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Plug and Produce

Getting the most out of the machine data in PI systems by cooperating with machine builders

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AVEVA

PLUG AND PRODUCE

Agenda

Getting the most out of the
machine data in PI systems by
cooperating with machine builders

WHY cooperate with machine builders

WHAT challenges to solve together

HOW to solve challenges



worldwide 
2,100 
employees 

worldwide
€ **300** m
sales 

55 years
experience 

machines in
more than
100 
countries 

15,000 
delivered
machines

represented in
more than
50 
countries 

About Bausch+Ströbel

Your expert partner for safe and continuous production.

World leader in technologies and services for filling and packaging lines for the pharmaceutical industry.



Together with our customers we find the best possible solutions



AMGEN



Biogen

Boehringer
Ingelheim

CSL Behring
Biotherapies for Life™

BD

FRESENIUS
KABI
caring for life

GILEAD

Genentech
A Member of the Roche Group



Janssen
PHARMACEUTICAL COMPANIES
of Johnson & Johnson

NOVARTIS

MERCK

Mylan®

REGENERON

Pfizer

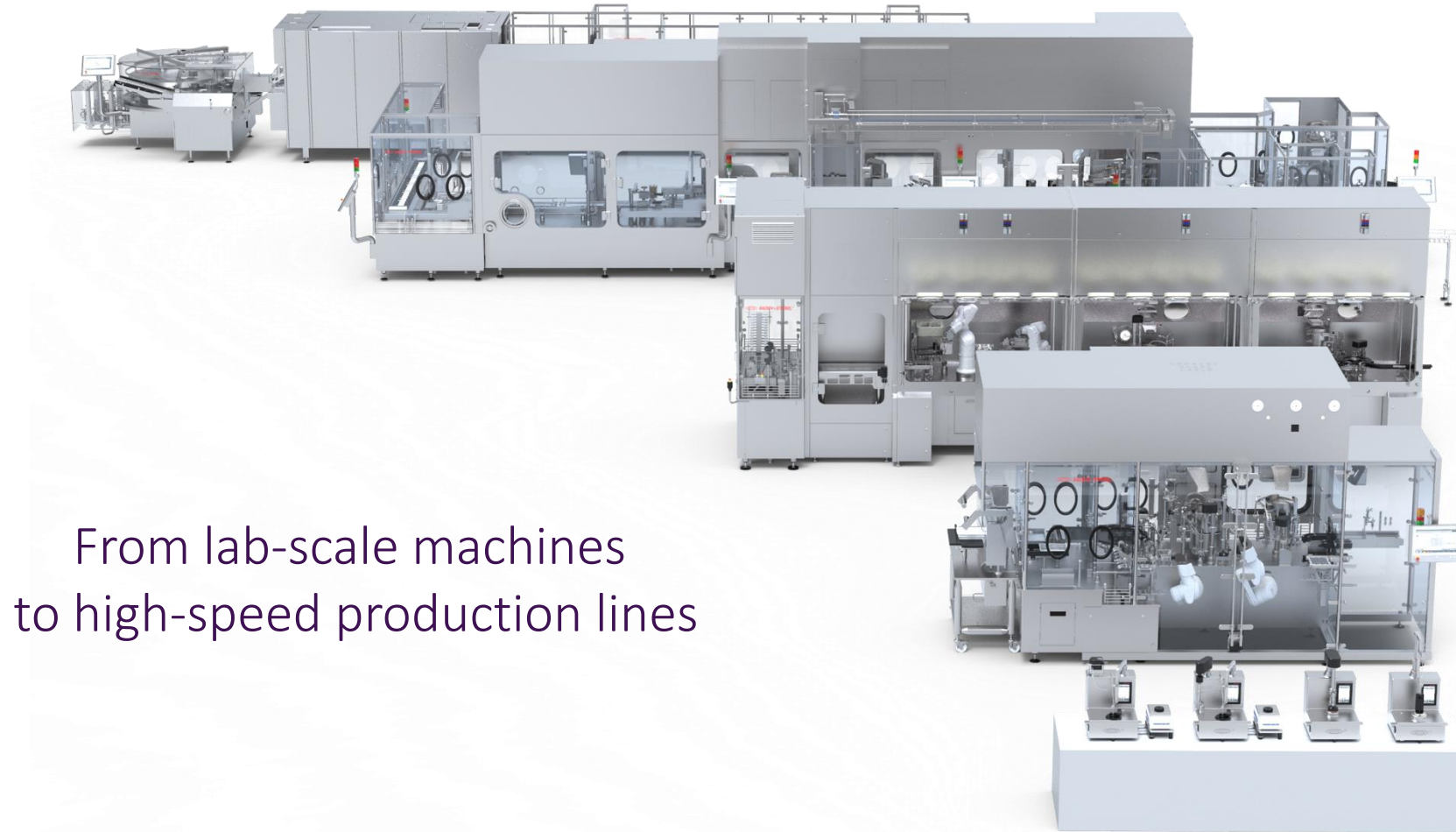
Roche

SCHOTT
glass made of ideas

sanofi

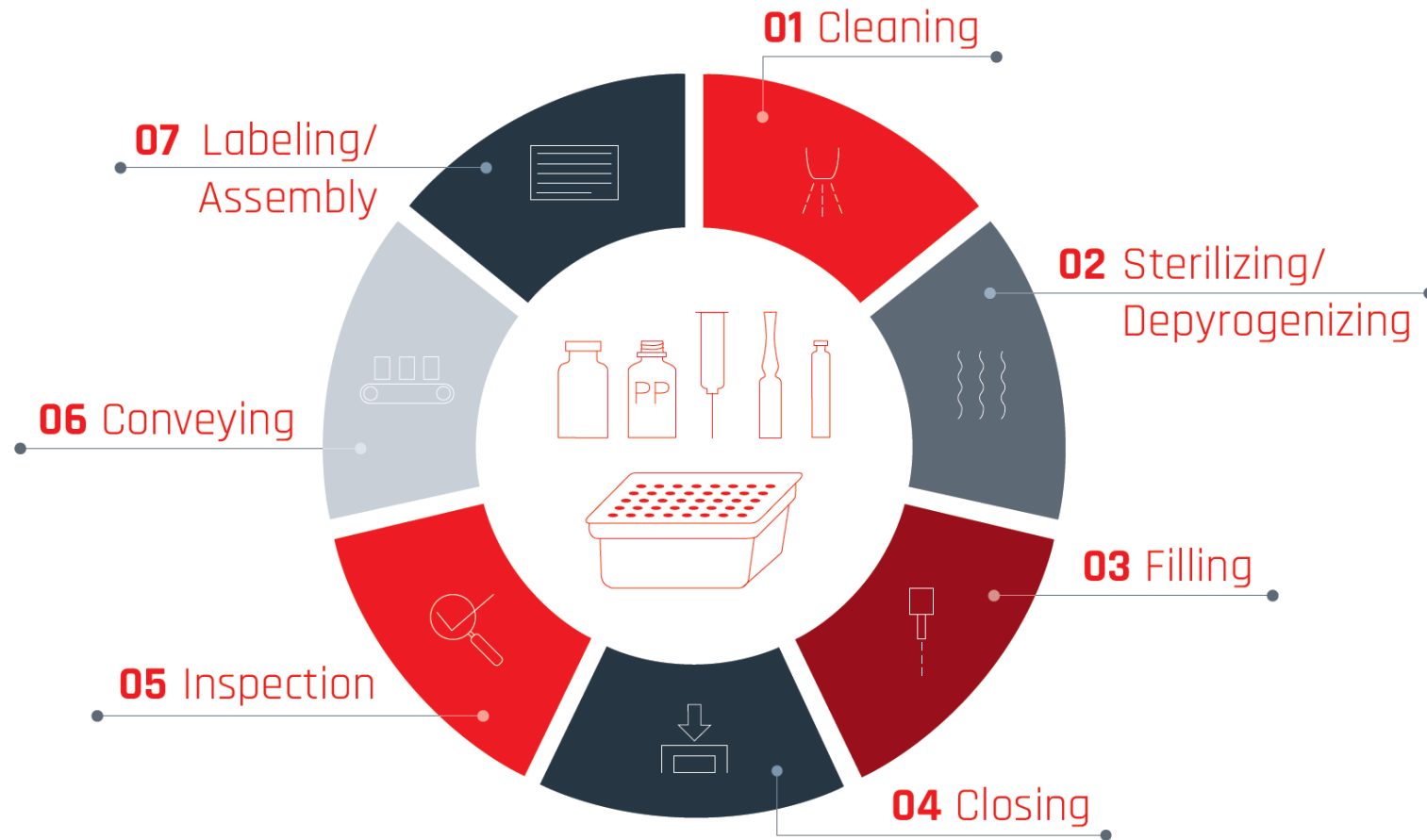


Product range

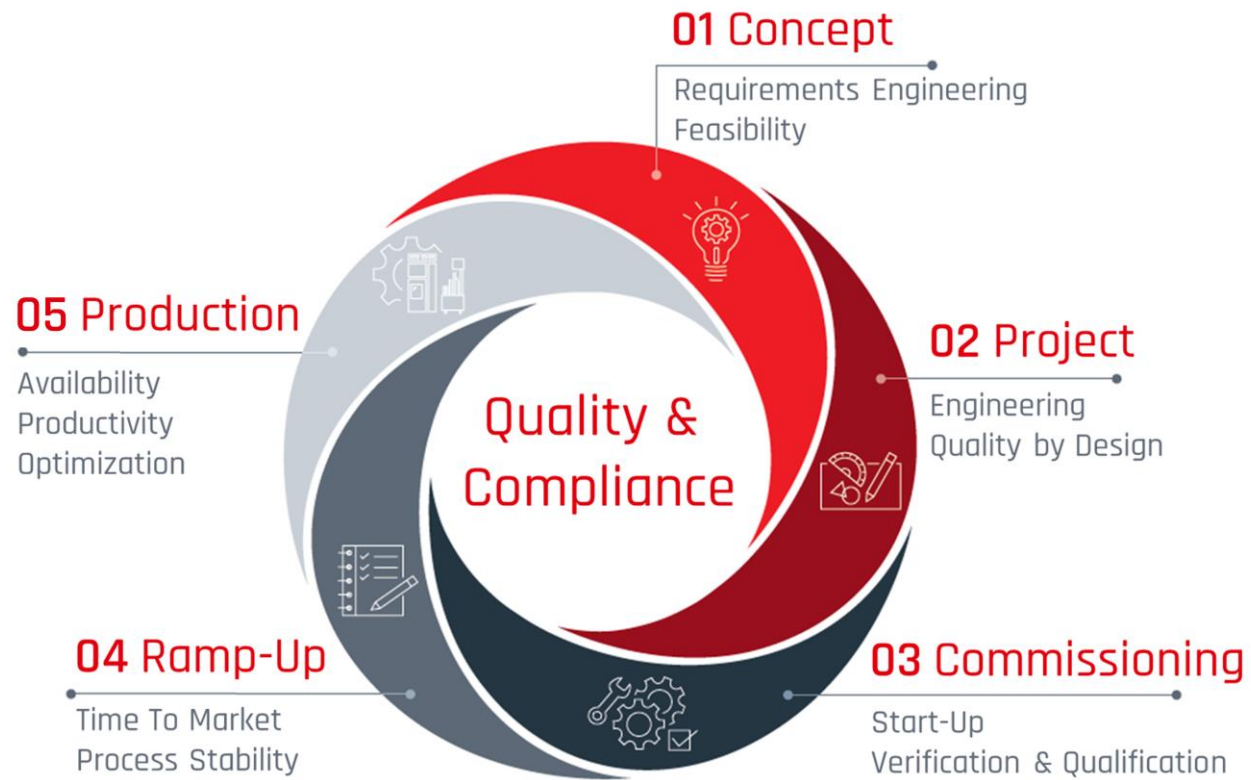


From lab-scale machines
to high-speed production lines

Machine processes



Life Cycle Services



// Not only leading in technology. ///

With our Life Cycle Services we accompany you through all stages of your pharmaceutical production.

From the first idea to spare parts management to optimizing your production.

PLUG AND PRODUCE

Agenda

Getting the most out of the
machine data in PI systems by
cooperating with machine builders

WHY cooperate with machine builders

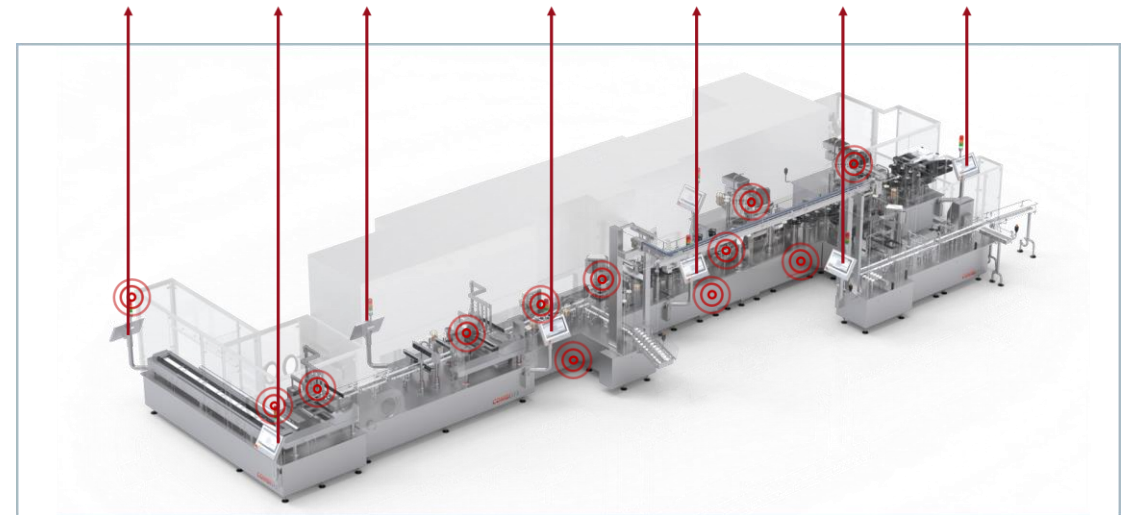
WHAT challenges to solve together

HOW to solve challenges

WHY to cooperate with machine builders.

Yesterday, machines were isolated systems
unconnected to the outside world.

Today, machines generate more data than ever.
Connectivity to higher-level systems is central to
