



Performance Insight for Industrial Edge

Update V1.3, October 2021

Introducing **Industrial Edge**

An open software platform that
makes shop-floor IT simple,
scalable and manageable



Edge Computing introduces IT-mechanisms to the shop-floor to provide local data processing and analytics capabilities in the most easiest way



Provides decentralized and **local** data

- acquisition,
- storage,
- analytics and
- transfer capabilities



Increases a **flexibility** by allowing to deploy **any** software fast and **reliably** on to the shop-floor



Reduces complexity and IT-costs by providing Edge device and application lifecycle management functionalities



Reduces infrastructure costs for data storage and transfer and allows **secure data** handling **within production**



Low-Code platform

Build apps faster for cloud, on-premise or hybrid infrastructure

IIoT as a service

Centralized compute & storage, with solutions, apps & services

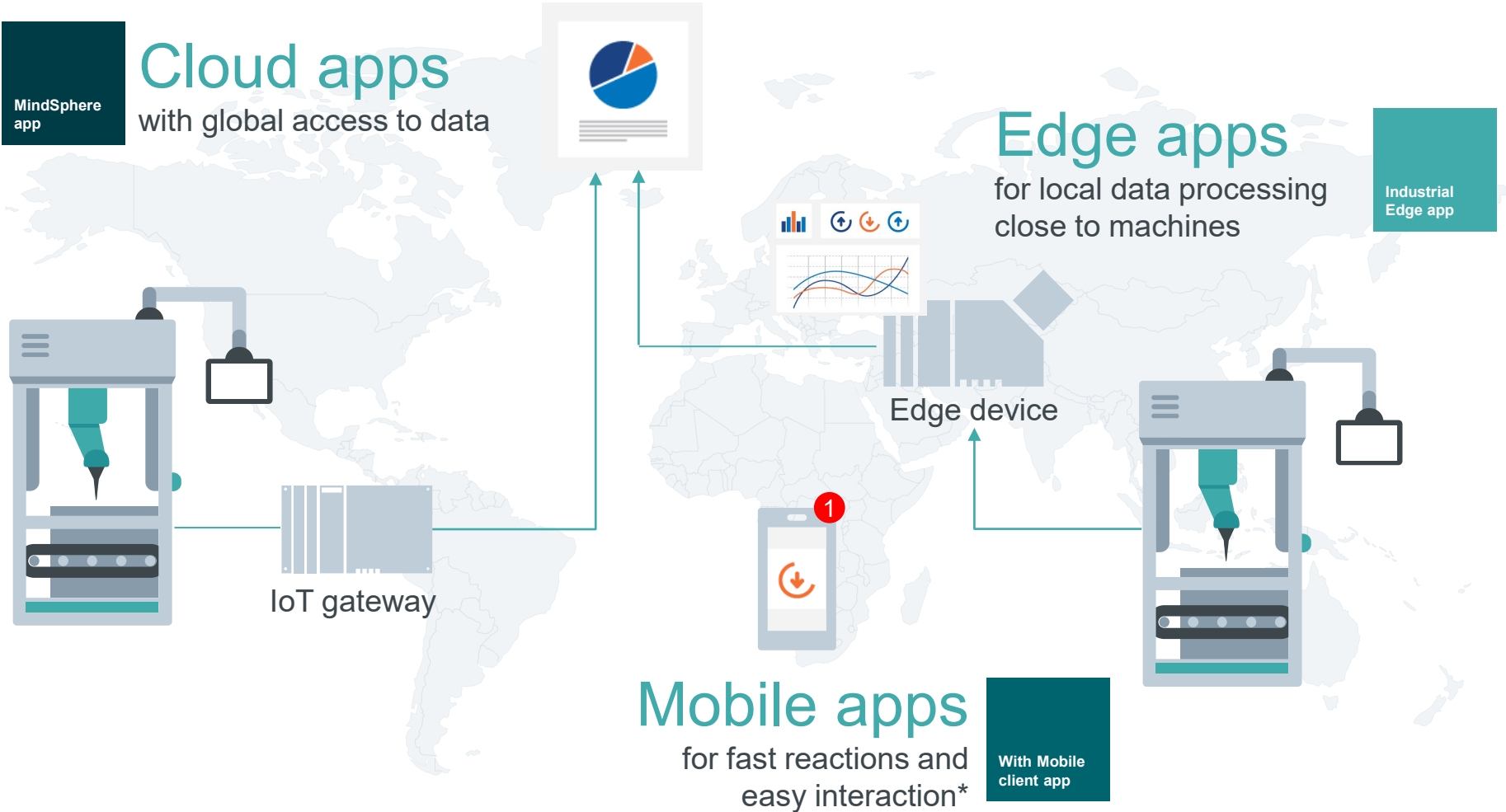
Edge Computing

Decentral compute & storage with device runtime, apps & management

Field/Control

Automation runtime & engineering connectivity

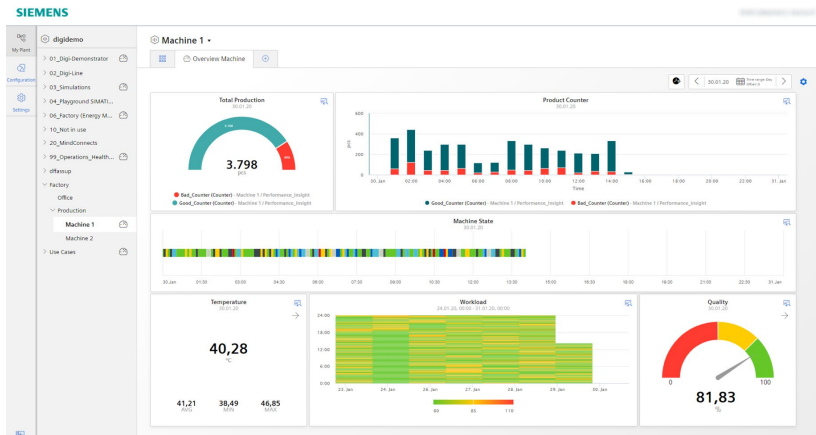
Industrial IoT apps add value to our open IoT ecosystem around MindSphere and Siemens Industrial Edge



* Mobile Client apps in addition to Cloud or Edge apps

Performance Insight

Easy transparency about machinery



Performance Insight is the tool to increase productivity for any machine, line or plant. Calculate and visualize key performance indicators to detect optimization potentials worldwide.

Benefits:

- ▶ Calculate KPIs based on individual formulas to determine machine and plant performance.
- ▶ Access machine and plant performance worldwide.
- ▶ Get the most valuable information for precise decision-making to optimize machine availability and performance.

Features:

- ▶ Performance overview of machines, lines and the whole plant.
- ▶ Flexible dashboard configuration with detail views.
- ▶ Support of different widgets (charts, gauge, bar, Gantt) to visualize machine states and performance indicators over time.
- ▶ Choose time period to detect unused performance potential in retro perspective.

Industry focus:

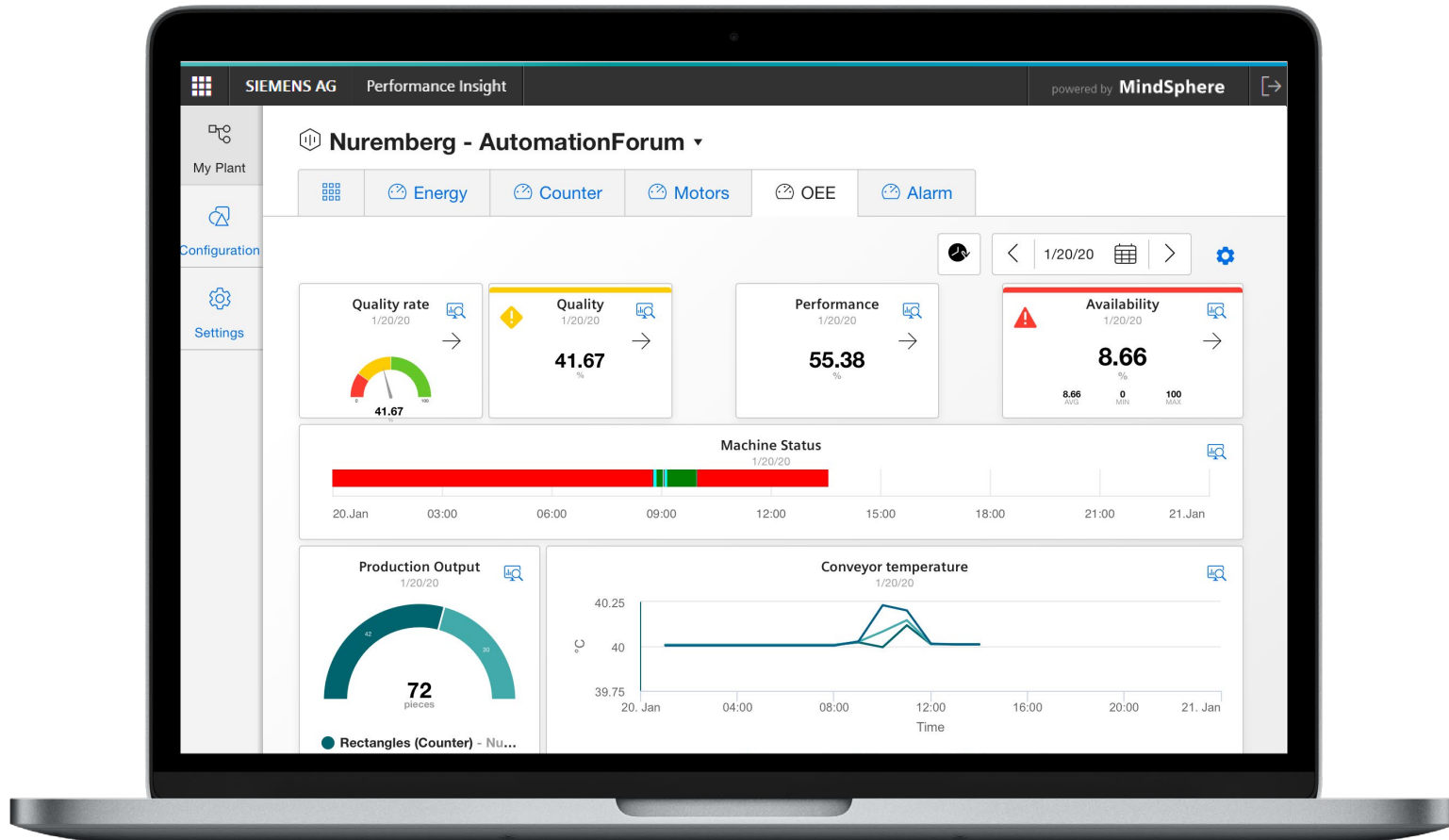
Cross industry based on flexible dashboard and KPI calculation.



