The Future of Automation is not Business as Usual

Pascal Junges / Commercial Business development

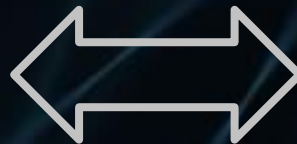Life Is On | Schneider Electric

Internal

For a vendor independant automation solution

1. **A community** of Users and Vendors

2. **A shared-source runtime execution engine**

3. **IEC 61499 standard –** as technology enabler

Think of it as the Android of Industrial Automation

For smartphones

For industrial automation

After 10 months UAO-compliant offers are available

ADVANTECH
Enabling an Intelligent Planet

- UNO 430

ESA

- EW420 (iPC)

flexbridge

- Ice Block (Distribute PLC)

KONGSBERG

- K-Chief (CPU board)

STAHL

- IS1+ remote IOs

Schneider Electric

- Ecostruxure Automation Expert
  - Soft dPAC (containerized runtime execution engine
  - Modicon M251d
  - Modicon M262d
  - Modicon M580d
  - Altivar dPAC module

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Automation Expert System Solution

License & Support
- Cloud License server
- Training
- TVDAs
- Getting Started

Application Libraries
- Common Process Library
- Single Line Electrical Templates
- W/WW Library
- MMM (on-Going)
- CPG – Liquid Food library

Field device HW CATs
- Variable Speed drives
- Safety modules
- Servo Control
- Communication Gateways

Historization
- Trend and alarms history
- SQL data base

Control – Communication
- Major OT networks
- Openness to IT communication

HMI - Control Room
AVEVA
- Aveva Industrial Graphic editor integrated
- Aveva System Platform" bulk engineering
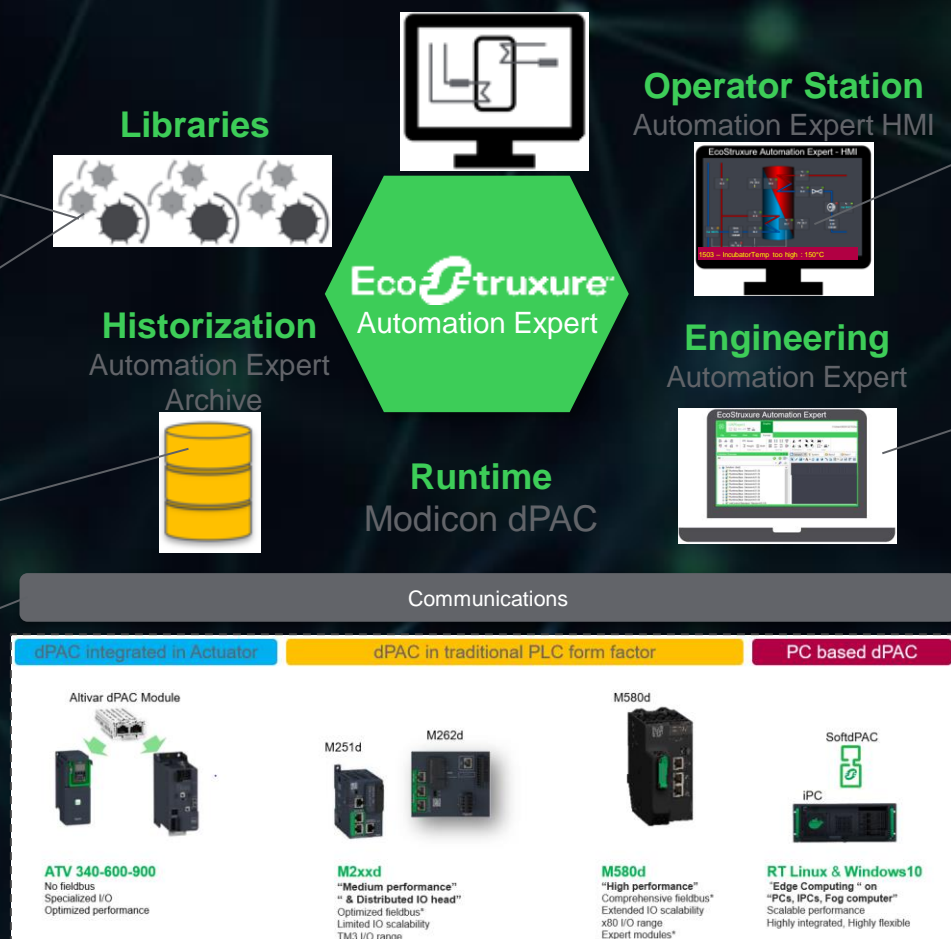- Aveva Engineering" bulk Engineering

Cyber Security
- User & certificate management
- Secure communication between equipment's

Libraries

Operator Station
Automation Expert HMI

EcoStruxure Automation Expert - HMI

HMI – Line Operator
- Integrated in IDE
- Multi Station Distributed HMI solutions
- Multi OS solutions

Historization
Automation Expert Archive

EcoStruxure
Automation Expert

Engineering
Automation Expert

EcoStruxure Automation Expert

Runtime
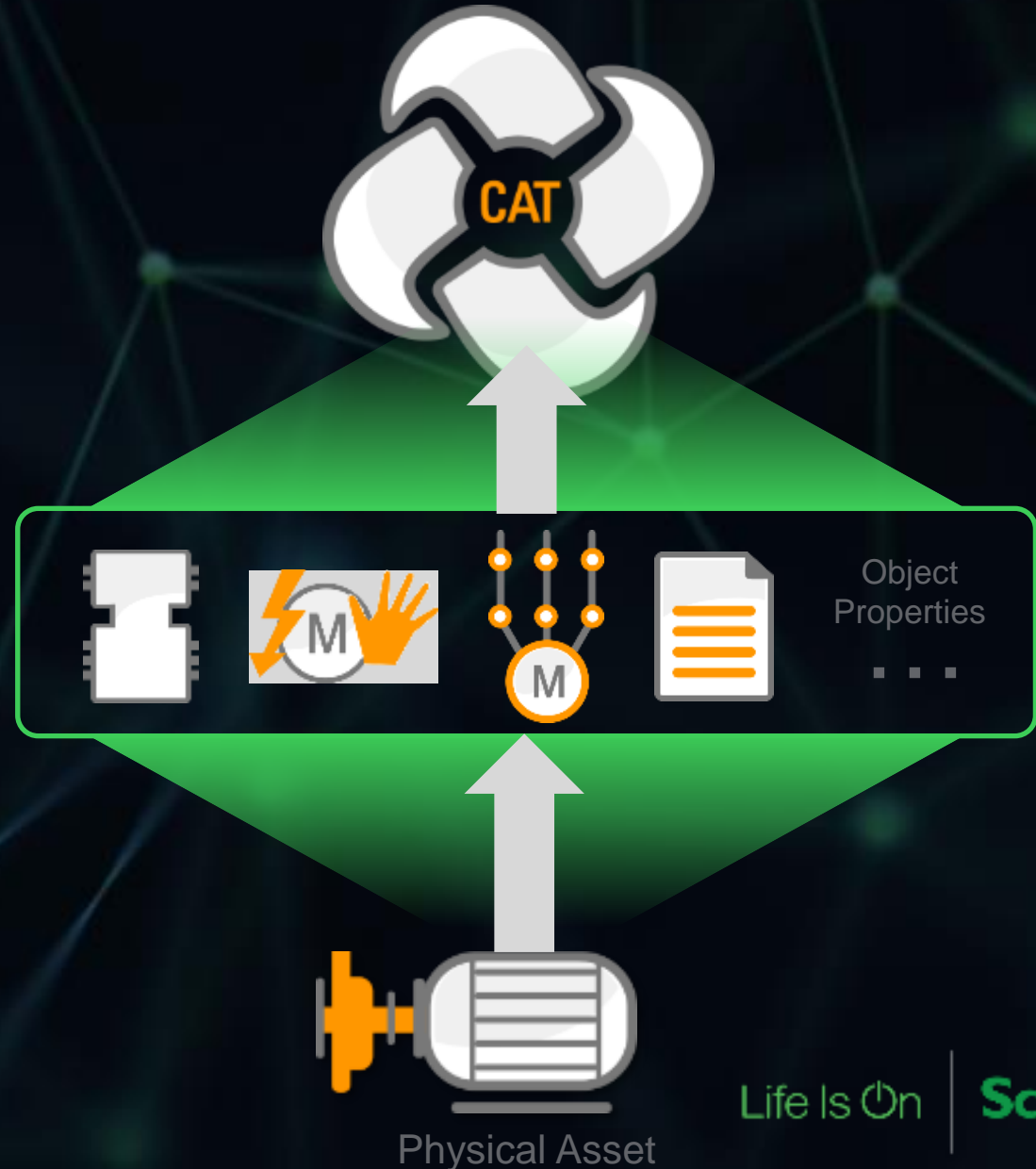Modicon dPAC

Engineering Station
- Design of libraries and Solution
- Control logic and HMI + Simulation
- Open for digital continuity and bulk engineering
- Graphic and off/online Topology
- Navigation in System Editor
- Debug / Diagnose

Communications

dPAC integrated in Actuator	dPAC in traditional PLC form factor	PC based dPAC

Altivar dPAC Module

M580d

M262d

M251d

SoftdPAC

iPC

ATV 340-600-900
No fieldbus
Specialized I/O
Optimized performance

M2xxd
"Medium performance"
" & Distributed IO head"
Optimized fieldbus"
Limited IO scalability
TM3 I/O range

M580d
"High performance"
Comprehensive fieldbus"
Extended IO scalability
x80 I/O range
Expert modules*

RT Linux & Windows10
"Edge Computing " on
"PCs, IPCs, Fog computer"
Scalable performance
Highly integrated, Highly flexible

Control – RT & Hardware
- HW & SW Controllers
- Distributed alarm management
- IO profiles for different segments and applications

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Internal

manage complexity by encapsulating process know-how into asset models

- **Embed process know-how** in segment or plant specific object libraries

- Expand the concept of object-orientation to the whole plant components to **maximize reuse** and **reduce engineering**

- Empower operators **to take better decision** by providing complete transparency to process operations

- Allow **system evolution by process expert** and not automation experts

CAT = Composite Automation Type

Object Properties

Physical Asset

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Internal

Complexity managed through smart engineering

Single Line Engineering

- Aggregations of event and data connections between function blocks resulting in **one single line** **connection** back & forward.

