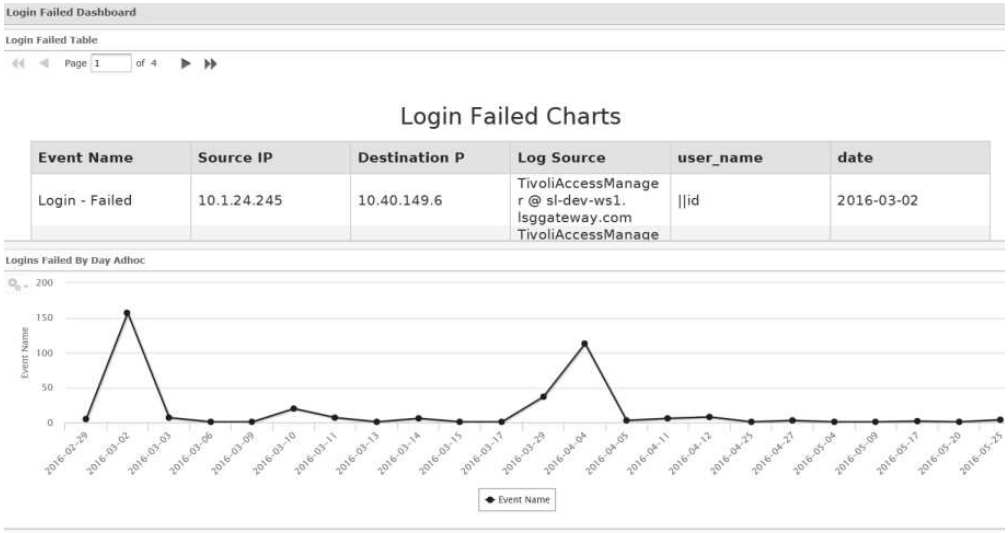
Chapter 3. Managing dashboards

A dashboard displays several reports in a single, integrated view. You can combine any number of reports and create as many dashboards as you need.

Dashboards overview

Dashboards can display any number of reports for different types of related content.

A dashboard can include input controls for choosing the data displayed in one or more dashlets, and custom dashlets that point to URLs for other content.



Dashboard designer

The Dashboard designer is used to embed reports, ad hoc views, and other objects into a single, interactive location.

You can create dashboards that include pre-existing elements, such as reports and views, and you can create new charts, tables, and crosstabs from your data sources.

Dashlets and dashboard elements

Each element added to your dashboard is called a dashlet. To add a dashlet to your dashboard, select a content element and drag it onto the dashboard canvas.

Dashlets can include the following elements, which you can access from the **Available Content** pane:

- **New Content**
  - **Chart**. Create a chart.
  - **Crosstab**. Create a crosstab.
  - **Table**. Create a table .
  - **Text**. Free-form field. Use free text items to add titles and instructional text to the dashboard.

  - **Web Page**. Any URL-addressable web content.
  - **Image**. An image from the repository or an image that is accessible by URL.
- **Existing Content**. Add reports and ad hoc views accessible to you.
- **Filters**. If a report you include on the dashboard is designed to use input controls or filters, you can add the input controls or filters to the dashboard. Controls can also be manually mapped to custom URL dashlets.

Dashboard properties

You can view and edit the basic appearance of all dashlets on your dashboard, and determine the refresh settings.

In the dashboard toolbar, click  to open the Dashboard Properties window.

Table 1. Dashboard properties

Canvas and dashlet settings	**Description**
Show filter dashlet as pop-up	Specifies whether the filter dashlet is a pop-up window instead of a dashlet that is pinned on the dashboard.
Show dashlet borders	Specifies whether to show or hide the lines around each dashlet.
Dashlet outer margin in pixels	The width, in pixels, of the margins between dashlets.
Dashlet inner padding in pixels	The width, in pixels, of the padding inside each dashlet.
Fixed canvas size in pixels	Specifics whether the dashboard is displayed at a specific width and height instead of dynamically resizing based on the browser window. Enter the width and height of the dashboard.
Buttons and Toolbar Settings	
Show Export button	Specifies whether to show or hide the **Export** icon in the dashboard viewer.
Refresh Settings	
Auto-refresh dashboard contents	Specifies automatic refresh for your content.
Refresh Interval	The number of minutes or seconds between each content refresh.

Dashlet properties

A dashlet is an element that is included in your dashboard. For example: a table, chart, or image. You can view and edit the basic properties for each dashlet. For some dashlets, you can also create parameter mappings. The properties that are available vary depending on the type of dashlet you are working with.

To open the Dashlet Properties window, right-click the dashlet in your dashboard and select **Properties**. The table lists all dashlet properties for all dashlet types. Depending on the dashlet that is selected, only some of the settings apply.

Table 2. Dashlet properties

Basic settings	Description
Dashlet Name	The dashlet name.
Resource ID	ID taken from the original dashlet name.
Web Page Address (URL)	Web page dashlets only. Specifies the URL to be displayed for the dashlet.
Web Address/Repository URI	Image dashlets only. The location of the image that is displayed in the dashlet. To find the correct syntax for a path in the repository, open the Properties window for the resource from the repository.
Source Report	Source data path.
Show/Hide Dashlet Elements	Specifies whether to show or hide the title bar, which includes the dashlet name, refresh icon, and maximize icon.
Show/Hide Dashlet buttons	Filter dashlet only. Specifies whether to show or hide the **Apply** icon or **Reset** icon.
Position of dashlet buttons	Filter dashlet only. Specifies the position of dashlet icons, bottom, or right.
Show scroll bars	Web page dashlets only. Specifies whether to show or hide scroll bars.
Text	Text dashlets only. Text to be displayed in the dashlet.
Scale to Fit	Specifies how the element is scaled in the dashlet.
Font	Text dashlets only. Specifies the font, font size, font style, alignment, and font color for the text displayed in the dashlet.
Refresh Settings	Refresh setting that overrides refresh properties set at the dashboard level.
Show Export Button	Specifies whether to show or hide the **Export** icon in the dashboard viewer.
Hyperlink	
Enable chart hyperlinks	Specifies whether to enable a hyperlink for the dashlet.
Action	Specifies the link behavior for the dashlet. • **Update dashboard**. Updates dashlets that are linked to this dashlet, when a user clicks a data point in the chart. • **Open new page**. Opens a web page or report, dashboard, or an ad hoc view in the repository when a user clicks the dashlet. A repository URL must begin with `repo:`, for example, `repo:/public/Samples/Ad_Hoc_Views/Failed_Logins_Trend` To find the correct syntax for a path in the repository, hover over the resource name in the Existing Content pane in the Dashboard Designer. Alternatively, open the Properties window for the resource from the repository. You can add a parameter to a hyperlink for a web page, dashboard, or report. Parameters are not available for ad hoc views.
Available parameters	Specifies a parameter to add to a hyperlink.
Create Links in Parameter Mapping	Saves and closes the Dashlet Properties window and opens the Parameter Mapping window. For more information, see Parameter mapping.

Parameter mapping

You use parameter mapping to specify which dashlets and which parameters are affected by a dashboard filter.

Click the **Parameter Mapping** icon to open the Parameter Mapping window for a dashboard.

Table 3. Parameter mapping settings

Columns/Buttons	Description
Source Dashlet	Name of the dashlet where the filter originates. Filter Group (multiple filters in a single dashlet) or Manually Created Filter can also be displayed.
Filter/Parameter	Name of the filter.
Dashlet Affected	Specifies dashlet that is affected by the filter.
Filter/Parameter Affected	Specifies parameter that is associated with the specified dashlet.
Create New Filter	Adds a dashlet/parameter combination to a filter.
Delete	Deletes a dashlet/parameter combination.

Creating a dashboard

You create a dashboard by dragging content onto the dashboard canvas. You can include existing report elements or create new elements.

Procedure

1. Select **Create** > **Dashboard** from the menu.
2. To include existing content, select the content element from the **Existing Content** pane, and drag the element onto the dashboard canvas.

   Report dashlets are sized to fit side-by-side on the canvas. You can drag a report dashlet to a different location on the canvas.
3. To create new content, select the type of element to create from the **New Content** pane, and drag the element onto the dashboard canvas.
   - Charts, crosstabs, and tables
     a. From the Select Data window, browse to or search for the data source you want to use.
     b. Click **OK** when the data source selection process is complete.
     c. Create the chart, crosstab, or table in the Ad Hoc Editor. For more information about using the Ad Hoc Editor, see Chapter 6, "Creating views with the Ad Hoc editor," on page 23.
     d. When you finish creating your view, click to save the view.
     e. In the **Save to Dashboard** window, enter a dashlet name and click **Save**. The dashlet is added to your dashboard.
   - Web page
     – In the Dashlet URL window, enter the URL that you want to appear on the dashboard. Click **OK**.
   - Text
     – In the Dashlet Text window, enter the text that you want to appear on the dashboard. Click **OK**.

- Image
  - In the Dashlet URI window, enter the URI that you want to appear on the dashboard. Use the `repo:` syntax for images in your repository. Click **OK**.

4. To scale a report dashlet, right-click the report on the canvas, click **Properties**, and use the **Scale to Fit** menu.
5. To hide dashboard borders, click  and clear **Show dashlet borders**.
6. To preview the dashboard, click  .
7. To save the dashboard, click  and select **Save Dashboard**.

Adding controls to a dashboard

If a report has input controls, when the report is added to a dashboard, the input controls must also be added.

About this task

Controls can either be added directly to the dashboard as a dashlet or accessed from the toolbar as a pop-up window. When the report runs, dashboard users provide input by using the control to filter the results of the report.

You can change the labels, or display names, of individual input controls and filters within a dashlet.

Procedure

1. Select the dashboard in the repository, right-click and select **Open in Designer**.
   Input controls that are available for reports in the dashboard appear in the **Filters** section of the **Available Content** pane.
2. Drag the input control that you want onto the dashboard canvas.
   An input control can have a number of options, for example:
   - A selection of different values.
   - All  . Selects all available values in the input control.
   - None  . Deselects all available values in the input control.
   - Invert  . Deselects any selected values, and selects the unselected values.
3. Select an option for the input control.
4. Click  and select **Save Dashboard**.

Adding controls as a pop-up window

Procedure

1. With the dashboard open, click  to open the Dashboard Properties window.
2. Select **Show filter dashlet as pop-up** and click **OK**.
3. Click  and select **Save Dashboard**.

Exporting a dashboard

You can create a snapshot of a dashboard and save it to your computer.

Before you begin

Export must be enabled for the dashboard. For more information about enabling dashboard export, see Dashboard Properties.

Procedure

1. Select **View** > **Repository** from the menu.
2. Locate and open the dashboard that you want to export.
3. Click  , and select an export format.

Table 4. Export formats

Option	Format name	Usage
PNG	Portable Network Graphics	Lossless image compression format.
PDF	Adobe Acrobat	Choose a template based on dashboard size. Use the Actual Size report template for reports with dimensions less than or equal to 14400px by 14400px.
DOCX	Word	Do not export dashboards with reports that have more than 63 columns.
ODT	OpenDocument Text	For best results, minimize the number of rows and columns in tables and ensure that there is no overlapping.

4. Open or save the dashboard in the specified format.

Chapter 4. Formatting and sorting a report

You can format and sort a report to visualize the data in different ways.

Formatting columns

You can change the basic formatting of column headings and fields.

Procedure

1. Run the report.
2. Click the column that you want to format.
3. Hover over and click **Formatting**.
4. Click the **Basic Formatting** tab, and change the options.
   - **Apply to**. Select the part of the column you want to apply the formatting to.
   - **Heading text**. Enter heading text to replace the current text.
   - **Font**. Select a font.
   - **Size**. Select a font size.
   - **Style**. Select Bold, Italic, or Underlined text.
   - **Background Color**. Click to open the background color picker, and click to select the background color.
   - **Font Color**. Click to open the font color picker, and click to select the text color.
   - **Alignment**. Click to select Left, Center, or Right alignment.
5. Click **OK**.

Formatting columns conditionally

You can format column headings and fields to highlight data that meets specific criteria. For example, if you want to emphasize fields for users with a high number of login failures, you can apply text and background formatting to those users.

About this task

If multiple conditions are applied to a single field, their order affects how they function. Conditions are read and applied from bottom to top, and the topmost condition overrides any condition lower in the hierarchy.

Because conditions higher up in the hierarchy can affect conditions below, the font style selection buttons each have three states:

- Unchanged, inherits the previous condition-based style, if any.
- Set, the style is applied to text that meets the condition.
- Not set, the style is not applied to the text that meets the condition, and is removed if a conflicting condition lower in the formatting hierarchy marked that style as Set.

The background and font color pickers have buttons for similar states.

- Unchanged, inherits the previous condition-based color, if any.
- Set, the color is applied to text or background of the field that meets the condition.

- No fill (background only), no color is applied to the background that meets the condition. Regardless of conditions lower in the hierarchy, the background inherits the default color.

Procedure

1. Run the report.
2. Click the column header of the column that you want to format.
3. Hover over the **Column Options** icon and select **Formatting**. Click the **Conditional Formatting** tab.
4. In the **Apply to box**, select the part of the column you want to apply the formatting to.
5. Click **Add** to add a condition to the **Conditions List**.
   - **Operator**. Select an operator to define how the condition is compared to the column data.
   - **Condition**. Enter the condition criteria.
   - **Format**. Select the formatting to be applied to fields that meet the defined condition.
6. Click **OK** to apply the condition to the column.

Moving, resizing, and hiding columns

You can move, resize, and hide report columns.

Procedure

1. To move a column, click the column that you want to move and drag the column to a new position.
2. To resize a column, click the column that you want to resize and drag the column to a new width.
3. To hide a column, click the column that you want to hide, hover over the **Column options** icon, and select **Hide column**.

Filtering and sorting reports by column

If a report contains more information than you want, you can filter the report. You can also sort a report into ascending or descending order.

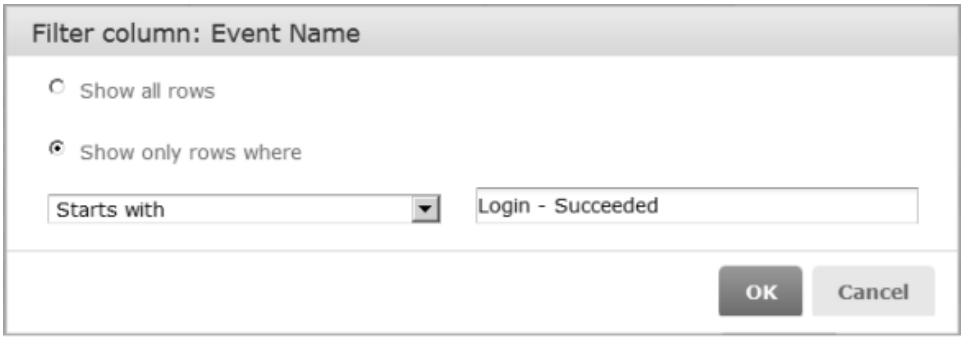
About this task

You filter and sort table-based reports. You conditionally filter report output by selecting the column to use as a basis for filtering. You enter a filter condition, then a value for comparison. You can see the conditions available for each type of column: numeric, date, and text.

Procedure

1. Run the report.
2. Click the column that you want to use to filter the report.
3. Click to open the Filter column window.
4. Select **Show only rows where**.
5. Select a comparison operator, and enter a comparison value.
6. Click **OK** to apply the filter to the column.

In this example, a report is filtered by a column that is called `Event Name`, for an event called `Login - Succeeded`.



7. To clear the filter indicator, reopen the Filter column window and select **Show all rows**.
8. To sort a report into ascending or descending order, click the column that you want to sort by. Click ▲ or ▼.

   In this example, a report is filtered by a column that is called `Event Name`, for an event called `Login - Succeeded`, and sorted by `date` and then by `time of day`.

User Name	Event Name ▽	Subject User Name	date ▼	time_of_day ▼
Paul Smith	Login - Succeeded		Aug 23, 2017	9:00:00 AM
Paul Smith	Login - Succeeded		Aug 14, 2017	9:12:00 AM
Paul Smith	Login - Succeeded		Jun 26, 2017	3:17:00 PM
Paul Smith	Login - Succeeded		Jun 26, 2017	3:17:00 PM
Paul Smith	Login - Succeeded		Apr 3, 2017	9:28:00 AM

Exporting a report

You can export reports to a number of different formats.

Procedure

1. Run the report.
2. Click  , and select an export format.

Table 5. Export formats

Option	Format name	Usage
PDF	Adobe Acrobat	Choose a report template based on report size. Use the Actual Size report template for reports with dimensions less than or equal to 14400px by 14400px.
Excel (Paginated)	XLS	Not suitable for exporting most tables and crosstabs.
Excel	XLS	Ignores page size and produces spreadsheet-like output.
CSV	Comma Separated Values	Characters outside the Latin 1 character set can cause the Excel spreadsheet to look unacceptable.
DOCX	Word	Do not export reports that have more than 63 columns.

Table 5. Export formats (continued)

Option	Format name	Usage
RTF	Rich Text Format	Creates a large output file and takes longer to export than PDF.
ODT	OpenDocument Text	For best results, minimize the number of rows and columns and ensure that there is no overlapping.
ODS	OpenDocument Spreadsheet	For best results, minimize the number of rows and columns and ensure that there is no overlapping.
XLSX (Paginated)	Microsoft Open XML Format Spreadsheet	Not suitable for exporting most tables or crosstabs. Repeats headers and footers on each page.
XLSX	Microsoft Open XML Format Spreadsheet	Ignores page size and produces spreadsheet-like output.
PPTX	Microsoft PowerPoint Presentation	Each page of the report is a slide in a PowerPoint presentation.

3. Open or save the report in the specified format.

Chapter 5. Scheduling reports

You can set up a schedule to run a report at specified times.

Creating a schedule

You can set up a report schedule with report parameters, output options, and notifications.

Procedure

1. Locate the report that you want to schedule in the repository. Right-click the report and select **Schedule** to open the Scheduled Jobs page.
2. Click **Create Schedule** to open the **Schedule** tab.
3. Set a start date, choosing whether to run immediately or on a specific date.
   If a specific date is selected, click to select a start date and time.
4. Specify the time zone for the schedule. The default time zone is the time zone of the server in which your service is hosted. You can set a different time zone.
5. Choose a recurrence setting.
   - **None**. Run the report once.
   - **Simple**. Schedule the job to recur at a regular interval, which is specified in minutes, hours, days, or weeks.
   - **Calendar**. Schedule the job to recur on days of the week, days of the month, specific dates, or date ranges.

   If you select **Simple** or **Calendar Recurrence**, more options are available. For more information, see "Report schedule settings" on page 20.
6. If the report has input controls that prompt for user input, click the **Parameters** tab. Choose a set of saved values, or set the input controls.

   Note: Any saved values are available in a menu. In the **Use saved values** menu, you can set the input controls defined for the report. To save the input value as a named set of values, click **Save Current Values**.
7. Click the **Output Options** tab and set the output format and location. For more information, see "Report output settings."
8. Click the **Notifications** tab and set up email notifications. For more information, see "Report notification settings" on page 19.
9. Click **Save** to open the Save As window.
10. Enter a name for the job in the **Scheduled Job Name** field, and enter a description in the **Description** field.

Report output settings

The **Output Options** tab for scheduled report output settings.

Table 6. Output options

Setting	Description
File name	The name for the output file. The name must be unique.

