

PUBLIC

SAP Lumira, desktop edition
Document Version: 1.31 – 2016-09-22

SAP Lumira, desktop edition User Guide

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1 About SAP Lumira

SAP Lumira Desktop is an application you can use to visualize and create stories about data. From manipulating, editing, formatting, and refining data to creating visualizations that represent data graphically, to finally sharing the visualizations—building stories in SAP Lumira starts and ends with data.

Data enters the application as a dataset (a set of columns, hierarchies, and filters) that you use to build a document. You create a dataset by acquiring data, enhance it with measures, hierarchies, calculations, and customized columns, and then choose charts to visualize the data. You can use the visualization to create stories that provide a graphical narrative to describe data. For example, you can group charts on a story page to create a presentation-style dashboard and then add images and text annotations.

You can publish datasets and stories to other applications and platforms, including the following places:

- SAP HANA
- SAP BusinessObjects Business Intelligence platform
- SAP Lumira, server for teams (previously called SAP Lumira Team Server and SAP Lumira, Edge edition)

SAP Lumira is installed locally and can use remote or local data from one or multiple data sources. The charts you build are saved automatically and can be printed or shared via email.

2 Getting started with SAP Lumira

Use SAP Lumira to create charts or stories that you can keep private or share with others.

You can switch between the following activities as needed to fine-tune your chart or story:

- Acquire data as a dataset.
- Prepare and enrich data for visualizations.
- Visualize data as charts and stories.

Acquire data as a dataset

Acquiring data involves the following process:

- Create a document to be the container for your data and visualizations.
- Connect to the data source that contains the data to be visualized.
- Acquire the data to create a dataset.

You can extend a dataset by merging or appending it with other compatible datasets. One document can contain multiple datasets.

Acquired datasets appear in the *Prepare* room.

Prepare and enrich data for visualizations

To make it easier to visualize data and to make the data more relevant to your charting and story telling needs, you can clean up and enrich your data. Enriching data means adding semantic value to your dataset by creating measures, hierarchies, and customizing columns.

Visualize data as charts and stories

In the *Visualize* room, choose from a variety of charts for the best chart to visualize your data. The enriched elements in the dataset allow you to plot meaningful relationships and to explore data trends in a purely graphical environment.

In the *Compose* room, create stories with charts, pictograms, input controls that filter data, text, shapes, and images to describe your data.

Related Information

[Acquiring data \[page 22\]](#)

[Prepare room—viewing, cleaning, manipulating, and sharing data \[page 54\]](#)

[Creating hierarchies \[page 64\]](#)

2.1 Navigating SAP Lumira's Home page

The *Home* page allows you to work on existing documents or to create visualizations using sample data.

When you start SAP Lumira you can start working immediately from the *Home* page, performing tasks such as creating or opening a dataset, using the samples that are shipped with the product, and so on.

To start working on an existing document or use the demo samples, click any one of the icons in the side bar to gain quick access to the following application components and resources:

Table 1:

Side bar	When clicked...	
Home	Gives you access to learning resources, for example video tutorials and the SAP Lumira website. If you are connected to the internet at startup, the <i>Home</i> page also has a live information feed about SAP Lumira customer solutions and news to help you develop your experience with your data, visualizations, and stories.	
My Items	Documents	Opens a list of all locally stored documents. Double-click a document name to open the dataset and associated visualizations.
	Visualizations	Opens a list of all locally stored visualizations. Double-click a visualization name to open the chart and its associated dataset.
	Datasets	Opens a list of all of the locally stored datasets. A dataset is the set of columns, hierarchies, and filters used to build a document. Datasets are stored in the SAP Lumira application Documents folder in in your profile path. Double-click a dataset name to open.
	Stories	Opens a list of all of the locally stored stories. Double-click a story to open its dataset and associated visualizations.
Server for teams	Allows you to upload documents to SAP Lumira Team Server for secure sharing with team members.	
SAP BI Platform	Opens an SAP Lumira document from the SAP BusinessObjects Business Intelligence platform.	
Hadoop HDFS	Allows you to download data from Apache Hadoop.	
Connections	Allows you to view locally defined connections and change data source for local connections.	
Try with Samples	Opens a list of sample documents and locally installed MS Excel data sources that you can use as learning materials.	

Related Information

[Acquiring data \[page 22\]](#)

[Prepare room—viewing, cleaning, manipulating, and sharing data \[page 54\]](#)

2.2 Opening a dataset

A dataset is a set of columns, hierarchies, and filters used to create a document. It does not contain any visualizations.

Context

Datasets are stored in the `Documents` folder whose location is defined in your profile path for SAP Lumira.

Procedure

1. On the *Home* page, select **▶ My Items > Datasets ▾**.
A list of available datasets appears.
2. Double-click a dataset, and enter your credentials if it is necessary to connect to a data source.
The document that contains the dataset is opened.

i Note

If you modify your dataset, the changes will be saved in your document even if you do not edit the document. If you have more than one document that uses the same data source and dataset, the dataset will appear twice in the list of datasets.

You can view the dataset in the *Prepare* room and visualizations saved in the document in the *Visualize* room.

2.3 Creating a document

You can connect to a data source and store the acquired dataset in a new `.LUMS` document.

Context

Each SAP Lumira document contains:

- One or more datasets
- Connection parameters for data sources if any of the sources are relational database management systems (RDBMS)
- Charts built from datasets
- Stories that describe data using charts, text, navigation points, and images

Procedure

1. On the *Home* page, select **File > New**.

→ Tip

You can also select *Create New Document* or select **My Items > Documents > + New Document** from the left-hand menu.

2. In the *Add new dataset* dialog, select a data source type from the *Select a Source* column or a recently used data source from the *All Recently Used* column and select *Next*.
3. Select a source file or enter the data source connection details and select *Create*.

The dataset is imported into the document.

i Note

If you select *Connect to SAP HANA* as a data source, only the metadata is imported into your document.

Results

A new document is created and opened in the SAP Lumira room you select as default. When you save the document, you will be prompted to provide a document name, location, and description.

Next Steps

You can now create a visualization from your dataset. You can use the *Prepare* room to prepare your dataset.

Related Information

[Acquiring data \[page 22\]](#)

[Prepare room—viewing, cleaning, manipulating, and sharing data \[page 54\]](#)

2.4 Saving a document to a local directory

When you save a document locally, your dataset, visualizations, and stories are added to the document.

Procedure

1. Select **File > Save As**, and select *Local* in *Save Options*.
2. Enter a name, location, and description for the document or select a name from the list, and select *Save*.

Note

If you modify your dataset, the changes will be saved in your document even if you do not edit the document. If you have more than one document that uses the same data source and dataset, the dataset will appear twice in the list of datasets.

Results

The document is saved locally.

Restriction

Documents saved in older versions of SAP Lumira or SAP Lumira, server for teams can be opened in newer versions of the application, but documents created in newer versions may not open correctly in older versions. You may publish a new document to a server with older software, but the server must be updated for the document to open properly.

Related Information

[Saving a document to the SAP Business Intelligence platform \[page 15\]](#)

2.5 Saving a document to SAP Lumira, server for teams

SAP Lumira, server for teams is a lightweight document storage solution for environments that do not have SAP HANA or the SAP BusinessObjects Business Intelligence platform. When you save a document to SAP Lumira, server for teams, your dataset, visualizations, and stories can be shared with a small number of collaborators.

Prerequisites

- Ensure that SAP Lumira, server for teams is installed and running on your network.
- Configure the URL to SAP Lumira, server for teams in SAP Lumira by selecting **File** > **Preferences** > **Network**.
- Enter the email address for each user or group that you want to share the document with.

→ Tip

For best results, use the same version of SAP Lumira and SAP Lumira, server for teams. If the two versions are different, some features may not be available.

⚠ Restriction

When you share a saved document, you must use the SAP Lumira, server for teams web interface to revoke a user's permissions. If you save the same document more than once, each time specifying permissions for a different user, both users will receive permissions.

Procedure

1. Select **File** > **Save As**, and select *Server for teams* in *Save Options*.
2. If prompted for credentials, select *Enterprise*, *WinAD*, or *SAP* from the *Authentication Type* list.
3. Type your username and password. If you selected *SAP* authentication, type the SAP system and client number.

➔ Tip

Unless the default settings of SAP Lumira, server for teams had been changed, your username is your email address. If you want SAP Lumira to remember your password, select the [Save password](#) check box.

4. Select [Connect](#).

If you log into SAP Lumira, server for teams for the first time and the versions of SAP Lumira and SAP Lumira, server for teams are different, a message is displayed, warning that some features may not be available.

5. Choose save options for the document, and select [Save](#).

i Note

If you leave the [Share with](#) option blank, you will be the only person who can view or edit the document.

Results

The document is saved to SAP Lumira, server for teams, and a copy is saved locally.

i Note

After the document is saved, the launchpad can refresh its datasets if refreshing is enabled on the server.

⚠ Restriction

Documents saved in older versions of SAP Lumira or SAP Lumira, server for teams can be opened in newer versions of the application, but documents created in newer versions may not open correctly in older versions. You may publish a new document to a server with older software, but the server must be updated for the document to open properly.

Related Information

[Upgrading from SAP Lumira Trial Edition \[page 200\]](#)

2.6 Saving a document to the SAP Business Intelligence platform

When you save a document to the SAP BusinessObjects Business Intelligence platform, you can take advantage of authorization, auditing, data loss prevention, and sharing functions for your dataset, visualizations, and stories.

Prerequisites

- Ensure that BI platform 4.1 SP3 or later is installed and running on your network.
- Configure the URL to the BI platform in SAP Lumira by selecting **File > Preferences > Network**.
- To view items on the BI platform, ensure that SAP Lumira, server for BI Platform with the same version as SAP Lumira is installed.

i Note

If a message indicating that the versions are different is displayed, contact your BI platform administrator.

Procedure

1. Select **File > Save As** and select *SAP BI Platform* in *Save Options*.
2. If prompted, enter your credentials.

i Note

In this release, you can publish a document or log onto SAP Lumira, server for BI Platform from Lumira desktop using the operating system SSO. However, ensure that you have configured the SSO on SAP Lumira server for BI Platform environment and Both Lumira Desktop and SAP Lumira server for BI Platform reside on the same machine.

3. Choose the authentication type and select *Connect*.

i Note

If you select *SAP* as the authentication type, enter the *SAP System* and the *SAP Client*.

4. Choose save options for the document, and select *Save*.

Results

The document is saved to the BI platform repository.

i Note

When you save a dataset, a visualization, or a story, the document and all of its contents are saved.

Related Information

[Setting application preferences \[page 196\]](#)

[Upgrading from SAP Lumira Trial Edition \[page 200\]](#)

2.7 Opening a document, visualization, dataset, or story

You can open local items such as documents, visualizations, datasets, and stories, or items saved to SAP Lumira, server for teams, or SAP BusinessObjects Business Intelligence platform.

Prerequisites

To be able to open a non-local item, you must configure the URL to SAP Lumira, server for teams, or the Business Intelligence platform in SAP Lumira by selecting **File > Preferences > Network**.

i Note

You must have appropriate rights to view and edit documents that you or other people own.

Procedure

1. On the left-hand menu of the [Home](#) page:
 - To open a local item, select [Documents](#), [Visualizations](#), [Datasets](#), or [Stories](#).
 - To open a document from SAP Lumira, server for teams, select [Server for teams](#), enter your credentials, and select [Connect](#).

→ Tip

Unless the default settings of SAP Lumira, server for teams had been changed, your username is your email address.

- To open a document from the BI platform, select *SAP BI Platform*, enter your credentials, select the *Authentication Type*, and select *Connect*. When you are connected, select the appropriate folder from the BI platform repository.

Note

The SAP BusinessObjects BI add-on for SAP Lumira must be installed and the BI platform must be version 4.1 SP3 or later.

A list of available items appears.

2. To open an item, double-click it.
3. If the document requires a data source, enter your credentials and select *OK*.

Results

The document opens in the *Visualize* room. You can view datasets in the *Prepare* room, visualizations in the *Visualize* room, and stories in the *Compose* room.

Restriction

Documents saved in older versions of SAP Lumira or SAP Lumira, server for teams can be opened in newer versions of the application, but documents created in newer versions may not open correctly in older versions. You may publish a new document to a server with older software, but the server must be updated for the document to open properly.

2.8 Example: Visualizing orders by type and time of day

I have an online retail store and want to answer the question “How do the number and type of orders vary by time of day? How does the time of year (June versus December) affect this pattern?”

This example shows what you need to do in the *Prepare*, *Visualize*, and *Compose* rooms to answer this question.

Note

This example uses data in datetime format. Datetime format is currently supported only for data acquired from SAP HANA.

Getting data ready in the Prepare room

Select *Prepare* at the top of the application to switch to the *Prepare* room.

Let's start by looking at some data. To keep things simple, assume the data contains only these columns:

- Order Date (datetime)
- Order ID (number)
- Product Type (string)

MEASURES 1		Order Date	Order ID	Product Type
 Order ID	Sum	14	123	ABC
DIMENSIONS 3		12/31/2013	43466	Accessories
 Order Date		2/19/2015	43541	Equipment
123	Order ID	9/7/2014	43304	Men's clothing
ABC	Product Type	12/22/2014	43274	Women's clothing

1. The first step is to create an *Hour* column. Let's create this column using a calculated dimension based on the *Order date* column:

1. Select the  icon next to the *Order date* dimension, then select *Create Calculated Dimension*.
2. Select `Hour()` from the *Functions* list (you can search for it rather than scrolling), and add it to the *Formula* pane. On Windows, this requires a double-click.
3. Move the `{Order Date}` parameter inside the `Hour()` function - keep the `{ }` brackets.
4. Name the new dimension and select *OK*.



New Calculated Dimension

Dimension Name

Formula

Dimensions

Functions

Hour(<time>)

2. Next, create a column for the month. Repeat the previous step using the `Month()` function instead of the `Hour()` function.
3. Change the aggregation of Order ID from *Sum* to *Count (Distinct)*. We don't want to plot the total number of orders – instead, we want to see how many orders were placed in each hour of the day.
 1. Select the  icon next to the Order ID measure.
 2. Select **Change Aggregation** > *Count (Distinct)*.



The Order ID measure now calculates the total number of unique orders.

The data preparation is finished, and we can move to the *Visualize* room to create the charts.

Creating charts in the Visualize room

Select *Visualize* at the top of the application to switch to the *Visualize* room.

We will create the following charts:

- Sales by hour and type for June.
- Sales by hour and type for December.

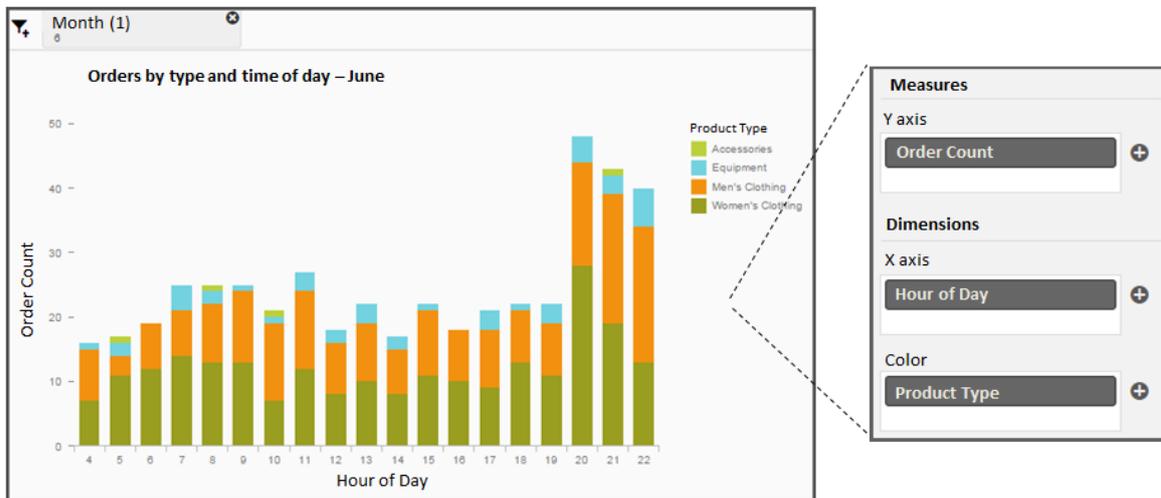
1. Select  next to the Visualization Gallery (near the bottom of the application) to add a new chart.
2. Select *Stacked Column Chart*  from the *Visualization Tools* panel.
3. Drag the following measures and dimensions from the *Measures and Dimensions* panel (on the left) to the shelves in the *Visualization Tools* panel.

Table 2:

Item	Shelf
Order ID (Select Order ID from the <i>Measures</i> panel)	<i>Y axis</i>
Hour (The calculated measure that you created using the <code>Hour ()</code> function).	<i>X axis</i>
Product Type	<i>Color</i>

4. Add a filter:
 1. Select  in the filter bar (near the top of the application).
 2. Select the Month dimension that you created using the `Month ()` function.
 3. Select 6 (for June).
5. Change the title to *Orders by type and time of day – June*.
Select the  icon next to the default title, select *Rename*, and enter a new title.
6. If you want, you can change the name of the measure and dimension used in the visualization. This will change the axis labels. (I changed *Hour* to *Hour of day* and *Order ID* to *Order Count*.)

Select the  icon next to the measure or dimension, select *Rename*, and enter a new name.



- Repeat the previous steps to make another chart for December. When creating the filter, select 12 (December) for the month.

You can duplicate the existing chart to get started. In the visualization gallery, select  on the previous chart, then select *Duplicate*.

We have created two charts:

- *Orders by type and time of day - June*
- *Orders by type and time of day - December*

We can now move to the *Compose* room and create the story.

Using charts to create a story in the Compose room

Select *Compose* at the top of the screen to switch to the *Compose* room. We will create a story that compares orders by type and time of day, for the months of June and December.

- In a new story, select one of the visualizations from the *Content Panel* and drag it to an area on the story page.
- Select the second visualization and drag it to the same story page.
- Arrange the visualizations on the page, and edit the visualization properties to format the story the way you want.

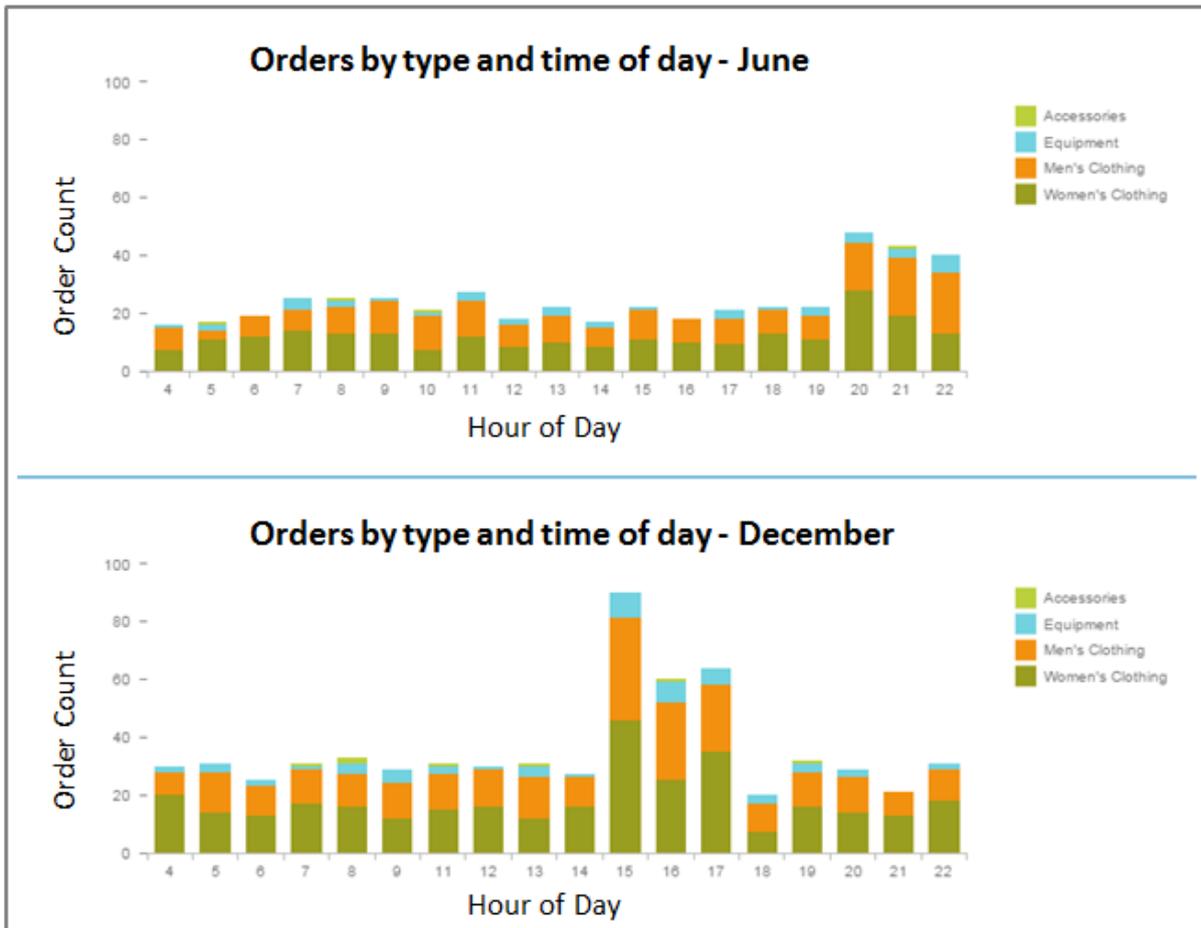
I did the following:

- Selected *expand*  in each visualization to expand it to the maximum width of the page.
- Turned off *Optimized Chart Alignment* in *Visualization Properties* to give the visualizations a little more room.
- Adjusted the vertical axis so both charts used the same scale. Select *Vertical Axis* in *Visualization Properties*, then adjust the *Axis Value Scale*.

➔ Tip

If you can't see the *Visualization Properties* panel, select a visualization on the story page. You may have to double-click it several times.

With my data, the final story looked like this:



3 Acquiring data

You acquire data by copying it from a data source to a local dataset.

When acquiring data, the application displays a preview of it, parses the data, and analyzes the columns to determine the data type. Objects representing columns are proposed as either dimensions or measures. You can manually hide some types of columns, based on the column name and data properties.

i Note

The maximum number of cells that can be acquired is determined by the capacity of your computer. You will be warned when an acquisition includes 30 million cells for 64-bit operating systems or 15 million cells for 32-bit operating systems.

Depending on the data source, data can be adapted before acquisition to include or remove columns, dimensions, measures, variables, and input parameters. Some data sources have additional options, such as formatting data, naming and trimming columns, and specifying column-name prefixes.

Table 3: Supported data sources

Data source	Description
Microsoft Excel	Loads an Excel worksheet as a dataset
Text file	Loads a text file (.csv or .txt) as a dataset
Clipboard	Creates a dataset from data that was copied to the clipboard
SAP HANA	Downloads data from SAP HANA (offline)
	Connects to SAP HANA (online)
SAP BusinessObjects universe	Downloads data from SAP BusinessObjects universe files (.unv and .unx)
Query with SQL	Runs freehand SQL on a database, to download a dataset
Hadoop	Downloads data from Apache Hadoop.
SAP BW	<ul style="list-style-type: none">• Accesses data through views in SAP HANA• Downloads data from SAP BusinessObjects universe files (.unx)• Downloads data from SAP BW (available when the "Download data from SAP Business Warehouse" extension is installed)

i Note

For some online data sources; for example the [Connect to SAP HANA](#) data source, data is not acquired as a dataset and saved in a document. Instead, the data is accessed from the server, and only metadata is saved in the document.

After a dataset is acquired, you can add or remove columns, dimensions, measures, and variables in it.

Related Information

[Acquiring data from a text file \[page 26\]](#)

[Acquiring data from SAP HANA views \[page 29\]](#)

[Acquiring data from an Excel workbook \[page 24\]](#)

[Acquiring data using Query with SQL \[page 38\]](#)

[Connecting to a universe data source \[page 36\]](#)

[Editing an acquired dataset \[page 49\]](#)

[Objects hidden from the object list \[page 51\]](#)

[Download data from SAP Business Warehouse extension \[page 183\]](#)

[SAP Universe Query Panel extension \[page 179\]](#)

3.1 Viewing a data source connection and its associated documents

You can view all connections defined for the application, and the documents associated with each connection, and change the target data source for locally defined connections.

Procedure

1. Close any open documents.
2. From the left-side menu, select *Connections*.
The *CONNECTIONS* pane appears on the right and lists all available data source connections. Select a connection to display a list of documents associated with it. The *DOCUMENT FOR* pane appears to the right of the *CONNECTIONS* pane and lists the documents associated with each connection.
3. Select a local connection in the list to display its target data source.
You can select another data source if required.
4. (Optional) To change the data source connection for a document, perform the following actions:
 - a. Select the connection to change.
 - b. Select the document to change the data source for in the *DOCUMENT FOR* pane.
 - c. Select a new data source for the document in the *CONNECTIONS* pane, and select *Apply*.

i Note

In this release, while acquiring the dataset you can edit BW connection locally in SAP Lumira Desktop. However, you can view these connections when you start SAP BW.

3.2 Acquiring data from an Excel workbook

Procedure

1. On the *Home* page, select *Create New Document*.
2. In the *Add new dataset* dialog, select *Microsoft Excel*, and select *Next*.
3. Choose one or more Excel files, and select *Open*.
Data from the Excel files is previewed in the *Add new dataset* dialog.
4. (Optional) Modify the Excel options for acquiring data.
5. Select *Create*.

Results

The *Visualize* room opens so you can start building charts and analyzing the data. If you want to modify the dataset first, switch to the *Prepare* room.

3.2.1 Add new dataset dialog options for Excel

You can acquire data from one or multiple Microsoft Excel workbooks. You choose which rows and columns to acquire. You can also acquire data from cross tables.

Table 4: Add new dataset dialog options for Excel

Option	Description
<i>Dataset Name</i>	Enter a name for the new dataset.
<i>File(s)</i>	Select the Excel workbooks that will be the data source for the new dataset.
<i>Sheet</i>	When an Excel workbook contains multiple worksheets, select the worksheet to acquire for the dataset.
<i>Append all sheets</i>	Select this check box to add all worksheets in the workbook to the dataset. Common columns are appended, and different columns are added as new columns.
<i>Set first row as column names</i>	Select this check box to set the first row values in the worksheet as column names in the dataset.
<i>Table Header Type</i>	Select <i>Standard Table (No Transformations)</i> or <i>Cross Table</i> .

Option	Description
Select All	Select this check box to add all columns in the worksheet to the dataset.
Show record count	Select this check box to show the number of columns and the number of rows in the dataset.
▶▶ Advanced Options ▶ Show hidden columns ▶	Select this check box to display hidden worksheet columns as column headers in the dataset.
▶▶ Advanced Options ▶ Show hidden rows ▶	Select this check box to display hidden worksheet rows in the dataset.
▶▶ Advanced Options ▶ Detect merged cells ▶	Select this check box to highlight merged worksheet cells in the dataset.
▶▶ Advanced Options ▶ Range Selection ▶	When a worksheet contains one or more named ranges, select the range to apply to columns acquired for the dataset. A dataset is restricted to the columns defined in this range.
▶▶ Advanced Options ▶ Column ▶	For cross tables, specify the number of columns to use for the left header.
▶▶ Advanced Options ▶ Row ▶	Specify the number of rows to use for the top header.

3.2.2 Acquiring data from multiple Excel workbooks

When acquiring data from multiple Excel workbooks, the data format and data type must be the same in all of the workbooks.

Procedure

1. On the *Home* page, select *Create New Document*.
2. In the *Add new dataset* dialog, select *Microsoft Excel*, and select *Next*.
3. Choose one or more Excel files, and select *Open*.
Data from the Excel files is previewed in the *Add new dataset* dialog.
4. (Optional) In the *Dataset Name* box, enter a name for the dataset.
5. Beside *File(s)*, select *Add Files*, and browse to and select the Excel spreadsheet to acquire data from.
You can use wild cards to search for a spreadsheet name. By default, the first file in the path is considered the reference file to which data will be appended from other spreadsheets acquired.
For example, enter **C:\data\monthly updates*.xls(x)** to find all .xls(x) files in the path.
6. In the *Sheet* list, select a worksheet.

This worksheet is the reference sheet that data from other worksheets will be appended to. The count of records is updated to reflect the number of records from all acquired data. A "Source file" column is added to the dataset, listing each data source name. If you selected the *Append all sheets* check box, all worksheets in the Excel spreadsheet are added to the dataset.

Data from the worksheet appears in the preview pane of the *Add new dataset* dialog.

7. (Optional) To display hidden worksheet rows or columns in the dataset, select *Advanced Options*.
8. (Optional) To display hidden worksheet columns in acquired data, select the *Show hidden columns* check box, and enter the column range to display in the *Range Selection* list.
9. (Optional) To display hidden worksheet rows in acquired data, select the *Show hidden rows* check box, and enter the row range to display in the *Range Selection* list.
10. Select *Create*.

Results

The data is acquired and appears in the *Prepare* room.

3.3 Acquiring data from a text file

You can acquire data from one or more text files, if the data is stored with delimiters or in fixed-width columns. An example of a text file using delimiters is a comma-separated value (.csv) file.

Context

A .csv file stores numbers and text in plain-text format. Each record consists of fields usually separated by a comma or a tab, and records are separated by line breaks. Here is an example of a .csv file, with data separated by commas:

```
"Product","Country","Year","Quantity","Margin"  
"Skis","Italy","2013","1,297","1,929"  
"Computers","China","2014","609","10,659"
```

Acquiring data from this .csv file results in five columns in the dataset: "Product," "Country," "Year," "Quantity," and "Margin." Column 2, in this example, would contain the values "Country", "Italy", and "China".

Here is an example of a text file with the data stored in fixed-width columns:

Product	Country	Year	Quantity	Margin
Skis	Italy	2013	1,297	1,929
Computers	China	2014	609	10,659

You can acquire data from multiple-file data sources. The files must have the same format and data type.

Table 5: Add new dataset dialog options for text files

Option	Description
<i>Dataset Name</i>	The name of the dataset
<i>File(s)</i>	The file or files that contain the data for the new dataset. You can import data from one or multiple files. To specify multiple files, separate the file paths in the <i>File(s)</i> field with semicolons, or select <i>Add Files</i> and choose one or more files to add to the selection.
<i>Separator</i>	Choose whether data in your files is separated by delimiters or is entered in fixed-width columns. Delimiters are symbols, such as commas, tabs, or spaces, that separate fields in the data source and that will specify columns in the dataset in SAP Lumira.
<i>Set first row as column names</i>	Select this check box to use the first row of data as column names in the dataset. Clear this check box to use the default column names ("Column1", "Column2", and so on).
▶ <i>Advanced Options</i> ▶ <i>Number format</i> ▶	The format for numeric columns in the dataset
▶ <i>Advanced Options</i> ▶ <i>Date format</i> ▶	The format for date columns in the dataset
▶ <i>Advanced Options</i> ▶ <i>Break Column</i> ▶	When acquiring data stored as fixed-width columns, analyze the data file and suggest column widths (in characters) for separating data into columns in the dataset. If the suggested widths aren't suitable, you can change the widths by entering values separated by commas. For example, if your data is in three columns and the column widths are five, 10, and 15 characters, you would enter 5, 10, 15 in the <i>Break Column</i> box, and select <i>Apply</i> to see a preview of the resulting dataset.
▶ <i>Advanced Options</i> ▶ <i>Trim leading spaces</i> ▶	Select this check box to remove leading and trailing values from numbers and text in the dataset so that column headers do not appear as empty fields. For example, if a "Product" entry has a leading space (" Product"), the space is removed and "Product" appears as the column header.

Procedure

1. On the *Home* page, select *Create New Document*.
2. In the *Add new dataset* dialog, select *Text*, and select *Next*.
3. Choose one or more text files, and select *Open*.
Data from the files is previewed in the *Add new dataset* dialog.
4. (Optional) Adjust the dataset options in the dialog as needed.
5. Select *Create*.

Results

The *Visualize* room opens, and you can start building charts and analyzing data. If you want to modify the dataset first, switch to the *Prepare* room.

3.4 Acquiring data copied to the clipboard

Text-based data can be copied to the clipboard from a text-based file (for example, from Microsoft Excel) or from a web page.

Context

Table 6: New Dataset dialog options for data copied from the clipboard

Option	Description
<i>Dataset Name</i>	The name of the dataset
<i>Separator</i>	Choose whether data on the clipboard is separated by delimiters or is entered in fixed-width columns. Delimiters are symbols, such as commas, tabs, or spaces, that separate fields in the data source and that will specify columns in the dataset in the application.
<i>Set first row as column names</i>	Select this check box to use the first row of data as column names in the dataset. Clear this check box to use the default column names ("Column1", "Column2", and so on).
▶▶ <i>Advanced Options</i> ▶ <i>Number format</i> ▶	The format for numeric columns in the dataset
▶▶ <i>Advanced Options</i> ▶ <i>Date format</i> ▶	The format for date columns in the dataset
▶▶ <i>Advanced Options</i> ▶ <i>Break Column</i> ▶	When acquiring data stored as fixed-width columns, analyze the data file and suggest column widths (in characters) for separating data into columns in the dataset. If the suggested widths aren't suitable, you can change the widths by entering values separated by commas. For example, if your data is in three columns and the column widths are five, 10, and 15 characters, you would enter 5, 10, 15 in the <i>Break Column</i> box, and select <i>Apply</i> to see a preview of the resulting dataset.

Option	Description
▶ Advanced Options ▶ Trim leading spaces ▶	Select this check box to remove leading and trailing values from numbers and text in the dataset so that column headers do not appear as empty fields. For example, if a "Product" entry has a leading space (" Product"), the space is removed and "Product" appears as the column header.

i Note

The Microsoft Internet Explorer (IE) web browser has a known issue when copying text to the clipboard. If you encounter this issue, use a different supported browser instead.

Procedure

1. Copy text to the clipboard.
2. On the *Home* page, select *Create New Document*.
3. In the *Add new dataset* dialog, select *Copy from Clipboard*, and select *Next*.
The text you copied is pasted in the dialog.
4. (Optional) Select *Trim Spaces* to remove leading and trailing spaces from numbers and text in the dataset.
5. (Optional) Select *Trim Row* to remove blank lines from the dataset.
6. Select *Proceed*.
Data from the files is previewed in the *Add new dataset* dialog.
7. (Optional) Adjust the dataset options in the dialog as needed.
8. Select *Create*.

Results

The *Visualize* room opens, and you can start building charts and analyzing data. If you want to modify the dataset first, switch to the *Prepare* room.

3.5 Acquiring data from SAP HANA views

You can acquire data from SAP HANA analytic or calculation views.

Data in an SAP HANA database is accessible in a "view"—a predefined virtual grouping of table columns that enables data access for a particular business requirement. Views are specific to the type of tables that are included, and to the type of calculations that are applied to columns. For example, an attribute view is built on dimension tables, an analytic view is built on a fact table and attribute views, and a calculation view executes a function on columns when the view is accessed.

You can connect to SAP HANA views in two ways:

- By downloading data from SAP HANA
Data is copied locally and can be manipulated and edited before being visualized in charts.
- By viewing data in SAP HANA
Data is read-only (that is, you cannot edit it), but you can visualize it in charts.

After connecting to a view, data is presented as columns, facets, measures, dimensions, and hierarchies in the application.

Related Information

[Downloading data from SAP HANA \[page 33\]](#)

[Connecting to SAP HANA \[page 30\]](#)

[Accessing SAP BW data in SAP HANA views \[page 34\]](#)

[Specifying values for SAP HANA variables and string input parameters \[page 35\]](#)

3.5.1 Connecting to SAP HANA

While connected to SAP HANA, you can view data and create visualizations from an SAP HANA cube.

Prerequisites

You need to know your SAP HANA server name, port number, user name, password and - in the case of MDC connection - you need to know your tenant details . For more information, contact your SAP HANA administrator.

Procedure

1. On the *Home* page, choose *New Document*.

The *Add new dataset* dialog box appears.

2. Choose *Connect to SAP HANA*.
3. Choose *Next*.

The *SAP HANA Data Acquisition Connector* dialog appears.

4. From the *Connect To* list, select either a direct connection to the *SAP HANA System*, or log on to the *SAP BusinessObjects BI Platform* to access the managed OLAP connections to SAP HANA.
 - For a connection to the *SAP HANA System*, proceed as follows:

1. In the *Connect to* field, choose HANA from the dropdown list.
2. Select the server to log on to from the *Server* list.
3. Enter the port number to log on with in the *Instance/Port* box.

i Note

In this release, you can connect to SAP HANA using **Multitenant Database Container (MDC)** connection, where you host multiple SAP HANA databases on a single SAP HANA system. In this setup, all tenant databases share the same system resources such as memory and CPU cores. However, each tenant database consists of resources such as database users, catalog, repository, services, and, persistence of both data files and log files. To connect to SAP HANA system using MDC connection, perform the following:

- Enter the details in the *Server* list, with the SAP HANA server name and tenant port number in the format: <HANA server name: Tenant port number> to log on to the server.
- Enter the instance number in the *Instance* field.

4. To connect to the SAP HANA server, perform one of the following:

Table 7:

Section	Description
If you connect by entering credentials	Enter your user name and password, and choose <i>Connect</i> .
If you connect via single sign-on (SSO)	Select the <i>Authenticate by Operating System (SSO)</i> check box, and choose <i>Connect</i> .

5. Choose *Next*.
The *Add new dataset: SAP HANA view* dialog appears, displaying available SAP HANA views.
6. Expand the SAP HANA view that contains the data to view, and choose the cube that contains the data.
7. Choose which data to access:
 - To access particular dimensions and measures in the data, choose *Next*, select the dimensions and measures, and choose *OK*.
 - To access all the measures and dimensions in a cube, choose *Create*.
- SAP BusinessObjects BIP-managed connections allow you to directly acquire data from the SAP HANA database without having to remember your credentials. For a connection to the SAP BusinessObjects BI Platform, proceed as follows:
 1. Enter the BI Platform connection details.
 2. If you want to save your password, select *Save Password*.
 3. Choose *Connect*.
 4. Select an OLAP connection, and select *Next*.
The following OLAP connections are supported:
 - **Single sign-on (SSO)**: System establishes connection via single sign-on.

i Note

SSO in HANA Managed connection works only if you have configured Kerberos SSO in the system where you have installed Lumira Desktop and the HANA system that you are trying to connect to.

- **Prompt:** System prompts you to enter your credentials.
- **Save password credentials:** System saves the password for the SAP HANA database
- 5. You can apply a search, based on key words, for the specific OLAP connection.
An *Add new dataset: SAP HANA views* dialog appears, displaying available SAP HANA views.
- 6. Expand the SAP HANA view that contains the data to view, and choose the cube that contains the data.
- 7. Choose *Next*.
- 8. Select the dimensions and measures you want to download to your Lumira Desktop dataset.
- 9. Select *Create*.

The Visualize room opens. You can start building charts and analyzing the data here. If you want to modify the dataset first, switch to the Prepare room.

Related Information

[Specifying values for SAP HANA variables and string input parameters \[page 35\]](#)

[Restrictions for Connecting to SAP HANA \[page 32\]](#)

3.5.1.1 Restrictions for Connecting to SAP HANA

When connected to an SAP HANA online data source, the following restrictions apply:

- The Change Aggregation action that is typically available for each measure in the Measures and Dimensions panel is not available.
- These actions that are typically available for each dimension in the Measures and Dimensions panel are not available:
 - Convert to Number
 - Convert to Text
 - Convert to Date/Time
 - Create a measure
 - Create a date/time hierarchy
 - Create a custom hierarchy
 - Create a geographic hierarchy by Latitude / Longitude
 - Duplicate
 - Merge this column
 - Create Calculated Dimension
- Although you cannot create date/time hierarchies, any level-based hierarchies that are modeled specifically as time hierarchies in your HANA views will be treated as time hierarchies by Lumira. For

details, see the section titled “Considerations for working with SAP HANA” in the *SAP Lumira Installation Guide*.

- Although you cannot create custom hierarchies, any regular level-based hierarchies that are modeled in HANA will be treated by Lumira similarly to custom hierarchies.
- Although you can create a geographic hierarchy “By Names”, the resultant geographic hierarchy will have only one level.
- The “Create New Dataset” action is not available from each visualization's thumbnail in the visualization gallery.
- Additional datasets can be added only from the same instance of the first SAP HANA dataset, using the same SAP HANA connection. It is not possible to acquire data from other data sources.
- The following SAP HANA functions are not supported in calculated measures or dynamic text:
 - *AddMonthToDate*
 - *AddYearToDate*
 - *LastDayOfMonth*
 - *DayOfYear*
 - *Week*
 - *LastWord*
 - *ExceptLastWord*

3.5.2 Downloading data from SAP HANA

You can manipulate data and create visualizations from an SAP HANA cube.

