User Reference

BI Dashboard Builder - ADF Tool

By CMiC

Proprietary Notice

Computer Methods International Corp.
4850 Keele Street
Toronto, Ontario M3J 3K1
Canada

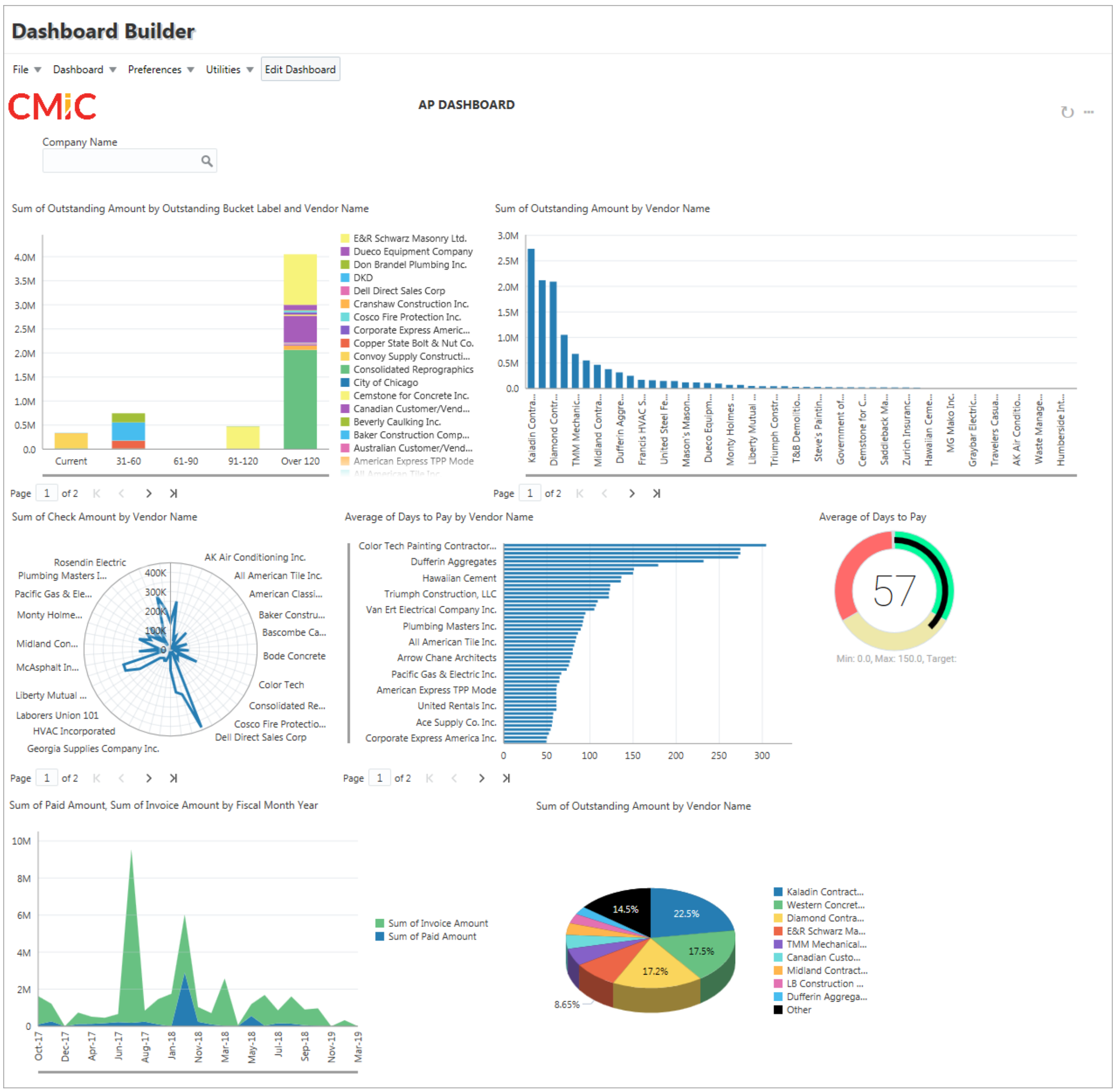
Risk of Use Notice

User Reference Guide – Version: **CMiC Open Enterprise v10x** Printed: **January 27, 2020**

Contents

BI Dashboard Builder – ADF Tool

Overview – BI Dashboard Builder



Dashboard in BI Dashboard Builder

BI Dashboard Builder is a powerful business intelligence tool for building custom dashboards with interactive charts, gauges, and tables that use real-time data directly from a user's CMiC system to:

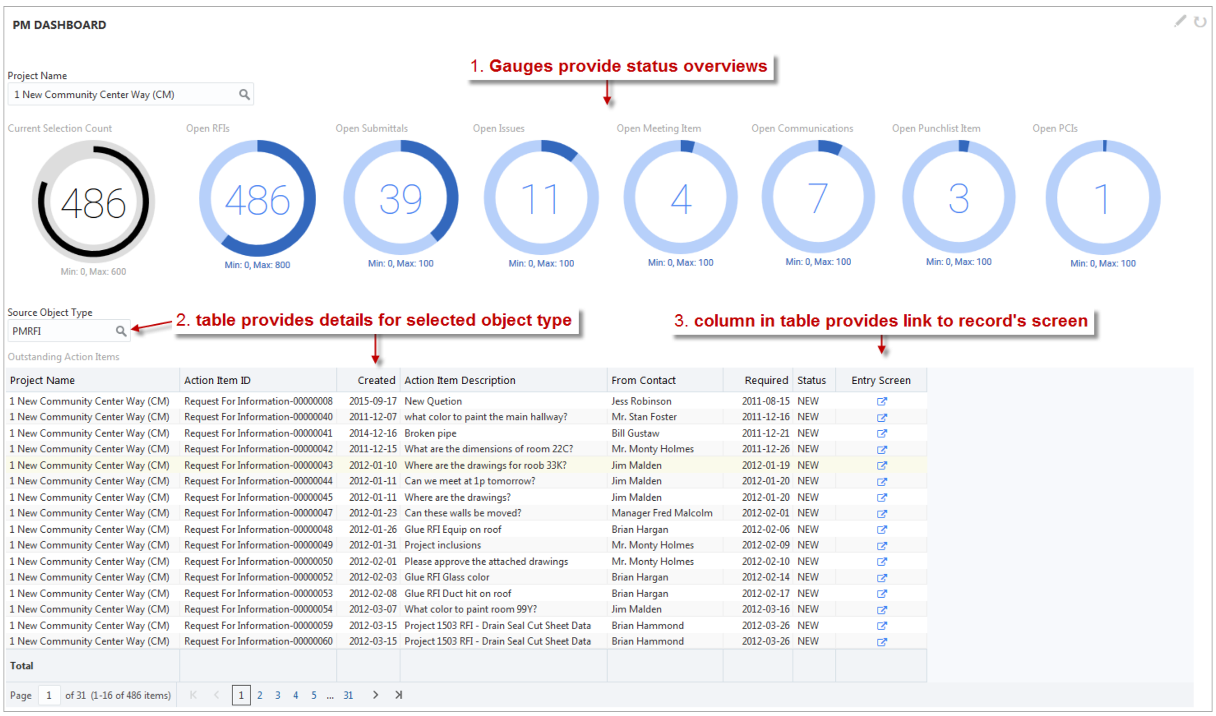
- Consolidate and visualize large amounts of data from departments to provide high-level overviews that display current statuses and reveal insights and trends.

- Provide operational metrics and KPIs to monitor and track performance and progress, and to measure the impact of activities and investments.
- Provide real time monitoring of any data in a user's CMiC system.
- Help make informed and effective decisions.

Since these dashboards use data directly from a user's CMiC system and are native to it (i.e., use same data formats), no data synchronization is required between the dashboards and the user's system, as would be for third-party BI dashboards, which means better performance and always up-to-date data. Furthermore, links to created dashboards can be added to Treeviews using our Treeview Builder tool, or to new Enterprise Console tabs using our UI Console tool.

BI Springboards

In addition to using BI Dashboard Builder to create display-only dashboards, it can be used to create dashboards with link-out capabilities, referred to as BI Springboards. As shown below, tables provide the ability to springboard to record screens to view further details, edit data, and perform actions like replying to RFIs, approving requests, changing voucher compliance statuses, and updating equipment details:



For details about a table's springboard capability, please refer to the following subsection, [*Tables*](#).

BI Query Builder

BI Query Builder is a simplified version of BI Dashboard Builder, tailored specifically for building and generating queries. In this specialized version of the software, users can focus on creating and modifying queries. In BI Query Builder, a query is a dashboard that contains a single table visualization that is always maximized. This fine-tuned query generator makes query building simple and easy, and it supports all the table visualization features available in BI Dashboard Builder, including pivoting, drill-in-place, etc. In addition, queries built in BI Query Builder can be viewed and maintained in BI Dashboard Builder.

Requirements

CMiC BI requires an Oracle WebLogic 12c Application server and a valid corresponding Oracle license.

CMiC BI Solution Options

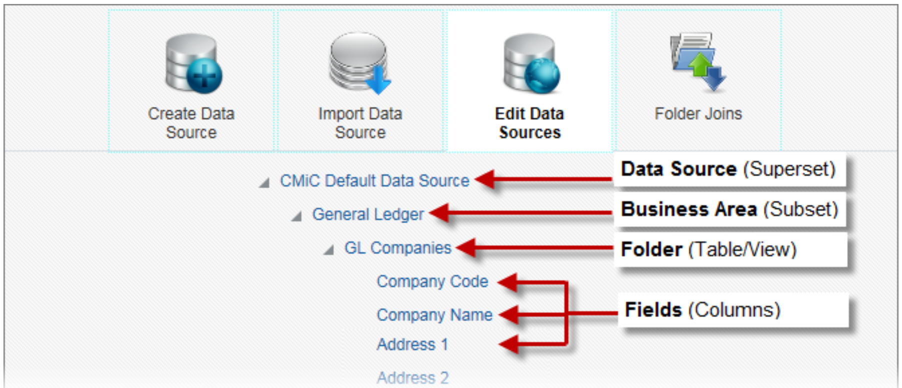
There are two options for implementing our BI solution:

- Have it installed on a user's own Oracle 12c Application servers.
- Sign up for CMiC's Cloud based BI solution, which includes the required hardware and Oracle license.

Questions or requests should be submitted by creating an issue in CMiC 360.

Data Sources

Data Sources, Business Areas, Folders, & Fields

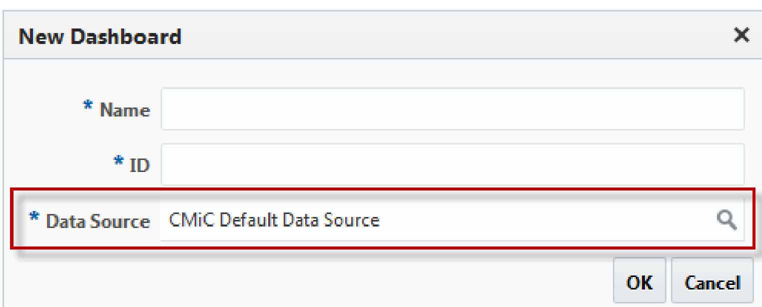


BI Catalog Builder, showing a data source, business area, folder and fields

The following section provides details about data sources and their components: business areas, folders, and fields.

Data Source (Superset of Database Objects)

A data source is a master set of tables and views that have been logically organized into subsets referred to as business areas.



Pop-up window launched when creating a new dashboard in BI Dashboard Builder tool

In BI Dashboard Builder, a data source is selected when creating a new dashboard (as shown above), and its folders (i.e., tables/views), and the results (rows) returned by their joins are used to create the dashboard's visualizations (i.e., charts, gauges, tables).

Business Area (Subset of Data Source)

A business area is a subset of the data source that contains a logical grouping of tables/views (i.e., folders) pertinent to a dashboard to be created in BI Dashboard Builder.

Folder (Table/View)

A folder is a single table/view, which contains rows of records comprised of fields (i.e., columns).

Field (Column in Row of Table/View)

For a table's or view's row, its data is stored in fields (i.e., columns).

CMiC Default Data Source & BI Catalog Builder

In BI Dashboard Builder, a dashboard is created using a particular data source.

A default data source is provided with BI Dashboard Builder titled, CMiC Default Data Source, which contains nearly every table and view in the system, with nearly all the joins that could be required between them optimally predefined. To create new dashboards, this provided data source likely contains the required tables, views and joins.

If the provided data source, CMiC Default Data Source, is not sufficient to create a desired dashboard, because a different join type is required (e.g., Left Outer required instead of Inner) or a required table\view is missing, the BI Catalog Builder tool can be used to create the necessary data source. For details about creating a data source, please refer to the BI Catalog Builder user guide.

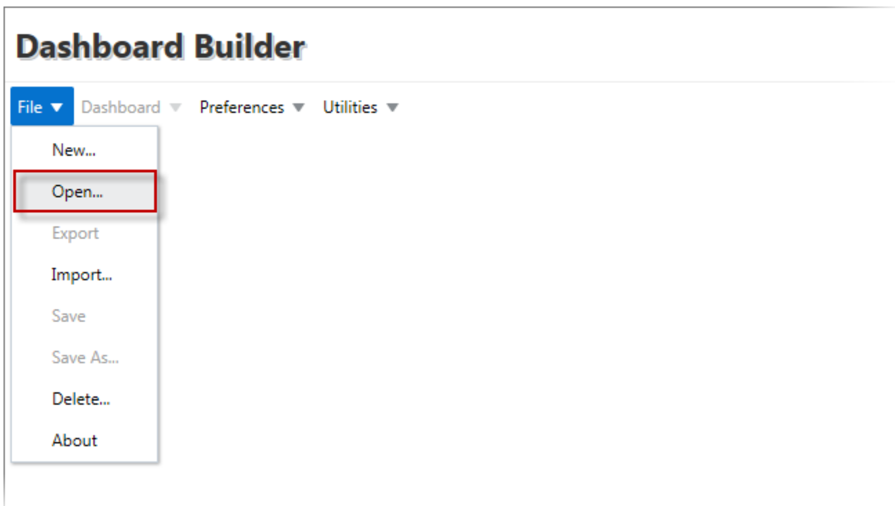
Getting Started – Creating Dashboards

Step 1: **CMiC BI Security Set Up**

Before BI Dashboard Builder can be used, CMiC BI security must be set up using the follow sections:

1. *CMiC BI Security Set Up – Quick Guide*
2. *CMiC BI Security – BI Dashboard Builder*

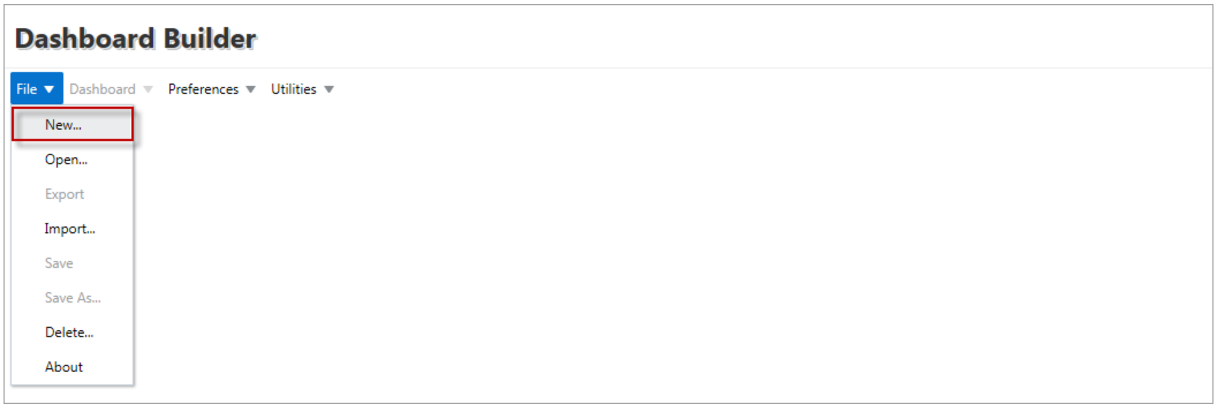
NOTE: Initial Access to Default Dashboards



BI Dashboard Builder's File > Open option to load default or custom dashboards

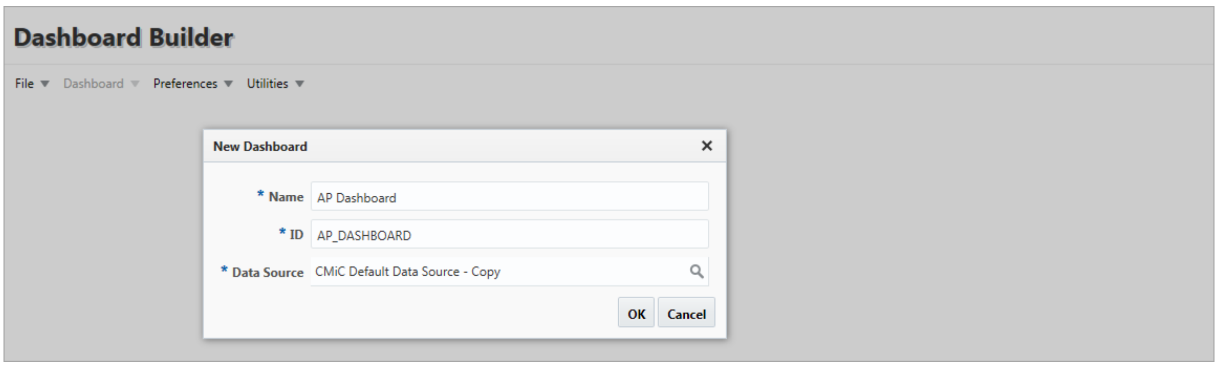
When BI Dashboard Builder is accessed for the first time, none of the provided, default dashboards accessed using BI Dashboard Builder's File > Open option will be available to any user, until they are granted the appropriate security access.

Step 2: **Create New Dashboard**

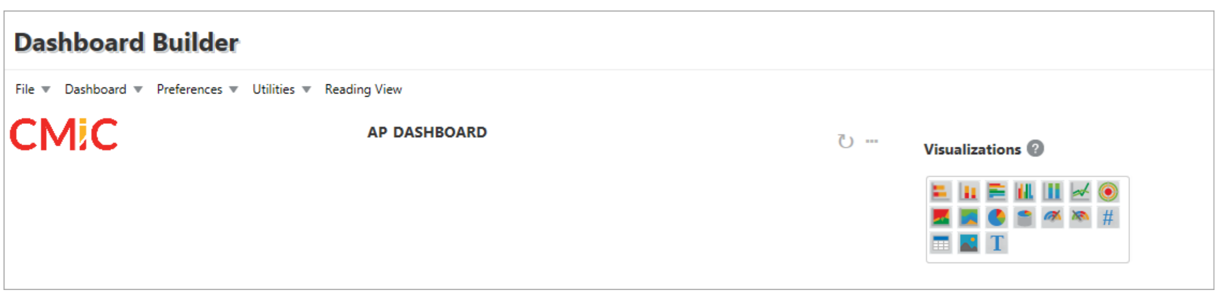


Click the File drop-down menu and select “New”.

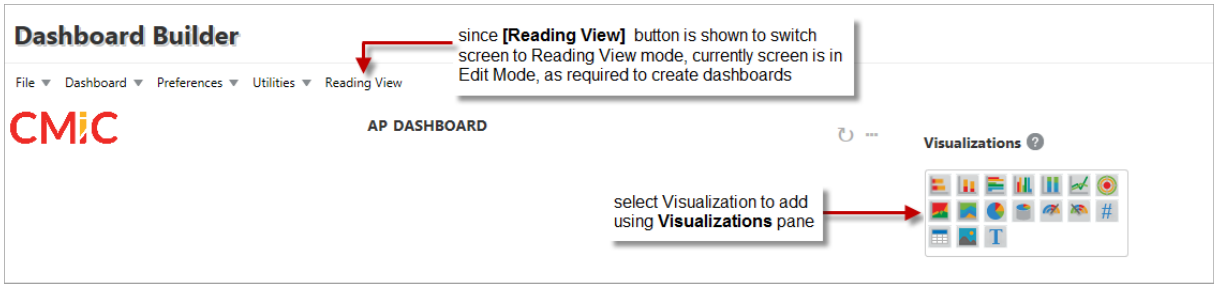
In the pop-up, shown below, provide a name for the new dashboard and select the data source containing the folders (tables/views) required to create the dashboard’s visualizations:



Upon clicking [**OK**], the newly created dashboard is displayed:



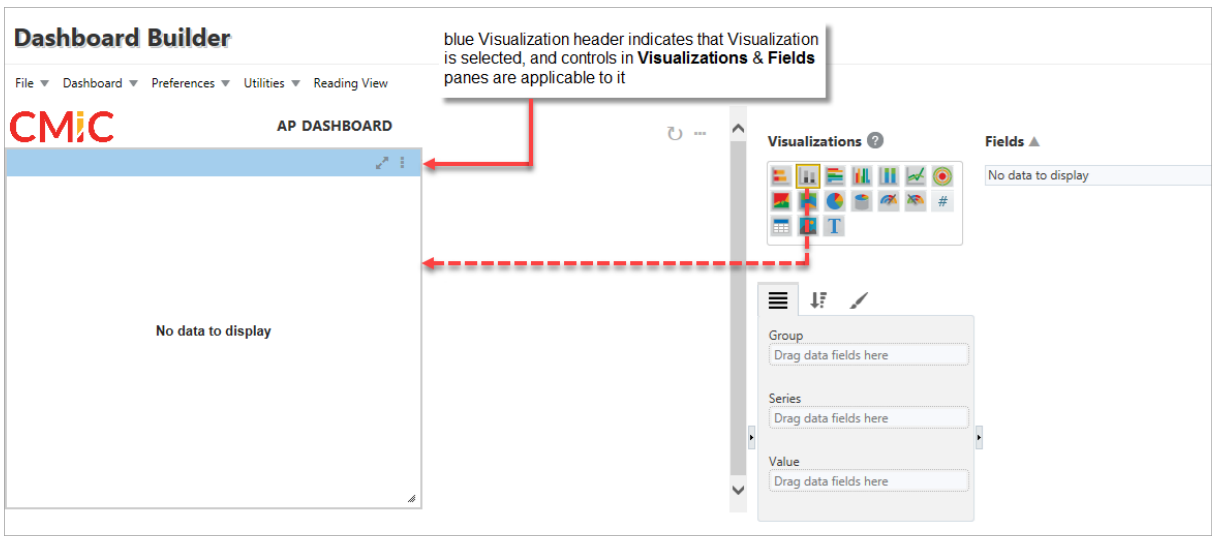
Step 3: **Add a Visualization**



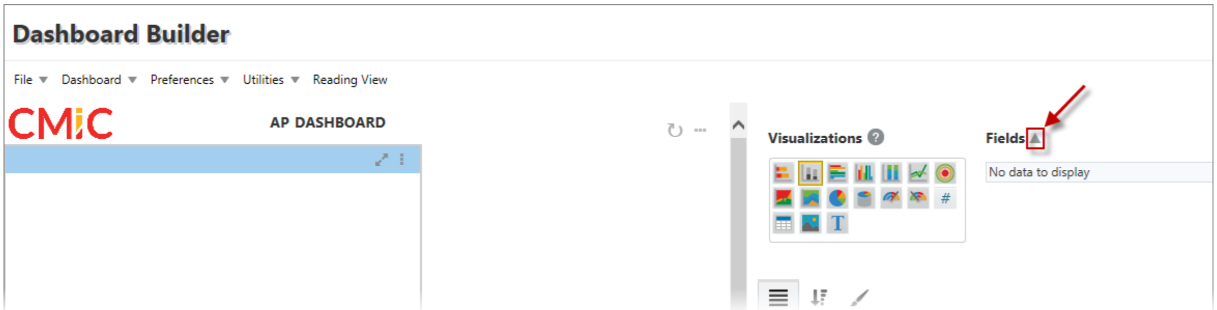
Since the screen will initially be in Edit Mode when a new dashboard is to be created, the Visualizations pane will be visible, as shown above, to select a visualization to add to the dashboard.

Click the visualization to add, and it will be added to the dashboard, as shown below. When a visualization is added, it is automatically selected (as indicated by its blue header), so the options in the Visualizations and Fields panes are applicable to it.

NOTE: A dashboard must not contain more than 20 visualizations.



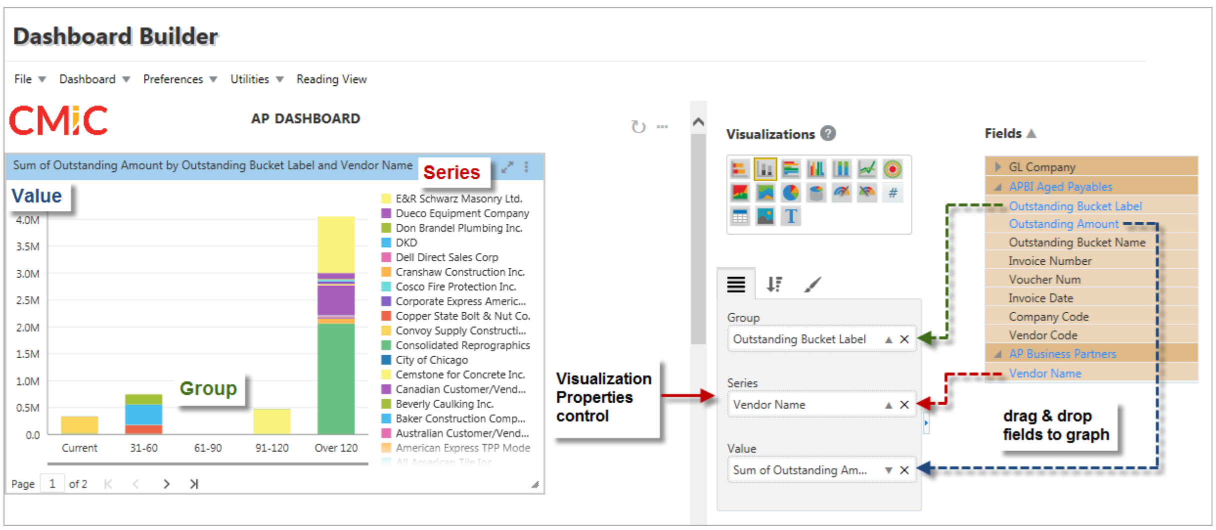
Step 4: **Add Fields to Visualization**



Next, click the up-arrow (▲) in the Fields pane to add fields (tables/views) to the visualization.

For details about adding fields to visualizations, please refer to the following section: *Fields – Pane*.

Step 5: **Configure Visualization Properties**



Stacked Column Chart

Next, configure the visualization's properties using the Visualization Properties control, as shown above. For details about configuring a visualization, please refer to the following section: *Visualizations*.

Step 6 (Optional): **Add Page Filter for Visualization(s)**

Optionally, add a page filter to filter the visualization. For details about adding page filters, please refer to the following section: *Insert Filter (Page Filter) – Menu Option*.

Step 7: **Assign Security Role(s) to Dashboard**

Use the *Assign Roles to Dashboards* utility to assign the appropriate security role(s) to the new dashboard.

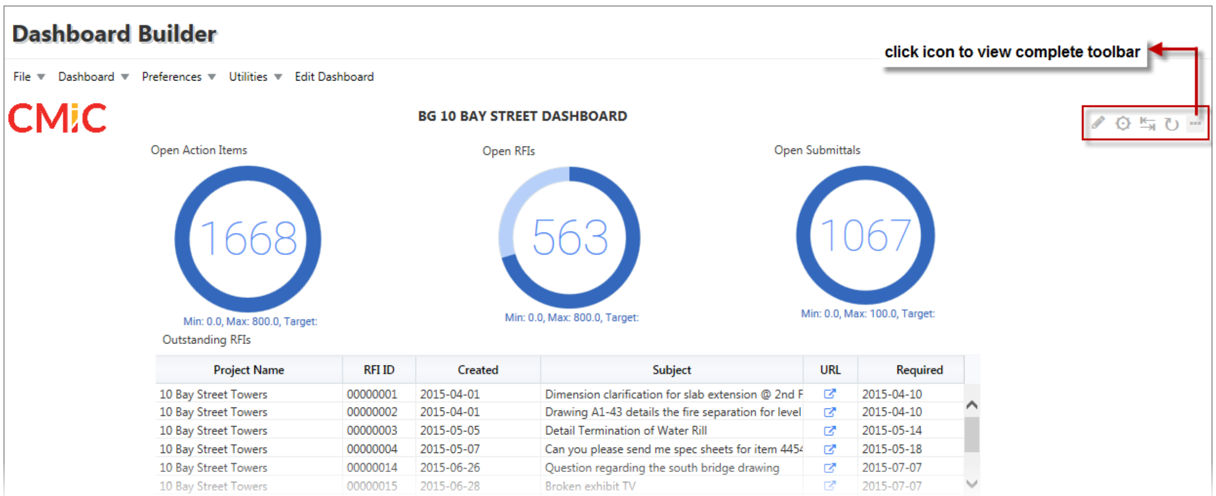
NOTE: Dashboards are only available to users that belong to their assigned security roles. Also, after BI Dashboard Builder is installed, security roles must be assigned to the provided dashboards to make them accessible to users. Depending on security setup, the administrator's security role may also need to be assigned to the Assign Roles to Dashboards program.

Step 8: **Make Dashboard Accessible via Console**

Lastly, the new dashboard needs to be made accessible to end-users. For details on how to do this, please refer to the following section: *Making Dashboards Accessible via Console*.

Dashboard Runtime Controls

Edit, Show/Hide Properties, Refresh – Controls



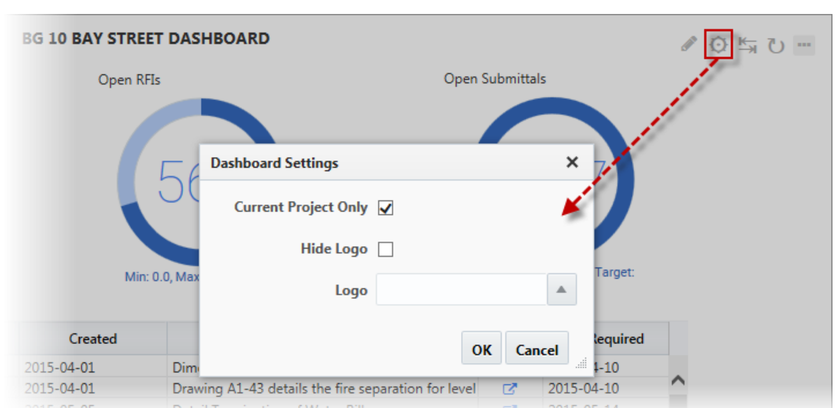
Example of dashboard at runtime for end-users, with the Dashboard Runtime Controls framed in red

The following dashboard controls are applicable to end-users at runtime. User must click on the Ellipses icon ( ) to view complete toolbar.

Edit

At runtime, this control is available to end-users with the BIDBRDEDIT system privilege in order to edit dashboards via BI Dashboard Builder.

Dashboard Settings



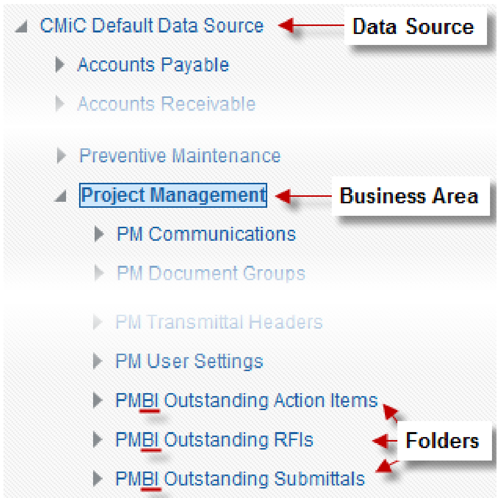
Pop-up window launched from Dashboard Settings icon in Dashboard Runtime Controls toolbar

Current Project Only – Checkbox

If 'Current Project Only' box is checked, the dashboard's visualizations using folders that are current-project sensitive will only use data from the user's current default project, as set in CMiC Field (formerly xProjects).

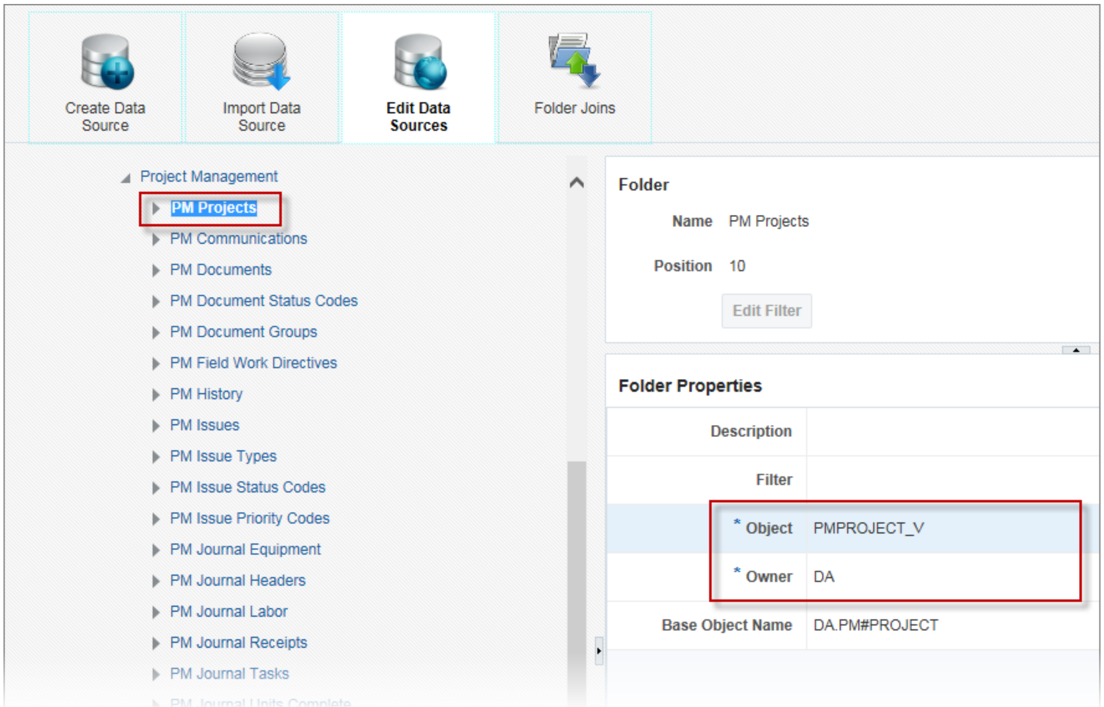
This option is applicable to:

1. Visualizations using data from folders of the advanced analytics type that are current-project sensitive (i.e., capable of returning data only for user's current default project). Folders of the advanced analytics type are identified in BI Catalog Builder by the "BI" suffix in a folder's name, as shown below:



BI Catalog Builder – Edit Data Sources

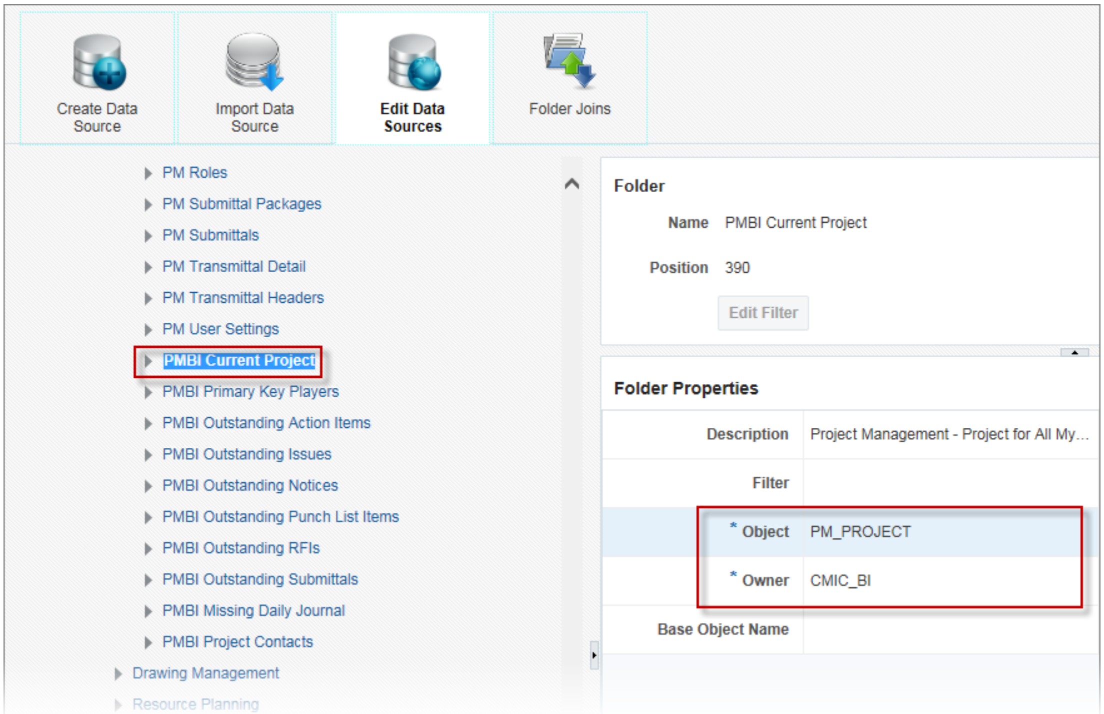
2. Visualizations using data from the PM Projects folder, or any user-created folder that references the DA.PMPROJECT_V view:



BI Catalog Builder – Edit Data Sources

NOTE: For this option, the ‘Use All Folders’ checkbox must also be checked in the visualization’s Fields pane in BI Dashboard Builder. Refer to *Use All Folders* section of this guide for more information.

3. Visualizations using data from the PMBI Current Project folder or any user-created folder that references the CMIC_BI.PM_PROJECT view:

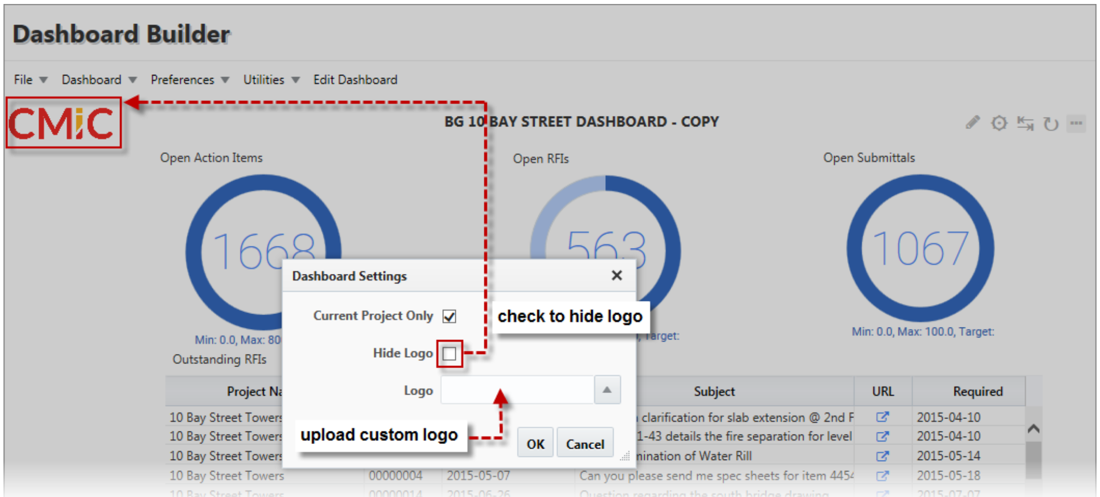


BI Catalog Builder – Edit Data Sources

NOTE: For this option, the 'Use All Folders' checkbox must also be checked in the visualization's Fields pane in BI Dashboard Builder. Refer to *Use All Folders* section of this guide for more information.

If the 'Current Project Only' checkbox option is required for visualizations using any other folder, BI Catalog Builder needs to be used to create a join between that folder and the PM Projects or PMBI Current Project folder, or between that folder and a user-created folder that references the DA.PMPROJECT_V or CMIC_BI.PM_PROJECT view.

Hide Logo – Checkbox

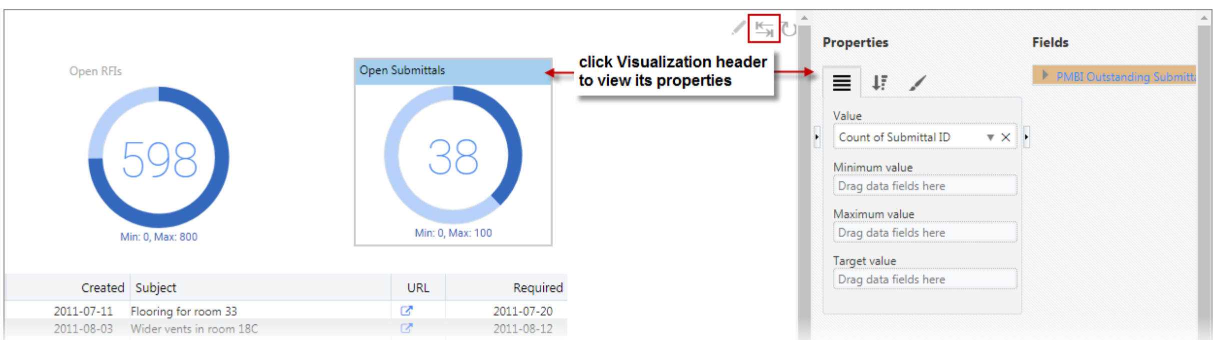


Use the 'Hide Logo' checkbox in the Dashboard Settings pop-up window to hide the logo displayed on the dashboard.

Logo

This property allows the user to upload and display a custom logo. If the Logo property is left empty, the logo defaults from the Dashboard Logo Image Path field on the Logo Path tab of the System Options screen (standard Treeview path: *System > Setup > System Options – Logo Path tab*).

Show/Hide Properties



This control is used to edit a visualization's properties during runtime. To do so, select a visualization by clicking its header, then click this control to reveal the Visualization Properties control for the selected visualization.

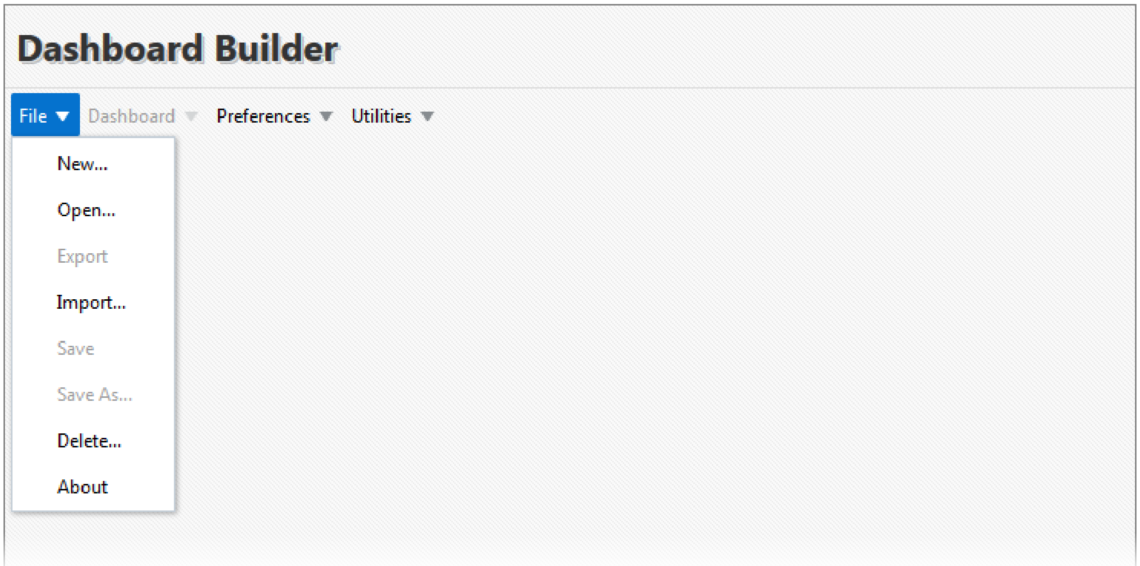
This functionality allows end-users to temporarily (no changes are saved) modify a visualization's properties, such as changing how its data is filtered and sorted.

Refresh

This control is used to refresh a dashboard's visualizations using current data from the database.

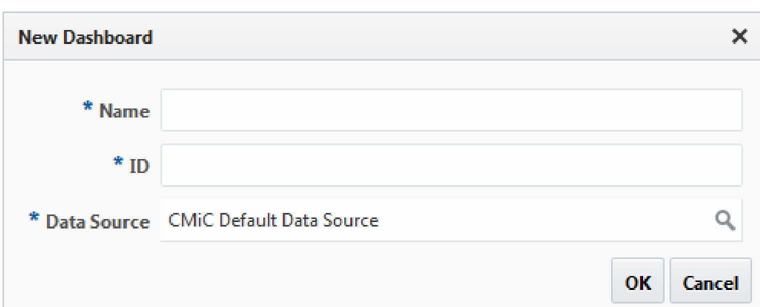
BI Dashboard Builder – Screen

File – Menu



File drop-down menu

New – Menu Option



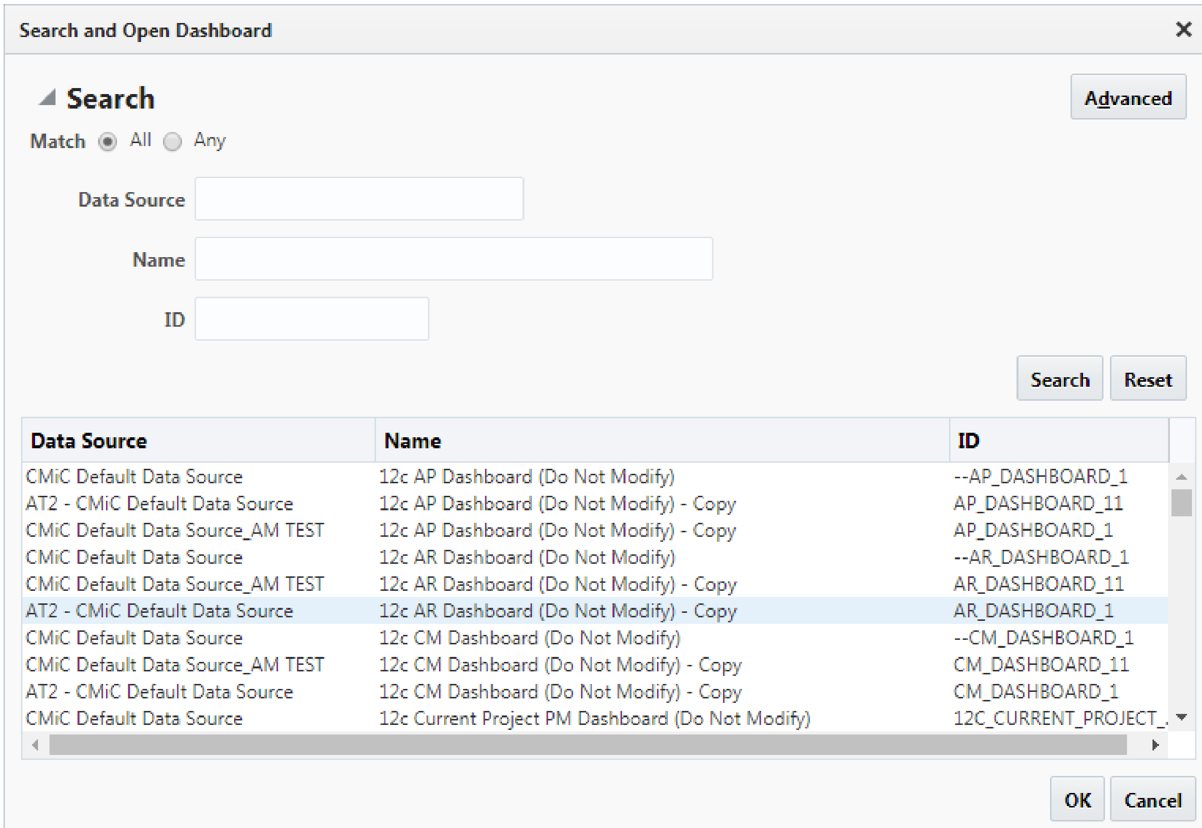
Launches the above New Dashboard pop-up window with the following fields to fill out:

Field	Details
Name	Name for new dashboard, which auto-populates ID field.
ID	Identifier used by system to identify new dashboard, which is auto populated based on Name field; can use uppercase alphanumeric characters and underscore character, but spaces are not allowed.

Field	Details
Data Source	Contains the folders (i.e., tables/views) to use to create the dashboard's visualizations (i.e., charts, gauges, tables). Visualizations can either use data from a single folder, or data returned by joined folders.

After clicking [**OK**], the new dashboard is loaded and ready to have visualizations added to it.

Open – Menu Option



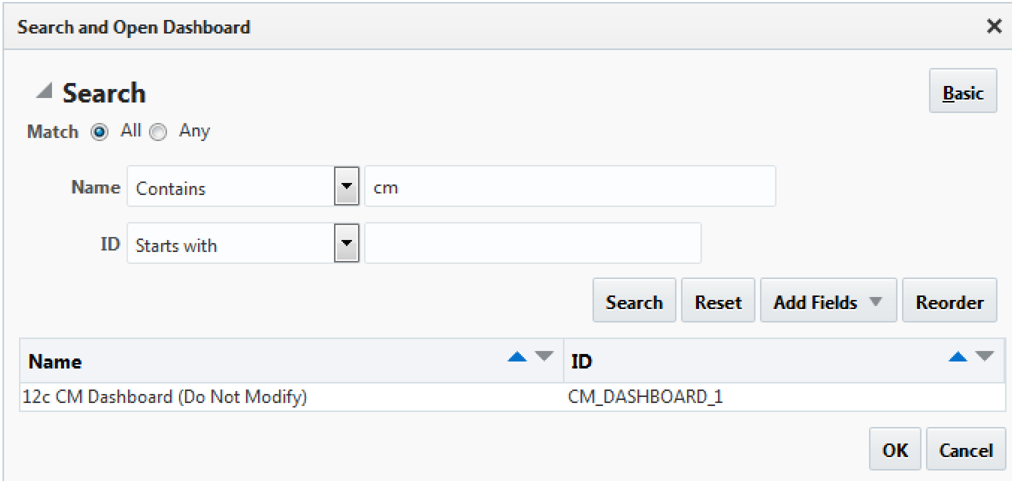
This option launches the above Search and Open Dashboard pop-up window to search for and select a dashboard to open.

NOTE: When BI Dashboard Builder is accessed for the first time, none of the provided, default dashboards will be available to any user, until they are granted appropriate security access.

Use the Data Source, Name and/or ID search fields to find a particular dashboard, and note that the following wildcard characters can be used:

- **%** (any string of characters)
- **_** (any single character)

Use the [**Advanced**] button to switch the pop-up to Advanced Search mode, shown below:



In Advanced Search mode, matching operators can be used, search fields can be added, and the search fields can be reset and reordered.

Export – Menu Option

The Export and Import functionality is used to copy dashboards from one Enterprise environment to another. For instance, if dashboards are created in the Test/Development environment, they can be copied to the Production environment using this functionality.

Copying Dashboards Between Enterprise Environments

NOTE: To import dashboards into one environment from another, the environments must be on the same patch/hotfix level. For example, if dashboards are created in the DEV environment, to export them to the PROD environment, the PROD environment must be on the same patch/hotfix level as that of DEV.

To copy a dashboard from one environment to another, using BI Dashboard Builder, open the dashboard to copy in the environment it exists. Then, use this Export option to export (save) the dashboard to a location from which it can be imported. The exported dashboard will have a “BI” file extension.

Next, launch BI Dashboard Builder in the environment into which the dashboard is to be imported. Then, use the Import option to import the dashboard that was exported to the temporary location.

NOTE: Imported dashboards are not automatically saved. Use the “Save” or “Save As” option to save and keep the imported dashboard.

Import/Export Rules

When working with multiple environments, where you are planning on developing in one environment (e.g. TEST or DEV) and then promoting these changes into another environment (e.g. PROD), the following rules and best practices for import/export should be considered:

1. Always make changes to your data source and dashboards in your development environment (e.g. TEST, DEV, etc.).
2. Once changes are completed and ready to be promoted into your production environment (e.g. PROD):

    a. Export your data source from the development database and import it into your production database. For more details, refer to the *Installation Scripts* section of the *BI Catalog Builder* guide.

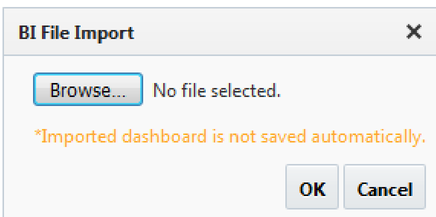
    b. Export your dashboards from the development environment and import them into your production environment. For more details, refer to the *Export – Menu Option* and *Import - Menu Option* sections of this guide.

3. Importing a data source will override the existing data source in the destination environment, therefore, it's important to follow Rule 1.

4. If users modify a dashboard in the source environment, and these changes don't require any modifications in the corresponding data source, then it's not necessary to export/import the data source. In this case, users can skip Rule 2a.

NOTE: If you export/import a dashboard between different environments and the dashboard required any changes in the corresponding data source, then you first need to export/import your data source as described in the *Installation Scripts* section of the *BI Catalog Builder* guide.

Import – Menu Option



This option is used along with the "Export" option to copy dashboards from one Enterprise environment to another. For details, please refer to the above documentation about the "Export" option.

Imported dashboards are not automatically saved. Use the "Save" or "Save As" option to save and keep the imported dashboard.

NOTE: If you export/import a dashboard between different environments and the dashboard required any changes in the corresponding data source, then you first need to export/import your data source as described in the *Installation Scripts* section of the *BI Catalog Builder* guide.

Save – Menu Option

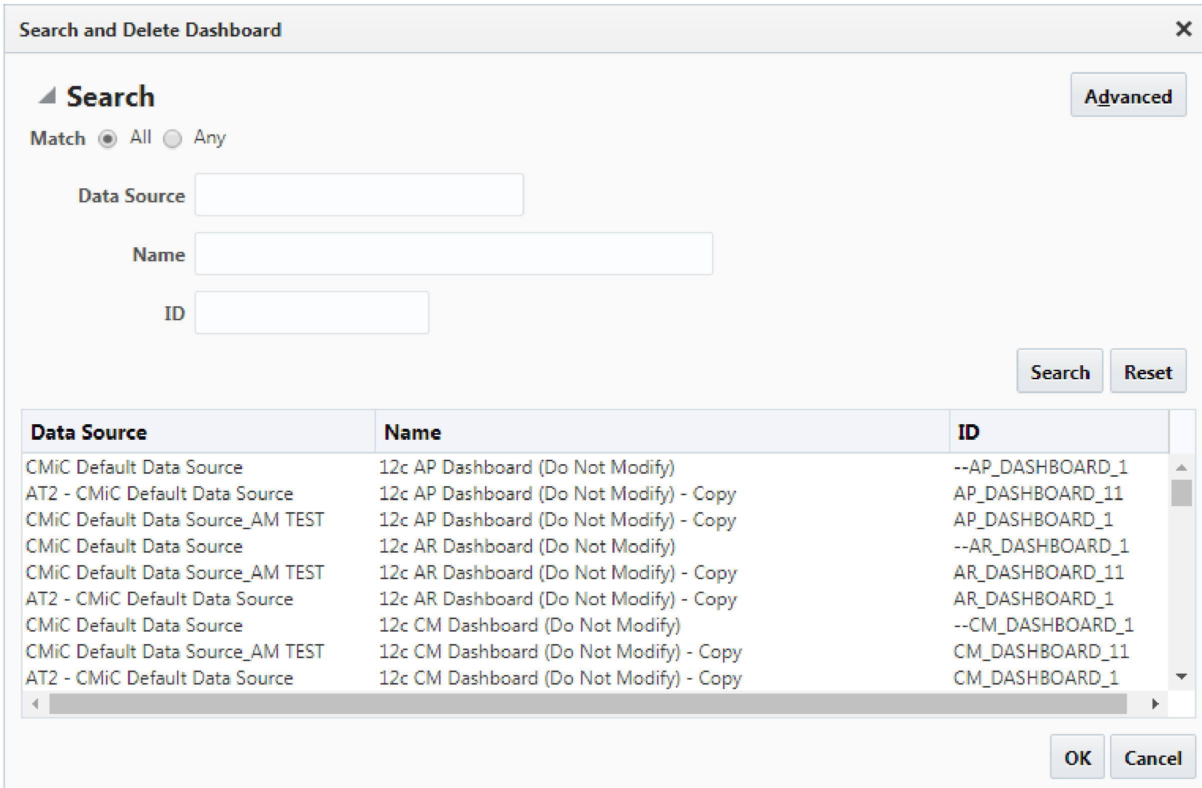
Saves changes to dashboard.

NOTE: The user will be unable to save a dashboard if errors exist (missing fields, missing folder, etc.) and will be required to resolve these errors before the dashboard will save. This functionality prevents broken visualizations from becoming corrupted to the point that they become unrecoverable.

Save As – Menu Option

Brings up the Save As pop-up window, which can be used to create a copy of the current dashboard by saving it with a different name.

Delete – Menu Option



This option launches the above Search and Delete Dashboard pop-up window to search for and delete a dashboard.

Use the Data Source, Name and/or ID search fields to find a particular dashboard, and note that the following wildcard characters can be used:

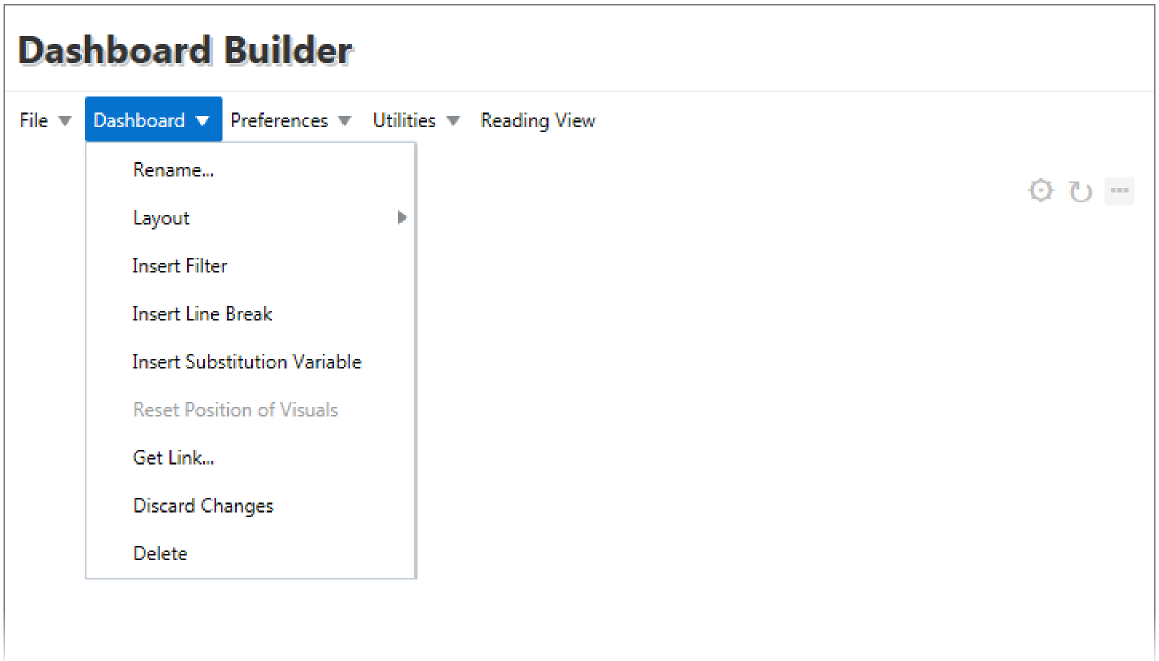
- **%** (any string of characters)
- **_** (any single character)

Use the [**Advanced**] button to switch the pop-up to Advanced Search mode, where matching operators can be used, search fields can be added, and search fields can be reordered.

