

BI Cards

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BI Cards

Estimated time to read: 29 minutes

With the use of BI Cards you have a flexible infrastructure that will permit the definition and visualization of KPIs, as well as other data.

Available as widgets, BI Cards can be used in a dashboard to create and define KPIs with different dimensions, collect data from different data sources and apply business rules for complex data calculations, and present information using a set of visually rich widgets. All of this provides you with increased visibility and monitoring possibilities.

i **Info**

BI Cards are part of the Core module.

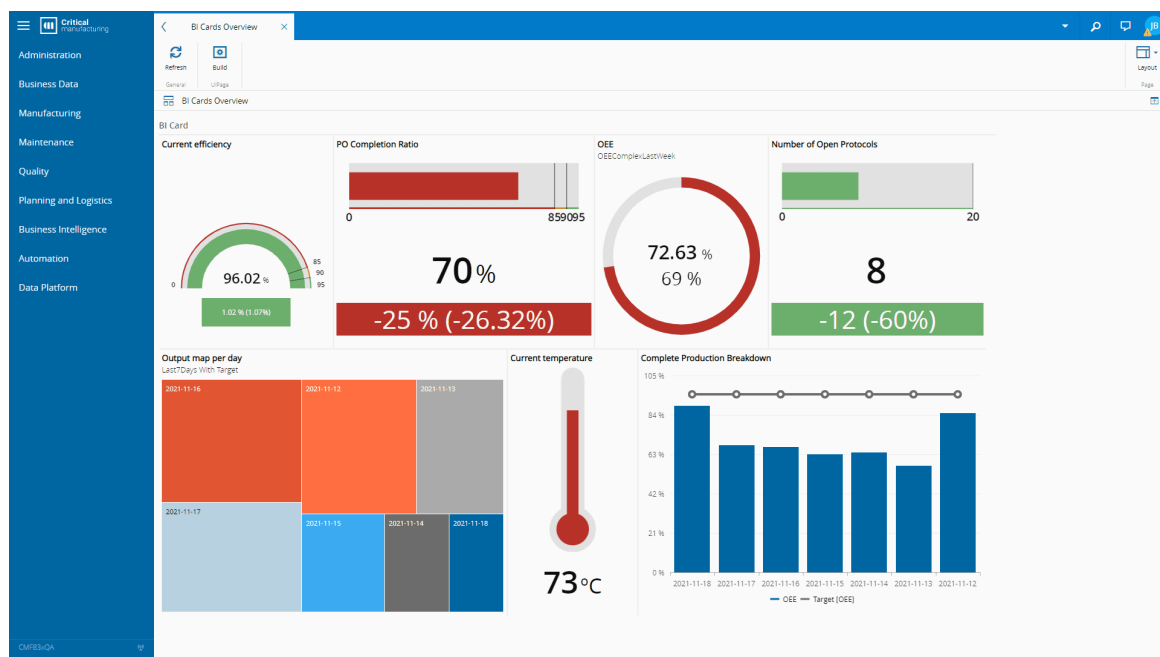
This document will guide you through the setup and usage of BI Cards.

Overview

BI Cards are a visual representation of KPI values that display real-time information. They provide a low-effort way of building highly visual dashboards, by displaying data for several KPIs using different visualization options. This enables the highlight of the performance of an entity so that key users can control the production status and take preventive or corrective actions.

A UI Page can contain multiple BI Cards displaying different KPIs for the same or different entities. The UI Page can be made dynamic by linking other widgets (for example, a **Query**) with the BI Card widgets. Thus, a visual-rich and powerful dashboard can be easily created and made available for several users.

The image below shows an example of a dashboard with BI Cards:



Info

BI Cards must be configured as a Widget in a UI Page.

Concepts

The table below describes the main concepts related to BI Cards:

Concept	Description
UI Page	A configurable GUI page that can be used to display information and interact with the system. There are different page elements that can be used to build a UI Page.
Widget	Visual elements used to build a UI Page, such as BI Cards, queries, buttons, and filters.
Parameter	A value to be monitored in a KPI.
Static KPI	A KPI structure that allows users to insert values for defined timeframes.
Dynamic KPI	A KPI which is associated with an entity's properties and its value is calculated considering a time window.
KPI Type	Defines which is the goal of the KPI: maximum, minimum, or deviation.
Entity Type	An entity (object type) for which the KPI is calculated.
Dimension	For dynamic KPIs, it defines the scope variation of the defined KPI, for example, Last 7 Days or Current Shift .
Timeframe	A time window associated with a KPI for which a certain value is considered.
Visualization	How the KPI values will be displayed in the Widget.

Table: BI Cards main concepts

KPI

A KPI is an object that can be used to store and organize data in order to be displayed in reports and widgets. The KPI object model is shown in image below.

There are two types of KPIs: **Static** and **Dynamic**.

```
graph LR
    A1[Parameter] --> Main[KPI Static]
    A1 --> L1[KPI Dynamic]
    Main --> Main2[KPI TimeFrame]
    L1 --> L2[KPI Dimension] --> L3[KPI Timeframe]
```

```
classDef mermaid_title color:#000, fill:#fafafa, stroke:#fafafa, stroke-width:0x, font-size:100%, font-weight:200;
classDef mermaid_start color:#000, fill:#fafafa, stroke:#fafafa, color:#fafafa, stroke-width:0x, font-size:100%, visibility: hidden;
classDef mermaid_businessdata color:#000, fill:#65CDE8, stroke:#65CDE8, stroke-width:0px, font-size:100%;
classDef mermaid_nonbusinessdata color:#000, fill:#B7DEE8, stroke:#B7DEE8, stroke-width:0px, font-
```

```
size:100%;
classDef mermaid_entity color:#000, fill:#FB9F53, stroke:#FB9F53, stroke-width:0px, font-size:100%;
classDef mermaid_entitylinked color:#000, fill:#FCD5B5, stroke:#FCD5B5, stroke-width:0px, font-
size:100%;
classDef mermaid_context color:#000, fill:#B9CDE5, stroke:#B9CDE5, stroke-width:0px, font-
size:100%;
classDef mermaid_optional color:#000, fill:#B7DEE8, stroke:#65CDE8, stroke-width:1px, font-
size:100%, stroke-dasharray: 5 5;
classDef mermaid_state color:#000, fill:#d7e4bd, stroke:#000, stroke-width:1px, font-size:100%,
font-weight:300;
class Main,Main2 mermaid_entity
class A1,A2,A3,A4,A5,A6,A7,A8,A9,A10,A11,A12 mermaid_businessdata
class L1,L2,L3,L4,L5,L6 mermaid_entitylinked
class C1,C2,C3,C4,C5,C6 mermaid_context
class N1,N2,N3,N4,N5,N6 mermaid_nonbusinessdata

click Main ".../userguide/business-data/kpi"
click A1 ".../userguide/business-data/parameter"
```

Static KPIs store data in defined time frames for a configured numeric **Parameter**. You must select a **Frequency** calculation (Daily, Weekly, Monthly, or Yearly) that defines the time interval for which data will be inserted into the KPI. Dynamic KPIs are associated with an **Entity Type** and **KPI Dimensions**. Each KPI Dimension corresponds to a variation of the scope of the KPI.