- Design driven by process expertise & **reduced time** and effort with **fewer mistakes** and **higher quality**

- Commissioning and troubleshooting simplified through **better application readability**

Complexity encapsulated within the active connection

Plug   Socket

FEEDER

CRUSHER

SCALPER

CAT*

Ready-to-use object representing a real device

Complexity encapsulated within the CAT* object

*CAT : Composite Automation Type

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Hardware - Software Abstraction : Increase flexibility and enable smooth migration by moving code from one hardware target to another without any engineering effort

Difficult to re-use
Resistant to change
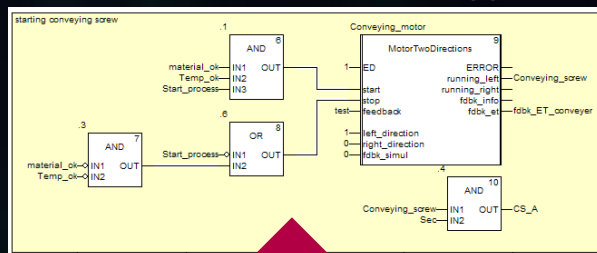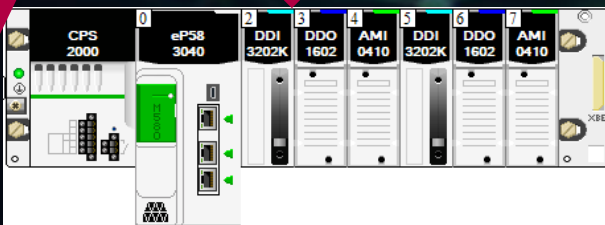
Independent HW / SW lifecycles
Just in time linking
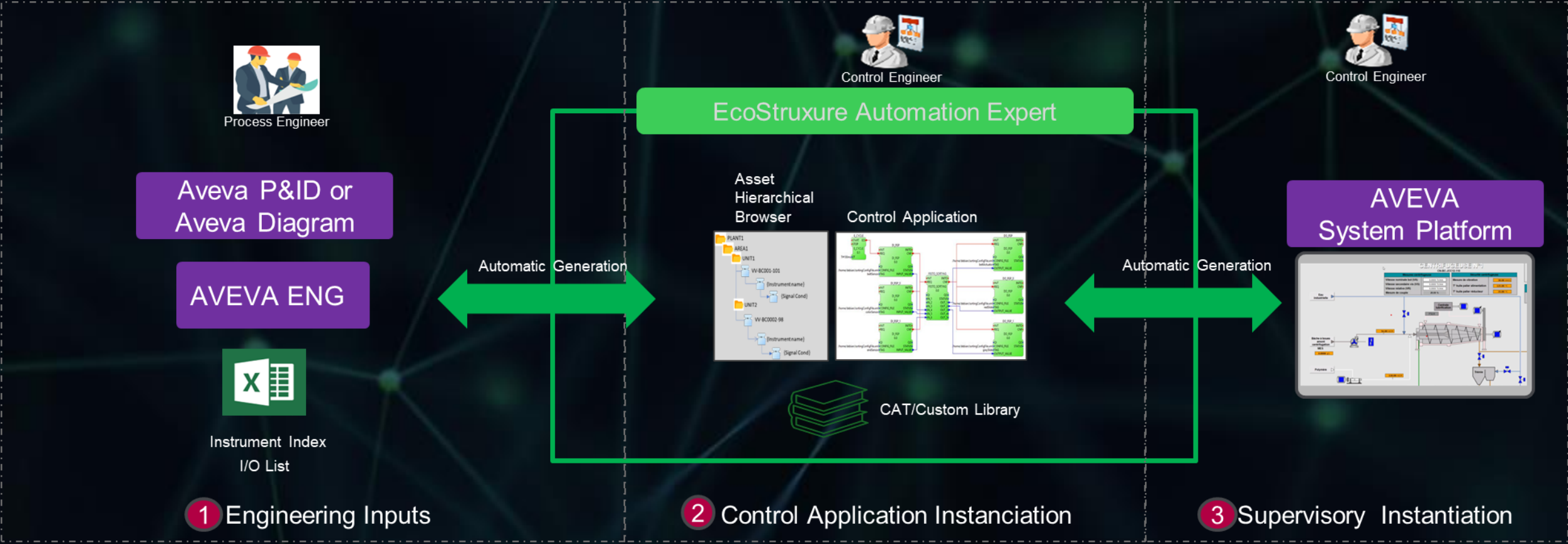Portable, reusable, interoperable, agile

Application

Platform
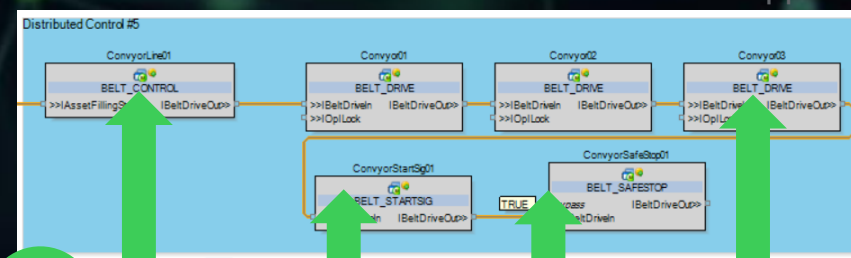
Application

Symlink

Platform
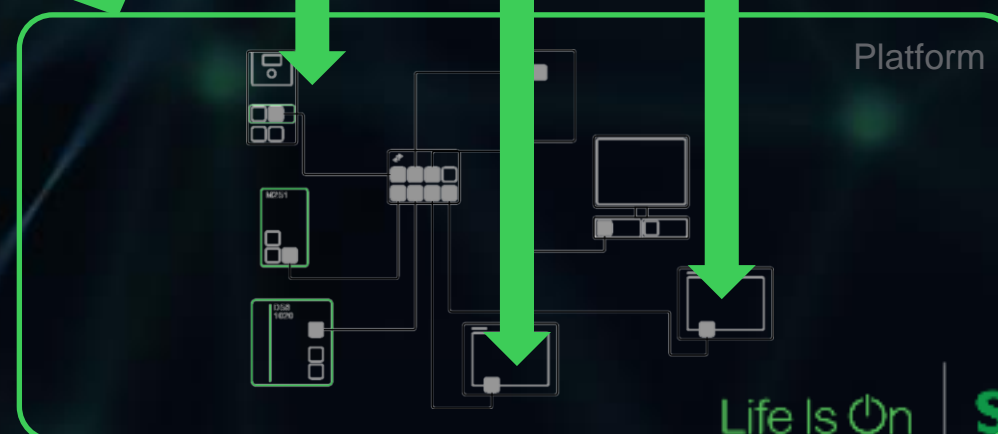
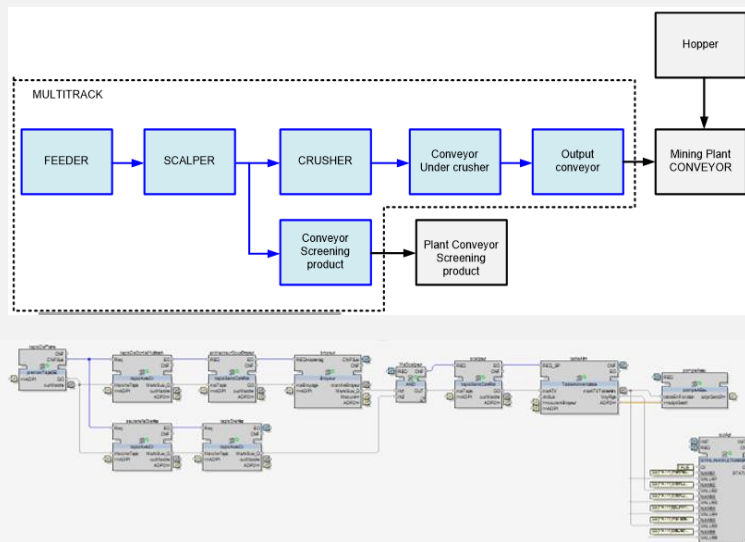Life Is On | Schneider Electric

Digital continuity to ease automation, shorten end user time to market and manage consistency in the application lifecycle

Process Engineer

Control Engineer

Control Engineer

EcoStruxure Automation Expert

Aveva P&ID or Aveva Diagram

AVEVA ENG

Instrument Index I/O List

Asset Hierarchical Browser

Control Application

PLANT1
AREA1
UNIT1
VV-BC001-101
[Instrument name]
[Signal Cond]
UNIT2
VV-BC0002-98
[Instrument name]
[Signal Cond]

Automatic Generation

Automatic Generation

CAT/Custom Library

AVEVA System Platform

1 Engineering Inputs

2 Control Application Instanciation

3 Supervisory Instantiation

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Automation Expert Use case

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Mobile Stone Crusher Machine

Customer Challenges

- Reduce the time to market thanks to reduced engineering efforts
- Better and faster fit to EU demand

The Solution

- Solution based on M251d with analog & digital IO
- Field bus controlled Altivar soft starters and Variable speed drives
- EAE HMI and Archive for system monitoring and control,
- Asset application library

Customer Benefits

- Faster to design the application by reuse of asset models (eg conveyors)

Customer's KPI:
- Engineering
- Flexibility
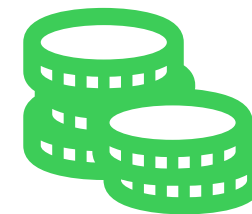
EcoStruxure™ MMM

