



DI PA DE-L

# Smart Asset Management

## User Manual

Version 1.0

Unrestricted

[siemens.com](https://www.siemens.com)

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## 1 Welcome to Smart Asset Management

### 1.1 Introduction

We warmly welcome you as a user of Siemens Smart Asset Management (SAM IQ). The purpose of this document is to enable you to use the Smart Asset Management application both correctly and efficiently.

Smart Asset Management is primarily designed for technical managers and asset managers enabling them to monitor and maintain assets in their plant. Its sources data obtained from intelligent assets to monitor asset condition and derive recommendations for maintenance.

Smart Asset Management is being continuously improved. This document applies to Smart Asset Management Version 1.0.

### 1.2 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary, and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit <https://www.siemens.com/industrialsecurity>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under <https://www.siemens.com/industrialsecurity>.

## 2 About

### 2.1 Disclaimer

In-depth knowledge of the supported field devices is required for the efficient and correct use of Smart Asset Management.

Smart Asset Management collects field device specific data. For meaningful results, we recommend regular data ingestions. However, compared to SCADA and DCS, this should be with a much lower ingestion rate.

Consequently, Smart Asset Management is not a replacement for your SCADA systems.

#### 2.1.1 Qualified personnel

The product/system described in this documentation may be operated only by personnel qualified for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, they must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation, and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be adhered to. The information in the relevant documentation must be observed.

#### 2.1.2 Disclaimer of liability

We have reviewed the contents of this publication for agreement with the hardware and software described. Nevertheless, we cannot assume responsibility for any deviations that may arise. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

#### 2.1.3 Proper use of Siemens products

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, they must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation, and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be adhered to. The information in the relevant documentation must be observed.

### 2.2 Export Control Classification

AL: N

ECCN: N

## 3 Getting started

### 3.1 Scope of Delivery

There are two variants of the Smart Asset Management application.

#### Cloud variant:

- All functionality is provided as a service and only a data uplink needs to be configured at your site
- Licenses are valid for 365 days
- Continuous updates and bugfixes

#### On-premises variant:

- A local installation at your site on dedicated hardware
- Licenses have no expiry date
- Updates are provided when service contract is effective

For more details about licensing refer to chapter 3.2, for the system description to 3.3.

### 3.2 Licenses

A license for Smart Asset Management contains the number of devices, a license type and an expiry date. When the data of new devices is ingested, these devices allocate license capacity. The number of currently licensed devices is shown in the license management section.

Within the timespan of your license you can ingest data for the licensed devices. When the number of licensed devices reaches the total capacity, ingestions of new devices are ignored.

There are two possible license types: Standard and Advanced. With the Standard license you can ingest device data and use the functionality provided by the Device List, Device Details and Events. The Advanced license contains the scope of the Standard license and adds the functionality of the Analyses.

A cloud license is valid for 365 days. The license starts after activation via the license management section of the application.

In the absence of a valid license (i.e. license missing / expired / replaced) the application still provides full functionality for any ingested data; however, no new data can be ingested.

It is possible to add multiple licenses to your SAM IQ application at the same time. The capacities of all active licenses are added up. Note that it is only possible to combine licenses with the same license type. The ingestion of a license with a different license type replaces all active licenses.

License Type	Number of devices	Description
Standard	10	Allows you to ingest data of 10 different devices Allows you to use the Device List, Device Details and Event List
Standard	100	Allows you to ingest data of 100 different devices Allows you to use the Device List, Device Details and Event List
Standard	1000	Allows you to ingest data of 1000 different devices

		Allows you to use the Device List, Device Details and Event List
Advanced	10	Allows you to ingest data of 10 different devices Allows you to use the Device List, Device Details, Event List and Analyses Views
Advanced	100	Allows you to ingest data of 100 different devices Allows you to use the Device List, Device Details, Event List and Analyses Views
Advanced	1000	Allows you to ingest data of 1000 different devices Allows you to use the Device List, Device Details, Event List and Analyses Views

### 3.3 System Description

This section provides you with essential information about the Smart Asset Management ecosystem.

The PDM MS V2.0 collects data from the assigned field devices and cyclically generates XML files for them. These files are ingested to Smart Asset Management to interpret and harmonize the device specific data and visualize it through a web UI. The Smart Asset Management web UI is optimized for Full HD monitors, smartphones and tablets.

The transfer of the XML files to the Smart Asset Management installation depends on the type of the installation. There are two different installation types:

- 
- Cloud installation  
On-premises installation

To securely transfer XML files to a SAM IQ cloud installation, the Data & Security Gateway is required. Please refer to the Data & Security Gateway installation manual.

For an on-premises installation, additional software needs to be installed on the PDM MS. This software is needed to transfer XML files to SAM IQ and to manage it remotely. Please refer to the on-premises installation manual for more information and instructions.