Product Overview

Performance Insight

Easy transparency about machinery with Performance Insight



Increase productivity for machines, line or plant:

- Flexible tool for calculating and visualizing the machine condition to get additional machine transparency.
- Optimize assets by gaining transparency about OEE, quality and further KPIs.
- Generic visualization enables an integration of all kind of machines.

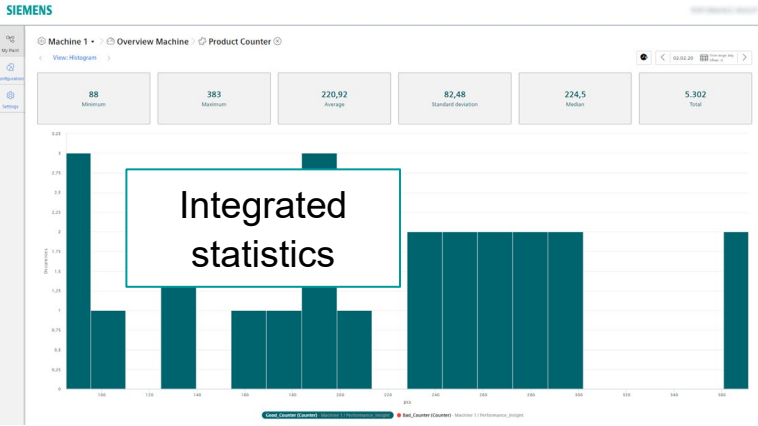
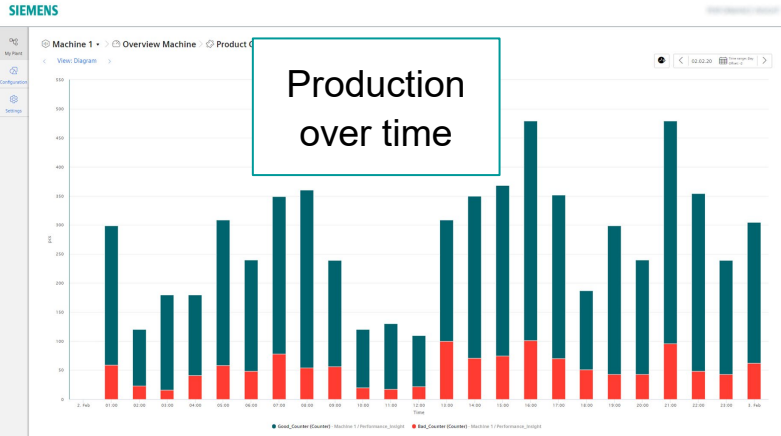
Transfer data to information with Performance Insight



Using custom dashboard with different widgets to transfer data to information:

- Gauge Widget provides an overview about the Quality of your machine.
- In the heat map the value is represented as color. → see when the Workload was on point.
- Additional Widget types like Pie Chart, Value, Diagram, Gantt are used to display KPIs in a way that measures can derived immediately.

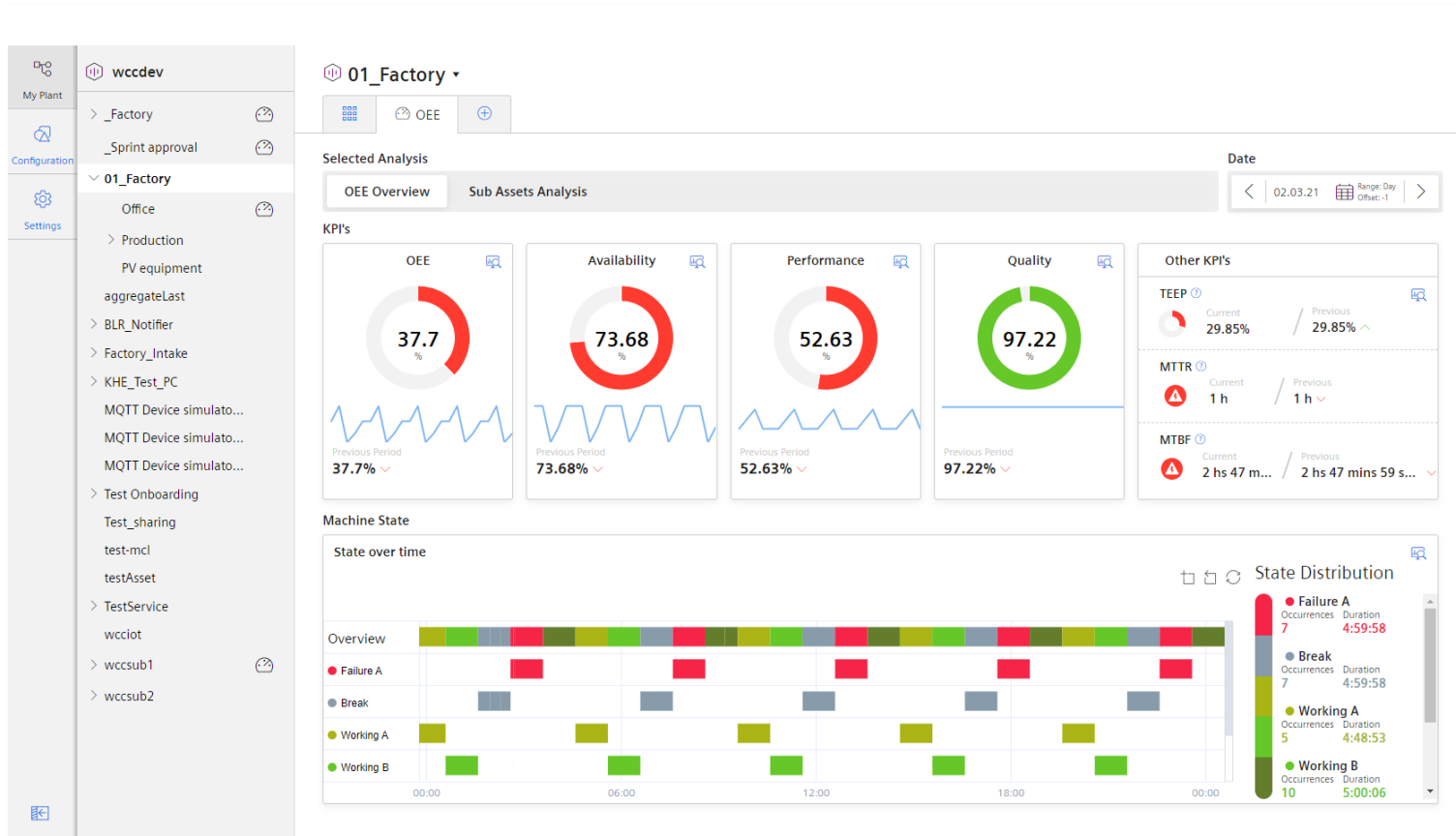
Out of the box analysis with Performance Insight



Detailed information for each widget in the dashboard:

- Statistic view provides a histogram for each parameter including the statistic. (min, max, average, median, standard deviation and sum).
- Regression view provides the possibility to display the data in a x-y chart including a trend representing the plant characteristic.

Out of the box OEE monitoring with Performance Insight



With just a view clicks to a holistic view about the machine or the line performance:

- Analysis capabilities with charts, statistics or time comparison.
- Transparency about machine states for route cause analysis.
- Time model analysis to visualize the Performance.



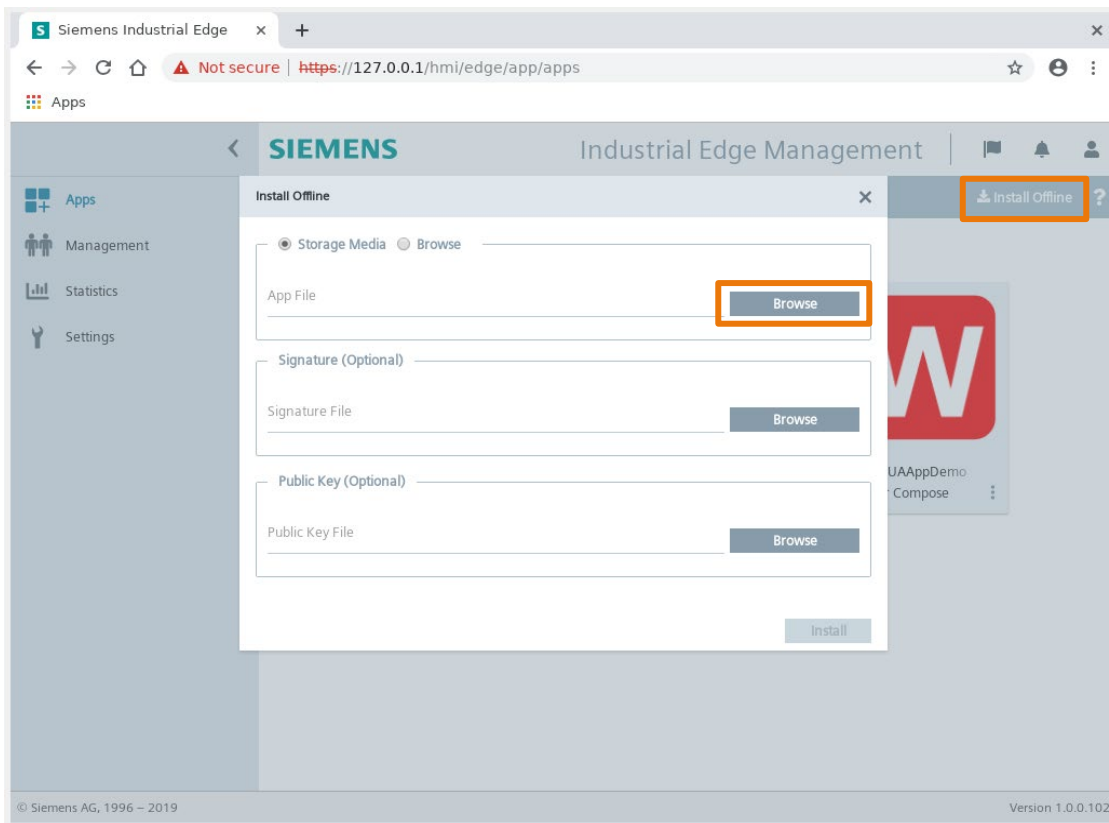
Install and start the Apps on the Unified Comfort Panel Overview

Performance Insight

Install the App on the Unified Comfort Panel

Install Offline

- 1 Click the “Install Offline” Button
- 2 Browse the *.app file



To install the App on the Unified Comfort Panel you need to save the *.app file on the USB Stick and plug it into the slot.