Apps, Analytics, & Services

Edge Control

M251d

Harmony P6 EAE HMI

Connected Products

Altivar soft starters and speed drives

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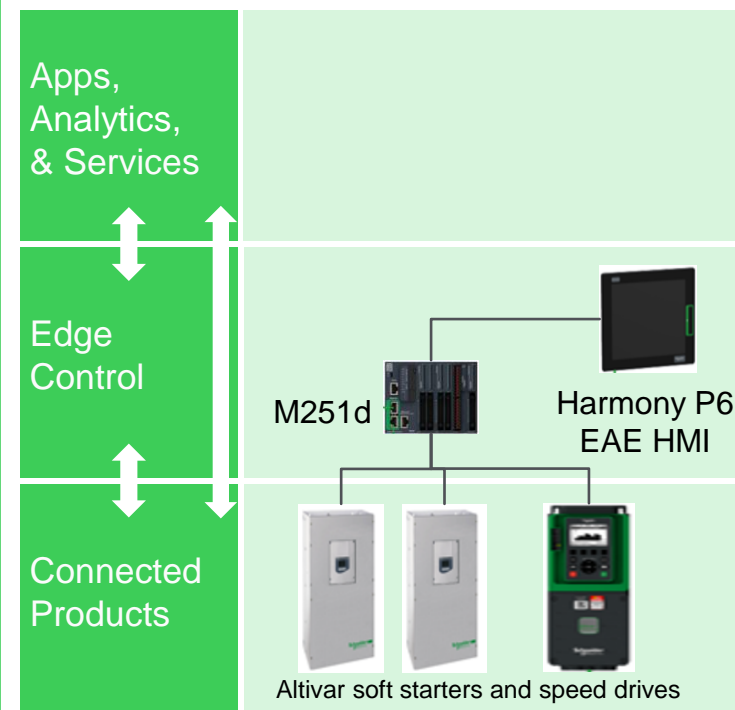
Mining industry

Customer Challenges

- Complexity and costs along life cycle (design and maintain)
    - Manage many different machine types
    - Options addressed through HW solutions
- Integrated value add services
    - Production quality
    - Improve maintainability
- Flexible solution to be adapted to installed base machines

The Solution

- PC based solution to combine Control + HMI + Value Add SW
- Scalable application to apply machine variants
- HW agnostic solution to matching EU specifications
- Compatible with installed base IO to reduce efforts to upgrade existing machines

Customer Benefits

- SW solution simplifies variants industrialization
- Division by 3 of number of variant per machines
- Extend service offer by proposing upgrade of existing machines
- Scalability and modularity to address whole machine range
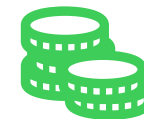
Customer's KPI:
- development savings

Control & AI

Eco truxure™

Apps, Analytics, & Services	iPC	Proprietary add value SW
Edge Control	Soft dPAC / Linux	EAE HMI
Connected Products	• Drive • Switches • Sensors • …..	

Life Is On

Schneider Electric
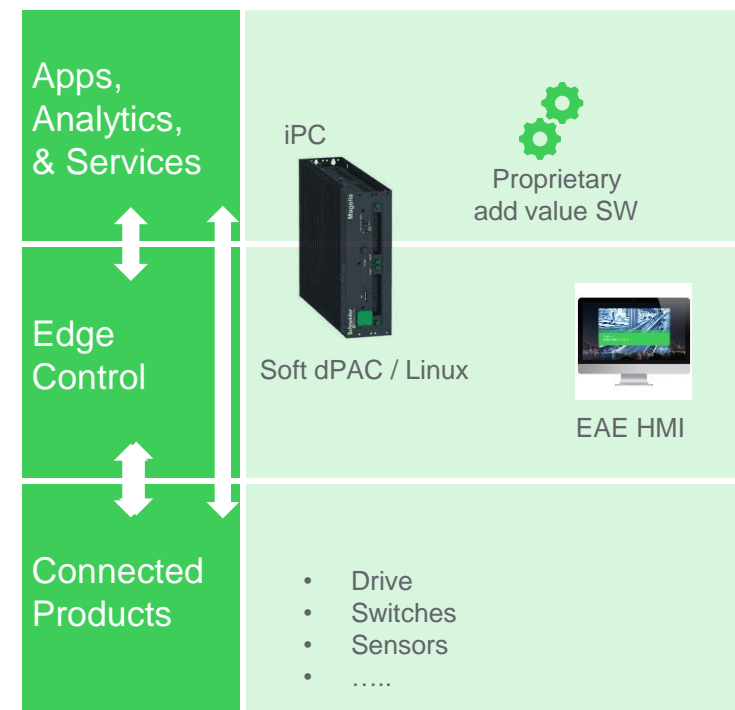
Customer Challenge

- Move to the Industry 4.0 while managing a strong install base
- Less central and local resources available to manage complex programming
- Willingness to optimize the process leveraging on Advance Process Control and Artificial Intelligence
- Necessity to keep the solution cyber-secured with increasing risk due to the IT/OT convergence.

The solution

- Soft dPAC managing Rockwell PowerFlex IO islands over EtherNet/IP
- Application Library update
- OPC UA communication with existing AVEVA Intouch application

The benefits

- Decouple the application from the hardware securing the application investment,
- Less dependance to a single vendor allowing more cost competitive solutions
- Digital Continuity for more efficient project lifecycle
- Simplification to give back to control to the Process Engineer (vs the Automation Engineer)

Customer's KPI:
- Implement the new automation solution while maintaining the same HMI and same I/O
- Implementation Time

EcoStruxure™ Food & Beverage

Apps, Analytics, & Services	Existing AVEVA Intouch
Edge Control	Soft dPAC — OPC UA
Connected Products	Power Flex IO — EtherNet/IP

Life Is On | Schneider Electric
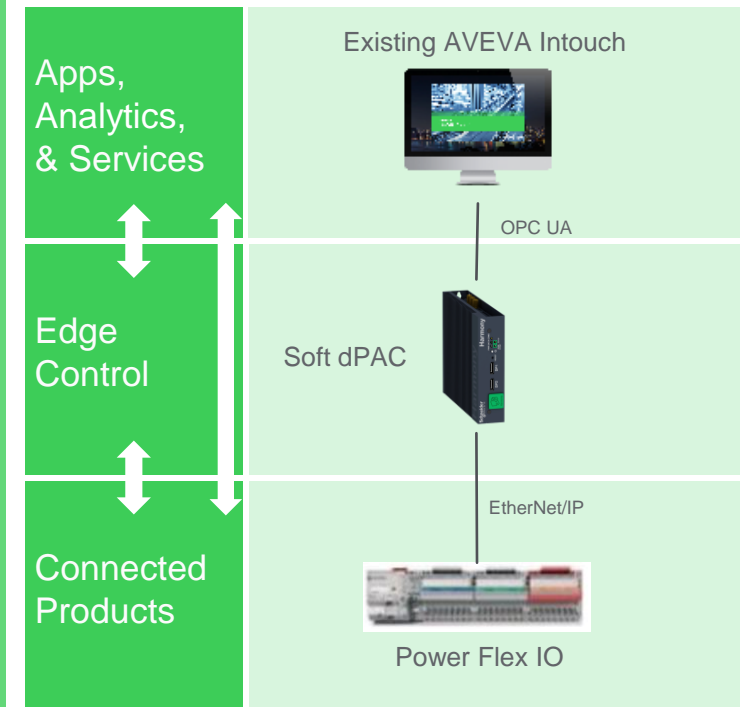
Packaging OEM

Customer Challenges

- add quality control during process execution on an existing wrapping machine (with PacDrive3)
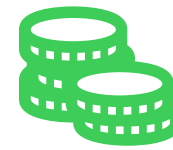
The Solution

- Add visual inspection with machine learning algorithm in order to detect bad/good wrapping

- EAE collaborates with Visual Inspection and orchestrates PacDrive

Customer Benefits - OEM

- Strong differentiations vs other OEMs
- New dimension for machine optimization
- Quality improvement – ensuring End-User satisfaction
- Financial gain – saving penalties from EU

Customer Benefits - EU

- Waste reduction
- Avoiding non-conformity process
- Better utilization of existing assets
- Less downtime

Customer's KPI:
- New digital services
- Quality

Data & Control

EcoStruxure™ Packaging

Apps, Analytics, & Services

EcoStruxure Visual inspection Machine Learning

Edge Control

PacDrive3

EcoStruxure Automation Expert

Connected Products
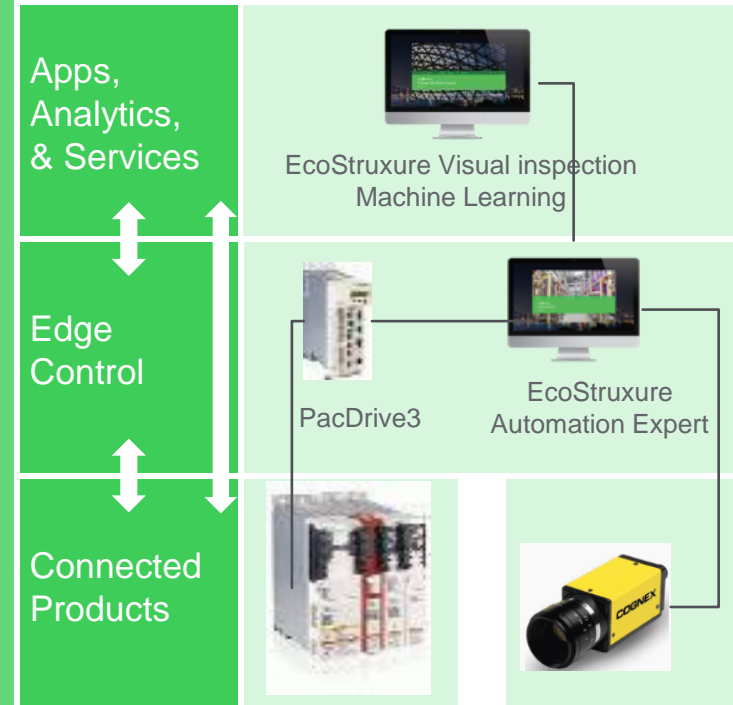
SE DC Shanghai
Stage 2
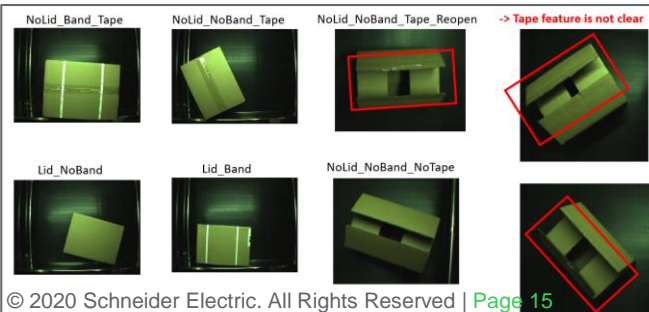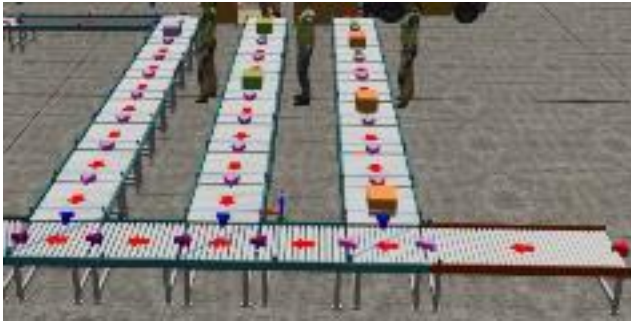
Customer Challenges

- Extend warehousing operations with lowest impact on running process
- Customer satisfaction / (ship what was ordered)

The Solution

- Control system is managing conveyors and connected products.
- Digital Twin running on the same platform detects anomalies and test optimization scenarii
- Visual recognition detecting size, shape, orientation and quality of the parcels.