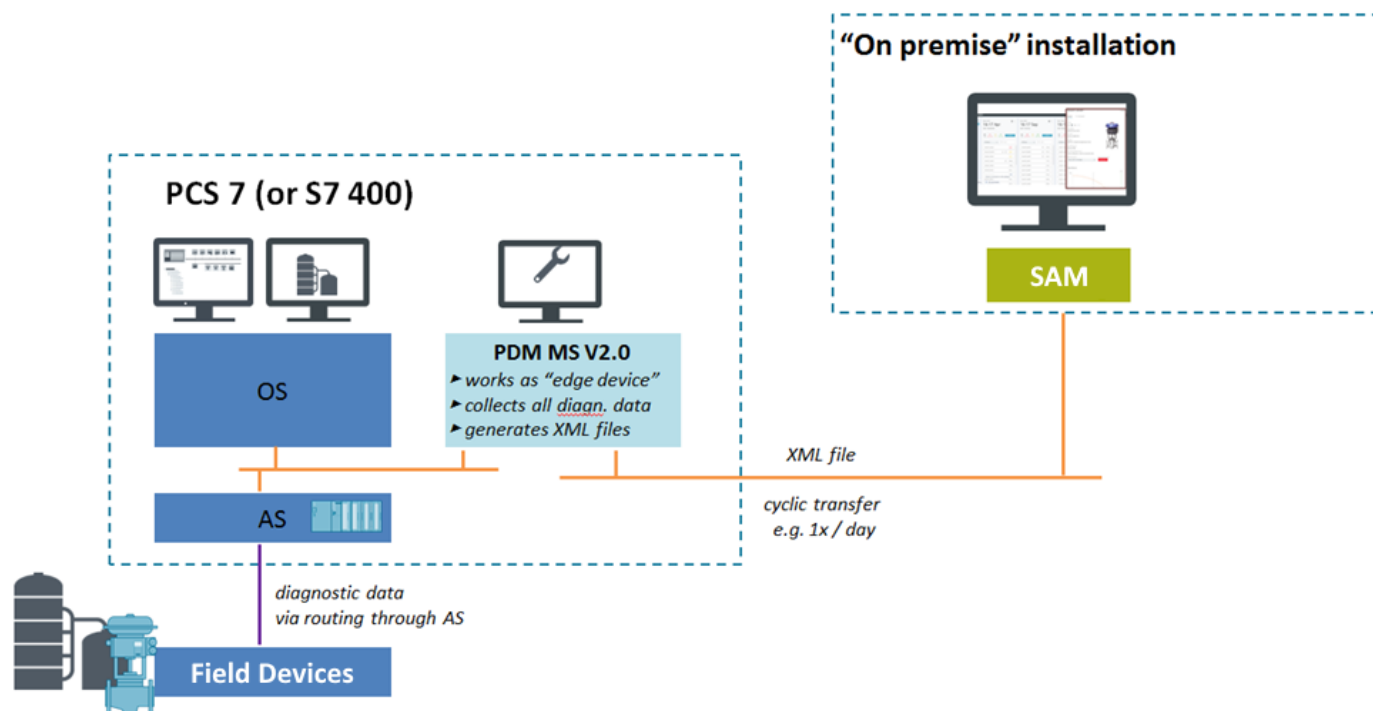


Figure 1: System description

### 3.3.1 Software (On-premises installation)

Smart Asset Management is delivered as a Kubernetes application and thus requires a Linux environment with Kubernetes and Docker support, e.g. Detox.

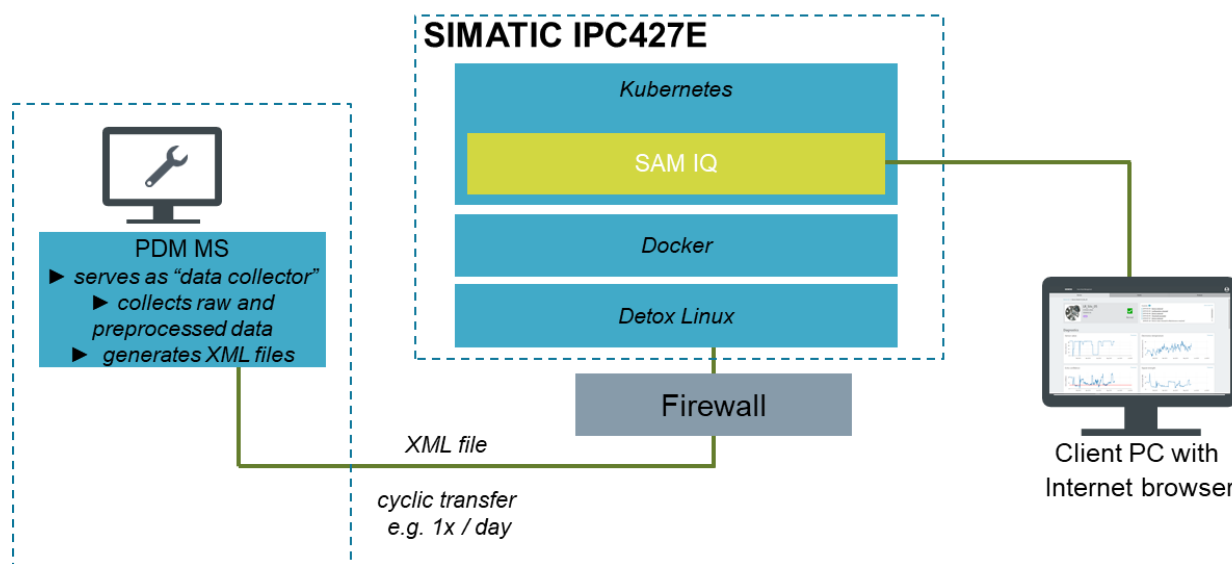


Figure 2: On premises application environment

The web UI can be accessed directly or via remote desktop from any authenticated office client in the perimeter network.