modern production.



WHY cooperate with machine builders

Challenges in IIoT – The flood of data

The screenshot displays a complex software interface with multiple panes. The top-left pane shows a tree view of a project structure. The top-right pane contains a table with columns for 'Gebildet', 'Kommentar', 'Titel', 'Adresse', 'Nummer', 'Typ', 'Sprache', 'Verf.', 'Optimiere...', 'DB-ersch.', 'Zustelltemp.', and 'Autor'. The bottom-left pane shows a 'Data Access View' with columns for 'Server', 'Node id', 'Display Name', 'Value', 'Datatype', and 'Source Times'. The bottom-right pane shows a diagram of a machine with various components and connections. A log window at the bottom shows messages with columns for 'Timestamp', 'Source', 'Server', and 'Message'.

Unstructured collection of all data available on the machine

What kind of data is available?

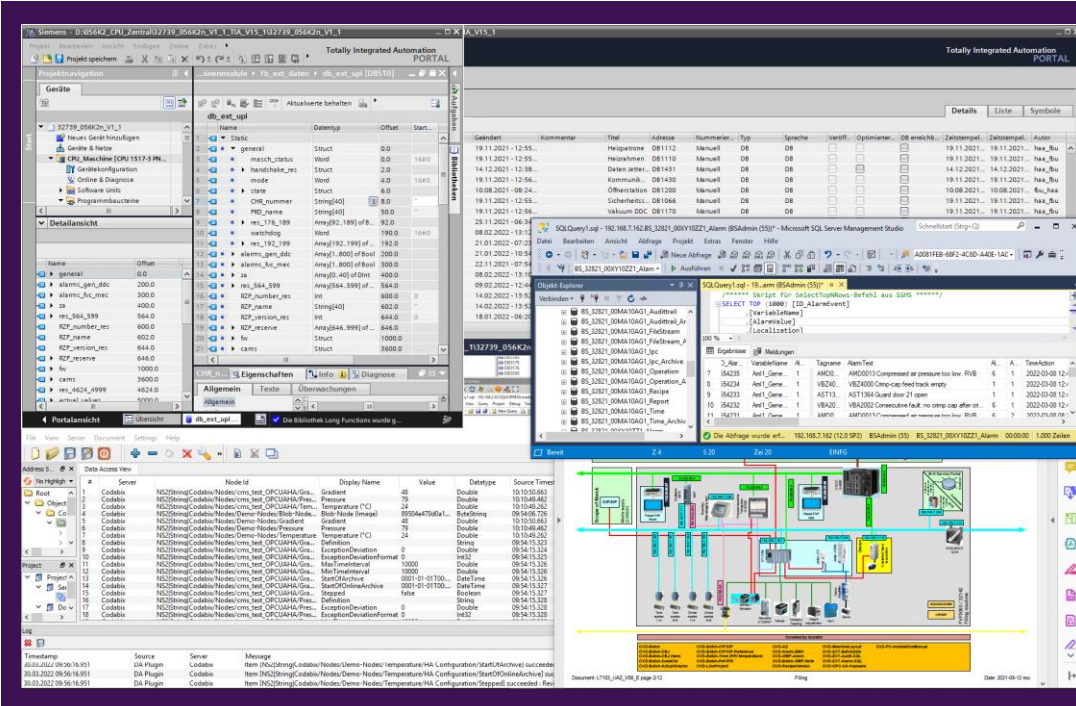
Where and how is the data available?

Which sets of data are relevant?

How can the components be connected?

WHY cooperate with machine builders

Challenges in IIoT – The flood of data



The screenshot displays the TIA Portal interface. On the left, a project tree shows a 'Geräte' (Devices) folder containing various components like 'CPU-Maschine' and 'Programmbausteine'. The main workspace is divided into several panes: a 'Detailsansicht' (Details view) showing a table of device properties, a 'Datenansicht' (Data view) showing a table of data points with columns for Name, Datentyp, and Wert, and a 'Netzplan' (Network diagram) showing a complex network topology with nodes and connections. A status bar at the bottom shows a message log with timestamps and server information.

Unstructured collection of all data available on the machine



The photograph shows a man and a woman sitting at a table in what appears to be a workshop or meeting room. They are both looking at a large document or set of papers on the table. The man is pointing at a specific part of the document. A laptop is open on the table in front of them. The background shows a modern office environment with large windows.