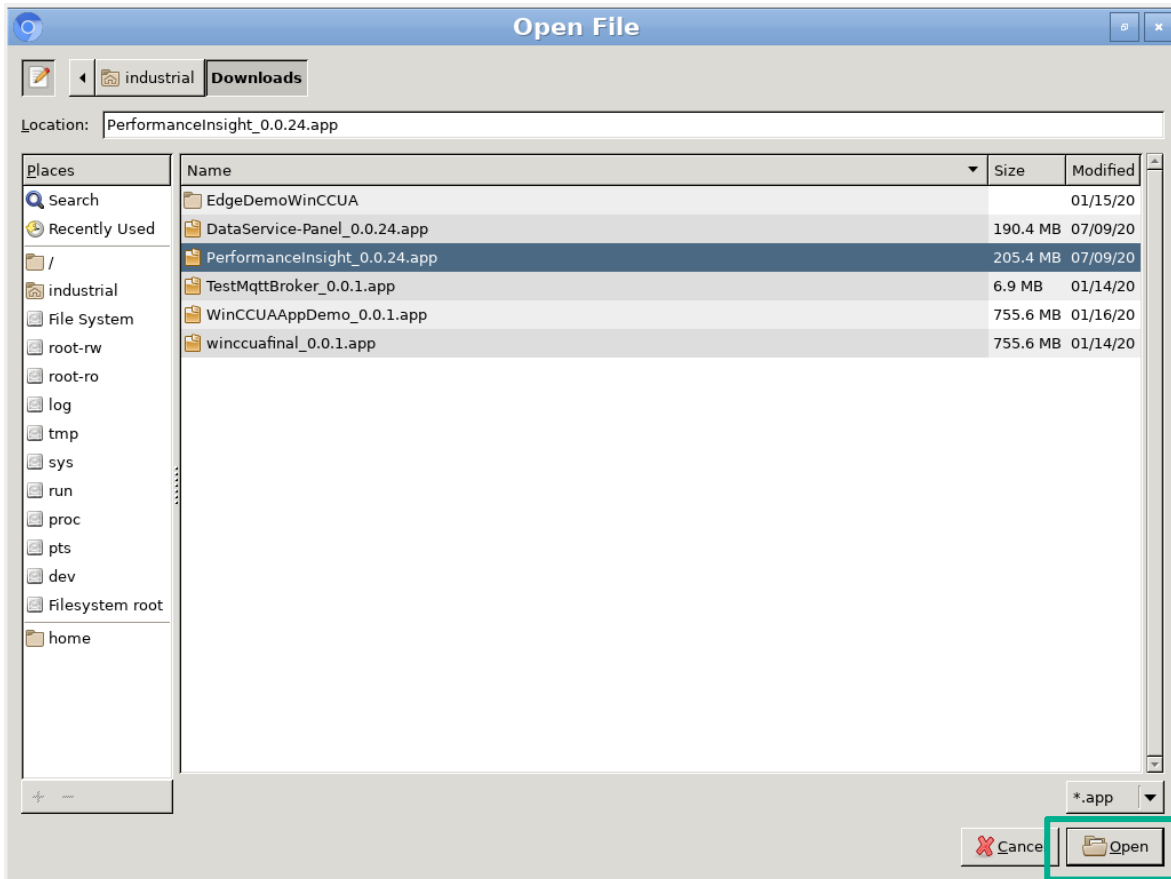
- Click on “install Offline”
- Browse the *.app File

Install the App on the Unified Comfort Panel

Install Offline

3 Select the *.app file

4 Open the *.app file

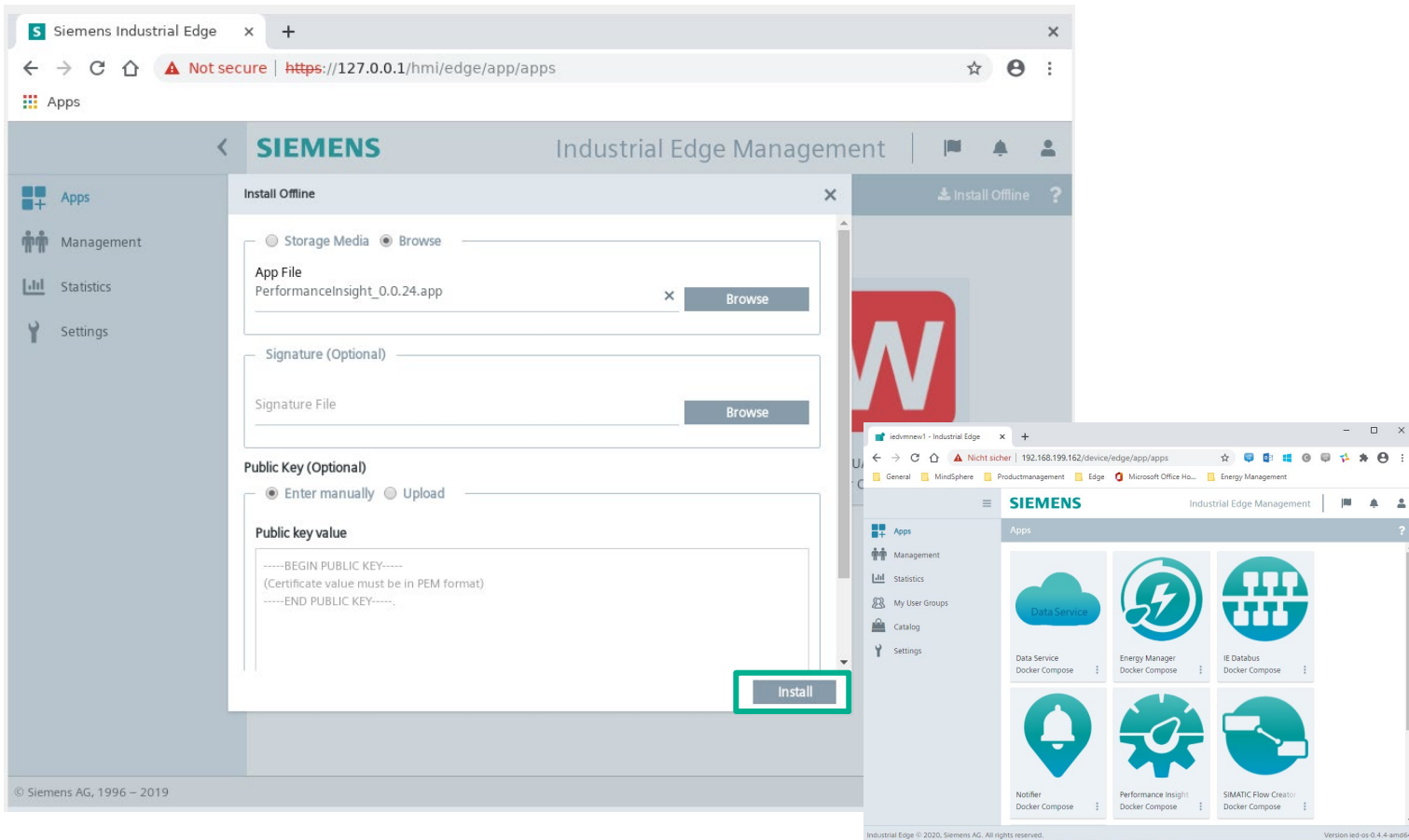


To install the App on the Unified Comfort Panel you need to select and open the *.app file.

Install the App on the Unified Comfort Panel

Install Offline

5 Install the *.app file



To install the App on the Unified Comfort Panel you need to install the App on the UCP.

After the successful installation, the App Home screen appears.

Start the App on the Unified Comfort Panel

Start the App

6 Start the App

The screenshot shows the Siemens Industrial Edge Management web interface. The left sidebar contains navigation options: Apps, Management (highlighted with an orange box), Statistics, My User Groups, Catalog, and Settings. The main content area is titled 'Management' and displays a list of 6 running applications and 1 stopped application. The 'Energy Manager V 0.0.24' application is highlighted in the 'Stopped' section. A detailed view for the Energy Manager app is shown on the right, including a description, a table of system resources, and a table of application volumes. The 'Start' button is highlighted with a green box.

Name	Action
energymanager_db-edge-apps-energymanager-volume	—
_data	—
PG_VERSION	↓
base	—
1	—
112	↓

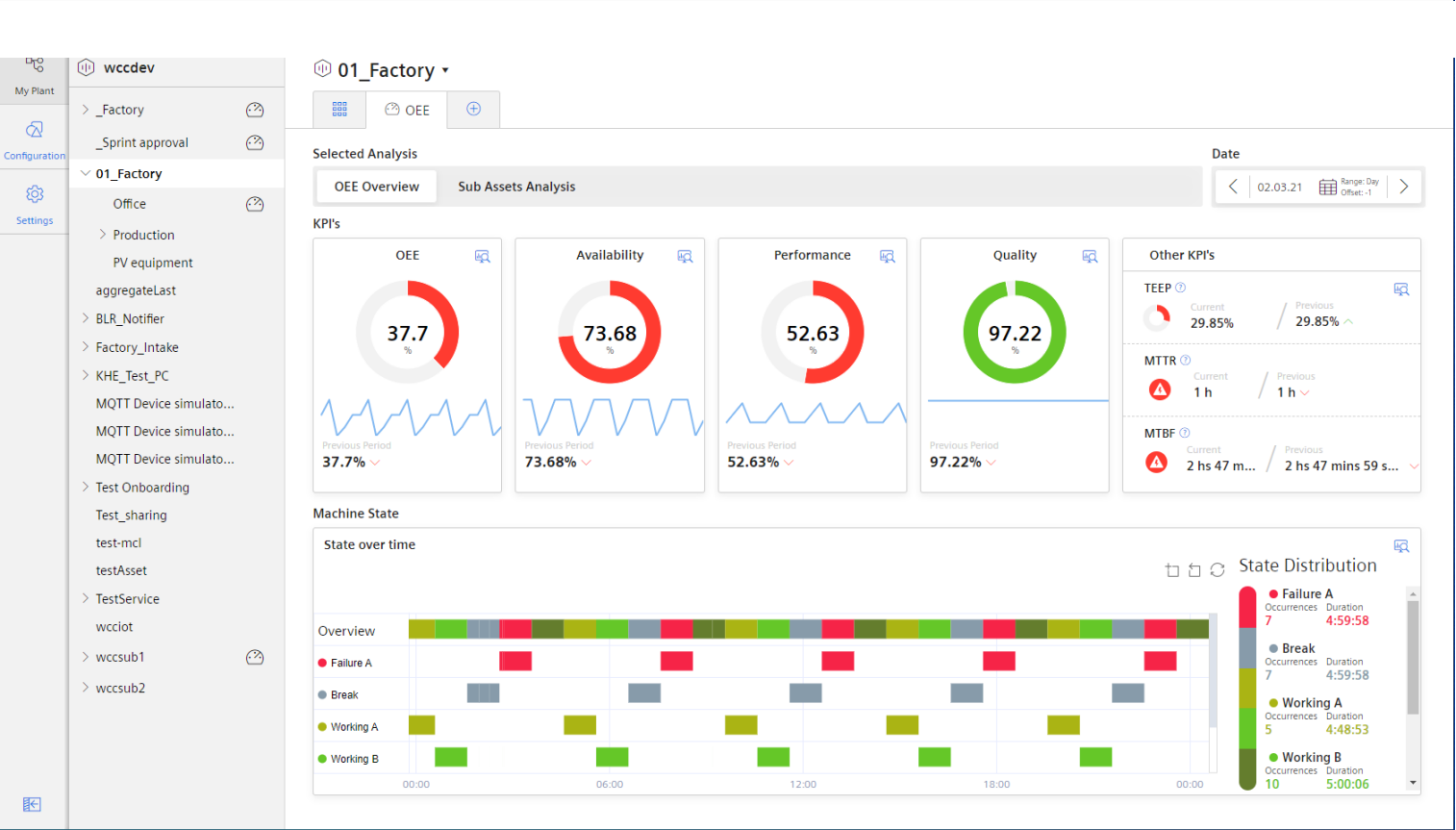
To start the App, go to the “Management” view and start the App.