For both KPIs, a goal type (**KPI Type**) needs to be defined, such as maximization, minimization, or deviation from a target value.

KPIs are referenced in Widgets of UI Pages and, during runtime, the GUIs will request the application server to retrieve the KPI values.

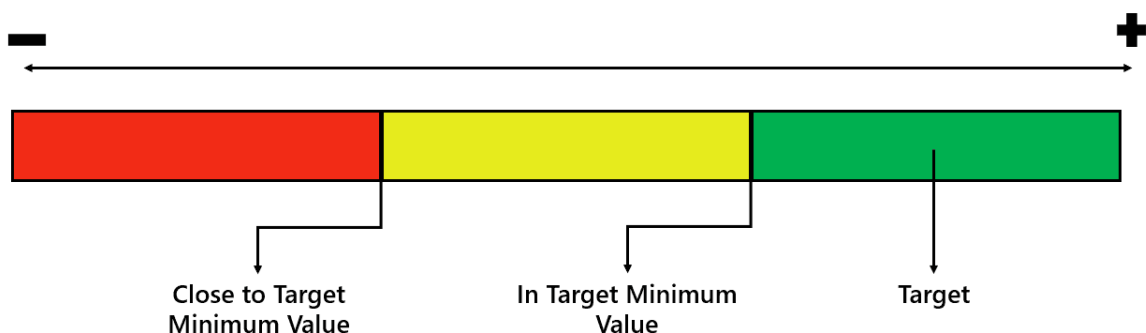
Setting Up BI Cards

Create the KPIs

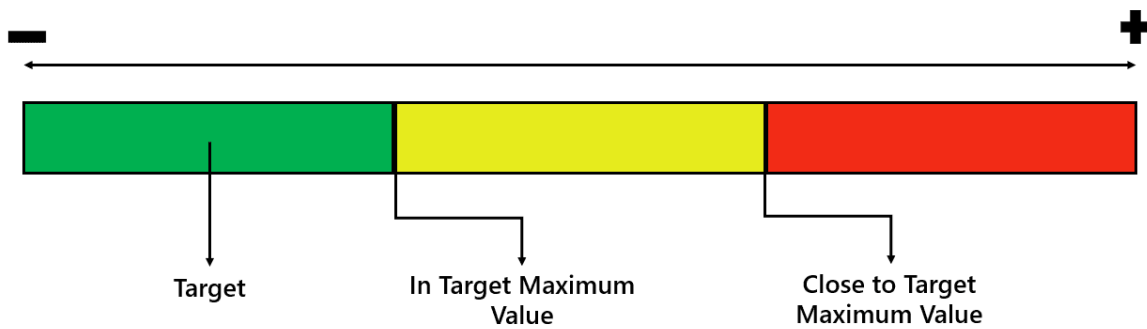
As BI Cards display information that is obtained from KPIs, you need to ensure that the desired KPIs are available before creating the BI Card itself.

For a KPI, it is mandatory to define the KPI Type (Maximum, Minimum, or Deviation) and, for each KPI Type, targets must be configured to allow you to visually assess, on the BI Card, how the current value compares with the target value.

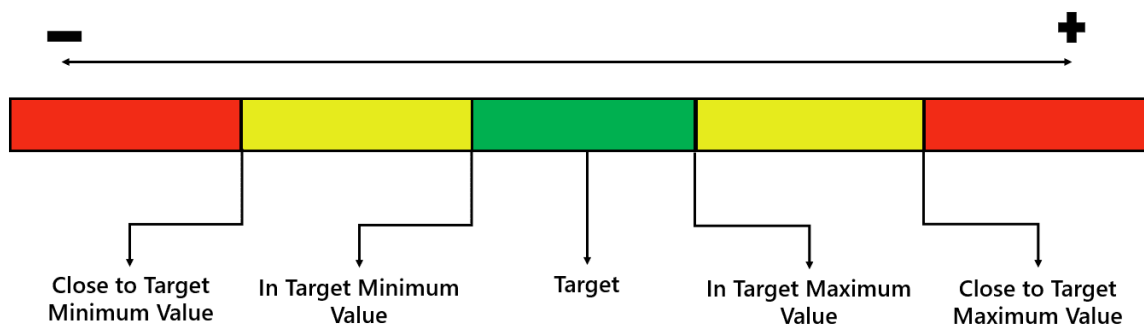
For the KPI of type Maximum, the limits, as shown below, should be configured:



For the KPI of type Minimum, the limits, as shown below, should be configured:



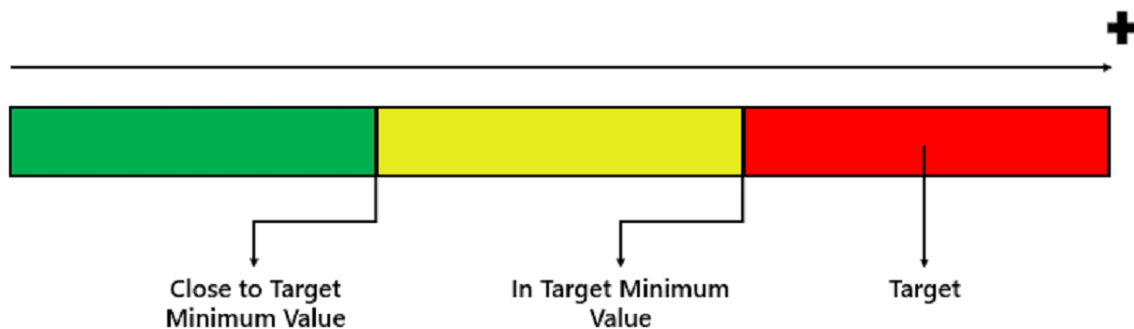
For the KPI of type Deviation, the limits, as shown below, should be configured:



For a KPI linked to a Parameter with Data Type DateTime, the KPI Type should be defined as Minimum. The limits, as shown below, should be configured:

Info

The KPI limits must be defined in the KPI Dimension.