Interdisciplinary workshops to define the optimal set of data to be monitored

WHY cooperate with machine builders

Challenges in IIoT – Contextualization of data

The screenshot displays the SIMATIC Manager interface with a table of machine data points. The table includes columns for 'Name', 'DateTyp', and 'Other'. The data points listed include:

Name	DateTyp	Other
general	Struct	0.0
meas_Limitus	Word	0.0
handstate_yes	Struct	2.0
mode	Word	4.0
state	Struct	4.0
OPF Nummer	String[40]	8.0
PHI_name	String[40]	9.0
me_171_199	Array[32..199] of...	92.0
watchdog	Word	190.0
me_192_199	Array[192..199] of...	192.0
alarm_group_404	Array[1..800] of Bool	200.0
alarm_kc_mac	Array[1..800] of Bool	300.0
ia	Array[1..400] of Date	400.0
me_364_599	Array[364..599] of...	564.0
RZP_number_yes	Int	600.0
RZP_name	String[40]	602.0
RZP_version_no	Int	644.0
RZP_version	Array[644..999] of...	644.0
fu	Struct	1000.0
cans	Struct	3600.0
res_4624_4999	Array[4624..4999] of...	4624.0
vector_values	Struct	9000.0
obj_min	Int	9000.0
res	Array[5002..5199] of...	5002.0
ku	Struct	5300.0
hit_det_beh	Struct	5300.0
volumen	Date	5300.0
rievue	Date	5304.0
sub_wart_gesamt_fuf	Date	5308.0
hit_wart_gesamt_fuf	Date	5312.0
gsm_buete	Date	5216.0
gsm_panto	Date	5320.0
res	Array[5324..5399] of...	5324.0
Werkstat	Struct	5300.0
pds	Struct	5320.0
hit_kat_kaus_Load	Date	5400.0
res	Array[5404..5499] of...	5404.0
klapp_Link	Struct	5900.0
aktuell	Date	5900.0
errecht	Date	5904.0
abgefallen	Date	5908.0
behalter	Date	5912.0
me_2	Array[1..10] of Date	5916.0
hit_Link	Struct	5960.0
me_3	Array[5564..5599] of...	5564.0

Below the table, the 'Eigenschaften' (Properties) window is visible, showing details for the selected data point.

Challenge of cryptic data points without adding contextual information

What is indicated by the data points?

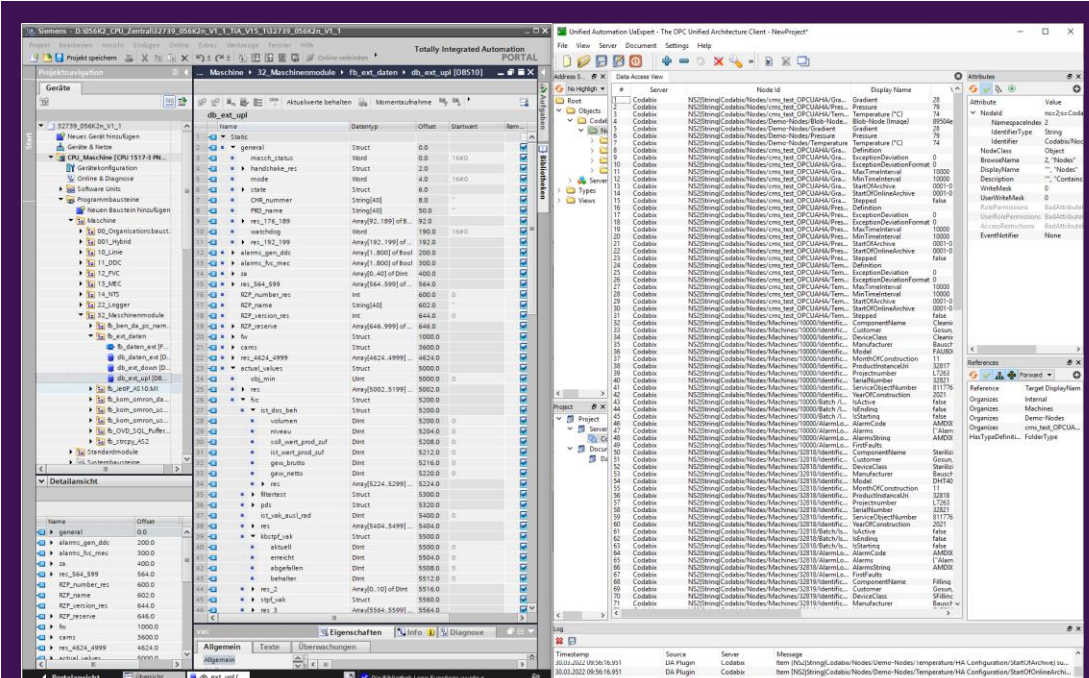
What are the units of measure, limits etc. ?

How should the data be structured in AF to solve specific use cases

How can the data be used to create intelligent event frame structures?

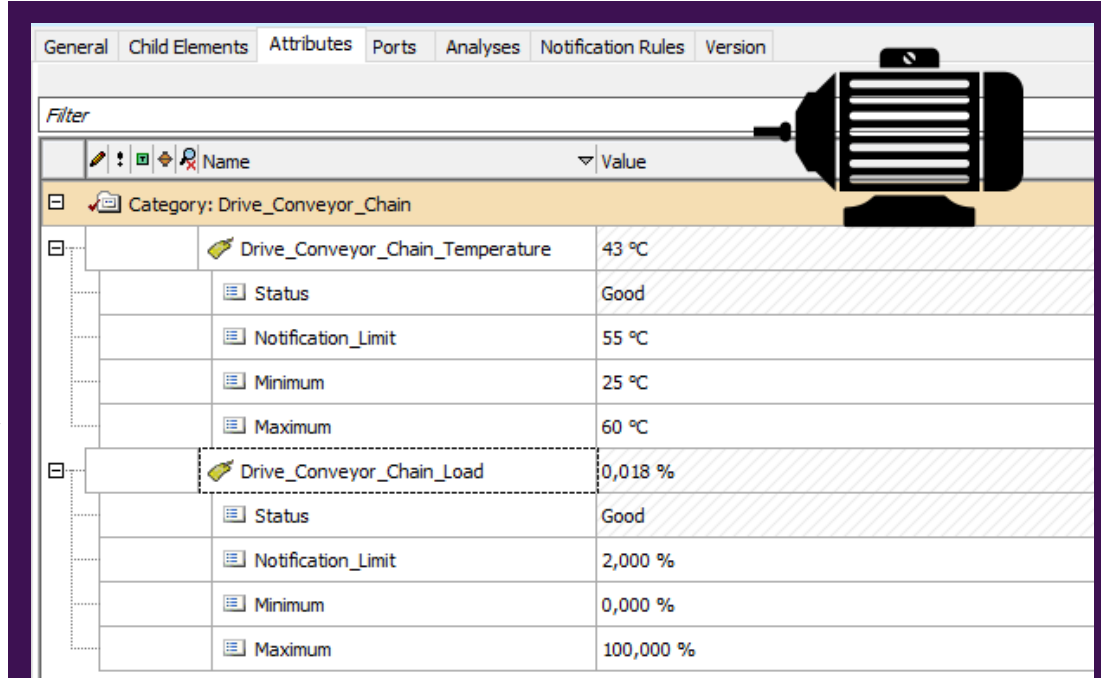
WHY cooperate with machine builders

Challenges in IIoT – Contextualization of data



The screenshot displays the Siemens TIA Portal interface. On the left, a project tree shows a hierarchy of objects including 'Maschine' and 'db_ext_upl'. The main workspace shows a table with columns for 'Name', 'Datentyp', 'Offset', 'Startwert', and 'Einheit'. Below this, a 'Detailsansicht' (Details view) shows properties for a selected object. At the bottom, a 'Log' window shows system messages.

Collection of cryptic data points without adding contextual information



The screenshot shows a data visualization tool with a motor icon in the top right. The main area contains a table with columns for 'Category', 'Value', and 'Unit'. The table is filtered by 'Category: Drive_Conveyor_Chain'. The data points are:

Category	Value	Unit
Drive_Conveyor_Chain_Temperature	43	°C
Status	Good	
Notification_Limit	55	°C
Minimum	25	°C
Maximum	60	°C
Drive_Conveyor_Chain_Load	0,018	%
Status	Good	
Notification_Limit	2,000	%
Minimum	0,000	%
Maximum	100,000	%

Context for interpretation and analysis is added to the data by the B+S machine specialists