Out of the box OEE monitoring

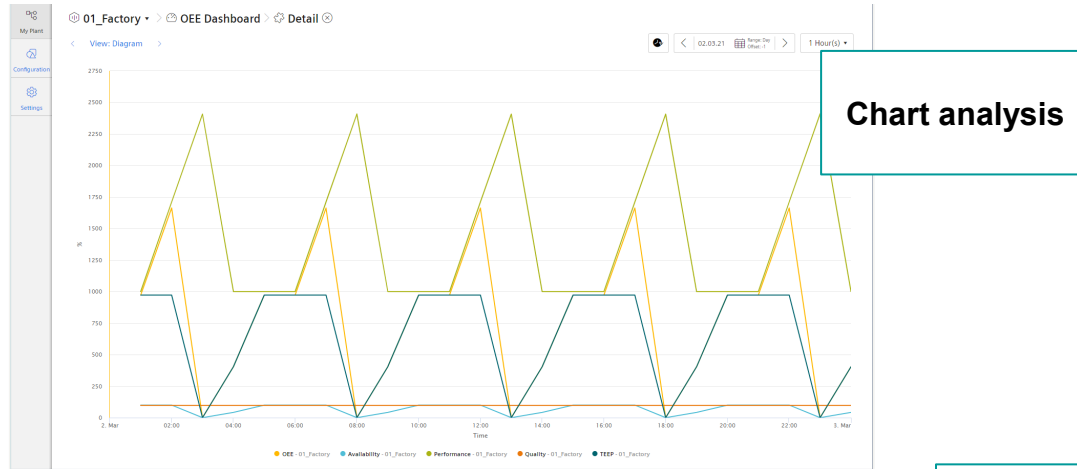
Performance Insight

Performance Insight offers an out of the box OEE dashboard



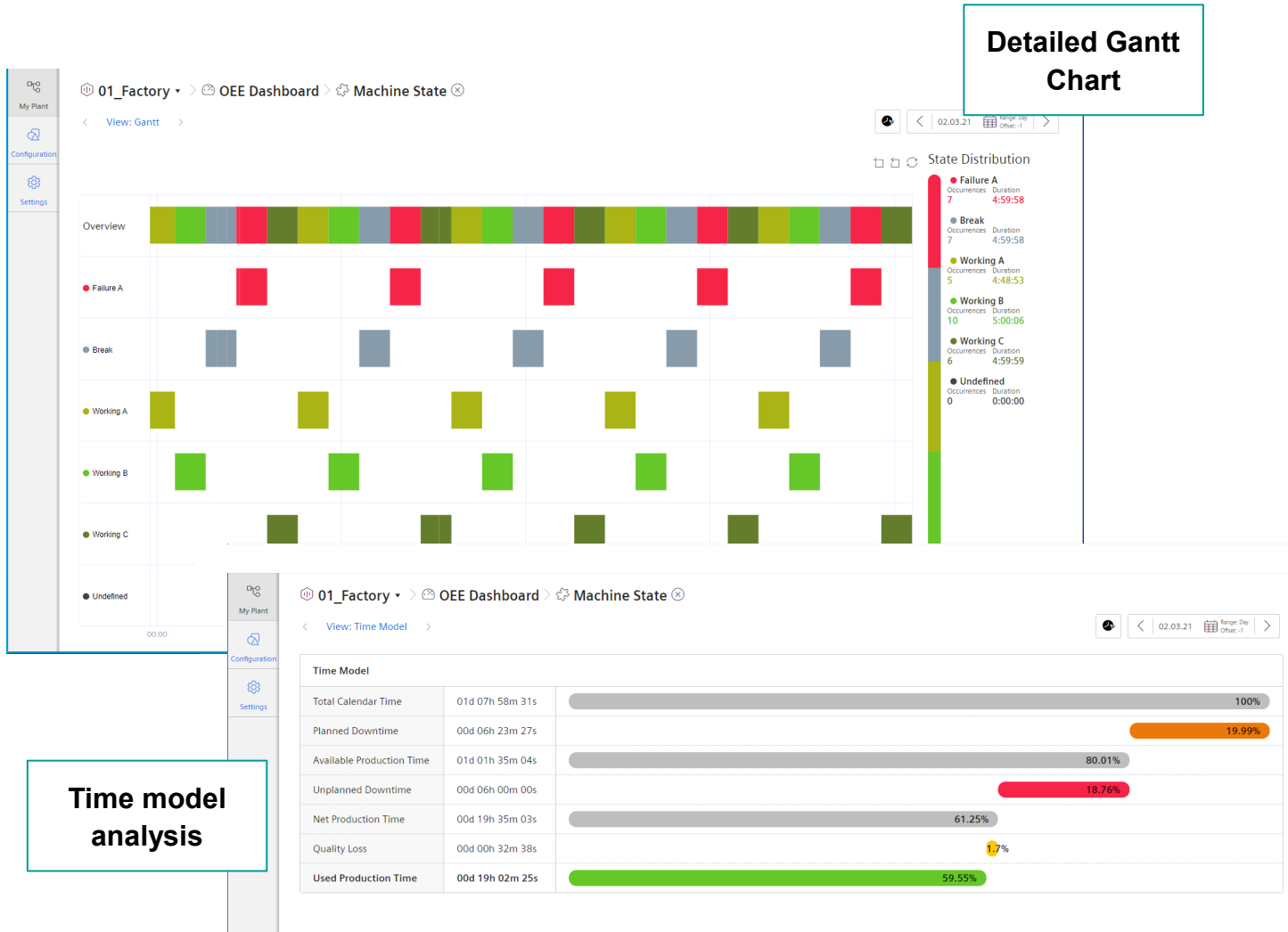
- As soon as the OEE settings are defined for the asset, the dashboard will be displayed.
- The main KPIs are displayed including the value of the previous period and the detailed data in the preview area.
- The limits are pre-defined but can be adjusted for each KPI .
- The Gantt Chart provides an overview about the individual machine states including a summary.
- As soon as if an OEE Configuration is available for a sub asset, the button “Sub Asset Analysis” is active.

Detail view for Performance KPIs



- Detail view of each KPI Widget provides all relevant KPIs in a line chart (TEEP, OEE, Performance, Availability and Quality).
- Change the analysis period or the resolution using the time picker.
- Histogram view is available providing statistic information.
- In the Time Comparison view, Performance KPIs are compared for the previous day, the previous week and the previous month, to detect deviations.

Detail view for the Performance Gantt chart

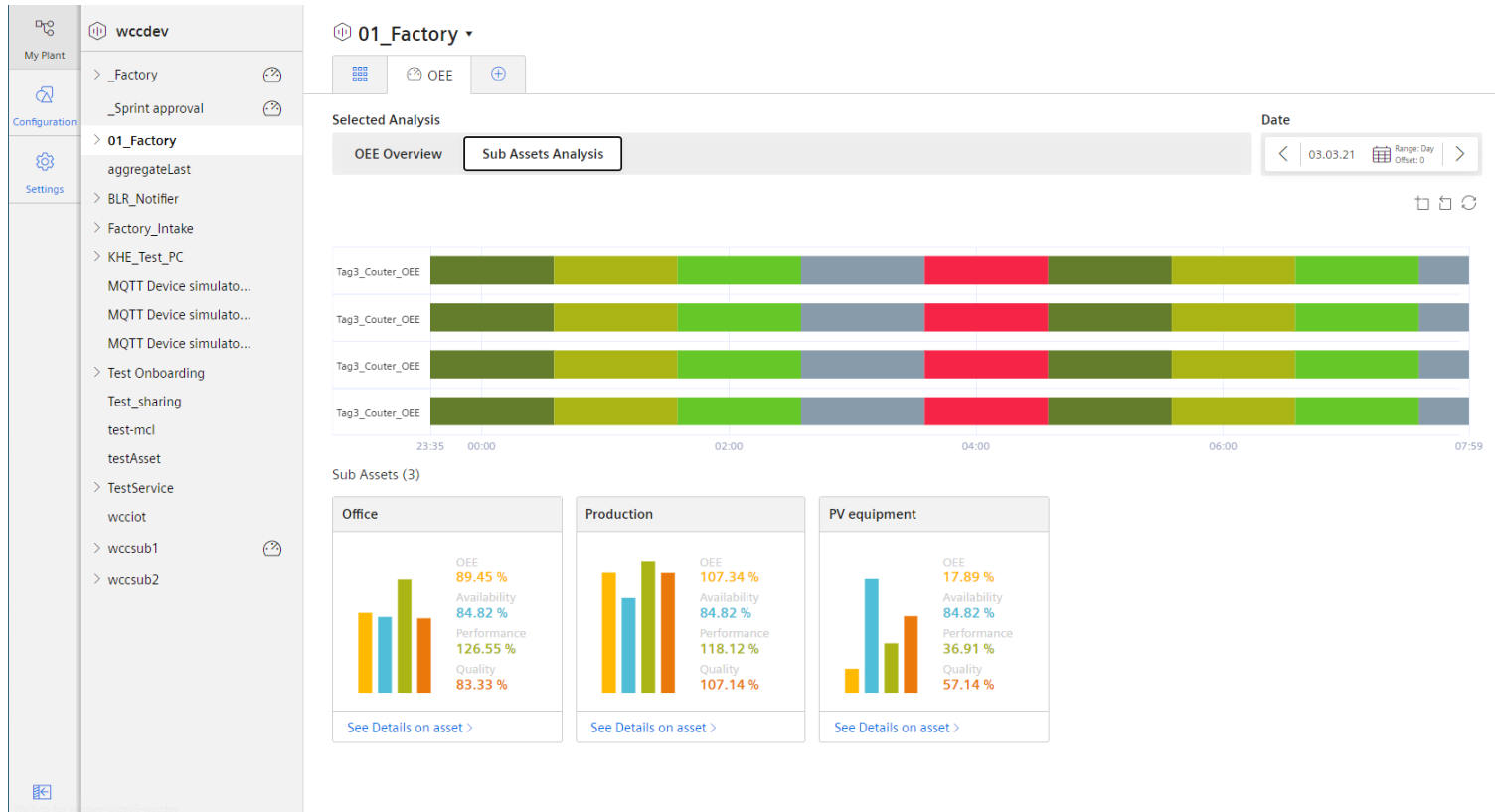


The Time Model analysis provides the overview about the total calendar time and the portion of Planned Downtime, the Unplanned Downtime and further the Net Production Time.