Customer Benefits

- Standard Asset library simplifies extensions and reduces time to deploy
- Asset oriented library simplifies maintenance
- Quality improvement : early defect identification + EU satisfaction

- for Smart Warehousing

Customer's KPI:
- New digital services
- Scalability

Control & AI

EcoStruxure™ Logistics

Apps, Analytics, & Services		EcoSruxure Digital Twin
Edge Control	Harmony P6 iPC	Automation Expert
Connected Products		
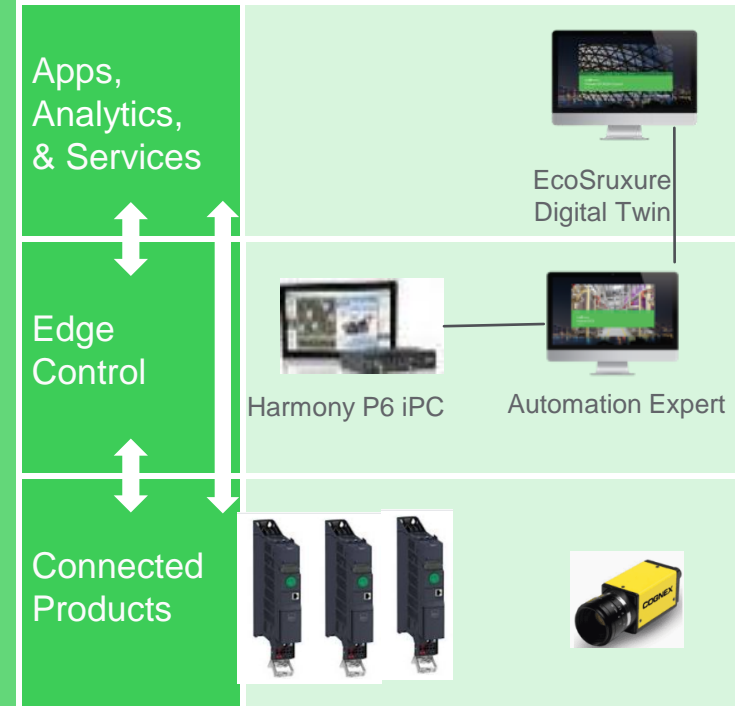
Link to the video

Cement Plant

Customer Challenges

- Saferock aiming to produce carbon neutral geopolymer concrete for the building and construction industry.

- They utilize industrial by-products to make geopolymer concrete, reducing carbon emissions by more than 70%.

The solution

- Rational programming in Automation Expert common to
- PLC and SCADA.
- SW centric, HW independent
- Modern programming, fusion between IT / OT standards

Customer benefits

- Reduced design time and faster time to production
- More flexibility in the choice of automation platforms, and easier integration of analytics or other software solutions in the future
- Future Ready & Scalable platform.

- Internal use only

Customer's KPI:
- Sustainability

Control

EcoStruxure™ MMM

Apps, Analytics, & Services

Aveva System platform (future)

Edge Control

Modicon M580 dPAC

EcoStruxure Automation Expert

Connected Products

Altivar drives

TeSys island

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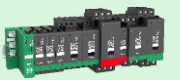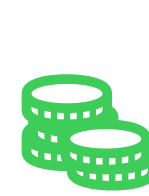
Small Water treatment
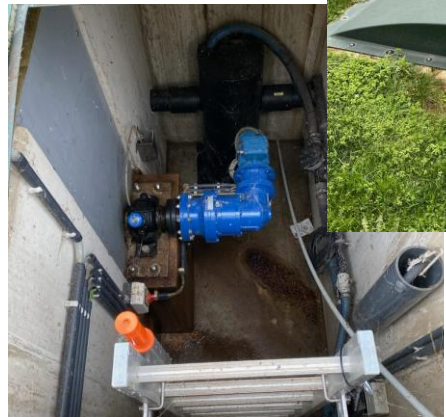
Customer Challenges
- Cost-effective
- Small footprint
- Easy-to-operate
- Sustainable

The Solution
- ATV dPAC using VSD local IO
- Local HMI

Customer benefits
- Easy to duplicate
- Optimized cabined footprint

Control

EcoStruxure™
Innovation At Every Level

WWW

Apps, Analytics, & Services	
Edge Control	ATV dPAC — ESX Scada Expert or Aveva
Connected Products	ATV Process 600/900

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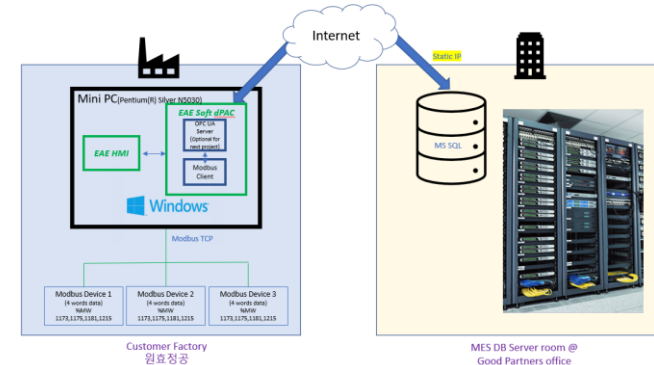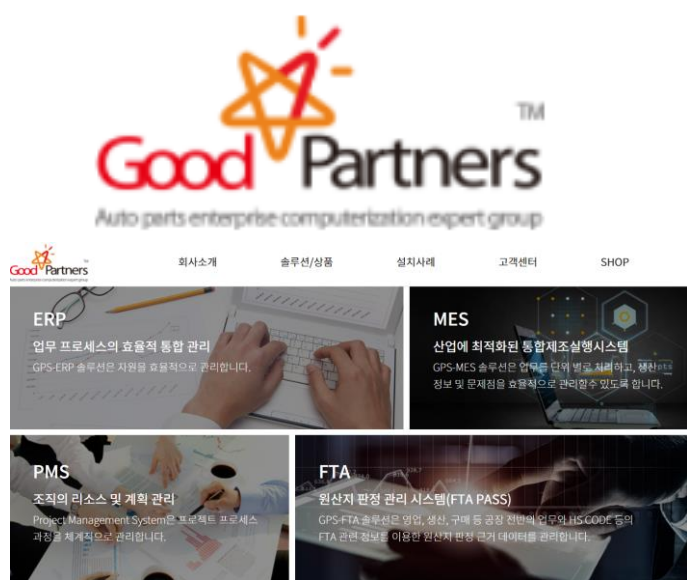
Customer Challenges

- Develop & maintain their SW for interaction between MES, ERP, PMS, and OT
    - using OPC UA protocol
    - Manage OT data in MS SQL DB
- Impact on existing OT applications when deploying a digital transformation plan
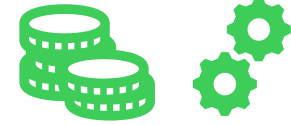
The Solution

- Soft dPAC + EAE HMI

Customer Benefits

- Rationalize skills development on one single and standardized IDE to manage the key challenges and open new opportunities
- Reduced learning curve thanks to IT mindset
- Saved design time thanks to limited impact on existing controllers using native OT protocols (Modbus TCP, OPC UA Server/Client)
- Deliver more added value by integrating Control and orchestration.

The Results: ..

- Engineering time saving
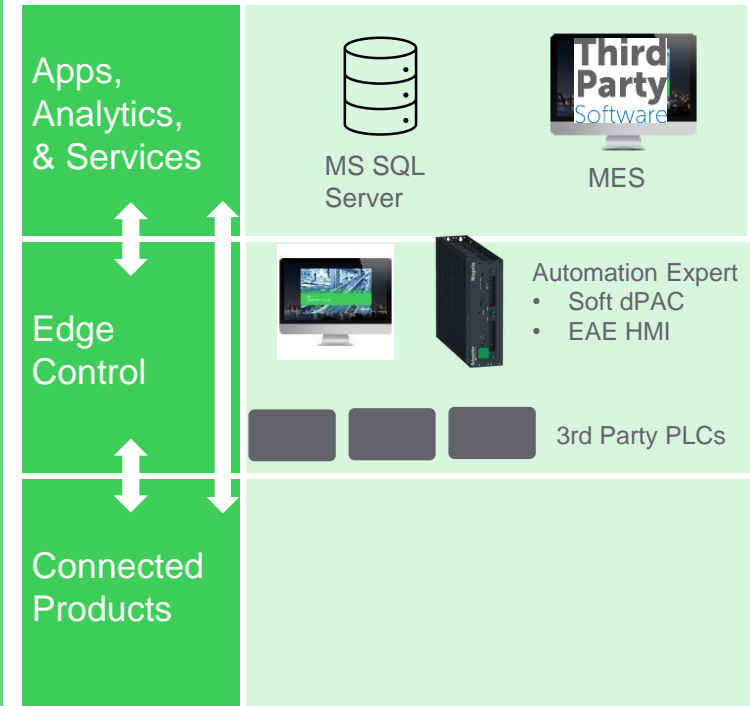- New business opportunities