Static and Dynamic KPIs have different configurations, as explained in the sub-sections below.

Static KPIs

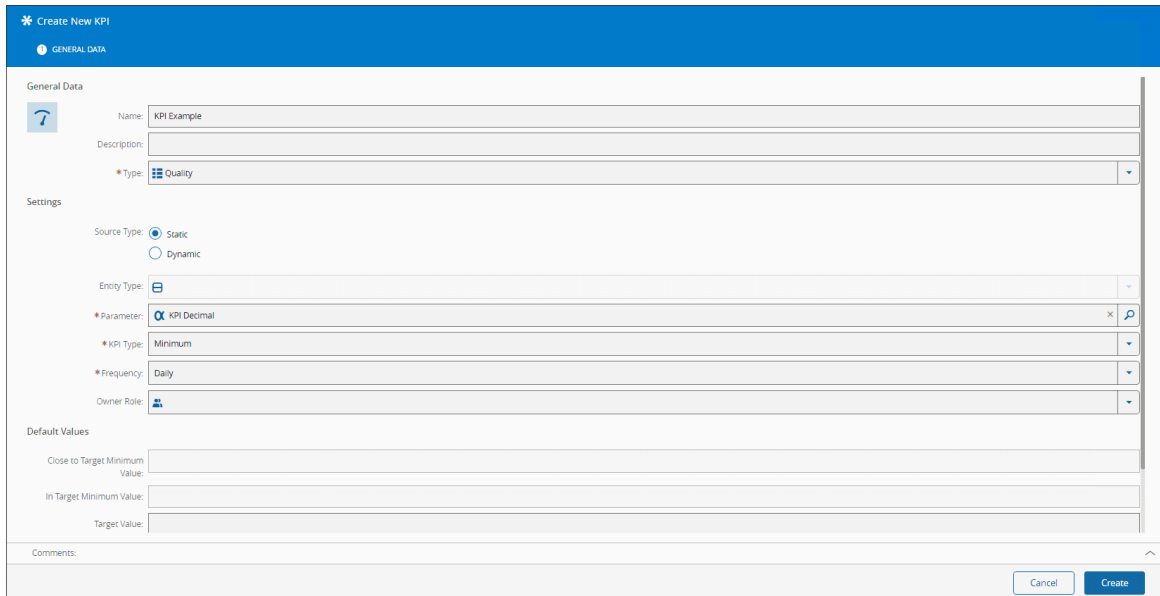
For a Static KPI you should define:

- The **Parameter** - a numeric value that will be monitored in the KPI. Its data type and boundaries must be aligned with the KPI scope.
- The **Frequency** - defines the time intervals for which values will be specified for the KPI.

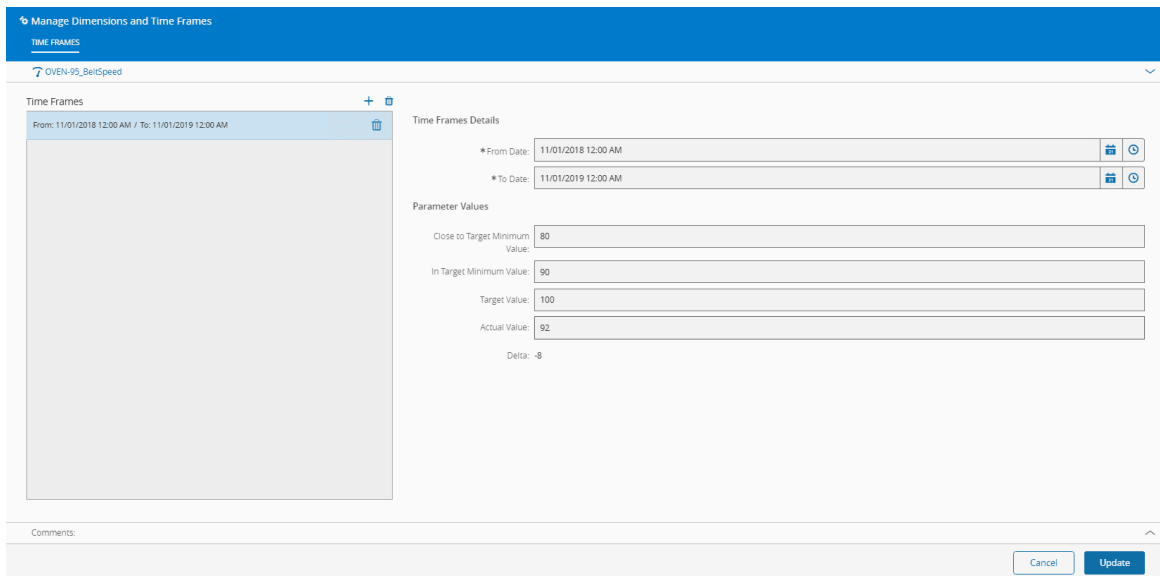
Note

Units (of Measure) that are defined for the Parameter associated with the KPI will determine the Unit that is shown in the BI Card.

