

| PM Add-ons

Process Management System WinCC Add-ons

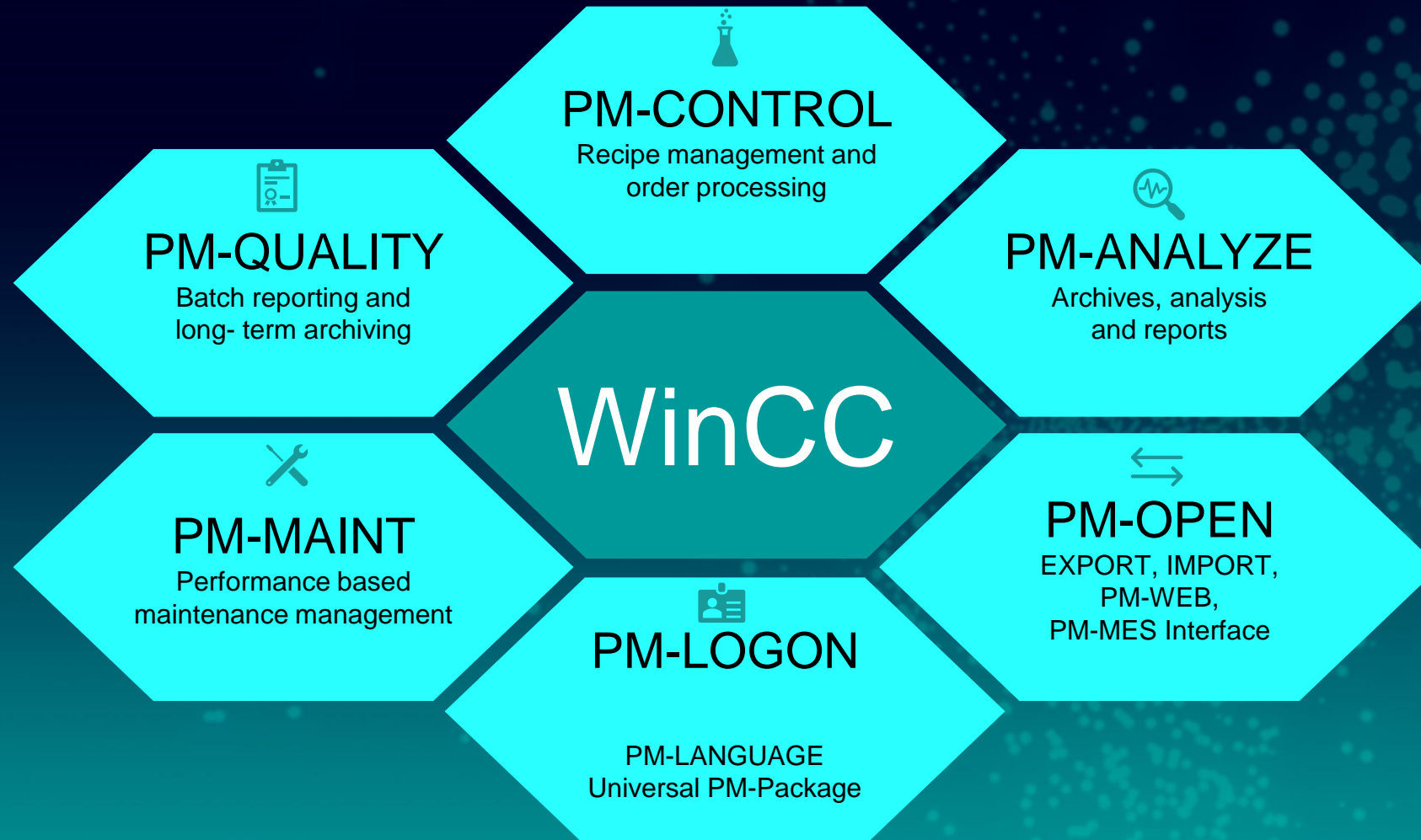
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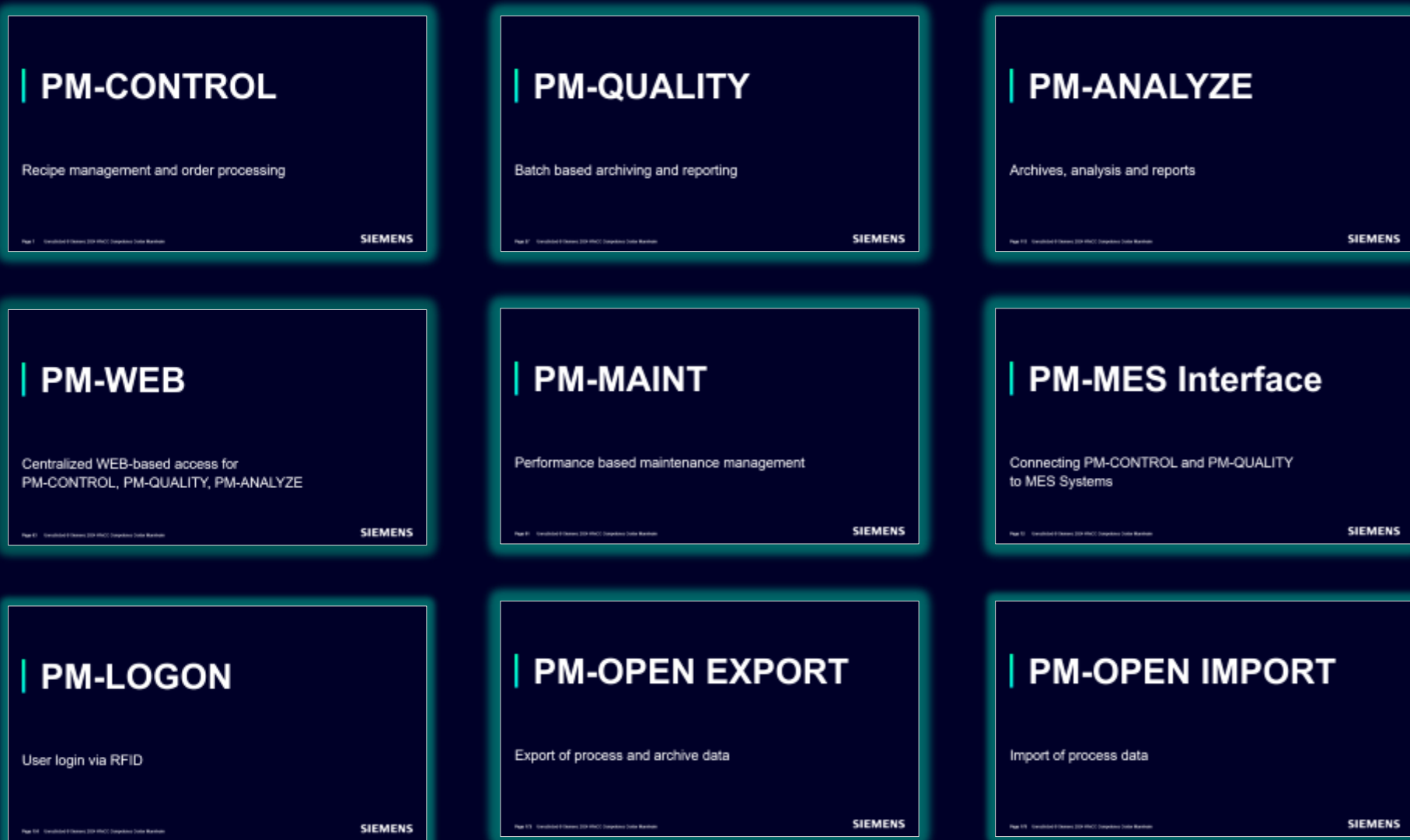
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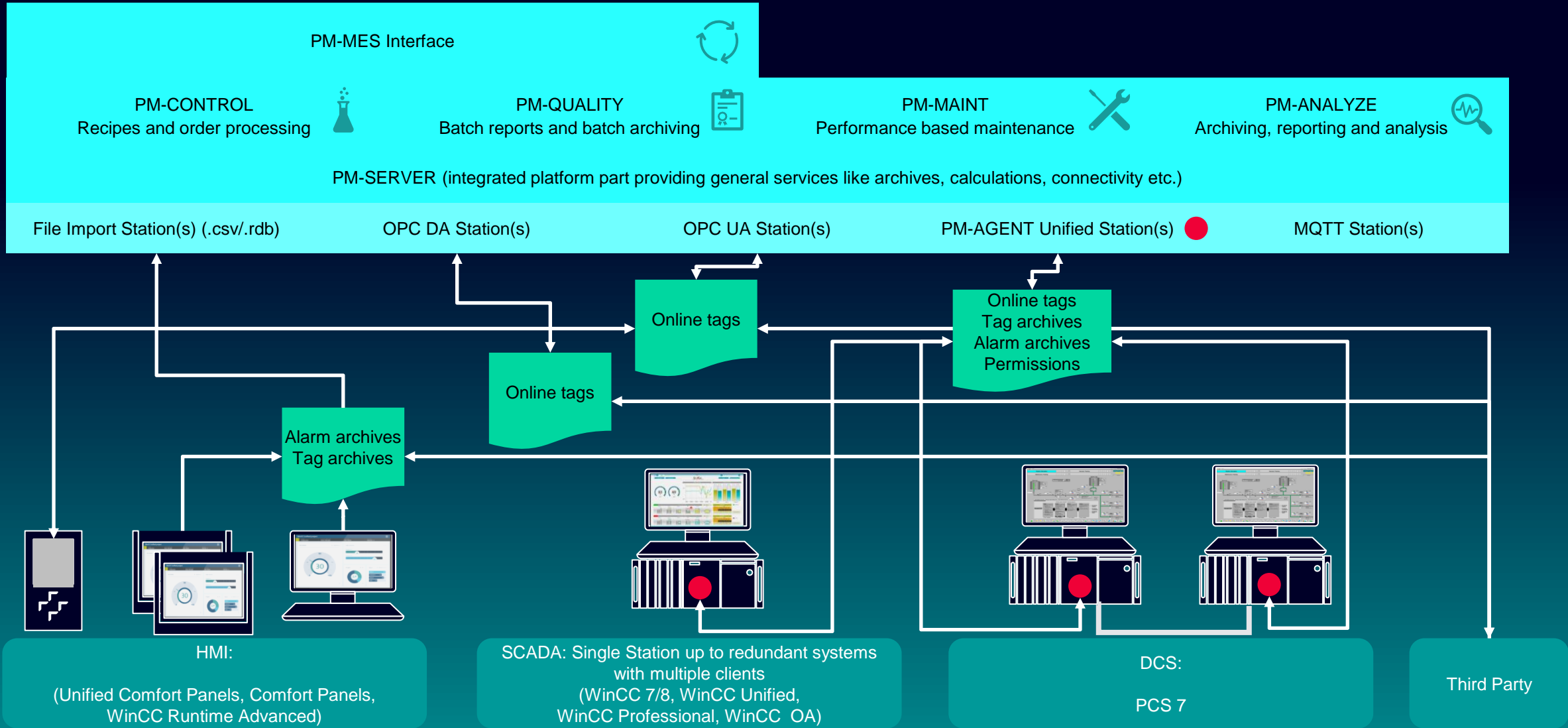
WinCC Premium Add-ons



Standard products - The key to success

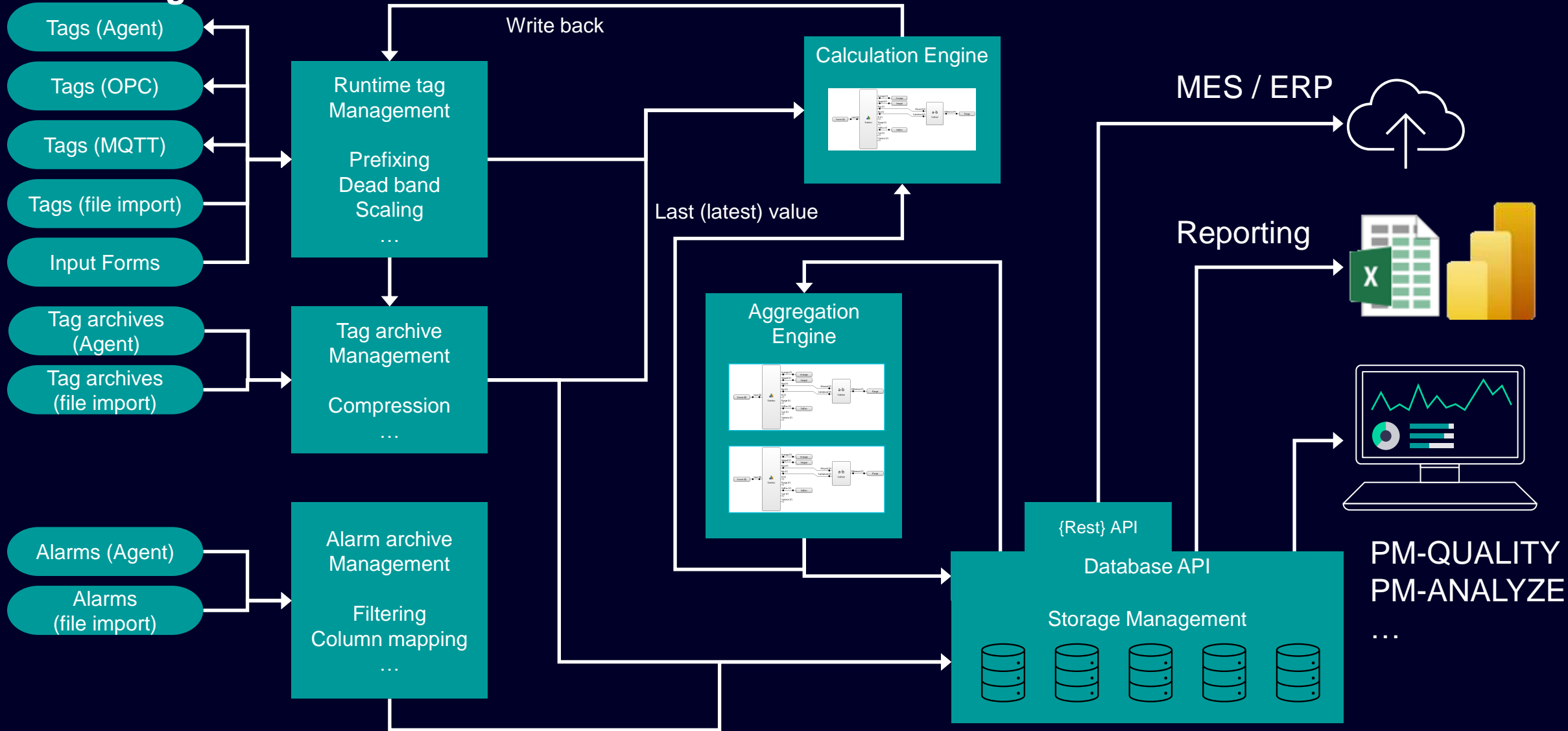


Structure of the PM-Products



PM-SERVER

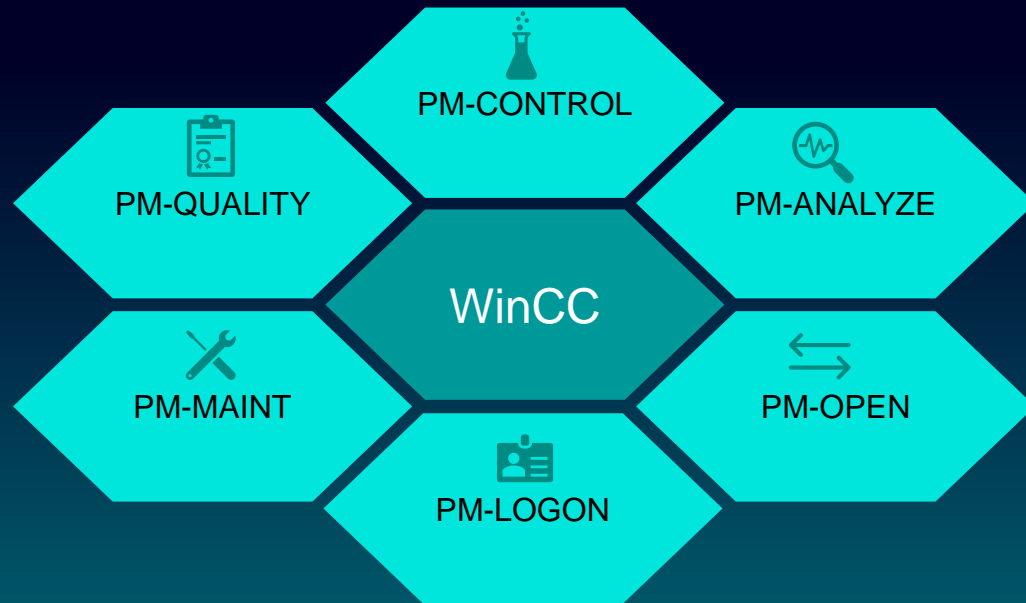
Archiving architecture



| PM-CONTROL

Recipe management and order processing

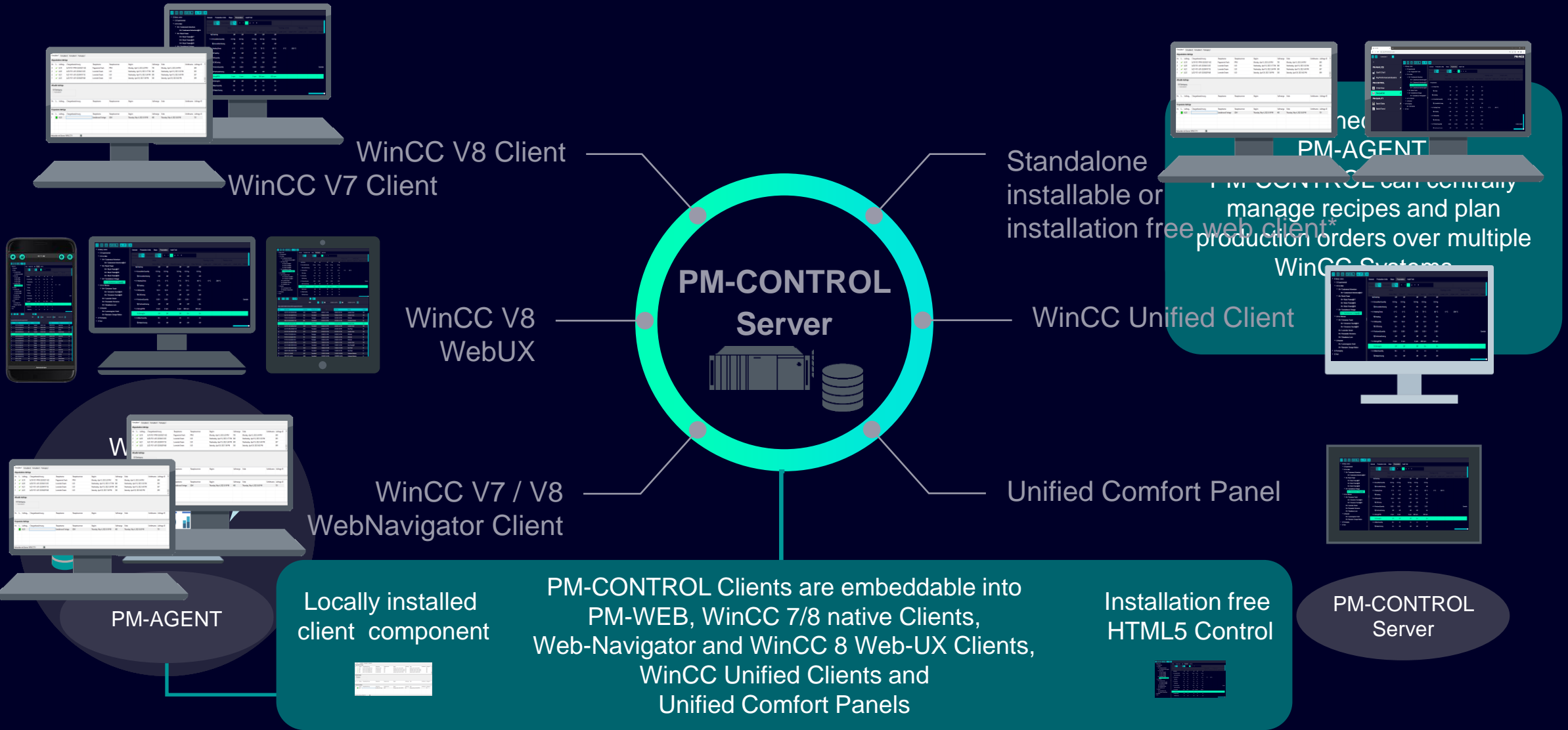
PM-CONTROL



- Management of recipe data, parameter sets, production settings
- Parameter control / Sequence control
- Target independent recipes
- Planning and execution of production orders
- Scalable server editions
- Embeddable clients for different HMI's
- Industry-neutral
- Available languages:
English, French, German, Chinese

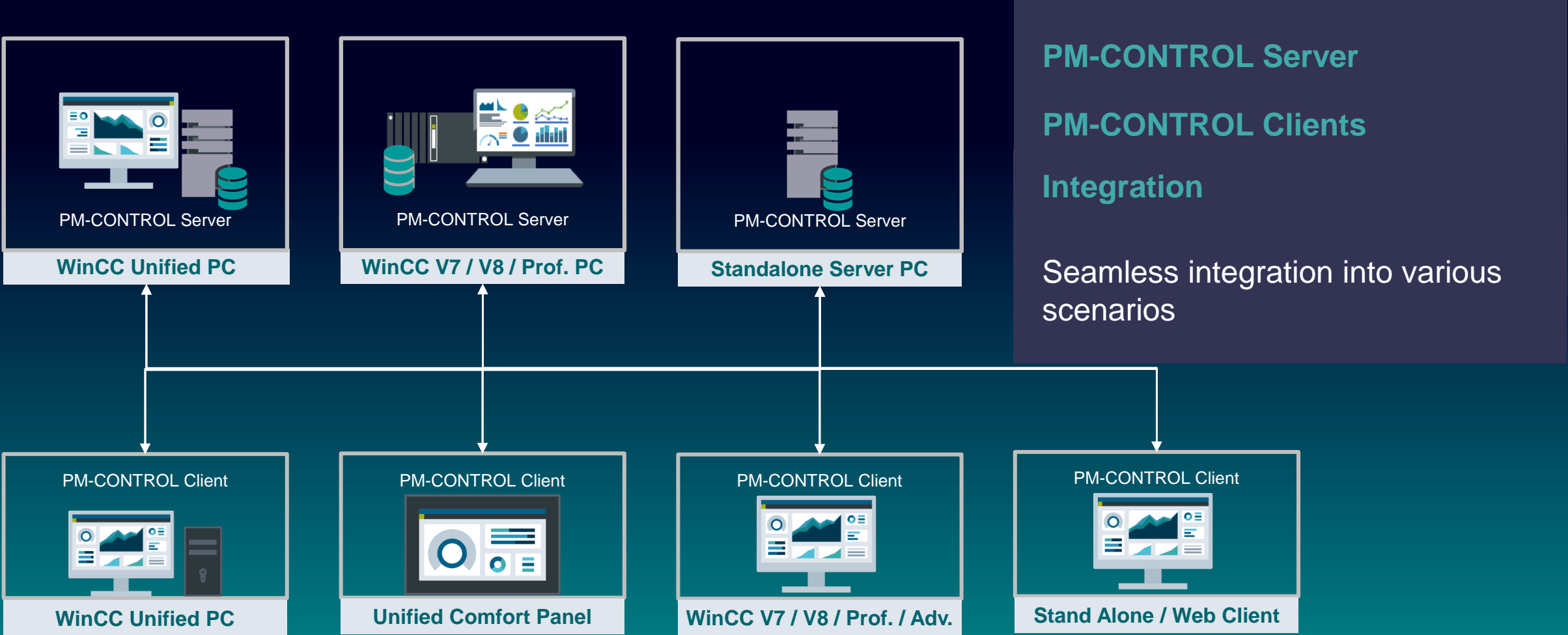
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Flexible, scalable, integrated in WinCC



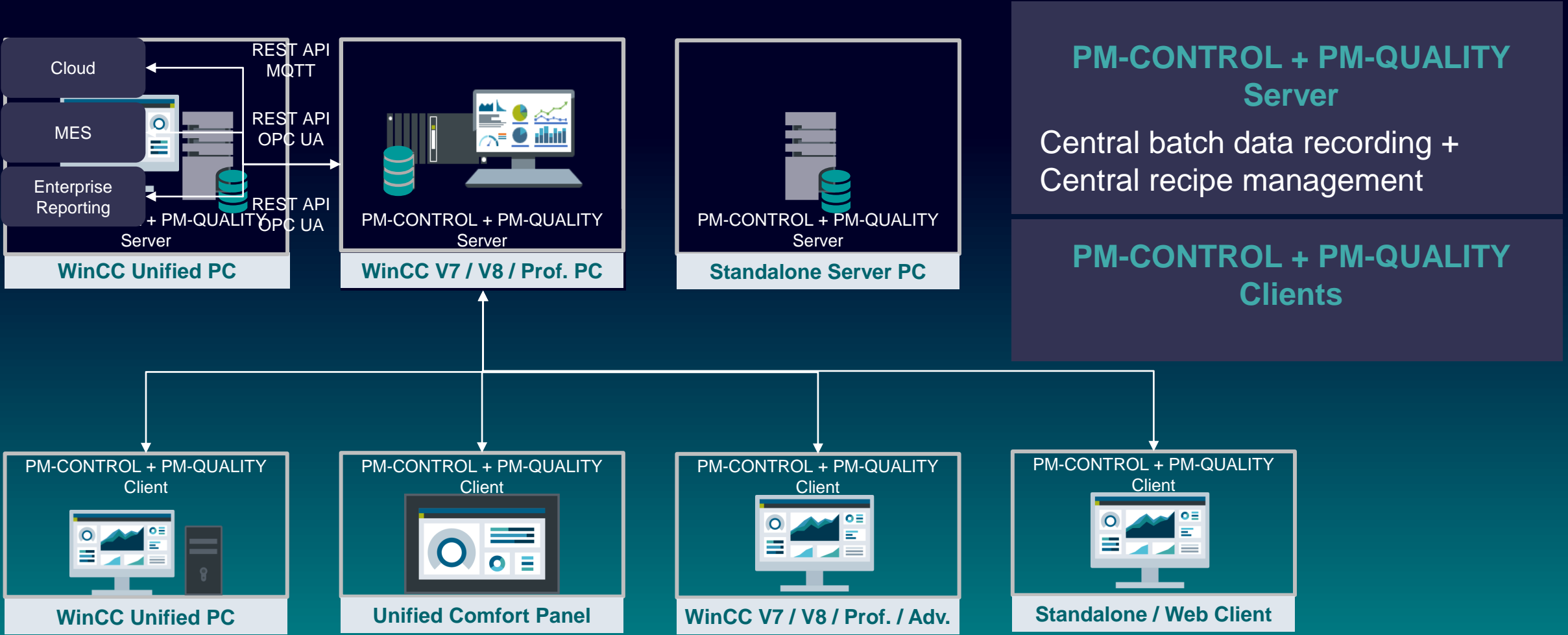
PM-CONTROL

System selection and components



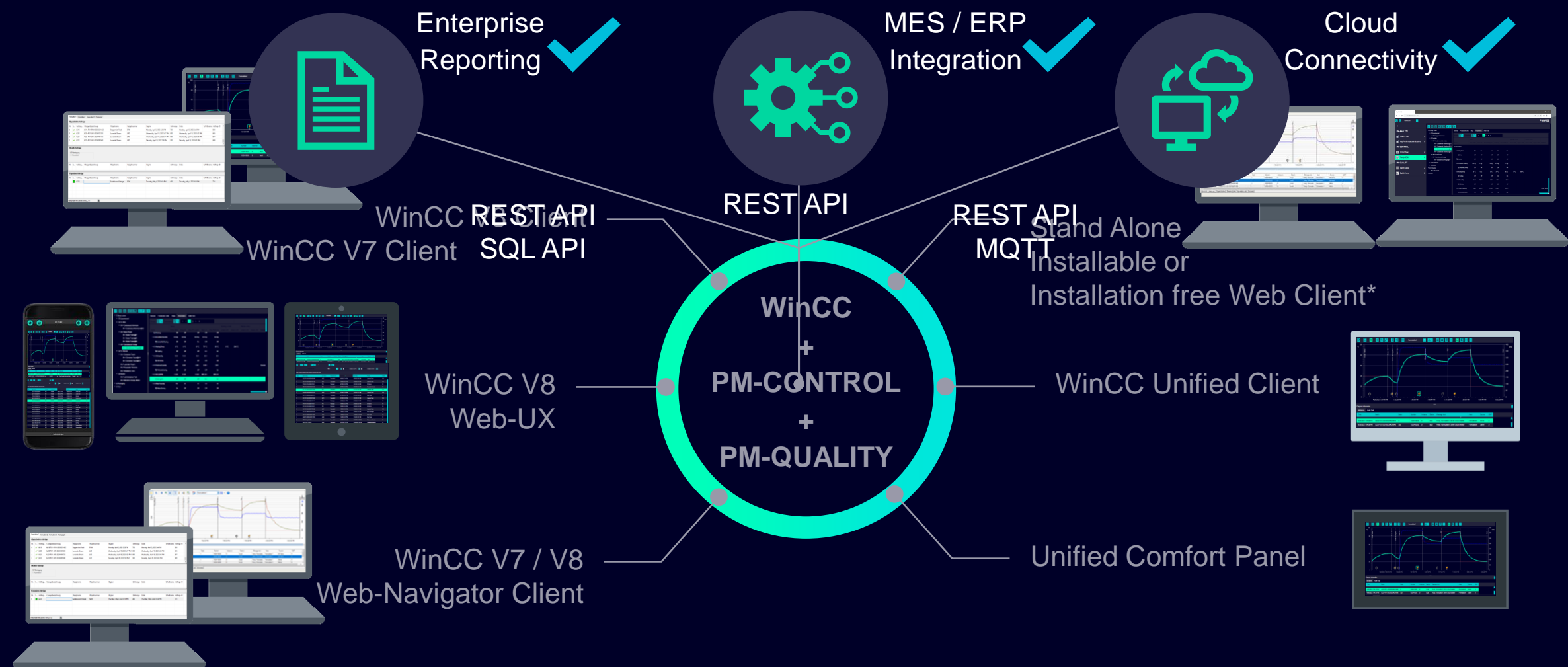
PM-CONTROL + PM-QUALITY

Modular combinable



WinCC & PM-CONTROL & PM-QUALITY

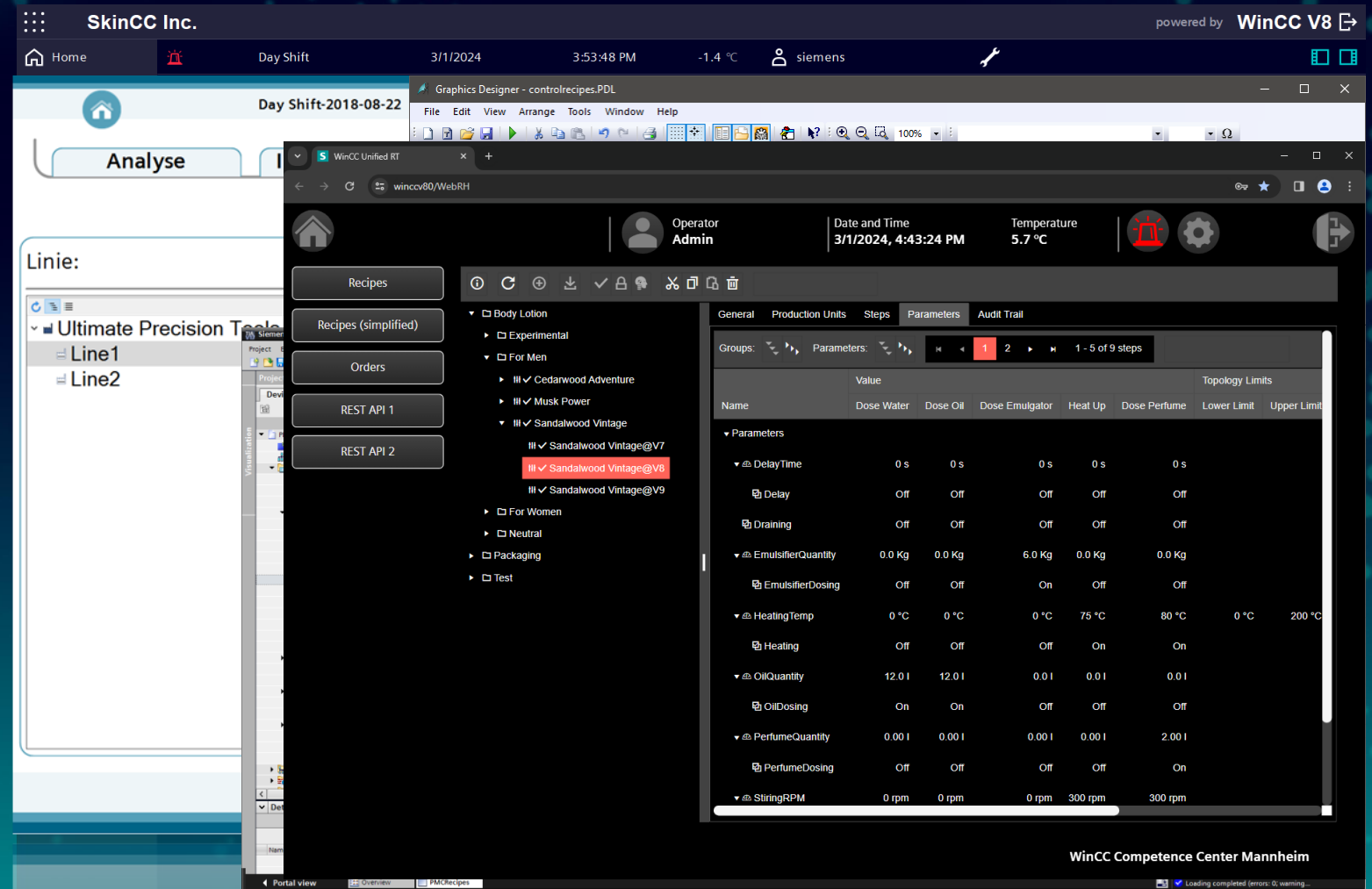
Flexible, scalable, easy to integrate



PM-CONTROL

Recipe management

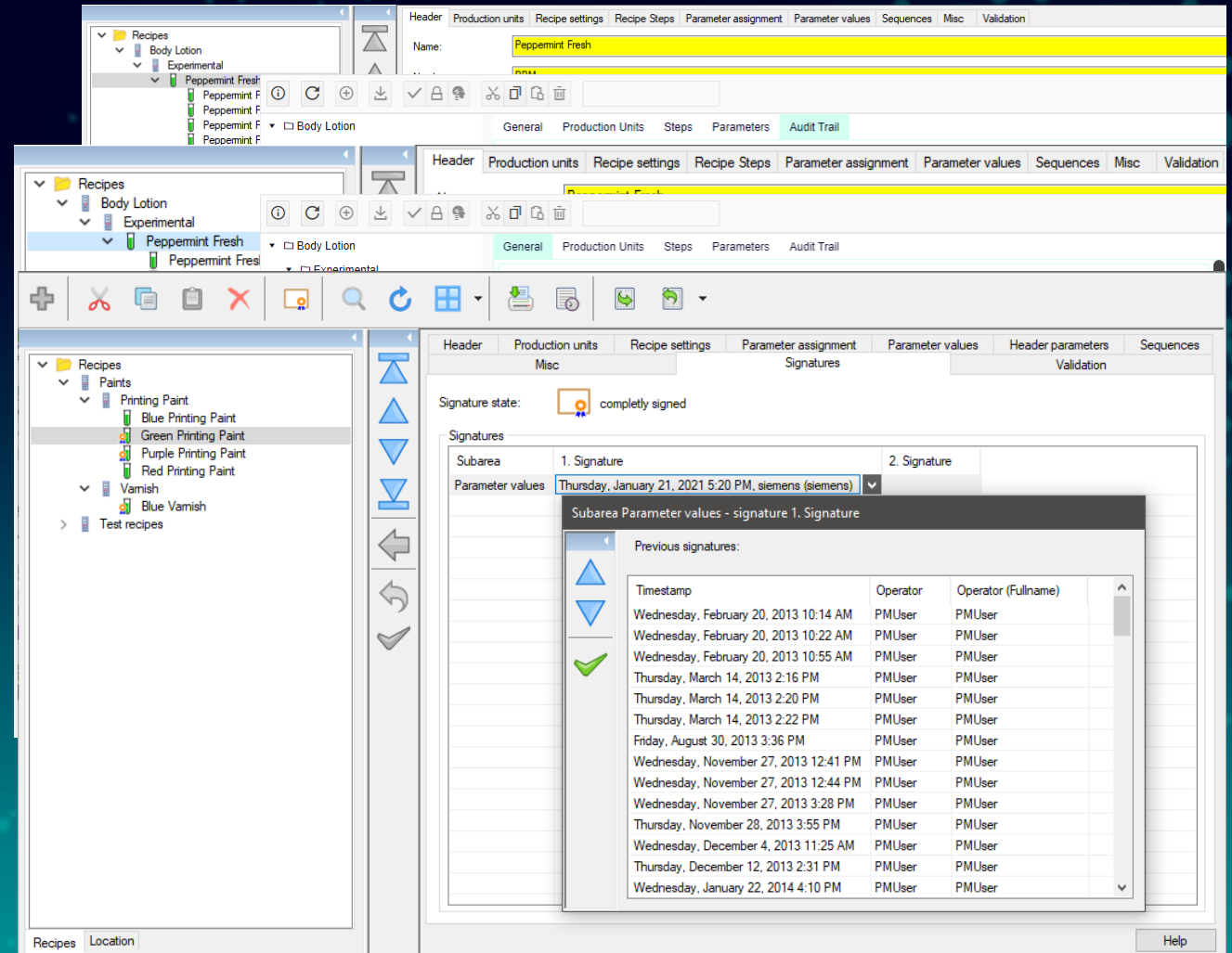
- Management of
 - Recipe data,
 - Parameter sets,
 - Production settings
- For process experts
- For operators
- Either locally at the machine
 - Integrated in
 - WinCC V7, V8 and PCS 7
 - WinCC Unified, Adv. / Prof.
 - Or as a standalone application in a laboratory



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Recipe management

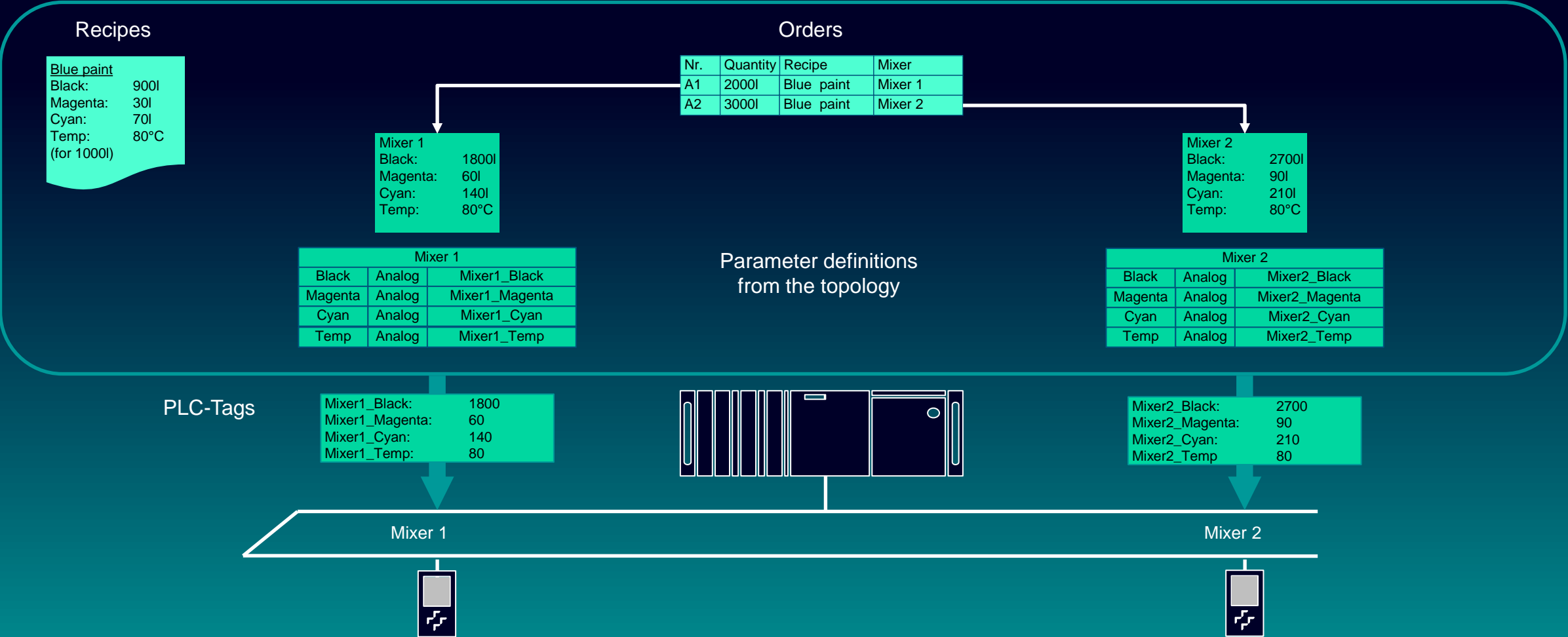
- Change tracking, versioning and release management for production recipes
- Integrated Audit Trail
- Integrated version management with automatic generation of version numbers
- Electronic signature with either single or double signature



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Recipe management and order processing

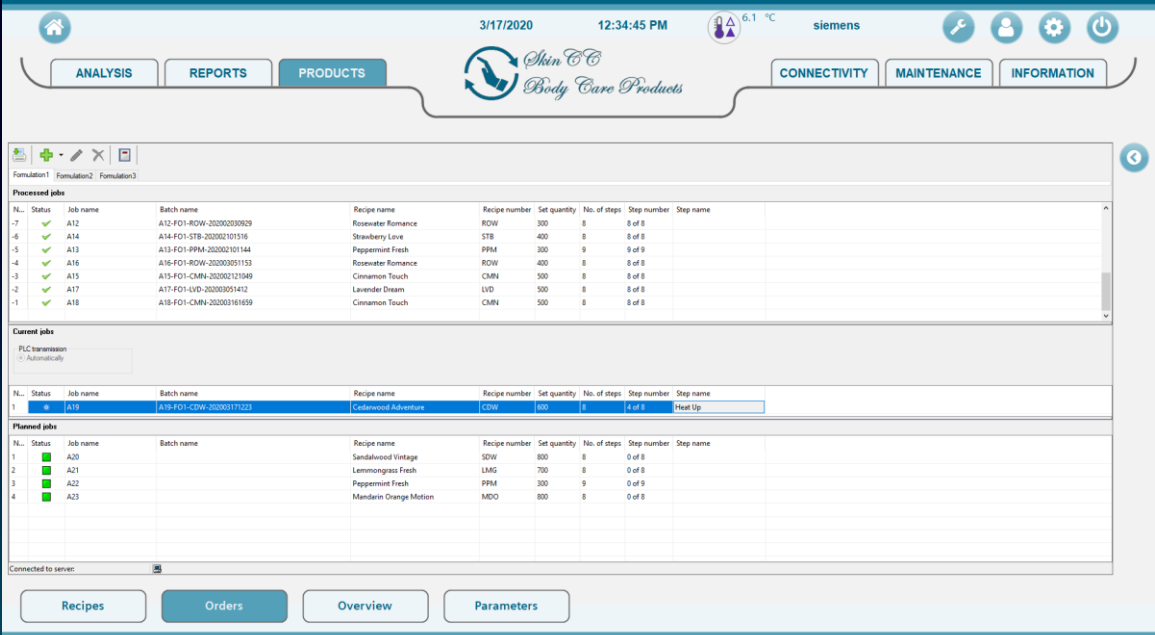
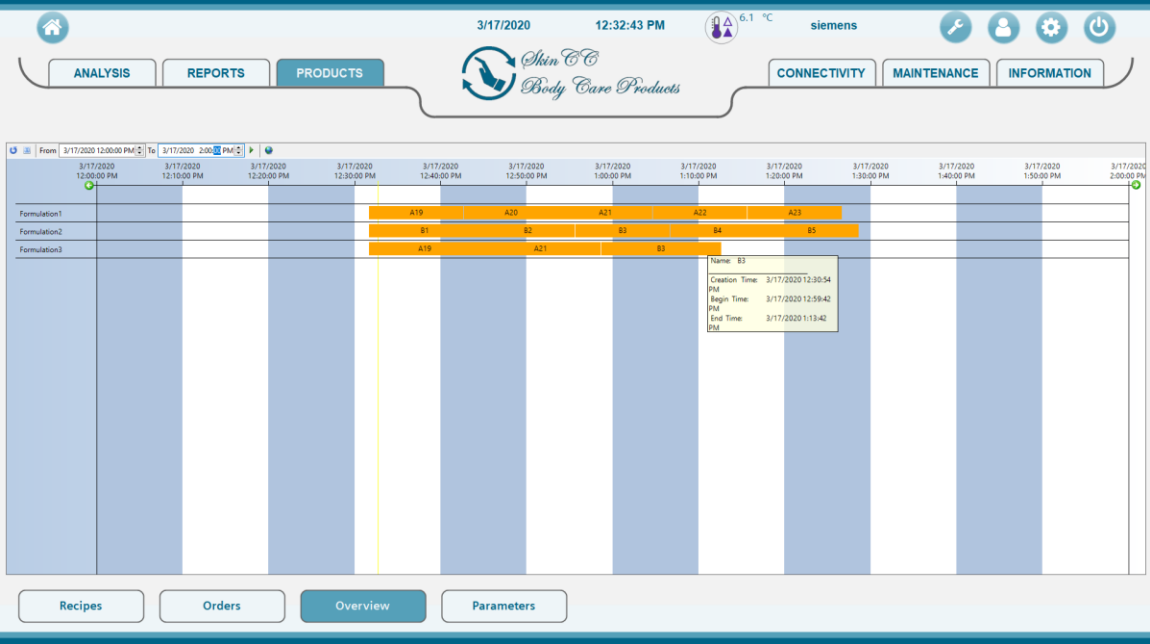
The same recipe can be loaded onto different targets



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Order processing

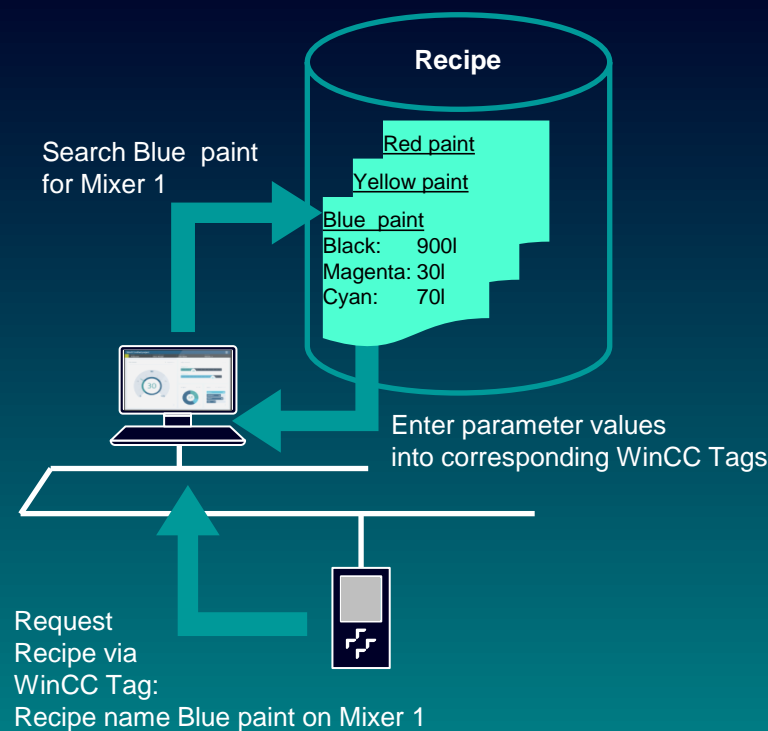
- Planning and execution of production orders
 - Scheduling for max. 100 parallel production units
 - Utilization overview for optimized planning



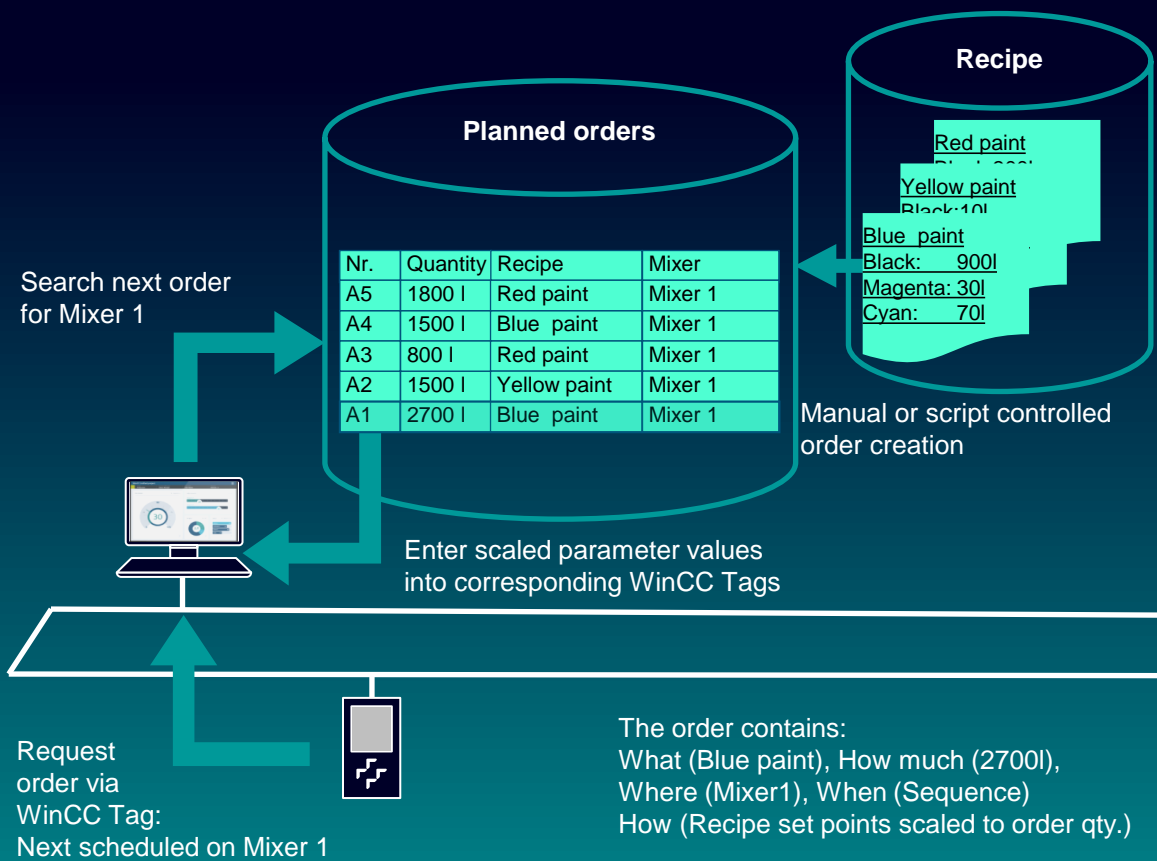
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Operating modes

Function principal Compact edition



Function principal Standard / Professional editions



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Step Mode

Function parameters

Functions	Step 1
Temperature	40 °C
Jacket Temperature	45 °C
Stirring Speed	0 rpm
pH Value	5.5 pH
Feed 1	0 %
Feed 2	0 %
Feed 3	0 %
Volume 1	0 ml
Volume 2	0 ml
Volume 3	0 ml
Weight 1	0 g
Weight 2	0 g
Weight 3	0 g
Boiler Weight	0 g
Conductivity	0 µScm

In the simplest case, the setpoint values are loaded with different process steps. In the sense of step processing, exactly one step.

In step processing mode each recipe can hold the setpoints for up to 1000 process steps.

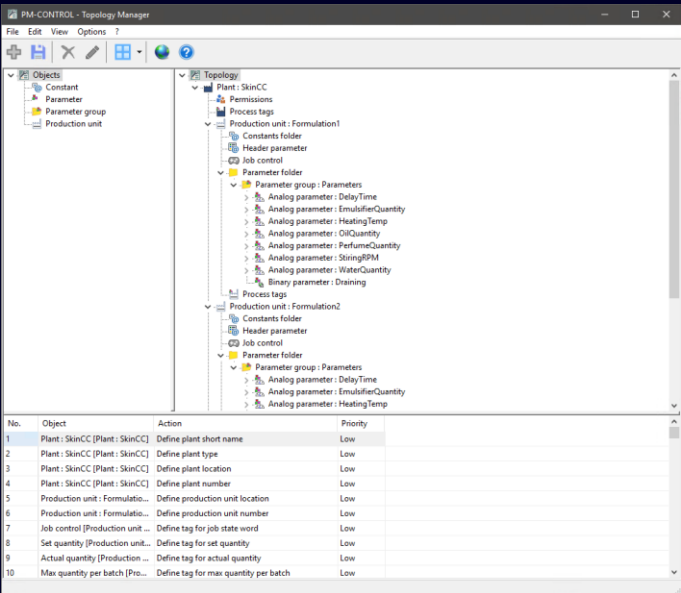
Set of parameter values at different setpoints for to a very limited extent. recipe consists of

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System components

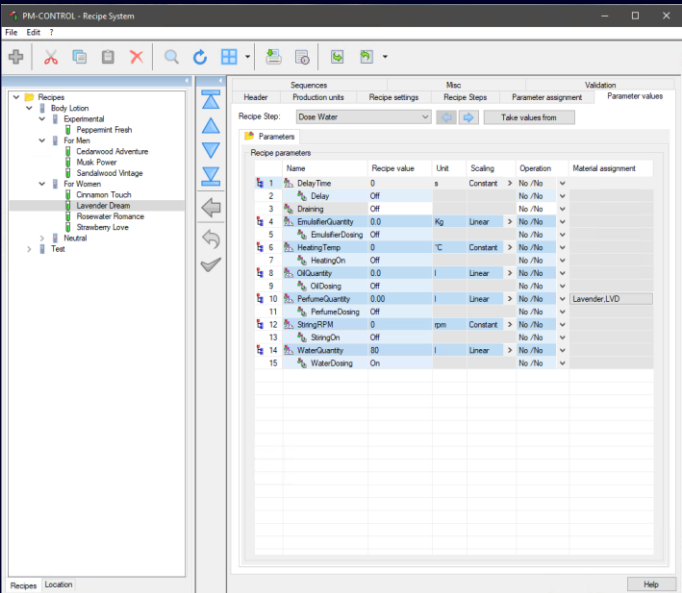
Topology

The topology manager defines the plant structure.



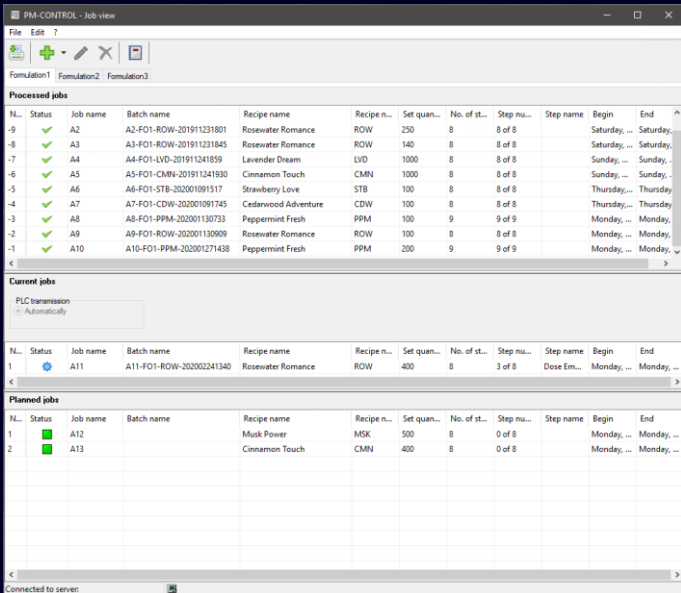
Recipe system

Recipes are created and managed in the recipe system.



Order processing

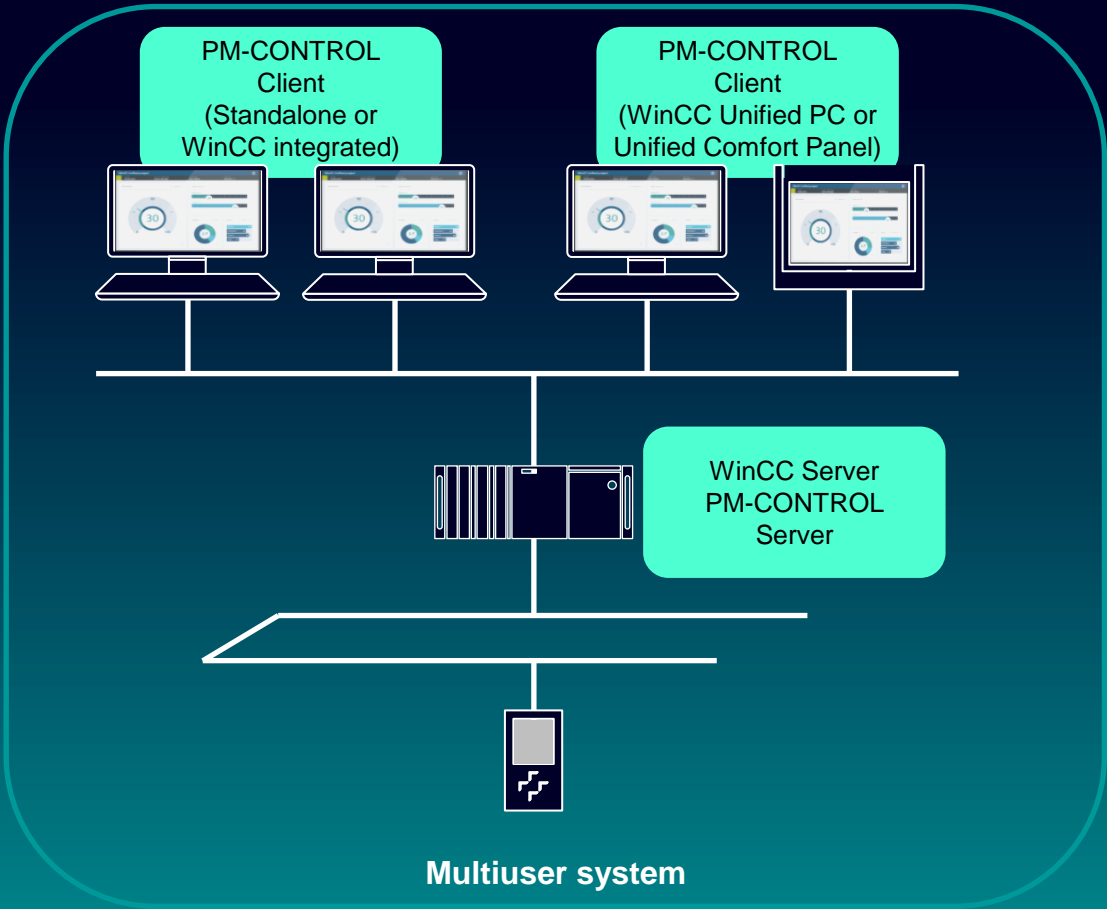
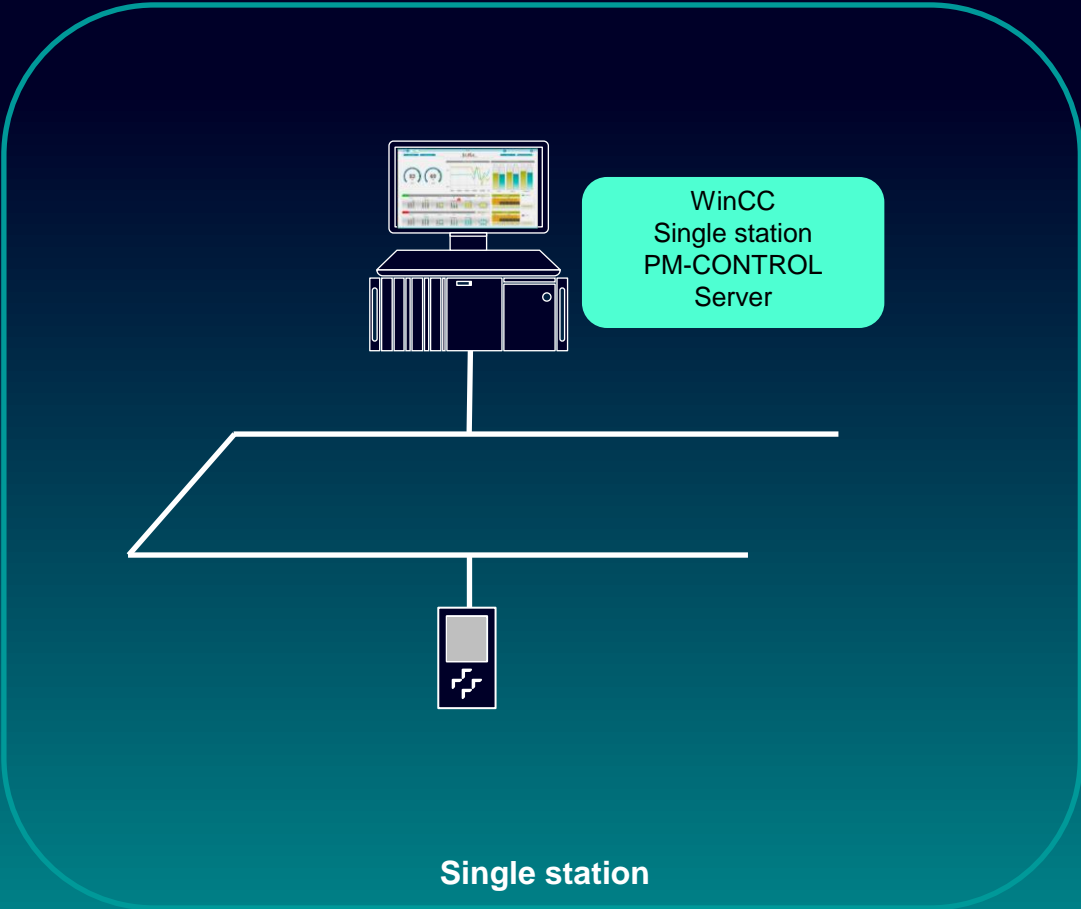
Production orders are created and scheduled in the order view.