Table 6. Output options (continued)

Setting	Description
Description	A description of the file that appears to users who view the repository.
Time Zone	The output time zone for generating the report.
Output Locale	The locale settings for generating the report. Your Cloud Identity Service configuration must support report locales for this option to be available.
Formats	Specifies output formats. One or more formats can be selected. The default format is PDF. When more than one format is selected, each format is stored as a separate file in the output destination.
File Handling	Specifies file handling for multiple output files with the same name. • **Overwrite Files**. Overwrite previous output files with newer ones of the same name. • **Sequential File Names by Timestamp**. Appends a time stamp to the names of files. Useful for the output of recurring jobs or for time-sensitive reports where the output must be dated. The output file name is *report_name-timestamp.format_extension*, for example, `loginReport-201606150601.pdf`. • **Timestamp Pattern**. Specifies a time stamp pattern for sequential file names, based on the `java.text.SimpleDateFormat`. The default pattern is yyyyMMddHHmm. For more information about valid patterns, see Class SimpleDateFormat.
Output Destination	Specifies the output location. If no locations are specified, the report is not saved. • **Output To Repository**. Saves the report to a location in the repository. Write permissions apply. • **Output To Host File System**. Saves the report to a location on the host server. Your Cloud Identity Service configuration must support saving to the host server for this option to be available. • **Output To FTP Server**. Saves the report output to a specified FTP server. Write permission to the selected directory on the FTP server apply. Your Cloud Identity Service configuration must support saving to an FTP server for this option to be available. – **Server Address**. The host, IP address, or URL of the FTP server. – **Directory**. The directory on the FTP server where the report output is to be saved. – **Username**. The user name for access to the FTP server. – **Password**. The password for the user name. – **Enable FTPS**. Specifies that server uses the FTPS file transfer protocol. – **Port**. The FTP connection port. For FTP, the default port is 21. For FTPS, the default port is 990.

Report notification settings

The **Notifications** tab for scheduled report email notification settings.

Table 7. Send report when scheduler runs options.

Setting	Description
To	One or more email addresses that are separated by commas for sending email notification.
CC	One or more email addresses that are separated by commas for sending CC email notification.
BCC	One or more email addresses that are separated by commas for sending BCC email notification.
Subject	Email subject description.
Message	Specifies the content of the notification email. • **Include reports as repository links in email body**. A link to the report output in the repository. **Output to Repository** must be selected in the **Output Options** tab. • **Include report files as attachments**. Report output is attached to the notification email. For multiple output formats, each output is attached as a separate file. • **Include report files as ZIP attachment**. Zip all report outputs into a single archive file to be attached to the email. • **Include HTML report in email body**. Displays the report directly in the email body. **Include report files as attachments** or **Include report files as ZIP attachment** must be selected and HTML is selected as one of the options in **Output File Options** in the **Output Options** tab. When this option is selected, a message cannot be included in the email body.
Do not send emails for empty reports	Prevents the attachment of empty report output files This applies to parametrized reports where no data matches the parameters.

Table 8. Job status notification options

Setting	Description
To	One or more email addresses that are separated by commas for sending email notification about the job success or failure
Subject	Email subject description.
Send success notification	Send a notification when the scheduled report runs. • **Success Message**. The message in the body of the notification email that is sent on success.
Send failure notification	Send a notification when the scheduled report fails to run. • **Failure Message**. The message in the body of the notification email that is sent on failure.
Include report job information	Include the report label, ID, description, and report job status in the notification email.
Include stack trace	Include the stack trace for failed jobs in the body of the email.

Report schedule settings

The **Schedule** tab for report schedule settings.

Table 9. Simple calendar settings.

Setting	Description
Repeat every	The interval between jobs, in minutes, hours, days, or weeks.
Run a set number of times	Runs a specified number of times.
Run until a specified date	Runs until a calendar date is reached. Click to select the date.
Run indefinitely	Runs at the specified times until the job is deleted.
Holidays	Specifies a list of days when the scheduled report does not run. Only one holiday calendar can be selected at a time. If no calendars are available in this list, this option is not configured for your Cloud Identity Service service.

Note: If the server where Cloud Identity Service is hosted recognizes Daylight Saving Time (DST), a 1 hour discrepancy can occur in job run times. Jobs that are scheduled using simple recurrence might seem to occur 1 hour later (when DST ends) or 1 hour earlier (when DST begins). If you jobs are to recur at the same time of day and respect DST adjustments, use calendar recurrence.

Table 10. Calendar recurrence settings.

Setting	Description
Months	The months during which the report runs, every month or selected months.
Days	The days when the report runs, every day, selected days, or dates in months. For dates in month, enter dates or date ranges that are separated by commas. For example, 1, 15 for the 1st and 15th day of the month or 1-12 for every day from the 1st to the 12th day of the month inclusive.
Times	The time of day in minutes and hours when the job is to be run in 24-hour format. Multiple minutes or hours, and ranges, which are separated by commas can also be used. For example, entering 0,15,30,45 for the minutes, and 9-17 for the hours, runs the report every 15 minutes from 9:00 AM. to 5:45 PM. Enter an asterisk (*) to run the job every minute or every hour.
End Date	Calendar recurrence runs until a calendar date is reached. Click to select the date.
Holidays	Specifies a list of days when the scheduled report is not run. Only one holiday calendar can be selected at a time. If no calendars are available in this list, this option is not configured for your Cloud Identity Service service.

Viewing event messages

When a scheduled report returns an error, a notification is sent to the owner of the report. You can browse these messages to troubleshoot report scheduling problems.

About this task

The Messages page displays a list of events that are logged for the current user.

Procedure

1. Click **View** > **Messages**.

   Note: To activate the controls on the Messages page, click in a blank area of the message row that you want to manage.
2. Select the message to open the Event Details page.

Chapter 6. Creating views with the Ad Hoc editor

The Ad Hoc Editor is used to design ad hoc views, where you can explore and analyze data from your Topic, or Domain data sources. Ad hoc views can also be used to create content for reports.

Ad Hoc Editor overview

The Ad Hoc Editor is used to create views for different types of reports. You can create views for reports that include tables, crosstabs, and charts.

You create views of your date by dragging and dropping elements into the Ad Hoc Editor. You can add and summarize fields, define groups, label and title reports, and format data for each field. You can also use the editor to explore and analyze data interactively.

Data sources

The data sources for your reports are located in the repository. Your Cloud Identity Service configuration determines the type and number of data sources that are available. Domain and topic objects provide a prepared connection to a data source for ad hoc view creation.

Domains

A domain specifies tables in a database, join clauses, calculated fields, display names, and default properties, all of which define items and sets of items for creating ad hoc views. Domains can be used to filter the data, create input controls, and manage a list of available fields and measures.

A view based on a domain can prompt the user for input that determines what data is presented in a report.

Topics

Topics are normally XML-based files and are associated with a data sources. A topic can also be created from a domain.

Using a topic as your data source generates an empty view. You can add data to an empty view without pre-filtering, or changing display names of the data. Normally any available topics are preconfigured for your Cloud Identity Service service.

Ad Hoc view types

You can use three types of views:

- Tables
- Charts
- Crosstabs

Tables

The architecture of a table view consists of columns, rows, and groups.

Columns in a table correspond to the columns in the data source. They are included by adding fields or measures to the table in the ad hoc view.

Rows correspond to rows in the data source. The information in each row depends on what columns are included in the table.

Using groups, rows can be grouped by identical values in any field with intermediate summaries for each grouped value.

Charts

Charts summarize data graphically. Types of charts include bar chart, line chart, and pie chart. Except for time series and scatter charts, each type of chart compares summarized values for a group.

Crosstabs

Crosstabs are more compact representations than tables. Crosstabs show only aggregate values, rather than individual database values. Columns and rows specify the dimensions for grouping. Cells contain summarized measurements.

Domains

Domains simplify access to data during view design. Domains are used to select fields from data sources and to filter data before it is included in a view and any subsequent report.

Cloud Identity Service has a number of domains that you can use to create views of your data.

- Audit data domain. Contains Cloud Identity Service audit data.
- Group and user domain. Contains user data for group members, and associated group data.
- Role and user domain. Contains user data, including LDAP attributes, custom user attributes, and Cloud Identity Service user attributes.
- Services and user domain. Contains user data for service members, and associated service data.
- Summary domain. Contains summary data for users, groups, services, and roles.
- User domain. Contains user data, including LDAP attributes, custom user attributes, and Cloud Identity Service user attributes.

Creating a view from a domain

Domains simplify access to data during view design. Domains can be used to select fields from the data source and to filter data before it is included in a view and any subsequent report.

About this task

You select the fields that you want to include in a view. You can also define filters for fields and save the view as a topic. Pre-filtering data limits the data choices available in a topic or the fields that appear in an ad hoc view. You can also define

a filter on a field that does not appear in the final report. The filter is applied and only data that satisfies all defined filters appear in the final report. You can also design reports that prompt users to input data to use as a filter.

You can also create a domain topic. Topics are used to create different views by using the fields, filters, and display label settings defined in the topic.

Procedure

1. From the Home page, select **Create** > **Ad Hoc View**.
2. Select the domain that you want to base your view on.

Option	Description
Audit data domain	Contains Cloud Identity Service audit data.
Group and user domain	Contains user data for group members, and associated group data.
Role and user domain	Contains role data for users.
Services and user domain	Contains user data for service members, and associated service data.
Summary domain	Contains summary data for users, groups, services, and roles.
User domain	Contains user data, including LDAP attributes, custom user attributes, and Cloud Identity Service user attributes.

3. Click **Choose Data** to open the Data Chooser window.
4. Click **Fields** to select the fields and sets of fields to include in the report.

   The **Selected Fields** pane shows the items that you selected. You can move a field or set of fields by dragging, double-clicking, or selecting an item and clicking the appropriate arrow button.
5. Click **OK** in the Data Chooser window.

Defining a filter

Procedure

1. To define data filters, click **Pre-filters** to open the Pre-filters page.
2. Expand the options in the **Fields** pane.
3. Double-click to select a field in the **Fields** pane.
4. Select a comparison operator.

   Text fields have both substring comparison operators such as "starts with" or "contains", and whole-string matching such as "equals" or "is one of". When you select a whole-string matching operator, a list appears showing all existing values for the chosen field. In the **Filters** pane, a menu appears from which you can select multiple values.
5. Click each value for comparison in **Available Values** to move it to **Selected Values**.
6. To limit the view design to the values in **Selected Values**, select the **Locked** check box.

   In the Report Viewer, users can click **Options** to enter a comparison value for the condition. The condition is available as a prompt even if the filtered field does not appear in the report.

Note: When the **Locked** check box is selected, the filter is not available to users that run the report.

7. Click **OK** to create the filter. The **Filters** pane shows the filters that you defined.

   Note: Data rows must match all conditions. The overall filter that is applied to the data is the logical AND of all the conditions that you defined.

Changing field labels and order

Procedure

1. Click **Display** to open the Display page.
2. To change the order of fields, click in a field row and use the **Move to top**, **Move up**, **Move down**, and **Move to bottom** arrow buttons.
3. To change the default display label of a field or set of fields, double-click anywhere in a field row and enter the new label in the text box.
4. To disable the use of field sets, select **Flat List** in the **Data Source Selection** pane. Fields in sets can now be relabeled and reordered.

Saving as a topic

You can enter a name and a description to save the Data Chooser settings as a domain topic.

About this task

You can create different views from a topic, by using its fields, filters, and display label settings. You can also edit the topic to change the settings.

Procedure

Click **Save As Topic** to create a topic for the view.

Domain fields

A set of standard set of Cloud Identity Service domains are available for the creation of views.

Some domains can include fields from one or more other domains. In addition, in some domains you might have extra custom fields specific to your organization. Depending on how Cloud Identity Service was set up for your organization, some domains or fields might not be available.

Audit data domain

Contains Cloud Identity Service audit data.

Table 11. Audit fields

Field	Type	Description
current date		The current date, in YYYY-MM-DD format.
current time		The current time, in 24-hour clock format.
date	String	Date that an event occurred, in YYYY-MM-DD format.
day	String	The day that an event occurred. Can be used as a measure, 1 through to 7.

Table 11. Audit fields (continued)

Field	Type	Description
Event Name	String	Audit event name. For more information on audit events, see "Audit events" on page 38.
hour	String	The hour of the day that an event occurred in, in 24-hour clock format. Can be used as a measure, 0 through to 24.
Log Source	String	Event log source.
minute	String	The minute of the hour that an event occurred. Can be used as a measure.
month	String	The month that an event occurred in. Can be used as a measure, 1 through to 12.
quarter	String	The quarter of the year that an event occurred in. The first quarter of the year is Q1, which represents the months January through to March.
time_of_day	String	The time of day that an event occurred, in 24-hour clock format.
User Email	String	The email of the user who is the agent of an event. For example, the email of the user that approved a service request.
User Name	String	The user name of the user who is the agent of an event. For example, the user name of the user that accepted a service request.
User ID		UUID of the user who is the agent of an event. For example, the UUID of the user that accepted a service request.
weekday_name	String	The day of the week that an event occurred.
year	String	The year that an event occurred. Can be used as a measure.
Subject User Name	String	The user name of the user that is the subject of an event. For example, the user name of the user that a service request is accepted for.
Subject User Email	String	The email of the user that is the subject of an event. For example, the email of the user that a service request is accepted for.
Subject User ID	String	UUID of the user that is the subject of an event. For example, the UUID of the user that a service request is accepted for.
Additional Event Data Keys	String	Additional data that is associated with an audit event. For example, for the event `APPROVE_ADD_USER_TO_SERVICE`, the additional data items are: • `service_name` • `user_uuid`.
Additional Event Data Values	String	Values for additional data. For example, Service Name 1, and 4357437543.
Event ID	String	The audit event ID. Can be used as a measure.
Additional Data XML	String	Complete XML for all additional data and values for an event.

Group and user domain

Contains user data for group members, and associated group data.

Table 12. Group fields

Field	Type	Description
cn	String	Name of the group.
description	String	Description of the group.
member_businessCategory	String	The kind of business that is performed by an organization.
member_c	String	Country. Indicated by a two-letter ISO 3166 country code (**countryName**).
member_carLicense	String	Vehicle license plate tag.
member_cn	String	Common name. The X.500 **commonName** attribute, which contains a name of an object. If the object corresponds to a person, it is typically the full name of the person.
member_departmentNumber	String	A department within an organization.
member_description	String	A lengthy description of a directory object entry. An attribute that is common to CIM and LDAP schema.
member_displayName	String	A name that is used to display an entry in a one-line summary list.
member_employeeType	String	The type of employment for an employee.
member_facsimileTelephoneNumber	String	A fax number.
member_givenName	String	The part of the name of a person that is not their surname or their middle name, for example John, Jane, or Joe.
member_AddressLine1	String	The first line of a postal address.
member_AddressLine2	String	The second line of a postal address.
member_IsManager	Boolean	Indicates whether a user is a manager of other users in Cloud Identity Service.
member_LastRecertDate	String	The last recertification date for a user.
member_Manager	Boolean	Indicates the name of a manager for a user.
member_UserType	String	The user type.
member_homeFax	String	A home fax number.
member_homePhone	String	A home telephone number.
member_homePostalAddress	String	A postal address.
member_initials	String	The initials of some or all of the name of a person, but not including the surname, for example D. or D. A. for a person with the name Dan Andrew Smith.
member_internationalISDNNumber	String	The Integrated Services Digital Network (ISDN) addresses, in the format specified in CCITT Rec. E. 164.
member_l	String	The name of a locality, such as a city, county, or other geographic region. (**localityName** in X.500.)

Table 12. Group fields (continued)

Field	Type	Description
member_labeledURI	String	The Uniform Resource Identifier with an optional label as defined in RFC2079.
member_mail	String	Email address.
member_manager	String	The distinguished name of the manager of a person.
member_middleName	String	The middle name of a person.
member_mobile	String	The mobile or cellular phone number.
member_o	String	The name of an organization. (**organizationName** in X.500.)
member_organizationalStatus	String	Specifies a category by which a person is often referred to in an organization.
member_otherMailbox	String	Indicates values for electronic mailbox types other than X.400 and rfc822.
member_ou	String	The name of an organizational unit. (**organizationName** in X.500.)
member_pager	String	A pager phone number.
member_personalTitle	String	A personal title for a person, for example Mr, Ms, Dr, Prof, and Rev.
member_physicalDeliveryOfficeName	String	A physical delivery office number.
member_postalAddress	String	A mailing address. This field is intended to include multiple lines.
member_postalCode	String	Postal code.
member_postOfficeBox	String	Post office box number.
member_preferredDeliveryMethod	String	A preferred contact or delivery method.
member_roomNumber	String	A room number. The **commonName** attribute is normally used for naming room objects.
member_seeAlso	String	The distinguished names of objects that are related to the subject object. Each related object name is one value of this multi-valued attribute.
member_sn	String	The X.500 surname attribute, which is the surname of a person.
member_st	String	The full name of a state or province. (**stateOrProvinceName** in X.500)
member_telephoneNumber	String	A telephone number.
member_telexNumber	String	A telex number.
member_title	String	The title, such as Vice President, of a person in their organizational context.
member_uid	String	A login names that are associated with the user, typically **shortname**, or **userid**.
member_uniqueIdentifier	String	A unique identifier for an object that is represented in the directory. The domain within which the identifier is unique, and the exact semantics of the identifier, are defined locally.

Table 12. Group fields (continued)

Field	Type	Description
member_x500UniqueIdentifier	String	Differentiates objects when a distinguished name is reused. The method of identification is binary.

Role and user domain

Contains role data for users.

Table 13. Role fields

Field	Type	Description
app_section_name	String	The Self Service portal application sections that the role can access. • Help Desk (not all organizations) • Launchpad • Profile • Direct reports • Requests • Services • User control • Show check user name
role_name	String	Name of the role.
role_priority	String	The role priority, 1 is the highest priority.
businessCategory	String	The kind of business that is performed by an organization.
c	String	Country. Indicated by a two-letter ISO 3166 country code (**countryName**).
carLicense	String	Vehicle license plate tag.
cn	String	Common name. The X.500 **commonName** attribute, which contains a name of an object. If the object corresponds to a person, it is typically the full name of the person.
departmentNumber	String	A department within an organization.
description	String	A lengthy description of a directory object entry. An attribute that is common to CIM and LDAP schema.
displayName	String	A name that is used to display an entry in a one-line summary list.
employeeType	String	The type of employment for an employee.
facsimileTelephoneNumber	String	A fax number.
givenName	String	The part of the name of a person that is not their surname or their middle name, for example John, Jane, or Joe.
AddressLine1	String	The first line of a postal address.
AddressLine2	String	The second line of a postal address.
IsManager	Boolean	Indicates whether a user is a manager of other users in Cloud Identity Service.

Table 13. Role fields (continued)

Field	Type	Description
LastRecertDate	String	The last recertification date for a user.
Manager	Boolean	Indicates the name of a manager for a user.
ServiceDN	String	Indicates the DN of a service.
UserType	String	The user type.
UUID	String	The UUID of a user.
homeFax	String	A home fax number.
homePhone	String	A home telephone number.
homePostalAddress	String	A postal address.
initials	String	The initials of some or all of the name of a person, but not including the surname, for example D. or D. A. for a person with the name Dan Andrew Smith.
internationalISDNNumber	String	The Integrated Services Digital Network (ISDN) addresses, in the format specified in CCITT Rec. E. 164.
l	String	The name of a locality, such as a city, county, or other geographic region. (**localityName** in X.500.)
labeledURI	String	The Uniform Resource Identifier with an optional label as defined in RFC2079.
mail	String	Email address.
middleName	String	The middle name of a person.
mobile	String	The mobile or cellular phone number.
o	String	The name of an organization. (**organizationName** in X.500.)
organizationalStatus	String	Specifies a category by which a person is often referred to in an organization.
otherMailbox	String	Indicates values for electronic mailbox types other than X.400 and rfc822.
ou	String	The name of an organizational unit. (**organizationName** in X.500.)
pager	String	A pager phone number.
personalTitle	String	A personal title for a person, for example Mr, Ms, Dr, Prof, and Rev.
physicalDeliveryOfficeName	String	A physical delivery office number.
postalAddress	String	A mailing address. This field is intended to include multiple lines.
postalCode	String	Postal code.
postOfficeBox	String	Post office box number.
preferredDeliveryMethod	String	A preferred contact or delivery method.
roomNumber	String	A room number. The **commonName** attribute is normally used for naming room objects.