The next image shows the creation page for a Static KPI:



After creating the KPI, data must be inserted into its time frames, as shown below:



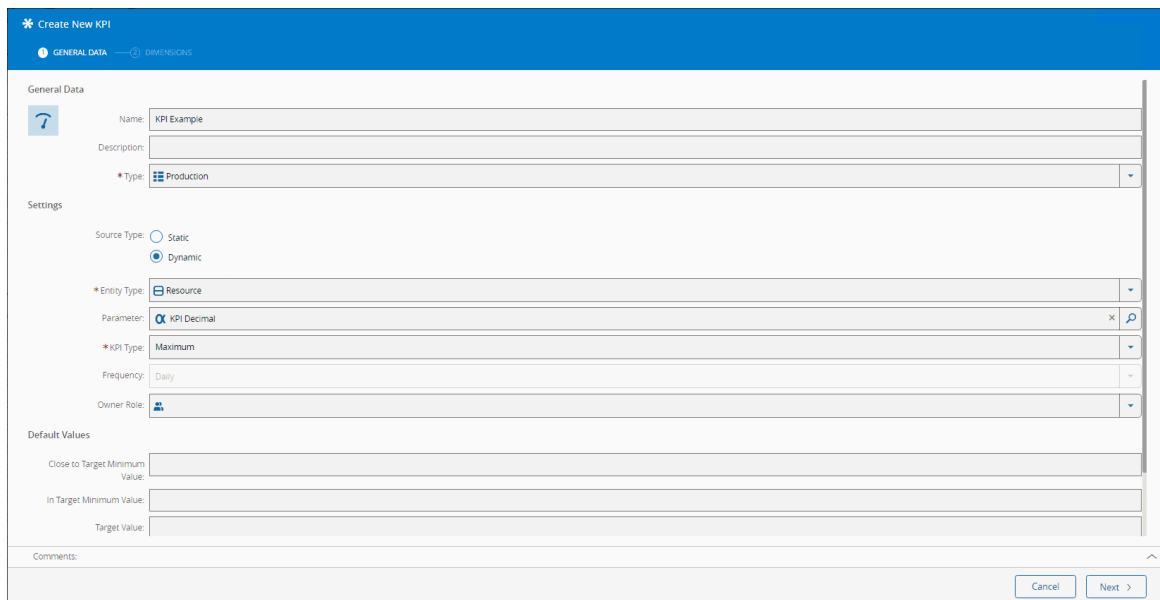
Dynamic KPIs

For a Dynamic KPI you should define:

- The **Entity type** - system's entity for which the KPI will be applied.
- The **Parameter** - a value that will be monitored in the KPI. Its data type and boundaries must be aligned with the KPI scope.
- For each **Dimension** you need to define:

- The **Value Type** - if the KPI calculation will return a Data Value (single value) or Data Series:
 - Data Value - the dataset is expected to have only one row representing a single value. If multiple rows are present, only one is presented.
 - Data Series - the dataset is expected to have multiple rows. Each row representing a value of the current dimension.
 - The **Source** - which source will be considered for calculating the KPI:
 - Business Rule - will execute a Rule.
 - Operational Data Store - will trigger a T-SQL query in the ODS Database.
 - Data Warehouse - will trigger a T-SQL query in the DWH Database.
 - Cubes - will trigger an MDX query in the Data Warehouse Cubes.
- If the source is not a **Business Rule**, you need to enter the **Source Command**, otherwise, a **Business Rule** must be selected from the ones available in the system.
- The **Default Visualization** - the default visualization for the presentation of the BI Card.

The image below shows the Create New KPI wizard for a Dynamic KPI:



To add a KPI Dimension, you can do it through the Create KPI wizard, through the Edit KPI wizard, or through the Manage Dimensions and Time Frames wizard, as displayed in the image below:

Edit KPI
GENERAL DATA
DIMENSIONS

Dimensions
+
Dimension Details

Current Shift
Cubes
Last 7 Days
Cubes

Name: Current Shift
Value Type: DataValue
Source: Cubes
Source Command:

```

1 /*
2   @CurrentDay | Date | "yyyy-MM-dd"
3   @EntityName | String |
4   @CurrentShift | String |
5
6   @Output_NAME_Column | "[In Process Date].[Calendar Day].[Calendar Day].[MEMBER_CAPTION]"
7
8   WITH
9   MEMBER [Measures].[Value] AS IF([ISNULL([Measures].[In Process Primary Quantity]), 0, [Measures].[In
10    Process Primary Quantity]) + IF([ISNULL([Measures].[In Process Sub Materials Primary Quantity]), 0, [Measures].

```

Open Documentation

Default Visualization:
100 100 100

Comments:

Cancel Save

Info

For the KPI Dimension **Source Command**, there is a special convention in place to return values to the application KPI infrastructure. The detailed documentation about this convention can be found by selecting the **Open Documentation** button that is available in the Wizard or in the [Developer Guide](#) section of the MES Help.

The source code snippet below shows an example of a **Source Command** that calculates the total primary and secondary quantity of WIP for the Area of a certain Facility (supplied as the variable **@EntityName**) for the current Employee's User (variable **@UserId**). In this example, the KPI type should be configured as a minimum and must be linked to the Entity Type **Facility**. For the KPI Dimension, it must be configured to return a **Data Value** and the Source must be defined as the **Operational Data Store**.

```

SELECT f.[Name], (SUM(ISNULL(m.PrimaryQuantity,@)) + SUM(ISNULL (m.SecondaryQuantity, @) )) AS
[Value]
FROM CoreDataModel.T_Material m
INNER JOIN CoreDataModel.T_StepArea sa ON sa.SourceEntityId = m.StepId
INNER JOIN CoreDataModel.T_Area a ON sa.TargetEntityId = a.AreaId
INNER JOIN CoreDataModel.T_Employee e ON e.AreaId = sa.TargetEntityId
INNER JOIN CoreDataModel.T_Facility f ON f.FacilityId = m.FacilityId AND f.FacilityId =
a.FacilityId
INNER JOIN Security.T_User u ON u.UserId = e.UserId
WHERE u.UserId = @UserId AND f.[name] = @EntityName AND m.UniversalState <> 4
GROUP BY f.[Name];

```

Although it is mandatory that the Source Command returns the Entity Name and Value columns, it is also possible to override the KPI, KPI Time Frames, and KPI Parameter's definitions by specifying these values in the correct column of the Dimension's Source Command. For example, if the **Units** column is added in the Source Command, and it is the specified value to be shown in the BI Card, that value will be shown instead of the **Unit** defined in the associated Parameter. For more information, see the table below:

Column	Output Source Definition	For Data Value	For Data Series
Category	It is the Category name displayed for the Data Series in the x-axis.	Optional	Mandatory
EntityName	It is obtained from the Source Command column.	Optional	Optional