PLUG AND PRODUCE

Agenda

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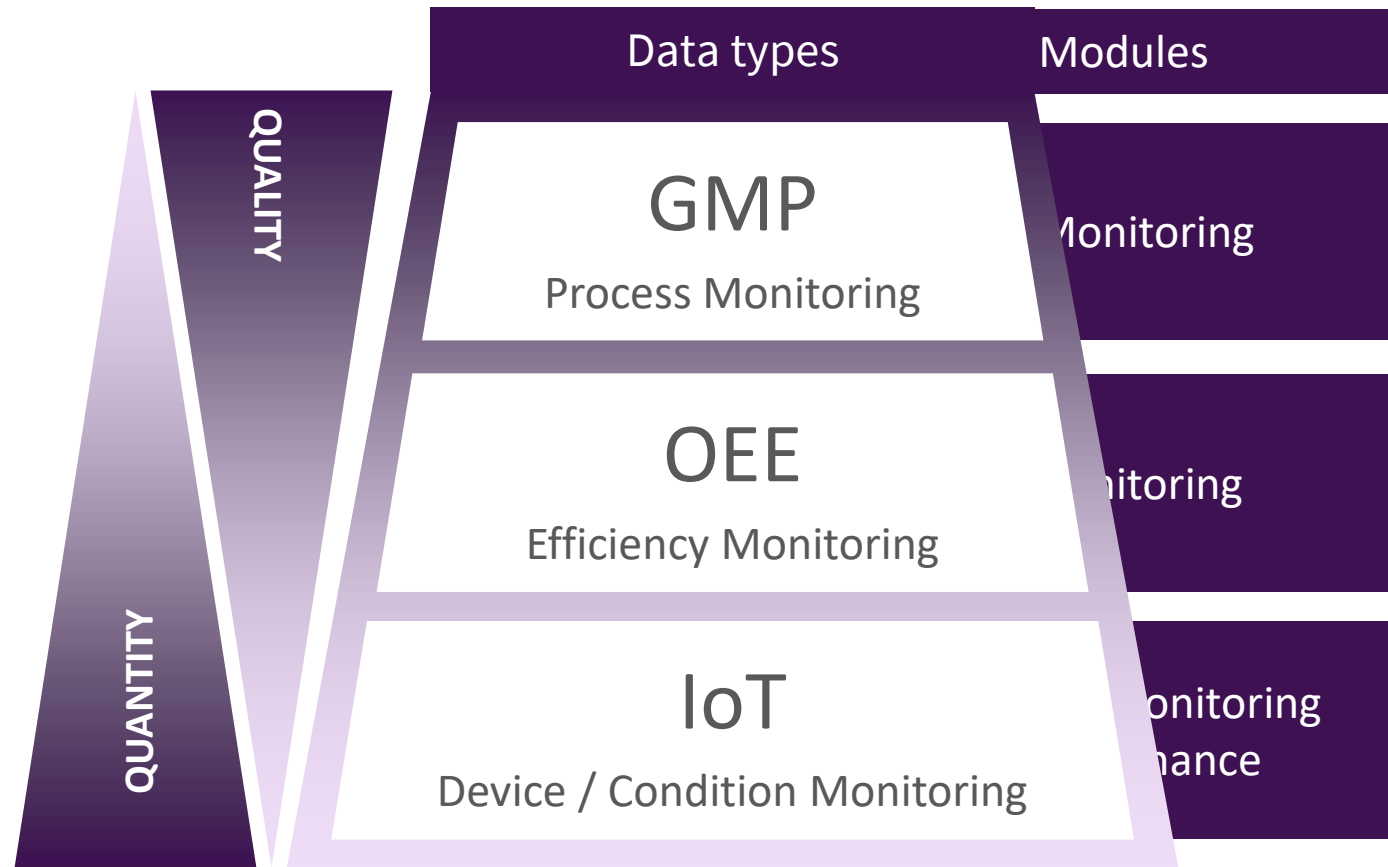
WHY cooperate with machine builders

WHAT challenges to solve together

HOW to solve challenges

WHAT challenges to solve together

Data types for Pharma 4.0



WHAT challenges to solve together



If a problem occurs while using the machine, it is vital to react quickly.

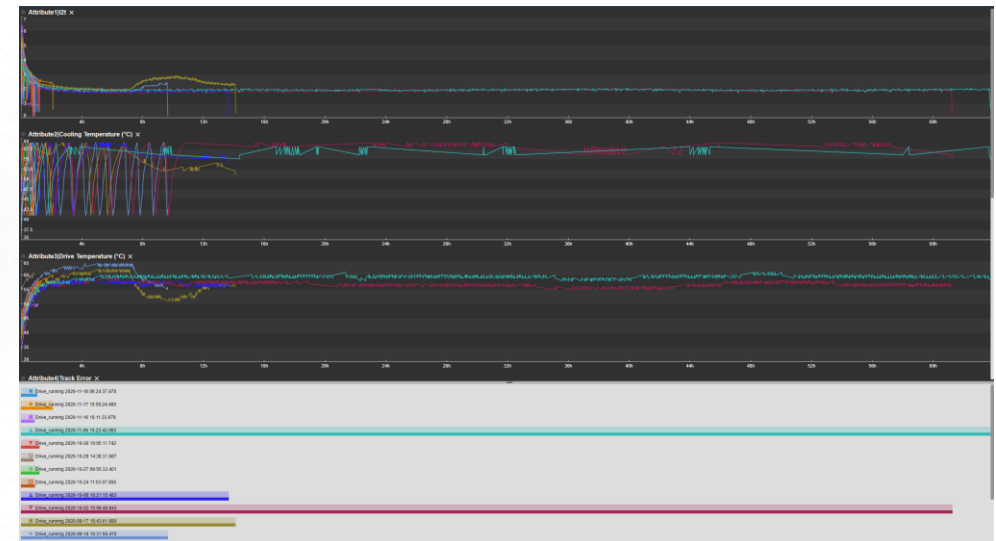
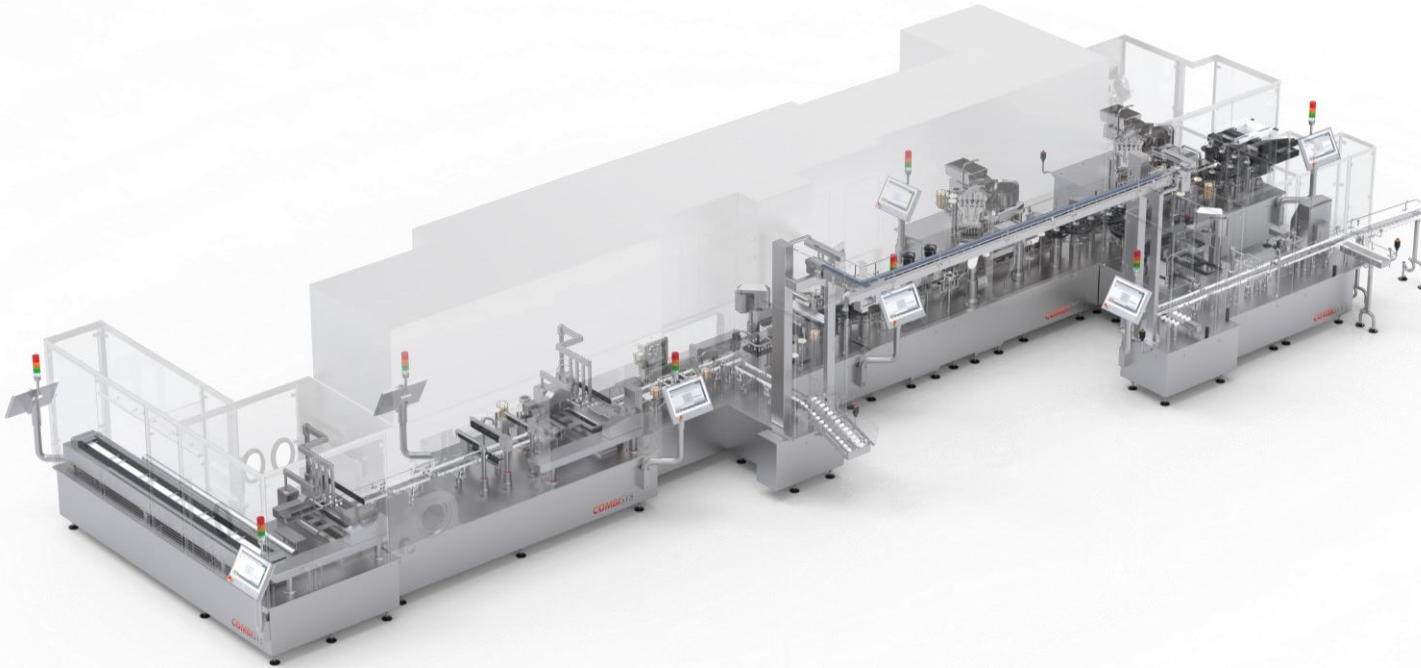
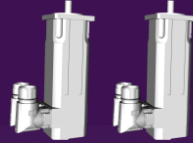
The ability to predict failures and the need for servicing is a much more effective basis for maintenance planning.

WHAT challenges to solve together

Identifying wear caused by high-speed movements

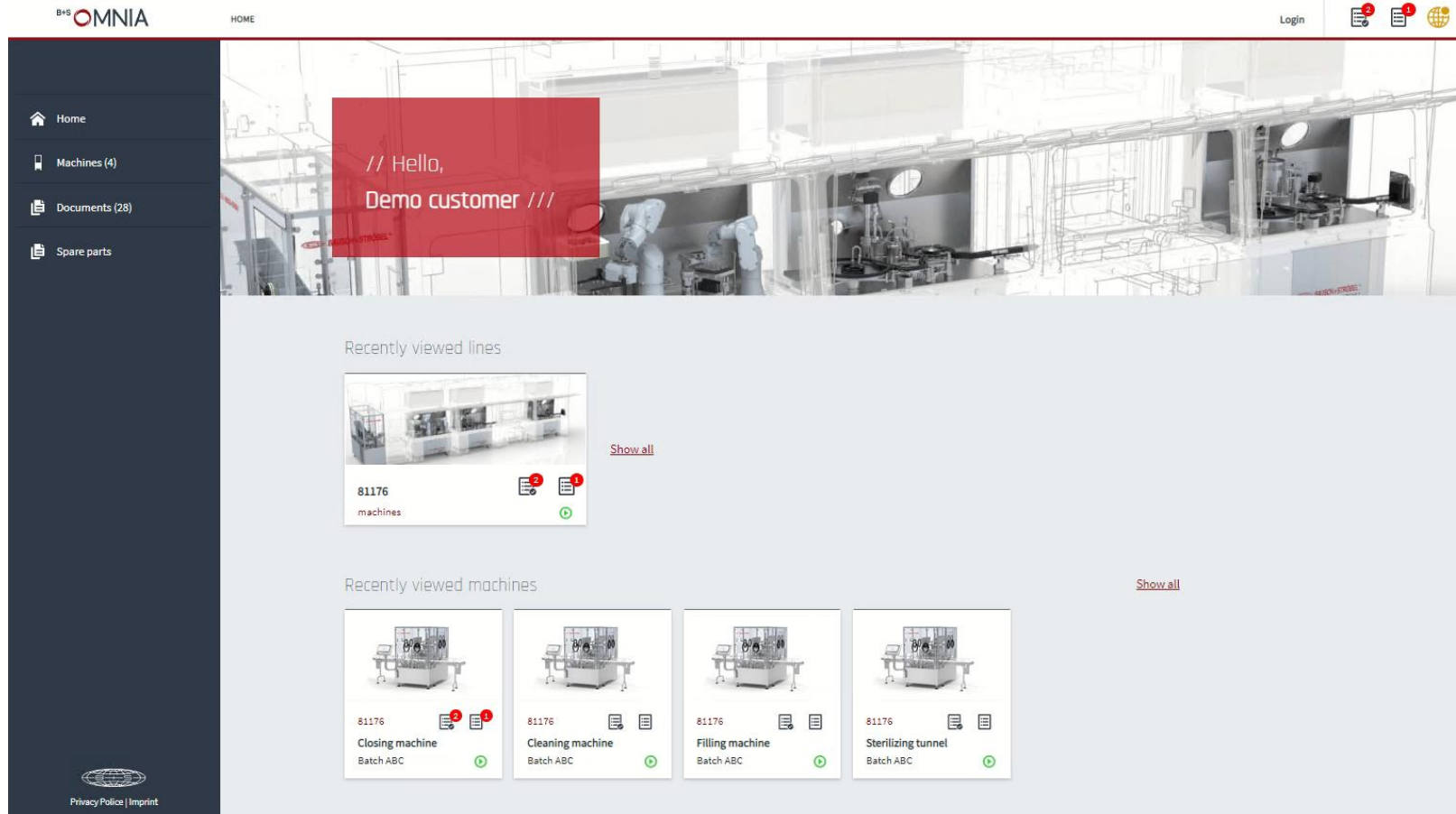
Machine movements are realized by the use of