Customer's KPI:
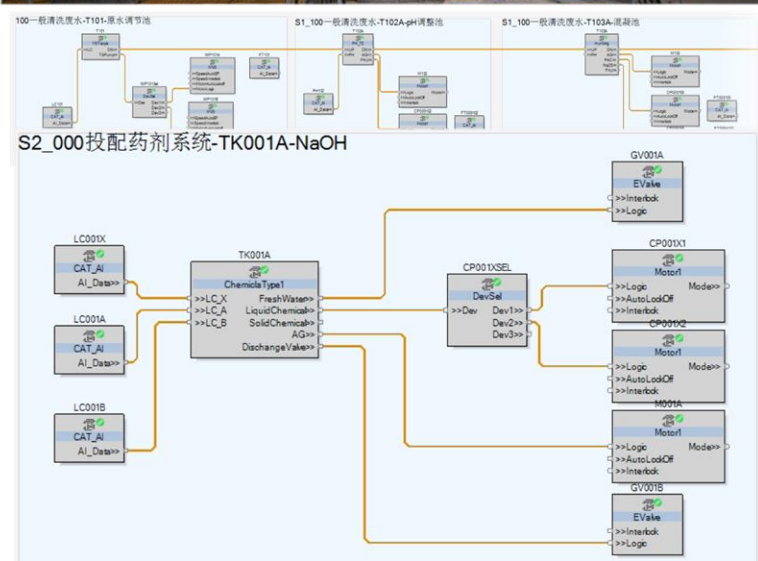- Engineering time

Orchestration

EcoStruxure™ Automotive

Apps, Analytics, & Services

MS SQL Server

MES

Edge Control

Third Party Software

Automation Expert
- Soft dPAC
- EAE HMI

3rd Party PLCs

Connected Products

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Guangxin Waste Water Treatment

Project information
- 22,000 tons/day of wastewater treatment
- 1,000+ IOs，150+Analog IOs，10+Modbus Devices
- Process parts：cleaning wastewater, comprehensive wastewater, cyanide and nickel wastewater, ink wastewater, organic wastewater, sludge treatment, dosing of chemicals, blower and analyzer, etc
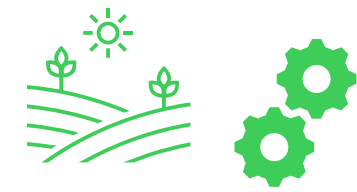
Customer Challenges
- Optimized design time to reduce labor cost
- Reduce on site commissioning time

Solution
- Modicon M251 dPAC：Signal acquisition and communication for each process station
- P6 IPC + Soft dPAC：data processing and process control implementation, interaction with upper monitoring system
- EcoStruxure™ Automation Expert：Plug and Play process library with Composite Automation Type (CAT)
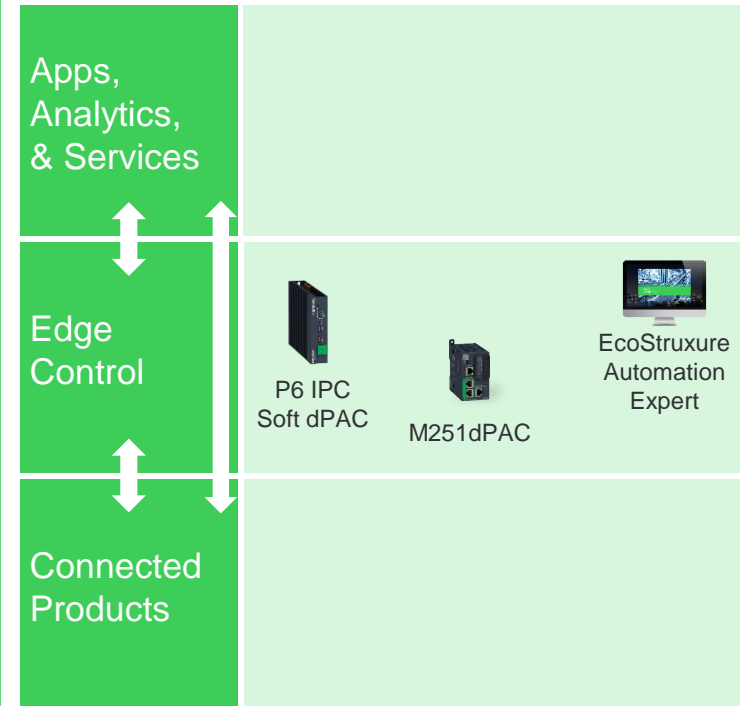
Customer Benefits
- Reduced engineering costs, thanks to the asset-oriented programming based on wastewater objects such as pumps, valves, reaction tanks and tanks. (custom library)
- System level simulation function to reduce engineering debugging time
- Less downtime thanks to faster diagnostic & troubleshooting with standardized programming (Asset objects)
- Easy to adapt and respond to new customer demands

Control

Customer's KPI:
- Design time & labor cost
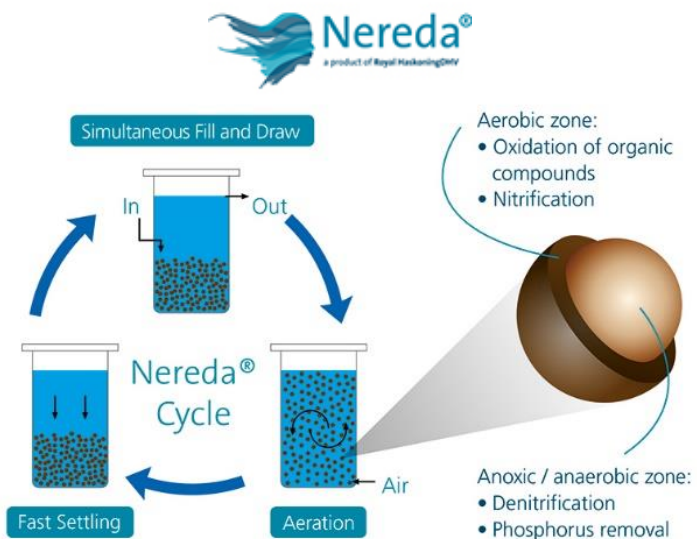- Reduced downtime
- Sustainability

EcoStruxure™ WWW

Apps, Analytics, & Services

Edge Control

Connected Products

P6 IPC Soft dPAC

M251dPAC

EcoStruxure Automation Expert

Life Is On | Schneider Electric

Waste Water Treatment Plant

Customer Challenges
- Sustainable
  - Energy saving
  - Optimize plant footprint
- Easy-to-operate & extend

The Solution
- Nereda controller to for process data computing and control
- Automation Expert Soft dPAC
  - Interface to Nereda controller OPC UA
  - remote IO for OT process control
- VSD controlled over Modbus TCP

Customer Benefits
- (EU) For same volume of cleaned water
  - Smaller plant footprint
  - Less energy consumed
- (SI) Design efficiency : Asset centric libraries simplify the design, the commissioning and future extensions,
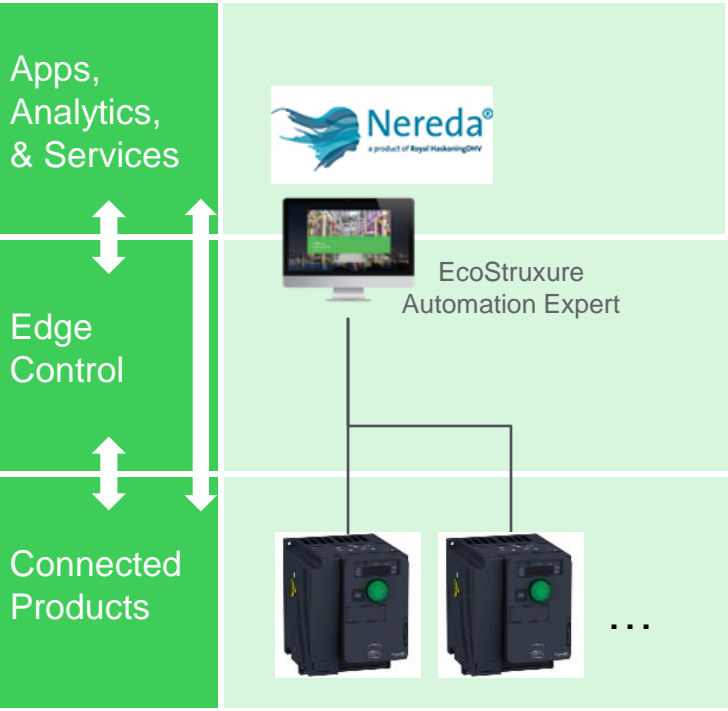
Customer's KPI:
- Footprint savings
- Sustainability

Control & data

EcoStruxure WWW

Apps, Analytics, & Services

Nereda®

EcoStruxure Automation Expert

Edge Control

Connected Products

...

Nereda®
a product of Royal HaskoningDHV

Nereda® Cycle

Simultaneous Fill and Draw

In — Out

Aerobic zone:
- Oxidation of organic compounds
- Nitrification

Fast Settling

Aeration

Air

Anoxic / anaerobic zone:
- Denitrification
- Phosphorus removal

Thx to granules, aerobic and anoxic/anaerobic zones co-exist. This enables a large variety of biological processes to happen simultaneously, like nitrification, denitrification and biological phosphate removal.