Table 13. Role fields (continued)

Field	Type	Description
seeAlso	String	The distinguished names of objects that are related to the subject object. Each related object name is one value of this multi-valued attribute.
sn	String	The X.500 surname attribute, which is the surname of a person.
st	String	The full name of a state or province. (**stateOrProvinceName** in X.500)
telephoneNumber	String	A telephone number.
telexNumber	String	A telex number.
title	String	The title, such as Vice President, of a person in their organizational context.
uid	String	A login names that are associated with the user, typically **shortname**, or **userid**.
uniqueIdentifier	String	A unique identifier for an object that is represented in the directory. The domain within which the identifier is unique, and the exact semantics of the identifier, are defined locally.
x500UniqueIdentifier	String	Differentiates objects when a distinguished name is reused. The method of identification is binary.

Services and user domain

Contains user data for service members and associated service data.

Table 14. Service fields

Field	Type	Description
businessCategory	String	The kind of business that is performed by an organization.
c	String	Country. Indicated by a two-letter ISO 3166 country code (**countryName**).
carLicense	String	Vehicle license plate tag.
cn	String	Common name. The X.500 **commonName** attribute, which contains a name of an object. If the object corresponds to a person, it is typically the full name of the person.
departmentNumber	String	A department within an organization.
description	String	A lengthy description of a directory object entry. An attribute that is common to CIM and LDAP schema.
displayName	String	A name that is used to display an entry in a one-line summary list.
employeeType	String	The type of employment for an employee.
facsimileTelephoneNumber	String	A fax number.

Table 14. Service fields (continued)

Field	Type	Description
givenName	String	The part of the name of a person that is not their surname or their middle name, for example John, Jane, or Joe.
AddressLine1	String	The first line of a postal address.
AddressLine2	String	The second line of a postal address.
IsManager	Boolean	Indicates whether a user is a manager of other users in Cloud Identity Service.
LastRecertDate	String	The last recertification date for a user.
Manager	Boolean	Indicates the name of a manager for a user.
UserType	String	The user type.
homeFax	String	A home fax number.
homePhone	String	A home telephone number.
homePostalAddress	String	A postal address.
initials	String	The initials of some or all of the name of a user, but not including the surname, for example D. or D. A. for a person with the name Dan Andrew Smith.
internationalISDNNumber	String	The Integrated Services Digital Network (ISDN) addresses, in the format specified in CCITT Rec. E. 164.
l	String	The name of a locality, such as a city, county, or other geographic region. (**localityName** in X.500.)
labeledURI	String	The Uniform Resource Identifier with an optional label as defined in RFC2079.
mail	String	Email address.
manager	String	The distinguished name of the manager of a person.
middleName	String	The middle name of a person.
mobile	String	The mobile or cellular phone number.
o	String	The name of an organization. (**organizationName** in X.500.)
organizationalStatus	String	Specifies a category by which a person is often referred to in an organization.
otherMailbox	String	Indicates values for electronic mailbox types other than X.400 and rfc822.
ou	String	The name of an organizational unit. (**organizationName** in X.500.)
pager	String	A pager phone number.
personalTitle	String	A personal title for a person, for example Mr, Ms, Dr, Prof, and Rev.
physicalDeliveryOfficeName	String	A physical delivery office number.

Table 14. Service fields (continued)

Field	Type	Description
postalAddress	String	A mailing address. This field is intended to include multiple lines.
postalCode	String	Postal code.
postOfficeBox	String	Post office box number.
preferredDeliveryMethod	String	A preferred contact or delivery method.
roomNumber	String	A room number. The **commonName** attribute is normally used for naming room objects.
seeAlso	String	The distinguished names of objects that are related to the subject object. Each related object name is one value of this multi-valued attribute.
sn	String	The X.500 surname attribute, which is the surname of a person.
st	String	The full name of a state or province. (**stateOrProvinceName** in X.500)
telephoneNumber	String	A telephone number.
telexNumber	String	A telex number.
title	String	The title, such as Vice President, of a person in their organizational context.
uid	String	A login names that are associated with the user, typically **shortname**, or **userid**.
uniqueIdentifier	String	A unique identifier for an object that is represented in the directory. The domain within which the identifier is unique, and the exact semantics of the identifier, are defined locally.
x500UniqueIdentifier	String	Differentiates objects when a distinguished name is reused. The method of identification is binary.
service_cn	String	Name of the service.
service_description	String	A description of the service.
service_ApprovalGracePeriod	String	The number of days before the approval reminder action is due. Defaults to 0.
service_ApprovalReminderActionId	Integer	Approval reminder action ID. The action to be taken when service membership is not approved by the due date. Defaults to 1. One of the following five action IDs can be specified. • 0. Take no action. • 1. Auto deny. • 2. Auto approve. • 3. Email approver • 4. Email manager of approver.
service_ContainedService	String	Name of the contained service.

Table 14. Service fields (continued)

Field	Type	Description
service_DeProvisioningInstructions	String	Deprovisioning instructions for the service.
service_DestroyIdOnRevoke	Boolean	Indicates whether to delete the user account when membership to the service is revoked. Defaults to `false`.
service_HideFromSelfCare	Boolean	Indicates whether to hide the service from users in the Self Service portal.
service_ManagerApproval	Boolean	Indicates whether the approval of the user manager is required to add members to the service dynamically via a policy. Defaults to `false`.
service_ManagerApprovalManual	Boolean	Indicates whether **service_ManagerApprovalManual** is required for users manually added via a request. Defaults to `false`.
service_ManagerNotification	Boolean	Indicates whether to send notifications to the user manager, of membership assignments and revocations.
service_ManagerRecert	Boolean	Indicates whether manager recertification is required for users added dynamically via a policy. Defaults to `false`.
service_ManagerRecertManual	Boolean	Indicates whether **service_ManagerRecertManual** is required for users manually added via a request. Defaults to `false`.
service_MemberNotification	Boolean	Indicates whether members are notified of membership assignment and revocation. Defaults to `false`.
service_NoMembers	Boolean	Indicates whether the service can have members.
service_owner	String	The owner of the service.
service_OwnerApproval	Boolean	Indicates whether the approval of the service owner is required to add members to the service dynamically via a policy. Defaults to `false`.
service_OwnerApprovalManual	Boolean	Indicates whether **service_OwnerApprovalManual** is required for users manually added via a request. Defaults to `false`.
service_OwnerRecert	Boolean	Indicates whether service owner recertification is required for users added dynamically via a policy. Defaults to `false`.
service_OwnerRecertManual	Boolean	Indicates whether **service_OwnerRecertManual** is required for users manually added via a request. Defaults to `false`.
service_ParentService	String	Name of the parent service.

Table 14. Service fields (continued)

Field	Type	Description
service_ProvisioningInstructions	String	Provisioning instructions for the service.
service_RecertGracePeriod	Integer	The number of days before the recertification reminder action is due. Defaults to 0.
service_RecertReminderActionId	String	Recertification reminder action ID. The action to be taken when service membership is not recertified by the due date. One of the following five action IDs can be specified. • 0. Take no action. • 1. Auto deny. • 2. Auto approve. • 3. Email approver • 4. Email manager of approver.
service_RequestInstructions	String	Instructions for requesting the service.
service_ServiceRequestXml	String	Service request XML.
service_ServiceRequestXml2	String	Service request XML 2.
service_SODCalloutRequired	Boolean	Indicates whether a Separation of Duties (SOD) callout is required before the approval process is triggered to record service request approvals on an external system.

Summary domain

Contains summary data for users, groups, services, and roles.

Table 15. Summary fields

Field	Type	Description
Users	Integer	The total number of users.
Groups	Integer	The total number of groups.
Services	Integer	The total number of services.
Roles	Integer	The total number of roles.

User domain

Contains user data, including LDAP attributes, custom user attributes, and Cloud Identity Service user attributes.

Table 16. User fields

Field	Type	Description
businessCategory	String	The kind of business that is performed by an organization.
c	String	Country. Indicated by a two-letter ISO 3166 country code (**countryName**).
carLicense	String	Vehicle license plate tag.

Table 16. User fields (continued)

Field	Type	Description
cn	String	Common name. The X.500 **commonName** attribute, which contains a name of an object. If the object corresponds to a person, it is typically the full name of the person.
departmentNumber	String	A department within an organization.
description	String	A lengthy description of a directory object entry. An attribute that is common to CIM and LDAP schema.
displayName	String	A name that is used to display an entry in a one-line summary list.
employeeType	String	The type of employment for an employee.
facsimileTelephoneNumber	String	A fax number.
givenName	String	The part of the name of a person that is not their surname or their middle name, for example John, Jane, or Joe.
AddressLine1	String	The first line of a postal address.
AddressLine2	String	The second line of a postal address.
IsManager	Boolean	Indicates whether a user is a manager of other users in Cloud Identity Service.
LastRecertDate	String	The last recertification date for a user.
Manager	Boolean	Indicates the name of a manager for a user.
UserType	String	The user type.
homeFax	String	A home fax number.
homePhone	String	A home telephone number.
homePostalAddress	String	A postal address.
initials	String	The initials of some or all of the name of a person, but not including the surname, for example D. or D. A. for a person with the name Dan Andrew Smith.
internationalISDNNumber	String	The Integrated Services Digital Network (ISDN) addresses, in the format specified in CCITT Rec. E. 164.
l	String	The name of a locality, such as a city, county, or other geographic region. (**localityName** in X.500.)
labeledURI	String	The Uniform Resource Identifier with an optional label as defined in RFC2079.
mail	String	Email address.
manager	String	The distinguished name of the manager of a person.
middleName	String	The middle name of a person.
mobile	String	The mobile or cellular phone number.
o	String	The name of an organization. (**organizationName** in X.500.)
organizationalStatus	String	Specifies a category by which a person is often referred to in an organization.

Table 16. User fields (continued)

Field	Type	Description
otherMailbox	String	Indicates values for electronic mailbox types other than X.400 and rfc822.
ou	String	The name of an organizational unit. (**organizationName** in X.500.)
pager	String	A pager phone number.
personalTitle	String	A personal title for a person, for example Mr, Ms, Dr, Prof, and Rev.
physicalDeliveryOfficeName	String	A physical delivery office number.
postOfficeBox	String	Post office box number.
postalAddress	String	A mailing address. This field is intended to include multiple lines.
postalCode	String	Postal code.
preferredDeliveryMethod	String	A preferred contact or delivery method.
roomNumber	String	A room number. The **commonName** attribute is normally used for naming room objects.
seeAlso	String	The distinguished names of objects that are related to the subject object. Each related object name is one value of this multi-valued attribute.
sn	String	The X.500 surname attribute, which is the surname of a person.
st	String	The full name of a state or province. (**stateOrProvinceName** in X.500)
telephoneNumber	String	A telephone number.
telexNumber	String	A telex number.
title	String	The title, such as Vice President, of a person in their organizational context.
uid	String	Login names that are associated with the user, typically **shortname**, or **userid**.
UUID	String	The unique identifier of the user.
uniqueIdentifier	String	A unique identifier for an object that is represented in the directory. The domain within which the identifier is unique, and the exact semantics of the identifier, are defined locally.
x500UniqueIdentifier	String	Differentiates objects when a distinguished name is reused. The method of identification is binary.

Audit events

Cloud Identity Service records a number of audit events that can be used in reports.

Event	Additional Event Data Keys
ACL_ADD_FAILURE	

Event	Additional Event Data Keys
ACL_ADD_SUCCESS	• acl_name • oauth_client_id
ACL_DELETE_FAILURE	• acl_name • oauth_client_id
ACL_DELETE_SUCCESS	• acl_name • oauth_client_id
ACL_UPDATE_FAILURE	
ACL_UPDATE_SUCCESS	• acl_name • oauth_client_id
ADD_ATTRIBUTE_TO_PERSON_SUCCESS	
ADD_CHILD_FAILURE_GMA_API	• child_service_name • failure_reason • oauth_client_id • service_name
ADD_CHILD_SUCCESS_GMA_API	• child_service_name • oauth_client_id • service_name
ADD_CHILDREN_FAILURE_GMA_API	
ADD_CHILDREN_SUCCESS_GMA_API	• child_service_name • oauth_client_id • service_name
ADD_CONTAINED_SERVICE_FAILURE_GMA_API	
ADD_CONTAINED_SERVICE_SUCCESS_GMA_API	• contained_service_name • oauth_client_id • service_name
ADD_CONTAINED_SERVICES_FAILURE_GMA_API	• contained_service_name • failure_reason • oauth_client_id • service_name
ADD_CONTAINED_SERVICES_SUCCESS_GMA_API	• contained_service_name • oauth_client_id • service_name
ADD_DPE_POLICY	
ADD_GROUP	
ADD_MEMBER_FAILURE_GMA_API	• failure_reason • group_name • oauth_client_id • user_uuid
ADD_MEMBER_SUCCESS_GMA_API	• failure_reason • oauth_client_id • user_uuid

Event	Additional Event Data Keys
ADD_MEMBERS_FAILURE_GMA_API	• failure_reason • group_name • oauth_client_id • user_uuid
ADD_MEMBERS_SUCCESS_GMA_API	• failure_reason • oauth_client_id • user_uuid
ADD_RECERT_POLICY	
ADD_SERVER	
ADD_SERVICE	
ADD_SERVICE_TO_CATEGORY_SUCCESS	• oauth_client_id • service_category_name • service_name
ADD_USER	• user_uuid
ADD_USER_TO_GROUP	
API_KEY_MANAGEMENT_DELETE_FAILURE	
API_KEY_MANAGEMENT_DELETE_SUCCESS	• api_key_oauth_client_id • oauth_client_id
API_KEY_MANAGEMENT_UPDATE_FAILURE	
API_KEY_MANAGEMENT_UPDATE_SUCCESS	• api_key_oauth_client_id • oauth_client_id
APPROVE_ADD_USER_TO_SERVICE	• service_name • user_uuid
APPROVE_SELF_REGISTRATION_REQUEST	
CHANGE_TO_USER_ACCOUNT_FAILURE_GMA_API	
CHANGE_TO_USER_ACCOUNT_SUCCESS_GMA_API	• convert_to_account • oauth_client_id • user_uuid
CHANGE_TO_USER_IDENTITY_FAILURE_GMA_API	
CHANGE_TO_USER_IDENTITY_SUCCESS_GMA_API	• convert_to_account • oauth_client_id • user_uuid
CREATE_ADMIN_ACCOUNT_FAILURE_GMA_API	• admin_uid • failure_reason • oauth_client_id
CREATE_ADMIN_ACCOUNT_SUCCESS_GMA_API	• admin_given_name • admin_mail • admin_sn • admin_uid • oauth_client_id
CREATE_ADMIN_FAILURE_GMA_API	

Event	Additional Event Data Keys
CREATE_ADMIN_SUCCESS_GMA_API	
CREATE_GROUP_FAILURE_GMA_API	• failure_reason • group_name • oauth_client_id
CREATE_GROUP_SUCCESS_GMA_API	• group_name • oauth_client_id
CREATE_IDM_CATALOG	
CREATE_IDM_CONNECTION	
CREATE_IDM_STORE	
CREATE_NEW_INSTANCE_FAILURE_GMA_API	
CREATE_NEW_INSTANCE_SUCCESS_GMA_API	• instance_name • oauth_client_id
CREATE_SERVICE_CATEGORY_FAILURE	• failure_reason • oauth_client_id • service_category_name
CREATE_SERVICE_CATEGORY_SUCCESS	• oauth_client_id • service_category_name
CREATE_SERVICE_FAILURE_GMA_API	• failure_reason • gma_admin_request • oauth_client_id • service_name • service_owner_uuid
CREATE_SERVICE_SUCCESS_GMA_API	• gma_admin_request • oauth_client_id • service_name • service_owner_uuid
CREATE_TOKEN_FAILURE_GMA_API	
CREATE_TOKEN_SUCCESS_GMA_API	• oauth_client_id • token_type • user_uuid
CREATE_USER_NO_APPROVAL_FAILURE_GMA_API	• failure_reason • is_account • oauth_client_id • user_name • user_uuid
CREATE_USER_NO_APPROVAL_SUCCESS_GMA_API	• is_account • oauth_client_id • user_name • user_uuid
CREATE_USER_OR_ACCOUNT_FAILURE_GMA_API	
DELETE_ADMIN_FAILURE_GMA_API	
DELETE_ADMIN_SUCCESS_GMA_API	

Event	Additional Event Data Keys
DELETE_DPE_POLICY	
DELETE_GROUP	
DELETE_GROUP_FAILURE_GMA_API	• failure_reason • group_name • oauth_client_id
DELETE_GROUP_SUCCESS_GMA_API	• group_name • oauth_client_id
DELETE_IDM_STORE	
DELETE_PROTECTED_OBJECT_FAILURE	• failure_reason • protected_object_name
DELETE_PROTECTED_OBJECT_SUCCESS	• protected_object_name
DELETE_SERVICE_CATEGORY_SUCCESS	• oauth_client_id • service_category_name
DELETE_SERVICE_FAILURE_GMA_API	• failure_reason • oauth_client_id • service_name
DELETE_SERVICE_SUCCESS_GMA_API	• oauth_client_id • service_name
DELETE_USER_FAILURE_GMA_API	• failure_reason • oauth_client_id • user_uuid
DELETE_USER_KBA_FAILURE_GMA_API	• failure_reason • oauth_client_id • user_uuid
DELETE_USER_KBA_SUCCESS_GMA_API	• oauth_client_id • user_uuid
DELETE_USER_SUCCESS_GMA_API	• oauth_client_id • user_cn • user_gateway_principal_name • user_given_name • user_mail • user_sn • user_uid • user_uuid
DEMOTE_ACCOUNT_TO_IDENTITY	• user_uuid
DENY_ADD_USER_TO_SERVICE	• justification • service_name • user_uuid
DENY_RECERT_RECORD	
ENDED_DPE_POLICY	• dpe_policy_id • dpe_policy_name

Event	Additional Event Data Keys
ENDED_RECERT_POLICY	
ERROR_DPE_POLICY	
ERROR_RECERT_POLICY	
Get credentials - Succeeded	
Get entitlements - Succeeded	
Get pac - Succeeded	
GLOBAL_BRANDING_UPDATE_SUCCESS	• global_branding_client_name • oauth_client_id
JUNCTION_ADD_FAIL	• failure_reason • junction_name • oauth_client_id
JUNCTION_ADD_SUCCESS	• junction_name • oauth_client_id
JUNCTION_DELETE_FAIL	• failure_reason • junction_name • oauth_client_id
JUNCTION_DELETE_SUCCESS	• junction_name • oauth_client_id
JUNCTION_UPDATE_FAIL	• failure_reason • junction_name • oauth_client_id
JUNCTION_UPDATE_SUCCESS	
Login - Failed	
Login - Succeeded	
Logout - Succeeded	
MODIFY_DPE_POLICY_SCHEDULE	
MODIFY_RECERT_POLICY_SCHEDULE	
PASSWORD_CHANGE_FAILURE_GMA_API	
PASSWORD_CHANGE_SUCCESS_GMA_API	• oauth_client_id • user_uuid
Password change - Failed	
Password change - Succeeded	
POP_ADD_FAILURE	• failure_reason • oauth_client_id • pop_name
POP_ADD_SUCCESS	• oauth_client_id • pop_name
POP_DELETE_FAILURE	• failure_reason • oauth_client_id • pop_name