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Column	Output Source Definition	For Data Value	For Data Series
Name	It is obtained from the Source Command column.	Mandatory	Mandatory
Value	It is obtained from the Source Command column.	Mandatory	Mandatory
TargetValue	It is obtained from the Source Command column if defined or from the <i>Target Value</i> defined in the KPI.	Optional	Optional
DisplayValue	It is obtained from the Source Command column.	Optional	Optional
Axis	It is obtained from the Source Command column. The index of the series axis - 0 is the left axis, 1 if the right axis.	Optional	Optional
Units	It is obtained from the Source Command column if defined or from the <i>Units</i> defined in the Parameter linked to the KPI.		
Maximum	It is obtained from the Source Command column if defined or from the <i>Maximum Value</i> defined in the Parameter linked to the KPI. It is the maximum value of the left axis.	Optional	Optional
Minimum	It is obtained from the Source Command column if defined or from the <i>Minimum Value</i> defined in the Parameter linked to the KPI. It is the minimum value of the left axis.	Optional	Optional
CloseToTargetMinimumValue	It is obtained from the Source Command column if defined or from the <i>Close to Target Minimum Value</i> defined in the KPI/KPI Time Frame.	Optional	Optional
CloseToTargetMaximumValue	It is obtained from the Source Command column if defined or from the <i>Close to Target Maximum Value</i> defined in the KPI/KPI Time Frame.	Optional	Optional
InTargetMinimumValue	It is obtained from the Source Command column if defined or from the <i>In Target Minimum Value</i> defined in the KPI/KPI Time Frame.	Optional	Optional
InTargetMaximumValue	It is obtained from the Source Command column if defined or from the <i>In Target Maximum Value</i> defined in the KPI/KPI Time Frame.	Optional	Optional

Column	Output Source Definition	For Data Value	For Data Series
SecondAxisMax	It is obtained from the Source Command column if defined or from the <i>Maximum Value</i> defined in the Parameter linked to the KPI. It is the maximum value of the right axis.	Optional	Optional
SecondAxisMin	It is obtained from the Source Command column if defined or from the <i>Minimum Value</i> defined in the Parameter linked to the KPI. It is the minimum value of the right axis.	Optional	Optional
SecondAxisUnits	It is obtained from the Source Command column if defined or from the <i>Units</i> defined in the Parameter linked to the KPI. It is the units of the right axis.	Optional	Optional
FromDate	It is obtained from the Source Command column if defined or from the <i>From Date</i> defined in the Timeframe of the KPI.	Optional	Optional
ToDate	It is obtained from the Source Command column if defined or from the <i>To Date</i> defined in the Timeframe of the KPI.	Optional	Optional
Color	It is a named or <u>HTML</u> color in which the KPI will be displayed in the BI Card. It is possible to define a different Color per data series.	Optional	Optional
[Name1,Value1], [Name2,Value2]...	Additional columns to display Data Series' information.	Optional	Optional

Table: Dynamic KPI output definition

For Dynamic KPIs, Time Frames can be added, as shown in the image below. When adding a Time Frame for a Dynamic KPI, you can define specific target values to be applied when displaying data for that corresponding Time Frame.

If an Entity is selected, then the Time Frame will only be applied for this Entity.

It is only possible to define one default Time Frame per Entity. If there are other Time Frames defined for a KPI which have a default Time Frame, then the non-default target values will be applied when displaying data for those Time Frames.

Manage Dimensions and Time Frames

DIMENSIONS

TIME FRAMES

7

Volume In

Time Frames

DIMENSION

Current Shift

1 Time Frame

Last 7 Days

No Time Frames

CURRENT SHIFT

New Time Frame

Time Frames Details

Resource:

Resource

Default:

☒

* From Date:

MM/dd/yyyy HH:mm PP

* To Date:

MM/dd/yyyy HH:mm PP

Parameter Values

Target Value:

300

In Target Maximum Value:

350

Close to Target Maximum Value:

400

Comments:

Cancel

Update

Out-of-the-Box Dynamic KPIs

There is a set of available Dynamic KPIs that are provided out-of-the-box and that are ready to use, as listed in the table below:

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Average Assist Time	- Resource		The average time between the start and end of Assist Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Minimum	KPI Hours
Average Changeover Time	- Resource		The average Setup Time of complete Setup transitions for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Minutes

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Closed Protocol Duration by Type and Severity	- Protocol Instance		The duration of Protocol Instances having the System State Closed by Type and Severity.	- Current - Current Day - Current Week - Current Month	Minimum	KPI Hours
Closed Protocol Duration by Type	- Protocol Instance		The duration of Protocol Instances having the System State Closed by Type.	- Current Day - Current Week - Current Month	Minimum	KPI Long
Closed Protocol Instances	- Protocol Instance		The Number of Protocol Instances in SystemState = Closed	- Current Day - Current Week - Current Month	Minimum	KPI Long
Completed Production Orders	- Facility - Product Group		The number of Completed Production Orders for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Maximum	KPI Long
Completed Quantity	- Facility - Product Group		The Quantity Completed for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Decimal

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Components Placed Per Hour	- Resource		The average number of components placed per hour registered on component placement Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Maximum	KPI Decimal
Defective Units Count	- Area - Facility - Resource		The Material Primary Quantity Loss for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Decimal
Down Reason Count	- Resource		The Reasons for the changes to Universal State Unscheduled Down for the selected Resource.	- Current	Maximum	None
Down Reason	- Resource		The Down Reason for the selected Resource with System State set as Down.	- Last 7 Days	Deviation	None
Equipment Recipe	- Resource		The Recipe of the selected Resource.	- Current	Deviation	None

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Equipment State	- Resource		The Universal State of the selected Resource.	- Current - Last 7 Days	Deviation	None
Fault Count	- Resource	🔗	The number of Fault Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Minimum	KPI Decimal
First Pass Yield	- Resource	🔗	The number of OK Units Inspected Events divided by the number of OK and NOK Units Inspected Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Decimal
Job Remaining Time	- Resource		The remaining process time of the last tracked-in Material in the selected Resource.	- Current	Maximum	KPI Decimal
Loss Reason Sum	- Area		The sum of the losses per Reason recorded in the selected Area.	- Last 7 Days	Minimum	KPI Decimal

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Material Completed Quantity	- Material		The Processed Quantity of the oldest tracked-in Material in the selected Resource.	- Current	Maximum	KPI Long
Material Customer	- Resource		The Customer of the Production Order of the oldest tracked-in Material in the selected Resource.	- Current	Deviation	None
Material Elapsed Time	- Material		The start processing date of the oldest Material tracked-in in the Resource.	- Current	Minimum	KPI DateTime
Material Estimated Remaining Time	- Material		The time until the Planned End Date of the oldest tracked-in Material in the selected Resource.	- Current	Minimum	KPI DateTime
Material Product Description	- Resource		The Product Description of the oldest tracked-in Material in the selected Resource.	- Current	Deviation	None
Material Product	- Resource		The Product of the oldest tracked-in Material in the selected Resource.	- Current	Deviation	None