44 servo drives



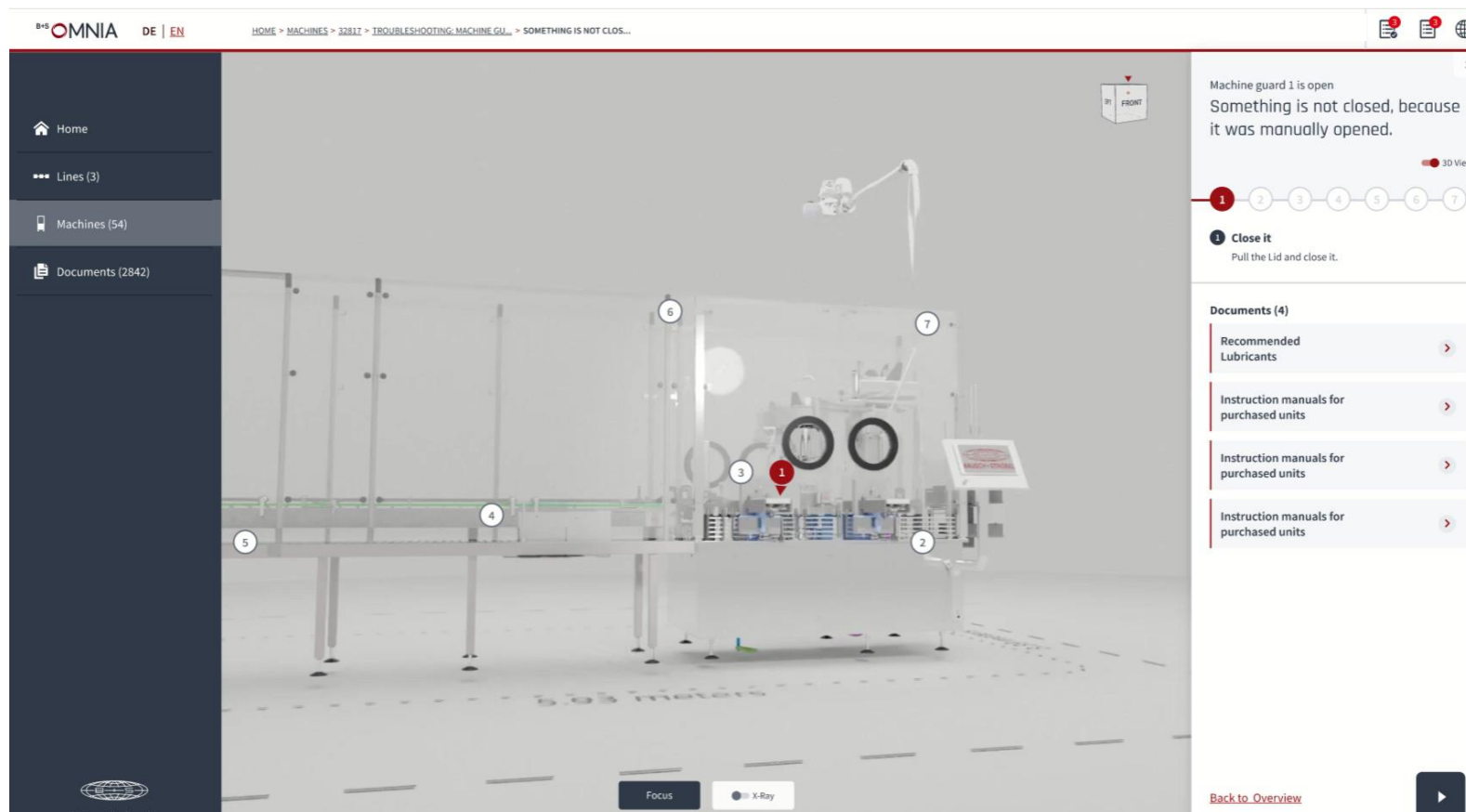
WHAT challenges to solve together

Solving problems faster with advanced troubleshooting options



WHAT challenges to solve together

Solving problems faster with advanced troubleshooting options



WHAT challenges to solve together

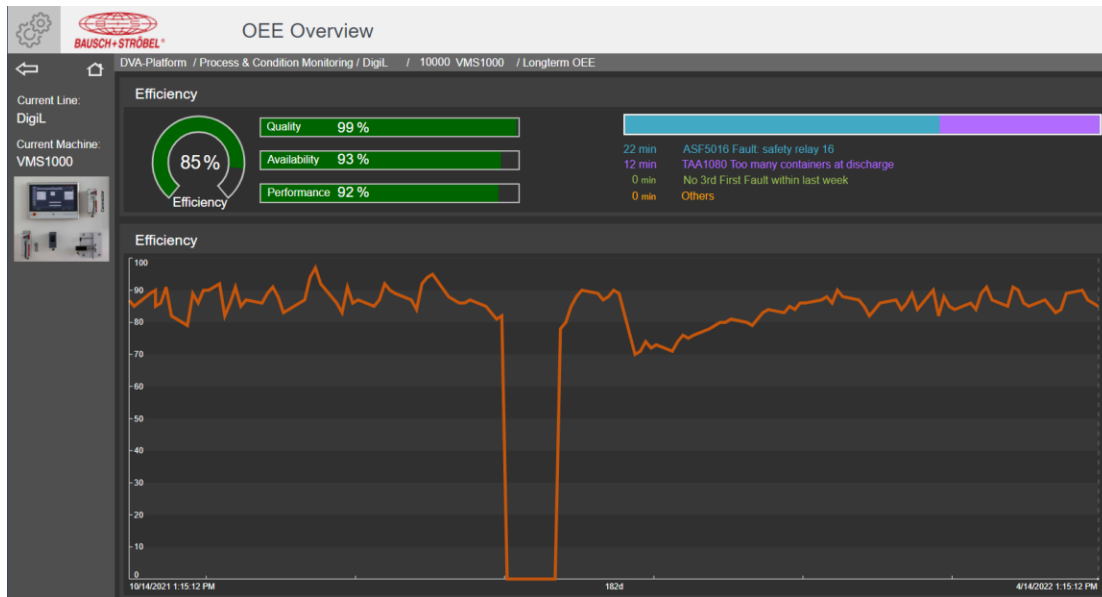


A data-based and comparable efficiency evaluation is indispensable for modern production planning.

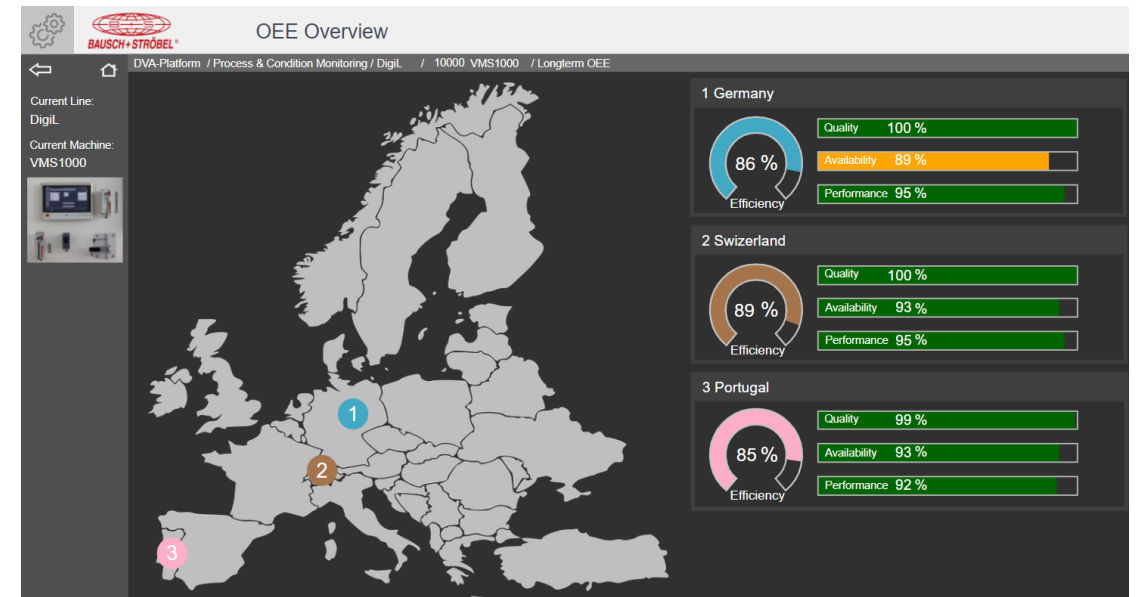
WHAT challenges to solve together

Efficiency analysis

Long-term overview to check if high efficiency levels are being maintained.