About – Menu Option

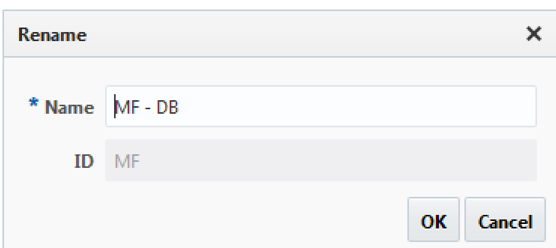
This option is used to display information about the application and its server.

Dashboard – Menu



Dashboard drop-down menu

Rename – Menu Option

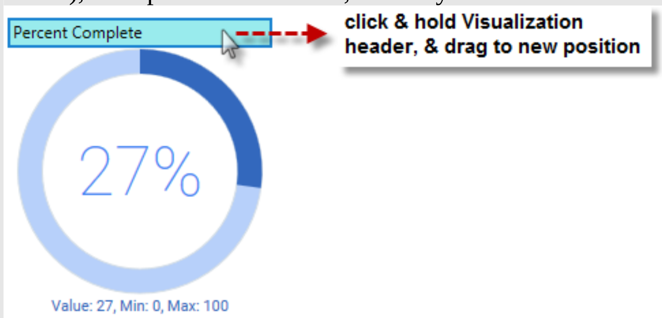


Launches the above Rename pop-up window to rename the dashboard.

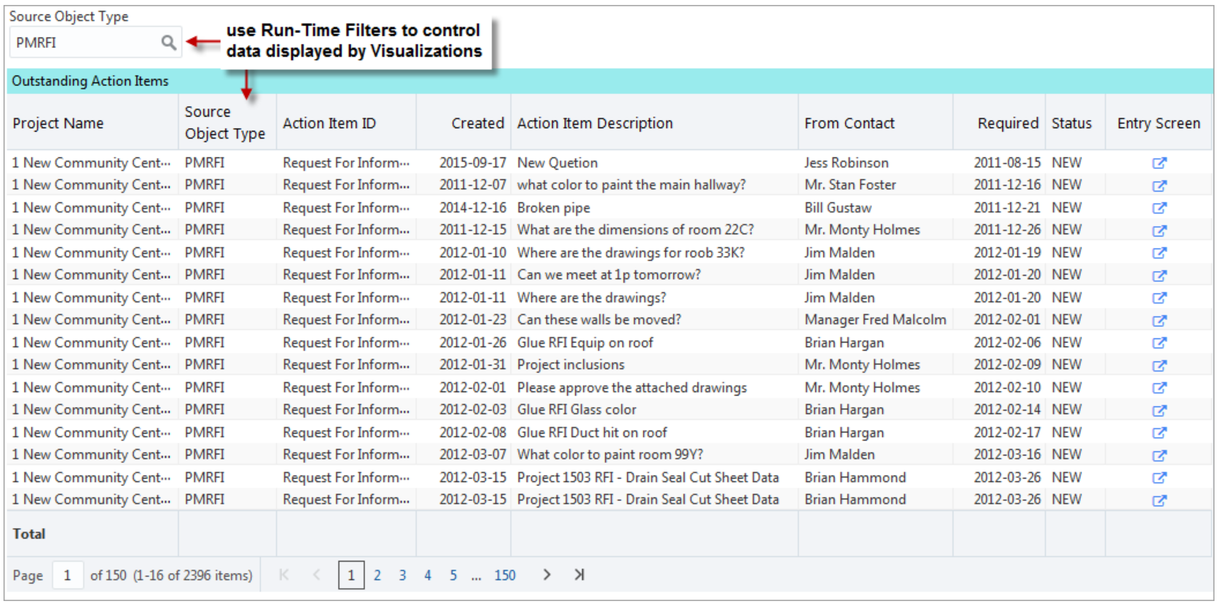
Layout – Menu Option

These layout options control how visualizations are arranged on the screen:

Option	Details
Flow	Visualizations are automatically arranged from left to right, and they dynamically wrap to new lines based on the browser's size. To force a visualization to a new line, insert a line break before it using the "Insert Line Break" option.

Fixed	Width and height of dashboard is specified, and its size does not change dynamically, but scrollbars are available if required; visualizations are arranged by user (as shown below), their positions are fixed, and they can be stacked. 

Insert Filter (Page Filter) – Menu Option



Project Name	Source Object Type	Action Item ID	Created	Action Item Description	From Contact	Required	Status	Entry Screen
1 New Community Cent...	PMRFI	Request For Inform...	2015-09-17	New Quetion	Jess Robinson	2011-08-15	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2011-12-07	what color to paint the main hallway?	Mr. Stan Foster	2011-12-16	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2014-12-16	Broken pipe	Bill Gustaw	2011-12-21	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2011-12-15	What are the dimensions of room 22C?	Mr. Monty Holmes	2011-12-26	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-01-10	Where are the drawings for roob 33K?	Jim Malden	2012-01-19	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-01-11	Can we meet at 1p tomorrow?	Jim Malden	2012-01-20	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-01-11	Where are the drawings?	Jim Malden	2012-01-20	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-01-23	Can these walls be moved?	Manager Fred Malcolm	2012-02-01	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-01-26	Glue RFI Equip on roof	Brian Hargan	2012-02-06	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-01-31	Project inclusions	Mr. Monty Holmes	2012-02-09	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-02-01	Please approve the attached drawings	Mr. Monty Holmes	2012-02-10	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-02-03	Glue RFI Glass color	Brian Hargan	2012-02-14	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-02-08	Glue RFI Duct hit on roof	Brian Hargan	2012-02-17	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-03-07	What color to paint room 99Y?	Jim Malden	2012-03-16	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-03-15	Project 1503 RFI - Drain Seal Cut Sheet Data	Brian Hammond	2012-03-26	NEW	
1 New Community Cent...	PMRFI	Request For Inform...	2012-03-15	Project 1503 RFI - Drain Seal Cut Sheet Data	Brian Hammond	2012-03-26	NEW	
Total								

Page 1 of 150 (1-16 of 2396 items) 1 2 3 4 5 ... 150

This option is available if the screen is in Edit Mode. It is used to add a page filter to a dashboard to dynamically control the data displayed by one or more of the dashboard’s visualizations during runtime.

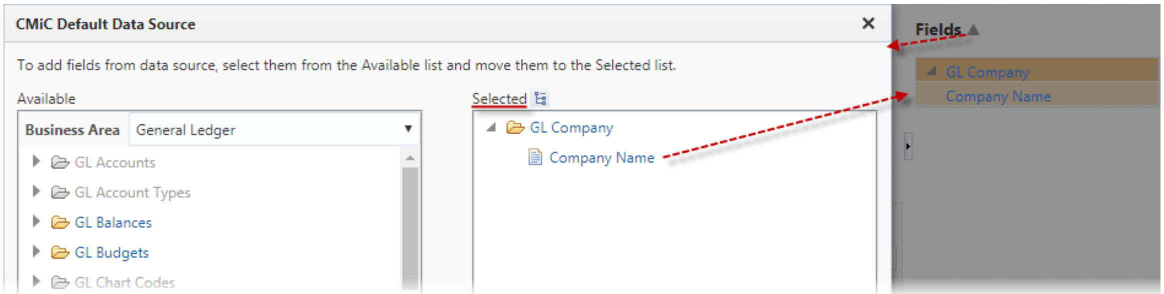
To clear a page filter’s selected item, use the Delete or Backspace keyboard key.

Adding & Configuring Page Filter

To add a page filter, select the “Insert Filter” option in the Dashboard drop-down menu, which creates a page filter at the top of the canvas if it is the first one added, or next to the previously added filter otherwise.

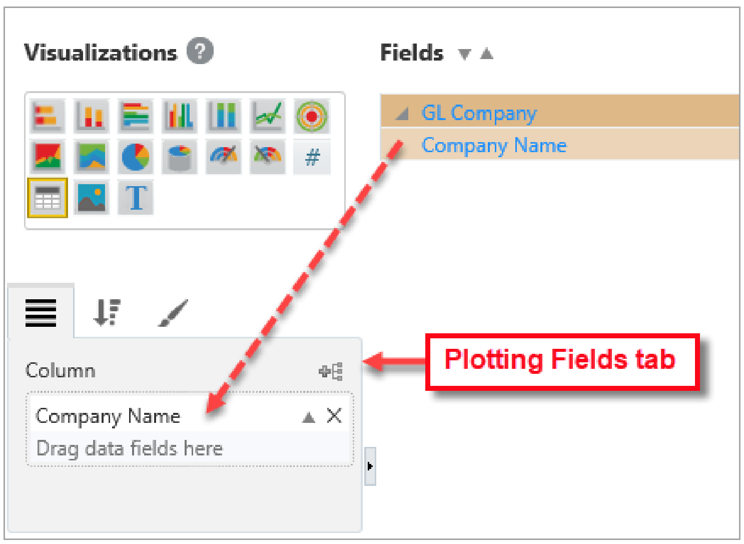
Next, drag and drop the filter over the visualization that is in the desired position for it, which causes that visualization to be moved to the right. If required, force a new line after the filter using the “Insert Line Break” option, which positions the new filter over the visualization forced to the new line.

Add Field to Filter Against From Data Source to Fields Pane



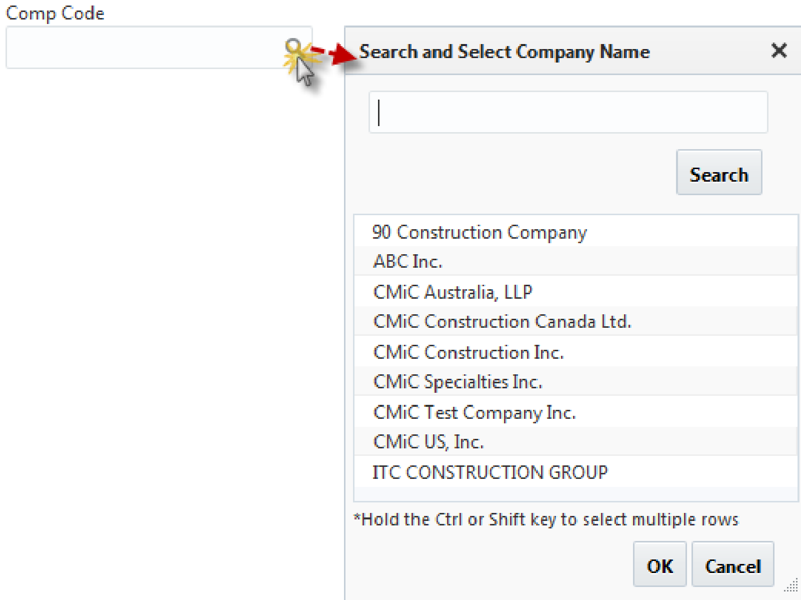
With the new filter selected by clicking its colored header, click the up-arrow (▲) in the Fields pane to add the field to filter against from a selected data source to the Fields pane. For details about adding fields from a data source to the Fields pane, please refer to the following subsection, *Fields – Pane*.

Plotting Fields – Tab: Add Field to Filter Against From Fields Pane

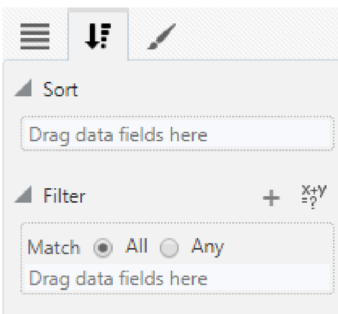


As shown above, drag and drop the field just added to the Fields pane into the Filter By parameter of the Visualization Properties control.

This creates a simple page filter with a pop-up that is auto-populated with relevant values to choose from, as shown below:

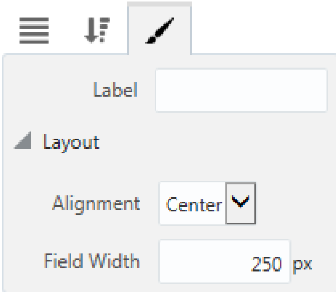


Sort and Filter – Tab: Sort & Filter Page Filter's LOV



To sort and filter the page filter's LOV, use the Visualization Properties control's Sort and Filter tab, as shown above. For details about the Sort and Filter tab, please refer to the following section: *Sort and Filter – Tab*.

Format – Tab: Format Page Filter



Label: Allows the user to use an alternate label for the page filter, as opposed to using the Field name which defaults from the Filter By parameter of the Visualization Properties control.

Alignment: Used to set how page filter's search box is aligned within the page filter.

Field Width: Used to set width of page filter's search box.

Setting Which Visualizations Page Filter Filters

To set what visualizations get filtered by a page filter, add the folder used to create the page filter to all the visualizations that are to be filtered by it. Note, the fields used by the filter do not need to be added to visualizations, only the folder used by the page filter does, even if the folder is not used by the visualization. When a page filter is activated, it looks for visualizations with the same folder, and only ones with it are filtered.

Using Multiple Page Filters Jointly

If multiple page filters are added to filter visualizations jointly, their filter expressions are combined using the *And* conjunction. Also, page filters that jointly filter visualizations (filter jointly since created using same folder) filter each other.

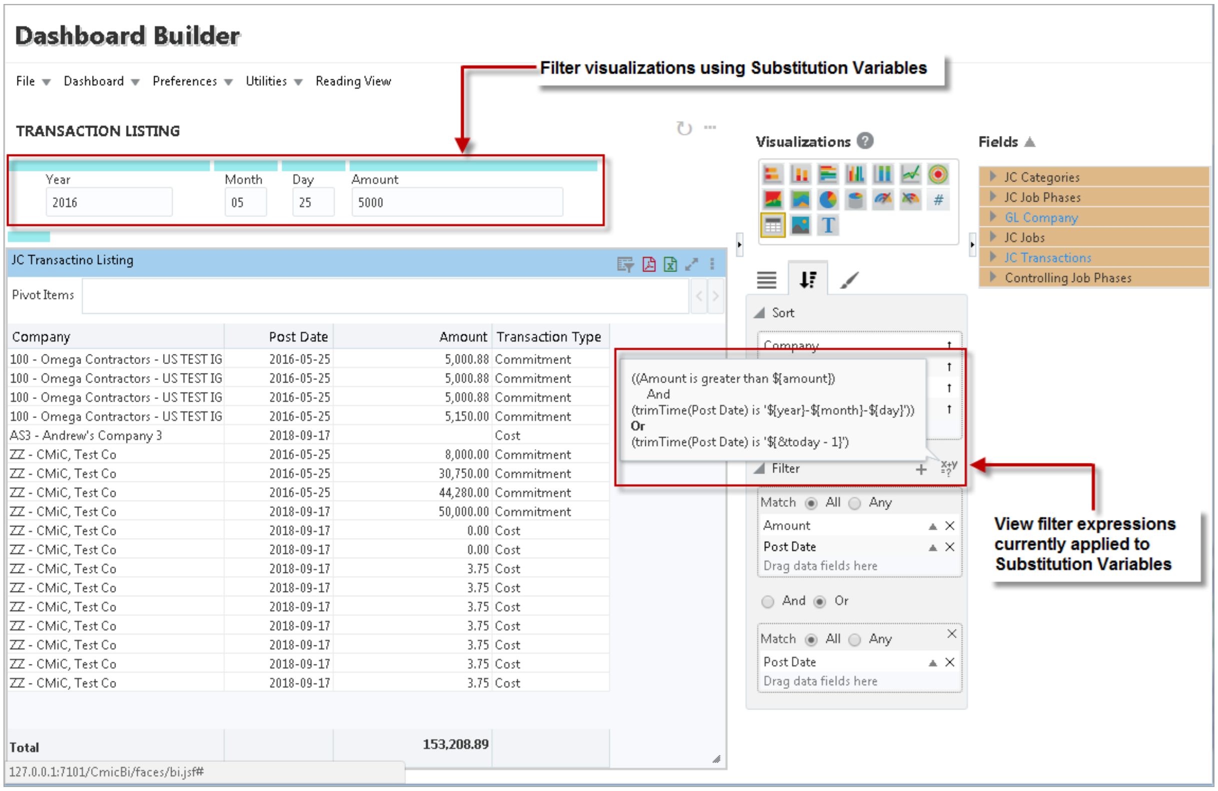
For instance, for two page filters filtering jointly, one by company and the other by job, if a company is selected using the first one, the second one's LOV is limited to only jobs belonging to the selected company.

Insert Line Break – Menu Option

This option is available if the screen is in Edit Mode. To insert a line break, select the visualization for which the next visualizations will be forced to a new line.

Once inserted, the following graphic appears under the selected visualization to indicate where the line break was added: . The line break can be deleted by selecting its graphic and pressing the Delete keyboard key.

Insert Substitution Variable – Menu Option

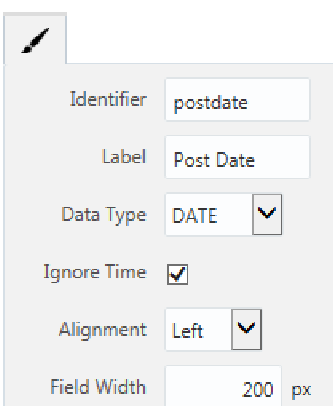


This option is available if the screen is in Edit Mode. It is used to filter visualizations using substitution variables to which substitution value expressions have been applied.

Adding & Configuring Substitution Variable

To add a substitution variable, select the "Insert Substitution Variable" option in the Dashboard drop-down menu, which creates a substitution variable search box at the top of the canvas.

Format – Tab: Format Substitution Variable

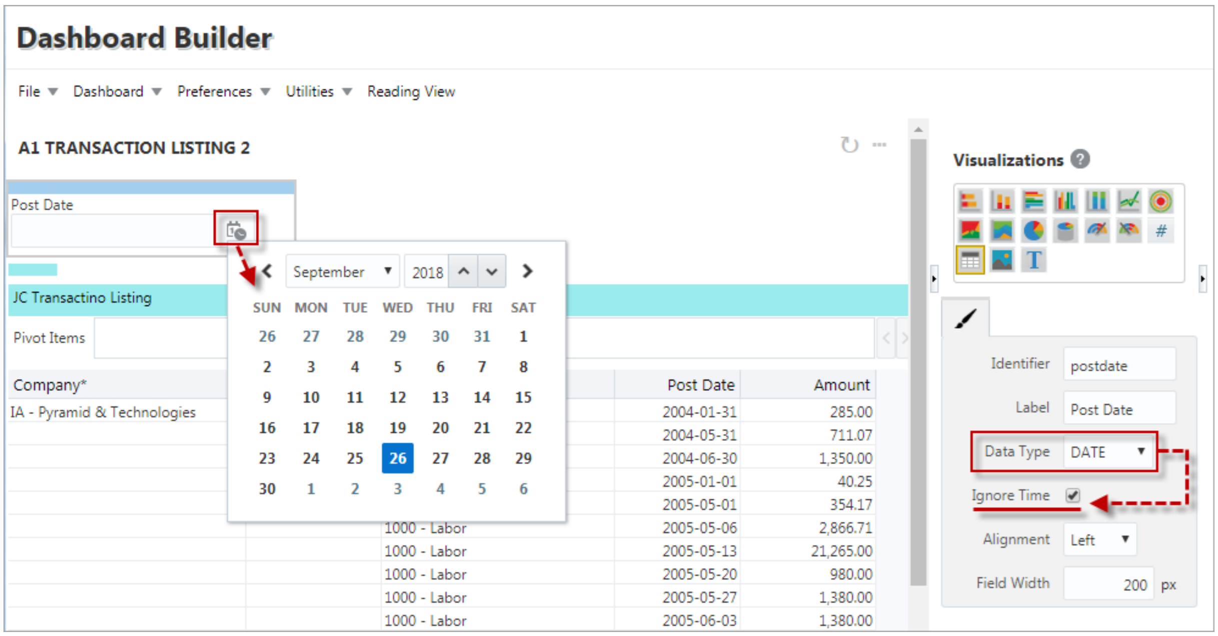


Use the Format tab to complete the substitution variable's format information. The tab's fields are described below.

Identifier: A unique name that is used to reference the value of this substitution variable. The identifier must start with a lowercase character and may only contain numbers, lowercase characters and underscores.

Label: Label for substitution variable.

Data Type: Sets the data type of the substitution variable. Options are "String", "Number", and "Date". If "Date" is selected as the data type, the 'Ignore Time' checkbox will become enabled. In addition, a pop-up calendar will be available in the Substitution Variable search box. Data validation will occur for Number, Date, and Time.

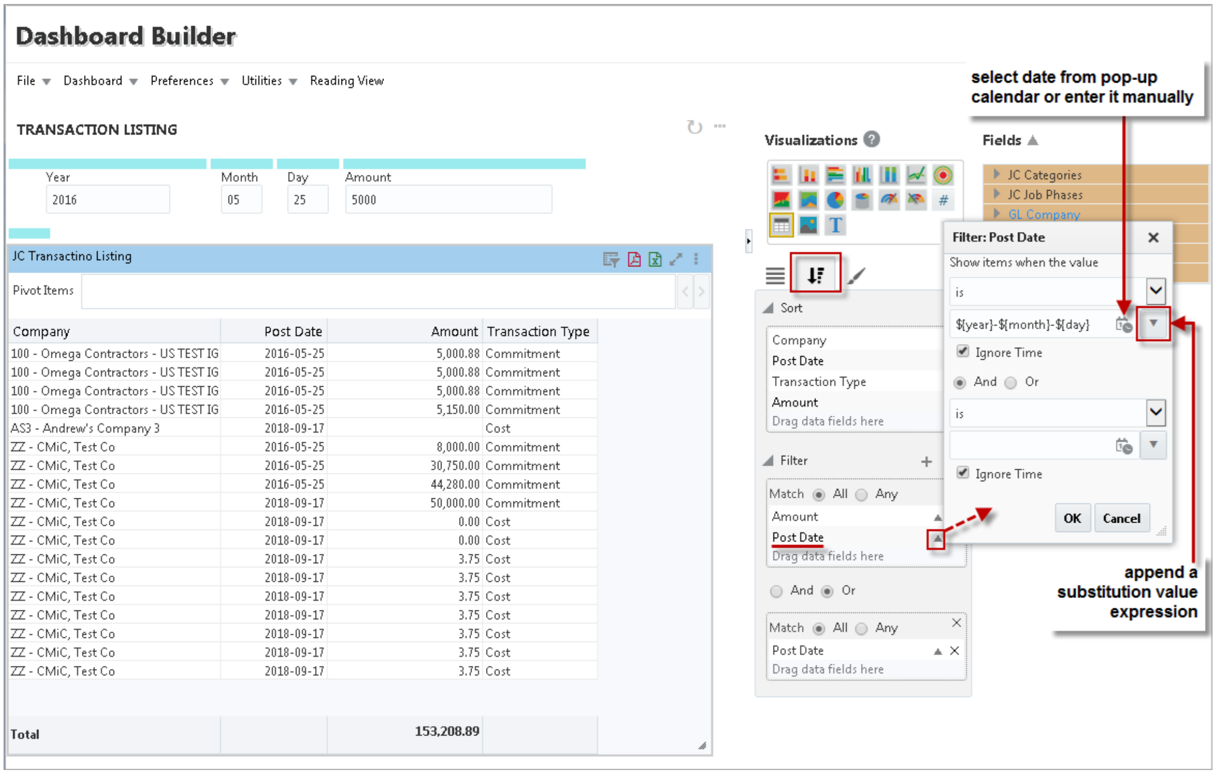


Ignore Time: This checkbox is only visible if "Date" is selected in the Data Type drop-down menu. This box is checked by default. When checked, time will be ignored. If unchecked, time can be specified.

Alignment: Set how substitution variable's search box is aligned within the substitution variable.

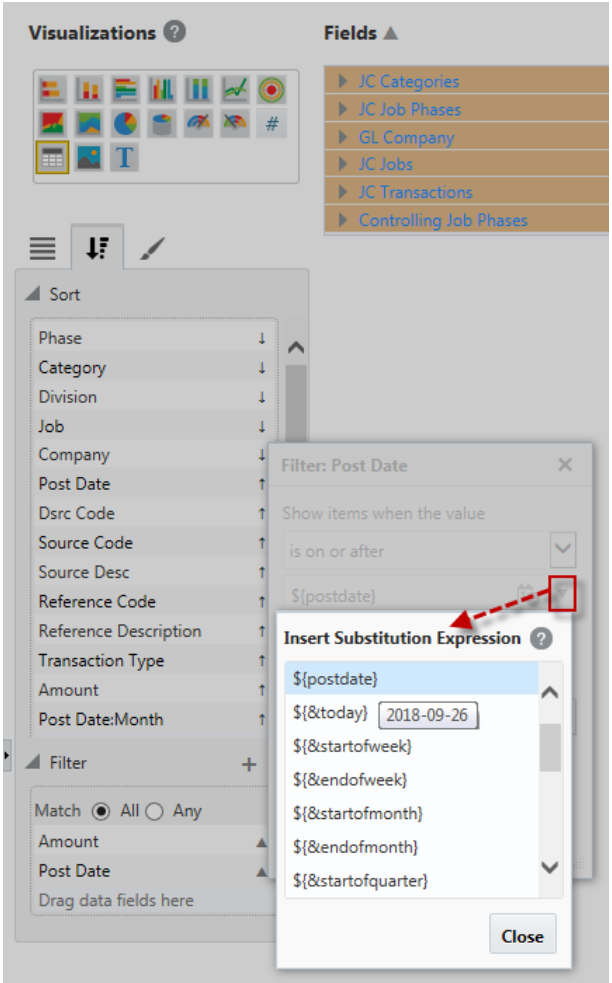
Field Width: Set width of substitution variable's search box.

Sort and Filter – Tab: Sort & Filter

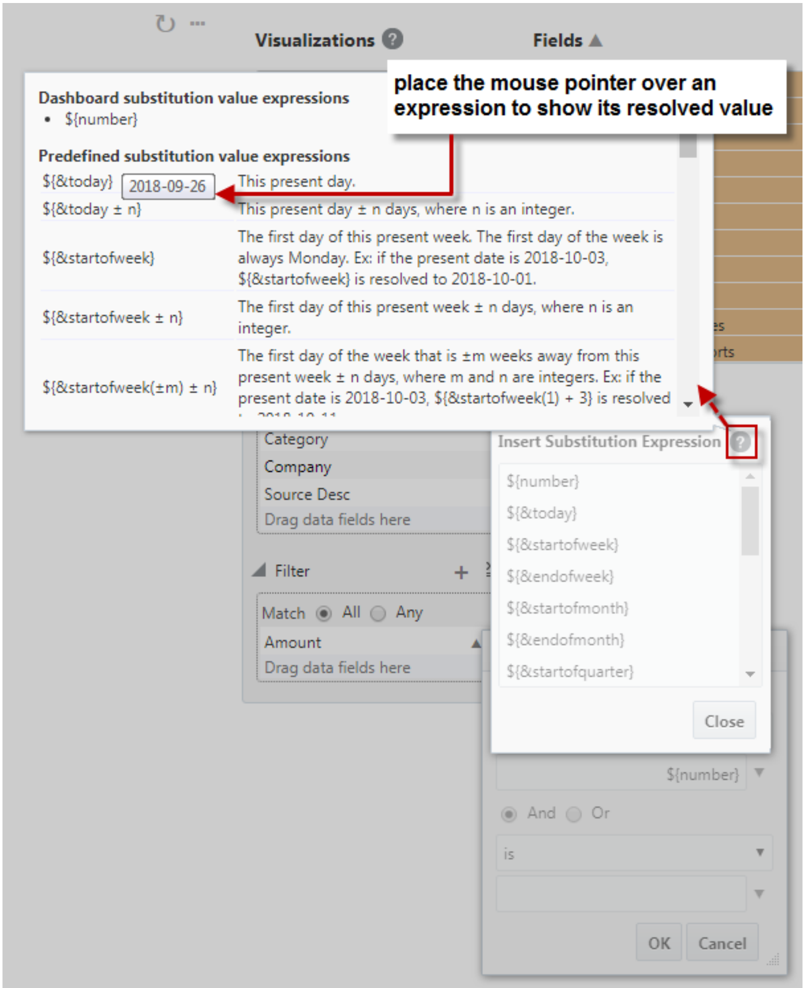


Use the Visualization Properties control’s Sort and Filter tab, as shown above, to enter substitution value expression(s) to the fields in the Filter panel. The value of a number or date criterion may contain one or more substitution value expressions (e.g. ${identifier}).

Substitution value expressions can be inserted by selecting them from the drop-down menu, as shown below.



Click on the help icon in the Insert Substitution Expression pop-up window to display all available substitution value expressions. Hovering over an expression in the help pop-up will show its resolved value.



A predefined substitution variable identifier always starts with an “&”. The following pre-defined substitution value expressions are available to use:

Predefined Substitution Value Expression	Description
${&today}	This present day.
${&today ± n}	This present day ± n days, where n is an integer.
${&startofweek}	The first day of this present week. The first day of the week is always Monday. E.g.: If the present date is 2018-10-03, ${&startofweek} is resolved to 2018-10-01.
${&startofweek ± n}	The first day of this present week ± n days, where n is an integer.
${&startofweek(±m) ± n}	The first day of the week that is ±m weeks away from this present

Predefined Substitution Value Expression	Description
	week ± n days, where m and n are integers. E.g.: If the present date is 2018-10-03, ${&startofweek(1) + 3} is resolved to 2018-10-11.
${&endofweek}	The last day of this present week. The last day of the week is always Sunday. E.g.: If the present date is 2018-10-03, ${&endofweek} is resolved to 2018-10-07.
${&endofweek ± n}	The last day of this present week ± n days, where n is an integer.
${&endofweek(±m) ± n}	The last day of the week that is ±m weeks away from this present week ± n days, where m and n are integers. E.g.: If the present date is 2018-10-03, ${&endofweek(-3) + 2} is resolved to 2018-09-18.
${&startofmonth}	The first day of this present month. E.g.: If the present date is 2018-07-20, ${&startofmonth} is resolved to 2018-07-01.
${&startofmonth ± n}	The first day of this present month ± n days, where n is an integer.
${&startofmonth(±m) ± n}	The first day of the month that is ±m months away from this present month ± n days, where m and n are integers. E.g.: If the present date is 2018-07-20, ${&startofmonth(2) + 1} is resolved to 2018-09-02.
${&endofmonth}	The last day of this present month. E.g.: If the present date is 2018-07-20, ${&endofmonth} is resolved to 2018-07-31.
${&endofmonth ± n}	The last day of this present month ± n days, where n is an integer.
${&endofmonth(±m) ± n}	The last day of the month that is ±m months away from this present month ± n days, where m and n are integers. E.g.: If the present date is 2018-07-20, ${&endofmonth(-2) - 1} is resolved to 2018-05-30.
${&startofquarter}	The first day of this present quarter. E.g.: If the present date is 2018-09-20, ${&startofquarter} is resolved to 2018-07-01.
${&startofquarter ± n}	The first day of this present quarter ± n days, where n is an integer.
${&startofquarter(±m) ± n}	The first day of the quarter that is ±m quarters away from this present quarter ± n days, where m and n are integers. E.g.: If the present date is 2018-09-20, ${&startofquarter(1) + 1} is resolved to 2018-10-02.
${&endofquarter}	The last day of this present quarter. E.g.: If the present date is 2018-09-20, ${&endofquarter} is resolved to 2018-09-30.
${&endofquarter ± n}	The last day of this present quarter ± n days, where n is an integer.
${&endofquarter(±m) ± n}	The last day of the quarter that is ±m quarters away from this present quarter ± n days, where m and n are integers. Eg.: If the present date is 2018-09-20, ${&endofquarter(1) - 1} is resolved to 2018-12-30.
${&startofyear}	The first day of this present year. E.g.: If the present date is 2018-09-20, ${&startofyear} is resolved to 2018-01-01.

Predefined Substitution Value Expression	Description
${&startofyear ± n}	The first day of this present year ± n days, where n is an integer.
${&startofyear(±m) ± n}	The first day of the year that is ±m years away from this present year ± n days, where m and n are integers. E.g.: If the present date is 2018-09-20, ${&startofyear(10) + 1} is resolved to 2028-01-02.
${&endofyear}	The last day of this present year. E.g.: If the present date is 2018-09-20, ${&endofyear} is resolved to 2018-12-31.
${&endofyear ± n}	The last day of this present year ± n days, where n is an integer.
${&endofyear(±m) ± n}	The last day of the year that is ±m years away from this present year ± n days, where m and n are integers. E.g.: If the present date is 2018-09-20, ${&endofyear(-10) - 1} is resolved to 2008-12-30.
${&userloginname}	Login name of the current user.
${&userdisplayname}	Display name of the current user.
${&glcompanycode}	Default GL company code.
${&gldepartmentcode}	Default GL department code.
${&projectoraseq}	Current project oraseq.
${&partnertypecode}	Partner type code of the current user.
${&partnercode}	Partner or company code of the current user.
${&contactcode}	Contact code of the current user.

NOTE: A visualization filter criterion is removed from the query when any of the following conditions occur:

- Criterion value contains a substitution variable identifier that does not exist.
- Criterion value is resolved to null or blank.
- For number criteria, criterion value cannot be resolved to a number.
- For date criteria, criterion value cannot be resolved to a date.

For more details about the Sort and Filter tab, please refer to the following section: *Sort and Filter – Tab*.

Reset Position of Visuals – Menu Option

This option is available if the "Layout" option is set to "Fixed". It is used to rearrange the visualizations to their default positions, which is stacked on each other in a cascading manner.

Get Link – Menu Option

This option launches a pop-up which displays the URL for the dashboard, which can be right-clicked and copied using the context menu that appears.

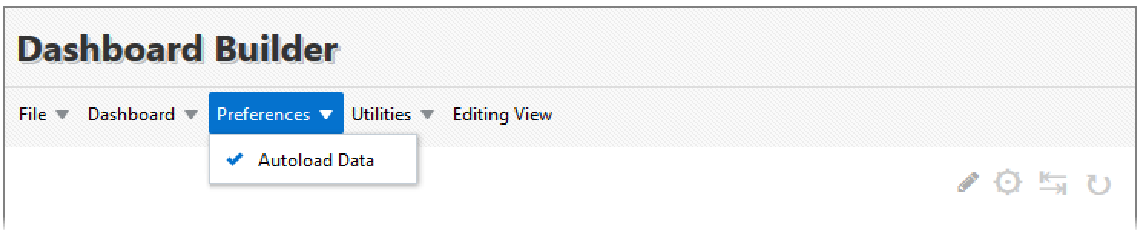
Discard Changes – Menu Option

This option launches a pop-up which prompts the user to confirm the discarding of all unsaved changes. Click [**OK**] to revert the dashboard back to the way it was before the unsaved changes.

Delete – Menu Option

This option launches a pop-up which prompts the user to confirm the deletion of current dashboard. Click [**OK**] to permanently delete it.

Preferences – Menu



Preferences drop-down menu

Autoload Data

The Autoload Data checkbox is intended for dashboard developers, to allow them to build dashboards faster, without waiting for data to load while building. This checkbox is a user setting of the Dashboard Builder tool and is not an attribute of a dashboard. The checkbox will stay checked or unchecked for each user (as it's the user's setting) and will apply to all dashboards (as it's the tool's setting).

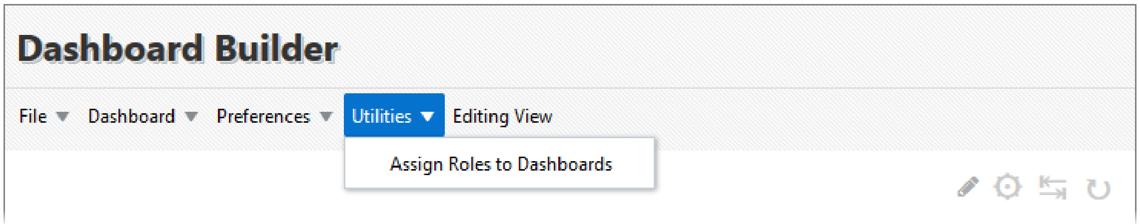
When launching a dashboard via URL, the data will always be loaded.

NOTE: An option does not exist to turn autoload data on or off when a dashboard is launched via URL.

By default, this checkbox is checked for the user. If checked, when a dashboard is loaded, data is automatically loaded for all visualizations. Otherwise, when a dashboard is loaded, visualizations will not be loaded with data, and to do so requires clicking the Refresh icon ( ). This is handy when building a dashboard, and you wish for it to load quickly.

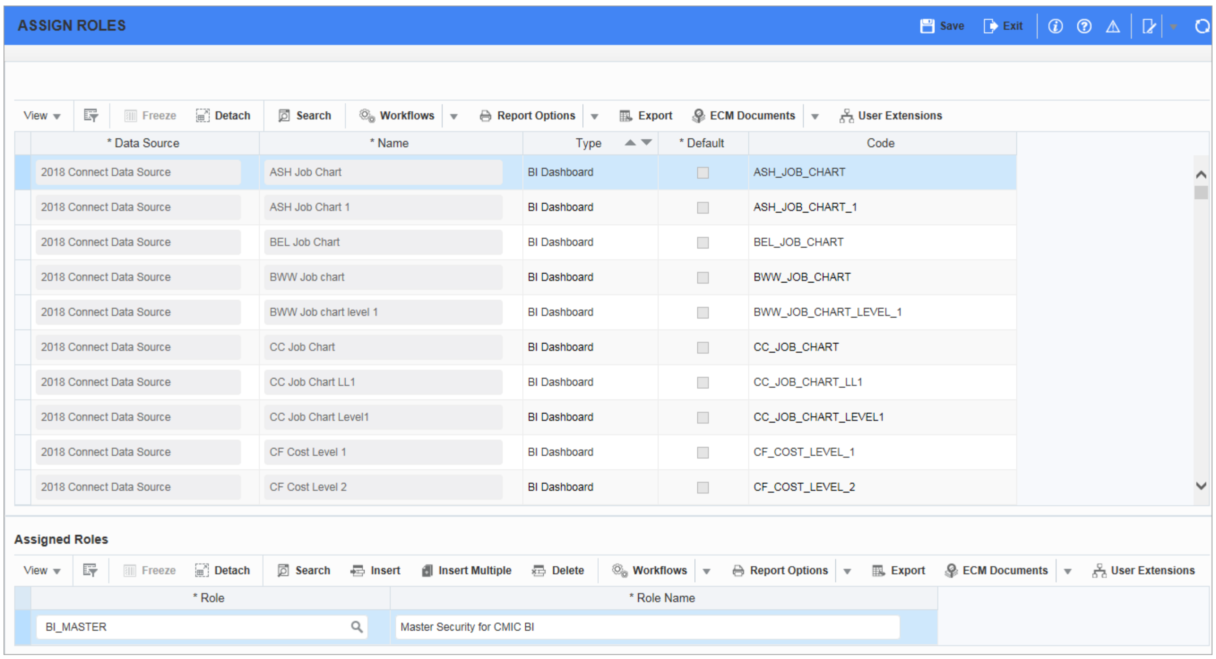
NOTE: When "Autoload Data" is unchecked in the drop-down menu, the "Create User-Defined Log…" menu option is disabled in the Visualization Menu. This prevents user-defined logs from being created for inefficient queries (i.e. when the table query is timed out).

Utilities – Menu



Utilities drop-down menu

Assign Roles to Dashboards – Dashboard Security



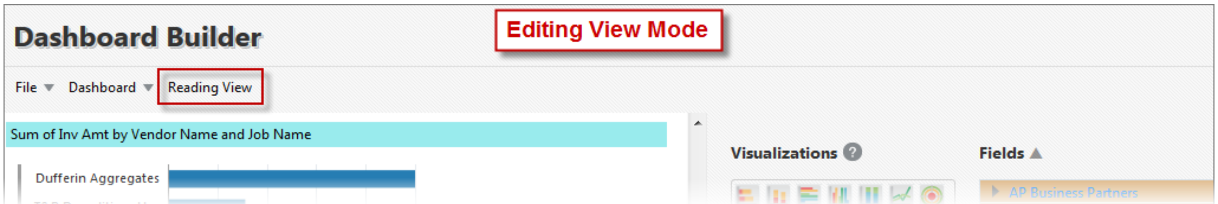
Assigning security roles to dashboards

To grant a user access to a dashboard, the security role to which the user belongs must be assigned to the dashboard. This can be done using the "Assign Roles to Dashboard" option under the Utilities menu of BI Dashboard Builder (shown above), by an administrator with the BISECMNG system privilege. This option is available without opening a dashboard. Depending on security setup, the administrator's security role may also need to be assigned to the Assign Roles to Dashboards program. For more details, refer to *Security Setup & Rules – Catalog & Dashboard Security* in this guide.

NOTE: A link to launch the Assign Roles to Dashboards utility can be added as a new Console tab using the Console tool, or to a Treeview using the Treeview Builder tool. The Target for this utility, which is required by the tools to create a link to the utility, is "SD - Assign Roles to BI Dashboards".

For details about dashboard security, please refer to the following section, *Security Setup & Rules – Data Source & Dashboard Security*.

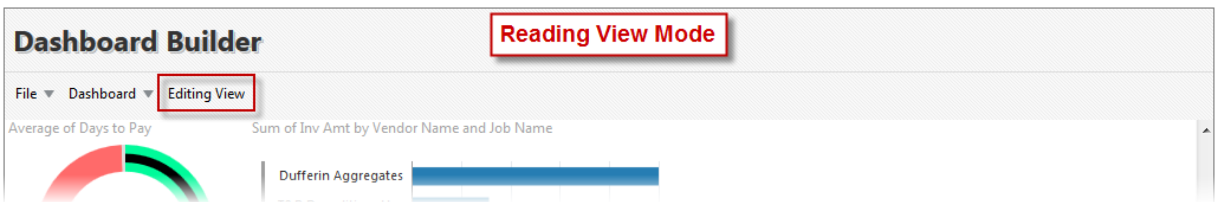
[**Reading View**] – Button



If the [**Reading View**] button is visible, the screen is in Editing View mode, as shown above, and the Visualizations and Fields panes are available to create and edit visualizations.

Click the [**Reading View**] button to switch the screen to Reading View mode, which displays the dashboard as it would be displayed to end-users, for review and testing purposes.

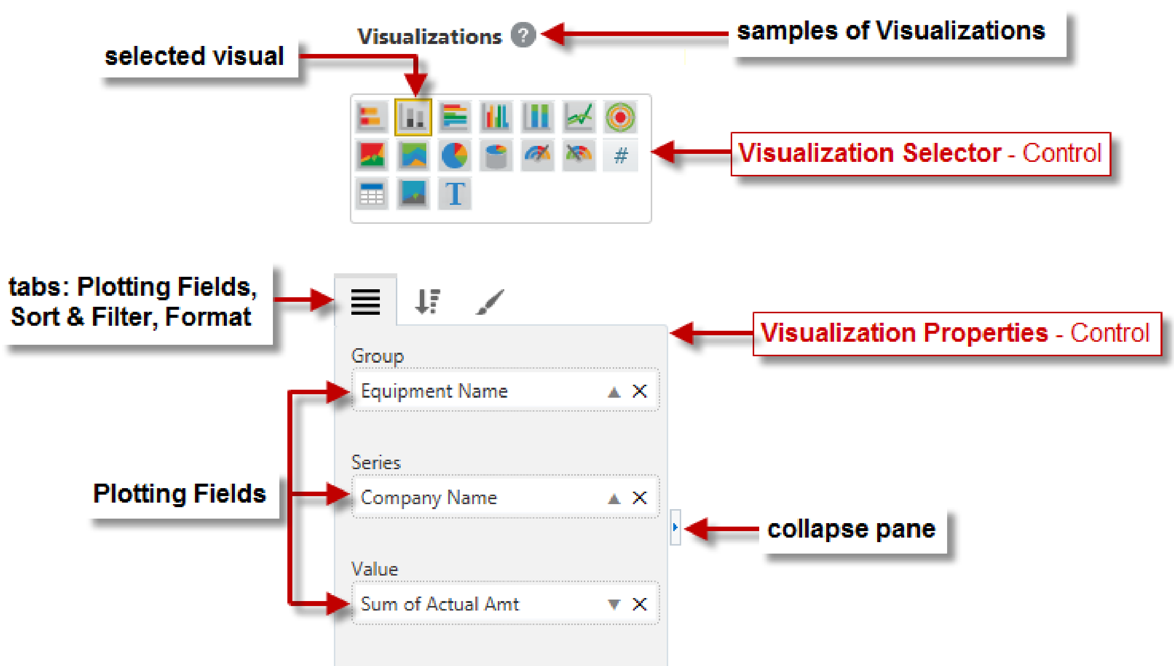
[**Editing View**] – Button



If the [**Editing View**] button is visible, the screen is in Reading View mode, as shown above, and the Visualizations and Fields panes are not available. In Reading View mode, the dashboard is displayed as it would be to end-users for review and testing purposes.

Click the [**Editing View**] button to switch the screen to Editing View mode, which is used to create and edit visualizations.

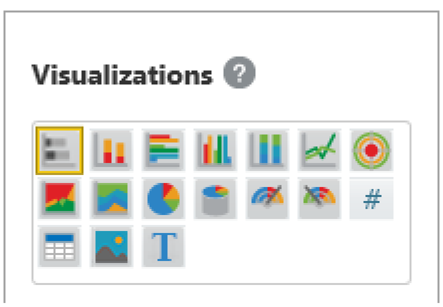
Visualizations – Pane



The Visualizations Pane is only available when the screen is in Editing View mode, and its Visualization Properties control is only visible if a visualization has been selected in the dashboard canvas.

This pane is used to create and configure the dashboard's visualizations, using its Visualizations Selector and its Visualization Properties controls.

Visualizations Selector – Control



The Visualizations Selector contains visualization icons that are clicked to add a new visualization to the dashboard, or clicked to change a selected visualization on the dashboard canvas to the clicked one.

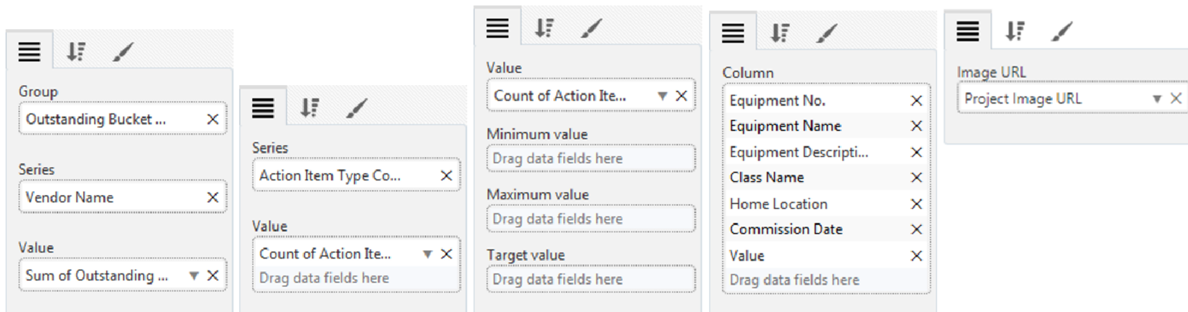
If a visualization is selected on the dashboard canvas, its corresponding visualization icon in the Visualizations Selector is grayed out and its outline is highlighted.

The Help Icon ( ) can be clicked to view the Visualization Catalog, which contains graphical samples of the visualizations, in a new browser tab.

Visualization Properties – Control

This section provides an overview of the Visualization Properties control, which is comprised of the following three tabs: Plotting Fields, Sort and Filter, and Format.

Plotting Fields *– Tab*

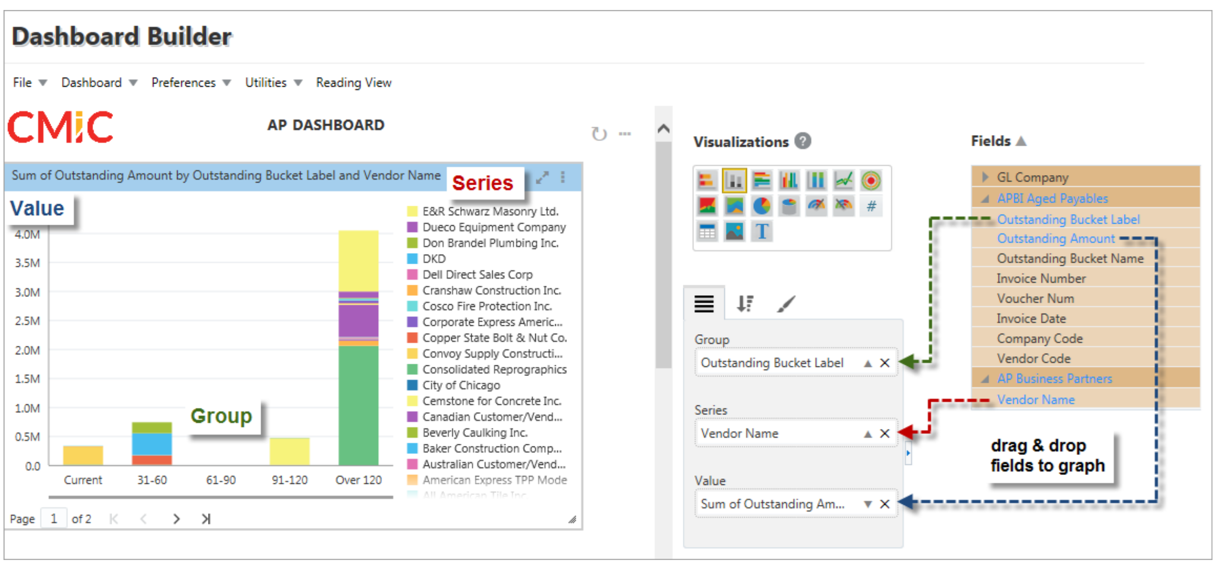


Bar, Column, Line & Area Charts *Pie Charts* *Gauges* *Tables* *Images, Text*

As shown above and explained below, the Plotting Fields tab differs between visualization types:

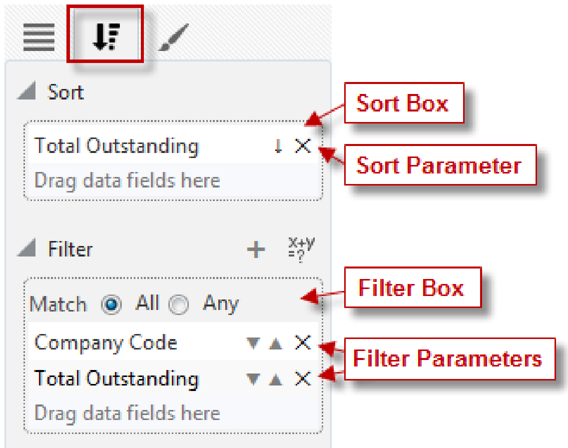
- **Charts**: Used to set which fields from the data source get graphed.
- **Gauges**: Used to set what field's aggregate value is displayed; and optionally, what fields' aggregate values are used to set the gauge's minimum, maximum and target values.
- **Tables**: Used to set what fields are to be its columns.
- **Images/Text**: Used to set which field is used to display an image or text.

As shown in the Stacked Column Chart example below, to set what fields get graphed, drag and drop them from the Fields pane into the relevant plotting fields in the Visualizations pane:



For details about the plotting fields of each visualization type, please refer to the relevant subsection under the following section, *Visualizations*.

Sort and Filter *– Tab*



The Sort and Filter tab is used to sort and filter the data displayed by the visualization. The following sections provide details about the Sort and Filter parameters.

Sort

To sort the items of a Group, Series or Column plotting field, drag the field by which to sort the items into the Sort box. If a single folder is used to create the visualization, only fields within it can be used for sorting; and if joined folders are used to create the visualization, only fields in the returned rows can be used for sorting.

By default, the sort method used is ascending, as indicated by the up-arrow icon (↑). Click the arrow to change the sort method to descending, which is identified by the down-arrow icon (↓).

More than one sort parameter can be specified, in which case data is first sorted by the first sort parameter, then by the second one and so forth.

To delete a sort parameter, click its corresponding Delete icon (✕).

Filter

This parameter is used to create a filter expression, comprised of comparison operators and values to compare against, to perform two types of filtering:

- Data Filter

  Filter rows (data) used to create visualization (i.e., filter rows in folder or filter returned rows of joined folders).

- Group/Series Filter

  Filter groups along groups axis, if <u>only</u> the Group plotting field is specified, or filter series in visualization, if the Series plotting field is specified.

A filter expression can be a simple filter expression (e.g., “Invoice Amount is not blank”) or a composite filter expression that is comprised of two or more simple filter expressions joined by the “And” or “Or” conjunction (e.g., “Invoice Amount is not ‘0’ And PO Number is not blank”).

The following are the steps to create a simple filter expression, which are repeated to create a composite filter expression.

Create Simple Filter Expression:

1. Drag and drop the field to filter against from the Fields pane into the Filter box.

2. **Group/Series Filter Type:** If and only if this simple filter expression is to be of the Group/Series Filter type, instead of the Data Filter type, click the down-arrow icon (▼) to select the relevant aggregate function; otherwise, skip this step.

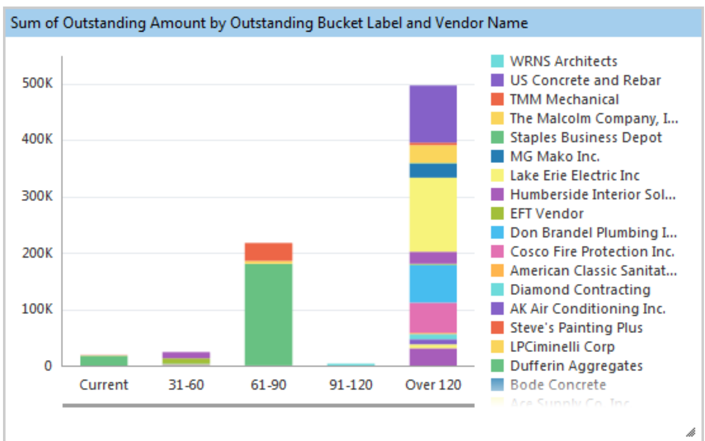
   The selected aggregate function is applied to the field dragged into the Filter box, and its result is used to filter the groups if only the Group plotting field is specified, or series, if the Series plotting field is specified.

   If Groups are being filtered: the calculated aggregate value for each group is compared to the value that will be specified using the ▲ icon in step 3, and if a group's value does not meet the criteria, it will not appear in the visualization.

   If Series are being filtered: the calculated aggregate value for each series is compared to the value that is to be specified using the ▲ icon in step 3, and if a series' value does not meet the criteria, it will not appear in the visualization.

   Example:

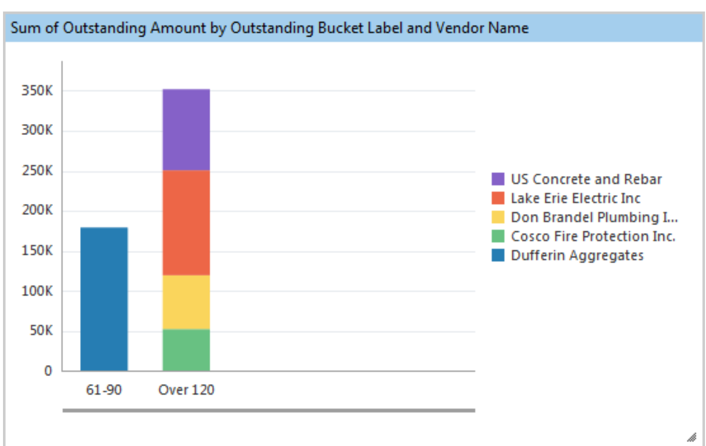
   For the following Stacked Column Chart, each Group's aggregate value is broken down into aggregate values for each Series (vendor).



   If the following simple filter expression of the Group/Series Filter type is used:

   "**Sum of Outstanding Amount is greater than 50 000**"

   Then all series with a sum equal to or less than 50 000 will not be included in the chart, as shown below:

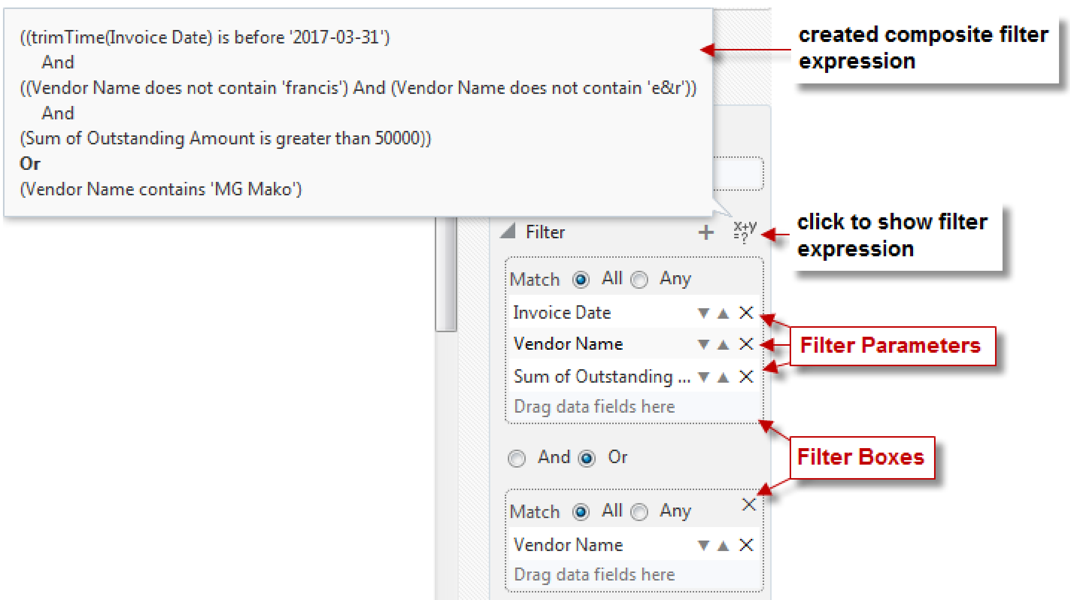


3. To create the simple filter expression, click the up-arrow icon (▲) to specify the comparison operator and the actual value to compare against the dragged-in field.

   For filters of the Data Filter type, the comparison operators available depend on the data type of the dragged-in field. For instance, if the dragged-in field is of the date type, the following notable comparison operators are available in the pop-up launched by clicking the filter parameter's up-arrow (▲): is after, is on or after, is before, is on or before; and a time may be specified for the entered date by unchecking the 'Ignore Time' checkbox in the pop-up.

   For filters of the Group/Series type, the comparison operators available depend on the aggregate function's type.

Create Composite Filter Expression:



When creating composite filter expressions, the brackets matter in its evaluation. The following are details about how brackets are applied:

- each new simple filter expression is encapsulated by brackets
- filter parameters can have up to two simple filter expressions, (created in ▲ icon's pop-up), and they are encapsulated by brackets
- filter parameters within each filter box are encapsulated by brackets, as shown in above screenshot

NOTE: Bolded conjunctions indicate that they are between expressions in filter boxes.

To view the created filter expression, click the x+y =? icon. If no expression is shown, one has not been fully completed.

I. To create a composite filter expression, after creating a simple filter expression, either:

   - drag and drop the field to use for the next simple filter expression into a Filter box, which automatically joins the new expression to the previous one in the box, if there was one, using the conjunction selected for the Filter box

   OR

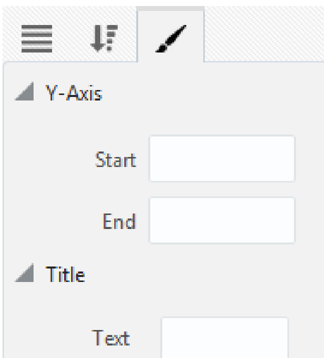
- click a previously specified filter parameter's icon to add another simple filter expression in its pop-up, and use the 'And' or 'Or' radio button to select the conjunction with which to join them

OR

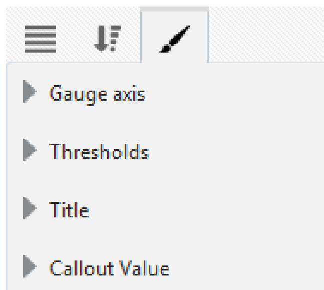
- click the add icon () to add another filter box, then drag in the field to use for its simple filter expression, and use the 'And' or 'Or' radio button to select the conjunction with which to join the new expression to the one of the previous filter box

II. Continue creating the simple filter expression as explained by the second or third step of the preceding *Create Simple Filter Expression* steps.