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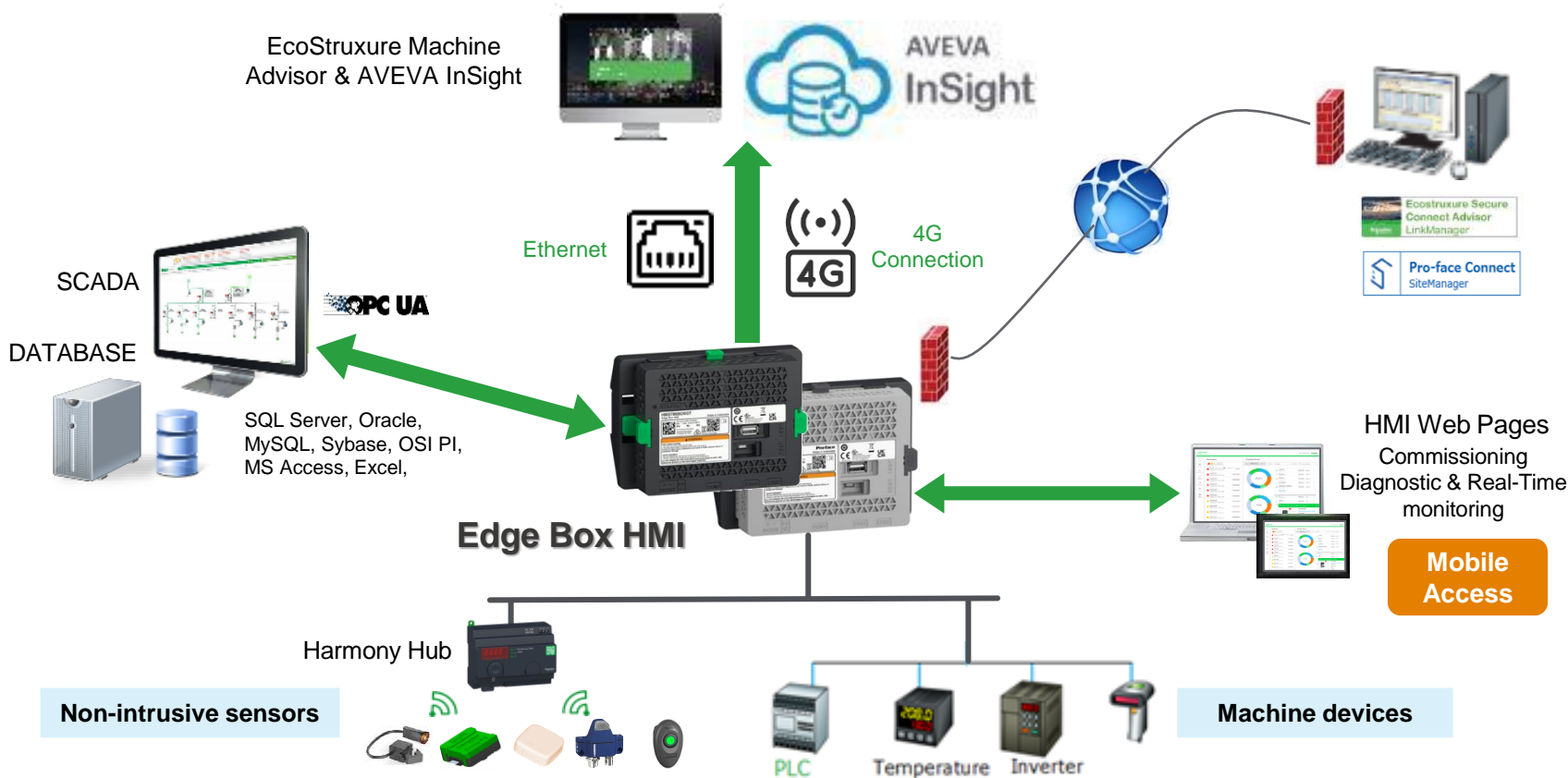
Technical Document
Basic Modular HMI STM6000/STM6 Edge Box

Edge Box HMI – Overview

- Edge Box HMI is based on the platform of STM6000/STM6 Gateway Box, so the environmental specifications and performance conform to it.

- Based on Linux OS, taking only main features of BOS/EMSE to adapt Edge function and Cloud connectivity.

EcoStruxure Machine Advisor & AVEVA InSight

AVEVA InSight

Ethernet

4G Connection

Ecostruxure Secure Connect Advisor LinkManager

Pro-face Connect SiteManager

SCADA

OPC UA

DATABASE

SQL Server, Oracle, MySQL, Sybase, OSI PI, MS Access, Excel,

Edge Box HMI

Harmony Hub

Non-intrusive sensors

PLC   Temperature   Inverter

Machine devices

HMI Web Pages
Commissioning
Diagnostic & Real-Time monitoring

Mobile Access

Highlights for Edge Box HMI:
1. Direct connection to EcoStruxure Machine Advisor
2. Direct connection to AVEVA Insight
3. MQTT/HTTPs for 3rd party connection
4. SQL database connection
5. Use as Faceless HMI (existing offer)

Pro-face™
by Schneider Electric

Edge Box HMI – Overview

Affordable Box to get ready for Cloud Service thanks to the power of BLUE Open Studio / EcoStruxure™ Machine SCADA Expert software.

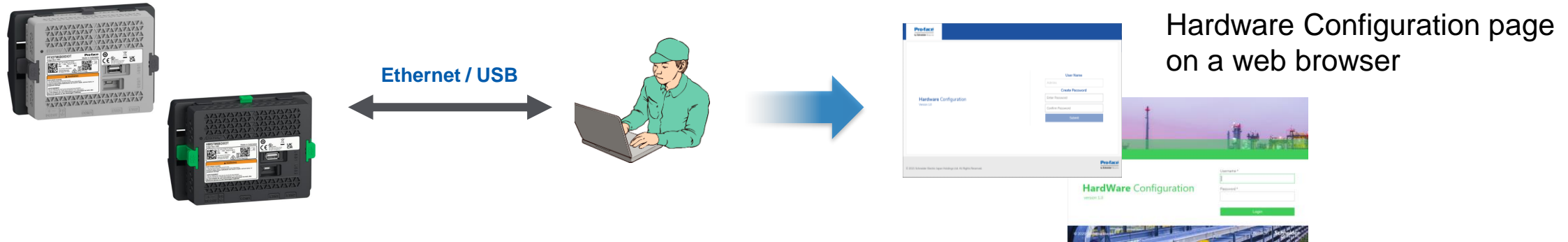|	Edge Box HMI	
	Edge Box HMI + Din Rail adapter HMI Runtime (500 tags) pre-installed One connection Mobile Access	
Model No.	PFXSTM6B00DIOT	HMISTM6BOXIOT
Software	BLUE Open Studio 2020 SP2 or later (20.0.2)	EcoStruxure Machine SCADA Expert 2020 SP2 or later (20.0.2)
Features	Easy configuration with EMSE/BOS	
	Serial & Ethernet interfaces available to collect Data	
	Many protocols to connect machine devices	
	Choice of protocols for Cloud connection	
	HMI features for on-premise operation	
	Direct connection to EcoStruxure Machine Advisor & AVEVA Insight (no scripting)	
	Ready to use (runtime license pre-activated)	
	Mobile Access with high resolution	
	Secure remote access by Pro-face Connect / Secure Connect Advisor	

Pro-face™
by Schneider Electric

Configuration

- **Hardware Configuration**

  - Able to configure required settings such as IP address and internal clock of Edge Box HMI.

Ethernet / USB

Hardware Configuration page on a web browser

- **HMI Application creation on Build Time BOS / EMSE**

  - HMI application configuration for Edge Box HMI by BOS / EMSE

Communication Driver List (1/2)

Driver	Description
ABCIP	Ethernet Communication with **Allen-Bradley PLCs** Using the CIP Protocol
ABTCP	Ethernet Communication with Allen-Bradley PLCs Using the DF1 Protocol
MELSE	Serial and Ethernet Communication with **Mitsubishi QnA and Q Series** Devices Using the MELSEC Protocol
MACHA	Machine Advisor driver
MODBU	Serial Communication with Devices Using the **Modbus Protocol**
MOTCP	Ethernet Communication with Devices Using the Modbus Protocol
MQTT	Ethernet Communication with Devices Using the MQ Telemetry Transport Protocol
OMETH	Serial and Ethernet Communication with **Omron Devices** Using FINS Command
ROC	Ethernet Communication with Devices Using ROC, ROC Plus and ROC 800L Protocols
SOFTP	Ethernet Communication with SoftPLCs
TI500	Serial Communication with Texas Instruments Series 500 Devices Using TBP or NITP Protocol

NOTE : This drivers listed will work with HMI Runtime (as of Mar 2022).
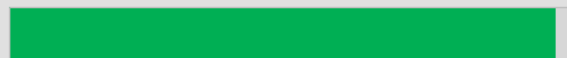
Pro-face™
by Schneider Electric

Mobile English Guest Exit

ANIMATIONS

You can use animations to create dynamic graphic objects or symbols. Animations cause objects and symbols to change appearance to reflect changes in the value of a tag or an expression. Each screen is an association of static and animated objects.
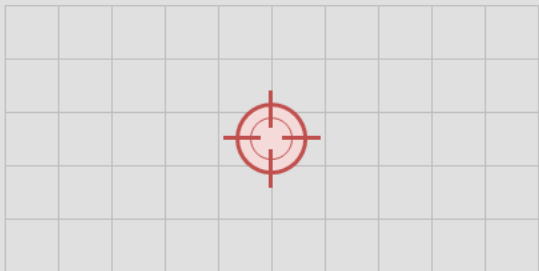
Animations

Active Objects

Recipe Management

Reports

Trends

Alarms

Multi-Touch and Gestures

BarGraph

Rotation

Visibility, Transparency, Size

Position - Horizontal and Vertical

X = 50.00 ; Y = 50.00

Data Entry

Numeric Value: 50

Alphanumeric Value: Click here to change

Text Box (scroll): Text automatically scroll in the

Text Box (multi-line): Text automatically wraps in the Text Box with support for multi-line text

Commands

On Down Only (0)

On Down / On Up

While Down (0)