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Material Progress	- Material		The progress of the Material's Completed Quantity of the oldest tracked-in Material in the selected Resource.	- Current	Maximum	KPI Percentage
Material Quantity	- Material		The Quantity to Process of the oldest tracked-in Material in the selected Resource.	- Current	Deviation	KPI Long
Material Remaining Quantity	- Material		The remaining Quantity to Process the oldest tracked-in Material in the selected Resource.	- Current	Minimum	KPI
Material Units Produced	- Resource		The number of Units Produced Events for the selected Resource.	- Current Order	-	KPI Decimal
Medium Time Between Assists	- Resource		The average time between Assist Events for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month - Current Order	Minimum	KPI Hours

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Missing Volume by Item	- Plan		The delta between the Planned Volume and the Actual Volume - the unfulfilled volume per Time Frame, per Item	- User Defined	-	KPI Decimal
<u>MTBF</u>	- Area - Facility - Resource		The Mean Time Between Failures for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Hours
<u>MTTR</u>	- Area - Facility - Resource		The Mean Time To Repair for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Hours
<u>OEE</u>	- Area - Facility - Resource		The Overall Equipment Effectiveness for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
On Hold Quantity	- Area - Facility - Step		The total Quantity placed on Hold in the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Decimal
On-Time Delivery (%)	- Facility - Product Group		The percentage of Production Orders closed at least until their Due Date for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
On-Time MAOs	- Area - Facility		The ratio of on time completed MAOs (before Late Due) for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
Open Protocol Instances by Type	- Protocol Instance		The Number of Protocol Instances having the System State Open by Type.	- Current	Minimum	KPI Long

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Open Protocol Instances	- Protocol Instance		The Number of Protocol Instances having the System State Open.	- Current	Minimum	KPI Long
Pending Corrective MAOs	- Area - Facility		The Pending Corrective MAOs for the selected entity.	- Total - By State	Minimum	KPI Long
Pending Late Production Orders	- Facility - Product Group		The number of Pending Late Production Orders for the selected entity.	- Current	Minimum	KPI Long
Pending Late Quantity	- Facility - Product Group		The Pending Late Quantity for the selected entity.	- Current	Minimum	KPI Decimal
Pending Preventive MAOs	- Area - Facility		The Pending Preventive MAOs for the selected entity.	- Total - By State	Minimum	KPI Long
Performance Efficiency	- Resource		The Performance Efficiency percentage for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Placement Efficiency	- Resource		The number of placed components divided by the number of placed and misplaced components registered on component placement Events for the selected Resource.	- Current Day - Current Shift - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
Quality Affected Quantity Dataset	- Area - Facility - Step		A Dataset containing information about the Quantity put on Hold, sent to Rework, and/or Lost for the selected entity.	- Last 7 Days	Minimum	KPI Decimal
Rate of Quality	- Resource		The Rate of Quality percentage for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage
Reject Rate	- Resource		The number of rejected components divided by the number of total components for the selected Resource.	- Current Day - Current Shift - Last 7 Days - Current Week - Current Month	Minimum	KPI Percentage

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Resources Down	- Area		The number of Resources with System State Down for the selected Area.	- Current	Minimum	KPI Decimal
Resources Up	- Area		The number of Resources with System State Up for the selected Area.	- Current	Maximum	KPI Decimal
State	- Resource		The Universal State for the selected Resource.	- Current - Last 7 Days	-	None
Throughput Rate	- Plan		The Produced Quantity per Unit Time, per Manufacturing Unit, connected to a Plan	- User Defined	-	KPI Decimal
Top Products by Loss Quantity	- Facility - Product Group		The Products with the highest Loss Quantities for the selected Product Group.	- Current Day Top 10 - Current Shift Top 10 - Current Week Top 10 - Current Month Top 10	Minimum	KPI Decimal
Top Reasons by Lost Quantity	- Facility - Product Group		The Loss Reasons with the highest Lost Quantity for the selected Product Group.	- Current Day - Current Shift - Current Week - Current Month	Minimum	KPI Decimal

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Top Reasons by Quantity on Hold	- Facility - Product Group		The Hold Reasons with the highest Quantity on Hold for the selected Product Group.	- Current Day - Current Shift - Current Week - Current Month	Minimum	KPI Decimal
Top Resources with AdHoc Maintenance	- Area - Facility		The Resources with the most requests for AdHoc Activities for the selected Facility.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Long
Unit Cycle Time	- Resource		The average processing time per unit for the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Minimum	KPI Seconds
Uptime %	- Resource		The Up Time percentage of the selected Resource.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage

KPI	Entity Type	Manual Calculation	Description	Dimension	KPI Type	Parameter
Volume Fulfilment	- Plan		The Percentage of the Total Planned Volume in the Plan that was achieved.	- User Defined	-	KPI Percentage
Volume In	- Resource - Step		The In Process Quantity registered for the selected entity.	- Current Shift - Last 7 Days	Maximum	KPI Decimal
Volume Out	- Resource - Step		The Processed Quantity registered for the selected entity.	- Current Shift - Last 7 Days	Maximum	KPI Decimal
Yield	- Area - Facility - Resource - Step		The Processed Quantity divided by the Processed Quantity plus the In Process and the Processed Quantity Losses registered for the selected entity.	- Current Day - Current Shift - Last 3 Days - Last 7 Days - Current Week - Current Month	Maximum	KPI Percentage

Table: Dynamic KPIs available out-of-the-box

A set of available industry-specific Dynamic KPIs is included and provided out-of-the-box. These are linked to Business Rules (deployed as **DEE Actions**) in order to retrieve data from shop-floor Equipment which must be integrated with the Critical Manufacturing MES. The limits for the out-of-the-box KPIs (In Target, Close to Target, and Target) are taken automatically for the ones linked to the Parameter **KPI Percentage**. For other KPIs, the limits should be manually defined so you can correctly compare the current value to the target value.