Prerequisites

You must know your SAP HANA server name, port number, user name, and password. For more information, contact your SAP HANA administrator.

Procedure

1. On the *Home* page, select *Create New Document*.
2. In the *Add new dataset* dialog, select *Download from SAP HANA One*, and select *Next*.
3. Select the server to log on to in the *Server* list.
4. Enter the port number to log on to in the *Instance/Port* box.
5. Connect to the SAP HANA server:

Option	Description
If you connect by entering credentials	Enter your user name and password, and select <i>Connect</i> .

Option	Description
If you connect via single sign on (SSO)	Select the <i>Authenticate by Operating System (SSO)</i> check box, and select <i>Connect</i> .

6. Select *Next*.
An *Add new dataset: SAP HANA views* dialog appears, displaying available SAP HANA views.
7. Expand the SAP HANA view that contains the data to view, and choose the cube that contains the data.
8. Choose which data to acquire:
 - To acquire particular dimensions and measures in the data, select *Next*, choose the dimensions and measures, and select *OK*.
 - To acquire all data, select *Create*.

Results

The *Visualize* room opens, and you can start building charts and analyzing the data. If you want to modify the dataset first, switch to the *Prepare* room.

Related Information

[Acquiring data from SAP HANA views \[page 29\]](#)

[Specifying values for SAP HANA variables and string input parameters \[page 35\]](#)

3.5.3 Accessing SAP BW data in SAP HANA views

You can access SAP Business Warehouse (BW) data that is available in SAP HANA analytic or calculation views.

In an SAP BW-on-SAP HANA system, you can use the SAP HANA modeler to import SAP BW models (for example, SAP HANA-optimized cubes, Data Store Objects (DSO), and BW Query Snapshots) as analytic views and calculation views. Once the models are activated, the application can consume them by connecting to an SAP HANA cube.

For information about implementing an SAP BW-on-SAP HANA system and about making data available to SAP HANA, see the *FAQ: BW on HANA* document at <http://www.experiencesaphana.com/community/solutions/net-weaver-bw/bwonhanafaq>.

Related Information

[Downloading data from SAP HANA \[page 33\]](#)

3.5.4 Specifying values for SAP HANA variables and string input parameters

You are prompted to enter a value for an SAP HANA variable or a string input parameter when acquiring an analytic view in *Download from SAP HANA One* mode and when creating a document on an analytic view in *Connect to SAP HANA One* mode.

Context

Each SAP HANA variable defines a filter on a dimension of a view. You enter a value for each dimension before data is acquired, and the value appears as a facet row after acquisition.

You enter a value for each SAP HANA input parameter when acquiring data, and SAP Lumira passes the value to a calculation, such as a formula for a calculated measure. When entering a value for a string input parameter, you must enter an SQL statement, using single quotes to indicate the beginning and end of the statement string. For example, enter `BUKRS= 'CALP'` to search for *CALP*.

Procedure

1. Connect to an SAP HANA instance in *Download from SAP HANA One* or *Connect to SAP HANA One* mode.
2. Choose which data to acquire:
 - To acquire particular data, select an analytic view, select *Preview and select data*, select *Select*, choose the dimension values and measures, and select *Edit Variables*.
When no variables or input parameters are defined in a view, the *Edit Variables* button is not available.
 - To acquire all data available in an analytic view, choose the view, and select *Create*.

A *HANA Variables* box appears, listing the variables and input parameters defined for the analytic view. Variables are prefixed by "VAR" and input parameters are prefixed by "IP."

3. Choose a variable or an input parameter.
The dimension or input parameter value appears in the right pane.
4. Choose one or more values, and select *Add*.
To choose multiple individual values, press and hold `Ctrl` and select each value. To choose a range of values, press and hold `Shift` and select the first and last value in the range.
The selected values appear in the bottom pane.
5. Select *OK*.
6. If you are acquiring data through *Preview and select data*, select *Create* to start the data acquisition.
Data appears in the *Prepare* room, and each variable appears as a facet with the selected prompt values.

Results

The [Variables](#) button appears at the top of the facets pane. Select the button to view the values you chose for SAP HANA variables.

3.6 Acquiring data from universes

You can acquire data from SAP BusinessObjects universe files.

Universe (.unx) files for SAP NetWeaver BW access are created with the Information Design Tool that is installed with SAP BusinessObjects Business Intelligence platform. For information about the Information Design Tool, see the *Information Design Tool User Guide*.

For information about data federation, see the *Data Federation Administration Tool Guide*.

For a complete list of supported universes and database access options, see the *Product Availability Matrix* on the SAP Service Marketplace at [SAP Product Availability Matrix](#).

3.6.1 Connecting to a universe data source

Procedure

1. On the [Home](#) page, select [Create New Document](#).
2. In the [Add new dataset](#) dialog, select [Universe](#), and select [Next](#).
3. In the [Universe credentials](#) pane:
 - a. Enter the name or IP address of the server that hosts your Central Management Server (CMS).
If you are connecting to a CMS that belongs to a different network domain, make sure the `hosts` file located at `C:\Windows\System32\drivers\etc` has the corresponding host name entry (for example, `x.x.x.x<NameOfMachineHostingCMS>`).
 - b. Enter the CMS user name, password, and authentication type.
 - c. To use Windows AD authentication to connect to the CMS, append the following entries in the `SAPLumira.ini` file, located at `<LumiraInstallDir>\SAPLumira\Desktop`:

```
-Djava.security.auth.login.config=<Path_to_bscLogin>\bscLogin.conf  
-Djava.security.krb5.conf=<Path_to_krb5>\krb5.ini
```

```
-Djava.security.auth.login.config=C:\Windows\bscLogin.conf  
-Djava.security.krb5.conf=C:\Windows\krb5.ini
```

- d. Select [Connect](#).
- A list of universes available in the CMS appears.
4. Choose a universe, and select [Select](#).
 5. Choose the required objects in the universe tree, and select [Acquire](#).

Before acquiring data, you can preview the data and apply filters by selecting the [Preview and Select Data](#) option. If a query contains contexts or prompts, you must respond to them before data can be acquired. When creating a query, you can set the following query properties:

- [Max Rows Retrieved](#): The maximum number of rows to be retrieved by the query.
- [Max Retrieval Time](#): The maximum amount of time a query can run (in seconds).
- [Retrieve Duplicate Rows](#): Select to retrieve duplicate rows.

Results

The [Visualize](#) room opens, and you can start building charts and analyzing the data. If you want to modify a dataset first, switch to the [Prepare](#) room.

3.6.2 Troubleshooting messages about universe data connections

You may encounter these messages and possible causes while working with the universe data source.

Table 8: Troubleshooting messages about universe data connections

Message	Cause
Could not connect to Central Management Server (CMS)	<ul style="list-style-type: none"> • The CMS is unresponsive. • Your user name or password is incorrect. • The authentication type is incorrect. • A network issue has occurred.
Could not load the selected universe	<ul style="list-style-type: none"> • The universe is corrupted. • The CMS is unresponsive. • The universe connection is not configured properly.
Could not validate the query	<ul style="list-style-type: none"> • There is an issue with the database connection. • The data types do not match the object. • A result returned from the server has reached the limit set for the <code>Maximum Character Stream Size (MB)</code> configuration parameter in the SAP Web Intelligence Report Server. • One or more universe objects are not configured properly.
Query returns no row sets	A query for the object returned no data.

3.7 Acquiring data using Query with SQL

You can create a data provider by manually entering the SQL for a target data source. You can specify the source tables, columns, and functions used to acquire data.

For a complete list of database middleware that Query with SQL can access, see the [SAP Product Availability Matrix](#).

Table 9: Supported database middleware drivers

Supported database middleware	How to obtain the driver
Amazon Redshift	The Simba Redshift driver is included with SAP Lumira.
Apache Spark	Manually install the driver in SAP Lumira as described in the section "Installing data access drivers". Select the <i>Generic JDBC datasource - JDBC Drivers</i> database. The driver binaries are located at <InstallDir>\Program Files\SAP Lumira\Desktop\utilities\SparkJDBC\. There are multiple .jar files in that location. Select all of them during driver installation.
Apache	Amazon EMR and Apache Hive Simba drivers are included with SAP Lumira.
Cloudera	The Cloudera Impala Simba driver is included with SAP Lumira.
IBM DB2	Go to the IBM DB2 connectivity download page at https://www.ibm.com/account/profile/us?page=reghelpdesk . Choose the appropriate driver for your database, save the compressed installation file to your computer, extract the compressed file (db2jcc.jar) to a local directory, and run the installer from your computer. For versions earlier than 9.5, you must extract db2cc.jar and db2jcc_license_cu.jar instead. Before you can download a driver, you must register using a free IBM-recognized user email address as the account name. If you do not know which version of the driver to use, both drivers for DB2 version 10.1 [DB2 version 10.1 FPO (GA) and version 10] are suitable for all versions later than DB2 version 9.5. For more information, contact your database administrator.
IBM Netezza	See your Netezza administrator.
Microsoft SQL Server	Go to the SQL Server 2005, 2008, and 2012 Microsoft Drivers download center page at http://www.microsoft.com/en-us/download/driver.aspx?q=driver . Choose the appropriate driver for your database, save the installation file to your computer, and run the installer from your computer. If you don't know which version of the driver to use, Microsoft JDBC Driver 4.0 for SQL Server is suitable for all supported SQL server versions. If you are installing JDBC Driver 4.0 for SQL Server, the driver is sqljdbc_4.0.2206.100_enu.exe for a Windows operating system. The sqljdbc4.jar driver file is extracted to \sqljdbc_4.0\enu\, in the specified extraction folder.

Supported database middleware	How to obtain the driver
Oracle	<p>Go to the Oracle JDBC Driver Downloads page at http://www.oracle.com/technetwork/database/features/jdbc/index-091264.html</p> <p>Before you can download a driver, you must create a free user account. If you don't know which version of the driver to use, <code>ojdbc14.jar</code> is suitable for any supported version of Oracle 10 and 11.</p>
Salesforce	<p>The Salesforce driver is installed by default; you do not need to install it. However, you do need to get a logon token before being able to acquire Salesforce data.</p> <p>Log on to the Salesforce website and go to ► My Settings ► Personal ► Reset My Security Token ►. A logon token will be sent to you by email.</p> <p>Append the token to the end of your password when logging on to SAP Lumira.</p>
Sybase	<p>The Sybase driver (<code>jconn4.jar</code>) is installed by default; you do not need to install it. It is located at <code>\\<InstallDir>\Program Files\SAP Lumira\Desktop\plugins\com.businessobjects.connectionserver.standalone_3.1.3.v20120603-0404\ConnectionServer\jdbc\drivers\IQ15</code>.</p>
Teradata	<p>Go to the Teradata connectivity download page at http://downloads.teradata.com/download/connectivity/jdbc-driver. Choose the appropriate driver for your database, save the compressed installation file to your computer, extract the compressed file to a local directory, and run the installer from your computer.</p> <p>Before you can download a driver, you must create a free user account. If you don't know which version of the driver to use, the Teradata JDBC Driver 14 is suitable for all supported Teradata versions. For Windows, use <code>TeraJDBC__indep_indep.14.00.00.14.zip</code>. Once extracted, the driver files are <code>tdgssconfig.jar</code> and <code>terajdbc4.jar</code>.</p>
IBM Puredata	See your Netezza administrator.
Informix Dynamic	See your IBM administrator.
GreenPlum 4	See your GreenPlum administrator.

Table 10: JDBC drivers for typical database middleware

Database middleware	JDBC driver available
Oracle	<code>ojdbc14.jar</code>
Microsoft SQL Server	<code>sqljdbc4.jar</code>
Teradata	<code>terajdbc4.jar</code> and <code>tdgssconfig.jar</code>
Sybase	<code>jconn4.jar</code>

Database middleware	JDBC driver available
IBM DB2	db2jcc.jar or db2cc.jar and db2jcc_license_cu.jar for versions earlier than 9.5
IBM Netezza	nzjdbc.jar

Related Information

[Installing data access drivers \[page 40\]](#)

[Connecting to a Query with SQL data source \[page 42\]](#)

[Query with SQL connection parameters \[page 44\]](#)

3.7.1 Installing data access drivers

The Sybase IQ 15 data access driver is automatically installed with the application. For other databases, you may need to install the JDBC data access driver for your database middleware, before using Query with SQL.

Prerequisites

- You must be familiar with your database and with the SQL language.
- The correct data access driver must be installed for your database middleware. A data access driver is the software provided by a database vendor that allows a client application to connect to middleware and to access data in a database. You copy the data access driver for your middleware from your database vendor support web site to a local folder, and then you can select the driver in the application and connect to the database.

i Note

Installing data access drivers from a vendor site can be problematic due to the variety of driver versions and file formats. If you are unfamiliar with your database version or the vendor web site, contact your database administrator.

Context

Follow these general steps to obtain a data access driver:

1. Download the data access driver (a .jar file) from the database vendor site, and copy the file to a local folder.

2. Register the driver path by selecting the driver in the application.
3. Select a Query with SQL data source on the *SQL Drivers* tab in the application preferences.
You can select an installed SQL driver or install the required driver.

Procedure

1. Select **File > Preferences > SQL Drivers**.

The *Driver Installation* page lists database middleware names and the status of drivers:

- When the status check mark is green, the driver is correctly installed and you can start using Query with SQL.
- When the status check mark is red, the driver is not installed for that middleware and you must install it.
- When the status check mark is yellow, a compatible driver is available for the middleware, but the application must be restarted before it is available. Once the software has restarted, you can use Query with SQL.

2. Choose a data source, and perform one of the following actions:

Option	Description
If the data source middleware has a green check mark	Select <i>Next</i> , enter the middleware connection information, and select <i>Create</i> . The data access drive is installed. You do not need to perform the remaining steps in this task.
If the data source middleware has a yellow check mark	Restart the application, and repeat step 1.
If the data source middleware has a red check mark	Go to step 3.

3. If the middleware driver is not configured, select the *Install* button, choose the database driver, and select *Install Drivers* at the top of the database list.
4. In the selection box for locally available middleware:

Option	Description
If the correct .jar file is listed	Go to step 6.
If the correct .jar file is not listed	Download the driver from the vendor support site, install the driver, select <i>Cancel</i> to close the driver selection box, and then download and install the correct .jar file.

You must access the web page that lists JDBC data access drivers for the middleware vendor. Depending on the database, different types of driver files are available; usually a compressed file containing the drivers or an executable file to install the drivers automatically. For the application, download only the compressed file.

5. On your vendor's support web site, download the compressed JDBC driver file (for example, a .tar, .gz, or .zip file) for your database middleware version.
6. On your computer, select the folder that contains the extracted JDBC driver files for your database middleware.

A complete list of supported JDBC drivers is included in the Product Availability Matrix, available on the SAP Service Marketplace site at <https://support.sap.com/pam>.

7. Restart the application.
The list of available database middleware drivers is updated.

Results

When you use Query with SQL to create a new document in the application, the target database middleware is listed with a green check mark, indicating that the driver is available to access the database.

i Note

You can refresh the Lumira documents successfully if you have the higher version of *SQL Drivers* for drivers such as Teradata 14, Teradata 15, PostgreSQL 9, Oracle 11, Oracle 12, and DB2 10 for LUW installed in SAP Lumira. For example, if you have Teradata 14 in the set of *SQL Drivers*, you can refresh the Lumira documents..

3.7.2 Connecting to a Query with SQL data source

You can connect directly to a database to specify the data to acquire and to set parameters to optimize the database connection.

Prerequisites

- You must be familiar with your database and with the SQL language.
- The correct data access driver must be installed for your database middleware. A data access driver is the software provided by a database vendor that allows a client application to connect to middleware and to access data in a database. You copy the data access driver for your middleware from your database vendor support web site to a local folder, and then you can select the driver in the application and connect to the database.

i Note

Installing data access drivers from a vendor site can be problematic due to the variety of driver versions and file formats. If you are unfamiliar with your database version or the vendor web site, contact your database administrator.

You need to install a JDBC data access driver for your database middleware before using Query with SQL. The data access driver is a `.jar` file that you download from a database vendor site and copy to the driver folder in the application installation path. Refer to the Related Information about finding and installing the correct data access driver for your database middleware.

Procedure

1. On the *Home* page, select *Create New Document*.
2. In the *Add new dataset* dialog, select *Query with SQL*, and select *Next*.
3. Choose the database middleware for the target database and select *Next*.
4. Enter your logon credentials and, if necessary, select *Advanced* to adjust advanced driver parameters.
5. Select *Connect*.
6. Choose a table, or type an SQL query to fetch the required table.
7. Select *Preview*, and choose the columns you want to acquire.
8. Select *Create*.
You can now start building charts and analyzing data in the *Visualize* room. If you want to modify the dataset first, use the *Prepare* room.

Related Information

[Query with SQL connection parameters \[page 44\]](#)

[SQL editor options for Query with SQL \[page 43\]](#)

[Installing data access drivers \[page 40\]](#)

3.7.2.1 SQL editor options for Query with SQL

Use an SQL editor to write SQL and create a Query with SQL data source, based on a connected database. The SQL editor is accessed from the Query with SQL connection option when you create a new document.

Only the `SELECT` statement is authorized in the SQL editor to acquire data from database tables. Use these SQL editor options to select tables for the data source:

Table 11: SQL editor options

Option	Description
<i>Catalog</i>	The accounts available to the connected database. Expand each node to see the tables available. Double-click a table to add the table to the SQL query.
<i>Query</i>	The <code>SELECT</code> query to fetch tables. (Only <code>SELECT</code> is supported.) You can add table names by double-clicking the table in the account node in the left pane.
<i>SQL History</i>	Keep a log of the <code>SELECT</code> statements used in the query pane. Choose a statement to include it in the query.
<i>Preview data</i>	Select this option to preview the tables that are acquired by <code>SELECT</code> .
<i>Select All/None</i>	Choose all or no columns, or choose individual columns for acquisition.

Related Information

[Connecting to a Query with SQL data source \[page 42\]](#)

3.7.3 Query with SQL connection parameters

You can create your own data provider by manually entering the SQL for a target data source to acquire table data. When using Query with SQL, you must enter connection information for the target database, and you can specify connection parameters to optimize the fetching of data.

Table 12: Logon parameters

Parameter	Description
User name	The user name that you use to connect with the target database
Password	The password that you use to connect with the target database
Server (<host>:<port>)	The name and port of the server hosting the database
Database	The database name

Table 13: Advanced parameters

Parameter	Description
Connection pool mode	If using a connection pool, use to keep the connection pool mode connection active.
Pool timeout	If the connection pool mode is set to <i>Keep the connection active for</i> , the length of time in minutes to keep the connection open.
Array fetch size	<p>The maximum number of rows authorized with each fetch from the database. For example, if you enter 20, and your query returns 100 rows, the connection retrieves the data in five fetches of 20 rows each. To deactivate array fetch, enter an array fetch size of 1. Data is retrieved row by row.</p> <p>Deactivating the array fetch size can increase the efficiency of retrieving your data, but it slows server performance. The greater the value in the array fetch size, the faster your rows are retrieved. However, ensure that you the client system has adequate memory.</p>
Array bind size	Size of the bind array before it is transmitted to the database. Generally, the larger the bind array, the more rows (n) can be loaded in one operation, and performance will be optimized.
Login timeout	The number of minutes before a connection attempt times out and a message appears.

Parameter	Description
JDBC driver properties	Values for JDBC driver properties. You can define the value of more than one property, separated by commas. For example, the <code>oracle.jdbc.defaultNChar=true, defaultNChar=true</code> value for JDBC driver properties sets the <code>oracle.jdbc.defaultNChar</code> and <code>defaultNChar</code> driver properties.

3.8 Acquiring data from Hadoop

You can acquire data from Apache Hadoop data sources.

Organizations that generate very large amounts of data (“Big data”) may store their data in an Apache Hadoop Distributed File System (HDFS). But working with entire sets of Hadoop data in analysis tools can lead to poor performance. Therefore, to maintain good performance when analyzing Hadoop data, Lumira Desktop lets you acquire a sample of the Hadoop data, create your visualizations and stories based on that sample, and then generate the full dataset.

You can also work directly with the full dataset without first acquiring a sample. In either case, Lumira Desktop acquires a maximum of 1 million rows, but you can change that limit by adding or changing this property in the `SAPLumira.ini` file, located at `<LumiraInstallDir>\SAP Lumira\Desktop:`

```
-Dhilo.hivemaxsamplingsize=<VALUE>
```

You can acquire Hadoop data directly from HDFS files, or you can acquire data using Apache Hive or Cloudera Impala queries. Also, you can merge a Hadoop dataset with another dataset, but only if the other dataset is also in Hadoop. If the other dataset isn't already in Hadoop, you can add it to Hadoop first.

i Note

In this release, when using Hadoop data, some Lumira Desktop features are disabled:

- Calculated dimensions
- Display formatting
- Semantic enrichment (for geographic and time dimensions)

3.8.1 Connecting directly to Hadoop HDFS files

You can acquire data directly from Apache Hadoop HDFS files.

Procedure

1. On the *Home* page, select *Create New Document*.
2. In the *Add new dataset* dialog, select *Connect to Hadoop*, and select *Next*.
3. Specify the URL and port number of the WebHDFS Server.
4. Provide *Username* and *Password*.

i Note

In previous releases, Password field option for connecting to Hive or Hadoop data sources was not supported. This was because the Lumira desktop only supported the Big Data Exploration workflows without authentication. However, with this release, you need to provide your user credentials while connecting Hive or HDFS data sources and scheduling workflows on a Kerberos enabled cluster. This eliminates the use of external tools like MIT Kerberos. Therefore, the system does not save the acquired tickets and once application is closed credentials are not available.

5. Choose *Connect*.
6. Select the directory where you want to acquire data from.
7. Specify how many lines of data you want to sample.
The number of lines of data that you specify are sampled from the first file in the directory. Data from the file is previewed in the *Add new dataset* dialog.

i Note

All files within the directory must have the same file structure.

8. (Optional) Adjust the dataset options in the dialog as needed.
9. Select *Create*.

Results

The data is acquired and appears in the *Prepare* room. A *SAMPLE* button at the top of the window reminds you that you're working with only a sample of the full dataset. You can select the button to see details of the sampled data.

Related Information

[Generating the full Hadoop dataset \[page 48\]](#)

3.8.2 Connecting to Hadoop using Hive or Impala

You can acquire data from Apache Hadoop by using Hive or Impala queries.

Procedure

1. On the *Home* page, select *Create New Document*.
2. In the *Add new dataset* dialog, select *SQL on Hadoop*, and select *Next*.
3. Specify a database driver, the URL and port number of the Impala or Hive server.
4. Provide *Username* and *Password*.

i Note

In previous releases, *Password* field option for connecting to Hive or Hadoop data sources was not supported. This was because the Lumira desktop only supported the Big Data Exploration workflows without authentication. However, with this release, you need to provide your user credentials while connecting to Hive or HDFS data sources and scheduling workflows on a Kerberos-enabled cluster. This eliminates the use of external tools like MIT Kerberos. Therefore, the system does not save the acquired tickets and once application is closed, credentials are not available.

5. Choose *Connect*.
6. In the left pane, select the schema or table that you want to acquire data from.
7. In the right pane, select the columns you want to acquire.
8. At the top of the dialog, choose whether you want to acquire just a sample of the dataset, and if so, specify a sampling rate percentage.
Sampling is done by randomly choosing rows in the dataset.
9. Select *Create*.
Data from the file is previewed in the *Add new dataset* dialog.

Results

The *Visualize* room opens, and you can start building charts and analyzing data. If you want to modify the dataset first, switch to the *Prepare* room. A *SAMPLE* button at the top of the window reminds you that you're working with only a sample of the full dataset. You can select the button to see details of the sampled data.

Related Information

[Generating the full Hadoop dataset \[page 48\]](#)

3.8.3 Generating the full Hadoop dataset

After you've acquired a sample of your Hadoop data and created your visualizations and stories, you can reapply your data transforms to generate the full Hadoop dataset, using the Oozie scheduler. For example, if you've split or removed columns in the sample dataset, those transforms are applied when generating the full Hadoop dataset.

Prerequisites

- The Apache Oozie Workflow Scheduler must be installed as part of your Hadoop deployment.
- Specify parameters for the Hadoop WebHDFS Server in ► [File](#) ► [Preferences](#) ► [Network](#) ►. The directory that you specify is where Lumira Desktop looks for the results of the scheduled files.

Procedure

1. Select the [SAMPLE](#) button.
2. Select [Generate Full Dataset](#).
3. In the [Schedule Hadoop Job](#) dialog, choose your settings:
 - Specify the [Output Options](#):
 - [Full Dataset Output Directory](#)
 - [Full Dataset Table Name](#)
 - [Compress Files](#)
 - [Generate SAP Lumira file with full dataset](#):
If you select this option, a `.lums` file is generated and saved in your Hadoop platform. You can save Hadoop datasets just like any other datasets, but be aware that the resulting `.lums` file can reach hundreds of megabytes in size. The `.lums` file can be copied to a local disk for faster access.
If you don't select this option, Lumira Desktop generates just a Hive table.
 - Ask your IT administrator for the Oozie settings.
 - Specify the same settings for the Hadoop WebHDFS Server as are specified in ► [File](#) ► [Preferences](#) ► [Network](#) ►.
4. Select [Schedule](#).
The full Hadoop dataset is generated. This can take several minutes, depending on the size of the Hadoop dataset. Also, the [SAMPLE](#) button is no longer displayed.

3.9 Editing an acquired dataset

After a dataset has been acquired, you can edit it.

Context

You can edit this information in acquired datasets:

- Add new columns that were removed from the data source when it was originally acquired
- Remove columns that were included in the original data source
- Change values selected for SAP HANA variables and input parameters
- Edit the SQL query for a [Query with SQL](#) data source

Procedure

1. Open a dataset that is already acquired in the application.
2. Select **► Data ► Edit data source ►**.
3. Perform one or more of the following actions:
 - Select a column name check box to add a new column.
 - Clear a column name check box to remove a column.
 - To change SAP HANA variables and input parameters, select [Edit Variables](#), enter or delete values for variables or input parameters, and select [OK](#).
 - Edit the SQL query for a [Query with SQL](#) data source
4. Select [OK](#).

The document is refreshed. If the data source has undergone a model change, such as columns being added or removed, the [Data Mapping](#) dialog opens so that you can resolve the model changes.

3.10 Refreshing data in a document

The data that is saved with a document can become stale or invalid. Refresh the document to get fresh data from the data source.

Context

For example, if you have an Excel data source comprising two columns [Name](#) and [Age](#), and you acquire the Excel data into SAP Lumira, but later the numbers in the Excel data are updated, you may want to refresh the document to reacquire the updated Excel data.

Data isn't automatically refreshed if the data source has undergone a model change, such as columns being added or removed. For example, if in the above Excel file the <Name> column is split into <First Name> and <Last Name> columns, the <Name> column in the data source no longer exists and the refresh fails.

If the data can't be refreshed automatically, the *Data Mapping* dialog helps you to refresh your data manually, by mapping columns in your dataset to columns in the data source.

Procedure

1. If your document is open in the *Prepare* room, select the  icon. Or, if you're working in the *Visualize* room, select the down-arrow next to the  icon and select either *Refresh* or *Refresh data with prompts*.

If your data source contains variables, choosing the *Refresh data with prompts* option lets you reselect variable values before the data is refreshed. These data sources support refreshing with prompts:

- Connect to SAP HANA
- Download from SAP HANA
- Download from SAP Business Warehouse
- SAP Universe Query Panel

If the data source model has not changed, the data is refreshed.

If the data source model has changed, the *Data Mapping* dialog appears. The dialog lists the datasets in your document that can't be automatically refreshed. Complete the rest of these steps:

2. For query-based data sources, for example MySQL, select *Edit Query*.
In the *Edit data source* dialog, redefine your query, and select *OK* when finished.
3. Select a dataset in the *Data Mapping* dialog.
The *Changed Columns* for that dataset are shown.
4. Using the drop-down lists, choose columns from the data source to map the *Changed Columns* to.
You can map columns only to other unused columns of the same type. You can also remove any columns that you no longer need in your dataset, but be aware that any dependencies based on the removed columns will be removed as well.
Using the above Excel example, you could choose the changed column <Name>, and map it to the <Last Name> or <First Name> column from the drop-down list.

Related Information

[Showing the latest data in a story page \[page 156\]](#)

[Editing an acquired dataset \[page 49\]](#)

[Specifying values for SAP HANA variables and string input parameters \[page 35\]](#)

[Prompting and SAP HANA variables and input parameters \[page 138\]](#)

3.11 Datetime and Time data types

Older versions of Lumira Desktop did not support Datetime (a data type containing both date and time information; for example, timestamps) or Time data types. When data was acquired from data sources that included time and datetime data, Lumira Desktop converted time data to string data, and datetime data to date data (truncating the time information). When these datasets were saved as Lumira Desktop documents, they were saved with the string and date data types.

When documents containing these older datasets are opened, saved, or refreshed in newer versions of Lumira Desktop, they remain unchanged. The time and datetime information is not converted back to time and datetime data.

Because Lumira Desktop now supports Time and Datetime data types, if you acquire a new dataset from a data source that contains time or datetime data, even if it's the same data source whose time and datetime data was converted to string and date data in an older version of Lumira Desktop, the time and datetime information is acquired as Time and Datetime data.

3.12 Renaming a dataset

You can rename a dataset in the *Prepare* and *Visualize* room.

Procedure

1. Open a dataset.
2. In the *Prepare* or *Visualize* room, select the dataset name.
3. Change the name of the dataset.
4. Press or select an area outside the dataset name field.

3.13 Objects hidden from the object list

Use the enrichment suggestions file to prevent specific columns from being proposed as measures in the application when data is acquired.

To prevent specific columns from being proposed as measures when data is acquired, the application uses the `enrichment_suggestions.<VersionNumber>.txt` file to identify columns that should not be proposed as measures.

The first time you create a document, the file is saved in your `@user.home/.sapvi` directory (for example `C:\Users\<YourUserName>\.sapvi`).

By default, column names in the enrichment suggestions file are in English. However, you can define names in other languages, specify column names to hide from the objects list, and prevent objects from being

considered time or geographical objects. The enrichment will be processed if you selected automatic detection of enrichments in the application preferences.

When you upgrade the application, a new version of the enrichment suggestions file is saved, without overwriting the original file. You can use the original file as a reference to modify the new suggestions file. The application will use the file name that corresponds with the installed version of the application.

3.14 Editing the enrichment suggestions file

Edit the enrichment suggestions file to identify which objects should not be proposed as measures or as time or geographic attributes on the *Measures and Dimensions* panel.

Context

You can define as many rules as you require in the `enrichment_suggestions.<VersionNumber>.txt` file. For each rule, you must declare four properties. The syntax is Java regex and metadata is not case-sensitive.

Table 14: Properties required for each rule in the enrichment suggestions file

Required property	Description
<code>objectName</code>	Pattern matching on the object name (column header). Any character can be used. When <code>. *DAY . *</code> is used, any object containing the string <code>DAY</code> is included in the rule (<code>MONDAY</code> , <code>TUESDAY</code> , and so on).
<code>dataType</code>	List of data types. Recognized data types are: <ul style="list-style-type: none"> <code>integer</code> <code>biginteger</code> <code>double</code> <code>string</code> <code>date</code> <code>boolean</code> Any column name, with any data type, will be considered for exclusion from the proposal pane. If no <code>dataType</code> property is declared, all data types are considered.
<code>enrichment</code>	Prevents objects from appearing. The values are <code>MEASURE</code> or <code>TIME</code> (time hierarchy objects) or <code>GEO</code> (geographic hierarchy objects).
<code>rule</code>	Defaults to <code>hide</code> . Do not change this value.

The following example shows the default enrichment file:

```
{
  "version": "1.0",
```

```

"policies":{
  },
  "suggestionRules":[
    {
      "objectName":"(?i).*year.*|.*month.*|.*quarter.*
        |.*week.*|.*day.*|.*semester.*|.*hour.*|.*minute.*|.*second",
      "dataTypes":["integer", "biginteger", "double"],
      "enrichment":"MEASURE",
      "rule":"hide"
    },
    {
      "objectName":"(?i).*zip.*",
      "dataTypes":["integer", "biginteger", "double"],
      "enrichment":"MEASURE",
      "rule":"hide"
    },
    {
      "objectName":"(?i).*_id\\d*",
      "dataTypes":["integer", "biginteger", "double"],
      "enrichment":"MEASURE",
      "rule":"hide"
    },
    {
      "objectName":"(?i).*key.*",
      "dataTypes":["integer", "biginteger", "double"],
      "enrichment":"MEASURE",
      "rule":"hide"
    },
    {
      "objectName":"(?i).*zip.*",
      "dataTypes":["integer", "biginteger", "double"],
      "enrichment":"TIME",
      "rule":"hide"
    },
    {
      "objectName":"(?i).*_id\\d*",
      "dataTypes":["integer", "biginteger", "double"],
      "enrichment":"TIME",
      "rule":"hide"
    },
    {
      "objectName":"(?i).*key.*",
      "dataTypes":["integer", "biginteger", "double"],
      "enrichment":"TIME",
      "rule":"hide"
    }
  ]
}

```

Procedure

1. Open the enrichment_suggestions.<VersionNumber>.txt file in a text editor.
2. For each object, define the data type(s), enrichment, and other properties as needed.
You must keep "rule" set to "hide".
3. Save the file with the same name.

4 Prepare room—viewing, cleaning, manipulating, and sharing data

When data is first acquired by the application, it is raw data that is often formatted inconsistently and is not easily interpreted by business users. Before creating charts to visualize your data, it is often necessary to prepare the data so that it is presentable and understandable. Use the tools in the *Prepare* room to view and prepare data.

These are the main areas where you interact with the *Prepare* room:

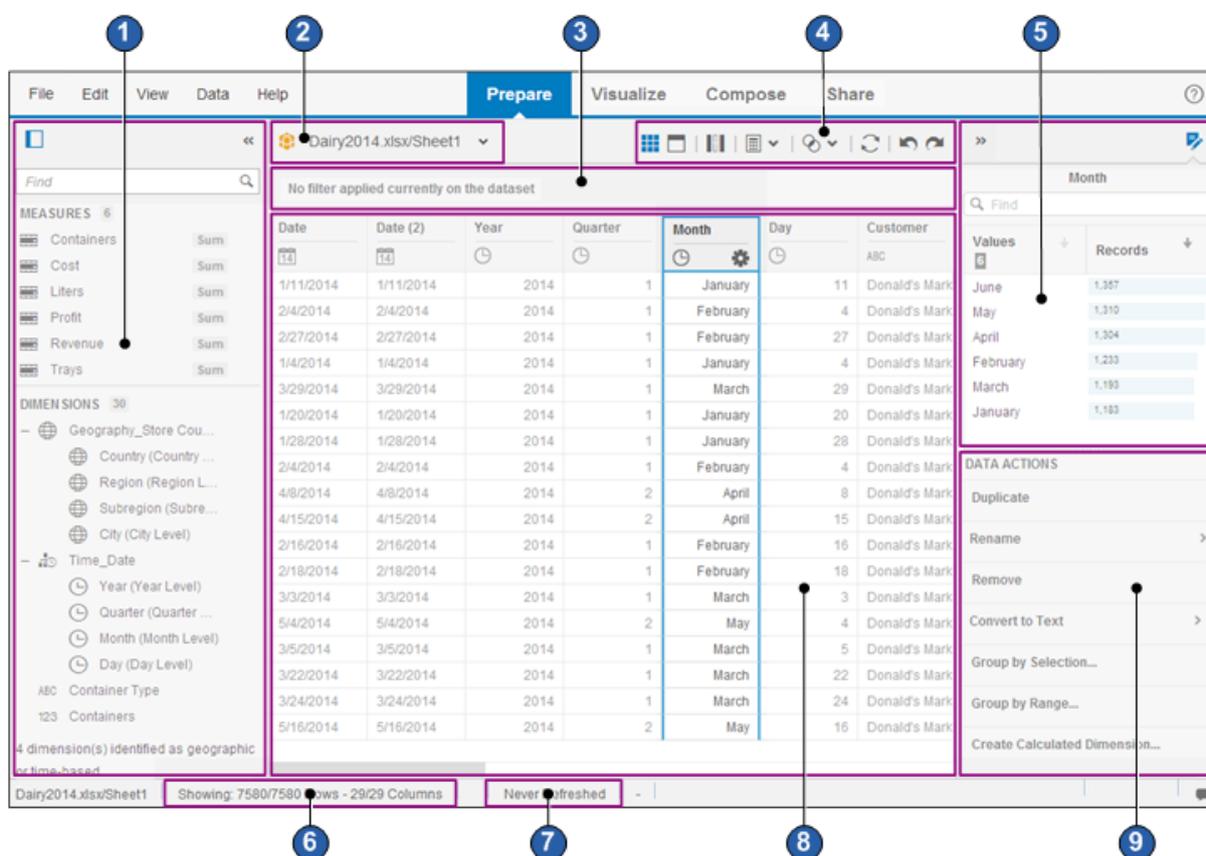


Table 15:

Number	Area	Description
1	<i>Measures and Dimensions</i> panel	Lists the measures and dimensions that were detected in the data. Use tools on the <i>Measures and Dimensions</i> panel to define and to edit measures and to create hierarchies.
2	dataset selector	The document may contain multiple datasets. Use the dataset selector to add a new dataset and to choose between different datasets.

Number	Area	Description
3	filter bar	Displays filter tokens that represent filters applied to the dataset. To add a filter to a column or a dimension, select the column or dimension and select the  icon that appears.
4	<i>Data Pane</i> tools	Use these tools to change the data display, add calculations, merge data, refresh data, and undo user actions.
5	column details <i>(Manipulation Tools panel)</i>	Select a column in the <i>Data Pane</i> to display information about its values: <ul style="list-style-type: none"> • View each unique value in the column, along with the number of times it occurs. • Search for a value in the column. • Sort the display by value or by number of occurrences.
6	Dataset status	Shows the number of rows and columns in the dataset that are visible in the <i>Data Pane</i> . For example, consider the message <i>Showing: 75000/75000 Rows - 48/50 columns</i> . This indicates that all 75000 rows in the dataset are visible, while 48 columns are visible and 2 columns are hidden.
7	refresh status	Indicates the last time the dataset was refreshed. Select  to refresh the data.
8	<i>Data Pane</i>	Displays the data in the currently selected dataset. <ul style="list-style-type: none"> • Select <i>Grid</i>  to display data in columns and rows. All rows are displayed. • Select <i>Facets</i>  to display only the unique values in each column. The number of times each value occurs is also displayed.
9	<i>Data Actions</i> <i>(Manipulation Tools panel)</i>	Select a column in the <i>Data Pane</i> to display the data actions. The data actions available depend on the type of data in the selected column.

Related Information

[Measures and Dimensions panel \[page 56\]](#)

[Data pane \[page 56\]](#)

[Manipulation Tools panel \[page 58\]](#)

[Data actions for columns \[page 58\]](#)

4.1 Measures and Dimensions panel

The *Measures and Dimensions* panel is located to the left of the Chart Canvas. It lists the measures, dimensions, hierarchies, and inferred dimensions in a dataset.

Table 16: Objects on the Measures and Dimensions panel

Object	Description
Measures	A map to aggregated data in a column or calculation. You use measures to get a calculated result when columns are combined. For example, a measure called Sales Revenue would represent the column Sales Revenue that contains the summed revenue for sales. Measures are automatically detected and listed.
Dimensions	A data object that represents categorical data in a dataset.
Hierarchies	A reference to more than one related column in a dataset; the columns have hierarchical relationships. For example, an object Time could include Year, Quarter, and Month columns arranged in a hierarchical structure under the top object Time.
Attributes	Maps to a column in a dataset.
Inferred dimensions	One or more columns created from geography or time data that is available to the application (to support a hierarchy).

Related Information

[Creating a geographic hierarchy with location names \[page 68\]](#)

[Creating measures \[page 72\]](#)

[Creating hierarchies \[page 64\]](#)

4.2 Data pane

The *Data* pane is the central pane that shows your data in the *Prepare* room.

Use the *Data* pane to view, organize, edit, and prepare datasets for visualizations.

Table 17: Options on the Data pane

Option	Description
Data source selection	Lists the data sources connected in the current session. You can use the list to toggle between datasets and to add datasets.