Event	Additional Event Data Keys
POP_DELETE_SUCCESS	• oauth_client_id • pop_name
POP_UPDATE_FAILURE	• failure_reason • oauth_client_id • pop_name
POP_UPDATE_SUCCESS	• oauth_client_id • pop_name
PROCESS_ADD_USER_TO_SERVICE	• service_name • user_uuid
PROCESS_REQUESTS_FAILURE_GMA_API	
PROCESS_REQUESTS_SUCCESS_GMA_API	• approver_uuid • oauth_client_id • request_id
REASSIGN_REQUESTS_FAILURE_GMA_API	
REASSIGN_REQUESTS_SUCCESS_GMA_API	• new_approver_uuid • oauth_client_id • old_approver_uuid • request_id
REJECT_SELF_REGISTRATION_REQUEST	
REMOVE_ADMIN_ACCOUNT_FAILURE_GMA_API	• admin_uid • failure_reason • oauth_client_id
REMOVE_ADMIN_ACCOUNT_SUCCESS_GMA_API	• admin_uid • oauth_client_id
REMOVE_CHILD_FAILURE_GMA_API	• child_service_name • failure_reason • oauth_client_id • service_name
REMOVE_CHILD_SUCCESS_GMA_API	• child_service_name • oauth_client_id • service_name
REMOVE_CHILDREN_FAILURE_GMA_API	• child_service_name • failure_reason • oauth_client_id • service_name
REMOVE_CONTAINED_SERVICE_FAILURE_GMA_API	• contained_service_name • failure_reason • oauth_client_id • service_name

Event	Additional Event Data Keys
REMOVE_CONTAINED_SERVICE_SUCCESS_GMA_API	• contained_service_name • oauth_client_id • service_name
REMOVE_CONTAINED_SERVICES_FAILURE_GMA_API	• contained_service_name • failure_reason • oauth_client_id • service_name
REMOVE_MEMBER_SUCCESS_GMA_API	• group_name • oauth_client_id • user_uuid
REMOVE_MEMBERS_FAILURE_GMA_API	• failure_reason • group_name • oauth_client_id • user_uuid
REMOVE_MEMBERS_SUCCESS_GMA_API	• group_name • oauth_client_id • user_uuid
REMOVE_SERVICE_FROM_CATEGORY_SUCCESS	• oauth_client_id • service_category_name • service_name
REMOVE_USER_FROM_GROUP	
REMOVE_USER_FROM_SERVICE	
REMOVE_USER_FROM_SERVICE_WITH_JUSTIFICATION	• justification • service_name • user_uuid
REQUEST_ADD_USER_TO_SERVICE	
Resource access - Failed	
Resource access - Succeeded	
Runtime audit start - Succeeded	
Runtime audit stop - Succeeded	
SEND_REQUEST_REMINDER_FAILURE_GMA_API	• approver_uuid • failure_reason • oauth_client_id
SEND_REQUEST_REMINDER_SUCCESS_GMA_API	• approver_uuid • oauth_client_id
SERVICES_ADD_MEMBERS_FAILURE_GMA_API	
SERVICES_ADD_MEMBERS_SUCCESS_GMA_API	• action • gma_admin_request • oauth_client_id • service_name • user_uuid

Event	Additional Event Data Keys
SERVICES_REMOVE_MEMBERS_FAILURE_GMA_API	• failure_reason • oauth_client_id • service_name • user_uuid
SERVICES_REMOVE_MEMBERS_SUCCESS_GMA_API	• oauth_client_id • service_name • user_uuid
SET_TOKEN_CONFIG_FAILURE_GMA_API	
SET_TOKEN_CONFIG_SUCCESS_GMA_API	• oauth_client_id • token_type
SETUP_BRANDING_INSTANCE_FAILURE_GMA_API	
SETUP_BRANDING_INSTANCE_SUCCESS_GMA_API	• oauth_client_id
STARTED_DPE_POLICY	• dpe_policy_execution_type • dpe_policy_id • dpe_policy_name
STARTED_RECERT_POLICY	
UPDATE_ADMIN_ACCOUNT_FAILURE_GMA_API	• admin_uid • failure_reason • oauth_client_id
UPDATE_ADMIN_ACCOUNT_SUCCESS_GMA_API	• admin_given_name • admin_mail • admin_sn • admin_uid • oauth_client_id
UPDATE_ADMIN_FAILURE_GMA_API	
UPDATE_ADMIN_SUCCESS_GMA_API	
UPDATE_APPLICATION_ROLES_FAILURE_GMA_API	
UPDATE_APPLICATION_ROLES_SUCCESS_GMA_API	• oauth_client_id • role_name • role_uuid
UPDATE_APPLICATION_TEXT_KEYS_SUCCESS_GMA_API	• oauth_client_id
UPDATE_ATTRIBUTE_ELEMENTS_FAILURE_GMA_API	
UPDATE_ATTRIBUTE_ELEMENTS_SUCCESS_GMA_API	• oauth_client_id
UPDATE_BRANDING_FAILURE_GMA_API	• failure_reason • oauth_client_id
UPDATE_BRANDING_SUCCESS_GMA_API	• oauth_client_id
UPDATE_COMPANY_CONTACT	
UPDATE_DELETE_USER_IF_NEW_CONFIG_SUCCESS	• delete_if_new_config_minutes • oauth_client_id
UPDATE_DPE_POLICY	

Event	Additional Event Data Keys
UPDATE_EMAIL_TEMPLATE_SUCCESS_GMA_API	• oauth_client_id
UPDATE_GLOBAL_USER_POLICY	
UPDATE_GROUP_FAILURE_GMA_API	• failure_reason • group_name • oauth_client_id
UPDATE_GROUP_SUCCESS_GMA_API	• group_name • oauth_client_id
UPDATE_KBA_FAILURE_GMA_API	
UPDATE_KBA_SUCCESS_GMA_API	• oauth_client_id
UPDATE_PW_RESET_OPTIONS_SUCCESS_GMA_API	• oauth_client_id
UPDATE_RECERT_POLICY	
UPDATE_SELF_REG_OPTIONS_SUCCESS_GMA_API	• oauth_client_id
UPDATE_SERVICE_CATEGORY_FAILURE	
UPDATE_SERVICE_CATEGORY_SUCCESS	• oauth_client_id • service_category_name
UPDATE_SERVICE_FAILURE_GMA_API	
UPDATE_SERVICE_FAILURE_GMA_SERVICES_CONTROLLER	• failure_reason • oauth_client_id • service_approval_grace_period • service_approval_reminder_action_id • service_destroy_id_on_revoke • service_hide_from_care • service_manager_approval_auto • service_manager_approval_manual • service_manager_recert_auto • service_manager_recert_manual • service_name • service_no_members • service_owner_approval_auto • service_owner_approval_manuak • service_owner_recert_auto • service_owner_recert_manual • service_owner_uuid • service_recert_grace_period • service_recert_reminder_acton_id • service_sod_callout_required
UPDATE_SERVICE_SUCCESS_GMA_API	• oauth_client_id • service_name

Event	Additional Event Data Keys
UPDATE_SERVICE_SUCCESS_GMA_SERVICES_CONTROLLER	• oauth_client_id • service_approval_grace_period • service_approval_reminder_action_id • service_destroy_id_on_revoke • service_hide_from_care • service_manager_approval_auto • service_manager_approval_manual • service_manager_recert_auto • service_manager_recert_manual • service_name • service_no_members • service_owner_approval_auto • service_owner_approval_manuak • service_owner_recert_auto • service_owner_recert_manual • service_owner_uuid • service_recert_grace_period • service_recert_reminder_acton_id • service_sod_callout_required
UPDATE_USER	• user_password_update • user_uuid
UPDATE_USER_DEMOTE_AND_CHANGE_UID_FAILURE_GMA_API	
UPDATE_USER_DEMOTE_AND_CHANGE_UID_SUCCESS_GMA_API	• oauth_client_id • user_uid • user_uuid
UPDATE_USER_FAILURE_GMA_API	
UPDATE_USER_KBA_FAILURE_GMA_API	
UPDATE_USER_KBA_SUCCESS_GMA_API	• oauth_client_id • user_uuid
UPDATE_USER_POLICY	• user_uuid
UPDATE_USER_SUCCESS_GMA_API	• oauth_client_id • user_uid • user_uuid
UPDATE_USERNAME_RECOVERY_OPTIONS_SUCCESS_GMA_API	• oauth_client_id
UPLOAD_BRANDING_FILE_FAILURE_GMA_API	
UPLOAD_BRANDING_FILE_SUCCESS_GMA_API	• oauth_client_id
USER_PWD_RESET	• user_uuid
USER_PWD_RESET_FAILURE	
USER_REGISTRATION	• user_uuid
USER_REGISTRATION_REQ	• user_uuid
USER_USERNAME_RECOVERY	• user_uuid

Event	Additional Event Data Keys
VIEW_USER	• user_uuid

Tables

Available fields are divided into **Fields** and **Measures**.

Fields are added to the table as columns or groups. Measures are fields that contain data values. All available fields for tables are listed in the **Data Source Selection** pane in the Ad Hoc Editor.

Groups are used to create detailed data rows. For example, if you have a table that lists the members of different services, you can group members to be located under a service name row. You can use multiple fields to make more specific nested groups. For example, by adding another group based on user managers, you can view membership by service name and user manager.

You can display summary data for any column in your table. Summary data can be in the form of a number of functions.

- Sum, count, distinct count, average

For example, in a table with a list of service members that are grouped by service name and manager, you can display the number of service members. You can display the total number of members and the number of service members by manager. By default, the summary function for each field is defined by the data source or domain definition.

Creating a table

You insert data into a table by adding fields. You can group data under header rows.

Procedure

1. Add a field as a column or a measure.
   a. In the **Data Source Selection** pane, select the field or measure you want to add to the table. Use the Ctrl key to select multiple fields.
   b. Drag the selected item into the **Columns** box in the Layout Band.
2. Create a group as a header row.
   a. In the **Data Source Selection** pane, select the field that you want to add to the table as a group.
   b. Drag the selected item into the **Columns** box in the Layout Band.
3. Add a summary to a column.
   a. In the table, right-click the column that you want to calculate a summary for, and select **Add Summary**.
   b. Drag the selected item into the **Columns** box in the Layout Band.

   The summary value is added to the group header, or is added to the bottom of a column when no groups are included in the table.
4. Click **Submit** to save the table.

Formatting a table

You can format a table by changing column labels, sorting, and sizing. You can also change data format and the level of detail displayed.

Procedure

1. To add a title to a table, click **Click to add a title** and enter a title.
2. Edit a column header or label.
   a. In the Ad Hoc view pane, right-click the column or group header you want to rename and select **Edit Label**.
   b. Delete the existing name and enter a new name.
3. Resize a column.
   a. In the Ad Hoc view pane, select the column to resize.
   b. Move the cursor to the right edge of the column, click and drag the column to a new position.
4. Add spacing between columns.
   a. In the **Data Source Selection** pane in the **Measures** section, click **Spacer**.
   b. Drag the spacer into the **Columns** box in the Layout Band between the names of the two columns you want to add the spacer to. Repeat until the margins are as wide as needed.
5. Create table margins.
   a. In the **Data Source Selection** pane, click to select **Spacer**.
   b. Drag the spacer into the **Columns** box in the Layout Band, and repeat until the margins are as wide as needed.
   c. Add spacers to the right edge of the table.
6. To reorder a column, in the Ad Hoc view pane, right-click the column to move and select **Move Right** or **Move Left**.
7. Sort a table.
   a. Click  to open the Sort window. If the table is already sorted, the window shows the fields that are used.
   b. To add a field to sort on, double-click the field in **Available Fields**.
   c. Select one or more fields to sort by. Use the Ctrl key to select multiple fields.
   d. To arrange the sorting precedence of the fields, select each field in the Sort window and click  ,  ,  , or  .
   e. Click **OK**.
8. Change the data format for a column.
   a. In the Ad Hoc view pane, right-click the column and select **Change Data Format**.
   b. Select the format that you want to use. Options vary, depending on the type of numeric data contained in the column.
9. To reorder a column, in the Ad Hoc view pane, right-click the column to move and select **Move Right** or **Move Left**.
10. To show or hide detail rows, place the cursor over  and select **Hide Detail Rows** or **Show Details Rows**.

    A summary is applied to each field dependent on its data type, or the complete information for the row is displayed.
11. To control the data set in the grid, click  .
    - **Detailed Data**. Displays table detail only.
    - **Totals Data**. Displays the table totals only.
    - **Details and Totals**. Displays both details and totals data.

Charts

You can select from a number of different chart types, and you can set different levels of aggregation for rows and columns. You can change a field from a column to a row, pivot a chart, hide chart values, and zoom in to see chart details.

Fields and Measures

You must add at least one measure to view a chart. Before any measures are added to the chart, the Ad Hoc Editor displays a placeholder with the legend that displays a single entry to add a measure to continue. As you add measures, the editor displays the grand total of each measure in the chart.

The initial display reflects only the measures you add, it does not change when you add fields or dimensions. For example, for each measure you add to a bar chart, you see a bar with the total value of the measure, regardless of how many fields you add. You can add, remove, and arrange measures and fields without waiting for the display to update. When you have the fields and measures you want, you can use the sliders to select the level of detail you want.

All available fields are listed in the **Data Selection** pane in the Ad Hoc Editor, as either standard fields or measures.

- Standard fields can be added to a column or a row.
- Measures contain summarized values. They are typically numeric fields that determine the length of bars, size of pie slices, location of points (in line charts), and height of areas. They can be added to rows or columns, but must all be in the same target. You can add one or more measures to the chart as columns, or add one or more measures to the chart as rows. You cannot have one measure as a column and another as a row in the same chart.

Chart types

Multiple chart types are available to best represent your information.

- Column. Compares values that are displayed as columns.
- Bar. Compares values that are displayed as bars.
- Line. Compares values that are displayed as points connected by lines.
- Area. Compares values that are displayed as shaded areas.
- Spider. Compares three or more values on a series of spokes. Spider charts can use columns, lines, or areas to display values.
- Dual and Multi-Axis. Displays values using two or more measures.
- Time Series. Compares time intervals that are displayed as points connected by lines.
- Scatter. Compares values as individual points arrayed across both axes of a chart.
- Bubble. Compares three measures that are displayed as circles of varying sizes that are arrayed across both axes of a chart.
- Pie. Compares values that are displayed as slices of a circular graph.
- Range. Displays values as heat and tree maps.

By default, the Ad Hoc Editor creates a column chart. You can select a different type of chart at any time.

Column charts

Column charts compare values that are displayed as columns.

Table 17. Column charts

Name	Description
Column	Multiple measures of a group are depicted as individual columns.
Stacked Column	Multiple measures of a group are depicted as portions of a single column whose size reflects the aggregate value of the group.
Percent Column	Multiple measures of a group are depicted as portions of a single column of fixed size.
Spider Column	Multiple measures of a group are depicted as portions of individual columns along a spoked chart.

Bar charts

Bar charts compare values that are displayed as bars.

Table 18. Bar charts

Name	Description
Bar	Multiple measures of a group are depicted as individual bars.
Stacked Bar	Multiple measures of a group are depicted as portions of a single bar whose size reflects the aggregate value of the group.
Percent Bar	Multiple measures of a group are depicted as portions of a single bar of fixed size.

Line charts

Line charts compare values that are displayed as shaded areas.

Table 19. Line charts

Name	Description
Line	Displays data points that are connected with straight lines.
Spline	Displays data points that are connected with a fitted curve.
Spider Line	Displays data points that are connected with straight lines on a spoked chart.

Area charts

Area charts compare values that are displayed as shaded areas.

Table 20. Area charts

Name	Description
Area	Displays data points that are connected with a straight line and a color below the line; groups are displayed as transparent overlays.
Stacked Area	Displays data points that are connected with a straight line and a solid color below the line. Groups are displayed as solid areas arranged vertically, one on top of another.
Percent Area	Displays data points that are connected with a straight line and a solid color below the line. Groups are displayed as portions of an area of fixed sized, and arranged vertically one on top of each other.
Area Spline	Displays data points that are connected with a fitted curve and a color below the line; groups are displayed as transparent overlays.

Table 20. Area charts (continued)

Name	Description
Spider Area	Displays data points that are connected with straight lines and a solid color between the line and the center of a spoked chart. Groups are displayed as transparent overlays.

Dual and multi-axis charts

Dual and multi-axis charts display values by using two or more measures, that uses one charting type or multiple charting types.

Table 21. Dual and multi-axis charts

Name	Description	Rules
Column Line	Displays leftmost measures as bars, last measure as a line.	• Requires two or more measures • Measures must be placed in the Columns location. • Fields and dimensions can be placed only in the Rows location.
Stacked Column Line	Displays leftmost measures as stacked bars, last measure as a line.	• Requires three or more measures. • Measures must be placed in the Columns location. • Fields and dimensions can be placed only in the Rows location.
Column Spline	Displays leftmost measures as bars, last measure as a spline.	• Requires two or more measures. • Measures must be placed in the Columns location. • Fields and dimensions can be placed only in the Rows location.
Stacked Column Spline	Displays leftmost measures as stacked bars, last measure as a line.	• Requires three or more measures. • Measures must be placed in the Columns location. • Fields and dimensions can be placed only in the Rows location.
Multi-Axis Line	Displays each measure as a separate axis line.	• Requires two or more measures. • Measures must be placed in the Columns location. • Fields and dimensions can be placed only in the Rows location.
Multi-Axis Spline	Displays each measure as a separate axis spline.	• Requires two or more measures. • Measures must be placed in the Columns location. • Fields and dimensions can be placed only in the Rows location.
Multi-Axis Column	Displays each measure as a separate axis column.	• Requires two or more measures. • Measures must be placed in the Columns location. • Fields and dimensions can be placed only in the Rows location.

Time series charts

Time series charts illustrate data points at successive time intervals.

Table 22. Time series charts

Name	Description	Rules
Line	Displays date and time data points connected with straight lines.	• Requires a single date/time field in the Rows location. • Field must be set to the day group function.
Spline	Displays date and time data points connected with a fitted curve.	• Requires a single date/time field in the Rows location • Field must be set to the day group function.
Area	Displays date and time data points connected with a straight line and a color below the line. Groups are displayed as transparent overlays.	• Requires a single date/time field in the Rows location. • Field must be set to the day group function.
Area Spline	Displays date and time data points connected with a fitted curve and a color below the line. Groups are displayed as transparent overlays.	• Requires a single date/time field in the Rows location. • Field must be set to the day group function.

Scatter charts

Scatter charts show the extent of correlation between the values of observed quantities.

Table 23. Scatter charts

Name	Description	Rules
Scatter	Displays the first measure as the x-axis, and the second measure as the y-axis. Other fields and dimensions in the column group become data points.	• Requires exactly two measures. • Measures must be placed in the Columns location.

Bubble charts

Bubble charts show the correlation between three measures, which are displayed as circles.

Table 24. Bubble charts

Name	Description
Bubble	Displays first measure as the x-axis, the second measure as the y-axis, and the third measure determines the size of the circle.

Pie charts

Pie charts display values as slices of a circular graph.

Table 25. Pie charts

Name	Description
Pie	Multiple measures of a group are displayed as sectors of a circle.
Dual Pie	Multiple measures of a group are displayed as sectors of concentric circles.
Semi-Pie	Multiple measures of a group are displayed as sectors of a half-circle.

Range charts

Range charts display values as heat and tree maps.

Table 26. Range charts

Name	Description	Rules
Heat Map	Individual values that are represented as colors.	• One field, followed by one measure, are required in the Columns location. • One field is required in the rows location.
Time Series Heat Map	Individual values across dates/times represented as colors.	• One measure is required in the Columns location. • One Date/Time field is required in the Rows location.
Dual Measure Tree Map	Displays data as color-coded rectangles. The size of each rectangle is proportional to the first measure and the color represents the second measure.	• Two measures are required in the Columns location. • One field is required in the Rows location.
Tree Map	Displays data as rectangles. The size of each rectangle is proportional to the measure of the data it represents. The treemap displays nested rectangles when you have more than one field. The parent rectangle represents the leftmost measure while the nested rectangles represent the current level of aggregation. Click a parent rectangle to drill down to the nest rectangles.	• One measure is required in the Columns location. • One or more fields are required in the Rows location.
Parent Tree Map	Displays data as nested rectangles. The size of each rectangle is proportional to the measure of the data it represents. The nested rectangles represent the current level of aggregation while the larger rectangle represents the parent level in the hierarchy. Click a parent rectangle to drill down to the nest rectangles.	• One measure is required in the Columns location. • Two or more fields are required in the Rows location.