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Installation scenarios

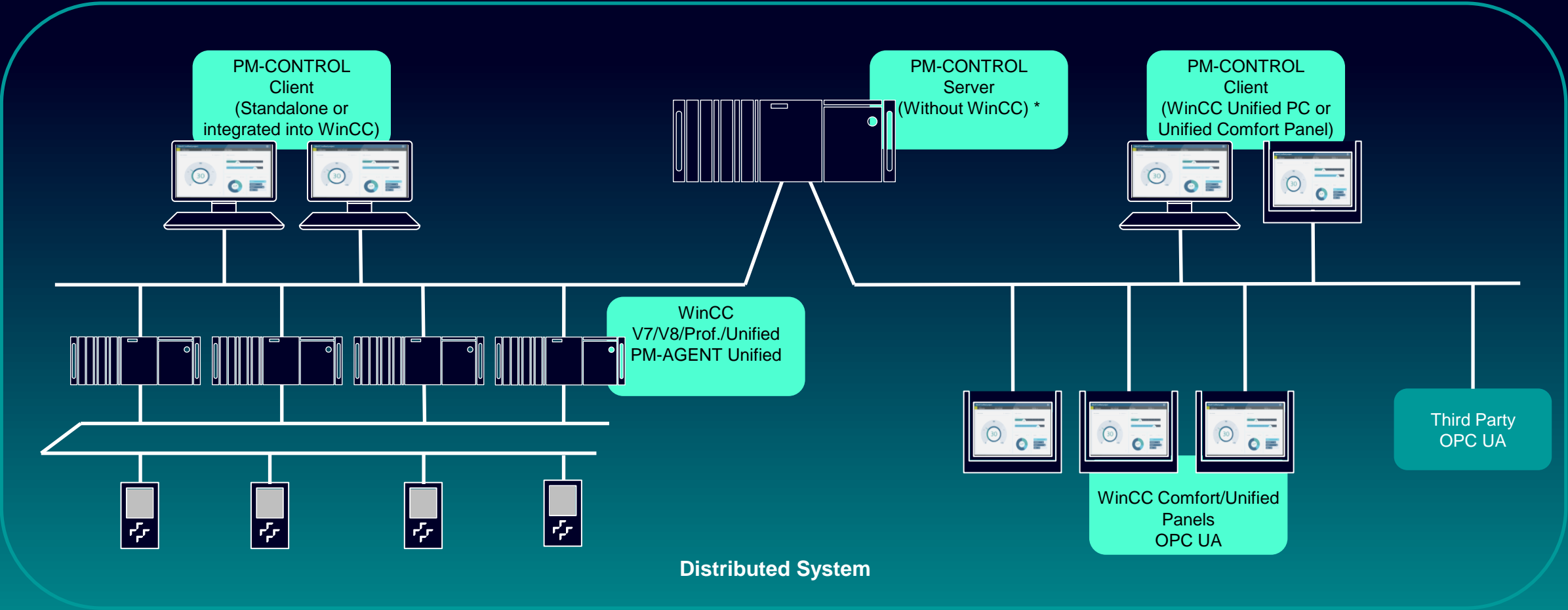
For released SIMATIC WinCC and operating systems please refer to the latest release notes.



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Installation scenarios

* Installation on a separate server without WinCC requires a Microsoft SQL Server 2014, 2016, 2017, 2019, 2022 installation.



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Ordering information

- Scalable server editions:
 - **Compact** (max. 100 production units without integrated order scheduling)
 - Server: 9AE7 110-2SS10-1AA0
 - **Standard** (One production unit with integrated order scheduling)
 - Server: 9AE7 110-2SS20-1AA0
 - **Professional** (max. 100 Production units with integrated order scheduling)
 - Server: 9AE7 110-2SS30-1AA0

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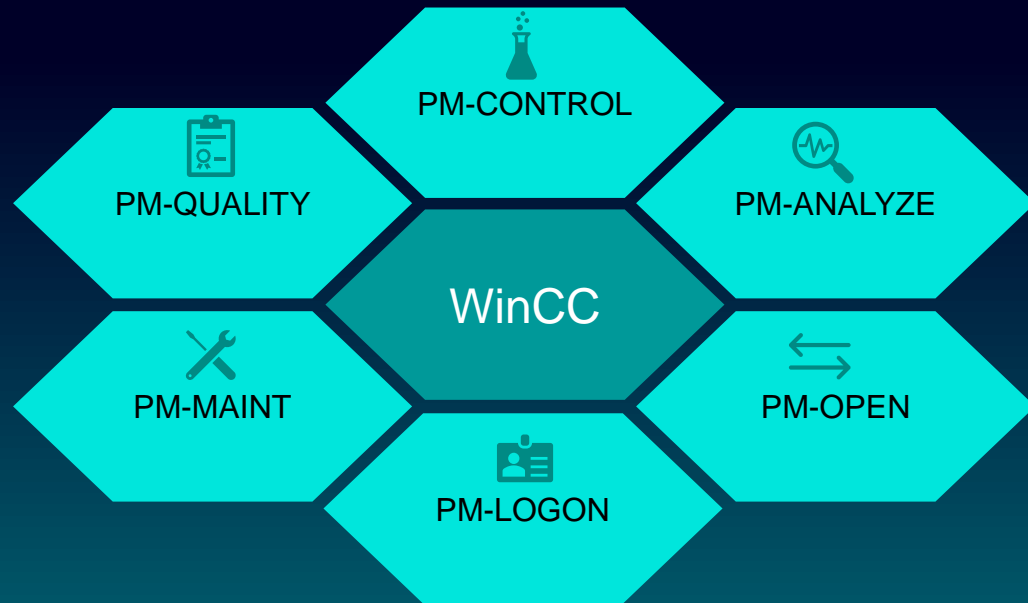
Ordering information

- Flexible client components:
 - Client for WinCC V7, V8, Runtime Professional, Runtime Advanced or Stand-alone
 - Client: 9AE7 110-4SC03-1AA0
 - Client packages for WinCC Unified PC and Unified Comfort Panel
 - 1 Unified Client: 9AE7 110-4SW00-1AA0
 - 3 Unified Clients: 9AE7 110-4SW00-1AA1
 - 10 Unified Clients: 9AE7 110-4SW00-1AA2
 - 30 Unified Clients: 9AE7 110-4SW00-1AA3
 - 100 Unified Clients: 9AE7 110-4SW00-1AA4

| PM-QUALITY

Batch based archiving and reporting

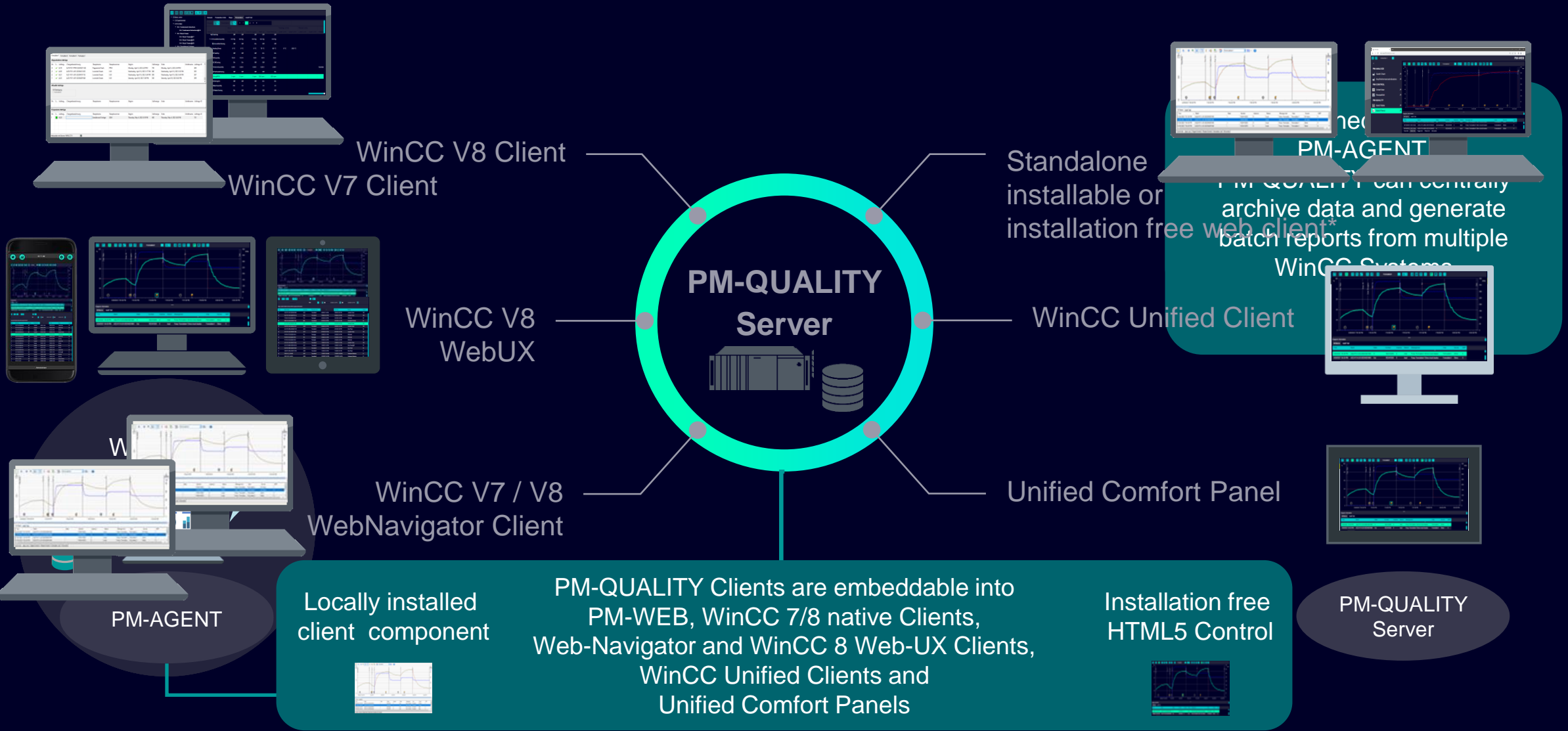
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- Batch based data recording of
 - Trends
 - Alarm messages / audit trail messages
 - Event triggered readings (Snapshots)
 - Manual input values
- Display of trends, alarms, snapshots and comments from current and historical trends in one diagram
- Comfortable creation of report-layouts
- Long term archiving
- Scalable server editions
- Embeddable clients for different HMI's
- Available languages:
English, French, German, Chinese

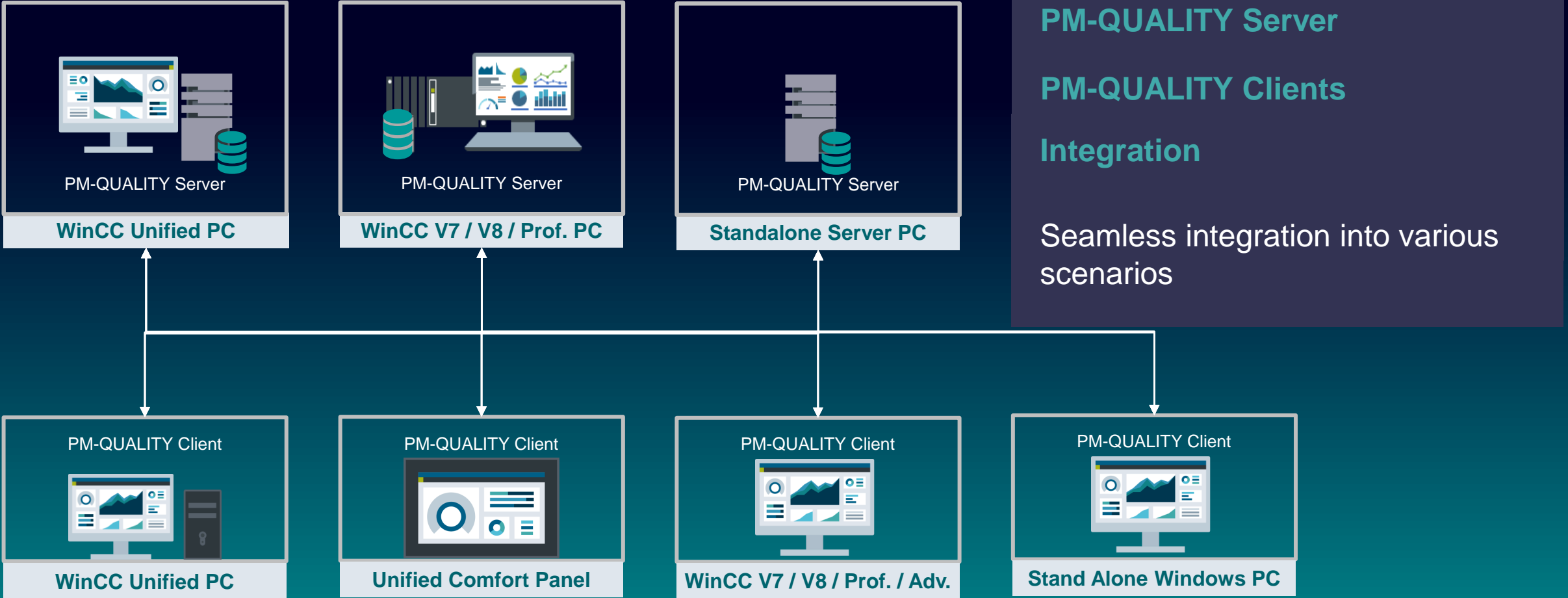
PM-QUALITY

Flexible, scalable, integrated in WinCC



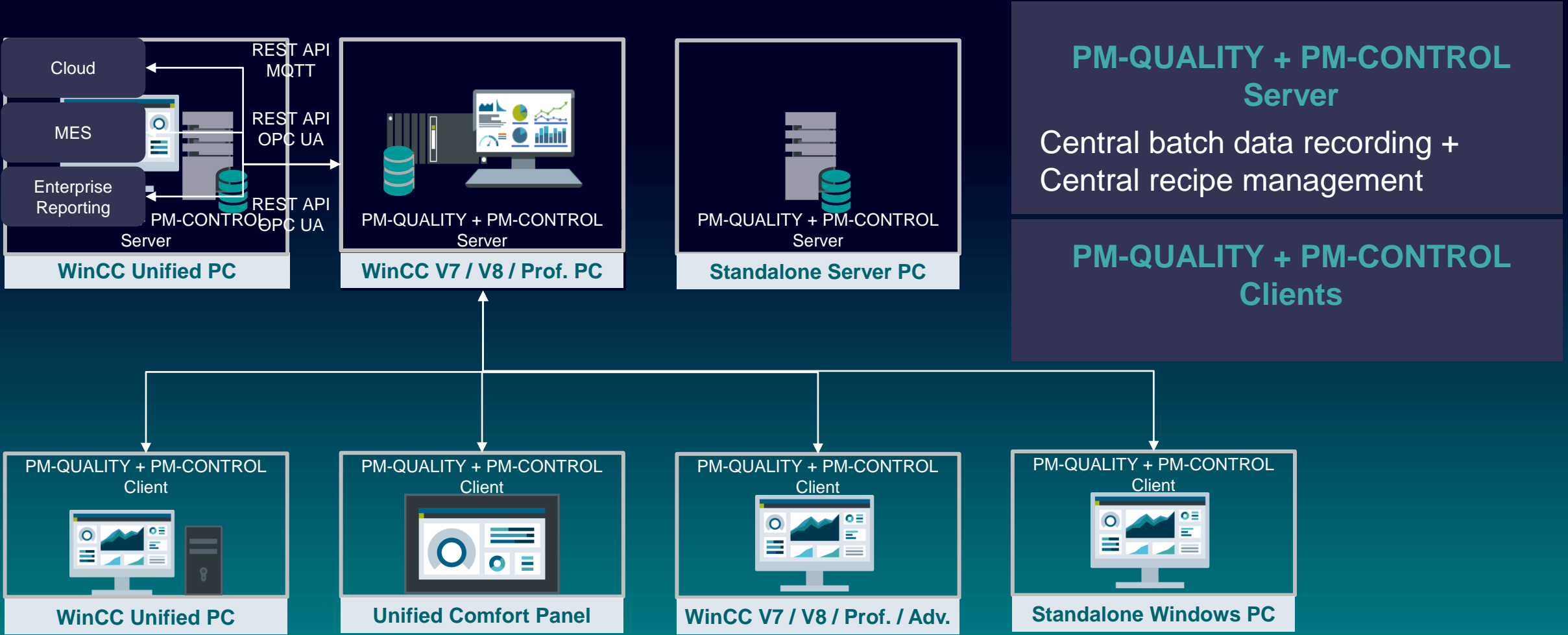
PM-QUALITY

System selection and components



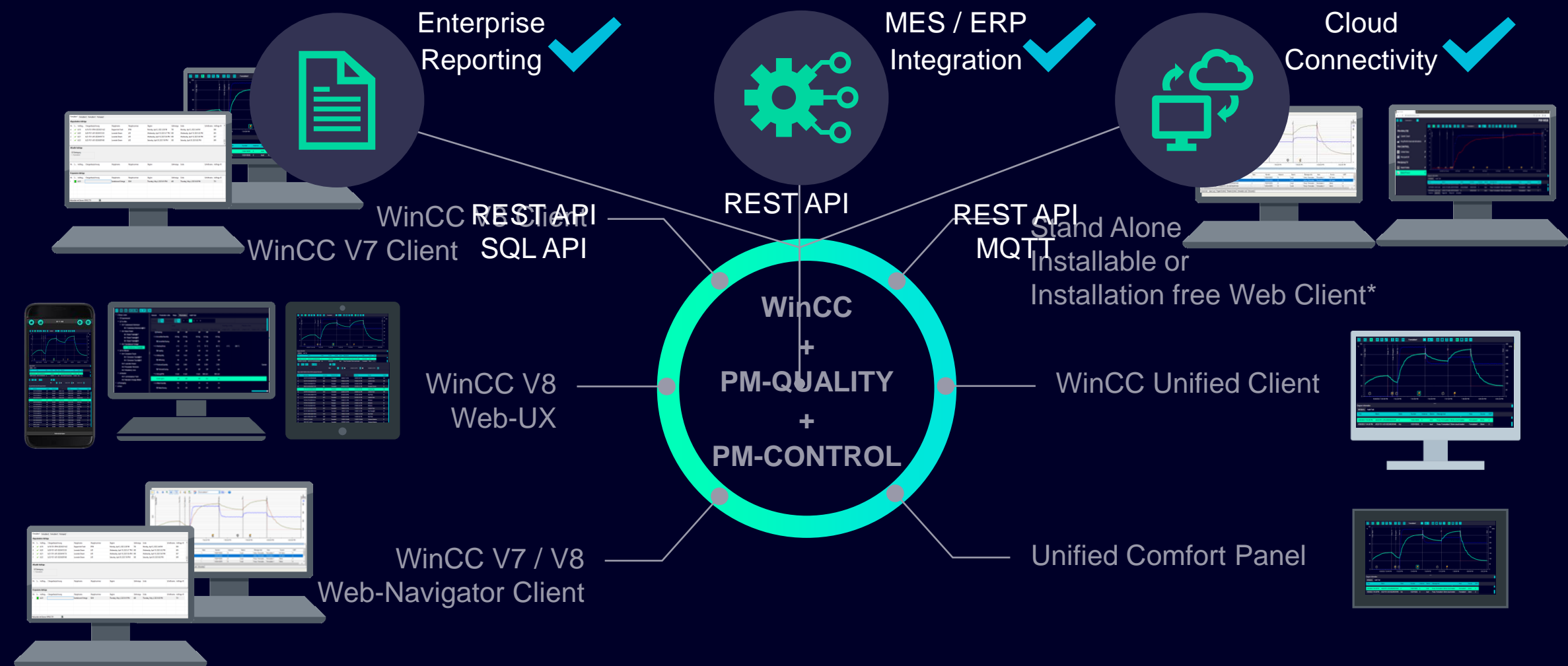
PM-QUALITY + PM-CONTROL

Modular combinable



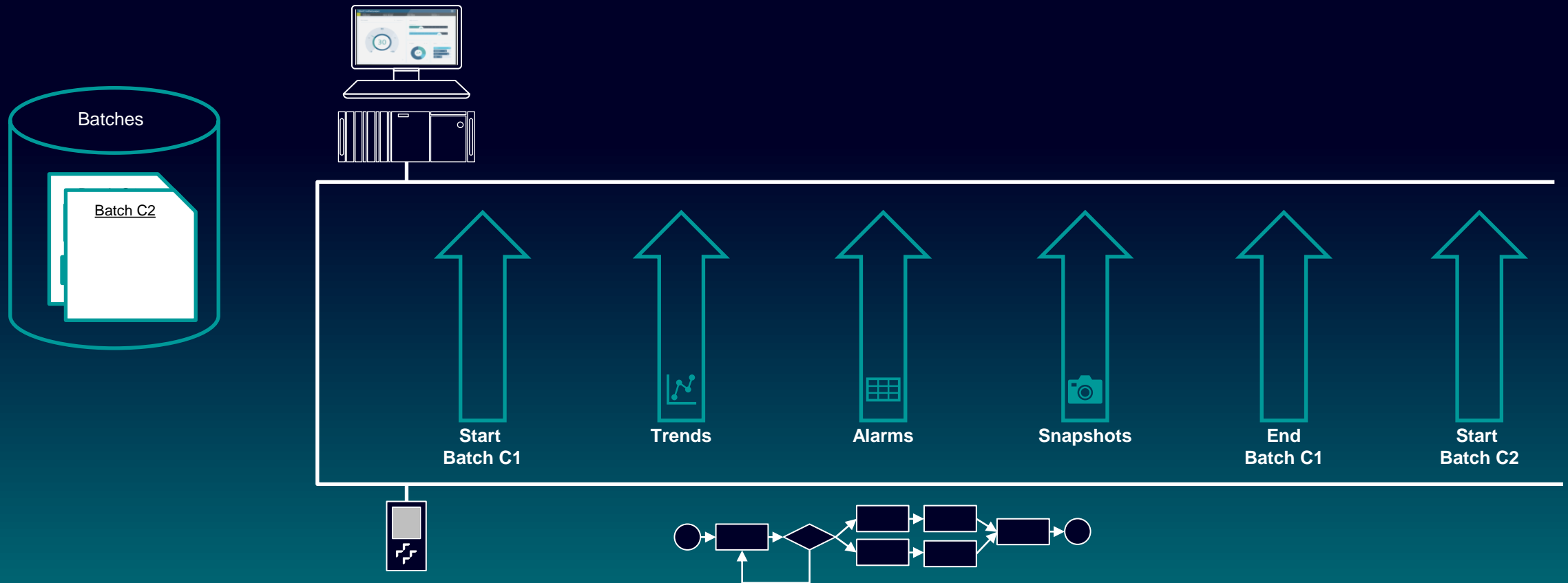
WinCC & PM-QUALITY & PM-CONTROL

Flexible, scalable, easy to integrate



PM-QUALITY

Batch based data recording

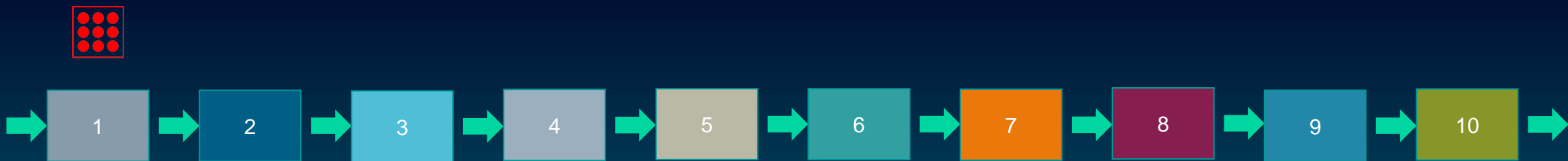


- All data recorded is stored under the name of the corresponding batch.
- The acquisition time frame is defined by a start/stop bit.

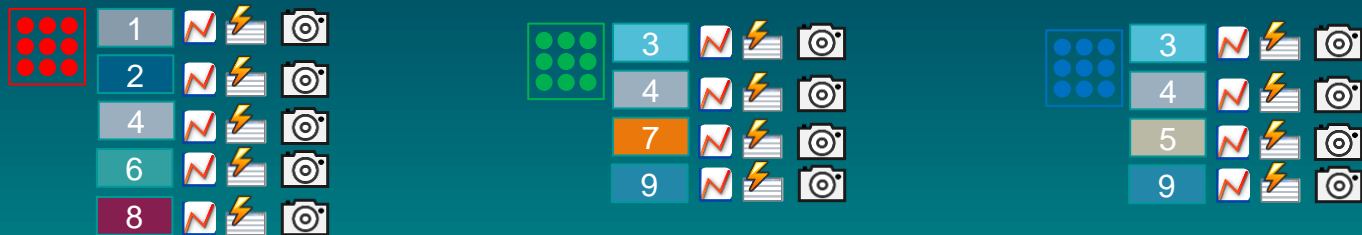
Batch concept in PM-QUALITY

Data recording

- If different stations are passed through during production, PM-QUALITY refers to a product batch consisting of several individual batches



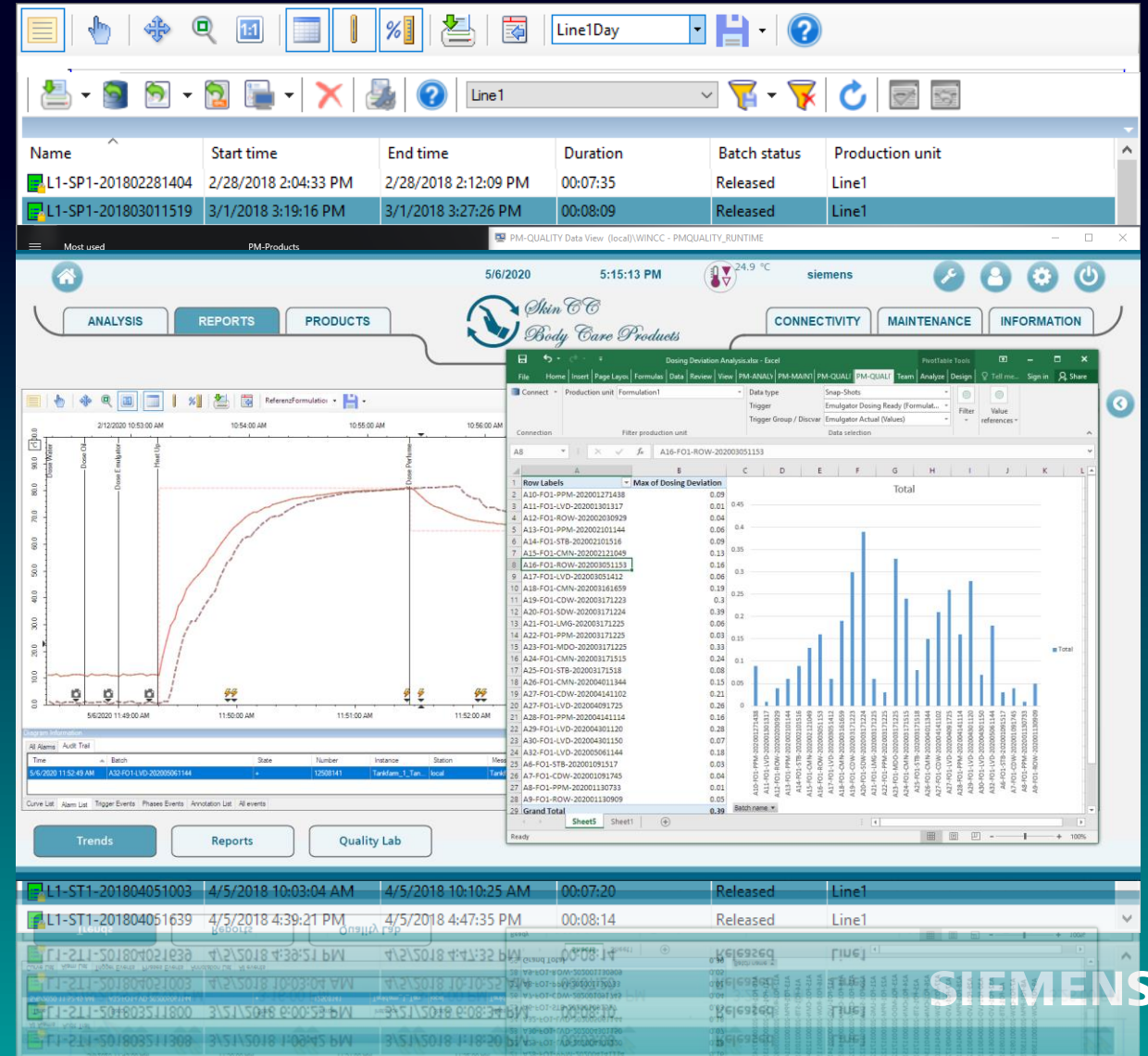
On each station data (trends, alarms, snapshots 📈⚡📷) are recorded



PM-QUALITY Standard Client

The PM-QUALITY Standard Client consists of the following components:

- TrendCurve Control
Control to display batch trends for WinCC V7, V8, Runtime Adv. & Runtime Prof.
- BatchTable Control
Control to select a batch report for WinCC V7, V8, Runtime Adv. & Runtime Prof.
- DataView
Standalone application to display batch trends and select reports.
- Microsoft Excel Plugin
Add-in for Microsoft Excel to analyze batch data



PM-QUALITY Unified Client

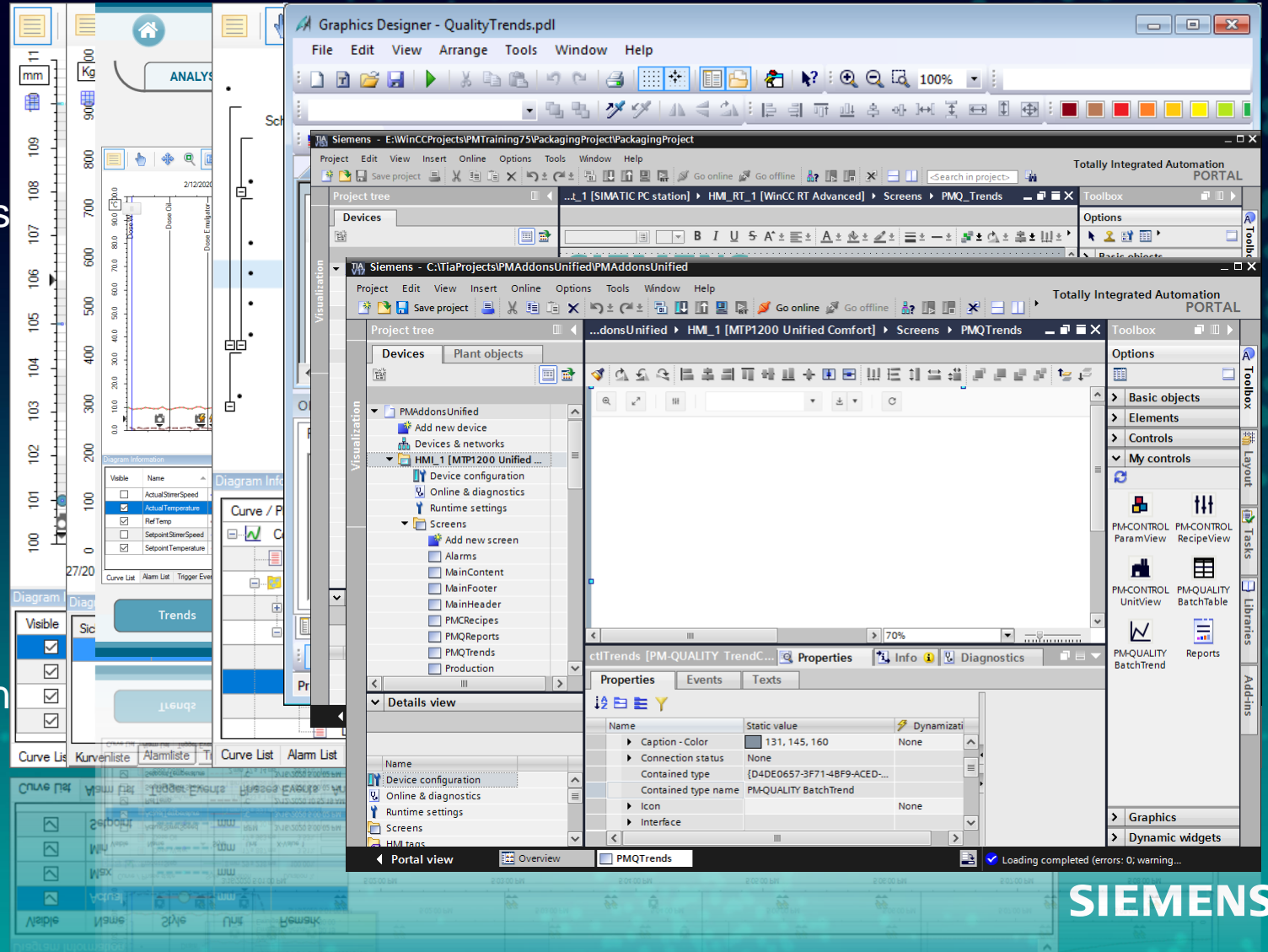
The PM-QUALITY Unified Client consists of the following components:

- BatchTrend Control for integrated display of batch trends in
 - WinCC Unified PC
 - Unified Comfort Panel
 - WinCC V8 Runtime & Web-UX
- BatchTable Control for the selection of batch reports in
 - WinCC Unified PC
 - Unified Comfort Panel
 - WinCC V8 Runtime & Web-UX



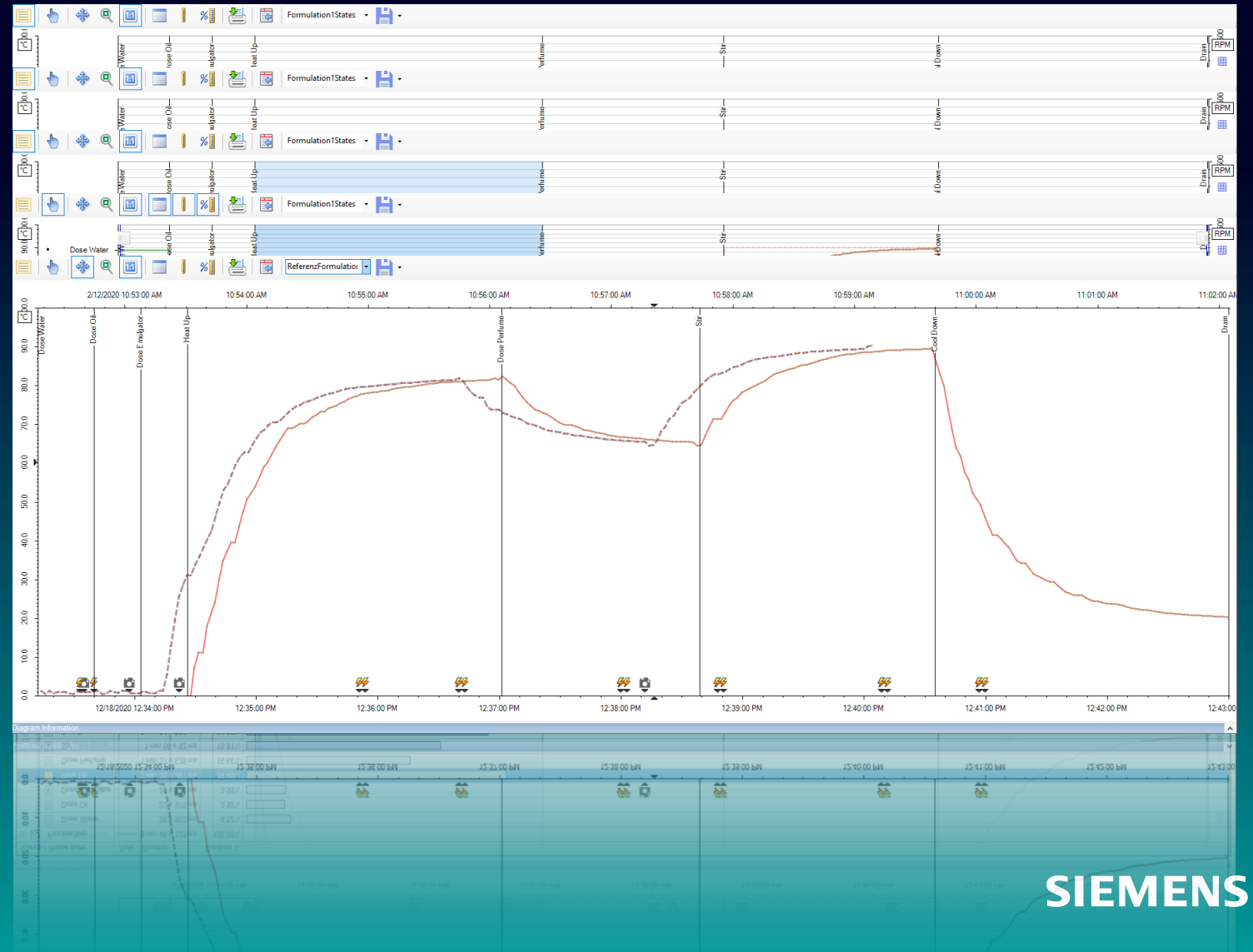
PM-QUALITY Trends

- In the process industry
- In discrete manufacturing
- For fast processes
- For the comparison of different batches
- To analyze machine states
- Either locally at the machine
 - Integrated into
 - WinCC V7, V8
 - PCS 7
 - WinCC Adv. / Prof. / Unified
- Or as a standalone analysis application in the laboratory



PM-QUALITY Trends

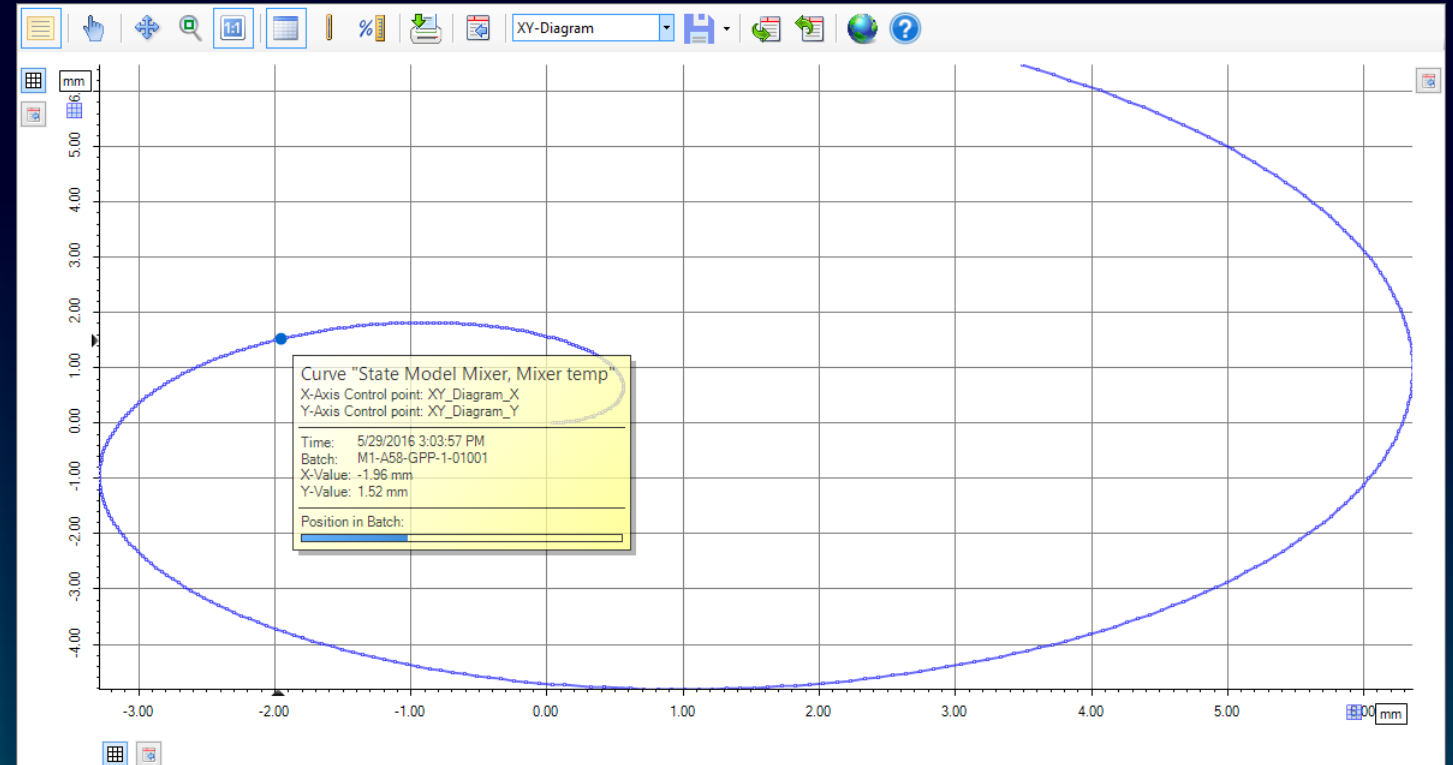
- Display of alarms within the trend
 - Display of triggered readings
 - Display of process states
 - Analysis of process states
 - Multiple time axis
- (Reference comparison)



PM-QUALITY Trends

XY-trends

- Display of trends from different acquisition cycles
 - Interpolation as sample and hold or linear
- Information about the timely position within the batch



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Trends for WinCC Unified

- Display of alarms within the trend
- Display of triggered readings
- Display of process states
- Extensive styling support for seamless integration into corporate designs



PM-QUALITY

Batch table for WinCC Unified

- Various search and filter functions available
- Grouping by arbitrary columns
- In place report display
- Extensive styling support for seamless integration into corporate designs

The screenshot displays the WinCC Unified RT interface. The top bar shows the user 'Operator UMCAdmin' and the date/time '4/3/2022, 2:17:20 PM'. Below this, there are filters for 'Production Unit' and 'Last n Months' (set to 1). The main area contains a table with the following data:

State	Batch Name	Job Name	Production Unit	Start Time	End Time	Recipe	Version
	A167-FO1-PPM-202203281107	A167	Formulation1	3/31/2022 1:57 PM	3/31/2022 2:07 PM	Peppermint Fresh	V3
	P26-PA1-STD-202203311355	P26	Packaging1	3/31/2022 1:55 PM	3/31/2022 2:00 PM	50l Barrels	V6
	A170-FO1-LVD-202203301108	A170	Formulation1	3/30/2022 11:10 AM	3/30/2022 11:19 AM	Lavender Dream	V45
	A169-FO1-LVD-202203301036	A169	Formulation1	3/30/2022 10:37 AM	3/30/2022 10:44 AM	Lavender Dream	V45
	A166-FO1-LVD-202203281051	A166	Formulation1	3/28/2022 10:57 AM	3/28/2022 11:06 AM	Lavender Dream	V45
	A165-FO1-CMN-202203251725	A165	Formulation1	3/25/2022 5:25 PM	3/25/2022 5:37 PM	Cinnamon Touch	V3
	P25-PA1-STD-202202280939	P25	Packaging1	3/25/2022 4:31 PM	3/25/2022 4:36 PM	50l Barrels	V6
	A164-FO1-CDW-202203251103	A164	Formulation1	3/25/2022 11:04 AM	3/25/2022 11:13 AM	Cedarwood Adventure	V1
	A163-FO1-ROW-202203161645	A163	Formulation1	3/16/2022 4:46 PM	3/16/2022 4:55 PM	Rosewater Romance	V8

The bottom of the interface features the text 'WinCC Competence Center Mannheim'.

PM-QUALITY

Documented batch processes

- Comfortable design of reports with integrated Report Designer
- Detailed batch trends in reports
- Process steps and snapshots
- Archiving of all batch relevant alarms
 - Audit Trail (operator input messages)
 - Alarms

The screenshot displays the PM-QUALITY Report Editor interface. The main window shows a report preview with an 'Alarm summary' section. Below this, there is an 'Audit trail' section. The interface includes a menu bar (File, Edit, Options), a toolbar, and a left-hand pane with a tree view of report blocks (Report title, Logo, New Page, Separator line, Free text, Barcode, Off code, Start multi column, Column changing, End multi column, Group, Sublayout, Parts, Trend Curve Diagram, Production unit: Multiple production units).

Alarm summary:

Timestamp	State	Area	Source	Message text
8/12/2020 11:16:26 AM.120	+	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:16:29 AM.121	-	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:17:13 AM.119	*	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:17:13 AM.120	+	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:17:17 AM.278	-	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:17:38 AM.249	+	Formulation1	Perfume Valve	Valve: Formulation1 Perfume Valve opening timeout
8/12/2020 11:17:45 AM.250	-	Formulation1	Perfume Valve	Valve: Formulation1 Perfume Valve opening timeout
8/12/2020 11:19:22 AM.339	*	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:19:22 AM.340	+	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:19:25 AM.341	-	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:20:42 AM.312	*	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:20:42 AM.313	+	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:20:45 AM.313	-	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:21:30 AM.458	*	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:21:30 AM.459	+	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker
8/12/2020 11:21:33 AM.459	-	Formulation1	Stirrer	Pump: Formulation1 Stirrer circuit breaker

Audit trail:

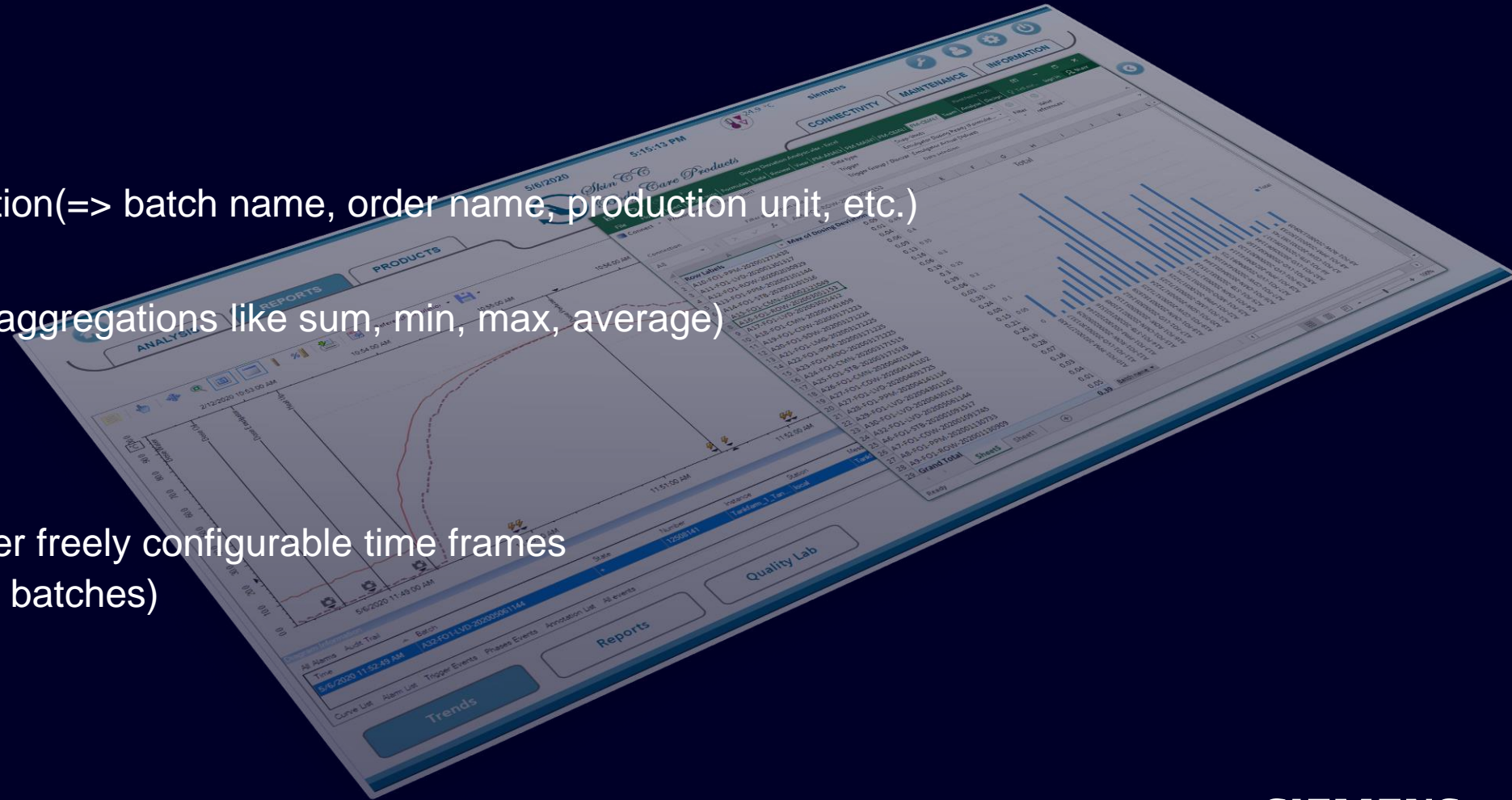
Timestamp	Message text	Comment-User	Old Value	New Value
8/12/2020 11:15:49 AM.055	Tankfarm_1_Temp_7.SetpointTemp: siemens new=23 old=21	siemens	21	23

The interface also includes a 'Print' button and a 'Close' button. At the bottom, there is a 'SIEMENS' logo.

PM-QUALITY

Summary Microsoft Excel Reporting

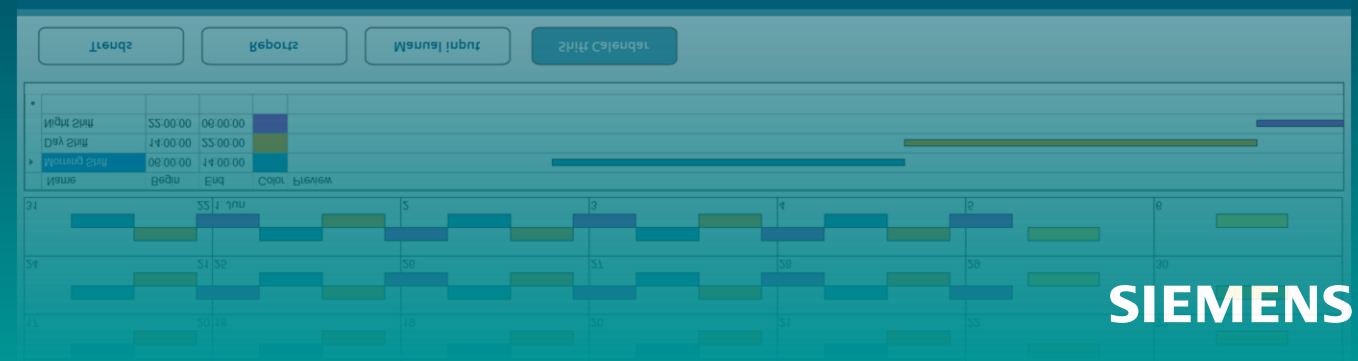
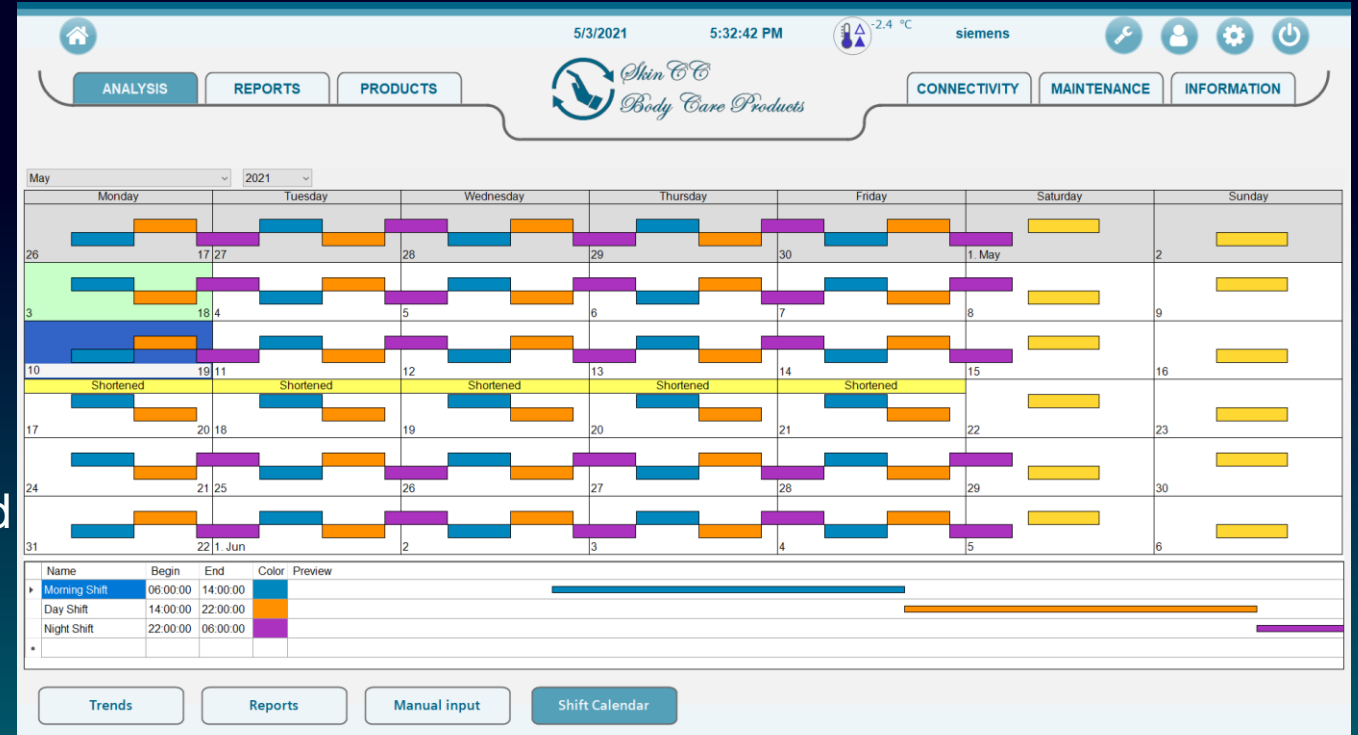
- Plug-in for Microsoft Excel 2013, 2016 or 2019
- Batch reports
 - Access to
 - Batch header information(=> batch name, order name, production unit, etc.)
 - Phases
 - Trend data (including aggregations like sum, min, max, average)
 - Snapshot values
 - Alarms
- Analysis of batch data over freely configurable time frames
(=> analysis over multiple batches)



PM-QUALITY

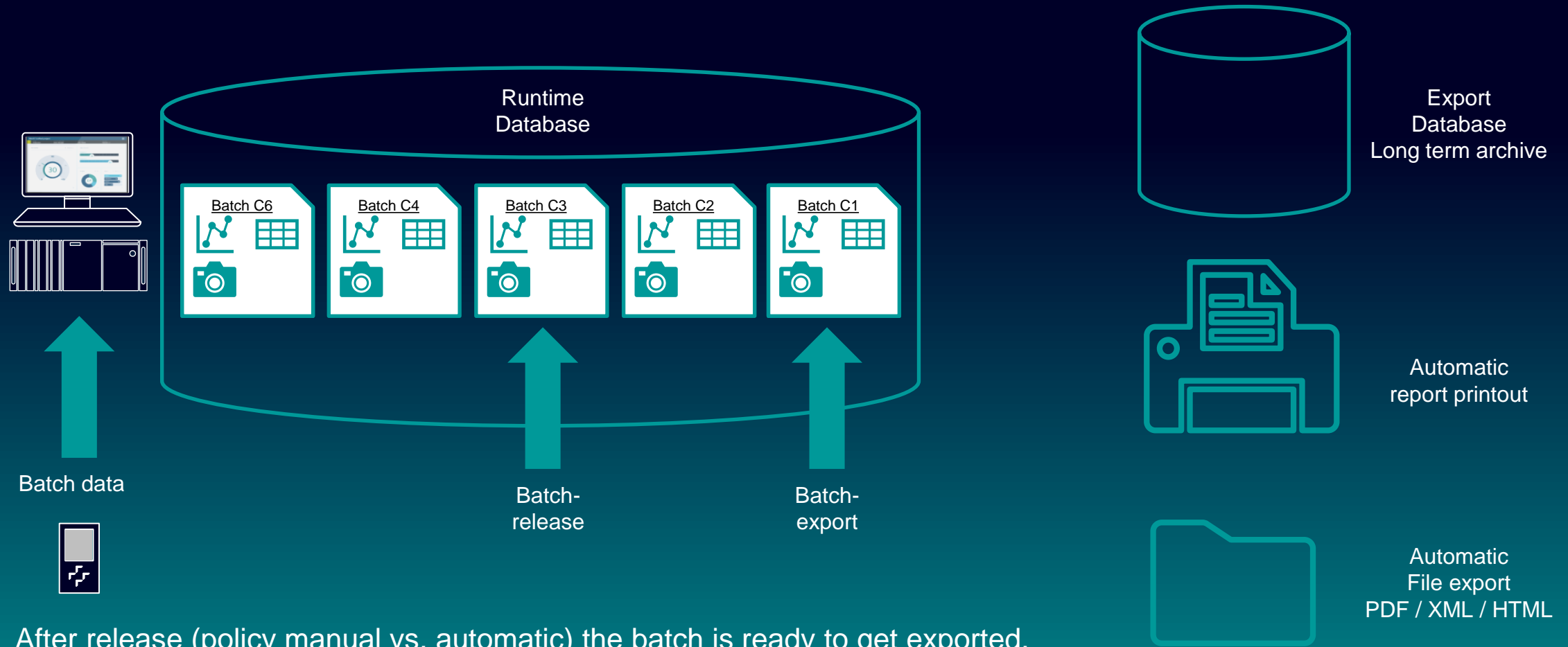
Flexible reporting time frames

- Day-, week-, or month reports
- Shift reports with shift plans
 - Shift plans consist of multiple shift definitions
 - Shift definitions describe a repeating time pattern, that is displayed in the calendar
 - Exceptions to the default planning (e.g., holiday shutdown) can easily be defined as “overwrites” for specific time frames.