Option	Description
<i>Data filters</i>	Lists the filters that are applied to column data. You can edit or remove the filters in the list.
<i>Grid</i>	Select  to display data in columns and rows. All rows are displayed.
<i>Facets</i>	Select  to display only unique values in data, in columns. (Repeated values in columns are not shown.) Using facets can be helpful when a dataset includes many repeated values.
<i>Show/Hide columns</i>	Select  to show or hide columns in a dataset.
<i>Calculation</i>	Select  to add calculated dimensions or measures.
<i>Combine</i>	Select  to merge or append data to a dataset. You can merge data from multiple datasets into the current dataset, but the data must be compatible. You can append another dataset to the current one. Data in common columns is appended to the current dataset, and data in unique columns is added in new columns.
<i>Refresh the document data</i>	Select  to refresh the dataset(s) used in the document.
<i>Undo</i>	Select  to reverse the last action. You can undo most actions, but actions that change the underlying data, such as adding or updating the data, clear the undo history.
<i>Redo</i>	Select  to repeat the last action.

Related Information

[Editing and cleaning data \[page 60\]](#)

[Filtering data \[page 61\]](#)

[Adding a dataset \[page 77\]](#)

[Merging datasets \(JOIN\) \[page 78\]](#)

[Switching to another dataset \[page 78\]](#)

[Creating a calculated measure or dimension \[page 74\]](#)

4.3 Manipulation Tools panel

The *Manipulation Tools* panel is located on the right side of the *Prepare* room and contains tools for editing and formatting values.

Depending on the data type of the selected column, you can use the panel to perform the following tasks:

- Duplicate, rename, and remove columns
- Create calculated dimensions
- Find, replace, and change string values
- Fill in prefixes and suffixes
- Convert, trim, and group values
- Edit text strings

4.3.1 Data actions for columns

Data actions for columns containing characters, dates, and/or numbers are listed on the *Manipulation Tools* panel. The actions that are available depend on the type of data in the column.

To show the data actions available for a column, select the  icon next to the column name or right-click the name.

Table 18: Options on the DATA ACTIONS panel

Option	Description	Available from menu in column header	Available for		
			Charac- ters	Dates	Num- bers
<i>Duplicate</i>	Inserts a new column that is a copy of this column.	Yes	Yes	Yes	Yes
<i>Rename</i>	Changes the name of this column to a specified name.	Yes	Yes	Yes	Yes
<i>Split</i>	Divides this column after a specified split point and moves all string values after that point to a new column. The split can be a punctuation mark (for example, a comma) or a text string.	No	Yes	No	No
<i>Remove</i>	Removes this column.	Yes	Yes	Yes	Yes
<i>Convert Case</i>	Converts text in this column to lowercase or uppercase.	No	Yes	No	No
<i>Replace</i>	Finds a specified string in this column and replaces it with another specified string.	No	Yes	No	No

Option	Description	Available from menu in column header	Available for		
			Characters	Dates	Numbers
<i>Fill</i>	Prefixes or suffixes a specified string with a specified character, to a specified length.	No	Yes	No	No
<i>Convert to Text</i>	Converts all values in this column to text.	Yes	No	No	Yes
<i>Convert to Integer</i>	Converts all values in this column to integers.	No	Yes	No	No
<i>Convert to Number</i>	Converts all values in this column to numbers.	Yes	Yes	No	No
<i>Convert to Date/Time</i>	Converts all values in this column to dates, times, or datetimes, in the selected format.	Yes	Yes	No	No
<i>Trim</i>	Removes characters in this column before or after a specified punctuation mark or character.	No	Yes	No	No
<i>Group by Selection</i>	Creates a group for the values selected in this column.	No	Yes	Yes	Yes
<i>Group by Range</i>	Creates a group for a specified range of values in this column.	No	Yes	Yes	Yes
<i>Create Calculated Dimension</i>	Creates a new column and applies a specified function to values in the new column. For example, a "Floor" function can be applied to a "Margin" column to create a new column of margin values, rounded down to the nearest whole number.	No	No	Yes	Yes
<i>Cell inner selection</i>	In the <i>Grid</i> or <i>Facets</i> view: <ul style="list-style-type: none"> Removes text in a specified word or range of characters in this column Replaces text in a specified word or range of characters in this column Creates a new column with data copied from this column and cleaned (for example, with "resort" removed from the data) Moves specified text to the beginning of each row value in this column 	No	Yes	No	No

Option	Description	Available from menu in column header	Available for		
			Characters	Dates	Numbers
<i>Concatenate</i>	Joins two or more columns, with an optional specified separator and name for the merged column. <i>Concatenate</i> options become available when you select two or more columns.	No	No	No	No

4.4 Editing and cleaning data

You use the *Manipulation Tools* panel to edit and format values in a column. The panel is available in the *Grid* and *Facets* views.

Context

Some data actions on the *Manipulation Tools* panel are also accessible by selecting the  icon in a column name or by right-clicking the column name.

Procedure

1. Perform one of the following actions:

Option	Description
To edit all values in a single column	Select the column header.
To edit all values in multiple columns	Press <code>Ctrl</code> and select each column header.
To edit an individual value	Select a cell.
To edit multiple values in a column	Press <code>Ctrl</code> and select each cell.
To edit a range of characters or a word within a cell (cell inner selection)	(Character values only) Double-click in the <i>Grid</i> view or slow double-click in the <i>Facets</i> view, and select a range of characters or a word.

2. Open the *Manipulation Tools* panel to the right of the *Data* pane. Unique column values appear in a *Values* box at the top of the panel. You can select one or more values to edit in this box, or enter a search string in the *Find* box. Selections in the editor panel override the value selections made directly in a column. The data actions available for a column depend on the data type of the column and on whether a column, cell, or range of characters within a cell is selected.

3. Select an editing option on the *Manipulation Tools* panel, modify the values as needed, and select *Apply*.

4.4.1 Filtering data

A filter is a restriction imposed on a dataset to limit the values displayed. You create filters by choosing values or ranges of values from a dimension to include or exclude.

You can filter data in an entire dataset or in a single visualization. Filters applied to a dataset affect any chart that uses the data. However, filters applied to a visualization affect only the current chart (not the entire dataset).

In the *Prepare* room, you can add or edit dataset filters. All of the filters that are defined on the dataset appear in the filter bar at the top of the *Data* pane.

In the *Visualize* room, you can work with filters applied to the dataset as well as filters on the current visualization.

Example

If a dataset includes data on revenue for products sold over years between 1995 and 2012 and you only want to analyze revenue data for the years 2010 to 2012, you can create a dataset filter on the dimension Year to limit the values shown to this period.

When composing or viewing stories, you can also filter data in individual visualizations, in an entire page, or in the whole story. These filters don't affect data in the *Visualize* or *Prepare* room, though, and you won't be able to edit dataset filters while viewing or composing stories.

Related Information

[Filtering data in the Visualize room \[page 117\]](#)

[Filtering data in stories \[page 163\]](#)

4.4.1.1 Using the filter dialog in the Prepare room

You use the filter dialog in the *Prepare* room to define a filter on the dataset and all of the visualizations based on it.

Context

The filter dialog does not support SAP Lumira formula language or regular expressions (regex). You may need to add a calculated measure or dimension to create a more complex filter.

Procedure

1. To open the filter dialog in the *Prepare* room, select the *Options*  icon in a column header or for a dimension, and select *Filter*.

You can also select the token for an existing dataset filter to edit it in the filter dialog.

2. On the filter dialog, choose an operator from the list.
3. Specify the filter values:

Operator	Description
<i>Between</i>	Type a beginning value and an end value.
<i>Equal to, Not Equal to, Greater than, Greater than or equal to, Less than, or Less than or equal to</i>	Type a value.
<i>Contains</i>	Type a string that is contained in all of the values that you want to include. For example, filtering a dimension of clothing product categories for shirt would return values such as <i>T-shirts, long-sleeve shirts, shirt dresses</i> , and so on.
<i>Like or Not Like</i>	Type a pattern that matches all of the values that you want to filter or exclude. You can use the following wildcard characters in the pattern: <ul style="list-style-type: none"> ○ The _ character matches any single character. For example, filtering a dimension of US state abbreviations for A_ would return the values AL, AK, AR, and AZ. ○ The % character matches any number of characters. For example, filtering a dimension of US state names for A%a would return Alabama, Alaska, and Arizona.
<i>In List or Not In List</i>	Select values from the list in the filter dialog. <ul style="list-style-type: none"> ○ You can hold SHIFT while clicking values to select a range of values. ○ With alphanumeric dimensions or numeric integer dimensions, you can select the box of filter values to show the values as comma separated text. You can then type values, or paste a CSV list. If your values include commas, surround each value with quotation marks. For example, "New York, NY", "Los Angeles, CA", "Chicago, IL" If you enter a value that does not exist in the dataset or visualization, it is saved with the filter. This way, you can filter values that are added to the data after the filter is created. ○ You can also select the <i>Options</i>  icon to change the filter dialog settings, including displaying the number of times that each record occurs in the dataset, and sorting the data by value or by number of occurrences. ○ When filtering an integer or alphanumeric dimension, you can select the <i>Find</i>  icon to search for a member by name. By selecting Options > <i>Enable wildcard</i>

Operator	Description
	<i>search</i>  , you can search alphanumeric dimensions using the <code>_</code> and <code>%</code> wildcards described in the previous row.

4. Select *Apply*.

Results

The data is filtered and a token representing the filter is added above the *Data* pane.

Next Steps

You can edit the filter by selecting the token in the *Prepare* room or *Visualize* room, or remove it by selecting the *Delete*  icon.

Related Information

[Creating a calculated measure or dimension \[page 74\]](#)

4.4.2 Formatting numbers and dates

You can choose a display format for number, date, time, and datetime columns.

Context

For example, numbers can be displayed as percentages or in scientific notation, and negative numbers can be displayed in parentheses. You can also add a custom symbol or character string as a prefix or suffix to the displayed values.

Procedure

1. Open the display format dialog from the *Measures and Dimensions* panel or from the Data pane in the *Prepare* room:

- On the *Measures and Dimensions* panel, select the *Options*  icon beside a measure or dimension, and select *Display Formatting*.
 - In the *Data* pane in the *Prepare* room, select the *Options*  icon in the header of a number or date column, and select *Display Formatting*.
2. Select formatting options and select *OK*.
 - If you're adding a character string prefix or suffix, the maximum number of characters is 256.
 - For Datetime dimensions, both date and time formatting options are available.
 - Fractional seconds are available only for Datetime dimensions, and can be used only when the 24-hour time format is selected.

4.4.3 Converting data to another type

You can convert data from one type to another. For example, you can convert text to dates or numbers to text.

Procedure

1. Perform one of the following actions:
 - On the *Measures and Dimensions* panel, select the *Options*  icon next to a dimension.
 - In the *Data* pane, select the  icon in a column heading.
2. In the data conversion dialog, select options as needed, and select *OK*.

If you're converting to Date, Time, or Datetime values:

 - If the dimension you're converting contains only time values, leave the *Date* format list set to *None*.
 - If the dimension you're converting contains only date values, leave the *Time* format list set to *None*.

4.5 Creating hierarchies

If the dataset contains dimensions that logically form a hierarchy, such as Year-Quarter-Month or Country-State-City, you can define the hierarchy in the application.

Hierarchies allow you to view data at different levels of granularity. In charts that contain hierarchies, you can drill up and down through the different levels of data to gain a deeper understanding of the relationship between the dimensions and measures. The following types of hierarchies are available:

Table 19:

Hierarchy	Example
date/time	<Year>-<Month>-<Day>
geographic	<Country>-<Region>-<City> <div style="background-color: #fff9c4; padding: 10px;"> <p>→ Tip</p> <p>You must create a geographic hierarchy from your location data before plotting it on a geographic map. For example, to plot sales by city on a map, you must create a geographic hierarchy for the <city> dimension.</p> </div>
custom	<Product Type> - <Product>

Related Information

[Creating a time or date/time hierarchy \[page 65\]](#)

[Creating a custom hierarchy \[page 67\]](#)

[Creating a geographic hierarchy \[page 68\]](#)

4.5.1 Creating a time or date/time hierarchy

Use dimensions containing date or datetime information to create a time hierarchy.

Prerequisites

Your dataset must contain a dimension with a valid date or datetime format, for example:

- 1997-07-16
- 2/19/2015 1:04:26 PM

Datetime data from SAP HANA is supported. Datetime data from other data sources, such as Excel, are not currently supported.

→ Tip

The  icon indicates dimensions with a valid date or datetime format that can be used to create a date/time hierarchy.

Context

With time hierarchies, you can view and analyze your data at different time levels:

- Drill up or down through data aggregated by year, month, quarter, day, and (for datetime data) hour, minute, and second.
- Filter data based on date or time.
- Answer time-based questions, such as "What time of day are most orders placed?".

Procedure

Select the  icon next to a dimension or column that contains valid date or date/time data, and select [Create a date/time hierarchy](#).

Results

A time hierarchy is created and displayed in the *Dimensions* panel. Columns are created for each level in the hierarchy, for example:

- *Year*
- *Quarter*
- *Month*
- *Day*
- *Hour*
- *Minute*
- *Second*

Note that *Hour*, *Minute*, and *Second* are created only for datetime data.

Related Information

[Creating a custom hierarchy \[page 67\]](#)

[Hierarchical data \[page 127\]](#)

[Creating a geographic hierarchy with location names \[page 68\]](#)

[Creating a geographic hierarchy using latitude and longitude \[page 70\]](#)

[Example: Visualizing orders by type and time of day \[page 17\]](#)

4.5.2 Creating a custom hierarchy

You can create a hierarchy using any combination of the available dimensions.

Context

Use a custom hierarchy to drill through and filter data using your own defined levels, such as Product Area - Product Line - Product.

Procedure

1. Select the  icon next to the dimension or column to use as the base for the hierarchy.
2. Select *Create a custom hierarchy*.
The *Create Hierarchy* dialog appears. The dimensions available on the *Measures and Dimensions* panel are listed in the left pane. You can enter a search string to find a dimension (for example, the first letters of a dimension name).
3. Add dimensions to the hierarchy in the right pane.

→ Tip

You can double-click a dimension to move it between the panes.

4. (Optional) Use the arrows beside the hierarchy list to move a selected dimension up or down in the hierarchy.
5. Enter a name for the hierarchy, and select *Create*.
The new custom hierarchy appears on the *Measures and Dimensions* panel. New columns are created for each level of the new hierarchy.

Related Information

[Hierarchical data \[page 127\]](#)

[Creating a geographic hierarchy with location names \[page 68\]](#)

[Creating a geographic hierarchy using latitude and longitude \[page 70\]](#)

[Creating a time or date/time hierarchy \[page 65\]](#)

4.5.3 Creating a geographic hierarchy

You must create a geographic hierarchy to plot location data on a geographic chart.

The application contains a database of location information that includes countries, regions, sub-regions, and cities, plus their latitude and longitude. The application uses this data to create geographic charts.

To create a geographic chart, you must first map your geographic data to the information contained in this database by creating a geographic hierarchy.

→ Tip

The location names in the application's database are available in many different languages, so you can use location names in different languages to create a geographic hierarchy.

4.5.3.1 Creating a geographic hierarchy with location names

Data in a geographic hierarchy can be mapped on a geographic chart. Geographic hierarchies based on location names are easily understood by users.

Context

During data acquisition, the application looks for dimensions containing location names and marks them with a  icon. These dimensions are good candidates for creating a geographic hierarchy.

Procedure

1. Select the *Options*  icon next to a dimension or column, and select **► Create a geographic hierarchy ► By Names ▾**.

This option is available for string dimensions and columns.

2. In the *Geographical Data* dialog, choose which dimensions to map to the hierarchy:

→ Tip

If a geographic level, for example *Sub-Region*, does not apply to your location, select *None*. Locations can still be mapped on a geographic chart with some information missing.

Table 20:

Option	Description
<i>Show</i>	<ul style="list-style-type: none"> Select <i>All Dimensions</i> to view all possible dimensions for each level in the geographic hierarchy. Select <i>Geo dimensions</i> to view only the suggested dimensions.
<i>Country</i>	Select the dimension to map to the <i>Country</i> level.
<i>Region</i>	Select the dimension to map to the <i>Region</i> level, for example <i>State</i> or <i>Province</i> .
<i>Sub-Region</i>	Select the dimension to map to the <i>Sub-Region</i> level.
<i>City</i>	Select the dimension to map to the <i>City</i> level.

3. Select *Confirm*.

The *Geographical Data* dialog displays the mapping between the locations in your dataset and the locations in the application's database:

- Locations mapped exactly are marked with green.
- Locations with more than one possible match (for example, if more than one city named *London* was found) are marked with yellow.
- Locations not found in the geographic database are marked with red.

4. Select *All* in the *Show* list to display the mappings for all locations:

- For items marked with yellow, select the correct location from the list.
- For items marked with red, either edit the source data or ignore the error.
If a location was not found in the database, it will not be included in the geographic hierarchy.
- (Optional) For items marked with green, you can choose to remove them from the mapping.

5. Select *Done*.

Results

The geographic hierarchy is created and marked with a  icon in the *Dimensions* panel.

Next Steps

To edit the mapping of a geographic hierarchy, select the *Options*  icon next to the hierarchy and select *Edit reconciliation*.

Related Information

[Creating a geographic hierarchy using latitude and longitude \[page 70\]](#)

[Creating a time or date/time hierarchy \[page 65\]](#)

[Creating a custom hierarchy \[page 67\]](#)

[Creating a geographic hierarchy \[page 68\]](#)

4.5.3.2 Creating a geographic hierarchy using latitude and longitude

Data in a geographic hierarchy can be mapped on a geographic chart. Latitude and longitude allows mapping of all possible locations, in addition to the cities, regions, and countries available in the geographic information database.

Prerequisites

Latitude and longitude data must be numeric. If data is not numeric, you must convert column values using a formula (for example, `ToNumber ()`).

Context

The application automatically calculates levels above and below a selected geographic dimension. You can accept the calculated levels in your hierarchy or replace them with levels that you define based on your latitude and longitude data.

Table 21: Properties for a calculated level in a hierarchy

Level property	Description
Category	Definition of the level, either automatically calculated based on the latitude/longitude data or user-defined (you select the column to base a level on)
Column	For a user-defined level, select the column to use for the level.
Latitude	For a user-defined level, select the latitude data.
Longitude	For a user-defined level, select the longitude data.
Level type	Name of the level in the hierarchy

i Note

The application does not support creating geographic hierarchies with latitude and longitude data from SAP HANA data sources.

Procedure

1. Ensure latitude and longitude dimensions are numeric.

Use the following steps to create a numeric dimension:

- a. Select *Options*  next to the latitude or longitude dimension and select *Create Calculated Dimension*.

The *New Calculated Dimension* dialog opens. The name of the dimension appears in the *Formula* windows, for example *{Latitude}*.

- b. In the *Functions* pane, select and double-click the formula *ToNumber*.

The formula *ToNumber* is added to the *Formulas* dialog.

- c. Add the dimension name to the formula, for example *ToNumber({Latitude})*.
- d. Enter a name for the calculated dimension in *Dimension Name* and select *OK*.
- e. Repeat these steps for the longitude dimension.

2. If you want to create a geographical hierarchy based on the longitude and latitude for a dimension or column, then perform the following:

- a. Choose the *Options*  next to the latitude or longitude dimension
- b. Navigate to  *Create a geographic hierarchy*  *By Latitude/Longitude* 

The Geographical Data dialog box appears.

- c. Select the required latitude and longitude on which you want to define the hierarchy.
- d. To select the geographical level, perform one of the following:

Option	Action
For geographical hierarchy with one level	Select any option except <i>Other</i>
For geographical hierarchy with two or more level	<ol style="list-style-type: none">1. Select <i>Other</i>2. Choose <i>Next</i> The Generate parent levels dialog box appears.3. Select the parent level hierarchy based on your requirement

3. Choose *Finish*.

Results

The geographic hierarchy is created and marked with a  icon in the *Dimensions* panel.

Related Information

[Hierarchical data \[page 127\]](#)

[Creating a geographic hierarchy with location names \[page 68\]](#)

[Creating a calculated measure or dimension \[page 74\]](#)

[Creating a custom hierarchy \[page 67\]](#)

[Creating a geographic hierarchy \[page 68\]](#)

4.6 Creating measures

Measures enrich datasets. You can manually create them at any time directly from a column or dimension or by using the formula language to create a calculated measure, or you can allow the application to detect them automatically on numeric column data types when a dataset is acquired.

i Note

When using a *Connect to SAP HANA* data source, it is not possible to create a measure with a numeric or string dimension. Measures in *Connect to SAP HANA* data sources are detected directly from the SAP HANA Analytic view. Measures must be created in the SAP HANA view, before being acquired automatically in the application.

i Note

When using a *Connect to SAP HANA* data source, it is not possible to change the aggregation type of a measure.

Related Information

[Creating a measure from a column or dimension \[page 72\]](#)

[Creating a calculated measure or dimension \[page 74\]](#)

4.6.1 Creating a measure from a column or dimension

You can create a measure from almost any column or dimension.

Context

These exceptions apply:

- When the column data type is *Numeric*, any aggregate function can be used for the measure.
- When the column data type is *Date* or *String*, neither *Sum* nor *Average* can be used.
- Aggregation is performed when the measure is used in the *Facets* view. It is not available in the *Grid* view.

Table 22: Aggregate functions

Function	Description
<i>Sum</i>	Returns the sum of a measure
<i>Min</i>	Returns the smallest value in a set of values
<i>Max</i>	Returns the largest value in a set of values
<i>Count (Distinct)</i>	Returns the number of distinct values in a set of values
<i>Count (All)</i>	Returns the number of values in a set of values
<i>Average</i>	Returns the average value of a measure
<i>None</i>	<p>Allows a numeric dimension to be used as a measure, without aggregation. This type of measure enables each value to be visualized in a graph, which is useful for certain types of graphs.</p> <p>For example, for a scatter plot that displays margin and quantity-sold values, this option displays all points on the scatter plot and shows the spread of individual values that would not be apparent using an aggregation function.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>i Note</p> <p>The aggregation type <i>None</i> is not supported when using a <i>Connect to SAP HANA</i> data source.</p> </div>

Procedure

1. Select the  icon on a column heading or next to the dimension to use as the basis for the measure, and select *Create a measure*.
A measure is created in the *Measures* section of the *Measures and Dimensions* panel.
2. Select the  icon next to the new measure, select *Change Aggregation*, and select an aggregate function.

Next Steps

Switch to the *Facets* view to see the measure applied to data in a dataset. Select the measure to see changes to data values caused by aggregation.

4.6.2 Creating a calculated measure or dimension

You can create calculated measures and dimensions using the SAP Lumira formula language.

Context

The following features are supported in the formula editor:

- Combining any two columns in a dataset
- Applying functions from a predefined set of numeric, date, and text functions
- Using "if," "then," "else" clauses
- Using automatic completion to improve editing speed
- Using a calendar picker for date parameters
- Copying text and syntax to a function definition

Procedure

1. Select the *Options* icon next to a measure or dimension and then select *Create Calculated Measure* or *Create Calculated Dimension*.
2. Enter a name for the measure or dimension.
3. Double-click one or more measures or dimensions and functions to add them to the *Formula* syntax box.
4. Enter parameters for the function and associated information based on the function task.
You must enter the names of columns used in the formula. Automatic completion will suggest a column name after you start entering the first letter.
5. If you are inputting calendar information, select the *Select a Date* button at the bottom of the functions list, and use the date picker to select dates.
6. Select *OK* to apply the formula.
A measure or dimension is created.

Related Information

[Lumira functions reference \[page 205\]](#)

4.7 Sharing Datasets

Context

You can export a dataset to either a CSV format or Microsoft Excel format from SAP Lumira to your local system. The following restrictions apply while exporting or publishing a dataset:

- Both visible and hidden objects will be exported
- Filters and sorting cannot be used
- Columns that are referenced more than once in a dataset are exported multiple times

Procedure

1. Start SAP Lumira.
2. Choose *Prepare* room.
3. Choose ► *File* ► *Export As File* ⌵.

The *Export As File* dialog box appears.

4. (Optional) Select an export option:
 - To apply dataset filters to the exported data, select *Export with filters*.
 - To export hidden dimensions in the dataset, select *Export hidden dimensions*.
 - To export hidden dimensions resulting from enrichment of the dataset, select *Export hidden dimensions derived from the dataset enrichment*
Two examples of these columns are the Latitude and Longitude columns generated for geography hierarchies that are created by geographical names.
5. Choose *Export*.
6. Choose a convenient location to save the file and choose the file format to save the dataset.

4.8 Publishing a dataset to SAP HANA

When you publish a dataset to SAP HANA, only the dataset is published (not associated visualizations).

Prerequisites

Before you publish the time hierarchies to SAP HANA, the following prerequisites apply:

- The maximum calendar range must be 50 years.
- The SAP HANA calendar system table must be available, and the calendar must be Gregorian. SAP Lumira uses time information from the SAP HANA server to match data to the SAP HANA Gregorian calendar.

Procedure

1. Start SAP Lumira.
2. Choose *Prepare* Room.
3. Select the dataset that you want to publish.
4. Choose **File > Publish > SAP HANA**.
The *Publish to SAP HANA* dialog box appears.
5. Enter your connection details.
6. Choose *Connect*.
The dialog box appears with the list of *Available Views*.
7. Select the required view.
8. Choose *Publish*.

Results

The dataset is published as a new analytic view.

5 Working with multiple datasets

You can add a dataset to the available datasets, move between datasets, merge or append two datasets, and use data from more than one dataset inside a visualization.

When combining datasets, two datasets are merged using a JOIN operator, and two matched datasets are merged using a UNION operator. Appended datasets are compatible and have an equivalent number of columns in the merged table.

Using multiple datasets within a visualization is called dataset linking.

Related Information

[Adding a dataset \[page 77\]](#)

[Switching to another dataset \[page 78\]](#)

[Merging datasets \(JOIN\) \[page 78\]](#)

[Appending datasets \(UNION\) \[page 79\]](#)

[Removing a dataset \[page 81\]](#)

[Dataset linking \[page 81\]](#)

5.1 Adding a dataset

You can open multiple datasets in the same document, and you can add a dataset to a document.

Procedure

1. In the datasets list at the top of the *Data* pane, select *Add Dataset*.
2. In the *Add new dataset* dialog, select a data source in the *Select a Source* or *All Recently Used* pane, and select *Next*.
3. Enter connection information for the dataset, and select *Create*.

Results

Data from the dataset is acquired in the document.

5.2 Switching to another dataset

You can have multiple datasets open in a document at the same time and switch from one dataset to another, which you would likely do when preparing a merge between two datasets or when using multiple datasets in a visualization (dataset linking).

Procedure

In the datasets list at the top of the *Data* pane, select the dataset to switch to.

Results

The dataset you selected is now the active dataset.

5.3 Merging datasets (JOIN)

Use the JOIN operator to merge two datasets.

Prerequisites

- The merging dataset must have a key column.
- Only columns with the same data type can be merged.
- The merge process combines all columns.

Context

Columns in the second dataset are matched to a key column in the original dataset. The application proposes potential column matches and the probability of each match.

Procedure

1. Select the *Combine*  icon, and select *Merge*.

- In the *Merge Data* dialog, select the key column to use as the identifying column for matching.
- Perform one of the following actions:

Option	Description
If the dataset to merge is already available in the document	Select the dataset in the list above the right pane.
If the dataset to merge is not open	Select <i>Add New Dataset</i> , and select the data source to merge.

Columns that can be matched, based on the key column in the original dataset, are listed under *LOOKUP DATASET*.

- Select a column in the *LOOKUP DATASET* list.
If the selected columns are compatible, the *Merge* button is enabled.
- Select *Merge*.

Results

Columns in the second dataset are added to the original dataset.

i Note

If you want to restore the original dataset, you can undo the merge operation, or remove the merged dataset and reacquire the original dataset.

Related Information

[Appending datasets \(UNION\) \[page 79\]](#)

5.4 Appending datasets (UNION)

Use the UNION operator to append two datasets.

Prerequisites

Both tables in the union must contain an equivalent number of columns and compatible data types. Only a dataset that is compatible with the target dataset can be appended.

Procedure

1. Select the *Combine*  icon, and select *Append*.
2. In the *Append Data* dialog, perform one of the following actions:

Option	Description
If the dataset to append is already available in the document	Select the dataset in the list above the right pane.
If the dataset to append is not open	Select <i>Add New Dataset</i> , and select the data source to acquire and append.

If the dataset to append is compatible with the original dataset, dimension columns are listed under *APPEND DATASET* on the right side of the pane. A sample of distinct values for each selected dimension appears in the *Sample of Distinct Values* column.

3. To select a different source dimension for the union with the matching target dimension, select another dimension in the list.
If the selected dimension contains a compatible data type, the dimension can be appended. If a `Union cannot happen` message appears, the selected dimension didn't contain a compatible data type and you must select a compatible dimension.
4. Select *Append*.

Results

The two datasets are combined. The combined dataset retains the column names of the original dataset.

Note

If you want to restore the original dataset, you can undo the append operation, or remove the combined dataset and reacquire the original dataset.

Related Information

[Merging datasets \(JOIN\) \[page 78\]](#)

5.5 Removing a dataset

You can remove a dataset from a document.

Procedure

1. Expand the datasets list at the top of the *Data* pane.
2. Select the *Remove Dataset*  icon next to the dataset.

Results

The dataset and any visualizations based on it are deleted.

5.6 Dataset linking

If you have multiple datasets that contain related data, but you don't want to wait for your technical staff to perform a time-consuming database merge, you can link the datasets while you're performing your analysis, in a Lumira Desktop visualization.

A visualization with linked datasets contains one or more links between dimensions from separate datasets, and measure values from those datasets. These datasets are not merged or joined prior to the visualization. Instead, data is aggregated from each dataset separately, and then joined on one or more common linked dimensions, to produce a result set that is visualized in a chart or table.

Dataset linking lets you enrich your own data, by adding columns that your IT organization may not provide. For example, if you're tracking sales performance for several account managers, but you have them assigned to virtual teams, or you have them weighted differently across different accounts, you can add this enrichment to an offline spreadsheet of your own, and link that information with your visualizations or tables to properly calculate the right sales numbers (performance and targets).

These terms are specific to dataset linking:

Primary dataset	The dataset that is used when first creating a visualization.
Secondary dataset	A dataset that is added to an existing visualization that is based on a primary dataset. There is no limit to the number of secondary datasets you can add.
Primary (or secondary) dimension	A dimension from the primary (or secondary) dataset.

Link A relationship between dimensions in different datasets. For example, a <Year> dimension in Dataset1 and a <Year> dimension in Dataset2 can be linked, so that a visualization can display data from both datasets.

Active linked dimensions The set of dimensions that the datasets are linked on.

With traditional database merging, if your data contains multiple instances of records, you have to decide which level you want to roll up your data to, and then join the databases at that level. With dataset linking, the data is automatically aggregated up to the level of the primary dimensions that you link.

When working with linked datasets, there are various visual indications:

- In the *Visualize* room, dimensions, measures, and filters from the primary dataset are identified by the primary dataset icon .
- The link icon is shown on the tokens for linked dimensions .
- When linking datasets, you can choose between these types of joins:

Join type	Description
 <i>Left Outer Join</i>	Returns all rows from the primary dataset, even if there are no matches in the secondary dataset.
 <i>Inner Join</i>	Returns rows where there is a match in both datasets.
 <i>Full Outer Join</i>	Returns all rows from both datasets.
 <i>Exception</i>	Returns only the rows from the primary dataset that do not have a match in the secondary dataset.

i Note

- Some features are not available when working with linked datasets. For example, Related Visualizations and influence analysis are not available if the current dataset doesn't match the dataset used in the current visualization, or if the visualization uses linked datasets. Also, facet view is not available when a visualization contains multiple datasets.
- You cannot link online data sources with offline data sources.
- Secondary datasets always link to the primary dataset; not to other secondary datasets.
- When you add a filter on a linked dimension, the list of values is the combination (union) of the lists of values from all datasets used in the visualization.
- When working with linked datasets, sometimes a measure from a secondary dataset may show duplicated values. This is usually caused by insufficient linked dimensions. Lumira detects when the duplicated measure values occur, and prompts you to update the linked dimensions.
- When linking datasets, a message may be displayed if the default java heap size is insufficient. Depending on the size of your result set, you may need to increase the heap size value as follows:
 1. Open the `SAPLumira.ini` file, located at `<LumiraInstallDir>\SAPLumira\Desktop`.
 2. Find the heap size setting: `-Xmx1024m` (default value).

3. Change the setting to a larger value; for example, `-Xmx2048m`. The value must be no greater than the amount of physical memory you have in your machine, in megabytes. For example, 2048 = 2 GB.
4. Save the file and restart Lumira Desktop.

Related Information

[Creating a dataset from a visualization \[page 141\]](#)

[Adding or modifying a predefined chart \[page 96\]](#)

[Influence analysis \[page 144\]](#)

5.6.1 Linking datasets in the Visualize room

Procedure

1. In the *Visualize* room, starting with a visualization that already contains dimensions or measures from one dataset (the primary dataset), add a second dataset (the secondary dataset).

You can add a second dataset in two ways:

- From the menu, select **Data > Add new dataset**.
- From the dataset selector above the Chart Canvas, select the down-arrow and select *Add Dataset*.

2. In the *Add new dataset* dialog, choose a dataset and select *Create*.

The secondary dataset becomes active, and the *Measures and Dimensions* panel shows the objects in the secondary dataset.

3. Add a dimension or measure from the secondary dataset to the visualization.

The *Define Dataset Links* dialog opens. Here, you define and manage links between dimensions in the two datasets.

In the *DATASETS IN USE* area in the Chart Builder, the primary dataset is indicated by the "primary dataset" icon .

You can also use the + button in the *DATASETS IN USE* area to start linking datasets, or to include additional secondary datasets in the current visualization.

4. By default, the datasets are linked using a left outer join . If you want to change the join type, select the join icon in the *DATASETS IN USE* area.

Results

- When dimensions and measures from both datasets are added to the visualization, the primary dataset icon appears in the tokens for the primary dimensions and measures .

- When a linked dimension is added to the visualization, a link icon appears in the dimension's token .
- When you select a visualization with linked datasets in the Visualization Gallery, the visualization is displayed in the Chart Canvas, the dataset selector displays the primary dataset used in the visualization, and the *Measures and Dimensions* panel shows the objects in that primary dataset.

→ Tip

In the *DATASETS IN USE* area, the *Active Linked Dimensions* area shows the set of linked dimensions for the datasets. You can use the + button to add other linked dimensions from the primary dataset. You can also remove a linked dimension from the active linked dimensions list, which automatically removes that dimension from the visualization. However, removing a dimension from the visualization does not automatically remove the dimension from the active linked dimensions.

→ Tip

If any active linked dimensions aren't added to the visualization, a warning icon appears, to inform you that nonmeaningful aggregations may be taking place. For example, consider this situation:

- Your chart shows population figures by country and city.
- Your datasets are linked on *Country* and *City* dimensions.

When you display both *City* and *Country* dimensions in your visualization, populations of Los Angeles and New York appear as 4,000,000 and 9,000,000. But when you exclude the *City* dimension from your visualization, the population values by country are calculated as averages by default. This results in an aggregated figure of 6,500,000 for the USA, which may not be the aggregation you want. In such cases, you

can change the aggregation method for a measure: select the *Settings*  icon beside a measure and then select *Calculate Total As*.

5.6.2 Creating and managing dataset links

Context

Use the *Define Dataset Links* dialog to create and manage links between dimensions in your datasets.

Procedure

1. In the *Visualize* room, access the *Define Dataset Links* dialog in one of these ways:
 - From the menu, select **▸ Data ▸ Link Datasets ▾**.
 - From the dataset selector above the Chart Canvas, select the down-arrow and select *Link Datasets*.
 - From the *Measures and Dimensions* panel, select the *Options*  icon for a dimension and select *Link Datasets*.

-
2. From the dimension lists, select a dimension from one dataset.

A link is initiated below the dimension lists.

Select the light-bulb icon  to see which dimensions from the other dataset Lumira considers the best linking candidates. Also, when you position the pointer over dimensions, sample values are displayed to help you choose which dimensions to link.

3. Select a dimension from the other dataset to complete the link.

6 Visualize room—creating charts

These are the main areas where you interact with the *Visualize* room:

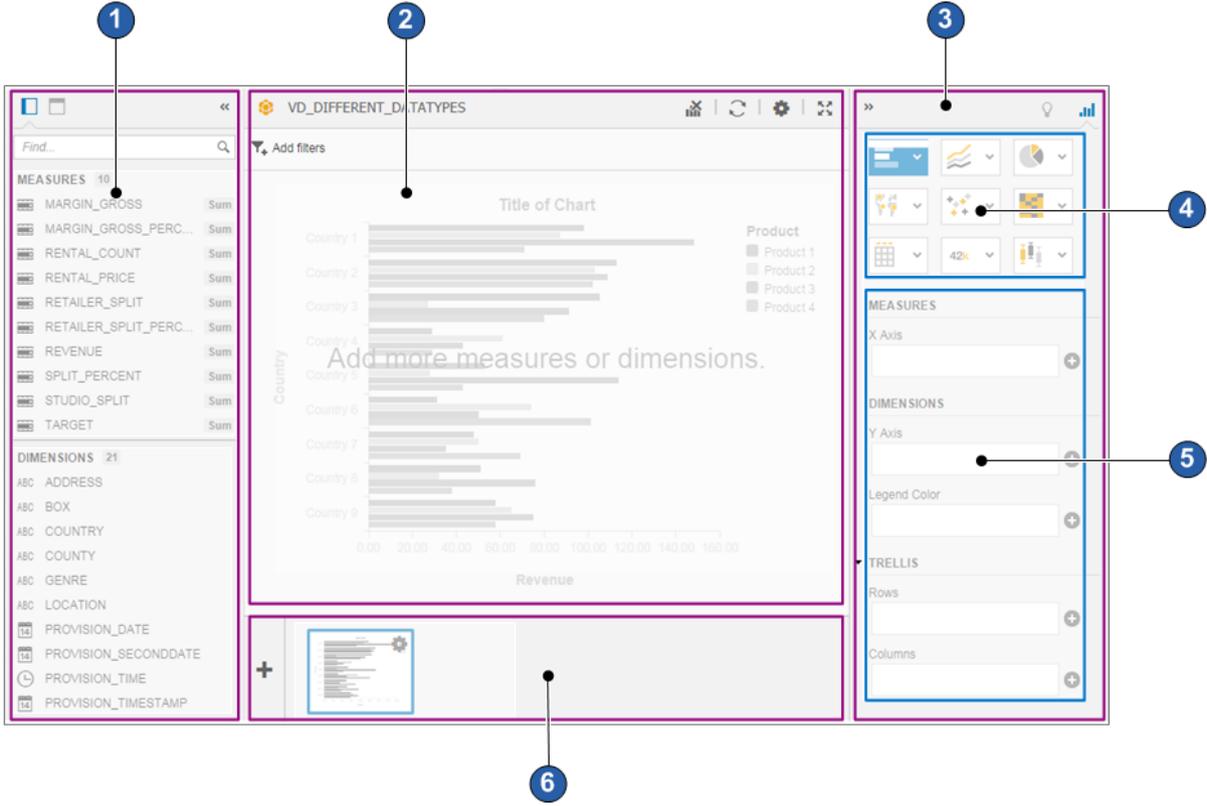


Table 23: Legend: Areas in the Visualize room

Number	Area	Description
1	<i>Measures and Dimensions</i> panel	<p>Use this panel to view, sort, select, and filter the data in a visualization. Data is grouped into measures (for quantitative data) and dimensions (for categorical data). Measures and dimensions can be dragged directly to the Chart Canvas or to shelves in the Chart Builder.</p> <p>The panel has two orientations:</p> <ul style="list-style-type: none"> • In the <i>Vertical Orientation</i>  layout, dimension hierarchies can be viewed and expanded, and you can search for measures and dimensions by name. • In the <i>Horizontal Orientation</i>  layout, the data associated with each dimension is displayed in a column above the Chart Canvas. You can search for specific data values within a dimension, select multiple values to include or exclude from a visualization, and view the measures associated with a dimension.

Number	Area	Description
2	Chart Canvas	<p>Use this area to create, modify, and explore a visualization. Build a chart by dragging measures and dimensions directly to the Chart Canvas or to shelves in the Chart Builder.</p> <p>Quickly adjust the content or appearance of a visualization with the toolbar buttons in the upper-right corner of the Chart Canvas:</p> <ul style="list-style-type: none"> •  <i>Fit Chart to Frame</i>: For a bar, column, or line chart, activate this setting to display all of the datapoints on the screen at once. When it is deactivated, you can focus on a smaller set of members and use a scroll bar to navigate the data. •  <i>Reprompt</i>: For data with SAP HANA variables or input parameters, opens the prompt dialog, where you select new prompt values. •  <i>Create new conditional formatting rule</i>: For a bar chart, column chart, or crosstab, select this icon to apply custom formatting to data points that meet a condition that you define. To manage existing conditional formatting rules, select the arrow next to the icon and select <i>Manage Rules</i>. •  <i>Sort</i>: Organizes chart data by measure. •  <i>Add or edit a ranking by measure</i>: Focuses a chart on a specified number of the highest or lowest dimension members. •  <i>Clear Chart</i>: Removes all dimensions and measures from a chart and any filters applied to the chart, not including dataset filters. •  <i>Refresh</i>: Refreshes the chart data. •  <i>Settings</i>: Sets the chart properties. •  <i>Maximize</i>: Expands the Chart Canvas to full-screen mode. •  <i>Undo</i>: Reverses the last action. You can undo most actions, but actions that change the underlying data, such as adding or updating the data, clear the undo history. •  <i>Redo</i>: Repeats the last action.