The Quality losses are also considered but this is a calculated value based on the quality rate.

Example: If the net production time is 60% and the quality rate is 90%, the Quality losses are $60 \cdot (1 - 0.9) = 5,4\%$

Sub asset OEE analysis



As soon as if one of the sub assets has an OEE configuration, the sub asset analysis is available.

The Gantt chart provides an overview about the complete line as well as the overview for each sub asset.

For each sub asset the main KPIs (OEE, Performance, Availability and Quality) are displayed for a fast comparison.

The OEE configuration for the line is similar to the configuration of a dedicated asset. The produced pieces can be used from e.g. the bottleneck machine.



Note: The aggregation from machine performance to line performance (several machines) has to be implemented in Visual Flow Creator, the PLC, or in a similar tool.

Easy and fast OEE configuration

The screenshot shows the 'Define OEE Settings' configuration page. It includes three main steps:

- 1. Choose a status mapping for your time model:** A dropdown menu is set to 'OMAG'. A callout box labeled 'Time model for status mapping (e.g. OMAG)' points to this dropdown.
- 2. Choose parameter representing your machine status:** A dropdown menu is set to 'VAR Tag3_Couter_OEE'. A callout box labeled 'Machine state' points to this dropdown.
- 3. Please link each operand with a variable to proceed:** This section contains three rows:
 - 'GoodCount' is linked to 'VAR Tag3_Couter_OEE' with a 'Counter' unit.
 - 'TotalCount' is linked to 'VAR Tag2_Couter_0_50' with a 'Counter' unit.
 - 'TheoreticalSpeed (pcs/s)' is linked to the value '1'.
 A callout box labeled 'Assigning the appropriate variable for produced pieces' points to the 'TotalCount' row.

At the bottom, there are 'Save', 'Cancel', and 'Delete' buttons. A note states: '* These fields must be filled out.'

On the right side of the interface, the 'OEE KPIs' section shows the formulas for TEPP, OEE, Availability, Performance, and Quality.

In the Asset Configuration the user can define parameters used for several KPI Instances.

The user can select the status mapping where also the machine states are mapped to the time categories.

The user can select the variable representing the machine state.

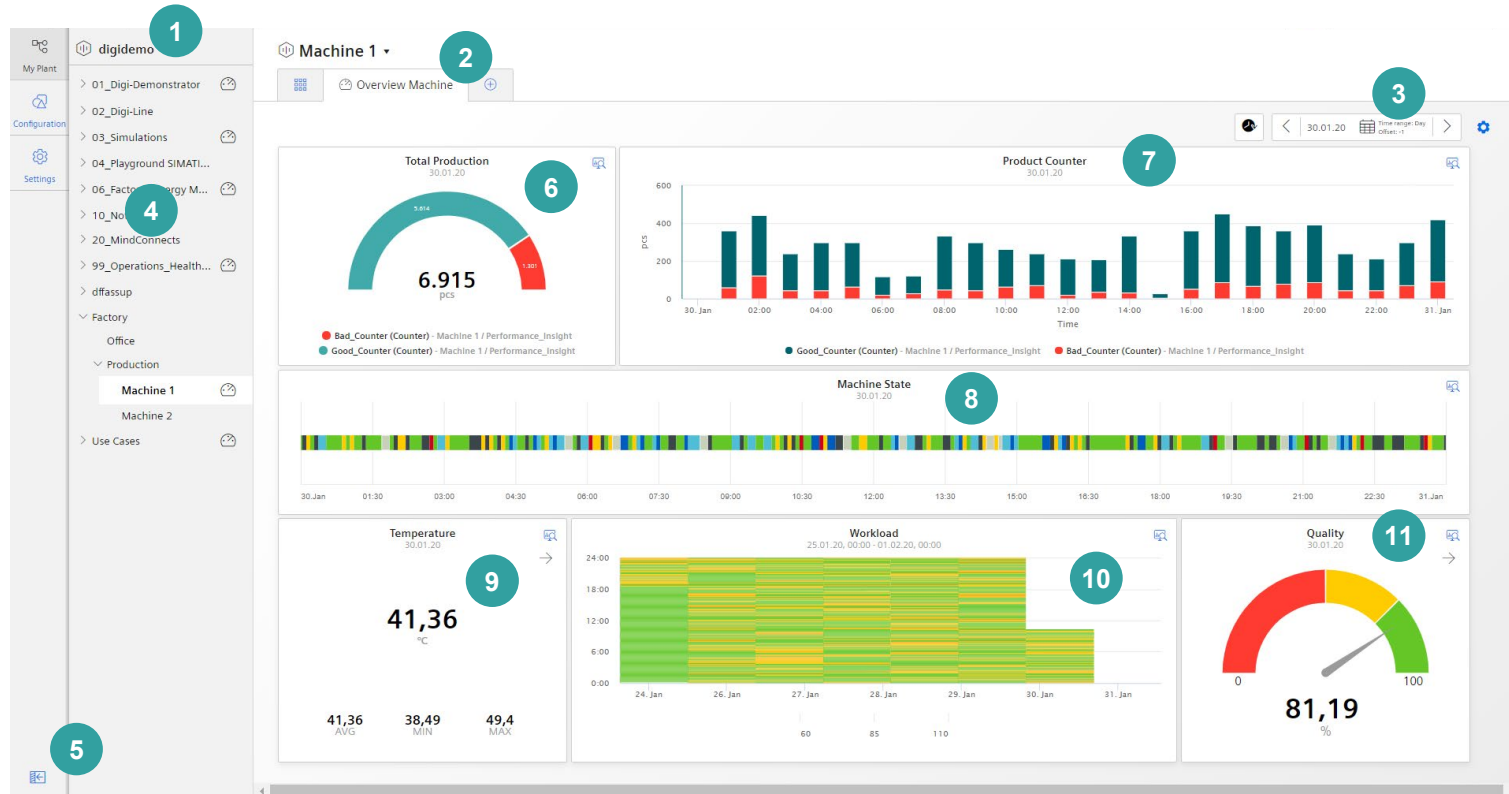
The user can assign the variable for GoodCount, TotalCount and the TheoreticalSpeed in pce/sec.



Dashboards and widgets

Performance Insight

Dashboard Overview



- 01: Asset model root
- 02: Dashboard name
- 03: Time Picker
- 04: Asset Structure
- 05: Show/Hide Asset Structure
- 06: Pie Widget
- 07: Chart Widget
- 08: Gantt Widget
- 09: Value Widget
- 10: Heatmap Widget
- 11: Gauge Widget

Adding a new dashboard in Performance Insight

The image shows a screenshot of the Performance Insight interface. On the left, there is a navigation pane with a tree view under 'My Plant' containing items like '01_Digi-Demonstrator', '02_Digi-Line', '03_Simulations', '04_Playground SIMATI...', '06_Factory (Energy M...', '10_Not in use', '20_MindConnects', '99_Operations_Health...', 'dffassup', 'Factory', and 'Use Cases'. The 'Use Cases' item is selected. In the main area, there is a 'Use Cases' tab with a '+' button and a 'Plant structure' label. Below this, a message states 'No dashboard has been created yet. To display a dashboard at this node, you must create at least one dashboard.' A blue button labeled 'Create first dashboard' is visible. A yellow arrow points from the 'Plant structure' label to the 'Create first dashboard' button. Another yellow arrow points from the 'Create first dashboard' button to the 'Create new Dashboard' dialog box. The dialog box has a title 'Create new Dashboard' and a 'Dashboard name' field with a red asterisk. Below the field is a note: 'Dashboard names in the same hierarchy must be unique.' There are 'Date Settings' for 'Time range' (set to 'Day'), 'Date (from)' (mm/dd/yyyy), 'Time (from)' (hh:mm:ss), and 'Offset' (set to '0'). A 'Use current date' checkbox is checked. At the bottom, there are 'Create' and 'Cancel' buttons. A red asterisk note at the bottom of the dialog says '* These fields must be filled out'.

The plant structure is defined by the MindSphere asset model. For each asset you can define up to 5 dashboards

Creating a dashboard:

- Click the button “Create first dashboard” or click the + in the tab.
- Define the name of the dashboard.
- Define the default time range for widgets with the time picker.
- With the Offset you can move the time range to the past.

Show data in individual time intervals with time picker

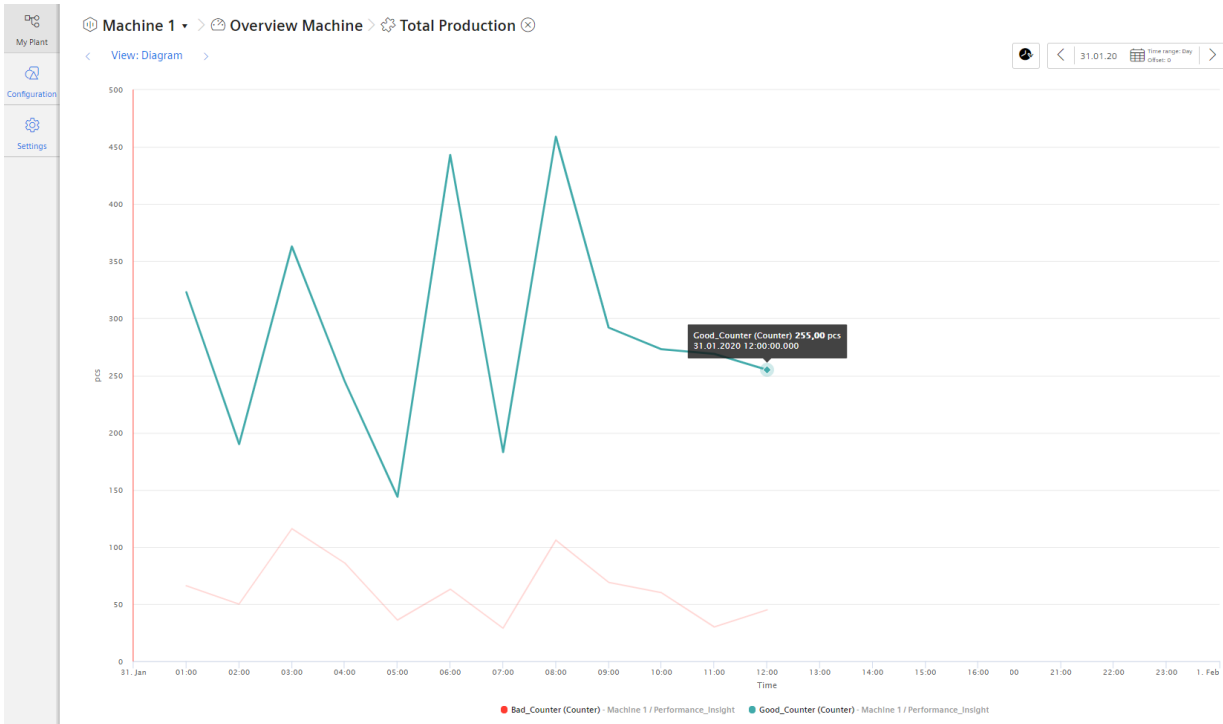
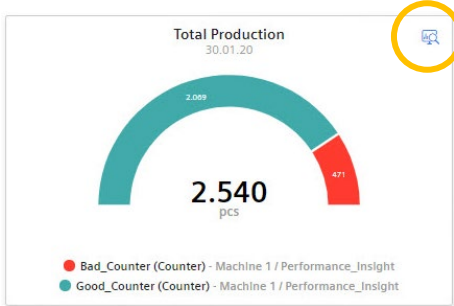
Time picker configuration showing the date 29.10.19 and the range selection menu. The range options include User-defined (selected), Day, Week, Month, Year, The last 3 hours, The last 7 days, The last 14 days, and The last 30 days.