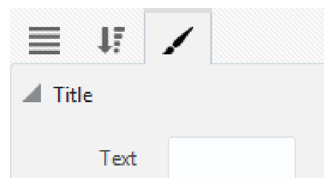
Format *– Tab*



Bar, Column, Line & Area Charts



Gauges

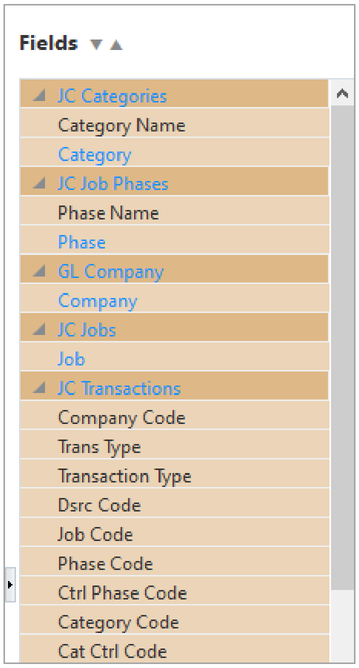


Pie Charts, Tables, Images, Text

As shown above, the Format tab also differs between visualizations. It is used to format the visualization and to provide a title for it, which is displayed along the visualization's header.

For details about this tab for each visualization type, please refer to the relevant subsection under *Visualizations*.

Fields – Pane

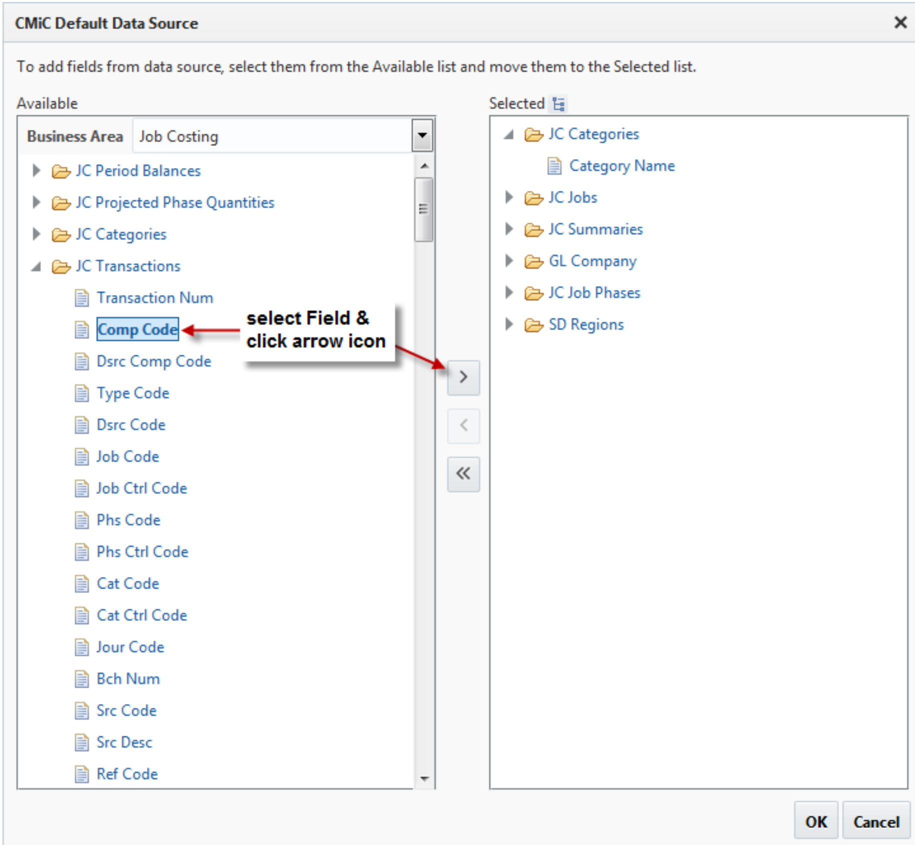


This pane needs to contain all the folders and fields required for a visualization or a page filter ("Insert Filter" option under Dashboard drop-down menu).

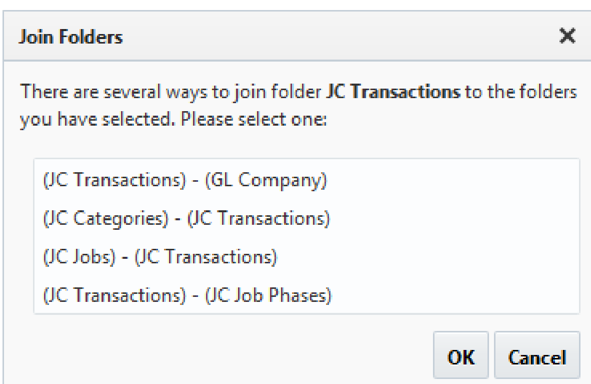
NOTE: If no business areas and fields are shown and the up and down arrows (▼ ▲) are not visible, no visualization is selected on the dashboard canvas.

To add fields to a visualization or a page filter, select it on the dashboard canvas and click the up-arrow (▲) in the Fields pane.

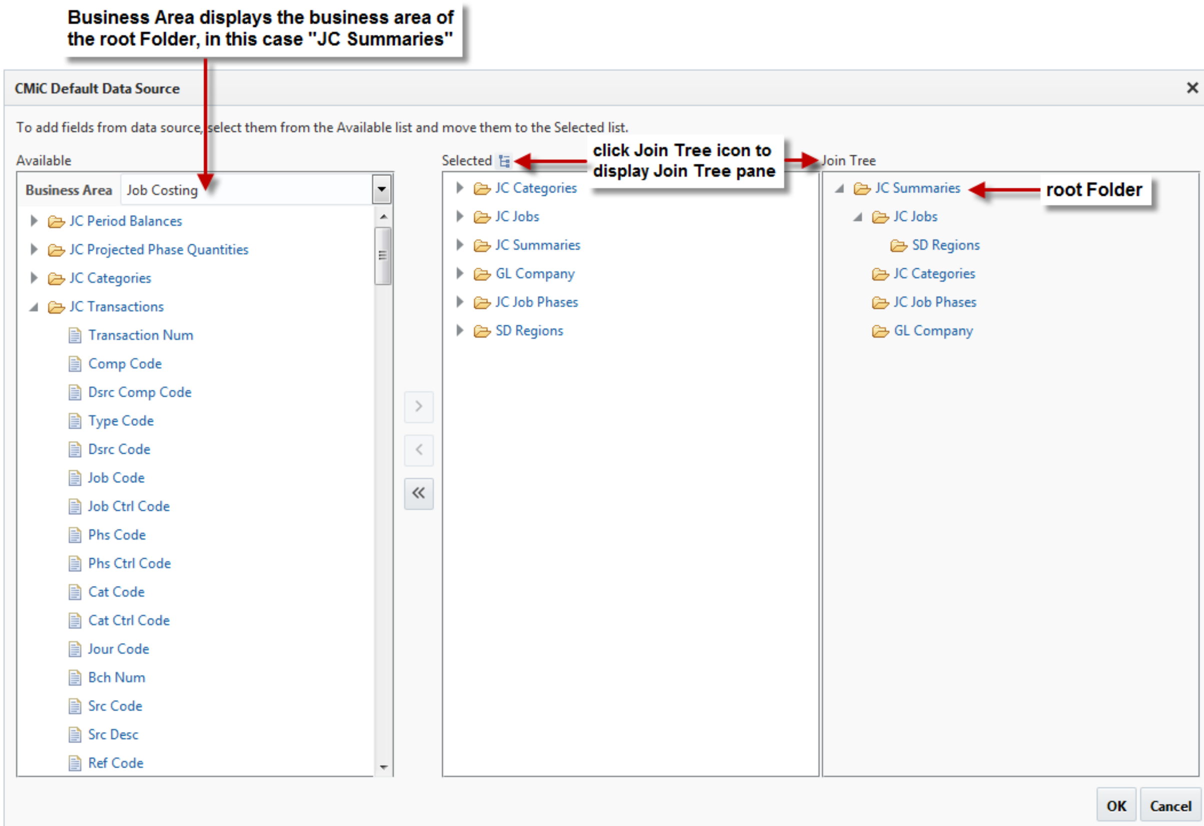
In the launched pop-up window (shown below), select a field to add in the Available pane, then click the single arrow (shown below) to move it to the Selected pane, which adds the field and its folder to the visualization.



When a field is added to the Selected pane, if its folder has joins to more than one of the folders already selected (joins specified via BI Catalog Builder tool), a pop-up is displayed to select to which folder it is to be joined, as shown below:



Join Tree

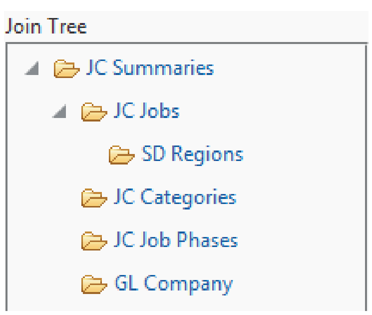


To view how the selected folders are joined, click the Join Tree icon ( ) to display the Join Tree pane.

The top-most folder is the root folder, and if it is removed from the Selected pane, all other folders will also be removed from the Selected pane.

By default, the Business Area displays the business area of the root folder.

Using the following Join Tree as an example, Join Trees show how the selected folders are joined as follows:



- top-most (root) folder (JC Summaries) is joined to all sub-folders, but not to their sub-folders, e.g., JC Summaries is joined to JC Jobs, JC Categories, JC Job Phases, and GL Company
- sub-folders are joined to their sub-folders, e.g., JC Jobs is joined to SD Regions

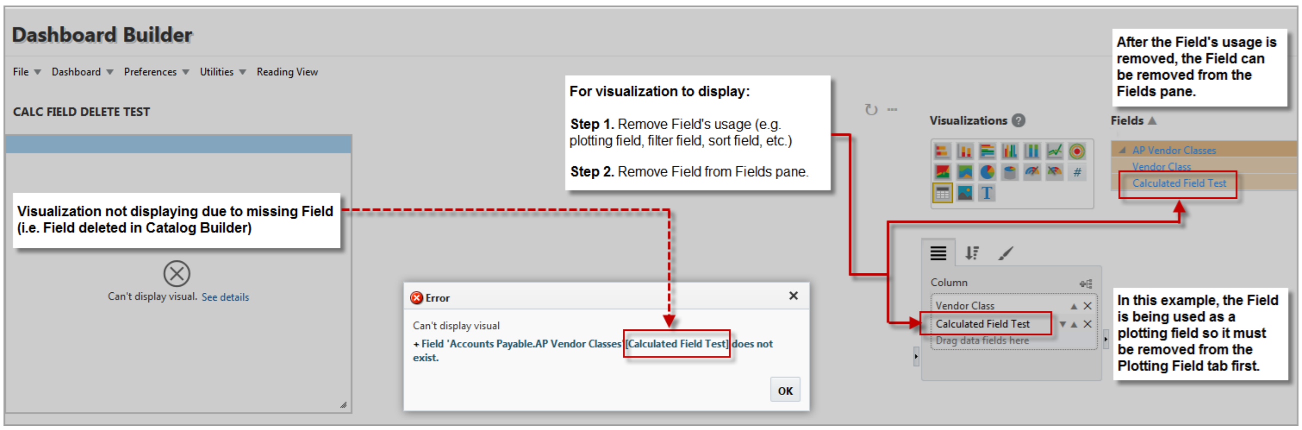
Removing Fields

When a field is deleted in BI Catalog Builder, visualizations in BI Dashboard Builder currently using the deleted field will no longer display properly.

For the visualization to display properly, the missing field needs to be removed from the Fields pane. In order to be able to remove a field from the Fields pane, the field must not be used. If the field is being used as a plotting field, filter field, sort field, etc., the user will be prompted to remove its usages first.

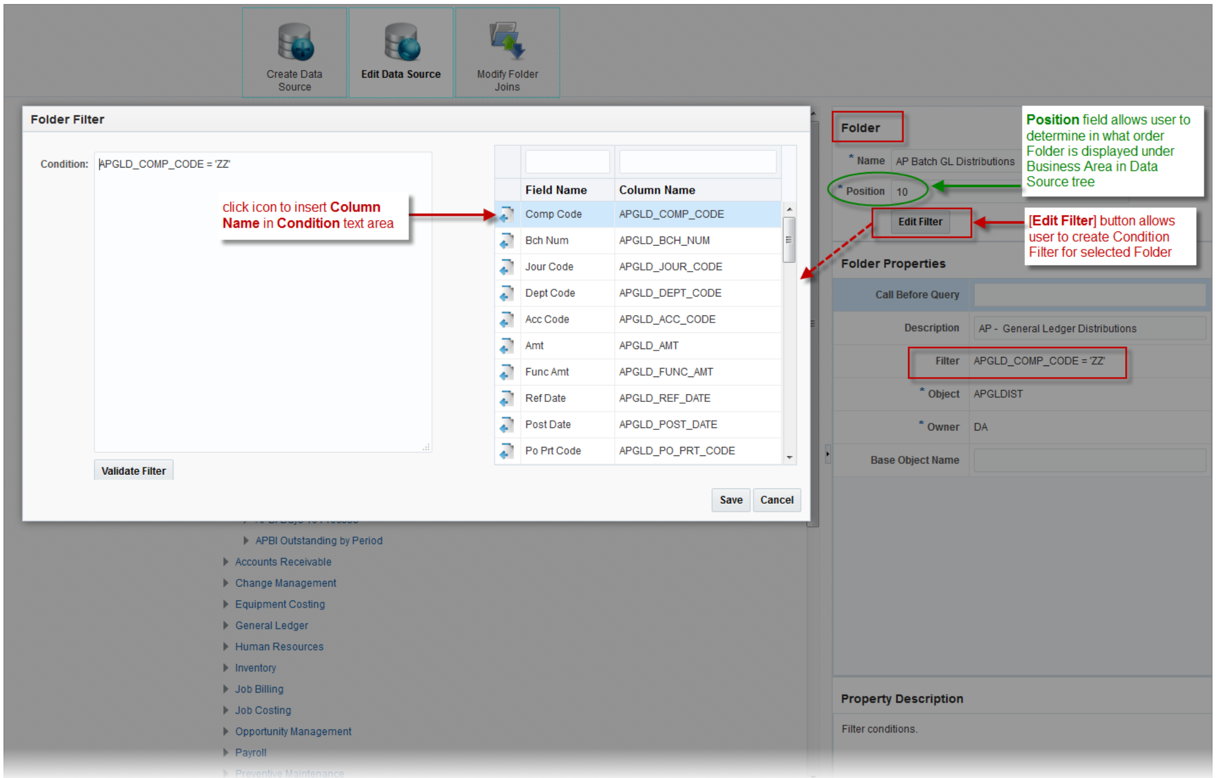
NOTE: A field is being used if its font is blue in the Fields pane; otherwise, an unused field's font is black.

The screenshot below shows an example of a visualization not displaying properly because a field being used as a plotting field has been deleted. For the visualization to display properly, the user needs to remove the missing field's usage first, in this case on the Plotting Fields tab, and then remove the field from the Fields pane.



Example of removing a field from a visualization's Fields pane

Editing Data Sources, Business Areas, Folders and Fields in Catalog Builder



Example of editing a folder in Catalog Builder by specifying position of folder node inside branch and applying a filter condition

The order in which business areas, folders and fields are displayed in a data source tree is determined in Catalog Builder. In the Property Pane section for each of these items, there is a property called Position which sets the position of the item's node inside a data source branch. The Position property is editable, allowing the user to change the position of a node to control the order in which business areas are displayed in a data source, folders are displayed in a business area, and fields are displayed in a folder.

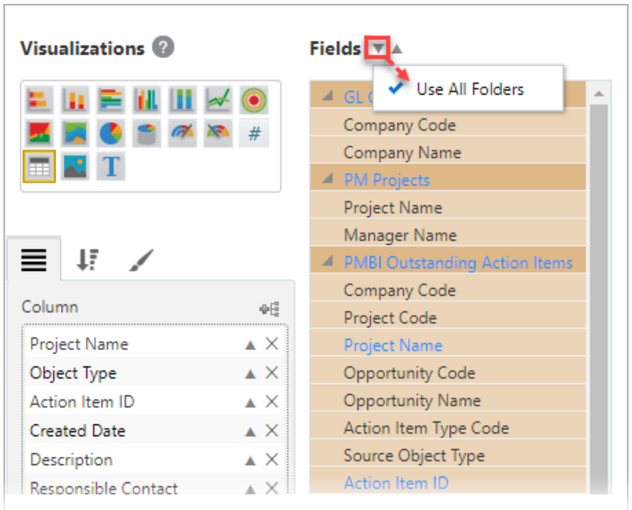
In addition, users can specify filter conditions to restrict the number of records returned by a folder using the [**Edit Filter**] button. This feature is available to Enterprise and Cloud Catalog Builder clients only, and users must have the system privilege BICFDRFLTR to use it; otherwise, the button will be hidden.

The application that performs the actual restriction is Dashboard Builder.

For example, the screenshot above shows an example of the folder "AP Batch GL Distributions" in Catalog Builder, in which the position of the folder node inside the business area (Accounts Payable) is specified as "10" and a filter condition has been specified for the folder so that it will only return records when its "Comp Code" is "ZZ".

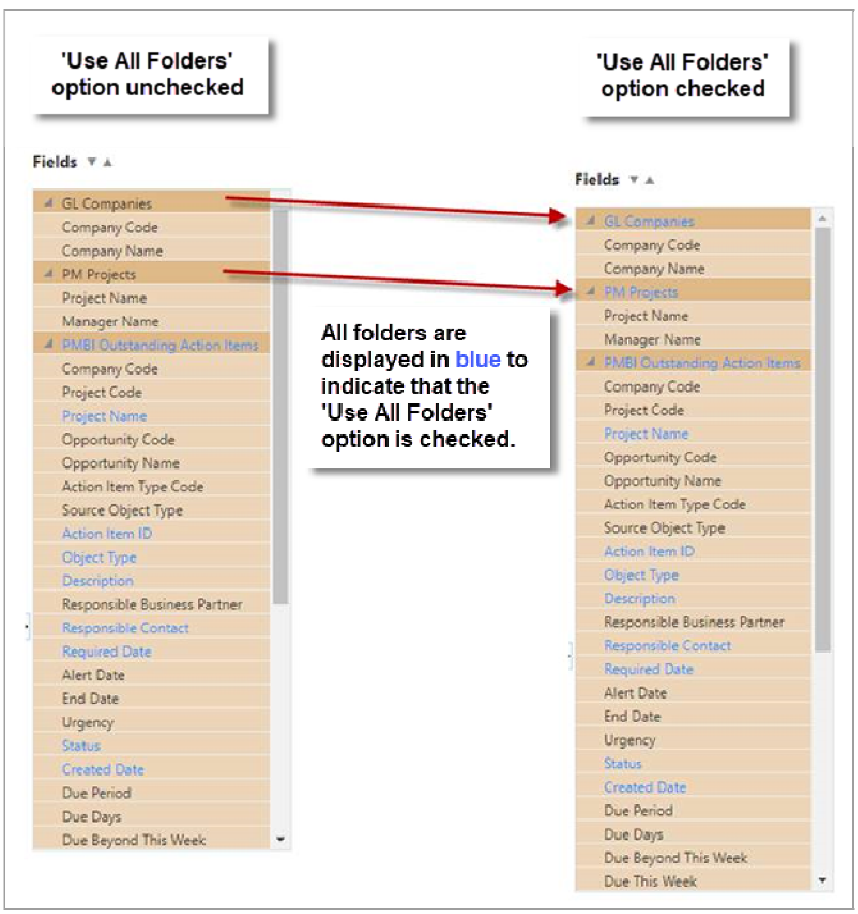
For more information, please refer to the BI Catalog Builder guide.

Use All Folders



When checked, this option allows dashboard developers to specify that all selected folders must always be used to query for data. All folders will be displayed in blue to indicate that the option has been checked, as shown in the screenshot below.

NOTE: This option is not available at runtime.



When this box is unchecked, if a folder is selected but its fields are not used in a visualization (or all its fields are removed by end users at runtime), then this folder will not be used in the query, potentially resulting in a different data set.

In some cases, dashboard developers may need their visualizations to always use all selected folders, even if no fields are actually used.

An example of such a case would be for JC Jobs security. The JC Jobs folder includes job security functionality. This folder will only return jobs that the current user has access to, while other folders may return all data regardless of job security.

In order to apply job security to other folders in the visualizations, dashboard developers need to include the JC Jobs folder and have the ‘Use All Folders’ box checked. This way, the JC Jobs folder will always be included in the query, limiting the data being displayed to only those jobs to which the current user has access. If the ‘Use All Folders’ box is unchecked, the JC Jobs folder won’t be used if its fields are not used in the visualization or if end users remove its fields at runtime.

Visualizations

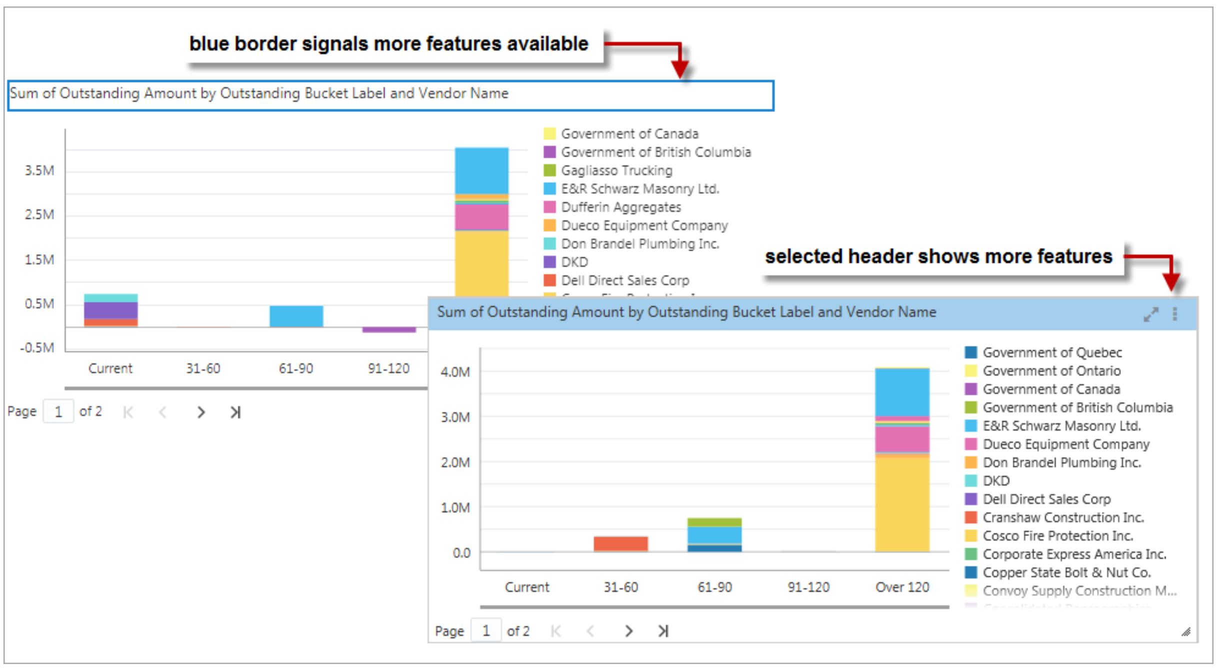
Add, Edit, Delete, Reposition

Add Visualization

To add a visualization, select the desired visualization from the Visualization Selector, which creates an instance of the visualization on the dashboard canvas.

Edit Visualization

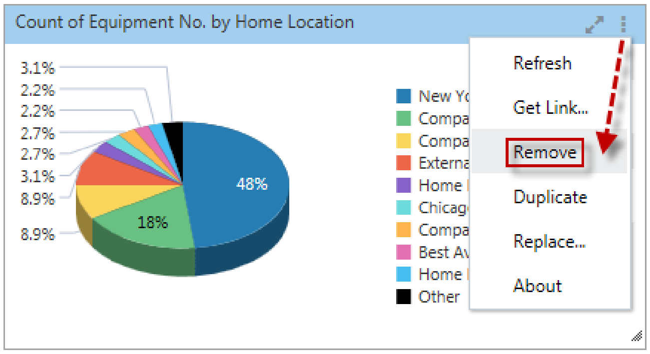
To edit a visualization, select it on the dashboard canvas by clicking its header, then use the Visualizations and Fields panes to edit it. Hovering the mouse over an unselected visualization in dashboard mode causes the header border to be highlighted in blue to indicate that the user can click the header to reveal more features.



NOTE: The Visualizations and Fields panes only have controls visible if a visualization is selected on the canvas.

Delete Visualization

To delete a visualization, first select it by clicking its header, then open the Visualization Menu by clicking on the Ellipsis icon ( ) and select “Remove” from the drop-down menu.

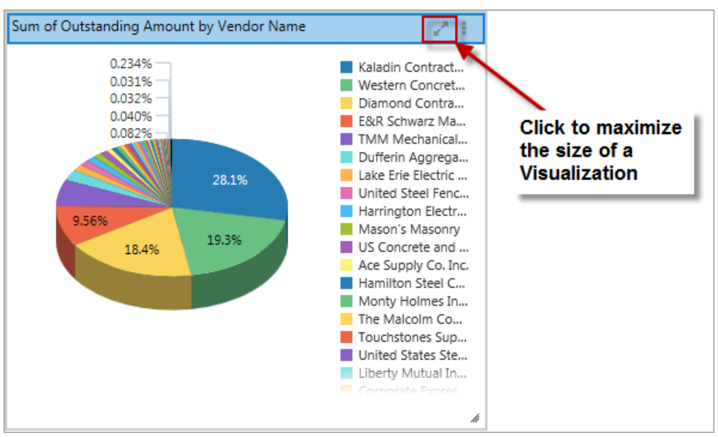


Reposition Visualization

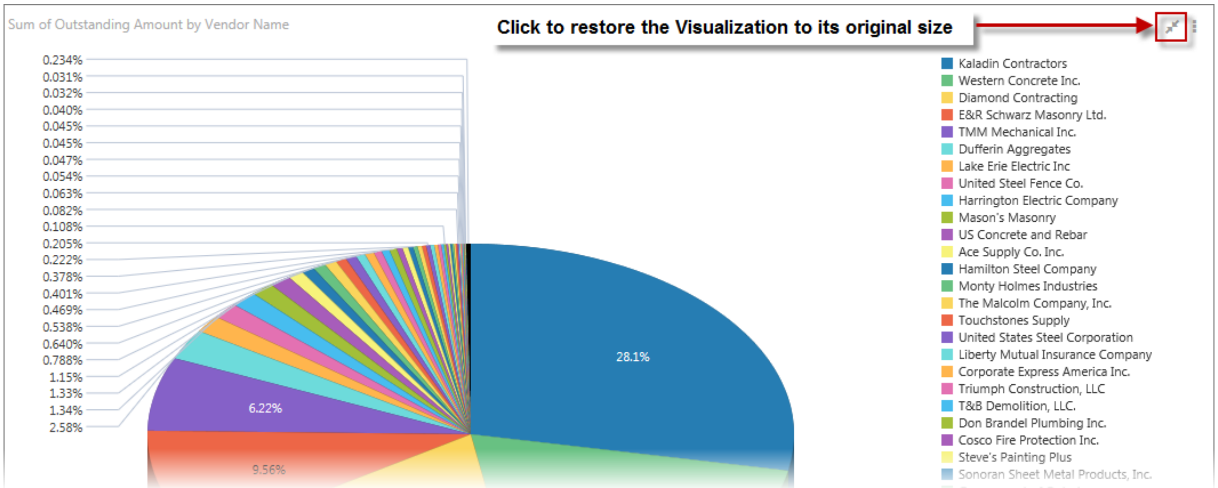
If the Layout option is set to “Flow” in the Dashboard drop-down menu, to reposition a visualization, click and hold its header, then drag and drop it over the visualization that is in the desired position, causing that visualization to be shifted to the right.

If the Layout option is set to “Fixed” in the Dashboard drop-down menu, to reposition a visualization, click and hold its header, then drag and drop it to the desired position. If it is dropped on another visualization, it will be stacked on it.

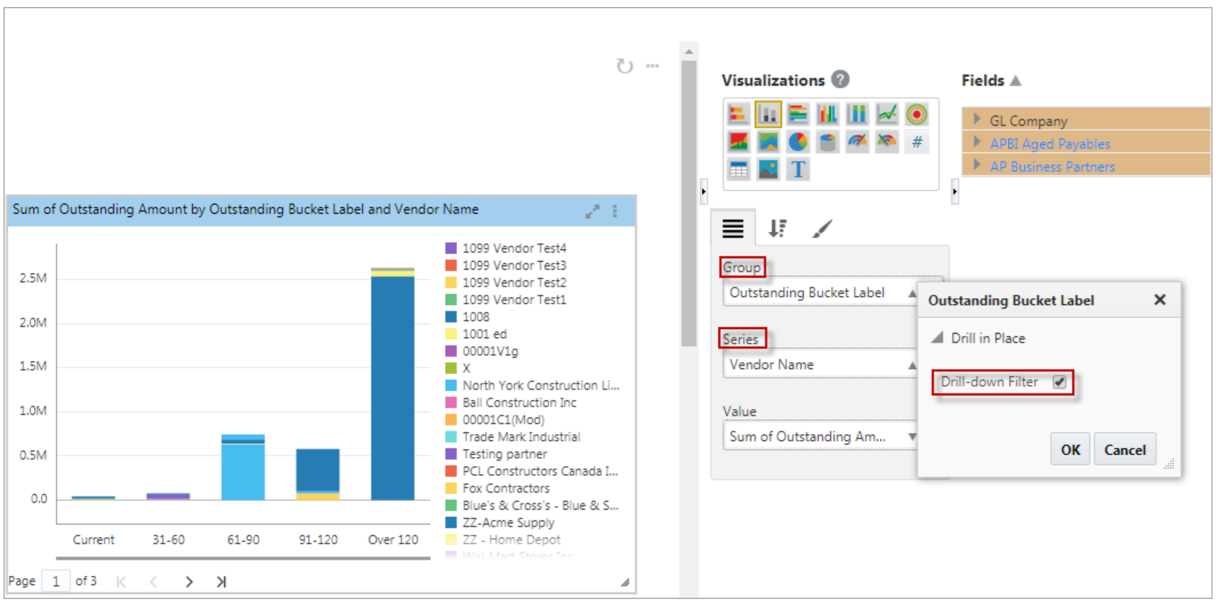
Maximize and Restore



All visualizations can be enlarged or reduced using the Maximize and Restore function. When a visualization is maximized, the Visualization Menu (Ellipsis icon) continues to be accessible.



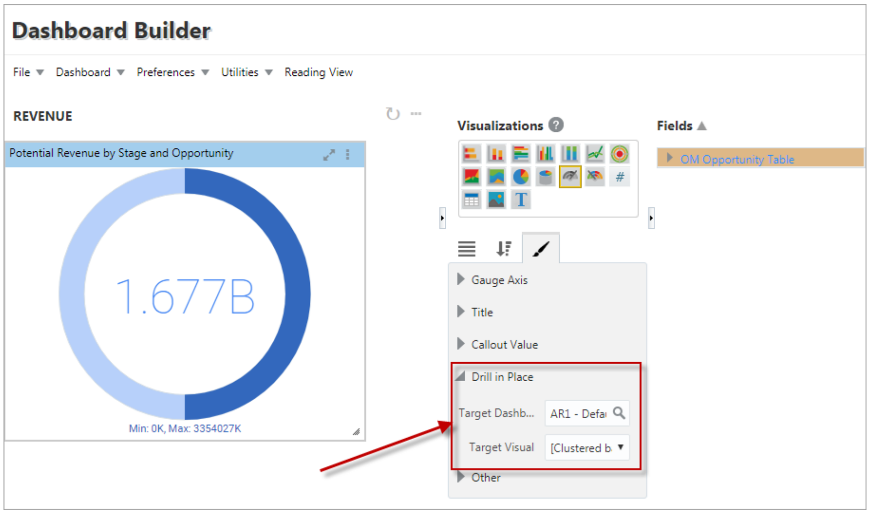
Drill in Place



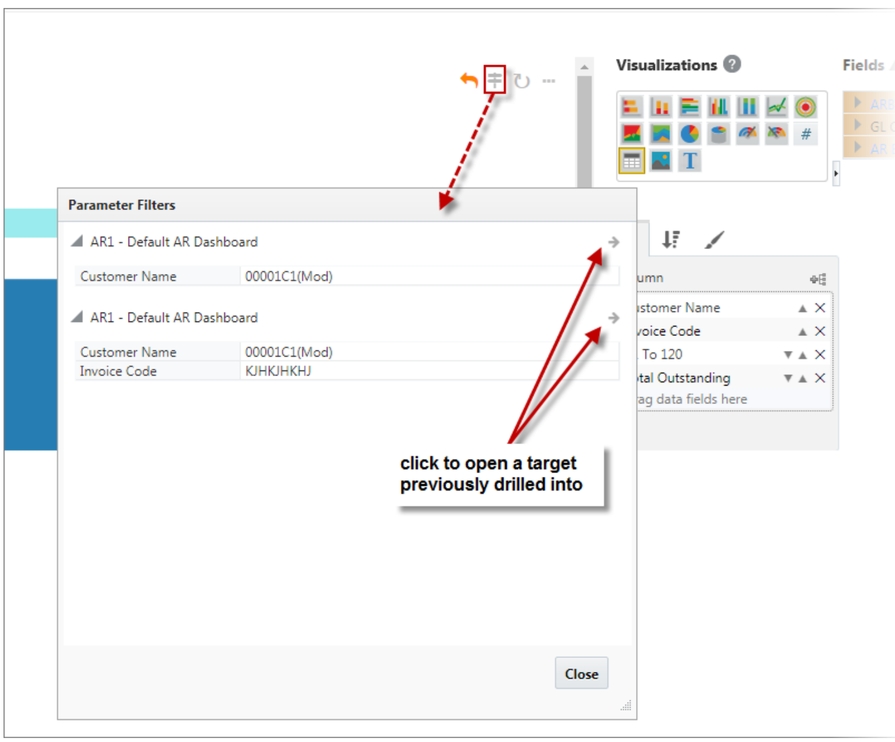
The Drill in Place feature is enabled by default for all visualizations, except for tables and gauges.

NOTE: For more information on the Drill in Place feature for table visualizations, please refer to the subsection on *Tables (Part 1: Plotting Fields)* in this guide.

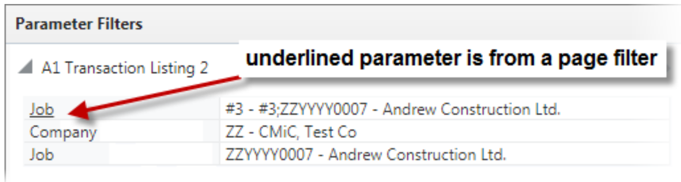
Drill in Place is enabled when a Group or a Series is marked as a drill-down filter, as shown in the screenshot of the chart visualization above, or the visualization has a Drill in Place target (to a dashboard or a specific visual on a dashboard), as shown on the screenshot of the gauge visualization below.



When Drill in Place is enabled, the chart becomes clickable. When the chart is clicked, the user is taken to the Drill in Place target defined for the visualization. When the visualization does not have a Drill in Place target defined, the current dashboard is the default target. Each Group value or Series value marked as a drill-down filter is sent to the target as a parameter filter. If page filters exist, all page filter values are also sent to the target dashboard.



The Parameter Filter pop-up window, launched from the Parameter Filter icon ( ), displays a history of viewed Drill in Place visualizations. It lists all parameter filters for the entire dashboard. A parameter filter is a field-value list pair in this pop-up window. All parameter filters on this pop-up window are active and the operator between these parameter filters is “and”. Click on the arrow icon to open a target previously drilled into. An underlined parameter is from a page filter. A page filter may contain multiple values, separated by a semi-colon (;). The operator between a page filter value is “or”.



To set what visualizations get filtered by a parameter filter, add the folder of the parameter filter's field to all visualizations that are to be filtered by it. Note, the filter's field does not need to be added to the visualizations, only its folder, even if the folder is not used by the visualization.

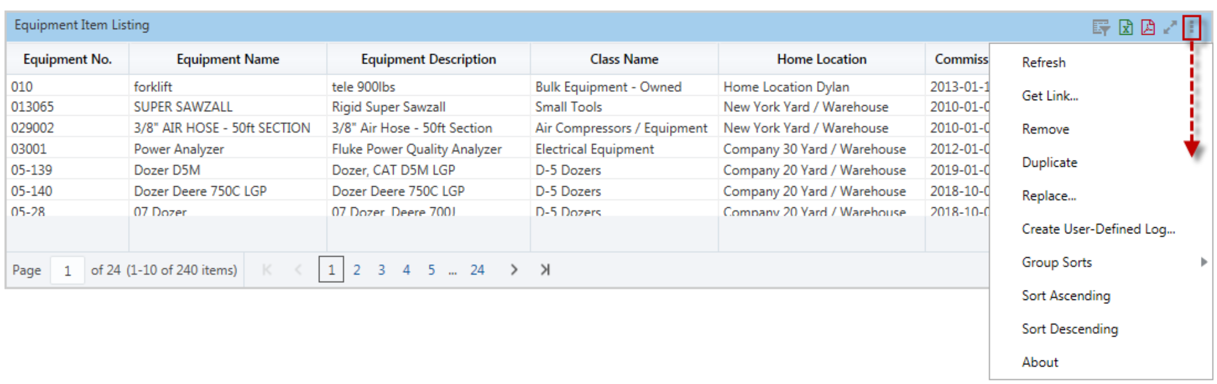
During data retrieval for the visualizations, the system looks for visualizations with the same folder, and only ones with it are filtered.

The user can go back to any target that was drilled into. The Back icon ( ) allows the user to see the last Drill in Place dashboard that was viewed. Clicking on the Back icon discards the last set of parameter filters and takes the user "back" to the state prior to the creation of the last set of parameter filters. The last Drill in Place visualization will be framed in green if it is drilling into the the same dashboard.

When drilling up, the state (excluding data) of the dashboard at the time of drilling down is re-displayed to the user instead of the latest version from the database. This allows the user to see the same parent dashboard when drilling back up. In addition, if the user made changes to the current dashboard and forgot to save before drill-down, the changes to the current dashboard are not lost and the user can simply drill-up to retrieve them.

NOTE: The Parameter Filter icon and the Back icon appear on the upper right-hand corner of the dashboard, as well as on the currently selected visualization.

Visualization Menu



Each visualization has a Visualization Menu, which is revealed by clicking the Ellipsis icon, as shown above.

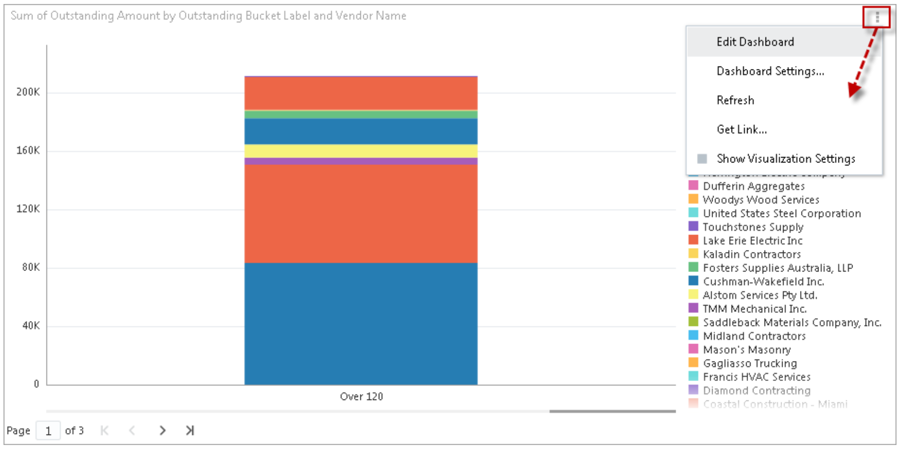
Refresh

Used to refresh the visualization, as opposed to the entire dashboard, based on the most recent data.

Get Link

Used to get link to visualization, as opposed to link to entire dashboard. The link can be sent to someone to illustrate a communication, or it can be used to create a new Console tab or a new Treeview link to view the visualization in the same way dashboards are made accessible, as per the following: [*Making Dashboards Accessible via Console*].

The screenshot below shows an example of a link opened at the visualization level. The visualization menu is located in the top right-hand corner of the display.



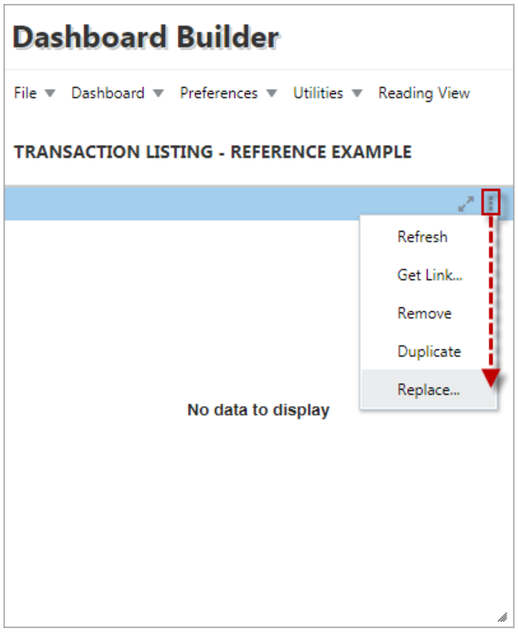
Remove

This option allows users to delete a visualization using a mouse and clicking on "Remove" in the drop-down menu.

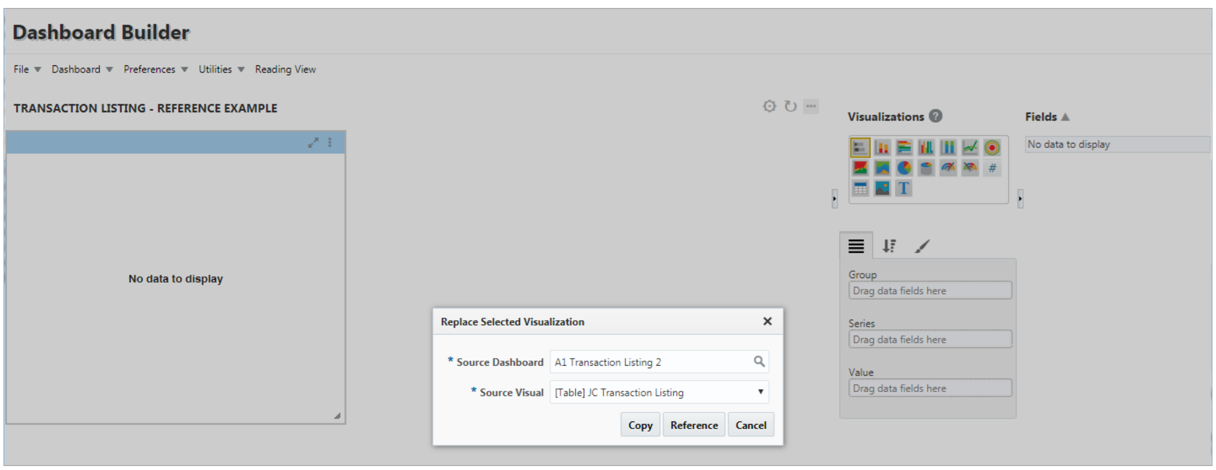
Duplicate

This option allows users to duplicate the currently selected visualization by clicking on "Duplicate" in the drop-down menu. A copy of the selected visualization will appear on the dashboard.

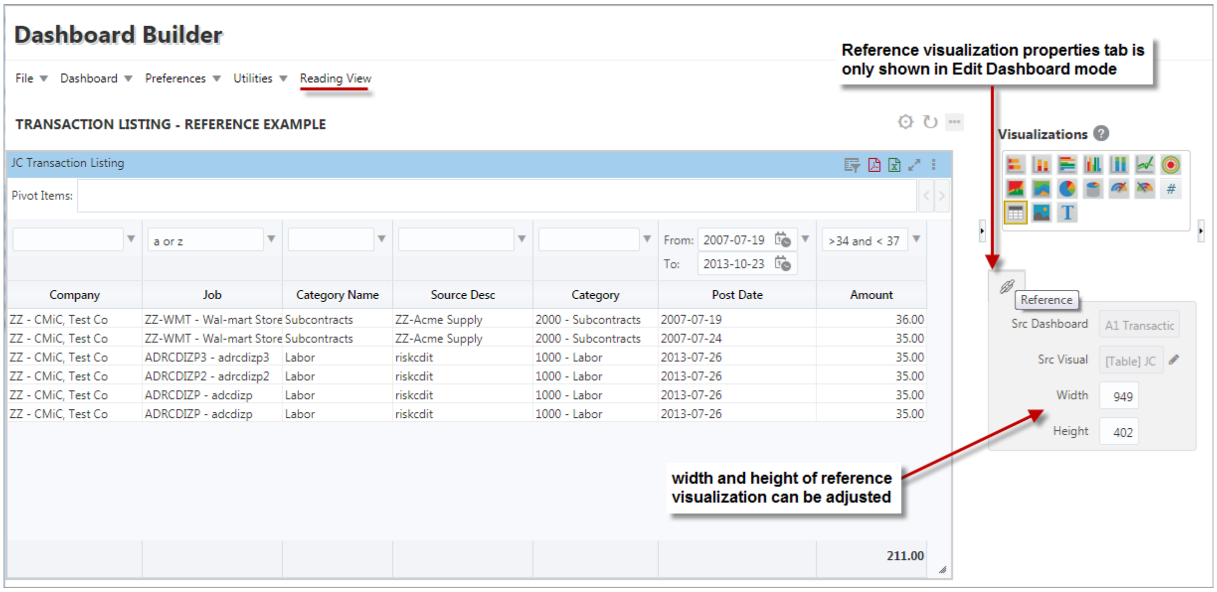
Replace



This option allows users to replace a visualization with a copy/reference visualization from another dashboard. Users can create a visualization on one dashboard and place it on other dashboards as a copy or reference visualization. A visualization can be copied/referenced multiple times.



A reference visualization is always taken from the source visualization when the dashboard is open.



The copy or reference visualization behaves the same as any other visualizations on the dashboard that it is placed. This includes being filtered by the page filters, substitution variables, etc. The user can modify the copy visualization and changes can be saved. Saved changes to the copy visualization do not update the original source visualization in any way.

The Reference visualization properties tab is only shown in Edit Dashboard mode. The user can use this properties tab to adjust the reference visualization's width and height.

In Reading View mode or during runtime, the end-user is not aware that the visualization is a reference visualization.

NOTE: The user may not reference a reference visualization.

Create User-Defined Log

This option is only available for tables, as per the following: *Create User-Defined Log based on Table*.

Group Sorts

This option is only available for tables, as per the following: *Remove Group Sorts (Keep Subtotals)* and *Remove All Group Sorts*.

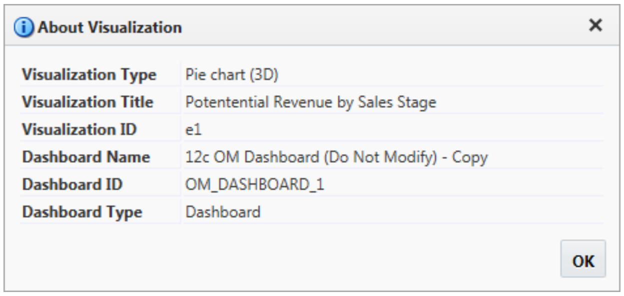
Sort Ascending

This option is only available for tables, as per the following: *Sort Ascending*.

Sort Descending

This option is only available for tables, as per the following: *Sort Descending*.

About

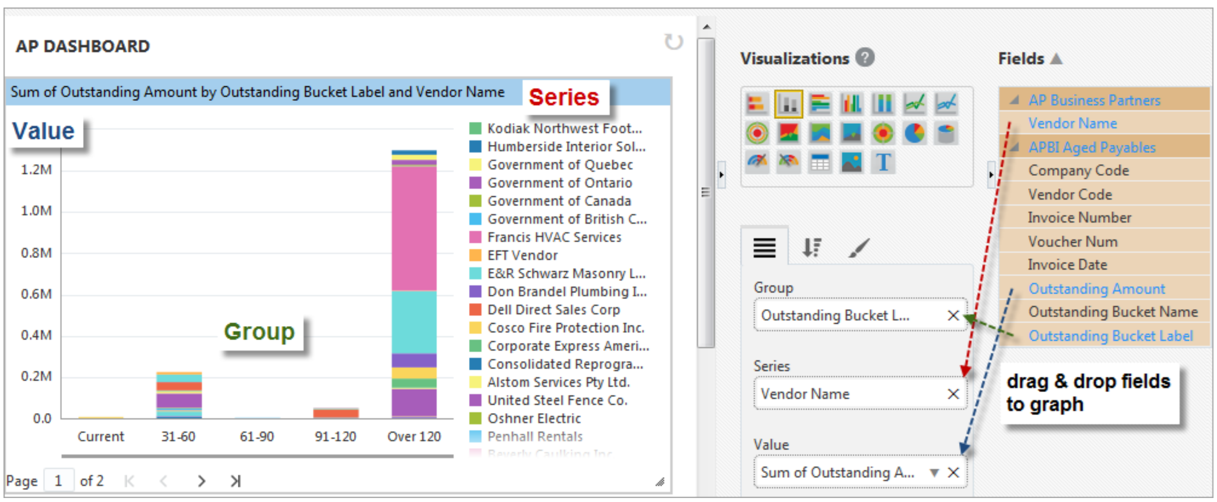


Pop-up window launched from About in the Visualization Menu

This pop-up window provides additional details about the selected visualization.

Charts: Bar, Column, Line & Area

Part 1: **Plotting Fields**



Example of Stacked Column Chart Visualization

Group

For the aggregate value displayed by the Value plotting field (e.g., Sum of Outstanding Amount in above screenshot), its component values (i.e., subtotals) are grouped by the field dragged into this plotting field, and a bar/column graphically displays each group's value in relation to the Value axis. If the Series plotting field is not used, these bars/columns are solid.

This plotting field is optional, and if it is not used, just one bar/column displays the aggregate value displayed by the Value plotting field.

Series (Subgroup)

Optionally, each group's value, which is graphed using a solid bar/column if this plotting field is not used, can be further broken down into component values for the field dragged into this plotting field. If this Series plotting field is specified, the solid bar/columns are divided into colored segments for each Series item (e.g., Vendor Names in above screenshot).

Value

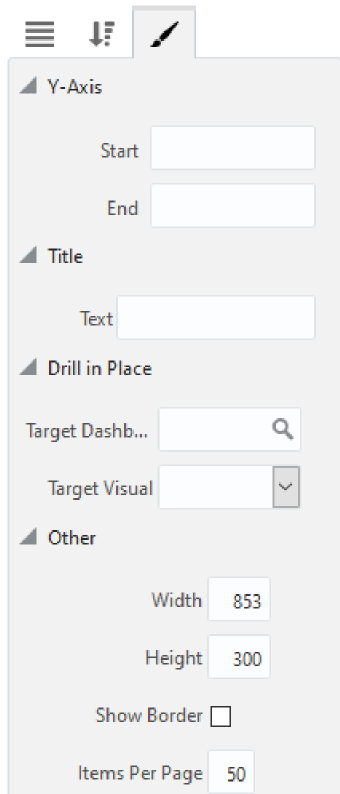
Result of inputting dragged in field into aggregate function defaulted or selected via the down-arrow (▼).

If both the Group and Series plotting fields are not used, just one bar/column displays this field's aggregate value.

Part 2: **Sort & Filter**

For details about sorting the Groups and Series, please refer to the previous subsection, *Sort and Filter – Tab*.

Part 3: **Format**



Y-Axis

Start: Value at which Y-axis is to start.

End: Value at which Y-axis is to end.

Title

Text: Title for visualization, which is displayed along its header.

Drill in Place

Target Dashboard: Specifies a Drill in Place target to a dashboard.

Target Visual: Specifies a Drill in Place target to specific visual on a dashboard (when a target dashboard has been selected in the Target Dashboard field above)

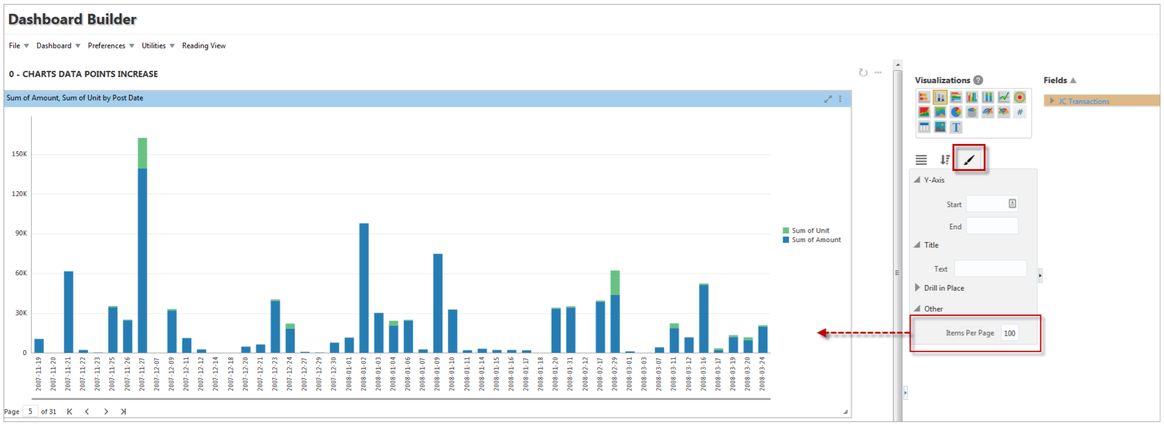
Other

Width: Shows the width of the visualization (editable to allow the user to adjust width).

Height: Shows the height of the visualization (editable to allow the user to adjust height).

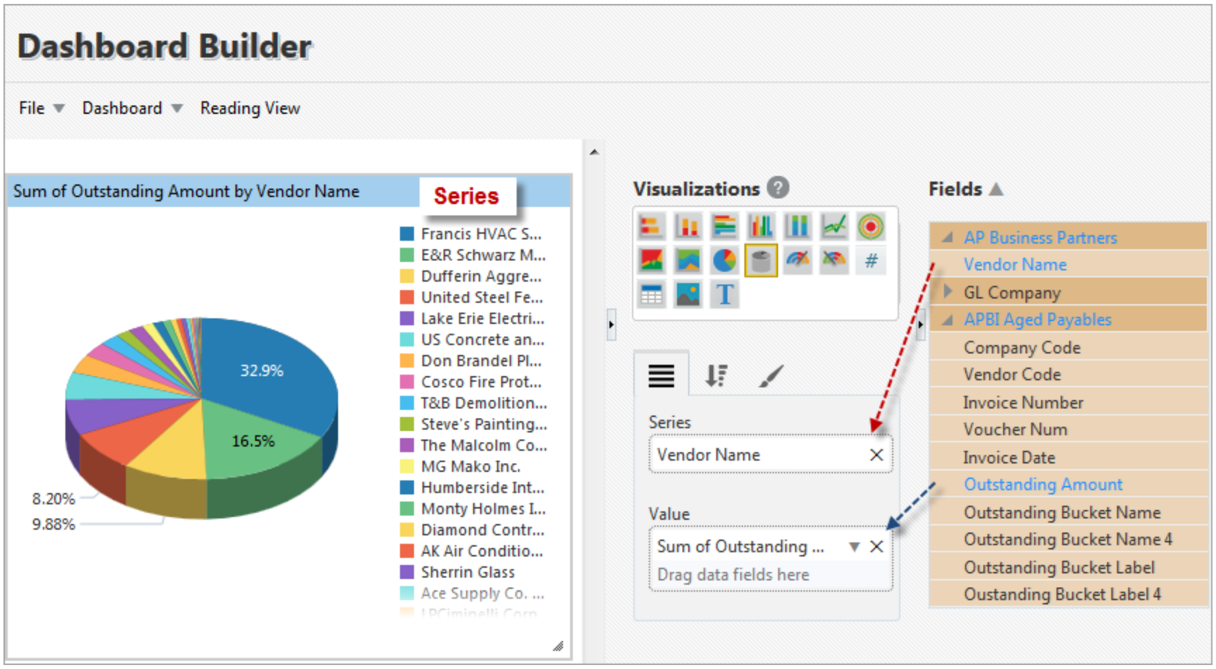
Show Border – Checkbox: Check to apply border to visualization.

Items Per Page: Specifies how many data items are displayed per page in charts (maximum allowed value is 150).



Pie Charts

Part 1: **Plotting Fields**



Example of Pie Chart (3D) Visualization

Series

For the aggregate value displayed by the Value plotting field (e.g., Sum of Outstanding Amount in above screenshot), its component values (i.e., Series) are grouped by the field dragged into this plotting field, and they are graphically displayed by pie slices.

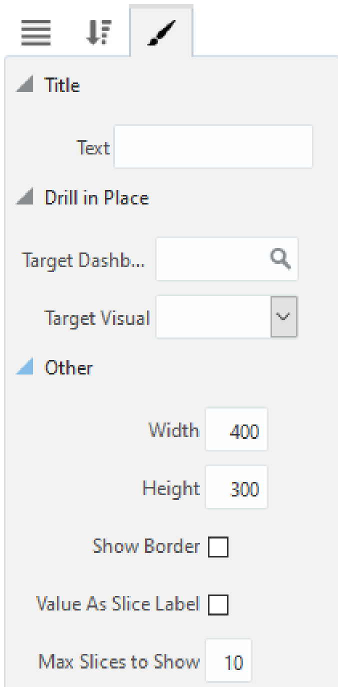
Value

Result of inputting dragged in field into aggregate function defaulted or selected via this plotting field's down-arrow (▼).

Part 2: **Sort & Filter**

For details about sorting the Series items, please refer to the previous subsection, *Sort and Filter – Tab*.

Part 3: **Format**



Title

Text: Title for visualization, which is displayed along its header.

Drill in Place

Target Dashboard: Specifies a Drill in Place target to a dashboard.

Target Visual: Specifies a Drill in Place target to specific visual on a dashboard (when a target dashboard has been selected in the Target Dashboard field above).

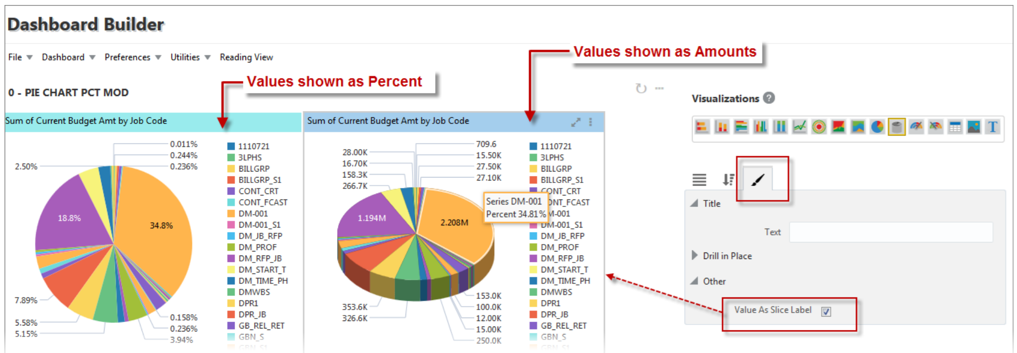
Other

Width: Shows the width of the visualization (editable to allow the user to adjust width).

Height: Shows the height of the visualization (editable to allow the user to adjust height).

Show Border – Checkbox: Check to apply border to visualization.