Number	Area	Description
3	Visualization Tools (The example shows the Chart Builder.)	<p>To switch between a left or right layout for the Visualization Tools panel, select File > Preferences > Charts > Position of Chart Builder.</p> <p>Use the tools at the top of this panel to switch between the <i>Chart Builder</i>  tab and the <i>Related Visualizations</i>  tab.</p> <ul style="list-style-type: none"> • Use the <i>Chart Builder</i> tab to change the chart type and to customize a chart. • Use the <i>Related Visualizations</i> tab to choose predefined charts that were automatically generated from the measures and dimensions in the current dataset. <ul style="list-style-type: none"> ◦ Add related visualizations to the current story and modify them. ◦ View all chart suggestions by selecting <i>Show All</i>. ◦ Remove measures or dimensions that were used to generate a visualization with the <i>Filter related visualizations</i>  icon. This refines the list of related visualizations that are available to you. <p>Use the <i>Related Visualizations</i> tab to access influence analysis, which suggests visualizations based on how dimensions contribute to a selected measure.</p>
4	Chart Picker	Use to select the type of chart to use for a visualization.
5	Shelves	Use to add measures and dimensions to a visualization. When you drag a measure or dimension to a shelf, the Chart Canvas updates automatically.
6	Visualization Gallery	<p>Use to create new visualizations and to select between visualizations in a story.</p> <ul style="list-style-type: none"> • Create a visualization by selecting the <i>Create new visualization</i>  icon. • Remove or copy a visualization by selecting the <i>Settings</i>  icon. • Change the order of visualizations in the Visualization Gallery by dragging them to a different order.

Related Information

[Creating charts \[page 90\]](#)

[Working with the Chart Builder \[page 91\]](#)

[Chart properties \[page 93\]](#)

6.1 Creating charts

You can create charts on the Chart Canvas or by using the Chart Builder. All charts included in a story are accessible in the Visualization Gallery under the Chart Canvas.

6.1.1 Creating a chart directly on the Chart Canvas

You can quickly create a chart by dragging measures and dimensions to the Chart Canvas in the central area of the *Visualize* room.

Context

A chart must have at least one measure. When you add a dimension to the chart, its values are calculated based on the chart's measures.

Procedure

1. In the *Visualize* room, select the *Chart Builder*  icon.
2. Select a chart type from the lists in the Chart Builder.
Bar Chart is the default chart type, but you can change the chart type.
3. Select a measure and drag it to an axis on the Chart Canvas.
Text in the chart body guides you to the correct axis for the measure. A check mark appears when you drag the measure over an area where it can be dropped.
4. Select a dimension and drag it to the Chart Canvas.
Text in the chart body guides you to the correct axis for the dimension. A check mark appears when you drag the dimension over an area where it can be dropped.

→ Tip

When you add a measure or dimension to the chart, or remove one, Lumira queries the dataset even if the resultant chart will be incomplete. When working with large online datasets, you may be able to improve performance by clearing the option *Update data for incomplete charts* in the *Charts* preferences, and adding dimensions to the chart before adding measures (most charts are minimally complete once they contain a measure).

5. Add additional measures and dimensions as required.
For example, if you selected *Column Chart 2 Y-Axes*, you must add a measure or dimension to the Y-Axis on the left side of the Chart Canvas and to the Y-Axis on the right side of the Chart Canvas.

-
6. To filter the data in the chart, select the [Add filters](#)  icon at the top of the Chart Canvas, and select a dimension to filter on.

Results

The chart is available in the Visualization Gallery.

Next Steps

Each new chart that you create in the [Visualize](#) room is automatically saved in the current session and is available in the [Compose](#) room, but it is not saved in the document. To access the chart the next time you open the story, you must save the document.

Related Information

[Filtering data in the Visualize room \[page 117\]](#)

[Saving a story \[page 151\]](#)

[Compose room—creating stories with visualizations \[page 147\]](#)

6.1.2 Working with the Chart Builder

You can use the Chart Builder to change the chart type and to customize a chart.

The Chart Builder has different types of shelves (measures, dimensions, and trellis) for each chart type. Measures and dimensions can be dragged or added to shelves.

Table 24: Measure shelves

Measure shelf	Description
Axis	An X or Y axis of a bar and column chart, line chart, scatter chart, bubble chart, box plot, radar chart, or waterfall chart. Multiple axis shelves may be available. For example, when you select a Bar Chart With 2 X-Axes , the Top X Axis and Bottom X Axis shelves appear.
Color	The color used for each area in a heat map chart, or each word in a tag cloud.
Column Width	The width of each column in a marimekko chart

Measure shelf	Description
<i>Height</i>	The thickness of each section in a pie with depth chart
<i>Measures</i>	The measures that are displayed in a crosstab. You can move the <i>Measures</i>  token to the <i>Rows</i> or <i>Columns</i> shelf to choose where the measures appear.
<i>Primary Values</i>	The primary values in a parallel coordinates chart
<i>Size</i>	The size of sections in a pie chart, bubbles in a bubble chart, areas in a tree map, or the size of words in a tag cloud
<i>Value</i>	The primary value used in a funnel chart or the number displayed in a geographic chart or numeric point chart
<i>Word Weight</i>	The weighting of text in a tag cloud

Table 25: Dimension shelves

Dimension shelf	Description
<i>Animation</i>	Adds an animation to a scatter chart. When you select the <i>play</i> button below a chart, the chart cycles through the values of the dimension added to this shelf.
<i>Axis</i>	An axis of a bar and column chart, line chart, box plot, heat map, or waterfall chart. Multiple axis shelves may be available. For example, if you select a <i>Bar Chart</i> , the <i>Y Axis</i> shelf appears.
<i>Category</i>	A section of data in a funnel chart or parallel coordinates chart
<i>Color</i>	The color of data points in a chart, including bar and column charts, line charts, pie charts, scatter charts, geographic charts, box plot charts, and radar charts. To set a color palette for the chart, select <i>Choose Colors</i> from the <i>Settings</i>  menu.
<i>Geography</i>	A data point in a geographic chart
<i>Radar Branches</i>	The quantitative variables represented on axes starting from the same point in a radar chart
<i>Shape</i>	The shape of each entry in a legend and of each data point for a scatter chart or radar chart
<i>Tag</i>	The text displayed in a tag cloud
<i>Time Dimension</i>	The horizontal axis of a <i>Line Chart for Date/Time Series</i> .

Table 26: Crosstab shelves

Crosstab shelf	Description
<i>Columns</i>	The column axis of a crosstab. You can add dimensions to this shelf, and move the <i>Measures</i>  token to this shelf to display measures on the columns.
<i>Rows</i>	The row axis of a crosstab. You can add dimensions to this shelf, and move the <i>Measures</i>  token to this shelf to display measures on the rows.

Table 27: Trellis shelves

A trellis chart is a set of small charts shown in a grid for comparison. Each small chart represents one item in a section. For example, if you create a bar chart that compares revenue by region, and then add the *<Country>* dimension to the trellis, multiple small charts appear. Each small chart displays the revenue by region for one country.

Trellis shelf	Description
<i>Rows</i>	The rows in a trellis chart. For example, if you place the <i><Year></i> dimension on the <i>Rows</i> shelf, the trellis chart will contain a row for each year in the <i><Year></i> dimension.
<i>Columns</i>	The columns in a trellis chart. For example, if you place the <i><Year></i> dimension on the <i>Columns</i> shelf, the trellis chart will contain a column for each year in the <i><Year></i> dimension.

Related Information

[Creating a chart with the Chart Builder \[page 94\]](#)

[Adding or modifying a predefined chart \[page 96\]](#)

6.1.2.1 Chart properties

Setting the properties for a chart can enhance its usability. For example, adding labels and legends can improve the visual analysis of data.

To set chart properties, select the *Settings*  icon above the Chart Canvas.

Table 28: Chart properties

Property	Description
<i>Normal Stacking or 100% Stacking</i>	<p>Applies to charts where each data point is divided into segments, such as stacked column charts and area charts.</p> <p><i>Normal Stacking</i> allows you to compare the absolute values of data points and their segments.</p> <p>With <i>100% Stacking</i>, percentage values are displayed on the measures axis, allowing you to compare the proportional value of each segment across different data points.</p>
<i>Horizontal or Vertical</i>	Switches the orientation of the chart between horizontal and vertical.
<i>Show Title</i>	Adds a title to the chart. You can edit the title at any time.
<i>Show Legend</i>	Adds a legend that shows a different color for each measure in a chart. To add dimensions to the legend in different colors, select <i>Color</i> in the Chart Builder.
<i>Choose Colors</i>	Opens the <i>Choose colors</i> dialog, which allows you to choose the colors that appear in the chart, as well as a template that sets the visual style of the chart.
<i>Show Data Labels</i>	Displays measure values for each dimension in a chart.
<i>Use Measures As a Dimension</i>	<p>Plots two or more measures as a dimension in a chart to show how data is spread over multiple measures on a single axis.</p> <p>You must add at least two measures to a chart before selecting this option. The measures appear as a new dimension in the Chart Builder.</p>
<i>Set Axis Scale</i>	<p>Defines the limits for values displayed on the Y Axis, either as a range or automatically to the highest measure value.</p> <p>This option applies only to charts with measures on the Y Axis.</p>
<i>Show Gridlines</i>	Displays gridlines on the chart.

6.1.2.2 Creating a chart with the Chart Builder

Use the Chart Builder when you need more control over chart creation. (You can use the Chart Canvas for simpler charts.)

Procedure

1. In the *Visualize* room, select the *Chart Builder*  icon.

2. In the Chart Builder, select the chart type to create.

Bar Chart is the default chart type, but you can change the chart type at any time.

3. Select an empty shelf in the Chart Builder, and select measures and dimensions in the list that appears.
Or, drag a measure or dimension to an empty shelf.

Each chart must have at least one measure. When you add a dimension to a chart, the dimension values are calculated based on the chart's measures.

→ Tip

When you add a measure or dimension to the chart, or remove one, Lumira queries the dataset even if the resultant chart will be incomplete. When working with large online datasets, you may be able to improve performance by clearing the option *Update data for incomplete charts* in the *Charts* preferences, and adding dimensions to the chart before adding measures (most charts are minimally complete once they contain a measure).

4. Add additional measures and dimensions as required.

For example, if you selected *Column Chart 2 Y-Axes*, you must add a measure or dimension to the Y-Axis on the left side of the Chart Canvas and to the Y-Axis that appears on the right side of the Chart Canvas.

5. To filter the data in the chart, select the *Add filters*  icon at the top of the Chart Canvas, and select the dimension to filter on.

6. Select **File > Save** to save the visualization in the document.

Results

The chart is available in the Visualization Gallery and the *Compose* room.

Related Information

[Filtering data in the Visualize room \[page 117\]](#)

[Saving a story \[page 151\]](#)

[Compose room—creating stories with visualizations \[page 147\]](#)

[Working with the Chart Builder \[page 91\]](#)

6.1.2.3 Adding or modifying a predefined chart

The *Related Visualizations* tab contains predefined chart suggestions that are based on the measures and dimensions in a dataset.

Context

You can select any chart on the *Related Visualizations* tab to immediately start visualizing data and then modify the chart for your information requirements.

Procedure

1. In the *Visualize* room, select the  icon in the Visualization Gallery to add a new chart to the current document.
This ensures that an existing chart is not replaced.
2. Select the *Related Visualizations*  icon.
3. In the list of chart suggestions, select *Show All* to display all chart suggestions.
4. Select the chart to add.
The chart appears on the Chart Canvas and its measures and dimensions are loaded in the Chart Builder.
5. To add or modify dimensions and measures, select the Chart Builder  icon to switch back to the Chart Builder:
 - To add a measure or dimension to the chart, drag it to an empty shelf.
 - To remove a measure or dimension, position the pointer over it and select the *Remove*  icon. Or, drag a measure or dimension off a shelf.
6. To filter the data in the chart, select the *Add filters*  icon at the top of the Chart Canvas, and select a dimension to filter on.
7. Select  *File* > *Save*  to save the visualization in the document.

Results

The chart is available in the Visualization Gallery.

Related Information

[Filtering data in the Visualize room \[page 117\]](#)

[Saving a story \[page 151\]](#)

[Compose room—creating stories with visualizations \[page 147\]](#)

[Working with the Chart Builder \[page 91\]](#)

6.1.2.4 Renaming a chart

The title displayed above a chart is generated automatically from the measures and dimensions added to the chart.

Procedure

Select the *Options*  icon next to a chart title, select *Rename*, and enter a new title.

➔ Tip

You can double-click a chart title to quickly change it.

6.1.2.4.1 Restoring a chart's default title

After a chart's title has been changed, if necessary, you can restore the original title that was generated automatically from the measures and dimensions in the chart.

Procedure

Select the *Options*  icon beside a chart title, and select *Restore Default Title*.

6.1.2.5 Modifying chart colors and appearance

In Lumira Desktop, you can create and customize the appearance of charts and perform the following:

- For dimensions, you can create a custom palette from preferences or visualizations.
- For measures, you can create a custom palette from preferences or visualizations.

You can create or edit palettes while in preferences and save them to palettes. While in visualizations however, you can only modify the color palettes for the particular visualization you are in.

i Note

- When you create a chart, the color and template settings that you set in the *Chart Style* section of the *SAP Lumira Preferences* dialog are applied by default. Select **File > Preferences > Charts** to access these settings.
- The *Choose Colors* option is not available for some chart types, such as crosstabs, numeric point charts, and charts with two X or Y axes. Default palette colors are not applied to these charts. The default template is applied to these charts, with the exception of the crosstab.

6.1.2.5.1 Color palettes for Dimensions

6.1.2.5.1.1 Creating a Dimension Color Palette from Preferences

Context

This section describes how to create a custom dimension palette from preferences.

Procedure

1. To create a dimension custom palette from preference, launch the Lumira Desktop and choose **File > Preferences > Charts**.
2. To create the dimension palette, select the *Default Dimension Palette* dropdown list.
3. Choose *Create Dimension Palette*.
The *Create Dimension Palette* dialog appears.
4. To choose the required custom color palette, perform the following:
 - a. Choose the  icon
 - b. Select the required color from the color picker.
 - c. Select the required color shade from the color picker.
 - d. Enter the name for the palette in the text box.
 - e. Choose *Done*.
5. If you want to set a color palette as default, select the required *User Defined palettes* or *Standard palettes* from the *Default dimension Palette* dropdown list.

Results

You have now created a color palette. The palette that you have created is listed under the *Default Dimension Palette* dropdown list under *User Defined Palettes*.

6.1.2.5.1.2 Creating a Dimension Color Palette from Visualizations

Prerequisites

Choose a chart type and add one or more dimensions and measures to the chart before customizing its appearance.

Note

You can also use an existing visualization or chart for customizing its appearance.

Context

This section describes how to create a custom dimension palette from Visualizations.

Procedure

1. Launch Lumira desktop.
2. Open a document that you want to view.
3. Choose the required visualization.
4. Right click on the visualization and select *Choose Colors...*

Note

You can select the  (Settings icon) above the chart canvas and select *Choose Colors...*

5. In the *Palette* dropdown list, choose the *Customize Dimension Palette* option to customize your color palette. *Customize Dimension Palette* appears.
6. Choose .

Note

If the boxes are already filled with colors, the  icon is not displayed.

7. Select the required color from the color picker.
8. Select the required color shade from the color picker.
9. Select the *Save As New Palette* option.

i Note

If you don't choose the *Save As New Palette* option, the colors that you customized will only be applicable for the particular visualization you are working in.

10. Enter the name for the palette.
11. Choose *Done*.

Results

You have now created a color palette. The palette that you created is listed under the *Default Dimension Palette* dropdown list under *User Defined Palettes*.

6.1.2.5.1.3 Editing a Dimension Color Palette

Context

This section describes how to edit a dimension color palette from preferences.

Procedure

1. To edit a dimension color palette from preferences, launch the Lumira Desktop and select **File > Preferences > Charts > .**
2. To edit dimension color palette, choose the required color palette from the *Default Dimension Palette* dropdown list.
3. Edit a color from the referenced palette by selecting the .
The *Create Dimension Palette* dialog appears.
4. If you want to add more colors, perform the following:
 - a. Choose the  icon.
 - b. Select the required color from the color picker.
 - c. Select the required color shade from the color picker.
5. If you want to remove the existing color from the box, choose the color and choose .

-
6. Choose *Done*.

Results

You have now edited a color palette.

6.1.2.5.1.4 Deleting a Dimension Color Palette

Context

This section describes how to delete dimension color palettes from preferences.

Procedure

1. To delete dimension custom palettes from preferences, launch the Lumira Desktop and choose **File** > **Preferences** > **Charts**.
2. To delete dimension custom palette, select the required color palette from the *Default Dimension Palette* dropdown list.
3. Choose the  (delete) icon.
The *Delete Custom Palette* dialog appears.
4. Choose *OK*.

Results

You have now deleted a color palette.

6.1.2.5.2 Color Palettes for Measures

6.1.2.5.2.1 Creating a Measure Color Palette from Preferences

Context

This section describes how to create a custom measure palette from preferences.

Procedure

1. To create a measure custom palette from preferences, launch the Lumira Desktop and select **File > Preferences > Charts**.
2. To create the measure palette colors, select the *Default Measure Palette* dropdown list.
3. Choose *Create Measure Palette*.

The *Create Measure Palette* dialog appears.

4. To choose the required custom color palette, perform the following:
 - a. In the *Number of Colors* dropdown list, you can use between two and nine different colors in the palette.

i Note

The number of colors setting is reverted to five when you choose a new palette.

- b. To create a single color gradient, choose the  icon from the top or bottom box and select a color from the color picker.
 - c. To create a double color gradient, choose the  icon from the top or bottom box and select a color from the color picker.
 - d. Enter a name for the palette.
 - e. Choose *Done*.
5. If you want to set a color palette as default, select the required *User Defined Palettes* or *Standard Palettes* from the *Default Measure Palette* dropdown list.

Results

You have now created a color palette. This is listed in the *Default Measure Palette* dropdown list, under *User Defined Palettes*.

6.1.2.5.2.2 Creating a Measure Color Palette from Visualization

Prerequisites

You have chosen a chart type and added one or more dimensions and measures to the chart before customizing its appearance.

i Note

You can also use an existing visualization or chart to customize its appearance.

Context

This section describes how to create custom measure palette from Visualization.

Procedure

1. Launch Lumira desktop.
2. Open a document that you want to view.
3. Choose the required visualization.
4. Right-click on the visualization and select *Choose Colors...*

The *Choose Colors* dialog appears.

i Note

- You can select the  (Settings icon) above the chart canvas and select *Choose Colors...*
- Some charts, such as heat maps, tree maps, tag clouds, geo maps, and geographic choropleth charts, can display measure-based colors.
- For geographic choropleth charts, you can customize individual colors in each palette. Select one of the color swatches at the top of the *Choose colors* dialog to change the color.
- For heat maps, tree maps, tag clouds, and geo map layers that use choropleth as the data point type, several additional options are available.

5. Choose the required color palette from the *Palette* dropdown list.
6. In the *Color Threshold* area, under the *Number of Colors* dropdown list, you can use between two and nine different colors in the palette.

The Number of Colors setting is reverted to five when you choose a new palette.

i Note

This step is applicable to measure palettes created from visualization only.

7. If you want to create a single color gradient, choose the  icon from the top or bottom box and select a color from a color picker in the *Color Threshold* area.
8. If you want to create a double color gradient, choose the  icon from the top or bottom box and select a color from a color picker in the *Color Threshold* area.
9. Select the *Apply Color Gradient* check box. This automatically creates a new palette based on the selected colors.

i Note

1. If you select the *Apply Color Gradient* button and increase or decrease the color count in the *Number of Colors* dropdown list, then following changes occur:
 - Threshold is regenerated.
 - Colors are regenerated based on the first color
2. If you unselect the *Apply Color Gradient* button and increase the color count in the *Number of Colors* dropdown list, then following changes occur:
 - Threshold values for the additional steps remains same as the previous value.
 - Colors for the additional steps remains same as the previous color.
3. If you unselect the *Apply Color Gradient* button and decrease the color count in the *Number of Colors* dropdown list, then following changes occur:
 - Thresholds are truncated.
 - Colors are truncated.

10. In the *Color Threshold* area, you can type numeric values in the fields for each color in order to set the color thresholds. Invalid entries are highlighted in red. You can also select *Reverse* to change the order of the palette colors from light to dark, or vice versa.
11. Select the *Save As User Defined Palette* option.

i Note

If you don't select the *Save As User Defined Palette* option, the colors that you have customized will only be applicable for the particular visualization you are working in.

12. Enter the name for the palette.
13. To customize the style of the chart, select an option from the *Template* list.

The three template options available are Standard, Flashy and High contrast.
14. Choose *OK*.

You have now created a color palette. The palette that you created is listed in the *Default Measure Palette* dropdown list dropdown under *User Defined Palettes*.

6.1.2.5.2.3 Editing a Measure Color Palette

Context

This section describes how to edit measure color palettes from preferences.

Procedure

1. To edit measure color palettes from preferences, launch the Lumira Desktop and choose ► [File](#) ► [Preferences](#) ► [Charts](#) ►
2. To edit measure color palettes, select the required color palette from the [Default Measure Palette](#) dropdown list.
3. Edit a color from the referenced palette by selecting the  (edit) icon.
The [Create Measure Palette](#) dialog appears.
4. To edit the palette colors, perform the following:
 - a. In the [Number of Colors](#) dropdown list, you can use between two and nine different colors in the palette.

Note

The Number of Colors setting is reverted to five when you choose a new palette.

- b. To edit a single color gradient, choose the icon from the top or bottom box and select a color from the color picker.
 - c. To edit a double color gradient, choose the icon from the top or bottom box and select a color from the color picker.
 - d. To switch from dual color gradient to single color gradient, choose .
5. Choose [Done](#).

Results

You have now edited a color palette.

6.1.2.5.2.4 Deleting a Measure Color Palette

Context

This section describes how to delete a measure color palette from preferences.

Procedure

1. To delete a measure palette from preferences, launch the Lumira Desktop and select **File > Preferences > Charts**.
2. To delete measure palette, choose the required color palette from the *Default Measure Palette* drop down list.
3. Choose the  (delete) icon.
The *Delete Custom Palette* dialog appears.
4. *OK*.

Results

You have now deleted a measure color palette.

6.1.2.6 Plotting measures as a dimension in a chart

Plotting measures as a dimension in a chart can show how data is spread over multiple measures on a single axis.

Context

You can include two or more measures as a dimension in a chart. Each measure is plotted as a dimension value on an axis or in a separate chart. (For trellis charts, measures always appear in a separate chart.) The chart automatically updates to show the new measure dimension.

Procedure

1. In the *Visualize* room, drag a measure to the *Measures and Dimensions* panel on the Chart Canvas.
2. Drag a second measure directly under the first measure, and drag each additional required measure under the previous measure.
3. Select the *Settings*  icon on the Chart Canvas menu bar, and select *Use Measures as a Dimension*.
For example, if the Revenue_Margin measure dimension is on an *X Axis* box and the Product_Line dimension is in the *Color* box, each measure is plotted on the *X Axis* with Product_Line values shown in distinguishing colors.
Measures appear as a new measure dimension on the *Measures and Dimensions* panel.

4. To display each measure in a separate chart, drag the combined measure to the *Columns* or *Rows* box on the *Trellis* panel.
The chart displayed is split by each measure name.

6.1.2.7 Splitting measures by color

When working with combined column line charts with multiple measures, you can choose which measures are split by the color dimensions.

For example, you may be analyzing the number of issues reported for retail goods each year, as well as the customer satisfaction rating, on a combined column line chart with 2 Y-axes. You add product line to the *Color* shelf to see which lines are responsible for the most issues, but you still want to see the overall customer satisfaction for all product lines combined.

You can choose which measures to split on the following chart types:

- Combined Column Line
- Combined Stacked Line
- Combined Column Line Chart with 2 Y-Axes
- Combined Stacked Line Chart with 2 Y-Axes

Each measure is split by the color dimensions by default. To stop splitting a measure, select the *Settings*  icon for the measure in the Chart Builder, and deselect *Split by color dimension(s)*. The measure is now shown as a single line or a single set of columns. In the previous example, you can deselect this setting for the customer satisfaction measure.

i Note

The *Split by color dimension(s)* setting is available when the following conditions apply to a visualization:

- No rankings, running calculations, or predictive calculations are applied.
- Two or more measures from the primary dataset have been added. The setting is not available for measures from a secondary dataset.
- The *X Axis* shelf has at least one dimension from the primary dataset.
- The *Color* shelf has at least one dimension from the primary dataset that is not present on the *X Axis* shelf.
- For datasets linked by an inner join or exception, the linked dimension cannot be added to the *Color* shelf.

If the visualization no longer meets all of these conditions, all measures are split by the color dimensions by default.

6.1.2.8 Custom charts

You can add custom charts to the chart selection bar by installing visualization extensions.

Visualization extensions let you use chart types that aren't included with the application. For information about the sample charts provided with the application or how to create extensions, see the *Visualization Extension Plugin for SAP Web IDE Guide*.

Related Information

[Visualization extensions \[page 190\]](#)

6.2 Chart types

Some types of data are especially suited to a particular chart type.

Table 29: Charts for different types of analysis

Type of analysis	Description	Charts available
<i>Comparison</i>	<p>Compares differences between values or shows a simple comparison of categorical divisions of measures.</p> <p>For example, use a bar chart to compare the differences in sales revenue between countries.</p>	<ul style="list-style-type: none">• Bar Chart• Column Chart• Column Chart with 2 Y-Axes• 3D Column Chart• Marimekko Chart• Radar Chart• Area Chart• Tag Cloud• Heat Map• Crosstab
<i>Percentage</i>	<p>Shows the percentage of parts in a whole or values as ratios to a whole. The legend shows the percentage and the total values.</p> <p>For example, use a pie chart to see who had the highest sales as part of a total sales value directly:</p> <p>Total sales = \$200, Paul had 10% (\$20), David had 65% (\$130), and Susan had 25% (\$50)</p>	<ul style="list-style-type: none">• Pie Chart• Donut Chart• Pie with Depth Chart• Stacked Column Chart• Tree• Funnel Chart

Type of analysis	Description	Charts available
<i>Correlation</i>	Shows the relationship between values or compares multiple measure values. For example, you can view the correlation of two measures and understand the impact of the first measure on the second measure.	<ul style="list-style-type: none"> • Scatter Plot • Scatter Matrix Chart • Bubble Chart • Network Chart • Numeric Point • Tree
<i>Trend</i>	Shows a trend in the data values (especially for dimensions that are time-based, such as Year) or the progression of your data and possible patterns. For example, you can use a line chart to view sales revenue trends of a product throughout a range of years.	<ul style="list-style-type: none"> • Line Chart • Line Chart for Date/Time Series • Line Chart with 2 Y-Axes • Combined Column Line Chart • Combined Column Line Chart with 2 Y-Axes • Scatter Plot for Date/Time Series • Bubble Chart for Date/Time Series • Waterfall Chart • Box Plot • Parallel Coordinates Chart
<i>Geographic</i>	Shows a map of the country object used in the analysis and can optionally show data for dimensions (sorted by the country on the map) or the geographical spread of data for a country. The dataset you use must contain geographical data. Before creating a geographic chart, you must have an Esri ArcGis Online account.	<ul style="list-style-type: none"> • Geo Bubble Chart • Geo Choropleth Chart • Geo Pie Chart • Geo Map

6.2.1 Combining Dimensions in a Date/Time Series Chart

You can add two or more date dimensions to a *Date/Time Series* chart.

Prerequisites

You have a dataset with two or more date columns.

Context

Each date dimension in a continuous axis can now have a separate chart in the *Time Series* chart. You can plot a chart by combining a date dimension from one column with two or more other date columns of the dataset. In this release, the Date/Time series chart supports three chart types, such as *Line Chart for Date/Time Series*, *Scatter Plot for Date/Time Series*, and *Bubble Chart for Date/Time Series*.

You can analyze the status of a project for example by plotting the following information:

- Running sum of tasks versus the **scheduled** completion date
- Running sum of tasks versus the **actual** completion date

The Time Series chart would then show whether a project was ahead of or behind schedule, and when the largest deviations from the schedule occurred.

In this release, you can find the following enhancements in *SAP Lumira desktop edition*:

- In the *Scatter Plot for Date/Time Series* and *Bubble Chart for Date/Time Series* chart types, you can use different shapes depending on your requirements using the *Shape* shelf. Different shapes for each entry are highlighted in the legend with different colors. The legend shows the shapes of each entry selected in a visualization for every date dimension.
- In the *Line Chart for Date/Time Series*, you can zoom to a specific data point. Drag your mouse on the chart area, choose *Zoom* in the dialog box and select the range for a selected dataset.
- In the *Line Chart for Date/Time Series*, you can define reference line to show the most important values on the visualization chart. For more information, see [Adding a reference line \[page 126\]](#) Adding a reference line.

Procedure

1. Create a new chart for *Date/Time Series* chart.
2. Add one or more measures to the *Y axis* shelf.
3. Add a date dimension to the *Time dimension* shelf.
4. Select the  icon next to the dimension you added in the previous step, and choose *Combine Dimensions*.

The *Combine Dimensions* dialog box appears. You can only combine columns of the same type.

5. In the *Combine Dimensions* dialog box, select the dimensions(s) you want to add to the chart, then choose *Apply*.

Results

The date dimensions are combined and added to the *Date/Time Series* chart. The *Color* shelf is automatically updated to show each combination of measure and dimension. The legend depicts the different date columns that are used in a visualization with different colors.

You can use these additional features with this chart type:

- Link datasets to expand your analysis. For example, you can add team information by task from a secondary dataset, and use input controls to see how well each team followed the schedule. Note that the date dimension must come from the primary dataset.
- Use filters to focus on specific areas of the visualization. Use the  icon, or select an area of the chart and use the resulting context menu.

i Note

In this release, you can combine two different date column for the datasets having **Date** type as the dimension. Combination of date columns for data types such as **DateTime** and **Date hierarchy** are not supported.

6.2.2 Analyzing data in crosstabs

Crosstabs show data points only as values, rather than providing a visual representation of those values. As a result, they are useful when your analysis depends on viewing exact values, or examining data from multiple measures with different scales or units of measurement.

In addition to regular sorting and ranking functionality, you can also use conditional formatting in crosstabs to help identify noteworthy data points, and add totals on the rows or columns.

Crosstab shelves

With a crosstab, you can add one or more measures to the *Measures* shelf, and switch the display of the measures between the columns and rows by moving the *Measures*  token. Dimensions can be added to the rows, columns, or both, allowing complex multidimensional analysis.

For example, a crosstab could be an effective way of examining the sales revenue for a list of products. You could create a crosstab with the Revenue measure and Year dimension on the columns and the Product dimension on the rows, making it easier to spot relationships between the two dimensions. You might also add a Product Category dimension to the outside of the row axis and choose to display the *Sum* total for the Product dimension, which would display the sum of sales revenue for the products in each category.

i Note

You can sort a crosstab by a measure, however, the sort is removed if a dimension is added to the same axis as the measures.

Right-click menu options

Right-click a crosstab cell in the *Visualize* room for these options:

Cell type	Right-click menu options
Dimension name	<ul style="list-style-type: none"> • Create a conditional formatting rule based on the dimension, or manage conditional formatting rules. • Add a total for the dimension, or manage totals. • Set cell sizes and label sizes for the entire crosstab.
Dimension member name	<ul style="list-style-type: none"> • <i>Filter</i> or <i>Exclude</i> the member. • Create a conditional formatting rule based on the dimension, or manage conditional formatting rules. By default, the conditional formatting rule will apply to members greater than the one that you right-clicked. If you selected multiple members, it will apply to the list of selected members. • Add a total for the dimension, or manage totals. • Set cell sizes and label sizes for the entire crosstab.
Measures  token	<ul style="list-style-type: none"> • Manage conditional formatting rules. • Manage totals. • Set cell sizes and label sizes for the entire crosstab.
Measure name	<ul style="list-style-type: none"> • Sort the data by the measure (not available if a dimension is added to the same axis). You can also sort data by measure by selecting the sort icon next to a measure name. • Create a conditional formatting rule based on the measure, or manage conditional formatting rules. • Add a total for the measure, or manage totals. • Set cell sizes and label sizes for the entire crosstab.
Measure value	<ul style="list-style-type: none"> • Create a conditional formatting rule based on the measure, or manage conditional formatting rules. • Manage totals. • Set cell sizes and label sizes for the entire crosstab.

You can also filter and exclude dimension members after selecting them.

Adding totals in a crosstab

To get a summary of your data, you can choose to add totals for dimensions on the rows or columns of the crosstab. Totals show an aggregation, such as a sum or an average, of the values of each measure.

Right-click a dimension in the crosstab, or select the *Settings* icon for a dimension in the *Columns* or *Rows* shelf. Choose *Totals* to select a total that you want to display.

If you want to configure multiple totals, select  *Totals* . In the *Totals* dialog, you can choose a dimension, select the totals that you want to display for that dimension, and drag the totals to reorder where they will appear in the crosstab.

To ensure that grand totals are always visible, select [Anchored Totals](#). The crosstab will always show grand totals while you scroll through the data. Anchored totals do not apply in exported PDFs.

Totals can be set in the [Visualize](#) room, in the [Compose](#) room, or while viewing a story.

Resizing crosstab cells

- Resizing individual columns:
Select and drag the border at the right side of the column. You can resize dimensions in the rows or dimension members in the columns.
- Resizing individual rows:
Select and drag the lower border of the row. Increasing the row height allows text wrapping for the names of dimensions, measures, and dimension members. Measure values remain on the same line, however.
- Managing cell and label sizes for the entire crosstab:
Right-click any cell in the crosstab and select [Set Size Properties](#) to set the column and row size for the entire crosstab, as well as sizes for the column labels and row headers. Select [Preview changes](#) to show the new cell sizes as you change them. If you select [Reset defaults](#), all cells will be reverted to the default size for a new crosstab.

You can resize crosstab cells and labels when working with stories in the [Compose](#) room, and when viewing stories.

Migration of tables from previous versions of SAP Lumira

Documents created in SAP Lumira 1.25 and earlier versions may contain tables. When you open these documents in the current version of the software, the tables are converted to crosstabs.

The following relationships between shelves are used to migrate tables to crosstabs:

Table	Crosstab
Primary Values shelf	Measures shelf (The Measures  token is added to the Columns shelf in the crosstab by default.)
Rows Axis shelf	Rows shelf
Rows Subtotals shelf	The total is enabled for the appropriate dimension in the Totals dialog.

In addition, the crosstab shows all conditional formatting rules that were applied in the table.

Related Information

[Working with crosstabs in stories \[page 171\]](#)

6.2.3 Analyzing data in Geo Maps

Prerequisites

- Your document contains a dataset with a geographical dimension.
- You have to enter the server details and select the connection type in the *Geo Map Service* section of the *SAP Lumira Preferences* dialog. For more information see, [Configuring Geo Maps in Preferences \[page 198\]](#)

Procedure

1. In the *Visualize* room, add a new visualization and select *Geo Map* from the *Geographic Charts* list.
2. For the first layer, select the type of data point:
 - *Choropleth*: Geographic regions are shaded with a color that represents their measure value. You can customize the measure-based color palette by selecting *Choose Colors* from the layer *Options* list.
 - *Bubble*: Bubbles are overlaid on each region, with different sizes and colors based on the measure and dimension that you add. Select *Cluster adjacent bubbles* to group bubbles together for regions that are close to each other.
 - *Marker*: A marker is added to each geographic region in the dimension that you add. Adjacent data points can be grouped together by selecting *Cluster adjacent markers*.
 - *Pie*: A pie chart is overlaid on each region, sized according to the measure that you add and divided by the dimension that you add to the *Color* shelf. You can display donut charts instead of pie charts by selecting *Show as donut*.
3. Select the **+** icon next to the *Geo Dimension* shelf and choose a geographical dimension for the layer.
4. If necessary, add a measure or dimension to other shelves for the layer.
5. To add another layer, select *Add Layer* and repeat steps 3 to 5 for the layer.

There are several options for managing multiple layers in a geo map:

- Select the checkbox next to a layer to toggle the layer visibility.
- Select the *Options* icon for a layer to change the layer order, or to delete the layer.

i Note

To customize the Esri map based on your requirements, choose the *Import Esri Custom Service* in the *Visualize* room. This provides you with the option of customizing the *Geo Map* with **feature services** that are added to your Esri ArcGIS account.

The feature services supported in Esri server connections are also supported in Esri On Premise server connections.

6.3 Data sorting in charts

You can sort measures and dimensions in charts in ascending or descending order.

6.3.1 Sorting by measure

Prerequisites

Before you can sort by measure, if chart data is filtered by rank, the rank must be removed.

Procedure

1. Select a measure on the Chart Builder.
2. Select the *Settings*  icon, and select *Sort Ascending* or *Sort Descending*.

→ Tip

Select the *Sort*  icon on the Chart Canvas toolbar to quickly change the sort order.

Results

The chart data is sorted.

6.3.2 Sorting dimensions

When the *Measures and Dimensions* panel is displayed in a horizontal orientation, you can sort dimensions that are visible in the panel. Sorting dimensions does not affect the data displayed in a visualization.

Procedure

1. Select the *Horizontal Orientation*  icon on the *Measures and Dimensions* panel.

-
2. Select the dimension to sort, and select the *Options*  icon.
 3. Choose a sort order:
 - For a numeric dimension, select *Sort Lowest to Highest* or *Sort Highest to Lowest*.
 - For an alphanumeric dimension, select *Sort A to Z* or *Sort Z to A*.
 - For a date or time dimension, select *Show Earliest to Latest* or *Show Latest to Earliest*.

Results

The data in the dimension column is sorted.

6.3.3 Sorting dimensions by occurrence on the Measures and Dimensions panel

You can sort dimensions visible in the *Measures and Dimensions* panel by the number of times each dimension value occurs in a dataset.

Context

Sorting dimensions does not affect the data displayed in a visualization.

Procedure

1. Select the *Horizontal Orientation*  icon on the *Measures and Dimensions* panel.
2. Display the number of occurrences:
 - a. Position the pointer over the dimension to filter.
 - b. Select the *Options*  icon, and select *Show Measure* and *Occurrences*.
The number of occurrences appears beside each dimension value in the column.
3. Sort by occurrence:
 - a. Position the pointer over the dimension that you selected in step 2.
 - b. Select the *Options*  icon, and select *Sort by Measure Lowest to Highest* or *Sort by Measure Highest to Lowest*.

Results

Data in the dimension column is sorted by occurrence.

6.4 Filtering data in the Visualize room

In the *Visualize* room, you can create filters that affect all visualizations based on the current dataset, or just filter data for the current visualization.

You can filter data in the *Visualize* room in the following ways:

- By selecting the *Add filters*  icon
- By selecting the *Options*  icon for a dimension on the *Measures and Dimensions* panel and selecting *Filter*
- By selecting data points in a chart to filter or exclude them
- By selecting the data to display on the *Measures and Dimensions* panel

As well, you can use the ranking by measure feature to filter data by measure.

Related Information

[Filtering data by rank \[page 121\]](#)

6.4.1 Using the filter dialog in the Visualize room

Context

You use the filter dialog in the *Visualize* room to define a filter on the current visualization only, or on the dataset and all of the visualizations based on it.

Tokens representing active filters are displayed above the Chart Canvas, including dataset filters and visualization filters. Dataset filters appear to the left, and have a darker background.

Procedure

- To open the filter dialog in the *Visualize* room, select the *Add filters*  icon above the Chart Canvas and choose a dimension to filter, or select the *Options*  icon for a dimension in the *Measures and Dimensions* panel and select *Filter*.

If a dimension includes a dimension hierarchy  icon, select **+** to expand the list to show all dimensions included in the hierarchy.

You can also select the token for an existing filter to edit it in the filter dialog.