Creating a chart

You insert data into a chart by adding fields as columns or rows. You can set different levels of aggregation for rows and columns.

About this task

Row and column groups are arranged in hierarchies, with the highest member of the hierarchy on the left. You can drag field headings to rearrange the hierarchy. The highest level in a group appears to the left. The lowest level in a group appears to the right.

Procedure

1. In the **Data Selection** pane, select the fields that you want to add as a group. Use the Ctrl key to select multiple fields.
2. Drag your selection into the **Columns** or **Rows** box in the Layout Band.
3. Click **Submit** to save the chart.

Setting levels

When you add a field or dimension to a column or row, a multi-level slider is positioned at the top of the **Filters** pane. The slider is used to set the level of aggregation for viewing data.

About this task

The number of fields or dimensions in the row or column determines the number of levels on the slider. Measures are not represented in the slider.

Note: You cannot adjust levels on time series charts.

Procedure

Use the sliders to set the levels of aggregation for viewing the data.

- The slider reflects the hierarchy of the row or column groups, as determined by the order in which fields are arranged in the Layout Band.
- Hovering over a setting on the slider shows the name of the field or dimension corresponding to that setting.
- When you pivot a chart, slider settings are preserved and applied to the new target. For example, if you have the Row slider set to Month, the Column slider is set to Month when you pivot.
- When you remove the currently selected level from a row or column, the slider is reset to the total. When you remove a field that is not selected, the level remains the same. When you add a field or dimension to a row or column, the number of levels of the slider changes to reflect your addition. When you change the order of the fields in a row or column, the level on the slider changes to reflect the new level of the field corresponding to the selection.

Changing the grouping of data

If your chart includes data based on a date field, you can change the level of aggregation for the time data to select a new unit of time to chart.

Procedure

Right-click on the date field in the Layout Band, and select **Change Grouping**, and select the time period that you want.

Note: Time Series charts can use only day, or smaller, intervals.

Changing the summary function of a measure

You can get a new view of your data by changing the summary function of a measure, for example, from sum to average.

Procedure

Right-click on the measure in the Layout Band, and select **Change Summary Function**, and select the function that you want.

Pivoting

You can pivot a chart to change vertical and horizontal orientation.

Procedure

1. To pivot an entire chart, click  . The row and column groups switch places and slider levels are maintained.
2. To pivot a single row group, right-click it and select **Switch To Column Group**.
3. To pivot a single column group, right-click it and select **Switch To Row Group**.

Formatting a chart

You can control some aspects of how data points, field names, and labels are displayed on your chart

About this task

You can edit many of the properties of a chart when you want more control over the appearance of a chart.

- Displaying and hiding data points.
- Showing a measure name on charts that include only a single measure.
- Restricting the number of labels displayed.
- Rotating the direction of label text.

Displaying data points

You can select whether to display data points in your line, time series, or area chart. Data points can help users visualize chart data more accurately.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Appearance** tab, select **Show data points on line charts**.
4. Click **Apply**, and then click **OK**. The name appears along the value axis.

Displaying the measure name on the Y axis

By default, in charts that include only a single measure, the measure name is not displayed along the Y (or value) axis. You can include a measure name on the value axis to clarify your chart.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.

3. In the **Appearance** tab, select **Show measure name on value axis**.
4. Click **Apply**, and then click **OK**. The name appears along the value axis.

Restricting label display

By default, every field included in your chart is displayed with a label along both axes.

About this task

Measures are displayed as numeric values, often along the Y axis, and fields that are measured display as text along the X axis. On some charts with many fields, labels might overlap or become difficult to read. You can step or reduce the number of labels that are displayed on your chart.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Axis** tab, in the **Interval between X-axis labels** box, specify how often you want the axis label to appear.

   For example, to display every second label, enter `2` or to display every third label, enter `3`.
4. Repeat this process in the **Interval between Y-axis labels** box.
5. Click **Apply**, and then click **OK**.

   Note: To display every label, open the Axis tab and enter `1` in the **Interval between Y-axis labels** and **Interval between X-axis labels** boxes.

Rotating label text

By default, labels on your chart are displayed horizontally.

About this task

Multiple labels or long labels can be difficult to read. You can change the direction of labels, on both the X and Y axes, to improve chart readability.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Axis** tab, in the **Rotation of X-axis labels** box, specify the degree of rotation to apply to labels.

   For example, to rotate labels clockwise 90 degrees, enter `90`, or to rotate labels counterclockwise 90 degrees, enter `-90`.
4. Repeat this process in the **Rotation of Y-axis labels** box.
5. Click **Apply**, and then click **Close**.

   Note: To return the labels to their horizontal position, enter `0` in the **Rotation of X-axis labels** and **Rotation of Y-axis labels** boxes.

Changing advanced formatting

The **Advanced** tab on the Chart Format window gives you more control over the appearance of an ad hoc chart

About this task

You can specify a list of colors for a chart. You can change the position of the legend, and you can choose whether to display data values in a chart. You can find a full list of supported commands by clicking the **More Information** link in the **Advanced** tab

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. Select the **Advanced** tab.
4. Click **Add New Property**.
5. In the **Property** field, enter the chart property that you want to format and then enter the values for the property.

   For example, you can format color, vertical alignment, and data value display properties.

   - To format colors, enter `colors` for the property and a comma-separated list of colors in brackets for the values, such as `[red, blue, green, magenta, purple, black, yellow]`.
   - To change the vertical alignment of the legend, enter `legend.verticalAlign` for the property and `top` or `bottom` or `center` for the value.
   - To display data values on the chart, enter `plotOptions.series.dataLabels.enabled` for the property and `true` for the value.

   Note: Property name or values are not validated. The chart ignores any invalid property that you enter.
6. Click  to save the property formatting.
7. Click **Apply**, and then click **Close**.

   Note: To remove the formatting, open the **Advanced** tab, and click  for the property to remove.

Formatting a chart

You can control some aspects of how data points, field names, and labels are displayed on your chart

About this task

You can edit many of the properties of a chart when you want more control over the appearance of a chart.

- Displaying and hiding data points.
- Showing a measure name on charts that include only a single measure.
- Restricting the number of labels displayed.
- Rotating the direction of label text.

Displaying data points:

You can select whether to display data points in your line, time series, or area chart. Data points can help users visualize chart data more accurately.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Appearance** tab, select **Show data points on line charts**.
4. Click **Apply**, and then click **OK**. The name appears along the value axis.

Displaying the measure name on the Y axis:

By default, in charts that include only a single measure, the measure name is not displayed along the Y (or value) axis. You can include a measure name on the value axis to clarify your chart.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Appearance** tab, select **Show measure name on value axis**.
4. Click **Apply**, and then click **OK**. The name appears along the value axis.

Restricting label display:

By default, every field included in your chart is displayed with a label along both axes.

About this task

Measures are displayed as numeric values, often along the Y axis, and fields that are measured display as text along the X axis. On some charts with many fields, labels might overlap or become difficult to read. You can step or reduce the number of labels that are displayed on your chart.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Axis** tab, in the **Interval between X-axis labels** box, specify how often you want the axis label to appear.

   For example, to display every second label, enter 2 or to display every third label, enter 3.
4. Repeat this process in the **Interval between Y-axis labels** box.
5. Click **Apply**, and then click **OK**.

   Note: To display every label, open the Axis tab and enter 1 in the **Interval between Y-axis labels** and **Interval between X-axis labels** boxes.

Rotating label text:

By default, labels on your chart are displayed horizontally.

About this task

Multiple labels or long labels can be difficult to read. You can change the direction of labels, on both the X and Y axes, to improve chart readability.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
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Changing advanced formatting:

The **Advanced** tab on the Chart Format window gives you more control over the appearance of an ad hoc chart

About this task

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Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. Select the **Advanced** tab.
4. Click **Add New Property**.
5. In the **Property** field, enter the chart property that you want to format and then enter the values for the property.

   For example, you can format color, vertical alignment, and data value display properties.
   - To format colors, enter `colors` for the property and a comma-separated list of colors in brackets for the values, such as `[red, blue, green, magenta, purple, black, yellow]`.
   - To change the vertical alignment of the legend, enter `legend.verticalAlign` for the property and `top` or `bottom` or `center` for the value.
   - To display data values on the chart, enter `plotOptions.series.dataLabels.enabled` for the property and `true` for the value.

   Note: Property name or values are not validated. The chart ignores any invalid property that you enter.

6. Click ✓ to save the property formatting.
7. Click **Apply**, and then click **Close**.

Note: To remove the formatting, open the **Advanced** tab, and click 🗑 for the property to remove.

Formatting a chart

You can control some aspects of how data points, field names, and labels are displayed on your chart

About this task

You can edit many of the properties of a chart when you want more control over the appearance of a chart.

- Displaying and hiding data points.
- Showing a measure name on charts that include only a single measure.
- Restricting the number of labels displayed.
- Rotating the direction of label text.

Displaying data points:

You can select whether to display data points in your line, time series, or area chart. Data points can help users visualize chart data more accurately.

Procedure

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2. Select **Chart Format** to display the Chart Format window.
3. In the **Appearance** tab, select **Show data points on line charts**.
4. Click **Apply**, and then click **OK**. The name appears along the value axis.

Displaying the measure name on the Y axis:

By default, in charts that include only a single measure, the measure name is not displayed along the Y (or value) axis. You can include a measure name on the value axis to clarify your chart.

Procedure

1. In the Ad Hoc View pane, click ⚙ to display the **Canvas Options** menu.
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About this task

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About this task

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- Displaying and hiding data points.
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3. In the **Appearance** tab, select **Show data points on line charts**.
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Procedure

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   - To display data values on the chart, enter `plotOptions.series.dataLabels.enabled` for the property and `true` for the value.

   Note: Property name or values are not validated. The chart ignores any invalid property that you enter.

6. Click ✓ to save the property formatting.
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4. Click **Apply**, and then click **OK**. The name appears along the value axis.

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2. Select **Chart Format** to display the Chart Format window.
3. In the **Appearance** tab, select **Show measure name on value axis**.
4. Click **Apply**, and then click **OK**. The name appears along the value axis.

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About this task

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Rotating label text:

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About this task

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Procedure

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3. Select the **Advanced** tab.
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   For example, you can format color, vertical alignment, and data value display properties.

   - To format colors, enter `colors` for the property and a comma-separated list of colors in brackets for the values, such as `[red, blue, green, magenta, purple, black, yellow]`.
   - To change the vertical alignment of the legend, enter `legend.verticalAlign` for the property and `top` or `bottom` or `center` for the value.
   - To display data values on the chart, enter `plotOptions.series.dataLabels.enabled` for the property and `true` for the value.

   Note: Property name or values are not validated. The chart ignores any invalid property that you enter.
6. Click  to save the property formatting.
7. Click **Apply**, and then click **Close**.

   Note: To remove the formatting, open the **Advanced** tab, and click  for the property to remove.

Formatting a chart

You can control some aspects of how data points, field names, and labels are displayed on your chart

About this task

You can edit many of the properties of a chart when you want more control over the appearance of a chart.

- Displaying and hiding data points.
- Showing a measure name on charts that include only a single measure.
- Restricting the number of labels displayed.
- Rotating the direction of label text.

Displaying data points:

You can select whether to display data points in your line, time series, or area chart. Data points can help users visualize chart data more accurately.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Appearance** tab, select **Show data points on line charts**.
4. Click **Apply**, and then click **OK**. The name appears along the value axis.

Displaying the measure name on the Y axis:

By default, in charts that include only a single measure, the measure name is not displayed along the Y (or value) axis. You can include a measure name on the value axis to clarify your chart.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Appearance** tab, select **Show measure name on value axis**.
4. Click **Apply**, and then click **OK**. The name appears along the value axis.

Restricting label display:

By default, every field included in your chart is displayed with a label along both axes.

About this task

Measures are displayed as numeric values, often along the Y axis, and fields that are measured display as text along the X axis. On some charts with many fields, labels might overlap or become difficult to read. You can step or reduce the number of labels that are displayed on your chart.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Axis** tab, in the **Interval between X-axis labels** box, specify how often you want the axis label to appear.

   For example, to display every second label, enter 2 or to display every third label, enter 3.
4. Repeat this process in the **Interval between Y-axis labels** box.
5. Click **Apply**, and then click **OK**.

   Note: To display every label, open the Axis tab and enter 1 in the **Interval between Y-axis labels** and **Interval between X-axis labels** boxes.

Rotating label text:

By default, labels on your chart are displayed horizontally.

About this task

Multiple labels or long labels can be difficult to read. You can change the direction of labels, on both the X and Y axes, to improve chart readability.

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. In the **Axis** tab, in the **Rotation of X-axis labels** box, specify the degree of rotation to apply to labels.

   For example, to rotate labels clockwise 90 degrees, enter `90`, or to rotate labels counterclockwise 90 degrees, enter `-90`.
4. Repeat this process in the **Rotation of Y-axis labels** box.
5. Click **Apply**, and then click **Close**.

   Note: To return the labels to their horizontal position, enter `0` in the **Rotation of X-axis labels** and **Rotation of Y-axis labels** boxes.

Changing advanced formatting:

The **Advanced** tab on the Chart Format window gives you more control over the appearance of an ad hoc chart

About this task

You can specify a list of colors for a chart. You can change the position of the legend, and you can choose whether to display data values in a chart. You can find a full list of supported commands by clicking the **More Information** link in the **Advanced** tab

Procedure

1. In the Ad Hoc View pane, click  to display the **Canvas Options** menu.
2. Select **Chart Format** to display the Chart Format window.
3. Select the **Advanced** tab.
4. Click **Add New Property**.
5. In the **Property** field, enter the chart property that you want to format and then enter the values for the property.

   For example, you can format color, vertical alignment, and data value display properties.
   - To format colors, enter `colors` for the property and a comma-separated list of colors in brackets for the values, such as `[red, blue, green, magenta, purple, black, yellow]`.
   - To change the vertical alignment of the legend, enter `legend.verticalAlign` for the property and `top` or `bottom` or `center` for the value.
   - To display data values on the chart, enter `plotOptions.series.dataLabels.enabled` for the property and `true` for the value.

   Note: Property name or values are not validated. The chart ignores any invalid property that you enter.

6. Click ✓ to save the property formatting.
7. Click **Apply**, and then click **Close**.

   Note: To remove the formatting, open the **Advanced** tab, and click 🗑 for the property to remove.

Crosstabs

A crosstab (cross-tabulation) is a table that shows the number of occurrences of each of the specified category combinations in your data sample. Crosstabs have different data, layout, and format options than tables or charts.

Available fields are divided into **Fields** and **Measures**. Measures are fields that contain data values. Fields can be added to crosstabs as row groups or column groups. Measures can be added to crosstab rows or columns. You can add one or more measures as columns, or add one or more measures as rows. You cannot have one measure as a column and another as a row in the same crosstab. All available fields for tables are listed in the **Data Source Selection** pane in the Ad Hoc Editor.

Creating a crosstab

You insert data into a crosstab by adding fields. You can group data in hierarchies.

About this task

Row and column groups are arranged in hierarchies. Drag the group headings to rearrange the hierarchy or right-click a heading and select a **Move** option. Rearranging groups might change the preview data in the editor.

Procedure

1. In the **Data Source Selection** pane, select the fields you want to add as a group. Use the Ctrl key to select multiple fields.
2. Drag your selection into the **Columns** or **Rows** box in the Layout Band.
3. Click **Submit** to save the crosstab.

Formatting a crosstab

You can format a crosstab by changing and removing measures, pivoting, excluding group members, merging cells, filtering, and sorting,

About this task

Many of the layout and formatting options that are set manually in tables are set automatically in crosstabs. Row and column sizes are fixed and no spacer is available.

Changing measures

Measure labels are displayed in the crosstab based on their status as a row or column.

About this task

Measures are arranged in cells. You can add any number of measures. All the measures appear together in every cell. To rearrange the measures, drag them in the measure label area.

- Measures that are included as rows appear in the crosstab below the **Measures** heading.
- Measures that are included as columns appear in the crosstab to the right of the **Measures** heading.

Procedure

Right-click a measure in the crosstab to change property of the measure.

- **Change Summary Function**
- **Change Data Format**
- **Remove From Crosstab**
- **Create Filter**
- **Move Up or Move Down**

Pivoting

You can pivot an entire crosstab or you can pivot rows and columns to change vertical and horizontal orientation.

About this task

Pivoting removes any custom sorting applied to headings in your crosstab. It does not affect column or row sorts.

Procedure

1. To pivot an entire crosstab, click  . The row and column groups switch places
2. To pivot a single row group, right-click it and select **Switch To Column Group**.
3. To pivot a single column group, right-click it and select **Switch To Row Group**.

Excluding group members

You can keep or exclude group members in a crosstab.

About this task

You can select multiple row groups or multiple column groups. You cannot exclude by both row groups and column groups.

Procedure

1. To remove all groups except the selected group, right-click a group member and select **Keep Only**.
2. To remove a group, right-click a group member and select **Exclude**.

Summarizing

All row and column groups are summarized automatically. You can turn off group summary.

About this task

The delete summary option is available only for the outermost group on either axis, either the outermost row group or the outermost column group.

Procedure

1. To turn off a group summary, right-click any heading in the group and select **Delete Row Summary** or **Delete Column Summary**.
2. To reapply a summary, right-click the heading and select **Add Row Summary** or **Add Column Summary**.
3. To select the summary function and data format for a measure, right-click the measure label and select a function.
   - **Sum**.
   - **Average**.
   - **Maximum**.
   - **Minimum**.
   - **Distinct Count**. The number of different items in a row or column.
   - **Count All**. The total number of items.

Collapsing and expanding members

By default, each row and column group of a crosstab is displayed in a collapsed state. You can see the totals for the group, but not the measures for its individual members.

About this task

When you collapse a group, its summary is automatically displayed, preventing invalid crosstab layouts in which nothing is displayed for some totals when the summary is deleted.

Collapsing an outer group also collapses its inner groups. The **Expand Members** and **Collapse Members** options are available only for outermost groups, or for inner groups nested in an expanded outer group.

Procedure

1. To see measures for group members, right-click the group label and select **Expand Members**.
2. To collapse group members, right-click the group label and select **Collapse Members**.

Merging cells

By default, cells that contain the same data are merged into a larger, single cell to make the crosstab data easier to read.

Procedure

1. To display all of the individual cells in the crosstab instead of merged cells, place the cursor over  and select **Unmerge crosstab cells**.
2. To merge cells, place the cursor over  and select **Merge crosstab cells**.

Sorting

You can sort a crosstab into ascending or descending order.

About this task

When the crosstab includes more than a single row group or more than a single column group, the inner groups are also sorted according to your selection. Only one measure can be used for sorting at any one time. Changing the sort order for another measure resets all others to the default.

Procedure

Right-click the heading that you want to use for sorting and select a sorting option.

- **Sort Ascending**
- **Sort Descending**
- **Don't Sort**

The crosstab is updated to reflect your sorting option. A blue dot appears in the menu next to the currently applied sort option.

Filtering

You can filter the numeric data that is shown in a crosstab.

About this task

You can filter to show only the rows with the top or bottom N values, where N is a number that you specify. For example, you can filter a crosstab to display only the top 10 values in a column.

Only one measure can be used for filtering at any one time. Changing the filtering or sort order for another measure resets the filtered column.

Procedure

1. Right-click the heading that you want to use for filtering and select a filtering option.
   - **Filter Top N Values**
   - **Filter Bottom N Values**
   - **Don't Filter Values**
2. Enter the number of values you want to show in the crosstab.
3. Select whether to show an aggregate of the unranked values in the crosstab.
4. Select whether to apply the filter across all row groups.
5. Click **OK**. The crosstab is updated to reflect your filter option. The icon appears in the heading when a column is filtered for the top N values. The icon appears when a column is filtered for the bottom N values. A blue dot appears in the menu next to the currently applied filter option.