In the above table, the KPIs marked with a  need to be calculated by the user through the following steps:

1. Storing the necessary data in a database where the data will be accessed;
2. Creating a **DEE Action** to perform the required calculation on that data;
3. Attaching that **DEE Action** to a **Rule**;
4. Changing the Source Type of the KPI Dimensions to **Rule**, and associating the created **Rule**.

This leads to the data being displayed in dashboards with out-of-the-box KPIs not being ready to be used unless there are extra steps performed to allow applying the calculations to the retrieved values.

For more information, see the [Cubes](#) section.

Info

The implementation of the **Material Estimated Remaining Time** KPI is dependent on the Planned End Date property entered in the Material Resource relation. For this to occur, the DEE action **ElMaterialResourceEstimatedRemainingTime** must be enabled and associated with the **BusinessObjects.MaterialCollection.TrackIn.Post** action group.

Configure the BI Card Widget

Having the necessary KPIs available, their visualization can be configured in a UI Page, using the **BI Card** widget.

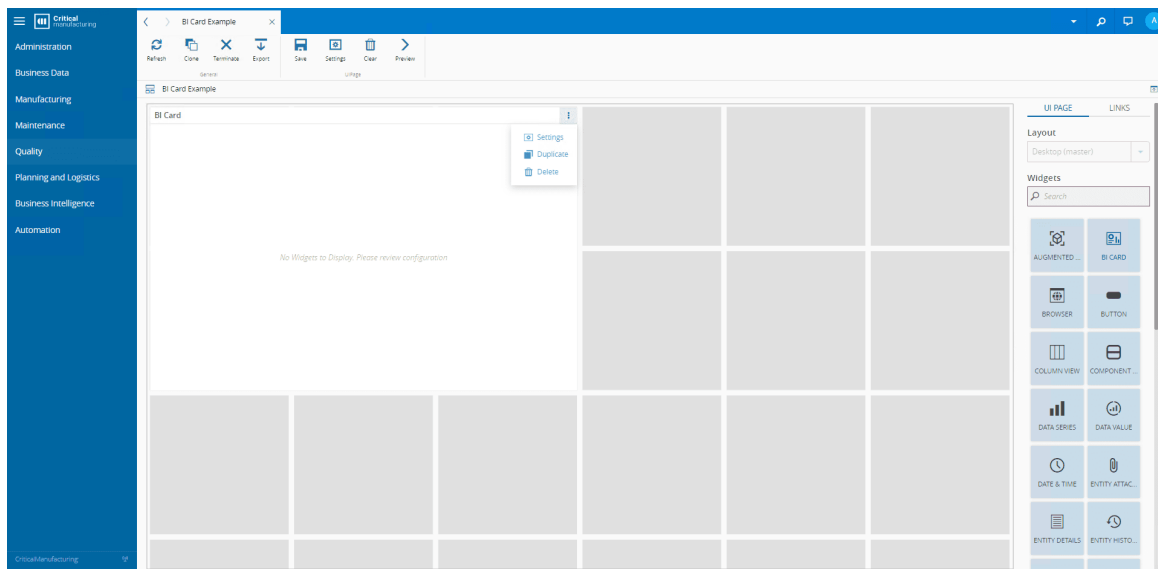
Info

Each BI Card widget can only be associated with one Entity Type.

Creation of a UI Page

When creating a UI Page, enter **Build** mode to drag and drop the BI Card widget.

To start configuring the BI Card, select **Settings** as shown below:



Configuration of the BI Card

In the **Setup** tab, select an Entity Type that has associated KPIs and, optionally, an Entity for which the information is going to be displayed.

In the **Layout** tab add the desired KPIs, as shown in the image below.

For Dynamic KPIs, the properties listed in the table below should be defined.

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Property	Description
Name	The Name of the KPI to be displayed.
Dimension	The Dimension of the KPI to be displayed in the BI Card.
Show-Caption	Whether the Caption of the series will be displayed.
Show Title	Whether the Name of the KPI will be displayed.
Show Sub-Title	Whether the name of the Dimension of the KPI will be displayed.
Visualization	How the KPI Dimension value or values will be displayed.
Is Percentage Value	If set to True, the system will identify the value as a percentage and will only fill the circle visualizations until the corresponding percentage value. Otherwise, the system will handle the value as a regular number and will fill the circle visualizations depending on the defined target. Available for selection for the Full Circle and Half Circles visualizations.
Decimal Places	The number of decimal places to be displayed. Available for selection for the Value display, Delta indicator, Delta Percentage display, Number & Delta indicator - Side by Side, and Number & Delta indicator visualizations.
Show Secondary Axis Series	Whether the secondary Axis series will be displayed. Available for selection for the Vertical Bars, Area, and Line visualizations.
Secondary Axis Visualization	The visualization for the secondary axis. Available for selection if the property Show Secondary Axis is set to True. The visualizations available for selection are the Vertical Bars, Area, and Line.
Shorten Axis Labels	Whether the chart labels will be trimmed depending on the available space. Available for selection for the Vertical Bars, Area, and Line visualizations.
Show Category Label on Tooltip	Whether the Category label will be available on the tooltip. Available for selection for the Vertical Bars, Area, and Line visualizations.
Always Show Axis	Whether the axis will be displayed.
Show Secondary Axis	If the property <i>Show Secondary Axis Series</i> is set to True, whether the secondary Axis will be displayed.
Show Series Axis in Labels	Whether the secondary series axis is pointed out in the axis labels.

Property	Description
Show Target Values	Whether the target values are displayed.