- On the filter dialog, choose an operator from the list.
- Specify the values to filter:

Operator	Description
<i>Between</i>	Type a beginning value and an end value.
<i>Equal to, Not Equal to, Greater than, Greater than or equal to, Less than, or Less than or equal to</i>	Type a value.
<i>Contains</i>	Type a string that is contained in all of the values that you want to include. For example, filtering a dimension of clothing product categories for shirt would return values such as <i>T-shirts</i> , <i>long-sleeve shirts</i> , <i>shirt dresses</i> , and so on.
<i>Like or Not Like</i>	Type a pattern that matches all of the values that you want to filter or exclude. You can use the following wildcard characters in the pattern: <ul style="list-style-type: none"> The _ character matches any single character. For example, filtering a dimension of US state abbreviations for A_ would return the values AL, AK, AR, and AZ. The % character matches any number of characters. For example, filtering a dimension of US state names for A%a would return Alabama, Alaska, and Arizona.
<i>In List or Not In List</i>	Select values from the list in the filter dialog. <ul style="list-style-type: none"> You can hold SHIFT while clicking values to select a range of values. With alphanumeric dimensions or numeric integer dimensions, you can select the box of filter values to show the values as comma separated text. You can then type values, or paste a CSV list. If your values include commas, surround each value with quotation marks. For example, "New York, NY", "Los Angeles, CA", "Chicago, IL" <p>If you enter a value that does not exist in the dataset or visualization, it is saved with the filter. This way, you can filter values that are added to the data after the filter is created.</p>

Operator	Description
	<ul style="list-style-type: none"> You can also select the <i>Options</i>  icon to change the filter dialog settings, including displaying the number of times that each record occurs in the dataset, and sorting the data by value or by number of occurrences. When filtering an integer or alphanumeric dimension, you can select the <i>Find</i>  icon to search for a member by name. By selecting  <i>Options</i>  <i>Enable wildcard search</i> , you can search alphanumeric dimensions using the <code>_</code> and <code>%</code> wildcards.

- Choose *Apply to Current Visualization* to apply the filter only to the chart that you are working with, or choose *Apply to Entire Dataset* to apply the filter to all visualizations that are based on the dataset.
- Select *Apply*.

Results

The data is filtered and a token representing the filter is added above the Chart Canvas.

Next Steps

You can edit the filter by selecting the token in the *Prepare* room or *Visualize* room, or remove it by selecting the *Delete*  icon.

Related Information

[Exploring a visualization in a story \[page 154\]](#)

6.4.2 Filtering or excluding data points in a chart

You can exclude non-relevant data points or filter data points to focus a chart on a specific set of data.

Procedure

- On the Chart Canvas, select the data points to exclude or filter.

➔ Tip

You can drag a box around a group of data points to select the group.

2. In the tooltip that appears, select *Filter* or *Exclude*.

Results

The data in the chart is filtered and a token representing the filter is added above the Chart Canvas.

Next Steps

You can edit the filter by selecting the token in the *Prepare* room or *Visualize* room, or remove it by selecting the *Delete*  icon.

Related Information

[Exploring a visualization in a story \[page 154\]](#)

6.4.3 Filtering data with the Measures and Dimensions panel

Procedure

1. Select the *Horizontal Orientation*  icon to display the *Measures and Dimensions* panel in a horizontal layout.
2. On the *Measures and Dimensions* panel, select one or more data points in the dimension to filter.
3. Select the *Options*  icon.
4. Depending on the kind of filter to apply, select one of the following options:

Option	Description
<i>Clear Selections</i>	Clears all values selected in the dimension
<i>Include</i>	Includes selected values in the chart. A filter token with the selected values appears on the filter bar.

Option	Description
<i>Exclude</i>	Excludes selected values from the chart. A filter token with the selected values in a strike-through font appears on the filter bar.

Results

The data in the chart is filtered and a token representing the filter is added above the Chart Canvas.

Next Steps

You can edit the filter by selecting the token in the *Prepare* room or *Visualize* room, or remove it by selecting the *Delete*  icon.

6.4.4 Filtering data by rank

Filtering data by rank focuses a visualization on a specified number of data points with the highest or lowest values.

Procedure

1. On the Chart Canvas toolbar, select the *Add or edit a ranking by measure*  icon.
2. In the *Ranking* dialog, select the measure to rank.
3. Select *Top* or *Bottom* as the focus of the ranking.
4. Choose the number of results to display.
The default number is three.
5. Select *(ALL)* to rank data based on all dimensions, or select the dimension to rank data on.
For example, if a chart shows Sales Revenue by Country and Product Line, ranking the top five data points by Country shows data for each product line in the five countries with the highest sales revenue.
6. Select *OK*.

Results

The data is filtered by rank and a token representing the filter is added above the Chart Canvas. Only one ranking can be applied to a visualization at a time.

Next Steps

You can edit the ranking by selecting the token in the *Prepare* room or *Visualize* room, or remove it by selecting the *Delete*  icon.

With visualizations that contain linked datasets, the ranking is applied to the result set of the linked datasets, not the datasets prior to the link operation.

6.5 Conditional formatting

Conditional formatting can highlight important data points in a chart by distinguishing values that meet a condition (such as being greater than a certain number or within a specific range).

You can define multiple conditional formatting rules on one or more measures or dimensions in the following chart types:

- all types of bar and column charts, except 3D column charts
- pie chart
- donut chart
- scatter chart
- bubble chart
- crosstab

For the following charts, you can define conditional formatting rules on dimensions that are added to the *Color* shelf, or to the *Rows* or *Columns* shelves in the *Trellis* section:

- all types of line charts, except area charts

You can also apply conditional formatting rules to measures displayed as lines in all types of line charts. The only operator available for these rules is the *is any value* operator.

These rules are preserved when you switch between chart types, and will be applied to any valid chart type.

The *Rules Manager* dialog allows you to work with the rules that you have created for a chart.

Crosstabs support custom formatting for the text and background color of cells. For other charts, you can change the color of bars, columns, line, and pie slices, but text formatting does not apply.

Example

In a bar chart with a measure that shows inventory shrinkage at your company's retail outlets, you could use conditional formatting to identify stores with high rates of shrinkage. A conditional formatting rule could change the bar color to red for each store with shrinkage higher than an amount you specify.

Multiple conditional formatting rules

- When you create multiple conditional formatting rules based on the same measure or dimension, data points may meet the condition for multiple rules. When this happens, the formatting for each rule that applies to a data point (that is, active rules) is considered a set. Formatting for each set will be applied or ignored, depending on the rule priorities.
- For each data point, the formatting set for the highest-priority active rule is applied first. Formatting for lower priority rules can also be applied. However, if two formatting sets for active rules modify the same attribute, none of the formatting defined for the lower priority rule is applied to the data point.
- For each data point, bold and italic formatting can be applied only by the highest priority active rule.

Example

A crosstab cell meets the conditions for three conditional formatting rules. The highest-priority active rule sets the font to Times New Roman. The rule with the second highest priority sets the background color to red. A final rule would set the background color to black and the font color to white, but that rule is ignored because it conflicts with the second rule.

6.5.1 Creating a conditional formatting rule

Prerequisites

Before you can define a conditional formatting rule, the chart must have a measure added to it.

Procedure

1. Select the *Create new conditional formatting rule*  icon.
For crosstabs, you can also right-click a cell, a measure, a member, or a selection of members, and choose **► Conditional Formatting ► New Rule ►** to create a rule based on it.
2. In the *Rule Editor* dialog, enter a name for the rule.
The name allows you to identify the rule in the *Rules Manager* dialog, and also appears in the legend of the chart, if applicable. If you do not enter a name, the rule will be named automatically, based on the condition that you set.
3. In the *Based On* list, select a measure or dimension.
This measure determines the values that are used in the rule and the data points where formatting appears. You can set multiple conditional formatting rules on a single measure or dimension.
4. Select an operator, and enter one or more values for the condition.
In all types of line charts, conditional formatting rules based on measures displayed as lines can only use the *is any value* operator.

For conditional formatting based on dimensions, choose *in list* or *not in list* to select values from a list of dimension members. In this list, you can also sort members, search for members using wildcard characters, and paste CSV lists of member names.

5. Select *Format*, choose the appearance of data points that meet the condition, and select *OK*.

Crosstabs can display the background color as well as the text style that you set. For other chart types, only the background color can be applied.

6. In the *Rule Editor* dialog, select *OK*.

Results

The conditional formatting rule is applied to the chart. By default, new conditional formatting rules have higher priority than older rules.

Next Steps

If needed, you can use the *Rules Manager* dialog to change the priority of rules.

6.5.2 Managing conditional formatting rules

Use the *Rules Manager* dialog to edit, add or remove, turn on or off, and set the priority order of conditional formatting rules.

Prerequisites

Before you can manage conditional formatting rules, a chart must have a measure added to it.

Procedure

1. Select the arrow beside the *Create new conditional formatting rule*  icon, and select *Manage Rules*.
2. In the *Rules Manager* dialog, perform any of these actions:

Option	Description
To create a rule	Select the  icon.

Option	Description
To delete a rule	Select the - icon.
To modify a rule	Select a rule and select <i>Edit Rule</i> .
To disable a rule	Clear the check box in the <i>Applied</i> column next to the rule name. Disabled rules are not applied to the chart, but you can turn them on again if necessary.
To change the priority of a rule	Select a rule and use the <i>Change Rule Order</i> icons to move it higher or lower in the list.

3. Select *OK*.

6.6 Reference lines

On some chart types, you can define reference lines to show important dates or values on your chart. For example, you can add reference lines that represent the dates of key project milestones.

You can add reference lines to these types of charts:

- Line Chart
- Line Chart for Date/Time Series
- Area Chart (100% Stacking not supported)
- Combined Column Line Chart
- Combined Stacked Line Chart
- Line Chart with 2 Y-Axes
- Combined Column Line Chart with 2 Y-Axes
- Combined Stacked Line Chart with 2 Y-Axes
- Bar Chart
- Column Chart
- Stacked Bar Chart (100% Stacking not supported)
- Stacked Column Chart (100% Stacking not supported)
- Bar Chart with 2 X-Axes
- Column Chart with 2 Y-Axes
- Scatter Plot
- Bubble Chart

Lumira provides two types of reference lines: *Fixed Value*, and *Dynamic Value*. Fixed-value reference lines are created with a specific reference value, and don't change when you change the data in your chart; for example if you filter your data. Dynamic-value reference lines are updated when filters, ranking, and sorting are applied to the chart.

Reference lines aren't visible on unsupported chart types, but once created, they will appear if you switch to one of the supported chart types listed above.

When you place the pointer over a reference line, a tooltip shows you the corresponding value and label.

6.6.1 Adding a reference line

Procedure

1. In the *Visualize* room, or while exploring a visualization in the *Compose* room, right-click an empty area in the visualization, and select *Add Reference Line*.

You can also select the toolbar button .

2. Choose whether you want to create a reference line at a fixed value or a dynamic value.
For example, if your visualization is showing parts costs, you could choose the fixed value **500**, or you could select the dynamic value *Average* by choosing the `Cost` measure and the *Average* aggregation.
3. If you chose a fixed value, follow these steps:
 - a. Select an axis to add the reference line to.
 - b. Enter a reference value.

For a date/time axis, you can choose a date value for each reference date, or you can specify that you want the line to always appear at the current date (*Today*) on the axis. For other axes, accept the reference value if one is provided, or type a new value.

4. Or, if you chose a dynamic value, select a measure to base your reference line on, and choose an aggregation type.
5. Type a label for the reference line, or leave this field blank to use the reference value as the label.
6. Choose line formatting options, and then select *OK* to create the reference line.

You can also create reference lines using the *Reference Lines Manager*: select the arrow beside the toolbar button , and select *Manage Reference Lines*. Select the + icon to add a reference line.

6.6.2 Removing a reference line

Procedure

1. In the *Visualize* room, or while exploring a visualization in the *Compose* room, select the reference line you want to remove.
2. Select *Delete*.

You can also remove reference lines using the *Reference Lines Manager*: select the arrow beside the toolbar button , and select *Manage Reference Lines*. Select the - icon to remove a reference line.

6.6.3 Moving or changing a reference line

Procedure

In the *Visualize* room, or while exploring a visualization in the *Compose* room, select a reference line and select *Edit*.

You can also move or change a reference line using the *Reference Lines Manager*: select the arrow beside the toolbar button , and select *Manage Reference Lines*. Select a reference line from the list and then select *Edit Reference Line*.

6.7 Hierarchical data

The *Dimension Hierarchy*  icon indicates that a hierarchy is associated with a dimension. There are multiple ways you can find and interact with hierarchical data.

6.7.1 Finding dimensions in a hierarchy

Hierarchical relationships between dimensions are visible on the *Measures and Dimensions* panel.

Context

Only the dimension containing the highest level of a hierarchy appears on the *Measures and Dimensions* panel, but you can expand the dimension to see additional levels.

You can add a dimension at any level of the hierarchy to a chart.

Procedure

Perform one of the following actions:

- If the *Measures and Dimensions* panel is in the vertical orientation, select the  icon beside a dimension to display all dimensions in the hierarchy.
- If the *Measures and Dimensions* is in the horizontal orientation, look for dimensions displayed beside each other in the hierarchy.

6.7.2 Choosing the level of hierarchy displayed in the Chart Builder

If a dimension containing a hierarchy is included in a chart, the level displayed in the chart can be changed in the Chart Builder.

Procedure

1. Select a dimension that contains a hierarchy.
2. Select the *Settings*  icon and choose a level in the hierarchy.

Results

The chart displays data from the selected level.

6.7.3 Drilling through hierarchical data

Context

If hierarchical dimensions are included in a chart, you can drill up or down through dimensions on the Chart Canvas to explore the data at different levels. If the chart contains more than one hierarchical dimension, you can select which dimension to drill into. You can use the *drill back*  icon to undo the drill operation and restore the chart to its original state.

The drill operation comprises:

- applying a filter
- redrawing the visualization at the new level in the hierarchy

When you drill, a filter token may appear above the chart, or the filter may be added to an existing filter token.

Procedure

1. Select an area in the chart or a label on the axis.

For example, you can select one or more bars in a bar chart, or an axis label in a trellis.

The selected area in the chart is highlighted.

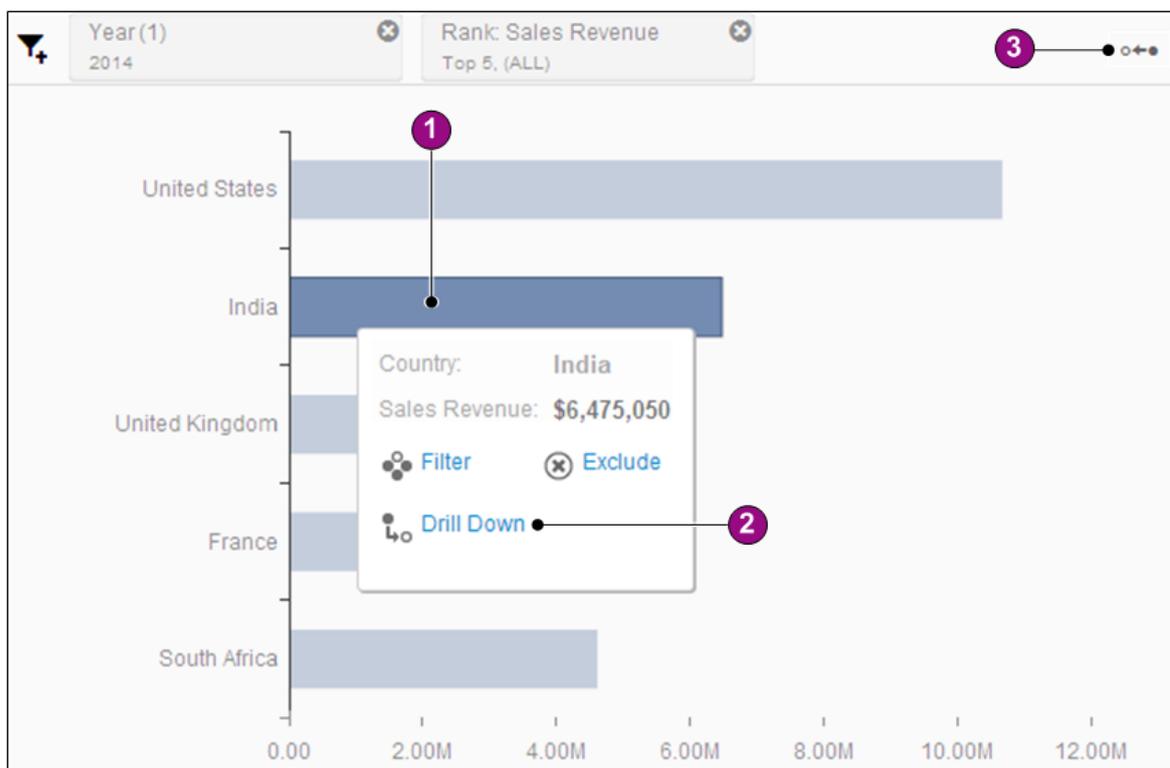
- In the tooltip that appears, select the *drill down*  or *drill up*  icon.

If the area you selected contains more than one hierarchical dimension, you can choose which dimension to drill into.

A filter is applied to the data and the chart is re-drawn at the new level in the hierarchy.

- To step back through the drill operation, select the *drill back*  icon.

The filter created by the drill operation is removed and the visualization is re-drawn at the previous level. Any filters applied by hand are maintained. Note that the *drill back* history is reset when you switch to the *Visualize* room.



Related Information

[Drilling through hierarchical data in a story \[page 168\]](#)

6.8 Finding measures, dimensions, and data values

You can search text and integer dimension values for the name of a measure or dimension.

The *find*  icon is located on the *Measures and Dimensions* panel

- When the panel is in a vertical orientation, you can use the *find*  icon to search for measures and dimensions by name.
- When the panel is in a horizontal orientation, the *find*  icon becomes available when the pointer is positioned inside a column, and you can use it to search each dimension for specific values.

Table 30: Operators for searches

Operator	Description
*	Matches any character zero or more times. For example, entering a*a matches any word containing the letter "a" followed by any combination of letters, followed by another "a."
?	Matches any character one time. For example, entering a?a matches any word containing the letter "a" followed by any single letter, followed by another "a."

If a dimension contains mapped labels, select the *Options*  icon, and select *Find by Key* or *Find by Label*.

Restriction

Date, time, time stamp, and non-integer numeric dimensions cannot be searched.

Restriction

Literal * and ? characters cannot be used in search text or values.

6.9 Measures associated with dimensions

You must display the *Measures and Dimensions* panel in the horizontal orientation to view the measure values associated with a dimension. You can also view the number of times each dimension value occurs in a dataset.

Example

Suppose a dataset contains a measure called "Number of Games Won" (calculated as a sum) and a dimension called "Name of Team". You can display the total number of games that each team won beside each team name on the *Measures and Dimensions* panel.

6.9.1 Viewing a measure associated with a dimension

Procedure

1. Select the *Horizontal Orientation*  icon to display the *Measures and Dimensions* panel in a horizontal layout.
2. Position the pointer over a dimension, and select the *Options*  icon next to the dimension.
3. Select *Show Measure*, and select the measure to view.

Results

A measure value appears beside each value in the dimension column.

6.9.2 Viewing the number of occurrences of dimension values

You can view the number of times each dimension appears in your dataset.

Procedure

1. Select the *Horizontal Orientation*  icon to display the *Measures and Dimensions* panel in a horizontal layout.
2. Position the pointer over the dimension, and select the *Options*  icon next to the dimension name.
3. Select **► Show Measure ► Occurrences ▼**.

Results

The number of occurrences appears beside each dimension value in the column.

2. Select a calculation in the list.
3. Enter the required parameters in the calculation dialog and select *OK*.

You can use multiple measures in your calculation.

Results

The chart is updated to include the calculation, and the calculation token appears in the measure shelf in Chart Builder.

Example

This example shows how to use the *Difference From* calculation. Suppose you have a crosstab containing the profit from three products for the years 2011 to 2014: the Measure is *Profit* and the rows are *Year* and *Product*. You can use a *Difference From* calculation to create a year-over-year comparison of the profit.

In the  *Calculation*  *Difference From*  dialog, enter the following values:

Table 31:

Parameter	Value
<i>Name</i>	Use the default name.
<i>Measure</i>	<i>Profit (Sum)</i> .
<i>Base Value</i>	<i>Previous (Value)</i> .
<i>Base Dimension</i>	<i>Year</i> .
<i>Show as values</i>	Selected.

The profit from a product in the current year is compared to the profit from a product in the previous year:

Profit and Difference From: Profit by Year, Product			
Year	Product	Measures	
		Profit	Difference From: Profit
2011	AAA	19,034	
	BBB	21,032	
	CCC	14,232	
2012	AAA	20,000	966
	BBB	33,453	12,421
	CCC	12,030	-2,202
2013	AAA	22,040	2,040
	BBB	35,604	2,151
	CCC	11,030	-1,000

Related Information

[Counter \[page 135\]](#)

[Running Calculations \[page 135\]](#)

[Moving Average \[page 136\]](#)

[Percentage Of \[page 137\]](#)

[Difference From \[page 137\]](#)

[Custom Calculation \[page 137\]](#)

[Lumira functions reference \[page 205\]](#)

6.10.1 Counter

Use Counter to create a measure that counts the number of occurrences of a dimension. The measure can be used directly in a chart, or used in other calculations.

For example, you can create a measure to count the number of members in the *tops* dimension. The measure, *Count (A): Tops*, is added to the *Measures* panel. You can then use *Count (A): Tops* directly in a chart or as the basis for another calculation.

Table 32: Parameters for Counter

Parameter	Description
<i>Name</i>	The name of the calculation. Use the default name or enter a new name.
<i>Dimension</i>	The dimension to count.
<i>Counter Type</i>	<ul style="list-style-type: none">Select <i>Count (All)</i> to count all members in the selected dimension.Select <i>Count (Distinct)</i> to count only the unique values of members in the selected dimension.

6.10.2 Running Calculations

Use running calculations for cumulative operations on the measure values.

Table 33: Parameters for Running Calculations

Parameter	Description
<i>Name</i>	The name of the calculation. Use the default name or enter a new name.
<i>Measure</i>	The measure to use in the calculation.
<i>Running Kind</i>	The type of running calculation. The following types are supported: <ul style="list-style-type: none"><i>Average</i><i>Count</i><i>Max</i><i>Min</i><i>Sum</i>

Parameter	Description
<i>Reset At</i>	<p>The dimension to use for restarting the calculation. Select <i>none</i> if you do not want the calculation to restart.</p> <p>For example, if your visualization contained a dimension called year, you could select year to restart the calculation for each year.</p> <p><i>Stop at last datapoint</i></p> <p>This option automatically detects the last data point and stops the running sum line at that point.</p> <p>For example, if you have a growth chart with a combined time dimension in which data does not exist for the entire time period, the running calculation line will stop at the last valid data point.</p>
<i>Empty values excluded</i>	<p>Used in running average and running count calculations. Select to exclude empty values from the calculation.</p> <p>For example, if this option is not selected, empty values will be included as "0" in running average calculations.</p>

6.10.3 Moving Average

Use moving average to calculate the average of different subsets of the measure values.

Table 34: Parameters for Moving Average

Parameter	Description
<i>Name</i>	The name of the calculation. Use the default name or enter a new name.
<i>Measure</i>	The measure to use in the calculation.
<i>Reset At</i>	<p>The dimension to use for restarting the calculation. Select <i>none</i> if you do not want the calculation to restart.</p> <p>For example, if your visualization contained a dimension called <i>year</i>, you could select <i>year</i> to restart the calculation for each year.</p>
<i>Values Before</i>	The number of values before the current value to include in the calculation.
<i>Values After</i>	The number of values after the current value to include in the calculation.
<i>include self</i>	Select to include the current value in the calculation.

6.10.4 Percentage Of

Use Percentage Of to calculate the current value's percentage of the total of all the values for the measure.

Table 35: Parameters for Percentage Of

Parameter	Description
<i>Name</i>	The name of the calculation. Use the default name or enter a new name.
<i>Measure</i>	The measure to use in the calculation.
<i>Base Dimension</i>	The dimension used to create a subtotal for the selected measure. For example, select <i>Year</i> to calculate the current value's percentage of the total of all the values for the current year. Select <i>(Grand Total)</i> to use the total of all the values for the measure in the calculation.

6.10.5 Difference From

Use Difference From to compare different subsets of the measure values.

Table 36: Parameters for Difference From

Parameter	Description
<i>Name</i>	The name of the calculation. Use the default name or enter a new name.
<i>Measure</i>	The measure to use in the calculation.
<i>Base Value</i>	The value to subtract from the current value. For example, if you select <i>Previous (Value)</i> , the previous value of the measure is subtracted from the current value of the measure.
<i>Base Dimension</i>	The dimension used for the comparison. For example, you could select <i>Year</i> to create a year-over-year comparison, or select <i>Product</i> to compare measures from different products. Select <i>Row (Table)</i> to treat the entire table as a single group.
<i>Show as value</i>	Display the Difference From value as a number.
<i>Show as percentages</i>	Display the Difference From value as a percentage.

6.10.6 Custom Calculation

Custom calculations are used for cumulative operations on aggregated measures.

You can create custom calculations on aggregated measures and on dimensions. You can even include other custom calculations in new custom calculations.

You can choose to remove a custom calculation from your visualization, but still keep the calculation for future use. The calculations will be available on the [Calculations](#) menu, even if you are not currently using them in the visualization.

When [Custom Calculation](#) is selected from the [Calculations](#) menu, the calculation editor is launched. The calculation editor is also launched when you edit an existing custom calculation.

Related Information

[Lumira functions reference \[page 205\]](#)

6.11 Prompting and SAP HANA variables and input parameters

SAP HANA variables, input parameters, and default values are defined in SAP HANA Studio.

After opening a story or dataset that includes SAP HANA variables or input parameters, a prompt dialog displays a list of required and optional variables. The values you select for the variables set filters that determine which data is included in a story. Multiple values can be selected when a SAP HANA variable allows for multiple values. After setting prompt values, when you save a story, the prompt values are saved. (You will not need to re-enter values.)

You can reset a prompt value by selecting the [Reprompt](#)  icon.

6.12 Refreshing data in a document

The data that is saved with a document can become stale or invalid. Refresh the document to get fresh data from the data source.

Context

For example, if you have an Excel data source comprising two columns `<Name>` and `<Age>`, and you acquire the Excel data into SAP Lumira, but later the numbers in the Excel data are updated, you may want to refresh the document to reacquire the updated Excel data.

Data isn't automatically refreshed if the data source has undergone a model change, such as columns being added or removed. For example, if in the above Excel file the `<Name>` column is split into `<First Name>` and `<Last Name>` columns, the `<Name>` column in the data source no longer exists and the refresh fails.

If the data can't be refreshed automatically, the *Data Mapping* dialog helps you to refresh your data manually, by mapping columns in your dataset to columns in the data source.

Procedure

1. If your document is open in the *Prepare* room, select the  icon. Or, if you're working in the *Visualize* room, select the down-arrow next to the  icon and select either *Refresh* or *Refresh data with prompts*.

If your data source contains variables, choosing the *Refresh data with prompts* option lets you reselect variable values before the data is refreshed. These data sources support refreshing with prompts:

- Connect to SAP HANA
- Download from SAP HANA
- Download from SAP Business Warehouse
- SAP Universe Query Panel

If the data source model has not changed, the data is refreshed.

If the data source model has changed, the *Data Mapping* dialog appears. The dialog lists the datasets in your document that can't be automatically refreshed. Complete the rest of these steps:

2. For query-based data sources, for example MySQL, select *Edit Query*.
In the *Edit data source* dialog, redefine your query, and select *OK* when finished.
3. Select a dataset in the *Data Mapping* dialog.
The *Changed Columns* for that dataset are shown.
4. Using the drop-down lists, choose columns from the data source to map the *Changed Columns* to.
You can map columns only to other unused columns of the same type. You can also remove any columns that you no longer need in your dataset, but be aware that any dependencies based on the removed columns will be removed as well.

Using the above Excel example, you could choose the changed column *<Name>*, and map it to the *<Last Name>* or *<First Name>* column from the drop-down list.

Related Information

[Showing the latest data in a story page \[page 156\]](#)

[Editing an acquired dataset \[page 49\]](#)

[Specifying values for SAP HANA variables and string input parameters \[page 35\]](#)

[Prompting and SAP HANA variables and input parameters \[page 138\]](#)

6.12.1 Printing a chart

Context

You can print the visualization charts. Only the charts that are saved in *Visualize* room can be printed; you cannot print tables.

Procedure

1. Start SAP Lumira.
2. Choose the *Visualize* room.
3. In the *Chart Gallery*, select the required visualization.
4. Choose ► *Settings* ► *Print* ▾
The *Print Visualization* dialog box appears.
5. In the *Printer* list, select a printer connected to your computer or select *Adobe Portable Document Format (PDF)*
6. Enter the number of print copies.
7. Select the required size.
8. Select the required page orientation.
9. To select the *Layout*, perform any one of the following actions :
 - a. To print one chart per page, select *One visualization per page*.
 - b. To print two charts per page, select *Two visualizations per page*.
 - c. To print comments for each chart, select *Visualizations with notes*.
10. Select *Print*.

The chart is either sent to the selected printer or opens as a PDF file in your default document viewing application.

6.13 Zooming in on data in a Line Chart for Date/Time Series

You can zoom in to focus on specific time periods when analyzing data in a Line Chart for Date/Time Series.

Context

Zooming is available in the *Visualize* room, and when viewing stories.

Procedure

1. Add at least one measure and one time dimension to the chart.
2. In the chart canvas, select the range of data that you want to focus on, and choose *Zoom*.
3. To view the entire chart again, select *Zoom Out* at the top right of the filter bar.

6.14 Creating a dataset from a visualization

After creating a visualization that contains filters, merged columns, calculated measures or dimensions, and other customizations, you can create a new dataset from that visualization.

Context

The resulting dataset contains objects that are visible in the visualization and hidden objects that are used in merges and calculations (because they are required to calculate or refresh data), but it may not use all of the objects from the original dataset. Hidden objects are visible when you edit the dataset. The new dataset is saved with the name of the visualization and is saved in the document.

When you edit a dataset created from a visualization, columns in the *Edit source* pane correspond with the acquisition dataset but not with the current dataset. For example, some names are a concatenation of the new dataset column header and the original object column header(s), and some columns cannot be removed. Columns that cannot be removed are used in the intermediary workflow (for example, inside a calculated measure) and are needed to retrieve data, even if they do not appear in resulting dataset.

Procedure

1. Select the *Options*  icon in the thumbnail of a visualization, and select *Create New Dataset*.
A dataset is created, with the same name as the visualization.
2. In the dialog that appears, select *OK*.
3. In the *Prepare* room, select the *expand* list next to the current dataset name.
A list of datasets available in the document appears.
4. Select the new dataset.
The dataset opens in the *Prepare* room.

6.15 Forecasting

The forecasting capability in SAP Lumira lets you use historical data as the basis for predicting future values.

Context

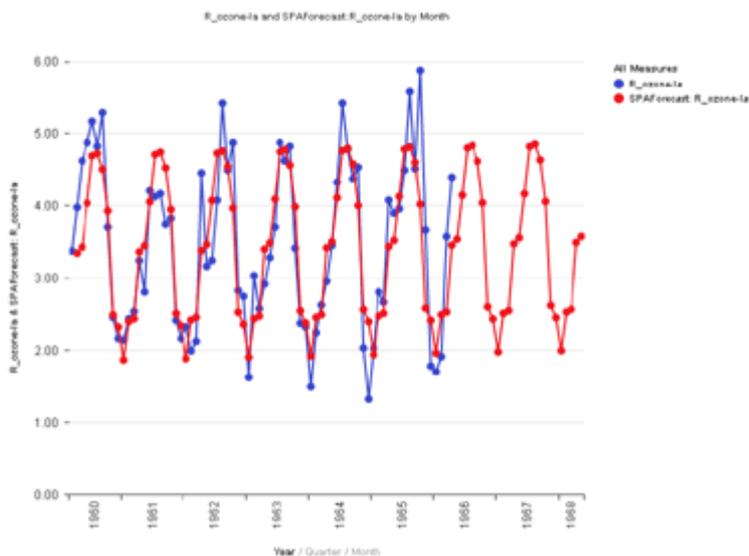
The forecasting feature analyzes the trends and cycles of a time series to predict future values. Forecasting uses a measure and a dimension that is part of a time hierarchy (for example, Month) as its inputs. You specify how many forecasted values you want the algorithm to produce.

SAP Lumira provides two algorithms for forecasting future data: SAP Predictive Analytics, and Triple Exponential Smoothing.

An SAP Predictive Analytics time series analysis computes several models that are compared for best results. It does this by breaking a time series into four components:

- Trend
- Cycles
- Fluctuations
- Information Residue

Here is an example of how an SAP Predictive Analytics time series analysis can predict future values. The blue line on the chart represents the actual data, and the red line represents the forecasted values.



In addition to SAP Predictive Analytics forecasting, the Triple Exponential Smoothing (TES) algorithm can be used, in particular for situations where SAP Predictive Analytics can't produce a forecast. The TES algorithm always produces a result, but the result is usually of lower quality.

To learn more about how forecasting and other predictive analytics techniques can help your business succeed, visit our SAP Predictive Analytics site: <http://www.sap.com/learn-predictive>.

Procedure

1. Select the *Settings*  icon beside a measure on the *MEASURES* shelf in the Chart Builder.
2. Select **► Predictive Calculation ► Forecast ▾**.
3. Choose a forecast type.

The *SAP Predictive Analytics* algorithm is more accurate, but needs more data before it can produce a meaningful forecast. The *Triple Exponential Smoothing* algorithm is less accurate, but can produce a forecast with any amount of input data.

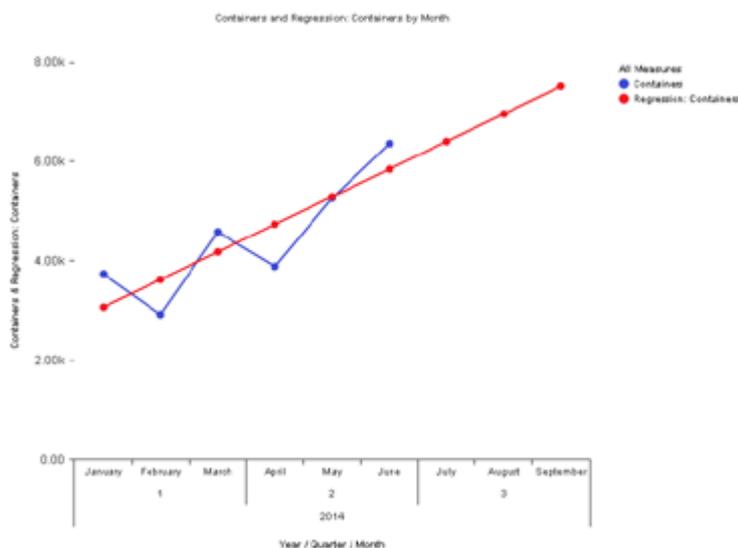
4. Choose a name for your calculation, then choose a number of time periods to predict, and select *OK*.

6.16 Linear Regression

You can apply a linear regression to your data, to visualize a linear trend or to predict future data based on the linear trend in your data. Linear regression uses a measure and a dimension that is part of a time hierarchy (for example, Month) as its inputs.

Context

Here is an example of how a linear regression can predict approximate future values. The blue line on the chart represents the actual data, and the red line represents the linear regression forecast.



Procedure

1. Select the *Settings*  icon beside a measure on the *MEASURES* shelf in the Chart Builder.
2. Select **► Predictive Calculation ► Linear Regression ►**.
3. Choose a name for your calculation, then choose a number of time periods to predict, and select *OK*.

6.17 Influence analysis

Using SAP Predictive Analytics influence analysis, you can look at a specific measure in your data to determine which dimensions are influencing that measure the most. SAP Lumira then suggests related visualizations based on the analysis.

Context

To learn more about how influence analysis and other predictive analytics techniques can help your business succeed, visit our SAP Predictive Analytics site: <http://www.sap.com/learn-predictive> .

Procedure

1. To find the Top Influencers of a measure, enter the *Explain* workflow by first navigating to the *Related Visualizations* tab from the *Visualization Tools* panel.
2. From the *Measures and Dimensions* panel, select the measure you wish to analyze and select *Run Analysis*.

A list of charts is generated, which represents the dimensions that have the most influence on your selected measure. A special *Top Influencers* summary chart appears at the top of the list and summarizes the amount of influence each dimension has on the selected measure. You can select and explore an influencer from the summary chart, and you can add any of those visualizations to a story except for the summary chart itself.

i Note

- If your data doesn't contain a statistically significant result, the influence analysis won't show any visualizations.
- Influence analysis is performed on the underlying dataset, and therefore filters are not considered when running an analysis.
- If the option to run an influence analysis doesn't appear, it could be because of one of these reasons:
 - Online data sources (for example, SAP HANA) are not supported for influence analysis. Data must be downloaded to SAP Lumira before running an influence analysis.

- In the *Preferences*, the *Would you like to display Related Visualizations and allow influence analysis?* check box needs to be selected.

6.18 Sharing Visualizations

After creating visualizations, you can share them by either sending the visualization chart by e-mail or by printing the visualization chart.

Table 37: Visualization sharing options

Option	Description
<i>Send by e-mail</i>	Send a visualization to an e-mail recipient.
<i>Print Visualization</i>	Send a visualization to a printer.

6.18.1 Sending a chart by e-mail

Context

You can share a visualization chart by sending it through e-mail. Charts are attached as graphic files, while table charts are attached as Excel files (not as graphic files) in e-mail messages.

Procedure

1. Start SAP Lumira.
2. Choose *Visualization* room.
3. In the *Chart Gallery*, select the required visualization.
4. Choose ► *Settings* ► *Send by Mail...* ►
The *Send by e-mail* dialog box appears.
5. Select the required size.
6. Choose *OK*.

You can see the chart added as an email attachment.

6.18.2 Printing a chart

Context

You can print the visualization charts. Only the charts that are saved in *Visualize* room can be printed; you cannot print tables.

Procedure

1. Start SAP Lumira.
2. Choose the *Visualize* room.
3. In the *Chart Gallery*, select the required visualization.
4. Choose ► *Settings* ► *Print* ▾

The *Print Visualization* dialog box appears.

5. In the *Printer* list, select a printer connected to your computer or select *Adobe Portable Document Format (PDF)*
6. Enter the number of print copies.
7. Select the required size.
8. Select the required page orientation.
9. To select the *Layout*, perform any one of the following actions :
 - a. To print one chart per page, select *One visualization per page*.
 - b. To print two charts per page, select *Two visualizations per page*.
 - c. To print comments for each chart, select *Visualizations with notes*.
10. Select *Print*.

The chart is either sent to the selected printer or opens as a PDF file in your default document viewing application.

7 Compose room—creating stories with visualizations

A story is a presentation-style document that uses visualizations, text, graphics, and other customizations to describe data. Data can be explored using filters, input controls, and by drilling.

These are the main areas where you interact with the *Compose* room:

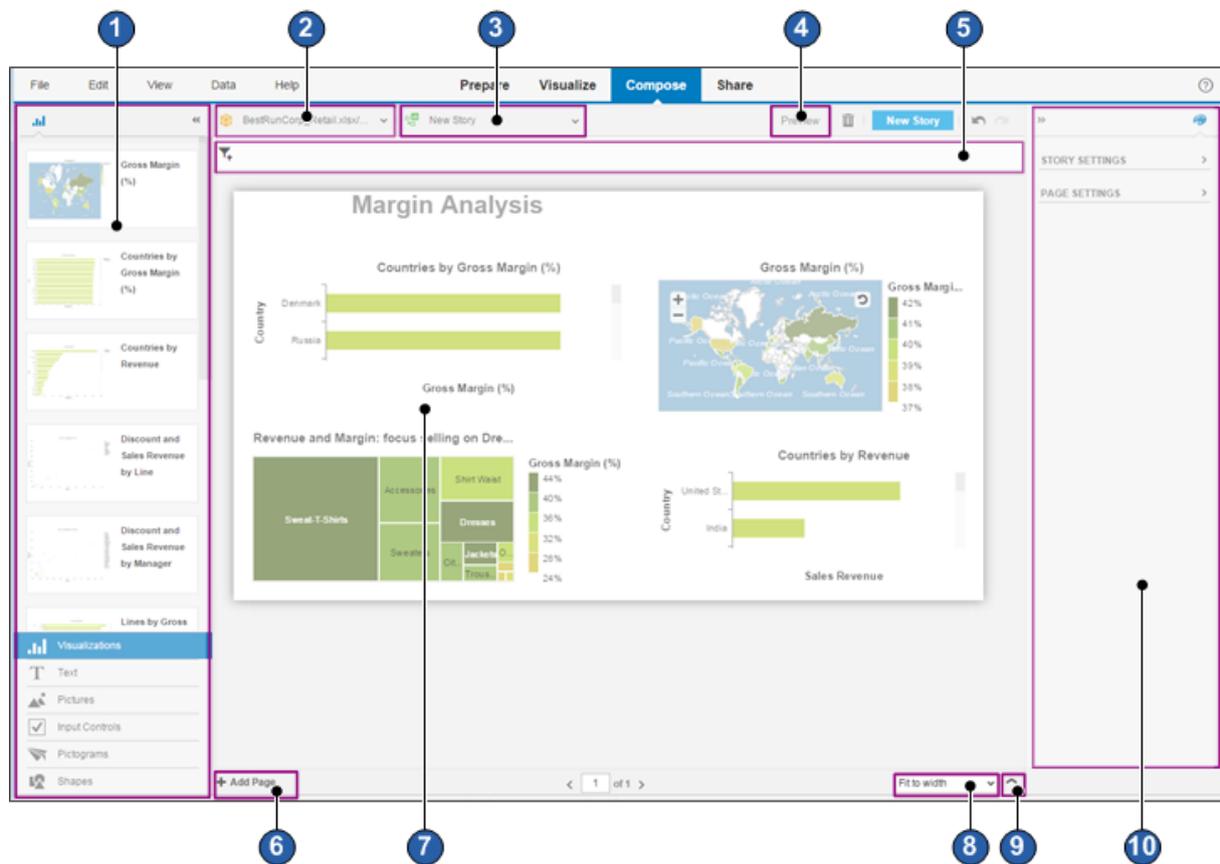


Table 38:

Number	Area	Description
1	<i>Content Panel</i>	Contains different types of content that you can drag on to the story page. The <i>Visualizations picker</i> is open by default, but you can select other pickers to display other types of content. For example, select the <i>Text picker</i> to display text boxes. Select an item in the picker and drag it to a section in the story page.