Formatting a crosstab

You can format a crosstab by changing and removing measures, pivoting, excluding group members, merging cells, filtering, and sorting,

About this task

Many of the layout and formatting options that are set manually in tables are set automatically in crosstabs. Row and column sizes are fixed and no spacer is available.

Changing measures:

Measure labels are displayed in the crosstab based on their status as a row or column.

About this task

Measures are arranged in cells. You can add any number of measures. All the measures appear together in every cell. To rearrange the measures, drag them in the measure label area.

- Measures that are included as rows appear in the crosstab below the **Measures** heading.
- Measures that are included as columns appear in the crosstab to the right of the **Measures** heading.

Procedure

Right-click a measure in the crosstab to change property of the measure.

- **Change Summary Function**
- **Change Data Format**
- **Remove From Crosstab**
- **Create Filter**
- **Move Up or Move Down**

Pivoting:

You can pivot an entire crosstab or you can pivot rows and columns to change vertical and horizontal orientation.

About this task

Pivoting removes any custom sorting applied to headings in your crosstab. It does not affect column or row sorts.

Procedure

1. To pivot an entire crosstab, click  . The row and column groups switch places
2. To pivot a single row group, right-click it and select **Switch To Column Group**.
3. To pivot a single column group, right-click it and select **Switch To Row Group**.

Excluding group members:

You can keep or exclude group members in a crosstab.

About this task

You can select multiple row groups or multiple column groups. You cannot exclude by both row groups and column groups.

Procedure

1. To remove all groups except the selected group, right-click a group member and select **Keep Only**.
2. To remove a group, right-click a group member and select **Exclude**.

Summarizing:

All row and column groups are summarized automatically. You can turn off group summary.

About this task

The delete summary option is available only for the outermost group on either axis, either the outermost row group or the outermost column group.

Procedure

1. To turn off a group summary, right-click any heading in the group and select **Delete Row Summary** or **Delete Column Summary**.
2. To reapply a summary, right-click the heading and select **Add Row Summary** or **Add Column Summary**.
3. To select the summary function and data format for a measure, right-click the measure label and select a function.
   - **Sum**.
   - **Average**.
   - **Maximum**.
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   - **Distinct Count**. The number of different items in a row or column.
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Collapsing and expanding members:

By default, each row and column group of a crosstab is displayed in a collapsed state. You can see the totals for the group, but not the measures for its individual members.

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Procedure

1. To see measures for group members, right-click the group label and select **Expand Members**.
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Merging cells:

By default, cells that contain the same data are merged into a larger, single cell to make the crosstab data easier to read.

Procedure

1. To display all of the individual cells in the crosstab instead of merged cells, place the cursor over  and select **Unmerge crosstab cells**.
2. To merge cells, place the cursor over  and select **Merge crosstab cells**.

Sorting:

You can sort a crosstab into ascending or descending order.

About this task

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Procedure

Right-click the heading that you want to use for sorting and select a sorting option.

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Filtering:

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About this task

You can filter to show only the rows with the top or bottom N values, where N is a number that you specify. For example, you can filter a crosstab to display only the top 10 values in a column.

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Procedure

1. Right-click the heading that you want to use for filtering and select a filtering option.
   - **Filter Top N Values**
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2. Enter the number of values you want to show in the crosstab.
3. Select whether to show an aggregate of the unranked values in the crosstab.
4. Select whether to apply the filter across all row groups.
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You can format a crosstab by changing and removing measures, pivoting, excluding group members, merging cells, filtering, and sorting,

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3. To pivot a single column group, right-click it and select **Switch To Row Group**.

Excluding group members:

You can keep or exclude group members in a crosstab.

About this task

You can select multiple row groups or multiple column groups. You cannot exclude by both row groups and column groups.

Procedure

1. To remove all groups except the selected group, right-click a group member and select **Keep Only**.
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About this task

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Procedure

1. Right-click the heading that you want to use for filtering and select a filtering option.
   - **Filter Top N Values**
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2. Enter the number of values you want to show in the crosstab.

3. Select whether to show an aggregate of the unranked values in the crosstab.
4. Select whether to apply the filter across all row groups.
5. Click **OK**. The crosstab is updated to reflect your filter option. The icon appears in the heading when a column is filtered for the top N values. The icon appears when a column is filtered for the bottom N values. A blue dot appears in the menu next to the currently applied filter option.

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- **Minimum**.
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- **Count All**. The total number of items.

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When you collapse a group, its summary is automatically displayed, preventing invalid crosstab layouts in which nothing is displayed for some totals when the summary is deleted.

Collapsing an outer group also collapses its inner groups. The **Expand Members** and **Collapse Members** options are available only for outermost groups, or for inner groups nested in an expanded outer group.

Procedure

1. To see measures for group members, right-click the group label and select **Expand Members**.
2. To collapse group members, right-click the group label and select **Collapse Members**.

Merging cells:

By default, cells that contain the same data are merged into a larger, single cell to make the crosstab data easier to read.

Procedure

1. To display all of the individual cells in the crosstab instead of merged cells, place the cursor over and select **Unmerge crosstab cells**.
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Sorting:

You can sort a crosstab into ascending or descending order.

About this task

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Procedure

Right-click the heading that you want to use for sorting and select a sorting option.

- **Sort Ascending**
- **Sort Descending**

- **Don't Sort**

The crosstab is updated to reflect your sorting option. A blue dot appears in the menu next to the currently applied sort option.

Filtering:

You can filter the numeric data that is shown in a crosstab.

About this task

You can filter to show only the rows with the top or bottom N values, where N is a number that you specify. For example, you can filter a crosstab to display only the top 10 values in a column.

Only one measure can be used for filtering at any one time. Changing the filtering or sort order for another measure resets the filtered column.

Procedure

1. Right-click the heading that you want to use for filtering and select a filtering option.
   - **Filter Top N Values**
   - **Filter Bottom N Values**
   - **Don't Filter Values**
2. Enter the number of values you want to show in the crosstab.
3. Select whether to show an aggregate of the unranked values in the crosstab.
4. Select whether to apply the filter across all row groups.
5. Click **OK**. The crosstab is updated to reflect your filter option. The icon appears in the heading when a column is filtered for the top N values. The icon appears when a column is filtered for the bottom N values. A blue dot appears in the menu next to the currently applied filter option.

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You can pivot an entire crosstab or you can pivot rows and columns to change vertical and horizontal orientation.

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2. To pivot a single row group, right-click it and select **Switch To Column Group**.
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You can keep or exclude group members in a crosstab.

About this task

You can select multiple row groups or multiple column groups. You cannot exclude by both row groups and column groups.

Procedure

1. To remove all groups except the selected group, right-click a group member and select **Keep Only**.
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Summarizing:

All row and column groups are summarized automatically. You can turn off group summary.

About this task

The delete summary option is available only for the outermost group on either axis, either the outermost row group or the outermost column group.

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1. To turn off a group summary, right-click any heading in the group and select **Delete Row Summary** or **Delete Column Summary**.
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Calculated fields and measures

Create new fields or measures in an Ad Hoc view by applying formulas to a view's existing fields and measures.

For example, consider a view that includes both a **User Email** and a **Log Name** field. Use these fields render specific user emails and the location from which such information is sourced according to the formula you write.

Explore formulas by right-clicking the field or measure name and selecting **Edit**. You can also create tables, charts, or crosstabs to see how these calculations work in views.

Managing the calculated fields and measures dialog boxes

Use the Formula Builder to create calculated fields and measures and configure their summary functions to generate the data that you want.

About this task

Procedure

1. Click **Create** > **Ad Hoc View**
2. Under **Select Data**, select a domain, and click, **Choose Data**.
3. Select a domain or domains, and double-click, drag, or use the direction buttons to move it under **Selected Fields**.
4. Click **OK** after you select the specific domain or domains you want
5. Hover over the drop-down icon, and click **Create Calculated Field** or **Create Calculated Measure** next to either the **Fields** pane or the **Measures** pane of the Data Source Selection window.
6. Work with the **Formula Builder** and **Summary Calculation** tabs.

- Creating calculated field and measure formulas in the Formula Builder tab.

  Use the following fields in the Formula Builder tab to create the formula for your calculated field and measures:

  Formula field box

  a. Edit the formula for calculating your fields and measures by typing directly into the **Formula** field box.
  b. Consider the following when you write your formula:
     - Formulas must use the following syntax:
       - Delineate labels for fields and measures must in double quotation marks ("). For example, `"Customer ID", "Date ordered"`.
       - Surround text with single quotation marks ('). For example, `'--'`.
       - Use single quotation marks for levels ('). For example, `'ColumnGroup'` and `'Total'`. For more information about levels, see "Aggregate functions" on page 120.
     - The following words are reserved and cannot be used as field names unless they are contained as part of a phrase such as `Not Available`:
       - `And`
       - `In`
       - `Not`
       - `Or`
     - Add fields, measures, and functions to your formula by double-clicking them.
     - Click the buttons below the **Formula** field to add operators.

  Operator buttons

  Select the operator buttons to insert the operator in the **Formula** field box. For more information about operators, see "Operators in Ad Hoc views" on page 118.

  Fields and Measures

  Lists all the fields and measures currently in your Ad Hoc view, including any calculated fields or measures that you created.

  Functions

  Lists all the available functions that you can use in your formula. For reference information to use as you create your formula, see "Calculated fields reference" on page 105.

  Function Description box

  Gives a brief description of the function that was selected in the Functions list, if any. The sample inputs are intended to be as descriptive as possible. See "Calculated fields reference" on page 105 for the precise syntax each function requires.

  Show arguments in formula checkbox

  When this check box is selected, double-clicking a function name in the Functions list adds the full description to the formula entry box. When the check box is not selected, double-clicking a function name adds only the function. For example, double-clicking `Round` adds `Round("NumberFieldName", Integer)` when the check box is selected,

and adds `Round()` when the check box is not selected. If you select this check box, you can double-click a string, such as `NumberFieldName`, and replace it by double-clicking a name in the Fields and Measures list.

Validate button
Checks the formula for syntax errors, such as missing parentheses or quotation marks. Your calculated field or measure must be valid before you can create it.

- Configuring the Summary Calculation tab

  Set the default summary function for your calculated field or measure in the Summary tab. Summaries show a result that is applied to all data values. For example, for fields such as **User Email** and **Log Name**, the summary functions returns a count of rows that are associated with your formula. With these fields, you can return user emails that abide by the formula you write and the location from which the requested information comes.

  Configure the **Calculation list** by using the following fields:

  Custom selection
  Displays the same options available in the Formula Builder tab:
  - The formula entry box.
  - Operator buttons.
  - Measures list.
  - The **Validate** button.

  Use these options to build a formula for your custom summary.

  Note: For summaries, you are limited to aggregate functions, which operate on all the values in your field. For example, `Sum` and `Mode` are valid summary functions, because they use all available field values to get a result. `Round` is not a valid summary function because it operates on a single value at a time. For more information about summary calculations, see "Summary calculations" on page 121.

  Weighted Average
  Displays a drop-down list from which you can choose another field or measure to use as the weight for the average.

Managing a calculated field

Apply formulas to existing fields to create custom fields to generate data that you want.

Before you begin

Use the following syntax for formulas:

- Use double quotation marks (") for labels in fields and measures. For example, `"Customer ID"` and `"Date ordered"`.
- Use single quotation marks (') for text. For example, `'--'`.
- Use single quotation marks (') for levels. For example, `'ColumnGroup'` and `'Total'`.

About this task

Create a custom field and its corresponding formula to conduct queries. The following example describes a calculated field and formula.

Procedure

1. Create an Ad Hoc view by clicking **Create** > **Ad Hoc View**.
2. In the **Select Data** wizard, click the **View as tree** icon.
3. From the domain source list, select **Audit Data Repository**, and click **Choose Data** to open the Data Chooser window.
4. In the Data Chooser window, select all of the sources from the source list, and click **OK** to open a new Ad Hoc View.
5. In the Ad Hoc view, hover over the drop-down icon next to **Fields**, and select **Create Calculated Field** from the menu to open the **New Calculated Field** dialog box. The Formula Builder is displayed.
6. Select **Show arguments in formula** if it is not already selected.
7. Enter a name for the field in **Field Name**. For example, `Russ email`.
8. In the **Formula Builder** tab, double-click **User Email** in the **Fields and Measures** list.
9. Double-click **Starts With** in the **Functions** list. The **Formula** box displays the text `"User Email" StartsWith("TextFieldName", 'string expression')`.
10. Edit this text as follows, `StartsWith('User Email', 'rsgo')`.
11. Click **Validate** to verify that the formula does not have any syntax errors. After you validate your formula, you can customize its summary calculation.

Creating a summary calculation

About this task

The Ad Hoc Editor creates a default summary calculation based on the type of formula you enter. Follow this procedure to select a different summary function.

Procedure

1. Click the **Summary Calculation** tab.
2. Select `Mode` from the **Calculation** menu.
3. Click **Create Field**. After you select **Create Field**, a new calculated field appears in bold text at the end of the list of available fields. Calculated fields are designated by special icons.

Planning and testing for calculated fields and measures

Follow an iterative process while you create calculated fields and measures.

Create calculated fields and measures by following an iterative process:

1. Create the necessary number of fields and measures.
2. View the results.
3. Adjust the results as needed.

Use the following practices while you create fields and measures:

- Reduce the size of your working data set to quicken field creation and testing:
  - Select `Sample Data` from the menu in the **Ad Hoc View** toolbar.
  - Create one or more filters. Filters are especially useful for tables, which display all data by default.
  - Limit the number of fields and measures you add to your test reports by reducing the number of summary levels to one or two.
- Create one or more formulas, as described in “Managing a calculated field” on page 103.

- After you create fields and measures, add them to a table or crosstab in your view, and test them to confirm that they generate the wanted output. Edit your fields as needed.

Note the following considerations when you create calculated fields:

- When you create a calculated field, it is listed at the end of the list.
- Calculated fields that use aggregate functions cannot be added to groups, and are not to be used as filters.
- By default, the Ad Hoc Editor supports only two decimal places. If the calculated fields return data that is significant to the third decimal place, add new masking options by editing configuration files.
- You can't delete a calculated field that is in use. Calculated fields that are in use are italicized.
- If the **Ad Hoc View** pane uses a calculated field, remove the calculated field from the **Ad Hoc View** pane, and then delete it from the **Data Source Selection** pane.
- If the calculated field is the basis of another field, you can’t delete it until you delete the one that builds on it.

Calculated fields reference

All functions that can be used to create calculated fields and measures in Ad Hoc views.

For details about supported syntax, see “Calculated field syntax” on page 117. These example functions use the correct syntax but are not necessarily associated with an Ad Hoc view.

Absolute(NumericExpression)

Returns the absolute value of a number or field, that is, the non-negative value of the number.

Examples.

- `Absolute("Transaction Amount")`

  Shows the magnitude of each transaction, regardless of whether the transaction is positive or negative.
- `"Commission Rate" * Absolute("Transaction Amount")`

  Calculates a positive commission on all transactions, regardless of whether the transaction is positive or negative.

Attribute('StringExpression1', ['StringExpression2'])

Given the name of an attribute as the first argument and an optional category as the second argument, `Attribute('StringExpression1', ['StringExpression2' ])` returns the attribute's current value as a string. If a category is specified (`USER`, `TENANT`, or `SERVER`), `Attribute('StringExpression1', ['StringExpression2' ])` returns a categorical attribute. Otherwise, it returns a hierarchical attribute. This value can be cast to a different data type by using one of the casting functions: `Boolean()`, `Date()`, `Decimal()`, `Integer()`, `Time()`, or `Timestamp()`. Confirm that the attribute's format and values work correctly with your Ad Hoc view.

Average(NumericExpression[,'Level'])

Returns the average value of a measure or numeric field, based on an optional level. Null values are not included. For more information, see "Aggregate functions" on page 120.

Example.

- `Average("Salary", 'RowGroup')`

Boolean ('StringExpression')

Casting function that takes a string expression and converts it to a Boolean data type. The string can be any expression that returns a supported string, including a field value or an attribute retrieved with the `Attribute()` function. The `Boolean()` function requires one of the following strings: `true`, `false`, `True`, `False`, `TRUE`, or `FALSE`. Other strings return an error.

Example.

- `Boolean('true'`

Case(Expression, ValueExpression1, ReturnExpression1, ValueExpression2, ReturnExpression2[,..., ValueExpressionN, ReturnExpressionN][,DefaultReturnExpression])

Takes `2N+1` or `2N+2` arguments, which are expressions followed by one or more value expressions or return expression pairs, with an optional final return expression. This function compares the expression in the first argument to each value expression in order of appearance. It also returns the value of the expression immediately following the first value expression that matches. If no expression matches, it returns the final `DefaultReturnExpression`. It is null otherwise. The types of all the return expressions must be compatible. For example, you cannot mix numeric and text return value types.

Example.

- `Case("Shipped by", 1, 'FedEx', 2, 'UPS', 3, 'USPS', 'Unknown')`

CaseRange (NumericExpressionInput, NumericExpression1, ReturnExpression1, NumericExpression2, ReturnExpression2[,..., NumericExpressionN, ReturnExpressionN][,DefaultReturnExpression])

Takes `2N+1` or `2N+2` arguments, which are expressions followed by one or more numeric expressions or return expression pairs, with an optional final return expression. This function finds the first numeric expression that is greater than the input expression and returns the value of the corresponding return expression. If no expression is greater, it returns the final `DefaultReturnExpression`. It is null otherwise.

The types of all the return expressions must be compatible. For example, you cannot mix numeric and text return value types.

Examples.

- `Case("Temperature", 60, 'too cold',  80, 'just right', 'too hot')`
- `CaseRange(CountAll("Shipping charge") % CountAll("Shipping charge" 'Total'), 2.0, 'Less than 2%', 5.0, '2% -  5%', 'More than 5%')`

CaseWhen(BooleanExpression1, ReturnExpression1, BooleanExpression2, ReturnExpression2[,..., BooleanExpressionN, ReturnExpressionN][, DefaultReturnExpression])

Takes `2N` or `2N+1` arguments, one or more pairs of Boolean expressions followed by return expressions, with an optional final return expression. It returns the expression immediately following the first true Boolean expression. If no expression is true, it returns the final `DefaultReturnExpression`. It is null otherwise. This construct is the most flexible.

The types of all the return expressions must be compatible. For example, you can't mix numeric and text return value types.

Examples.

- `CaseWhen("Shipped by" == 1, 'FedEx', "Shipped by" == 2, 'UPS', "Shipped by" == 3, 'USPS', 'Unknown')`
- `Case("Temperature" <= 60, 'too cold', "Temperature" > 80, 'too hot', 'just right')`

Concatenate(TextExpression1[,TextExpression2,...,TextExpressionN])

Combines multiple text strings and fields into a single text field. Text strings are enclosed in single quotation marks. Labels for fields or measures in Ad Hoc are enclosed in straight quotation marks.

Examples.

- `Concatenate('Last Name', ' , ', 'First Name')`
- `Concatenate('Product Category', ' -- ', 'Product Name')`

Contains(TextExpression1 ,TextExpression2])

Boolean function that returns `true` if the first string contains the second and `false` otherwise.

Example.

- `Contains("Product Name", 'Soda')`

CountAll(Expression[,'Level')]

Returns the count of non-null items in a field or measure.

Note: `CountAll` always returns a non-negative integer.

`Level` can be one of the following types.

- `Current` (default)
- `ColumnGroup`
- `ColumnTotal`
- `RowGroup`
- `RowTotal`
- `Total`

Example.

- `CountAll("Transaction Amount", 'RowGroup')`

  Counts the total number of non-null transactions in the specified group.

CountDistinct(Expression[,'Level'])

Returns the distinct count of non-null items in the input. It always returns a non-negative integer.

`Level` can be one of the following types.

- `Current` (default)
- `ColumnGroup`
- `ColumnTotal`
- `RowGroup`
- `RowTotal`
- `Total`

Example.

- `CountDistinct("Customer Name", 'Total')`

  Counts the number of distinct customers.