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Long term archiving

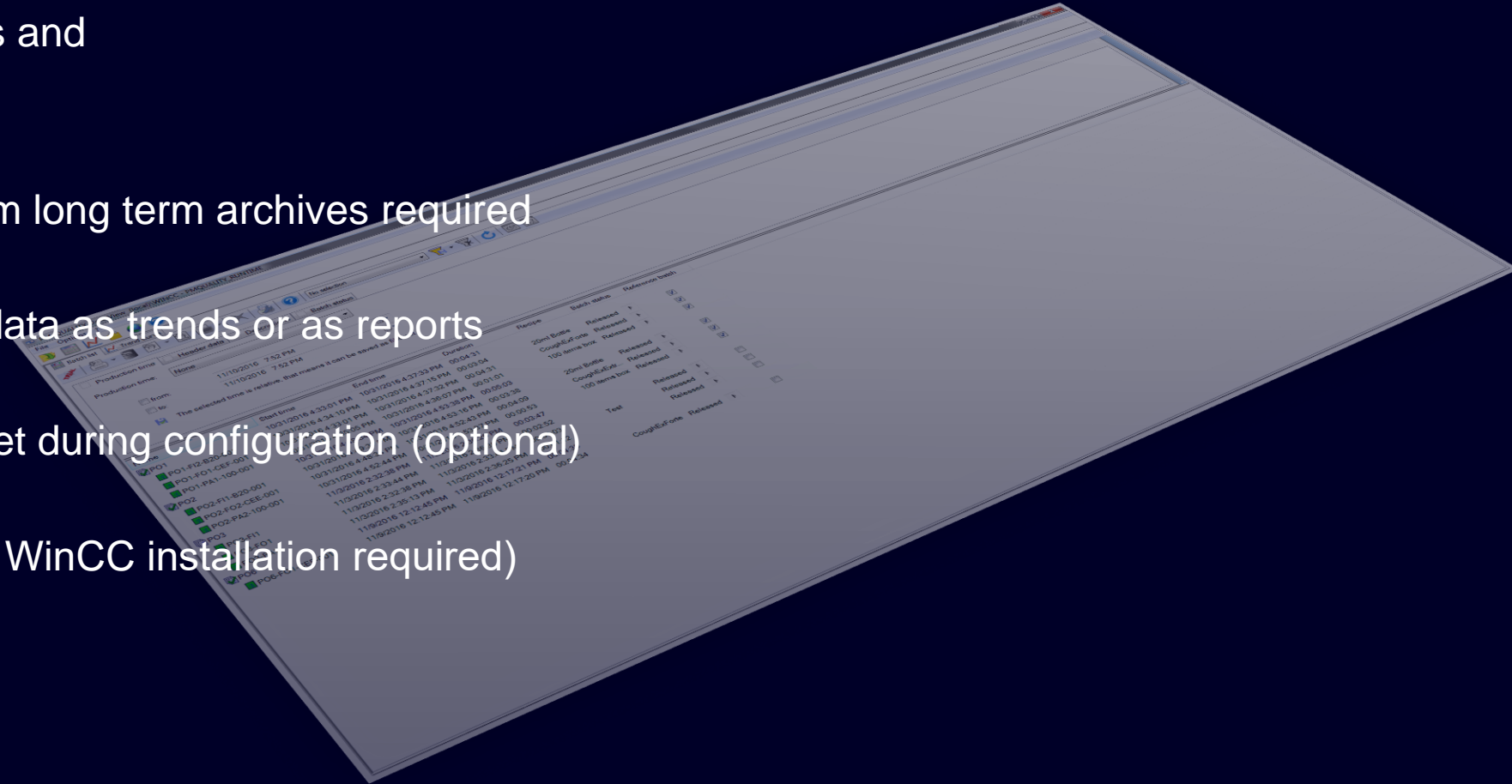


- After release (policy manual vs. automatic) the batch is ready to get exported.
- During the export, the batch is locked against modifications.

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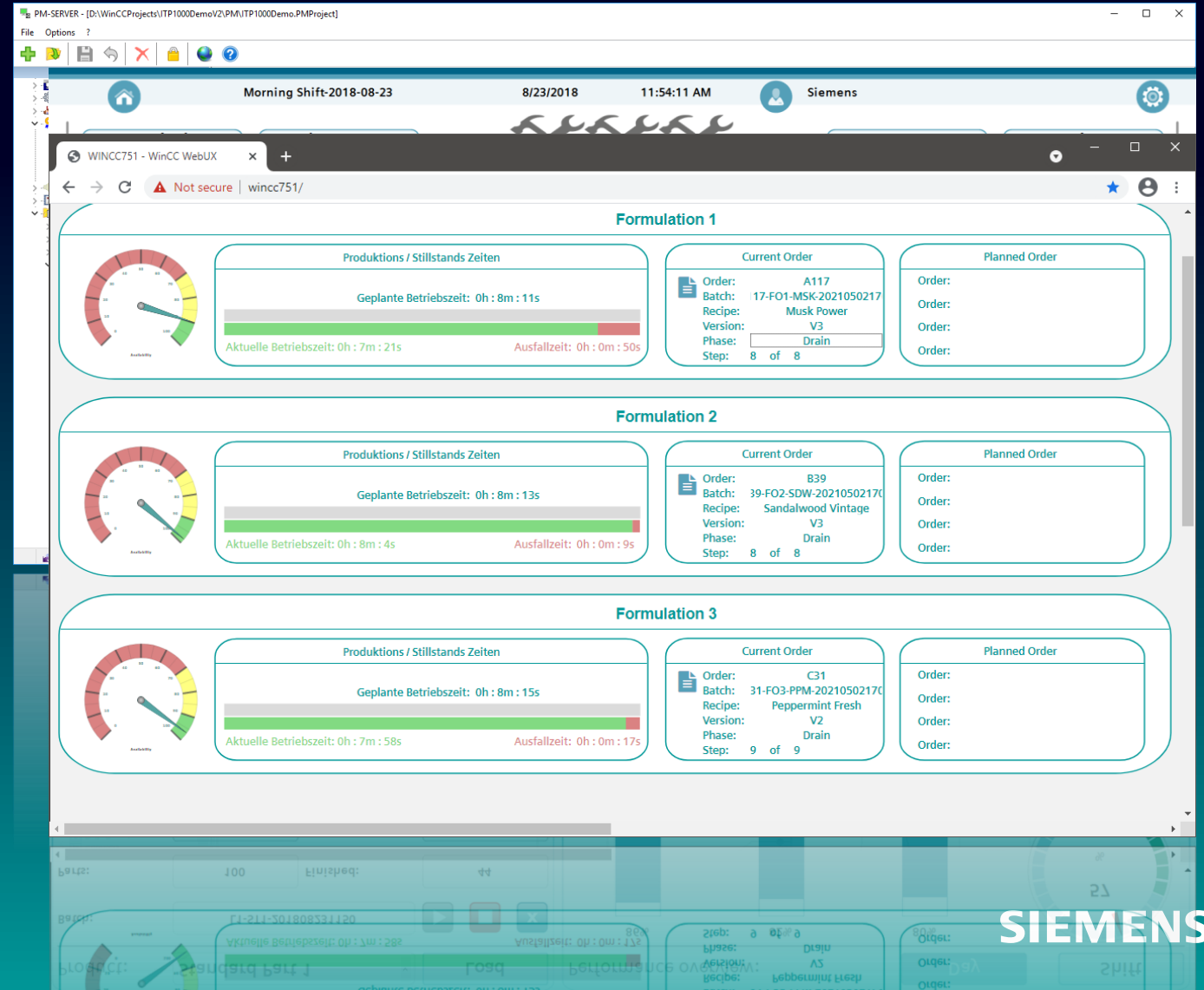
Data View (PM-QUALITY Client)

- Provides easy and consistent access to
 - Exported long term archives and
 - The runtime database
- No explicit restore of data from long term archives required
- Output of all recorded batch data as trends or as reports
- Observance of permissions set during configuration (optional)
- Installation on office PC's (no WinCC installation required)



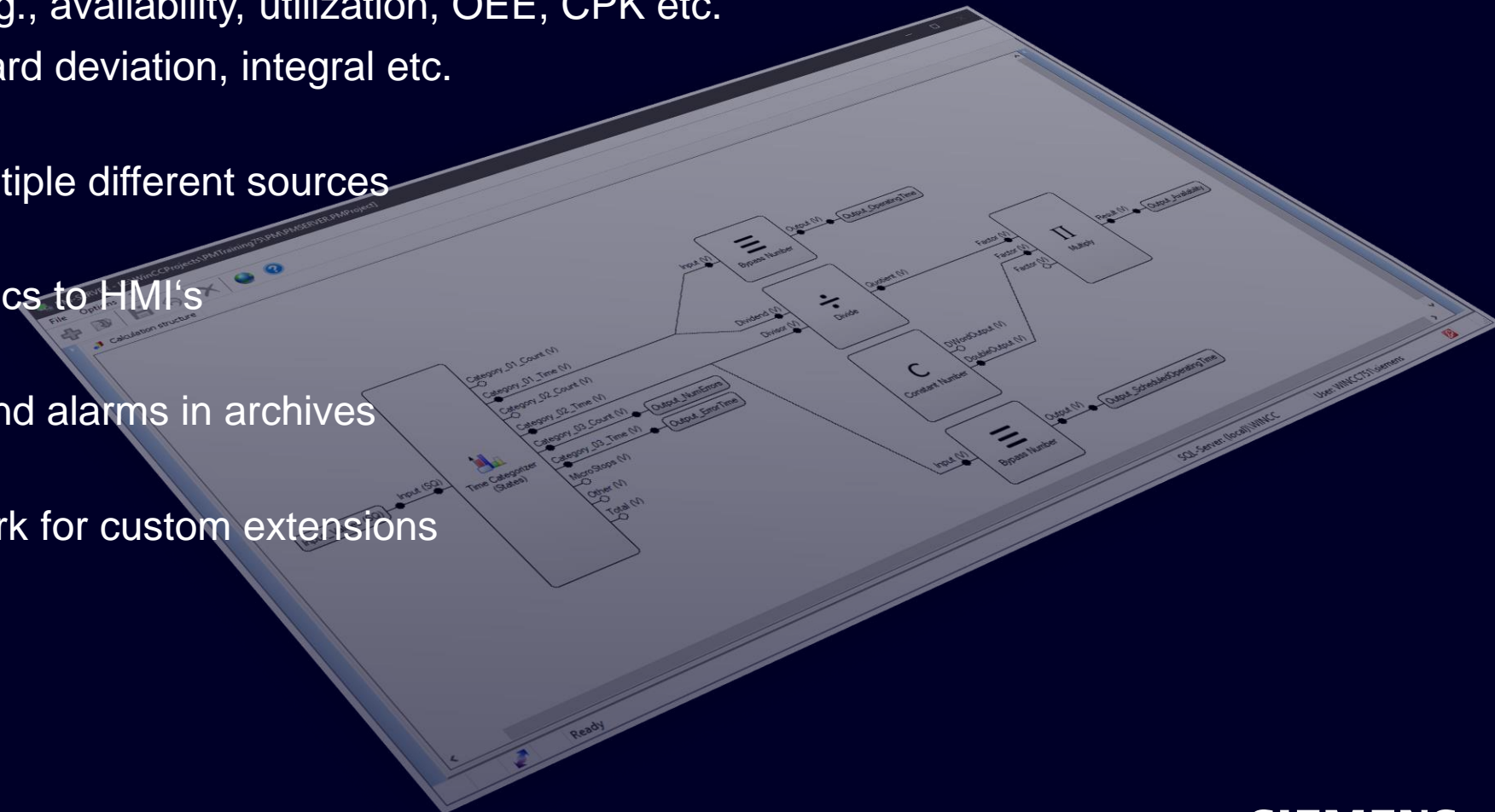
PM-QUALITY KPI calculations

- Simple calculation of complex KPIs with graphical calculation rules
 - Availability
 - Quality rate
 - Performance rate
 - OEE, CPK, ...
- Output to Panels, OS Clients, WinCC Screens... by write back functionality to tags
- Together with WinCC WebUX or WinCC Unified ideal for Web Dashboards
- Extensible framework for custom functions



PM-QUALITY KPI calculations

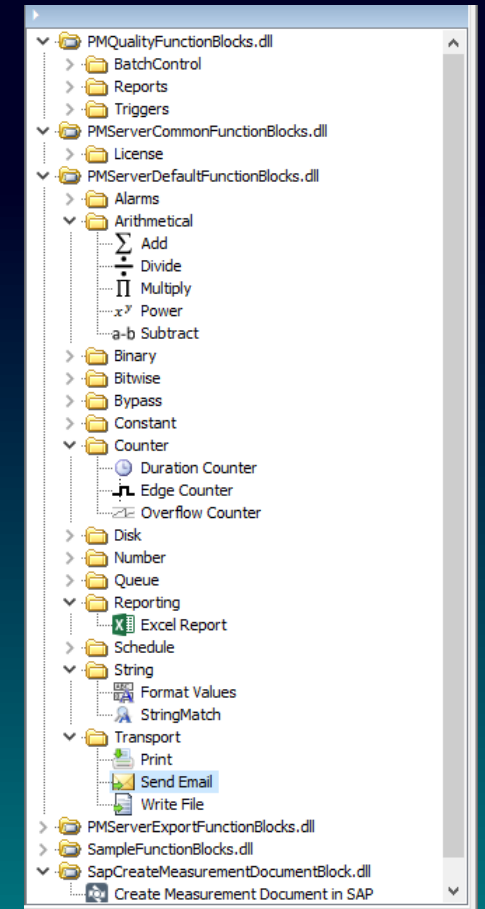
- Graphical user interface for the definition of calculation algorithms
 - Calculation of metrics like e.g., availability, utilization, OEE, CPK etc.
 - Statistical values like standard deviation, integral etc.
- Calculation of results from multiple different sources
- Write back for calculated metrics to HMI's
- Buffering of process values and alarms in archives
- Open and extensible framework for custom extensions



PM-QUALITY

Calculations / Available functions

- Arithmetic Functions:
 - Add, Subtract, Multiply, Divide
- Bitwise binary functions : And, Or, Not, Shift left, Shift right
- Logical binary function: And, Or, Not, Comparison (<,<=,>,>=)
- Counters: Slope counter, Time counter, Difference counter
- Statistics: Average, Integral, Min, Max, Range, Time categorization
- Misc.: Limit monitoring, constant number, constant text
- ...
- Extensible framework with sample blocks for customer specific extensions

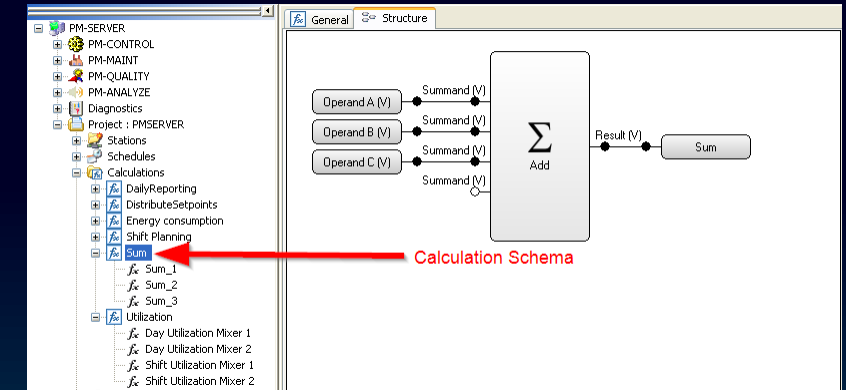


PM-QUALITY KPI calculations

Calculation schema

The calculation schema defines the algorithm

- The schema has no external connections
- The schema defines the number and type of external connections

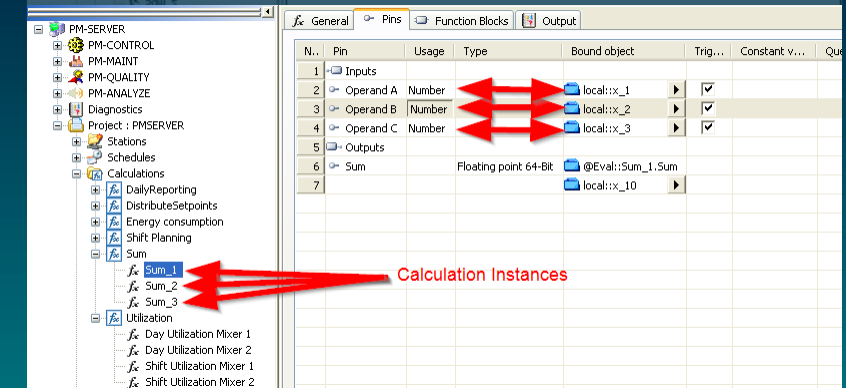


Calculation instance

The calculation instance connects the schema to the outside world

Each instance has its own set of connections
(e.g. tags)

Each instance has its own set of trigger conditions



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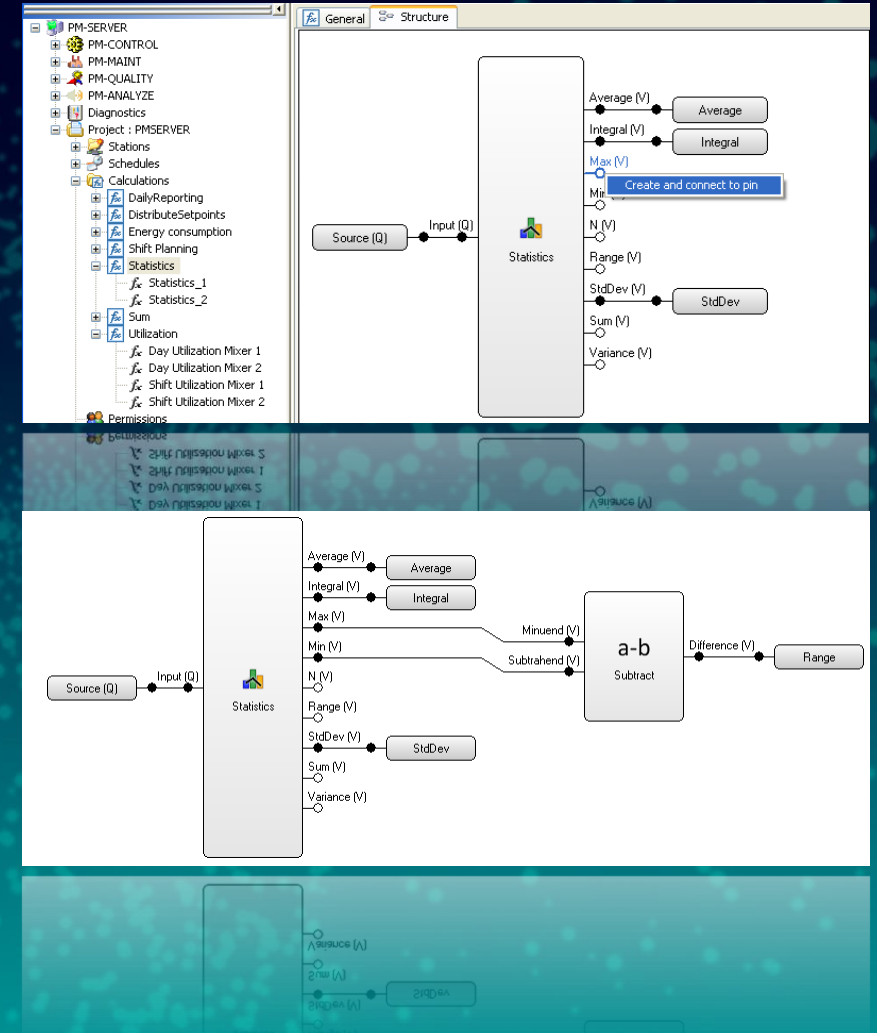
Calculation results

The calculation schema may define multiple outputs

- Depending on the used calculation block
 - E.g., The statistics block produces Min, Max, Average, Integral, standard deviation...
 - In order to be available in an instance, the output of a calculation is connected to a “pin”

A calculation schema can contain multiple calculation blocks that are connected via Drag and Drop

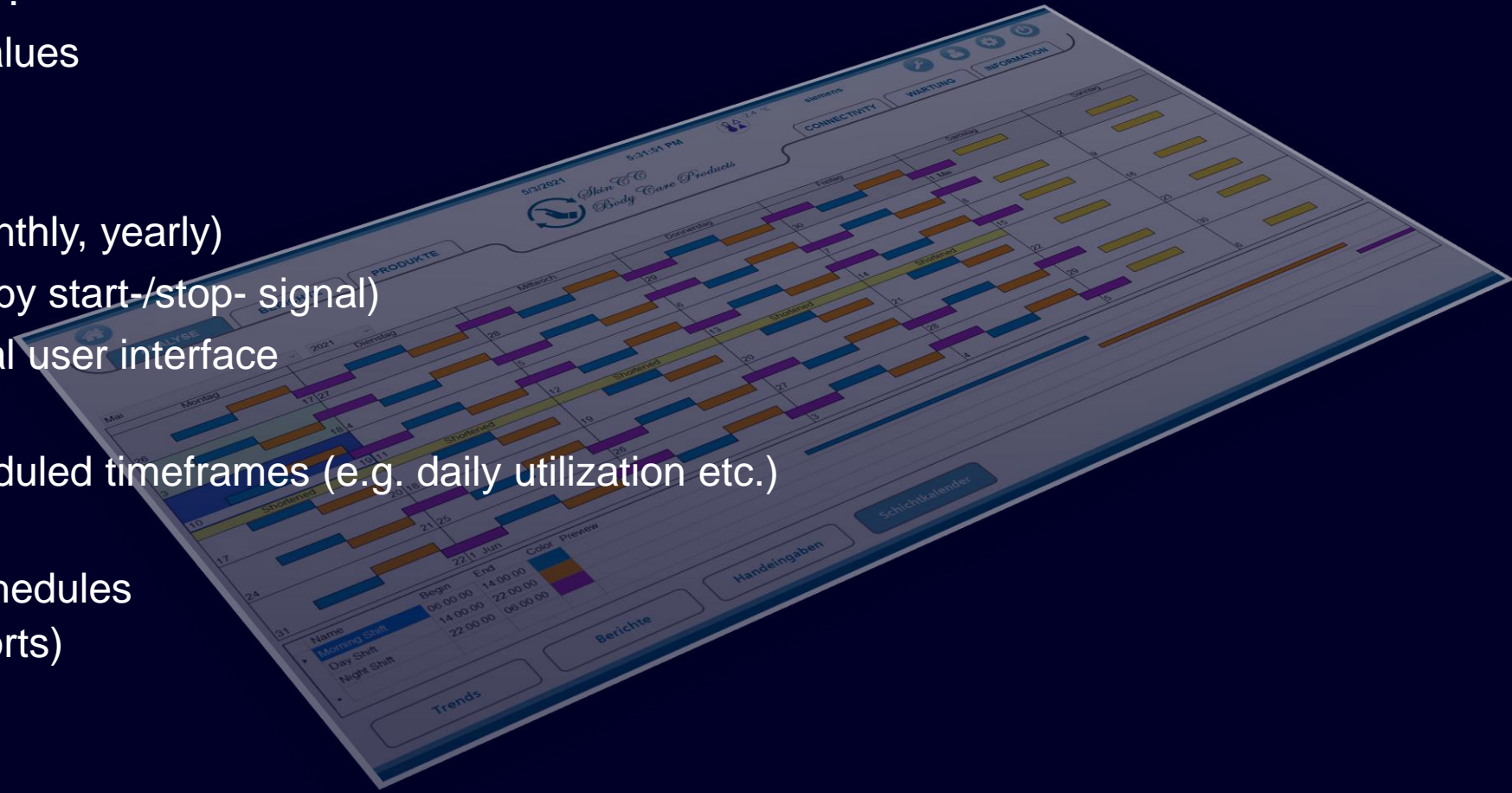
- Calculation results create new tags that can be used as :
 - Inputs for batch reports (curves and snap shots)
 - Write back source to display the information in WinCC
 - Inputs for higher level calculations



PM-QUALITY

Calculation triggering

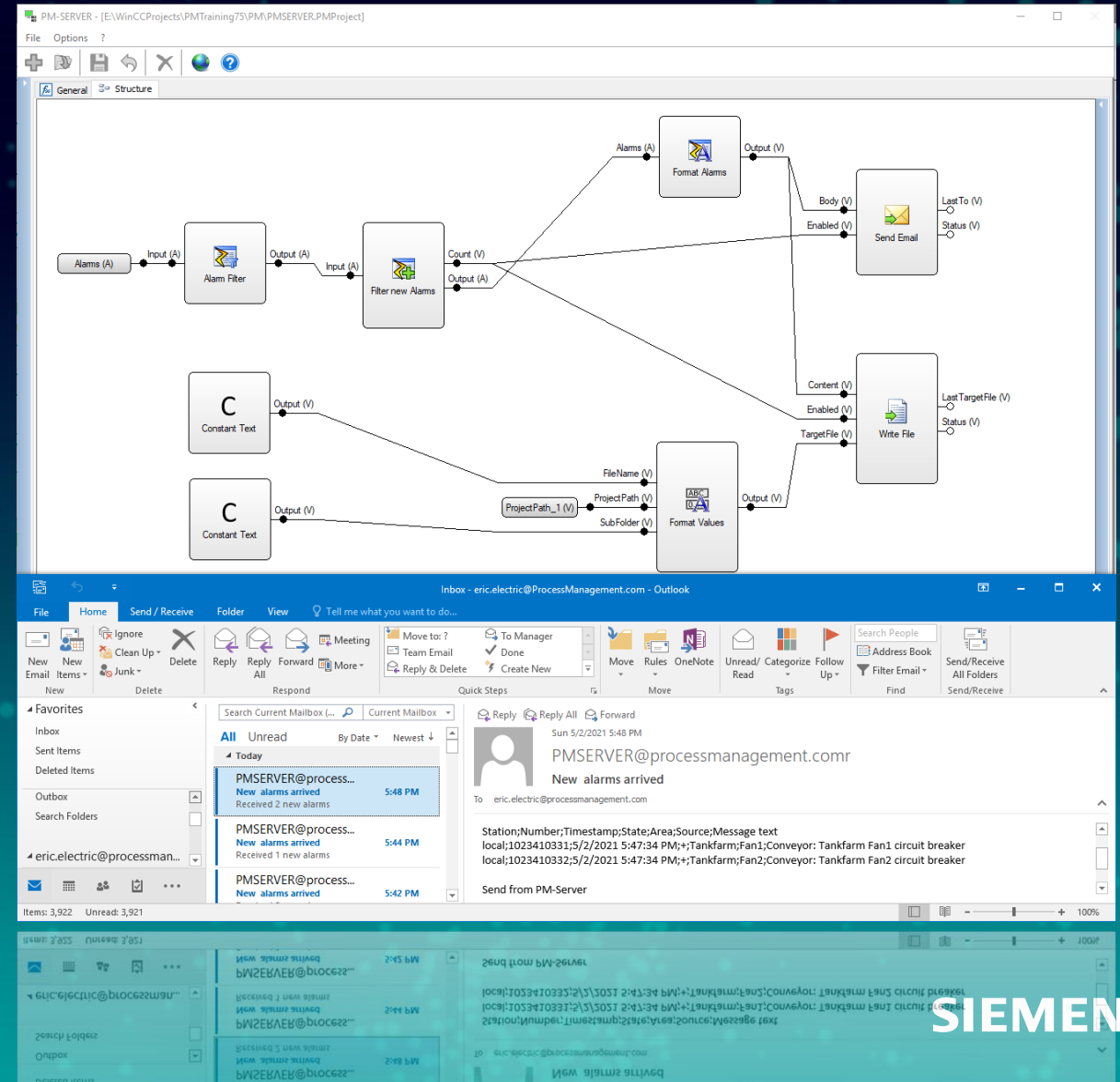
- Calculations can be triggered by :
 - Change of calculation input values
 - Schedules
 - Static schedules
(=> Hourly, daily, weekly, monthly, yearly)
 - Dynamic schedules (triggered by start-/stop- signal)
 - Shift schedules with graphical user interface
- Calculation of metrics over scheduled timeframes (e.g. daily utilization etc.)
- Reporting and archiving over schedules
(=> daily-, weekly-, monthly reports)



PM-QUALITY

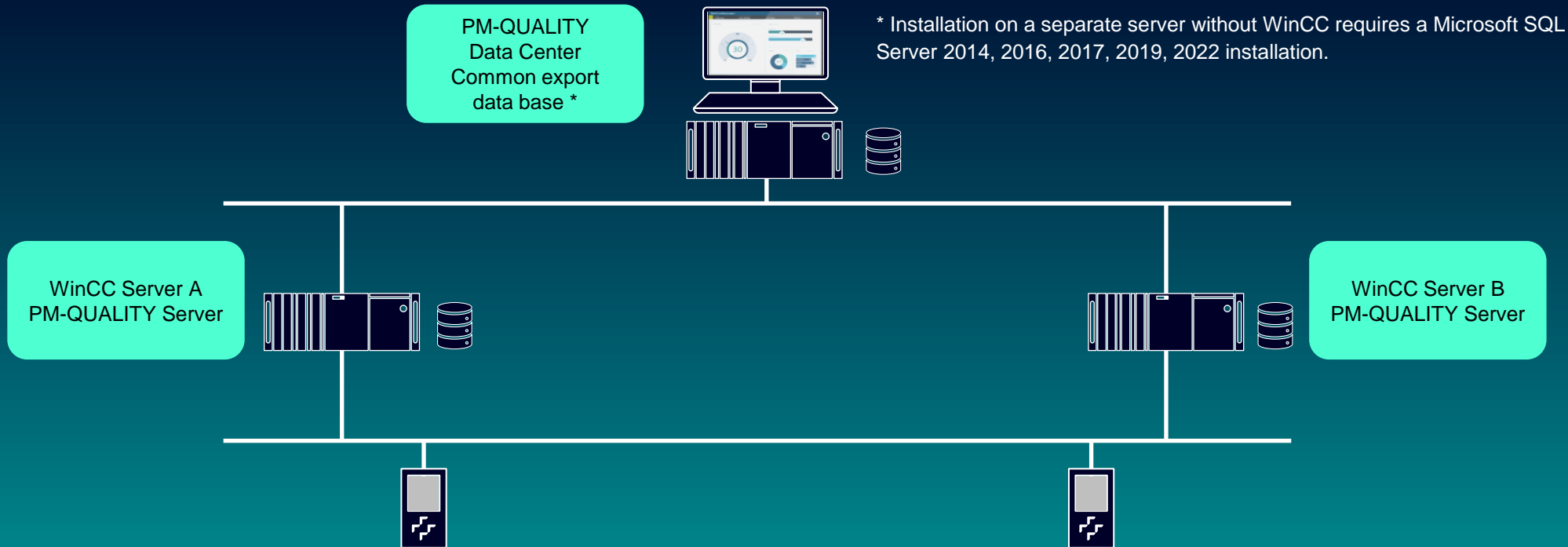
Additional functions

- Powerful processing blocks for handling alarms
- Saving alarms into files
- Sending alarms via e-mail
- ...



PM-QUALITY Data center (redundancy option)

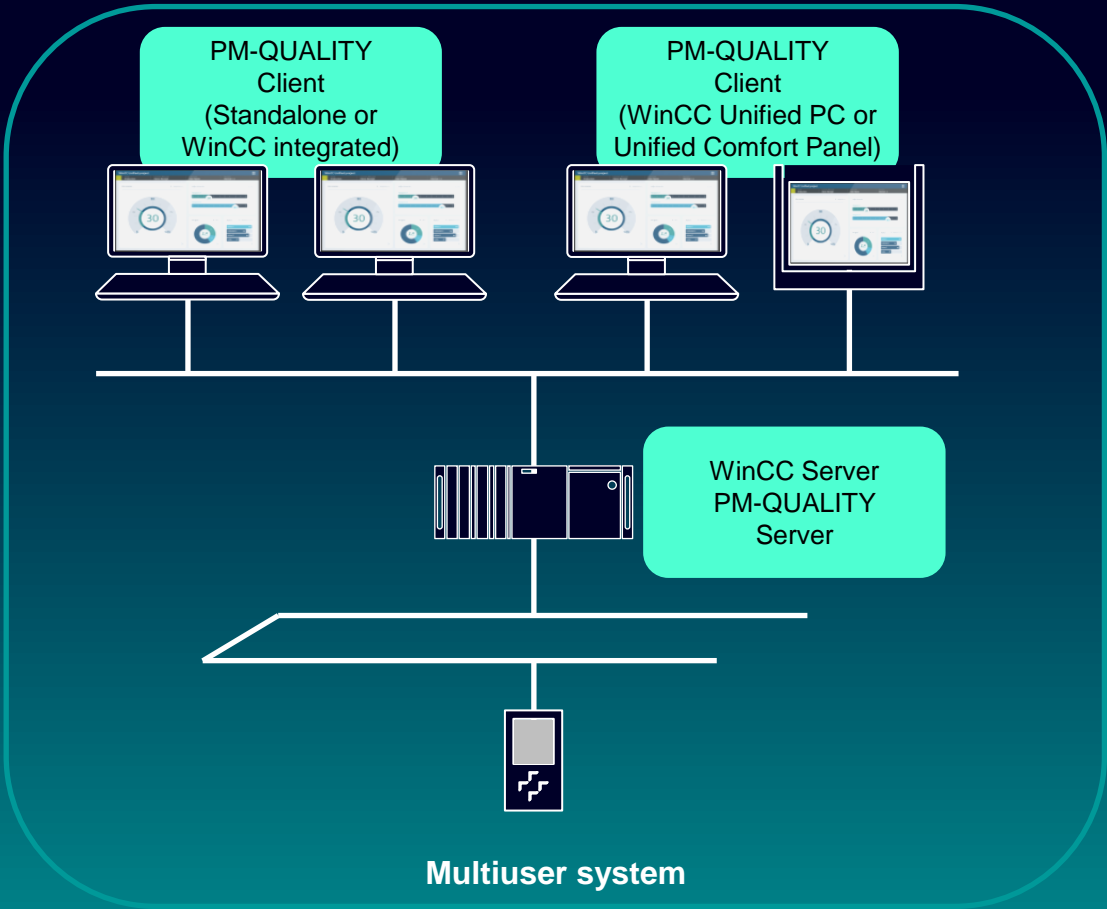
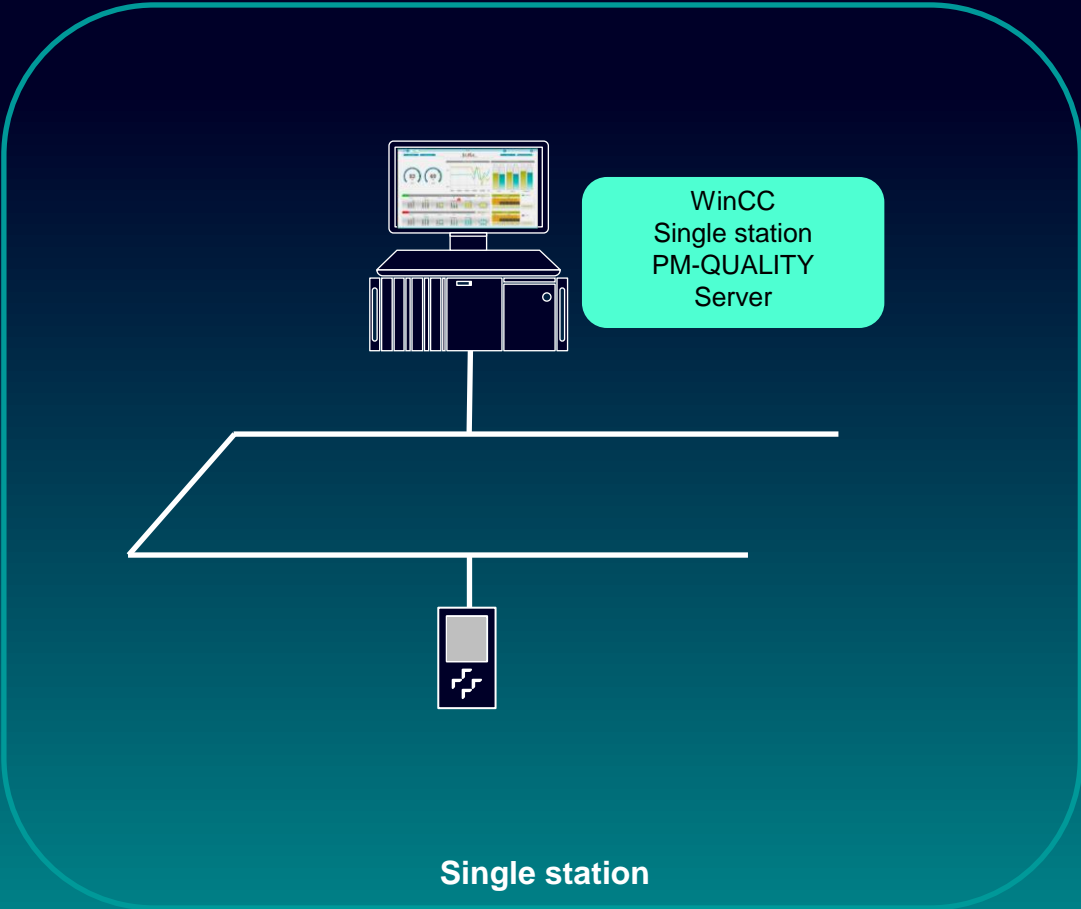
- Improvement of data integrity and availability with the data center option
 - High data availability is achieved by parallel recording of batches on two servers.
 - The data center consolidates the recordings of both sources archives into a separate consistent database from where the reports are generated.



PM-QUALITY

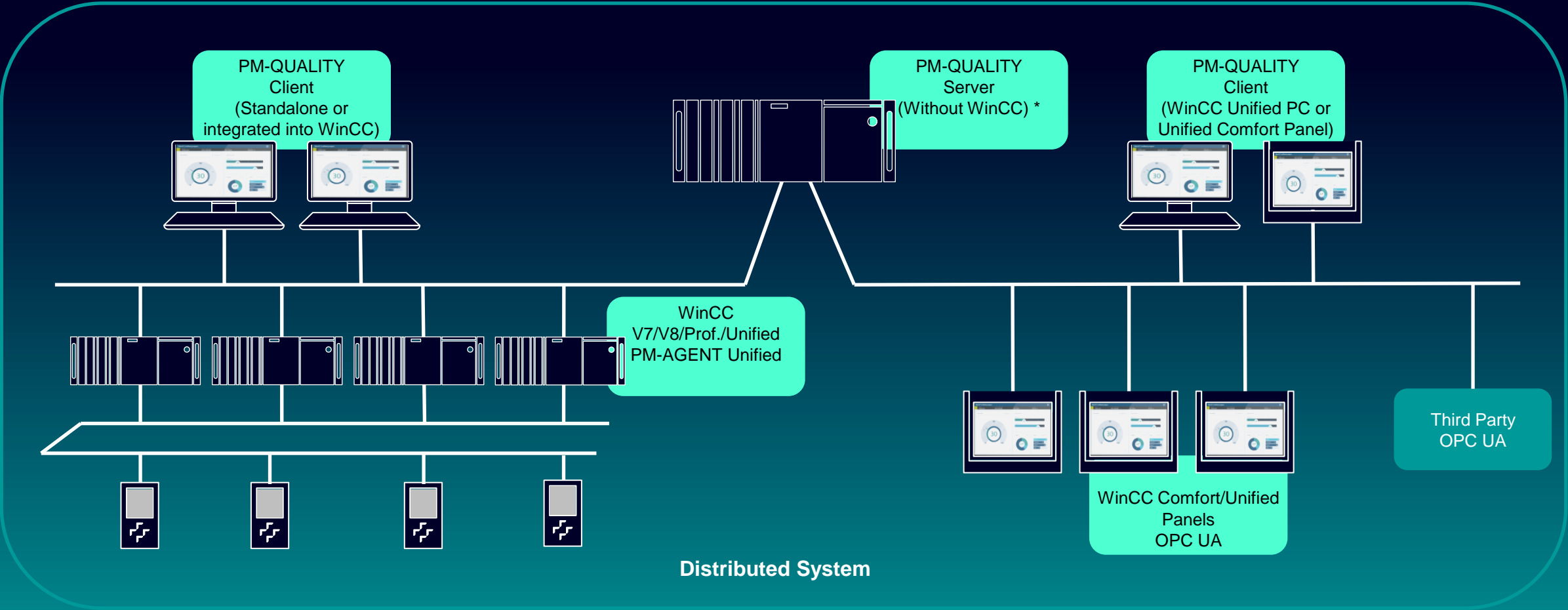
Installation scenarios

For released SIMATIC WinCC and operating systems please refer to the latest release notes.



PM-QUALITY Installation scenarios

* Installation on a separate server without WinCC requires a Microsoft SQL Server 2014, 2016, 2017, 2019, 2022 installation.



PM-QUALITY

Ordering information

- Scalable server editions:
 - **Standard** (One production unit)
 - Server: 9AE7 111-2SS20-1AA0
 - **Professional** (max. 100 production units)
 - Server: 9AE7 111-2SS30-1AA0
 - **Professional** with Data Center (max. 100 production units)
 - Server: 9AE7 111-2SS30-1BA0 (Only reasonable to be ordered in pairs of 2!)

PM-QUALITY

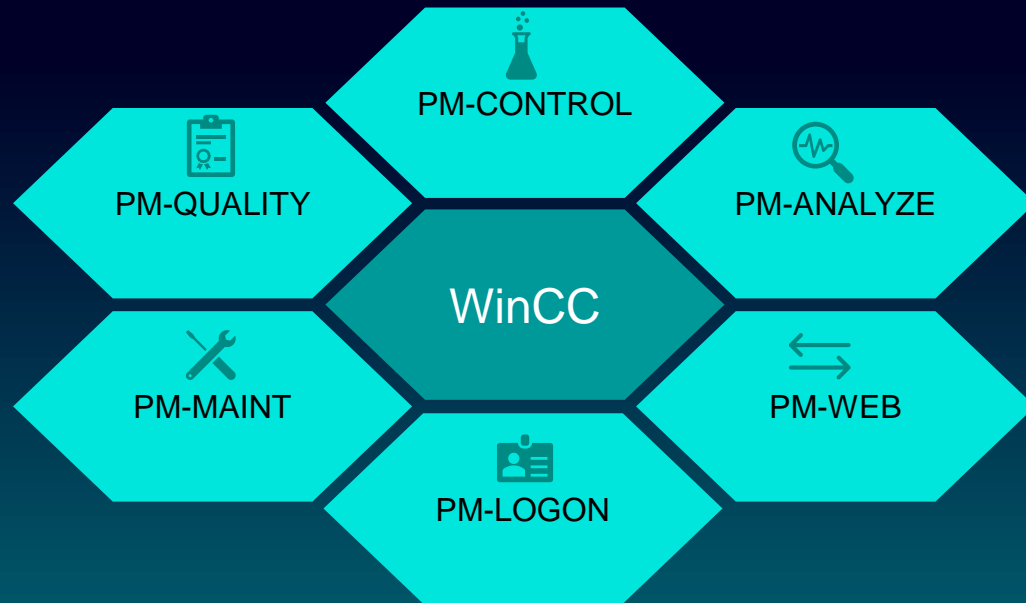
Ordering information

- Flexible client components:
 - Client for WinCC V7, V8, Runtime Professional, Runtime Advanced or Stand-alone
 - Client: 9AE7 111-4SC01-1AA0
 - Client packages for WinCC Unified PC and Unified Comfort Panel
 - 1 Unified Client: 9AE7 111-4SW00-1AA0
 - 3 Unified Clients: 9AE7 111-4SW00-1AA1
 - 10 Unified Clients: 9AE7 111-4SW00-1AA2
 - 30 Unified Clients: 9AE7 111-4SW00-1AA3
 - 100 Unified Clients: 9AE7 111-4SW00-1AA4

| PM-WEB

Centralized WEB-based access for
PM-CONTROL, PM-QUALITY, PM-ANALYZE

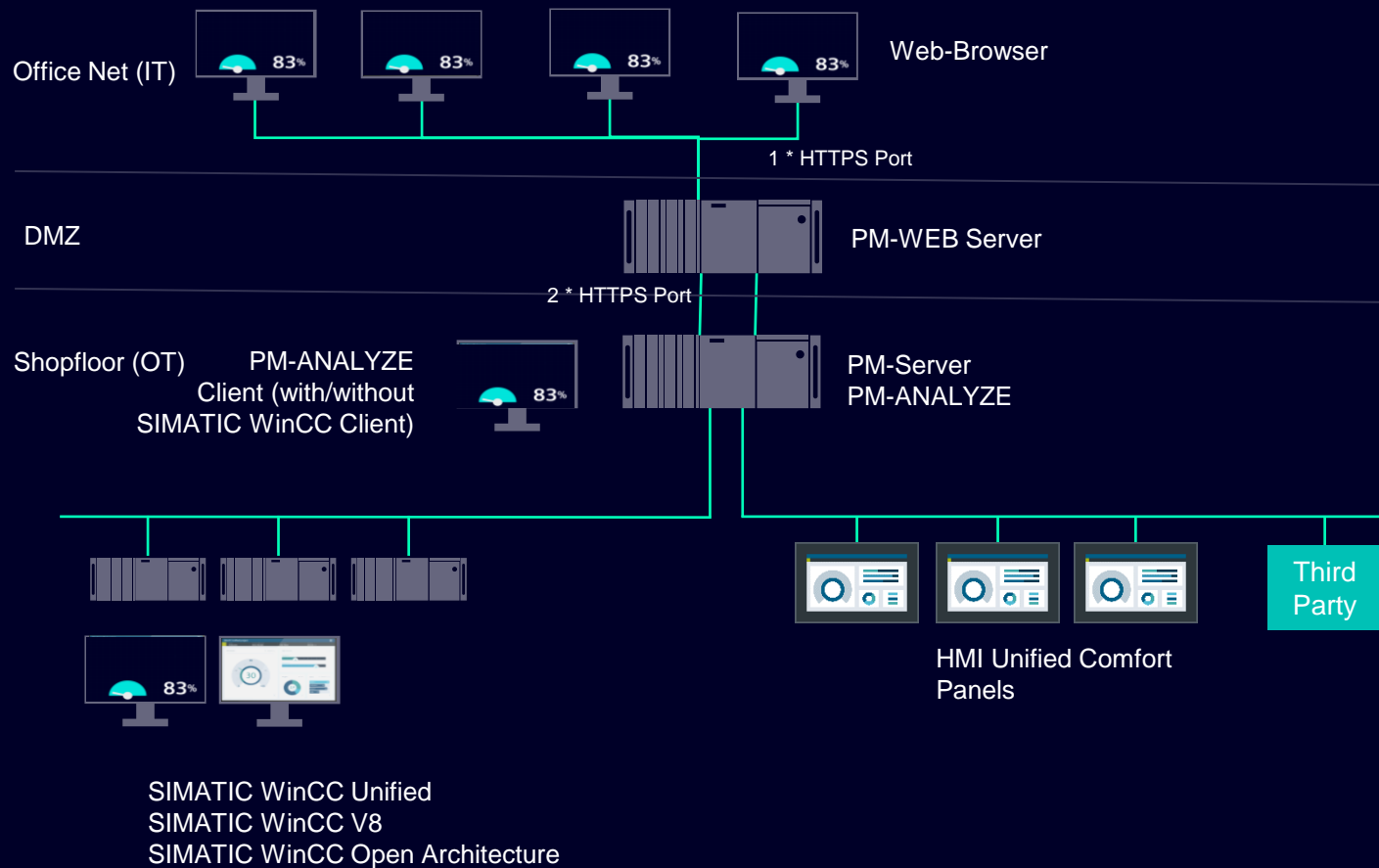
PM-WEB



- Provides install free, browser-based client access for
 - PM-CONTROL
 - PM-QUALITY
 - PM-ANALYZE
- Secure web access to multiple PM-C/Q/A-Servers installations via https
- Fine grained access control
 - Local and/or AD user groups

PM-WEB

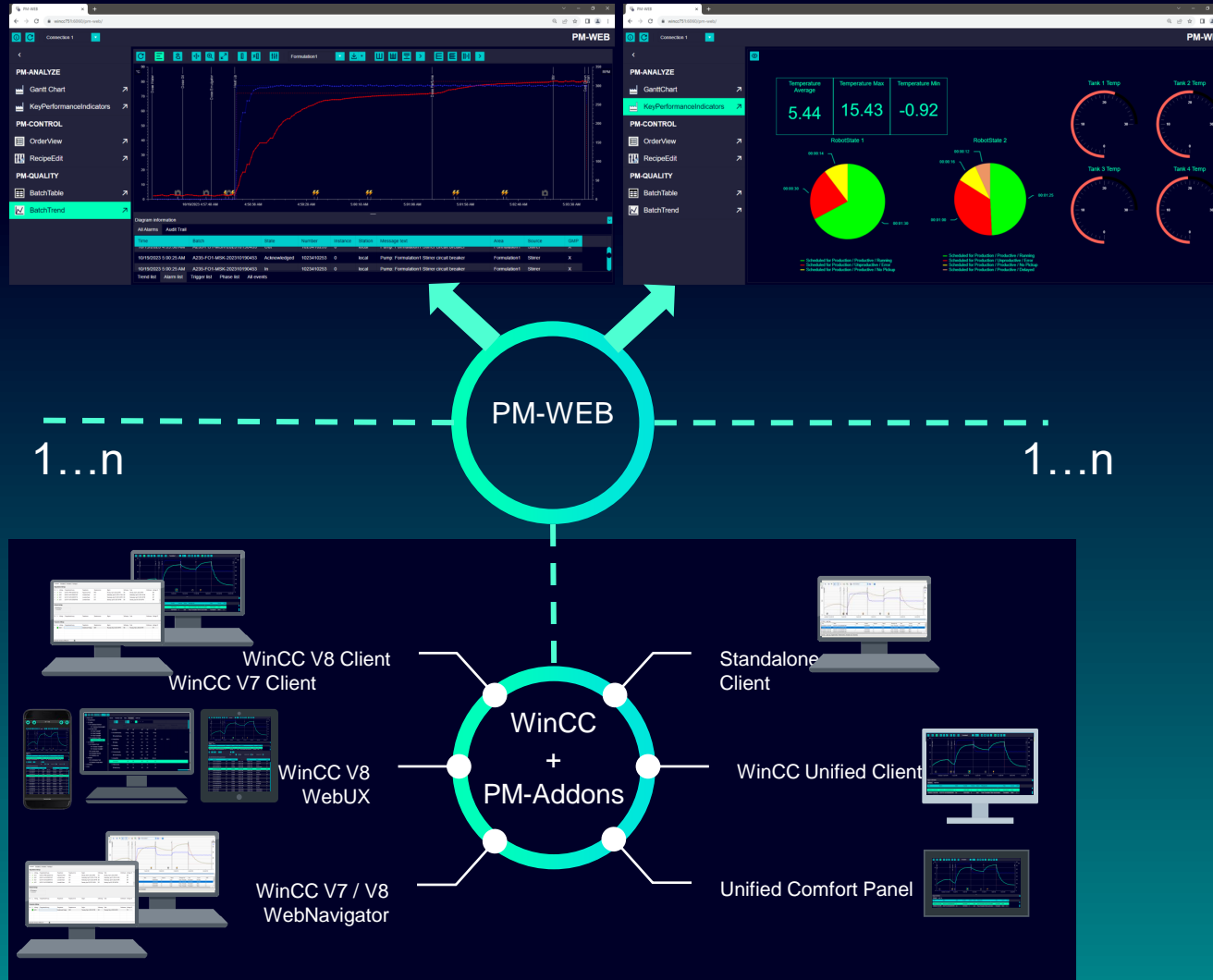
Central performance and quality analysis



- Installation-free web-based client application for analysis in a web browser
- Single sign-on for quick access to dashboards
- Comfortable trend and chart viewer as a stand-alone application in the office network
- Shared widget configurations between PM-WEB, WinCC V8, and WinCC Unified
 - Same configuration
 - Same look and feel
- Secure data transfer from shop floor to office network
- IT-friendly integration into an existing IT environment

PM-WEB

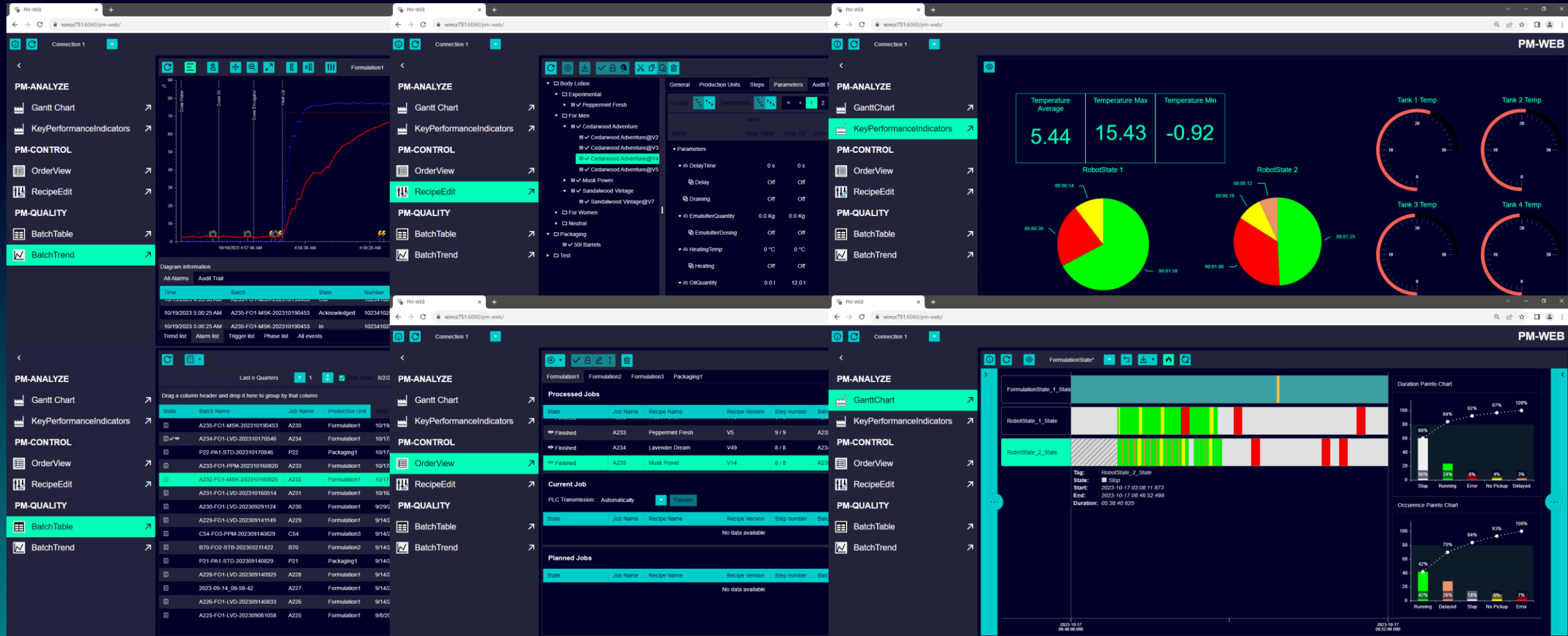
System-wide access to recipes, reports and KPIs



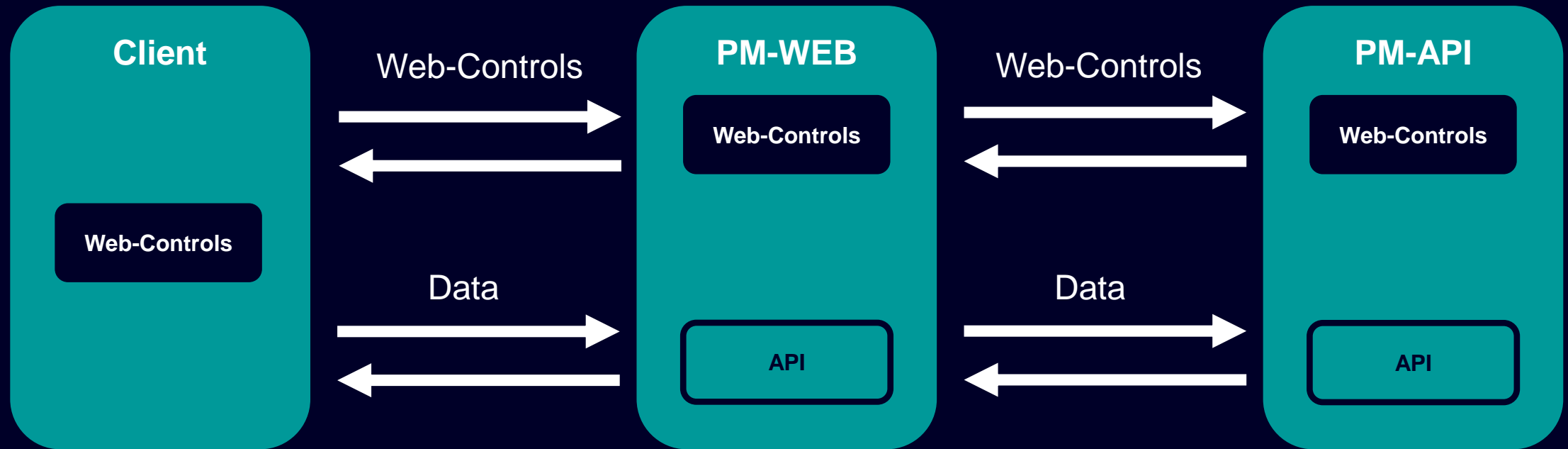
- Centralized information management
- Multiple server connections
 - Individual access rights for each connection
 - Customizable landing page
 - Extensive styling support
- PM-QUALITY Web Client
 - Batch trends & reports
- PM-CONTROL Web Client
 - Recipes and order scheduling
- PM-ANALYZE Web Client
 - KPI-Dashboards and Gantt charts

PM-WEB enables centralized access for

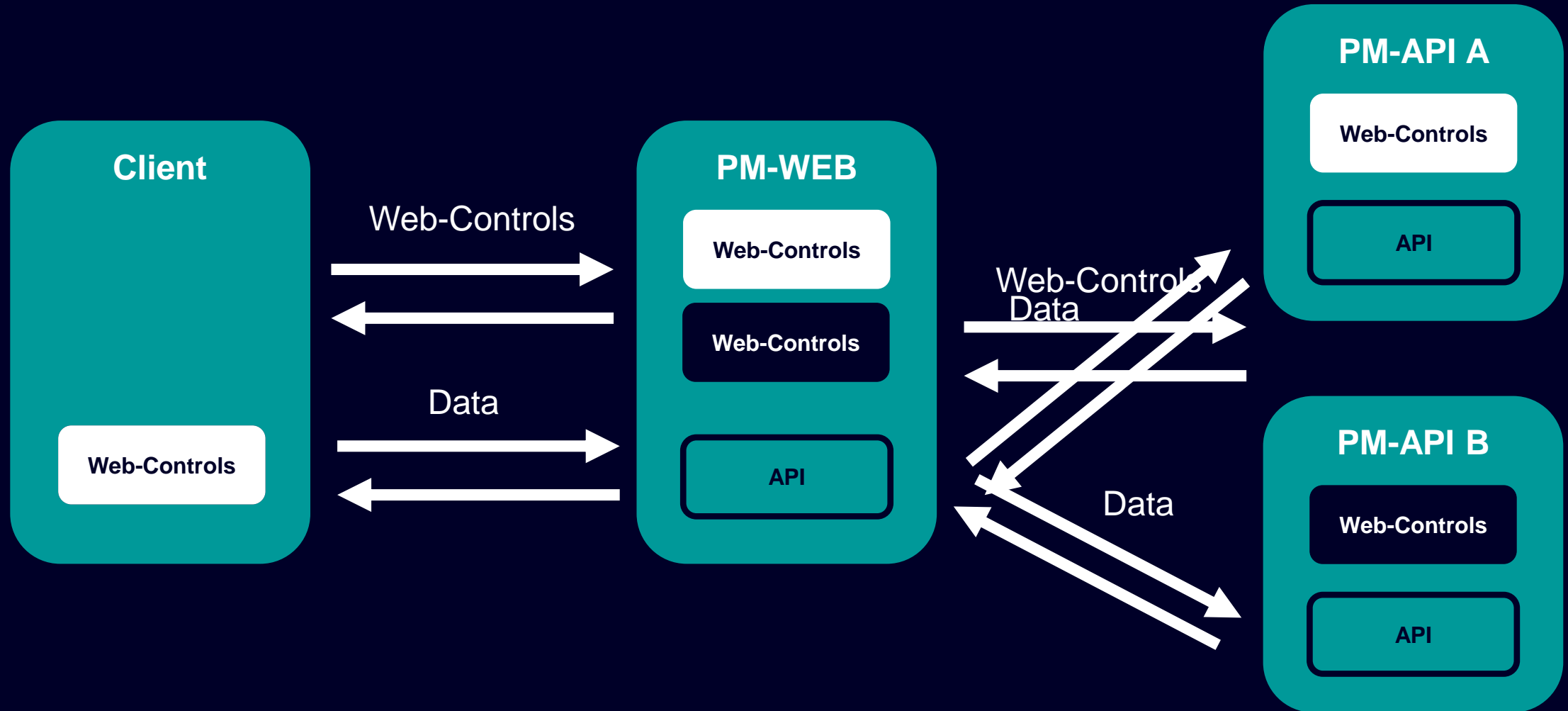
PM-QUALITY PM-CONTROL PM-ANALYZE



Basic system structure



System structure with multiple servers



Components and prerequisites

- PM-WEB is compatible with:
 - PM-ANALYZE as of V10.4
 - PM-QUALITY as of V11.4
 - PM-CONTROL as of V12.4
- Stand-alone or combined installation
- Components
 - PM-WEB Configurator
 - PM-WEB Server (requires IIS)

SIEMENS

Installation of PM-WEB

You can find more detailed information on the compatibility of the versions in the "latest release notes" at www.siemens.com/process-management

Web-based access to PM products via PM-WEB

The installation of PM-WEB enables web-based access to PM products, independent of the SCADA system. The access to the data of the PM products is provided in the PM-WEB Landing Page by embedding the existing PM web-controls into a single web application. PM-WEB can be accessed installation-free via browser - whether on a PC, tablet or mobile.