Number	Area	Description
2	dataset selector	The story may contain multiple datasets. Use the dataset selector to choose a different dataset. Visualizations based on the currently-selected dataset are displayed in the Visualizations picker .
3	story selector	The document may contain multiple stories. Use the story selector to choose a different story to work on.
4	Preview	Select Preview to see how the story will appear when published.
5	filter bar	Displays filter tokens that represent any filters applied to the dataset or to the current page.
6	Add Page	Select to add a new page to the story. Each page in a story can have its own format.
7	story page	Every story has one or more pages that can contain items such as visualizations, text, graphics, and input controls. You can change the page size in the Page Settings panel. Drag items from the Content Panel to the story page to describe and explore your data.
8	zoom control	Select to choose a zoom level.
9	story page gallery	Expand to create story pages or to manipulate story pages. <ul style="list-style-type: none"> • Create a story page by selecting the Add Page  icon. • Rename or delete a story page by selecting the Settings  icon. (To delete the entire story rather than the current page, use the Delete Story  icon near the top of the Compose room.) • Change the order of the story pages by dragging them to a different order.
10	Settings	Contains panels that enable customization of the currently-selected item on the page. The Page Settings and Story Settings panels are always available. For example, the Visualization Properties panel appears if you select a visualization on a page. This panel enables customization of colors, axis layout, and other areas.

7.1 Getting started with stories

Use visualizations together with pictures and text to create a story about data. Explore and analyze the data using filters, input controls, calculations, conditional text, and other tools.

Context

i Note

In the 1.27 release, the *Board* and *Report* formats are removed from the application. The *Infographic* layout is used for all story pages in 1.27 and later releases. All functionality from *Board* and *Report* pages has been added to *Infographic* pages, and all existing *Board* and *Report* pages are automatically converted to the new format when opened. All functionality in the existing story pages is preserved.

Various templates are available to help you develop professional-looking documents. Each page in a story can have its own template, and you can add, move, and delete pages as you work. You can also save your story and create a new one at any time. Select from the following templates:

- *Blank* - Use this template to create a custom format. Sections on the page will be created as content is added.
- *Standard*, *Overview* and *Detailed* - Use these templates as a starting point for common types of documents. Pages are pre-formatted with sections for visualizations and text.
- *Slideshow* - Use this template to automatically create a story using every visualization from the *Visualize* room. Each visualization is added to its own page.

i Note

Use *Slideshow* to automatically create a story with every visualization on its own page.

The *Content Panel* on the left side of the *Compose Room* contains content such as *Visualizations* and *Text*. Drag content from these areas onto sections of the story page.

➔ Tip

The content panel displays visualizations based on the currently selected dataset. If the selected dataset is a primary dataset for any visualizations, those visualizations are included in the content panel. But if the selected dataset is a secondary dataset for any visualizations, those visualizations are not included in the content panel.

The *Board Settings* panel on the right side of the *Compose Room* contains panels for formatting different types of content. Panels appear as the corresponding elements are selected: for example, the *Section Color* panel appears when a section on the page is selected.

Procedure

1. In the *Compose* room, select *New Story*.
2. Select the template for the first page in the story, and select *Create*.

The *Compose* room opens, displaying a page with the selected format. Visualizations are displayed in the *Content Panel* on the left side of the window. If the document contains more than one dataset, visualizations based on the first dataset are displayed, but you can select a different dataset to display other visualizations.

3. Drag a visualization from the *Content Panel* to a section in the story page.

(Optional) Reposition the visualization, or re-size it by dragging a corner of its bounding box.

4. (Optional) Select *Expand*  to enlarge the visualization to the size of its section.

Position the pointer over the visualization to display the *Expand*  icon on the options menu.

5. Select *Explore*  to customize a visualization in the story by adding filters, rankings, calculations, or by drilling through hierarchical data.

Position the pointer over the visualization to display the *Explore*  icon.

6. Use Undo  and Redo  to experiment with different layouts and tools, then revert the page to its original state.
7. Select *Preview* to see how the story will appear when published.
8. To create additional pages, select *Add Page*.
9. Save the story.

Related Information

[Formatting a story page \[page 151\]](#)

[Formatting a visualization \[page 152\]](#)

[Linking to a web page or to another page in the story \[page 159\]](#)

7.1.1 Modifying a story

Context

You can make changes to a saved story.

Procedure

Open a saved story.

The story opens in the *Compose* room, where you can modify it.

Related Information

[Compose room—creating stories with visualizations \[page 147\]](#)

7.1.2 Saving a story

You can save a story or make a copy of an existing story by using the *Save As* option.

7.2 Formatting a story page

Context

Use the *PAGE SETTINGS* panel to format the size, general appearance, and behavior of each page.

Table 39: Page Settings Panel

Option	Description
<i>Size</i>	Select <i>Standard (4:3)</i> or <i>Widescreen (16:9)</i> , depending on the preferred layout and the type of device that the published story will be viewed on. Select <i>Continuous Scrolling</i> to display all data rows in a crosstab in a single page.
<i>Width, Height</i>	Set the default page size (in pixels). This option allows you to design story pages based on the size of the screen they will be viewed on, whether it is larger or smaller than the screen used to create the pages. You only need to set one value; the other will be set automatically.
<i>Background Color</i>	Select a background color for the page.
<i>Grid Properties</i>	Select the <i>Show</i> check box to display grid lines. Grid lines make it easy to align elements and achieve a professional appearance for your story.
<i>Show latest data</i>	Automatically refreshes the data when the page opens. To stop the automatic refresh, select <i>OFF</i> .

Option	Description
<i>Show page filter indicators</i>	Select <i>ON</i> to enable page filter indicators for visualizations on the story page. Page filter indicators give visual cues that a page-level filter applies to the data in a visualization.

i Note

If the story page contains a crosstab that has a scrollbar (because the viewable region is not big enough to show all the cells) and the story page has *Show latest data* turned on, when the story page is exported to PDF the crosstab in the PDF will be displayed with the default scroll position. It will not show the scroll position that you see in the Compose room.

Procedure

1. In the *Compose* room, open the page of the story to format. The *Page Settings* panel displays the options available.
2. Select page formatting options as needed.
3. Save the story.

7.3 Formatting a visualization

Visualizations can be easily customized to emphasize the data message.

Context

Use the *Visualization Properties* panel to modify the appearance of each visualization in the page. Different options are available for formatting, depending on the type of chart in your visualization.

To display the *Visualization Properties* panel, select a visualization in the page.

Table 40: Visualization Properties Panel

Area	Description
<i>General</i>	<ul style="list-style-type: none"> • <i>Show Chart Title</i>: Select to display the chart title and format it. • <i>Show Legend</i>: Select to display the chart legend and format it. • <i>Show Data Labels</i>: Select to display the values for each dimension in a chart. • <i>Format Data Labels</i>: Select to format the values for each dimension in a chart. • <i>Optimize Chart Alignment</i>: This option is available for most charts with axis lines. Positions a chart in its section with optimal area for displaying data, while preserving space for labels and text. All visualizations that are the same size and that have this option selected will have horizontal and vertical axis automatically aligned. Deselect to align axis by hand.
<i>X and Y axis</i>	<ul style="list-style-type: none"> • <i>Show Axis</i>: Select to display the axis. • <i>Show Axis Title</i>: Select to display the axis title and to format it. • <i>Show Axis Labels</i>: Select to display axis labels and to format them.
<i>Bar</i>	Select a bar shape or pictogram to display as the bars in a bar chart, and choose the color of the bars.
<i>Column</i>	Select a column shape or pictogram to display as the columns in a column chart, and choose the color of the columns.
<i>Line Chart</i>	<ul style="list-style-type: none"> • <i>Chart Area</i>: Select the background color of the chart area. • <i>Chart Title</i>: Display the chart title and format it. • <i>Plot Area</i>: Select the background color of the plot area. • <i>Legend</i>: Display a chart legend and to display a legend title and format it. • <i>Data Label</i>: Display data labels or data-label pictograms. • <i>Horizontal Axis</i>: Display the axis line and ticker, display axis labels and format them, and display axis pictograms. • <i>Horizontal Axis Title</i>: Display the axis title and format it. • <i>Vertical Axis</i>: Display the axis line and ticker, display axis labels and format them, and adjust the axis value scale. • <i>Vertical Axis Title</i>: Display the axis title and format it. • <i>Marker</i>: Select and format a pictogram to represent data points. • <i>Line</i>: Set the line color, thickness, and style. • <i>Plot Area</i>: Show or hide grid lines.
<i>Donut Chart</i>	<ul style="list-style-type: none"> • <i>Chart Area</i>: Change the size of the inner circle in the donut. • <i>Chart Title</i>: Display the chart title and format it. • <i>Plot Area</i>: Change the background color of the plot area. • <i>Legend</i>: Display a chart legend and to display a legend title and format it. • <i>Slice</i>: Change the color of a slice of the donut (to draw attention to that data point). • <i>Data Label</i>: Select the <i>Show Data Labels</i> check box to display the data labels and format them.

Area	Description
Crosstab Chart elements	<ul style="list-style-type: none"> • Crosstab area formatting: You can set formatting separately for different areas in a crosstab. Choose an area: <ul style="list-style-type: none"> ◦ Column Dimension Header ◦ Column Labels ◦ Row Dimension Header ◦ Row Labels ◦ Data Cells <p>The affected part of the crosstab is outlined on the story page. You can format the text, set the text alignment, and choose a background color. For data cells, you can choose to alternate between two colors for the rows.</p> <ul style="list-style-type: none"> • Expand Crosstab to See All rows: Expand the crosstab vertically to see all the rows it contains. The page size is changed to continuous scrolling when this option is selected.

Procedure

1. In the [Compose](#) room, select a visualization on a story page.
The [VISUALIZATION PROPERTIES](#) panel displays the options available. Different types of charts have different options.
2. From the drop box, select the area of the visualization you want to format.
The formatting options for the selected visualization area appear.
3. Format the visualization area.
4. Save the story.

7.4 Exploring a visualization in a story

You can explore visualizations while working on a story in the [Compose](#) room, or while viewing a story. For example, you can drill down and up, filter values, and add rankings.

Context

While exploring a visualization, you can make some of the changes that are available in the [Visualize](#) room, such as:

- Drilling down on a value and drilling up
- Applying filters or modifying filters that are applied to the visualization, including filters created in the [Visualize](#) room

- Changing how the data is sorted
- Zooming and panning on geographic charts
- Changing the title and chart settings
- Setting whether to fit all of the chart data inside the frame at once

The updates are applied to the copy of the visualization that you added to the page. Other visualizations are not affected.

Filters applied to the story or page are displayed in the filter bar while exploring a visualization, but they can't be edited. These types of filters are distinguished with the following icon: 

Procedure

1. In the *Compose* room, open a page and add a visualization.

You can also explore visualizations while viewing a story.

2. Select the *Explore*  icon in the upper-right corner of a visualization. The visualization opens in a new window.
3. Explore the visualization and make changes as needed.
4. Select *Update* to apply your changes.
5. In the *Compose* room, save the story.

Related Information

[Visualize room—creating charts \[page 86\]](#)

[Drilling through hierarchical data in a story \[page 168\]](#)

[Using the filter dialog in the Visualize room \[page 117\]](#)

[Filtering or excluding data points in a chart \[page 119\]](#)

[Filtering data by rank \[page 121\]](#)

7.5 Showing the latest data in a story page

The latest data in a story page is automatically shown when you open the page, but you can turn that option off if you would prefer to refresh the data yourself.

Context

Showing the latest data each time you open the story page can change the narrative message of an infographic because it changes the data that the infographic is built on. You may want to refresh the data yourself.

i Note

If you use a pictogram to represent a chart element, such as a bar in a bar chart, the size of the element may change when the data on the page is refreshed.

Procedure

1. In the *Compose* room, open the page that you want to update.
2. Expand the *PAGE SETTINGS* panel.
3. To stop automatically refreshing data each time you open the page, select the *OFF* button under *Show latest data*.

Results

When you reset the option to *ON*, a dialog appears, indicating that visualizations will be updated to use the most recent data and this may change existing customizations.

7.6 Rearranging story pages

You can easily change the order of your story pages.

Context

When you move the story pages around, the hyperlinking between pages is automatically updated to reflect the new page order.

Procedure

1. In the *Compose* room, expand the story page gallery.
A thumbnail image is displayed for each page in the story.
2. Drag a thumbnail image to a new position.
The page numbers automatically change to reflect the new order of the pages.

7.7 Renaming story pages

Provide your own descriptive names for story pages.

Procedure

1. In the *Compose* room, expand the story page gallery.
A thumbnail image is displayed for each page in the story.
2. Select the thumbnail image for the page that you want to rename.
3. Select the settings icon on the image and then click *Rename*.
4. Type in a name and then click *OK*.

7.8 Deleting story pages

Delete individual story pages.

Procedure

1. In the *Compose* room, expand the story page gallery.
A thumbnail image is displayed for each page in the story.
2. Select the thumbnail image for the page that you want to delete.
3. Select the settings icon on the image and then click *Delete*.
4. In the *Remove Page* dialog, click *Yes*.

7.9 Pictograms and shapes

Shapes and pictograms can add visual flair to your story.

You can insert them in two ways:

- As a separate element
In the *Compose* room, drag a pictogram or shape from the *Content Panel* to a page. The graphic can then be formatted using the *Board Settings* panel.
- As part of a visualization
You can use pictograms to represent certain visualization elements, such as columns, bars, data point markers, data labels, and axes. These display options are available on the *VISUALIZATION PROPERTIES* panel when you select the element or group of elements. You can use the same pictogram for each member or select individual members to customize the appearance of each one.

i Note

If you use a pictogram to represent a visualization element, the size of the element may change when the data on the page is refreshed.

7.9.1 Uploading custom pictograms and shapes

Before you can add your own pictograms and shapes to stories, you must upload them to the application. The graphics must be in Scalable Vector Graphics (SVG) format.

Procedure

1. In the *Compose* room, select *Pictograms* or *Shapes* on the *Content Panel*.
2. Select the + icon and select *Add from Local*.
3. Choose the .svg file to add, and select *Open*.

The file must be an SVG file with valid XML encoding.

Results

The graphic appears in the *Personal* section of the *Content Panel* for *Pictograms* or *Shapes*. You can add the graphic to infographic or report pages. You can add custom pictograms as part of a visualization on an infographic page, as well.

Note

- Changing the line color, fill color, or line width of custom shapes and pictograms is not supported.
- If you open a story with a custom shape or pictogram added by a different SAP Lumira user, the custom graphic is displayed as normal. However, it does not appear in your *Content Panel*.

7.10 Linking to a web page or to another page in the story

You can add a hyperlink to an external web page, or to another page in the same story. The hyperlink can be added to highlighted text in text boxes, pictograms, shapes, and pictures.

Procedure

1. In the *Compose* room, select the text, pictogram, shape, or picture that you want to link from.
For text, select the text itself; not just the frame containing the text.
2. Select the *Hyperlink*  icon on the right side of the window, in the properties area.
3. In the *Link to* list, select *External URL* or *Page*.

-
4. Enter a web page's URL, or select a page in the story to link to.
 5. If you're linking to a web page and you want the web page to open in a new window, select the *Open in new window* check box.
 6. Select *OK*.

7.10.1 Modifying a hyperlink

You can modify a hyperlink so that it points to a different web page, or to a different page in the story.

Procedure

1. In the *Compose* room, select the object that you want to modify the link for.
2. Select the *Hyperlink*  icon on the right side of the window, in the properties area.
3. In the *Edit Hyperlink* dialog, modify the URL or change the page to link to.
4. Select *OK*.

7.10.2 Removing a hyperlink

You can remove a hyperlink.

Procedure

1. In the *Compose* room, select the object that you want to remove the link from.
2. Select the *Hyperlink*  icon on the right side of the window, in the properties area.
3. Select *Remove*.

7.11 Adding text to a story

You can add text to sections in a story page, or overlay the text on a visualization.

Context

When a page has multiple elements (visualizations, pictures, pictograms, and shapes), use text to reinforce the intended message.

Procedure

1. In the *Compose* room, select the visualization or the page section to add text to.
2. Select *Text* on the *Content Panel*, and drag the box for the required type of text from the panel to the page. A blue bounding box shows the position of the text box in the visualization.
3. Enter the required text in the box.
4. (Optional) To move the text box, drag the bounding box to a new location.
5. (Optional) To resize the text box, select an anchor on the bounding box, and drag it to the desired size.
6. (Optional) To format the text, use the options under *TEXT PROPERTIES* on the *Board Settings* panel.

7.12 Adding dynamic text to a story

You can add dynamic text that is based on the measures in the dataset. Dynamic text is updated when the dataset is refreshed.

Procedure

1. In the *Compose* room, select the page to add dynamic text to.
2. Select the text element and position the pointer where you want to insert dynamic text. You can also highlight existing text you want to change to dynamic text.
3. On the *TEXT PROPERTIES* panel, select the *Add or Edit Dynamic Text*  icon.
4. In the *New Formula* dialog, enter a name for the formula.
5. Double-click the measures and functions you want to add to the *Formula* syntax box.
You cannot create dynamic text objects based on dimensions.

-
6. Enter the parameters for the function and associated information, based on the function task.
You must enter the names of columns used in the formula. After you enter the first letter, if the application can match an existing name to the letter, it displays the name.
 7. If you are inputting calendar information, select the [Select a Date](#) button at the bottom of the functions list to use the date picker.
 8. Select [OK](#) to apply the formula.
You cannot add both dynamic text and a hyperlink to the same text.

Results

The dynamic text element is added to the text object and will be updated each time the dataset is refreshed.

7.12.1 Modifying dynamic text in a story

You can modify dynamic text in a story.

Procedure

1. In the [Compose](#) room, select the page to edit.
2. Select the dynamic text to edit.
3. In the [TEXT PROPERTIES](#) panel, select the [Add or Edit Dynamic Text](#)  icon.
The [Edit Formula](#) dialog appears.
4. Modify the text in the [Formula](#) box or change other options as needed, and select [OK](#).

7.12.2 Removing dynamic text from a story

You can remove dynamic text from a story.

Procedure

1. In the [Compose](#) room, select the page to remove dynamic text from.
2. Select the dynamic text to remove.
3. On the [TEXT PROPERTIES](#) panel, select the [Remove Dynamic Text](#)  icon.

7.13 Filtering data in stories

In the *Compose* room, or while viewing a story, you can apply filters to individual visualizations, or to an entire page or story.

While exploring a visualization, you can filter that instance of the visualization using most of the functionality that is available in the *Visualize* room. Filters that were applied to the visualization in the *Visualize* room can be modified or removed. Other copies of the visualization are not affected.

Also, the following actions apply filters to the entire story, or to the current page in the story:

- Choosing values for input controls in the *Compose* room or while viewing a story.
- Selecting data points in a chart to drill through hierarchical data while viewing a story.
- Selecting data points in a chart to filter or exclude the chart members while viewing a story.

Tokens appear in the filter bar on pages where these filters are active. Filters that apply to the entire story are

distinguished by the following icon: 

You can set the scope of a filter by selecting the token in the filter bar and choosing *All Pages (Story Filter)* or *Current Page (Page Filter)*. In the *Story Settings* panel, you can switch the default scope for these filters as well.

You can also turn on the *Show page filter indicators* setting for a page to provide a visual cue that visualizations are being filtered.

i Note

- In stories with multiple datasets, filters are automatically applied to matching dimensions from other datasets. Matching dimensions are linked in the *Define Dataset Links* dialog, or have the same name and type.
- By default, the filter scope is set to *All Pages*. In documents created using versions of SAP Lumira earlier than 1.28, however, the default setting is *Current Page*.
- Sometimes, two filters on a page may apply to the same dimension. For example, you may apply a filter on the Country dimension for all pages and then filter a single page by the Country dimension as well. In this case, the filter selections are merged for that page. For example, if you select USA and Germany for the story filter and France and Germany for the page filter, the page shows data for USA, France, and Germany.
- Each member can appear multiple times in a Line Chart for Date/Time Series that has combined dimensions in the *Time Dimension* shelf. When you select a range in the chart to exclude, some of the excluded members may have other instances that still appear in the chart. In this case, those members are not filtered out of other charts in the story or page. That is, a member is excluded only if every instance is inside the excluded range.

Any filters that were applied to the dataset or to individual visualizations in the *Prepare* or *Visualize* room are

applied in the *Compose* room as well. Dataset filters are shown in the filter bar with this icon: 

Related Information

[Exploring a visualization in a story \[page 154\]](#)

[Filtering data \[page 61\]](#)

7.13.1 Using input controls

Use input controls to interactively filter data in your story's visualizations.

Context

Use input controls to apply interactive filters to a story, making it easy to highlight different areas of the data in the *Compose* room, or while viewing the story. The filter created by the input control applies to each relevant visualization. A visualization is relevant if its dataset contains the dimension you are filtering, or a matching dimension.

The input control's filter will apply to any matching dimension in any of the story's datasets. Matching dimensions are determined first by any links established in the *Define Dataset Links* dialog. In the remaining datasets without matched dimensions, dimensions with the same name and type as the selected dimension will match automatically, regardless of upper or lower case. If you need to manually add or remove links between dimensions from different datasets, you can select *edit input control*.

Procedure

1. Select *Input Controls* on the *Content Panel*.
Dimensions from the selected dataset appear on the gallery above the *Content Panel*. If you want to view dimensions from a different dataset, choose it from the dataset selector.
2. Drag a dimension to the story.
You can add input controls to a section in the story, or you can overlay the input control on a visualization. A blue guide box indicates the placement of the input control in the visualization. You can optionally re-size or move the input control.

A *CONTROL PROPERTIES* panel appears on the *Page Settings* panel, allowing you to modify the input control and view a list of affected datasets, or datasets that contain a dimension with the same name as the selected dimension.
3. In the *CONTROL PROPERTIES* panel, choose the *Style* for the input control.

Both combo boxes and list boxes allow users to view, search, and sort a list of members. List boxes may be more appropriate for smaller input controls, because they show dimension members in a drop down list.
4. In the *CONTROL PROPERTIES* panel, choose the *Selection Mode* for the input control.

Select *Single* to restrict the input control to a single dimension value. Select *Multi* to allow users to select multiple values.

5. If necessary, select the check box beside each value that you want to show for the dimension.

In longer lists of values, you can find a value by scrolling through the list or by entering text in the *Search*

box. You can also use the sort arrow  to sort values in ascending or descending order.

All relevant visualizations on either the current page or in the entire story are updated with the values you chose for the dimension, and a filter token appears for the input control.

6. To change the scope of the input control, select the filter token and choose *Current Page (Page Filter)* or *All Pages (Story Filter)* from the *APPLY TO* list.
7. Repeat these steps for each dimension that you want to add an input control for.

Results

When viewing the story, your collaborators can customize the data by selecting new values for each input control.

If you export the story to PDF, the dimension and the selected values for each input control are displayed in the PDF.

Related Information

[Apply page filter indicators \[page 169\]](#)

[Configuring input controls for multiple datasets \[page 165\]](#)

7.13.1.1 Configuring input controls for multiple datasets

Context

The *CONTROL PROPERTIES* panel for an input control lists the affected datasets and the dimension in each dataset that the input control applies to. The dimensions that are affected by an input control are determined as follows:

- First, if the dimension selected for the input control is linked to a dimension in another dataset, those dimensions are mapped together. Links are established in the *Visualize* room, from the *Define Dataset Links* dialog.
- For the remaining datasets, dimensions that have the same name as the dimension selected for the input control are mapped together. This mapping is not case-sensitive, but the dimension type must be the same.

If you want to change how a dimension in a dataset is mapped to an input control, select *Edit affected datasets*.

To map affected datasets, your story must contain two or more visualizations and contain two or more datasets.

Procedure

1. Select an input control on a page of a story.

The *CONTROL PROPERTIES* panel for the selected input control appears.

2. Select *edit input control*.

The *Edit Input Control* dialog appears. Displayed on the left are the dataset and dimension that the input control is based on. Other datasets in the story are listed on the right, with each dimension that is currently mapped to the input control.

3. From the list of dimensions for each dataset, select the new dimension to map to the input control, or select *Does not affect* to prevent the input control from filtering that dataset.

You can only map dimensions of the same type, for example string type or number type.

4. For online datasets based on SAP HANA views, select the Join  icon for each secondary dataset to configure the list of values for the input control.
 - Select *Left Outer Join*  to show the values from the first dataset. Values that exist only in the secondary dataset will not appear in the input control.
 - Select *Full Outer Join*  to show values that exist in either dataset.
5. Select *Apply*.

Results

The input control mapping is updated.

Related Information

[Using input controls \[page 164\]](#)

[Apply page filter indicators \[page 169\]](#)

7.13.2 Using the filter dialog in the Compose room

Use the filter dialog in the *Compose* room to define a filter on the current story page or on all story pages.

Context

Tokens representing active filters are displayed above the Chart Canvas.

Procedure

1. To open the filter dialog in the *Compose* room, click the *Add filters*  icon above the Chart Canvas and choose a dimension to filter.

If a dimension includes a dimension hierarchy  icon, click **+** to expand the list to show all dimensions included in the hierarchy.

You can also select the token for an existing filter to edit it in the filter dialog.

2. On the filter dialog, choose an operator from the list.
3. Specify the values to filter:

Operator	Description
<i>Between</i>	Type a beginning value and an end value.
<i>Equal to, Not Equal to, Greater than, Greater than or equal to, Less than, or Less than or equal to</i>	Type a value.
<i>Contains</i>	Type a string that is contained in all of the values that you want to include. For example, filtering a dimension of clothing product categories for shirt would return values such as <i>T-shirts</i> , <i>long-sleeve shirts</i> , <i>shirt dresses</i> , and so on.
<i>Like or Not Like</i>	Type a pattern that matches all of the values that you want to filter or exclude. You can use the following wildcard characters in the pattern: <ul style="list-style-type: none">○ The _ character matches any single character. For example, filtering a dimension of US state abbreviations for A_ would return the values AL, AK, AR, and AZ.○ The % character matches any number of characters. For example, filtering a dimension of US state names for A%a would return Alabama, Alaska, and Arizona.
<i>In List or Not In List</i>	Select values from the list in the filter dialog. <ul style="list-style-type: none">○ You can hold SHIFT while clicking values to select a range of values.

Operator	Description
	<ul style="list-style-type: none"> ○ With alphanumeric dimensions or numeric integer dimensions, you can select the box of filter values to show the values as comma separated text. You can then type values, or paste a CSV list. If your values include commas, surround each value with quotation marks. For example, "New York, NY", "Los Angeles, CA", "Chicago, IL" If you enter a value that does not exist in the dataset or visualization, it is saved with the filter. This way, you can filter values that are added to the data after the filter is created. ○ You can also select the <i>Options</i>  icon to change the filter dialog settings, including displaying the number of times that each record occurs in the dataset, and sorting the data by value or by number of occurrences. ○ When filtering an integer or alphanumeric dimension, you can select the <i>Find</i>  icon to search for a member by name. By selecting <i>Options</i> > <i>Enable wildcard search</i> , you can search alphanumeric dimensions using the <code>_</code> and <code>%</code> wildcards.

4. Click *Apply*.

Results

The data is filtered and a token representing the filter is added above the Chart Canvas.

7.13.3 Drilling through hierarchical data in a story

Context

Drilling through hierarchical data in a story has the same capabilities as drilling in the *Visualize* room. Input controls and filters applied to the page are maintained during the drill and drill back operations.

The drill operation consists of:

- applying a filter to the current page or all pages, depending on the *Default Filter Scope* for the story
- redrawing the visualization at the new level of the hierarchy

When you drill through one visualization in a page, the filter is applied to other visualizations on the page or in the story, including visualizations based on other datasets.

In order for hierarchies to match across datasets, both the dimension name and type must match, or the dimensions must be linked in the *Define Dataset Links* dialog.

Procedure

1. Select an area in the visualization to drill through.
2. In the tooltip that appears, select the *drill down*  or *drill up*  icon.

The filter is applied to relevant visualizations and a token is added to the filter bar. The selected visualization is re-drawn at the new level in the hierarchy.

3. To step back through the drill operation, select the *drill back*  icon.

The filter created by the drill action is removed from all visualizations in the page. The selected visualization is re-drawn at the previous level. Any filters or input controls applied by hand are maintained. Note that the *drill back* filter is reset when you switch to the *Compose* room.

Related Information

[Drilling through hierarchical data \[page 128\]](#)

7.13.4 Apply page filter indicators

Page filter indicators  give visual cues that a page-level filter applies to the data in a visualization.

Context

Page filter indicators can be triggered by drilling, input controls, or filtering or excluding chart members. When you have multiple visualizations on a page, these operations can affect more than one visualization, so the filter indicators can help you understand how a filter has changed the data on each visualization.

i Note

Filters that you apply in *Explore* mode, which affect only a single visualization, do not trigger the page filter indicator for that visualization.

For each filter applied to the visualization, the icon's tooltip shows the affected dataset, the filtered dimension, and the number of filtered values. You can turn page filter indicators on or off for each page in a story.

Procedure

1. On the *PAGE SETTINGS* panel, turn on *Show page filter indicators*.
2. The  icon appears in the upper left corner of every visualization that is displaying filtered data. If a number appears next to the icon, it indicates the number of filters applied to the visualization.
3. Hover over the  icon on a visualization. Each affected dataset is listed in bold. The filtered dimensions are listed underneath each dataset, along with the number of values being filtered for each dimension.
4. To remove page filter indicators from a page, turn off *Show page filter indicators*.

Related Information

[Using input controls \[page 164\]](#)

[Configuring input controls for multiple datasets \[page 165\]](#)

7.14 Viewing stories

After you publish and share a story, collaborators can view it. Depending on their rights and how the story was shared, they may not be able to edit it in Lumira. However, stories allow collaborators to make certain changes to visualizations to customize how the data is displayed. In the *Compose* room, you can select *Preview* to test the features that are available while viewing the story. You can also pick a resolution for the preview, for example, if you intend to share the story with colleagues using mobile devices or tablets.

Some changes affect only a single visualization, while others can affect all data on the current page, or in the entire story.

Table 41: Features available while viewing stories

Feature	Description	Scope
Drilling	You can drill up or down in hierarchical data by selecting a data point in a visualization.	Page-level or story-level filter
Filtering	You can apply filters to visualizations by choosing data points and selecting <i>Filter</i> or <i>Exclude</i> .	Page-level or story-level filter
Selecting input control values	If input controls were added to the story in the <i>Compose</i> room, you can select values for the input controls to filter data while viewing the story. Input controls apply a story-level or page-level filter that can affect multiple visualizations.	Page-level or story-level filter

Feature	Description	Scope
Exploring visualizations	You can select the <i>Explore</i>  icon for a visualization to apply much of the functionality that is available in the <i>Visualize</i> room, such as filtering, ranking, and sorting data in the visualization.	Single visualization only

Related Information

[Drilling through hierarchical data in a story \[page 168\]](#)

[Filtering or excluding data points in a chart \[page 119\]](#)

[Exploring a visualization in a story \[page 154\]](#)

[Using input controls \[page 164\]](#)

7.15 Working with crosstabs in stories

Crosstabs are used in stories to display all the original data from a dataset. You can use the *VISUALIZATION PROPERTIES* panel to customize how a crosstab appears in a story.

Expanding a crosstab to see all rows

By default, a crosstab is sized to fit into its container, but you can use *Expand Crosstab to See All Rows* to show all rows of data on a single page. This setting changes the page to continuous scrolling mode.

If the width of the crosstab is greater than the width of the page, you can use the scroll bars to view all columns.

➔ Tip

If you can't see the vertical scroll bar, double-click the crosstab to enable the crosstab properties. Then you can scroll down through all the rows.

Date	Country	Category	Quantity sold
1/1/2012	Australia	Mini city	150
		Sweater dresses	550
	Colombia	Sweater dresses	200
	Egypt	Skirts	50
	Italy	Party pants	600
	Japan	Cardigan	7,650
	Netherlands	Jewelry	17,200
	Russia	T-Shirts	20,550

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Show Chart Title

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Expand Crosstab to See All Rows

OFF

You can overlay pictograms and shapes on a crosstab if [Expand Crosstab to See All Rows](#) is not selected. If [Expand Crosstab to See All Rows](#) is selected, these items cannot be placed on the crosstab.

The amount of data you can retrieve from a data source is customized by your administrator. This may result in the crosstab displaying fewer rows than are available in original data source.

Stories with crosstabs can be shared. Data is preserved when the story is published, so all of the data retrieved from the original data source is shared to the new destination. Users with sufficient rights can select [Expand Crosstab to See All Rows](#) in the shared story and see all of the original data.

The data in the shared stories can be refreshed. Note that data size limits in the destination may be different from the data size limits on SAP Lumira (desktop).

Stories that contain crosstabs can be exported to PDF. If [Expand Crosstab to See All Rows](#) is selected, only the first 100 rows are exported.

Customizing fonts and colors

You can customize formatting such as font, text alignment, and background color. Different types of areas in a crosstab, for example, row labels, column labels, and data cells, can be formatted separately. Select an area from the list in the [VISUALIZATION PROPERTIES](#) panel, or select the area of the crosstab that you want to format in the story page. Formatting options appear in the [VISUALIZATION PROPERTIES](#) panel.

Setting crosstab area size and configuring totals

Options for crosstab area sizes and subtotals are available when composing and viewing stories. For more information, see the [Analyzing data in crosstabs](#) section of this guide.

Related Information

[Analyzing data in crosstabs \[page 111\]](#)

[Pictograms and shapes \[page 158\]](#)

7.16 Exporting records

When viewing a visualization, you may want to export the values of the data points shown in the visualization. Alternatively, you may want to export the records from your dataset that are being aggregated to create those values.

For example, if your visualization shows sales by country from a dataset that contains all of your sales orders, you can export those aggregated sales values for each of the countries. You also have the option to export the individual sales order records behind those data points, which may be useful if there are additional columns of value in the data that aren't easily accessible from the visualization.

When exporting detailed individual records, you can choose which dimensions and measures will be exported.

Any global filters (filters applied to the entire dataset), page-level filters, and story-level filters are applied when exporting records from a visualization.

You can export the records to Excel or comma-separated-values (CSV) formats.

i Note

If there are too many values to export, the exported set of data will be truncated, and the exported file will include a warning message at the beginning of the file to indicate this. The Excel file format is more complex than the CSV file format, and therefore the number of cells that can be exported is more limited when using the Excel format. When exporting a large number of records, the CSV format may be a better output format if data truncation is occurring.

i Note

You can set the default export type (aggregated or detailed) by selecting **File > Preferences > Charts**.

7.16.1 Exporting records for all data points

Context

You can export records for all data points in a visualization, while previewing the visualization in the *Compose* room or editing the visualization in the *Visualize* room.

Procedure

1. Select *Export Records* by one of these methods:

- In the *Compose* room, select the *Export Records* icon  at the top-right corner of the visualization.

- In the *Compose* room, while exploring a visualization (select the *Explore*  icon in the upper-right corner of a visualization), select the *Export Records* icon  .
 - In the *Visualize* room, select the *Export Records* icon  .
2. Choose whether you want to export the aggregated values or the detailed records.
 3. If you're exporting detailed records, select the dimensions and measures that you want to export.
 4. Choose whether you want to export the records to a CSV (comma-separated values) file or to an Excel XLSX file.
 5. Select *Export*, and choose a directory and filename.

7.16.2 Exporting records for selected data points

Context

You can export records for selected data points in a visualization, while previewing the visualization in the *Compose* room or editing the visualization in the *Visualize* room.

Procedure

1. Select the data points whose records you'd like to export.
For example, if you're working with a bar chart on a Windows PC, click bars to select them. If you select an unwanted data point unintentionally, `Ctrl` + `click` the data point to deselect it. Or click an empty area of the visualization to clear your selection.
2. In the tooltip box, select *Export Records*.
3. Choose whether you want to export the aggregated values or the detailed records.
4. If you're exporting detailed records, select the dimensions and measures that you want to export.
5. Choose whether you want to export the records to a CSV (comma-separated values) file or to an Excel XLSX file.
6. Select *Export*, and choose a directory and filename.

i Note

When you export running calculations, forecasts, or linear regressions for selected data points, you're essentially filtering the values so that the resulting aggregates apply only to those data points.

For example, here is a data set:

Table 42:

Date	Profit	Running Calculation - Sum
2015/01/01	100	100
2015/02/01	100	200
2015/03/01	100	300
2015/04/01	100	400
2015/05/01	100	500

If you create a chart for this dataset, add a Sum running calculation, and then select only the bottom three data points in the chart, the running calculation will be recalculated for those three data points only. Notice that the results differ from the original results:

Table 43:

Date	Profit	Running Calculation - Sum
2015/03/01	100	100
2015/04/01	100	200
2015/05/01	100	300

7.17 Sharing Stories

Context

You can export the story to a PDF format.

Procedure

1. Start SAP Lumira.
2. Choose *Compose* room and select the story that you want to export.
3. Choose **File** > *Export As File*.

The *Export as File* dialog box appears.

4. In the *Export As File* dialog box, perform the following:
 - a. Select PDF as your *Format*.
PDF is the default format.
 - b. Under *Pages*, you can select one of the following options:

-
- *ALL*: Exports all the pages in the document.
 - *Range*: Enter the range of pages that you want to export. The range entered should be in the following format: *<Start Page> - <End Page>*.
 - c. Under *Dataset Filters* , choose one of the following options:
 - *Do not display*: If no appendix is required.
 - *Display in appendix*: To generate an appendix of the dataset and page filters used in the story.
5. Choose *Export*.

The PDF file of the story is available for sharing.

8 Enabling share room using -Dhilo option

If you want to share your Lumira documents using *Share* room, you can enable the *Share* room in SAP Lumira.

Prerequisites

You have used the text editor with administrator rights only.

Context

Note

In this release, the *Share* room is deprecated. You can however share datasets, visualizations and stories from the *Prepare* room, the *Visualize* room, and the *Compose* room respectively.

- For more information on sharing datasets in the *Prepare* room, see [Sharing Datasets \[page 75\]](#) Sharing Datasets.
- For more information on sharing visualizations in the *Visualize* room, see [Sharing Visualizations \[page 145\]](#) Sharing Visualizations.
- For more information on sharing stories in the *Compose* room, see [Sharing Stories \[page 175\]](#) Sharing Stories.

If you are an existing SAP Lumira Desktop user, using an earlier versions of SAP Lumira Desktop and want to retain the *Share* room in SAP Lumira Desktop, perform the following:

Procedure

1. Navigate to the location where you have installed SAP Lumira Desktop, for example *Program Files*.
2. In this directory, choose  *SAP Lumira*  *Desktop*  *SAP Lumira.ini* 
3. Open the *SAP Lumira.ini* file and enter the following code snippet:

Sample Code

```
-Dhilo.shareroom.enabled=true
```

4. Save and replace the *SAP Lumira.ini* file.
5. Restart SAP Lumira.

Results

The *Share* room is enabled in your SAP Lumira Desktop application.