Message Box

3D Sharp Confirm

3D Soft E-Sign

Standard Shortcut <F10>

Home

Features

Industries

Solutions

Corporate

Mobile | English | Guest | Exit

PackML | OEE

Machinery

Bio Energy

Ovens / Furnaces

Water

Wastewater

Oil And Gas

Process

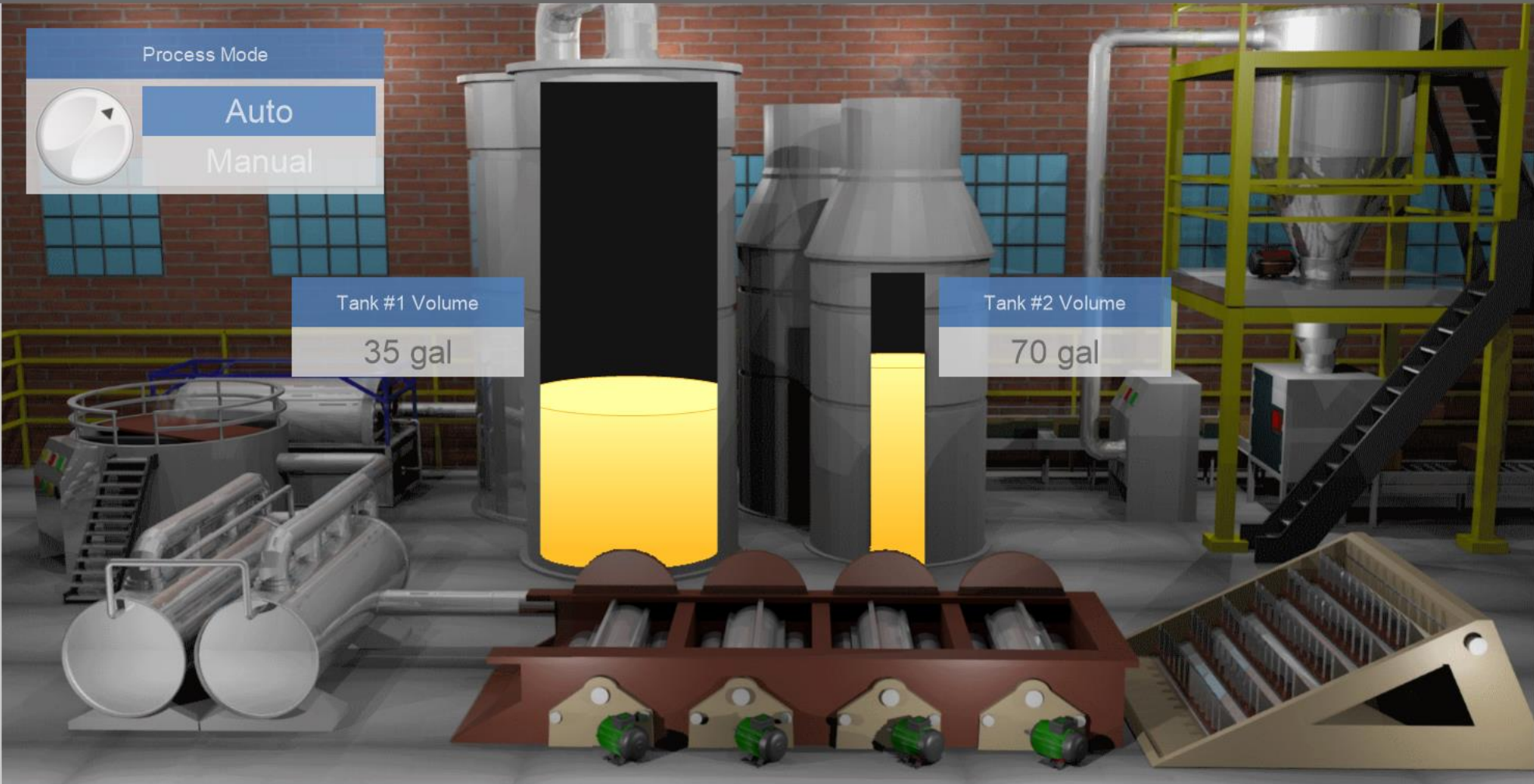Food and Beverages

Wind Power

Solar Power

Control Panel

Stage 1　　Stage 2　　Stage 3

Control

Stop

Life Time Production
13026152

Progress Status	Job #2: Fender FL XYZ				
Whitin Target	Target	Actual	Remaining	Actual (%)	Progress
Parts	10	2	8	20 %	
Time	00:01:00	00:00:11	00:00:49	18 %	

Home

Features

Industries

Solutions

Corporate

Process Mode

Auto

Manual

Tank #1 Volume

35 gal

Tank #2 Volume

70 gal

Machinery

Bio Energy

Ovens / Furnaces

Water

Wastewater

Oil And Gas

Process

Food and Beverages

Wind Power

Solar Power

Control Panel

Mixer			
Turn On	Turn Off	State	Fault

Year To Date Production

7453931 gal

Target
7453329 gal

Milling			
Turn On	Turn Off	State	Fault

EcoStruxure Machine SCADA Expert

Machine Selection						Period Selection	Current Shift (2)	Current Day (Wednesday)	Current Week (42)	Current Month (October)	Current Year (2020)

Availability	Performance	Quality	OEE
86.59 %	56.77 %	90.47 %	44.47 %
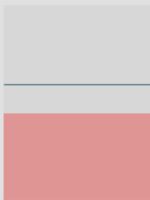
Target 60.00 %

Six Big Losses

- Operation Time
- Non-Loss Time
- BreakDowns
- Long Stops
- Speed Loss
- Short Stops
- Startup Rejects
- Production Stops
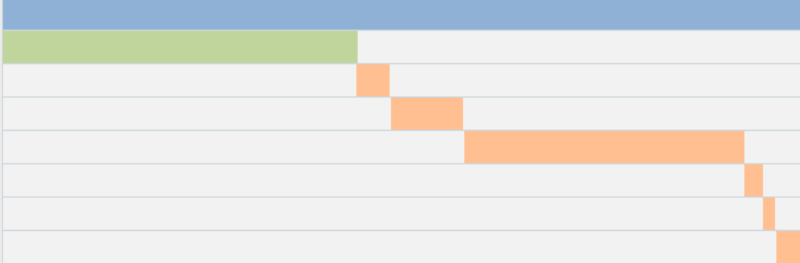
Time

Idle Time	16:00:00	66.67 %
Operation Time	08:00:00	33.33 %
Total Time	24:00:00	100.00 %

Idle Time / Operation Time

Availability Loss

Breakdowns	00:20:30	4.27 %
Long Stops	00:43:51	9.14 %
TOTAL	01:04:21	13.41 %
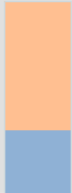
Speed

Missed Speed	53 units/min	44.11 %
Actual Speed	67 units/min	55.89 %
Maximum Speed	120 units/min	100.00 %

Missed Speed / Actual Speed
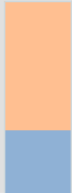
Performance Loss

Speed Loss	02:48:27	35.09 %
Short Stops	00:11:14	2.34 %
TOTAL	02:59:41	37.43 %

Production

Bad Units	1508 units	5.56 %
Good Units	25616 units	94.44 %
Total Units	27124 units	100.00 %

Bad Units / Good Units

Quality Loss

Startup Rejects	00:07:42	1.61 %
Production Rejects	00:14:46	3.08 %
TOTAL	00:22:29	4.68 %

Sidebar

- PackML
- OEE
- Andon

Left Navigation

- Home
- Features
- Industries
- Solutions
- Corporate

Life Is On | Schneider Electric

6-JUL-2023

AVEVA PI System, operations information management

SI Enablement

Nathawan Hanpadungdhama (Noon)

Senior Presales Engineer, Operations Information Management Portfolio

AV∃VA

Oil & Gas

85%

of the top oil and gas companies

Power & Utilities

1,000+

utilities worldwide

Mining & Metals

9

of the top 10 Mining companies

Pharma & Life Sciences

24

of the top 25 Pharmaceutical companies

Chemicals

9

of the top 10 Chemical companies

Manufacturing

6

of the World Economic Forum's Factories of the Future

Asset health

DCP Midstream saved

$20-25 million

in first year

Energy efficiency

Air Liquide achieved

10x ROI

in operational savings in first 8 months

Process optimization

ArcelorMittal shipped

26M additional tons

for $120M in added revenue

Quality tracking

Deschutes postponed

$8 million

capital upgrade

Compliance & sustainability

TasWater sped up response time by

13 hours

and saved the local oysters

Safety & resilience

Qatar Power operated over

3,452 days

without lost-time accidents

Delivering end-to-end customer value with best of breed industrial software

AVEVA Connect cloud services platform and AVEVA Flex subscription program

AVEVA

Industrial software to optimize engineering and operations

PI System

Industry-standard for industrial information management
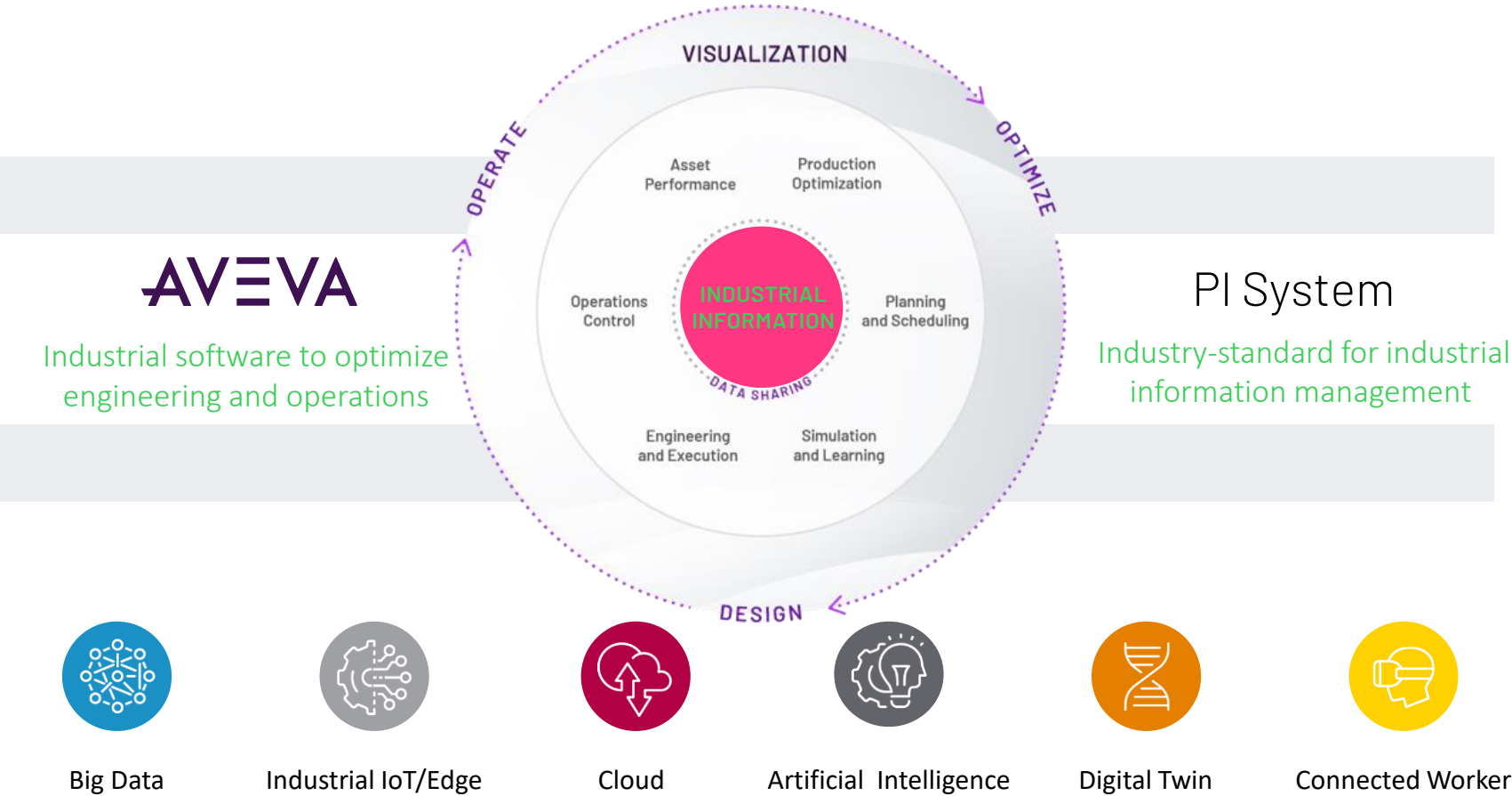
① Better data
Accuracy, reliability, context, scope and scale