The following software is required to run Smart Asset Management:



1. Linux with:

- Docker (part of installation package)
- Kubernetes (part of installation package)

2. Internet browser

- Chrome since the web UI is optimized accordingly (part of installation package)
- Firefox / Edge / Safari (Internet Explorer is NOT supported)

### 3.3.2 Software (cloud installation)

Smart Asset Management cloud installation is a fully managed software environment within AWS that is already deployed and maintained by Siemens.

The web application can technically be accessed from any office client in the world.

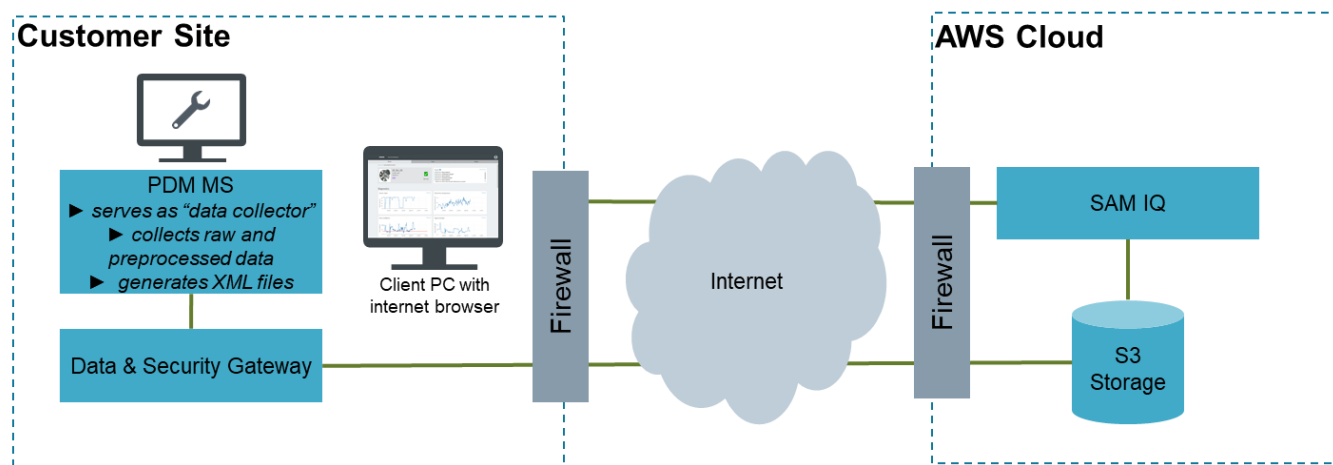


Figure 3: Cloud application environment

Please refer to the Data & Security Gateway installation manual for more information and instructions.

### 3.3.3 Hardware

The following hardware-related requirements apply:

Components	Description	Details
PDM MS V 2.0 / V 3.0	Interacts with field devices (i.e. level radars) to generate the XML-files that Smart Asset Management relies on	Released Siemens product For more information refer to: <a href="http://go.siemens.net/22862044">http://go.siemens.net/22862044</a>
Smart Asset Management machine (On-premises installation only)	Host Machine for Smart Asset Management (SIMATIC IPC427E Microbox PC)  • • • •	CPU: XEON E3-1505L Network: 3x Gigabit Ethernet (IE/PN) Memory 16GB No OS pre-installed Storage: 480GB SATA SSD  For more information refer to: <a href="http://go.siemens.net/10090653">http://go.siemens.net/10090653</a>  Order number: 6AG4141-7BC30-0GA0
Office client / mobile device	Client that access the application's web UI	No specific requirements Must offer one of the supported browsers (see section 3.3.1) Full HD resolution recommended

**Table 1: Hardware requirements**

In addition, a functioning network is needed to enable communication between the hardware components listed above (see Table 1: Hardware requirements).

To see a full overview of our currently supported assets, refer to the list of supported devices.

## 3.4 First Start and Setup Wizard

### 3.4.1 Authentication

We send both the username and an initial password with the application. After your first log in you are required to change your password. When successfully logged in, start by managing user accounts (refer to Section 3.4.2).