Benchmarking and comparison of different machines, lines and sites.

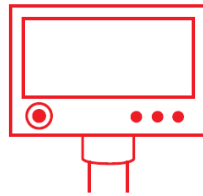


WHAT challenges to solve together

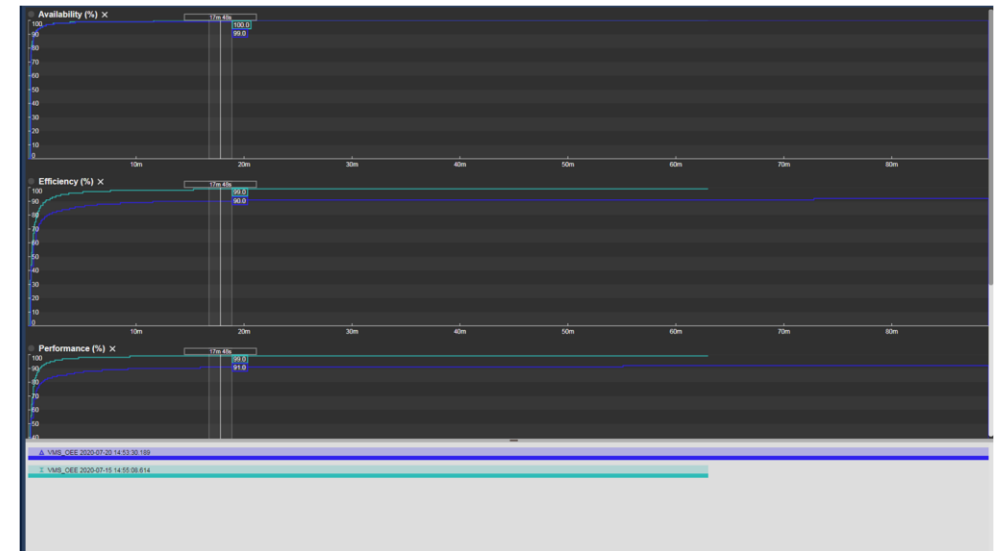
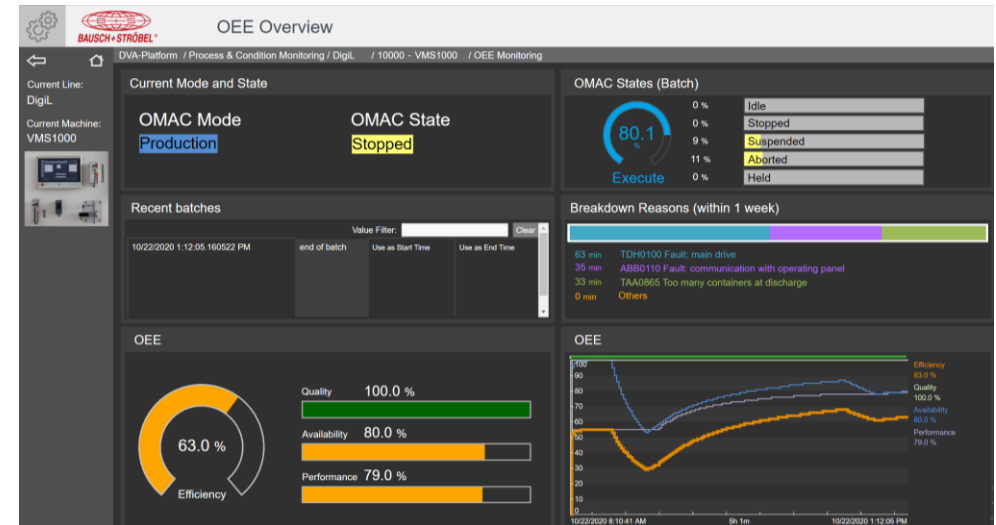
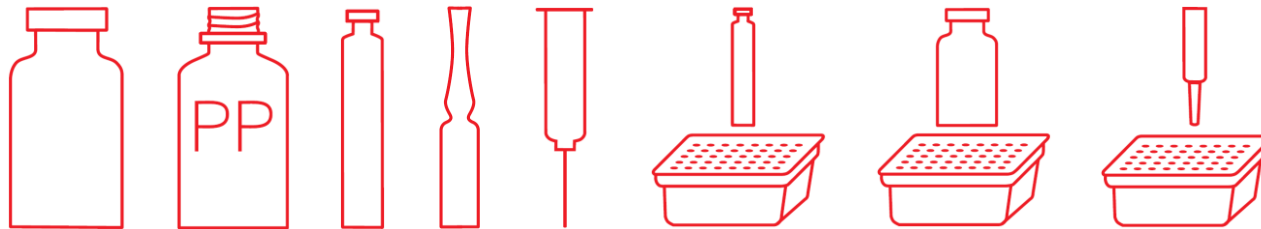
Efficiency analysis

Batch comparisons to determine the influence of:

- changing recipe parameters



- changing packaging materials or recipe parameters.



WHAT challenges to solve together



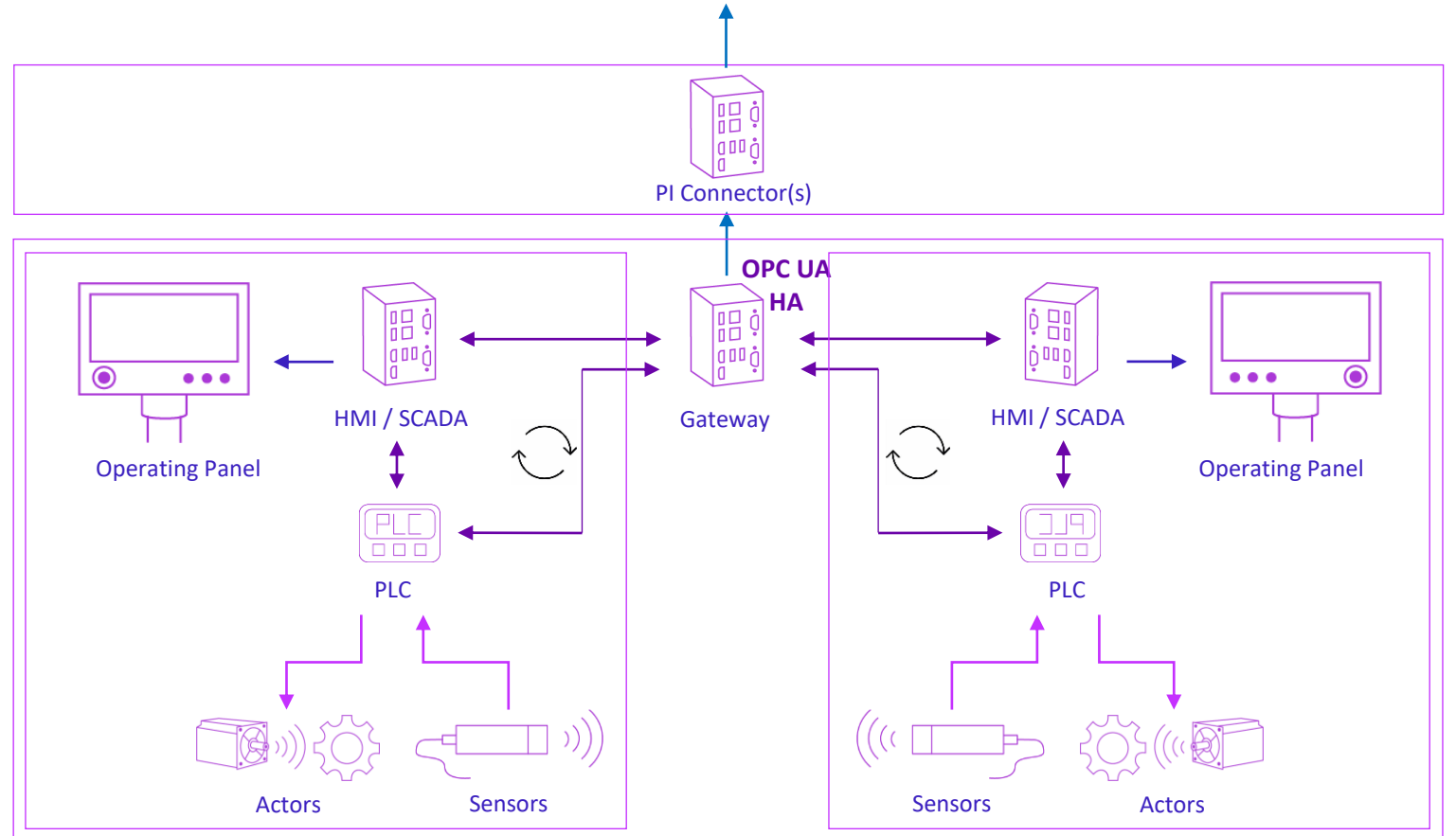
Many pharmaceutical manufacturers are currently planning to migrate their local SCADA reporting systems to higher-level systems such as PI System.

In these cases, it is crucial to eliminate the risk of data loss.