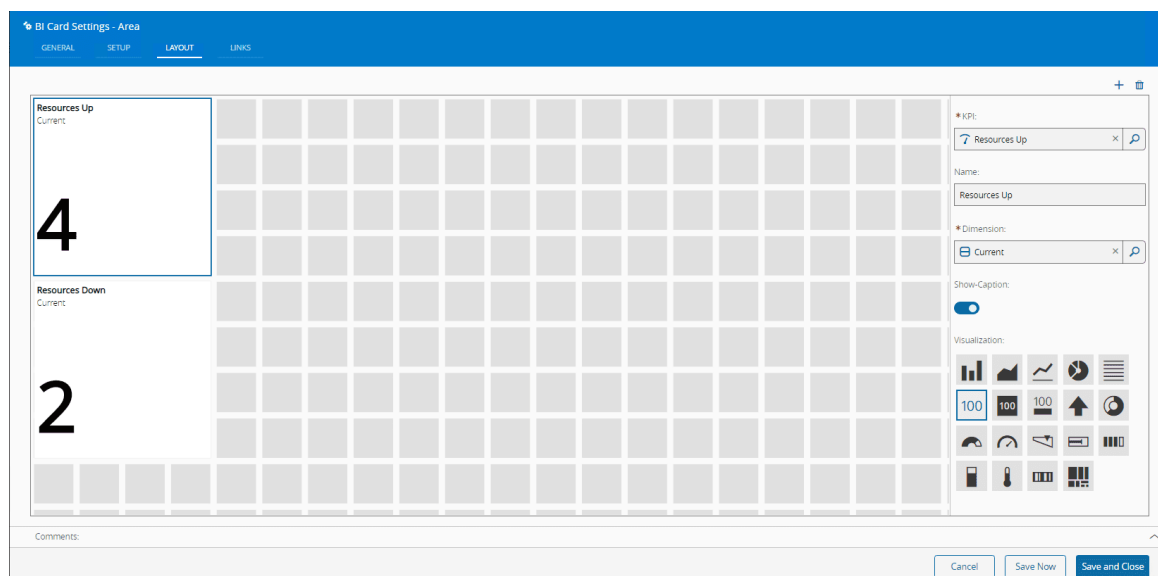
Table: Dynamic KPIs BI Cards properties

For Static KPIs, the properties listed in the table below should be defined.

Property	Description
Dimension	The Dimension of the KPI to be displayed in the BI Card.
Visualization	How the KPI Dimension value or values will be displayed.
Time Frame	Defines which KPI values will be displayed, whether using a time interval or the last number of occurrences.
Show Terminated	Whether the values of terminated Time Frames will be displayed.

Table: Static KPIs BI Cards properties

In the **Links** tab, you can pass the Entity to be considered, by linking the widget from another source.



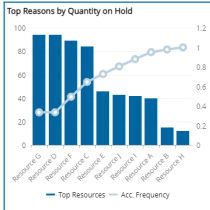
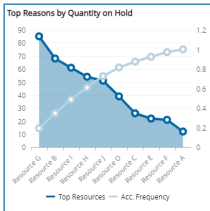
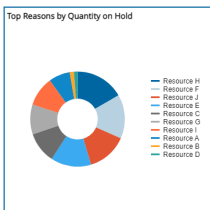
Info

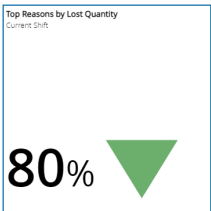
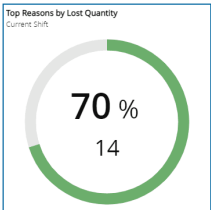
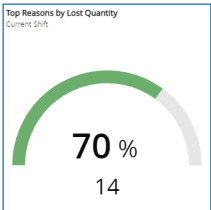
When selecting the visualization control, it is important to consider whether the KPI will display a data value (for a single value) or a data series (one or more series of data).

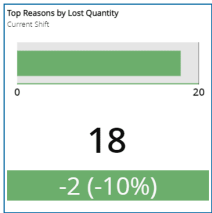
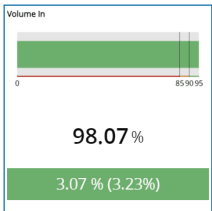
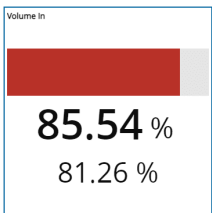
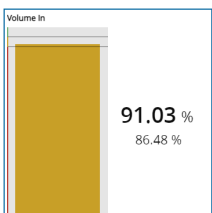
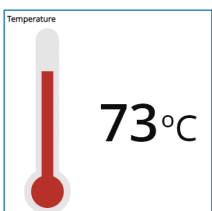
Available visualizations

The table below presents the available KPI visualization options:

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Visualization	Example	Description
Vertical bars		This visualization displays in the graph each value of the series of the KPI, in its own bar. Hovering the mouse over the bar displays the value and the delta to the target value.
Area		This visualization displays the points in the graph for each value of the series of the KPI.
Line		This visualization displays the points in the graph for each value of the series of the KPI.
Donut		This visualization slices a pie according to the proportion of each value of the series.
List		This visualization lists the values of the KPI for the dimension or time frame defined.
Value display		This visualization displays the current value of the KPI.

Visualization	Example	Description
Delta indicator		This visualization displays the absolute difference of the KPI (actual value vs. target). Note: The color is associated with the limits defined for the KPI (green, yellow and red).
Delta percentage display		This visualization displays the current value of the KPI, and the absolute and percentage delta to the target value are shown at the bottom.
Number and delta indicator - side by side		This visualization displays the current value side by side with the KPI percentage delta to the target value.
Number and delta indicator		This visualization displays the KPI percentage delta to the target value.
Full circle		This visualization displays the percentage completion for the KPI target, in the circle bar, and the current value.
Half circle		This visualization displays the percentage completion for the KPI target, in a half-circle bar, and the current value.

Visualization	Example	Description
Radial gauge		This visualization displays the current value of the KPI, in a radial gauge control, and the absolute and percentage delta to the target value.
Linear gauge		This visualization displays the current value of the KPI, in a linear gauge control, and the absolute and percentage delta to the target value.
Bullet linear gauge		This visualization displays the current value of the KPI, in a bullet linear gauge, and the absolute and percentage delta to the target value.
Progress bar		This visualization displays the percentage completion for the KPI target and the current value.
Vertical bar		This visualization displays the percentage completion for the KPI target and the current value.
Thermometer		This visualization displays the current value of the KPI.

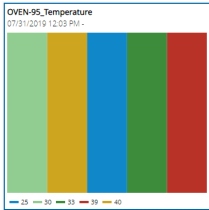
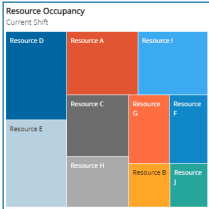
Visualization	Example	Description
Timeline chart		This visualization displays the values of the KPI for the defined time frame (time interval or last number of occurrences).
Text		This visualization displays the current text of the KPI.
Tree map chart widget		This visualization displays a rectangle with different areas according to the percentage of each value of the series. Hovering the mouse over the area displays the value.
Timer		This visualization displays the countdown timer to the target date of the KPI.

Table: KPI visualization options



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