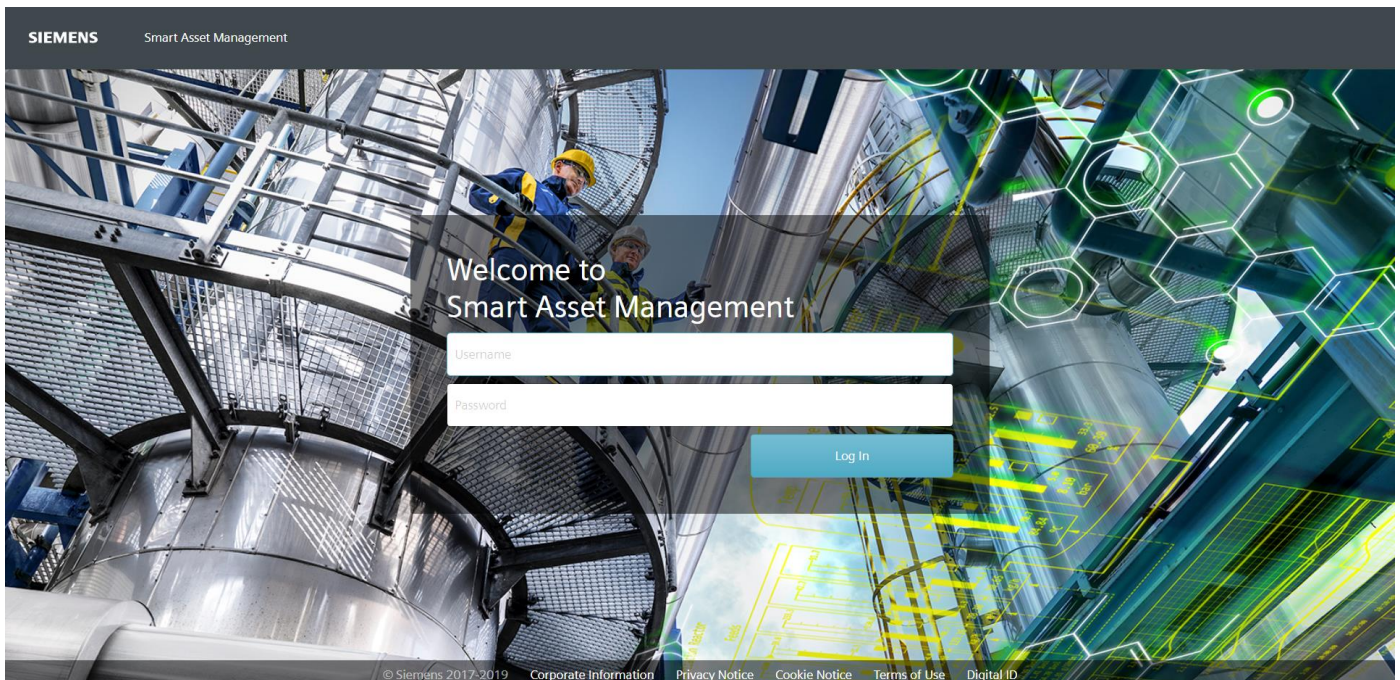


Figure 4 Login screen

### 3.4.2 User Management

All functionality regarding user accounts is in the flyout menu. The application supports two user roles: administrators and users. In addition to the regular features of the application, administrators can manage user accounts and licenses. Initially, the application comes with a pre-configured administrator account. Click “Profile” to change your user data and password. Administrators can create or remove user accounts via User Management.

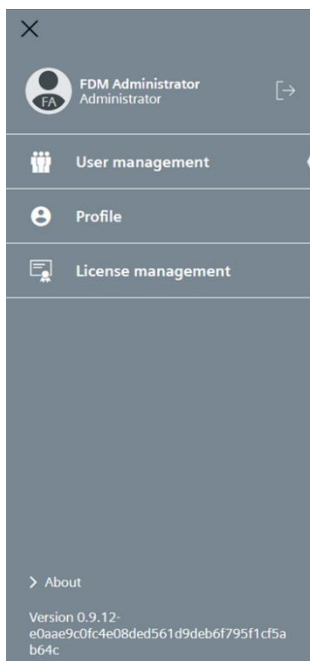


Figure 5 Flyout menu

After adding and saving a new user (see 1, Figure 6), the new user can immediately log in. All users can be deleted (see 2, Figure 6), including administrators, except for the role of the currently logged in administrator.

## User management

1 + add new user

Email	First name	Last name	Role
abc@def.gh	John	Doe	User
admin2@admins.de	Ad	Min	Administrator
fdm-admin	FDM	Administrator	Administrator
fdm-user	Field Device	Manager	User
hallo@du.com	ich	du	Administrator
oliver.strnad@siemens.com	Oliver	Strnad	User
test@test.com	test	test	User

2

Figure 6 User Management

### 3.4.3 License Management

Before any device data can be ingested, a license must be added. Open the flyout menu and select the License Management section, select “add license” (1) and insert your license key.

## License management

License availability

2 Licenses: 10  
Used: 0

1 + add license

License type	Size	Start date	Expiry date	Remaining days	Status
Advanced	10	2019-10-18	2020-10-01	349	Active

Figure 7: License management

This view also provides an overview of your licensing status including the total capacity of the currently active licenses and the number of all licensed devices (2) and a table showing a history of all licenses with the following information:

- license type
- capacity
- start and expiration date
- resulting remaining days

## License status

The application shows a warning message if there is no active license available or all devices of a license are used. After a license has expired, its capacity will be withdrawn, and the assigned devices are unlicensed. During the next data ingestion, these devices will be automatically reassigned to the next license with free capacity.

Licenses are always shown in the table. If the end date is reached, they get the status 'expired', if they were superseded by a license with a different type, they get the status 'replaced'. This means they are not part of the total capacity of licensable devices. The table is therefore not just an overview of your active licenses, but also a license history of your Smart Asset Management application.

## 4 Application Overview

This section provides an initial overview of the application and its features.

### 4.1 Navigation

The header bar is always accessible and gives access to all functions of your Smart Asset Management application. There is the button to open the flyout menu and the tabs for the different functions of the application, which are explained in detail in the following sub chapters.

Application functions

- Devices (2) gives an overview of all devices that are or have been maintained
- Events (3) shows all events that have occurred across all devices of the Device List
- Analyses (4) provides custom device analysis



Figure 8: Navigation with flyout menu and tabs

The flyout menu contains the header with the username, the role and the logout button (see 5, Figure 9).