PM-WEB can be installed independently of the PM products on a separate computer, the connection to the PM products is made via the PM-API.

PM-WEB thus offers a central platform for accessing PM products, which through the use of modern web-technologies, can be accessed independently of the end device type, as well as by flexible remote access via the network.

Install now

PM-WEB

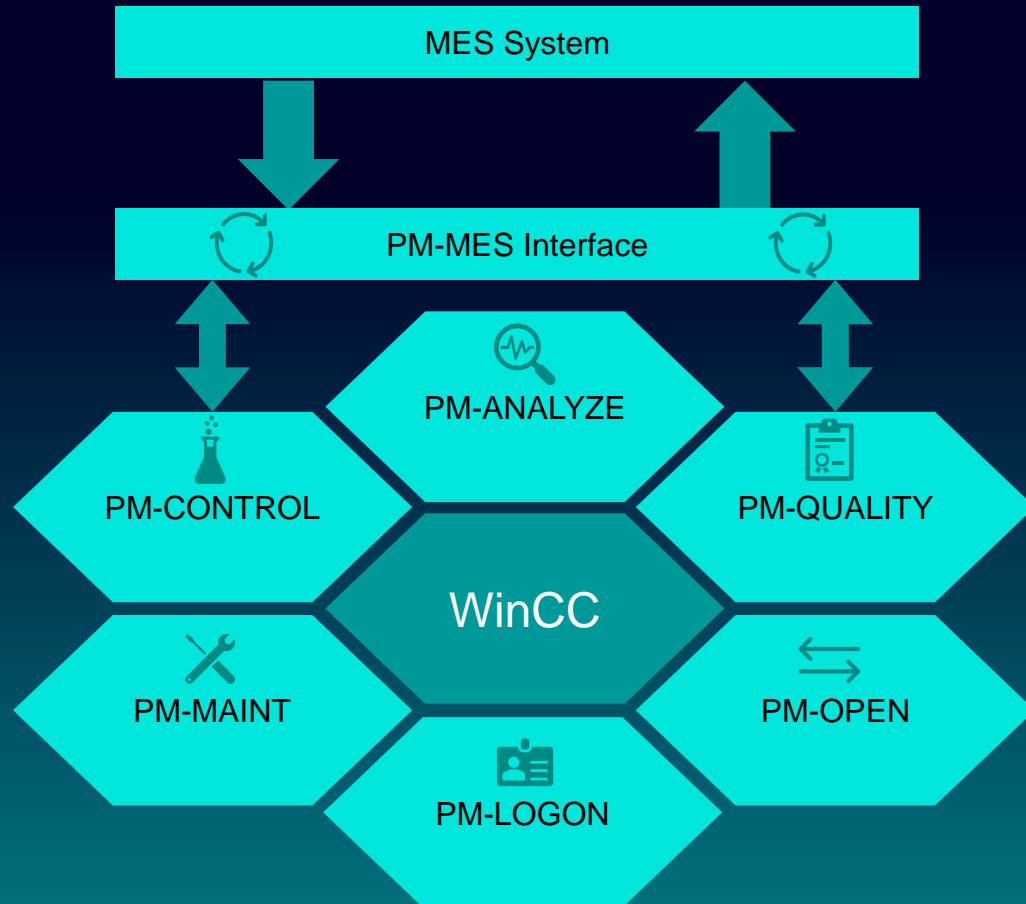
Ordering information

- Scalable from simple up to complex plant topologies:
 - **Base installation**
 - Server: 9AE7 121-1SW01-1AA0 (Dongle)
 - Server: 9AE7 121-1SW01-1AA1 (SW-License)
 - Licensing of the clients provided by PM-WEB is done on the connected servers of
 - PM-QUALITY
 - PM-CONTROL
 - PM-ANALYZE

| PM-MES Interface

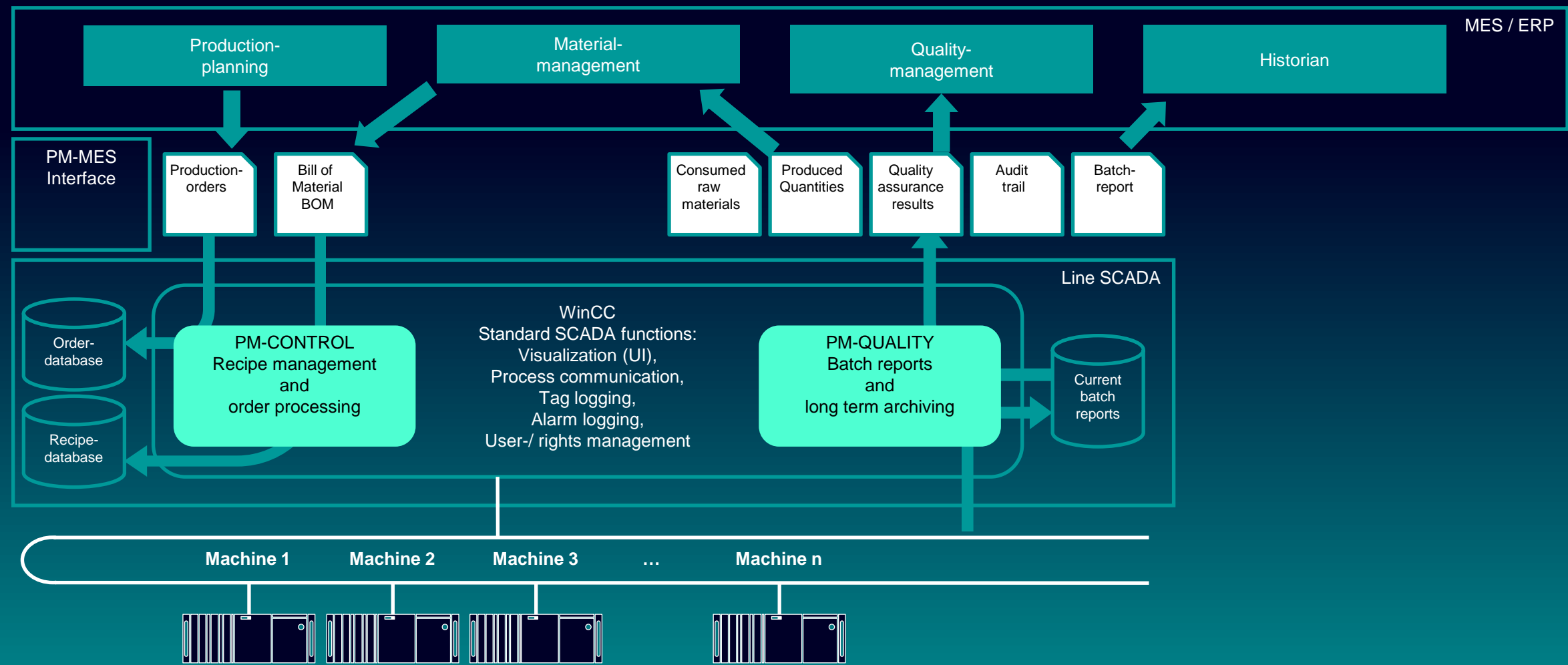
Connecting PM-CONTROL and PM-QUALITY
to MES Systems

PM-MES Interface



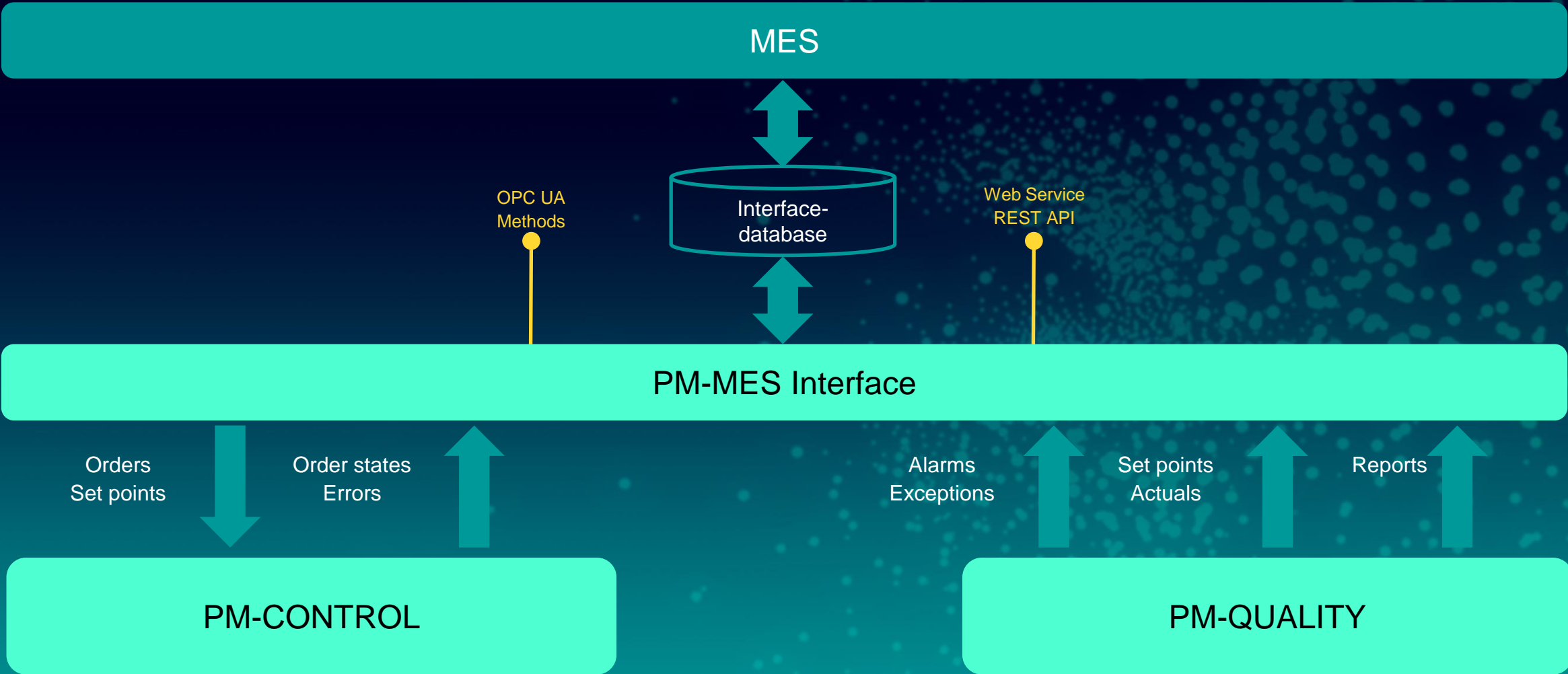
- Bi-directional communication interface between PM-CONTROL, PM-QUALITY and MES Systems
- Communication via
 - Interface database
 - OPC UA Methods
 - REST API
- Allows an MES System to :
 - Create orders in PM-CONTROL
 - Override individual parameters in PM-CONTROL on each order (variant management)
 - Retrieve batch recordings from PM-QUALITY
 - Trends, Snapshots
 - Request batch report generation from PM-QUALITY and retrieve results to embed into master batch record

PM-MES Interface Integration



PM-MES Interface

Available integration API's



The conceptual mismatch ...

What the MES knows about:

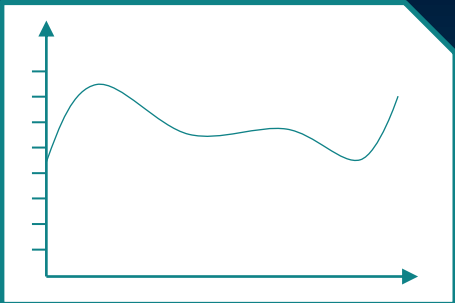
The MES generates a future production plan consisting of production orders.

The MES sends orders to all participating partners and requests the order related status for further processing and decisions.

Order No.	Material No.	Quantity	Variant
<u>A1</u>	M1	500Kg	High Quality
<u>A2</u>	M2	200Kg	Standard
<u>A3</u>	M1	700Kg	Standard

Request?

Datapoint	Value
Temp Setpoint:	50 °C
Temp Current:	49.8 °C
Speed::	300 rpm
Pressure:	3.5 bar



Response?

Order No.	A1
Material No.	M1
Start:	2/9/20 5:30 AM
End:	2/9/20 6:50 AM
Quality:	A+
Produced:	508 Kg

Date Time	State	Number	Message
02/08/20 02:15:23 AM	+	0815	Pressure low (0.4 bar)
02/08/20 02:17:45 AM	-	0815	Pressure low (1.5 bar)
02/08/20 03:05:36 AM	*	0815	Pressure low (2.3 bar)

What the SCADA system knows about:

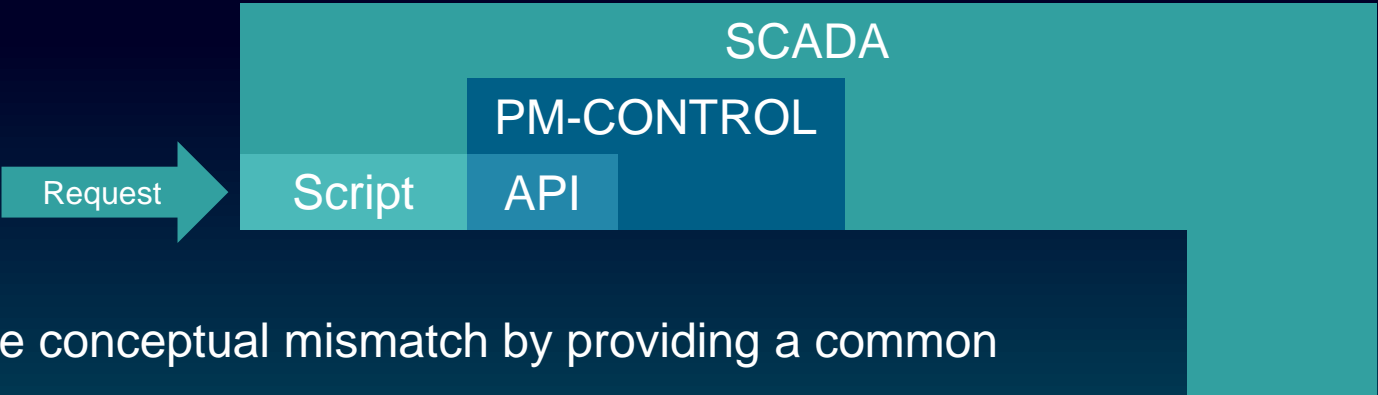
The SCADA knows and controls the current status of all participating partners (e.g. plc's).

By means of its archiving capabilities it also knows the historical status over time.

The first step...

Adding a job scheduler and recipe module removes the conceptual mismatch by providing a common model for production requests:

Order No.	Material No.	Quantity	Variant
<u>A1</u>	M1	500Kg	High Quality
<u>A2</u>	M2	200Kg	Standard
<u>A3</u>	M1	700Kg	Standard



Adding a batch/order data collector removes the conceptual mismatch by providing a common model for production responses:

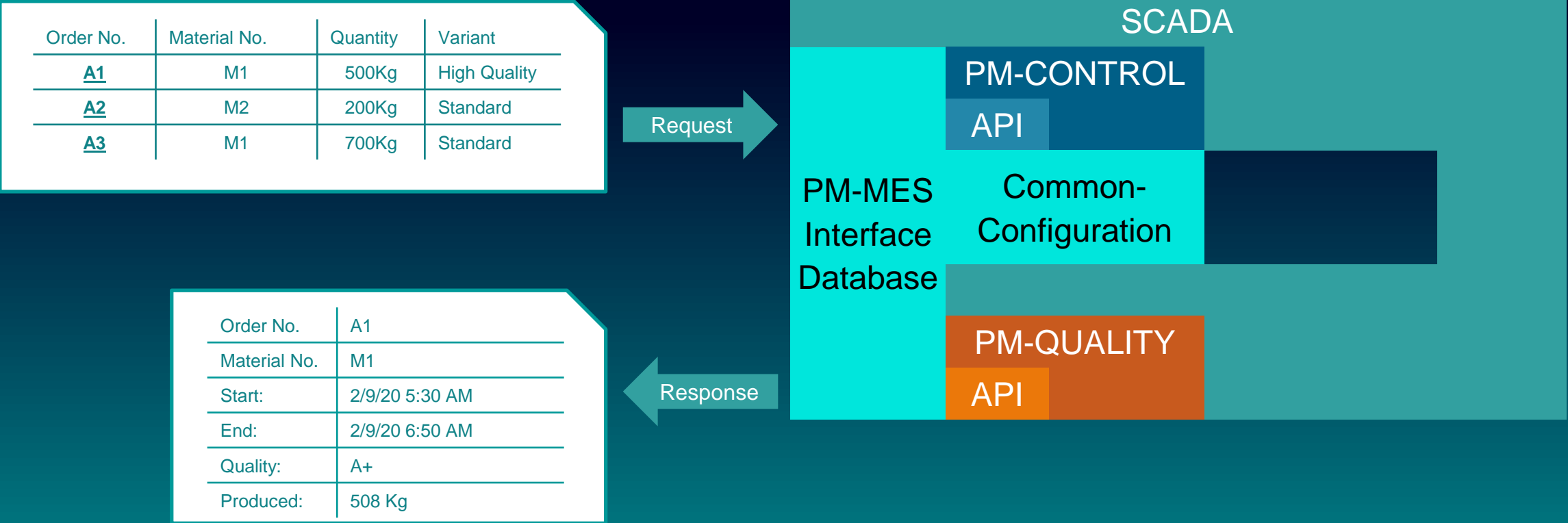
Order No.	A1
Material No.	M1
Start:	2/9/20 5:30 AM
End:	2/9/20 6:50 AM
Quality:	A+
Produced:	508 Kg



But: There are still lots of different options for the transfer of the requests/responses
E.g. File transfer csv, xml, json, database tables etc. => Requires scripting within the SCADA

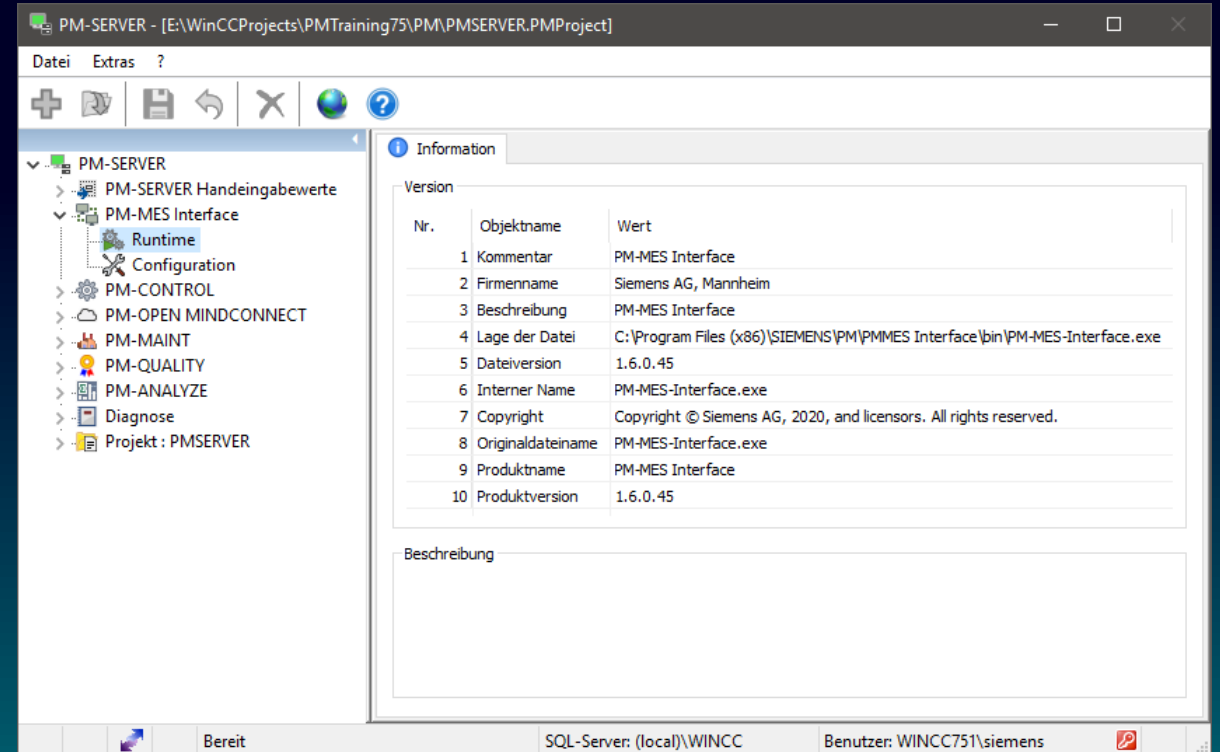
The next step ...

Adding the PM-MES Interface provides a standardized and documented API for the MES and removes the need for API scripting within the SCADA system.



PM-MES Interface Modules

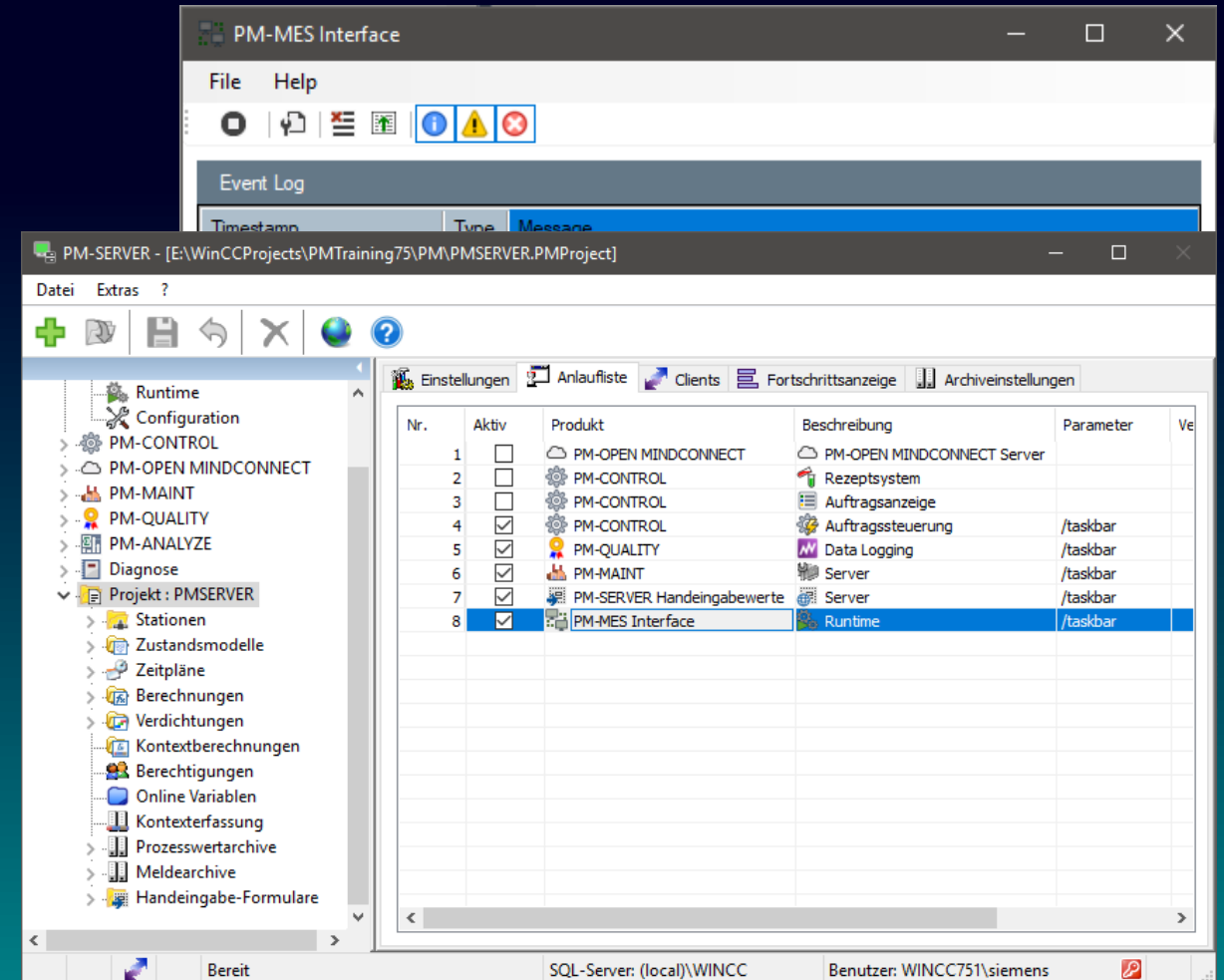
- The PM-MES Interface is only installed on the computer on which the PM-QUALITY and PM-CONTROL server is installed
- The PM-MES Interface integrates into the PM-SERVER and consists of a
 - Runtime and a
 - Configuration component



PM-MES Interface

Runtime component

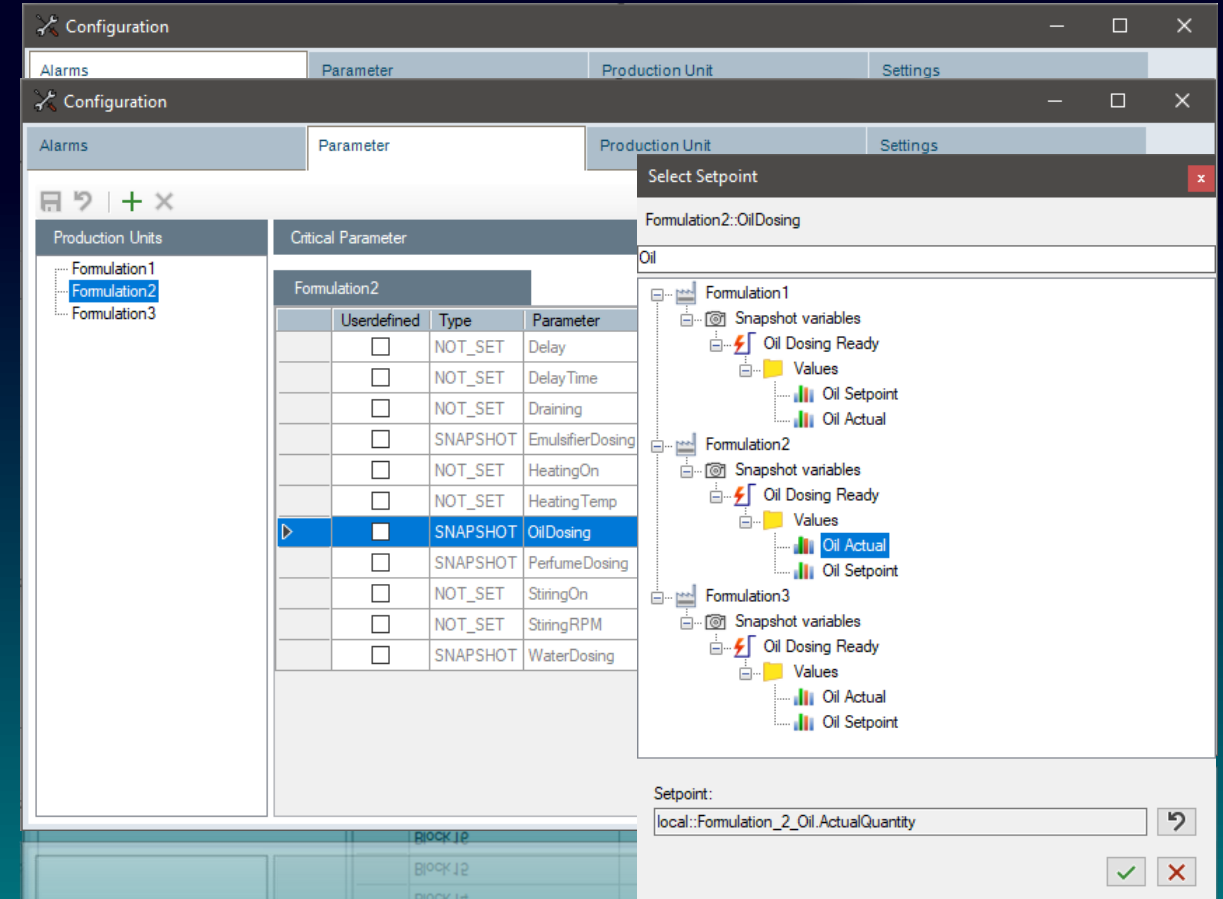
- The runtime component is running minimized in the background (except for diagnostics output)
- The runtime component is started automatically by the project startup list of the PM-SERVER project



PM-MES Interface

Configuration component

- In the configuration, the columns from the alarm groups of PM-QUALITY from the different units can be mapped to a uniform layout (i.e., column structure) towards the MES.
- The parameter mapping allows the definition of parameters that can be overwritten individually for each order from the MES
I.e., the values from the MES overwrite the value that would normally be coming from the recipe.
- For the reporting of values recorded by PM-QUALITY, the source (trend or snapshot) inside PM-QUALITY can be assigned.



PM-MES Interface

Interface database: Tables to transfer production orders

Order data from the MES

- Order Number
- Production Unit
- Recipe Name
- Quantity
- 5 order header fields (e.g. Customer)
- Action (currently “PRP”, “ADD” or “CAN”)

Parameter

- Recipe parameters of PM-CONTROL can be overridden from the MES-System
- Overrides are tracked in the PM-CONTROL Audit Trail
- Available for non scaled analog, text and binary parameters

PM-MES Interface

Interface database: Tables for order feedback

Order feedback

- Order Number (in PM-CONTROL)
- Status (Added, Loaded, Running, Ended)
- Timestamp

Errors :

- e.g. order cannot be created in PM-CONTROL
 - Wrong production unit for recipe
 - Unknown or locked recipe
- All errors contains processing timestamps
- Reproducible and documented

PM-MES Interface

Interface database: Tables for alarms / exceptions

The MES-Interface reads data from PM-QUALITY and writes it to the interface database

Alarms containing

- Production Unit
- Order Number
- Batch Number
- Alarm Group
- Station / Timestamp / Alarm number / Instance / State
- 10 user defined columns

PM-MES Interface

Interface database: Tables for set point and actual values

The MES-Interface reads data from PM-CONTROL + PM-QUALITY and writes it to the interface database

Data sources:

- Set points from PM-CONTROL
- Actual values from PM-QUALITY
 - Snapshots
 - Trends

Columns

- Order number
- Set point
- Actual value
- Timestamp

PM-MES Interface

Interface database: Table for commands

The MES-Interface executes commands sent from the MES

Currently one command supported: Report

- Cookie (from the MES, transparently sent back in the response)
- Production Unit
- Layout Name
- Batch Name

Response

- Cookie
- BLOB (Report as a zip file)

PM-MES Interface

Interface database: Basic concepts

MES writes records into the database tables

- The column „Processed“ remains empty („Null“)

MES-Interface processes the records

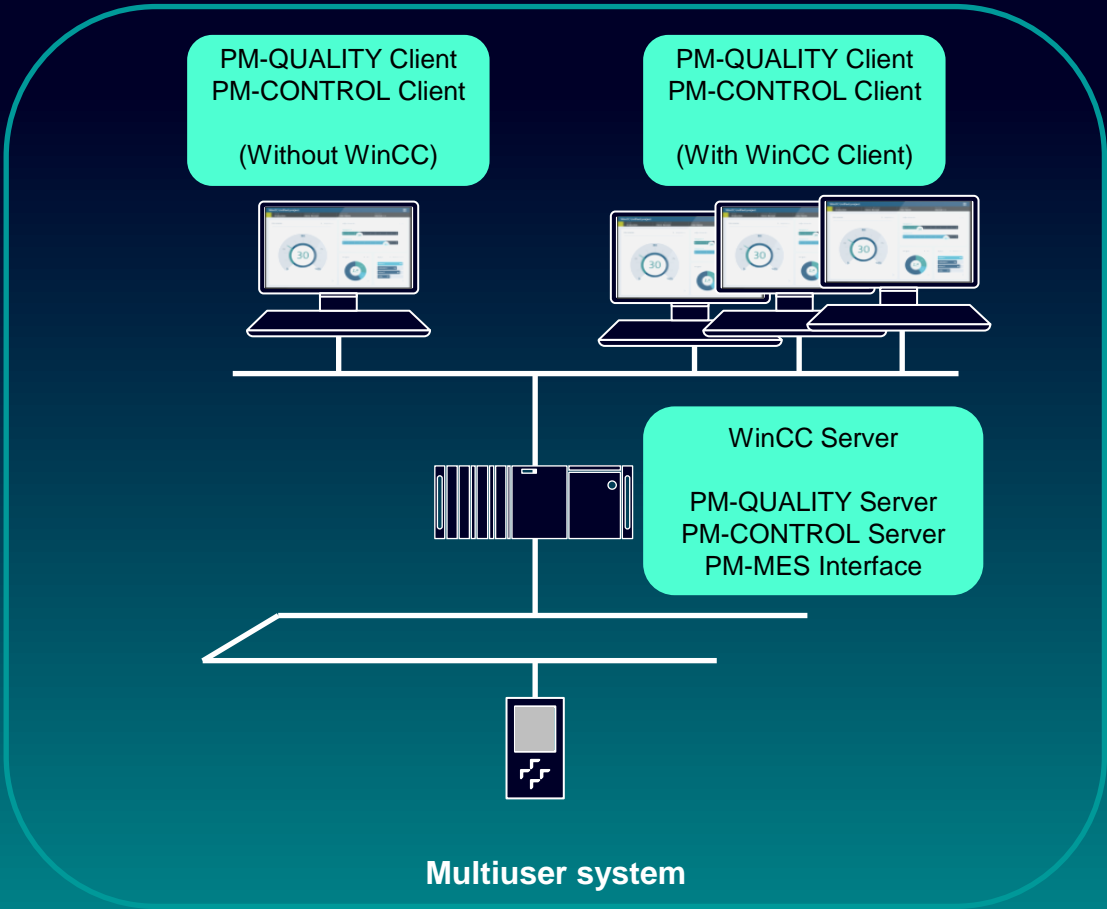
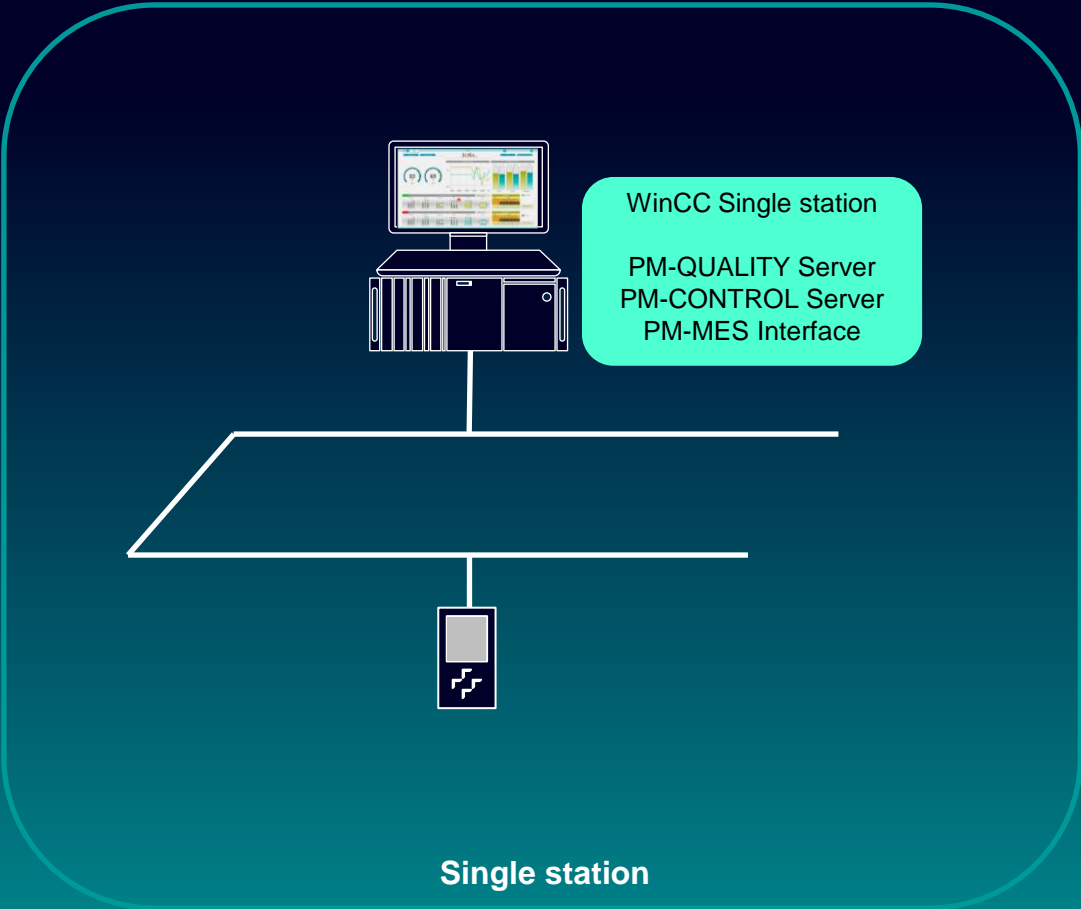
- The column „Processed“ is set to „1“
- The processing timestamp is also added in another column

The same mechanism is used in the opposite direction

PM-MES Interface

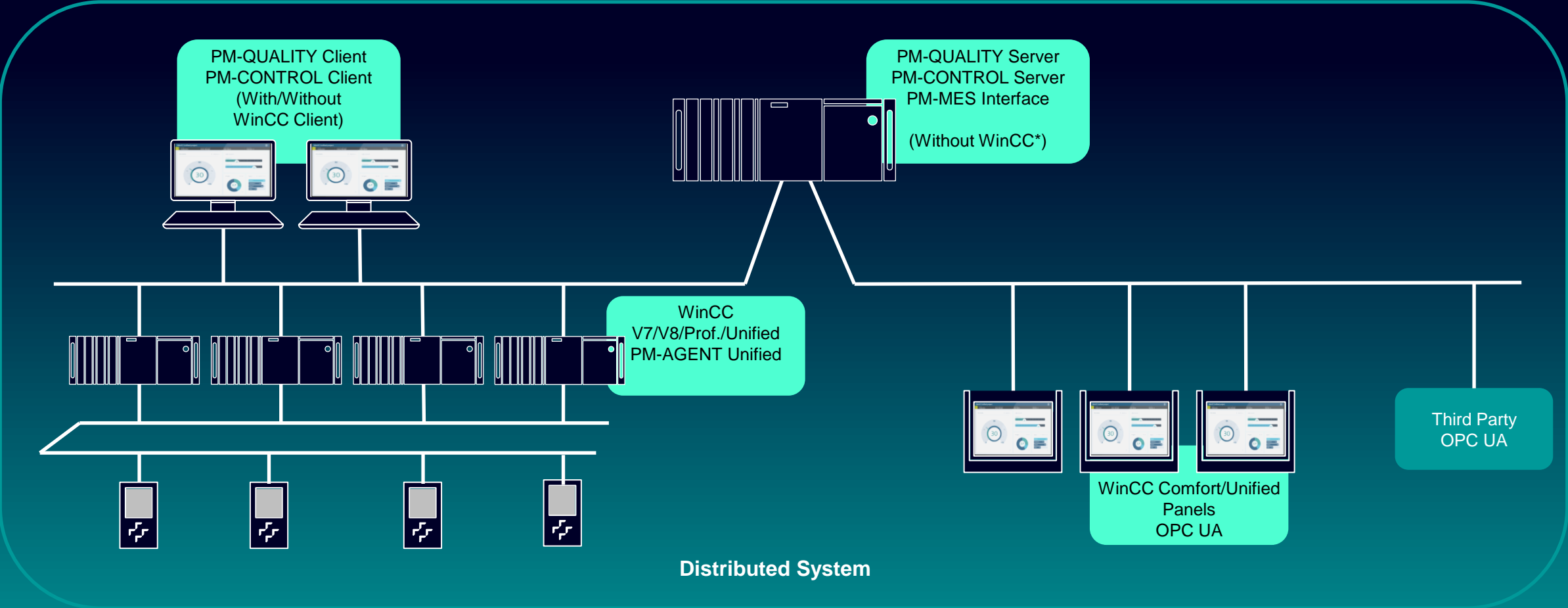
Installation scenarios

For released SIMATIC WinCC and operating systems please refer to the latest release notes.



PM-MES Interface Installation scenarios

*Installation on a separate server without WinCC requires a Microsoft SQL Server 2014, 2016, 2017, 2019, 2022 installation.



PM-MES Interface

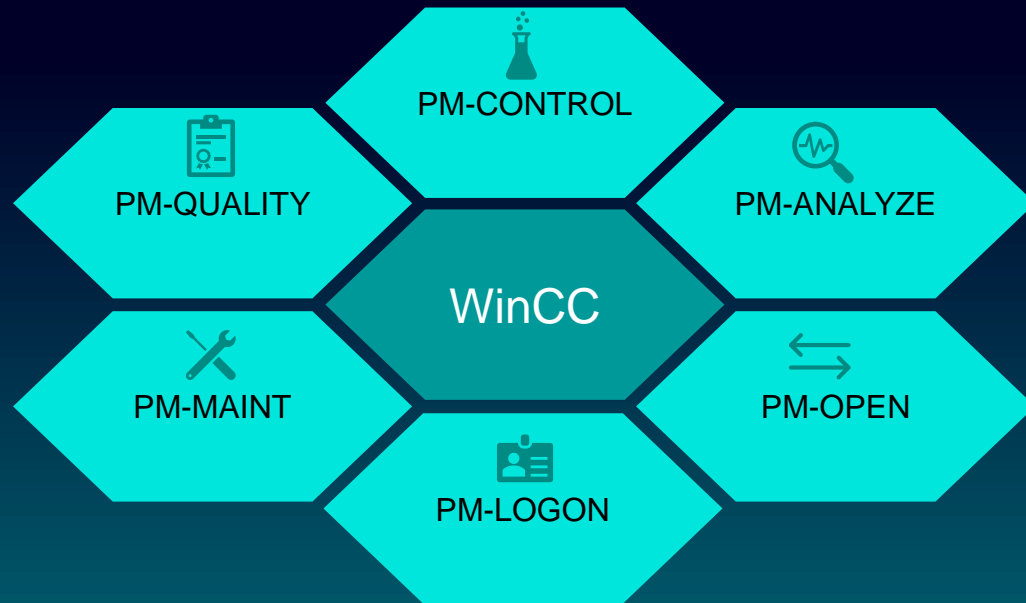
Ordering information

- Scalable from simple up to complex plant topologies:
 - **PM-MES Interface**
 - **9AE7110-2SX30-1AA0**
 - **Required software packages**
 - PM-CONTROL Professional Server: 9AE7 110-2SS30-1AA0
 - PM-QUALITY Professional Server: 9AE7 111-2SS30-1AA0

| PM-MAINT

Performance based maintenance management

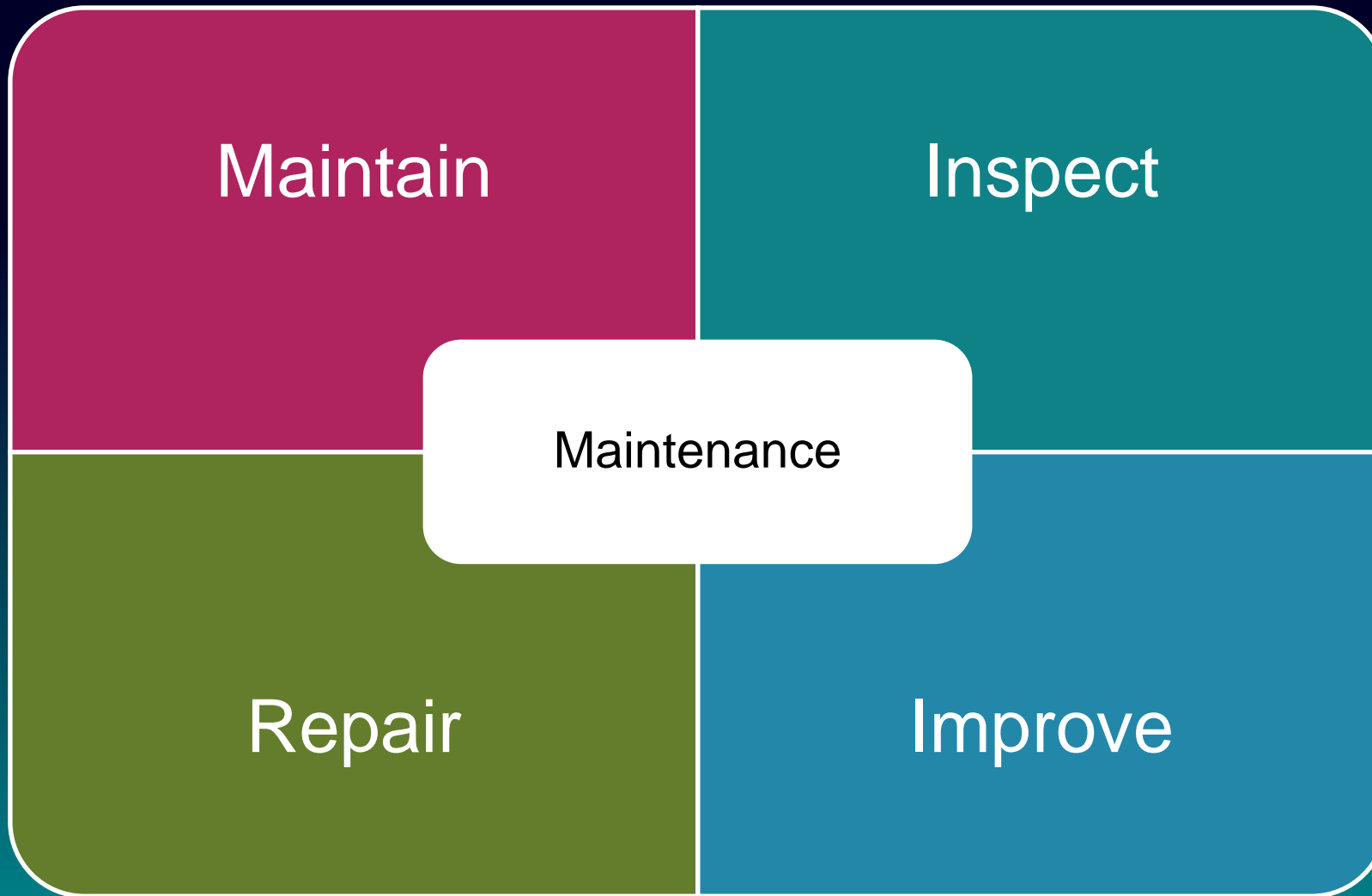
PM-MAINT



- Industry-and technology neutral maintenance management system
- Designed for close to production operation
- Performance-, calendar- and event-based maintenance by utilization of
 - Operating hour counters
 - Operation cycle counters
 - Process signals
- Tracking and documentation of repairs
- Shop floor integration
 - Repair request from HMI screens
 - Write back functions for maintenance information into tags

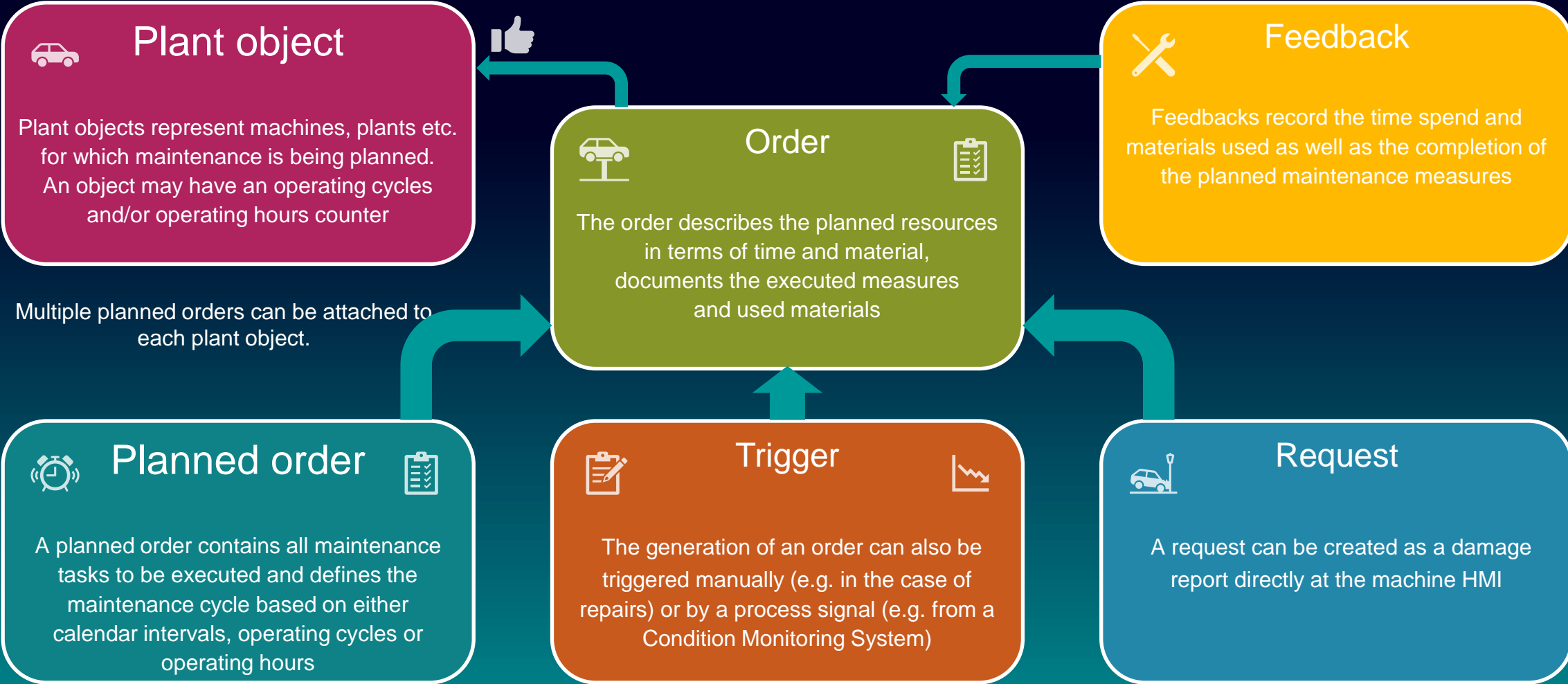
PM-MAINT

Support for all maintenance tasks



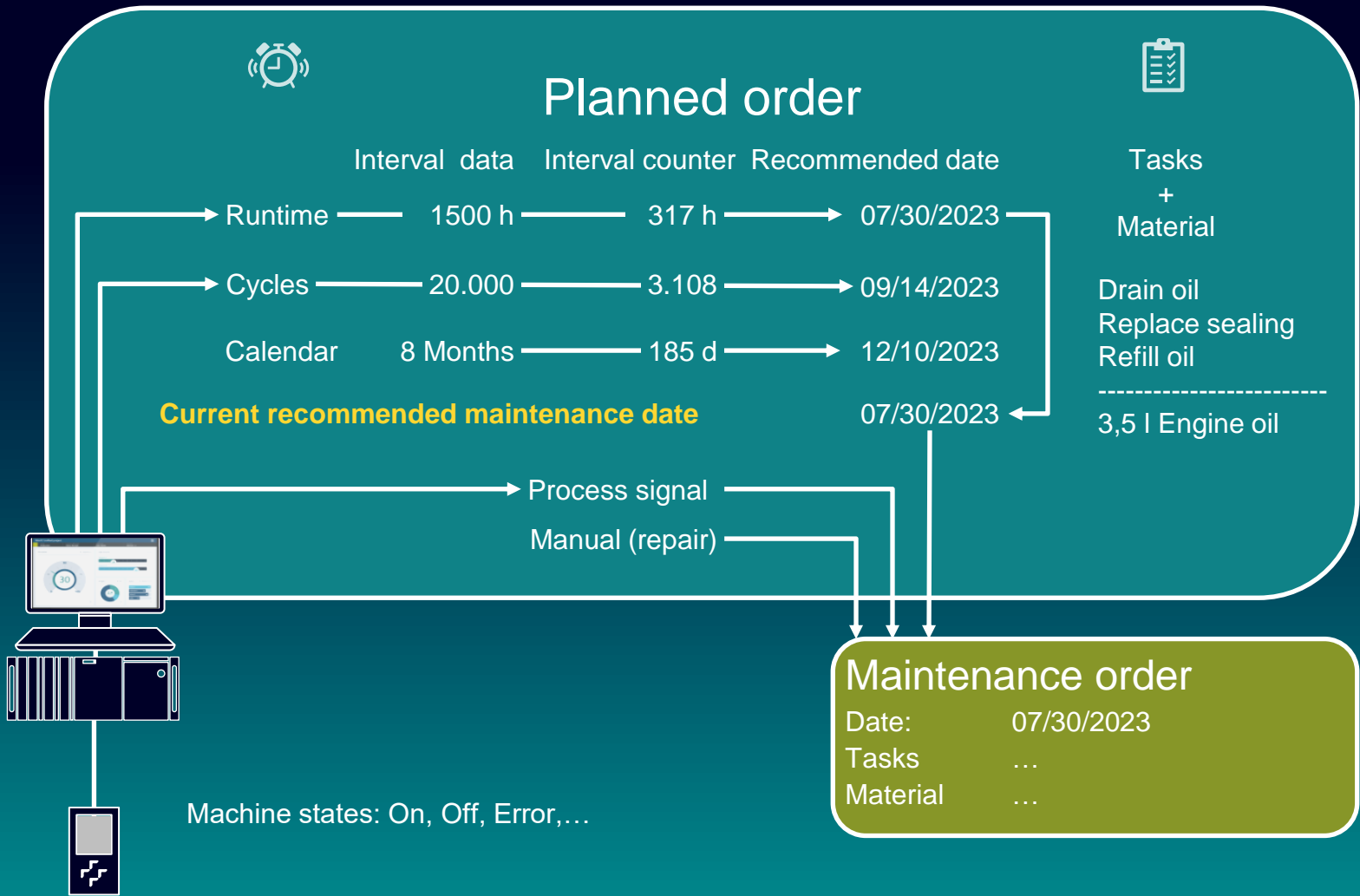
PM-MAINT

Plant objects and orders



PM-MAINT

Planning of maintenance orders

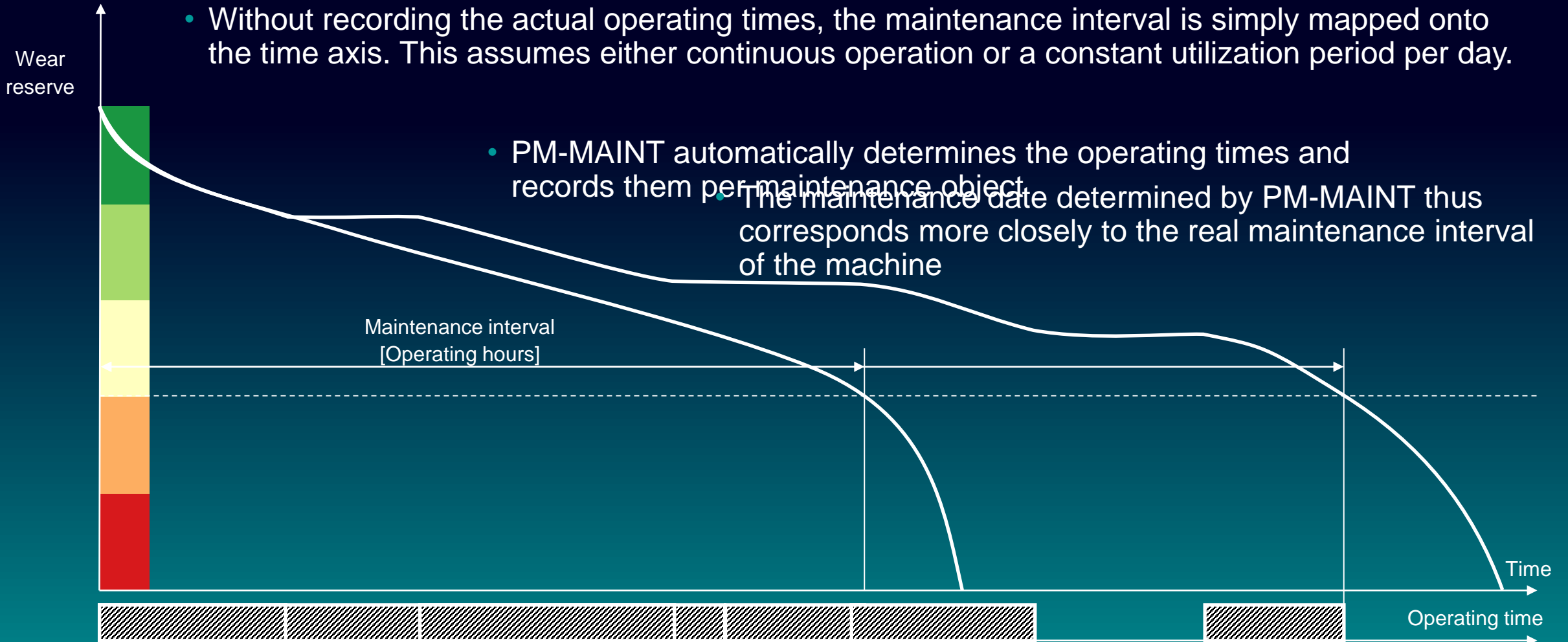


The maintenance intervals, activities and any material required are stored in the planned order. The machine states such as on, off, malfunction, required maintenance, are available in the HMI. PM-MAINT calculates the current interval counters and recommended dates. If multiple criteria are available to determine an expected maintenance date, the one closest in the future is indicated. An order can be created manually at any time in the case of a repair or automatically when a maintenance requirement is detected from the process.

PM-MAINT

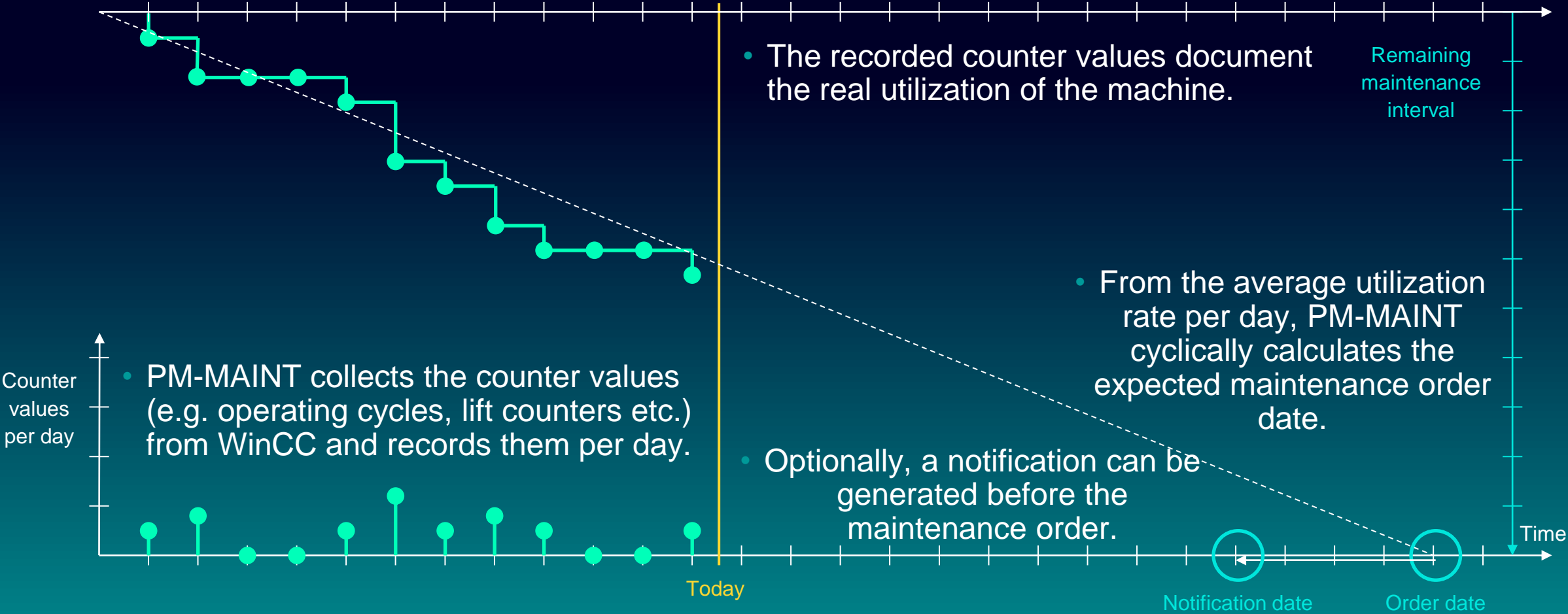
Maintenance dates: Calendar based vs. Operating hours

- Without recording the actual operating times, the maintenance interval is simply mapped onto the time axis. This assumes either continuous operation or a constant utilization period per day.