9 Application extensions

A standard installation of SAP Lumira lets you acquire data from many different data source types, and provides a wide variety of visualization types. But by installing extensions, you can have an even broader choice.

SAP Lumira extensions are similar to the extensions, add-ons, and plug-ins that are available for popular web browsers. Extensions can add new features or provide enhanced connectivity.

Two kinds of extensions are available for SAP Lumira: data access extensions, and visualization extensions. Data access extensions let you acquire data from data sources that are not otherwise supported by SAP Lumira. Visualization extensions let you design your own custom chart types.

Extensions can be either provided by SAP, or created by your own developers or third parties. For example, your organization may be using a custom database type. Your developers can create an extension that will allow SAP Lumira users to use your organization's data.

Extensions provided by SAP are available from the SAP Extension Repository. Users install those extensions from the repository using the [Extension Manager](#). For details on how to create and publish extensions, see the [Data Access Extensions for SAP Lumira Developer Guide](#) and the [Visualization Extension Plugin for SAP Web IDE Guide](#).

i Note

Some extensions, for example all data access extensions, require a paid license for SAP Lumira.

9.1 Data access extensions

If you want to acquire data from a data source that SAP Lumira doesn't normally support, you can develop a data access extension, or use an extension available from SAP.

Any data access extensions you install appear in the list of data source types in the [Add new dataset](#) window.

9.1.1 SAP Universe Query Panel extension

The SAP Universe Query Panel extension, provided by SAP, lets you use advanced query capabilities to acquire data from `.unx` universes.

Using the query panel lets you acquire a highly specific subset of data, relevant to the analysis you want to perform. For example, you can include filters and prompts in a query to customize the data returned from the data source.

i Note

The SAP Universe Query Panel extension is available only if you have a Trial or Full license for SAP Lumira.

Related Information

[Acquiring data from universes \[page 36\]](#)

[Where to find extensions \[page 193\]](#)

[Installing or uninstalling an extension \[page 193\]](#)

9.1.1.1 Connecting to a universe query panel data source

Procedure

1. On the *Home* page, select *Create New Document*.
2. In the *New Dataset* window, select *SAP Universe Query Panel*, and select *Next*.
3. In the *SAP Universe Query Panel* dialog, enter the following details:
 - a. Enter the name or IP address of the server that hosts your Central Management Server (CMS).
If you are connecting to a CMS that belongs to a different network domain, make sure the `hosts` file located at `C:\Windows\System32\drivers\etc` has the corresponding host name entry. For example, `x.x.x.x<NameOfMachineHostingCMS>`.
 - b. Enter the CMS user name, password, and authentication type.
To use Windows AD authentication to connect to the CMS, append the following two entries in the `SAPLumira.ini` file, located at: `<LumiraInstallDir>\SAPLumira\Desktop`

```
-Djava.security.auth.login.config=<Path_to_bscLogin>\bscLogin.conf
-Djava.security.krb5.conf=<Path_to_krb5>\krb5.ini
```

For example:

```
-Djava.security.auth.login.config=C:\Windows\bscLogin.conf
-Djava.security.krb5.conf=C:\Windows\krb5.ini
```
 - c. Select *Next*.
A list of universes available in the CMS appears.
4. Select a universe and select *Next*.
The query panel opens, displaying the universe tree, called the business layer.

Related Information

[Connecting to a universe data source \[page 36\]](#)

9.1.1.2 Building a query

You can run queries on published universes.

Context

Note

For detailed information about querying universes, see the topic “Using the Query Panel” in the *Information Design Tool User Guide*, available on the SAP Help Portal <http://help.sap.com/>.

Procedure

1. To select the objects you want to include in the query, drag objects from the business layer (the universe tree) into the *Result Objects* pane.
2. For hierarchy result objects, select members to include or exclude in the results.

To open the Member Selector, click the arrow to the right of the hierarchy object name: .

3. To filter the results of the query, drag objects from the business layer into the *Query Filters* pane.

If a mandatory filter is defined on an object, the filter is triggered when you add the object to the *Result Objects* pane. The mandatory filter is visible in the query script, but not in the *Query Filters* pane.

Non-mandatory pre-defined filters are listed in the business layer. You can drag these pre-defined filters into the *Query Filters* pane to limit the results. The filter is visible in the query script.

You can also build business filters, including filters that use prompts.

4. For relational universes, you can build combined queries. To open the *Combined queries* pane, click the  icon.

5. To set query properties, click the  icon.

6. To see or edit the query script, click *View script*.

7. To preview the query results, click *Refresh* in the *Data Preview* pane.

You can profile the values in the result columns. In the *Data Preview* pane, click the *Advanced Preview* icon



To change the layout of hierarchical data, click the *Result set display options* icon  and select an option from the list:

Option	Description
Flat layout	Displays repeated values for a level in every row.
Hierarchical layout	Displays repeated values once for a level.

8. To run the query, click *Finish*.

The *Visualize* room opens, and you can start building charts and analyzing the data. If you want to modify a dataset first, use the *Prepare* room.

Related Information

[Using prompts to filter data \[page 182\]](#)

9.1.1.3 Using prompts to filter data

You can use prompts to customize a dataset for your needs.

A prompt is a special type of query filter. It is a dynamic filter that displays a question every time you refresh the data in a query. You answer prompts by specifying the values you want to view before you refresh the data. You can specify values by typing them, selecting them from the list of values, or searching the list for the values you're interested in. The query returns only the values you specified.

i Note

If you search for values, only values that have been retrieved from the server are searched. As you scroll down the list of values, more values are retrieved from the server.

Prompts allow multiple users viewing a single document to specify a different sub-set of the database information and display it in the same report tables and charts. Prompts also reduce the time it takes for the data to be retrieved from the database.

When you define a prompt query filter, you can either build a new prompt, or use an existing prompt defined as a parameter in the business layer.

If you define more than one prompt in a query, you can change the order in which prompts are presented. Change prompt order in the query properties.

i Note

For detailed information about using prompts, see the topic "Using the Query Panel" in the *Information Design Tool User Guide*, available on the SAP Help Portal <http://help.sap.com/>.

9.1.1.4 Limitations of the Query Panel extension

The SAP Universe Query Panel extension has these limitations:

- The SAP Universe Query Panel extension does not support OLAP universes.
- Universe parameter prompting does not support hierarchical prompts.
- Currently, the SAP Universe Query Panel extension does not support multiple flows of SQL. If a query will result in two separate SQL statements, you will need to modify your query before the Query Panel extension can execute it.

9.1.2 Download data from SAP Business Warehouse extension

The “Download data from SAP Business Warehouse” extension, provided by SAP, lets you directly connect to SAP Business Warehouse (BW) systems using Business Intelligence Consumer Services (BICS) connectivity. This allows you to download a slice of BW data to Lumira Desktop.

This connectivity allows you to connect to SAP Business Explorer (BEx) queries or InfoProviders. Once the data is acquired in Lumira Desktop, users can perform data discovery:

- Interact with, manipulate, and experiment with the BW data
- Apply data transformations to the BW data
- Merge BW data with other data sources
- Build visualizations and compose stories
- Share data in a visual manner with other users in your organization

Note

The “Download data from SAP Business Warehouse” extension is available only if you have a Trial or Full license for Lumira Desktop.

Related Information

[Where to find extensions \[page 193\]](#)

[Installing or uninstalling an extension \[page 193\]](#)

9.1.2.1 Downloading a BW dataset

Learn how to connect to BEx Queries or InfoProviders, select dimensions and measures, and set values for BW variables (for BEx queries).

Procedure

1. To create a new dataset, select **File > New**.
2. In the *Add new dataset* dialog, select *Download from SAP Business Warehouse*, and select *Next*.
3. From the *Connect To* list, select either a direct connection to *Local BW System*, or log onto the *SAP BusinessObjects BI Platform* to access the managed OLAP connections to BW.
 - For a connection to a *Local BW System*:
 1. Prerequisites:

Before you can connect to an SAP Business Warehouse (BW) system, it needs to be registered through SAP GUI for Windows on the same computer. It is recommended to test the connectivity of the registered BW system via SAP Logon before using it in Lumira Desktop. Refer to the *SAP GUI for Windows* documentation on the SAP Help Portal at <http://help.sap.com> to configure a new system. To download SAP GUI for Windows, go to [SAP Service Marketplace](#).
The list of available BW servers is derived from SAP Logon.
 2. Enter the BW connection details, and select *Connect*.
 3. Search for and choose a BEx Query, and then select *Create*.

You can apply a search, based on key words, for your BEx Query, using the *Roles* or *InfoAreas* view.
 4. Enter values for variables of the BEx Query, if any.
 5. Select the dimensions and measures you want to download to your Lumira Desktop dataset.
 6. Select *Create*.

i Note

While acquiring or editing the data from BW dataset to SAP Lumira desktop or while refreshing the BW dataset in SAP Lumira, server for BI platform, if you obtain the following error message: *Result set too large (XXXXXX cells). Data retrieval restricted by configuration (Maximum=XXXXXX cells)*, then perform the following:

1. Navigate to the location where you have installed SAP Lumira Desktop. For example, Program Files.
2. In this directory, choose **SAP Lumira > Desktop > SAPLumira.ini**.
3. Open the SAPLumira.ini file with administrator rights.
4. Modify the cell limit by increasing the **Maximum** value according to your requirements in the following code snippet:

```
-DBICS_DA_RESULT_SET_LIMIT_DEF=500000  
-DBICS_DA_RESULT_SET_LIMIT_MAX=1000000
```

Ensure that the **MAXIMUM** value is always greater than the **DEFAULT** value.
5. Save the file and restart the application.

- For a connection to *SAP BusinessObjects BI Platform*:

1. Enter the BI Platform connection details, and select [Connect](#).
2. Select an OLAP connection, and select [Next](#).
You can filter the list of available OLAP connections to BW using the [Show Connections](#) drop-down list. Alternatively, you can apply a search, based on key words, for the specific OLAP connection.
3. Enter values for variables of the BEx Query, if any.
4. Select the dimensions and measures you want to download to your Lumira Desktop dataset.
5. Select [Create](#).

Next Steps

For details on supported BEx query features relevant to SAP BW data acquisition, see this SAP note: [1869560](#)


Note

In SAP Lumira, each SAP BW variable defines a filter on a dimension of a view. In this release, you can select dimensions and filter the selected dimensions while acquiring the dataset in SAP BW.

9.1.2.2 Understanding SAP BW data acquisition

Lumira Desktop includes a data access extension that lets you access BEx queries from an SAP BW system. You can connect to BW queries and acquire a slice of BW data into Lumira Desktop. How the data is being acquired is an important topic to understand. The following sections describe specific BEx query concepts that you should be aware of, and known limitations.

The SAP BW data access extension lets you do the following:

Connect to existing BEx queries on a BW 7.x system

Your organization might have invested in and refined your BEx queries over time. While Lumira Desktop is not positioned for the same use cases (OLAP analysis) as the Analysis client applications, Lumira Desktop is able to leverage that investment in queries by allowing connection to the BW 7.x systems.

Answer the BEx variables

It is common for BEx queries to have BW variables defined in them. Variables are important not only for filtering data, but also for guaranteeing that users see the correct data (for example, using key date and exit variables) and only the data they have permission to see (using authorization variables).

Select the BW metadata

You can choose the specific dimensions and measures to acquire. The selection of dimensions and measures is important because it influences the volume of data acquired, and because certain BEx query concepts directly influence the acquired BW data values (for example, BEx conditions and zero suppression).

Acquire BW data into Lumira Desktop

Although your organization's BEx queries may be highly developed, a query rarely corresponds to 100% of a user's needs. In many cases, you may need to trim, split, or concatenate fields in preparation for creating a visualization, or merging with another dataset. You can benefit from the many data preparation features that Lumira Desktop offers.

Once the BW data is acquired, the data is stored in a local Lumira Desktop file. Interactions and calculations performed on the BW data do not access the BW OLAP engine. Refreshing of the BW data values in Lumira Desktop is possible, but the refresh is based upon the dimensions and measures that were selected at data-acquisition time. For information on key design behaviors and limitations while interacting with local BW data, see the following sections.

i Note

In this release, you can choose the date format while acquiring data in BW. However, if you have not chosen any specified format, then the BW considers default date format.

9.1.2.3 Data acquisition design behaviors and known limitations

Be aware of the following design behaviors and limitations regarding BW query concepts. For details on supported BEx query features relevant to SAP BW data acquisition, see this SAP note: [1869560](#).

Related Information

[BW hierarchy support \[page 187\]](#)

[BW filtering support \[page 188\]](#)

[Limitations with BW measures \[page 189\]](#)

[Limitations with mixed currency and units symbols \[page 189\]](#)

9.1.2.3.1 BW hierarchy support

BW hierarchies can be acquired into Lumira Desktop. The BW hierarchies are flattened into level-based dimensions as part of the acquisition process.

The parent-child relationship of BW hierarchies is not supported, but after the hierarchy is acquired as level-based dimensions, you can use the custom hierarchy feature to build the acquired dimensions into a level-based hierarchy. The custom hierarchy can then be used for visualizations.

BW time-generated hierarchies

Lumira Desktop supports a time hierarchy concept as a single data type. For any given level of a standard BW time hierarchy, nodes and leaves may be of mixed data types (for example, nodes are of data type String, while leaves are of data type Date or Time). Lumira Desktop assigns only the data type String to a hierarchy level column. You can create visualizations with the acquired hierarchy, but the data points may not be ordered chronologically as expected, because of the mapping to data type String.

BW hierarchical structures

BW hierarchical structures (both dimension-based and measure-based) cannot be acquired.

BW hierarchies with link nodes

BW hierarchies and the data relating to link nodes can be acquired. However, the context of data values that represent the link node is not persisted. Be careful when performing aggregations on the BW data, because double-counting of link nodes cannot be avoided.

See this page for more information about link nodes: http://help.sap.com/saphelp_erp60_sp/helpdata/en/b3/fa3d3806136268e10000009b38f8cf/content.htm

Changing of hierarchies in Lumira Desktop

Changing of BW hierarchy context within a visualization or story is not supported. This applies to BEx queries containing the following BW prompting scenarios:

- Hierarchy variables (and hierarchy node variables)
- Key date variables driving a change in context, where entire hierarchies are modelled as time-dependent

9.1.2.3.2 BW filtering support

Filtering of BW data is an integral part of the overall BW data acquisition workflow. Lumira Desktop is able to leverage data filtering defined in the BEx query via the following configurations:

- BEx query filters defined on dimensions
- BW variable prompting
- BEx conditions
- Zero suppression

Lumira Desktop offers limited support of BEx conditions and zero suppression:

BEx conditions

BEx conditions defined along the row are supported at the time of data acquisition. You can select the dimensions to acquire, and define a specific ordering for the dimensions. The ability to order the dimensions prior to data acquisition is necessary, because the acquisition of data takes into account the BEx condition rule defined in the query (for example, Top 3 Product Sales), and how the aggregation will be applied (for example, Top 3 per Region for all Countries).

i Note

At the time of selection of dimensions and measures for data acquisition, the row/column structure of the underlying BW query is not reflected. When you select the dimensions, they are conceptually placed into a row axis. Because of this behavior, BEx conditions at data acquisition time in Lumira Desktop may not produce the results you expect, compared to the underlying BW query definition.

Once data is acquired in Lumira Desktop, the concept of BEx conditions is not supported. The calculation of the data aggregation based on the placement or ordering of dimensions in a Lumira Desktop crosstab or visualization is performed locally on the acquired data.

BEx conditions defined along the column are not supported at the time of data acquisition. When there are active BEx conditions along the column defined in the BW query, the conditions are ignored and do not influence the acquisition of BW data in Lumira Desktop.

For more information on BEx conditions, see this page: https://help.sap.com/saphelp_nw70/helpdata/en/43/2695d2fd2f0d23e10000000a1553f7/content.htm.

Zero suppression

Zero suppression defined along the rows is supported at the time of data acquisition. Zero suppression defined along the columns is not supported at the time of data acquisition.

Once data is acquired in Lumira Desktop, the concept of zero suppression is not supported. The calculation of selected measures in a Lumira Desktop crosstab or visualization is performed locally on the acquired data.

For more information on zero suppression, see this page: http://help.sap.com/saphelp_nw70/helpdata/en/a4/dd3841d132d92be10000000a1550b0/content.htm.

9.1.2.3.3 Limitations with BW measures

For BW formula-based measures, the aggregation state in Lumira Desktop is detected as “none” because the aggregation is not known during data acquisition. Lumira Desktop is unable to determine the aggregation based on available information from BICS. This can lead to unexpected data results when the acquired measure is used in Lumira Desktop visualizations, where aggregation is expected.

In this scenario, Lumira Desktop will not automatically determine how to aggregate the BW data. However, you can manually change the aggregation of a measure in Lumira Desktop, once data is acquired.

9.1.2.3.4 Limitations with mixed currency and units symbols

Lumira does not support the acquisition of a unit or currency symbol assigned to a measure. A measure can be configured with a custom symbol, such as a unit or currency, by using the *Display Formatting* feature in Lumira. However, Lumira does not support the situation where the display of mixed units and currency symbols is required.

In addition, Lumira does not support the situation where aggregation of values of different currencies is required.

9.1.2.3.5 Restrictions and usage patterns

Delegated search for prompts

Delegated search is supported for LOV (list of values) prompts, with the exception of the following prompt types: Date, Time, hierarchy variable, and hierarchy node variable. When using delegated search on LOV prompts, these are the restrictions and usage patterns:

- Search is based on the selected LOV presentation (Text or Key or Text & Key), and is case sensitive.
- When Text & Key presentation is selected, the delegated search is based on Key first. If no Key values are returned, then a delegated search is performed by Text.
- Use of search wildcards is supported: *, +. “+” represents a single character.

Selection Option variable support

Manual entry of Key values is possible as part of Selection Option variable support. The use of the “*” wildcard pattern as part of the Key value is permitted (but not the “+” wildcard).

Examples:

- *3* works.
- *3 works.

- * works.
- A value followed by a wild card (for example, 3*) does not work.

Other known limitations:

- Entering Key values by using pattern matching does not trigger the highlighting of associated selections in the list of values.
- Pattern matching is supported only in conjunction with the use of the operators = or !=. For example, combinations of the operator > and *3 do not work.

9.1.2.4 Support for SAP BW structures

SAP Lumira can connect to and acquire data from SAP BW queries with structures. Lumira supports data acquisition from two types of structures: dimension structures, and measure structures.

Known data acquisition behaviors

The dimension structure is always added to the metadata explorer result set, and can't be removed.

The hierarchical context is lost when data from a BW structure is acquired, both for dimension-based and measure-based structures. For example, the result set of the dimension structure is always a pivot, and not a hierarchy. This is to ensure that the measure values are accurate. Also, the aggregation type for the measure values is set to "None".

An auto-generated ordinal numeric key (1, 2, 3, and so on) is required as part of the data acquisition step, to drive the order of the dimension structure. This key will appear as a column in the *Prepare* room, and should be associated with the dimension structure so that when the dimension structure is displayed in a visualization, the data is in the correct order.

9.2 Visualization extensions

If you want to use a custom chart type in SAP Lumira, you can develop a visualization extension, or use an extension available from SAP.

Any visualization extensions you install appear in the *Chart Extensions* group in the Chart Builder.

9.2.1 Tutorial: installing and using the flagbar visualization extension

A sample visualization extension that uses flags instead of bars to display results.

During installation of SAP Lumira, some visualization extension samples are also installed. The helloworld extension displays the words "Hello World", while other extensions rely on data files.

The Flag Bar chart visualization extension shows how you can use images within your chart results. The tutorial explains how to set up the data to use with the extension.

1. [Manually install the flagbar extension \[page 191\]](#)
Install the flagbar visualization extension example.
2. [Create the flagbar CSV data file \[page 192\]](#)
Create a text data file to use with the flagbar extension.
3. [Create a flagbar visualization extension document \[page 192\]](#)
Use the sample flagbar visualization extension to create an SAP Lumira document.

9.2.1.1 Manually install the flagbar extension

Install the flagbar visualization extension example.

Procedure

1. Select **File > Extensions**.
2. From the *Extension Manager* dialog, select *Manual Installation*.
3. Browse to the extension sample directory. (<installdir>\SAP Lumira\Desktop\samples\extensions\charts)
4. Select **sap.viz.ext.flagbar.zip** and click *Open*.
5. Close the *Extension Manager* dialog.
6. Shutdown SAP Lumira.

Task overview: [Tutorial: installing and using the flagbar visualization extension \[page 191\]](#)

Next task: [Create the flagbar CSV data file \[page 192\]](#)

9.2.1.2 Create the flagbar CSV data file

Create a text data file to use with the flagbar extension.

Procedure

1. Open a text editor.
2. Paste the following data into the text editor:

```
Medal Type, Country, Athens (2004), Beijing (2008)
Gold, USA, 35, 36
Silver, USA, 39, 38
Bronze, USA, 29, 36
Gold, China, 32, 51
Silver, China, 17, 21
Bronze, China, 14, 28
Gold, Russia, 27, 23
Silver, Russia, 27, 21
Bronze, Russia, 38, 29
```

3. Save the file as **flagbar.csv**.

Task overview: [Tutorial: installing and using the flagbar visualization extension \[page 191\]](#)

Previous task: [Manually install the flagbar extension \[page 191\]](#)

Next task: [Create a flagbar visualization extension document \[page 192\]](#)

9.2.1.3 Create a flagbar visualization extension document

Use the sample flagbar visualization extension to create an SAP Lumira document.

Procedure

1. Start SAP Lumira.
2. Select **File > New**.
3. Double-click *Text*.
4. Find your **flagbar.csv** file and *Open* it.
5. Select *Create*.
6. In the *Chart Builder*, select the **Flag Bar Chart**.
7. Add the measures: Athens (2004) and Beijing (2008)

8. Add the dimensions to the appropriate shelves.

Results

Your SAP Lumira document shows a breakdown of medals by country, using images of flags in the chart.

Task overview: [Tutorial: installing and using the flagbar visualization extension \[page 191\]](#)

Previous task: [Create the flagbar CSV data file \[page 192\]](#)

9.3 Where to find extensions

You can get extensions in two ways:

- From the SAP Extension Repository
 - Select **File > Extensions**. The *Extension Manager* opens, showing the extensions available from the SAP Extension Repository, including extensions you've already installed.
 - You can also select *Get partner extensions* to get extensions published by SAP partners.
- Transport units
 - If your organization's developers have created an extension, they can make it available to users as a transport unit, which the users can manually install from a shared network folder. Or if a third party develops an extension, they can distribute the extension as a transport unit.
 - When you click *Manual Installation* in the *Extension Manager*, it opens the file browser. When you open a transport unit, packaged as a .zip file, it is automatically verified as an SAP Lumira extension, installed, and then added to the list of installed extensions in the *Extension Manager*.

9.4 Installing or uninstalling an extension

Procedure

1. Select **File > Extensions**.
The *Extension Manager* opens, showing the extensions available from the SAP Extension Repository, including extensions you've already installed.
2. To install an extension, select *Install* .

i Note

Some extensions are available only if you're using a paid version of the application.

You can also select [Get partner extensions](#) to get extensions published by SAP partners. Or, select [Manual Installation](#) to browse for an extension packaged as a transport unit (saved as a .zip file). Select the .zip file and select *OK*.

3. To uninstall an extension, select [Uninstall](#) .
4. Restart the application after installing or uninstalling any extensions.

Results

Note

If SAP Lumira is uninstalled, extensions are not uninstalled.

9.5 Updating an extension

Some extensions are compatible only with a particular version of SAP Lumira. When you install a new version of SAP Lumira, your installed extensions should update automatically. But if for any reason the extensions don't update automatically, you can update them manually from the [Extension Manager](#).

Procedure

1. Select **File > Extensions** .
- The [Extension Manager](#) opens, showing the extensions available from the SAP Extension Repository, including extensions you've already installed.
2. Select [Upgrade](#) .

10 Managing SAP Lumira

You can optimize your SAP Lumira settings, upgrade the product, send feedback, and so on.

10.1 Optimizing memory usage

You can customize SAP Lumira configuration parameters to optimize memory usage in the `SAP Lumira.ini` file, located at `\\<InstallDir>\SAP Lumira\Desktop\`.

Context

Table 44: Configuration parameters in the SAP Lumira.ini file

Parameter	Default value	Description
<code>- Dhilo.maxvizdata setsize</code>	10000	The maximum number of data points permitted in a chart before a message appears advising you to filter or rank the values to reduce the data points. You can increase this value to increase the threshold. If you increase the value, also consider increasing the virtual memory allocated to SAP Lumira and the SAP HANA server-side setting for the <code>maxFetchSize</code> property.
<code>-Xmx</code>	1024M	The virtual memory allocated to SAP Lumira. If 4 GB is available on the computer, allocate 1024–2048 MB of memory to SAP Lumira. If more system memory is available, you can increase the available memory for SAP Lumira, ensuring you keep sufficient memory to run the operating system.

Procedure

1. Browse to the `<InstallDir>\SAP Lumira\Desktop\SAPLumira.ini` file.
2. Open the file in a text editor, and set the required configuration parameters.
3. Restart SAP Lumira to activate the new parameters.

10.2 Setting application preferences

You can modify the default settings for some SAP Lumira preferences.

Context

Table 45: Application preferences

Preference area	Description
<i>General</i>	<ul style="list-style-type: none"> • <i>Language</i>: Select the language to use in the SAP Lumira user interface. • <i>Auto Recovery</i>: Select the <i>Save Auto Recovery information every <n> minutes</i> check box and enter the time interval at which to automatically create a recovery file of the current document. (The default time interval is five minutes.) When the check box is selected and SAP Lumira shuts down unexpectedly, the next time the application starts, the recovery file is located and a Lumira has found an auto recovery file for "<DocumentName>" from the last session. Do you want to open this file? If you select Discard or close this window, the file will be removed. message appears. • <i>Font</i>: Select the font to use in user interface text and messages. • <i>Default Room</i>: Select the default room to open documents in.
<i>Views</i>	Set the preferred view to open when starting SAP Lumira. You can select a default view for each type of data source.
<i>Charts</i>	<ul style="list-style-type: none"> • <i>Chart Canvas Layout</i>: Choose whether to position the Chart Builder on the left or right side of the <i>Visualize</i> room. • <i>Chart Style</i>: Select the default colors and visual template for new charts that you create. The <i>Default Measure Color Palette</i> applies to charts with measure-based color schemes. The <i>Default Color Palette</i> applies to any other chart that has the <i>Choose Colors</i> setting available. • <i>Export Records</i>: Choose the default export type. See the <i>Exporting records</i> section for more information. • <i>Data Update</i>: By default, Lumira queries for data every time you add a measure or dimension to a chart, or remove one, even when more measures or dimensions are needed to define a complete chart. You can change this behavior by clearing the <i>Update data for incomplete charts</i> check box. Lumira will then query for data only if the result will be a complete chart. Disabling this option can reduce the time it takes to build charts when you are working with larger data volumes or more complex on-line datasets.

Preference area	Description
<i>Datasets</i>	<ul style="list-style-type: none"> • <i>Online Datasets</i>: Specify how hierarchies and measures are detected when data is acquired. This is called enriching your dataset. • <i>Offline Datasets</i>: <ul style="list-style-type: none"> ○ Specify how hierarchies and measures are detected when data is acquired. This is called enriching your dataset. ○ Specify whether to show dataset statistics in the status bar. ○ Choose whether to display the <i>Related Visualizations</i> tab in the <i>Manipulation Tools</i> panel and enable influence analysis. The <i>Related Visualizations</i> tab displays predefined charts proposed by SAP Lumira, based on the dimensions and measures available in the <i>Measures and Dimensions</i> panel. Use this tab to access influence analysis, which suggests visualizations based on how dimensions contribute to a selected measure.
<i>Software Updates</i>	<ul style="list-style-type: none"> • <i>Check For Updates</i>: Select the frequency for checking for software updates.
<i>Network</i>	<ul style="list-style-type: none"> • <i>Proxy</i>: <ul style="list-style-type: none"> ○ If your network doesn't use a proxy server, select <i>No Proxy</i>. ○ If your network uses a proxy server and you want to use the system's Internet proxy settings, select <i>Use System Proxy Settings</i>. ○ If your network uses a proxy server and you want to enter the HTTP proxy server address, port number, user, and password, select <i>Manual Proxy Configuration</i>, and enter the information. This information may be necessary for automatic updates and viewing maps with Esri. • <i>SAP BI Server</i>: Enter the URL to the SAP BusinessObjects Business Intelligence platform RESTful web services. Set this URL to open and save documents on the Business Intelligence (BI) platform repository. The default URL is <code>http://<ServerName>:<port>/biprws/</code>, where <code><ServerName></code> is the BI platform server name or IP address, and <code><port></code> is the RESTful web services port, by default 6405. • <i>Server for teams</i>: Enter the URL to SAP Lumira, server for teams. Use SAP Lumira, server for teams to save documents and share them with collaborators in deployment environments without SAP HANA or the BI platform. • <i>Give Feedback</i>: Enter the URL to the feedback server. The default URL is https://analytics-feedback.itc.sap.com/FeedbackOffice/sap/ .
<i>SQL Drivers</i>	Select the SQL drivers to install.
<i>Geo Map Service</i>	Enter account information for the Esri Geo map data provider. The Esri map is used by the <i>Geo map</i> chart in the <i>Visualize</i> room.

Procedure

1. Select **File > Preferences**, and select a preference area.
2. Choose preferences as needed, and select *Done*.

Related Information

[Acquiring data using Query with SQL \[page 38\]](#)

[Adding or modifying a predefined chart \[page 96\]](#)

10.2.1 Configuring Geo Maps in Preferences

You can use Esri ArcGIS technology to overlay data on maps with detailed geographic information. You can use *Geo Map*, which has multiple layers and different types of data markers.

Using geographic information system (GIS), you can integrate, store, edit, analyze, share and display geographic information for decision making. ArcGIS is a GIS software program used for working with maps and geographic information. It is used for creating and using maps, compiling geographic data, analyzing mapped information, sharing, discovering and managing geographic information in a database.

Esri is an international organization supplying Geographic Information System (GIS) software, Web GIS and geo database management applications. Esri is a suite of ArcGIS products. It compiles a detailed user basemap information into a common cartographic format called Topographic Basemap.

You need to have an ArcGIS account in order to access Esri maps.

10.2.1.1 Connecting to Esri ArcGIS Server

Context

In SAP Lumira desktop, if you want to use *Geo Map*, then you need to connect to ESRI ArcGIS, to do so, perform the following steps:

Procedure

1. Start SAP Lumira.
2. Choose **File > Preferences**.

The *SAP Lumira Preferences* dialog box opens.

3. Choose [Geo Map Services](#).
4. To log on to Esri ArcGIS server directly, select the [Esri ArcGIS Online](#) option and proceed as follows:
 - If you want to access the basic features of Esri map, perform the following steps:
 1. Select the [Default Account \(*\)](#) option.
 2. Choose [Done](#).

You can only access the basic features of ESRI map and cannot customize it according to your requirements. Therefore, you cannot modify the map, when you choose the [Import Esri Custom Service](#) option in [Visualize](#) room.
 - If you want to customize the Esri map based on your requirements, perform the following steps:
 1. Select the [Use this account \(*\)](#) option.
 2. Enter the user name and the password of your Esri ArcGIS server account.
 3. Choose [Apply](#).

To customize the Esri map, choose the [Import Esri Custom Service](#) in the [Visualize](#) room. This provides you with the option of customizing the Geo map with feature services that are added to your Esri ArcGIS account.

The proxy setting is set to [Use System Proxy Settings](#) by default in [Network](#). If you select [No Proxy](#) however, you cannot use [Geo Map](#), as the Esri map is not loaded to your visualization.

10.2.1.2 Connecting to Esri ArcGIS with On Premise Server

In [SAP Lumira Desktop](#), you have to configure the settings in [Preferences](#) before using [Geo Maps](#).

Context

When you connect to Esri ArcGIS server using an **On Premise** server connection, you can connect to the Esri ArcGIS server that is locally deployed in your enterprise. To connect to Esri ArcGIS server for On Premise server connections, perform the following:

Procedure

1. Start [SAP Lumira](#).
2. Choose [File > Preferences](#).

The [SAP Lumira Preferences](#) dialog box opens.

3. Choose [Geo Map Services](#).
4. To log on to the local Esri ArcGIS server, select the [Esri On Premise](#) option.
5. Enter the [User Name](#), [Password](#) and the [Portal URL](#) of your local Esri ArcGIS server account.
6. Choose [Done](#)

i Note

The feature services that are supported in Esri server connections are also supported in Esri On Premise server connections.

The default proxy setting in *Network* is *Use System Proxy Settings*. If you select the *No Proxy* option however, you cannot use *Geo Map*, as the Esri map is not loaded to your visualization.

10.3 Optimizing display settings for SAP Lumira

Depending on your operating system and display settings, you may need to make adjustments to optimize the display for SAP Lumira.

To ensure that the edges of fonts and icons appear properly in Lumira, tune your computer's ClearType settings. On Windows 7, for example, open the *Control Panel* and select ► *Display* ► *Adjust ClearType text* ►. Follow the instructions in the *ClearType Text Tuner* dialog.

To ensure that the background color appears correctly in Lumira when remotely connecting to a Windows Server 2008 machine, follow the steps described in this topic to set the maximum color depth for the connection to 32 bit: <https://technet.microsoft.com/en-us/library/cc772048.aspx> ►. Then, set the color depth of the remote session to 32 bit when connecting to the machine. In Windows 7, for example, select ► *Options* ► *Display* ► in the *Remote Desktop Connection* dialog, and set *Colors* to 32 bit.

10.4 Upgrading from SAP Lumira Trial Edition

You can purchase a license for SAP Lumira Desktop Edition to access all of the features for this application.

Context

When you initially download and install SAP Lumira, you have access to the features that are available for the trial edition. In trial addition, you can access all these features for a period of 30 days. Once this period has expired, you cannot access these features any more. To continue using Lumira Desktop, you therefore need to enter a valid license key. You can enter any of the following license keys based on your requirements:

- Personal key
- Trial key
- Permanent key

Some features are available only with a license for SAP Lumira Desktop Edition., These features include database connections, saving documents to SAP Lumira, server for teams or the BI platform, or publishing datasets to SAP HANA.

i Note

To obtain the keycode for the personal and trial editions, contact support.lumira@sap.com.

To purchase a permanent Desktop Edition license, follow these steps:

Procedure

1. Select *Buy* on the Home page.

A window opens where you can register or log on, enter your payment information, and confirm your purchase of SAP Lumira Desktop Edition.

2. Complete the purchase in this window.

The Desktop Edition features are activated by a temporary license. You will receive an e-mail with your permanent Desktop Edition keycode.

3. To activate your permanent license, open Lumira and choose **Help > Enter Keycode**. Copy the permanent Desktop Edition keycode from the e-mail and press *OK*.

10.5 Sending feedback about the application to SAP

You can provide feedback to SAP technical consultants directly from SAP Lumira. Your feedback can be sent via email or from the *Send your feedback* dialog (when you need to include log details or a snapshot of the active application window).

You may want to provide feedback for reasons such as:

- You are unable to complete a non-urgent task during data preparation or in the charting area.
- A message appears and you need non-urgent help to resolve the issue.
- You want to suggest a change that could make the application easier to use.
- You want to rank the application.

Related Information

[Sending a snapshot of the active window with feedback \[page 202\]](#)

10.5.1 Sending feedback via email

Procedure

1. At the bottom of the *Home* page, select `support.lumira@sap.com`.
An email message opens.
2. Enter a subject for the message and a description of the issue or suggestion for improvement, and select *Send*.

Results

Your message is sent to `support.lumira@sap.com`.

10.5.2 Sending a snapshot of the active window with feedback

You can annotate a snapshot of the active SAP Lumira window and include a log file that shows activity in the window, before sending the information to SAP technical consultants.

Prerequisites

You have configured mail repository in your local system. For example, MS Outlook, Gmail.

Context

Table 46: Annotation toolbar

Tool	Icon	Description
<i>Undo</i>		Select the button to reverse the last action.
<i>Redo</i>		Select the button to repeat the last action.

Tool	Icon	Description
<i>Pencil</i>		Select the button, select an image, and drag the cursor to create a free-form shape that you can use to encircle or highlight irregular areas of the window.
<i>Square Highlight</i>		Select the button, select an image, and drag to create a square shape that you can use to highlight an area of the window.
<i>Square Hide</i>		Select the button, select an image, and drag to create a solid square shape.
<i>Text</i>		Select the button, enter a comment, and drag the comment to the image.

To retract your feedback for any reason, create an SAP CSS case with "Feedback ID" as the subject.

Procedure

1. Select the *Send your feedback*  icon in the lower-right corner of the window that you want to provide feedback on.
The *Send your feedback* dialog appears, displaying a snapshot of the active application window, a rating scale, a *Comments* box, and an annotation toolbar.
2. To provide a quick evaluation of SAP Lumira, select a rating star.
3. To include a description of the issue or a suggestion for improvement, enter text in the *Comments* box .
4. To highlight areas of or add text to the snapshot, use the annotation toolbar.
5. To send the snapshot with your feedback, select the *Screenshot* check box.
Do not select this check box if you only want to send a comment to SAP technical consultants.
6. To send a log file that traces activity before the active window opened, select the *Log file* check box.
Attaching a log file can be useful because it helps SAP technical consultants to reproduce your activity when examining a problem.
7. Select *Submit*.
Your comments and a snapshot and log file (if included) are sent to SAP for evaluation.

Results

A dialog box with *Thank You* message appears. An email message opens with the following attachments:

1. Subject line contains version of SAP Lumira Desktop.
2. Attachment field contains (if you have attached any, while sending the feedback).
 - Snapshot of active application window
 - Log file.
3. Message body contains

- Your rating
- Your comment

Related Information

[Setting application preferences \[page 196\]](#)

10.5.3 Resetting the URL to the feedback server

You may want to reset the URL to the feedback server (for example, if the URL was deleted from the application preferences).

Procedure

1. Select **File > Preferences > Network** to locate the URL of the feedback server.
The URL of the server is specified under *Give Feedback* on the *Network* tab of the *SAP Lumira Preferences* dialog.
2. Copy `https://analytics-feedback.itc.sap.com/FeedbackOffice/sap/` and paste it in the *URL* box under *Give Feedback*.
3. Select *Done*.

11 Lumira functions reference

Overview of the functions that are available.

You can use functions to create formulas for calculated measures or dimensions or for custom calculations. The following table shows the high-level grouping of the available functions.

Table 47: Categories of functions

Category	Description
Aggregate [page 206]	Aggregates data (for example, by summing or averaging a set of values)
Character [page 212]	Manipulates character strings
Date and Time [page 219]	Returns date or time data
Expression [page 233]	Functions that are used in custom calculations.
Miscellaneous [page 245]	Functions that do not fit in any other category
Numeric [page 248]	Returns numeric data
Operator [page 253]	Returns <code>true</code> or <code>false</code>

i Note

Aggregate functions are implemented in the definition of a measure.

[Aggregate functions \[page 206\]](#)

Functions that can be used for custom calculations on aggregated values.

[Character functions \[page 212\]](#)

Use a character function to manipulate character strings in a formula.

[Date and time functions \[page 219\]](#)

Date and time functions return date or time data.

[Expression functions \[page 233\]](#)

Functions to be used for custom calculations and running calculations.

[Miscellaneous functions \[page 245\]](#)

Miscellaneous functions reference.

[Numeric functions \[page 248\]](#)

Functions that return numeric data.

[Operator functions \[page 253\]](#)

Operator functions include logical functions and other functions that return *true* or *false*.

Related Information

[Creating a calculated measure or dimension \[page 74\]](#)

[Using calculations in the Visualize room \[page 132\]](#)

11.1 Aggregate functions

Functions that can be used for custom calculations on aggregated values.

All functions are case-sensitive:

- [Average \[page 206\]](#)
- [Count \[page 207\]](#)
- [CountDistinct \[page 208\]](#)
- [Max \[page 209\]](#)
- [Min \[page 210\]](#)
- [Sum \[page 210\]](#)

Average

Returns the post aggregated average value of a measure.

Code Syntax

```
Average (obj)
```

- obj: User object (column)

Example

```
Average ({Sales})
```

returns:

Country	Product	Sales	Avg
DE	A	70	74
DE	B	90	74
US	A	100	74
US	B	50	74

Country	Product	Sales	Avg
US	C	60	74

Example

```
Average({Sales}) For [{Country}]
```

returns the sum of Sales divided by the count of all the Products displayed in the result set per Country:

Country	Product	Sales	Avg
DE	A	70	80
DE	B	90	80
US	A	100	70
US	B	50	70
US	C	60	70

Count

Returns the post aggregated count of a measure.