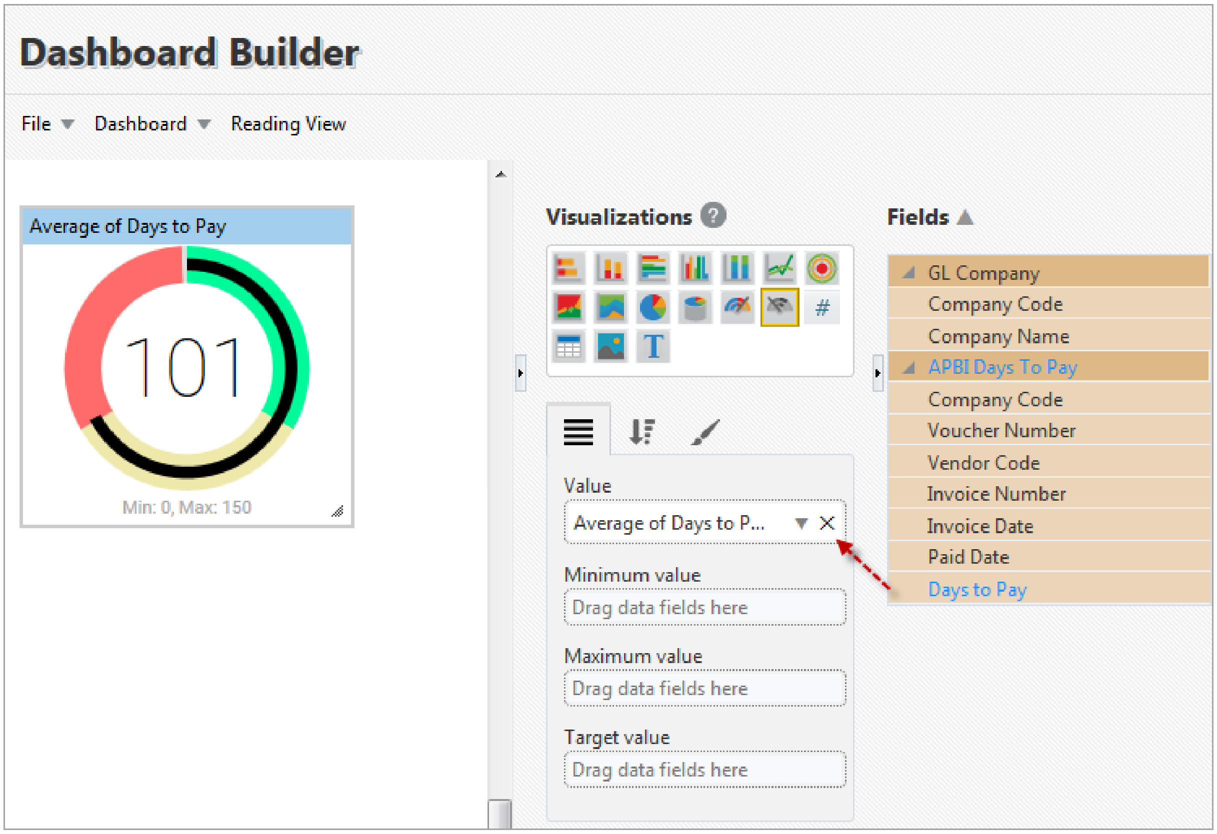
Value As Slice Label – Checkbox: Specifies whether labels on Pie Chart slices show values as a percent or as an amount. If unchecked, values will be shown as a percent, and amounts will appear in a pop-up label when the user hovers over a slice of the pie chart. If checked, values will be shown as amounts, and percent will appear in a pop-up label when the user hovers over a slice of the pie chart.



Max Slices to Show: Sets the maximum number of slices to show in the visualization.

Gauges

Part 1: **Plotting Fields**



Example of Gauge Visualization

Value

This plotting field is used to set how the value displayed at the center of the gauge is calculated. To set the value, drag in the relevant field from the Fields pane that is to be inputted into an aggregate function to calculate the value. Upon dragging in the field, a default aggregate function will be applied, according to the field's data type. Use the down-arrow (▼) to bring up a popup to select a different aggregate function, if required.

This value can be displayed as a number or as a percentage of the gauge's max value, as set by Callout Value option on the Format tab of this control.

Minimum Value

This plotting field is used to set the gauge's minimum value, by dragging in a field from the Fields pane. The value is then calculated using the dragged-in field and the default aggregate function for its data type. If the dragged-in field is of the string or date type, the default function is Count, and if it is of the number type, the default function is Sum.

Maximum Value

There are two ways to set the gauge's maximum value: via this plotting field or via the Max field under the Gauge Axis option on the Format tab. This field takes precedence over the one on the Format tab.

For this field, the maximum is calculated using the dragged-in field and the default aggregate function for its data type. If the dragged-in field is of the string or date type, the default function is Count, and if it is of the number type, the default function is Sum.

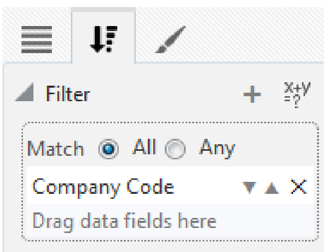
If the maximum value is not provided, it will be calculated by doubling the current value, which essentially sets the gauge's current value in the middle of the gauge. Therefore, the start value (minimum value) will be set to "0" and the end value (maximum value) will be set to double the current value. We recommend that users specify the source for the maximum value, either through this Maximum Value plotting field or through the Max field under the Gauge Axis option on the Format tab, if a maximum value is required on the gauge's visualization.

Target Value

There are two ways to set the gauge's target value: via this plotting field or via the Target field under the Gauge Axis option on the Format tab. This field takes precedence over the one on the Format tab.

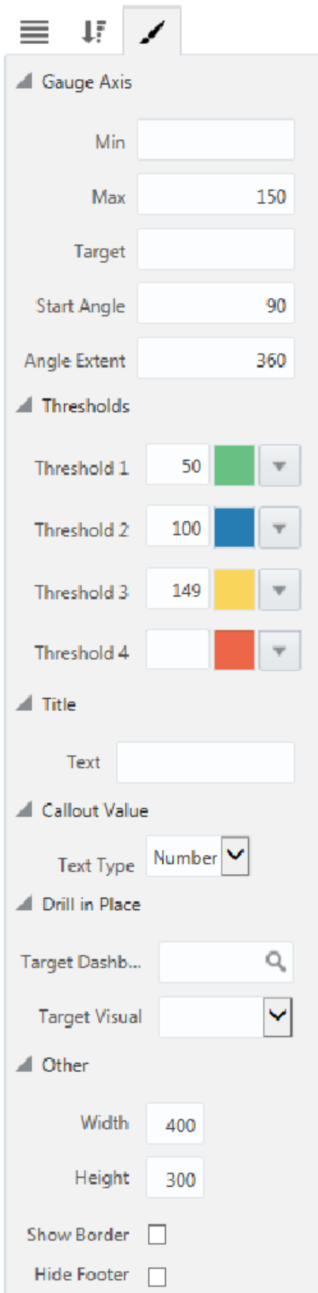
This plotting field is used to set the gauge's target value, by dragging in a field from the Fields pane. The value is then calculated using the dragged-in field and the default aggregate function for its data type. If the dragged-in field is of the string or date type, the default function is Count, and if it is of the number type, the default function is Sum.

Part 2: **Sort & Filter**



For details about filtering the data used by a gauge, please refer to the previous subsection, *Sort and Filter – Tab*.

Part 3: **Format**



Gauge Axis

Attribute	Details
Min	Minimum value of gauge's range.
Max	Maximum value of gauge's range, which can also be set on Plotting Field tab; setting on Plotting Field tab takes precedence.
Target	Gauge's target value, displayed as line on gauge, which can also be set on Plotting Field tab; setting on Plotting Field tab takes precedence.
Start Angle	Position at which gauge's range starts; if Angle Extent (following attribute) is set to 360, the range starts at the following clock positions for the following values: • if set to 0, starts at "3 o'clock" • if set to 90, starts at "12 o'clock" • if set to 180, starts at "9 o'clock" • if set to 270, starts at "6 o'clock"
Angle Extent	This setting affects the gauge's shape, e.g., if set to 180, the gauge is a half-circle.

Thresholds

There are four thresholds that can be defined. For each one, set its maximum value and the color for its range.

Title

Text: Used to set the title for the visualization, which is displayed along its header.

Callout Value

Text Type: Used to set whether the value displayed by the gauge is displayed as a number or as a percentage of the max.

Drill In Place

Target Dashboard: Used to specify a Drill in Place target to a dashboard.

Target Visual: Used to specify a Drill in Place target to specific visual on a dashboard (when a target dashboard has been selected in the Target Dashboard field above).

Other

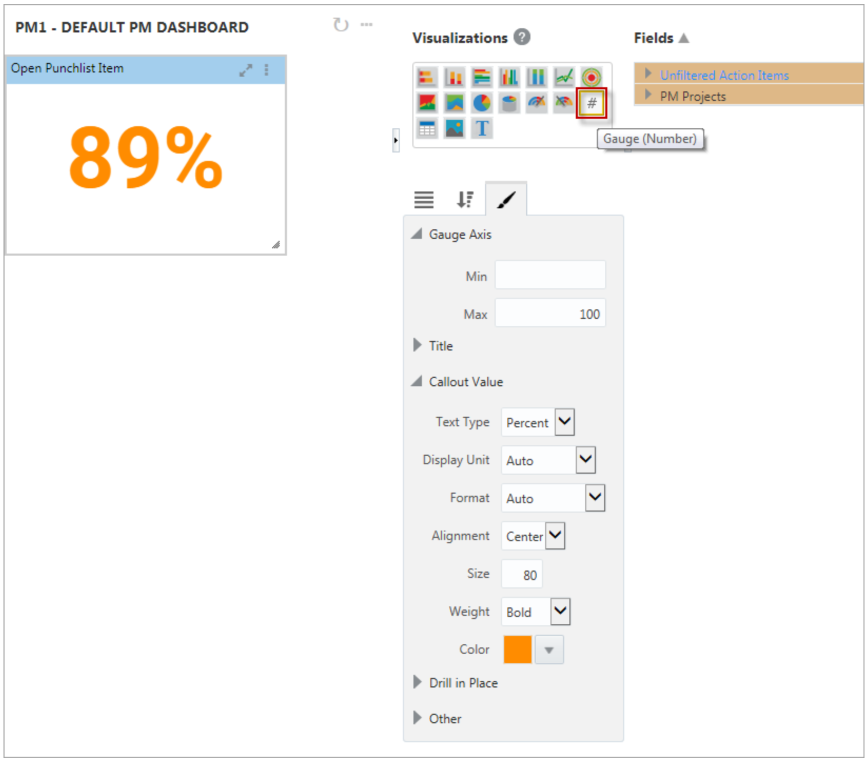
Width: Shows the width of the visualization (editable to allow the user to adjust width).

Height: Shows the height of the visualization (editable to allow the user to adjust height).

Show Border – Checkbox: Check to apply border to visualization.

Hide Footer – Checkbox: Check to hide footer at bottom of gauge.

Gauge (Number)



Another variation of the gauge is the Gauge (Number) visualization. It's a gauge without a status indicator. The format of this visualization is similar to that of the standard gauge visualization described in the previous section, except for some additional format properties listed under the Callout Value:

Callout Value

Text Type: Used to set whether the value displayed by the gauge is displayed as a number or as a percentage of the max.

Display Unit: Used to set the value's display unit (e.g. thousands, millions, billions, etc.), if desired; otherwise, default display unit is set to "Auto". (Note: This property is only applicable if the Text Type is "Number".)

Format: Used to set the number format of the displayed value to show more or less digits, if desired; otherwise, default format is set to "Auto".

Alignment: Used to align the value displayed by the gauge (alignment options are "Left", "Centre", or "Right" aligned).

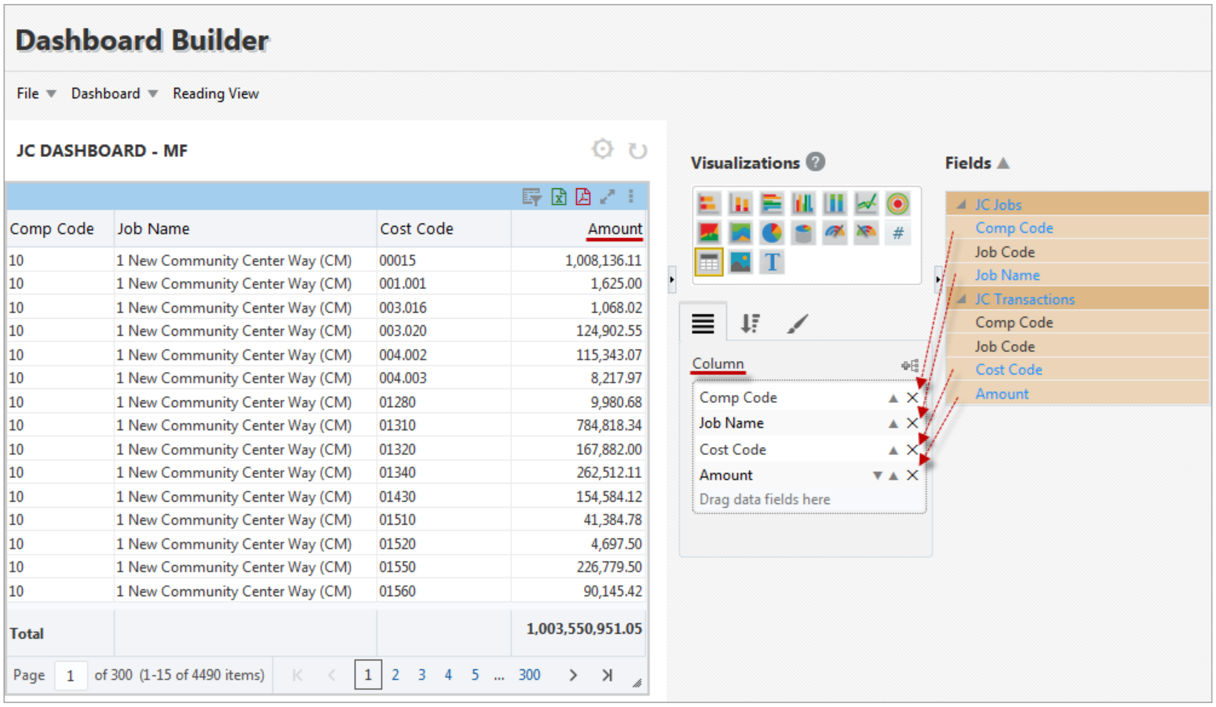
Size: Used to define the font size of the displayed value.

Weight: Used to set the font-weight or thickness of the value's font (font-weight options are "Bold", "Normal", or "Lighter").

Color: Used to determine the color of the value displayed by the gauge.

Tables

Part 1: **Plotting Fields**



Example of Table Visualization

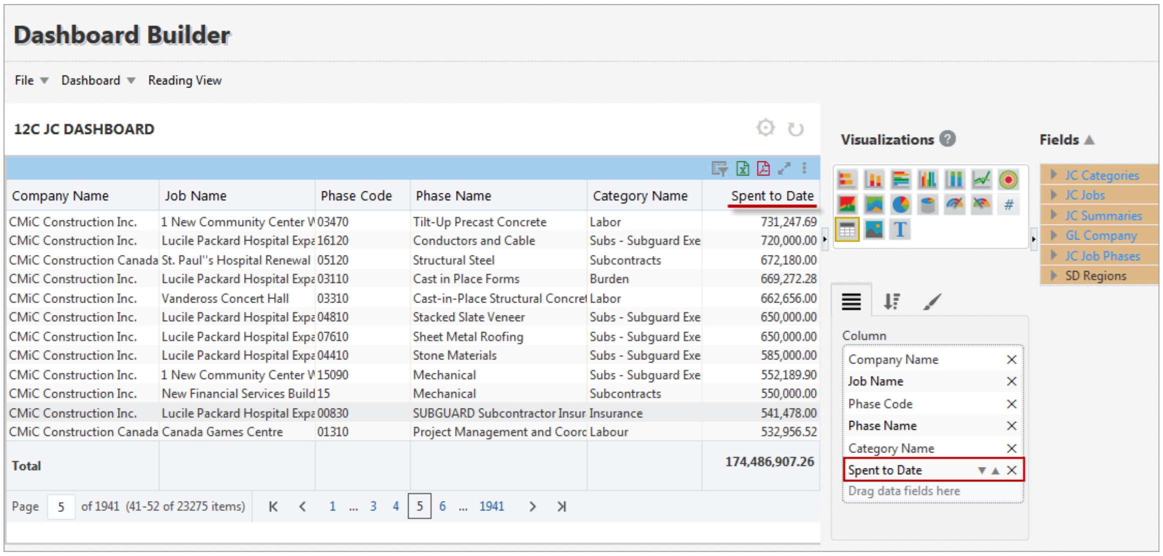
Column

Drag and drop fields from the Fields pane that are to be columns in the table into the Column box of the Plotting Fields tab.

If the dragged-in field is of the URL data type instead of the String data type, the column's text is displayed as a hyperlink. A field's data type can be changed from the String type to the URL type via BI Catalog Builder. For details, please refer to the *BI Catalog Builder* reference guide.

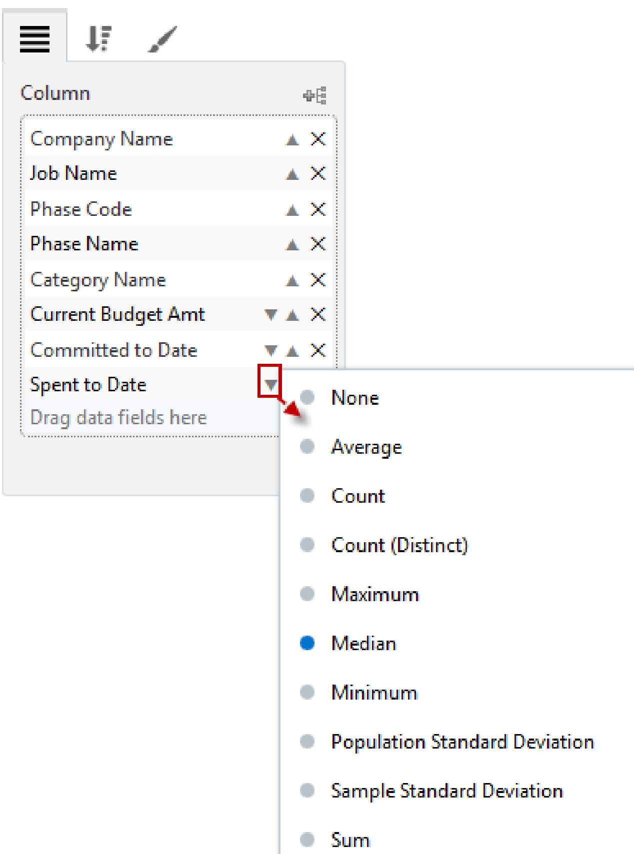
Also, if a table is created using a special Advanced Analytics view, which is a special view that contains a column with links to each record's screen, the column with the links, titled Entry Screen, is automatically added to the table. For details, please refer to the upcoming section, *Create BI Springboards.*

Column Line Aggregation



Example of table visualization with a Number data type field

For columns of the Number data type, such as the Spent to Date column in the above screenshot, a down-arrow (▼) is available to select an aggregate function for them, as shown below:



When an aggregate function is selected for a column, the aggregate function is used to calculate a single value for the column, for every unique line.

The uniqueness of a line is determined by the values of its non-aggregated columns, hence the columns to include in the table must take this into consideration.

For instance, in the following screenshot, the Inv Amt column is to be the aggregated column, so the Vendor Code, Vendor Name, Due Date: Year and Due Date: Month column values are used to determine the uniqueness of a line.

Vendor Amount by Month

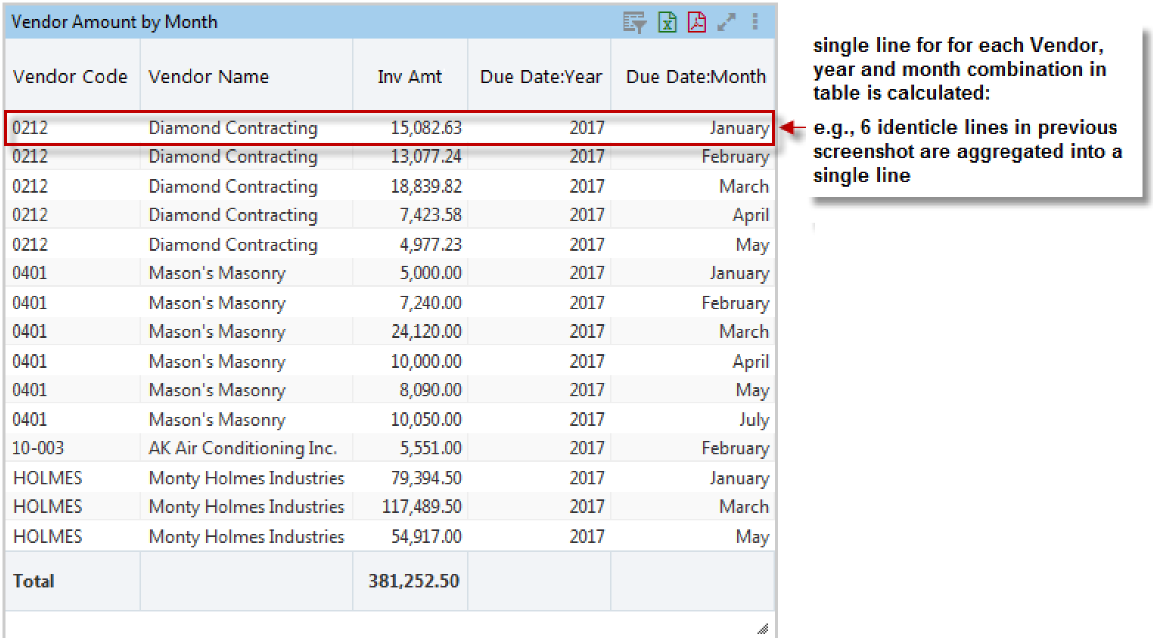
Vendor Code	Vendor Name	Inv Amt	Due Date:Year	Due Date:Month
0212	Diamond Contracting	289.95	2017	January
0212	Diamond Contracting	900.00	2017	January
0212	Diamond Contracting	1,000.00	2017	January
0212	Diamond Contracting	3,500.00	2017	January
0212	Diamond Contracting	4,500.00	2017	January
0212	Diamond Contracting	4,892.68	2017	January
0401	Mason's Masonry	5,000.00	2017	January
HOLMES	Monty Holmes Industries	1,099.50	2017	January
HOLMES	Monty Holmes Industries	1,475.00	2017	January
HOLMES	Monty Holmes Industries	18,625.00	2017	January
HOLMES	Monty Holmes Industries	58,195.00	2017	January
0212	Diamond Contracting	1,800.00	2017	February
0212	Diamond Contracting	1,800.00	2017	February
0212	Diamond Contracting	4,077.24	2017	February
0212	Diamond Contracting	5,400.00	2017	February
0401	Mason's Masonry	2,240.00	2017	February
0401	Mason's Masonry	5,000.00	2017	February
10-003	AK Air Conditioning Inc.	1,000.00	2017	February
10-003	AK Air Conditioning Inc.	1,000.00	2017	February
10-003	AK Air Conditioning Inc.	1,500.00	2017	February
10-003	AK Air Conditioning Inc.	2,051.00	2017	February
Total		381,252.50		

Page 1 of 3 (1-21 of 44 items) 1 2 3

Note, multiple entries for Vendors for same year and month combinations in table:

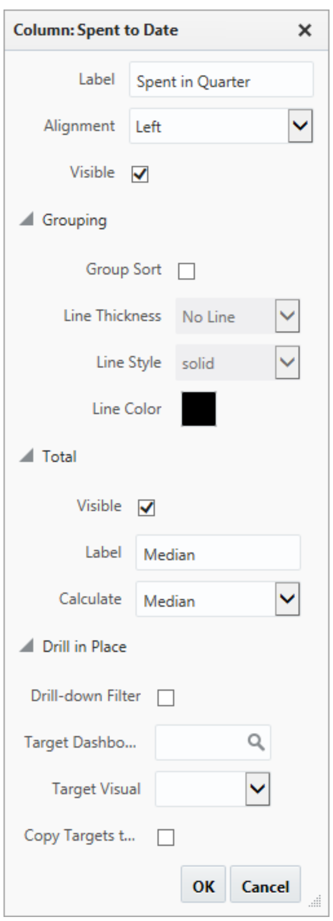
e.g., 6 lines for Vendor "Diamond Contracting" for January 2017

After selecting an aggregate function for the Inv Amt column, the aggregate value for each unique line is calculated, as shown below:



Vendor Code	Vendor Name	Inv Amt	Due Date:Year	Due Date:Month
0212	Diamond Contracting	15,082.63	2017	January
0212	Diamond Contracting	13,077.24	2017	February
0212	Diamond Contracting	18,839.82	2017	March
0212	Diamond Contracting	7,423.58	2017	April
0212	Diamond Contracting	4,977.23	2017	May
0401	Mason's Masonry	5,000.00	2017	January
0401	Mason's Masonry	7,240.00	2017	February
0401	Mason's Masonry	24,120.00	2017	March
0401	Mason's Masonry	10,000.00	2017	April
0401	Mason's Masonry	8,090.00	2017	May
0401	Mason's Masonry	10,050.00	2017	July
10-003	AK Air Conditioning Inc.	5,551.00	2017	February
HOLMES	Monty Holmes Industries	79,394.50	2017	January
HOLMES	Monty Holmes Industries	117,489.50	2017	March
HOLMES	Monty Holmes Industries	54,917.00	2017	May
Total		**381,252.50**		

Column Label, Group Sort, Column Aggregation



Label

Use this property to change the column's title. If the column title is changed, hovering over it reveals its default title.

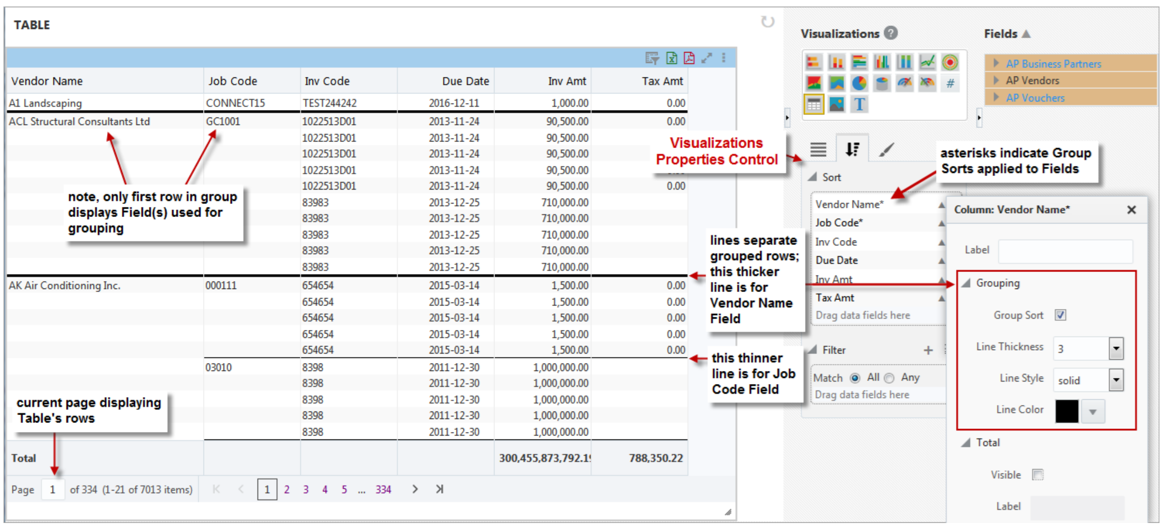
Alignment

Use this property to change the column's alignment. Alignment options are "Left", "Centre", or "Right" aligned. This property is also applied to PDF and Excel exports.

Visible – Checkbox

Use this property to show/hide the column in ADF, PDF exports, and Excel exports.

Group Sort, Line Thickness, Line Style, Line Color (Group Sorting)



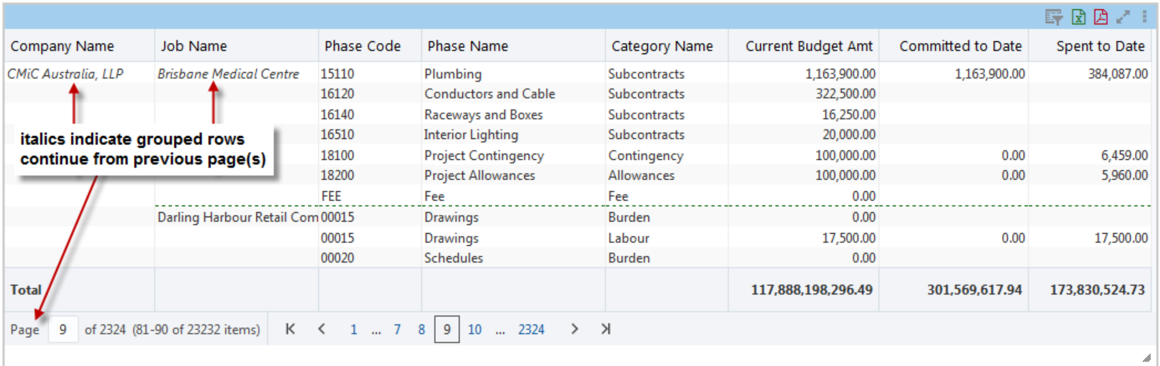
Tables provide the option of group sorting their rows by particular fields (columns).

To create a group sort, click the relevant field's up-arrow ( ) to launch the pop-up, shown above. In the pop-up, check the 'Group Sort' checkbox, and optionally, use the Line Thickness, Line Style, and Line Color properties to select the line's thickness, style and color.

If more than one field (columns) is to be group sorted, a thick line can be set for the first group sort and a thinner line for the second one, as shown in the previous screenshot. A different line style and line color could also be used for each group sort to further distinguish them.

On the Sorts & Filters tab, fields that are group sorted appear at the top of the Sort box and they have an asterisk at the end of their name.

In the table, as shown in the previous screenshot, rows that are group sorted by fields only have their first row displaying the name of the group sorted fields. If the grouped rows continue to the next table's page, the first row on the new page displays the field names in italics, as shown below:



Company Name	Job Name	Phase Code	Phase Name	Category Name	Current Budget Amt	Committed to Date	Spent to Date
CMiC Australia, LLP	*Brisbane Medical Centre*	15110	Plumbing	Subcontracts	1,163,900.00	1,163,900.00	384,087.00
		16120	Conductors and Cable	Subcontracts	322,500.00		
		16140	Raceways and Boxes	Subcontracts	16,250.00		
		16510	Interior Lighting	Subcontracts	20,000.00		
		18100	Project Contingency	Contingency	100,000.00	0.00	6,459.00
		18200	Project Allowances	Allowances	100,000.00	0.00	5,960.00
		FEE	Fee	Fee	0.00		
	Darling Harbour Retail Com	00015	Drawings	Burden	0.00		
		00015	Drawings	Labour	17,500.00	0.00	17,500.00
		00020	Schedules	Burden	0.00		
Total					117,888,198,296.49	301,569,617.94	173,830,524.73

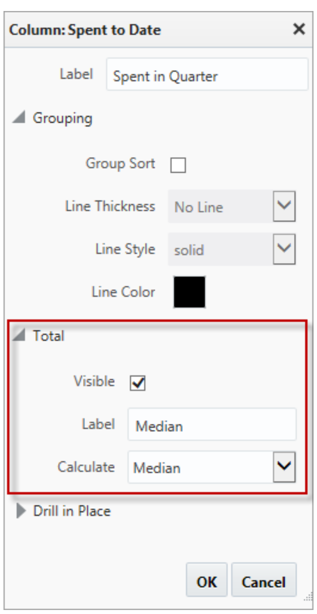
Also, for the Visualizations Properties Control, dropping a field that is not group sorted between two fields that are, makes the dropped field a group sorted one.

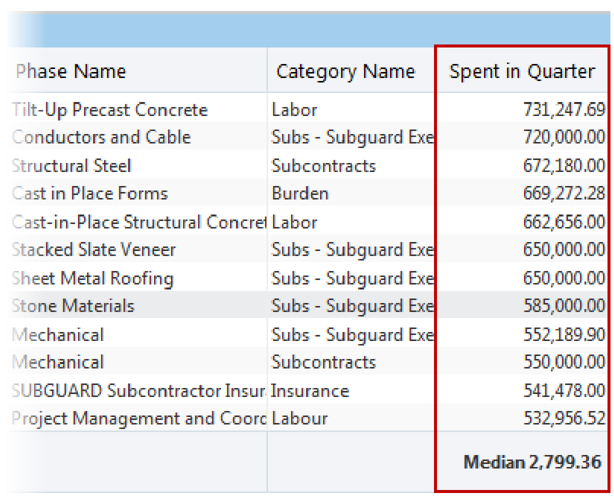
NOTE: For the Visualization Properties Control, all fields added to the Column box on the Plotting Fields tab are automatically added to the Sort box on the Sorts & Filters tab. Also, if a field is added to the Sort box on the Sorts & Filters tab, it will automatically be added to the Column box on the Plotting Fields tab.

Visible, Label, Calculate (Column Aggregation)

These properties are used to set an aggregate value to display at the bottom of the column, as shown below on the right.

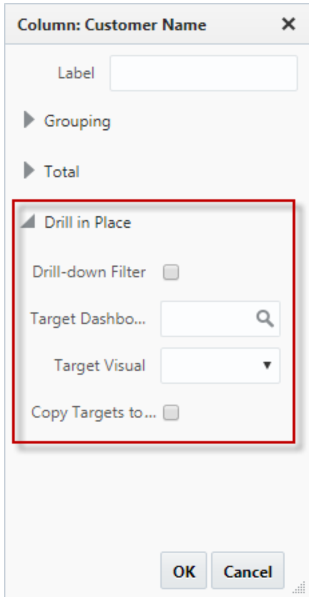
The 'Visible' checkbox sets whether or not the aggregate value is displayed for the column, the Label field is used to provide a label for the aggregate value, and the Calculate field is used to select the aggregate function.





Phase Name	Category Name	Spent in Quarter
Tilt-Up Precast Concrete	Labor	731,247.69
Conductors and Cable	Subs - Subguard Exe	720,000.00
Structural Steel	Subcontracts	672,180.00
Cast in Place Forms	Burden	669,272.28
Cast-in-Place Structural Concret	Labor	662,656.00
Stacked Slate Veneer	Subs - Subguard Exe	650,000.00
Sheet Metal Roofing	Subs - Subguard Exe	650,000.00
Stone Materials	Subs - Subguard Exe	585,000.00
Mechanical	Subs - Subguard Exe	552,189.90
Mechanical	Subcontracts	550,000.00
SUBGUARD Subcontractor Insur	Insurance	541,478.00
Project Management and Coorc	Labour	532,956.52
		Median 2,799.36

Drill Down Filter, Target Dashboard, Target Visual, Copy Targets to (Drill in Place)



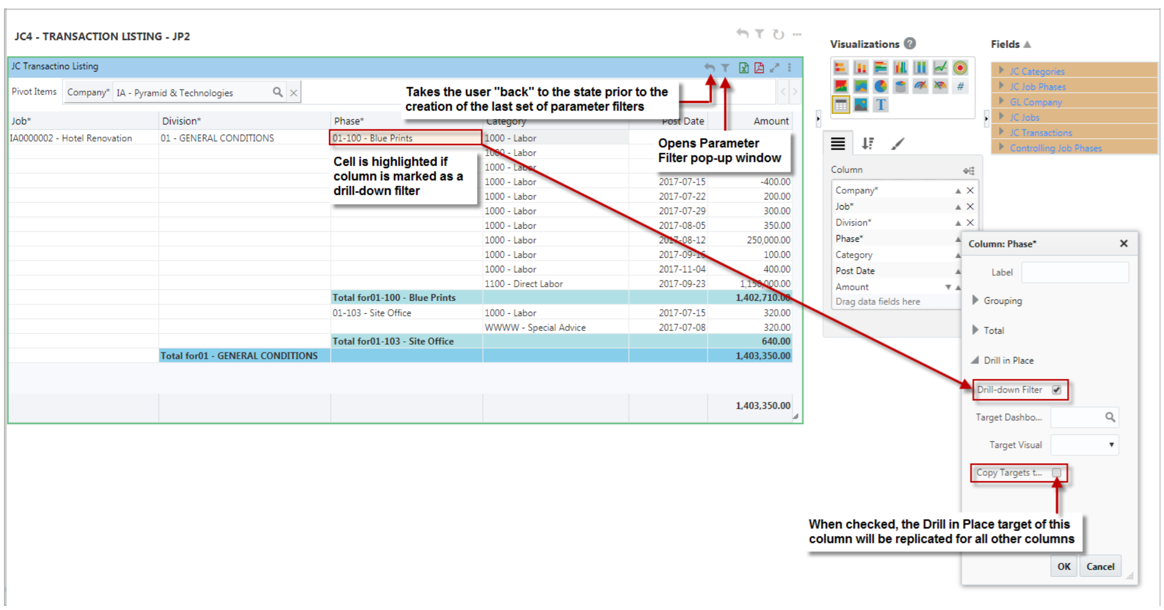
These properties are used to add a Drill in Place for a table visualization. This feature is disabled by default for table and gauge visualizations, but for all other visualizations it is enabled by default.

Drill in Place is enabled for a table visualization when a column is marked as a drill-down filter or has a Drill in Place target defined (to a dashboard or a specific visualization on a dashboard).

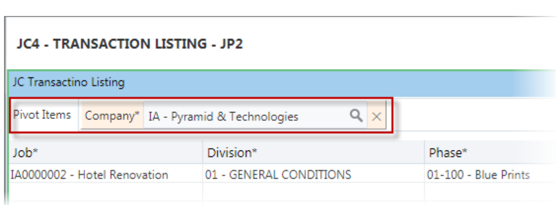
The 'Drill-down Filter' checkbox is used to mark a column as a drill-down filter and the Target Dashboard field is used to select a dashboard as a Drill in Place target. The Target Visual field is used to further drill down into the dashboard to target a specific visualization. The 'Copy Targets to…' checkbox, when checked, replicates the Drill in Place target defined for the column to all other columns.

When Drill in Place is enabled, each regular cell (not including a subtotal) is clickable. When a cell with Drill in Place enabled is clicked, the user is taken to the Drill in Place target defined for the column. When the column does not have a Drill in Place target defined, the current dashboard is the default target.

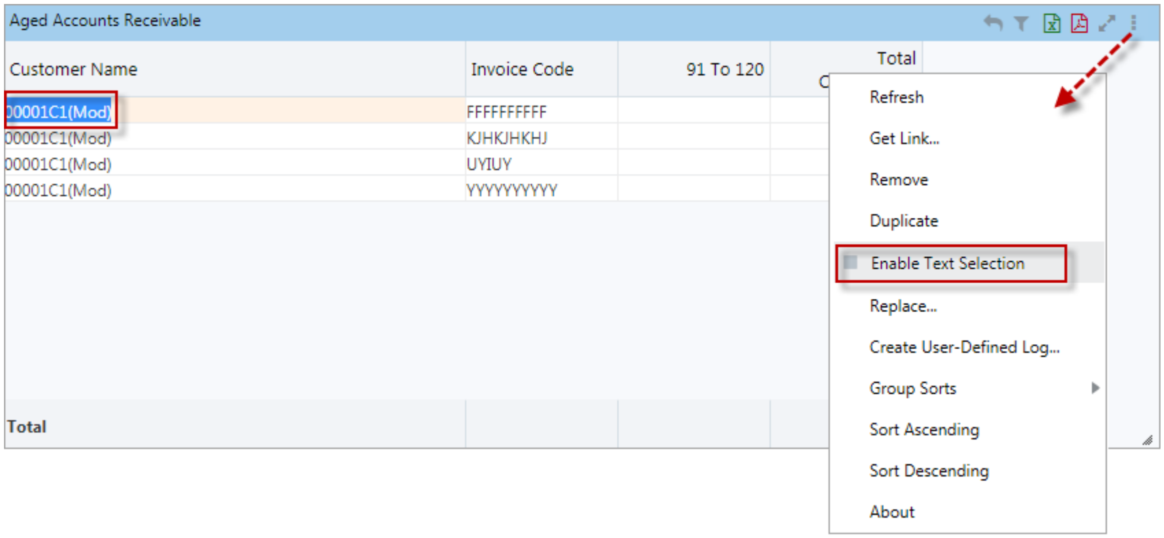
Each drill-down filter cell value on the row is sent to the target as a parameter filter.



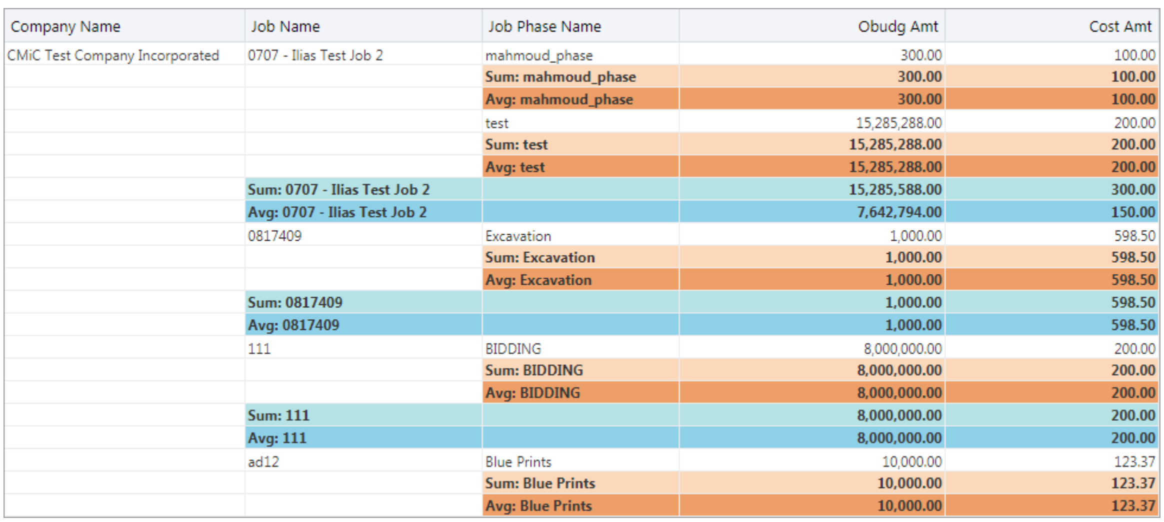
Pivot Items can also be marked as a drill-down filter.



When Drill in Place is enabled for a table visualization, and the cells are clickable, the user can enable text selection by using the Visualization drop-down menu and selecting "Enable Text Selection".



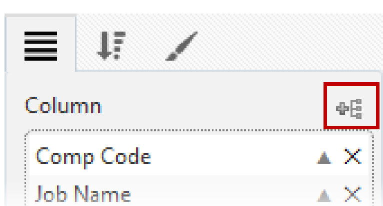
Subtotals



Company Name	Job Name	Job Phase Name	Obudg Amt	Cost Amt
CMiC Test Company Incorporated	0707 - Ilias Test Job 2	mahmoud_phase	300.00	100.00
		Sum: mahmoud_phase	**300.00**	**100.00**
		Avg: mahmoud_phase	**300.00**	**100.00**
		test	15,285,288.00	200.00
		Sum: test	**15,285,288.00**	**200.00**
		Avg: test	**15,285,288.00**	**200.00**
	Sum: 0707 - Ilias Test Job 2		**15,285,588.00**	**300.00**
	Avg: 0707 - Ilias Test Job 2		**7,642,794.00**	**150.00**
	0817409	Excavation	1,000.00	598.50
		Sum: Excavation	**1,000.00**	**598.50**
		Avg: Excavation	**1,000.00**	**598.50**
	Sum: 0817409		**1,000.00**	**598.50**
	Avg: 0817409		**1,000.00**	**598.50**
	111	BIDDING	8,000,000.00	200.00
		Sum: BIDDING	**8,000,000.00**	**200.00**
		Avg: BIDDING	**8,000,000.00**	**200.00**
	Sum: 111		**8,000,000.00**	**200.00**
	Avg: 111		**8,000,000.00**	**200.00**
	ad12	Blue Prints	10,000.00	123.37
		Sum: Blue Prints	**10,000.00**	**123.37**
		Avg: Blue Prints	**10,000.00**	**123.37**

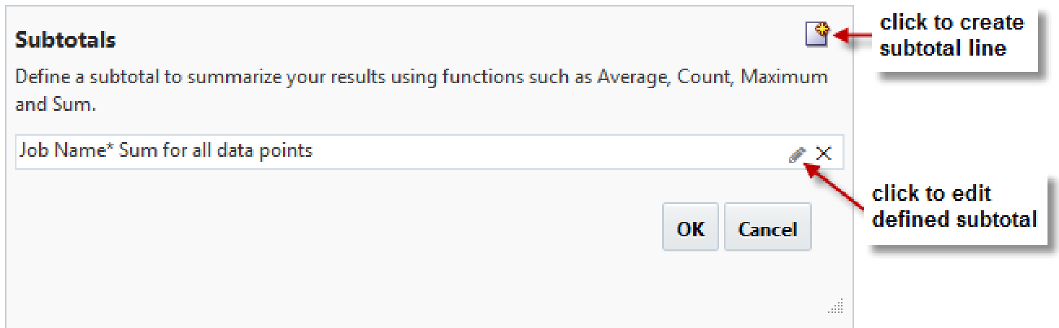
Example of table visualization with various subtotals set up

To create a subtotal line, click the Subtotals icon, shown below:

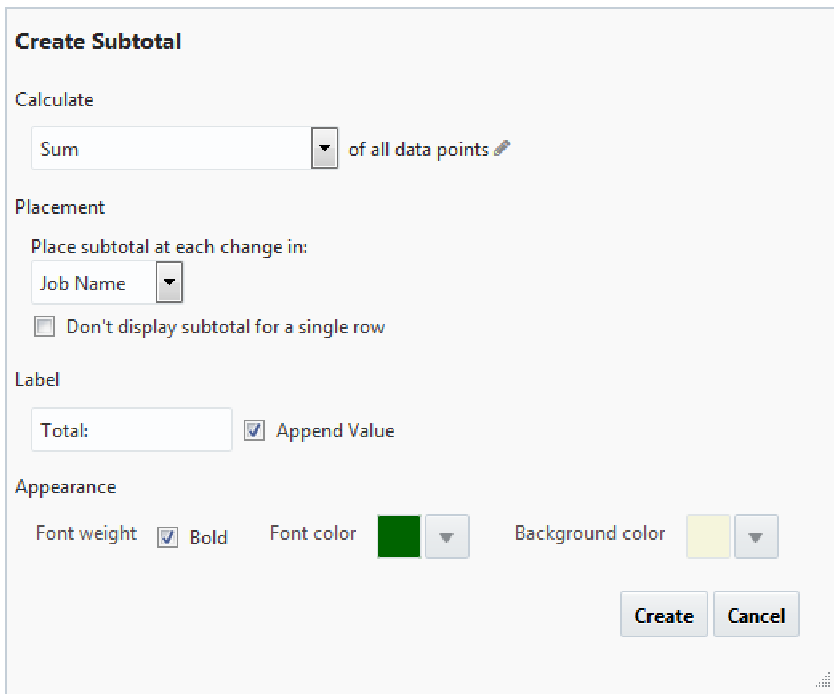


NOTE: Subtotals are not computed for columns that are group sorted.

In the pop-up, click the New icon, pointed to below:



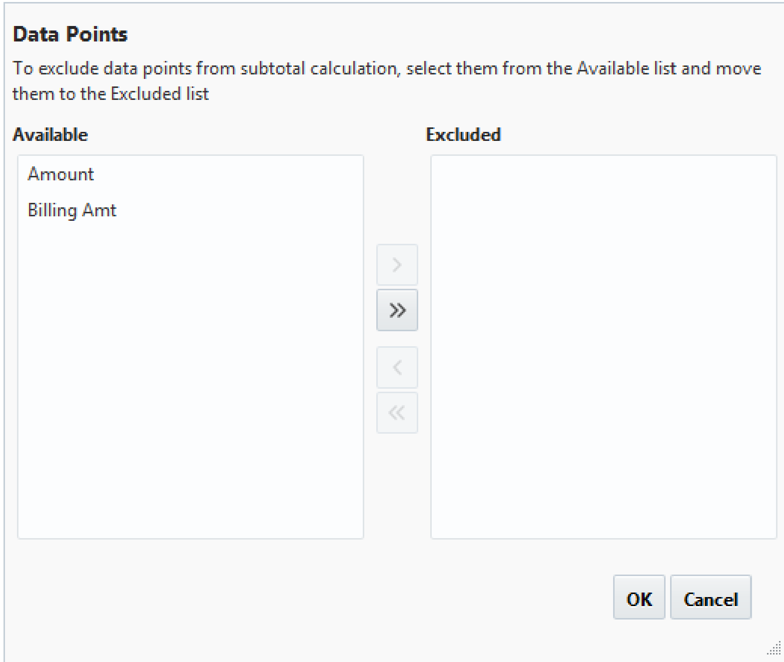
In the Create Subtotal pop-up, define the subtotal line, using the following details.



Calculate

Use this field's LOV to select the aggregate function that is to be applied to the field selected via the **Place subtotal at each change in** field.

of all data points

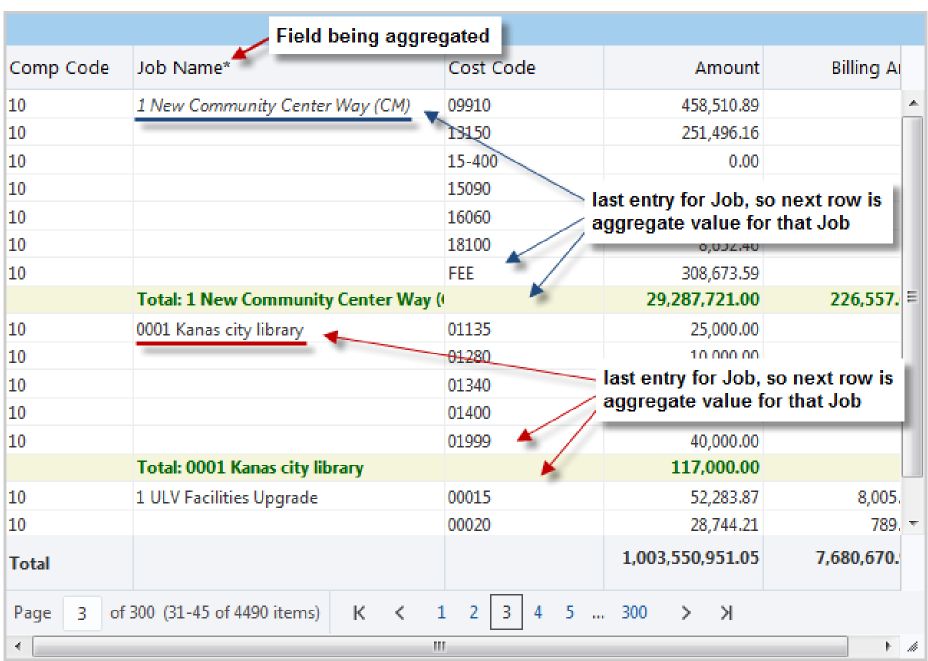


By default, all numerical fields will have an aggregate value calculated. This pop-up is used to exclude a field from having its aggregate value calculated.

Place subtotal at each change in

Select the field that is to be aggregated.

For each unique value of the field (e.g., if the field is "Job", then for each job), the calculated aggregate value for it will be displayed just after the last entry for that field.



Don't display subtotal for a single row

If checked, single rows will not have an aggregate value calculated.

Label

Label for aggregate value rows.

Append Value – Checkbox

If checked, name of field being aggregated will be appended to label identified in Label field above.

Bold

If checked, text for aggregate value rows is in bold.

Font color

Color of text for aggregate value rows.

Background color

Background color for aggregate value rows.

Part 2: **Sort & Filter**

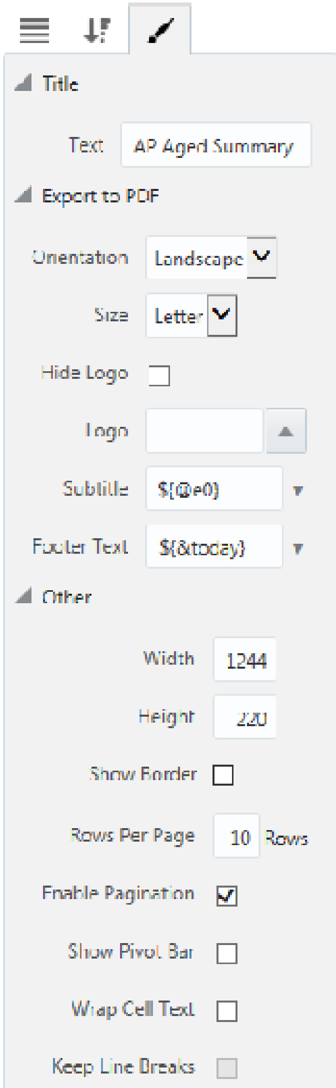
Tables have unique sorting options for their rows, explained here. For general details about sorting rows, please refer to the previous subsection, *Sort and Filter – Tab*.

For tables only, the fields in the Sort box on the Sorts & Filters tab can be reordered by dragging and dropping them to their new positions, which changes the order by which rows are sorted (rows are first sorted by first field, then by second one and so forth).

The arrows next to the fields indicate their sort order. The up arrow (↑) indicates that the ascending sort order is used, and the down arrow indicates that the descending sort order is used. Click the arrows to switch between the two sort types.

NOTE: All visualizations, including tables, can filter by aggregation. For table visualizations, the table must have at least one aggregate column (aggregation is not "None").

Part 3: **Format**



Title

Text

Title for table, which is displayed along its header.

Export to PDF

The following are options for the Export Table to PDF functionality. For details, please refer to the *Export Table to PDF* subsection.

Orientation

PDF's page orientation. Options are "Landscape" or "Portrait".

Size

PDF's size. Options are "Letter" or "Legal".

Hide Logo – Checkbox

Allows user to hide PDF/query logo.

Logo

File name of uploaded logo for exported PDF. To clear this field, use the Delete or Backspace keyboard key.

NOTE: If this field is left empty, the logo will default from the Dashboard Logo Image Path field on the Logo Path tab of the System Options screen (standard path: *System* > *Setup* > *System Options – Logo Path tab*).

Subtitle & Footer Text

Subtitle and footer text to be printed on the subtitle and footer of each PDF page. Custom subtitle and footer text may contain any of the available substitution value expressions, including substitution variable value expressions, filter value expressions, and pre-defined variable value expressions. For a list of available pre-defined substitution value expressions, please refer to the table in the following section of this guide: *Insert Substitution Variable – Menu Option*".

Other

Width

Shows the width of the visualization. This field is editable to allow the user to adjust the width.

Height

Shows the height of the visualization. This field is editable to allow the user to adjust the height.

Show Border – Checkbox

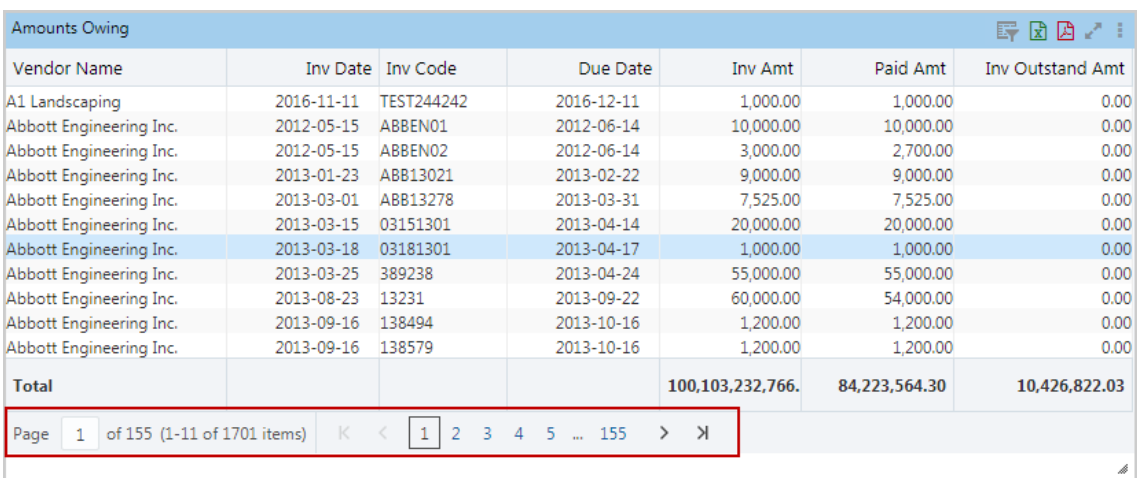
Check to apply border to visualization.

Rows Per Page

Available if 'Enable Pagination' box is checked, to set number of rows to display per page of table.