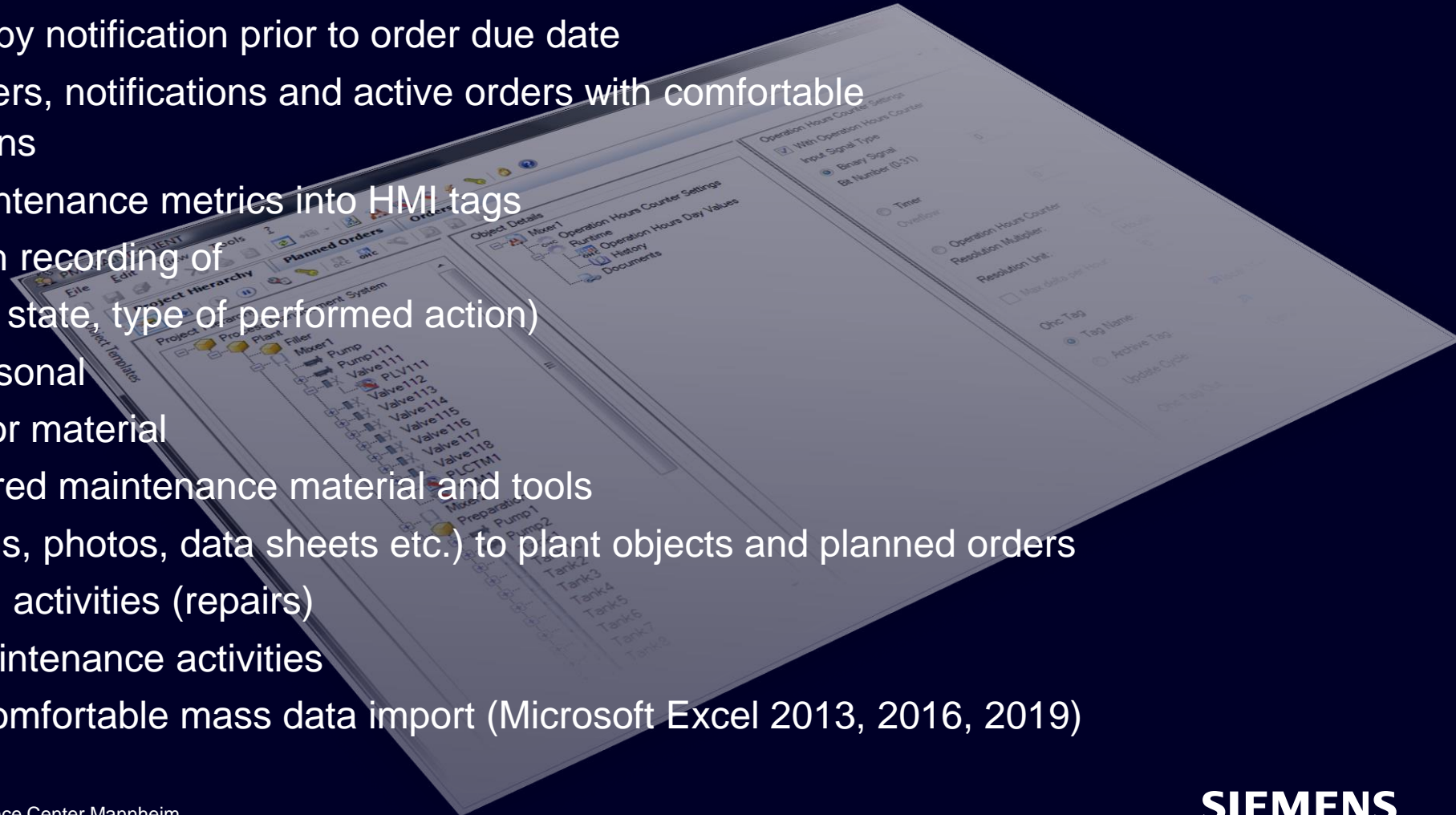
PM-MAINT

Performance based maintenance dates



PM-MAINT Highlights

- Automatic calculation of the recommended maintenance dates under consideration of the utilization
- Optimum resource planning by notification prior to order due date
- Clear display of planned orders, notifications and active orders with comfortable selection and filtering functions
- Write back capability for maintenance metrics into HMI tags
- Multiple order feedbacks with recording of
 - Feedback data (e.g. object state, type of performed action)
 - Cost and time input for personal
 - Cost and used quantities for material
- Central material list for required maintenance material and tools
- Linking of Documents (graphs, photos, data sheets etc.) to plant objects and planned orders
- Manual orders for unplanned activities (repairs)
- Long term archive for all maintenance activities
- Microsoft Excel Plug-in for comfortable mass data import (Microsoft Excel 2013, 2016, 2019)



PM-MAINT

Project hierarchy

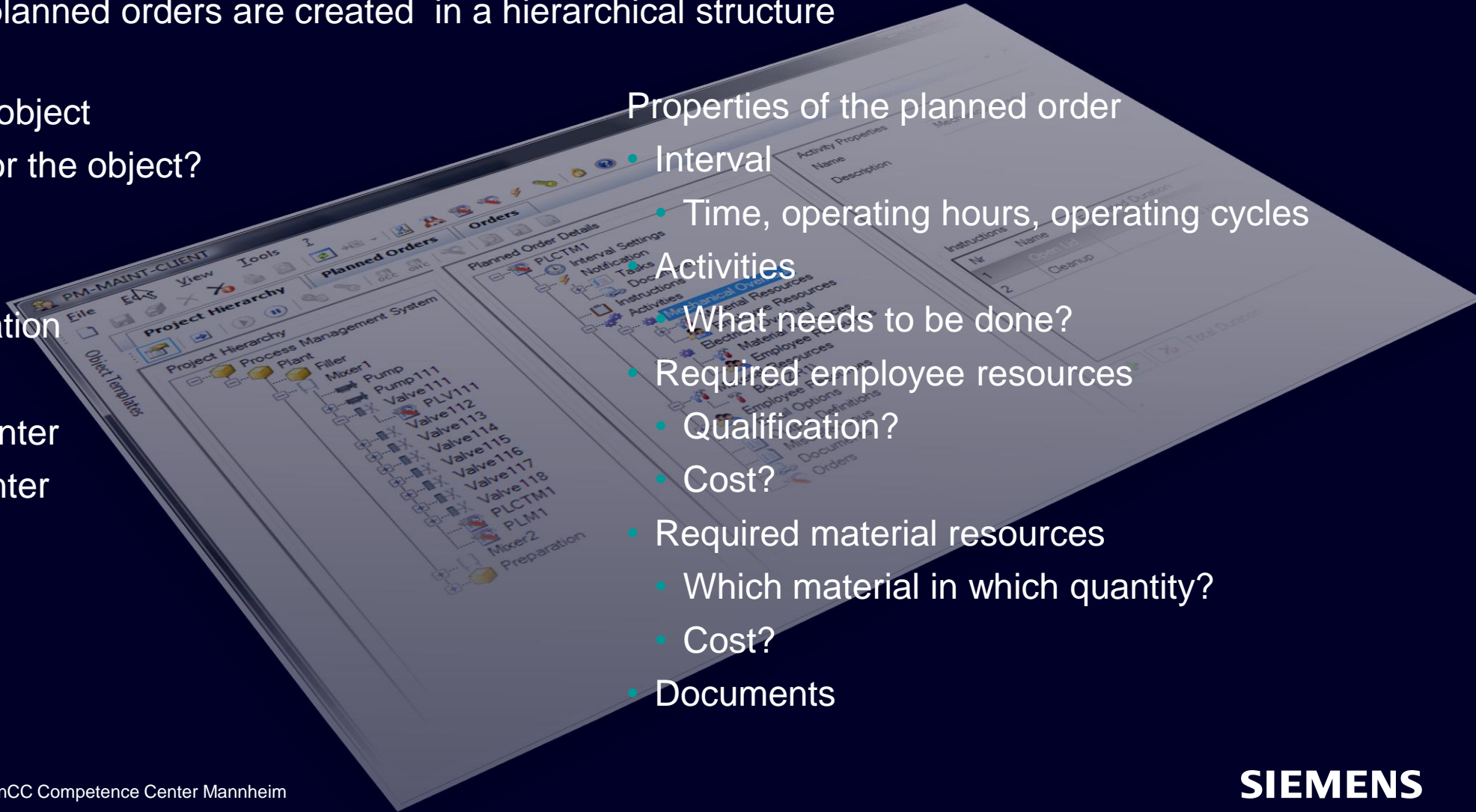
Objects and attached planned orders are created in a hierarchical structure

Properties of the plant object

- Who is responsible for the object?
- State
- Cost center
- Manufacturer information
- Vendor information
- Operating cycles counter
- Operating hours counter
- Documents
- ...

Properties of the planned order

- Interval
- Time, operating hours, operating cycles
- Activities
 - What needs to be done?
- Required employee resources
- Qualification?
- Cost?
- Required material resources
 - Which material in which quantity?
- Cost?
- Documents



PM-MAINT

Planned orders

- Up to date maintenance information is displayed for all planned orders
 - Remaining maintenance interval
 - Operating cycles counter / Operating hours counter
 - Last/Next maintenance date
 - Remaining number of operating cycles / operating hours until the next scheduled maintenance
- The view for planned orders can be filtered and sorted in various ways
 - By object type
 - By remaining maintenance interval
 - By recommended maintenance date
 - By position in the project hierarchy
 - ...and much more.
- User defined views can be defined for individual users, user groups, or globally for all users

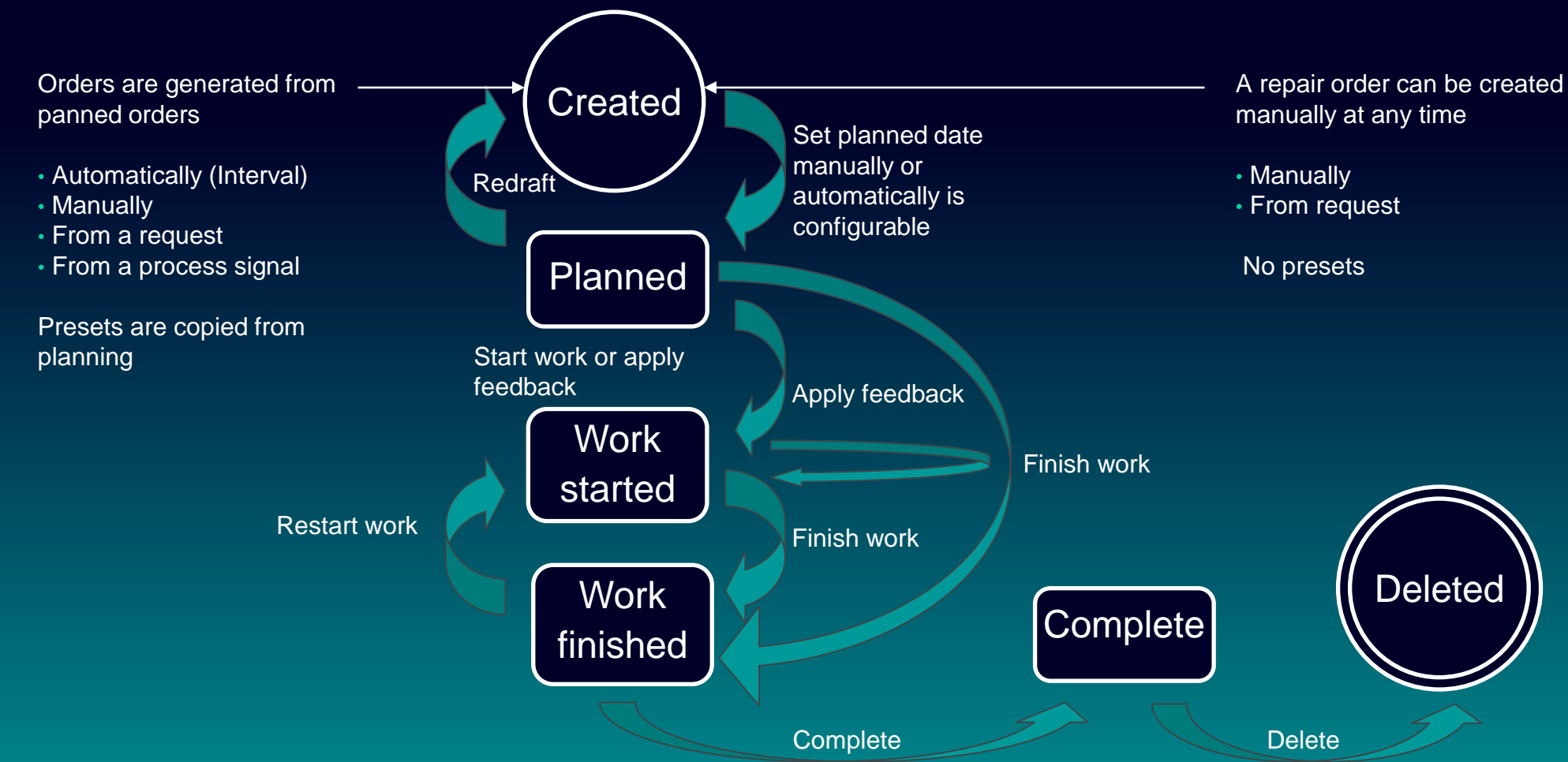
The screenshot displays the PM-MAINT-CLIENT software interface. The main window shows a table of planned maintenance orders. The table has columns for Order No., Name, Object, Interval, and Last Date. The data is as follows:

Order No.	Name	Object	Interval	Last Date
PLP211	PLM2	M2	170	
PLCTM2	PLV211	V211	140	
PLV211	PLV212	V212	50	
PLV212	PLV213	V213	142	
PLV213	PLV214	V214	164	
PLV214	PLV215	V215	158	
PLV215	PLV216	V216	164	
PLV216	PLV217	V217		
PLV217	PLV218	V218		

The interface also shows a sidebar with navigation options like Project Hierarchy, Planned Orders, and Objects. The main window has a title bar that reads 'PM-MAINT-CLIENT' and a menu bar with options like File, Edit, View, and Tools. The status bar at the bottom indicates 'Plant: Mixer2'.

PM-MAINT

Life cycle of maintenance orders

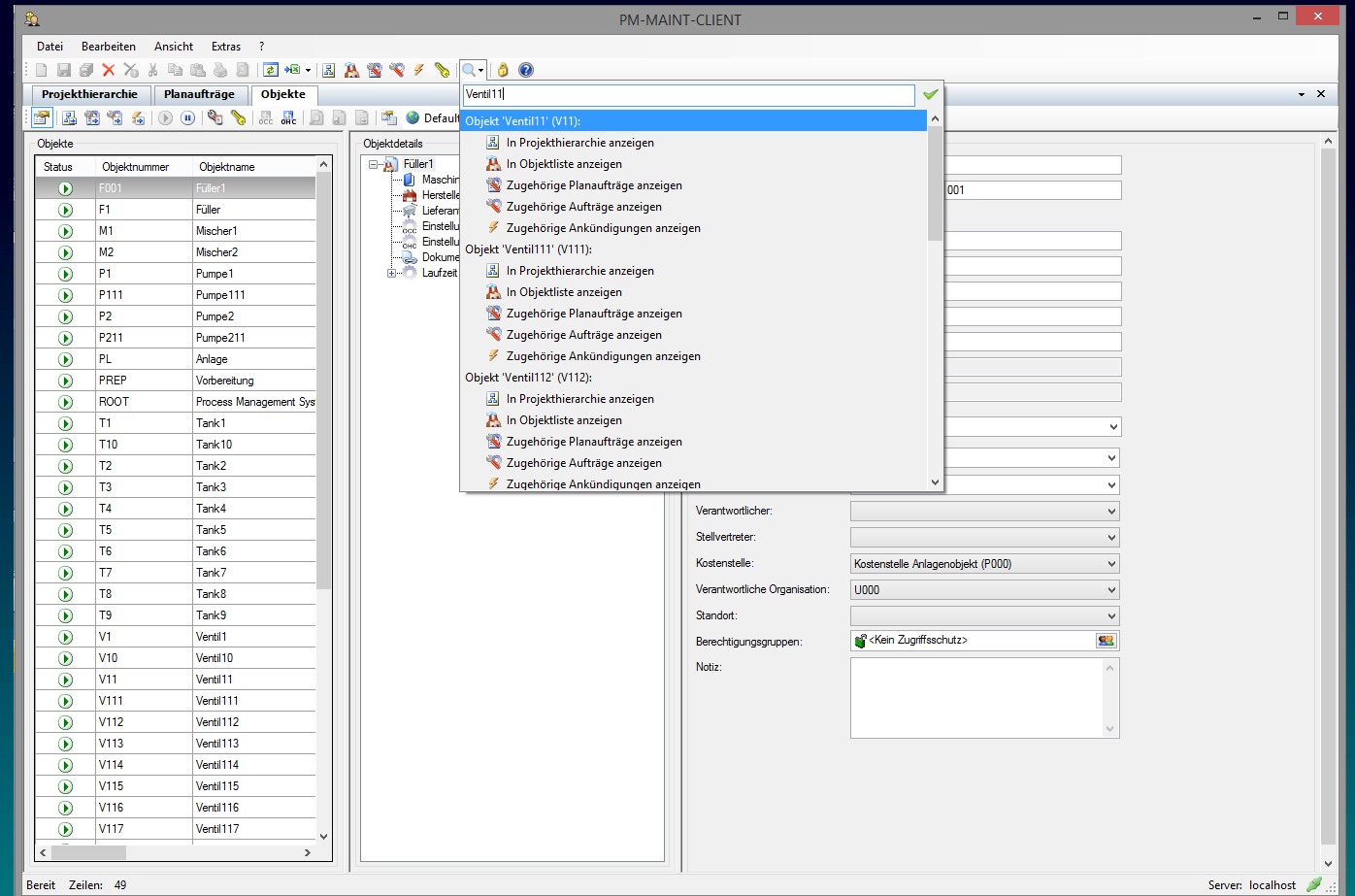


PM-MAINT

Search function

Allows instant retrieval of:

- Maintenance objects in the
 - Object hierarchy
 - Object list
- Planned orders
- Notifications
- Materials



PM-MAINT Object links

Drag & Drop of maintenance objects
onto the Windows desktop

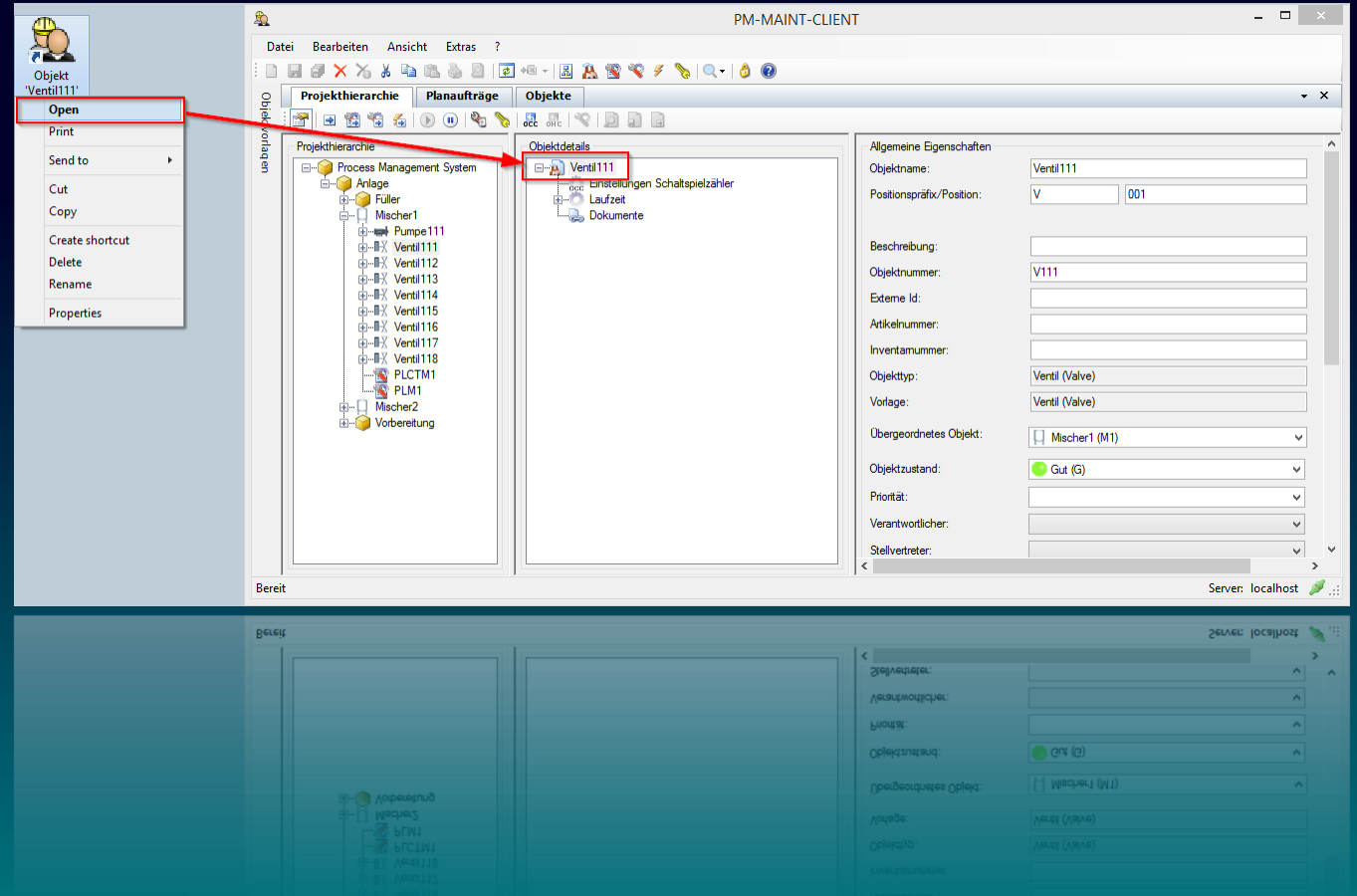
Quick search can be triggered from outside
by custom URL Format

e.g.

`pmm://object/V111?target=ProjectHierarchy`

`pmm://plannedorder/PLP211`

Allows to directly link screen objects to the
corresponding maintenance object



PM-MAINT Feedbacks

- Multiple order feedbacks can be applied until work finished state is reached
- Entry form for
 - Feedback date
 - Feedback and weak point code
 - Object state
 - Performed activities
 - Comments
 - Employee cost
 - Material cost

The screenshot displays the 'Feedback' entry form in a software application. The form is titled 'Feedback' and contains several sections for data entry.

Feedback Data:

- Feedback Text: 15.01.2013
- Feedback Date: 15.01.2013 11:45
- Order Activity: Inspect electrical
- Feedback Code: Inspection carried out (I)
- Weak Point Code: No notice (N)
- Object Condition: Good (G)
- Object State: Work Completed

Notes: The pump works good.

Employees and Materials:

Employee/Qualification	Time	Rate	Costs	Fix Costs	Total
Electrician	1.00 Hour	75.00 EUR/Hour	75.00 EUR		75.00 EUR

Material:

Material	Quantity	Unit Costs	Costs	Fix Costs	Total
Pump cleaner / Main warehouse	1.01	50.00 EUR	50.00 EUR		50.00 EUR
Screwdriver standard 5mm / Toolshop	1 pcs	10.00 EUR	10.00 EUR		10.00 EUR

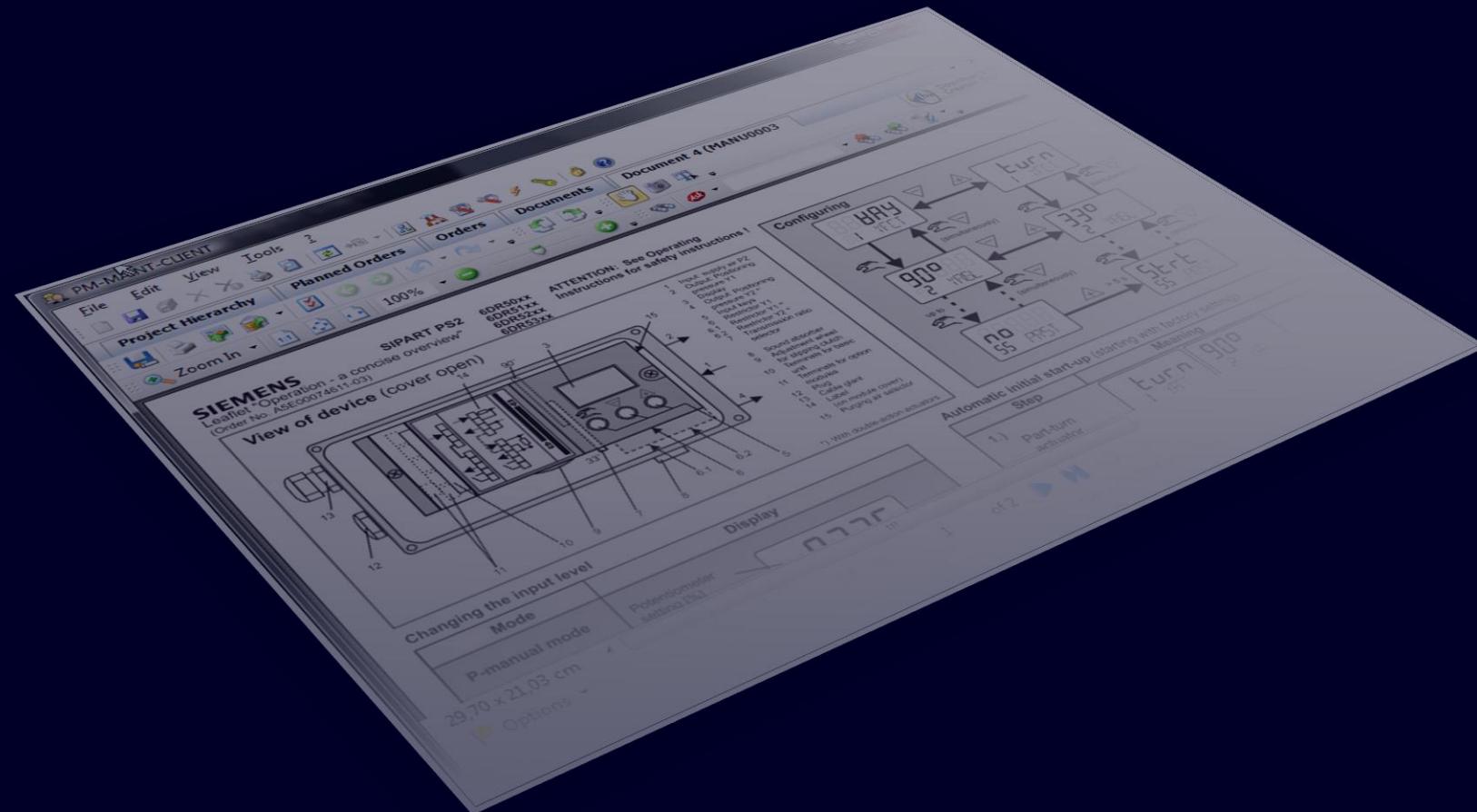
Summary:

- Total Employee Costs: 75.00 EUR
- Total Material Costs: 60.00 EUR
- Total Costs: 135.00 EUR

Total Working Time: 1.00 Hour

PM-MAINT Documents

- Each object, planned order or order can be linked to an arbitrary number of documents
 - Characteristics curve
 - Photos
 - Data sheets
 - Descriptions



PM-MAINT Materials

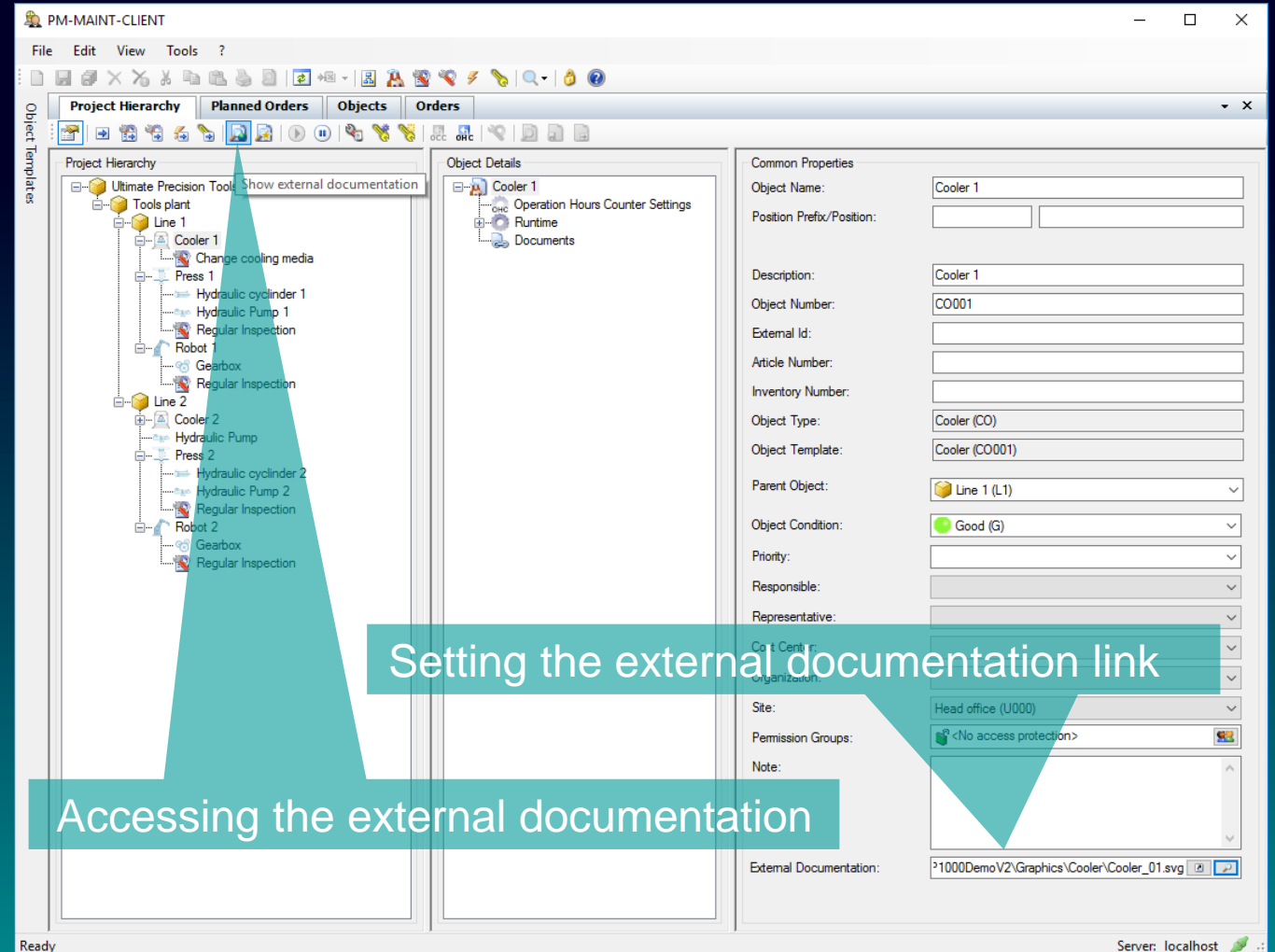
- All maintenance relevant material is managed and displayed in the material list
- Comfortable filtering and sorting functions

State	Material Number	Name	Article Number	Unit	Costs Per Unit	Manufacturer
	BEAR10/24	Bearing 10/24mm	ART-BEAR10/24	pcs	15.00 EUR/pcs	
	BEAR20/40	Bearing 20/40mm	ART-BEAR20/40	pcs	25.50 EUR/pcs	
	ZR1	Brushes	ART-BR01	pcs	13.50 EUR/pcs	
	BR01	Grease	ART-CONG1	pcs	75.00 EUR/pcs	
	CONG1	Motor oil			25.00 EUR/pcs	
	MA0000000	Oil filter	ART-OEL1	pcs	0.00 EUR/pcs	
	OEL1	O-ring seal 12mm	ART-OELF1	pcs	18.90 EUR/pcs	
	OELF1	O-ring seal 14mm	ART-DR12	pcs	6.50 EUR/pcs	
	DR12	O-ring seal 7mm	ART-DR14	pcs	1.75 EUR/pcs	
	DR14	Pressure hose	ART-DR7	pcs	0.00 EUR/pcs	
	DR7	Pump cleaner	ART-HOSE9	pcs	1.50 EUR/pcs	
	HOSE9	Screw wrench 13mm	ART-CL3	pcs	30.00 EUR/pcs	
	CL3	Screw wrench 17mm	ART-SS13	pcs	50.00 EUR/pcs	
	SS13	Screwdriver standard 3mm	ART-SD3	pcs	1.50 EUR/pcs	
	SS17	Screwdriver standard 5mm	ART-SD5	pcs	5.00 EUR/pcs	
	SD3	Screwdriver standard 7mm		pcs	10.00 EUR/pcs	
	SD5					

PM-MAINT

Linking to external documentation

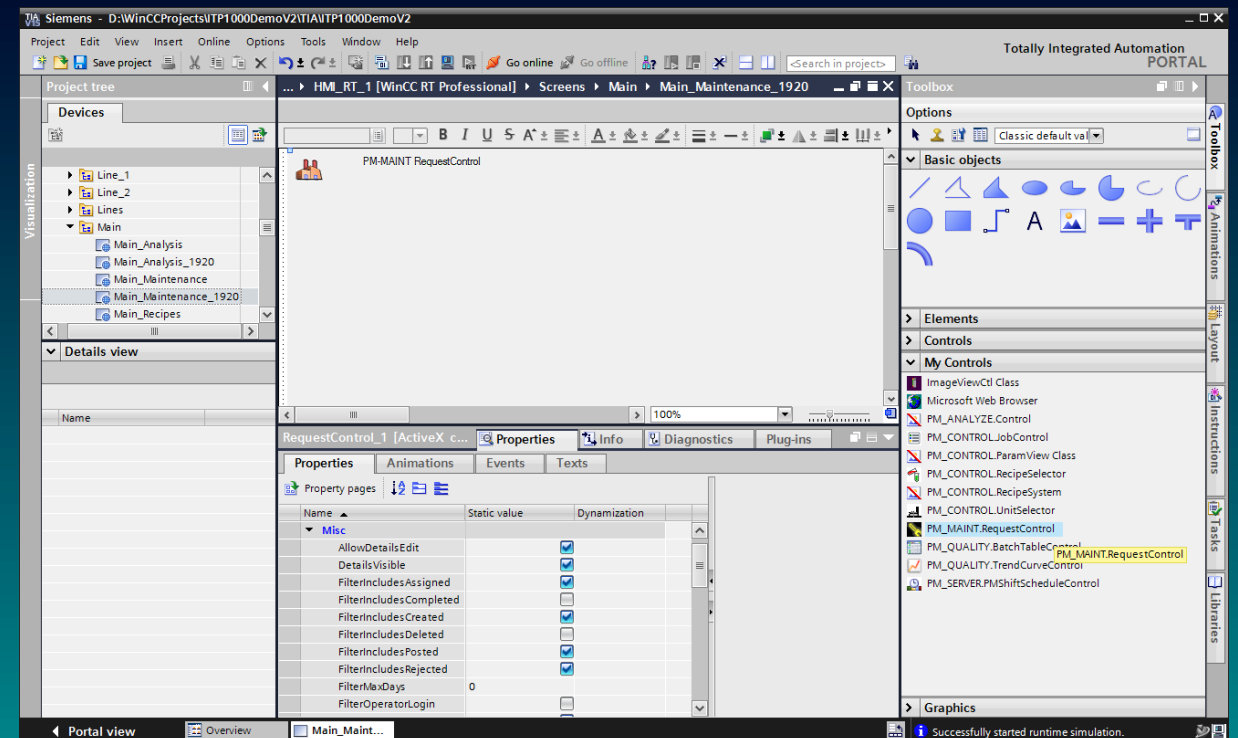
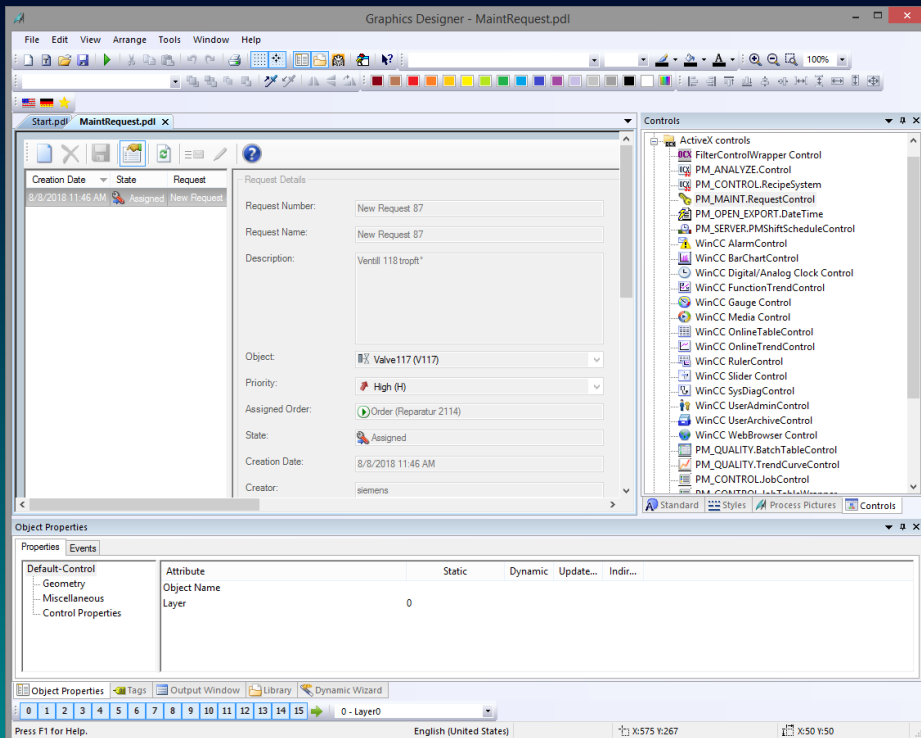
- An external documentation link can be set for
 - objects,
 - planned orders and
 - Orders
- and can be accessed directly with a toolbar button
- Used to integrate into enterprise wide installed third party document management systems



PM-MAINT

Repair requests

- ActiveX Control for the entry and the tracking of repair request by the operating personal
- Integration into local HMI screens
 - WinCC V7, V7, PCS 7
 - WinCC Professional / Advanced (TIA Portal)



PM-MAINT

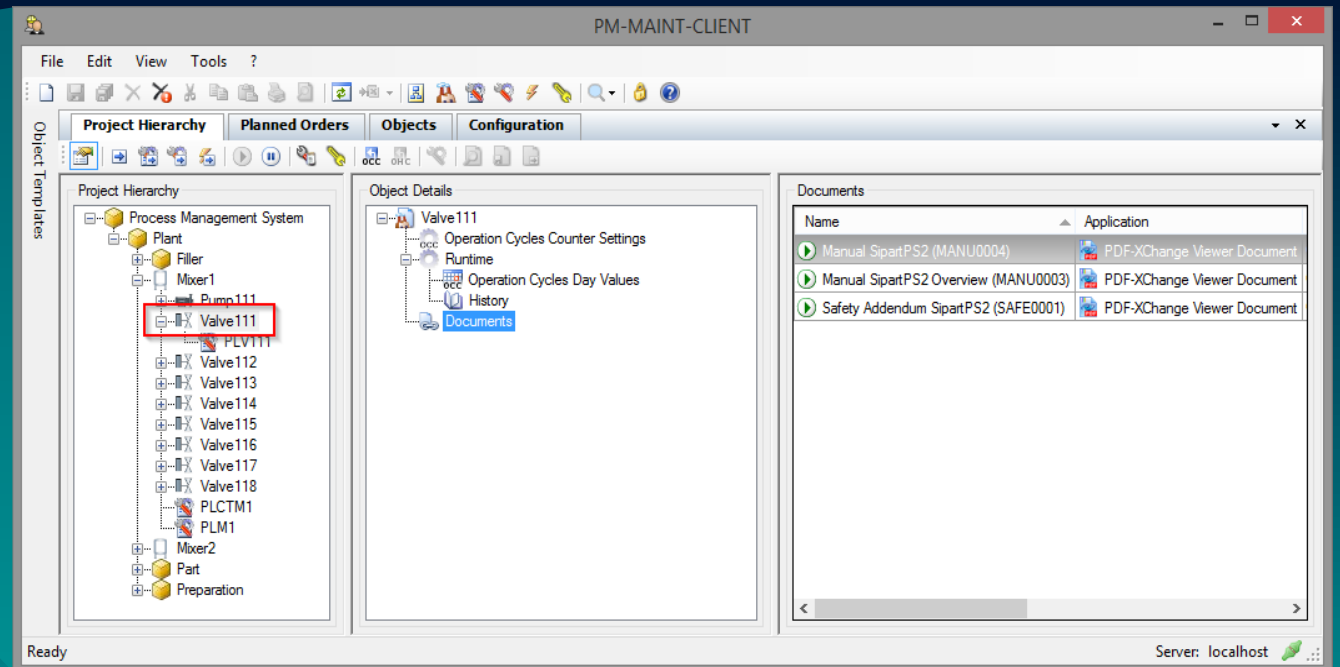
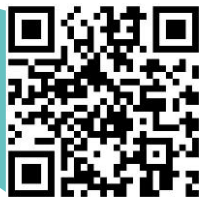
Maintenance information always immediately available

- The ITP1000 is an excellent robust and mobile client platform for maintenance tasks
 - All maintenance information is immediately available and always up to date
- PM-MAINT supports the QR code reader of the ITP1000 to identify maintenance equipment

Valve V111 ?



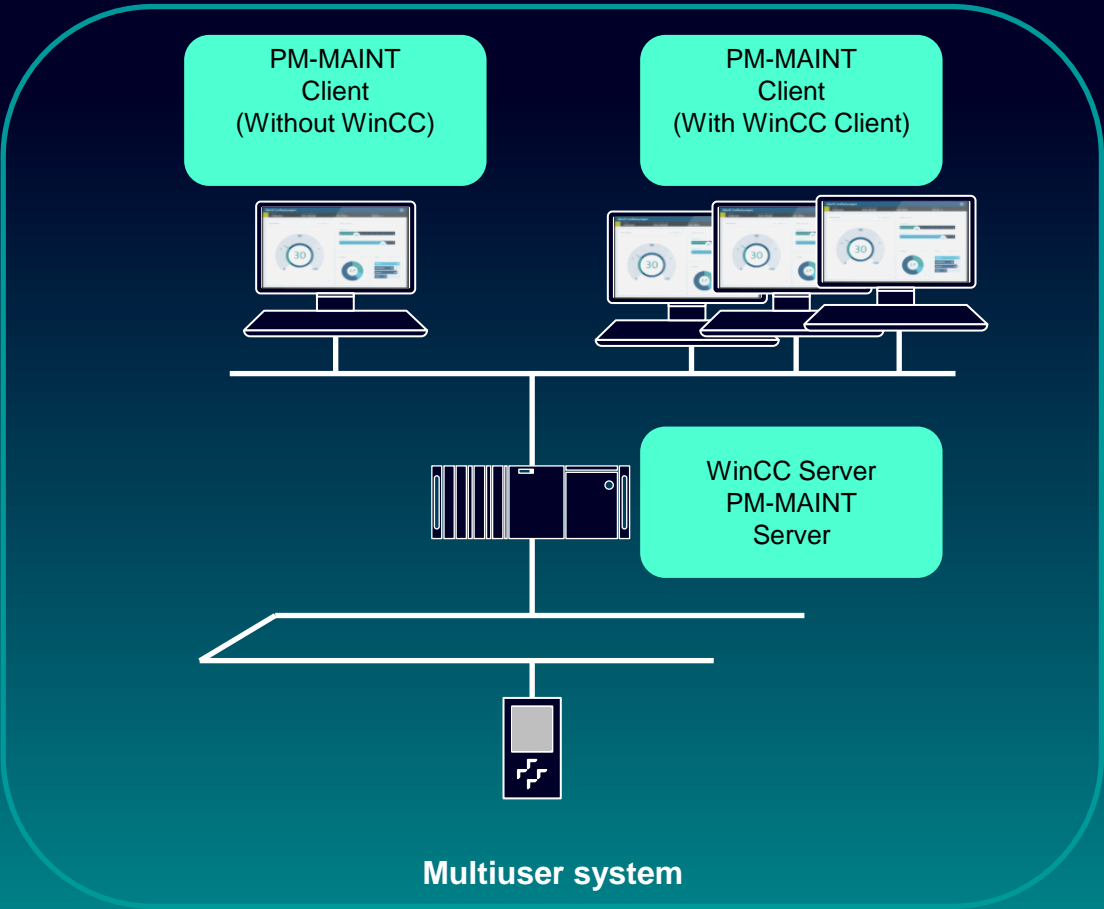
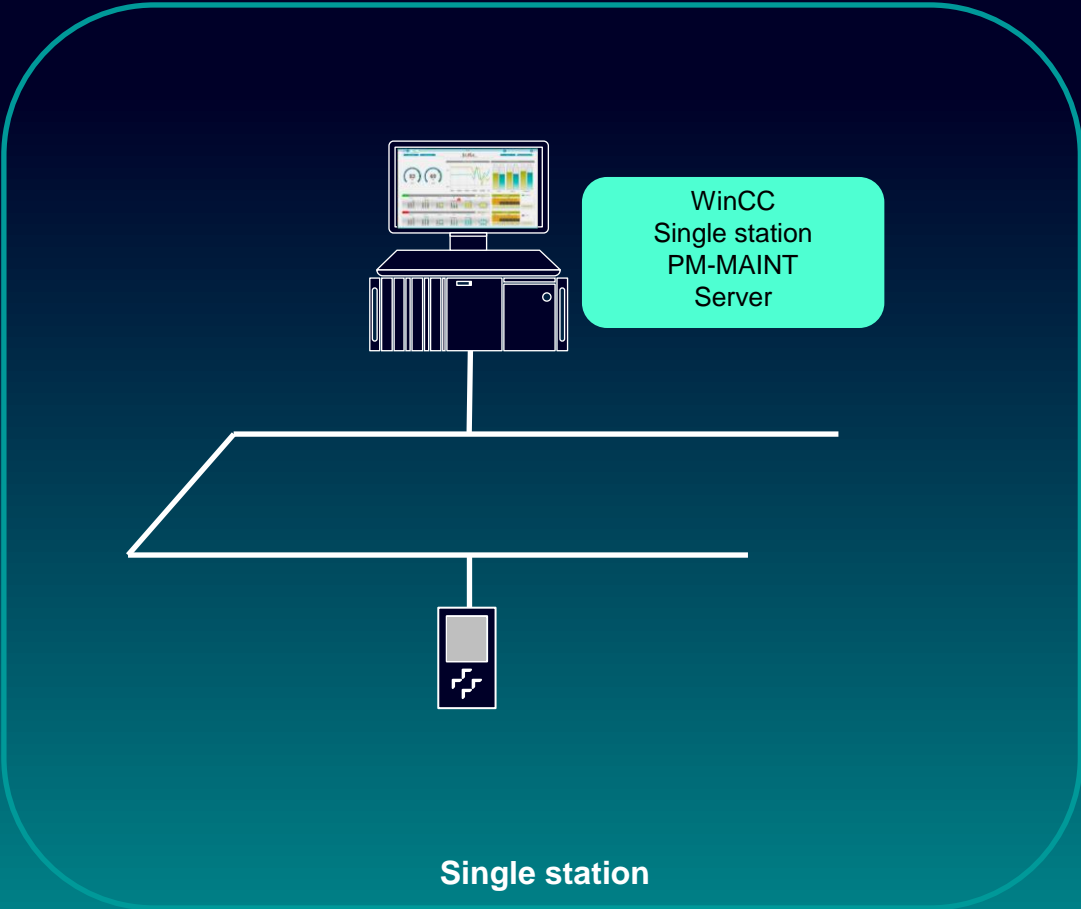
pmm://object/V111



PM-MAINT

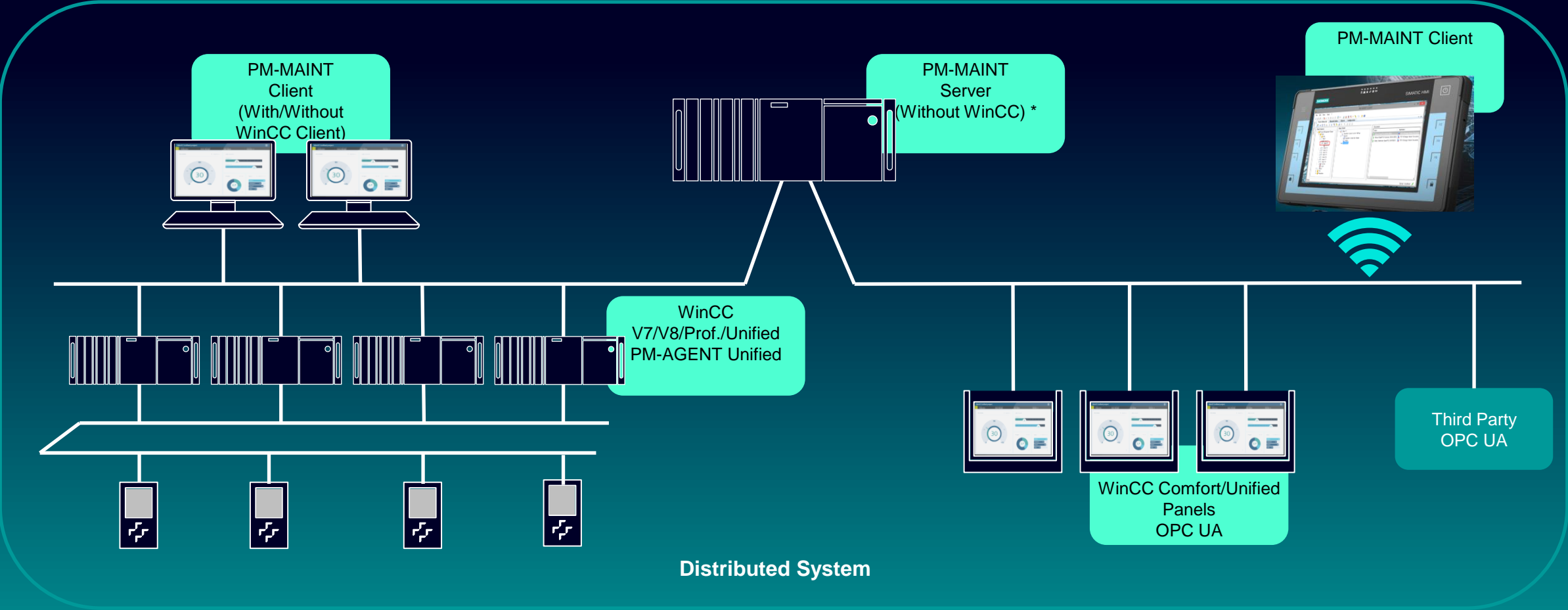
Installation scenarios

For released SIMATIC WinCC and operating systems please refer to the latest release notes.



PM-MAINT Installation scenarios

*Installation on a separate server without WinCC requires a Microsoft SQL Server 2014, 2016, 2017, 2019, 2022 installation.



PM-MAINT

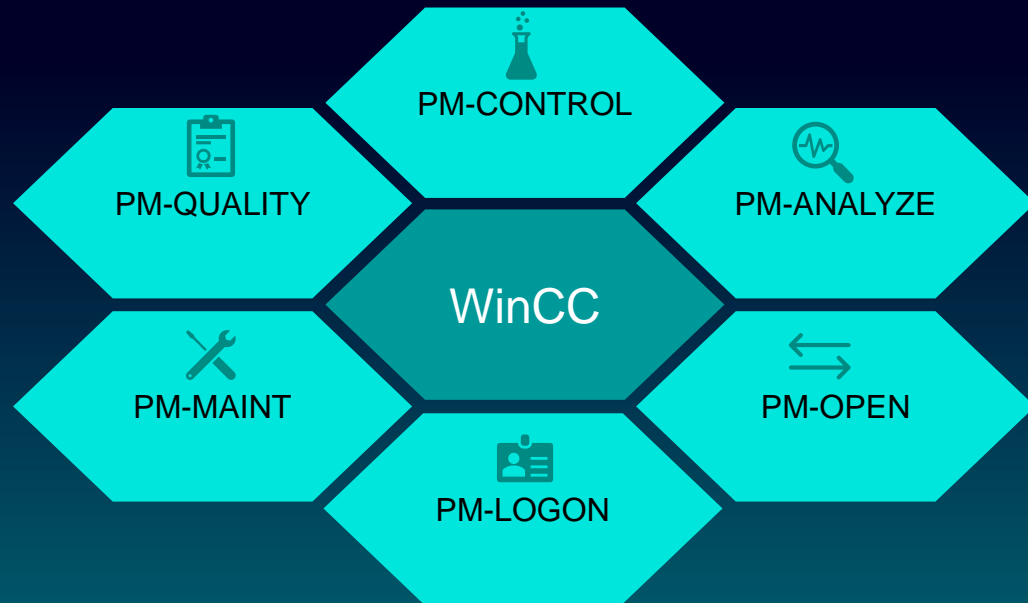
Ordering information

- Scalable from simple up to complex plant topologies:
 - **Basic installation** (One server with integrated client and local PM-AGENT Unified)
 - Server: 9AE7 104-2SS30-1AA0
 - **Additional client workplace**
 - Client: 9AE7 104-4SC00-1AA0
 - **Connection to additional systems** (WinCC, PCS 7, WinCC RT Prof., WinCC Unified PC-Runtime)
 - PM-AGENT Unified 9AE7 117-2SS01-1AA0

| PM-ANALYZE

Archives, analysis and reports

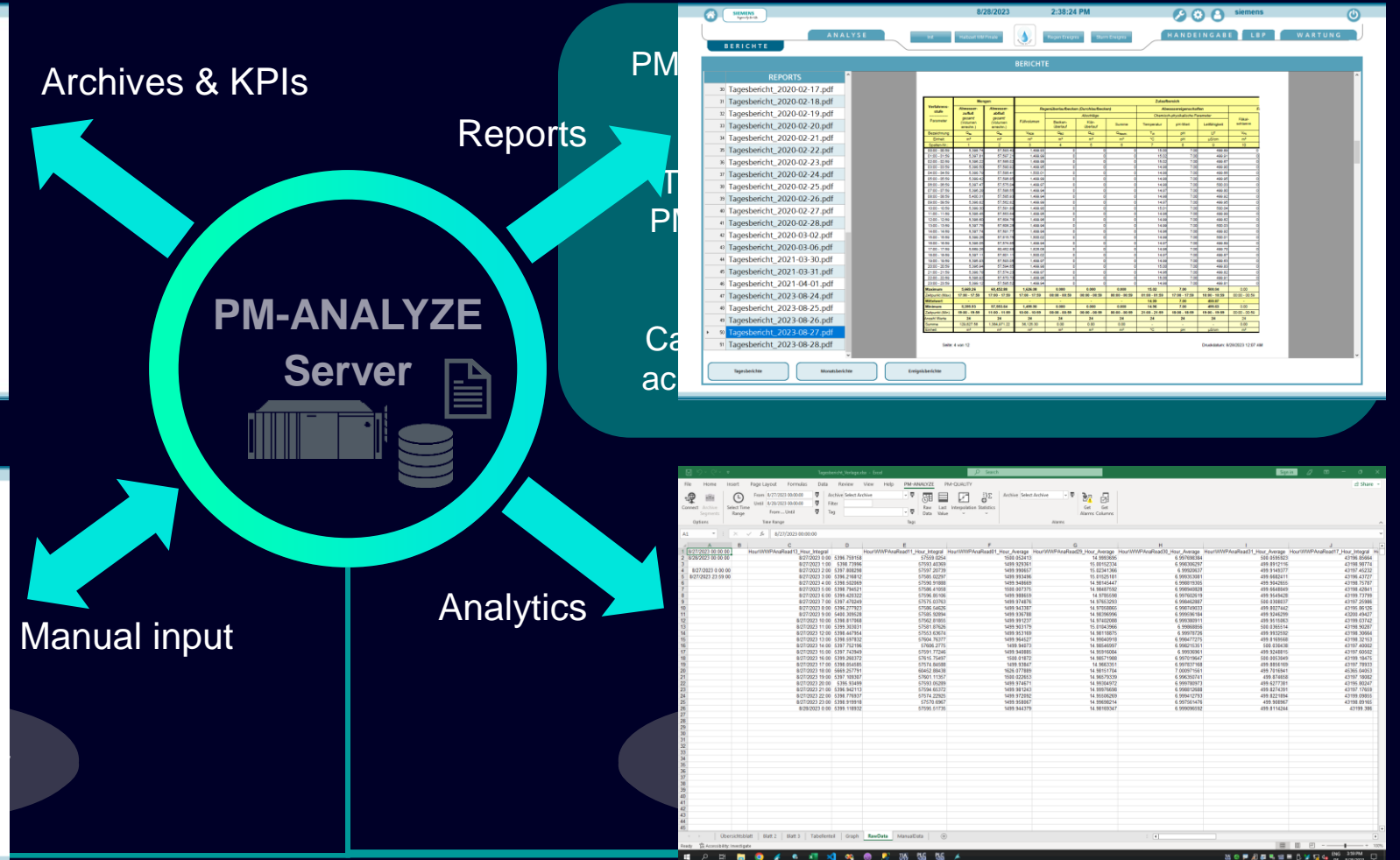
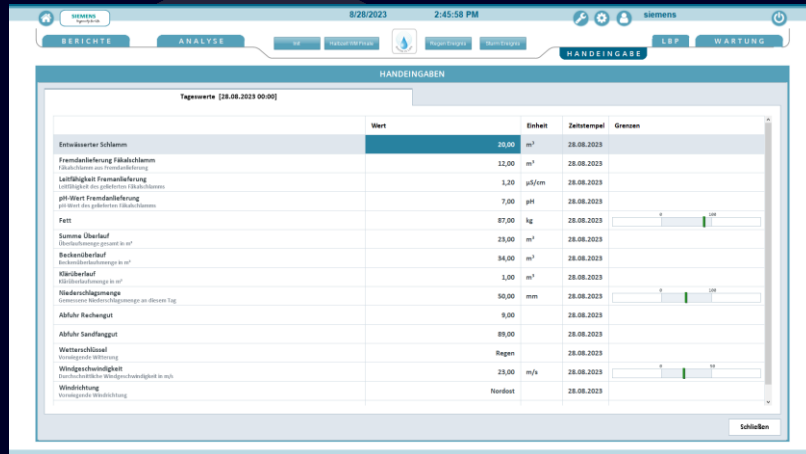
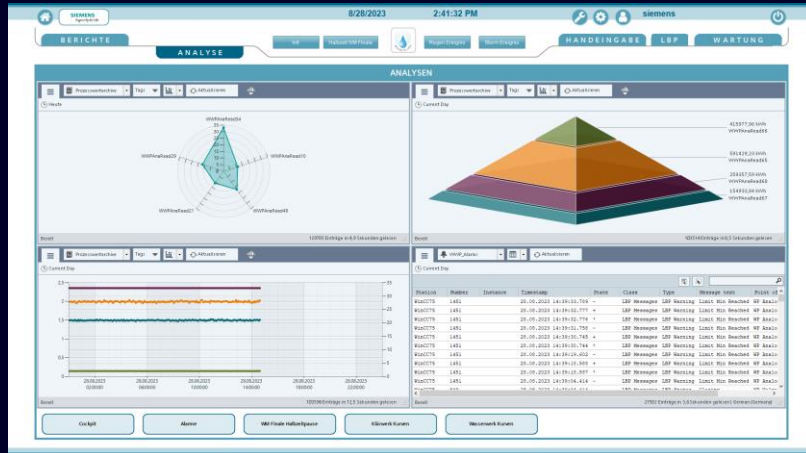
PM-ANALYZE



- Archiving and analysis of process data from
 - WinCC V7, V8, PCS 7,
 - WinCC Professional / Advanced / Comfort / Unified
 - Event log of the operating system,
 - Third party via OPC DA/UA and file import
- Archiving, display and analysis of alarms
 - Across multiple systems in correct chronological order
- Process value archives for historical data with flexible calculation and aggregation functions
- Comfortable trend and alarm viewer
 - As stand-alone application in the office
 - Integrated in HMI screens
- Report generation with Microsoft Excel