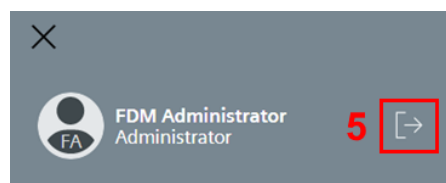


Figure 9: Log out

Non-technical functions in SAM IQ are in the flyout menu, including:

1. user management
2. profile
3. license management

Only “Profile” is visible for the user role, other functions are restricted to administrators only.

At the bottom of the menu the following legal topics are covered:

1. List of third-party open source software licenses
2. Siemens AG corporate information
3. Siemens data privacy notice

### 4.2 Device List

The Device List is accessible via the “Devices” tab (see Figure 8). It supports the user by giving a list of devices and a filter bar including counters for the common NAMUR states. Choosing a filter will refresh the Device List in showing only the devices in this specific state.

The Device List offers only standard information (see Figure 10). For further device details, select a row. This opens the Device Details view.

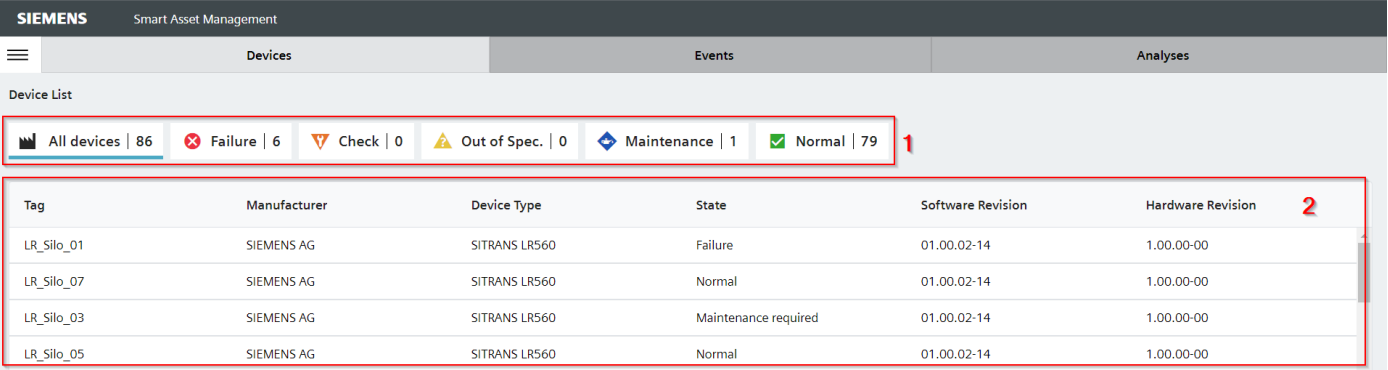


Figure 10 Screen Device List

## 4.3 Device Details

The Device Details view always has the same structure. It contains the header card on the top left (2), which contains the tag name of the device, the product name, the manufacturer, the device type, a photo of the device or as a replacement if no picture is available, a symbolic picture and the health status. On the top right (3) is the event card with device-specific events. Selecting a listed event opens an event detail dialog. Selecting the “show event list” link leads you to the Event List with an active filter to the previously selected device.

Below is an overview of the supported device data, grouped by the sections Diagnostics, Identification and Setup (see below). below).