Code Syntax

```
Count (obj)
```

- obj: User object (column)

Example

```
Count (Product)
```

returns the count of all the Products in the result set:

Country	Product	Sales	Count
DE	A	70	5
DE	B	90	5
US	A	100	5

Country	Product	Sales	Count
US	B	50	5
US	C	60	5

CountDistinct

Returns the post aggregated distinct count of a measure.

Code Syntax

```
CountDistinct (obj)
```

- obj: User object (column)

Example

```
CountDistinct ({Product})
```

returns the distinct count of all the Products in the result set:

Country	Product	Sales	CountDistinct
DE	A	70	3
DE	B	90	3
US	A	100	3
US	B	50	3
US	C	60	3

Example

```
CountDistinct ({Product}) For [{Country}]
```

returns the distinct count of all the Products per Country in the result set:

Country	Product	Sales	CountDistinct
DE	A	70	2
DE	B	90	2

Country	Product	Sales	CountDistinct
US	A	100	3
US	B	50	3
US	C	60	3

Max

Returns the post aggregated maximum of a measure.

Code Syntax

```
Max (obj)
```

- obj: User object (column)

Example

```
Max (Sales)
```

returns the maximum Sales in the result set:

Country	Product	Sales	Max
DE	A	70	100
DE	B	90	100
US	A	100	100
US	B	50	100
US	C	60	100

Example

```
Max ({Sales}) For [ {Country} ]
```

returns the maximum Sales value of Product in each Country:

Country	Product	Sales	Max
DE	A	70	90

Country	Product	Sales	Max
DE	B	90	90
US	A	100	100
US	B	50	100
US	C	60	100

Min

Returns the post aggregated minimum of a measure.

 Code Syntax

```
Min(obj)
```

- obj: User object (column)

 Example

```
Min({Sales})
```

returns the minimum Sales value in the result set:

Country	Product	Sales	Min
DE	A	70	50
DE	B	90	50
US	A	100	50
US	B	50	50
US	C	60	50

Sum

Returns the post aggregated sum of a measure.

 Code Syntax

```
Sum(obj)
```

- obj: User object (column)

Example

```
Sum({Sales})
```

returns:

Country	Product	Sales	Sum
DE	A	70	370
DE	B	90	370
US	A	100	370
US	B	50	370
US	C	60	370

Example

```
Sum({Sales}) ForAllExcept [{Product}]
```

returns the sum of Sales for each Country:

Country	Product	Sales	Sum
DE	A	70	160
DE	B	90	160
US	A	100	210
US	B	50	210
US	C	60	210

Parent topic: [Lumira functions reference \[page 205\]](#)

Related Information

[Character functions \[page 212\]](#)

[Date and time functions \[page 219\]](#)

[Expression functions \[page 233\]](#)

[Miscellaneous functions \[page 245\]](#)

[Numeric functions \[page 248\]](#)

[Operator functions \[page 253\]](#)

11.2 Character functions

Use a character function to manipulate character strings in a formula.

The following character (string) functions can be used for calculations (all functions are case-sensitive):

- [Concatenate \[page 212\]](#)
- [ExceptFirstWord \[page 213\]](#)
- [ExceptLastWord \[page 213\]](#)
- [FirstWord \[page 213\]](#)
- [LastWord \[page 214\]](#)
- [Length \[page 214\]](#)
- [LowerCase \[page 215\]](#)
- [Lpad \[page 215\]](#)
- [Replace \[page 215\]](#)
- [Rpad \[page 216\]](#)
- [SubString \(length\) \[page 216\]](#)
- [SubString \[page 217\]](#)
- [Trim \[page 217\]](#)
- [TrimLeft \[page 218\]](#)
- [TrimRight \[page 218\]](#)
- [UpperCase \[page 219\]](#)

Concatenate

Concatenates two strings into a single string.

Code Syntax

```
Concatenate(str1, str2)
```

- `str1`: First string
- `str2`: Second string

The operator `+` can also concatenate strings.

Example

```
Concatenate("Mr", "Brown")
```

returns "MrBrown"

ExceptFirstWord

Returns a copy of a string, with the first word removed.

Code Syntax

```
ExceptFirstWord(str, sep)
```

- `str`: Input string
- `sep`: A separator

Example

```
ExceptFirstWord("Level 3, Standford Street", ", ")
```

returns "Standford Street"

ExceptLastWord

Returns a copy of a string, with the last word removed.

Code Syntax

```
ExceptLastWord(str, sep)
```

- `str`: Input string
- `sep`: A separator

Example

```
ExceptLastWord("james.brown@company.com", "@")
```

returns "james.brown"

FirstWord

Returns the first word of a string.

Code Syntax

```
FirstWord(str, sep)
```

- `str`: Input string
- `sep`: A separator

Example

```
FirstWord("Senior Developer", " ")
```

returns "Senior"

LastWord

Returns the last word of a string.

Code Syntax

```
LastWord(str, sep)
```

- `str`: Input string
- `sep`: A separator

Example

```
LastWord("Red/Purple", "/")
```

returns "Purple"

Length

Returns the length of a string.

Code Syntax

```
Length(str)
```

- `str`: Input string

Example

```
Length("How long")
```

returns 8

LowerCase

Returns a copy of a string, with all characters converted to lowercase.

Code Syntax

```
LowerCase(str)
```

- `str`: Input string

Example

```
LowerCase("GOOD JOB")
```

returns "good job"

Lpad

Returns a copy of a string, padded with leading characters to the specified total length.

Code Syntax

```
Lpad(str, length, pad)
```

- `str`: Input string
- `length`: Expected length
- `pad`: Character sequence to add

Example

```
Lpad("Incomplete field", 20, "#")
```

returns "####Incomplete field"

Replace

Returns a string, with all occurrences of a specified string replaced with another specified string.

Code Syntax

```
Replace(str, target, replacement)
```

- `str`: Input string
- `target`: String to be replaced
- `replacement`: String value to insert

Example

```
Replace("hyperthermia", "ert", "ot")
```

returns "hypothermia"

Rpad

Returns a copy of a string, padded with trailing characters to the specified total length.

Code Syntax

```
Rpad(str, length, pad)
```

- `str`: Input string
- `length`: Expected length
- `pad`: Character sequence to add

Example

```
Rpad("Incomplete field", 20, "#")
```

returns "Incomplete field####"

SubString (length)

Returns a substring (of a specific length) of a string.

Code Syntax

```
SubString(str, start, length)
```

- `str`: String from which a substring is computed
- `start`: Start position in the input substring
- `length`: Length of the substring to return

Example

```
SubString("Wong", 2, 2)
```

```
returns "on"
```

SubString

Returns a substring of a string.

Code Syntax

```
SubString(str, start)
```

- `str`: String from which a substring is computed
- `start`: Start position in the input substring

Example

For example:

```
SubString("Wong", 3)
```

returns "ng"

Trim

Returns a copy of the string, with the leading and trailing repetitions of a character removed. This function is case-sensitive.

Code Syntax

```
Trim(str, toTrim)
```

- `str`: Input string
- `toTrim`: Character to be removed

Example

```
Trim("Aurora", "a")
```

returns "Auror"

Table 48: Example of the Trim(str, toTrim) function: Trim ({Name}, "a")

Name	Trimmed string
Auror	Auror

Name	Trimmed string
auror	uror
aurora	uror

TrimLeft

Returns a copy of the string, with the leading occurrence of a character removed. This function is case-sensitive.

Code Syntax

```
TrimLeft(str, toTrim)
```

- `str`: Input string
- `toTrim`: Character to remove

Example

```
TrimLeft("Above", "A")
```

returns "bove"

TrimRight

Returns a copy of a string, with trailing repetitions of a character removed. This function is case-sensitive.

Code Syntax

```
TrimRight(str, toTrim)
```

- `str`: Input string
- `toTrim`: Character to be removed

Example

```
TrimRight("Laura", "a")
```

returns "Laur"

UpperCase

Returns a copy of a string, with all characters converted to uppercase.

Code Syntax

```
UpperCase(str)
```

- `str`: Input string

Example

```
UpperCase("Little Boy")
```

returns "LITTLE BOY"

Parent topic: [Lumira functions reference \[page 205\]](#)

Related Information

[Aggregate functions \[page 206\]](#)

[Date and time functions \[page 219\]](#)

[Expression functions \[page 233\]](#)

[Miscellaneous functions \[page 245\]](#)

[Numeric functions \[page 248\]](#)

[Operator functions \[page 253\]](#)

11.3 Date and time functions

Date and time functions return date or time data.

The following Date and Time functions can be used for calculations (all functions are case-sensitive). Note that you may need to convert the format of your source data in the application:

- [AddDayToDate \[page 220\]](#)
- [AddMonthToDate \[page 221\]](#)
- [AddTime \[page 221\]](#)
- [AddWeekToDate \[page 221\]](#)
- [AddYearToDate \[page 222\]](#)
- [CurrentDate \[page 222\]](#)
- [CurrentDateTime \[page 223\]](#)

- [CurrentTime \[page 223\]](#)
- [DateDiffInDays \[page 223\]](#)
- [DateDiffInMonths \[page 224\]](#)
- [Day \[page 224\]](#)
- [DayOfWeek \[page 225\]](#)
- [DayOfYear \[page 225\]](#)
- [Hour \[page 225\]](#)
- [LastDayOfMonth \[page 226\]](#)
- [LastDayOfWeek \[page 226\]](#)
- [MakeDate \[page 226\]](#)
- [MakeDateTime \[page 227\]](#)
- [MakeTime \[page 227\]](#)
- [Minute \[page 228\]](#)
- [Month \[page 228\]](#)
- [Quarter \[page 229\]](#)
- [Second \[page 229\]](#)
- [TimeDiff \[page 229\]](#)
- [ToDate \[page 230\]](#)
- [ToDateTime \[page 230\]](#)
- [ToTime \[page 231\]](#)
- [Week \[page 232\]](#)
- [Year \[page 232\]](#)

AddDayToDate

Returns the date produced by adding a specified number of days (periods) to a specified date (date).

Code Syntax

```
AddDayToDate (date, periods)
```

- `date`: A Date or Datetime object
- `periods`: A number of days

Example

```
AddDayToDate (ToDateTime ("2015-01-20 23:59:45", "yyyy-mm-dd hh:mi:ss"), 2)
```

returns 2015-01-22 11:59:45 PM

AddMonthToDate

Returns a date that is produced by adding a specified number of month(s) to a specified date.

Code Syntax

```
AddMonthToDate (#date#, periods)
```

- #date#: Original date
- periods: Number of periods to add

Example

```
AddMonthToDate (#2012-01-01#, 1)
```

returns 2012-02-01

AddTime

Returns the time produced by adding a specified amount of time (numberofunits) to a specified time (datetime), in the specified format (format).

Code Syntax

```
AddTime (datetime, numberOfUnits, format)
```

- datetime: A Time or Datetime object
- numberOfUnits: A number of time units. The time unit type is specified by the format.
- format:
 - hh: hours
 - mi: minutes
 - ss: seconds

Example

```
AddTime (ToDateTime ("2015-01-20 23:59:45", "yyyy-mm-dd hh:mi:ss"), 1, "hh")
```

returns 2015-01-21 12:59:45 AM

AddWeekToDate

Returns a date that is produced by adding a specified number of week(s) to a specified date.

Code Syntax

```
AddWeekToDate (#date#, periods)
```

- #date#: Original date
- periods: Number of periods to add

Example

```
AddWeekToDate (#2012-01-01#, 1)
```

returns 2012-01-08

AddYearToDate

Returns a date that is produced by adding a specified number of year(s) to a specified date. Use negative numbers to remove a year.

Code Syntax

```
AddYearToDate (#date#, periods)
```

- #date#: Original date
- periods: Number of periods to add

Example

```
AddYearToDate (#2012-01-01#, 1)
```

returns 2013-01-01

CurrentDate

Returns the current date as a Date object.

Code Syntax

```
CurrentDate ()
```

Example

```
CurrentDate ()
```

returns the current date: 2015-01-01

CurrentDateTime

Returns the current Datetime (combined date and time).

Code Syntax

```
CurrentDateTime ()
```

Example

```
CurrentDateTime ()
```

returns the current datetime: 2011-06-12 8:39:45 PM

CurrentTime

Returns the current time as a Time object.

Code Syntax

```
CurrentTime ()
```

Example

```
CurrentTime ()
```

returns the current time: 8:39:45 PM

DateDiffInDays

Returns the number of days between two dates.

Code Syntax

```
DateDiffInDays (#start#, #end#)
```

- #start#: Start date of the interval

- #end#: End date of the interval

Example

```
DateDiffInDays (#2012-03-23#, #2012-01-30#)
```

returns -53

DateDiffInMonths

Returns the number of months between two specified dates.

Code Syntax

```
DateDiffInMonths (#start#, #end#)
```

- #start#: Start date of the interval
- #end#: End date of the interval

Example

```
DateDiffInMonths (#2013-02-01#, #2014-01-01#)
```

returns 11

Day

Returns the day of the month as a number from 1 to 31.

Code Syntax

```
Day (#date#)
```

- #date#: A date

Example

```
Day (#2012-03-23#)
```

returns 23

DayOfWeek

Returns the day of the week as a number from 1 (Sunday) to 7 (Saturday).

Code Syntax

```
DayOfWeek (#date#)
```

- #date#: A date

Example

```
DayOfWeek (#2012-03-23#)
```

returns 6

DayOfYear

Returns the day of the year as a number.

Code Syntax

```
DayOfYear (#date#)
```

- #date#: A date

Example

```
DayOfYear (#2012-03-23#)
```

returns 83

Hour

For a specified time (time), returns the hour.

Code Syntax

```
Hour (time)
```

- time: A Time or Datetime object

Example

```
Hour (ToTime ("20:39:45"), "hh:mi:ss")
```

returns 20

LastDayOfMonth

Returns the date produced by computing the last day of the month of a specified date.

Code Syntax

```
LastDayOfMonth (#date#)
```

- #date#: A date

Example

```
LastDayOfMonth (#2012-03-23#)
```

returns the date 2012-03-31

LastDayOfWeek

Returns the date produced by computing the last day of the week of a specified date.

Code Syntax

```
LastDayOfWeek (#date#)
```

- #date#: A date

Example

```
LastDayOfWeek (#2012-03-23#)
```

returns the date 2012-03-24

MakeDate

Returns a date that is built from a specified year, month, and day.

Code Syntax

```
MakeDate (year, month, day)
```

- `year`: Number that represents a year (0001-9999)
- `month`: Number that represents a month (1-12)
- `day`: Number that represents a day of the month (1-31)

Example

```
MakeDate (2011, 6, 12)
```

returns the date 2011-06-12

MakeDateTime

Returns the Datetime (combined date and time) that corresponds to the specified date and time.

Code Syntax

```
MakeDateTime (date, time)
```

- `date`: A Date object
- `time`: A Time object

Example

- `date`: A Date object
- `time`: A Time object

```
MakeDateTime (MakeDate (2011, 6, 12), MakeTime (20, 39, 45))
```

returns 2011-06-12 8:39:45 PM

MakeTime

Returns the time that corresponds to the specified hours, minutes, and seconds.

Code Syntax

```
MakeTime (hour, minute, second)
```

- `hour`: Number that represents the hour (0-23)
- `minute`: Number that represents the minute (0-59)
- `second`: Number that represents the second (0-59)

Example

```
MakeTime (20, 39, 45)
```

returns 8:39:45 PM

Minute

For a specified time (time), returns the minute.

Code Syntax

```
Minute (time)
```

- `time`: A Time or Datetime object

Example

```
Minute (ToTime ("20:39:45"), "hh:mi:ss")
```

returns 39

Month

Returns the month of the year as a number from 1 to 12.

Code Syntax

```
Month (#date#)
```

- `#date#`: A date

Example

```
Month (#2012-03-23#)
```

returns 3

Quarter

Returns a number that represents the quarter of a specified date.

Code Syntax

```
Quarter (#date#)
```

- #date#: A date

Example

```
Quarter (#2012-03-23#)
```

returns 1

Second

For a specified time (time), returns the seconds.

Code Syntax

```
Second (time)
```

- time: A Time or Datetime object

Example

```
Second (ToTime ("20:39:45"), "hh:mi:ss"))
```

returns 45

TimeDiff

Returns the amount of time between a specified start time (start) and a specified end time (end), in the specified format (format).

Code Syntax

```
TimeDiff (start, end, format)
```

- start and end: Time, Date, or Datetime objects

The format includes:

- hh: hours
- mi: minutes
- ss: seconds

Example

```
TimeDiff (MakeDateTime (MakeDate (2015, 1, 14), MakeTime (1, 23, 45)),  
MakeDateTime (MakeDate (2015, 1, 15), MakeTime (6, 40, 58)), "ss")
```

returns 105433

ToDate

Converts an input string to a date in a specified format, when the dates in a column of an original data source are in string format.

Code Syntax

```
ToDate (string, format)
```

- `string`: Input string to convert
- `format`: Date format

The date format is a combination of the following reserved tokens, separated by delimiters:

- `d` or `dd`: Day of month (1-31)
- `M` or `MM`: Month of year (1-12)
- `y` or `yy`: Abbreviated year without century (00-99)
- `yyyy`: Year with century (1956, 2012, 2014, and so on)

All other characters are considered delimiters.

Example

```
ToDate (Obj, 'yyyy/dd/MM')
```

converts a string in the format `yyyy/dd/MM` to a date

ToDateTime

Converts a specified input string (datetime) in the specified format (format) to a Datetime (combined date and time).

Code Syntax

```
ToDateTime (datetime, format)
```

- `datetime`: Input string to convert
- `format`: Datetime format

The datetime format is `<yyyy>-<mm>-<dd> <hh>:<mi>:<ss>.<ff>` where:

- `yyyy` or `YYYY`: year (0001-9999)
- `mm` or `MM`: month (1-12)
- `dd` or `DD`: day (1-31)
- `hh` or `HH`: hours (0-23)
- `mi` or `MI`: minutes (0-59)
- `ss` or `SS`: seconds (0-59)
- `ff` or `FF`: fractional seconds. Include “ff” only if the input string contains fractional seconds. If fewer than 7 decimal places are provided, the value will be padded with zeros. If more than 7 decimal places are provided, the value will be truncated to 7 decimal places.

All other characters are considered delimiters.

Tip

The date elements can be in any order.

For example, instead of `<yyyy>-<mm>-<dd>`, you could use `<mm>-<dd>-<yyyy>` or `<dd>-<mm>-<yyyy>`.

Example

```
ToDateTime("2011-06-12 20:39:45.123", "yyyy-mm-dd hh:mi:ss.ff")
```

returns 2011-06-12 8:39:45.1230000 PM

ToTime

Converts a specified input string (time) in the specified format (format) to a Time object.

Code Syntax

```
ToTime (time, format)
```

- `time`: Input string to convert
- `format`: Time format

The time format is a combination of the following reserved tokens, separated by delimiters:

- `hh` or `HH`: hours (0-23)

- `mi` or `MI`: minutes (0-59)
- `ss` or `SS`: seconds (0-59)

All other characters are considered delimiters.

Example

```
ToTime("20:39:45", "hh:mi:ss")
```

returns 8:39:45 PM

Week

Returns a number that represents the week of a specified date.

Code Syntax

```
Week(#date#)
```

- `#date#`: A date

Example

```
Week(#2012-03-23#)
```

returns 12

Year

Returns the year of a specified date.

Code Syntax

```
Year(#date#)
```

- `#date#`: A date

Example

```
Year(#2012-03-23#)
```

returns 2012

Parent topic: [Lumira functions reference \[page 205\]](#)

Related Information

[Aggregate functions \[page 206\]](#)

[Character functions \[page 212\]](#)

[Expression functions \[page 233\]](#)

[Miscellaneous functions \[page 245\]](#)

[Numeric functions \[page 248\]](#)

[Operator functions \[page 253\]](#)

11.4 Expression functions

Functions to be used for custom calculations and running calculations.

The following functions can be used for custom calculations on aggregated values (all functions are case-sensitive):

- [For \[page 234\]](#)
- [ForAllExcept \[page 234\]](#)
- [CumulativeDistribution \[page 234\]](#)
- [DenseRank \[page 235\]](#)
- [First \[page 236\]](#)
- [Index \[page 236\]](#)
- [Key \[page 237\]](#)
- [Last \[page 237\]](#)
- [Median \[page 238\]](#)
- [MovingAverage \[page 238\]](#)
- [MovingSum \[page 239\]](#)
- [Next \[page 239\]](#)
- [NthValue \[page 240\]](#)
- [PercentRank \[page 240\]](#)
- [Previous \[page 241\]](#)
- [Rank \[page 241\]](#)
- [RunningAverage \[page 241\]](#)
- [RunningCount \[page 242\]](#)
- [RunningMax \[page 242\]](#)
- [RunningMin \[page 243\]](#)
- [RunningSum \[page 243\]](#)
- [Value \[page 244\]](#)
- [Variance \[page 244\]](#)

For

Returns the context for a calculation.

Code Syntax

```
<calculation> For <context>
```

Example

```
RunningSum({Sales}) For [{Country}, {Product}]
```

returns the running sum of Sales and resets it at Country and Product level.

ForAllExcept

Returns everything else in the dimensions as the context for a calculation.

Code Syntax

```
<calculation> ForAllExcept <context>
```

Example

```
Previous({Sales}) ForAllExcept [{Country}, {Product}]
```

returns the previous value of Sales, resetting at all dimensions other than Country and Product.

CumulativeDistribution

Returns the cumulative distribution of a measure object (obj). The parameter (bool) is used to set the relative rank order. (true) is ascending order and (false) is descending order.

Code Syntax

```
CumulativeDistribution(obj, bool)
```

- obj: User object (column)
- bool: A Boolean

Example

```
CumulativeDistribution({Sales}, false)
```

returns the relative rank of the current Sales value: (number of rows preceding or peer with the current Sales value divided by the total number of rows).

Year	Product	Sales	Cumulative Distribution
2010	B	160	25
2010	A	110	50
2011	B	10	100
2011	A	10	100

DenseRank

Returns the density rank of a measure. The second parameter is a Boolean value used to set the dense rank order: `true` ranks the number from high to low and `false` ranks the number from low to high.

Code Syntax

```
DenseRank(obj, bool)
```

- `obj`: User object (column)
- `bool`: A Boolean

Example

```
DenseRank({Sales}, true)
```

returns Sales in a ranked manner (without gaps).

Country	Product	Sales	Dense Rank
DE	A	70	3
DE	B	90	2
US	A	100	1
US	B	50	5
US	C	60	4

First

Returns the first value of a measure.

Code Syntax

```
First(obj)
```

- obj: User object (column)

Example

```
First(Sales)
```

returns the first value of Sales in the result set:

Year	Quarter	Sales	Last
2014	Q1	500	500
2014	Q2	0	500
2015	Q1	400	500
2015	Q2	700	500

Example

```
First(Sales) For [{{Year}}]
```

returns the first value of Sales in the result set for each Year:

Year	Quarter	Sales	Last
2014	Q1	500	500
2014	Q2	0	500
2015	Q1	400	400
2015	Q2	700	400

Index

Returns the row number of the current row in the result set.

Code Syntax

```
Index ()
```

Key

Returns the key value of a dimension member.

Code Syntax

```
Key (obj)
```

- obj: User object (column)

Example

```
Key (Month)
```

returns the key value of the Month level in a time hierarchy.

Year_lvl	Month_lvl	Key
2010	1	[2010].[1]
2010	2	[2010].[2]
2011	1	[2011].[1]
2011	2	[2011].[2]

Last

Returns the last value of a measure.

Code Syntax

```
Last (obj)
```

- obj: User object (column)

Example

```
Last (Sales)
```

returns the last value of Sales in the result set:

Year	Quarter	Sales	Last
2014	Q1	500	700
2014	Q2	0	700
2015	Q1	400	700
2015	Q2	700	700

Median

Returns the median of a measure

Code Syntax

```
Median (obj)
```

- obj: User object (column)

Example

```
Median (obj)
```

returns the median of Sales in the result set:

Country	Year	Sales	Median
CA	2013	100	60
US	2014	50	60
US	2014	60	60

MovingAverage

The moving average returns the sum of the previous n values and the current value divided by n+1.

Code Syntax

```
MovingAverage (obj, int, int, bool)
```

- `obj`: User object (column)
- `int`: an integer; the first integer sets the number of values before the current value.
- `int`: an integer; the second integer sets the number of values after the current value.
- `bool`: A Boolean; `true` includes the current value, `false` excludes the current value.

Example

```
MovingAverage([Sales],1,0,true) For [Country]
```

The moving average returns the sum of the previous Sales value and the current value divided by 2. The For operator is used to reset the moving average at the Country level.

Country	Product	Sales	Moving Avg
DE	A	70	70
DE	B	90	80
US	A	100	100
US	B	50	75
US	C	60	55

MovingSum

Returns the moving sum of a measure.

Code Syntax

```
MovingSum(obj, int, int, bool)
```

- `obj`: User object (column)
- `int`: an integer; the first integer sets the number of values before the current value.
- `int`: an integer; the second integer sets the number of values after the current value.
- `bool`: A Boolean; `true` includes the current value, `false` excludes the current value.

Next

Returns the next value of a measure.

Code Syntax

```
Next(obj, int)
```

- `obj`: User object (column)
- `int`: an integer

NthValue

Returns the nth value of a measure.

Code Syntax

```
NthValue(obj, int)
```

- `obj`: User object (column)
- `int`: an integer

Example

```
NthValue({Sales}, 3)
```

returns the Sales value at the 3rd row of the result set (counting from 1); returns null if there is no such row.

Year	Product	Sales	NthValue
2010	B	160	10
2010	A	110	10
2011	B	10	10
2011	A	10	10

PercentRank

Returns the percent rank of a measure.

Code Syntax

```
PercentRank(obj, bool)
```

- `obj`: User object (column)
- `bool`: A Boolean; `true` is ascending order, `false` is descending order.

Previous

Returns the previous value of a measure.

Code Syntax

```
Previous(obj, int)
```

- `obj`: User object (column)
- `int`: an integer

Rank

Returns the rank value of a measure.

Code Syntax

```
Rank(obj, bool)
```

- `obj`: User object (column)
- `bool`: A Boolean; `true` ranks from high to low, and `false` ranks from low to high.

RunningAverage

Returns the running average of a measure. The parameter `true` excludes empty sales values.

Code Syntax

```
RunningAverage([Sales], true) for [Country]
```

Example

Returns running average of Sales and resets it at the Country level.

```
RunningAverage([Sales], true) for [Country]
```

Country	Year	Sales	R Avg
DE	2013	70	70
DE	2014	90	80
US	2013	100	100

Country	Year	Sales	R Avg
US	2014	50	75
US	2015	60	70

RunningCount

Returns the running count of a measure.

Code Syntax

```
RunningCount([Sales], true)
```

Example

Returns running count of Sales and resets it at the Country level.

```
RunningCount([Sales] for [Country])
```

Country	Year	Sales	R Count
DE	2013	70	1
DE	2014	90	2
US	2013	100	1
US	2014	50	2
US	2015	50	3

RunningMax

Returns the running maximum of a measure.

Code Syntax

```
RunningMax([Sales])
```

Example

Returns running maximum of Sales and resets it at the Country level.

```
RunningMax([Sales] for [Country])
```

Country	Year	Sales	R Max
DE	2013	70	70
DE	2014	90	90
US	2013	100	100
US	2014	50	100

RunningMin

Returns the running minimum of a measure.

Code Syntax

```
RunningMin([Sales])
```

Example

Returns running minimum of Sales and resets it at the Country level.

```
RunningMin([Sales] for [Country])
```

Country	Year	Sales	R Min
DE	2013	70	70
DE	2014	90	70
US	2013	100	100
US	2014	50	50

RunningSum

Returns the running sum of a measure.

Code Syntax

```
RunningSum([Sales])
```

Example

Returns running sum of Sales and resets it at the Country level.

```
RunningSum([Sales] for [Country])
```

Country	Year	Sales	R Sum
CA	2014	100	100
US	2013	100	100
US	2014	50	150

Value

Returns the value of a dimension member.

Code Syntax

```
Value(obj)
```

- obj: User object (column)

Variance

Returns the variance value of a member.

Code Syntax

```
Variance(obj)
```

- obj: User object (column)

Parent topic: [Lumira functions reference \[page 205\]](#)

Related Information

[Aggregate functions \[page 206\]](#)

[Character functions \[page 212\]](#)

[Date and time functions \[page 219\]](#)

[Miscellaneous functions \[page 245\]](#)

[Numeric functions \[page 248\]](#)

[Operator functions \[page 253\]](#)

11.5 Miscellaneous functions

Miscellaneous functions reference.

The following miscellaneous functions can be used for calculations (all functions are case-sensitive):

- [Contain \[page 245\]](#)
- [GroupValues \[page 245\]](#)
- [if then else \[page 246\]](#)
- [IsNotNull \[page 246\]](#)
- [IsNull \[page 247\]](#)
- [ToNumber \[page 247\]](#)
- [ToText \[page 247\]](#) number
- [ToText \[page 247\]](#) parameter

Contain

Returns occurrences of a string within another string. The search is not case-sensitive.

Code Syntax

```
Contain(whereStr, whatStr)
```

- `whereStr`: String in which a search is conducted
- `whatStr`: Substring that is the object of the search

Example

```
Contain("Cats are grey", "aRe")
```

returns true

GroupValues

Groups a list of values.

Code Syntax

```
GroupValues(column, ListOfValues, newValue)
```

- `column`: User object to apply the grouping to
- `ListOfValues`: List of values to be grouped
- `newValue`: Value that will replace the grouped values

Example

```
GroupValues(CountryColumn, ["USA", "India", "France"], "My Countries")
```

returns "My Countries" when the `CountryColumn` column contains "USA", "India", or "France"

If Then Else

Chooses between two alternatives, based on a Boolean condition. The second alternative is optional and evaluates to `null` when missing.

Code Syntax

```
if<cond> then <alt1> else <alt2>
```

- `cond`: Boolean condition to test
- `alt1`: Alternative 1
- `alt2`: Alternative 2

IsNotNull

Returns a Boolean value that indicates whether a supplied field does not contain a null value. When a field contains a null value, the function returns `false`. For all other values, the function returns `true`.

Code Syntax

```
IsNotNull(obj)
```

- `obj`: User object (column)

IsNull

Returns a Boolean value that indicates whether the supplied field contains a null value. When a field contains a null value, the function returns `true`. For all other values, the function returns `false`.

Code Syntax

```
IsNull (obj)
```

- `obj`: User object (column)

ToNumber

Converts any type of parameter to a numeric value. Numbers are truncated to zero decimal places.

Code Syntax

```
ToNumber (param)
```

- `param`: Parameter to convert

ToText (number)

Converts a specified number to a string. The number is truncated to the specified number of decimal places.

Code Syntax

```
ToText (num, digits)
```

- `num`: A number
- `digits`: Number of decimal places to use. This parameter is optional, and its default value is 0.

Example

```
ToText (12.1451, 2)
```

returns 12.14

ToText (parameter)

Converts a parameter to a string. All parameters are valid, and numbers are truncated to zero decimal places.

Code Syntax

```
ToText (param)
```

- param: Parameter to convert

Parent topic: [Lumira functions reference \[page 205\]](#)

Related Information

[Aggregate functions \[page 206\]](#)

[Character functions \[page 212\]](#)

[Date and time functions \[page 219\]](#)

[Expression functions \[page 233\]](#)

[Numeric functions \[page 248\]](#)

[Operator functions \[page 253\]](#)

11.6 Numeric functions

Functions that return numeric data.

The following functions can be used for custom calculations on aggregated values (all functions are case-sensitive):

- [Abs \[page 248\]](#)
- [Ceil \[page 249\]](#)
- [Floor \[page 249\]](#)
- [Log \[page 250\]](#)
- [Log10 \[page 250\]](#)
- [Mod \[page 250\]](#)
- [Power \[page 251\]](#)
- [Round \[page 251\]](#)
- [Sign \[page 252\]](#)
- [Truncate \[page 252\]](#)

Abs

Returns the absolute value of a number

Code Syntax

```
Abs (num)
```

- num: A number

Example

```
Abs (-11)
```

returns 11

Ceil

Returns the smallest integer that is greater than or equal to a specified number.

Code Syntax

```
Ceil (num)
```

- num: A number

Example

```
Ceil (14.2)
```

returns 15

Floor

Returns the largest integer that is not greater than a specified number.

Code Syntax

```
Floor (num)
```

- num: A number

Example

```
Floor (14.8)
```

returns 14

Log

Returns the natural logarithm of a specified number.

Code Syntax

```
Log (num)
```

- num: A number

Example

```
Log (100)
```

returns 4.605

Log10

Returns the base 10 logarithm of a specified number.

Code Syntax

```
Log10 (num)
```

- num: A number

Example

```
Log10 (100)
```

returns 2

Mod

Returns the remainder of the division of a number by another number.

Code Syntax

```
Mod (num, divisor)
```

- num: A number
- divisor: The divisor

Example

```
Mod (15, 2)
```

returns 1

Power

Raises a number to a power.

Code Syntax

```
Power (num, exponent)
```

- `num`: A number
- `exponent`: The exponent

The operator `^` (caret) can be used instead of this function.

Example

```
Power (2, 3)
```

returns 8

Round

Returns a numeric value, rounded to a specified number of decimal places.

Code Syntax

```
Round (num, digits)
```

- `num`: A number
- `digits`: The number of decimal places to round off to

Example

```
Round (14.81, 1)
```

returns 14.8

Sign

Returns -1 if a specified number is negative, 0 if the specified number is zero, or +1 if the specified number is positive.

Code Syntax

```
Sign (num)
```

- num: A number

Example

```
Sign (-2)
```

returns -1

Truncate

Returns a numeric value, truncated at a specified number of decimal places.

Code Syntax

```
Truncate (num, digits)
```

- num: A number
- digits: Number of decimal places to truncate

Example

```
Truncate (12.281, 1)
```

returns 12.200

Parent topic: [Lumira functions reference \[page 205\]](#)

Related Information

[Aggregate functions \[page 206\]](#)

[Character functions \[page 212\]](#)

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[Expression functions \[page 233\]](#)

[Miscellaneous functions \[page 245\]](#)

[Operator functions \[page 253\]](#)

11.7 Operator functions

Operator functions include logical functions and other functions that return *true* or *false*.

The following functions can be used for custom calculations on aggregated values (all functions are case-sensitive):

- [And operator \[page 253\]](#)
- [Or operator \[page 253\]](#)
- [Like pattern \[page 254\]](#)
- [InList \[page 254\]](#)
- [Not operator \[page 255\]](#)

And operator

Returns the logical conjunction of its Boolean inputs. This function returns `false: true and false`.

Code Syntax

```
<left> and <right>
```

- `left`: Left operand
- `right`: Right operand

Or operator

Returns the logical disjunction of its Boolean inputs. This function returns `true: true or false`.

Code Syntax

```
<left> or <right>
```

- `left`: Left operand
- `right`: Right operand

Like pattern

Determines whether a character string matches a specified pattern. The search is not case-sensitive.

Code Syntax

```
<matchExpr> like <pattern>
```

- `matchExpr`: The string expression to search
- `pattern`: The pattern string constant to search for

The pattern can include regular characters and the following special characters:

- `"_"` matches a single character
- `"%"` matches zero to many characters

Before you can use a special character as a regular character, you must escape it, using a backslash ("`\`").

Note

"`[`", "`^`", "`-`", and "`]`" are reserved for future use.

Example

```
"Hiking is fun" like "H% is _un"
```

returns `true`

In List

Use to determine whether a first input matches a value in a second input list.

Code Syntax

```
<testExpr> in <candidateList>
```

- `testExpr`: Expression to be tested
- `candidateList`: List of match candidates

Example

```
3 in [2, 4, 6]
```

returns `false`

Not operator

Use to negate a Boolean input.

Code Syntax

```
not<bool>
```

- bool: A Boolean

Example

```
not false
```

returns true

Parent topic: [Lumira functions reference \[page 205\]](#)

Related Information

[Aggregate functions \[page 206\]](#)

[Character functions \[page 212\]](#)

[Date and time functions \[page 219\]](#)

[Expression functions \[page 233\]](#)

[Miscellaneous functions \[page 245\]](#)

[Numeric functions \[page 248\]](#)

12 Documentation resources for SAP Lumira

These resources can help you get the most out of the data acquisition, enrichment, visualization, and document sharing features in the application.

Table 49:

For this information	See
Immediate help with SAP Lumira and information about a feature or workflow	SAP Lumira Help is available in the software. To open it, select the <i>help ?</i> icon in any SAP Lumira dialog, or select Help > Help .
Complete documentation about using SAP Lumira, in English, on the Internet	SAP Lumira Help Portal page
Complete documentation for using SAP Lumira in languages other than English, on the Internet	All Products Help Portal page Select a language, select <i>Lumira</i> , and select the version required.
Latest database and software support for SAP Lumira	SAP Product Availability Matrix

13 Glossary

This glossary defines terms used in SAP Lumira.

chart	A display of information in a graphical or visual manner.
Chart Builder (Visualize room)	The panel used to change the chart type and customize the chart.
Chart Canvas (Visualize room)	The area used to create, modify, or explore a visualization.
comparison	A means to compare the differences between values or the categorical divisions of measures using a variety of chart types.
Comparison mode	The view that displays each data point in isolation used to compare individual values. Each data point starts from zero on an absolute scale. For example, a story containing sports team data can compare individual players by their points and assists.
Compose room	The page used to create and explore stories.
Data Access Extension	A plugin module created by SAP or other developers that allows users to access an additional data source. For example, data can be imported from XML files, social data sources like Twitter or Facebook, or other big data sources such as Google Big Query.
data source	The source from where data is imported to create a dataset. The data in a data source is not altered in any way; only the imported dataset is manipulated.
dataset	The data used to create charts. A dataset can also contain semantic enhancements or enrichments. For example, a dataset can contain time and geography hierarchies, measures, formulas, and calculations.
dimension	A data object that represents categorical data in a dataset. For example, <i>Products</i> or <i>Sales</i> .
document	A file created in SAP Lumira that contains datasets, data source connection information, visualizations, and stories.
Edge Server	For Lumira 1.26 and later versions, see SAP Lumira, server for teams .
enrichment	The process of organizing a dataset into measures and hierarchies during data acquisition. For example, if the source data contains years and months, the enrichment process might create a <i>Date</i> hierarchy.
Extension Manager	A dialog box that displays installed and available Visualization and Data Access Extensions.
facet	An attribute or characteristic of a dataset. For example, measures, dimensions, calculations, and hierarchies are facets of a dataset.
Facets view (Visualize room)	The view that displays a summary of a dataset by listing the unique values for each dimension. For example, a dataset may contain a dimension called <i>Country</i> that

	contains multiple instances of the values <i>U.S.A.</i> , <i>Canada</i> , and <i>Mexico</i> . If you select the <i>Country</i> dimension in the Facet view, the values <i>U.S.A.</i> , <i>Canada</i> , and <i>Mexico</i> are displayed along with the number of times they appear in the dataset.
Geo Map	A visualization where charts overlay a geographical image of the earth.
influence analysis	A feature that lets you look at a specific measure in your data to determine which dimensions impact that measure the most. Related visualizations can be viewed based on the analysis.
Launchpad	A page that lists all available stories and datasets.
measure	A data object that represents quantitative data in a dataset. For example, sales revenue, salary, or number of employees.
Measures and Dimensions panel (Visualize room)	An interactive component in the Visualize room that allows searching for all available measures and dimensions. When you drag and drop Values from this panel to the Visualization Tools panel, the results are displayed on the Chart Canvas.
Prepare room	The page used to view, organize, and manipulate tabular data.
SAP BusinessObjects Business Intelligence platform	The full name of the Business Intelligence (BI) platform or BI platform.
SAP Lumira, Edge edition	For Lumira 1.26, see SAP Lumira Server for Teams .
SAP Lumira, server for teams	In SAP Lumira 1.26 and later, the solution for deployments without BI platform or SAP HANA that allows sharing SAP Lumira content with a small number of collaborators.
Stack mode	The view that displays data points as related stacks, building on previous data points. In a stacked bar chart, each data point starts from the previous data point. For example, a story containing sports team data can visualize each team's total salary budget as a stacked bar chart with individual player salaries. The total height of the stacked individual player salaries equals the team salary.
story	A collection of visualizations, text, and images that describes your data.
trellis	A grid layout of charts that use the same scale and format to allow side-by-side comparison. For example, if you create a bar chart that compares revenue by region, and then add the <i>Country</i> dimension to the trellis, multiple small charts will be displayed, with each chart showing the revenue by region for one country.
visualization	A visual representation of your data. For example, data displayed in a pie chart.
Visualization Tools panel	The panel that contains tabs used for creating visualizations, for example the Chart Builder tab or the Related Visualizations tab.
Visualize room	The page used to work with data contained in a dataset.

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