PM-ANALYZE

Flexible, scalable, integrated with WinCC



PM-ANALYZE

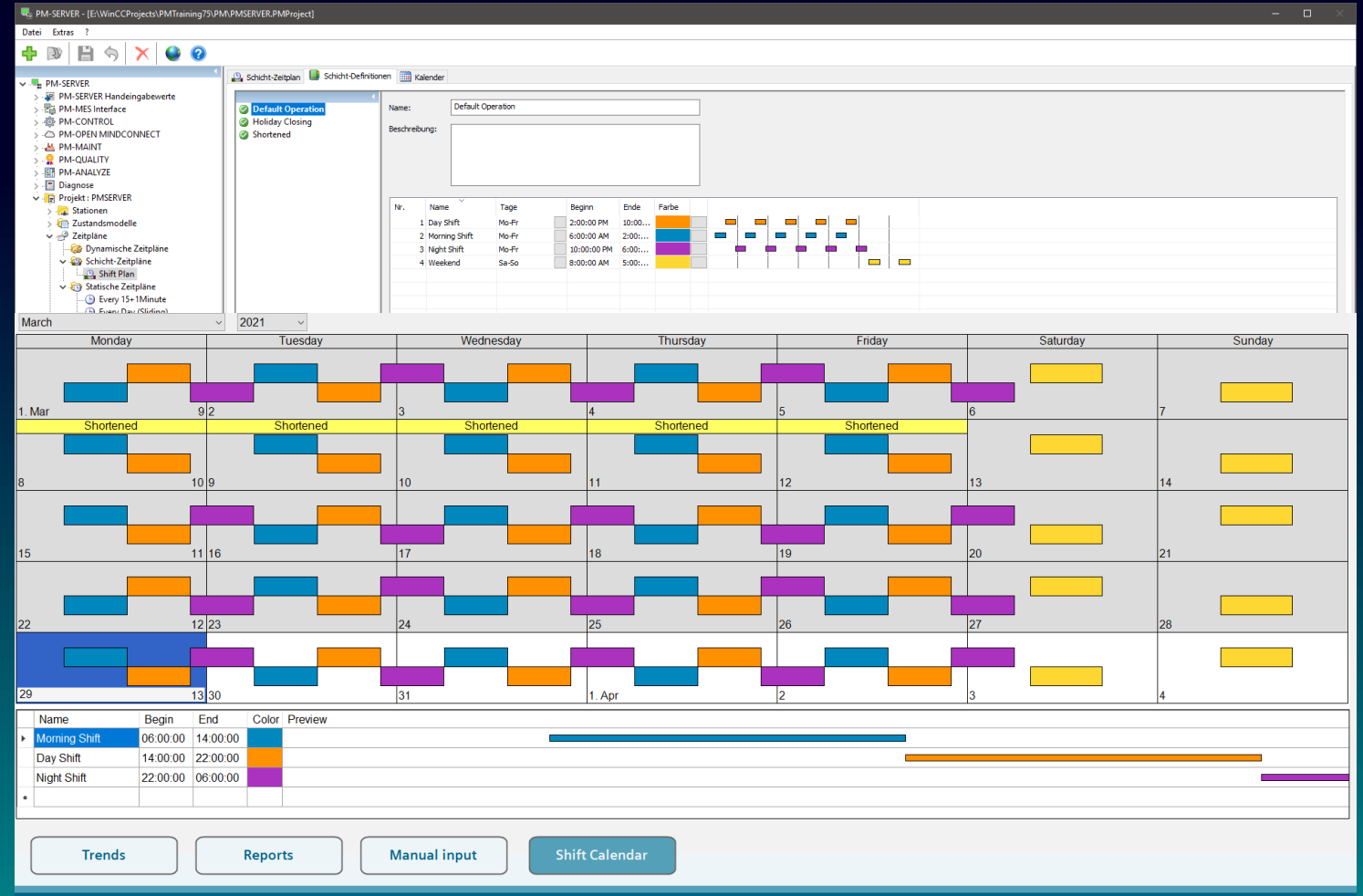
Display and analysis

- Comfortable display and filter functions for e.g. the operator input message log
- Analysis of process alarms
- Calculation of KPIs and display inside the HMI
- Display of process states as a Gantt chart
- Completely integrated or as a stand-alone client



PM-ANALYZE Reports

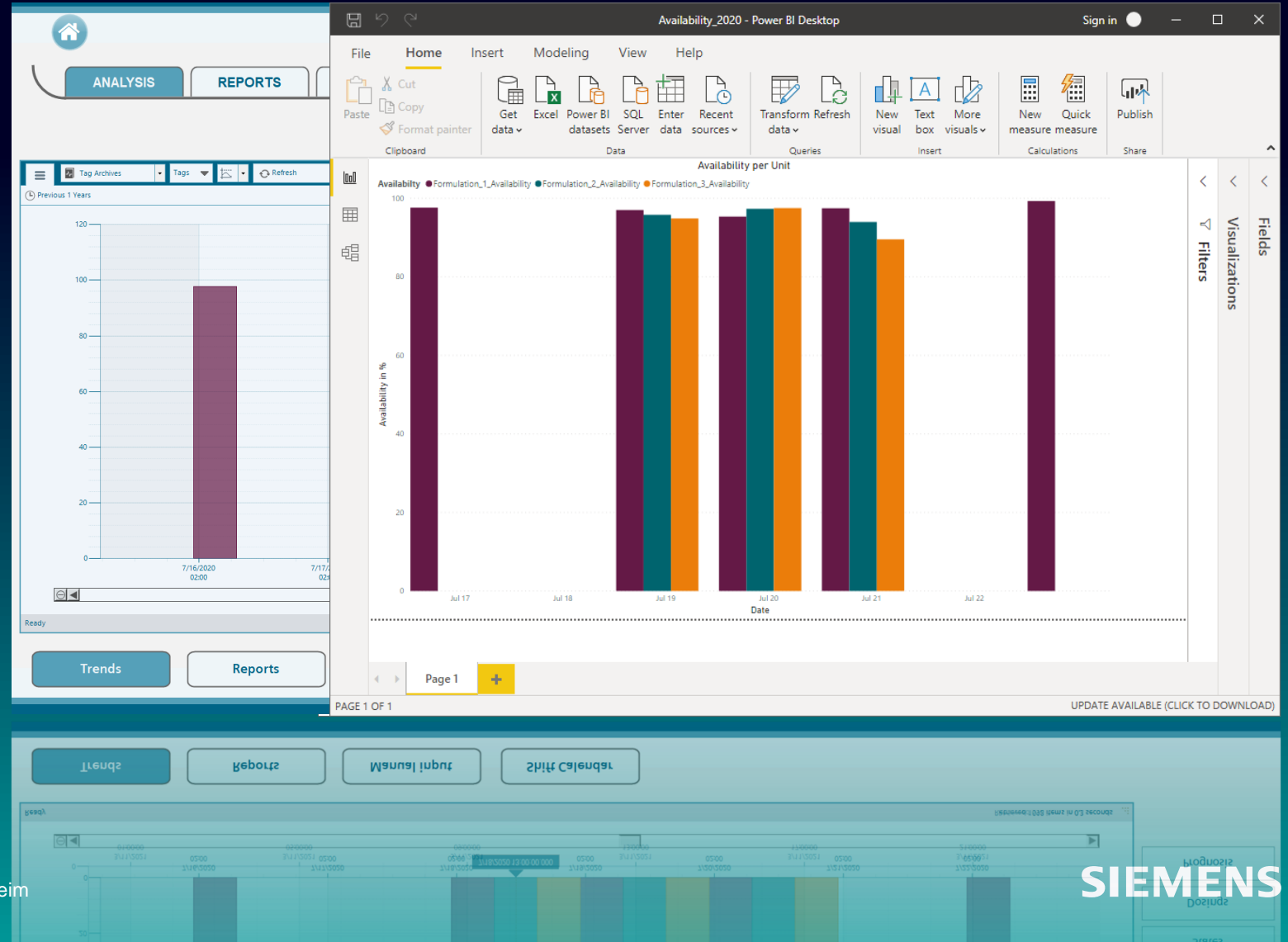
- Easy access to all archive data with Microsoft Excel
- Automatic report generation e.g. by day, week, month, shift, event and much more.
- Integrated shift calendar



PM-ANALYZE

Openness and interfaces

- KPIs calculated by PM-ANALYZE can be provided to other systems in various ways e.g. WinCC WebUX
- Enterprise reporting systems like Microsoft Reporting Services or Power BI can be easily connected via database APIs or the integrated REST API



PM-ANALYZE

KPI Control for WinCC Unified and WinCC V8

- KPIs calculated by PM-ANALYZE can be displayed and combined into online configurable dashboards
- Various card types available like Single value, Trend, Gauge, Pie / Donut, Bar
- Extensive styling support for seamless integration into corporate designs



PM-ANALYZE

Gantt Chart Control for WinCC Unified and WinCC V8

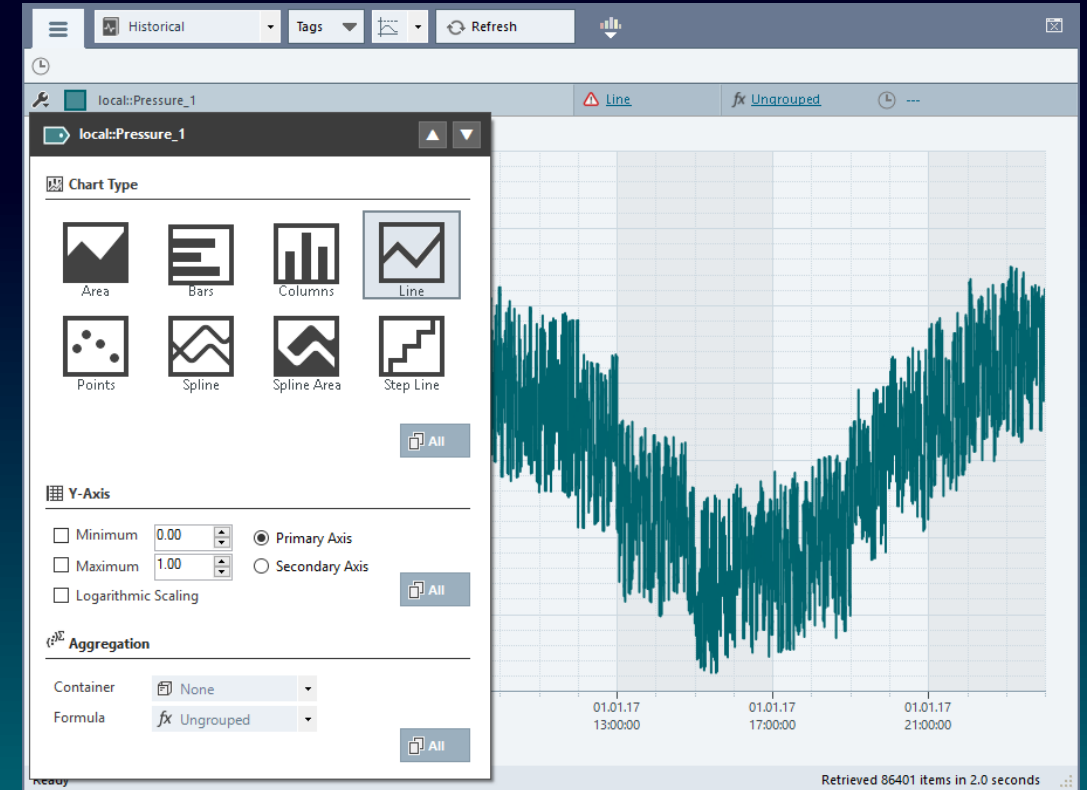
- Process states can be visualized in a Gantt Chart Control
- States can be summarized by duration and number of occurrences in a pareto chart
- Extensive styling support for seamless integration into corporate designs



PM-ANALYZE Trends

Data display as standalone client application
or as a Control within the HMI

- Various trend displays
 - Area
 - Bars, Columns
 - Doughnut, Pie
 - Line, Step line, Points
 - Spline, Spline area
- Aggregation of process values in the display (Min, Max, Avg, Sum, First, Last, Count)
- Various aggregation intervals within the display



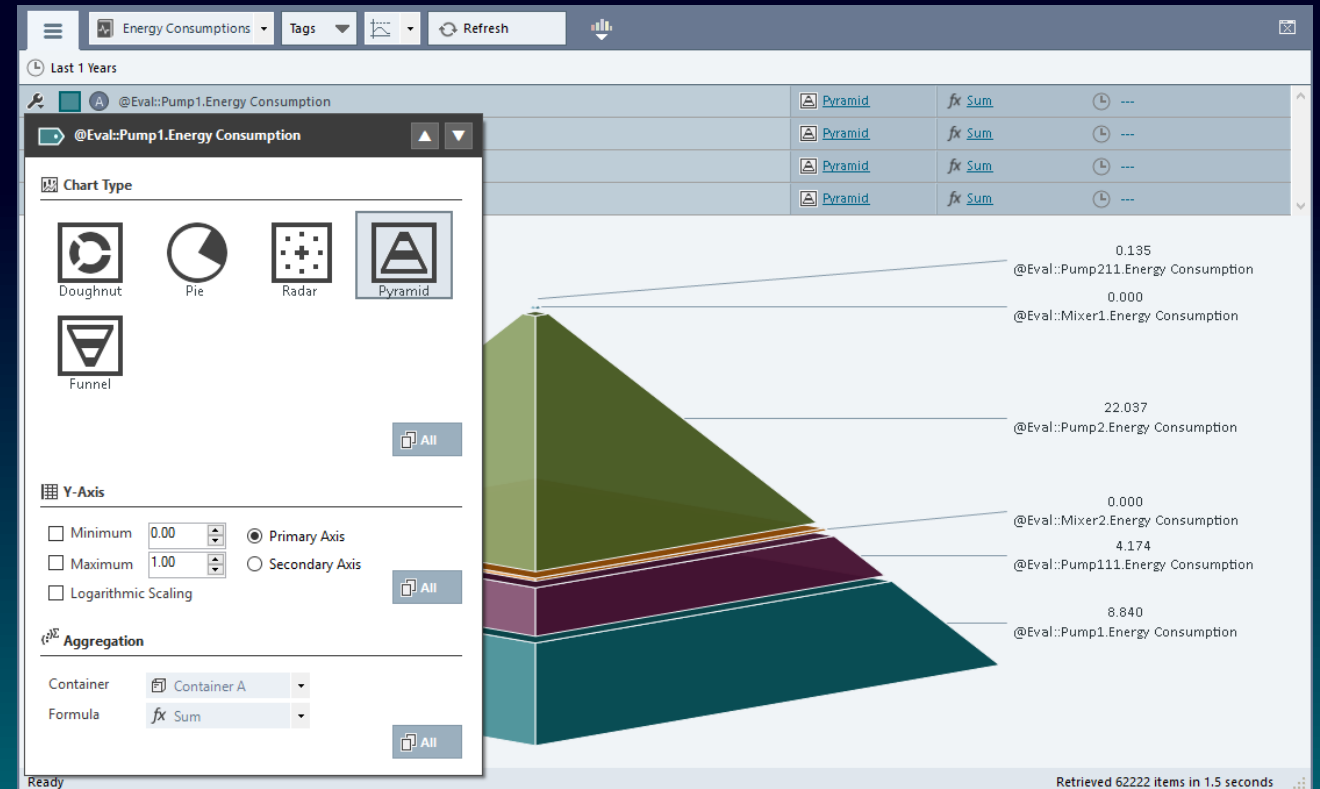
PM-ANALYZE

Trends

- To compare value series the display types Doughnut, Pie, Radar, Pyramid and Funnel are available

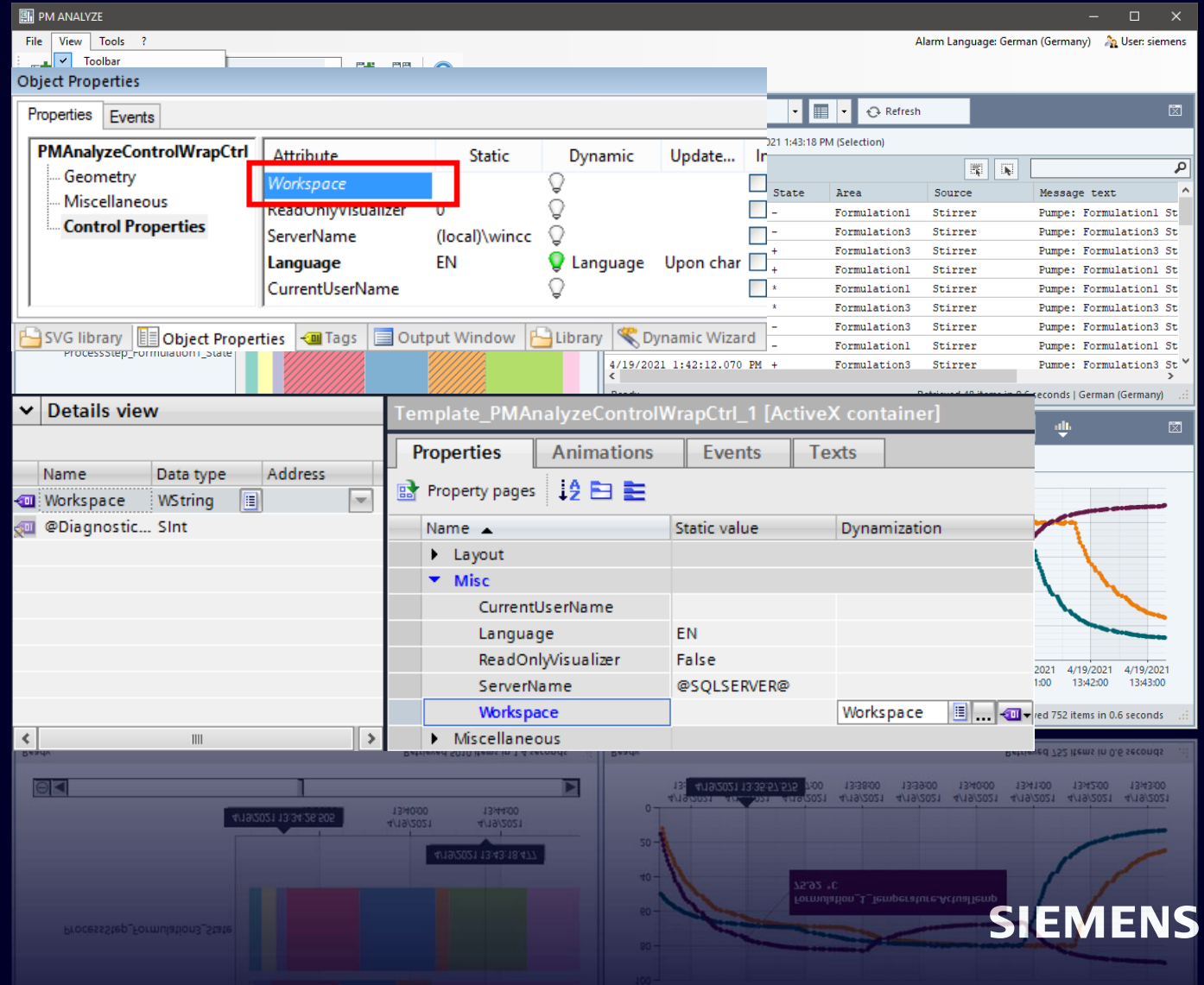
Within these diagrams the aggregated values (Sum, average etc.) of the time series are available for comparison

- Which data series are to be compared in one diagram is defined by the assignment to one of the five aggregation containers



PM-ANALYZE Workspaces

- Workspaces to store view configurations
 - Globally for all users
 - Individually for the current user
- Inside the HMI the workspace is available as a property
 - Either statically preset in the graphics designer or
 - Dynamically set at runtime via
 - Direct connection
 - Tag connection
 - ...



PM-ANALYZE Workspaces

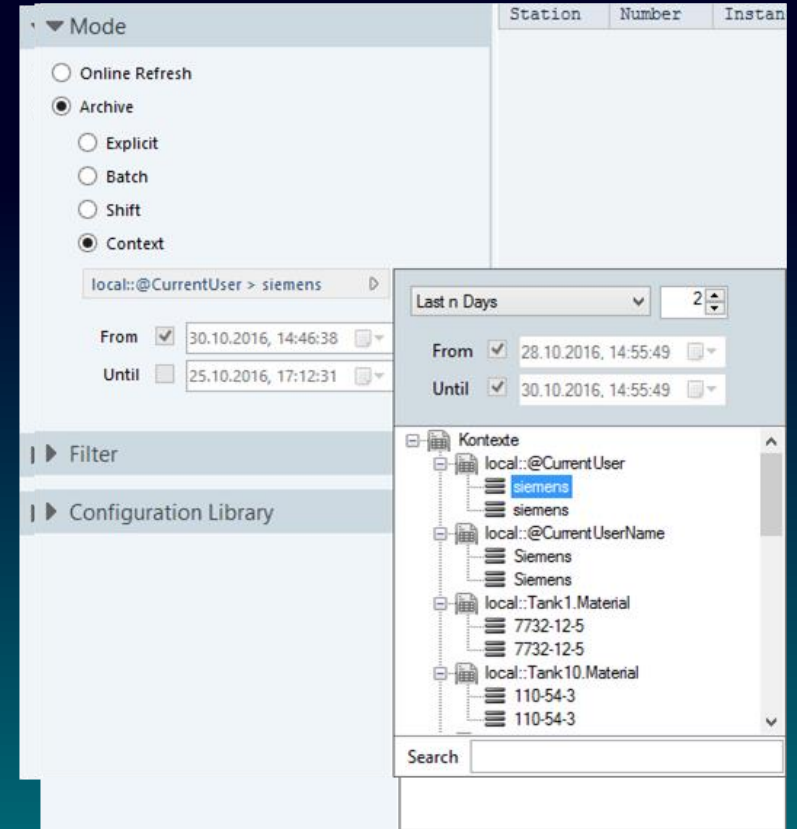
- Combined display of alarms and trends
- Variable number and layout of the display panels
 - Time range between panels can be synchronized
- Comparison of different time periods
 - (Comparison with previous day/week/month...)
- “Follow selection” mode for interactive drill down functionality from master to dependent panels



PM-ANALYZE

Time range selection

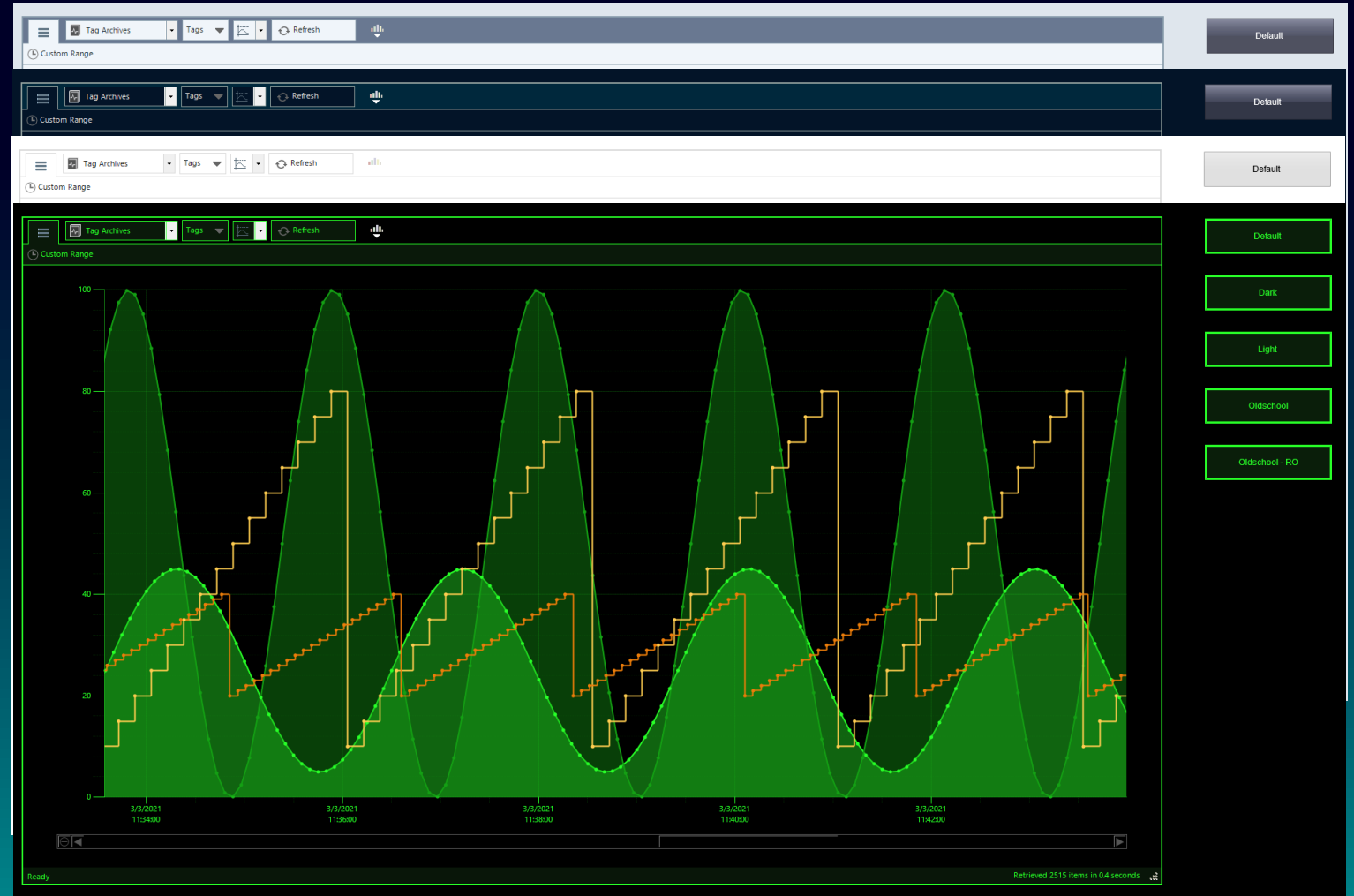
- Explicitly over different relative periods
 - last/previous n hours/days/weeks/month/quarters/years
- Batch run time if installed together with PM-QUALITY
- Shift definitions from PM-SERVER shift plans
- Contexts from the PM-SERVER context archive



PM-ANALYZE

Adjustable color schema

- The PM-ANALYZE display can be customized in many ways to match the design of the surrounding WinCC project and thus fits seamlessly into the user interface.



PM-ANALYZE

Alarm analysis

- Frequency analysis – Number of alarms by number of occurrences (location clustering)
- Volume analysis – Number of alarms with a specific time period, split into multiple sub intervals (period clustering)
- Flickering analysis – Identification of alarms that are occurring in bursts
- Duration analysis – Total duration how long a specific device was failing within a given analysis period
- Display either as a separate client application or integrated in WinCC
- Direct transfer of analysis results to Microsoft Excel

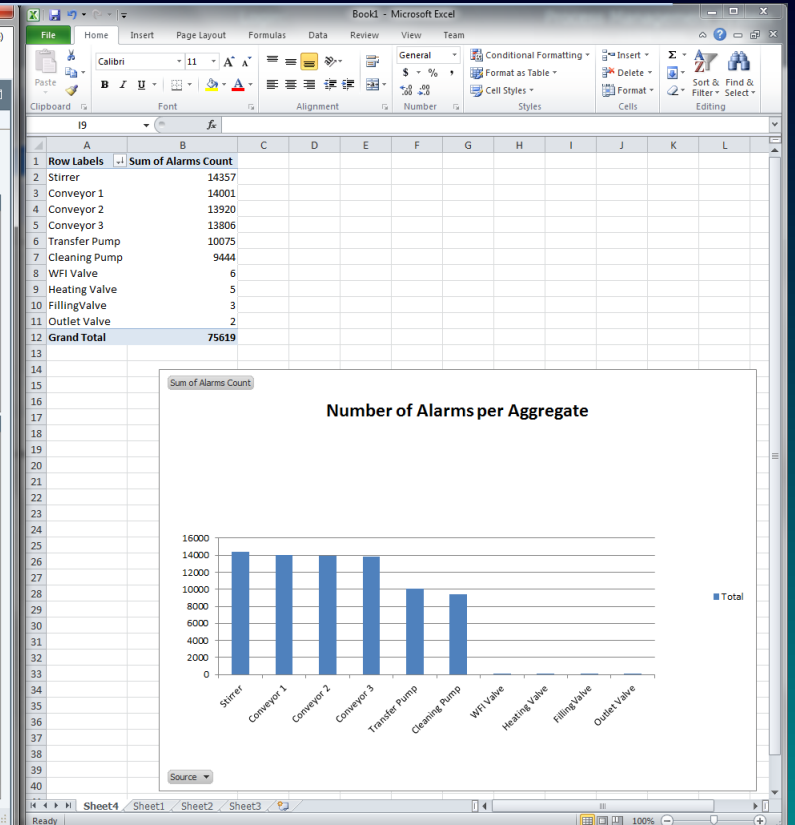
PM-ANALYZE

Frequency analysis: Identify location-based clusters

- Calculation of the most frequent alarms in the selected time frame
- Grouping functionality
 - Ordering of analysis result by arbitrary alarm columns e.g.
 - Alarm source
 - (technological Top x analysis)
 - Alarm number
 - (classical top x analysis)
 - ...
 - Also over multiple columns
- Ranking according to relevance
- Ideal basis for Pivot-Diagrams in Microsoft Excel

The screenshot shows the PM-ANALYZE application window. The top menu bar includes File, View, Tools, and a help icon. Below the menu is a toolbar with icons for Alarms and Audit. The main area displays a frequency analysis for the time range 10/1/2016 12:00:00 AM to 1/1/2017 12:00:00 AM. It shows a list of alarms with columns for Source, Alarms Count, Station, Number, Instance, Timestamp, State, Status, Alarm class, Controller/CPU number, Tag, and Info text. The 'Stirrer' is the most frequent alarm source with 14357 occurrences.

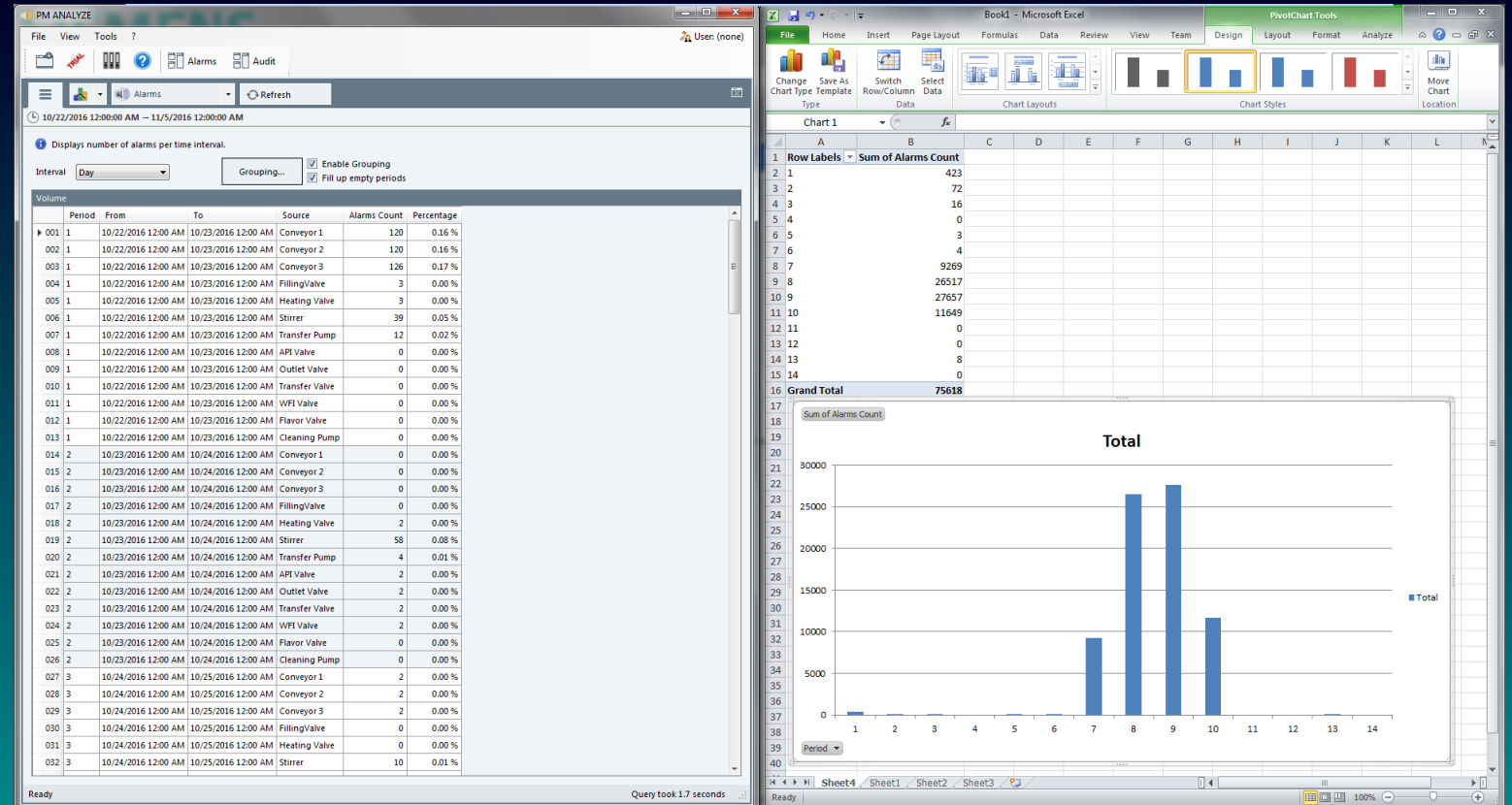
Source	Alarms Count
01 Stirrer	14357
02 Conveyor 1	14001
03 Conveyor 2	13920
04 Conveyor 3	13806
05 Transfer Pump	10075
06 Cleaning Pump	9444
07 WFI Valve	6
08 Heating Valve	5
09 Filling Valve	3
10 Outlet Valve	2



PM-ANALYZE

Volume analysis: Identify time-based clusters

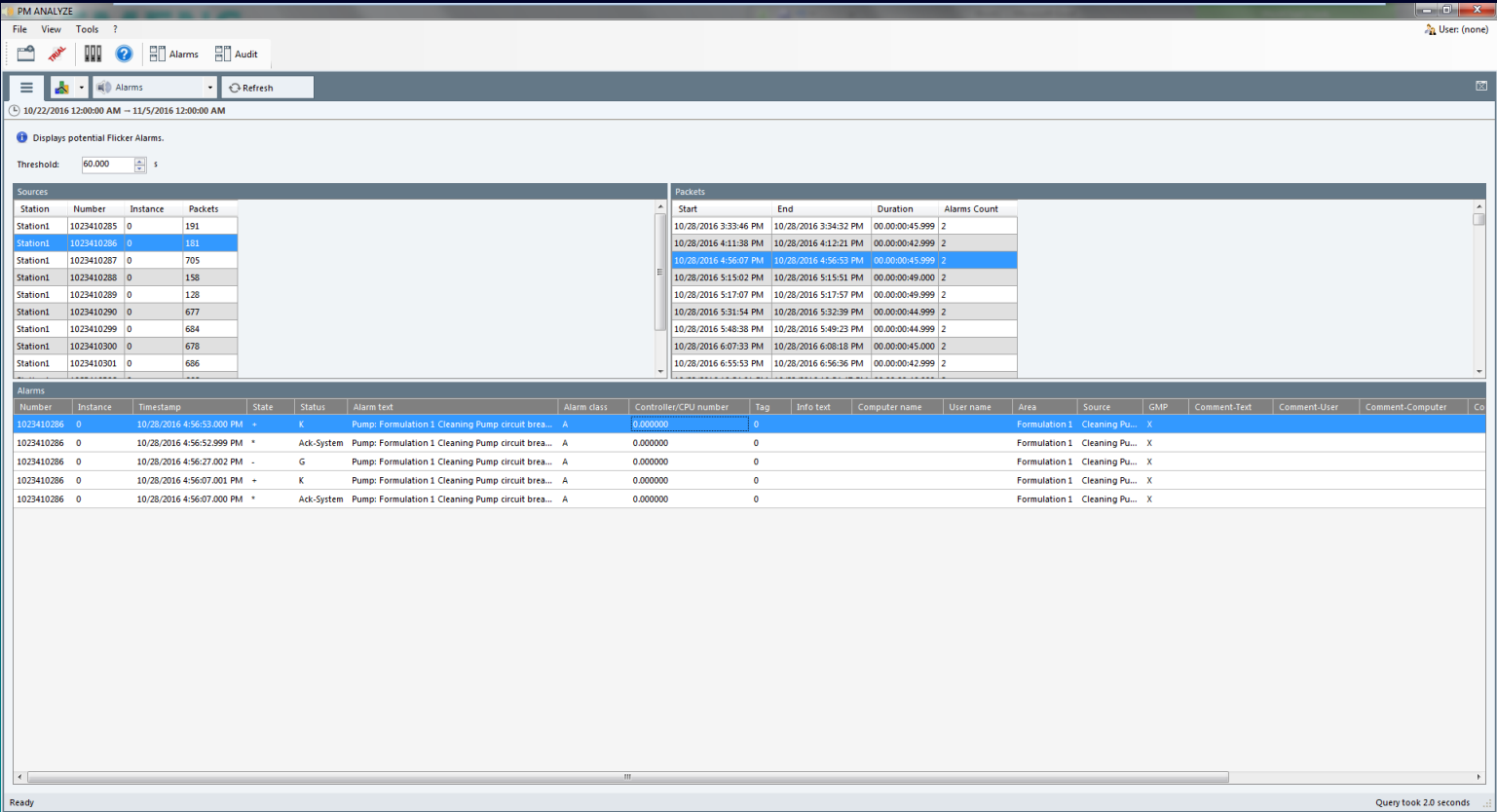
- Analysis of all alarms in a given time frame that is split into several sub intervals
 - Available interval settings are hour, day, week, month, year (e.g. a complete month split into individual days)
- Grouping functions
 - Ordering of analysis results by column content (e.g. source)
- Optional filling of empty intervals for optimized pivot chart display in Microsoft Excel



PM-ANALYZE

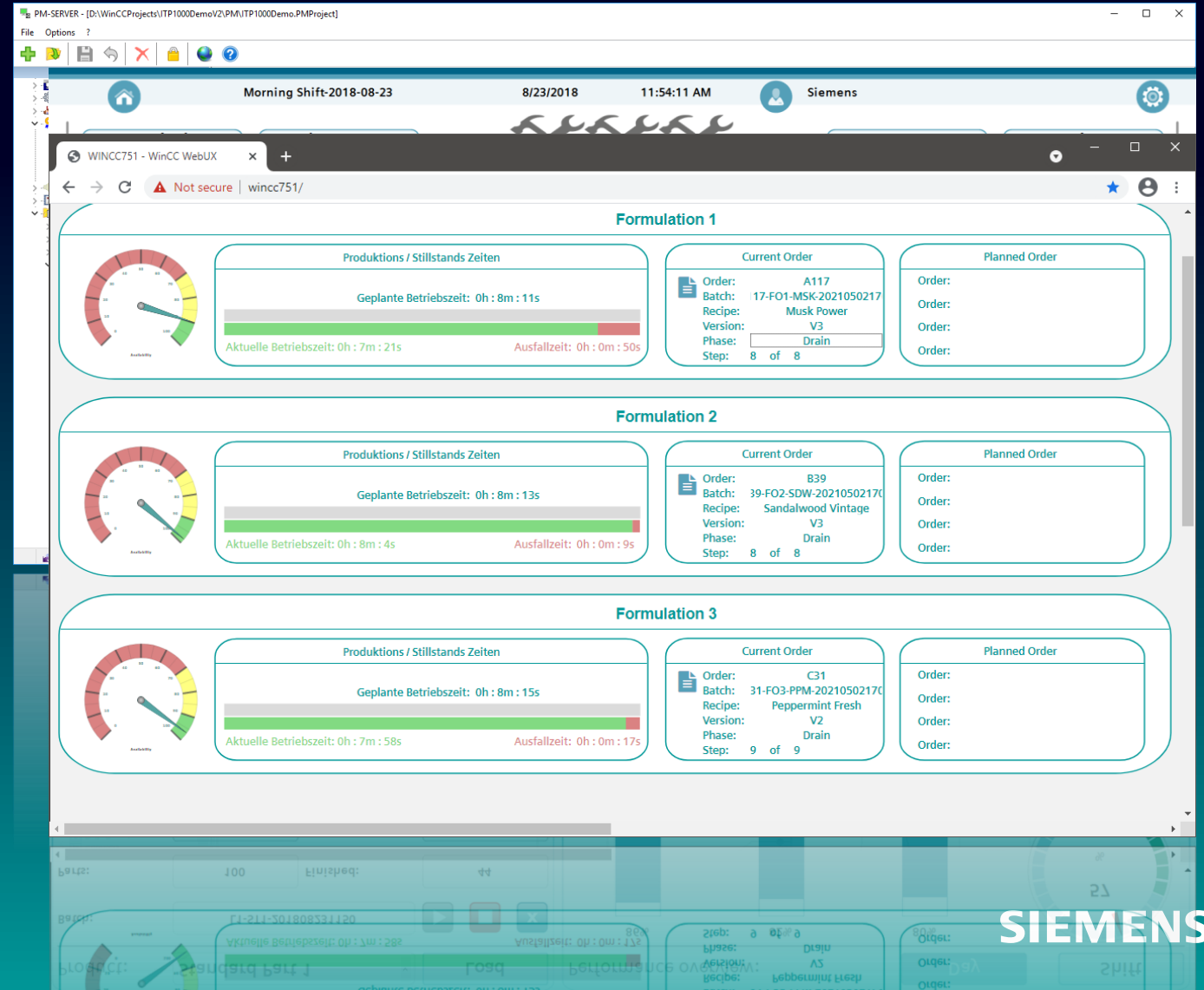
Flickering analysis: Identify bursts

- Identification of possible flicker alarms (bursts), that occur with a high frequency sporadically in short timeframes
- Configurable threshold
- Analysis of alarm archive in configurable time range



PM-ANALYZE KPI calculations

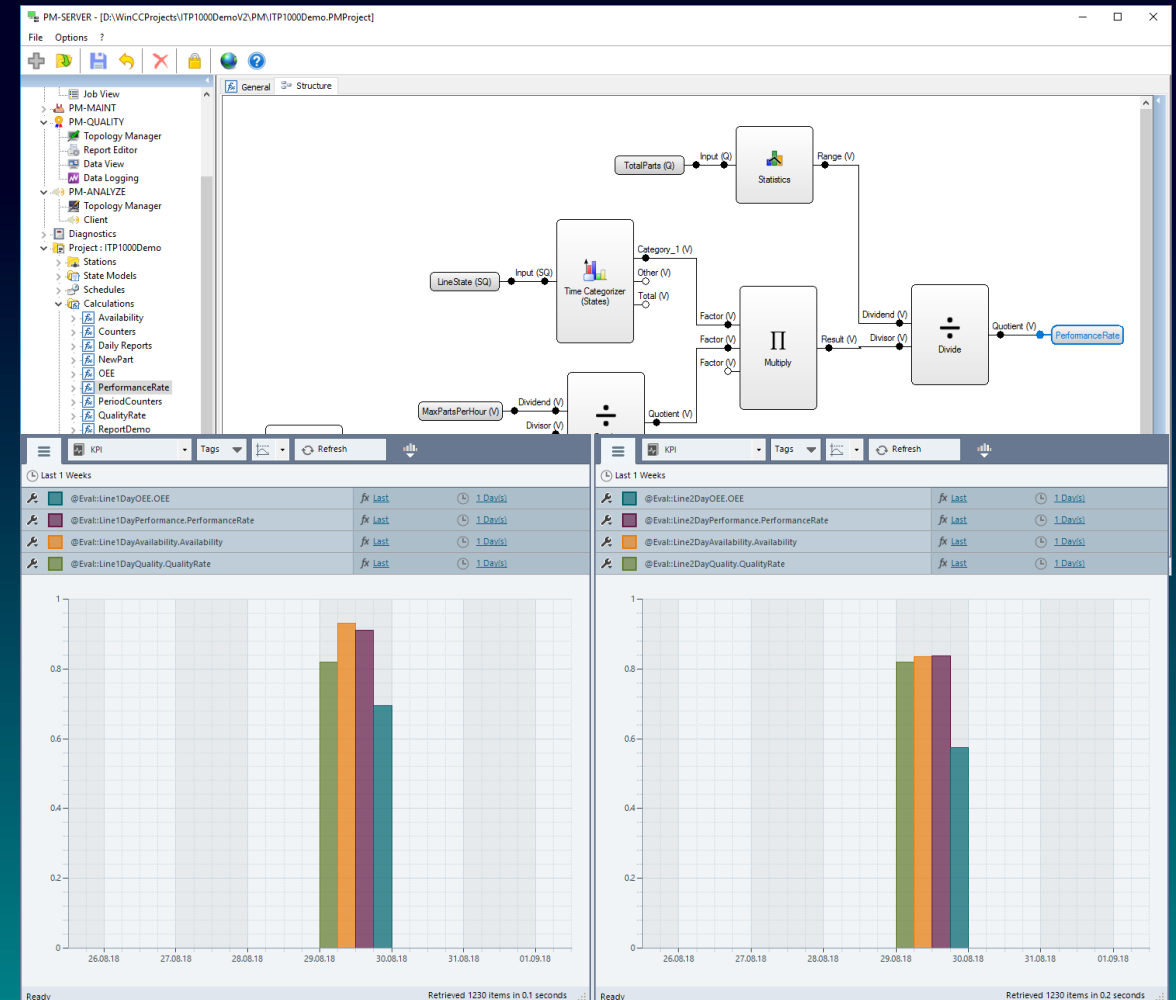
- Simple calculation of complex KPIs with graphical calculation rules
 - Availability
 - Quality rate
 - Performance rate
 - OEE, CPK, ...
- Output to Panels, OS Clients, WinCC Screens... by write back functionality to tags
- Together with WinCC WebUX or WinCC Unified ideal for Web Dashboards
- Extensible framework for custom functions



PM-ANALYZE

Database and archiving

- Generation of calculated values
 - Calculation results create new internal tags
- Calculation results are available like any other process value for archiving
- Archived calculation results available in the client display like any other archived value



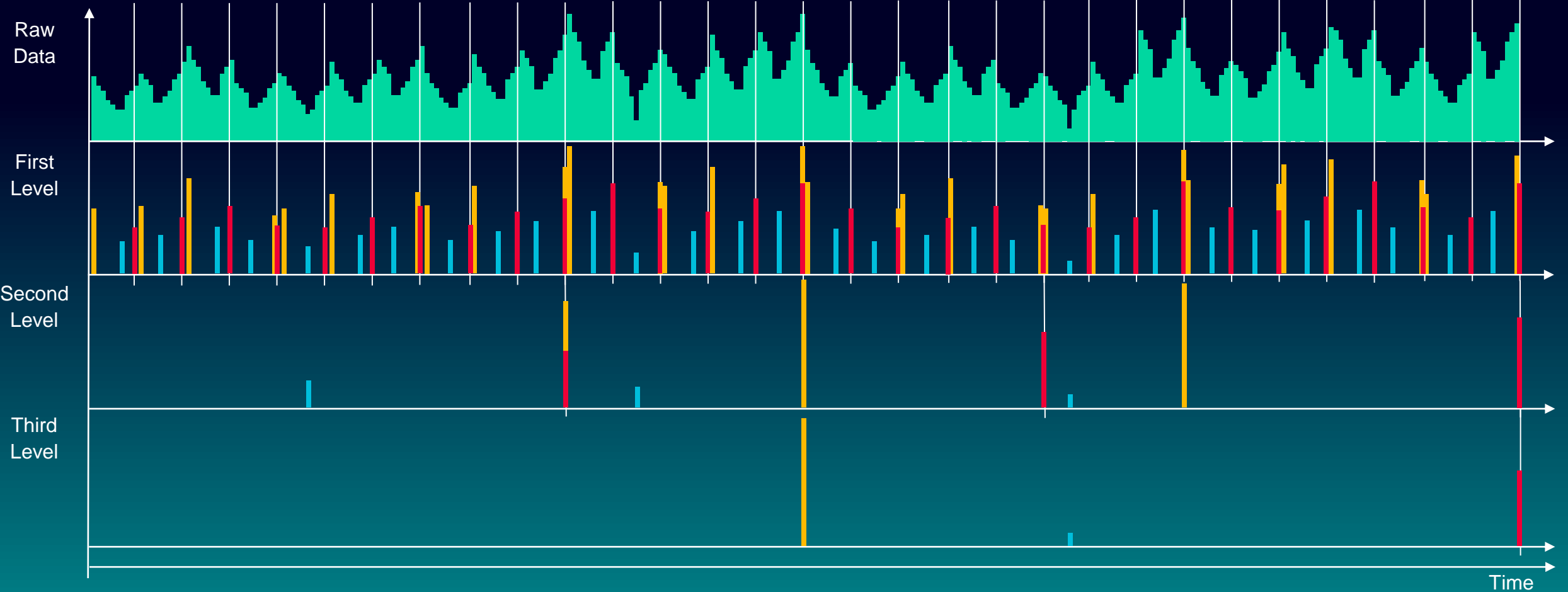
PM-ANALYZE

Data aggregation

- Aggregations describe the compression of a set of values by a calculation formula
 - Example: A series of raw tag readings is aggregated to an hourly average.
- Aggregations are hierarchical, possibly over multiple levels
 - Example:
A set of raw readings is used to generate hourly averages,
The hourly averages are used to calculate daily averages,
The daily averages are used to calculate monthly averages,
The monthly averages are used to calculate yearly averages
- Modifications in a lower level trigger a recalculation of the levels above
- Historical readings can be imported and aggregated retrospectively
 - Example: Replacement of legacy systems while preserving historical values
- Aggregations prepare data for transfer to higher level systems (e.g. a central PM-ANALYZE system)

PM-ANALYZE

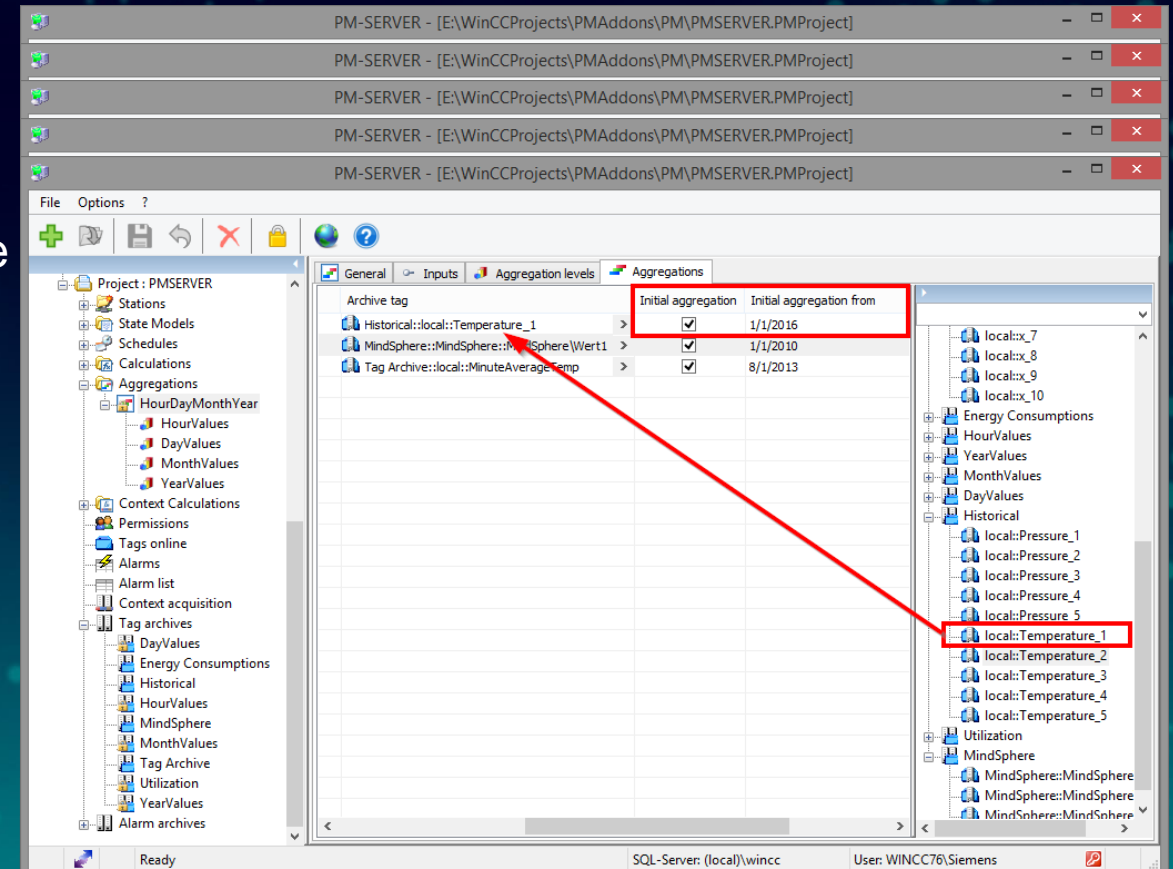
Data aggregation (e.g. Min/Max/Avg)



PM-ANALYZE

Data aggregation

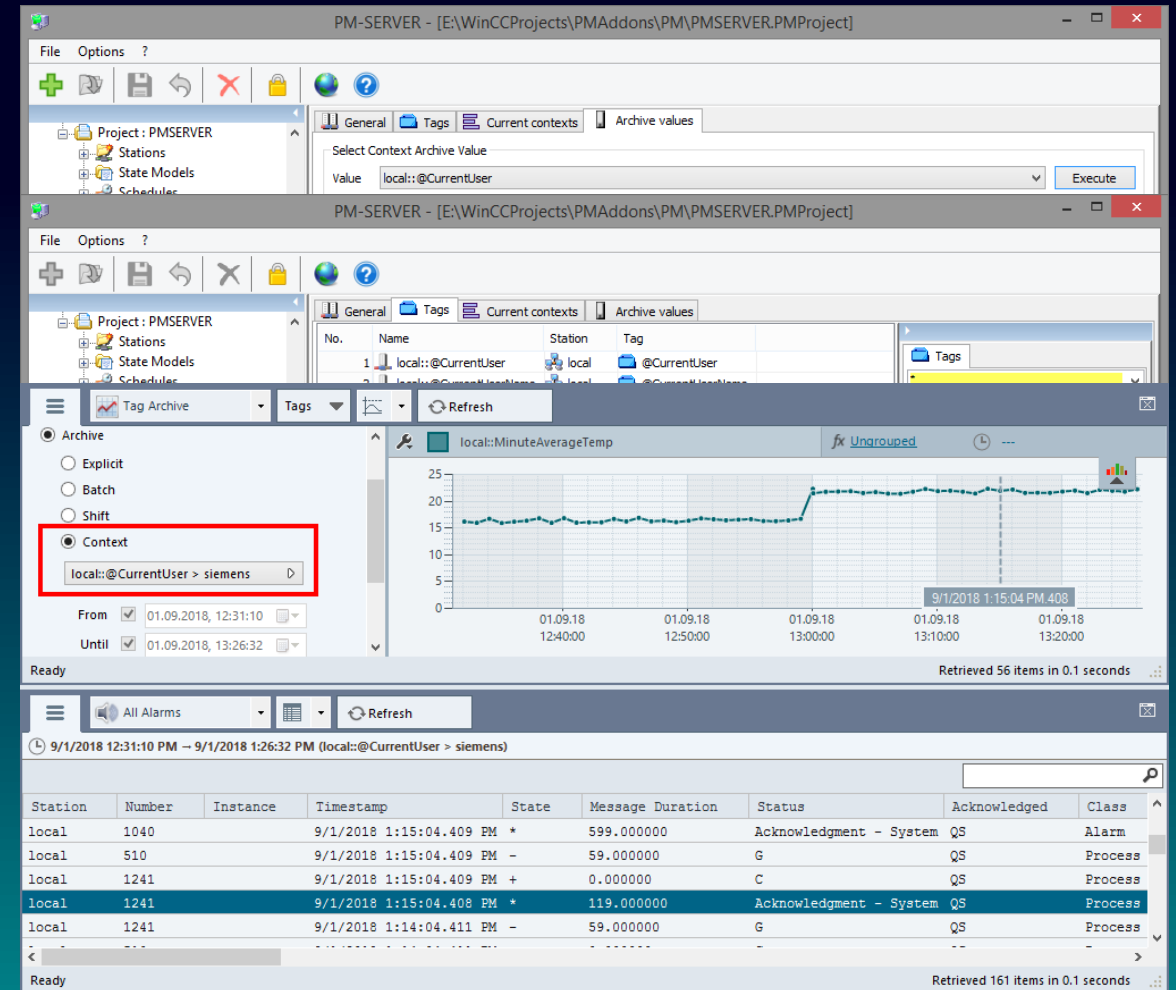
- Aggregations are defined by Aggregation Schemas
 - The schema defines the aggregation intervals
 - E.g. Hour, Day, Month, Year
- Each level creates a new process value archive for the generated target values
 - The source values are always preserved
- Each level defines its own aggregation algorithm
- Outputs from the source level are inputs for the target level
 - Any level below (back to the raw source data) is available as a source
- Existing source data can be re-aggregated back to a configurable point in time



PM-ANALYZE

Context archiving

- A context consists of
 - Start timestamp
 - End timestamp
 - Value for the period described by Start to End
 - End timestamp always empty for current context
- A context begins with the first occurrence of a new text value in the context tag
- A context ends if the text value in the context tag
 - becomes empty
 - or changes to a different text value
 - (starting a new context timeframe)
- Any text tag can be archived in order to define context time frames
- Simplifies the time range selection by context



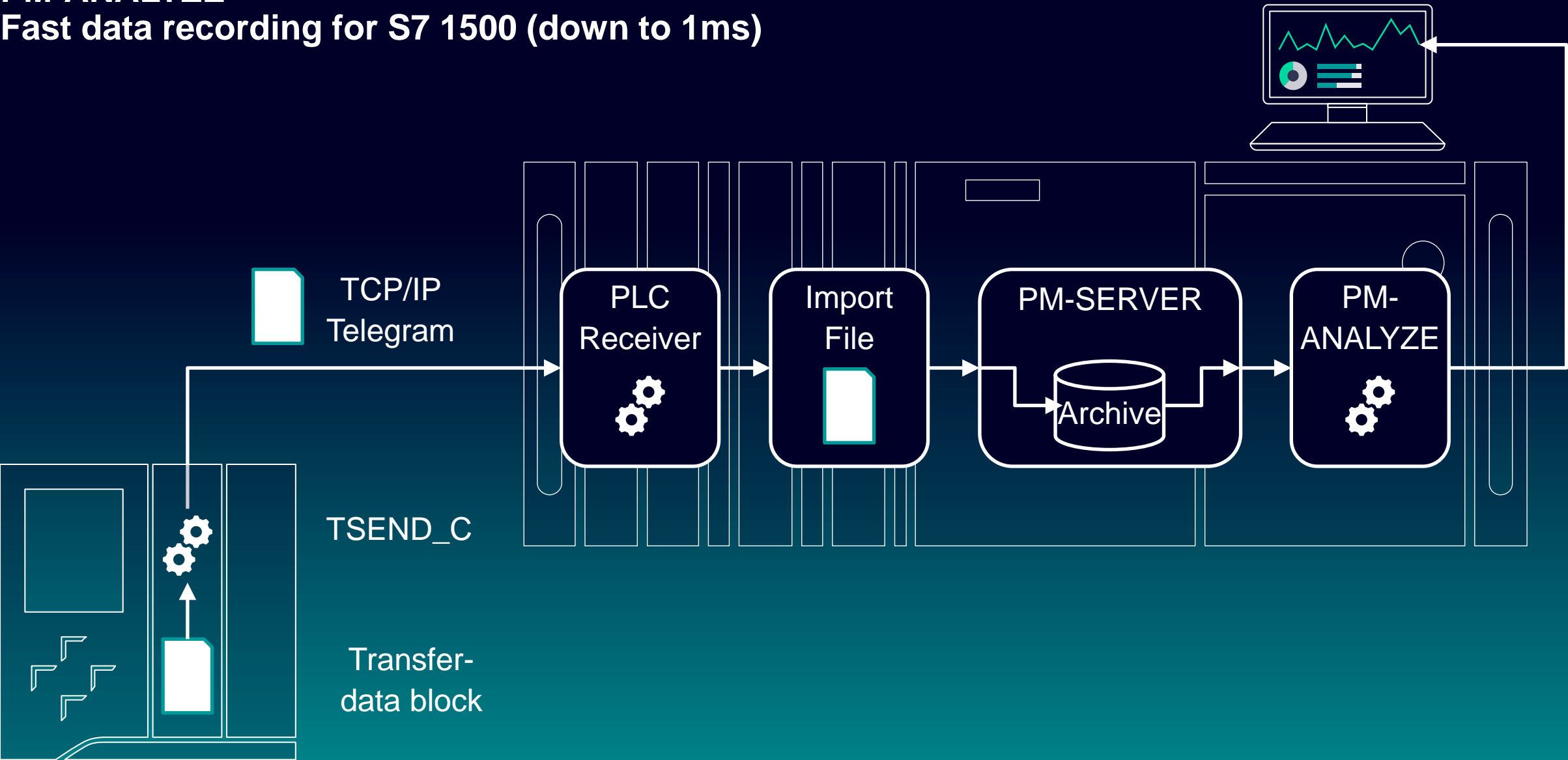
PM-ANALYZE

Fast data recording for S7 1500 (down to 1ms)

- Data is collected in the PLC within a data block and is transferred via TCP/IP with the TSEND_C function block to an application (PLCReceiver.exe, part of the PM-ANALYZE server installation) on the PM-ANALYZE server.
- The application stores the received package in a text file which is compatible with one of the text import station formats of the PM-SERVER.
- Within the PM-SERVER the file is imported, and the process value tags contained are linked to a process value archive.
- The data in the process value archive are displayed with the PM-ANALYZE trend control either in WinCC, WinCC Professional, WinCC Advanced or the standalone client.