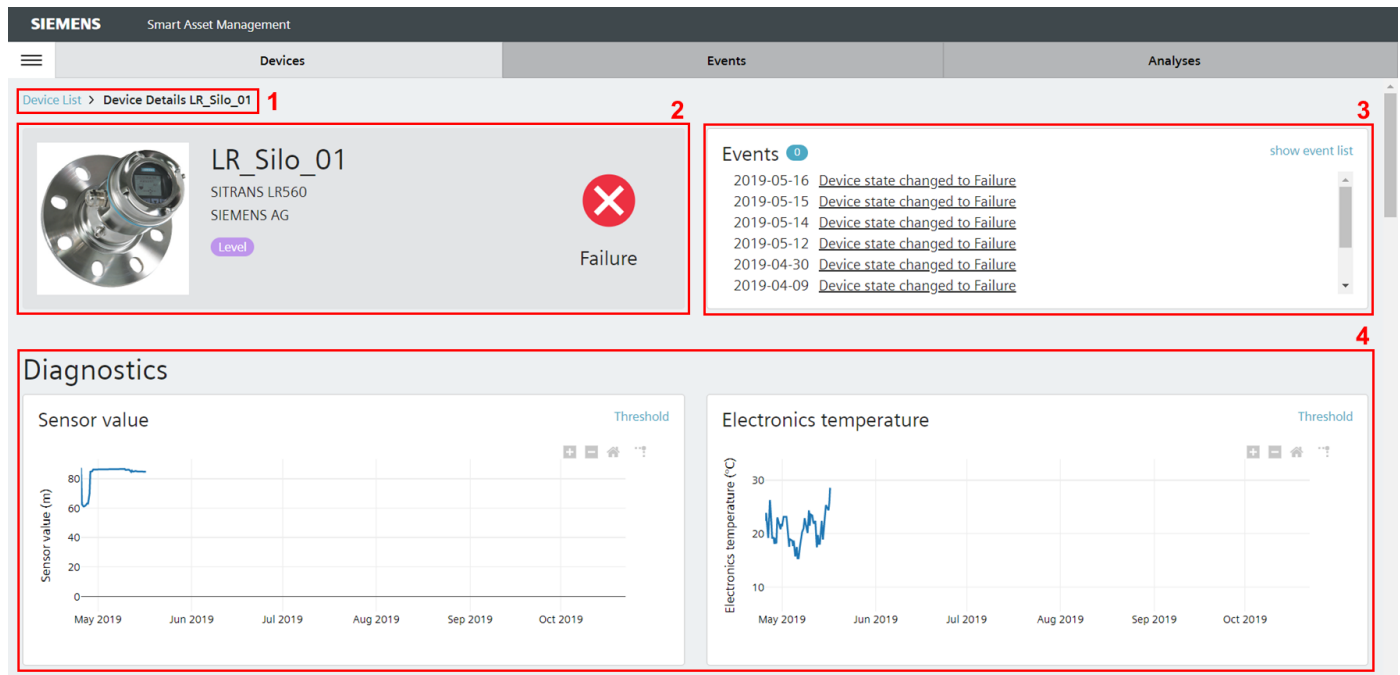


Figure 11: Device details view – Header and Diagnostics section

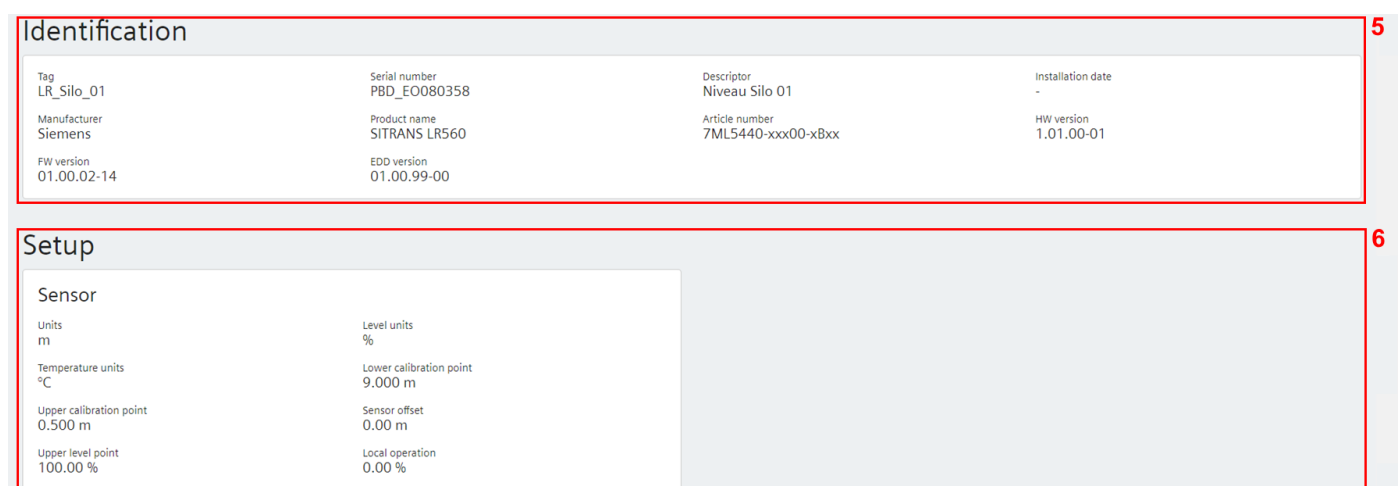


Figure 12: Device details view – Identification and Setup section

### 4.3.1 Threshold Settings

In some cases, it is important to get a notification when a value reaches a specific limit. For that reason, SAM IQ supports user defined thresholds. The user can set an upper and lower threshold which triggers a custom



event after its limit is exceeded. The dialog is accessible via the link “Threshold” in the device diagnostics chart.

A threshold needs at least one valid limit to be created. To prevent an unwanted frequent triggering of events, if the parameter value fluctuates around a limit, the user can set a hysteresis. Additionally, an associated action can be assigned to the threshold limit event (see 2, Figure 13). The default is “No action”, but the user can also select “Failure”, “Out of Specification” and “Maintenance required”. If this threshold is not just required for the specific device, but for several or all devices of that type, the user can set a checkmark to apply the settings to all devices of that type.

When a threshold is no longer needed, it can be removed. This can be done either for a single device or all devices of a device type. Select “Clear” and “Save” to delete its values.

Note: In the latter case the checkbox under threshold options must be enabled.

Threshold settings - LR\_Silo\_05 - SITRANS LR560 - SIEMENS AG X

Sensor value

Sensor value

**Define values**

Lower limit

 m

Upper limit

 m

Hysteresis

 m

Clear

**Threshold options**

Action

No action ▼

☐ Use these thresholds for all SITRANS LR560.

**Explanation**

Cancel

Save

Figure 13: Threshold Settings

## 4.4 Event List

The Events view provides a chronologically sorted list of all occurred events. It is possible to mark events as acknowledged. This moves these events to the end of the list and let you focus on events that haven't been addressed yet.