Enable Pagination – Checkbox

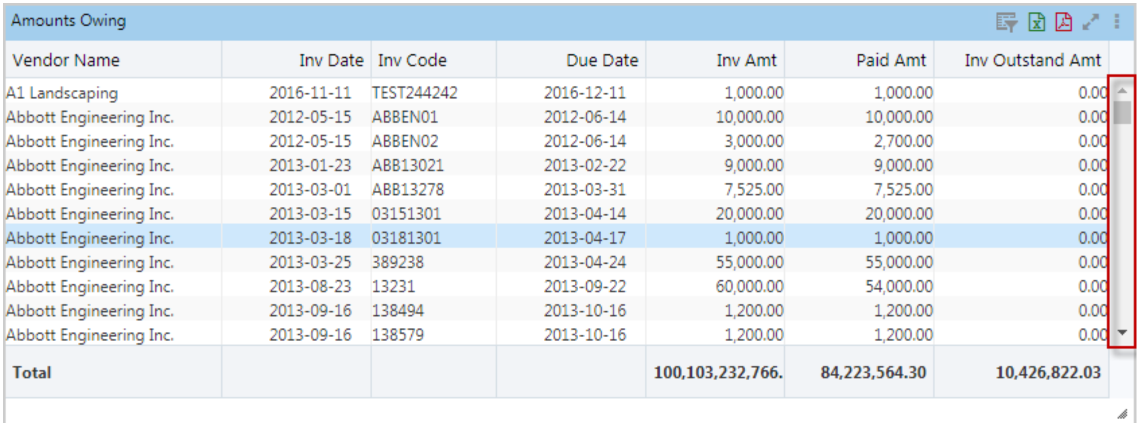
If checked, a table visualization's rows span over pages, as shown below:


Amounts Owing

Vendor Name	Inv Date	Inv Code	Due Date	Inv Amt	Paid Amt	Inv Outstand Amt
A1 Landscaping	2016-11-11	TEST244242	2016-12-11	1,000.00	1,000.00	0.00
Abbott Engineering Inc.	2012-05-15	ABBEN01	2012-06-14	10,000.00	10,000.00	0.00
Abbott Engineering Inc.	2012-05-15	ABBEN02	2012-06-14	3,000.00	2,700.00	0.00
Abbott Engineering Inc.	2013-01-23	ABB13021	2013-02-22	9,000.00	9,000.00	0.00
Abbott Engineering Inc.	2013-03-01	ABB13278	2013-03-31	7,525.00	7,525.00	0.00
Abbott Engineering Inc.	2013-03-15	03151301	2013-04-14	20,000.00	20,000.00	0.00
Abbott Engineering Inc.	2013-03-18	03181301	2013-04-17	1,000.00	1,000.00	0.00
Abbott Engineering Inc.	2013-03-25	389238	2013-04-24	55,000.00	55,000.00	0.00
Abbott Engineering Inc.	2013-08-23	13231	2013-09-22	60,000.00	54,000.00	0.00
Abbott Engineering Inc.	2013-09-16	138494	2013-10-16	1,200.00	1,200.00	0.00
Abbott Engineering Inc.	2013-09-16	138579	2013-10-16	1,200.00	1,200.00	0.00
Total				100,103,232,766.	84,223,564.30	10,426,822.03

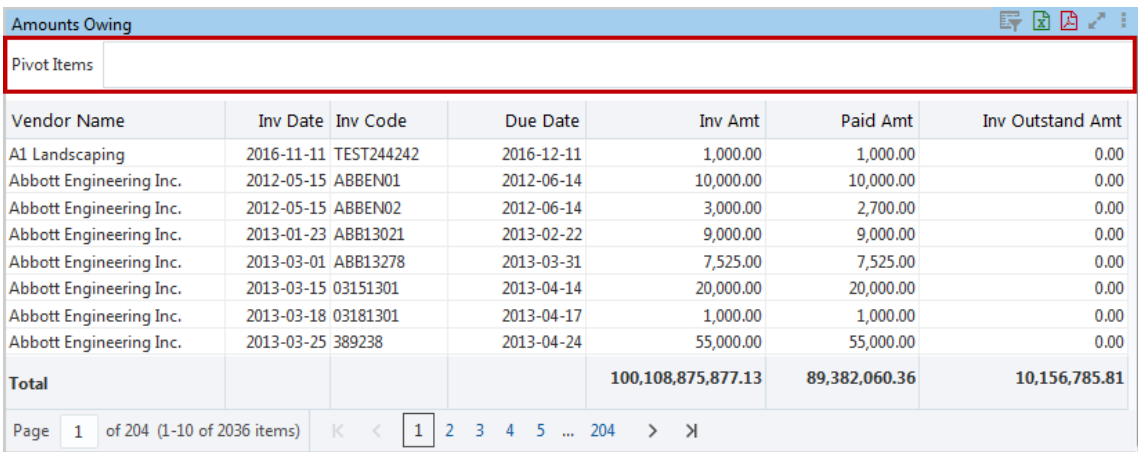
Page 1 of 155 (1-11 of 1701 items) 1 2 3 4 5 ... 155

If unchecked, a scrollbar is used to view a table’s rows, as shown below:


Amounts Owing

Vendor Name	Inv Date	Inv Code	Due Date	Inv Amt	Paid Amt	Inv Outstand Amt
A1 Landscaping	2016-11-11	TEST244242	2016-12-11	1,000.00	1,000.00	0.00
Abbott Engineering Inc.	2012-05-15	ABBEN01	2012-06-14	10,000.00	10,000.00	0.00
Abbott Engineering Inc.	2012-05-15	ABBEN02	2012-06-14	3,000.00	2,700.00	0.00
Abbott Engineering Inc.	2013-01-23	ABB13021	2013-02-22	9,000.00	9,000.00	0.00
Abbott Engineering Inc.	2013-03-01	ABB13278	2013-03-31	7,525.00	7,525.00	0.00
Abbott Engineering Inc.	2013-03-15	03151301	2013-04-14	20,000.00	20,000.00	0.00
Abbott Engineering Inc.	2013-03-18	03181301	2013-04-17	1,000.00	1,000.00	0.00
Abbott Engineering Inc.	2013-03-25	389238	2013-04-24	55,000.00	55,000.00	0.00
Abbott Engineering Inc.	2013-08-23	13231	2013-09-22	60,000.00	54,000.00	0.00
Abbott Engineering Inc.	2013-09-16	138494	2013-10-16	1,200.00	1,200.00	0.00
Abbott Engineering Inc.	2013-09-16	138579	2013-10-16	1,200.00	1,200.00	0.00
Total				100,103,232,766.	84,223,564.30	10,426,822.03

Show Pivot Bar – Checkbox

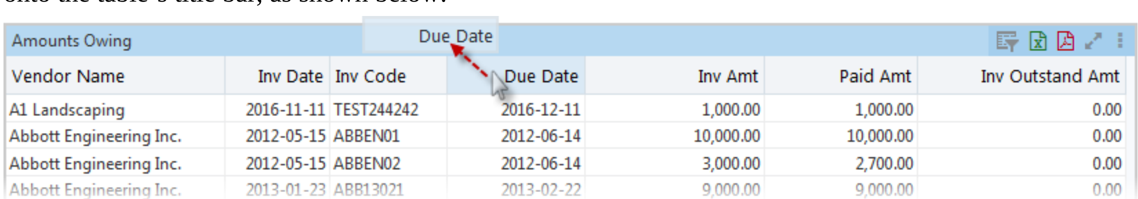

Amounts Owing

Pivot Items

Vendor Name	Inv Date	Inv Code	Due Date	Inv Amt	Paid Amt	Inv Outstand Amt
A1 Landscaping	2016-11-11	TEST244242	2016-12-11	1,000.00	1,000.00	0.00
Abbott Engineering Inc.	2012-05-15	ABBEN01	2012-06-14	10,000.00	10,000.00	0.00
Abbott Engineering Inc.	2012-05-15	ABBEN02	2012-06-14	3,000.00	2,700.00	0.00
Abbott Engineering Inc.	2013-01-23	ABB13021	2013-02-22	9,000.00	9,000.00	0.00
Abbott Engineering Inc.	2013-03-01	ABB13278	2013-03-31	7,525.00	7,525.00	0.00
Abbott Engineering Inc.	2013-03-15	03151301	2013-04-14	20,000.00	20,000.00	0.00
Abbott Engineering Inc.	2013-03-18	03181301	2013-04-17	1,000.00	1,000.00	0.00
Abbott Engineering Inc.	2013-03-25	389238	2013-04-24	55,000.00	55,000.00	0.00
Total				100,108,875,877.13	89,382,060.36	10,156,785.81

Page 1 of 204 (1-10 of 2036 items) 1 2 3 4 5 ... 204

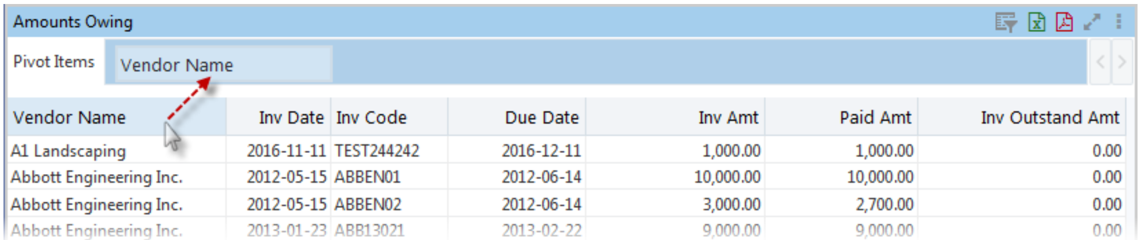
If checked, the Pivot Items bar appears above the table’s columns, as shown above. Alternatively, during runtime, the Pivot Items bar can be made available by dragging and dropping a column header onto the table’s title bar, as shown below:


Amounts Owing Due Date

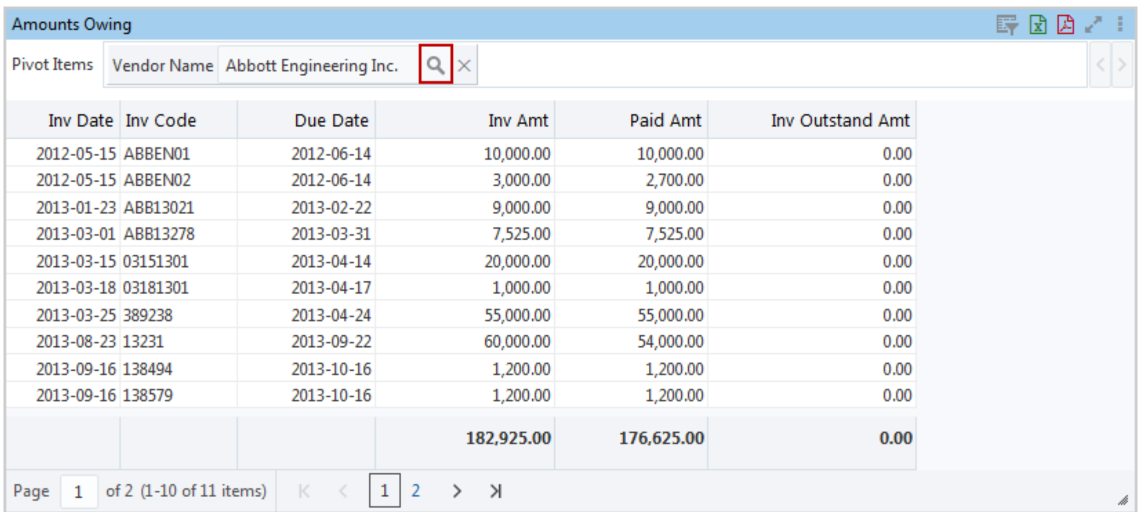
Vendor Name	Inv Date	Inv Code	Due Date	Inv Amt	Paid Amt	Inv Outstand Amt
A1 Landscaping	2016-11-11	TEST244242	2016-12-11	1,000.00	1,000.00	0.00
Abbott Engineering Inc.	2012-05-15	ABBEN01	2012-06-14	10,000.00	10,000.00	0.00
Abbott Engineering Inc.	2012-05-15	ABBEN02	2012-06-14	3,000.00	2,700.00	0.00
Abbott Engineering Inc.	2013-01-23	ABB13021	2013-02-22	9,000.00	9,000.00	0.00

The Pivot Items bar is used at runtime to filter the table by entries in one or more columns.

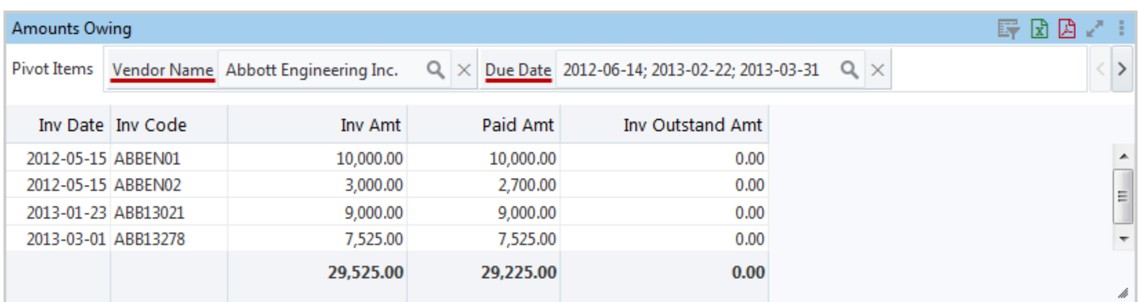
For instance, using the above table as an example, if you want the table to display data for a particular vendor, drag and drop the Vendor Name column header onto the Pivot Items bar, as shown below:



Next, click the 🔍 icon (framed below) to select one or more vendors by which to filter the table's data. Hold the Ctrl or Shift keyboard keys to select more than one item.



As shown below, more than one column can be dragged and dropped onto the Pivot Items bar:



To clear a Pivot Item's selected item, use the Delete or Backspace keyboard key.

Wrap Cell Text

If checked, when a column is not wide enough to fully display its text, the height of the row is increased to fully display the text. Note, however, text wrapping does not occur for columns with a subtotal defined, or columns with a group sort defined with the Line Thickness property set to anything other than "No Line".

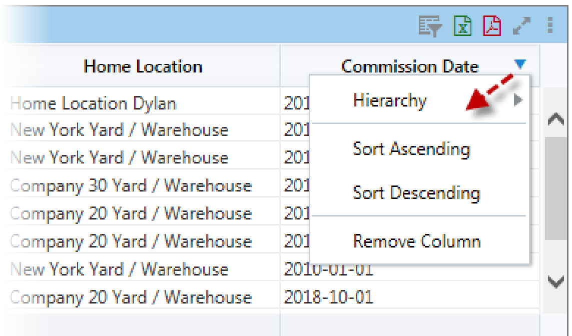
If not checked, when a column is not wide enough to fully display its text, the height of the row does not change, and the text is cut off.

Keep Line Breaks

This option is available if the ‘Wrap Cell Text’ box is checked, and it is used to preserve text formatting.

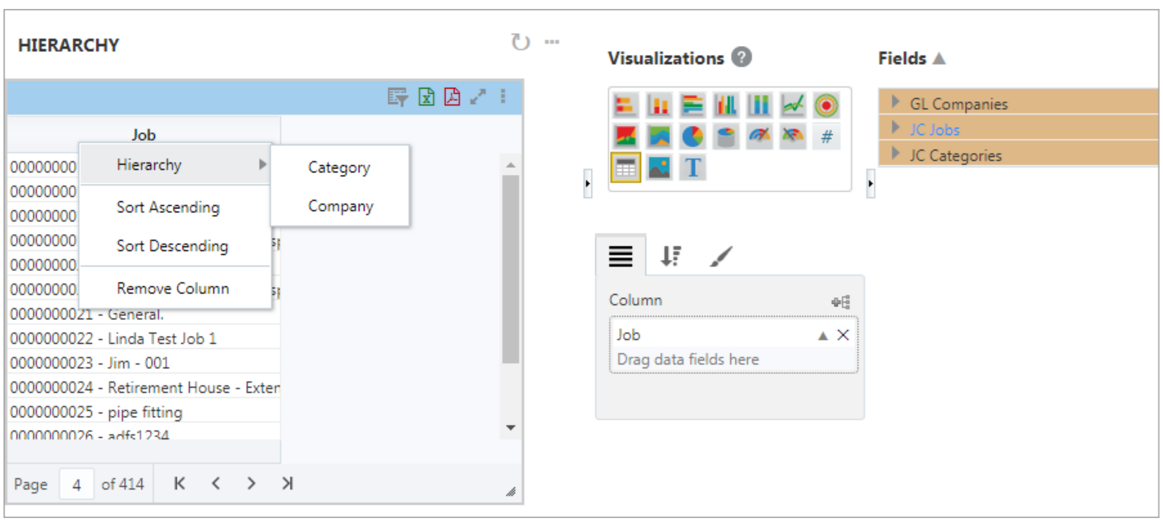
Tables at Runtime

Column Menu



To open a table column drop-down menu, hover your mouse over the column header and click on the down arrow.

Hierarchy



The Hierarchy menu option allows users to insert columns belonging to the same hierarchy to the table. A column’s hierarchy list can contain fields from folders that are not the column’s folder. A field hierarchy contains a root field and all its descendants.

NOTE: The hierarchies are defined in BI Catalog Builder, where the user can group any data type fields (same data type or mix) to form a hierarchy. For more information, please refer to the *Editing Fields* section of the *BI Catalog Builder* guide.

Data source security is applied to the fields in the Hierarchy submenu and the only fields displayed will be the ones to which the user has access.

When the user selects a field from the submenu, if the field was not previously selected for the table, it will be automatically added to the table.

A column's field hierarchy list is created as follows:

- Start with all fields in the column's field hierarchy.
  - Remove all fields that the user does not have authorization to use.
  - Remove all fields that were already added to the table as columns.
  - Remove all fields whose folders are not selected in the Fields pane.

Sort Ascending

Each column can be sorted in ascending order using this menu option.

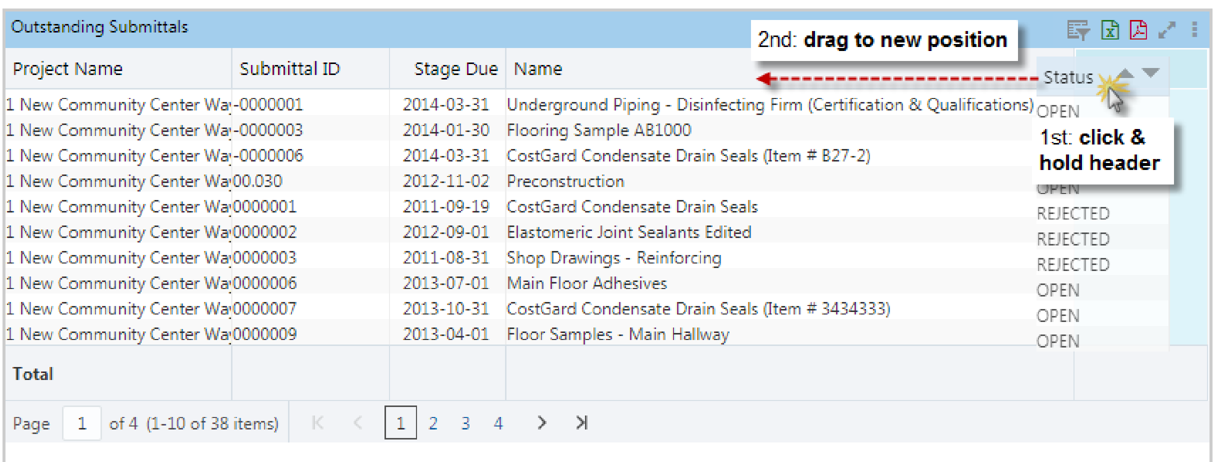
Sort Descending

Each column can be sorted in descending order using this menu option.

Remove Column

Use this option to remove a column from a table visualization.

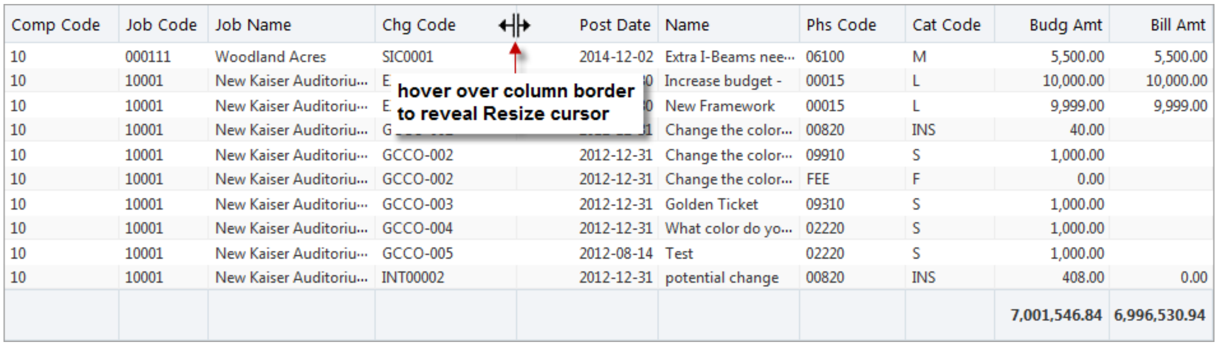
Reordering Columns



As shown above, a column can be drag and dropped to a new position by clicking and holding the column's header and then dragging it to its new position.

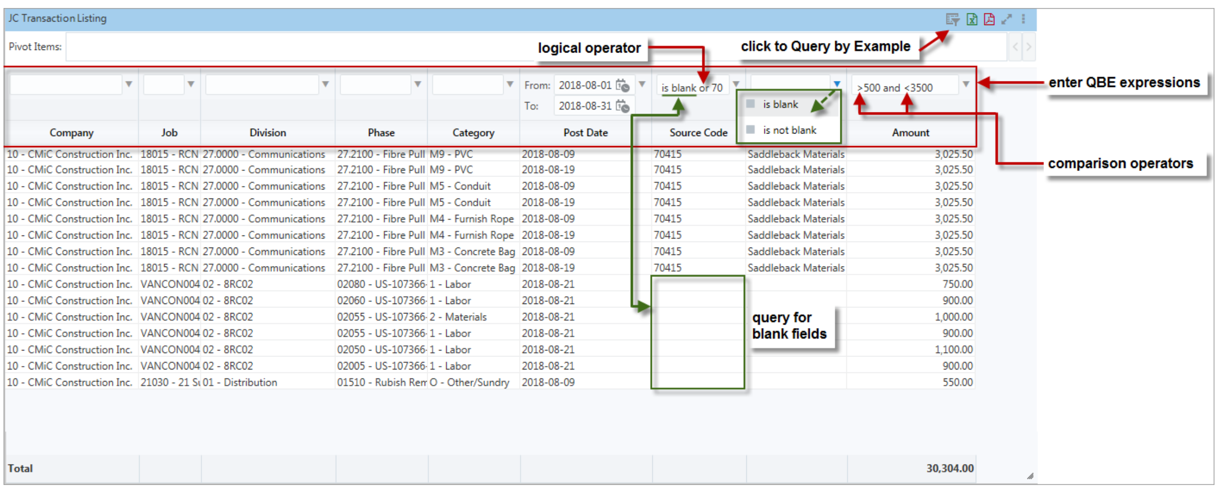
To reorder the position of a column, hover over its column header to reveal the Move cursor, then click and hold it and drag it to the desired position. Save the dashboard to save the column's new position.

Resizing Columns



To resize a column, hover the cursor over the column's border to reveal the Resize cursor (shown above), then click and hold the border and drag it to the desired position. Save the dashboard to save the columns new width.

Query By Example (QBE)



As shown above, a filter icon is available on the top-right of a table's header to Query by Example.

When the icon is clicked, a row of fields appears above the table column headers for the user to enter QBE expressions for each of the table's columns. Details on comparison and logical operators available to use in the expression fields for String, Number and Date columns are provided below.

Each table column can be queried for blank fields by clicking on the arrow button beside each expression field and selecting "is blank" or "is not blank" from the drop-down menu.

NOTE: The Value Case Hint field property, which is specified in BI Catalog Builder, can be used to generate SQL queries that may benefit from database column indexes. This field property is used to set whether values in a field are always uppercase or lowercase, which allows for a faster case-sensitive search in dashboard filters. However, users should only set this field property if the letter case of the column value is known, as inaccurate search results may be generated if set incorrectly. Refer to the *BI Catalog Builder* guide for more information.

After entering the QBE expressions, users can execute the query by pressing Enter on their keyboard. Invalid QBE expressions will not be included in the query.

NOTE: QBE is also applied to PDF and Excel exports.

Comparison Operators

The following comparison operators are supported:

Operator	Description
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to
=	Equal to
!=	Not equal to
<>	Not equal to

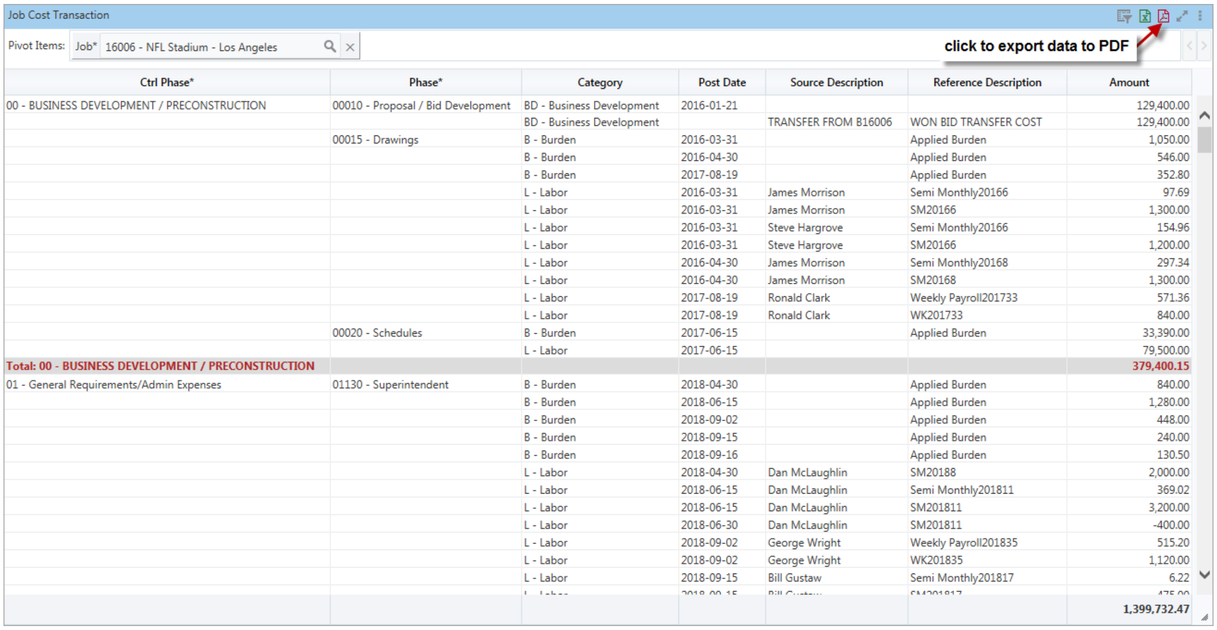
Logical Operators

The logical operators “and” and “or” are supported. They are case-insensitive. Only one logical operator is allowed per QBE expression.

Columns

- **STRING**: For a STRING column, a QBE value without a comparison operator prefix is implicitly assigned the startsWith operator.
- **NUMBER**: For a NUMBER column, a QBE value without a comparison operator prefix is implicitly assigned the = operator.
- **DATE**: For a DATE column:
    - The **From** date is implicitly assigned the >= operator.
    - The **To** date is implicitly assigned the <= operator.
    - When **From** date is empty, it is defaulted to the minimum date value for the column.
    - When **To** date is empty, it is defaulted to the maximum date value for the column.

Export Table to PDF



Ctrl Phase*	Phase*	Category	Post Date	Source Description	Reference Description	Amount
00 - BUSINESS DEVELOPMENT / PRECONSTRUCTION	00010 - Proposal / Bid Development	BD - Business Development	2016-01-21			129,400.00
		BD - Business Development		TRANSFER FROM B16006	WON BID TRANSFER COST	129,400.00
	00015 - Drawings	B - Burden	2016-03-31		Applied Burden	1,050.00
		B - Burden	2016-04-30		Applied Burden	546.00
		B - Burden	2017-08-19		Applied Burden	352.80
		L - Labor	2016-03-31	James Morrison	Semi Monthly20166	97.69
		L - Labor	2016-03-31	James Morrison	SM20166	1,300.00
		L - Labor	2016-03-31	Steve Hargrove	Semi Monthly20166	154.96
		L - Labor	2016-03-31	Steve Hargrove	SM20166	1,200.00
		L - Labor	2016-04-30	James Morrison	Semi Monthly20168	297.34
		L - Labor	2016-04-30	James Morrison	SM20168	1,300.00
		L - Labor	2017-08-19	Ronald Clark	Weekly Payroll201733	571.36
		L - Labor	2017-08-19	Ronald Clark	WK201733	840.00
	00020 - Schedules	B - Burden	2017-06-15		Applied Burden	33,390.00
		L - Labor	2017-06-15			79,500.00
Total: 00 - BUSINESS DEVELOPMENT / PRECONSTRUCTION						379,400.15
01 - General Requirements/Admin Expenses	01130 - Superintendent	B - Burden	2018-04-30		Applied Burden	840.00
		B - Burden	2018-06-15		Applied Burden	1,280.00
		B - Burden	2018-09-02		Applied Burden	448.00
		B - Burden	2018-09-15		Applied Burden	240.00
		B - Burden	2018-09-16		Applied Burden	130.50
		L - Labor	2018-04-30	Dan McLaughlin	SM20188	2,000.00
		L - Labor	2018-06-15	Dan McLaughlin	Semi Monthly201811	369.02
		L - Labor	2018-06-15	Dan McLaughlin	SM201811	3,200.00
		L - Labor	2018-06-30	Dan McLaughlin	SM201811	-400.00
		L - Labor	2018-09-02	George Wright	Weekly Payroll201835	515.20
		L - Labor	2018-09-02	George Wright	WK201835	1,120.00
		L - Labor	2018-09-15	Bill Gustaw	Semi Monthly201817	6.22
						1,399,732.47

As shown above, a PDF icon is available on the top-right of a table's header to export the table's data to a PDF file.

Below is a screenshot of the above table's exported data in a PDF file:

CMiC

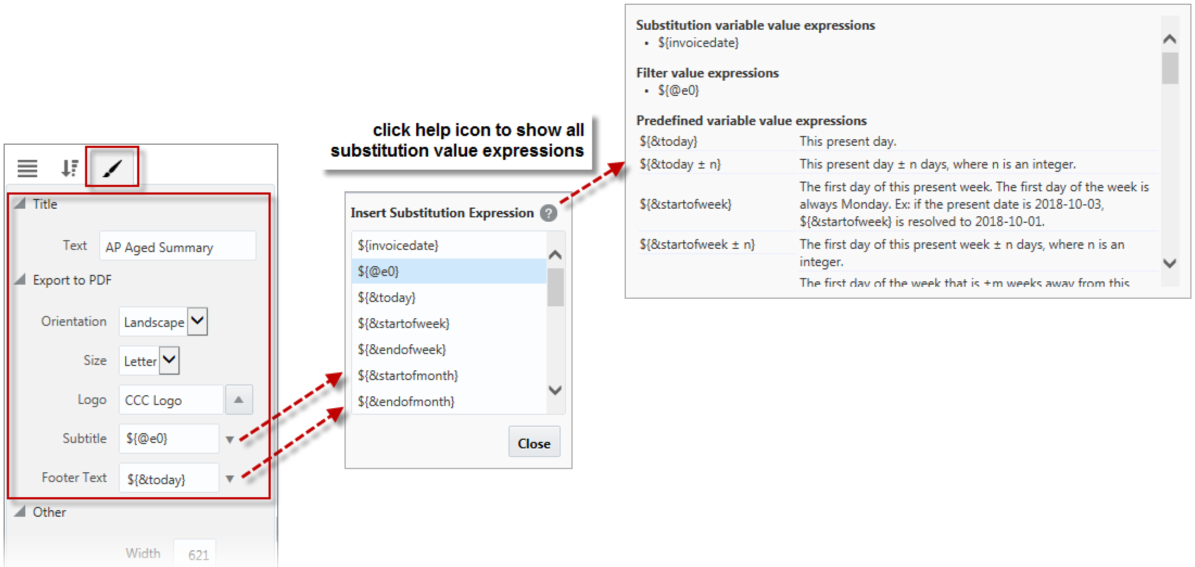
JOB COST TRANSACTION
Sample Subtitle

Page: 1 of 12
Date: 10-Dec-2018
Time: 11:23 AM EST

Ctrl Phase*	Phase*	Category	Post Date	Source Description	Reference Description	Amount
00 - BUSINESS DEVELOPMENT / PRECONSTRUCTION	00010 - Proposal / Bid Development	BD - Business Development	2016-01-21			129,400.00
		BD - Business Development		TRANSFER FROM B16006	WON BID TRANSFER COST	129,400.00
	00015 - Drawings	B - Burden	2016-03-31		Applied Burden	1,050.00
		B - Burden	2016-04-30		Applied Burden	546.00
		B - Burden	2017-08-19		Applied Burden	352.80
		L - Labor	2016-03-31	James Morrison	Semi Monthly20166	97.69
		L - Labor	2016-03-31	James Morrison	SM20166	1,300.00
		L - Labor	2016-03-31	Steve Hargrove	Semi Monthly20166	154.96
		L - Labor	2016-03-31	Steve Hargrove	SM20166	1,200.00
		L - Labor	2016-04-30	James Morrison	Semi Monthly20168	297.34
		L - Labor	2016-04-30	James Morrison	SM20168	1,300.00
		L - Labor	2017-08-19	Ronald Clark	Weekly Payroll201733	571.36
		L - Labor	2017-08-19	Ronald Clark	WK201733	840.00
	00020 - Schedules	B - Burden	2017-06-15		Applied Burden	33,390.00
		L - Labor	2017-06-15			79,500.00
Total: 00 - BUSINESS DEVELOPMENT / PRECONSTRUCTION						379,400.15
01 - General Requirements/Admin Expenses	01130 - Superintendent	B - Burden	2018-04-30		Applied Burden	840.00
		B - Burden	2018-06-15		Applied Burden	1,280.00
		B - Burden	2018-09-02		Applied Burden	448.00
		B - Burden	2018-09-15		Applied Burden	240.00
		B - Burden	2018-09-16		Applied Burden	130.50
		L - Labor	2018-04-30	Dan McLaughlin	SM20188	2,000.00
		L - Labor	2018-06-15	Dan McLaughlin	Semi Monthly201811	369.02
		L - Labor	2018-06-15	Dan McLaughlin	SM201811	3,200.00
		L - Labor	2018-06-30	Dan McLaughlin	SM201811	-400.00
		L - Labor	2018-09-02	George Wright	Weekly Payroll201835	515.20
		L - Labor	2018-09-02	George Wright	WK201835	1,120.00
		L - Labor	2018-09-15	Bill Gustaw	Semi Monthly201817	6.22
		L - Labor	2018-09-15	Bill Gustaw	SM201817	475.00
		L - Labor	2018-09-15	Candice Francis	Semi Monthly201817	14.32
		L - Labor	2018-09-15	Candice Francis	SM201817	125.00
		L - Labor	2018-09-16	Harry Adams	Weekly Payroll201837	20.55
		L - Labor	2018-09-16	Harry Adams	WK201837	123.75
		L - Labor	2018-09-16	Ryan Miller	Weekly Payroll201837	128.96
		L - Labor	2018-09-16	Ryan Miller	WK201837	202.50
	01135 - Project Management	B - Burden	2016-03-31		Applied Burden	1,134.00
		B - Burden	2016-04-30		Applied Burden	189.00
		B - Burden	2017-04-15		Applied Burden	478.80
		B - Burden	2017-06-30		Applied Burden	159.60

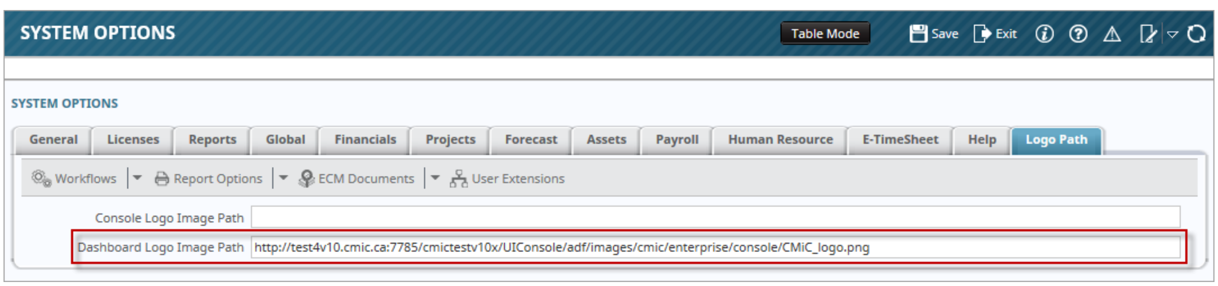
Sample Footer Text

The following options are available for the Export to PDF functionality on the Format tab of the Visualization Properties control, as shown below. They are used to set the PDF's page orientation and size, to upload a logo, and to specify subtitle and footer text for the PDF.



Example of the export to PDF functionality on the Format tab of the Table Visualization Properties control

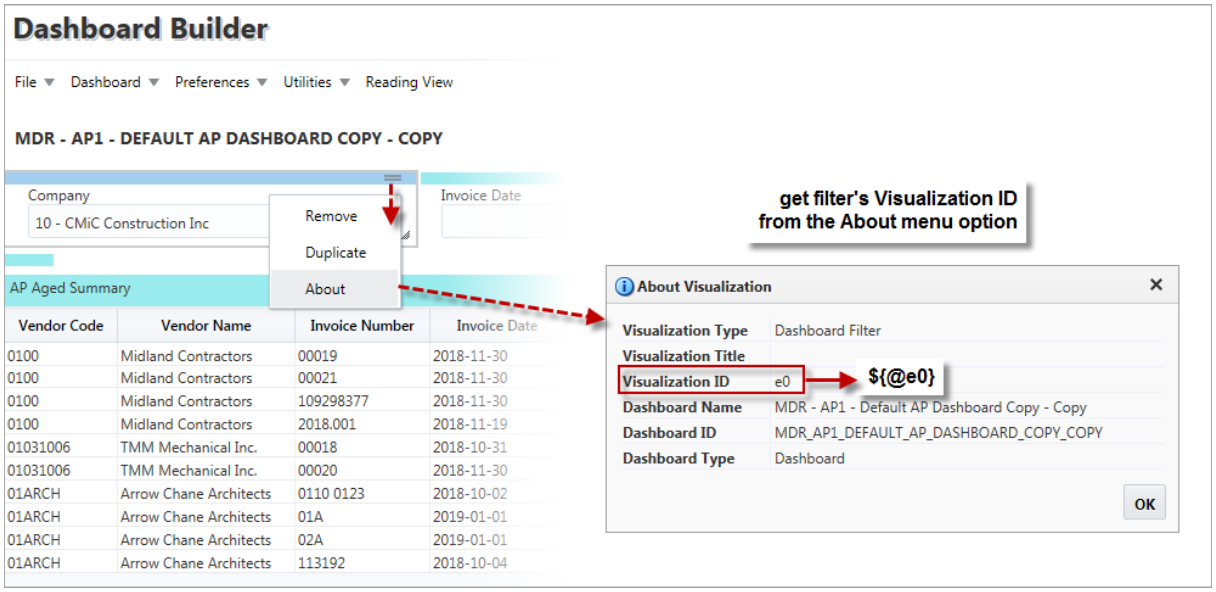
As shown in the above screenshot, a logo can be displayed in the upper left corner of the exported PDF. If the Logo property is left empty on Format tab of the Visualization Properties control, the logo defaults from the Dashboard Logo Image Path field on the Logo Path tab of the System Options screen (standard path: *System > Setup > System Options – Logo Path tab*), as shown below. Note, the URL to the image must be publicly accessible (no authentication).



Otherwise, the user can upload a substitute logo in the Logo property on the Format tab of the Visualization Properties control which will display on the PDF instead. To clear a substitute logo from the Logo property on the Format tab, use the Delete or Backspace keyboard key.

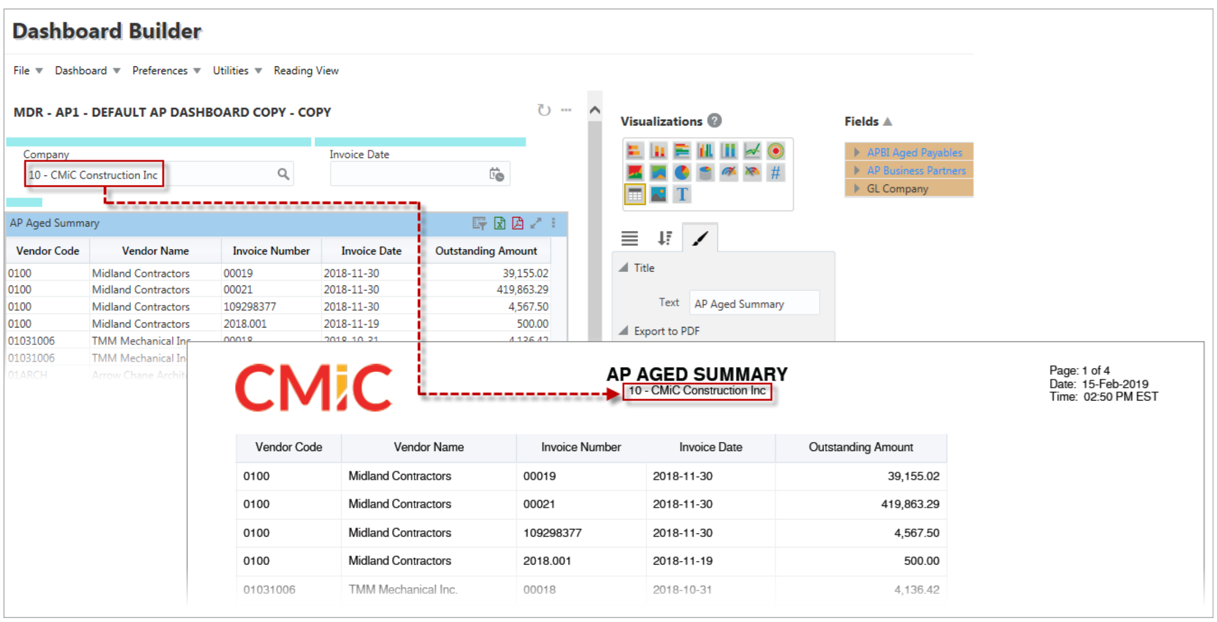
Custom subtitle and footer text may contain any of the available substitution value expressions. Click on the arrow next to the Subtitle or Footer Text fields in the Format tab to launch a pop-up window where substitution values can be selected. Click on the help icon in the pop-up window to show all substitution value expressions, including substitution variable value expressions, filter value expressions, and pre-defined variable value expressions.

For a list of available pre-defined substitution value expressions, please refer to the table in the following section of this guide: *Insert Substitution Variable – Menu Option*.



The format for a page filter value expression is: ${@visualizationId}. The visualizationId can be obtained from the page filter's About menu option (e.g. ${@e0}), as shown in the screenshot above.

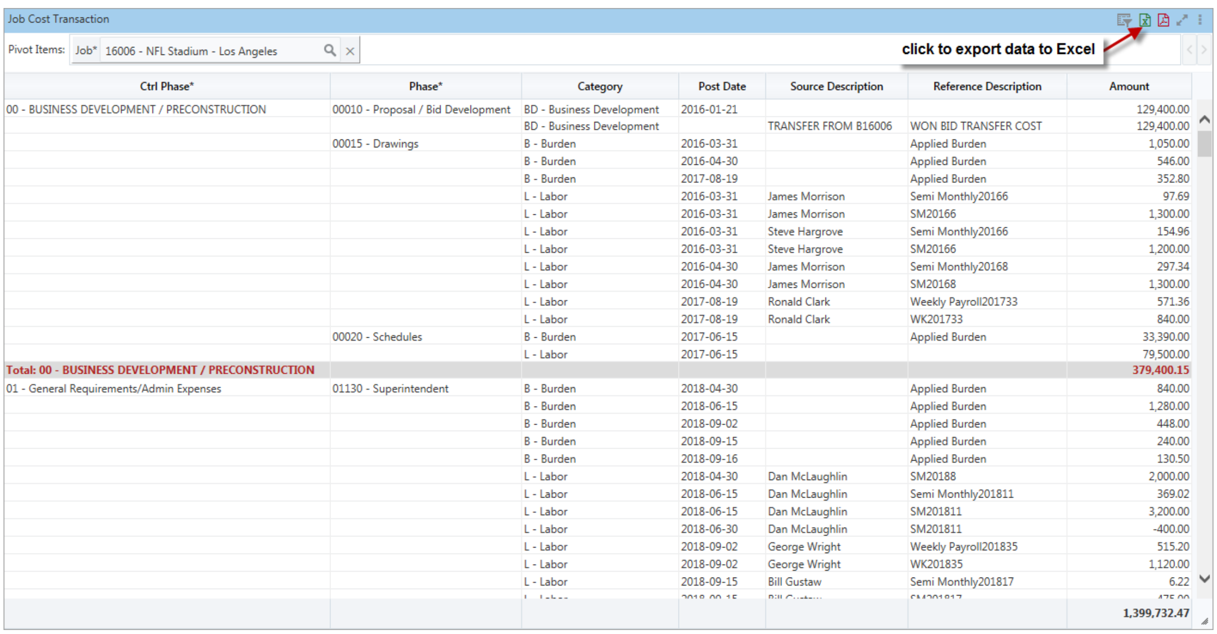
An example of the resulting exported PDF is shown in the screenshot below.



Notes for Exporting Data to PDF

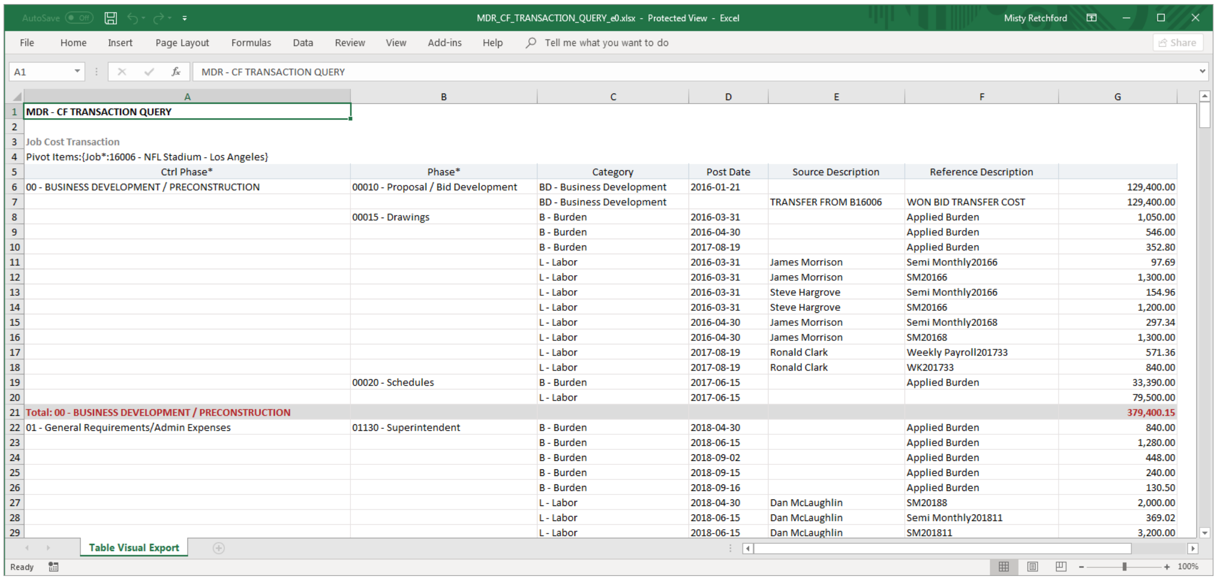
- The following items are exported from a table to a PDF file:
    - Column sorts (ascending/descending)
    - Group Sorts
    - Group Sort Lines, including color & thickness
    - Subtotals, including font & background color
    - Grand totals
- Latest data is exported, and latest page filter values are applied.
- URLs in columns become hyperlinks in PDF.
- When necessary, an export is queued, with a message stating position in queue as follows, "Please Wait. You are currently in position *X*."
- Maximum amount of time a PDF export can run to completion is 5 minutes; after 5 minutes, a timeout message is displayed, asking the user to narrow the data selection; an incomplete PDF file is still downloaded, with the prefix "Incomplete".
- Characters from most writing systems (languages) are supported; if unknown characters are found during the export process, the unknown characters are replaced with the character �.

Export Table to Excel



Ctrl Phase*	Phase*	Category	Post Date	Source Description	Reference Description	Amount
00 - BUSINESS DEVELOPMENT / PRECONSTRUCTION	00010 - Proposal / Bid Development	BD - Business Development	2016-01-21			129,400.00
		BD - Business Development		TRANSFER FROM B16006	WON BID TRANSFER COST	129,400.00
	00015 - Drawings	B - Burden	2016-03-31		Applied Burden	1,050.00
		B - Burden	2016-04-30		Applied Burden	546.00
		B - Burden	2017-08-19		Applied Burden	352.80
		L - Labor	2016-03-31	James Morrison	Semi Monthly20166	97.69
		L - Labor	2016-03-31	James Morrison	SM20166	1,300.00
		L - Labor	2016-03-31	Steve Hargrove	Semi Monthly20166	154.96
		L - Labor	2016-03-31	Steve Hargrove	SM20166	1,200.00
		L - Labor	2016-04-30	James Morrison	Semi Monthly20168	297.34
		L - Labor	2016-04-30	James Morrison	SM20168	1,300.00
		L - Labor	2017-08-19	Ronald Clark	Weekly Payroll201733	571.36
		L - Labor	2017-08-19	Ronald Clark	WK201733	840.00
	00020 - Schedules	B - Burden	2017-06-15		Applied Burden	33,390.00
		L - Labor	2017-06-15			79,500.00
Total: 00 - BUSINESS DEVELOPMENT / PRECONSTRUCTION						**379,400.15**
01 - General Requirements/Admin Expenses	01130 - Superintendent	B - Burden	2018-04-30		Applied Burden	840.00
		B - Burden	2018-06-15		Applied Burden	1,280.00
		B - Burden	2018-09-02		Applied Burden	448.00
		B - Burden	2018-09-15		Applied Burden	240.00
		B - Burden	2018-09-16		Applied Burden	130.50
		L - Labor	2018-04-30	Dan McLaughlin	SM20188	2,000.00
		L - Labor	2018-06-15	Dan McLaughlin	Semi Monthly201811	369.02
		L - Labor	2018-06-15	Dan McLaughlin	SM201811	3,200.00
		L - Labor	2018-06-30	Dan McLaughlin	SM201811	-400.00
		L - Labor	2018-09-02	George Wright	Weekly Payroll201835	515.20
		L - Labor	2018-09-02	George Wright	WK201835	1,120.00
		L - Labor	2018-09-15	Bill Gustaw	Semi Monthly201817	6.22
						1,399,732.47

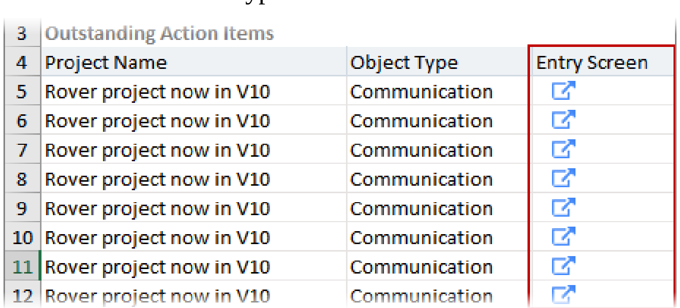
As shown above, an Excel icon is available on the top-right of a table's header to export the table's data to an Excel spreadsheet. Below is a screenshot of the above table's exported data in Excel:



	A	B	C	D	E	F	G
1	**MDR - CF TRANSACTION QUERY**						
2							
3	Job Cost Transaction						
4	Pivot Items:{Job*:16006 - NFL Stadium - Los Angeles}						
5	Ctrl Phase*	Phase*	Category	Post Date	Source Description	Reference Description	
6	00 - BUSINESS DEVELOPMENT / PRECONSTRUCTION	00010 - Proposal / Bid Development	BD - Business Development	2016-01-21			129,400.00
7			BD - Business Development		TRANSFER FROM B16006	WON BID TRANSFER COST	129,400.00
8		00015 - Drawings	B - Burden	2016-03-31		Applied Burden	1,050.00
9			B - Burden	2016-04-30		Applied Burden	546.00
10			B - Burden	2017-08-19		Applied Burden	352.80
11			L - Labor	2016-03-31	James Morrison	Semi Monthly20166	97.69
12			L - Labor	2016-03-31	James Morrison	SM20166	1,300.00
13			L - Labor	2016-03-31	Steve Hargrove	Semi Monthly20166	154.96
14			L - Labor	2016-03-31	Steve Hargrove	SM20166	1,200.00
15			L - Labor	2016-04-30	James Morrison	Semi Monthly20168	297.34
16			L - Labor	2016-04-30	James Morrison	SM20168	1,300.00
17			L - Labor	2017-08-19	Ronald Clark	Weekly Payroll201733	571.36
18			L - Labor	2017-08-19	Ronald Clark	WK201733	840.00
19		00020 - Schedules	B - Burden	2017-06-15		Applied Burden	33,390.00
20			L - Labor	2017-06-15			79,500.00
21	Total: 00 - BUSINESS DEVELOPMENT / PRECONSTRUCTION						379,400.15
22	01 - General Requirements/Admin Expenses	01130 - Superintendent	B - Burden	2018-04-30		Applied Burden	840.00
23			B - Burden	2018-06-15		Applied Burden	1,280.00
24			B - Burden	2018-09-02		Applied Burden	448.00
25			B - Burden	2018-09-15		Applied Burden	240.00
26			B - Burden	2018-09-16		Applied Burden	130.50
27			L - Labor	2018-04-30	Dan McLaughlin	SM20188	2,000.00
28			L - Labor	2018-06-15	Dan McLaughlin	Semi Monthly201811	369.02
29			L - Labor	2018-06-15	Dan McLaughlin	SM201811	3,200.00

Notes for Exporting Data to Excel

- CMiC BI is a data charting/analyzing tool that presents data in BI dashboards and is not designed to be used as a data export tool. While Excel export functionality exists in BI, it is only meant to assist users with formatting and printing dashboard data. For assistance with tasks specifically related to exporting customer data, we recommend that users contact CMiC Support.
- The following items are exported from a table to an Excel file:
  - Wrap Cell Text option
  - Column sorts (ascending/descending)
  - Group Sorts
  - Group Sort Lines, including color & thickness (line thickness of 1 becomes an Excel thin line; line thickness more than 1 becomes an Excel thick line)
  - Subtotals, including font & background color
  - Grand totals
  - Pivot items
- Latest data is exported, and latest page filter values are applied.
- URLs in columns become hyperlinks in Excel:

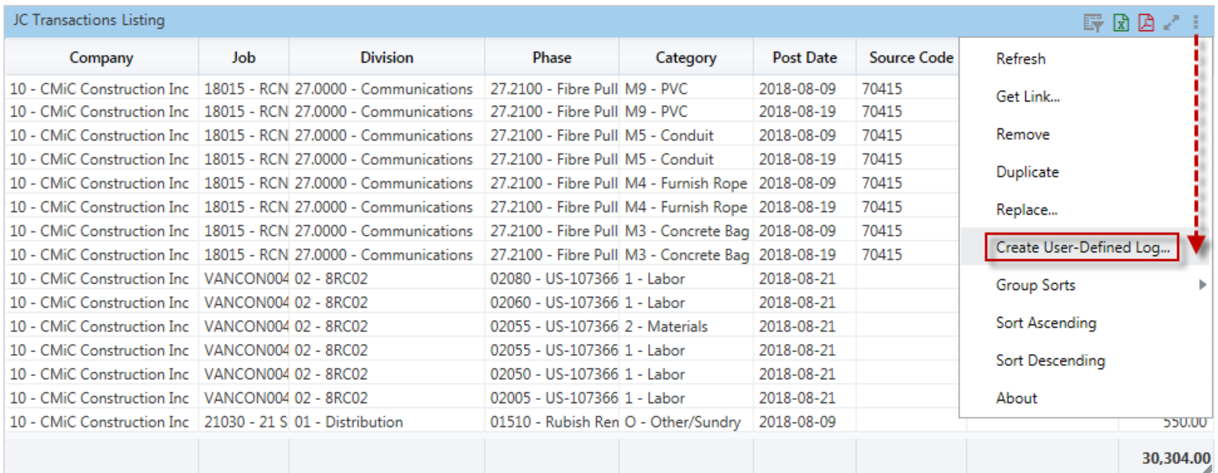


3	Outstanding Action Items		
4	Project Name	Object Type	Entry Screen
5	Rover project now in V10	Communication	
6	Rover project now in V10	Communication	
7	Rover project now in V10	Communication	
8	Rover project now in V10	Communication	
9	Rover project now in V10	Communication	
10	Rover project now in V10	Communication	
11	Rover project now in V10	Communication	
12	Rover project now in V10	Communication	

- When necessary, an export is queued, with a message stating position in queue as follows, "Please Wait. You are currently in position *X*."

- Maximum amount of time an Excel export can run to completion is 5 minutes; after 5 minutes, a timeout message is displayed, asking the user to narrow the data selection; an incomplete Excel file is still downloaded, with the prefix "Incomplete".
- When a large amount of data is exported, the actual number of exported records varies depending on the system load at the time of export.
- If export cannot be completed due to a timeout, try limiting the amount of exported data using filters.
- Characters from most writing systems (languages) are supported; if unknown characters are found during the export process, the unknown characters are replaced with the character �.

Create User-Defined Log based on Table


JC Transactions Listing

Company	Job	Division	Phase	Category	Post Date	Source Code
10 - CMiC Construction Inc	18015 - RCN	27.0000 - Communications	27.2100 - Fibre Pull	M9 - PVC	2018-08-09	70415
10 - CMiC Construction Inc	18015 - RCN	27.0000 - Communications	27.2100 - Fibre Pull	M9 - PVC	2018-08-19	70415
10 - CMiC Construction Inc	18015 - RCN	27.0000 - Communications	27.2100 - Fibre Pull	M5 - Conduit	2018-08-09	70415
10 - CMiC Construction Inc	18015 - RCN	27.0000 - Communications	27.2100 - Fibre Pull	M5 - Conduit	2018-08-19	70415
10 - CMiC Construction Inc	18015 - RCN	27.0000 - Communications	27.2100 - Fibre Pull	M4 - Furnish Rope	2018-08-09	70415
10 - CMiC Construction Inc	18015 - RCN	27.0000 - Communications	27.2100 - Fibre Pull	M4 - Furnish Rope	2018-08-19	70415
10 - CMiC Construction Inc	18015 - RCN	27.0000 - Communications	27.2100 - Fibre Pull	M3 - Concrete Bag	2018-08-09	70415
10 - CMiC Construction Inc	18015 - RCN	27.0000 - Communications	27.2100 - Fibre Pull	M3 - Concrete Bag	2018-08-19	70415
10 - CMiC Construction Inc	VANCON004	02 - 8RC02	02080 - US-107366	1 - Labor	2018-08-21	
10 - CMiC Construction Inc	VANCON004	02 - 8RC02	02060 - US-107366	1 - Labor	2018-08-21	
10 - CMiC Construction Inc	VANCON004	02 - 8RC02	02055 - US-107366	2 - Materials	2018-08-21	
10 - CMiC Construction Inc	VANCON004	02 - 8RC02	02055 - US-107366	1 - Labor	2018-08-21	
10 - CMiC Construction Inc	VANCON004	02 - 8RC02	02050 - US-107366	1 - Labor	2018-08-21	
10 - CMiC Construction Inc	VANCON004	02 - 8RC02	02005 - US-107366	1 - Labor	2018-08-21	
10 - CMiC Construction Inc	21030 - 21 S	01 - Distribution	01510 - Rubish Ren	O - Other/Sundry	2018-08-09	

This feature is used to create a user-defined log in CMiC Field (PM JSP) based on a table visualization, and it is only available to users with the system privilege BILOGCRT (CMIC BI: Allows the user to create User-Defined Logs). Also, this option is only available in BI Dashboard Builder – it is not available in dashboards at runtime.

NOTE: Only users with the system privilege will be able to see the Create User-Defined Log menu item; otherwise, the menu item will be hidden.

To create a User-Defined Log screen in CMiC Field, after a table is created, select the Create User-Defined Log option from the table's Visualization Menu (shown above).

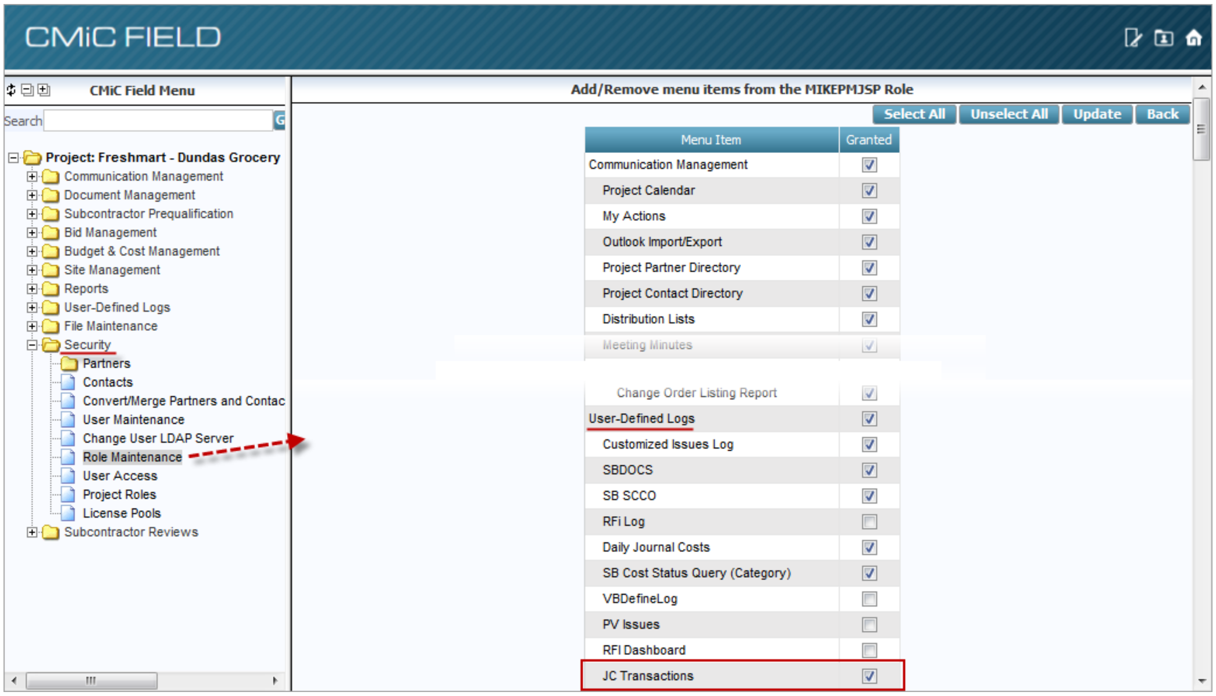
To have the User-Defined Log filtered for particular values, use Pivot Items, as detailed under the following section: *Part 3: Format*.