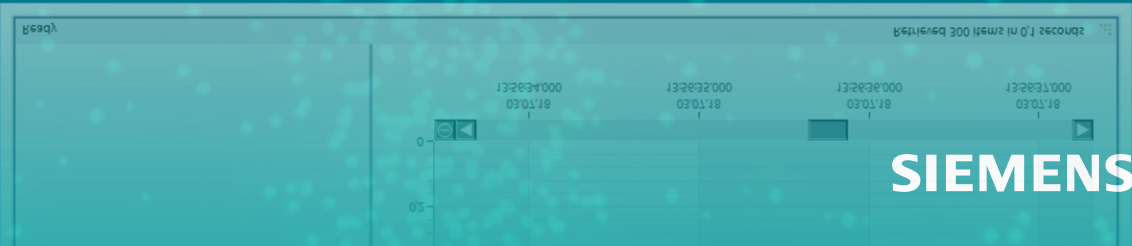
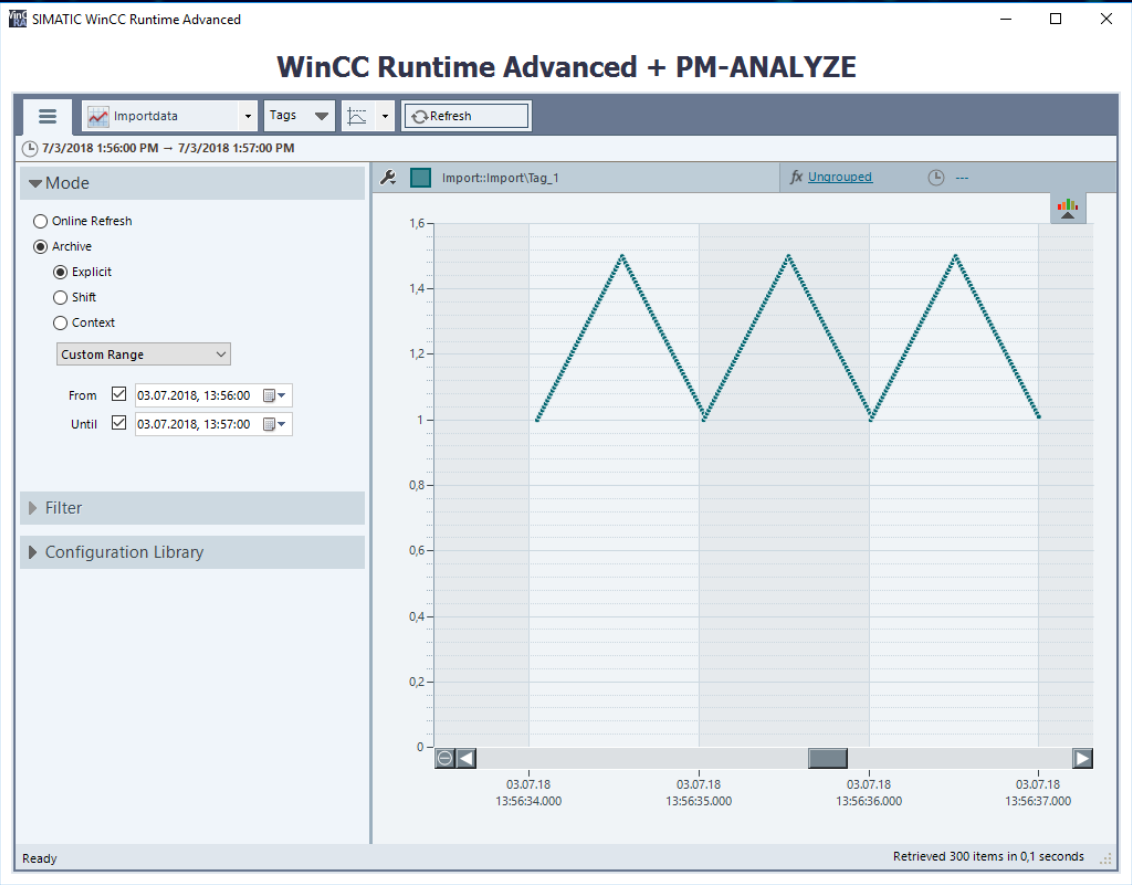
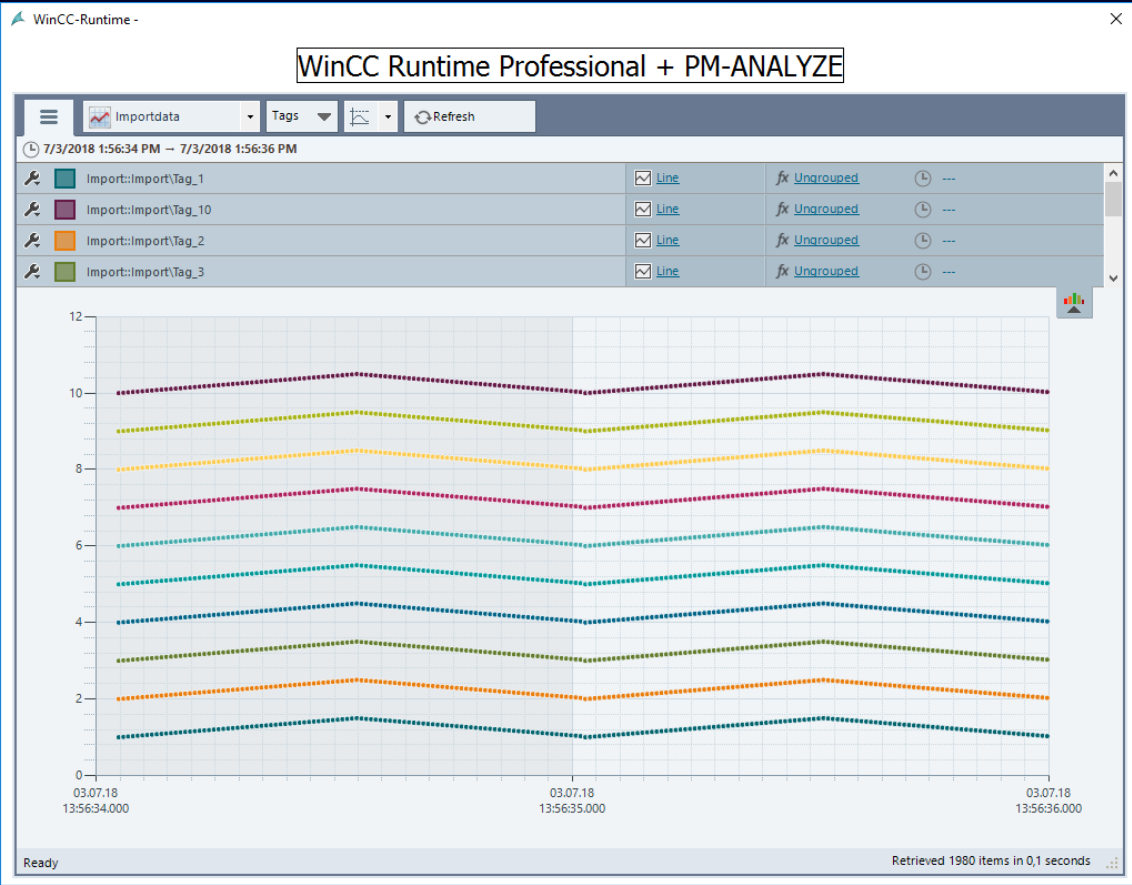
PM-ANALYZE

Fast data recording for S7 1500 (down to 1ms)

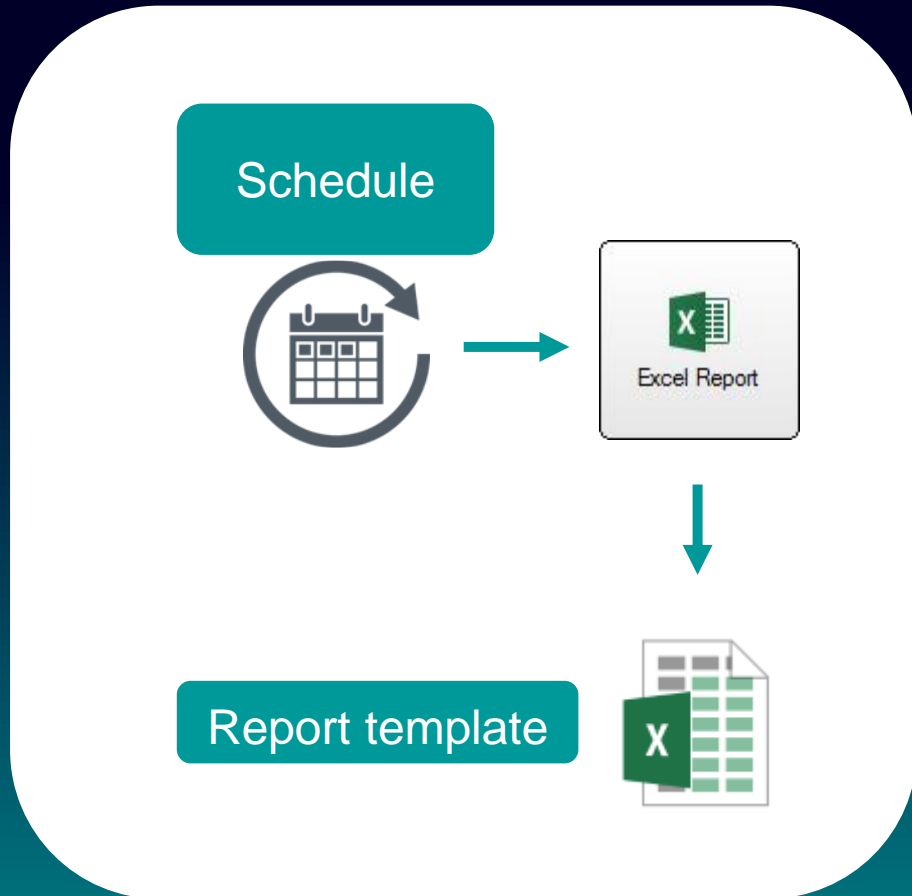


PM-ANALYZE

Fast data recording for S7 1500 (down to 1ms)



PM-ANALYZE Reports with Microsoft Excel



- The report template is filled with data by a function block within the PM-SERVER
- With each execution of the function block that is triggered by the schedule (e. g. daily), a copy of the report template is filled with the data for the report and saved
- Besides the output as xlsx file the formats PDF, HTML or CSV are also possible



2023-01-30



2023-01-31



2023-02-01



2023-02-02

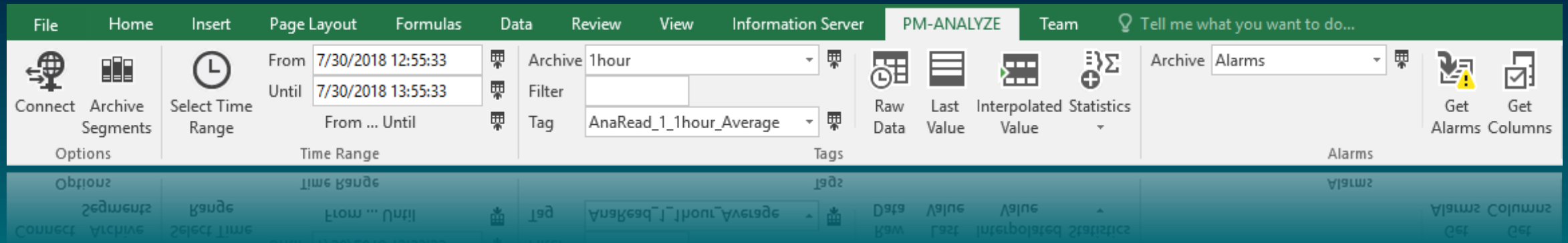


...

PM-ANALYZE

Reports with Microsoft Excel

- Add-In for Microsoft Excel 2013, 2016, 2019
- Access to all process value and aggregation archives of the PM-SERVER
- Access to all calculated values and KPIs
- Access to all alarms and operator input messages (audit trail)
- Several statistical functions like e.g.:
 - Average (weighted / unweighted), Integral, Min / Max / Range, Sum, Standard deviation, variance, Median, Percentile



PM-ANALYZE

Reports with Microsoft Excel

The image shows the PM-ANALYZE ribbon in Microsoft Excel, which is used for generating reports from process data. The ribbon is divided into several groups of icons, each with a corresponding callout box explaining its function:

- Database selection:** Points to the 'Connect' icon in the 'Options' group.
- Time range selection:** Points to the 'Select Time Range' icon in the 'Options' group.
- Last recorded value in the time frame:** Points to the 'Last Value' icon in the 'Statistics' group.
- PM-ANALYZE Add-In:** Points to the 'PM-ANALYZE' tab on the ribbon.
- Alarm archive selection:** Points to the 'Archive' dropdown menu in the 'Alarms' group.
- Selection of the process value archive and the archive tag:** Points to the 'From ... Until' and 'Tag' fields in the 'Time Range' group.
- Output of the raw data:** Points to the 'Raw Data' icon in the 'Statistics' group.
- Access to interpolated values:** Points to the 'Interpolated Value' icon in the 'Statistics' group.
- Statistics functions:** Points to the 'Statistics' icon in the 'Statistics' group.
- Alarm output:** Points to the 'Get Alarms' icon in the 'Alarms' group.

PM-ANALYZE

Reports with Microsoft Excel

- Dynamic output of the selected values depending on the selected time frame
 - Either as unformatted raw data for further processing within the spreadsheet
 - Or directly into the desired report format
- Separate Excel files can be used for separate report templates. Like e.g.:
 - Day report
 - Month report
 - Year report
 - Event report (e.g. rain basin overflow)

FileHomeInsertPage LayoutFormulasDataReviewViewInformation ServerPM-ANALYZETeamTell me what you want to do...

Connect

Archive Segments

Options

Select Time Range

Time Range

From 7/30/2018 14:25:21

Until 7/30/2018 15:25:21

From ... Until

Archive Select Archive

Filter

Tag

Raw Data

Last Value

Interpolated Value

Statistics

Archive Select Archive

Get Alarms

Get Columns

E35

	A	B	C	D	E	F	
1	7/30/2018 00:00:00		1hourAnaRead_13_1hour_Sum		1hourAnaRead_11_1hour_Sum	1hourAnaRead_1_1hour_Average	1hourAnaRead_1_1hour_Average
2	7/31/2018 0:00		7/30/2018 0:00	7.907244332	21.40		201.5124578
3			7/30/2018 1:00	7.128317609	19.29		181.6618348
4			7/30/2018 2:00	6.349390887	17.18		161.8112118
5			7/30/2018 3:00	5.570464164	15.08		141.9605889
6			7/30/2018 4:00	4.791537442	12.97		122.1099659

FileHomeInsertPage LayoutFormulasDataReviewViewInformation ServerPM-ANALYZETeamTell me what you want to do...

Connect

Archive Segments

Options

Select Time Range

Time Range

From 7/30/2018 14:25:21

Until 7/30/2018 15:25:21

From ... Until

Archive Select Archive

Filter

Tag

Raw Data

Last Value

Interpolated Value

Statistics

Archive Select Archive

Get Alarms

Get Columns

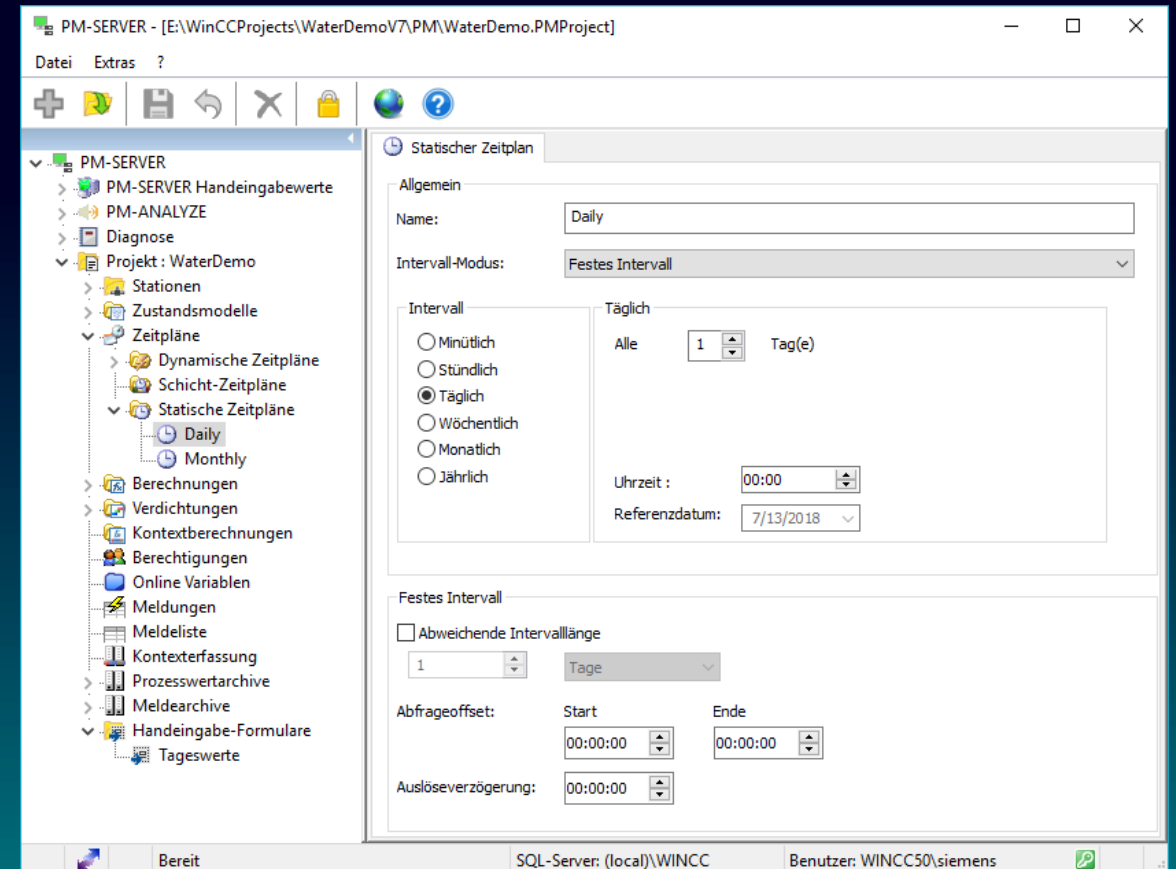
M7

	A	B	C	D	E	F	G	H	I	J	K	
1	Verfahrens- stufe ----- Parameter	Mengen		Zulaufbereich								
2		Abwasser- zufluß gesamt (Volumen errechn.)	Abwasser- abfluß gesamt (Volumen errechn.)	Regenüberlaufbecken (Durchlaufbecken)				Abwassereigenschaften			Fremdan- schlamm	
3				Abschläge				Chemisch-physikalische Parameter				
4				Füllvolumen	Becken- überlauf	Klar- überlauf	Summe	Temperatur	pH-Wert	Leitfähigkeit		
5	Bezeichnung	Q _{ZU}	Q _{AB}	V _{REG}	Q _{REG}	Q _{KU}	Q _{ABSOHL}	T _W	pH	LF	V _{FS}	
7	Einheit	m³	m³	m³	m³	m³	m³	°C	pH	µS/cm	m³	
8	Spalten-Nr.	1	2	3	4	5	6	7	8	9	10	
9	00:00 - 00:59	7.13	19.29	181.66	0	0	0	0.38	0.16	11.24	0	
10	01:00 - 01:59	6.35	17.18	161.81	0	0	0	0.34	0.14	10.01	0	
11	02:00 - 02:59	5.57	15.08	141.96	0	0	0	0.30	0.12	8.78	0	
12	03:00 - 03:59	4.79	12.97	122.11	0	0	0	0.26	0.11	7.56	0	
13	04:00 - 04:59	4.01	10.86	102.26	0	0	0	0.21	0.09	6.33	0	
14	05:00 - 05:59	3.23	8.75	82.41	0	0	0	0.17	0.07	5.10	0	
15	06:00 - 06:59	2.45	6.64	62.56	0	0	0	0.13	0.05	3.87	0	
16	07:00 - 07:59	1.68	4.54	42.71	0	0	0	0.09	0.04	2.64	0	
17	08:00 - 08:59	0.90	2.43	22.86	0	0	0	0.05	0.02	1.41	0	
18	09:00 - 09:59	72.53	68.34	1,574.02	0	0	0	2.70	1.29	25.87	0	
19	10:00 - 10:59	363.20	383.40	8,000.40	0	0	0	15.09	6.99	486.29	0	
20	11:00 - 11:59	359.50	334.05	7,999.92	0	0	0	14.97	7.00	500.16	0	
21	12:00 - 12:59	358.98	379.14	8,000.02	0	0	0	14.97	7.00	499.80	0	
22	13:00 - 13:59	360.76	359.69	8,000.01	0	0	0	15.00	7.00	500.27	0	
23	14:00 - 14:59	359.42	330.87	8,000.04	0	0	0	14.99	7.00	499.67	0	

PM-ANALYZE

Reports with Microsoft Excel

- Definition of schedules for report generation:
 - Static schedules: for fixed reporting time frames (e.g. day report)
 - Dynamic schedules: Based on specific events (e.g. rain basin overflow)
 - Shift schedules: Freely definable shift patterns
- Reporting timeframes that are different from the schedule itself (e.g. daily report over data of the last 36 hours) or usage of a sliding interval (i.e. generating intermediate reports) are also possible



PM-ANALYZE

Reports with Microsoft Excel

The function block defines the report template file

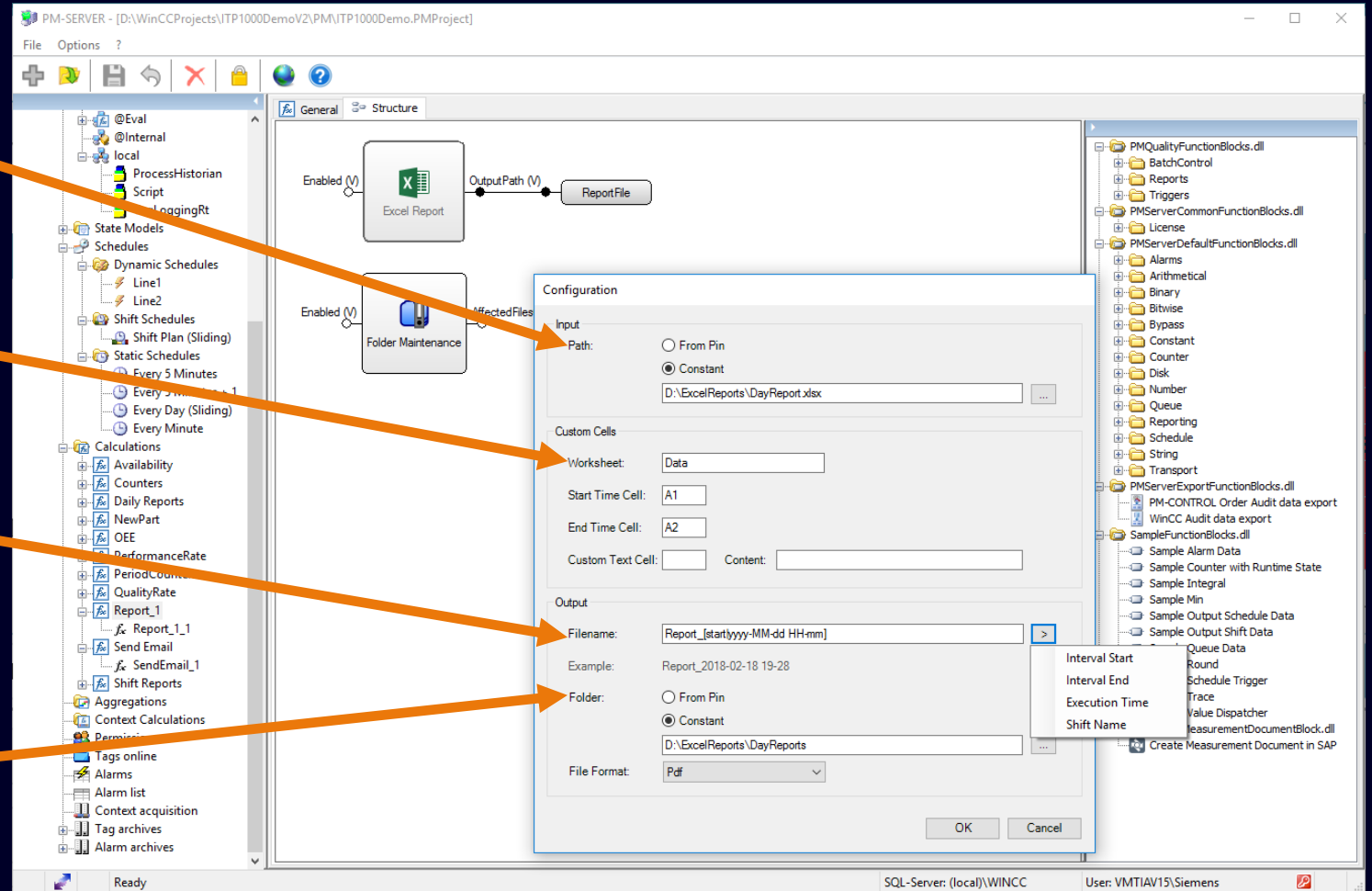
- statically or dynamically

The worksheet and the cells for the report start and end are defined here

The report files are generated based on the pattern defined here

This settings defines the output folder for the reports

- statically or dynamically

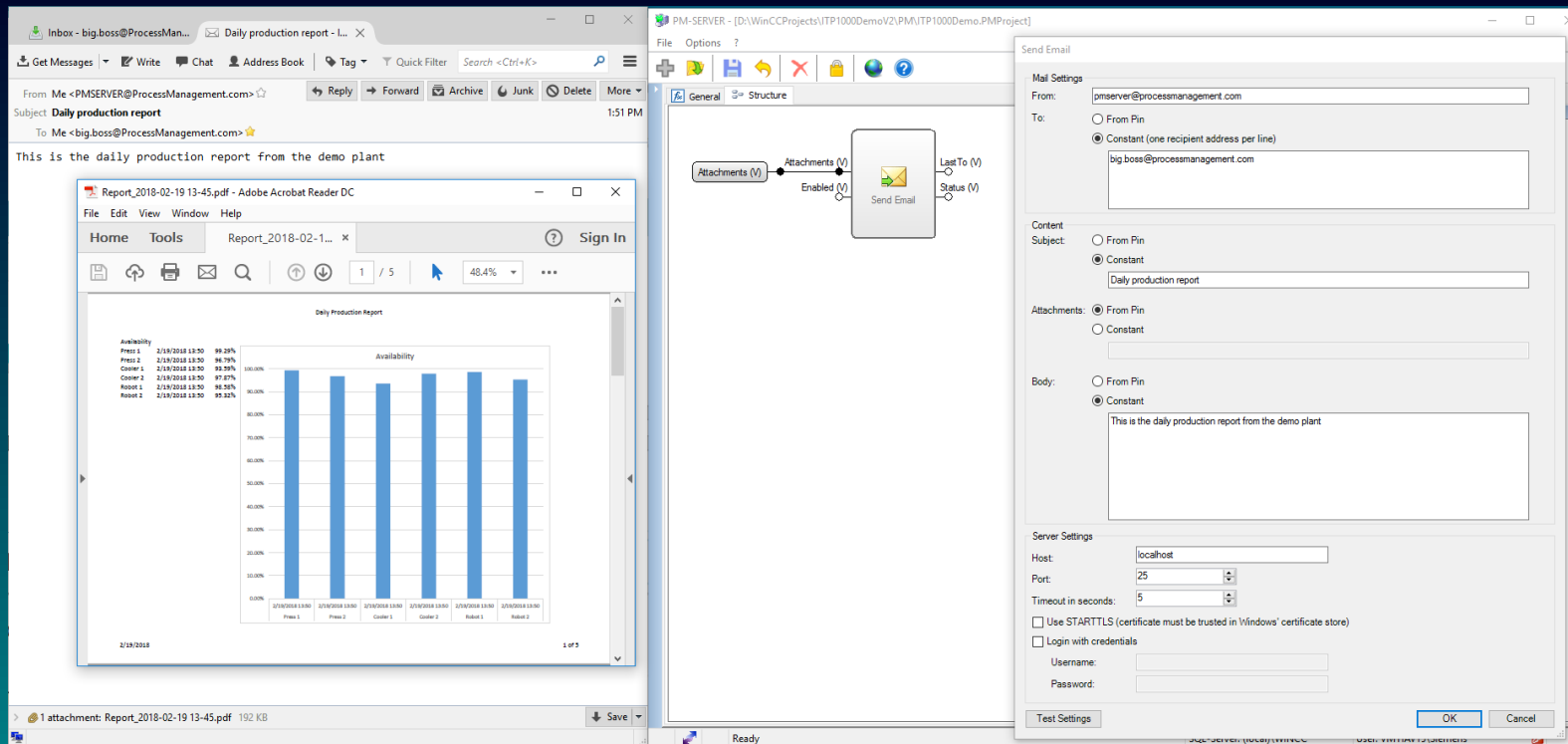


PM-ANALYZE

Reports with Microsoft Excel

The last generated report file is provided with a text type output pin of the function block. With this, the file is available for further processing with other function blocks

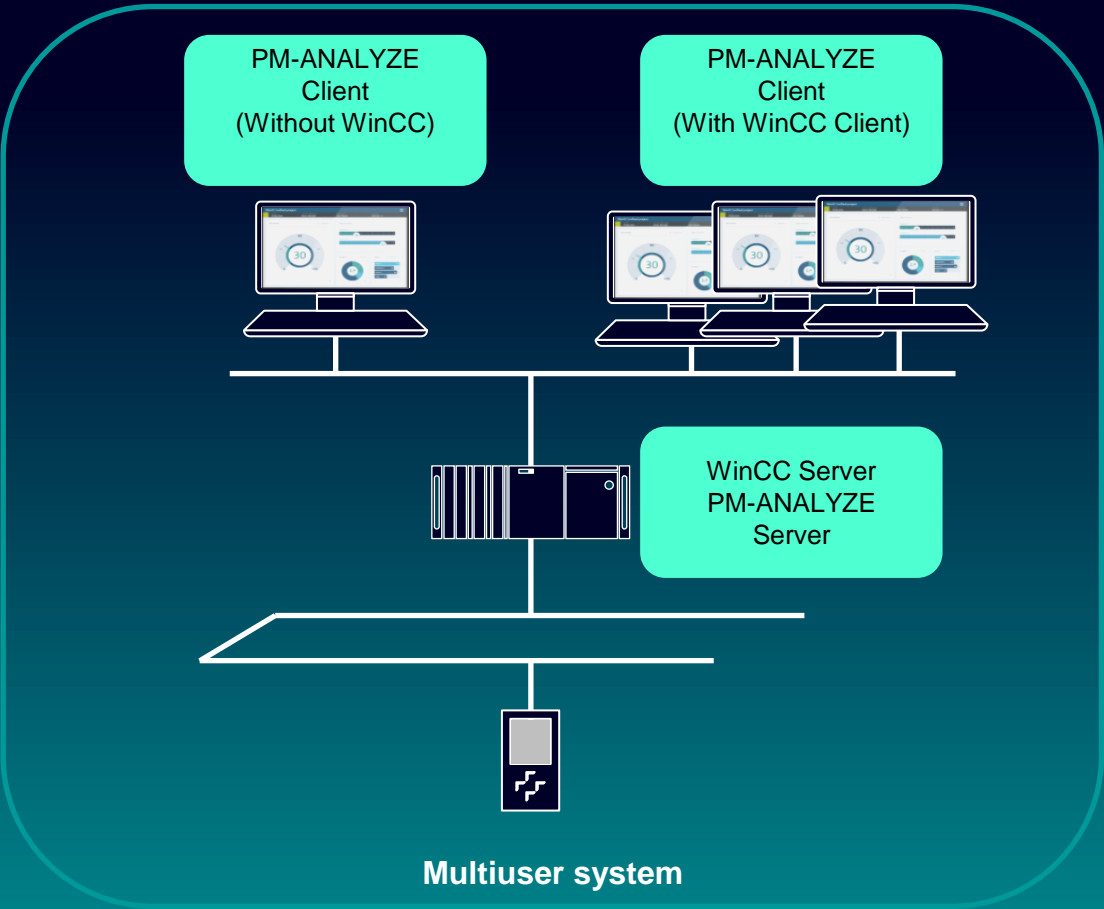
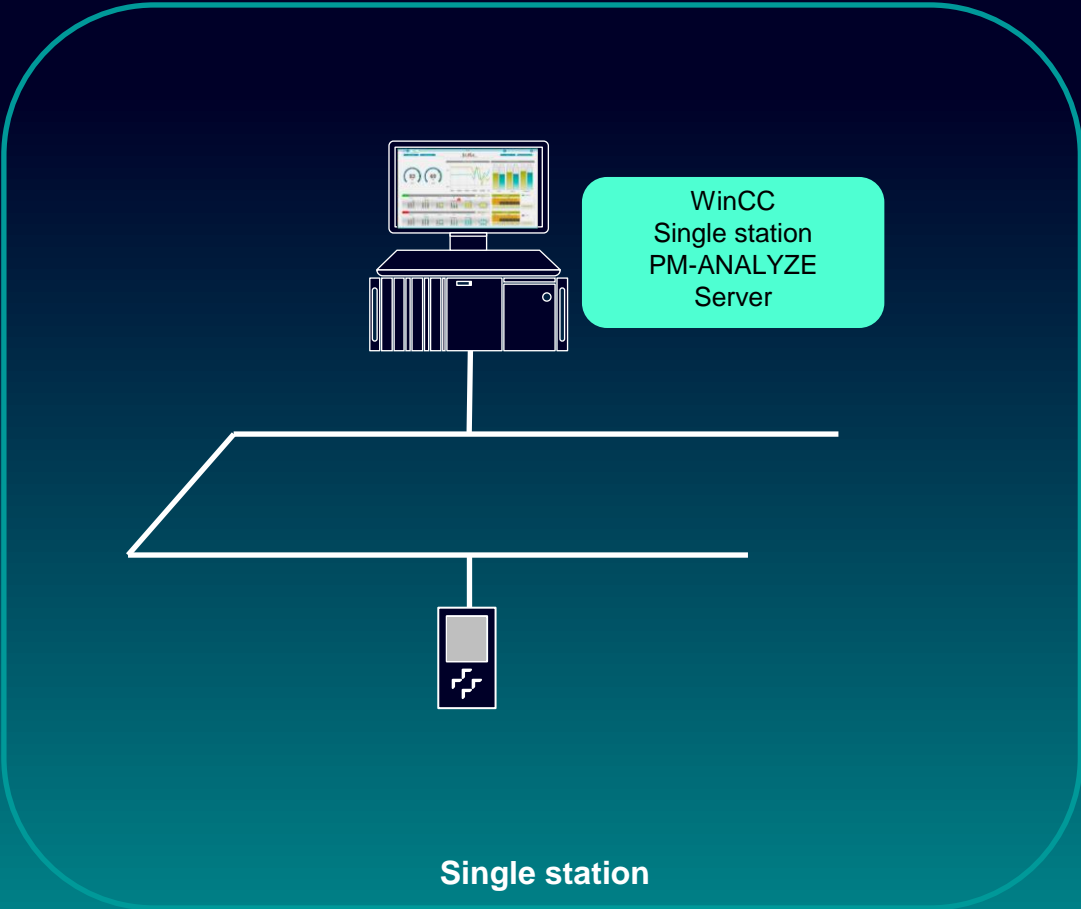
- e.g. for sending the generated reports as email attachment



PM-ANALYZE

Installation scenarios

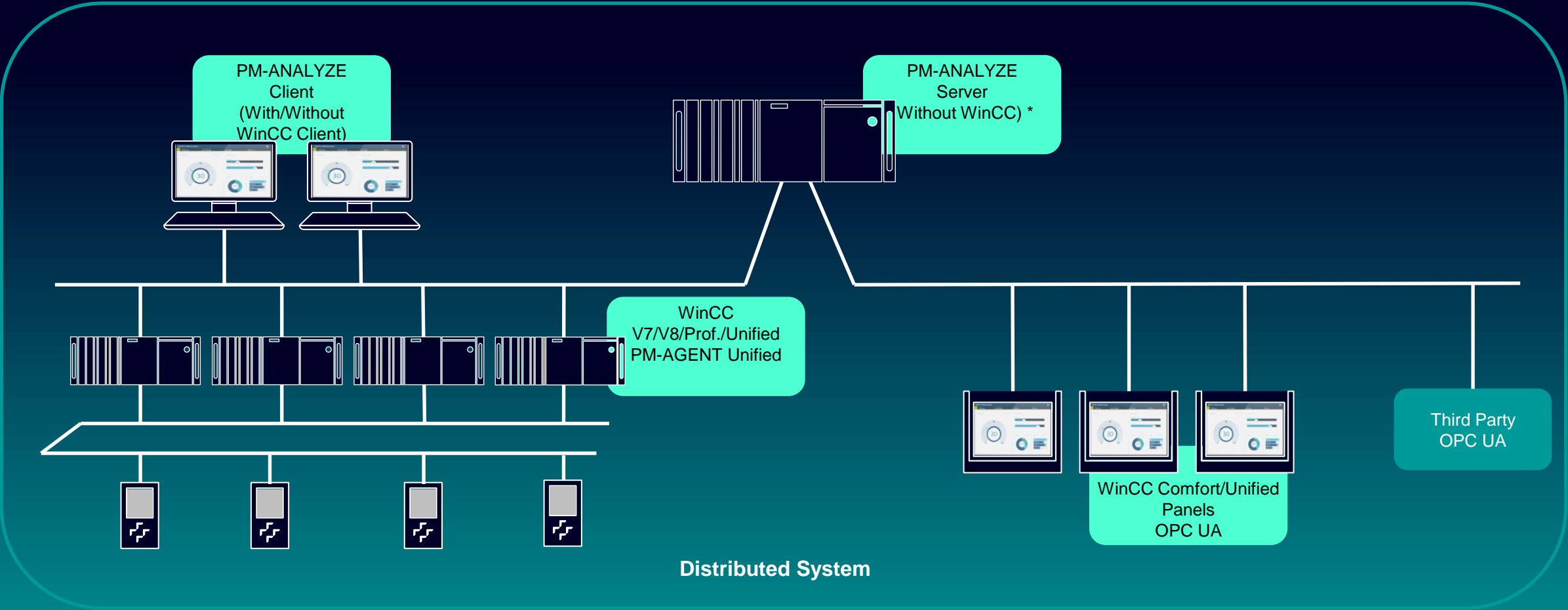
For released SIMATIC WinCC and operating systems please refer to the latest release notes.



PM-ANALYZE

Installation scenarios

*Installation on a separate server without WinCC requires a Microsoft SQL Server 2014, 2016, 2017, 2019, 2022 installation.



PM-ANALYZE

Ordering information

- Scalable from simple up to complex plant topologies :
 - **Basic installation** (One server with integrated client and local PM-AGENT Unified)
 - Server: 9AE7 112-1SS01-1AA0
 - **Connection to additional systems** (WinCC, PCS 7, WinCC RT Prof.)
 - PM-AGENT Unified 9AE7 117-2SS01-1AA0

PM-ANALYZE

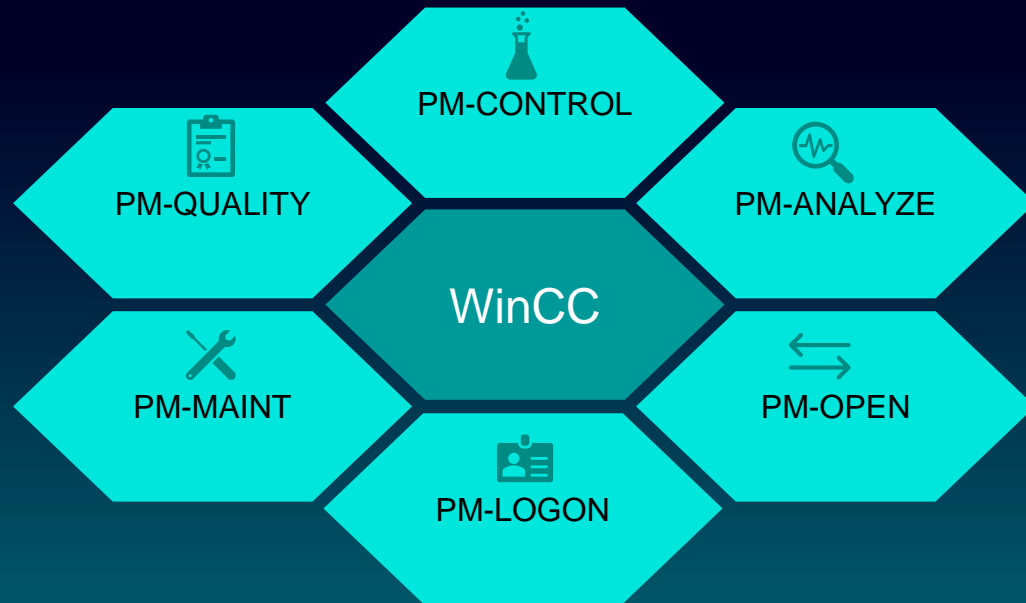
Ordering information

- Flexible client components:
 - Client for WinCC V7, V8, Runtime Professional, Runtime Advanced or Stand-alone
 - Client: 9AE7 112-4SC01-1AA0
 - Client packages for WinCC Unified PC and Unified Comfort Panel
 - 1 Unified Client: 9AE7 112-4SW00-1AA0
 - 3 Unified Clients: 9AE7 112-4SW00-1AA1
 - 10 Unified Clients: 9AE7 112-4SW00-1AA2
 - 30 Unified Clients: 9AE7 112-4SW00-1AA3
 - 100 Unified Clients: 9AE7 112-4SW00-1AA4

| PM-LOGON

User login via RFID

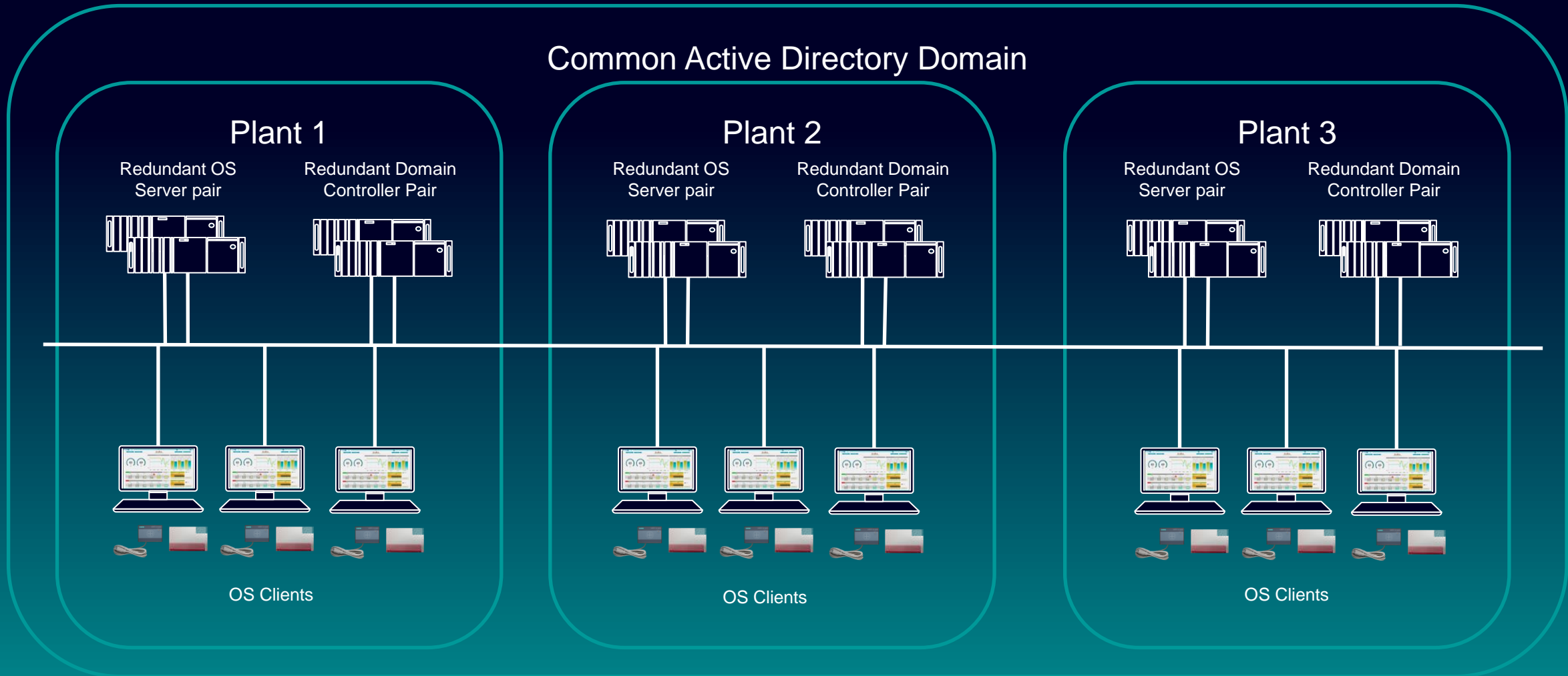
PM-LOGON



- Login via RFID Card or Smartphone for:
 - WinCC V7, V8, PCS 7, WinCC Professional Runtime via SIMATIC Logon
 - WinCC Advanced Runtime via OPC DA or OPC UA
 - WinCC Comfort Runtime via OPC UA
 - WinCC WebNavigator Client (WinCCViewerRT.exe)
 - WinCC Unified via UMC

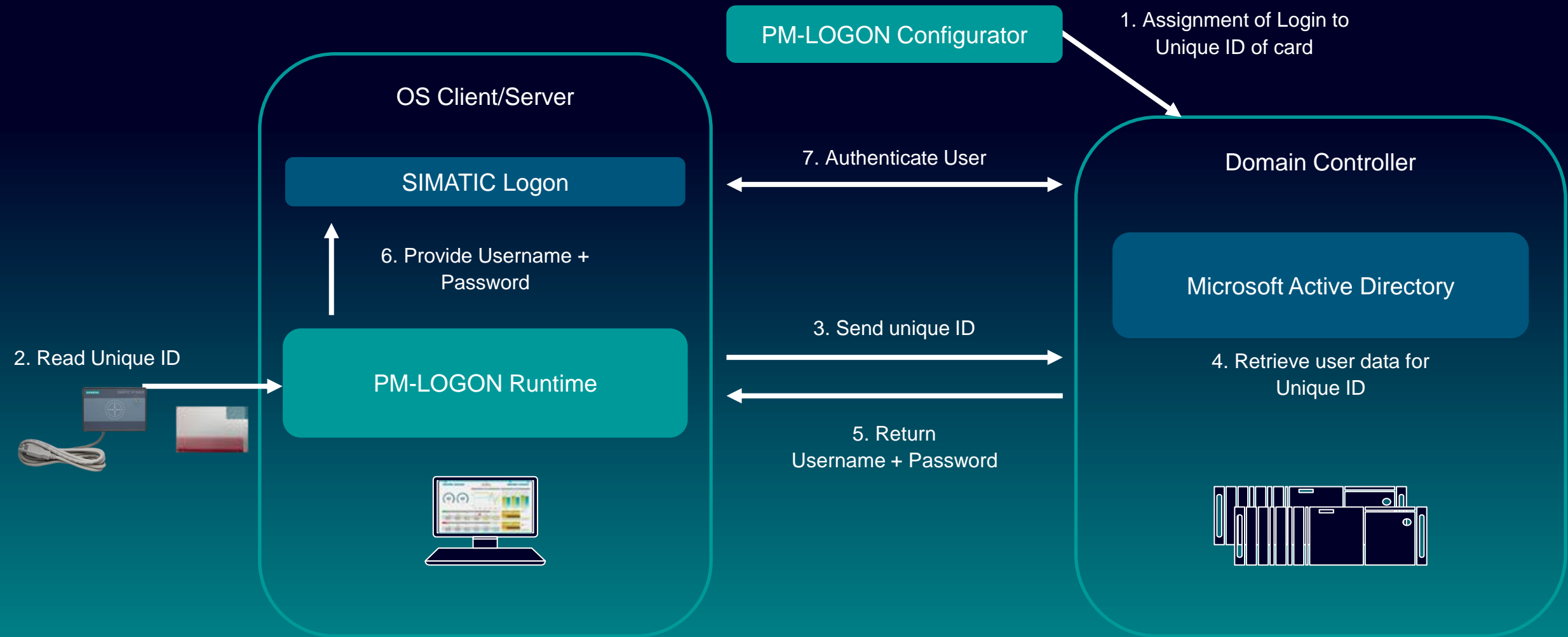
PM-LOGON

System structure (Example)



PM-LOGON (WinCC, PCS 7, Runtime Professional)

Function principle



PM-LOGON (WinCC, PCS 7, Runtime Professional)

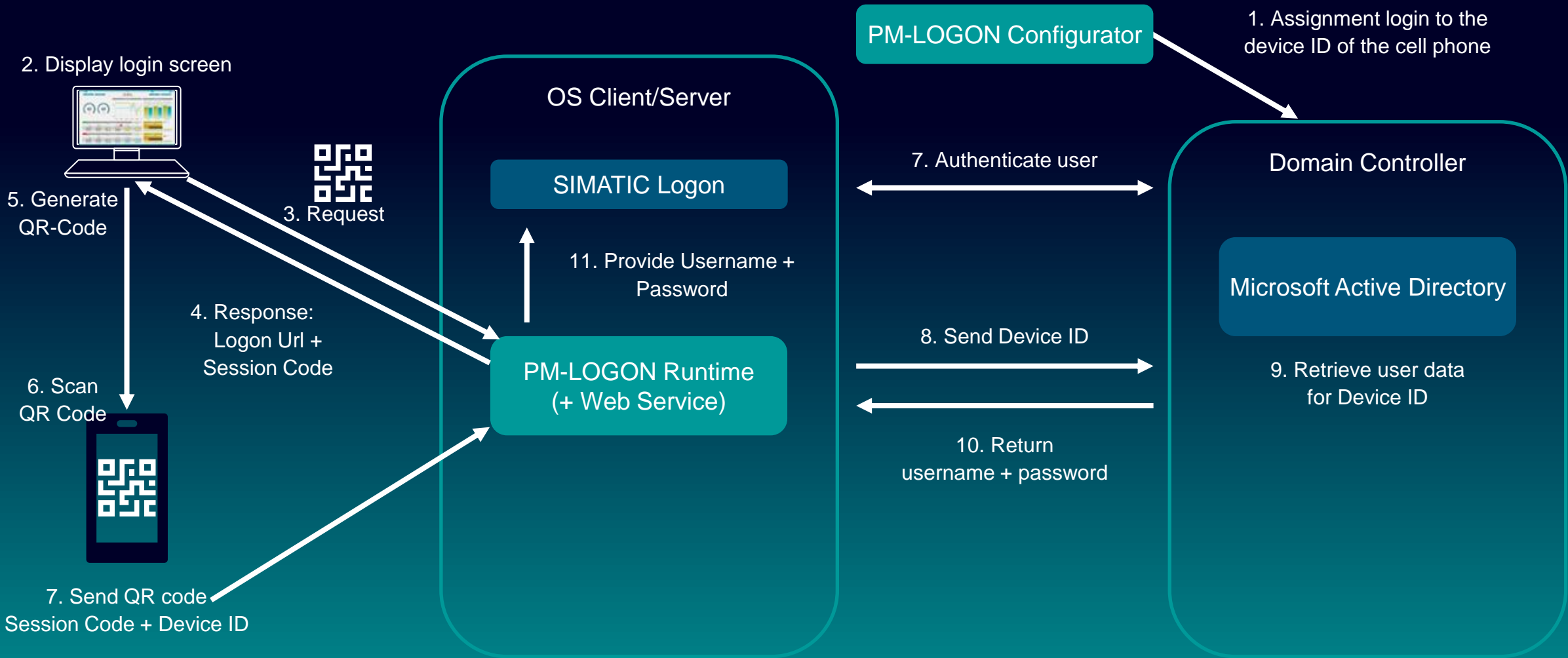
Function principle

1. Required users are created in the active directory on the domain controller and are added to the appropriate user groups. (Standard SIMATIC Logon procedure.)
2. Each RFID-Transponder has a unique ID*. This ID is linked to a user from the active directory.
3. Username and password are stored in encrypted format together with the transponder ID in attributes of the Microsoft Active Directory of the domain.
4. When a transponder is detected by a RFID reader, its ID is read by the PM-LOGON Runtime and a query is run against the Active Directory to find the associated user.
5. The currently active domain controller retrieves the associated user and sends the encrypted user name and password back to the PM-LOGON Runtime.
6. The PM-LOGON Runtime performs the login against SIMATIC Logon with the credentials retrieved
7. Users stay logged in until they actively log out or the inactivity timeout defined in SIMATIC Logon performs the logout automatically.

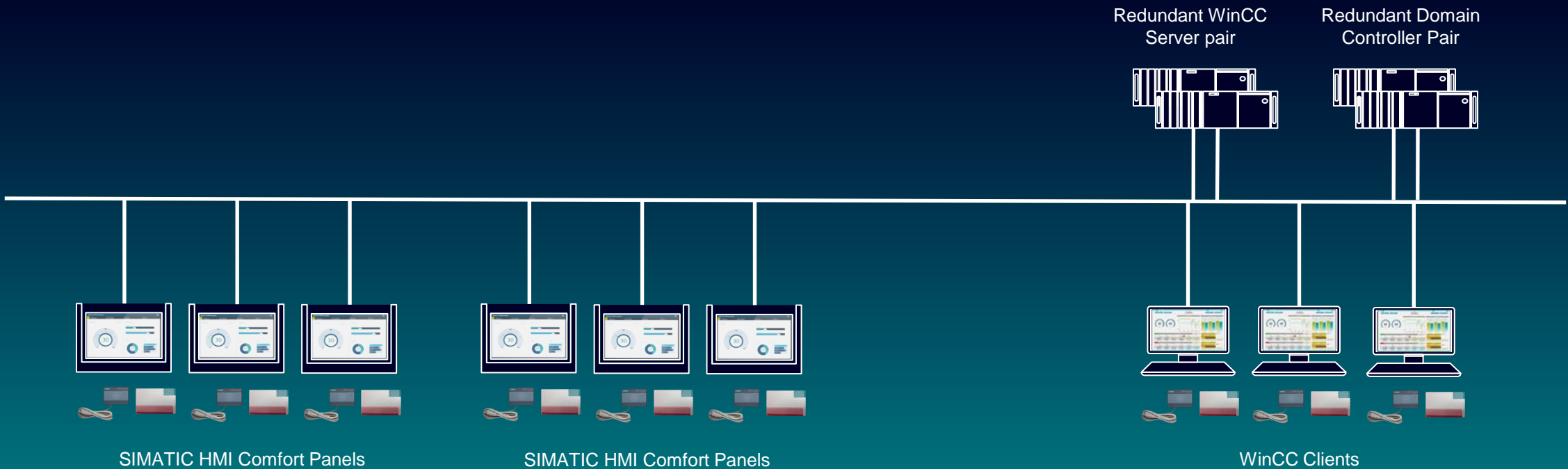
* The unique ID is by default the generally readable UID of the transponder.

For enhanced security, an encrypted data record can also be read from the transponder instead of the UID.

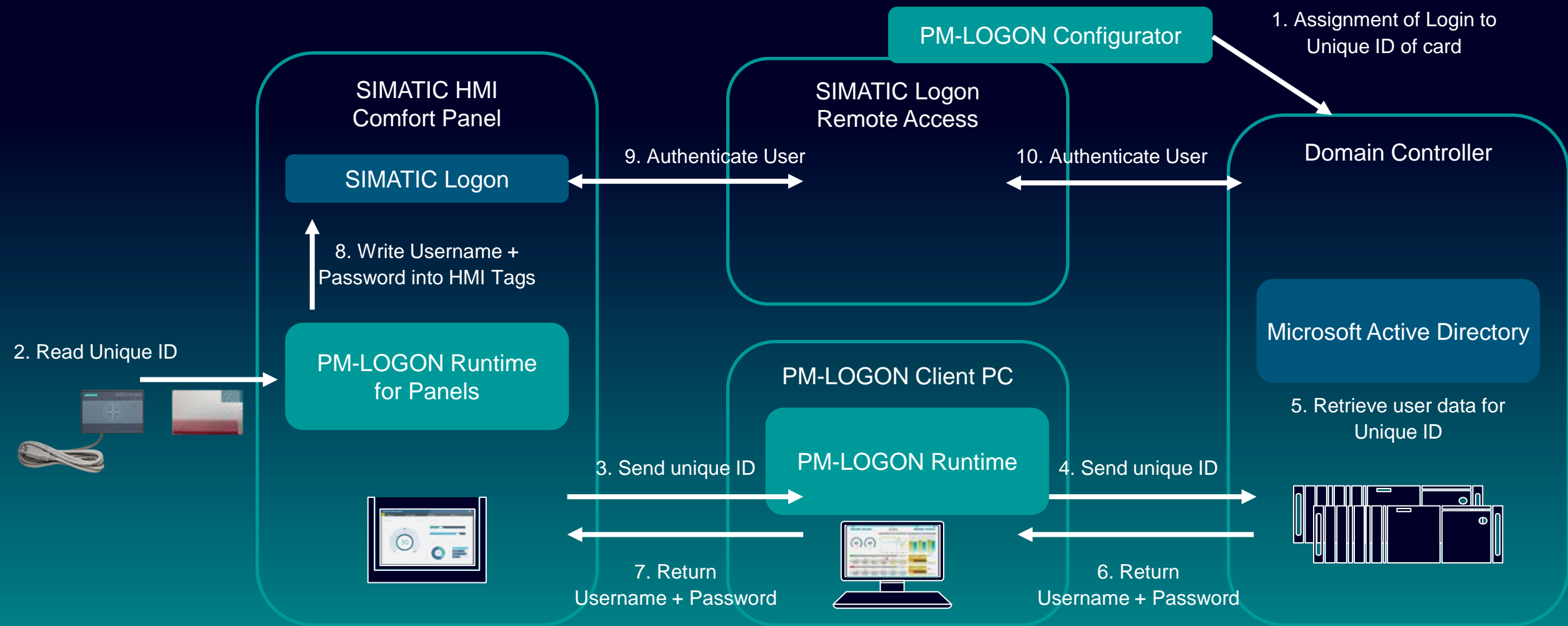
PM-LOGON Mobile Login



PM-LOGON (Comfort Panels) System structure (Example)



PM-LOGON (Comfort Panels) Function principle



PM-LOGON (Comfort Panels)

Function principle

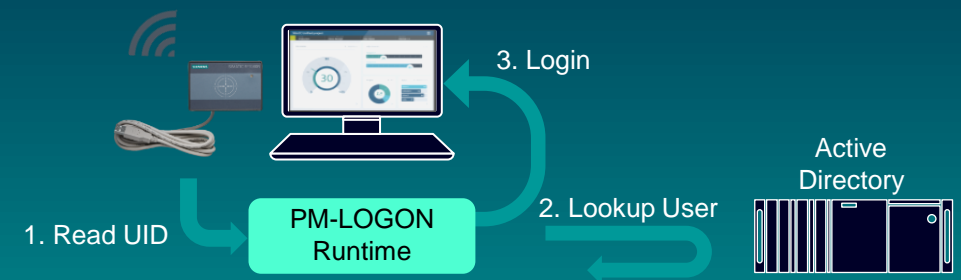
1. Required users are created in the active directory on the domain controller and are added to the appropriate user groups. (Standard SIMATIC Logon procedure.)
2. Each RFID-Transponder has a unique ID*. This ID is linked to a user from the active directory.
3. Username and password are stored in encrypted format together with the transponder ID in attributes of the Microsoft Active Directory of the domain.
4. When a transponder is detected by a RFID reader, its ID is read by the PM-LOGON Runtime for Panels and sent to another PM-LOGON Runtime (on a PC) which runs a query against the Active Directory to find the associated user.
5. The currently active domain controller retrieves the login associated with the RFID card.
6. The PM-LOGON Runtime for Panels transfers the username and password into tags on the Panel where a standard script function performs the login process.
7. The user stays logged in until he actively logs out or the inactivity timeout defined in SIMATIC Logon performs the logout automatically.