The following types of events may occur in this view:

- “State change” informs you about a device health state or its reason has changed
- “Device replaced” events occur when a different device is registered under a known device tag
- “Configuration changed” events pop up if a configuration parameter is altered
- “Threshold exceeded” is thrown if a user defined value for a device parameter has been exceeded

SIEMENS

Smart Asset Management

Devices

Events

Analyses

Events

All events | 51

Unacknowledged | 1

<input type="checkbox"/>	Date	Tag	Device Type	State	Change Type
<input type="checkbox"/>	2019-09-08	LT_MS113	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-09-06	LT_MS113	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-09-04	LT_MS113	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-09-04	LT_MS09	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-09-04	LT_MS05	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-09-03	LT_MS02	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-05-16	LR_Silo_01	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-05-16	LR_Silo_02	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-05-15	LR_Silo_02	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-05-15	LR_Silo_01	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-05-14	LR_Silo_02	SITRANS LR560	Failure	Device state changed to Failure
<input type="checkbox"/>	2019-05-14	LR_Silo_01	SITRANS LR560	Failure	Device state changed to Failure

Figure 14: Event Overview

This dialog shows an example of a state change, with details about when it occurs, its reason, the previous state and current state and the tag of the device. You can acknowledge the event directly in the details dialog or with the checkboxes in the overview. If several events must be acknowledged, we recommend using the latter variant.

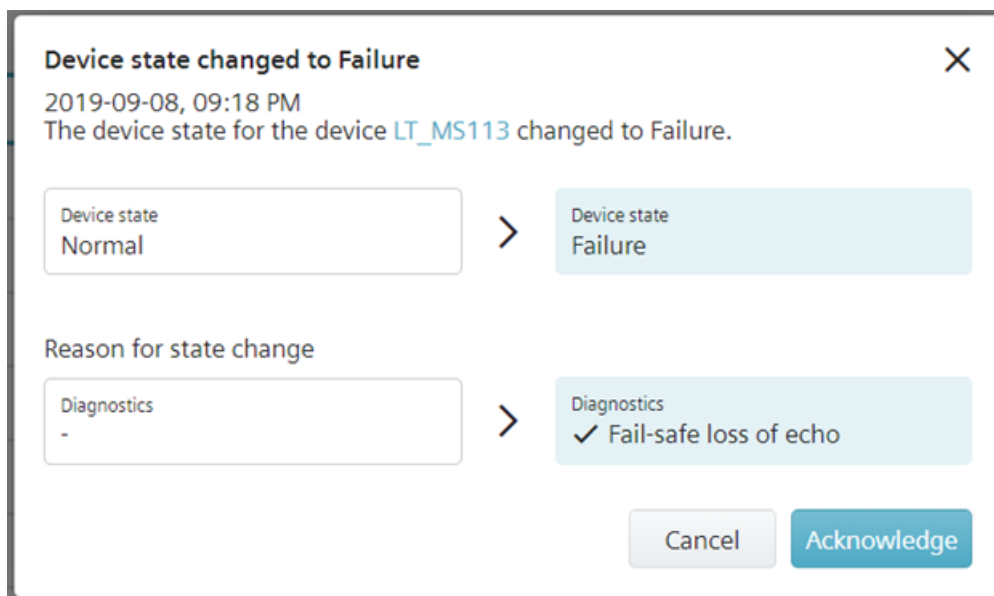


Figure 15: Event Details

## 4.5 Analyses Overview

The Analyses module is accessible via the Analyses tab. An analysis is a customizable view that allows you to compare multiple parameters of different devices. The overview shows all analyses that were already created.

- Select an already created analysis to view it in detail
- Select the context menu of an analysis to rename or delete it

### 4.5.1 Create an analysis

To create an analysis, select “+ add new analysis” in the upper left. A dialog will open.

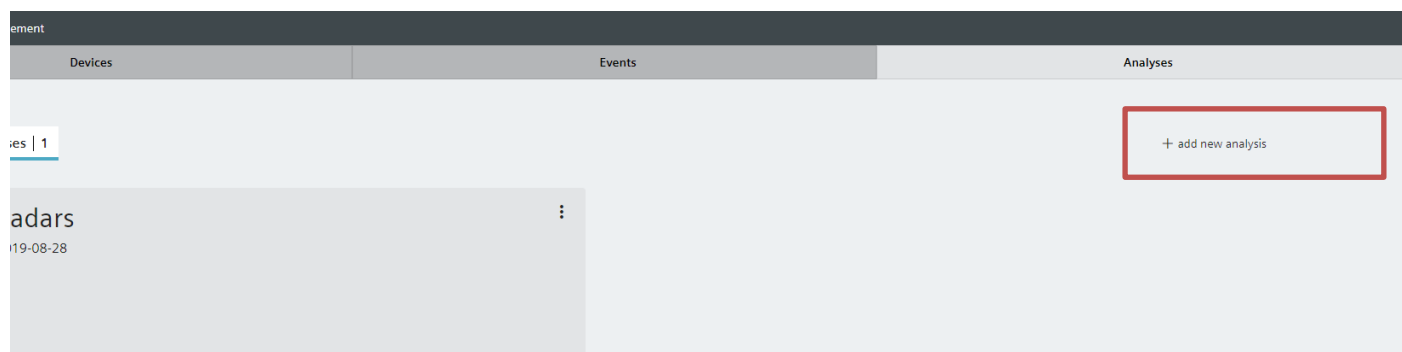


Figure 16: Add a new analysis button

Insert a name for your new analysis and confirm by selecting “add”.

Add new analysis

×

Name analysis

Enter analysis name

Cancel

Add

Figure 17: "New analysis" dialog

The application creates an empty analysis and directly opens it for you. Now you can customize this analysis page to support you with observing or analyzing devices or correlations at your plant.