If page filters, visual filters or 'Current Project Only' checkbox filter are defined in Dashboard Builder properties, these properties will be replicated in CMiC Field's user defined logs.

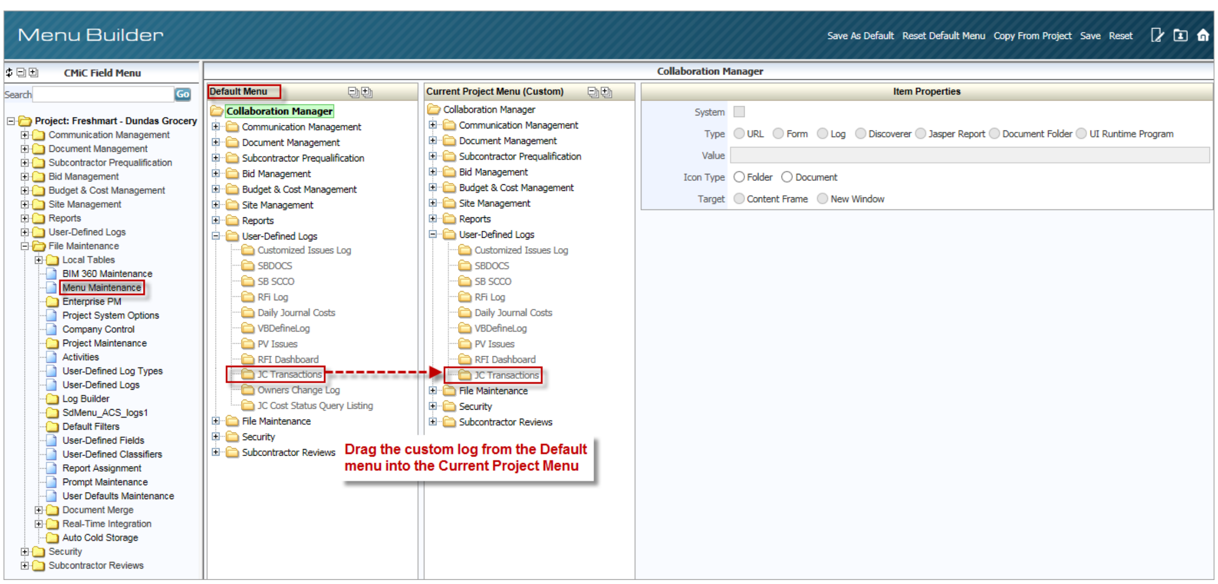
Grant Security Access to New Log's Treeview Link

When the new User-Defined Log is created, the user that created it is automatically granted rights to the Treeview link for the new log.

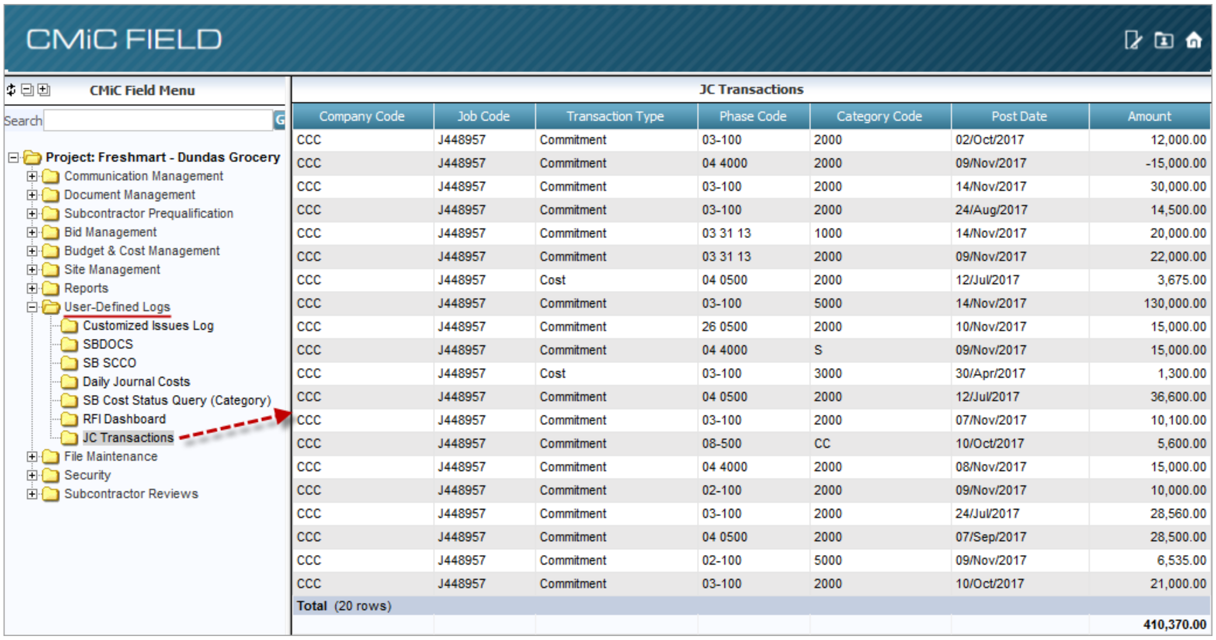
Security access to the log's Treeview link for other users or for CMiC Field security roles is granted using the "Assign Menu Items" option in the Role Maintenance or User Access screen, as shown below.



After security access to the new User-Defined Log has been granted, the log may need to be manually added to the CMiC Field Treeview menu using the Menu Maintenance screen. Locate and drag the custom log from the Default menu into the Current Project Menu and click on [**Save**].



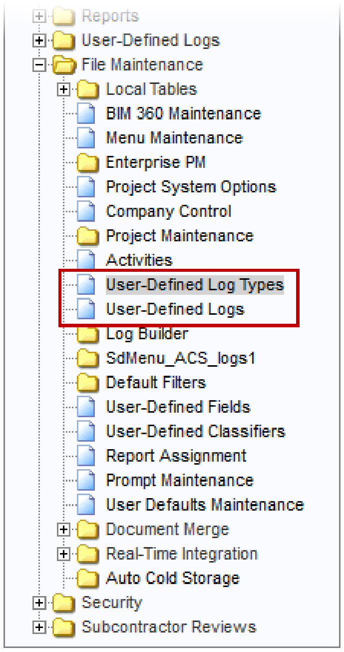
The new User-Defined Log will now be available under the User-Defined Logs Treeview node in CMiC Field:



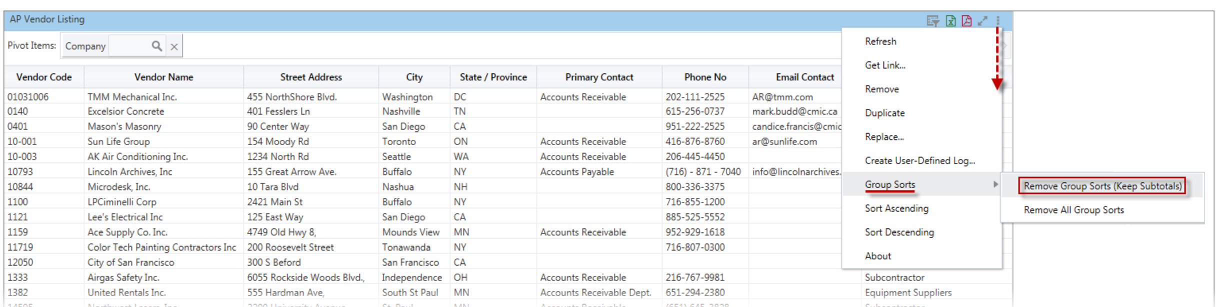
Company Code	Job Code	Transaction Type	Phase Code	Category Code	Post Date	Amount
CCC	J448957	Commitment	03-100	2000	02/Oct/2017	12,000.00
CCC	J448957	Commitment	04 4000	2000	09/Nov/2017	-15,000.00
CCC	J448957	Commitment	03-100	2000	14/Nov/2017	30,000.00
CCC	J448957	Commitment	03-100	2000	24/Aug/2017	14,500.00
CCC	J448957	Commitment	03 31 13	1000	14/Nov/2017	20,000.00
CCC	J448957	Commitment	03 31 13	2000	09/Nov/2017	22,000.00
CCC	J448957	Cost	04 0500	2000	12/Jul/2017	3,675.00
CCC	J448957	Commitment	03-100	5000	14/Nov/2017	130,000.00
CCC	J448957	Commitment	26 0500	2000	10/Nov/2017	15,000.00
CCC	J448957	Commitment	04 4000	S	09/Nov/2017	15,000.00
CCC	J448957	Cost	03-100	3000	30/Apr/2017	1,300.00
CCC	J448957	Commitment	04 0500	2000	12/Jul/2017	36,600.00
CCC	J448957	Commitment	03-100	2000	07/Nov/2017	10,100.00
CCC	J448957	Commitment	08-500	CC	10/Oct/2017	5,600.00
CCC	J448957	Commitment	04 4000	2000	08/Nov/2017	15,000.00
CCC	J448957	Commitment	02-100	2000	09/Nov/2017	10,000.00
CCC	J448957	Commitment	03-100	2000	24/Jul/2017	28,560.00
CCC	J448957	Commitment	04 0500	2000	07/Sep/2017	28,500.00
CCC	J448957	Commitment	02-100	5000	09/Nov/2017	6,535.00
CCC	J448957	Commitment	03-100	2000	10/Oct/2017	21,000.00
Total (20 rows)						
						410,370.00

Edit User-Defined Log

After the User-Defined Log has been created, like any other User-Defined Log, it can be edited using the User-Defined Log Types and User-Defined Logs screens:



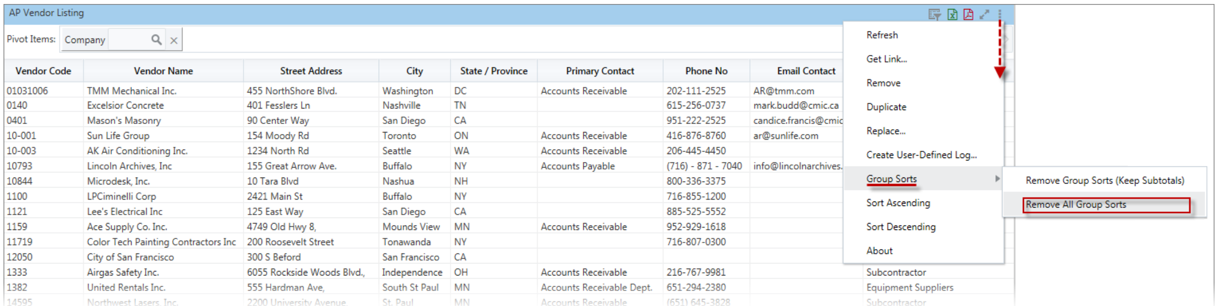
Remove Group Sorts (Keep Subtotals)



This option is used to remove all Group Sorts set up for the table but to keep Subtotals for Group Sorts.

The Group Sort option for tables is discussed in the following subsection for tables: *Part 1: Plotting Fields*.

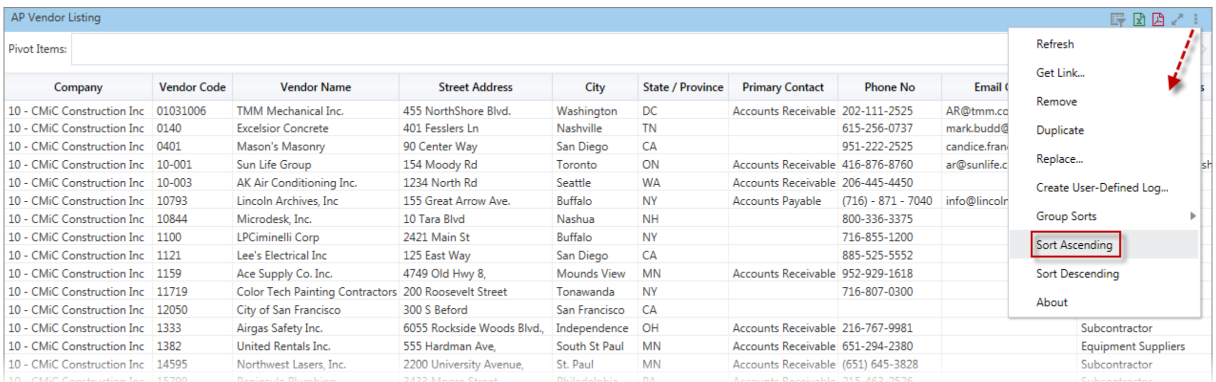
Remove All Group Sorts



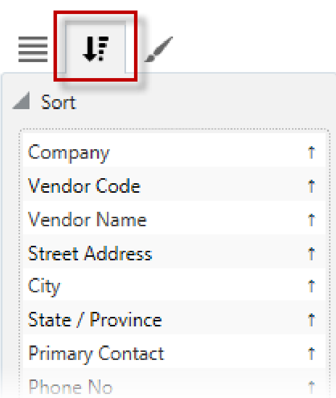
This option is used to remove all Group Sorts (including Subtotals for Group Sorts) set up for the table.

The Group Sort option for tables is discussed in the followig subsection for tables: *Part 1: Plotting Fields*.

Sort Ascending

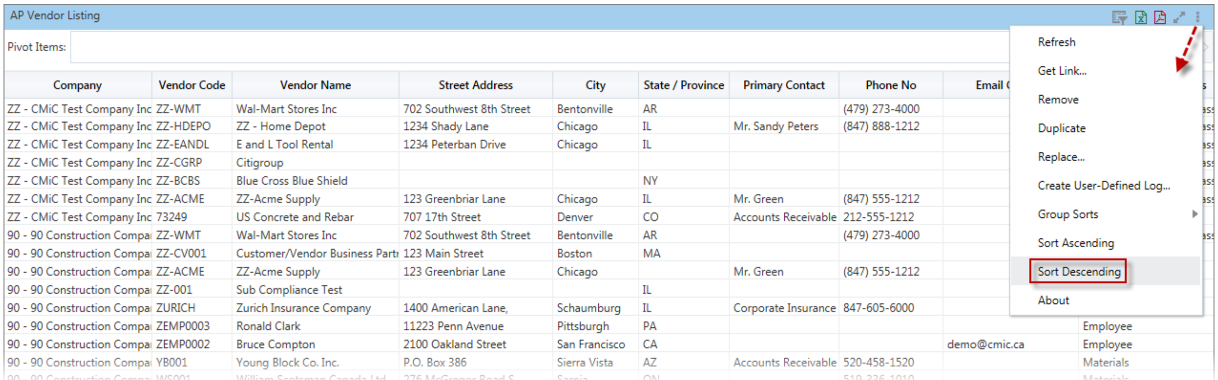


This option aligns the table's sort order to the order of the columns and sorts the table's columns in ascending order. The sort method selected, ascending in this case, is reflected in the Sort & Filters tab of the Visualization Properties control, as indicated by the up-arrow (↑).

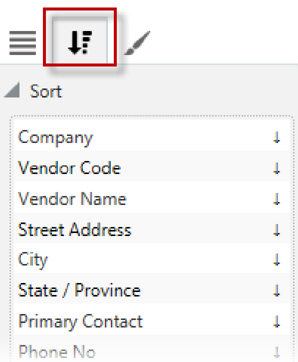


Example of Visualization Properties control showing ascending sort method

Sort Descending



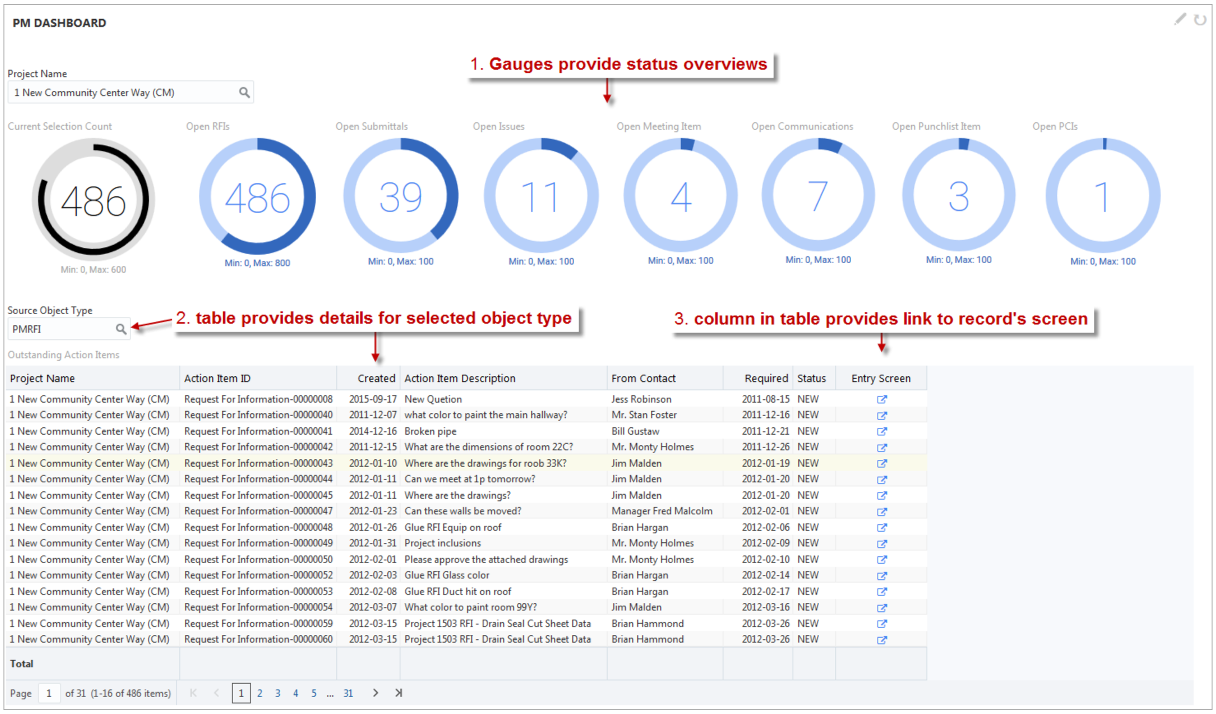
This option aligns the table's sort order to the order of the columns and sorts the table's columns in descending order. The sort method selected, descending in this case, is reflected in Sort & Filters tab of the Visualization Properties control, as indicated by the down-arrow (↓).



Example of Visualization Properties control showing descending sort method

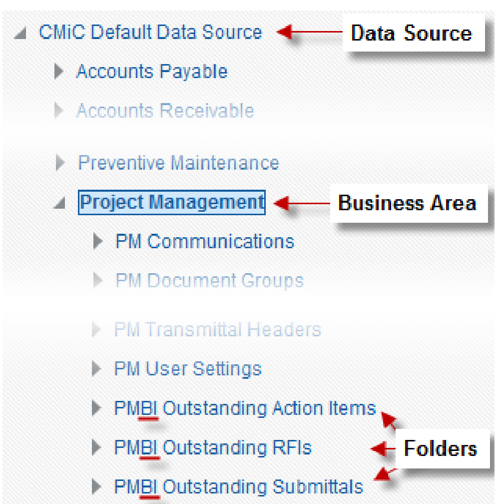
Create BI Springboards

As explained in the overview, BI Dashboard Builder can also be used to create BI Springboards, which are dashboards with springboard (link-out) capabilities, as tables provide the ability to springboard to record screens to view further details, edit data, and to perform actions like replying to RFIs, approving requests, changing voucher compliance statuses, and updating equipment details, as shown below:



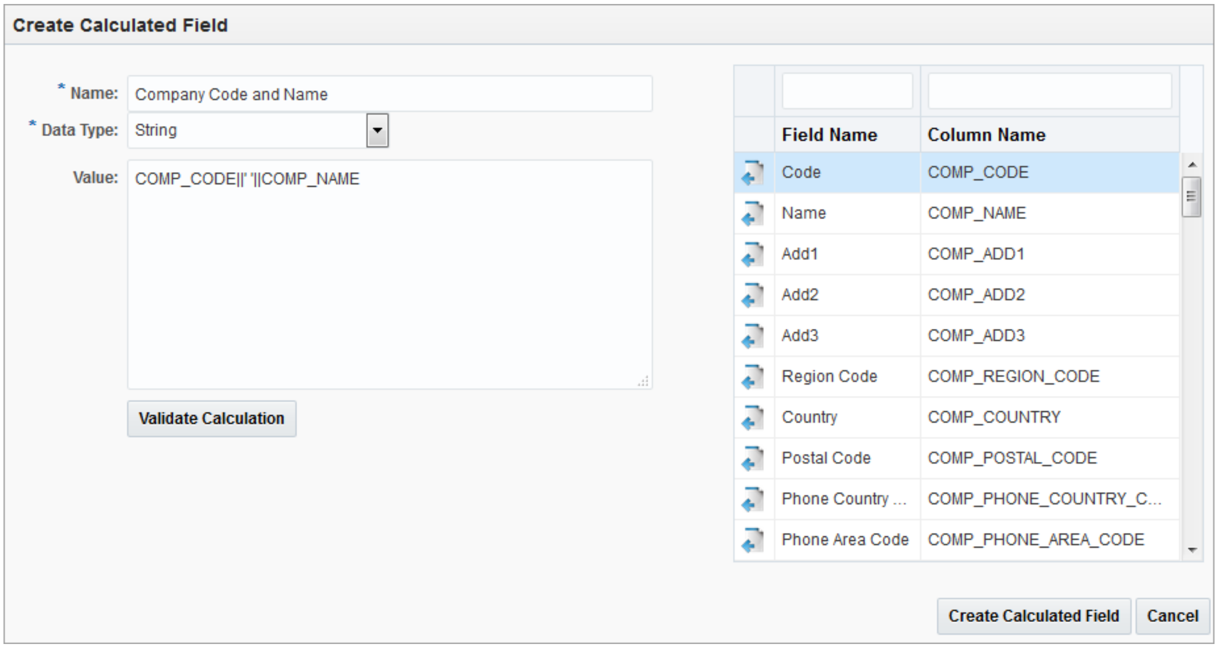
Project Name	Action Item ID	Created	Action Item Description	From Contact	Required	Status	Entry Screen
1 New Community Center Way (CM)	Request For Information-00000008	2015-09-17	New Quetion	Jess Robinson	2011-08-15	NEW	
1 New Community Center Way (CM)	Request For Information-00000040	2011-12-07	what color to paint the main hallway?	Mr. Stan Foster	2011-12-16	NEW	
1 New Community Center Way (CM)	Request For Information-00000041	2014-12-16	Broken pipe	Bill Gustaw	2011-12-21	NEW	
1 New Community Center Way (CM)	Request For Information-00000042	2011-12-15	What are the dimensions of room 22C?	Mr. Monty Holmes	2011-12-26	NEW	
1 New Community Center Way (CM)	Request For Information-00000043	2012-01-10	Where are the drawings for roob 33K?	Jim Malden	2012-01-19	NEW	
1 New Community Center Way (CM)	Request For Information-00000044	2012-01-11	Can we meet at 1p tomorrow?	Jim Malden	2012-01-20	NEW	
1 New Community Center Way (CM)	Request For Information-00000045	2012-01-11	Where are the drawings?	Jim Malden	2012-01-20	NEW	
1 New Community Center Way (CM)	Request For Information-00000047	2012-01-23	Can these walls be moved?	Manager Fred Malcolm	2012-02-01	NEW	
1 New Community Center Way (CM)	Request For Information-00000048	2012-01-26	Glue RFI Equip on roof	Brian Hargan	2012-02-06	NEW	
1 New Community Center Way (CM)	Request For Information-00000049	2012-01-31	Project inclusions	Mr. Monty Holmes	2012-02-09	NEW	
1 New Community Center Way (CM)	Request For Information-00000050	2012-02-01	Please approve the attached drawings	Mr. Monty Holmes	2012-02-10	NEW	
1 New Community Center Way (CM)	Request For Information-00000052	2012-02-03	Glue RFI Glass color	Brian Hargan	2012-02-14	NEW	
1 New Community Center Way (CM)	Request For Information-00000053	2012-02-08	Glue RFI Duct hit on roof	Brian Hargan	2012-02-17	NEW	
1 New Community Center Way (CM)	Request For Information-00000054	2012-03-07	What color to paint room 99Y?	Jim Malden	2012-03-16	NEW	
1 New Community Center Way (CM)	Request For Information-00000059	2012-03-15	Project 1503 RFI - Drain Seal Cut Sheet Data	Brian Hammond	2012-03-26	NEW	
1 New Community Center Way (CM)	Request For Information-00000060	2012-03-15	Project 1503 RFI - Drain Seal Cut Sheet Data	Brian Hammond	2012-03-26	NEW	
Total							

For a table to have this springboard ability, it must use a folder of the Advanced Analytics type, which is a special view that contains a column with links to each record's screen. Some such views (i.e., folders) are included in the provided default data source (CMiC Default Data Source), and they are identified in BI Catalog Builder by the "BI" suffix in a view's (i.e., folder's) name, as shown below:



Calculated (Custom) **Fields**

Visualizations can use calculated fields, which are custom fields created and added to a folder in BI Catalog Builder, using the Create Calculated Field pop-up shown below:



When a calculated field is added to a folder (i.e., table/view), a column for the new field is added to it, and each of its rows has the new calculated field.

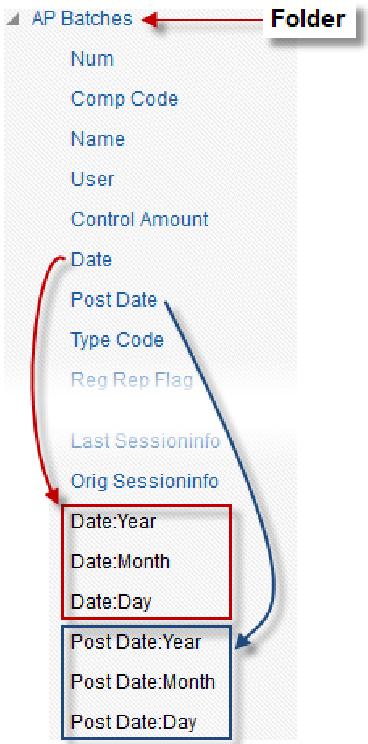
For each row, the calculated field displays the result of an SQL expression, which can include any Oracle SQL function and operator, and can contain references to any fields in the folder to specify values. A field referenced in an SQL expression represents the value of that field in the particular row of the calculated field being evaluated.

For details about creating and adding calculated fields to a folder, please refer to the *BI Catalog Builder* guide.

Date Fields

Date Calculated Fields

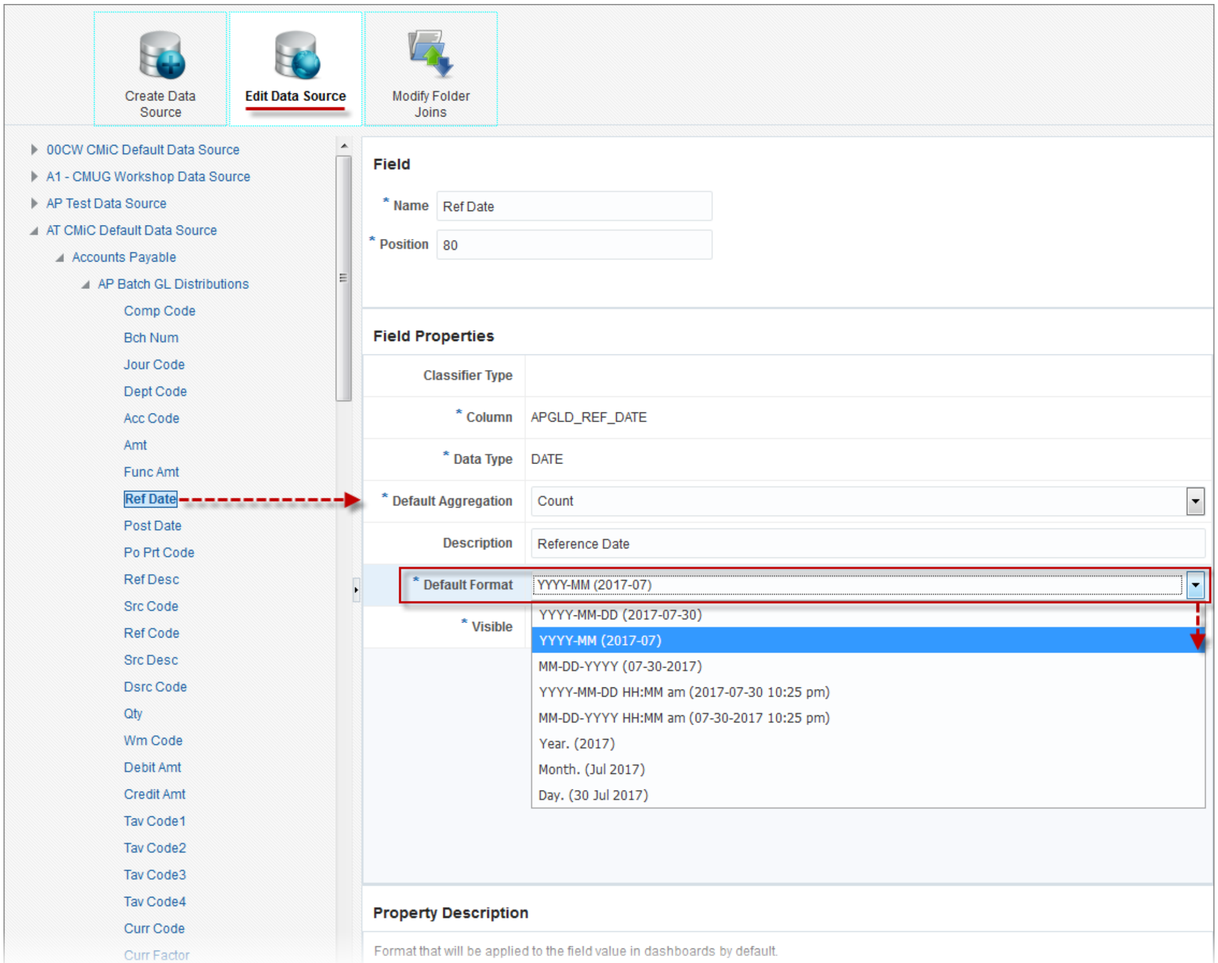
As shown below, every field in a folder that is of the date data type has three corresponding calculated fields: one for the year component, one for the month component, and one for the day component. As shown below, these corresponding calculated fields are added to the end of a folder's list of fields:



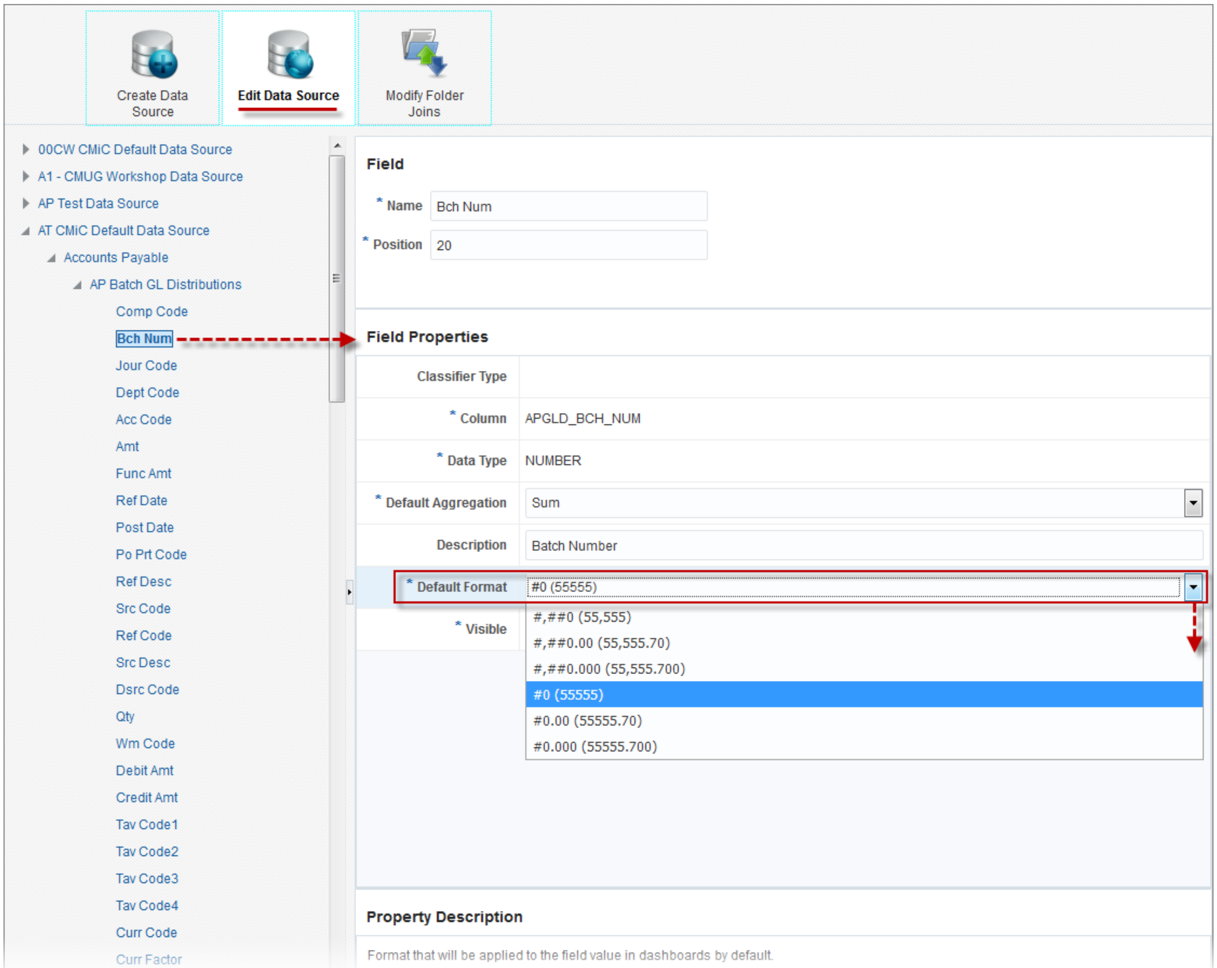
These date calculated fields can be added to visualizations in order to sort or group their data by year, month or day.

Date and Number Formats

For fields of the date and number data type, the format to use to display their dates is set in BI Catalog Builder using the Default Format property in the Field Properties section of the Edit Data Source option, as shown below:

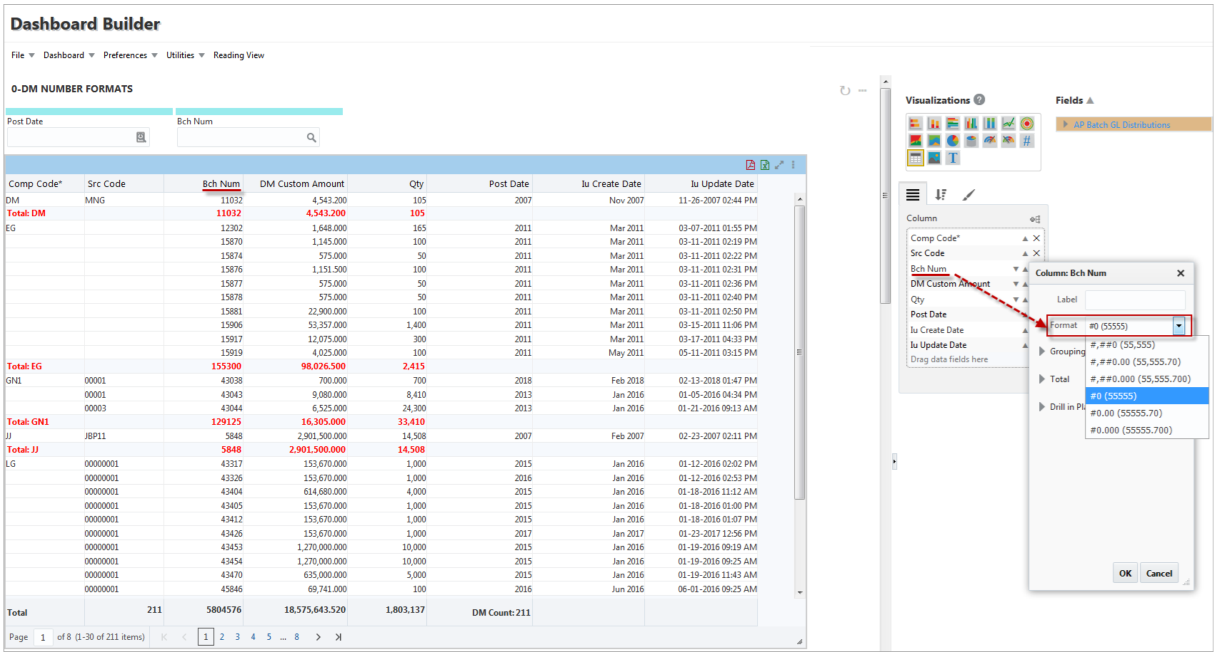


Example of Edit Data Source option of BI Catalog Builder tool for date type fields



Example of Edit Data Source option of BI Catalog Builder tool for number type fields

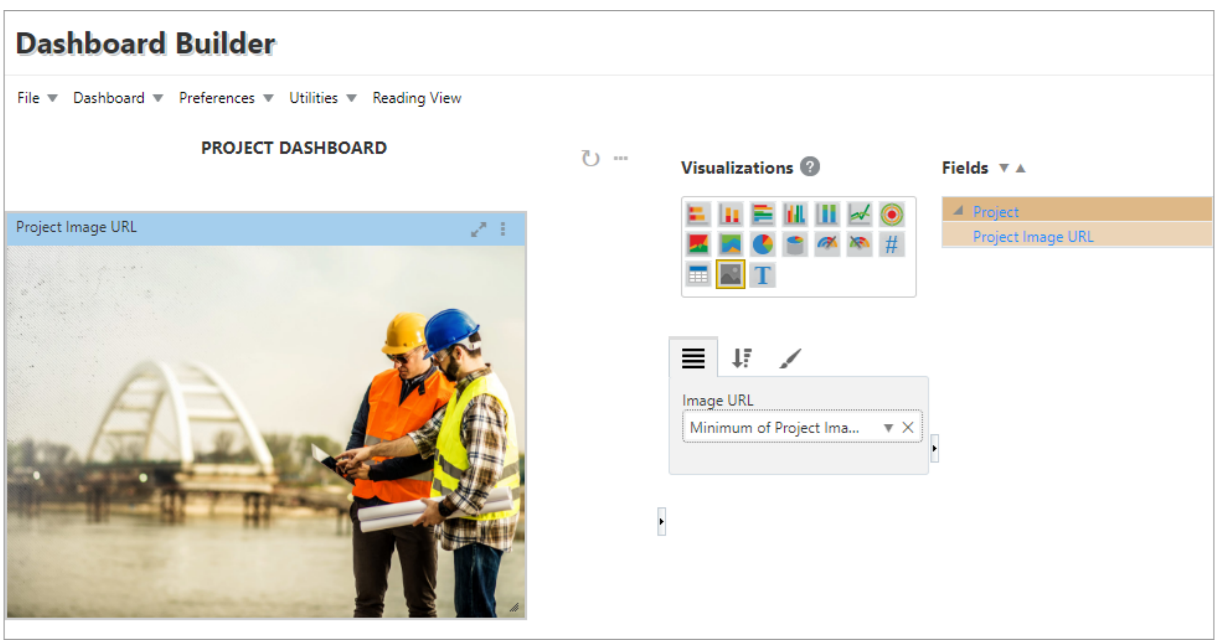
For table visualizations, the user can also modify the format to use for date and number type fields in Dashboard Builder, as shown in the screenshot below.



Example of modifying format for Number type field for a Table in Dashboard Builder.

NOTE: For charts, number and date type fields are formatted as per the default format specified in Catalog Builder.

Images



Example of Image Visualization

Part 1: **Plotting Fields**

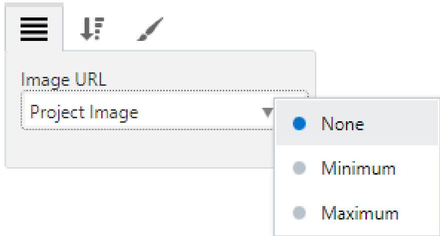


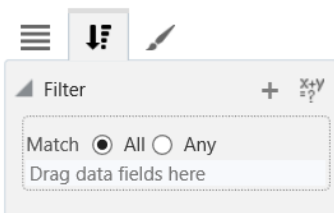
Image URL

This plotting field is used to set the image to be displayed in the visualization. To set the image, drag the relevant field from the Fields pane. The selected field's data type must be URL (specified in BI Catalog Builder).

When multiple database records are found for the image URL, the following message will be displayed: "Single Record Required". A down-arrow (▼) is available to select a single image URL by its position when sorted alphabetically (dictionary order). Options available include "None", "Minimum", and "Maximum".

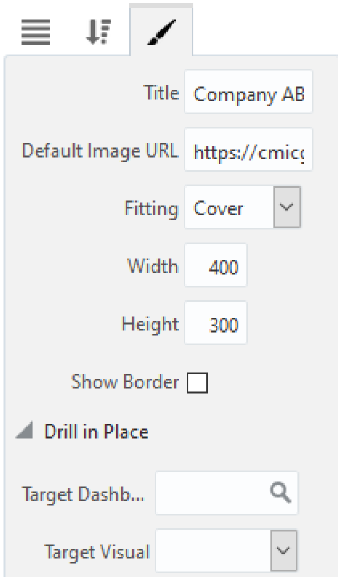
If no database record is found for the image, the default image URL, if provided, will be used instead. The default image URL is defined on the image visualization's Format tab.

Part 2: **Sort & Filter**



For details about filtering the data used by an image, please refer to the previous subsection, *Sort and Filter – Tab*.

Part 3: **Format**



Title

Title for image, which is displayed along its header.

Default Image URL

The file path for the default image URL. The default image URL will be displayed if no database record is found for the image visualization. Note, the URL to the image must be accessible.

For example:

https://cmicglobal.com/wp-content/uploads/2018/06/ConstructionSoftwareEvolved_062218-1200x811.jpg

Fitting

Used to set how the image is displayed within the aspect ratio of the visualization. Options available are as follows:

Cover: Keep aspect ratio while filling the visualization. If the image's aspect ratio does not match the aspect ratio of the visualization, then the image will be clipped to fit.

Contain: Keep aspect ratio while fitting within the visualization. The image will be "letterboxed" if its aspect ratio does not match the aspect ratio of the visualization.

Fill: Fill the entire visualization. If the image's aspect ratio does not match the aspect ratio of the visualization, then the image will be stretched to fit.

None: The image is not resized.

Width

Shows the width of the visualization (editable to allow the user to adjust width).

Height

Shows the height of the visualization (editable to allow the user to adjust height).

Show Border – Checkbox

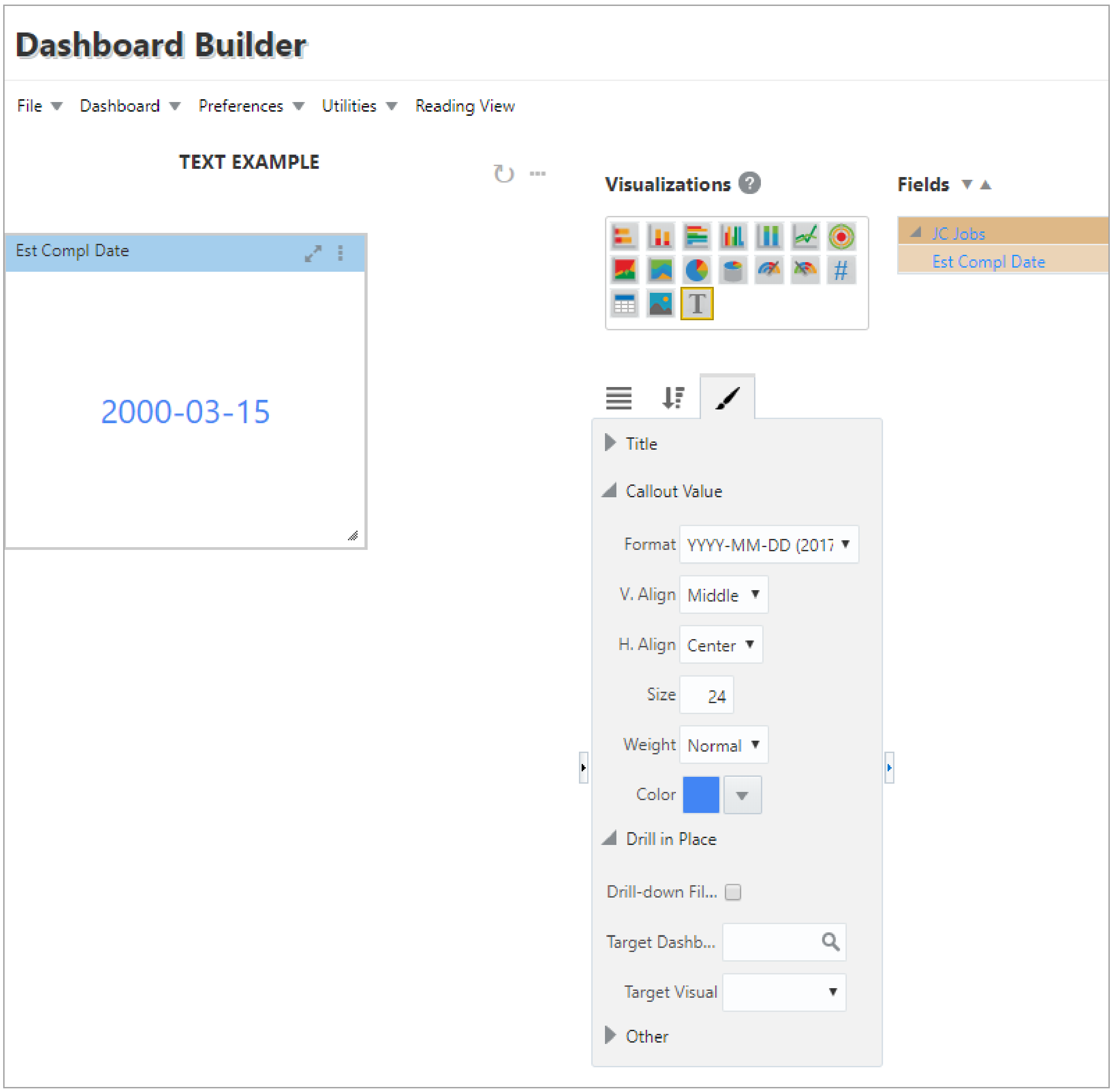
Check to apply border to visualization.

Drill in Place

Target Dashboard: Used to specify a Drill in Place target to a dashboard.

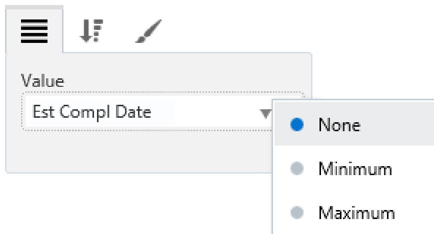
Target Visual: Used to specify a Drill in Place target to specific visual on a dashboard (when a target dashboard has been selected in the Target Dashboard field above).

Text



Example of Text Visualization

Part 1: Plotting Fields



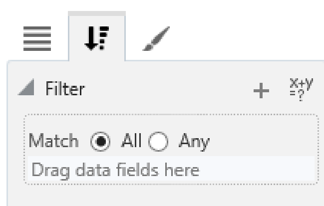
Value

This plotting field is used to set the text to be displayed in the visualization, which is a single non-aggregated value from the database. To set the text, drag the relevant field from the Fields pane. All data types are supported. An alternate format for number and date can be specified on the text visualization's Format tab.

When multiple database records are found, the following message will be displayed: "Single Record Required". For String or URL data types, a down-arrow (▼) is available to select a single text value by its position when sorted alphabetically (dictionary order). Options available include "None", "Minimum", and "Maximum".

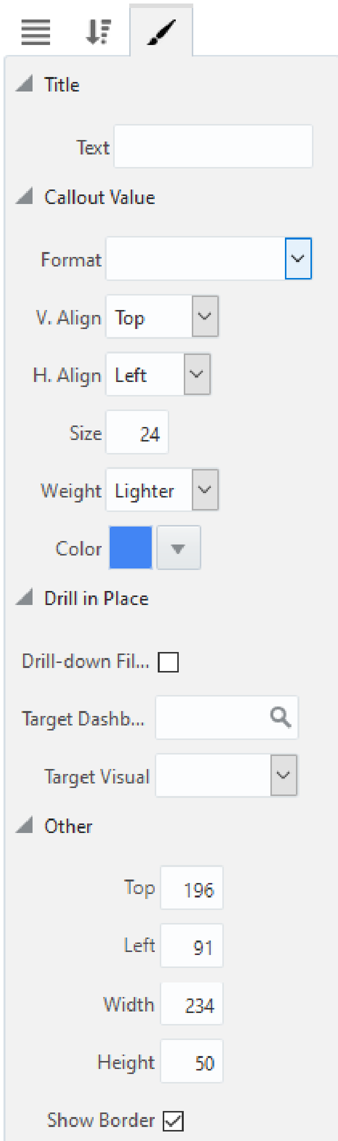
If no database record is found, the following message will be displayed: "No data to display".

Part 2: Sort & Filter



For details about filtering the data used by the text visualization, please refer to the previous subsection, *Sort and Filter – Tab*.

Part 3: Format



Title

Text: Title for visualization, which is displayed along its header.

Callout Value

Format: Used to specify format of the value.

V. Align: Used to set the vertical alignment of the text. Options available are “Top”, “Middle”, or “Bottom”. When the number of characters exceeds the visualization’s available space, a vertical scrollbar is displayed. The scrollbar only appears when the V. Align property is set to “Top”. The text is clipped for all other V. Align options.

H. Align: Used to set the horizontal alignment of the text. Options available are “Left”, “Center”, or “Right”.

Size: Used to set the font size of the text.

Weight: Used to set the font weight of the text. Options available are “Lighter”, “Normal”, and “Bold”.

Color: Used to set the color of the text using a pop-up color selector.

Drill in Place

Drill-down Filter – Checkbox: Check to pass the current value to the target dashboard.

Target Dashboard: Used to specify a Drill in Place target to a dashboard.

Target Visual: Used to specify a Drill in Place target to specific visual on a dashboard (when a target dashboard has been selected in the Target Dashboard field above).

Other

Top, Left: In fixed layout, the location of the top-left corner for each visualization is displayed. This provides the ability to line visualizations up without using a mouse.

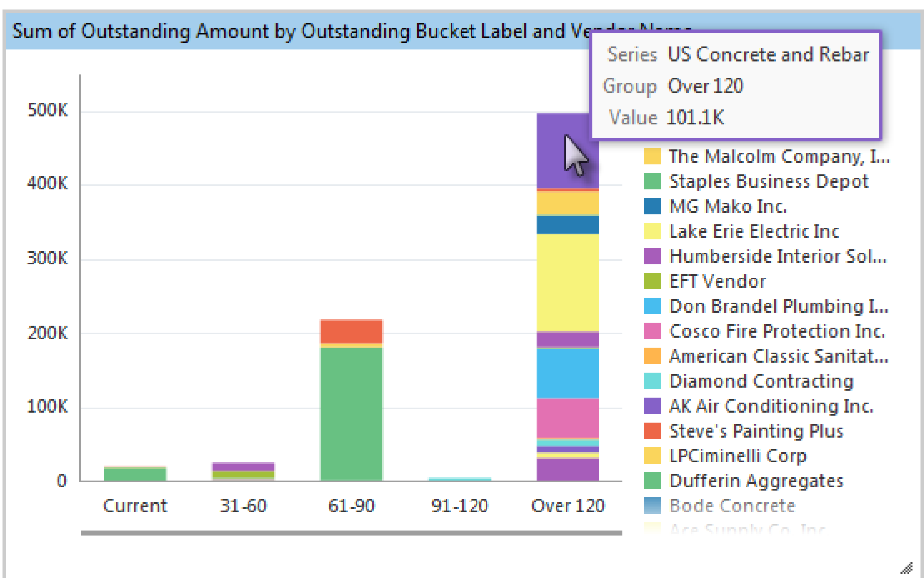
Width: Shows the width of the visualization (editable to allow the user to adjust width).

Height: Shows the height of the visualization (editable to allow the user to adjust height).

Show Border – Checkbox: Check to apply border to visualization.

Interact with Visualizations

Mouseovers

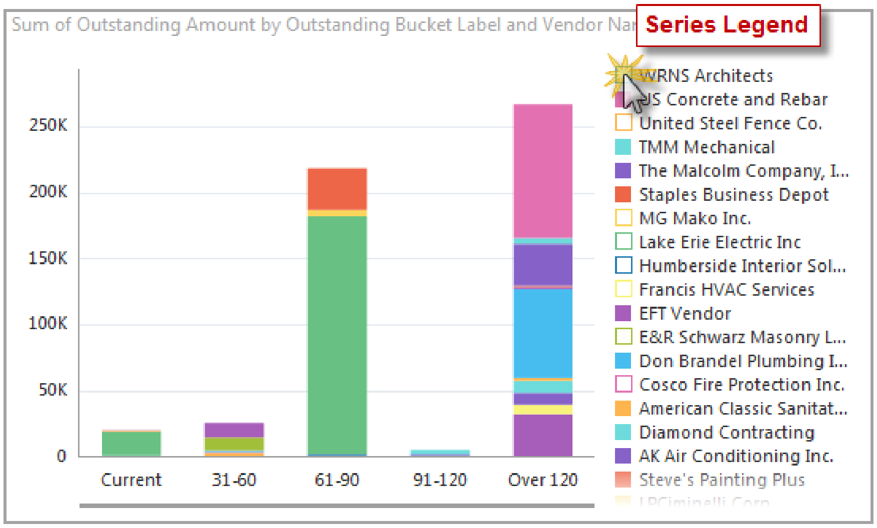


Hover mouse over any Series segment to view its details, as shown above.

Dynamically Scale Charts

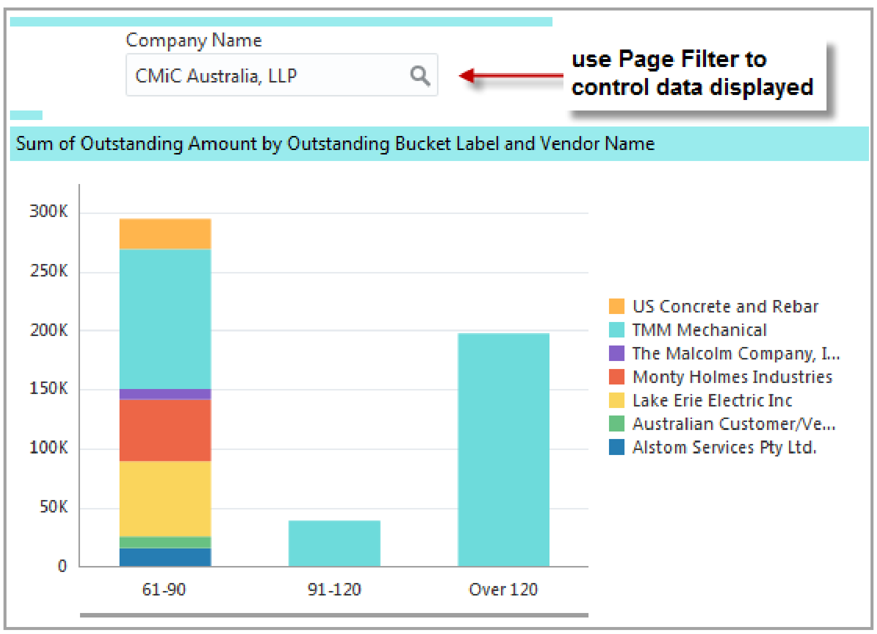
Hover mouse over a chart and use mouse-wheel to zoom in to view smaller segments, and to zoom out.

Dynamically Removing Series from Visualizations



Click a Series element in the Series Legend to remove it from the visualization, and click it again to re-add it.

Dynamically Control Displayed Data Using Page Filters

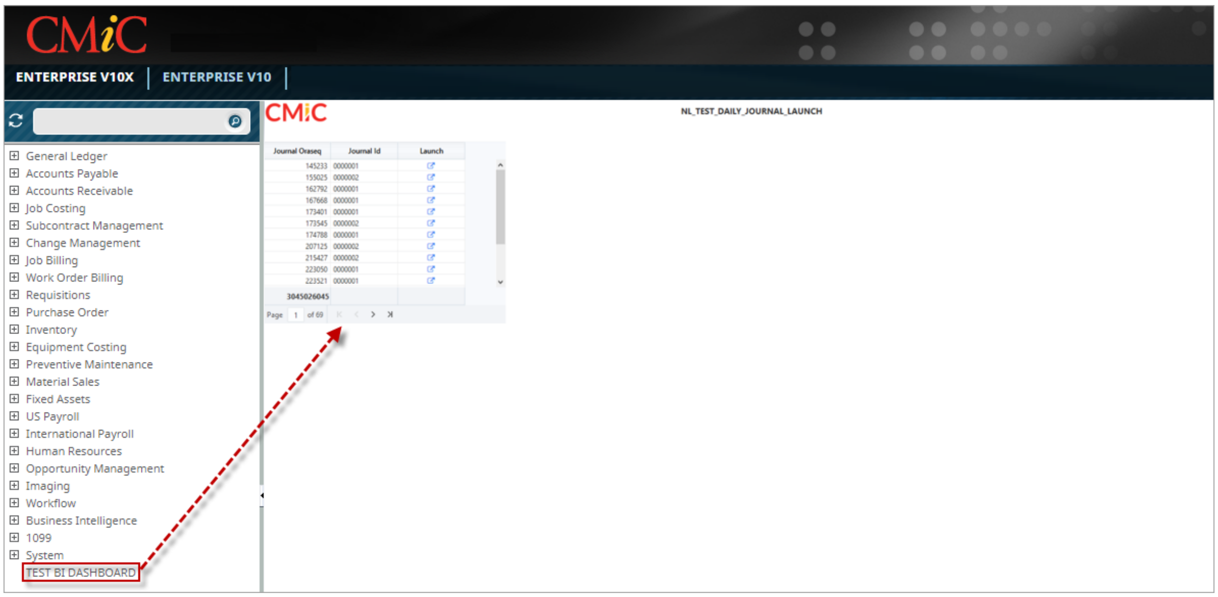


As shown above, page filters can be added to control the data displayed by a single visualization, or for all visualizations on a dashboard.

Page filters are added using the “Insert Filter” option under the Dashboard drop-down menu.

Making Dashboards Accessible via Console

Add Dashboard Link to Treeview

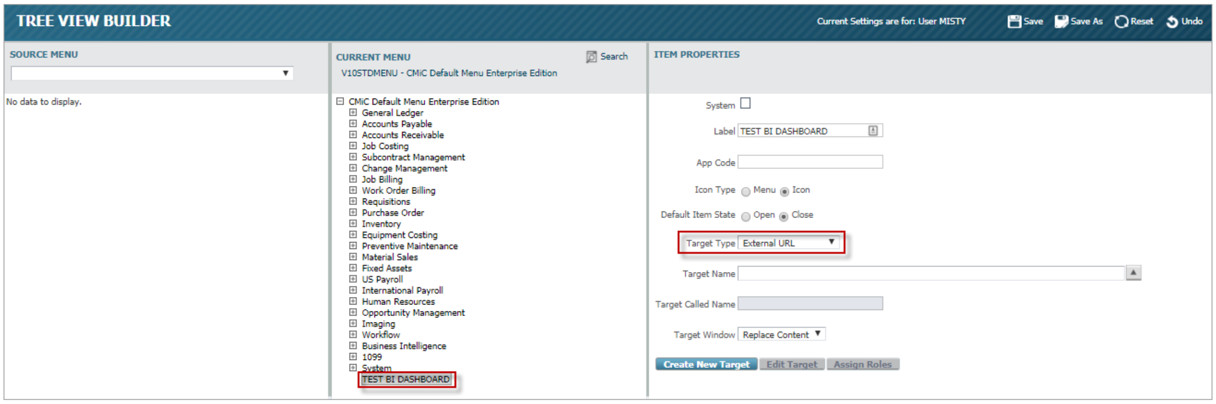


To add a link to a dashboard in Treeview, please refer to the *V10xTOOLS ADF* **-** *UI Treeview Builder* reference guide in conjunction with the following instructions.