WHAT challenges to solve together

Preventing data loss

- Installation of an OPC UA server on a central gateway in the filling line.
- Connection of the PLC and SCADA to the OPC UA server.
- Implementation of a watchdog between PLC and OPC UA server to detect connection problems.
- Configuration of all tags in the server as OPC UA HA → buffering of the historic values.
- Connection of the server to a PI Connector for OPC UA with automatic history recovery.



WHAT challenges to solve together



A great deal of time and effort is spent on printing, checking and approving batch reports. A central batch reporting central system is a much more efficient way to handle batch reporting.

Name	Duration	Start Time	End Time	Description	Category
Batch-EXT-No2020-11-17-39					OSBatch_OSI_Batch08
Batch-EXT-No2020-11-18-30					OSBatch_OSI_Batch08
Batch-EXT-No2020-11-19-44					OSBatch_OSI_Batch08
Batch-EXT-No2020-11-19-46					OSBatch_OSI_Batch08
Batch-EXT-No2020-11-20-38					OSBatch_OSI_Batch08
Batch-EXT-No2020-11-20-14					OSBatch_OSI_Batch08
Batch-EXT-No2020-11-24-28					OSBatch_OSI_Batch08
Batch-EXT-No2020-12-17-22					OSBatch_OSI_Batch08
Batch-EXT-No2020-12-22-45					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-15-10					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-18-10					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-19-01					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-20-20					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-21-05					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-21-48					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-26-10					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-26-12					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-26-26					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-27-42					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-27-05					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-29-49					OSBatch_OSI_Batch08
Batch-EXT-No2021-01-29-36					OSBatch_OSI_Batch08
Batch-EXT-No2021-02-11-54					OSBatch_OSI_Batch08
Batch-EXT-No2021-02-12-01					OSBatch_OSI_Batch08
Batch-EXT-No2021-02-12-09					OSBatch_OSI_Batch08
Test-Batch-External					OSBatch_OSI_Batch08
Batch-EXT-No2020-08-30-27					OSBatch_OSI_Batch08
Batch-EXT-No2020-09-13-18					OSBatch_OSI_Batch08
Batch-EXT-No2020-09-15-05					OSBatch_OSI_Batch08
Batch-EXT-No2020-10-01-09					OSBatch_OSI_Batch08
Batch-EXT-No2020-10-12-28					OSBatch_OSI_Batch08
Batch-EXT-No2020-10-14-54					OSBatch_OSI_Batch08
Batch-EXT-No2020-10-15-48					OSBatch_OSI_Batch08

WHAT challenges to solve together

Process monitoring and batch reports

✓ Connection of Batch Report Data (such as Alarms / Audit Trail) incl. SCADA Timestamps

✓ Generation of Event Frames based on machine operation mode handling and relevant machine data.

➤ These Event Frames can be used for generating reports (e. g. with RtReports)

Chargenreport

Maschine VMS1000 / 10000
 Rezept DigitalLab20190709
 Produktname Prod-NoX
 Chargennummer Batch-EXT-No2020-10-22-10

Chargenstart 2020-10-22 08:10
 Chargenende 2020-10-22 13:12
 Chargendauer 5 hours 1 minute
 25,971 seconds

Chargenreport

Maschine VMS1000 / 10000
 Rezept DigitalLab20190709
 Produktname Prod-NoX
 Chargennummer Batch-EXT-No2020-10-22-10

Chargenstart 2020-10-22 08:10:41
 Chargenende 2020-10-22 13:12:07
 Chargendauer 5 hours 1 minute
 25,971 seconds

Chargenreport

Maschine VMS1000 / 10000
 Rezept DigitalLab20190709
 Produktname Prod-NoX
 Chargennummer Batch-EXT-No2020-10-22-10

Chargenstart 2020-10-22 08:10:41
 Chargenende 2020-10-22 13:12:07
 Chargendauer 5 hours 1 minute
 25,971 seconds

Effektivität

Betriebsart

OMAC Status	Start Zeit	End Zeit
idle	2020-10-22 08:10:45	2020-10-22 08:10:45
start-up	2020-10-22 08:10:49	2020-10-22 08:10:49
production	2020-10-22 08:10:53	2020-10-22 09:18:20
idle	2020-10-22 09:18:20	2020-10-22 09:18:20
suspended	2020-10-22 12:14:28	2020-10-22 12:14:28
idle	2020-10-22 12:14:28	2020-10-22 12:14:28
running-empty	2020-10-22 13:11:48	2020-10-22 13:11:48
idle	2020-10-22 13:11:56	2020-10-22 13:11:56
stopped	2020-10-22 13:11:56	2020-10-22 13:11:56

Audit Trail

Datum/Uhrzeit	Text
2020-10-22 08:10:42	'Set-up' selected
2020-10-22 08:10:45	'Start-up mode' selected
2020-10-22 08:10:49	Parameter change: (1)
2020-10-22 08:10:53	'Production' selected
2020-10-22 09:18:20	Parameter change: (1)
2020-10-22 09:18:20	Parameter change: OMA (CS %): New: (85 %)
2020-10-22 10:28:10	User 'SS - Signetur' logged on
2020-10-22 12:14:20	User 'SS - Signetur' logged in
2020-10-22 13:11:44	'Running empty' selected
2020-10-22 13:11:48	Parameter change: (1)
2020-10-22 13:11:54	Parameter change: (1)
2020-10-22 13:11:56	'End batch' selected
2020-10-22 13:12:03	Recipe component "Batch" Recipe "Clearing alarm display" [1] executed.

Zusammenfassung

Maschine VMS1000
 Massennummer
 Produktname Prod-NoX
 Chargennummer Batch-EXT-No2020-10-22-10
 Chargenstart 2020-10-22 08:10:41
 Chargenende 2020-10-22 13:12:07
 Chargendauer 5 hours 1 minute 25,971 seconds
 Benutzer beim Chargenstart Signetur
 Benutzer beim Chargenende Signetur
 Rezept beim Chargenstart DigitalLab20190709
 Element beim Chargenstart
 Abschlusskommentar beim Chargenende

Zähler
 Objekte schädlich 0
 Objekte gut 211907
 Objekte gesamt 211907

PLUG AND PRODUCE

Agenda

Getting the most out of the
machine data in PI systems by
cooperating with machine builders

WHY cooperate with machine builders

WHAT challenges to solve together

HOW to solve challenges

HOW to solve challenges

OMNIA – Architecture and Design

OMNIA is the central digital platform for everything related to B+S machines. In OMNIA, all information on the machine can be accessed at a single central location, allowing users to make the most of all available information.

- ✓ modular concept
- ✓ multiple hosting options
- ✓ flexible and scalable concept

Edge

Local applications in the machine network

Focus: operator support

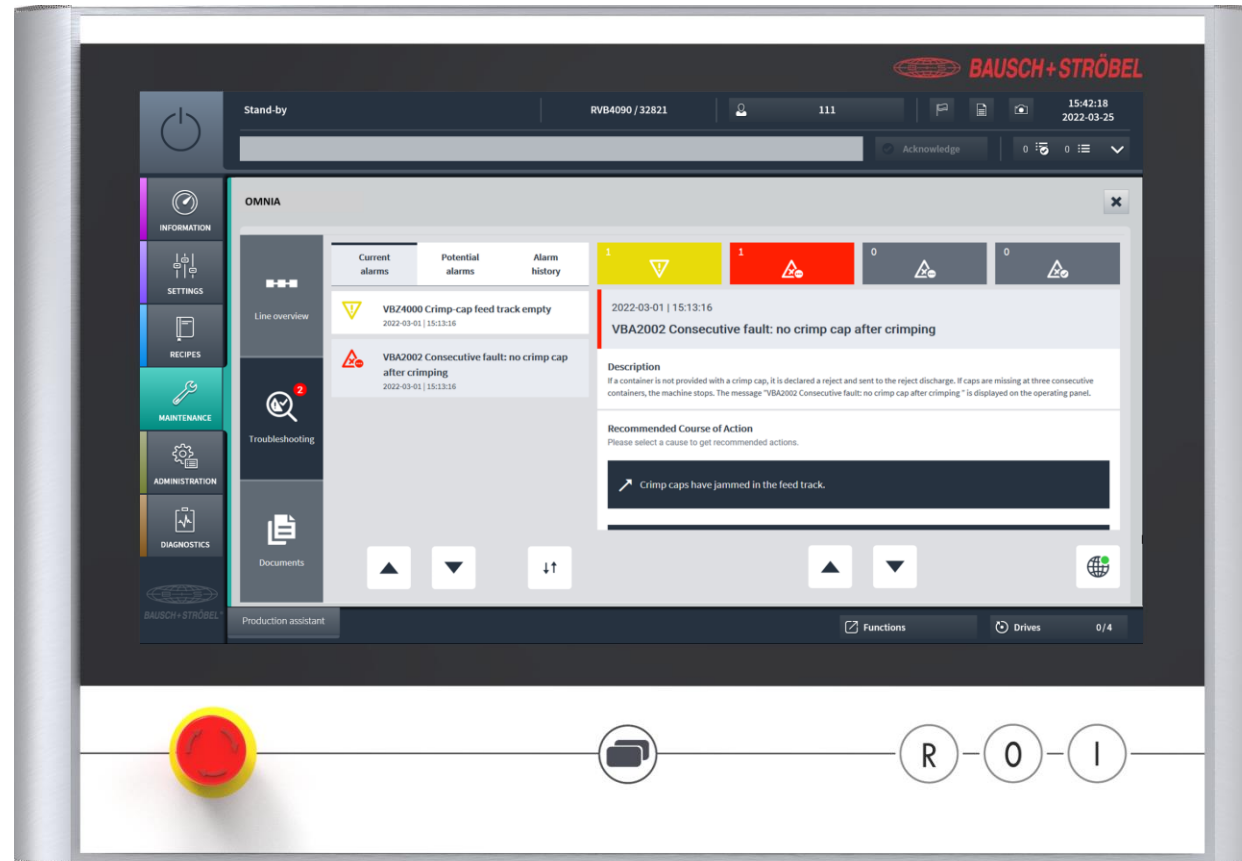
HOW to solve challenges

OMNIA – Edge



HOW to solve challenges

OMNIA – Edge



Cloud

Online hosted applications.