Time picker for showing the dashboard in the desired time range.

The initial time picker configuration can be defined in the dashboard configuration
Supported time ranges:

- User-defined: the begin & end date incl. time can be defined.
- Day: 00:00 – 00:00.
- Week: Monday – Sunday.
- Month: 1st – last day of month.
- Year: January – December.
- The last 3 hours, last 7 days, last 14 days, last 30 days.

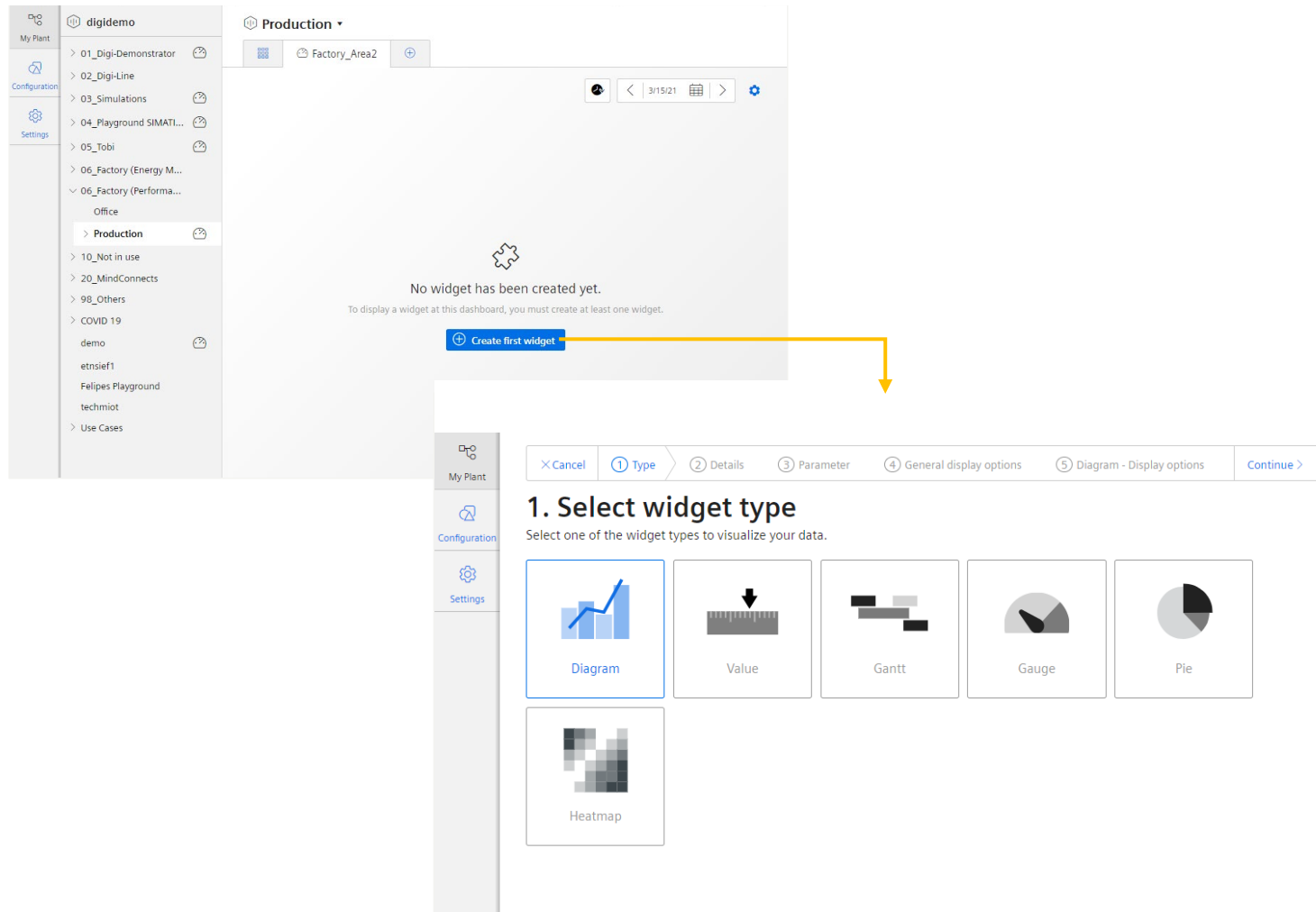
Widgets have a detail view that includes historical data



Detail view opens data in full screen with for detailed analysis capabilities and historical data.

Add Widgets to the dashboard

1. Select Widget Type



Create the widget:

1. Select the widget Type.
2. Define the details like name and time picker behavior.
3. Select the parameter which should be displayed.
4. Define the parameter specific settings like limits, color, decimal places or an alternative name.
5. Define the widget specific settings like line type, visibility or if the lines shall be stacked.

Add Widgets to the dashboard

2. Define time settings

The screenshot shows a configuration interface for a dashboard widget. At the top, a breadcrumb trail reads 'Create new widget > Diagram > Overview'. Below this, a progress bar contains five steps: 1. Type, 2. Details (active), 3. Parameter, 4. General display options, and 5. Diagram - Display options. Navigation buttons for '< Back' and 'Continue >' are also present. The main heading is '2. Define details', followed by the instruction 'Enter a suitable widget name and complete the remaining information.' The 'Widget name' field contains 'Overview'. The 'Date settings' section has a checked checkbox 'Use the date settings from the dashboard.' The 'Interval for the time range' section has a 'Calculation period' field with '1' and a dropdown menu set to 'Hour(s)'. A red asterisk note at the bottom states '* These fields must be filled out.'

Step 2: Define time settings

Enter a unique name for the widget

Define the date/time settings:

- Use the date settings from the dashboard.
- Dedicated date & time definition by selecting the time range and optionally an Offset.

The interval for the time range is used for the KPI calculation or the Variable aggregation.

Add Widgets to the dashboard

3. Select the parameter

My Plant

Configuration

Settings

Cancel 1 Type 2 Details 3 Parameter 4 General display options 5 Diagram - Display options < Back Continue >

Create new widget > Diagram > Overview

3. Select parameter

Select KPI instances or tags.

ID	Name	Path	Type	Aggregation	Action
01	Gas_Consumption (S... Gas_Consumption	digidemo / 06_Factory (Energy Manager) / Office	VAR	Sum	⊗
02	Water_Consumption (... Water_Consumption	digidemo / 06_Factory (Energy Manager) / Office	VAR	Sum	⊗
03	Electricity_Consumpti... Electricity_Consumption	digidemo / 06_Factory (Energy Manager) / Office	VAR	Sum	⊗

Select an additional parameter.

New KPI instance
If no matching KPI instance exists, you can create a new KPI instance.
+ New KPI instance

Select parameter

All VAR KPI Asset

digidemo > 06_Factory (Energy Manage... > Office

- VAR Gas_Consumption
Gas_Consumption
- VAR Water_Consumption
Water_Consumption
- VAR Electricity_Consumption
Electricity_Consumption

3 selected parameter(s) Choose Cancel

Step 3: Select parameter

The user can select one or several variables or KPI instances based on the widget type.

Variable:

- Available MindSphere variables can be selected.
- For the variable the user can select the aggregation algorithm. NONE means displaying the raw data which is only applicable in the chart.

KPI Instances:

- If there is no matching KPI Instance a new KPI Instance can be created.

Add Widgets to the dashboard

4. Define the display options

The screenshot shows the configuration interface for a widget. At the top, there is a navigation bar with steps: 1 Type, 2 Details, 3 Parameter, 4 General display options (selected), and 5 Diagram - Display options. Below the navigation bar, the title is "4. Define general display options" with the subtitle "Define the general display options for the selected parameters." The main configuration area is for parameter "01 Gas" (Gas_Consumption) with a path of "digidemo / 06_Factory (Energy Manager) / ...". The configuration is divided into three sections: "Alternative label" (input field with "Gas"), "Number of decimal places" (input field with "2"), and "Color" (color selection). Below these is the "Limits" section, which is optional and used for general restrictions. It features four input fields for "Low limit alert" (0), "Low limit warning" (0), "High limit warning" (1200), and "High limit alert" (1400). Below the input fields is a horizontal bar with five colored segments: red (Alert), yellow (Warning), white (OK), yellow (Warning), and red (Alert). A yellow callout box with the text "Limits help to identify deviations" points to the limit input fields. At the bottom, there are two more parameter entries: "02 Water_Consumption" and "03 Electricity_Consumption".

Step 4:

The User can define general settings for each parameter in the Widget:

- Set an alternative label which is used in e.g. the legend.
- Set the number of decimal places.
- Set the color of the graphs.
- Set the lower and higher limits.

Add Widgets to the dashboard

5. Define display options

The screenshot shows the configuration interface for a widget. The breadcrumb trail is: ① Create new widget > Diagram > Overview. The main heading is "5. Diagram - Define display options" with the instruction "Define the widget specific display options." The interface is divided into several sections:

- Navigation:** A top bar with "Cancel", "Type", "Details", "Parameter", "General display options", "Diagram - Display options" (active), "Back", and "Finish".
- Widget List:** A table with columns for ID, Name, Path, Type, and Aggregation. The first row is "01 Gas Gas_Consumpt... digidemo / 06_Factory (Energy Manager) / Office VAR Sum".
- Type Selection:** A dropdown menu for "Type" is open, showing options: Line, Spline, Area, Bar, Scatter. A yellow callout box "Display options for parameters" points to this menu.
- Further options:** Includes a checked "Visible" checkbox and an unchecked "Stacked" checkbox.
- Y-axis Configuration:** A section titled "Y-axis (2)" contains two y-axis configurations:
 - kWh:** Name: kWh, Low limit: [empty], High limit: [empty]. Parameters: VAR Gas (digidemo / Use Cases / Factory (Energy Manager) / Office / Gas_Consumption) and VAR Electricity_Consumption (Sum) (digidemo / Use Cases / Factory (Energy Manager) / Office / Electricity_Consumption).
 - m³:** Name: m³, Low limit: [empty], High limit: [empty]. Parameter: VAR Water_Consumption (Sum) (digidemo / Use Cases / Factory (Energy Manager) / Office / Water_Consumption).A "New Y-axis" button is at the bottom.