### 4.5.2 Customizing an analysis

After a new analysis has been created, an empty template appears. Every template has a header card with its name and creation date. Here you can rename your analysis or delete it via the context menu (see 1, **Error! Reference source not found.**).


There is also a description card. It is meant to be used to describe the purpose of the analysis, to note specific correlations or just to inform others about important details. To add or edit its content, select the pencil icon (see 2, **Error! Reference source not found.**).

The last card is always the "Add a new chart to this analysis" card (see 3, **Error! Reference source not found.**), which needs to be clicked to add new graphs to your analysis.


Analyses > Example Analysis


Example Analysis

Created on 2019-10-29

1 

Description

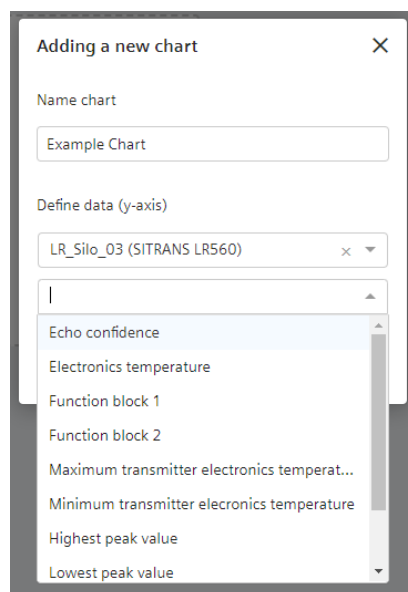
2 

3 

+

Add a new chart to this analysis

Figure 18: New example analysis



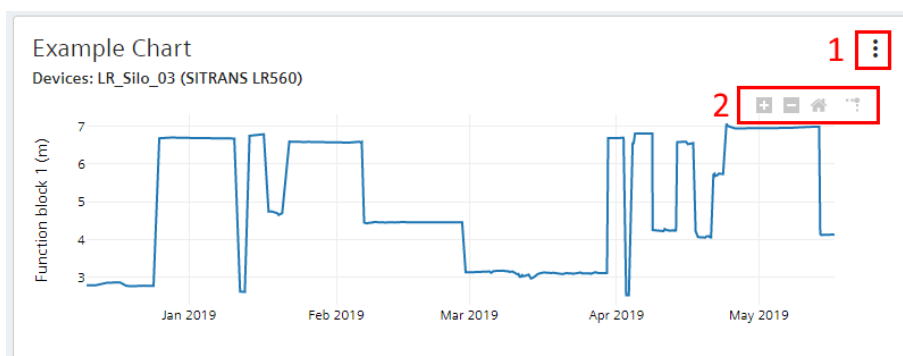
**Figure 19: Define chart**

When the card is clicked, a dialog opens asking you for the name of the chart, the field device that should be the data source and the parameter which should be shown in the chart.

The shown parameters are related to the previously selected field device type, so it is not possible to accidentally select an unsupported parameter.

If the input is complete, confirm with save. The dialog closes and the chart appears on the analysis view.

The chart has a similar context menu as the header card (see 1, Figure 20). You may change the charts name, but also change the field device used or the shown parameter.



**Figure 20: Example Chart**

Additionally, the chart has some extra functions to support the analysis of a chart (see 2, Figure 20).

From left to right users can zoom in, zoom out, reset zoom and toggle spike lines.

## 5 Troubleshooting

If you encounter any kind of undesired or unexpected application behavior, e.g. XML files are not ingested, follow the steps described in Table 2 until the issue is resolved:

No.	Measure	Description
	Refresh browser	Refresh the browser page
1.	Check device compatibility	Check whether the missing device is on our device compatibility list. To order additional device types send a support request (reference No. 4).
2.	Check remaining licensed devices	If the missing device is read for the first time, ensure there are enough unused licenses. Go to License Management and check whether you have unused licenses available.
3.		
4.	Send a support request	If none of the aforementioned steps are successful, send a support request to <a href="mailto:sam.support.industry@siemens.com">sam.support.industry@siemens.com</a>

Table 2: Troubleshooting measures

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## 8 Abbreviations

AS	Automation System
CPU	Central Processing Unit
DCS	Distributed Control System
EDD	Electronic Device Description
MS	Maintenance Station
OS	Operator Station
PCS 7	Process Control System 7
PDM	Process Device Manager
PDM MS	Process Device Manager Maintenance Station
RSS	Really Simple Syndication
SAM	Smart Asset Management
SCADA	Supervisory Control and Data Acquisition
SIMATIC software	Programs for process automation (e.g. PCS7, WinCC, PDM)
SSD	Solid State Disk
UI	User interface
XML	Extensible Markup Language

## 9 Glossary

Term	Description
NAMUR NE107 States	<div>  <b>Failed</b> → High severity: signal invalid due to malfunction in the device, sensor or actuator         </div> <div>  <b>Out of Specification</b> → Medium severity: permissible ambient or process conditions exceeded or the measuring uncertainty of sensors or deviations from the set value in actuators is probably greater than expected         </div> <div>  <b>Maintenance Required</b> → Low severity (advisory): although the signal is valid, the remaining life is nearly exhausted, or a function will soon be restricted due to operational conditions e.g. aging of a pH-electrode         </div> <div>  <b>Check Function</b> → Signal temporarily invalid (e.g. frozen) due to on-going work on the device         </div> <div>  If none of the above states applies, the state is <b>Normal</b> </div>

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