Date('StringExpression')

Casting function that takes a string expression and converts it to a date data type. The string can be any expression that returns a supported string, including a field value or an attribute retrieved with the `Attribute()` function. The `Date()` function requires a String value that is formatted as `yyyy-MM-dd`. Other strings return an error.

Example.

- `Date('2015-07-17')`

Decimal('StringExpression')

Casting function that takes a string expression and converts it to a decimal data type. The string can be any expression that returns a supported string, including a field value or an attribute retrieved with the `Attribute()` function. The `Decimal()` function requires a String value in decimal format, for example, `'123.45'`. Other Strings return an error.

Example.

- `Decimal('1234.567')`

DayName (DateExpression)

Given a date field, `DayName (DateExpression)` returns a text field with the name of the day of the week.

Examples.

- `DayName("Open Date")`

  Displays the day of the week on which a store was opened.

- `Mode(DayName("Open Date"), 'Total')`

The day of the week on which the most stores were opened.

DayNumber (DateExpression)

Numeric field that returns the day of the month from a date field.

Example.

- `DayNumber("Open Date")`
  Displays the day of the month on which a store was opened.

ElapsedDays (DateExpression1, DateExpression2)

Calculates the number of days that elapsed between two date fields that contain time values.

Example.

- `ElapsedDays ("Date shipped","Date required")`

ElapsedHours (DateTimeExpression1, DateTimeExpression2)

Calculates the number of hours that elapsed between two date fields that contain time values.

Example.

- `ElapsedHours ("Date shipped","Date required")`

ElapsedMinutes (DateTimeExpression1,DateTimeExpression2)

Calculates the number of minutes that elapsed between two date fields that contain time values.

Example.

- `ElapsedMinutes ("Date shipped","Date required")`

ElapsedMonths (DateTimeExpression1,DateTimeExpression2)

Calculates the number of months that elapsed between two date fields that contain time values.

Example.

- `ElapsedMonths ("Date shipped","Date required")`

ElapsedQuarters (DateExpression1, DateExpression2)

Calculates the number of quarters that elapsed between two date fields.

Example.

- `ElapsedQuarters ("Date shipped","Date required")`

ElapsedSeconds (DateTimeExpression1,DateTimeExpression2)

Calculates the number of seconds elapsed between two date fields that contain time values.

Example.

- `ElapsedSeconds ("Date shipped","Date required")`

ElapsedSemis (DateExpression1,DateExpression2)

Calculates the number of semi-years that elapsed between two date fields.

Example.

- `ElapsedSemis ("Date shipped","Date required")`

ElapsedWeeks (DateExpression1,DateExpression2)

Calculates the number of weeks that elapsed between two date fields that contain time values.

Example.

- `ElapsedWeeks ("Date shipped","Date required")`

ElapsedYears (DateExpression1,DateExpression2)

Calculates the number of years between two date fields.

Example.

- `ElapsedYears ("Date shipped","Date required")`

EndsWith(TextExpression1, TextExpression2]

Boolean value that returns `true` if the first text input ends with the string that is specified in the second input and `false` otherwise.

Example.

- `EndsWith("Product Name", 's')`

IF (BooleanExpression, ExpressionWhenTrue[, ExpressionWhenFalse])

Given a Boolean field or calculation as the first argument, this function returns the second argument if it returns a value of `true`. Optionally, it returns the third argument if it returns a value of `false`. It returns `null` if the first argument is null.

`ExpressionWhenFalse` must be the same type as `ExpressionWhenTrue`. For example, if `ExpressionWhenTrue` is a date, `ExpressionWhenFalse` must be a date in the same format. If `ExpressionWhenFalse` is not set, then a false result returns a null value.

You can create a `BooleanExpression` under the following conditions:

- Using the following comparison operators.
  - `"=="`
  - `"!="`
  - `">"`
  - `">="`
  - `"<"`
  - `"<="`

- Using any functions that return Boolean values such as `StartsWith`, `EndsWith`, `IsNull`, and `Contains`
- Using the following logical operators.
  - `and`
  - `or`
  - `not`

When dates are used in comparisons or the IF function, they must be the same type:

- Date only
- Date and time
- Time only

Verify that you are using the correct modifier when using date constants in comparisons:

- `d`
- `ts`
- `t`

Example.

- `IF(Contains("Product Name", 'Soda'), 'Yes', 'No')`

  Uses the `Contains` function to see whether the product name contains the string, `Soda`. If it does, the field value sets to `Yes`.

Integer('StringExpression')

Casting function that takes a string expression and converts it to an integer data type. The string can be any expression that returns a supported string, including a field value or an attribute retrieved with the `Attribute()` function. The `Integer()` function requires a string value that can be read as an integer, such as '123'. Other strings return an error.

Example.

- `Integer('123')`

IsNull(Expression)

Boolean that returns `true` if the field value is null and false otherwise.

Example.

- `IsNull("First Name")`

Length(TextExpression)

Given a text string, `Length(TextExpression)` returns its length. Null values return null.

Example.

- `Length("First Name")`

Max (NumericExpression|DateExpression[,'Level'])

Returns the maximum value that is reached by the specified field or calculation.

`Level` can be one of the following types.

- `Current` (default)
- `ColumnGroup`
- `ColumnTotal`
- `RowGroup`
- `RowTotal`
- `Total`

For more information, see "Aggregate functions" on page 120.

Example.

- `Max("Salary")`

Median (NumericExpression|DateExpression[,'Level'])

For an odd number of values, returns the middle value after all values are listed in order. For an even number of values, returns the average of the middle two values. For example, if a field has only five instances, with values 1,1,3,10,20, the median is 3.

`Level` can be one of the following types.

- `Current` (default)
- `ColumnGroup`
- `ColumnTotal`
- `RowGroup`
- `RowTotal`
- `Total`

Example.

- `Median("Salary")`

Mid (TextExpression,Integer1,Integer2)

Given a text string, `Mid (TextExpression,Integer1,Integer2)` returns the sub string that starts at `Integer1` with length `Integer2`.

Example.

- `Mid("Phone", 1, 3`

Extracts the area code of an American phone number that starts with a 3-digit area code.

Min (NumericExpression|DateExpression[,'Level'])

Returns the minimum value that is reached by the specified field or calculation based on an optional level.

`Level` can be one of the following types.

- `Current` (default)
- `ColumnGroup`
- `ColumnTotal`
- `RowGroup`
- `RowTotal`
- `Total`

Example.
- `Min("Salary")`

Mode (Expression[,'Level'])

Returns the most frequent value that is reached by the specified input, based on an optional level. For example, if a field has only five instances with values 1,2,2,4,5, the mode is 2.

`Level` can be one of the following types.
- `Current` (default)
- `ColumnGroup`
- `ColumnTotal`
- `RowGroup`
- `RowTotal`
- `Total`

Example.
- `Mode (DayName ("Order Date",RowGroup))`

  Returns the day of the week on which the most orders were placed for each row group.

MonthName (DateExpression)

Returns a text field with the name of the month.

Example.
- `MonthName ("Order Date")`

  Returns the day of the week on which the most orders were placed for each row group.

MonthNumber (DateExpression)

Returns the number of the month, where January is 1 and December is 12. Null values return null values.

Example.
- `MonthNumber ("Order Date"))`

PercentOf (NumericExpression[,'Level'])

Returns the value as a percent of total for the specified level. Null values are ignored.

`Level` can be one of the following types.

- `Total` (default)
- `ColumnGroup`
- `ColumnTotal`
- `RowGroup`
- `RowTotal`

Note: Calculated fields that use the `PercentOf` function are not be used as filters. If `PercentOf` is used as a filter, then the total percent might not be `100`.

Example.

- `PercentOf("")`

Range (NumericExpression[,'Level'])

The difference between the largest and smallest values of an input.

Example.

- `Range("Salary",'ColumnGroup')`

Rank (NumericExpression)

Returns the position of each value relative to the other values after all the values are listed in order. For example, the first ten in sales are the first ten in rank. Null values are ignored.

Example.

- `Rank("Store Sales")`

Round (NumericExpression[,Integer])

Rounds a number to a specified number of digits. The default value is zero (0) digits. Decimal values greater than 0.5 are rounded up to the next largest whole number, and values less than 0.5 are rounded down.

Example.

- `Round("Sales")`

StartsWith(TextExpression1, TextExpression2]

Boolean that returns true if the first text input starts with the string that is specified in the second input. This function returns false otherwise.

Example.

- `StartsWith("Product Name", 'Q')`

StdevP (NumericExpression[,'Level'])

Standard deviation based on the entire population, which is taken over the values at the specified (optional) level. Null values are excluded.

`Level` can be one of the following types.

- `Current` (default)
- `ColumnGroup`

- ColumnTotal
- RowGroup
- RowTotal
- Total

Example.
- StdevS("Sales",'RowTotal')

StdevS (NumericExpression[,'Level'])

Standard deviation based on a sample that is taken over the values at the specified level. Null values are excluded.

Level can be one of the following types.
- Current (default)
- ColumnGroup
- ColumnTotal
- RowGroup
- RowTotal
- Total

Example.
- StdevS("Sales",'RowTotal')

Sum (NumericExpression[,'Level'])

The sum of all values in the range. Null values are excluded.

Level can be one of the following types.
- Current (default)
- ColumnGroup
- ColumnTotal
- RowGroup
- RowTotal
- Total

Example.
- Sum("Sales",'RowGroup')

Time('StringExpression')

Casting function that takes a string expression in the format 'HH:mm:ss.SSS' and converts it to a Time data type. The string can be any expression that returns a valid string, including a field value or an attribute retrieved with the Attribute() function.

Example.
- Time('17:12:33:147')

Timestamp('StringExpression')

Casting function that takes a string expression in the format `'yyyy-MM-dd HH:mm:ss.SSS'` and converts it to a `Timestamp` data type. The string can be any expression that returns a valid string, including a field value or an attribute retrieved with the `Attribute()` function.

Example.

- `Timestamp('2015-07-17 17:12:33:147')`

Today (Integer)

Calculates the date that is the specified number of days from the current system date.

Examples.

- `Today(0)`
  Current system date.
- `Today(1)`
  Day after the current system date.
- `Today(-1)`
  Day before the current system date.

WeightedAverage (NumericExpression1,NumericExpression2,'Level')

Returns the weighted average for the first input that is weighted against the second input, which is calculated at an optional level. Null values are excluded.

`Level` can be one of the following types.

- `Current` (default)
- `ColumnGroup`
- `ColumnTotal`
- `RowGroup`
- `RowTotal`
- `Total`

Examples.

- `WeightedAverage ("Price","Units", 'Current')`
  Extended price based on the number of units.
- `WeightedAverage ("Price","Units", 'RowGroup')`
  Sum of the extended price for all units in the row group.

Year (DateExpression)

Given a date field, returns the year.

Example.

- `Year("Order Date")`

Calculated field syntax

Calculated field syntax guidelines

Follow the following syntax guidelines when you create calculated fields in Ad Hoc views.

- To reference a text string, use single quotation marks ('). For example, `'Text String'`.
- To reference a field label, use double quotation marks ("). For example, `"Ad Hoc Label"`.
- To reference date constants, indicate the date type as part of the syntax:
  - To reference a date without time data, use `d` followed by single quotation marks ('). Use the following format: `yyyy-dd-mm`. For example, `d'2014-06-10'`.
  - To reference a date with day and time data, use `ts` followed by single quotation marks ('). If you use `ts` and enter the date information only, the time is automatically set to `00:00:00`. Use the following format: `yyyy-dd-mm hh:mm:ss`. For example, `ts'2014-06-10 01:30:00'`.
  - To reference a date with time data only, use `t` followed by single quotation marks ('). Use the following format: `hh:mm:ss)`. For example, `t'01:30:00'\`.
  - To reference a date field label, use double quotation marks ("). For example, `"Ad Hoc Date Field Label"`.

Note: The following are reserved words and cannot be used as field names regardless of the case unless they are part of a phrase such as `Not Available`:

- `And`
- `In`
- `Not`
- `Or`

When dates are used in comparisons or the `IF` function, they both need to be one of the following types:

- Date only
- Date and time
- Time only

Make sure to use the correct modifier when you use date constants in comparisons:

- `d`
- `ts`
- `t`

The argument name in the function descriptions for calculated fields describes the type of input the function accepts as described in "Calculated fields reference" on page 105:

`BooleanExpression`

Any expression that takes on Boolean values, including the label of a Boolean field or measure, a Boolean calculation, or a Boolean value.

Note: You can create a `BooleanExpression` by using the following elements:

- Comparison operators.

- `==`
- `!=`
- `>`
- `>=`
- `<`
- `<=`
- `in`

- Functions that return Boolean values.
  - `StartsWith`
  - `EndsWith`
  - `IsNull`
  - `Contains`
- Logical functions.
  - `AND`
  - `OR`
  - `NOT`

DateExpression
Any type of date or time stamp values, including the label of a date field or measure, or a calculation that returns dates.

DateTimeExpression
Date expressions that contain time values, including the label of a date field or measure, or a calculation that returns dates. These values are also known as time stamp values.

Expression
Any valid date, date and time, numeric, or string expression.

NumericExpression
Numeric values, including the label of a numeric field or measure, or a calculation that returns numbers.

TextExpression
Text values, including the label of a text field or measure, or a text string.

Level For aggregate functions, specifies the set of values that are used to compute the calculation. Possible values for `Level`:

- `Current` (not available for `PercentOf`)
- `ColumnGroup`
- `ColumnTotal`
- `RowGroup`
- `RowTotal`
- `Total`

For more information, see "Aggregate functions" on page 120.

Operators in Ad Hoc views

A number of operators are supported for calculated fields in Ad Hoc views.

Operators in calculated fields are evaluated in the order that they are shown in the following table.

Table 27. Supported operators for calculated field creation in Ad Hoc views

Operator	Syntax	Description
multiply, divide	`i * j / k`	Arithmetic operators for numeric types only.
percent	`i % j`	Calculates i as a percent of j for numeric types only.
add, subtract	`i + j - k`	Arithmetic operators for numeric types only.
equal	`i == j`	Comparison operators for string, numeric, and date types.
not equal	`i != j`	Comparison operators for string, numeric, and date types.
less than	`i < j`	Comparison operators for numeric and date types only.
less than or equal	`i <= j`	Comparison operators for numeric and date types only.
greater than	`i > j`	Comparison operators for numeric and date types only.
greater than or equal	`i >= j`	Comparison operators for numeric and date types only.
IN set	`i IN ('apples','oranges')`	Sets can be of any type.
IN range	`i IN (j:k)`	Ranges must be numeric or date types.
NOT	`NOT( i )`	Boolean operators. Parentheses are required for `NOT`.
AND	`i AND j AND k`	Boolean operators. Parentheses are required for `NOT`.
OR	`i OR j OR k`	Boolean operators. Parentheses are required for `NOT`.
parentheses	`()`	Used for grouping.

Note: The following are reserved words and cannot be used as field names unless they are part of a phrase such as `Not Available`.

- `And`
- `In`
- `Not`
- `Or`

When dates are used in comparisons or the `IF` function, they both need to be one of the following types:

- Date only
- Date and time
- Time only

Make sure to use the correct modifier when you use date constants in comparisons.

- d
- ts
- t

Aggregate functions

Use aggregate functions when you create calculated fields so they complete calculations based on groups of rows, rather than on single rows.

Instead of using Sum or Average for a single value, take the sum or average over a row or column group or over the total set. In many cases, aggregate functions in the Ad Hoc Editor are analogous to SQL functions that can be used with the GROUP BY clause in a SELECT statement. Aggregate functions include the following values:

- Average
- CountAll
- CountDistinct
- Max
- Median
- Min
- Mode
- PercentOf
- Range
- StdDevP
- StdDevS
- Sum
- WeightedAverage

Because aggregate functions already operate on groups, their use is restricted in the following ways:

- You can use aggregate functions only in calculated measures. Do not use aggregates to create non-measure fields.
- You cannot add an aggregate function to a group.
- Only AggregateFormula, Custom, or None are supported as summary calculations for aggregate functions. A Custom summary option appears in the **Change Summary** menu only if you defined a custom function in the **Create Calculated Field** dialog box.

Levels in aggregate functions

Many aggregate functions accept an optional level to specify the grouping of the aggregate. A level that is used in an aggregate must be enclosed in straight quotation marks ('), for example, 'RowGroup'. Available levels include the following options:

Current
Default. Use the current value for detail rows in a table view.

RowGroup
Use the parent values from a row location.

RowTotal
Use the grand total value from a row location.

ColumnGroup
Use the parent values from a column location.

ColumnTotal
Use the grand total value from a column location.

Total Use the grand total value from a cross tab and the `RowTotal` from a table.

Summary calculations

Summary calculations are aggregate functions that are used for subtotals and totals. Summary calculations can be set in the Domain Designer or in the Ad Hoc view.

In Ad Hoc table views, each field displays a single summary calculation. The summary calculation is automatically applied to all groups in the table. Summaries appear at the end of each group, and at the end of the view. When a new group is added, it includes a summary for each column.

In Crosstabs, each measure displays a summarized value. Summaries determine the values of the Totals at the intersection of each row and column.

In Charts, the type of chart determines whether measures are summarized. If summaries are used, they determine the size or location of the graphical elements that represent your data.

For dual pie charts, the summary function for the field needs to be `Sum` or `CountAll`. Dual pie charts with other summary functions might give unexpected results. You can change the summary calculation of most measures.

By default, the fields of each data type are summarized as shown in the following table.

Table 28. Default summary functions in calculated fields

Default Summary Calculation	Data type	Description
`Sum`	Numeric	Displays the sum of all values in the set.
`CountAll`	Date	Displays the total number of values in the set.
`CountAll`	String	Displays the number of values in the set.
`CountAll`	Boolean	Displays the number of values in the set.
`AggregateFormula`	Aggregate	For a calculated field that uses an aggregate function, Aggregate types use the same aggregate formula as the summary.
`None`	Combined	For a calculated field that combines an aggregate function with a non-aggregate function, the summary calculation is null.

Select from the following options to set a measure's summary function in any type of view.

Table 29. Summary function options

Function	Meaning	Available for
`AggregateFormula`	For a calculation that uses an aggregate function, uses the same aggregate formula as the summary.	Aggregate
`Average`	Displays the average of all values in the set.	Numeric
`CountAll`	Displays the number of rows in the set.	• Boolean • Date • Numeric • String
`CountDistinct`	Displays the number of unique values in the set.	• Boolean • Date • Numeric • String
`Custom`	You can enter an aggregate calculation for the summary. The `Custom` summary option is only available for calculated fields and measures in the Ad Hoc Editor. It is not available for Domains.	• Aggregate • Date • Numeric
`Max`	Displays the highest value in the set.	Date and Numeric
`Median`	Displays the median value of the set.	Date and Numeric
`Min`	Displays the lowest value in the set.	Date and Numeric
`Mode`	Displays the value that occurs most frequently in the set.	• Boolean • Date • Numeric • String
`None`	The aggregate function is null. No summary function displays.	• Aggregate • Boolean • Date • Numeric • String
`Range`	Displays the difference between the minimum and maximum values of the set.	Numeric

Table 29. Summary function options (continued)

Function	Meaning	Available for
RangeDays	Displays the difference in days between the minimum and maximum values of the set.	Date
RangeHours	Displays the difference in hours between the minimum and maximum values of the set.	DateTime
RangeMinutes	Displays the difference in minutes between the minimum and maximum values of the set. Displays the difference in minutes between the minimum and maximum values of the set.	DateTime
RangeMonths	Displays the difference in months between the minimum and maximum values of the set.	Date
RangeQuarters	Displays the difference in quarters between the minimum and maximum values of the set.	Date
RangeSemis	Displays the difference in semi-annual periods between the minimum and maximum values of the set.	Date
RangeWeeks	Displays the difference in weeks between the minimum and maximum values of the set	Date
RangeYears	Displays the difference in years between the minimum and maximum values of the set.	Date
Aggregate Formula	Uses the aggregate formula that is used to define the calculated field as the summary function and sets the appropriate level for the context.	Aggregate
StdDevP	Displays the standard deviation for the population of the set.	Numeric
StdDevS	Displays the standard deviation on a sample for the set.	Numeric
Sum	Displays the grand total for the set.	Numeric

Table 29. Summary function options (continued)

Function	Meaning	Available for
`WeightedAverage`	Displays the weighted average for the set, based on a second numeric field or expression. Only available for calculated fields and measures in the Ad Hoc Editor, and not available for Domains.	Numeric

Note: Be aware of the following points when you use summaries:

- The calculation is shown in parentheses after the field name when you complete the following actions:
  - Choose a field.
  - Select a summary calculation other than the default.
- In Ad Hoc views, the following outcomes can occur when you create a calculated field or measure with the following types of summary calculations:
  - If you create a custom summary calculation for a field or measure, **Custom** is available on the **Change Summary Function** menu for that field. It is not available otherwise.
  - If you create a `WeightedAverage` summary calculation for a field or measure, `WeightedAverage` is available on the **Change Summary Function** menu for that field. It is not available otherwise.
- You can remove summaries by setting the summary function to **None**.
- Only `AggregateFormula`, `Custom`, or `None` are supported as summary calculations for aggregate functions. The `Custom` summary option appears in the **Change Summary** menu only if you define a custom function in the **Create Calculated Field** dialog box.