*The unique ID is by default the generally readable UID of the transponder.

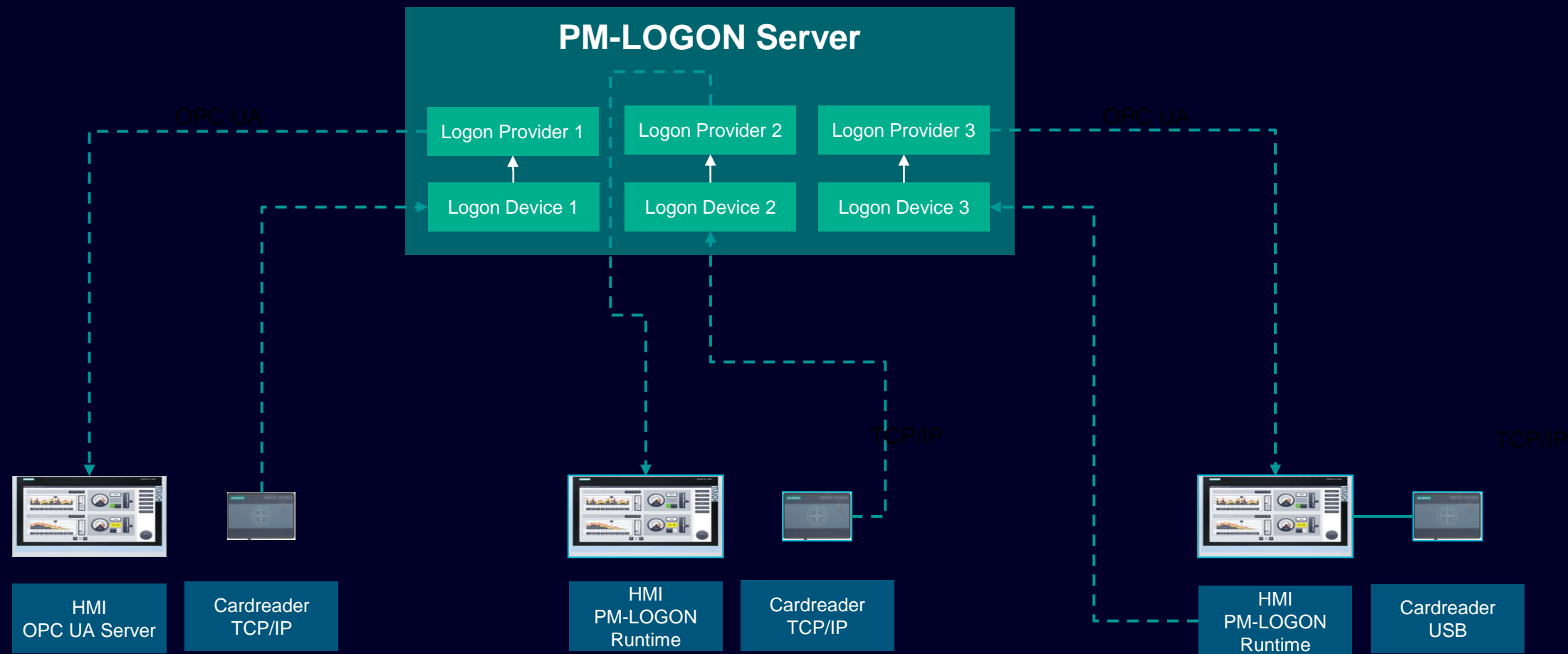
For enhanced security, an encrypted data record can also be read from the transponder instead of the UID.

PM-LOGON Components

- PM-LOGON consists of:
 - PM-LOGON Configurator
The PM-LOGON Configurator defines the association between the Login Account and the identification property (company card, cell phone)
 - PM-LOGON Runtime
The PM-LOGON Runtime reads the identification property, searches the associated Login Account and performs the login operation
 - PM-LOGON Runtime (for WinCC V7, V8, PCS 7, WinCC Prof., Advanced, Unified PC)
 - PM-LOGON Runtime for Panels (for Comfort Panels)
 - PM-LOGON Runtime for UCP (integrated in Firmware)

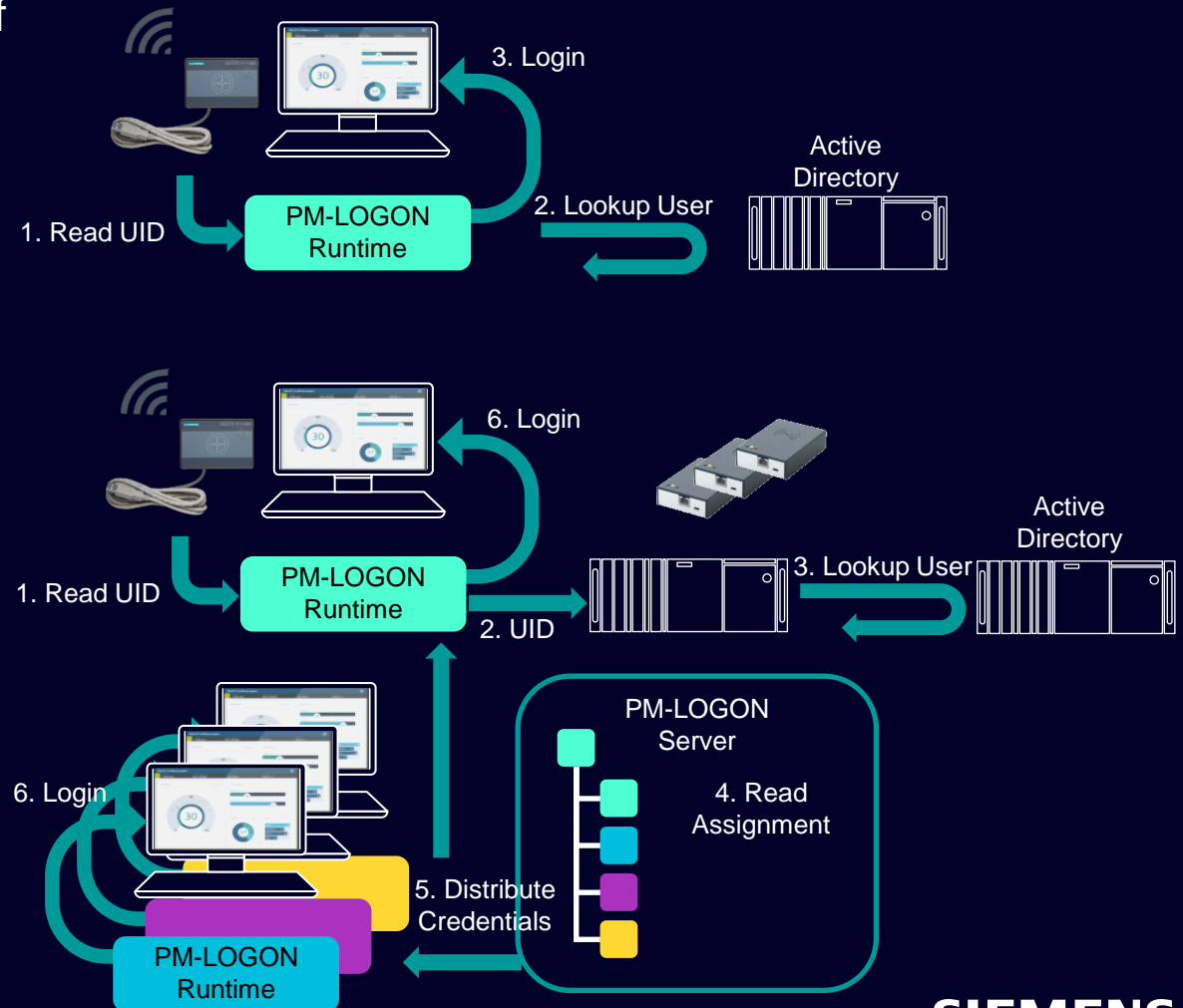


PM-LOGON Server



PM-LOGON Runtime and Server

- The PM-LOGON Runtime supports the assignment of one RFID reader to one local Login Provider
- PM-LOGON Server supports the assignment of 1..n RFID readers to 1..m Login Providers
- Usage of the PM-LOGON Servers is optional (separate MLFB)
- Supported TCP/IP reader can be directly connected to the PM-LOGON Server

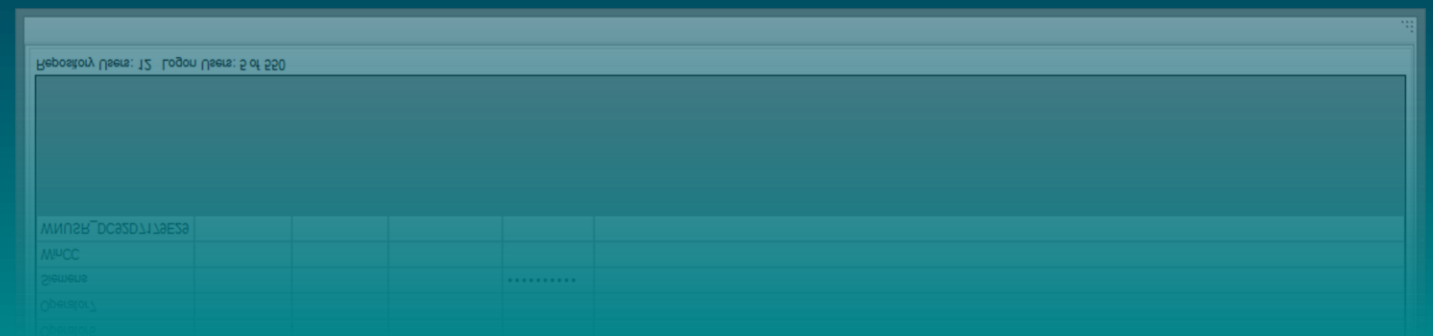
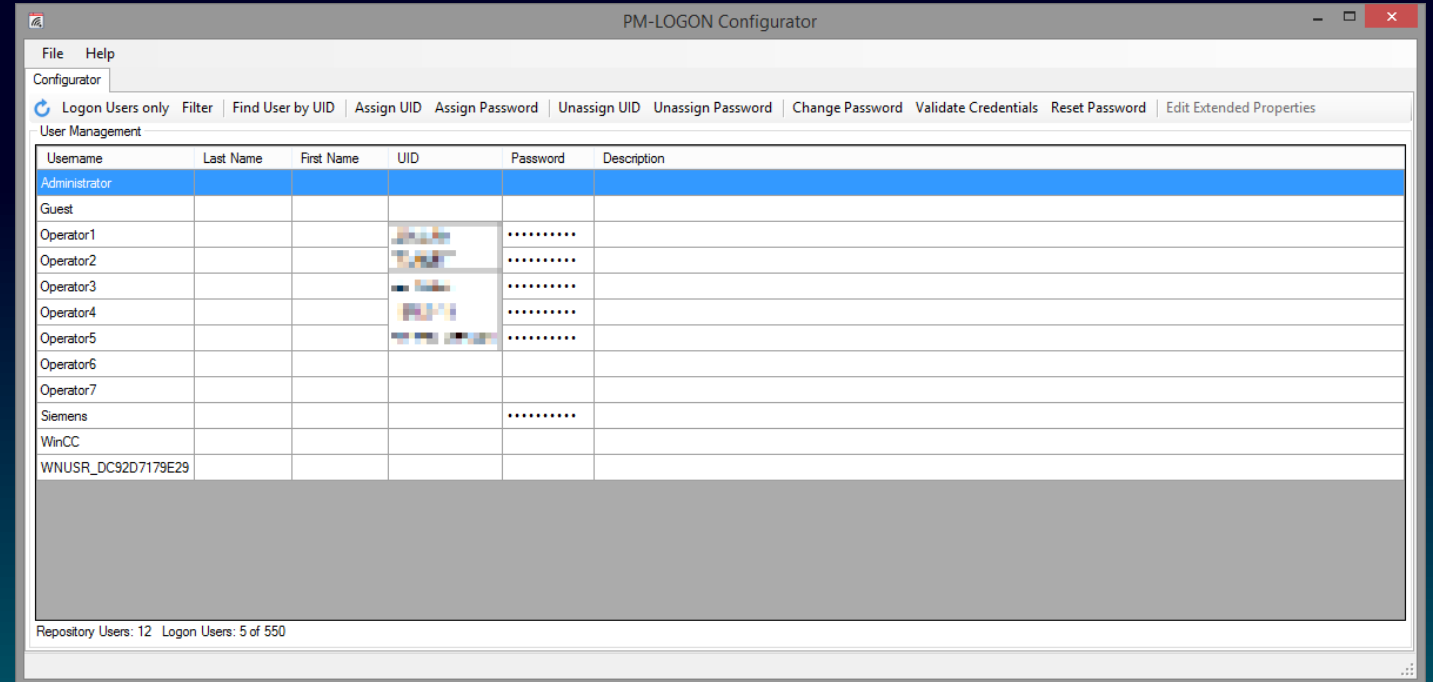
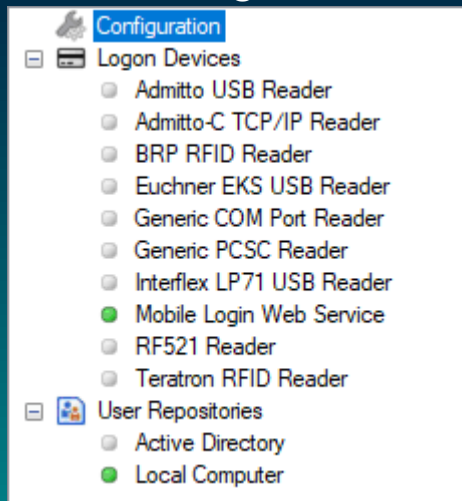


PM-LOGON Konfigurator

The Configurator defines the assignment of the user and the corresponding card

The logon credentials can be stored in

- Active Directory (Domain)
- Windows user management
- UMC

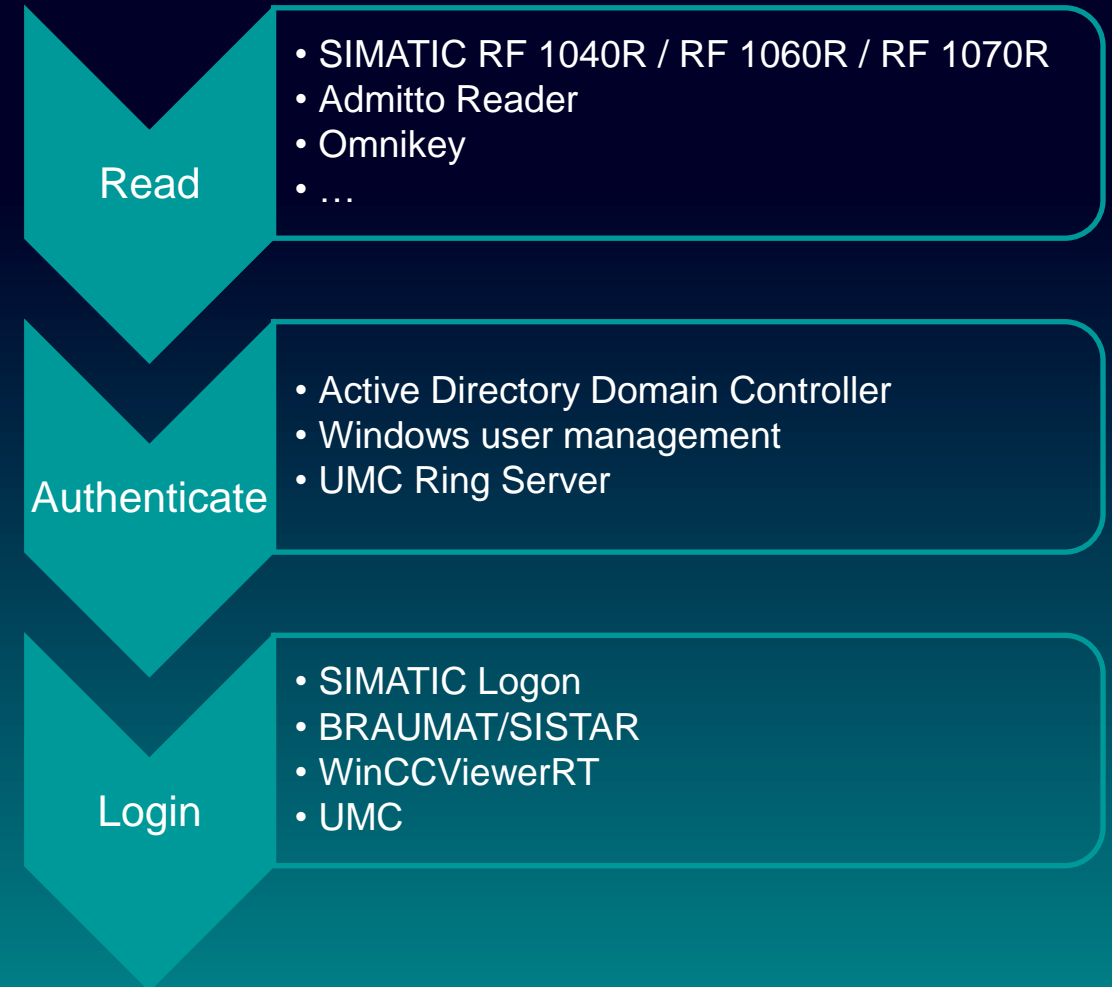


PM-LOGON Components

- Operation of PM-LOGON requires at least 1 configurator.
 - The configurator includes 1 Client
 - Together with the free of charge trial version ideal for testing
 - The runtime can be installed as many times as needed and does not require a license
 - Client packages can be added as required by the project
 - The Client packages define the maximum number of different users the can login

PM-LOGON Runtime

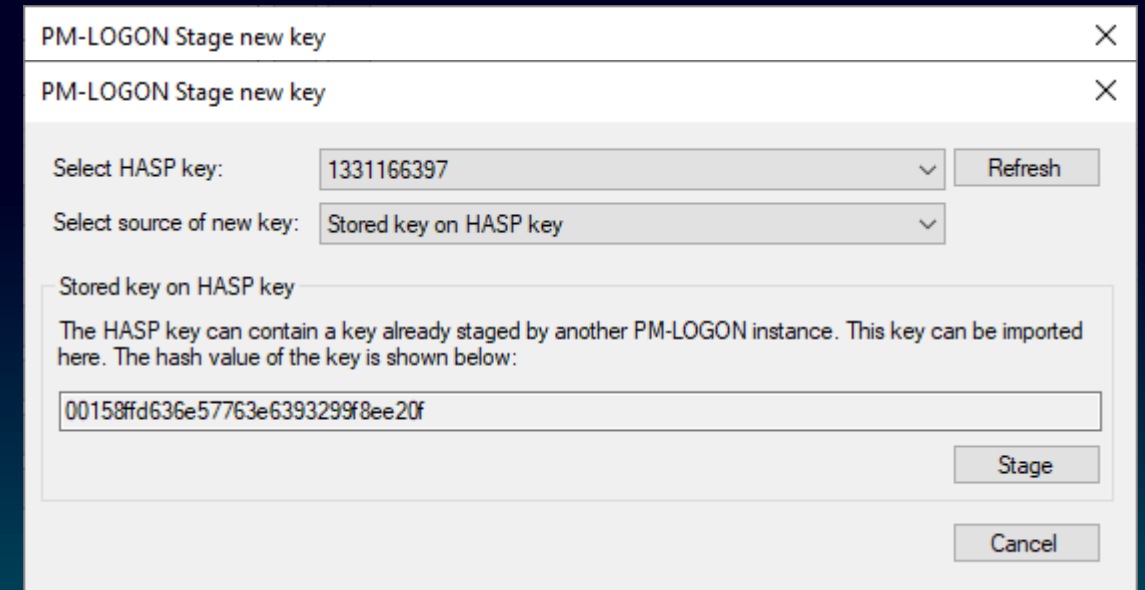
- The PM-LOGON Runtime offers the following functions:
 - Retrieve the unique ID of the RFID card from the configured RFID reading device
 - Determine credentials from :
 - Active Directory (Domain controller)
 - Windows user management
 - Remote PM-LOGON Runtime
 - UMC Ring Server
 - Login user via
 - SIMATIC Logon
 - BRAUMAT/SISTAR
 - OPC/UA
 - WinCCViewerRT
 - UMC



PM-LOGON

Customer specific encryption keys

- A new, customer-specific encryption key is generated centrally in the PM-LOGON configurator
- The key is transferred onto a second hardlock, which is included in the scope of delivery of the PM-LOGON configurator.
- The generated encryption key is imported into the PM-LOGON Runtime



PM-LOGON Stage new key

PM-LOGON Stage new key

Select HASP key: 1331166397 Refresh

Select source of new key: Stored key on HASP key

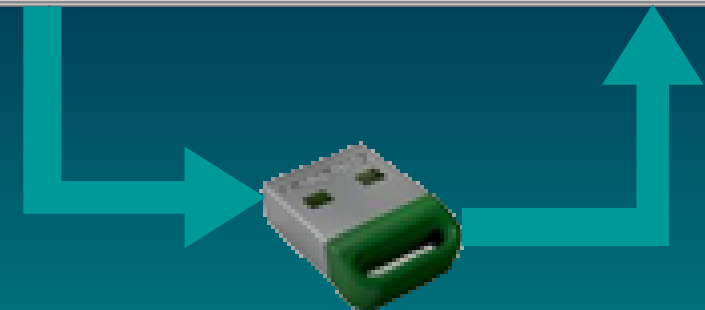
Stored key on HASP key

The HASP key can contain a key already staged by another PM-LOGON instance. This key can be imported here. The hash value of the key is shown below:

00158ffd636e57763e6393299f8ee20f

Stage

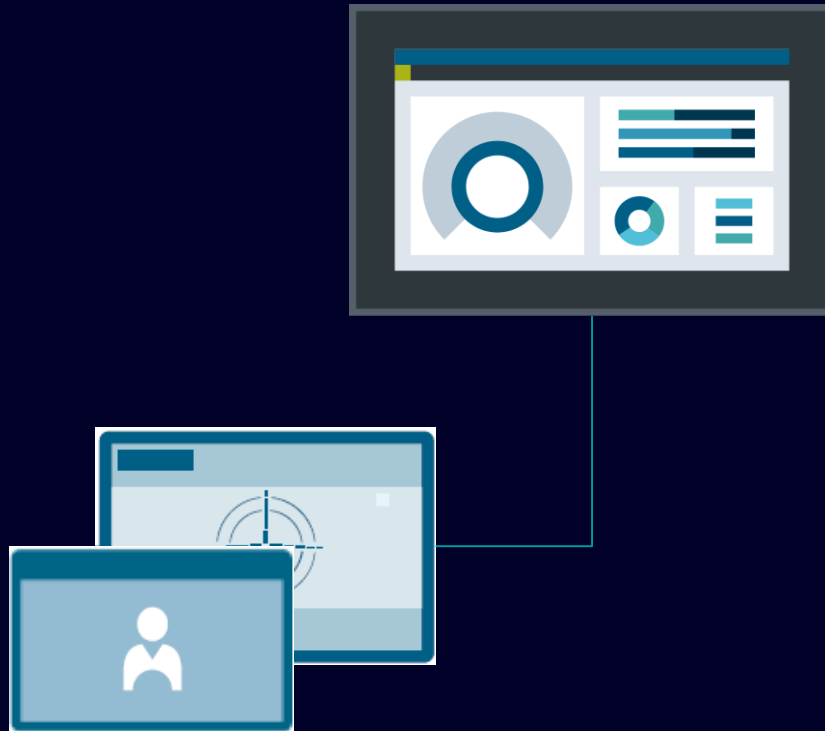
Cancel



PM-LOGON Unified

Integrated in the firmware of the Unified Comfort Panels

Unified Comfort Panel ✓



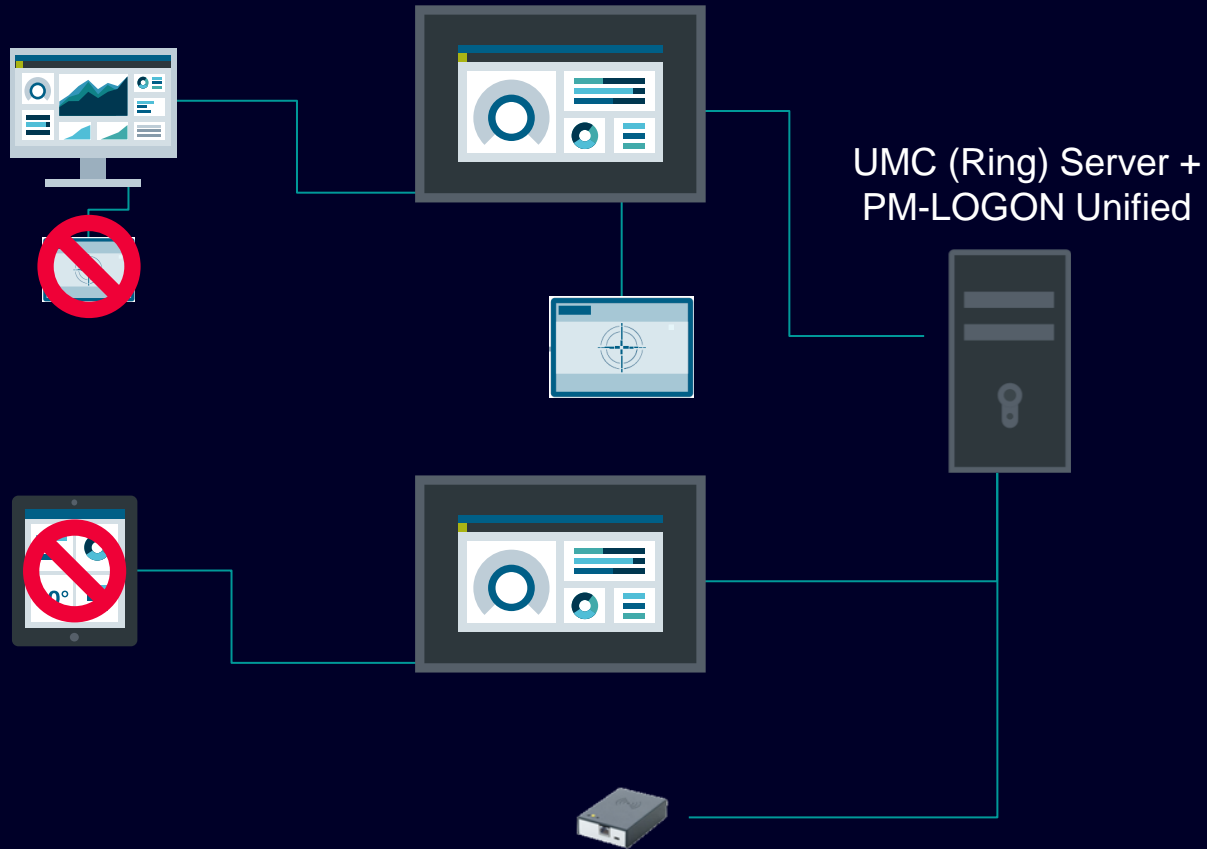
Unified Comfort Panel

- Local users only
- No Remote Web Clients
- PM-LOGON integrated into the panel image
- No license (part of firmware)
-

RFID Reader

- Siemens RF1040R 6GT2831-6CA50
- Siemens RF1060R 6GT2831-6AA50
- Siemens RF1070R 6GT2831-6BA50

PM-LOGON Unified UCP + Central user management (UMC-S)

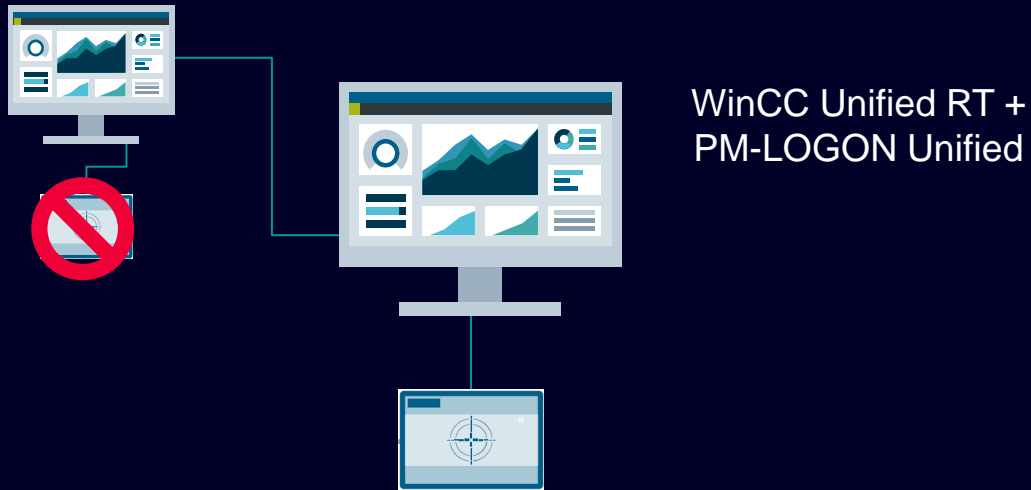


- UMC (Ring) Server with PM-LOGON Unified
- Local (USB) Siemens RF10x0 Reader at UCP
- No RFID Support für web clients

- UMC (Ring) Server with PM-LOGON Unified
- TCP/IP RFID Reader (e.g.: Siemens RF1000R)
- No RFID support for web clients

PM-LOGON Unified

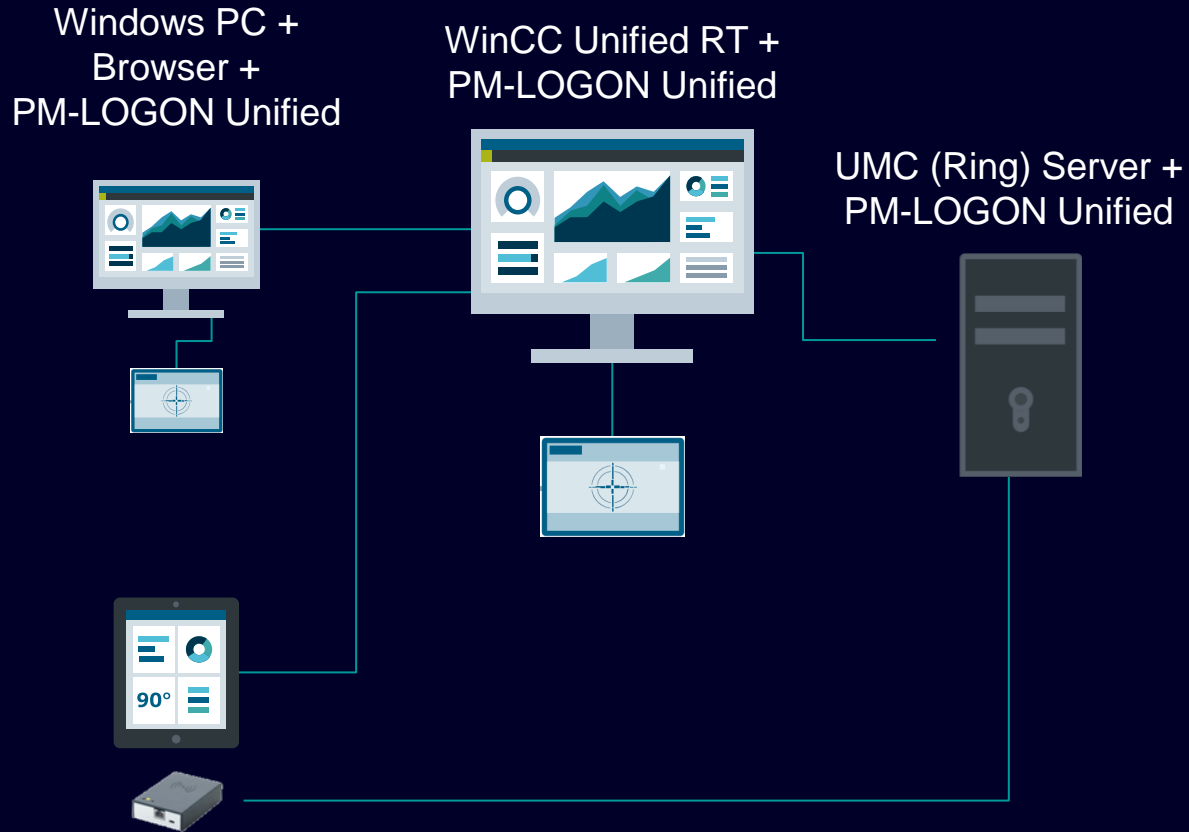
PM-LOGON Unified PC + Local user management (UMC-L)



- WinCC Unified RT mit PM-LOGON Unified
- All PM-LOGON supported RFID readers
 - SIMATIC RF1060R, RF1070R, RF1040R USB
 - Admitto-A-1200-D Advant USB-CDC
 - Admitto-A-1400-D Advant USB-CDC
 - Admitto-A-3100-D Desfire USB-CDC
 - Admitto-A-2000-D 125kHz USB-CDC
 - Admitto-C TCP/IP
 - Omnikey 5021 CL USB
 - Omnikey 5321v2CR USB
 - Elatec TWN4 LEGIC NFC-P USB
 - Teratron PC-LOC reader USB
 - Euchner EKS reader USB
 - R.Stahl UB03 EX-Reader USB-CDC, phg_crypt-Mode supported
 - Serial and virtual-COM-Port based on reader configuration
 - RFIdeas Wave ID Reader
 - OPC UA Leser (UID via OPC UA Tags)
- No RFID support for web clients

PM-LOGON Unified

PM-LOGON Unified PC + Global User Management (UMC-S)



- WinCC Unified RT with PM-LOGON Unified
- All PM-LOGON supported RFID readers
 - SIMATIC RF1060R, RF1070R, RF1040R USB
 - ...
- RFID support for web clients
 - Windows PC + PM-LOGON Unified + every supported reader
 - Any Unified Client Device + any supported TCP/IP reader

PM-LOGON

Ordering information

- Scalable from simple up to complex plant topologies:

- **Configurator**

- Unified (*) 9AE7123-1SS00-1AA0
- Configurator incl. 1 User: 9AE7123-1SS01-1AA0
- Server incl. 1 User: 9AE7123-1SS02-1AA0

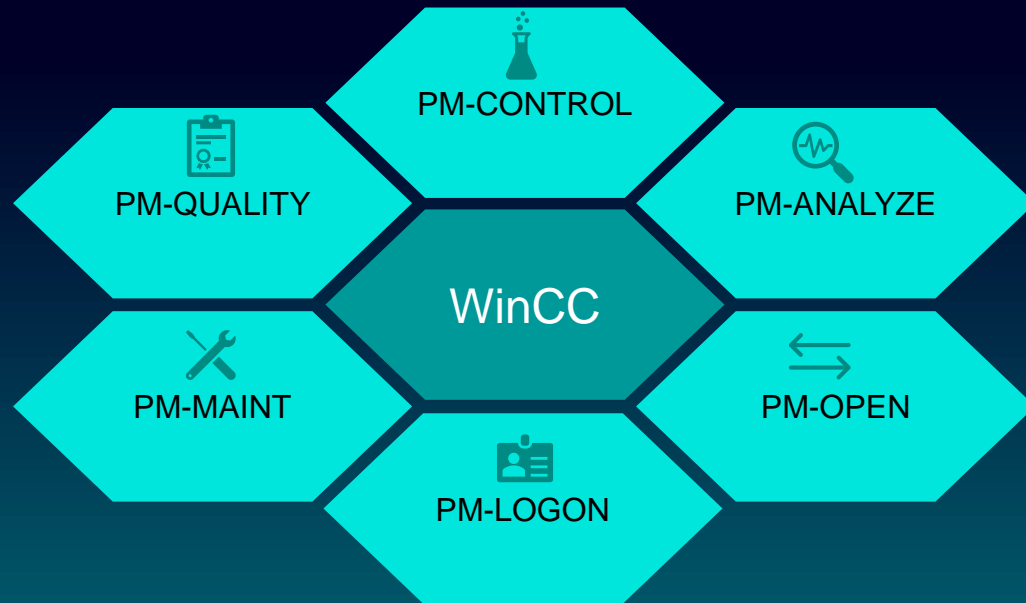
- **User Packages**

- User Package 10: 9AE7123-1SC00-1AA0
- User Package 50: 9AE7123-1SC01-1AA0
- User Package 100: 9AE7123-1SC02-1AA0
- User Package 500: 9AE7123-1SC03-1AA0
- User Package 1000: 9AE7123-1SC04-1AA0
- User Package 2000: 9AE7123-1SC05-1AA0
- User Package 5000: 9AE7123-1SC06-1AA0
- User Package 10000: 9AE7123-1SC07-1AA0

| PM-OPEN EXPORT

Export of process and archive data

PM-OPEN EXPORT

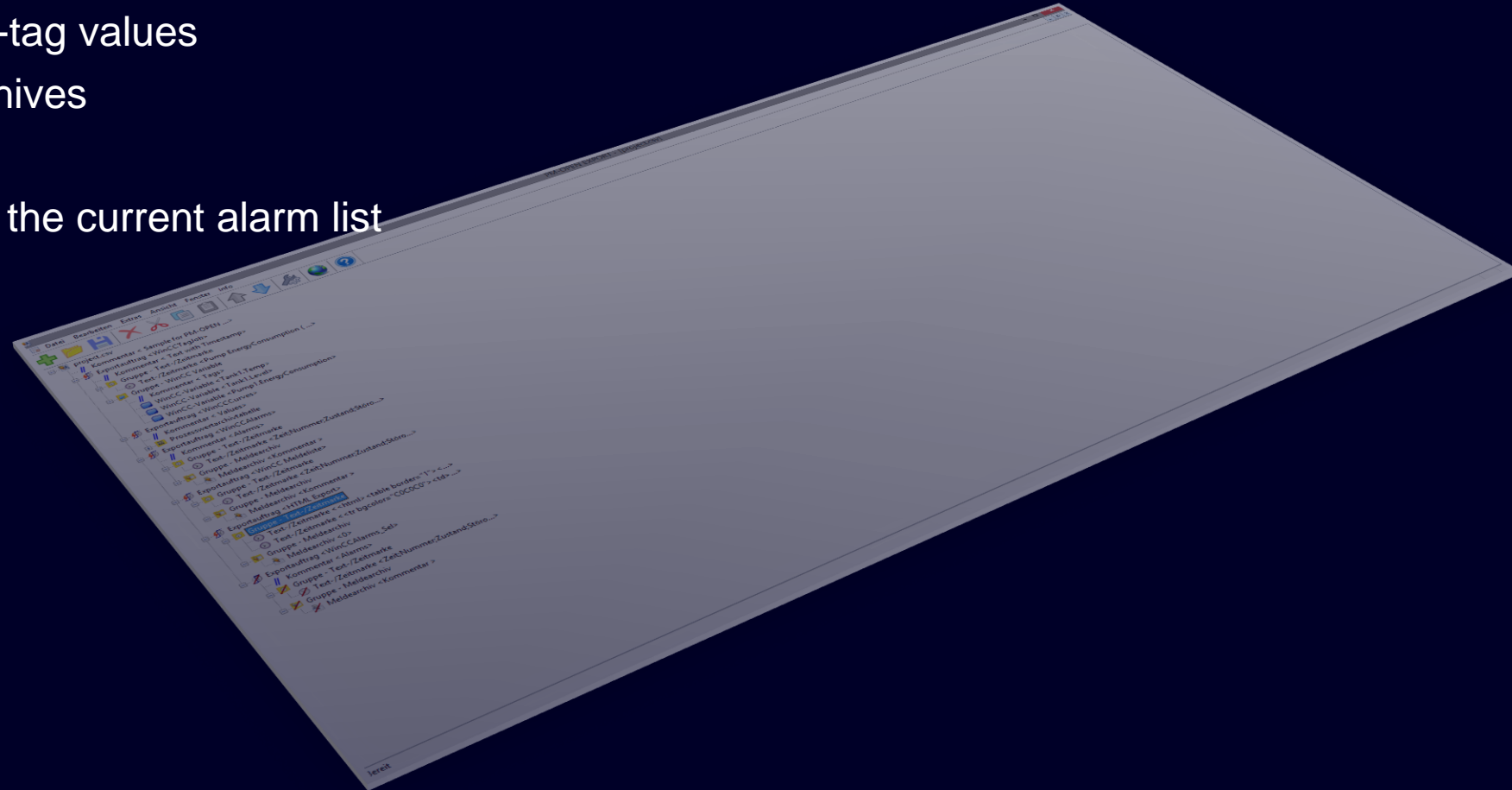


- Export of process- and archive data into text files
- Flexible, individual design of target file format
- Export to arbitrary storage media (local / network)
- Dynamic generation of file names
- Flexible and cost-effective solution
- Used in production of various industry branches (Pharmaceutical, chemical, food and beverage, machine builders...)
- Released for WinCC / PCS 7 / WinCC Professional

PM-OPEN EXPORT

Functional scope

- Export of
 - External and internal WinCC-tag values
 - Data from process value archives
 - Data from user archives
 - Data from alarm archive and the current alarm list
- Exports may be triggered
 - Cyclically
 - Time based
 - Event based

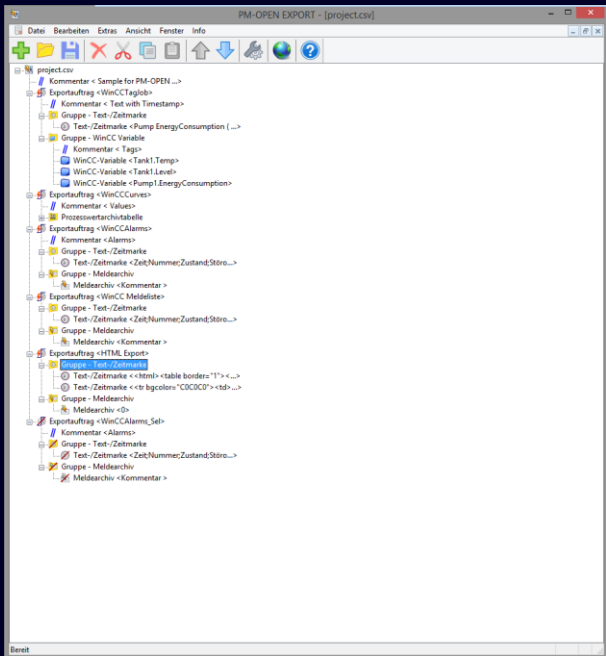


PM-OPEN EXPORT

System components

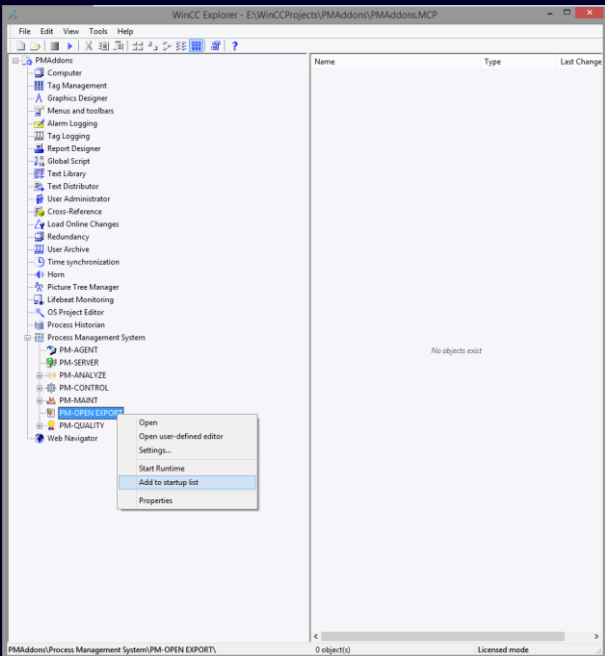
Configuration

The configuration editor is used to define the export jobs.



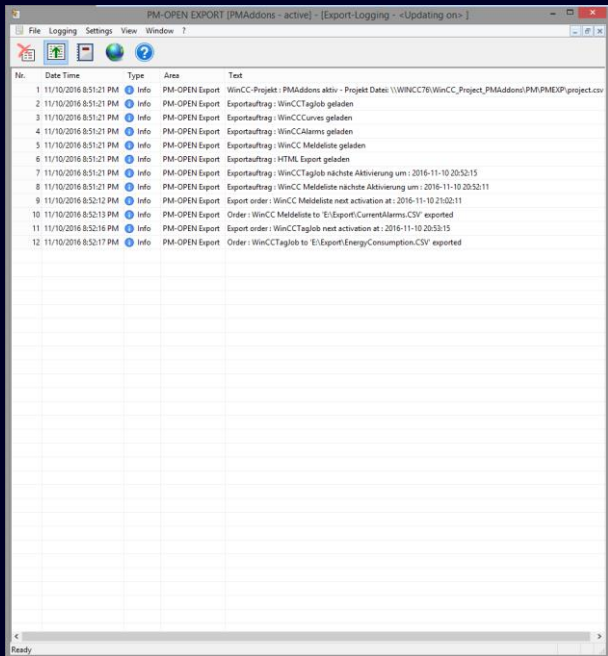
WinCC

The runtime module is activated from the WinCC startup list.



Runtime

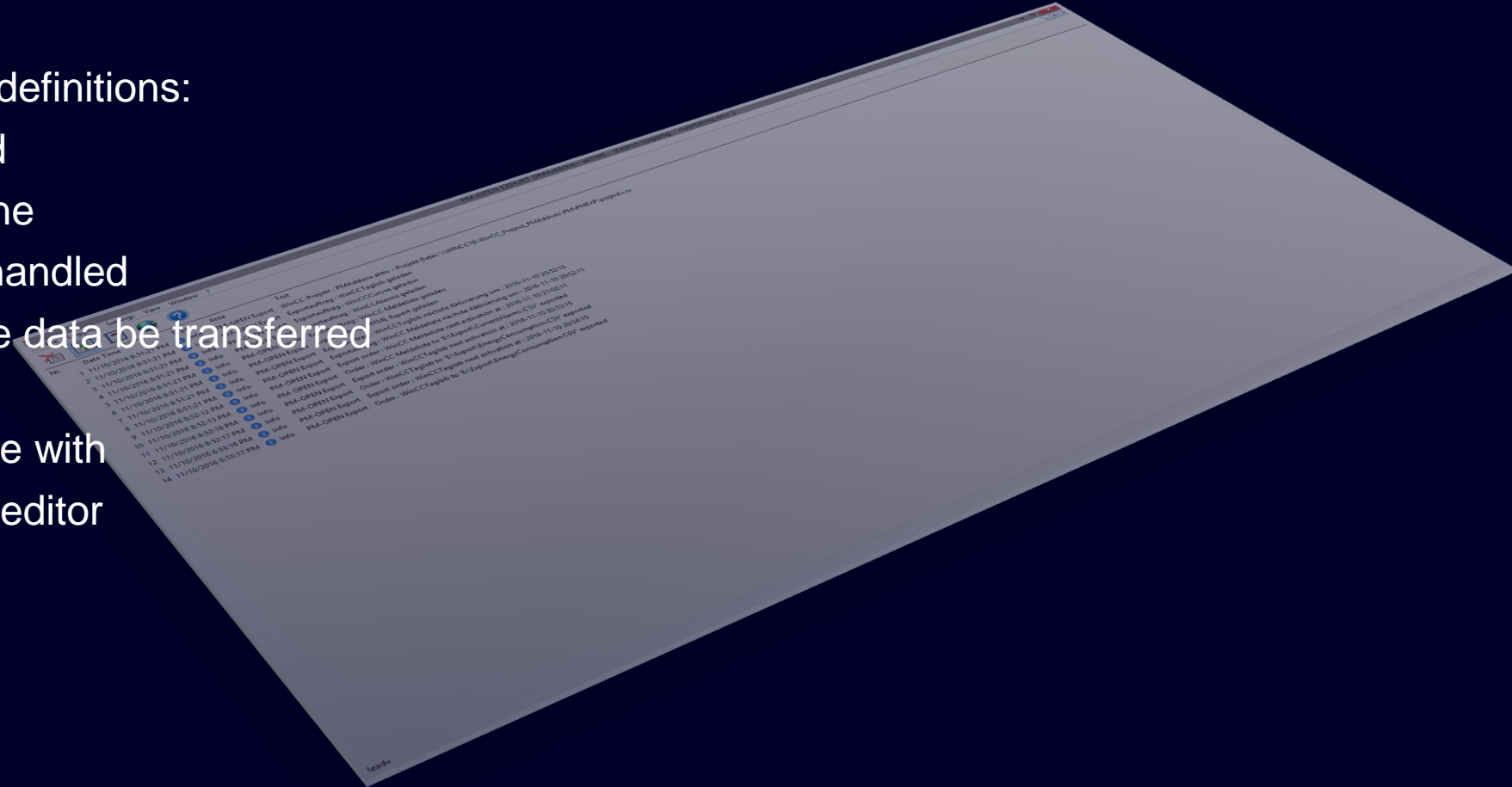
The runtime exports the configured process data.



PM-OPEN EXPORT

Export jobs

- Exports jobs are defined in a configuration file
- The file contains the following definitions:
 - Which data shall be exported
 - When shall the export be done
 - How shall the export file be handled
 - To which destination shall the data be transferred
- The configuration file is editable with
 - The integrated configuration editor
 - or any other text editor



PM-OPEN EXPORT

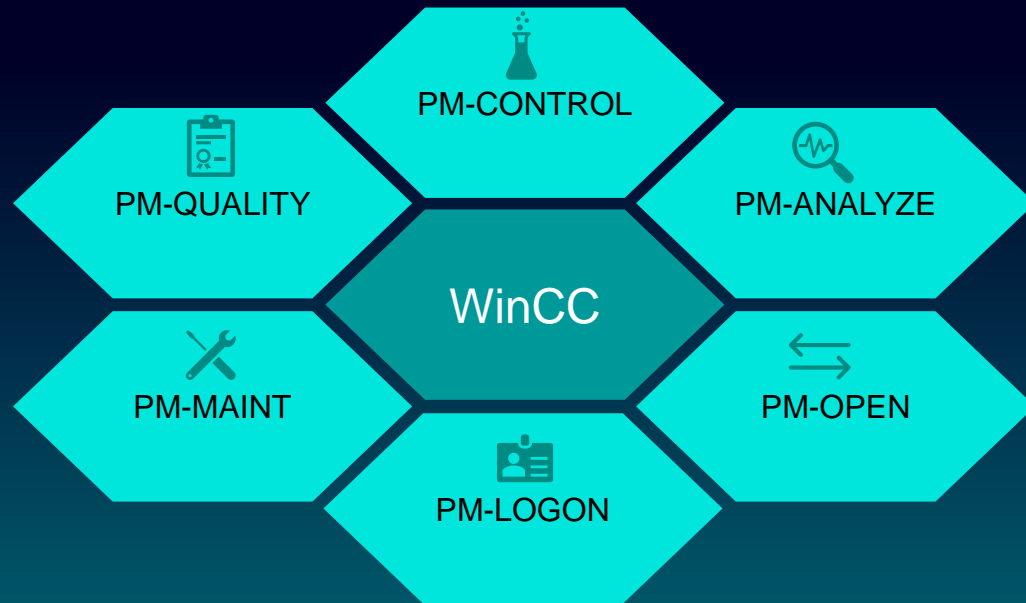
Ordering information

- Scalable from simple up to complex plant topologies:
 - **Base installation**
 - PM-OPEN EXPORT: 9AE7 106-1SS01-1AA0

| PM-OPEN IMPORT

Import of process data

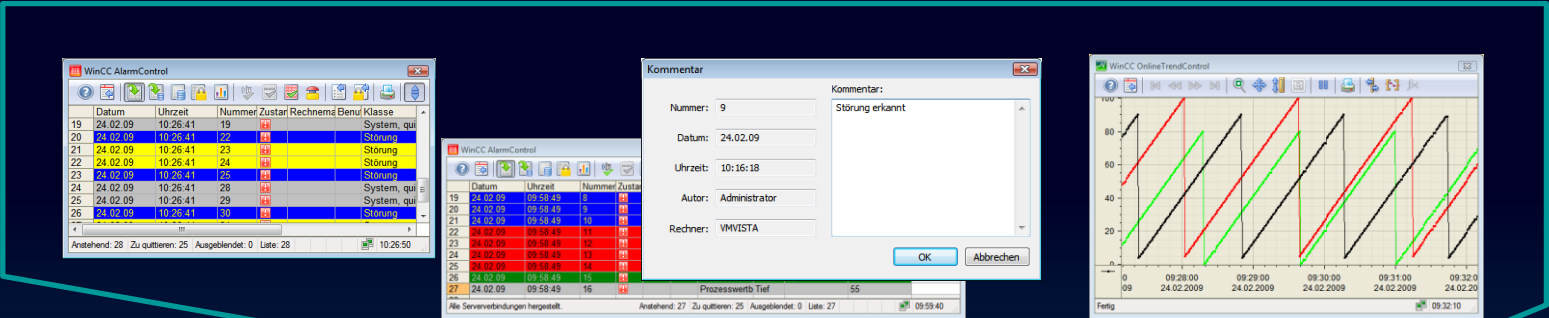
PM-OPEN IMPORT



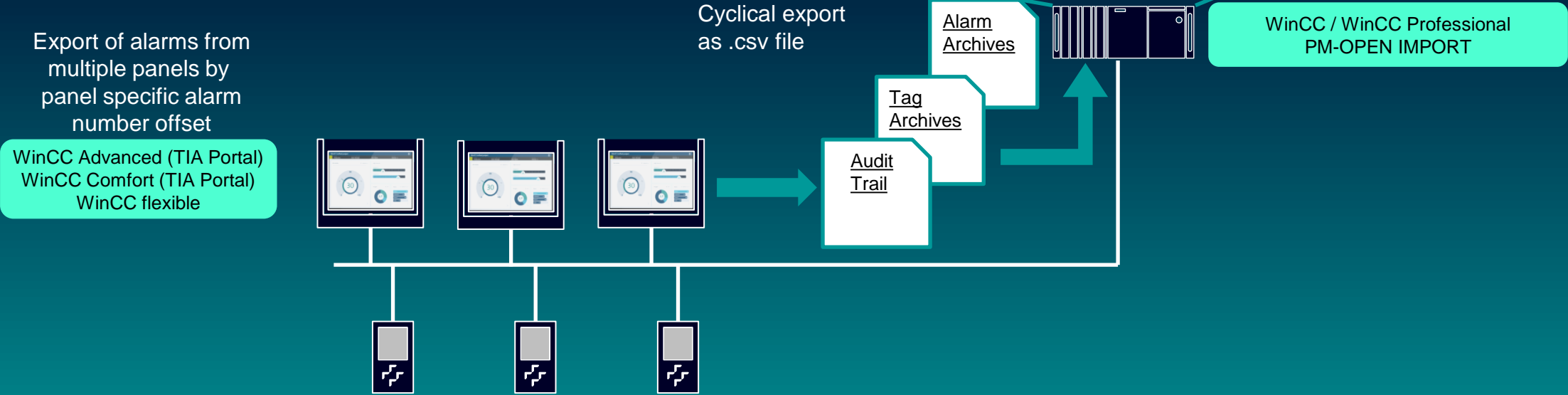
- Import of data from WinCC Advanced and Comfort for a central long-term archiving in WinCC / WinCC Professional (TIA-Portal)
 - Archive values (data logs)
 - Alarms (alarm logs)
 - Operator input logs (Audit-Trail)
- Original alarm time stamps are preserved
- Automatic data import
- Flexible and cost-effective solution
- Used in production of various industry branches (Pharmaceutical, chemical, food and beverage, machine builders...)
- Released for WinCC, PCS 7, WinCC Professional

PM-OPEN IMPORT

Function principal



Display and analysis with standard WinCC features

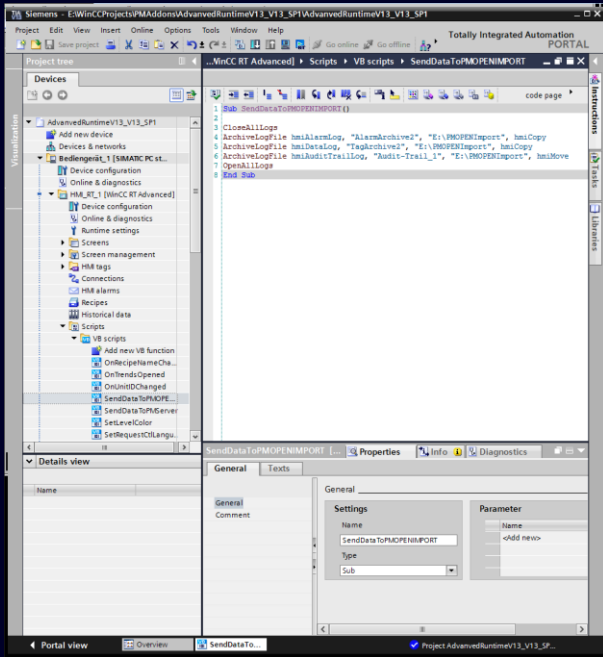


PM-OPEN IMPORT

System components

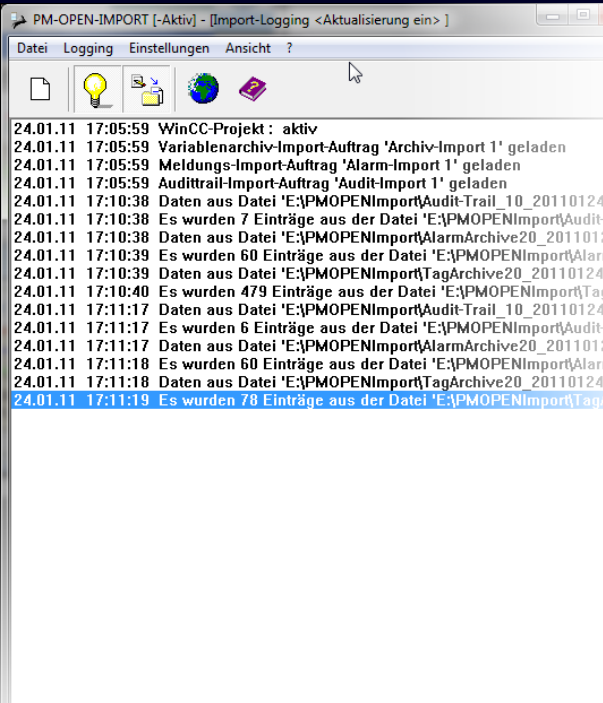
WinCC Advanced, Comfort

Data is exported by a VB Script included in the product.



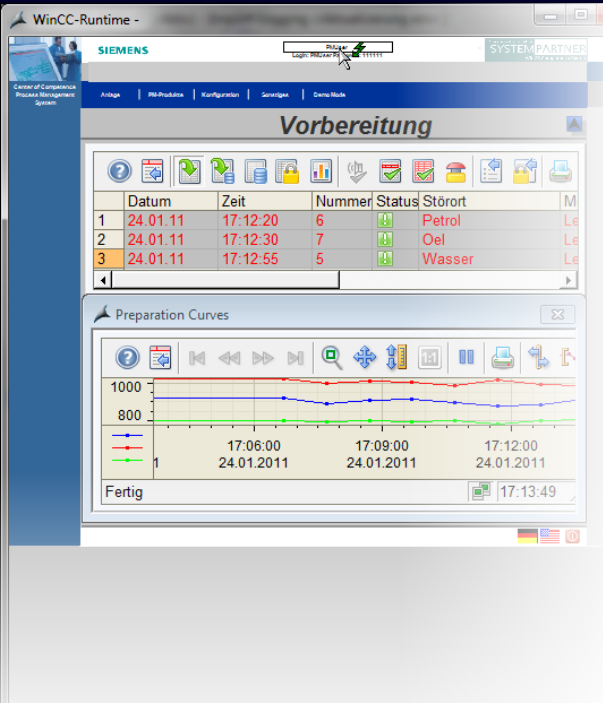
PM-OPEN IMPORT

PM-OPEN IMPORT assigns the files to WinCC archives.



WinCC WinCC Professional

Display and analysis is done with standard WinCC functionality.



PM-OPEN IMPORT

Ordering information

- Scalable from simple up to complex plant topologies:
 - **Base installation**
 - PM-OPEN IMPORT: 9AE7 114-1SS01-1AA0

| Contact

Issuer: Siemens AG
WinCC Competence Center Mannheim

Phone: +49 621 1723 1010

E-Mail: winccaddon.automation@siemens.com

Internet: <https://www.siemens.com/process-management>