Step 5:

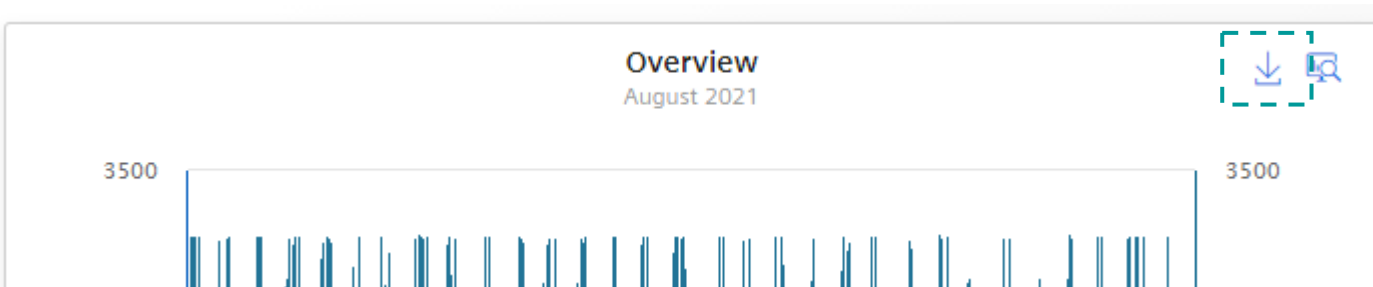
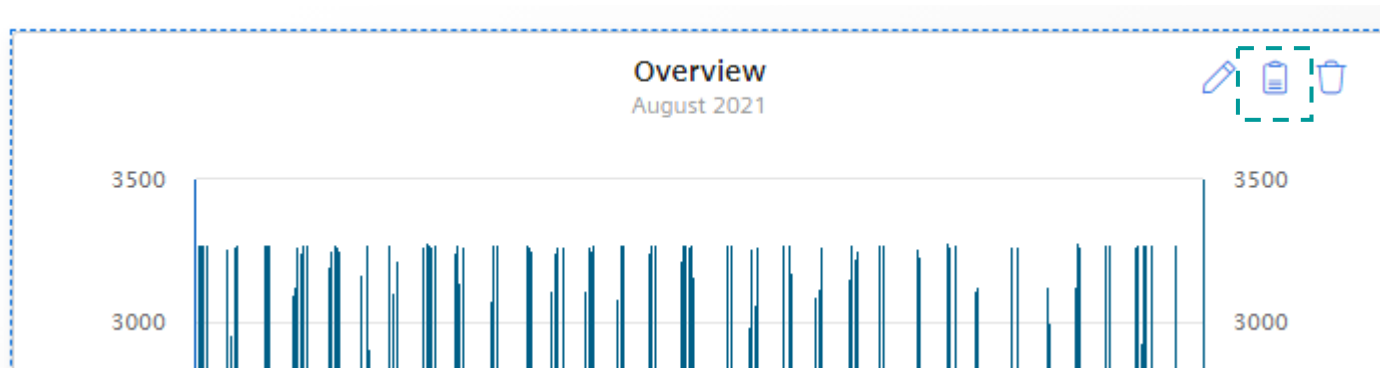
The User can set the display option for each parameter in the Widget:

- Line Type (Line, Spline, Area, Bar, Scatter).
- Visibility.
- Stacked.

The user can define up to 5 y-axis and can configure the scaling option:

- Autoscaling (two blank fields).
- 0 Point scaling (Lower Limit = 0).
- Fix Range (e.g lower limit, 10 upper limit 100).

Copy a widget or export data



Copy a widget:

- In the Dashboard edit mode, the user can copy a widget and paste it. After pasting the user can define a new name or change the analysis period.

Export data to a csv file:

- The user can export the widget data to a csv file.
- In the csv file, the value with both time stamps (local time and UTC) are available.

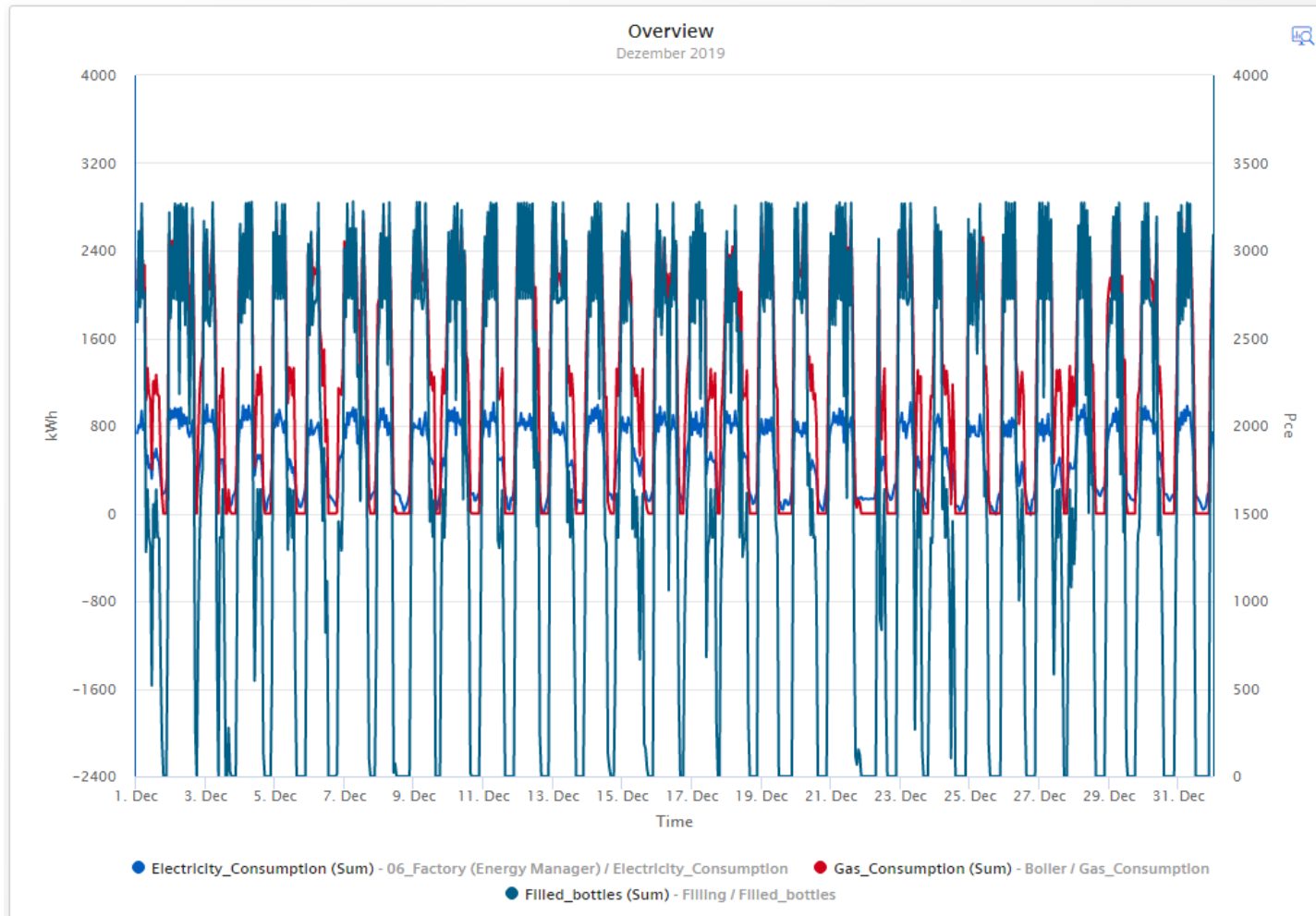


Widget types

Performance Insight

Widget types

Diagram - Chart widget



User can perform data analysis by using the functions as follows:

- Changing time range, Using the zoom functionality.
- Hide or unhide a graph; show the limits for an individual parameter.
- Use the tooltip for the exact value.
- Using up to 10 variables and up to 5 Y-Axis.
- The following detailed views are available:
 - Chart displaying detailed data.
 - Histogram including statistic values.
 - Regression analysis.

Widget types

Value widget



User overview about the KPI or aggregated variable:

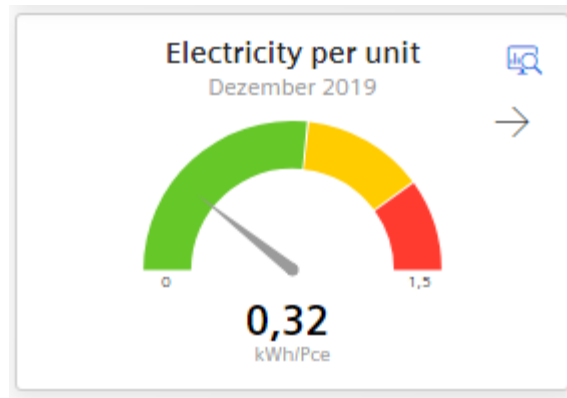
- Display the statistic (Note: The statistic is based on the KPI or variable aggregation based on the interval for the time range).
- The arrow represent the trend of the displayed value compared to the previous period.

The following detailed views are available:

- Chart displaying detailed data.
- Histogram including statistic values.

Widget types

Gauge widget



With the Gauge Widget the user gets an overview about higher and upper limits of values:

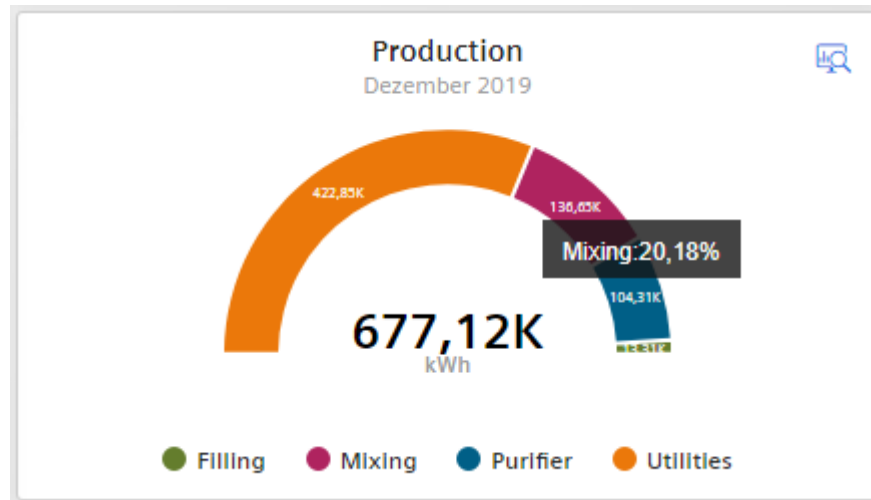
- The user can define the limits for the sections whereby the limits for the parameter are used.
- The arrow represent the trend of the displayed value compared to the previous period.