Filters

Domains (and domain topics) can be filtered to restrict the data that is returned.

Domains (and domain topics) can be filtered by selecting fields in the domain and specifying comparison values. The filters can be configured for users to select the data to include.

You can define filters in the Ad Hoc Editor regardless when you are working with data from a domain or a topic. Filters can be helpful in improving the initial performance of an ad hoc view by reducing the amount of data the view returns by default.

Filters can be defined at three levels.

- In the Domain Designer.
- When a view is created from a domain (using the Data Chooser). For information on defining filters in the Data Chooser, see Defining a filter.
- In the Ad Hoc Editor.

Creating a filter in the Ad Hoc Editor

You can limit the data that is returned by using filters. You can also control how and what filters are applied to a field or fields by using custom expressions.

Procedure

1. In the **Data Source Selection** pane, right-click the field that you want to add a filter to and select **Create Filter** to open a new filter in the Filters pane.
2. Use the fields in the filter to change its value. Depending on the data type of the field you selected, the filter can be multi-select, single-select, or text input.
3. Click and select **Minimize All Filters** or **Maximize All Filters** to toggle expansion of the items in the filter.
4. Click ▼ to hide filter details, click ▶ to display filter details.
5. Click the **Select All** check box in the Filters pane to select all values currently available in the data set.

   The **Select All** check box does not appear in the Filters pane for numbers and dates.

   Note: Using the **Select All** check box does mean that all values are selected each time that the report is run. The **Select All** check box helps you to quickly select all the values currently available in the data set. To ensure that all values appear in the view whenever it is edited or a report is run, remove the filter.

   In the Filters pane, you can also create a filter by right-clicking a column in a table. On the **Chart** tab, you must right-click the field in the Data Source Selection pane.

   When you change a filter, the new value is used to determine what data to display. If you change only the operator in a filter, you must clear the value in that filter, then reselect it to apply the updated filter.

Creating a relative date filter

You can filter information in your view based on a date range relative to the current date of your service environment.

About this task

You use a date-based filter, and a text expression that describes the relative date or date span that you want to display, using the format `<Keyword>+/-<Number>` where:

- `Keyword` indicates the time span that you want to use. Options include, DAY, WEEK, MONTH, QUARTER, SEMI, and YEAR.
- `+` or `-` indicates whether the time span occurs before or after the chosen date.
- `Number` indicates the number of the above-mentioned time spans you want to include in the filter.

For example, if you want to look at values for the prior week, your expression would be `WEEK-1`.

Procedure

1. Create a filter based on a date field. For information about creating a filter, see “Creating a filter in the Ad Hoc Editor” on page 124.
2. In the first text box, enter an expression that describes the relative date or date span you want to display.
3. In the second text box, enter the date that you want to base your filter on.

   For example, if you want to display all values for one month before the current date, enter `MONTH-1` in the first text entry box, and enter today's date in the second box.

Note: When you right-click a group member in a crosstab and select **Keep Only** or **Exclude**, you create complex filters. When you create a filter against an inner group, the filter that appears might be created as a complex filter. You cannot edit a complex filter, but you can remove it. Complex filters also appear in the Ad Hoc Editor if a data chooser filter was created and locked.

Creating a custom filter

You can apply greater control over the data displayed by applying a custom expression

About this task

When you create multiple filters, they are connected with an implicit AND operator by default. The data that is displayed in your table, chart, or crosstab is what remains after all your filters are applied. You can use a more complex custom expression that includes nested AND, OR, and NOT operators, and multiple filters applied to a field.

Note: Custom filters are applied to views, but filter details do not appear on previews or on the report that is generated from that view.

Procedure

1. Create two or more filters for your data.

   You can create standard field-based filters, or **Keep Only** and **Exclude filters**. For information about creating a filter, see "Creating a filter in the Ad Hoc Editor" on page 124.
2. Expand the **Custom Filter Expression** section, in the Filters pane.
3. In the text box, enter a filter expression using the letter designations, and including the operators that you need.
   - `AND`. Narrows your results and includes only fields that meet the criteria of both filters before and after the operator.
   - `OR`. Broadens your results and includes fields that meet the criteria of either filter before or after the operator.
   - `NOT`. Excludes results that match the criteria.
   - Parentheses combine multiple filters into a single item in the expression.

   Note: Filter letter designations are case-sensitive, and must be uppercase.
   For example, a user might want to view failed logins of greater than 5 for postal code areas in specific states. In this example a user has a table with three columns.
   - State, Postal Code, and Failed Logins

   The following filters are defined:
   - A. State equals NY
   - B. Postal Code starts with 100
   - C. State equals PA
   - D. Postal Code starts with 190
   - E. Failed logins is greater than 5

   The following custom expression is created:
   - ((A and B) or (C and D)) and E
4. Click **Apply**.

Your view is updated to reflect the newly applied filter criteria. You can add another filter to the expression or you can remove one already included in the expression.

Tutorials

Tutorials are available to help you understand how to use reports. Tutorials consist of modules that focus on helping you accomplish specific goals.

Tutorial: Creating a view of service request approvals

This tutorial teaches you how to create an ad hoc view of service approvals.

Ad hoc views are used to specify the data that you want to include in a report. The view that you create in this tutorial includes the following information.

- date the requests were made.
- users that approve the requests.
- users that make the requests.
- services the approvals are for.

Learning objectives

In this tutorial, you learn to do the following tasks.

- Create an ad hoc view.
- Pre-filter data in the view.
- Select fields to include in the view, represented in a table.
- Generate a report from the view, and filter data for more granulated data analysis.

Time required

15 minutes. If you explore other concepts that are related to this tutorial, it might take longer to complete.

The order of lessons

This tutorial contains three lessons. Complete them in order.

Lesson 1: Creating a view and pre-filtering data

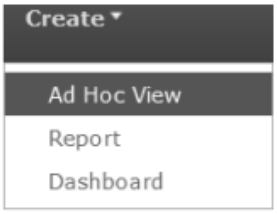
This lesson shows you how to create a view by selecting the data source, fields, and pre-filters.

About this task

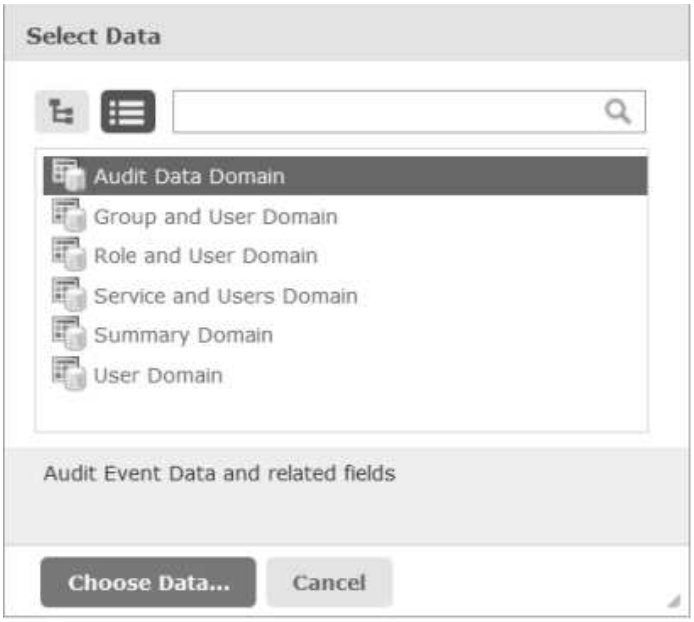
You select data source (domain) and the fields that you want to include in a view. Pre-filtering data limits the data choices that are available. The pre-filter is applied and only data that satisfies all defined pre-filters appears in the final report.

Procedure

1. Select **Create** > **Ad Hoc View**.

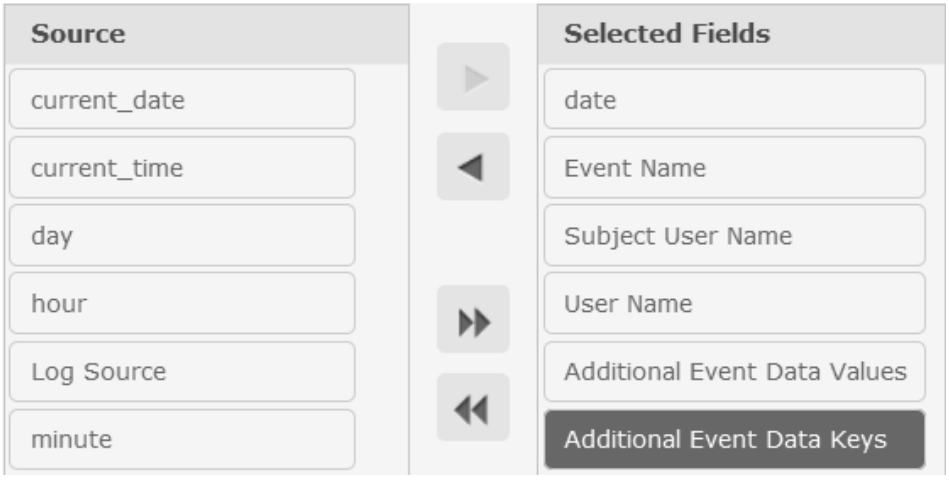


2. Select the **Audit Data Domain**.



The audit data domain contains Cloud Identity Service audit data for users, groups, and services.

3. Click **Choose Data** to open the Data Chooser window.



4. Click **Fields**  to select data to include in the report.

Select the following fields:

- **date**. The date the event occurred, this field is used to show the date that the user was approved for the service.

- **Event Name**. The name of the event, this field is used to filter the report to show only approver user request events. For more information on events and event data, see "Audit events" on page 38.
- **Subject User Name**. The user name of the user that is the subject of the event, this field is used to show the name of users whose requests are approved.
- **User Name**. The user name of the user who is the agent (initiator) of the event, this field is used to show the names of the managers that approved user requests.
- **Additional Event Data Values**. Values for additional data, this field is used to show the names of services.
- **Additional Event Data Keys**. Additional data that is associated with an audit event, this field is used to filter the report to show only service names for approver user request events.

5. Click **Pre-filters** 

to select fields to limit the data by an event and by data that is associated with the event.

   Double-click the following fields to select them as pre-filters:
   - **Event Name**. Select **equals**, select the `APPROVE_ADD_USER_TO_SERVCE` event, and select **Locked**. Click **OK**.
   - **Additional Event Data Keys**. Select **equals**, select the event data key `service_name`, and select **Locked**. Click **OK**.

   Note: When the **Locked** check box is selected, the filter is not available to users that run the report.

6. Click **OK** to close the Data Chooser window.

Lesson 2: Selecting report fields and changing column labels

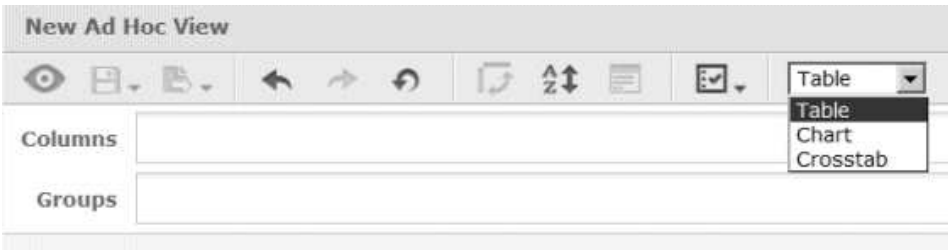
This lesson shows you how to select the fields that you want to include in reports that are generated for the view.

About this task

You select the fields and specify the column order. You rename columns to be more meaningful.

Procedure

1. Select **Table** and **Sample Data**.

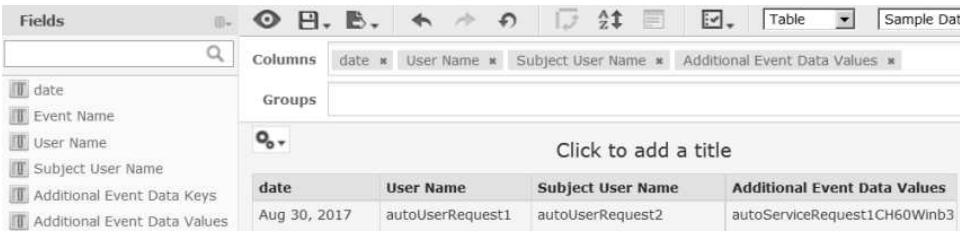


   Tip: Sample data limits the amount of data in the view, but still gives you a clear idea of the data that is returned by the report. Loading full data might be time-consuming while you are designing your view.

2. Select fields for the report columns by clicking and dragging the fields from the **Fields** panel to the **Columns** box.

   Select the following fields:

   - **date**
   - **User Name**.
   - **Subject User Name**.
   - **Additional Event Data Values**.



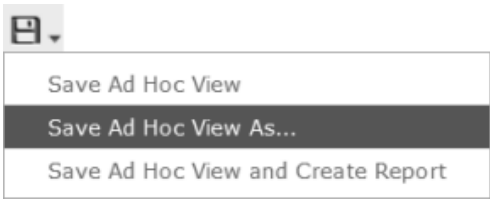
3. Click **Click to Add Title** to enter a meaningful title for the report.

4. Rename the columns so that they are more meaningful. To rename a column, right-click the column and select **Edit Label**.

   Rename the following columns:

   - **User Name**. Approving manager.
   - **Subject User Name**. User approved.
   - **Additional Event Data Values**. Service name.

5. Select **Save Ad Hoc View As** to save the view.



6. Enter a name and description for the view, select a location and click **Save**.

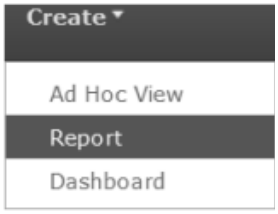
You are limited to locations accessible to your user profile.

Lesson 3: Running a report, and using report filters

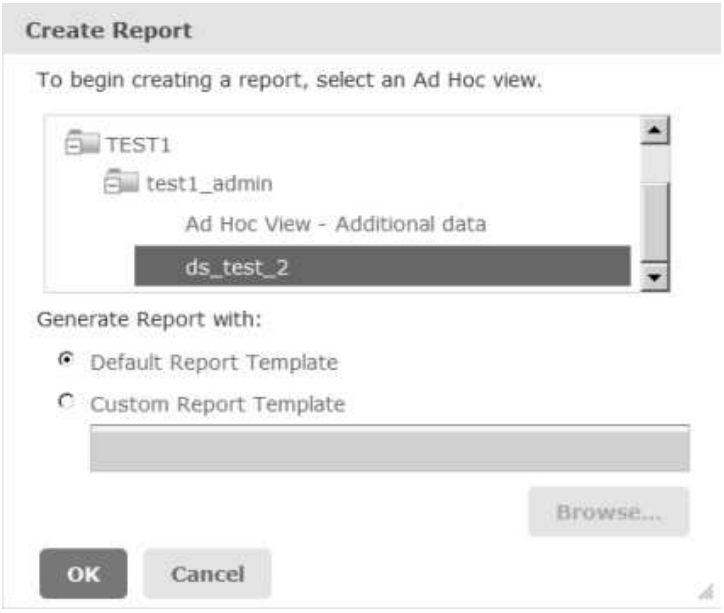
This lesson shows you how to generate a report from the view you created, and how to apply filters to view a subset of the data.

Procedure

1. Select **Create** > **Report**.



2. Select the ad hoc view to base the report on. Browse to and select the ad hoc you created.



a. Browse to and select the ad hoc view you created.
b. Select **Default Report Template**, and click **OK**.

The report is displayed.

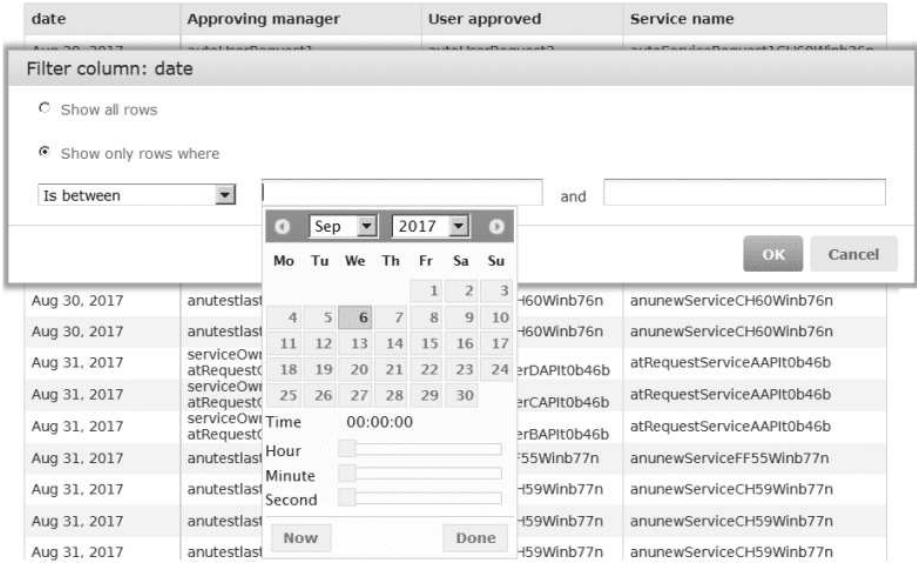
Service approvals

date	Approving manager	User approved	Service name
Aug 30, 2017	autoUserRequest1	autoUserRequest2	autoServiceRequest1CH60Winb
Aug 30, 2017	autoUserRequest1	autoUserRequest2	autoServiceRequest1CH59Winb
Aug 30, 2017	autoUserRequest1	autoUserRequest2	autoServiceRequest1CH60Winb
Aug 30, 2017	autoUserRequest1	autoUserRequest2	autoServiceRequest1CH59Winb
Aug 30, 2017	anutestlastname1CH59Wint	anutestlastCH59Winb76n	anunewServiceCH59Winb76n
Aug 30, 2017	anutestlastname1CH59Wint	anutestlastCH59Winb76n	anunewServiceCH59Winb76n
Aug 30, 2017	anutestlastname1CH59Wint	anutestlastCH59Winb76n	anunewServiceCH59Winb76n
Aug 30, 2017	anutestlastname1CH60Wint	anutestlastCH60Winb76n	anunewServiceCH60Winb76n

3. Filter and sort the report to better analyze the data.
   a. Filter the **Service name** column to show approved requests for only one service
   b. Right-click the **Service name** column and select the **Column filters** icon.

   c. Select **Show only rows**, enter the name of the service and click **OK**.

d. Similarly, filter the **date** column to show approved requests between specific dates.



e. Sort the **date** column to show the most recent approvals first, by right-clicking the column and selecting the **Sort descending** icon.

4. To save the changes to the report, select **Save** or **Save As**.

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