Focus: advanced analytics
(maintenance applications,
mobile applications, etc.)

HOW to solve challenges

OMNIA – Architecture and Design

- As a PI System Integrator and Connected Services Partner, Bausch+Ströbel can offer highly flexible architectures and use case designs.
- The flexible architecture and concept of OMNIA allows use cases to be implemented in any network area.
- Challenges can be solved in Edge as well as OnPremise and in online hosted solutions.

OnPremise

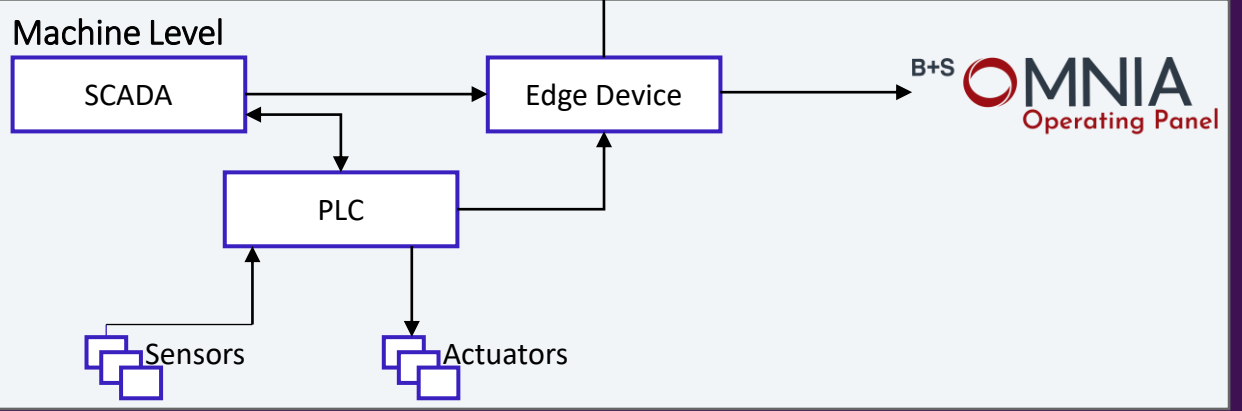
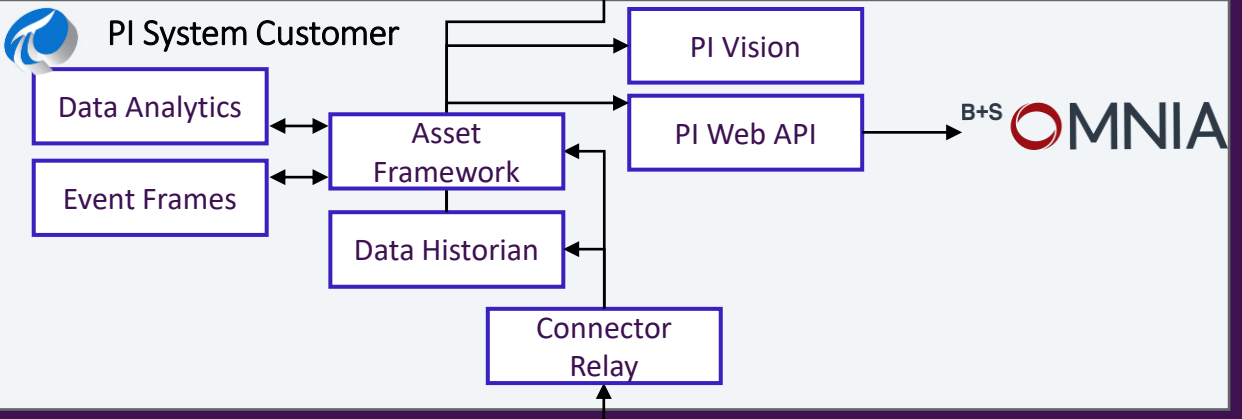
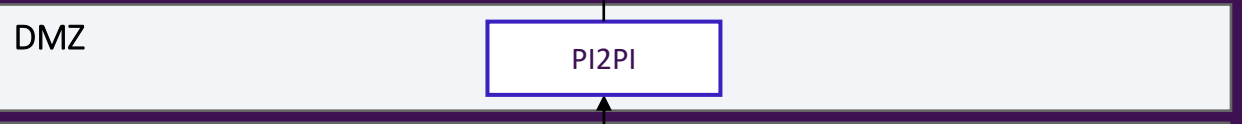
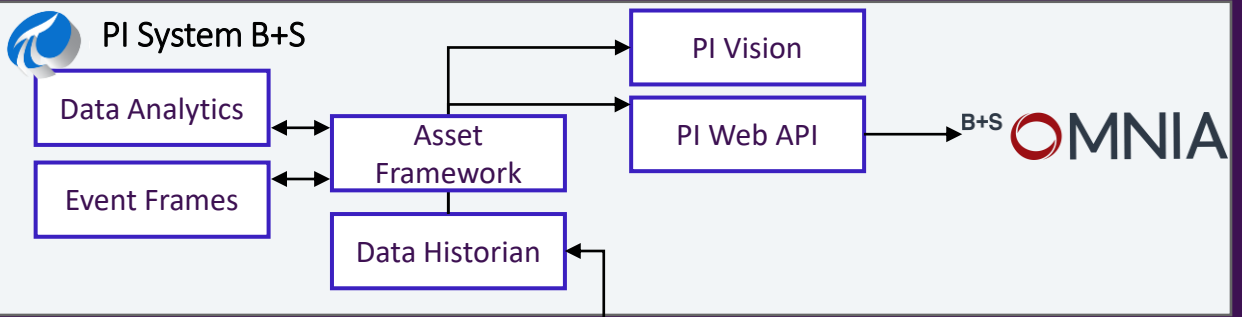
Customer internal applications
in the office network.

Focus: sensitive and process
critical data

Edge

Local applications in the
machine network

Focus: operator support



HOW to solve challenges

OMNIA – Architecture and Design

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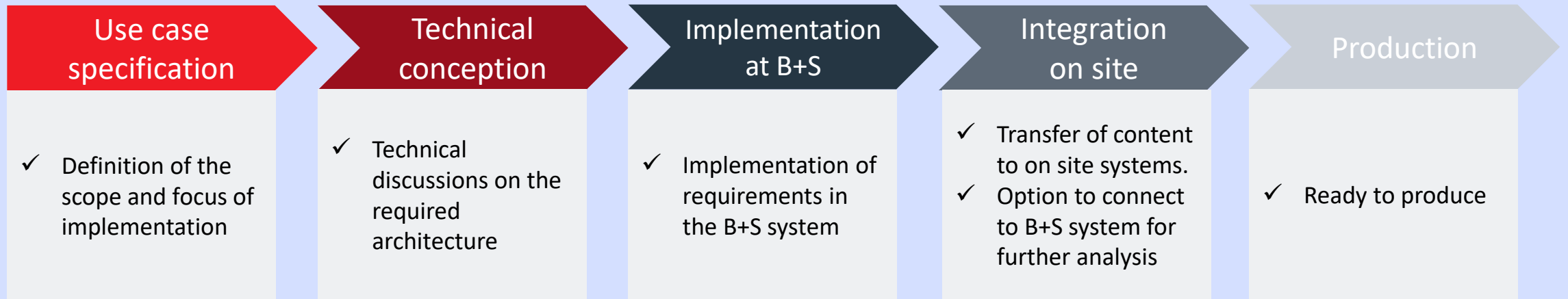
How to solve challenges

Best practice for project planning

Machine Project



PI Project





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DZIĘKUJĘ CI
 NGIYABONGA
 TEŞEKKÜR EDERİM
 DANKIE
 TERIMA KASIH
 СПАСИБО
 GRAZIE
 МАХАДСАНИД
 GO RAIBH MAITH AGAT
 БЛАГОДАРЯ
 GRACIAS
 ТИ БЛАГОДАРАМ
 TAK DANKE
 RAHMAT
 HATUR NUHUN
 PAKKA PÉR
 HATUR NUHUN
 PAXMAT САГА
 CÁM ƠN BẠN
 WAZVIITA
 FALEMINDERIT
 謝謝
 ТАРАДН ЛЕІВН
 KEA LЕВОНА
 БАЯРЛАЛАА
 MISAOTRA ANAO
 WHAKAWHETAI KOE
 DANKON TANK TAPADH LEAT
 SALAMAT
 MATUR NUWUN
 ХВАЛА ВАМ
 MULŢUMESC
 PAKMET CIZGE
 고맙습니다
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 SHUKRA
 HVALA
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 ESKERRIK ASKO
 HVALA
 TEŞEKKÜR EDERİM
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 СИПОС

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ABOUT AVEVA

AVEVA is a global leader in industrial software, driving digital transformation and sustainability. By connecting the power of information and artificial intelligence with human insight, AVEVA enables teams to use their data to unlock new value. We call this Performance Intelligence. AVEVA's comprehensive portfolio enables more than 20,000 industrial enterprises to engineer smarter, operate better and drive sustainable efficiency. AVEVA supports customers through a trusted ecosystem that includes 5,500 partners and 5,700 certified developers around the world. The company is headquartered in Cambridge, UK, with over 6,500 employees and 90 offices in over 40 countries.

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