The following detailed views are available:

- Chart displaying detailed data.
- Histogram including statistic values.

Widget types

Pie widget



With the Pie Widget the user gets an overview about the distribution of quantities:

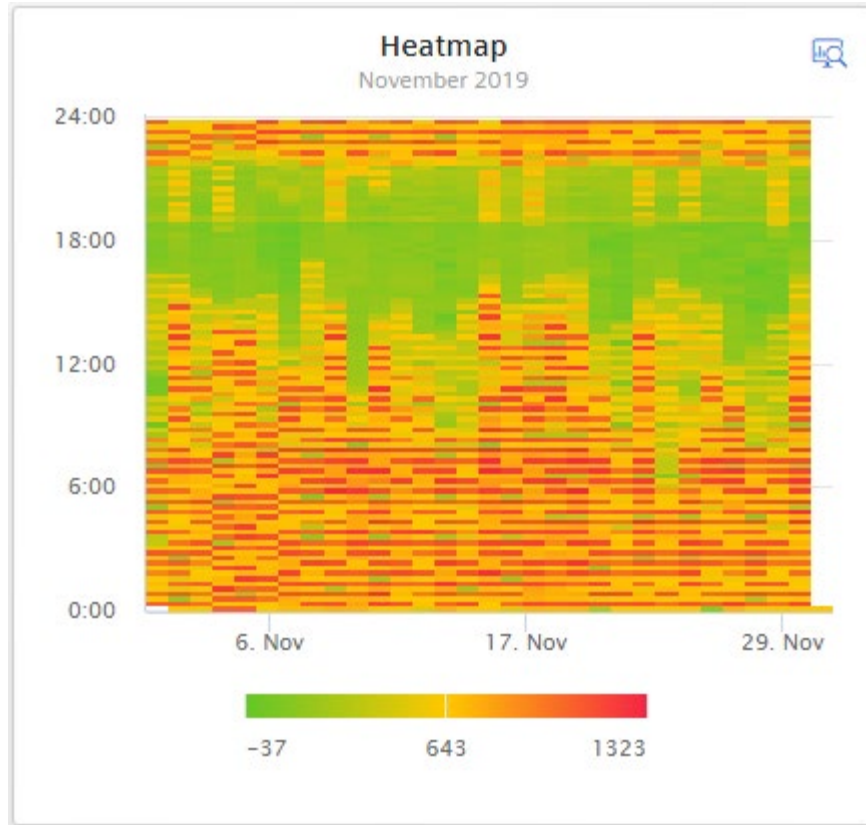
- With a click on the section the section is highlighted and user gets the corresponding value.

The following detailed views are available:

- Chart displaying detailed data.
- Histogram including statistic values.
- Regression analysis.

Widget types

Heatmap



With the Heatmap Widget the user gets an overview about when (time of the day) the peaks appear. The value is represented by a color:

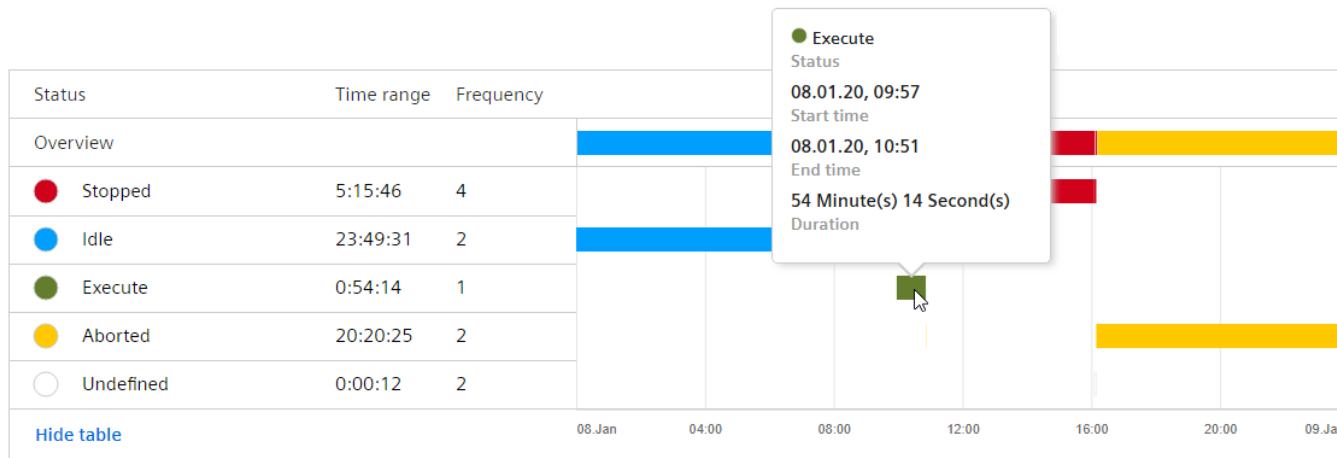
- Zoom in to get details.
- A tooltip provides the exact value.

The following detailed view is available:

- Heatmap.
- Chart displaying detailed data.
- Histogram including statistic values.

Widget types

Gantt chart



With the Gantt Chart Widget, the user gets an overview about the machine state:

- User can change the time range.
- Use the tooltip for the exact values.
- Use the Advanced Gantt View to see in detail, how often and how long the machine was in the different defined machine states.
- Use “Show table” to show the time range and frequency.

Note: For the first and the last state period, the actual start and end time is used. Also in cases if this is out of the observation period.

This is the reason why the sum of all time ranges can be greater than the observation period.



| Configuration

Performance Insight

Status mapping helps to assign different machine states for later use in e.g. Gantt Chart

Configuration

- Status mappings**
A list of all existing status mappings
- KPI types**
A list of all existing KPI types
- Periods**
A list of all existing periods

Status mappings

Search + New status mapping

Name	Description		
AE_StatusMapping			
Bool Mapping	Map FALSE to red and TRUE to green		
BraumatRecipe			
DigiDemo Mapping			
F&B - Material			
OMAC_DigiLine			
Opening Hours			
Simulation			
testMapping			
Webianr_Mapping			

Go to Configuration/Status Mappings

- App admins can add, modify or delete a status mapping table which is used in Gantt chart widgets.

Machine states are configured in the mapping table

Create new status mapping

Name *
Asset XY
The status mapping name must be unique.

Description
Description

Use time categories
Time category is used for eg: OEE calculation

Color *	Value *	Label *	Time Category *	Description
	1	Running	Net Production Time	Description
	2	Break	Planned Downtime	Description
	3	Error	Unplanned Downtime	Description
	4	No Material	Planned Downtime	Description

[+ New row](#)

* These fields must be filled out.

[Save](#) [Cancel](#)

Add or modify a status mapping table:

- App admins can add a status with a color, a value, a label and optionally a description.
- Each status can be assigned to a time category which is used to calculate how long the machine is in a dedicated time category or how often one of the assigned machine state were in a dedicated time category.
- If no match between the received value and the definition in the status mapping table is given, a state “undefined” with color white is used.
- User can change the order in the status list to define the order in the Gantt chart detailed view.

Calculate individual KPIs based on machine parameters

The screenshot displays the 'Configuration' section of a Siemens application. On the left, a sidebar contains 'My Plant', 'Configuration', and 'Settings'. The main area is titled 'Configuration' and contains three cards: 'Status mappings', 'KPI types', and 'Periods'. A yellow arrow points from the 'KPI types' card to a detailed view of the 'KPI types' configuration page. This detailed view includes a search bar, a 'New KPI type' button, and a table of KPI types with edit and delete icons for each.

Name	Edit	Delete
AE_Quality		
Availability_EAS		
AwesomeKPIType		
BSA_KPI		
Demo-Test_1		
DigiDemo - Availability		
DigiDemo - Performance		
DigiDemo - Quality		
DigiLine - Quality		
F&B - Filling Overall		
F&B - Lost		
F&B - Lost Overall		
F&B - Silo Filllevel		
Loss counter		
my quality rate		
MyAwesomeKPI		

Only app admins can add, modify or delete KPIs.

Note:
A KPI Type can only be deleted if there is no linked KPI Instance available.

KPIs are configured in an excel-like formula editor

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Create new KPI type

Name *
Availability

Unit *
%

Formula editor *

+ - ÷ × () Operand Constant Time Category ?

TIME CATEGORY
Net Production Time ▾ Duration /

TIME CATEGORY
Available Production Time ▾ Duration * CONSTANT
100

* These fields must be filled out.

Save Cancel

A KPI Type is defined by its Name, its unit of measure and its formula

Within the formula the user can add operands, constants, time categories and calculation operations.

The name of the operands can be changed as well. An operand can be copied to be used several times in the same formula.

Operands are placeholders for the real variable assigned in the KPI Instance.

Pre defined KPI Types for OEE Performance monitoring

$$\text{OEE [\%]} = \frac{\text{Availability} * \text{Performance} * \text{Quality}}{10\ 000}$$

$$\text{Availability [\%]} = \frac{\text{Net Production Time.Duration}}{\text{Available Production Time.Duration}} * 100$$

$$\text{Performance [\%]} = \frac{\text{TotalCount [pcs]}}{\text{TheoreticalSpeed} \left[\frac{\text{pcs}}{\text{s}} \right] * \text{Available Production Time.Duration[s]}} * 100$$

$$\text{Quality [\%]} = \frac{\text{GoodCount}}{\text{TotalCount}} * 100$$

$$\text{TEEP [\%]} = \frac{\text{Available Production Time.Duration}}{\text{Total Calendar Time.Duration}} * \text{OEE}$$

$$\text{MTTR [s]} = \frac{\text{Unplanned Downtime.Duration}}{\text{Unplanned Downtime.Occurrence}}$$

$$\text{MTBF [s]} = \frac{\text{Net Production Time.Duration}}{\text{Unplanned Downtime.Occurrence}}$$

- Pre-defined OEE KPI-Types are available from scratch.
- The formula editor is extended by a “Time Category” option.
- For the time category the function “Duration [s]” and Occurrence are available.

Overall Equipment Effectiveness (OEE)






Total effective equipment performance (TEEP):

Mean time to repair (MTTR)

Mean time between failure (MTBF)

| Ordering

Machine Insight Order information

01		Industrial Edge Hub Access Get Initial Access to IE Hub	6ES7823-0EE00-4AX0	SDEX
02		Industrial Edge Devices	Device specific	Device specific
03		Industrial Edge Management Device Licence Per device per year	6ES7823-0EE00-4AY0	SDEX
04		Performance Insight base subscription incl. 3 assets	6AV2170-0JA10-0AA0	SDEX
05		Performance Insight 1 additional asset	6AV2170-0JA11-0AA0	SDEX

Thank you for your attention!

For further information and support, please contact:

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