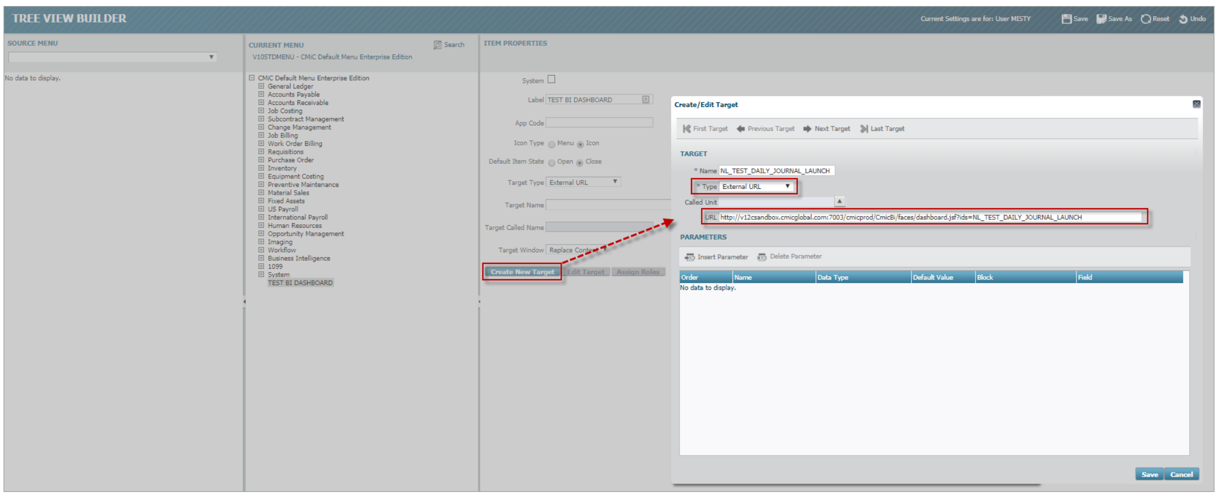
There are two ways to add a link to a Treeview once the menu item has been added. Both methods are described below.

Use Dashboard’s URL

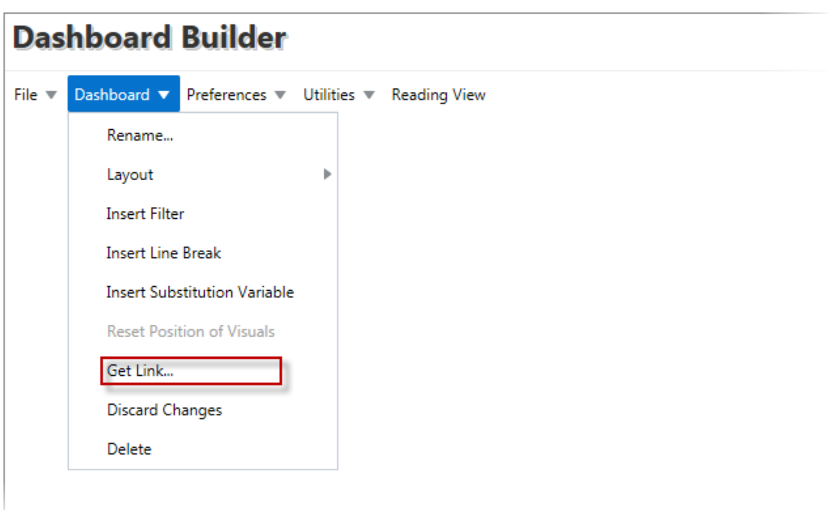
On the UI Treeview Builder screen, add a new menu item to a Treeview and use the Item Properties section to set the Target Type field to “External URL”.

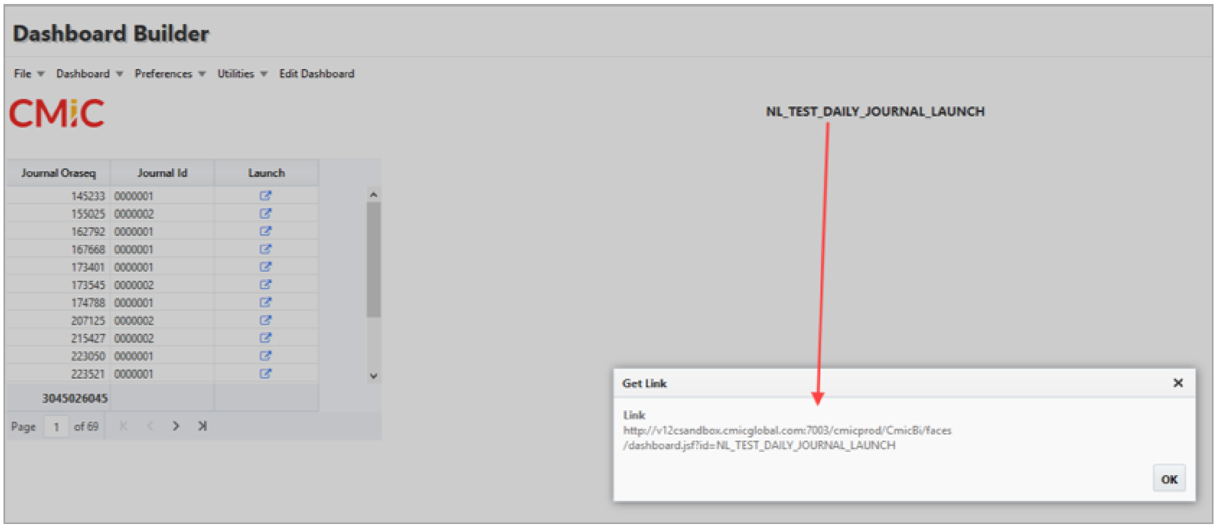


Next, click on [**Create a new Target**].



In the Create/Edit Target pop-up window, enter the target's name in the Name field and select "External URL" in the Type field. In the URL field enter the dashboard's URL as provided by the Get Link option under the Dashboard drop-down menu in BI Dashboard Builder, as shown below.



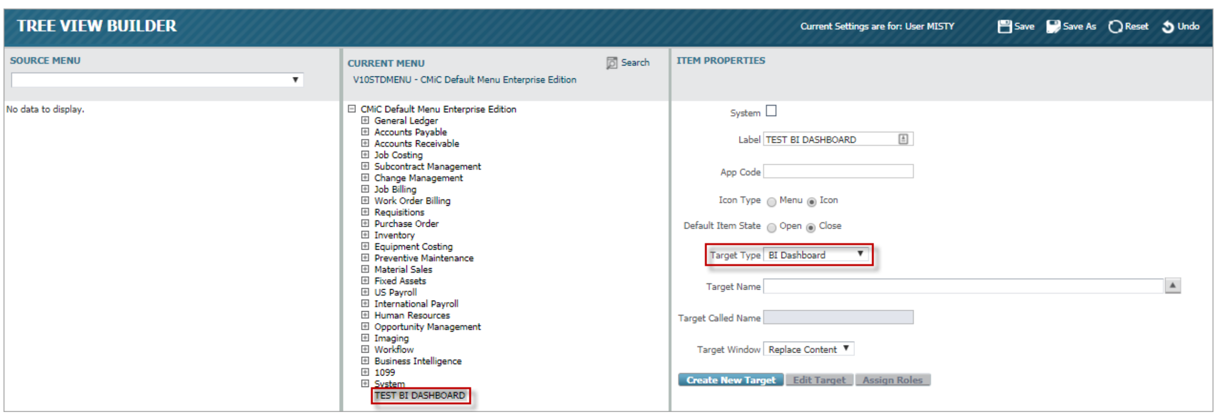


Click on [**Save**] to close the Create/Edit Target pop-up window.

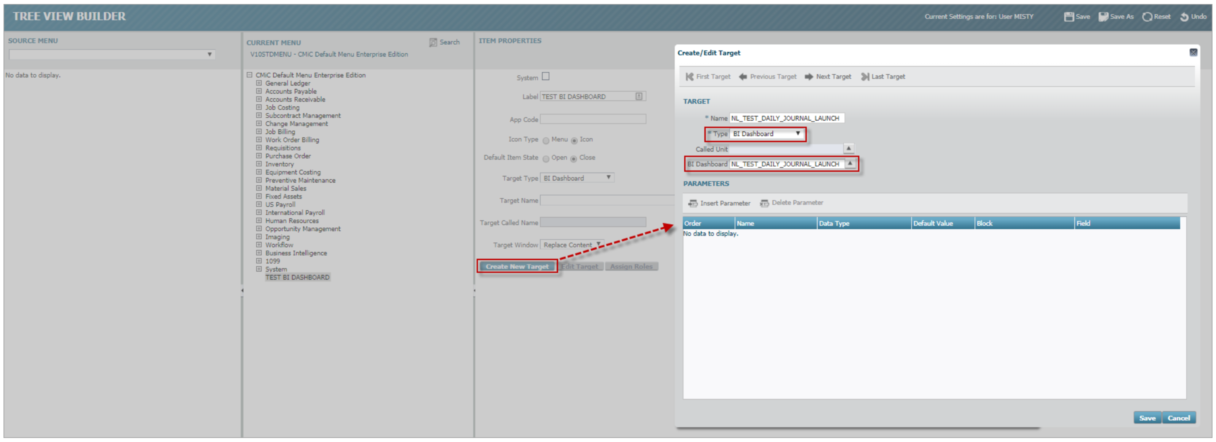
Finally, select the created target via the Target Name field in the Item Properties section of the UI Treeview Builder screen and click on [**Save**].

Create User-Defined Target

On the UI Treeview Builder screen, add a new menu item to a Treeview and use the Item Properties section to set the Target Type field to “BI Dashboard”.



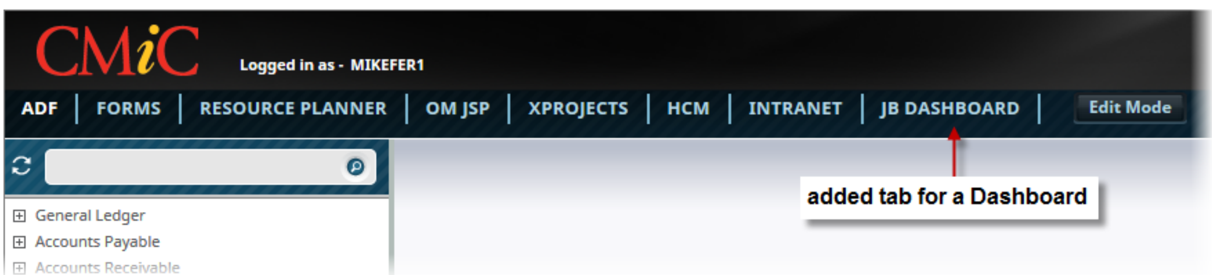
Next, click on [**Create a new Target**].



In the Create/Edit Target pop-up window, enter the target's name in the Name field and select "BI Dashboard" in the Type field. Use the BI Dashboard field's LOV to select the dashboard you would like to add to the target. When finished, click on [**Save**].

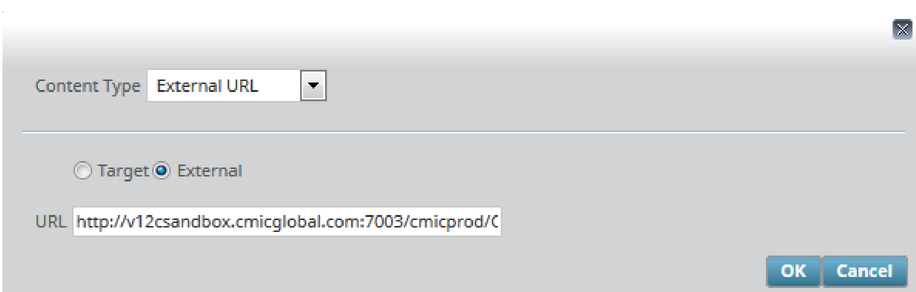
Finally, select the created target via the Target Name field in the Item Properties section of the UI Treeview Builder screen and click on [**Save**].

Add Dashboard Tab to Console



To create a new tab on the UI Console to launch a dashboard, as shown above, please refer to the *V10xTOOLS – Console* reference guide in conjunction with the following instructions.

With the UI Console in Edit mode, add a new tab, then edit the Region Content (as shown below) so that the Content Type field is set to "External URL", the 'External' radio button is selected and the URL field is set to the dashboard's URL:



To get the link to a dashboard, use BI Dashboard Builder's Get Link option, as shown in the previous section.

Making BI Queries Accessible via Console

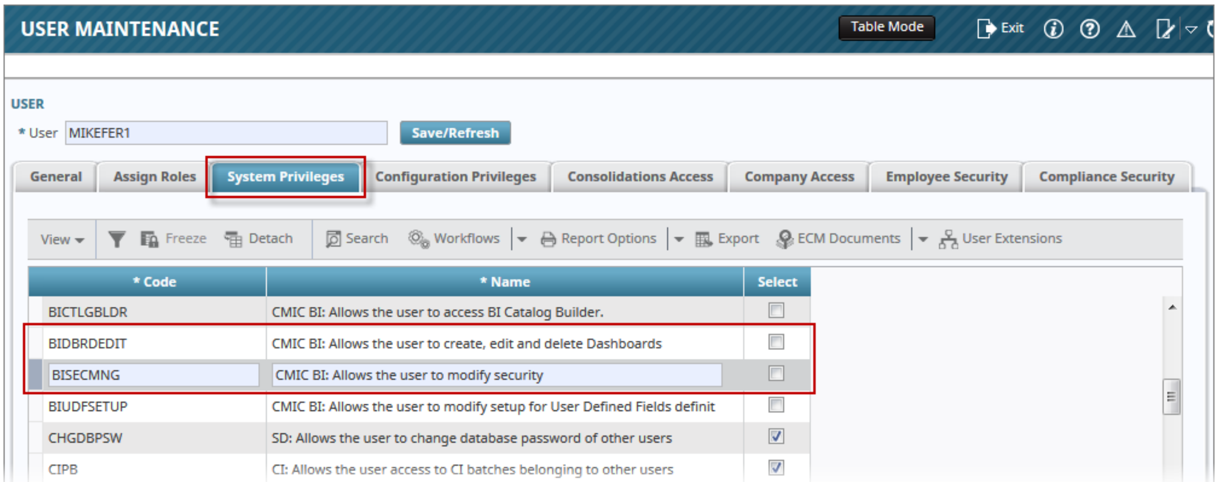
Add BI Query Link to Treeview

For details on adding a link to a BI Query in Treeview, please refer to *Step 6: Make Query Accessible via Console* in the *BI Query Builder – Quick Guide* at the end of this guide.

Setup

CMiC BI Security – BI Dashboard Builder

System Privileges



The following system privileges pertain to BI Dashboard Builder:

System Privilege	Description
BIDBRDEDIT	Allows user, BI Developer or BI Administrator, to create, edit and delete dashboards.
BISECMNG	Grants BI Administrators full security privileges for BI Catalog Builder, giving them access to all data sources in BI Catalog Builder in order to grant members of security roles access to data sources and their business areas and folders. Note though, if Catalog Security was enabled in BI Catalog Builder, by using the Assign Roles context menu option, in BI Dashboard Builder they will only have access to data sources to which they have been granted access via BI Catalog Builder. Typically, though, admins would not need access to data sources in BI Dashboard Builder, only BI Developers would. In BI Dashboard Builder, this privilege grants administrator's access to the Assign Roles to Dashboards option to grant members of security roles access to dashboards. Note, this option is available without opening a dashboard. **NOTE**: Depending on security setup, the administrator's security role may also need to be assigned to the Assign Roles to Dashboards program. For more details, refer to *Dashboard Security: Granting Access to Dashboards* in the section below.

Security Setup & Rules – Catalog & Dashboard Security

1. **Catalog Security**: Granting Access to Data Sources, Business Areas & Folders

- If at least one security role is assigned to any data source, business area or folder in BI Catalog Builder, *Catalog Security* is enabled.
- Once *Catalog Security* is enabled, for each data source, business area and folder, only users belonging to the security role(s) assigned to them can use them.
- In BI Dashboard Builder, if a user has rights to a data source, but not all of its business areas and folders, the business areas and folders to which the user does not have rights are hidden from the user.
- If a user does not have rights to a data source, the data source and any dashboards using it are hidden from the user
- If *Catalog Security* is not enabled or used, *Dashboard Security* can be used to control user access to dashboards, as per the following about *Dashboard Security*.

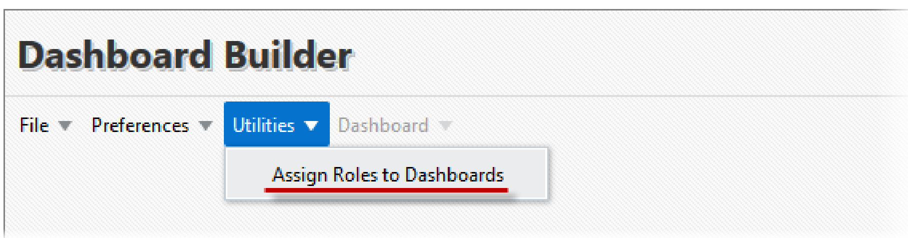
2. **Dashboard Security**: Granting Access to Dashboards

   I. **Initial Security Setup**

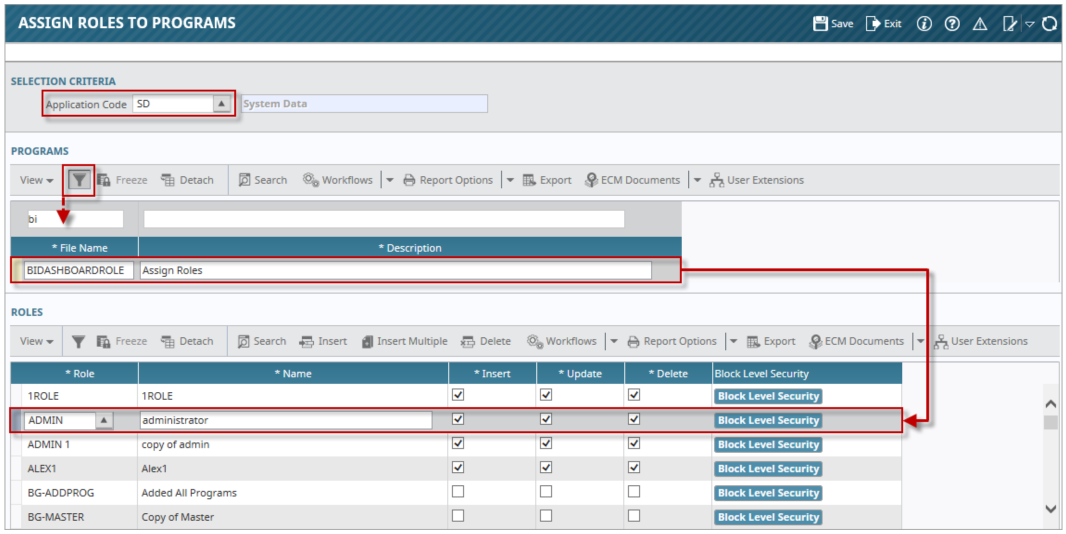
   After BI Dashboard Builder is installed, security roles must be assigned to the provided dashboards to make them accessible to users.

   II. **Granting Access to Dashboards**

   To grant a user access to a dashboard, the security role to which the user belongs must be assigned to the dashboard. This can be done using the “Assign Roles to Dashboard” option under the **Utilities** menu of BI Dashboard Builder (shown below), by an administrator with the BISECMNG system privilege.



   Depending on security setup, the administrator’s security role may also need to be assigned to the Assign Roles to Dashboards program using the Assign Roles to Programs screen in the System Data module, as shown in the screenshot below.



Pgm: FORMROLE – Assign Roles to Programs; standard Treeview path: System > Security > Roles > Assign Roles to Programs

---

NOTE: A link to launch the Assign Roles to Dashboards utility can be added as a new Console Tab using the Console tool, or to a Treeview using the Treeview Builder tool. The Target for this utility, which is required by the tools to create a link to the utility, is "SD - Assign Roles to BI Dashboards".

---

3. Set Up BI Developers

To set up a user as a BI Developer, an administrator with the BISECMNG system privilege needs to grant the developer the BIDBRDEDIT system privilege (allows user to create, edit and delete dashboards).

If *Catalog Security* is being used (set up in BI Catalog Builder), the BI Developer needs to be granted access to the data sources, business areas and folders required to create the dashboards they will be creating.

4. Dashboard Security for New Dashboards

When a BI Developer saves a new dashboard, the developer is asked to assign a security role to the dashboard. Only security roles to which the developer belongs can be assigned by the developer to the new dashboard.

To assign other security roles to new dashboards, administrators with the BISECMNG system privilege can use the "Assign Roles to Dashboard" option under the Utilities menu, as described in part 2 (Dashboard Security) above.

CMiC BI Security Setup – Quick Guide

Overview – CMiC BI Security

A standard CMiC Catalog and several Default Dashboards are provided with CMiC's BI tools, but before you get started, you must set up your BI security. This quick guide leads you through the three easy steps to set up your BI Administrators, BI Developers and Dashboard End Users. Once your security is set up, CMiC's BI tools are ready for you to use.

Happy building!

Setup Notes to Keep in Mind

BI Administrators

BI Administrators have full security privileges for BI Catalog Builder, meaning they have access to all data sources in BI Catalog Builder in order to grant members of security roles access to data sources and their business areas and folders.

NOTE: In BI Dashboard Builder, if Catalog Security was enabled, BI Admins will only have access to data sources to which they have been granted access via BI Catalog Builder. Typically, though, BI Admins would not need access to data sources - only BI Developers would.

In BI Dashboard Builder, BI Administrators can access the Assign Roles to Dashboards option, which is available without opening a dashboard, to assign security roles to dashboards.

BI Developers

By default, Catalog Security is not enabled, and the provided CMiC Catalog provides BI Developers access to data from all parts of the system.

If security access to data in the CMiC Catalog needs to be tailored for each BI Developer, BI Catalog Builder is required to enable and configure Catalog Security.

Also, if custom data sources are needed to create unique, client specific dashboards, BI Catalog Builder is required to develop and add them to the CMiC Catalog.

Dashboard End Users

By default, none of the provided dashboards are accessible to any user. Dashboard End Users, as well as BI Developers, can only see dashboards to which they have been granted access.

Step 1: **BI Administrator Setup**

A BI Administrator is someone that has security privileges for administering BI Dashboard Builder and BI Catalog Builder.

System Privileges for BI Administrators

To set up a user as a BI Administrator, grant the user the following system privileges. For details about granting system privileges, please refer to the following section: *Assigning System Privileges*.

BISECMNG – System Privilege (Dashboard Builder & Catalog Builder)

Grants BI Administrators full security privileges for BI Catalog Builder, giving them access to all data sources in BI Catalog Builder in order to grant members of security roles access to data sources and their business areas and folders.

Note though, if Catalog Security was enabled in BI Catalog Builder, by using the "Assign Roles" context menu option, in BI Dashboard Builder they will only have access to data sources to which they have been granted access via BI Catalog Builder. Typically, though, admins would not need access to data sources in BI Dashboard Builder - only BI Developers would.

In BI Dashboard Builder, this privilege grants administrator's access to the Assign Roles to Dashboards option to grant members of security roles access to dashboards. Note, this option is available without opening a dashboard.

BIDBRDEDIT – System Privilege (Dashboard Builder)

Allows a BI Administrator or BI Developer to create, edit and delete dashboards.

BICTLGBLDR – System Privilege (Catalog Builder)

Allows a BI Administrator or BI Developer to access BI Catalog Builder.

Step 2: **BI Developer Setup**

A BI Developer is someone that creates dashboards, and if BI Catalog Builder is being used, they could also create the data sources used to create dashboards.

Part I: **System Privileges for BI Developers**

To set up a user as a BI Developer, grant the user the following system privileges. For details about granting system privileges, please refer to the following section: *Assigning System Privileges – Quick Guide*.

BICALCFLD – System Privilege (Catalog Builder)

Allows a BI Developer to create calculated fields and to modify their calculation in BI Catalog Builder.

BICFDRFLTR – System Privilege (Catalog Builder)

Allows a BI Developer to modify folder filters in BI Catalog Builder.

BICTLGBLDR – System Privilege (Catalog Builder)

Allows a BI Developer to access BI Catalog Builder.

BIDBRDEDIT – System Privilege (Dashboard Builder)

Allows a BI Administrator or BI Developer to create, edit and delete dashboards.

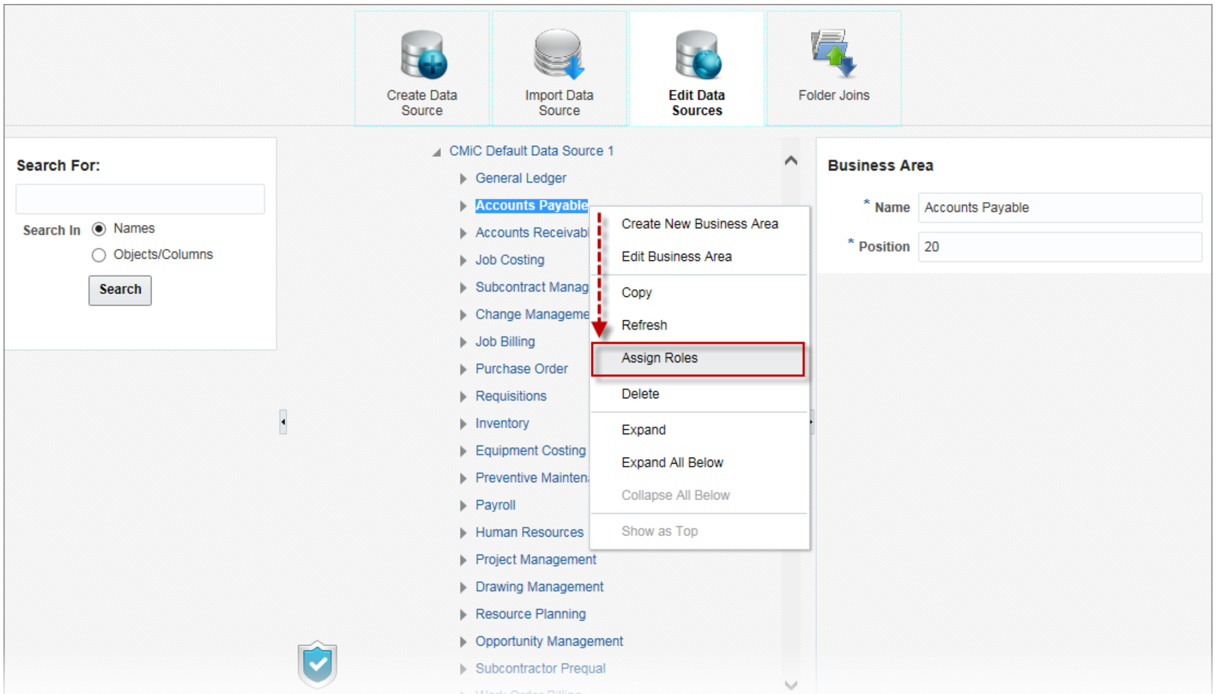
BIUDFSETUP – System Privilege (Catalog Builder)

Allows BI Developer to modify the Base Object Name property of User Defined Fields in folders, in BI Catalog Builder.

BIMODJOINS – System Privilege (Catalog Builder)

Allows a BI Developer to modify folder joins in BI Catalog Builder.

Part II: **Catalog Security for BI Developers** (Catalog Builder – Data Source Security)



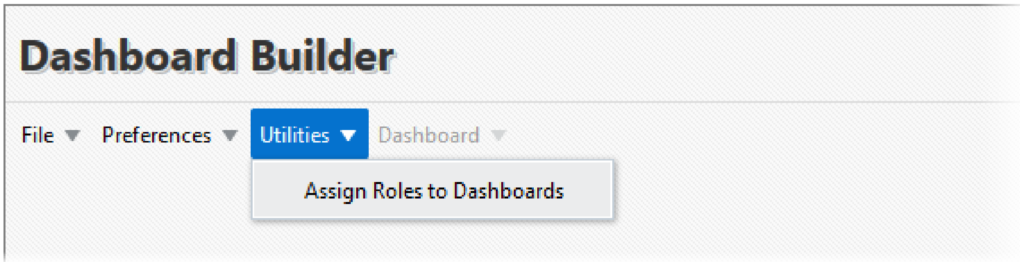
NOTE: For CMiC Cloud users, BI Catalog Builder is an advanced, premium tool. For details, please contact your CMiC Account Representative.

If BI Catalog Builder is being used, and Catalog Security is to be enabled, a BI Administrator uses the “Assign Roles” context menu option (shown above) on the Edit Data Source screen of BI Catalog Builder to grant members of security roles access to data sources and their business areas and folders.

In BI Dashboard Builder, if a BI Developer has rights to a data source, but not all of its business areas and folders, the business areas and folders to which the developer does not have rights are hidden from the developer. If a developer does not have rights to a data source, the data source and any dashboards using it are hidden from the developer.

NOTE: The “Assign Roles” context menu option is not available for the CMiC Default Data Source’s business areas and folders.

Step 3: **Dashboard End User Setup**



Utilities drop-down menu

A Dashboard End User is someone that uses dashboards, such as an AP clerk.

Assign Roles to Dashboards – Dashboard Security

To grant a Dashboard End User access to a dashboard, the security role to which the user belongs must be assigned to the dashboard. This is done using the "Assign Roles to Dashboard" option under the Utilities menu of Dashboard Builder (shown above), by a BI Administrator (user with BISECMNG system privilege).

NOTE: A link to launch the Assign Roles to Dashboards utility can be added as a new Console tab using the Console tool, or to a Treeview using the Treeview Builder tool. The Target for this utility, which is required by the tools to create a link to the utility, is "SD - Assign Roles to BI Dashboards".

Step 4: **Data Security Setup**

Defining and Applying Data Security Within a BI Dashboard

BI Dashboard Builder allows security to be applied right down to a detailed data level so that dashboard and query views can be restricted to display only those records to which the user has access.

This detailed level of security is beneficial, for example, if records are being displayed from a folder, for example from a PM Issues folder, and data should be limited to display only those records from projects to which the user has access.

In this example, the following folders would be used:

- PM Issues Folder: Returns data for all projects regardless of user's security.
- PM Projects Folder: Returns only those projects to which the user has access.

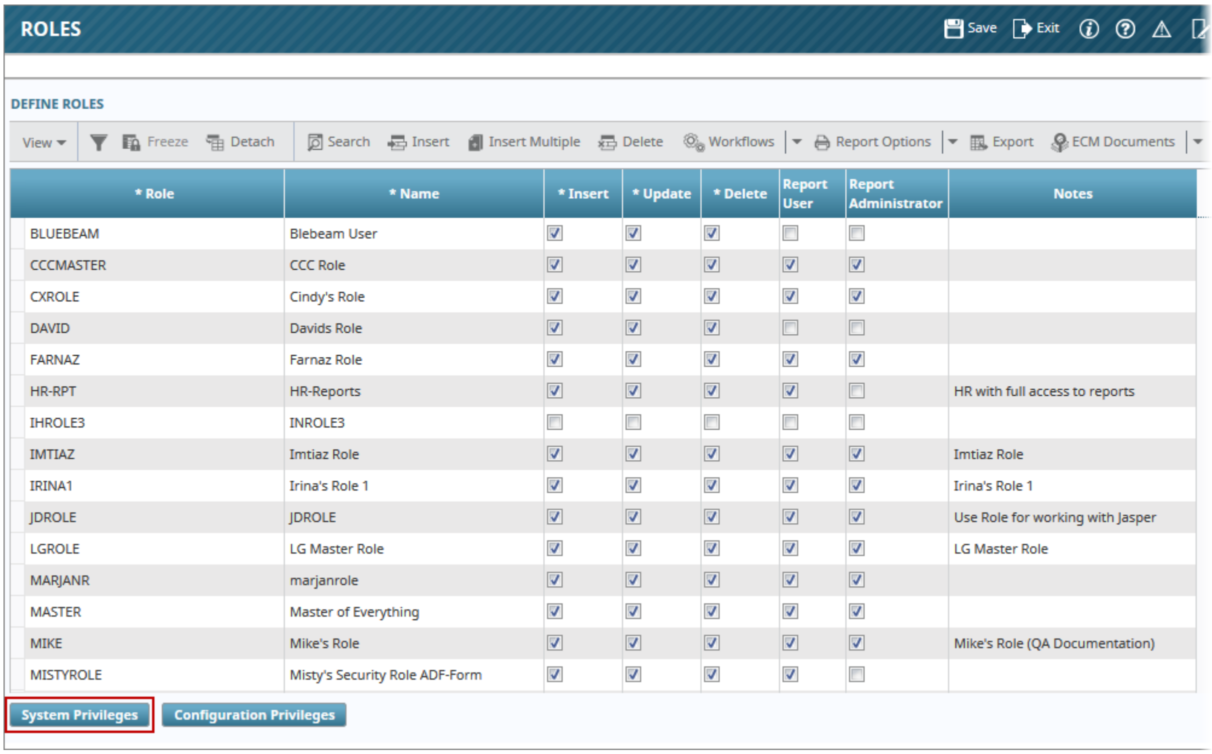
To enforce PM Projects security on PM Issues data when building a dashboard or query, the PM Projects folder must be added to the list of selected fields and the 'Use All Folders' option must be checked. (For more information on this option, refer to the *Use All Folders* section in this guide).

CMiC BI Training

If you would like to schedule a CMiC BI training session, please contact CMiC Support, and they will ensure that you are scheduled for training as quickly as possible.

Assigning System Privileges – Quick Guide

Option 1: **Assign System Privilege to Security Role**

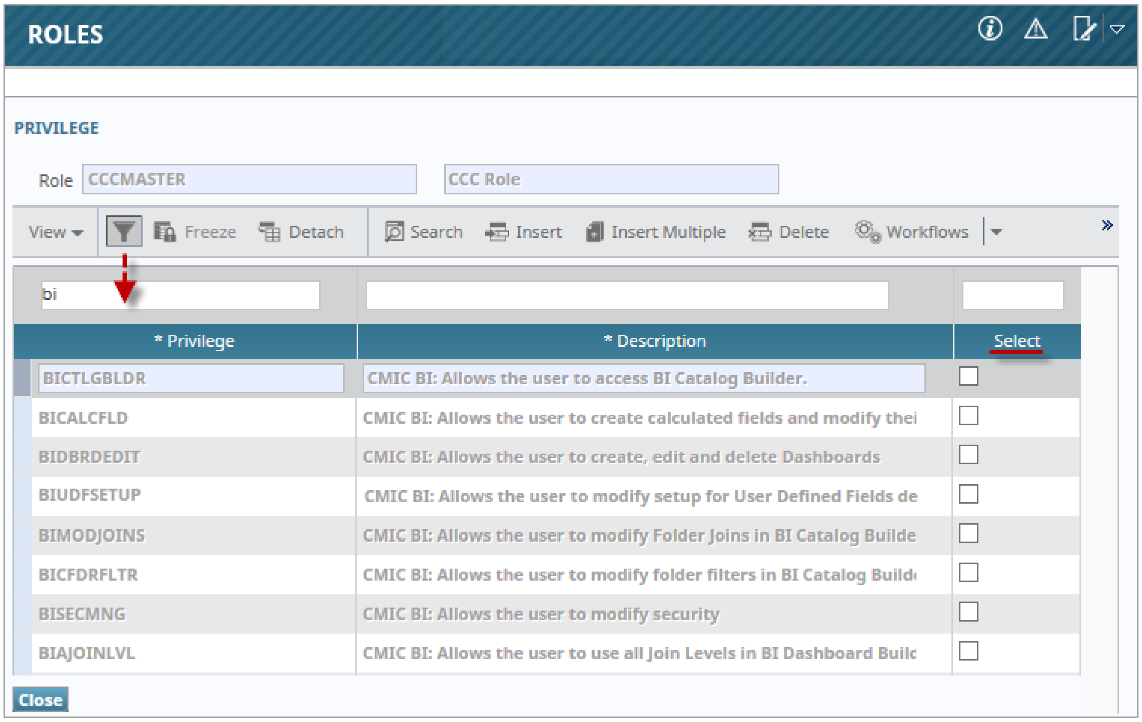


* Role	* Name	* Insert	* Update	* Delete	Report User	Report Administrator	Notes
BLUEBEAM	Blebeam User	☑	☑	☑	☐	☐	
CCCMASTER	CCC Role	☑	☑	☑	☑	☑	
CXROLE	Cindy's Role	☑	☑	☑	☑	☑	
DAVID	Davids Role	☑	☑	☑	☐	☐	
FARNAZ	Farnaz Role	☑	☑	☑	☑	☑	
HR-RPT	HR-Reports	☑	☑	☑	☑	☐	HR with full access to reports
IHROLE3	INROLE3	☐	☐	☐	☐	☐	
IMTIAZ	Imtiaz Role	☑	☑	☑	☑	☑	Imtiaz Role
IRINA1	Irina's Role 1	☑	☑	☑	☑	☑	Irina's Role 1
JDROLE	JDROLE	☑	☑	☑	☑	☑	Use Role for working with Jasper
LGROLE	LG Master Role	☑	☑	☑	☑	☑	LG Master Role
MARJANR	marjanrole	☑	☑	☑	☑	☑	
MASTER	Master of Everything	☑	☑	☑	☑	☑	
MIKE	Mike's Role	☑	☑	☑	☑	☑	Mike's Role (QA Documentation)
MISTYROLE	Misty's Security Role ADF-Form	☑	☑	☑	☑	☐	

Pgm: ROLES – Roles; standard Treeview path: System > Security > Roles > Define Roles

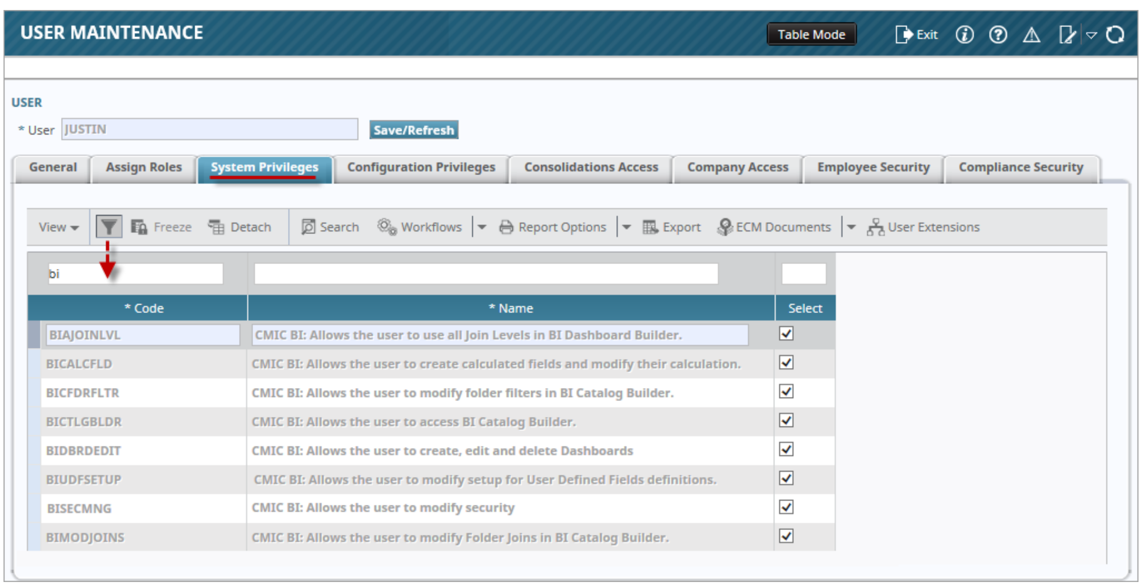
Using the Security Roles screen in the System Data module, select the role to which the system privileges will be added and click [**System Privileges**].

In the pop-up, shown below, check the ‘Select’ checkbox for the privileges to grant the role and click [**Close**]:



Back on the main screen, click [**Save**].

Option 2: **Assign System Privilege to User ID**

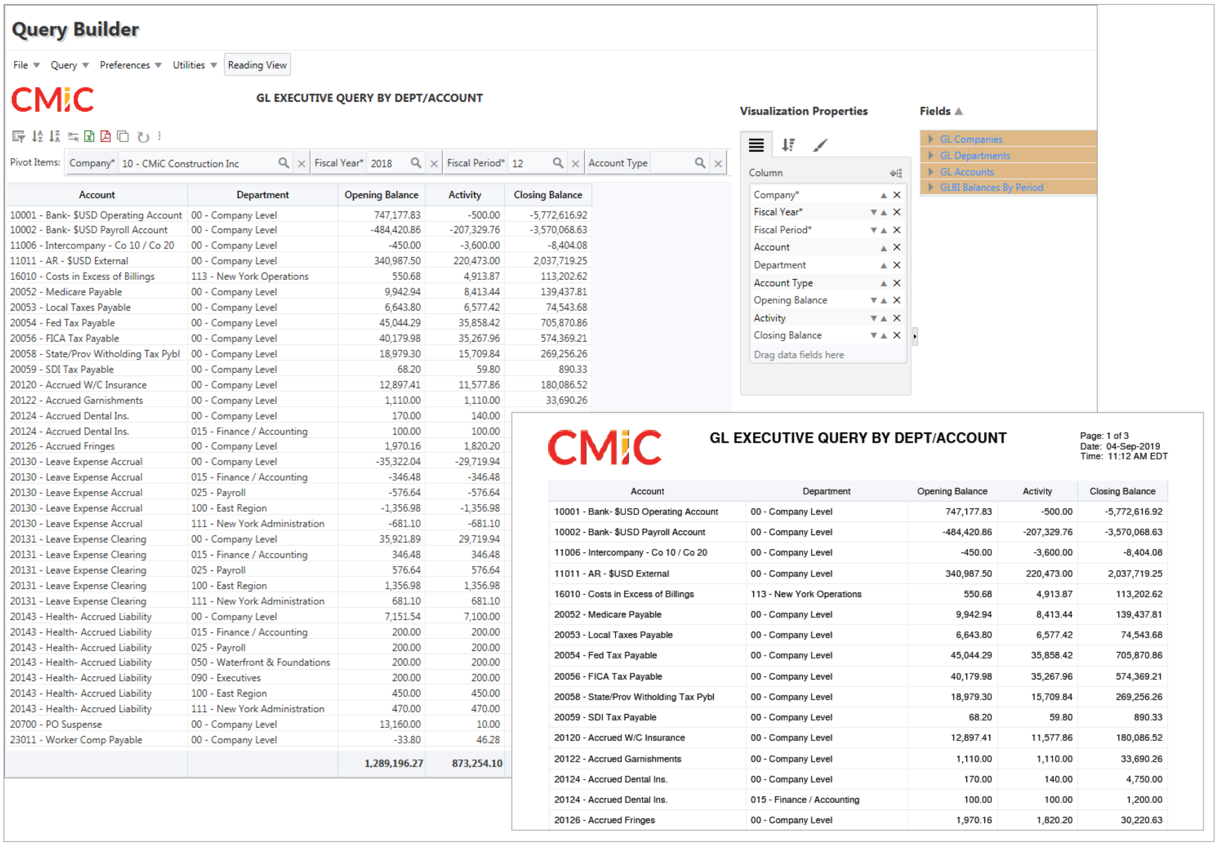


Pgm: SDUSRMNT – User Maintenance; standard Treeview path: System > Security > Users > User Maintenance

In the User Maintenance screen, load the target user and click the System Privileges tab. Then, use the ‘Select’ checkboxes to select the system privileges to grant the user and click [**Save/Refresh**].

BI Query Builder – Quick Guide

Overview – BI Query Builder



BI Query Builder

BI Dashboard Builder is a powerful business intelligence tool for building custom dashboards with interactive charts, gauges, and tables that use real-time data directly from your CMiC system.

BI Query Builder, however, is a simplified version of BI Dashboard Builder, tailored specifically for building and generating queries. In this specialized version of the software, users can focus on creating and modifying queries. In BI Query Builder, a query is a dashboard that contains a single table visualization that is always maximized. This fine-tuned query generator makes query building simple and easy, and it supports all the table visualization features available in BI Dashboard Builder, including pivoting, drill-in-place, etc. In addition, queries built in BI Query Builder can be viewed and maintained in BI Dashboard Builder.

This quick guide focuses on the components and functionality specific to the BI Query Builder tool. For more information on the full-blown software features of BI Dashboard Builder, including requirements and setup options, please refer to the *BI Dashboard Builder* guide.

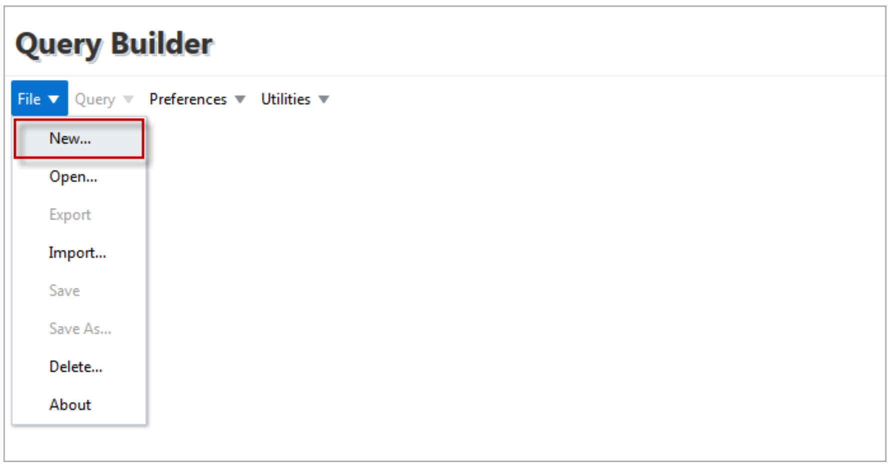
Getting Started – Creating Queries

Step 1: **CMiC BI Security Setup**

Before Query Builder can be used, CMiC BI security must be set up. Please refer to the following sections in the *BI Dashboard Builder* guide:

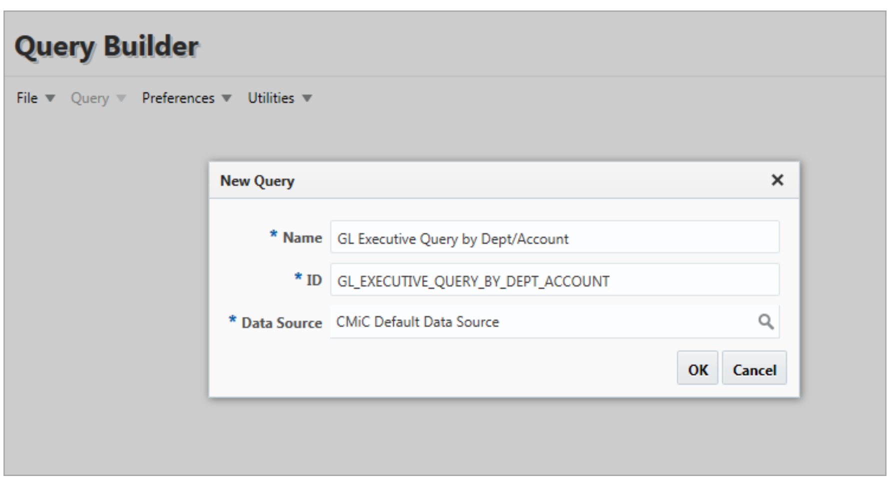
- CMiC BI Security Set Up – Quick Guide
- CMiC BI Security – BI Dashboard Builder

Step 2: **Create New Query**

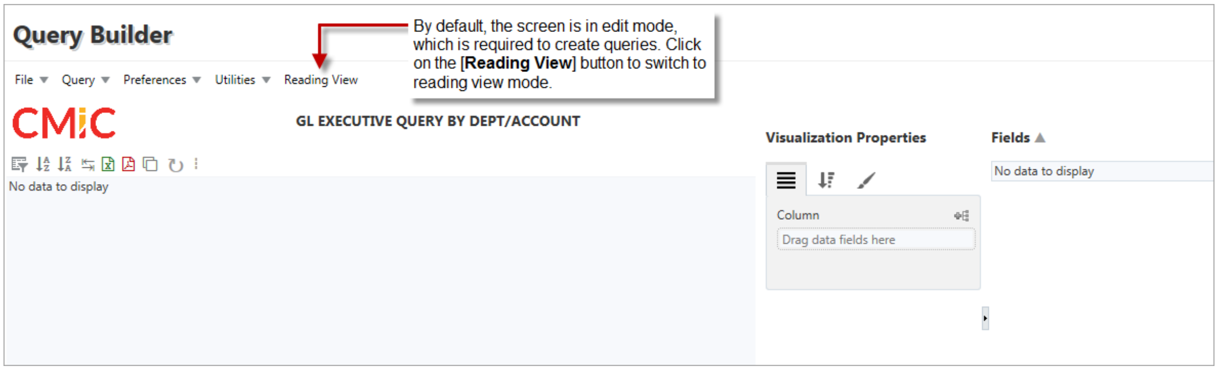


Click the File drop-down menu and select "New".

In the pop-up, shown below, provide a name for the new query and select the data source containing the folders (tables/views) required to create the query's table visualization.



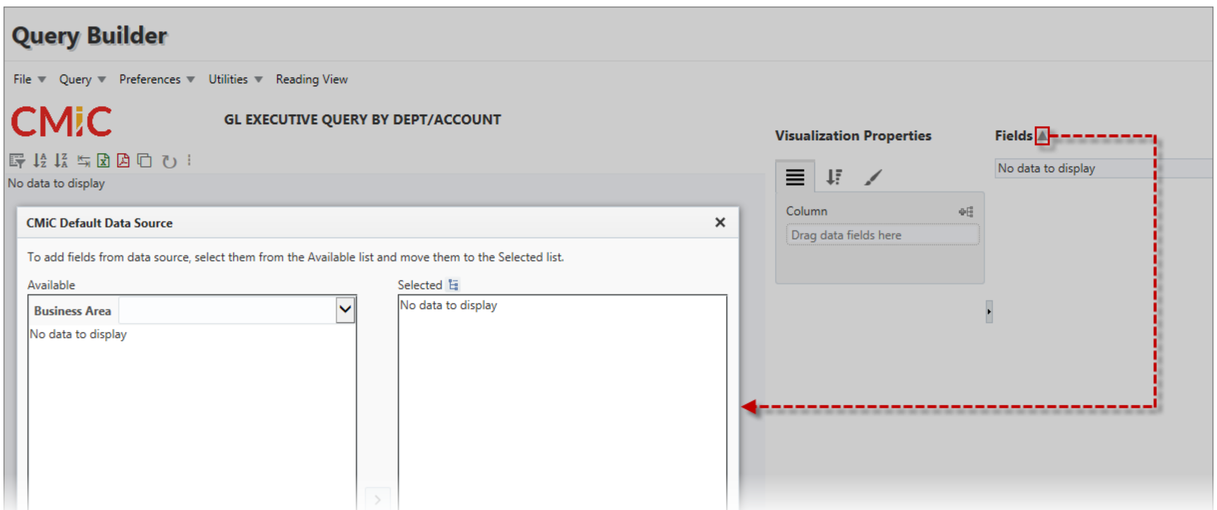
Upon clicking [**OK**], the newly created query is displayed:



Since the screen will initially be in edit mode when a new query is being created, the Visualization Properties and Field panes will be visible, as shown above.

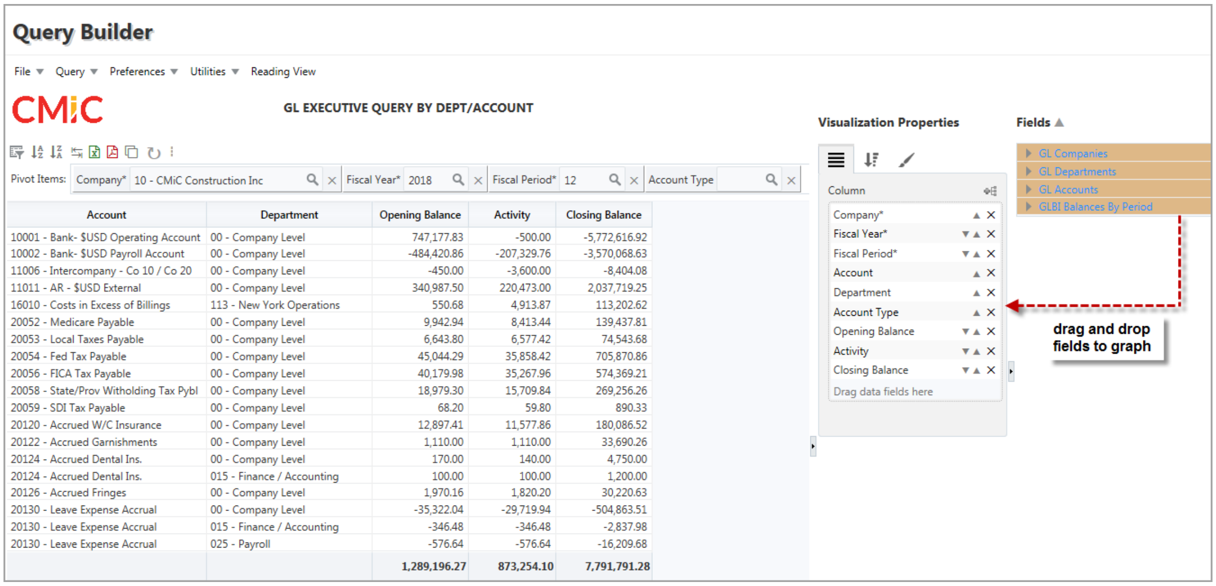
When a user creates a new query, the query's name defaults as the title of the query on the dashboard.

Step 3: **Add Fields to Query**



Click the up-arrow ( ) in the Fields pane to add fields (tables/views) to the query (table visualization).

Step 4: **Configure Query's Properties**



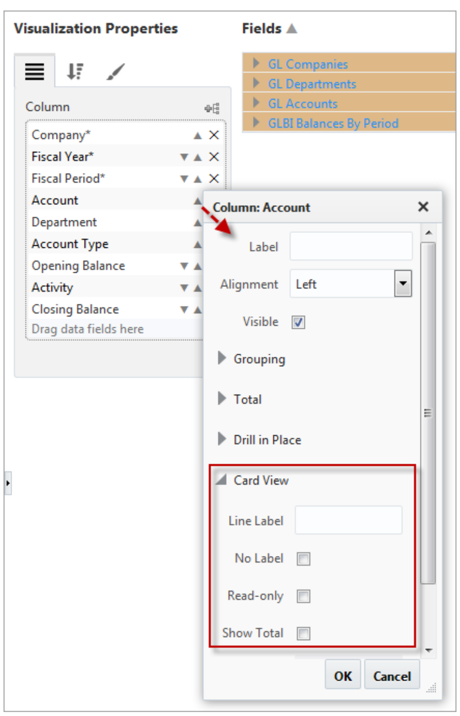
Example of Query

Configure the query's properties using the Visualization Properties control, as shown above.

Card View Properties

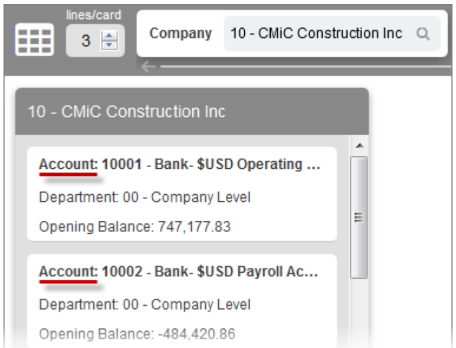
The Card View properties are located on the Plotting Fields tab and the Format tab, as shown below. They are used for customizing settings if the user will be launching their query in card view.

Plotting Fields Tab

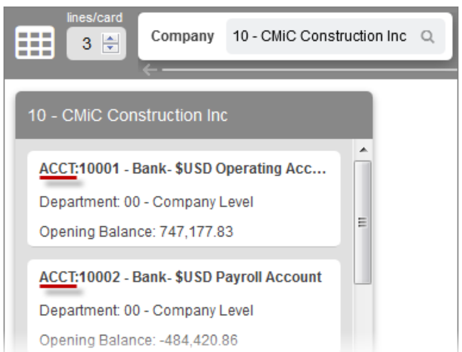


Line Label: This property is used to specify how the column's line label appears on the card. For example:

If this property is left empty, the card defaults the column's title. In this example, it's the Account column so it would appear in card view as follows:

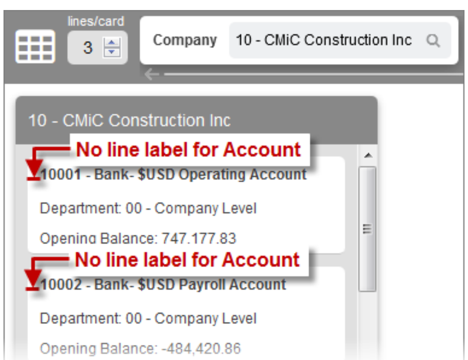


If a label is specified, such as "ACCT:", then it would appear in card view as follows:



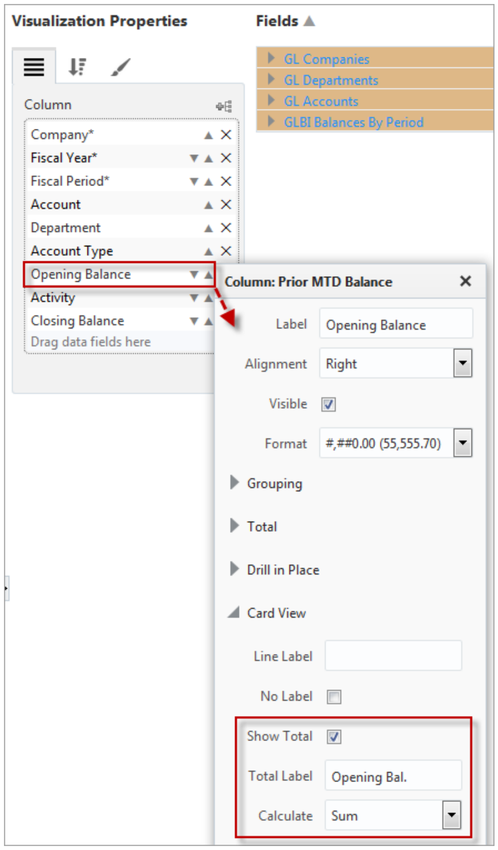
No Label – Checkbox: Check this box to display no label.

For example, if the 'No Label' checkbox is checked for the Account column, it would appear in card view as follows:

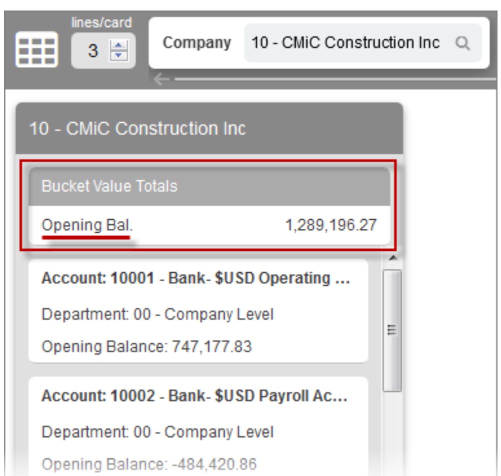


Read-only – Checkbox: Checking this box enables a read-only setting for the table column. This setting has the highest priority. It ensures that the column is not updatable and overrides the updatable setting in BI Catalog Builder. This setting can only be modified in BI Query Builder/BI Dashboard Builder and is disabled at runtime.

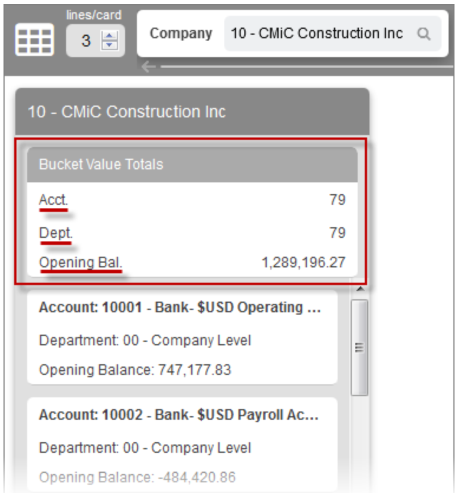
Show Total – Checkbox: Checking this box enables the Total Label and Calculate properties. A new totals card titled “Bucket Value Totals” will be added in card view.



This example shows a Bucket Value Totals card entered for the Opening Balance column.



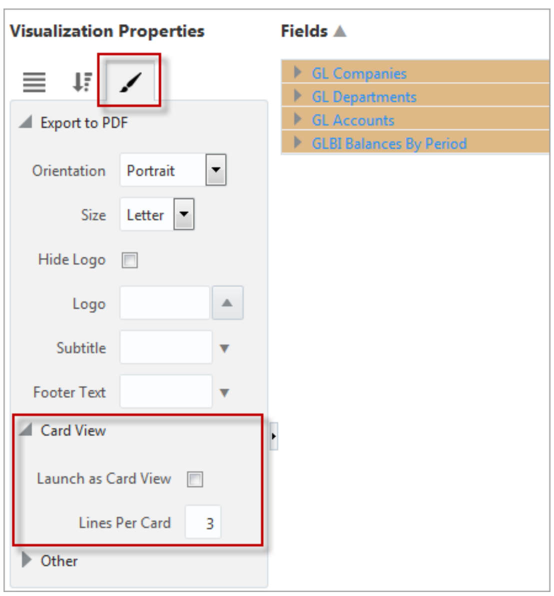
The next example shows a Bucket Value totals card entered for the following three columns: Account, Department, and Opening Balance.



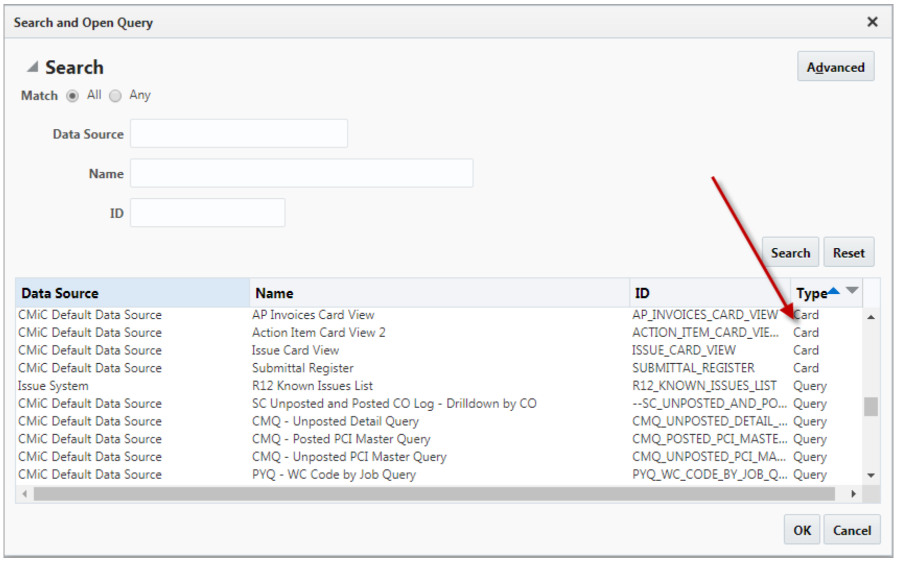
Total Label: This property is enabled when the ‘Show Total’ box is checked. It allows the user to add a label to the column’s title in the Bucket Value Totals in card view.

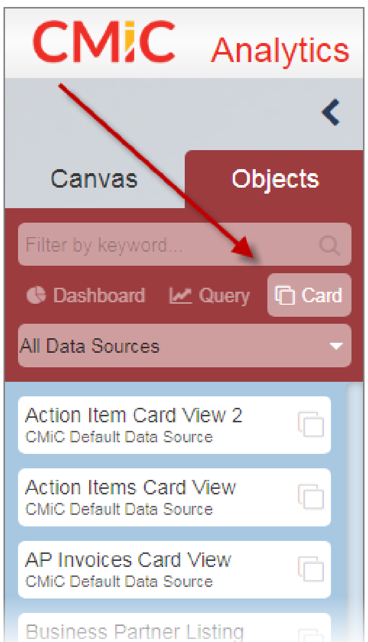
Calculate: This property is enabled when the ‘Show Total’ box is checked. It allows the user to specify the type of calculation performed on each column’s bucket value totals (e.g. Average, Count, Count (Distinct), Maximum, Median, Population Standard Deviation, Sample Standard Deviation, or Sum).

Format Tab



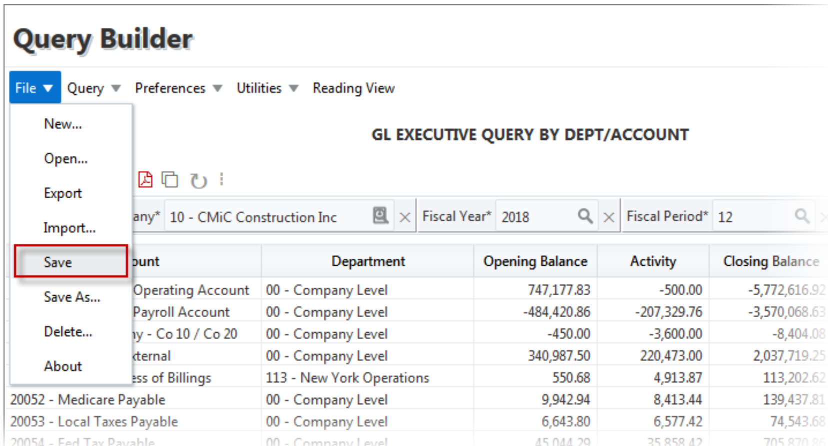
Launch as Card View – Checkbox: Allows the user to set the query to launch in card view by default and turns the query type from “Query” to “Card”, allowing it to be filtered as card view in BI Analytics.



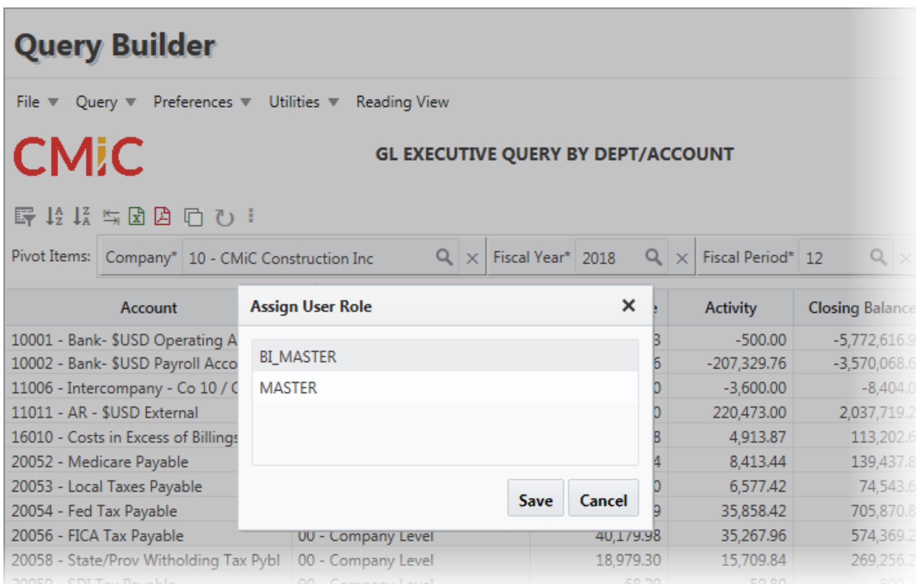


Lines Per Card: Allows the user to set the number of lines per card. By default, the lines per card is three.

Step 5: **Save and Assign Security Role(s) to Query**



Click on File and select “Save” from the drop-down menu.



A pop-up window will appear to assign a security role to the query. Select a security role and click on [**Save**].

NOTE: Queries are only available to users that belong to the assigned security roles.

Step 6: **Make Query Accessible via Console**

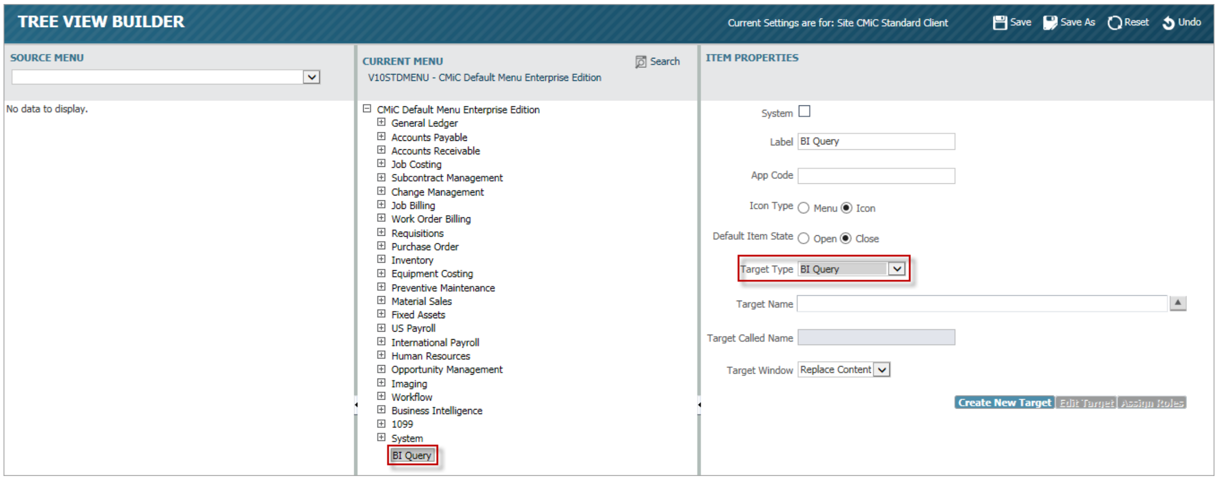
Lastly, the new query needs to be made accessible to end-users.

Add BI Query Link to Treeview

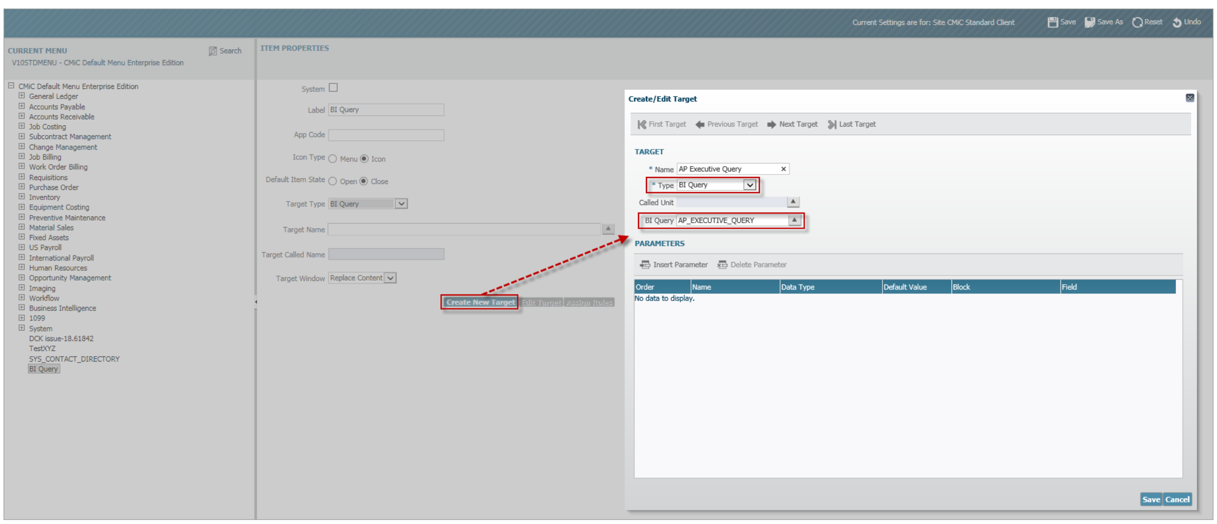
To add a link to a BI Query in Treeview, please refer to the *V10xTOOLS ADF - UI Treeview Builder* reference guide in conjunction with the following instructions.

Create User-Defined Target

On the UI Treeview Builder screen, add a new menu item to a Treeview and use the Item Properties section to set the Target Type field to “BI Query”.



Next, click on [**Create a new Target**].

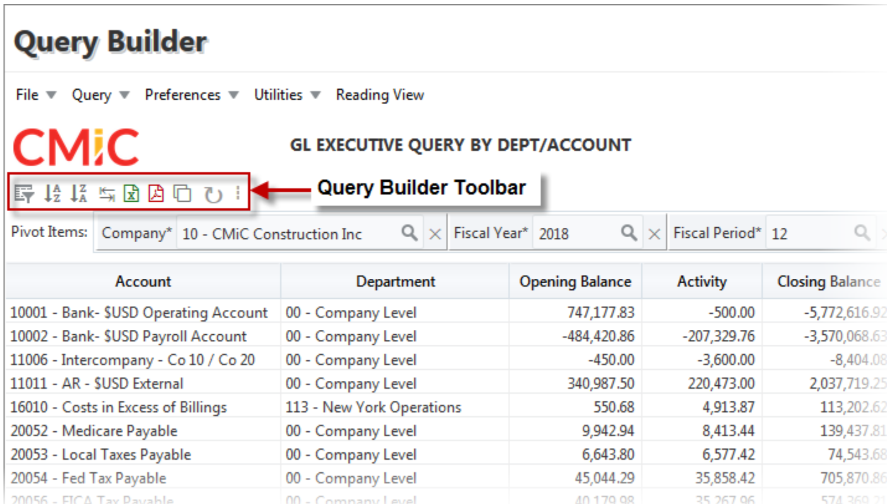


In the Create/Edit Target pop-up window, enter the target’s name in the Name field and select “BI Query” in the Type field. Use the BI Query field’s LOV to select the query to be added to the target. When finished, click on [**Save**].

Finally, select the created target via the Target Name field in the Item Properties section of the UI Treeview Builder screen and click on [**Save**].

Query Builder Toolbar

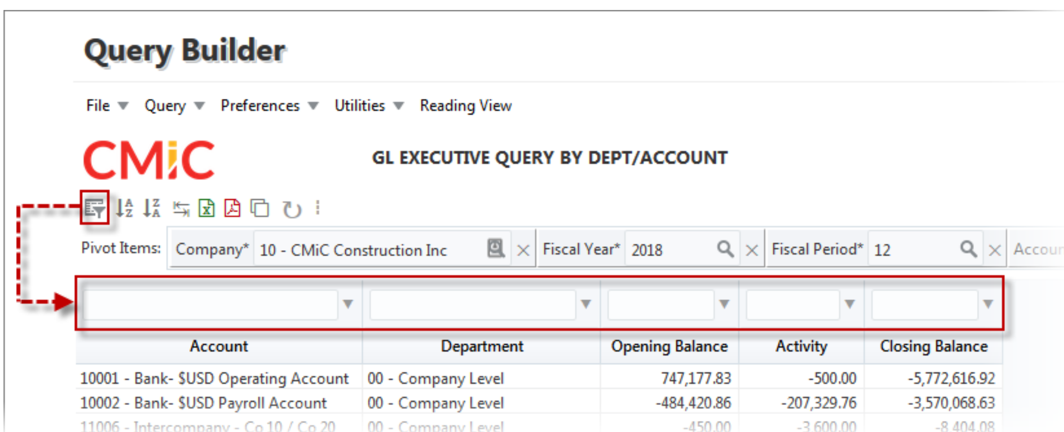
Toolbar – Controls



Query Builder with toolbar controls framed in red

The following toolbar controls are available in BI Query Builder.

Query By Example



A filter icon is available to Query by Example (QBE).

When the filter icon is clicked, a row of fields appears above the table column headers for the user to enter QBE expressions for each of the table's columns.

For more details on comparison and logical operators available to use in the expression fields for String, Number and Date columns, refer to the *Query By Example (QBE)* section in the *BI Dashboard Builder* guide.

Sort Ascending

This option aligns the table's sort order to the order of the columns and sorts the table's columns in ascending order.

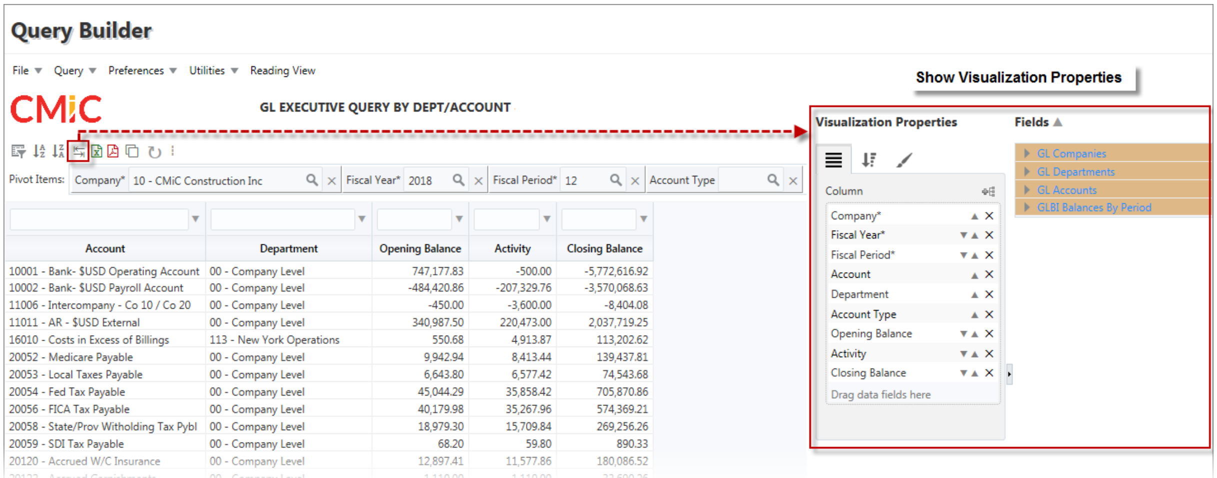
For more details, refer to the *Sort Ascending* section in the *BI Dashboard Builder* guide.

Sort Descending

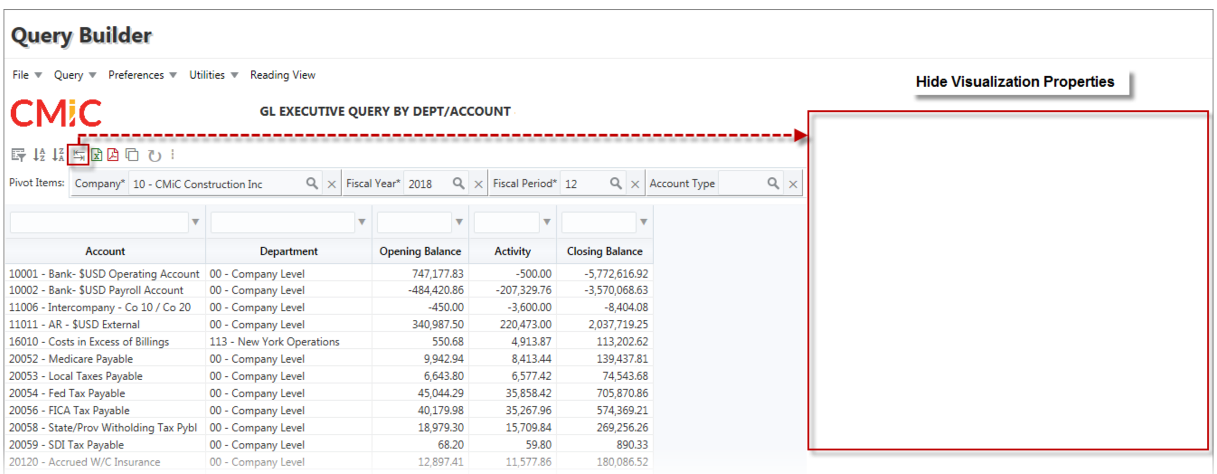
This option aligns the table's sort order to the order of the columns and sorts the table's columns in descending order.

For more details, refer to the *Sort Descending* section in the *BI Dashboard Builder* guide.

Show/Hide Visualization Settings



This option is used to show/hide the query's visualization settings.



Export to Excel

An Excel icon is available to export the query to an Excel spreadsheet.

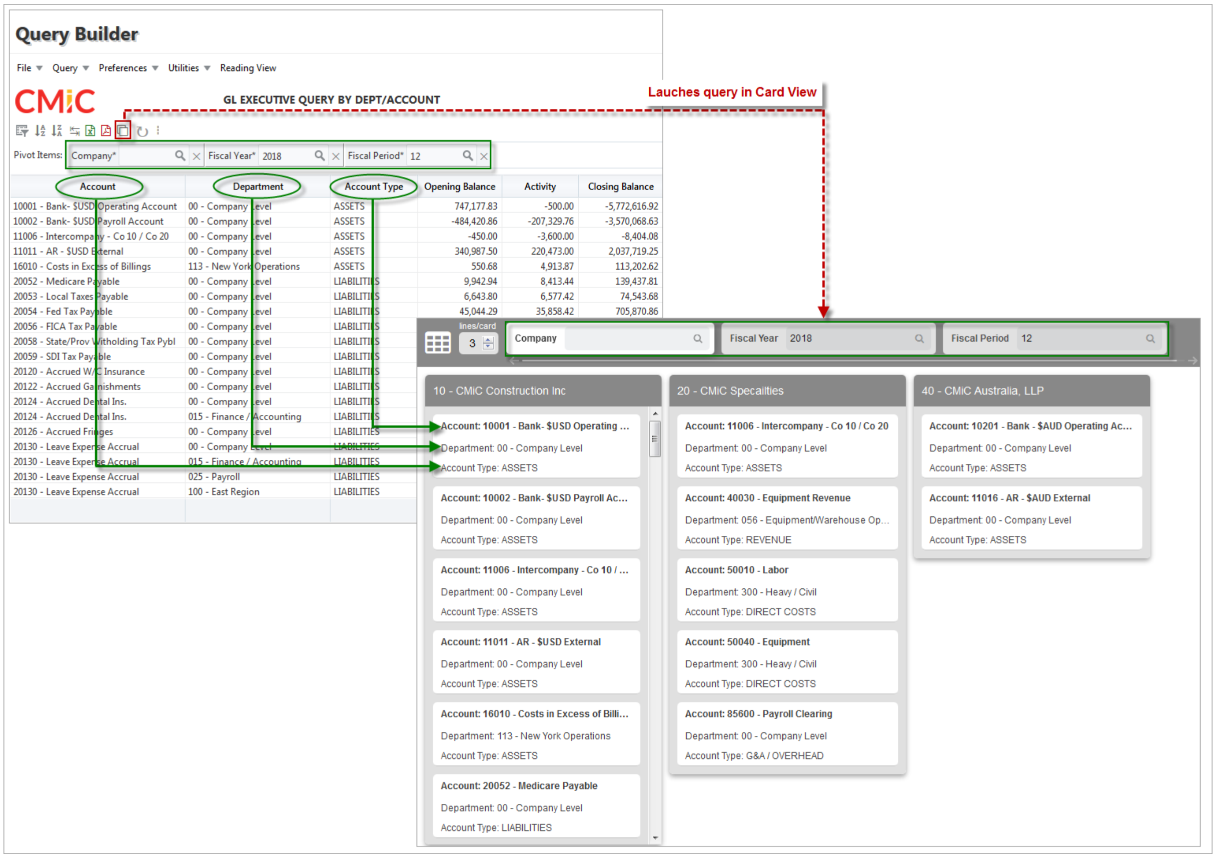
For more details, refer to *Export Table to Excel* section in the *BI Dashboard Builder* guide.

Export to PDF

A PDF icon is available to export the query to a PDF file.

For more details, refer to *Export Table to PDF* section in the *BI Dashboard Builder* guide.

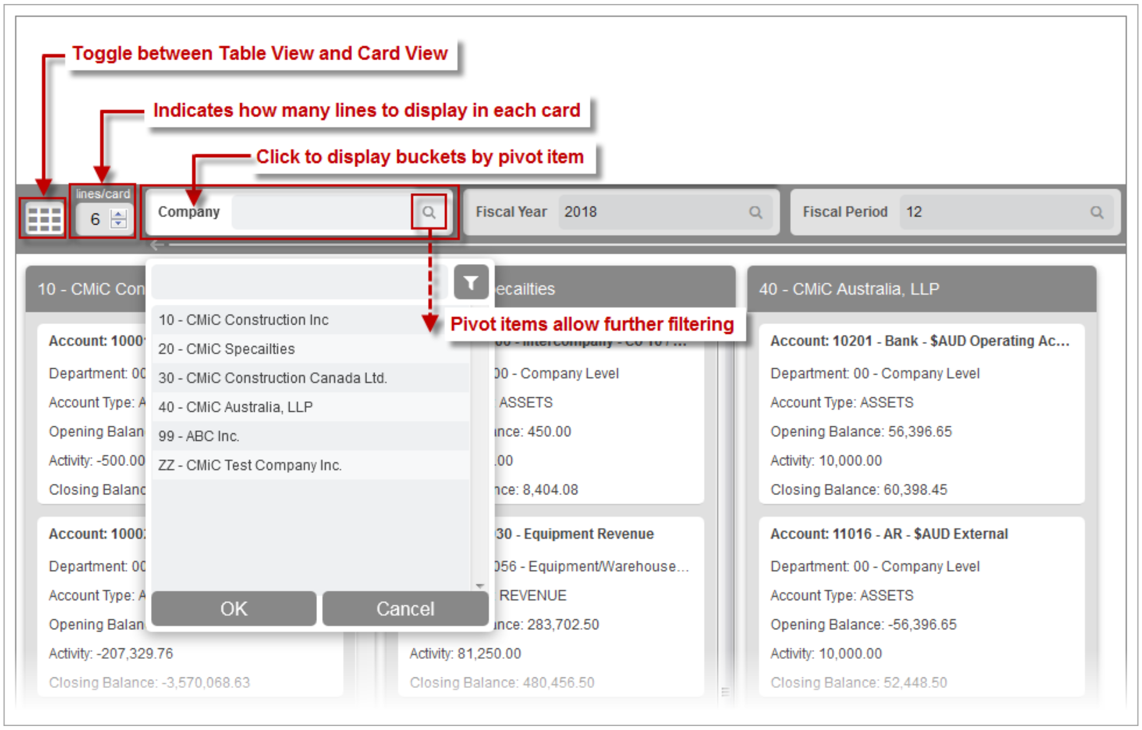
Card View



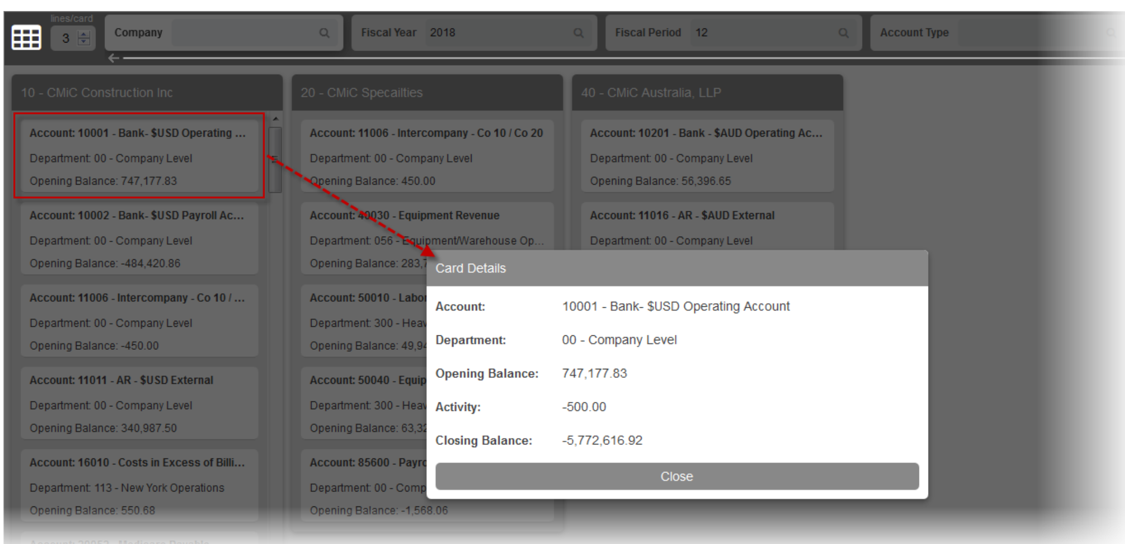
The Card View icon ( ) is available to launch a query in card view. (This icon is not visible for IE version 11 or lower.) From card view, the Table View icon ( ) can be used to toggle back to table view.

Within the Card View screen, the user can specify how many lines to appear in each card. Each card line represents a column in the query table. The order of the lines from top to bottom correspond to the order of the columns from left to right in the table.

In addition, each pivot item along the top of the screen allows filtering. Clicking on a pivot item in card view allows the user to display buckets by pivot item. If the user would like to add new pivot items, they must add the pivot items in table view and then they will be displayed in card view as well.



Clicking on a card launches the Card Details pop-up window, which contains additional details contained within the card.



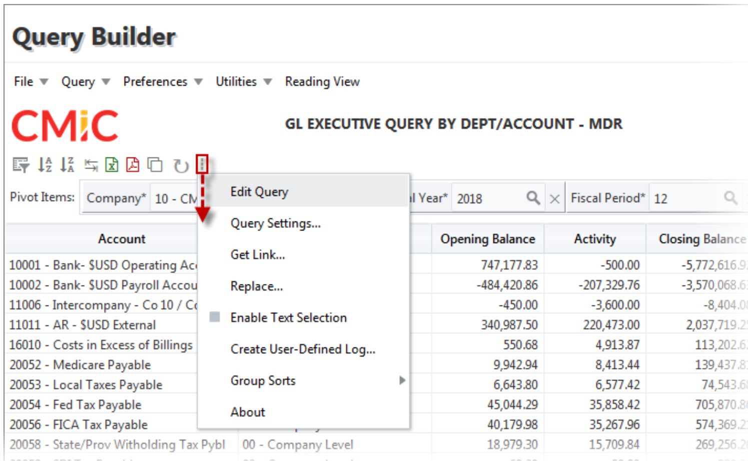
Cards can be dragged and dropped if the following conditions are met:

- All aggregatable columns’ aggregation must be set to “None”.
- The selected pivot item:
    - Must be a User Defined Field (UDF) and updatable. This is specified in BI Catalog Builder.
    - Its primary key values must be unique for each row on the table in Table View.

Refresh

This control is used to refresh a query's table visualization using current data from the database.

Menu

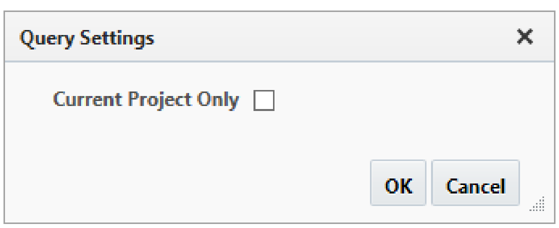


An Ellipses icon is available to open a drop-down menu containing additional query options. The options contained in this menu are described below.

Edit Query

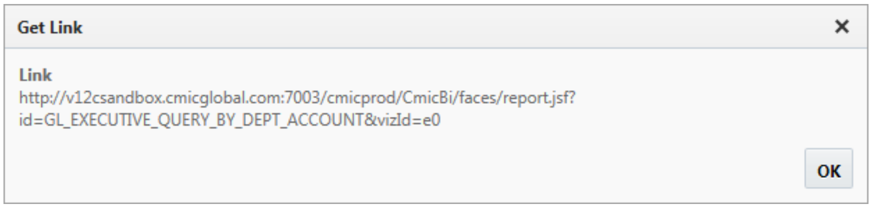
When a query is launched via URL, this option will allow users to open this query in BI Query Builder if they have the appropriate system privilege (BIDBRDEDIT) assigned. BI Query Builder will be launched in a separate tab and this query will be automatically opened for editing.

Query Settings



The Query Settings pop-up window launched from this menu option contains the 'Current Project Only' checkbox. If this box is checked, and the query's table visualization is using folders that are current-project sensitive, the table will only use data from the user's current default project, as set in CMiC Field.

Get Link…



The Get Link pop-up window launched from this menu option displays the URL for the query, which can be right-clicked and copied using the context menu that appears.

Replace…

This option allows a table visualization to be replaced with a copy/reference table visualization from another query. Users can create a table visualization in one query and place it in other queries as a copy or reference visualization. A visualization can be copied/referenced multiple times.

Enable Text Selection

If checked, this menu option allows the user to select table cell text when drill-in-place is enabled.

Create User-Defined Log…

This feature is used to create a user-defined log in CMiC Field based on a table visualization.

For more information, refer to the *Create User-Defined Log based on Table* section in the *BI Dashboard Builder* guide.

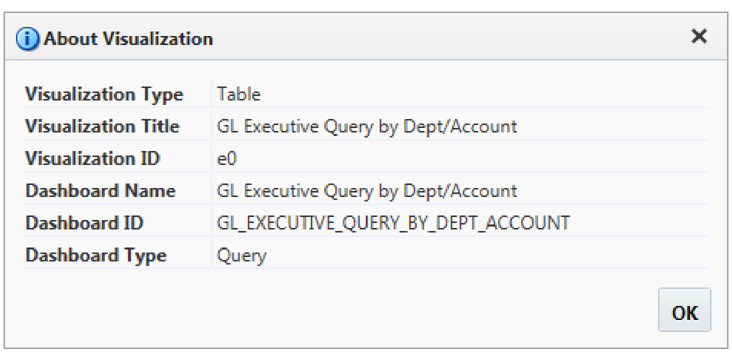
Group Sorts

This option contains two sub-options:

- Remove Group Sorts (Keep Subtotals): This option is used to remove all Group Sorts set up for the table but to keep Subtotals for Group Sorts.
- Remove All Group Sorts: This option is used to remove all Group Sorts (including Subtotals for Group Sorts) set up for the table.

The Group Sort option for tables is discussed in more detail in *Part 1: Plotting Fields* section in the *BI Dashboard Builder* guide.

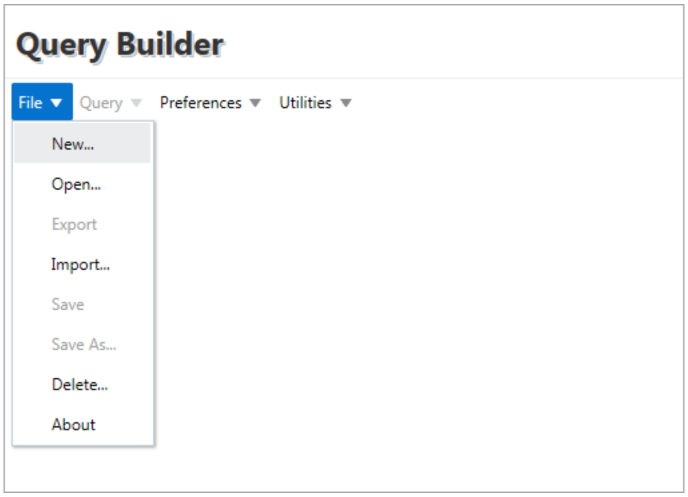
About



The pop-up window launched from this menu option provides additional details about the selected visualization.

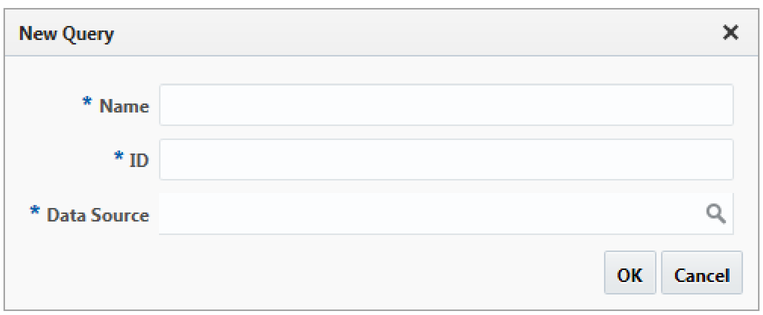
BI Query Builder – Screen

File – Menu



File drop-down menu

New – Menu Option

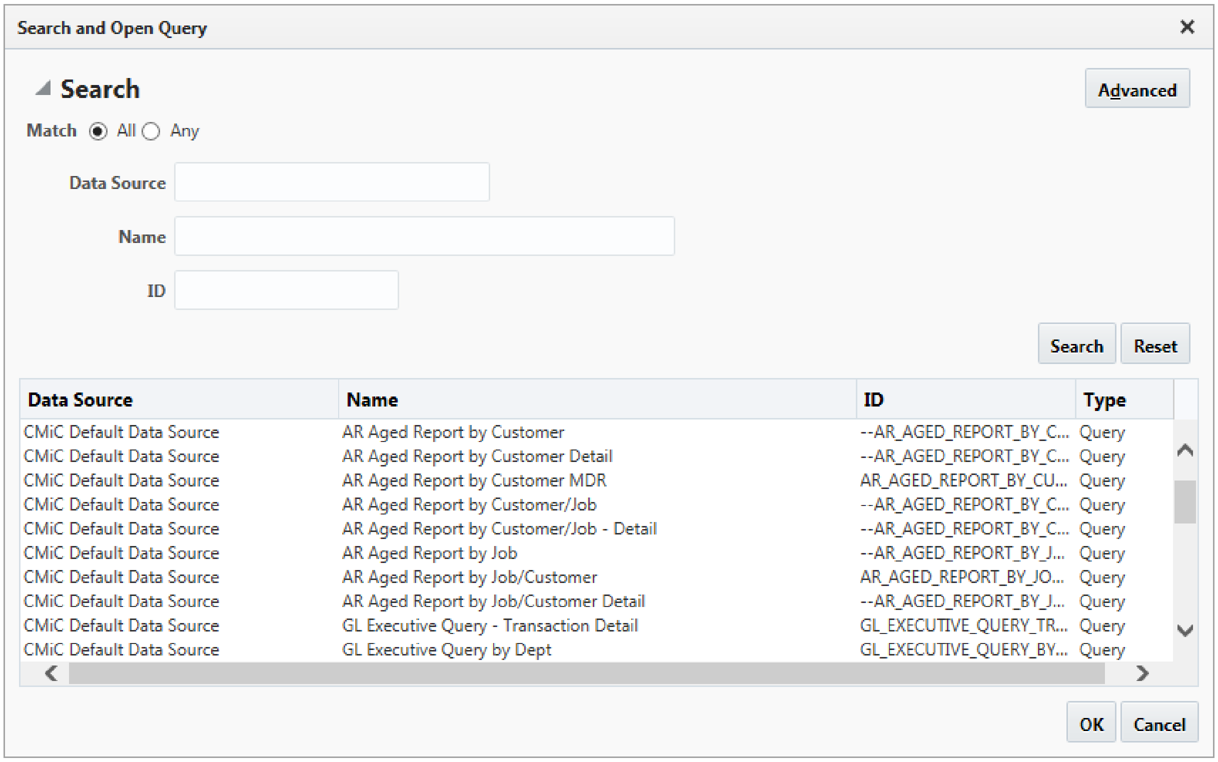


Launches the above New Query pop-up with the following fields to fill out:

Field	Details
Name	Name for new query, which auto-populates ID field.
ID	Identifier used by system to identify new query, which is auto-populated based on Name field; can use uppercase alphanumeric characters and underscore character, but spaces are not allowed.
Data Source	Contains the folders (i.e., tables/views) to use to create the query's table visualization. Table visualizations can either use data from a single folder, or data returned by joined folders.

After clicking [**OK**], the new query is loaded and ready to have a table visualization added.

Open – Menu Option



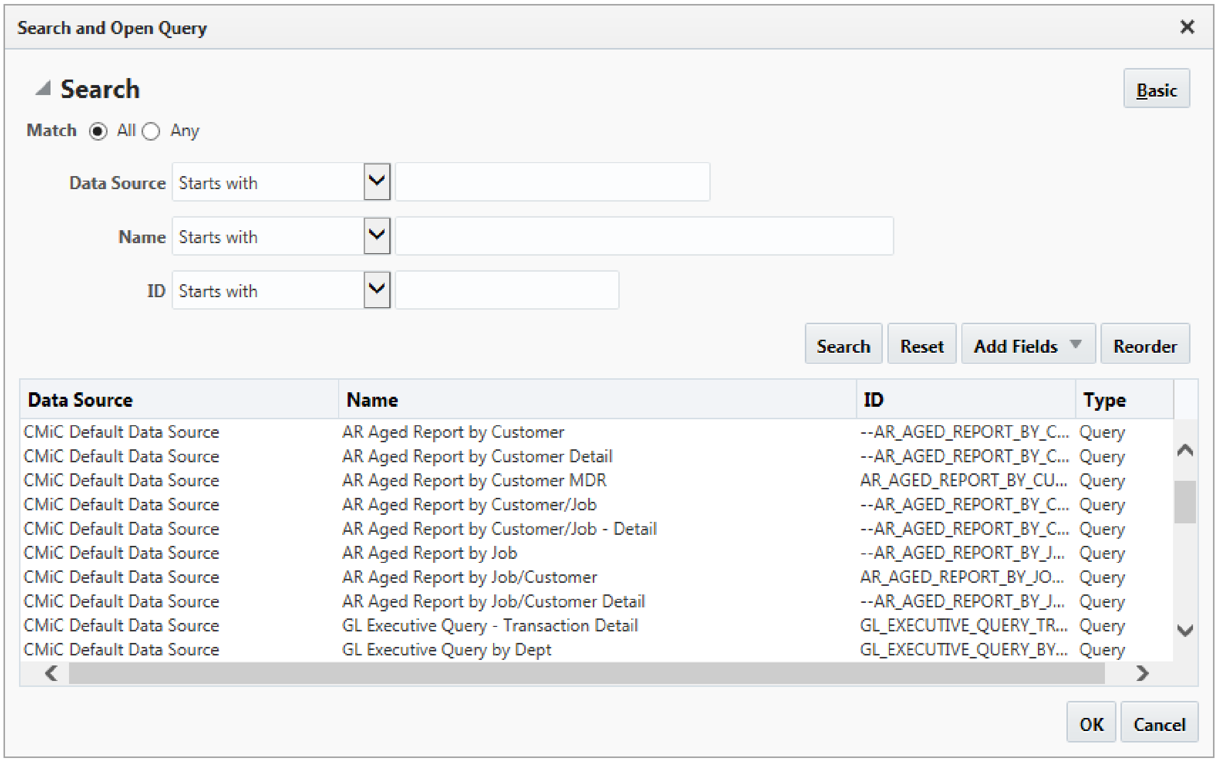
This option launches the above Search and Open Query pop-up to search for and select a query to open.

NOTE: When BI Query Builder is accessed for the first time, none of the provided default queries will be available to any user, until they are granted appropriate security access.

Use the Data Source, Name and/or ID search fields to find a particular query, and note that the following wildcard characters can be used:

- **%** (any string of characters)
- **_** (any single character)

Use the [**Advanced**] button to switch the pop-up to Advanced Search mode, shown below:

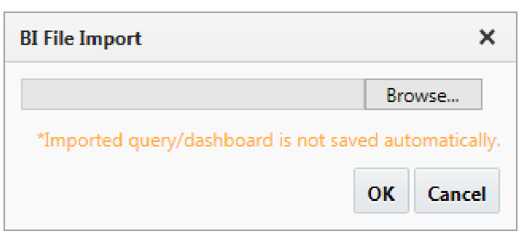


In Advanced Search mode matching operators can be used, search fields can be added, and search fields can be reset and reordered.

Export – Menu Option

The Export and Import functionality is used to copy queries from one Enterprise environment to another. For instance, if queries are created in the Test/Development environment, they can be copied to the Production environment using this functionality.

Import – Menu Option



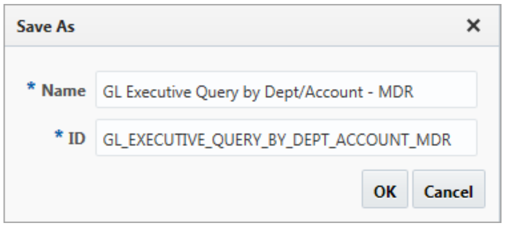
This option is used along with the Export option to copy queries from one Enterprise environment to another.

Save – Menu Option

Saves changes to query.

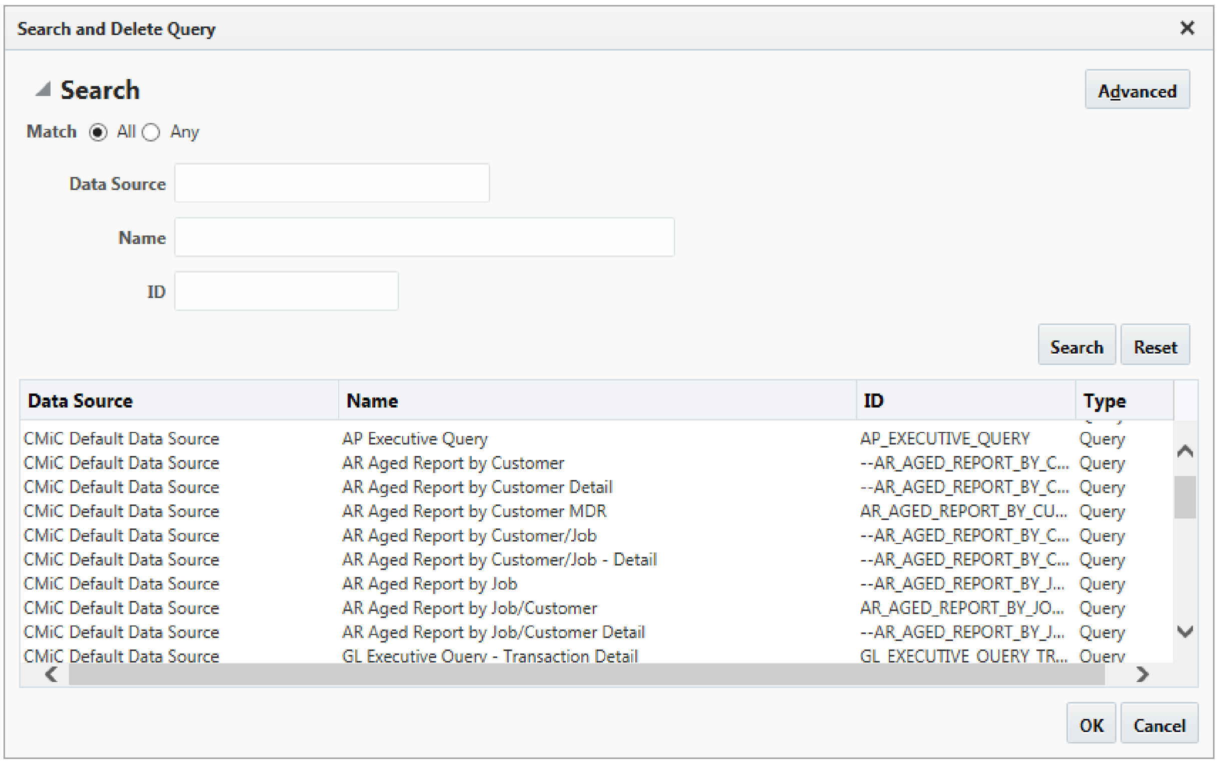
NOTE: The user will be unable to save a query if errors exist (missing fields, missing folder, etc.) and will be required to resolve these errors before the query will save. This functionality prevents broken visualizations from becoming corrupted to the point that they become unrecoverable.

Save As – Menu Option



Opens the Save As pop-up window, which can be used to create a copy of the current query by saving it with a different name.

Delete – Menu Option



This option launches the above Search and Delete Query pop-up window to search for and delete a query.

Use the Data Source, Name and/or ID search fields to find a particular query, and note that the following wildcard characters can be used:

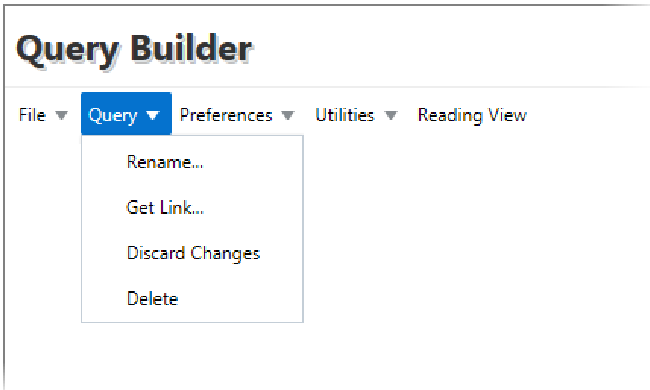
- **%** (any string of characters)
- _ (any single character)

Use the [**Advanced**] button to switch the pop-up to Advanced Search mode, where matching operators can be used, and search fields can be added or reordered.

About – Menu Option

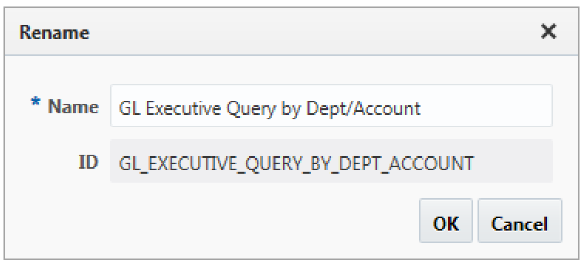
This option is used to display information about the application and its server.

Query – Menu



Query drop-down menu

Rename – Menu Option



This option launches the above Rename pop-up window used to rename the query.

Get Link – Menu Option

This option launches a pop-up window which displays the URL for the query, which can be right-clicked and copied using the context menu that appears.

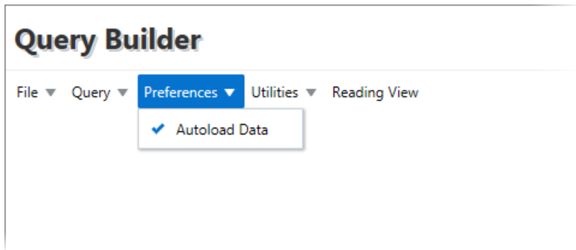
Discard Changes – Menu Option

This option launches a pop-up window which prompts the user to confirm the discarding of all unsaved changes. Click [**OK**] to revert the query back to the way it was before the unsaved changes.

Delete – Menu Option

This option launches a pop-up which prompts the user to confirm the deletion of current query. Click [**OK**] to permanently delete it.

Preferences – Menu



Preferences drop-down menu

Autoload Data – Menu Option

The Autoload Data checkbox is intended for query developers, to allow them to build queries faster, without waiting for data to load while building. This checkbox is a user setting of the Query Builder tool and is not an attribute of a query. The checkbox will stay checked or unchecked for each user (as it's the user's setting) and will apply to all queries (as it's the tool's setting).

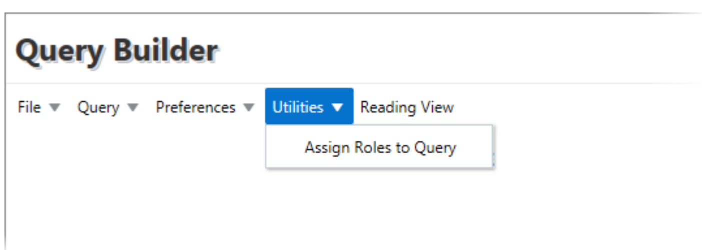
When launching a query via URL, the data will always be loaded.

NOTE: An option does not exist to turn autoload data on or off when a query is launched via URL.

By default, this checkbox is checked for the user.

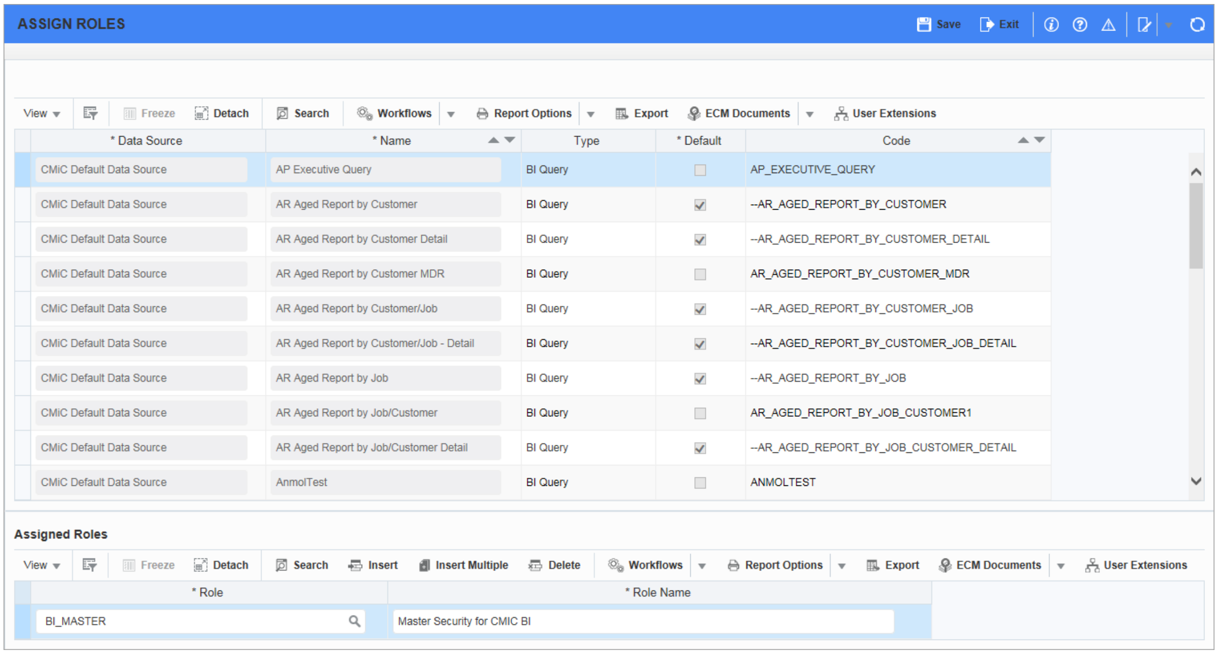
If checked, when a query is loaded, data is automatically loaded for the table visualization. Otherwise, when a query is loaded, the table visualization will not be loaded with data, and to do so requires clicking the Refresh icon . This is handy when building a query, and you wish for it to load quickly.

Utilities – Menu



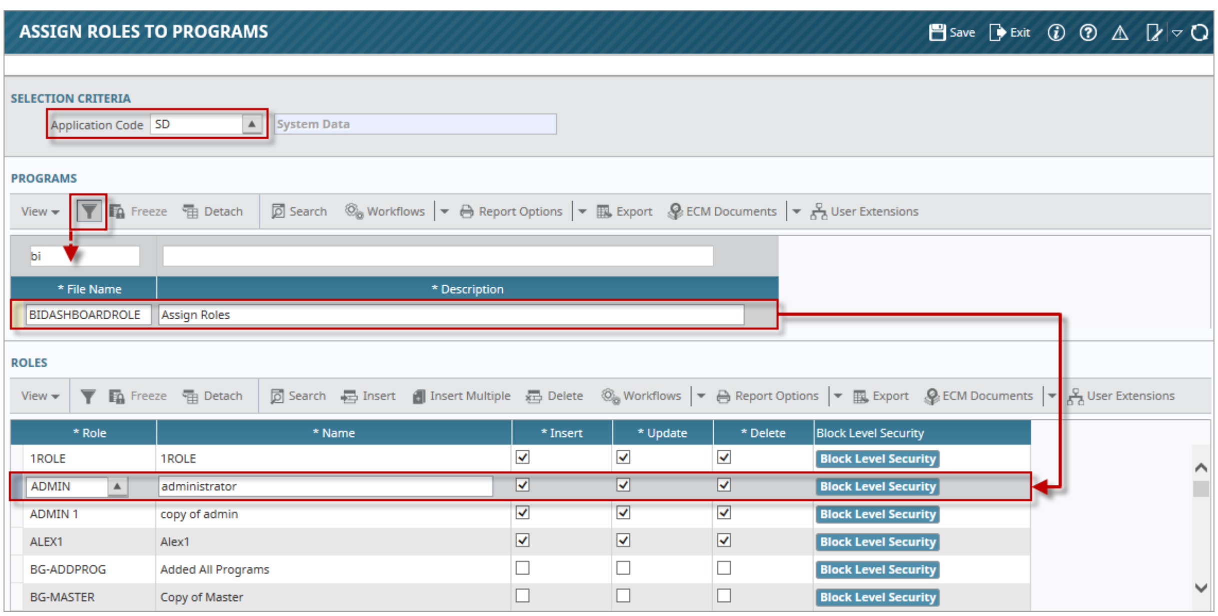
Utilities drop-down menu

Assign Roles to Query – Query Security



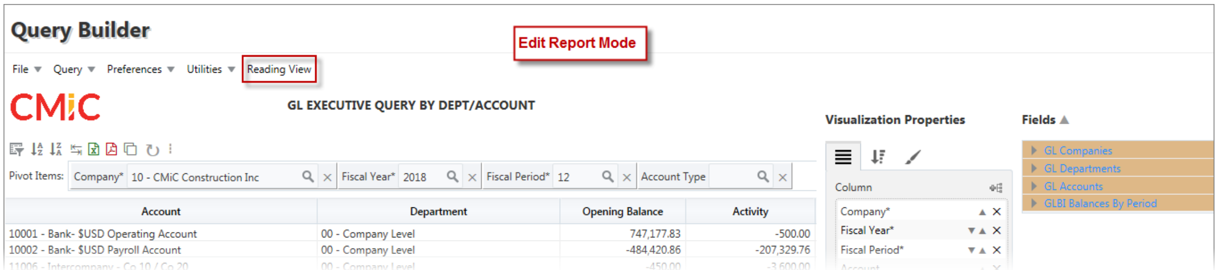
Assigning security roles to queries

To grant a user access to a query, the security role to which the user belongs must be assigned to the query. This can be done using the “Assign Roles to Query” option under the Utilities menu of BI Query Builder (shown above), by an administrator with the system privilege BISECMNG. This option is available without opening a query. Depending on security setup, the administrator’s security role may also need to be assigned to the Assign Roles to Query program using the Assign Roles to Programs screen in the System Data module, as shown in the screenshot below.



Pgm: FORMROLE – Assign Roles to Programs; standard Treeview path: System > Security > Roles > Assign Roles to Programs

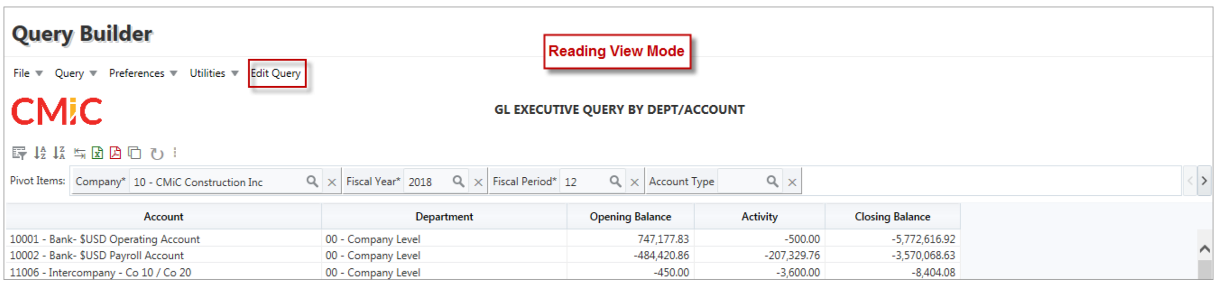
[**Reading View**] – Button



If the [**Reading View**] button is visible, the screen is in Edit Query mode, as shown above, and the Visualization Properties and Fields panes are available to create and edit queries.

Click the [**Reading View**] button to switch the screen to Reading View mode, which displays the query as it would be displayed to end-users, for review and testing purposes.

[**Editing View**] – Button



If the [**Edit Query**] button is visible, the screen is in Reading View mode, as shown above, and the Visualization Properties and Fields panes are not available. In Reading View mode, the query is displayed as it would be to end-users for review and testing purposes.

Click the [**Edit Query**] button to switch the screen to Edit Query mode, which is used to create and edit queries.

Index

[

A

B

C

D

E

F

G

I

J

L

M

N

O

P

Q

R

S

T

U

V