② Smarter solutions
With better integration, while maintaining neutrality

③ Proven results
Efficiency, agility, reliability, sustainability

Big Data   Industrial IoT/Edge   Cloud   Artificial Intelligence   Digital Twin   Connected Worker

Delivering a complete digital thread, purpose-built for industry

Accelerate time to value with flexible, scalable, and trusted industrial hybrid SaaS solutions

DESIGN → **OPERATE** → **OPTIMIZE**

OPEN AND AGNOSTIC

Visualization

Multi-experience engineering and operations visualization across the enterprise

3rd party visualization

Simulation and Learning	Engineering and Execution	Operations Control	Asset Performance	Production Optimization	Planning and Scheduling
Process simulation, operator training, enterprise learning	Engineering, 3D design, project execution	Edge, supervisory, enterprise control	Asset strategy, asset analytics, maintenance execution	Operations execution, process optimization, production management	Feedstock management, supply chain planning and scheduling

3rd party apps and analytics

Industrial Information Management

Engineering: Engineering data collection, aggregation, storage and contextualization

←→

Operations: Real-time data collection, aggregation, contextualization, events and self-service calculations

3rd party data sources, systems, and databases

DATA SHARING

SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

AVΞVA

Operations Information Management

Accelerate time to value with flexible, scalable, and trusted industrial hybrid SaaS solutions

DESIGN → OPERATE → OPTIMIZE

OPEN AND AGNOSTIC

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Operations: Real-time data collection, aggregation, contextualization, events and self-service calculations

3rd party data sources, systems, and databases

SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

AVEVA

PI System Synergies

Enterprise Visualization

- AVEVA Unified Operations Center (UOC)

Operations Control

- AVEVA InTouch HMI
- AVEVA Plant Scada (Citect)
- AVEVA Historian
- AVEVA System Platform
- AVEVA Reports for Operations

Simulation and Learning

- AVEVA Process Simulation

Engineering Information Management

- AVEVA Asset Information Management (AIM)

Asset Performance

- AVEVA Predictive Analytics
- AVEVA Mobile Operator

Production Optimization

- AVEVA Process Optimization (former name: ROMeo)
- AVEVA Production Management (former name: Ampla)
- AVEVA Advanced Process Control
- AVEVA Production Accounting
- AVEVA Unified Supply Chain

Internal

PI System Overview

AVEVA

Operations data sources

Standardization

Data consumers

SCADA

DCS

PLC → OPC

Controllers

Databases → Text files

Instruments → Manual data

IIoT Gateways

Cloud systems

Collect

Store & Enrich

Visualize & Deliver

Visualize	Report
Analyze	Notify
Share	Integrate
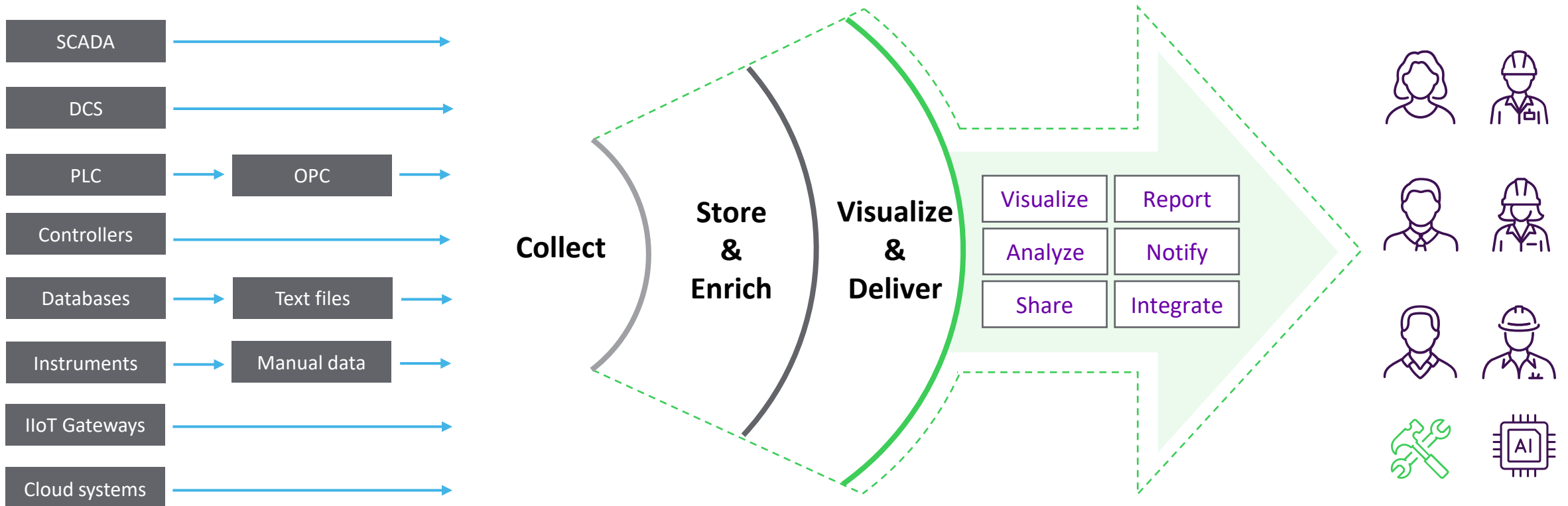
An integrated, edge-plant-cloud architecture supports OT, IT and IIoT use cases

In the cloud

Scalable data services available for a wider array of users, tools and applications

At the edge

Pervasive, real-time data collection from sensors, IIoT devices and remote assets

On-premises

Enriched industrial data available 24/7 for critical operations
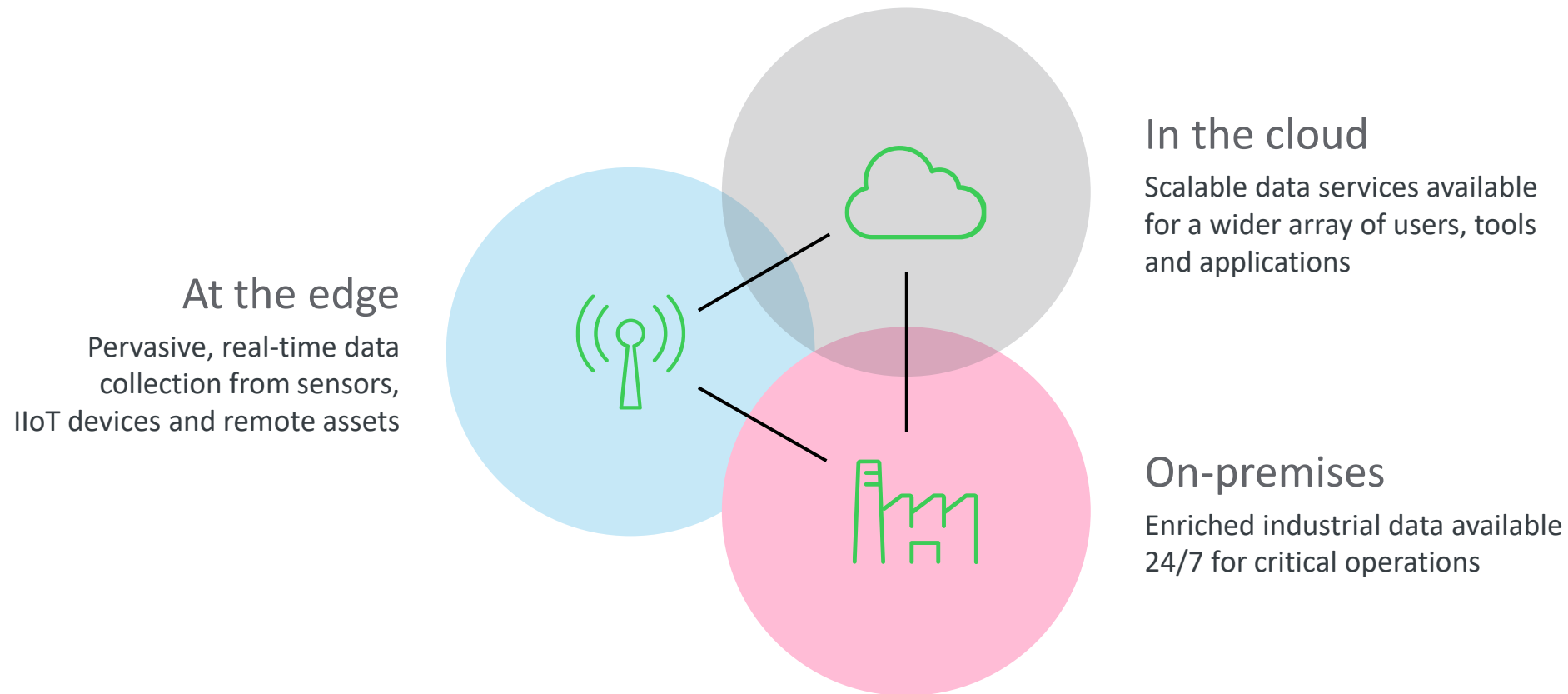
Edge data expands operational insights and creates new opportunities
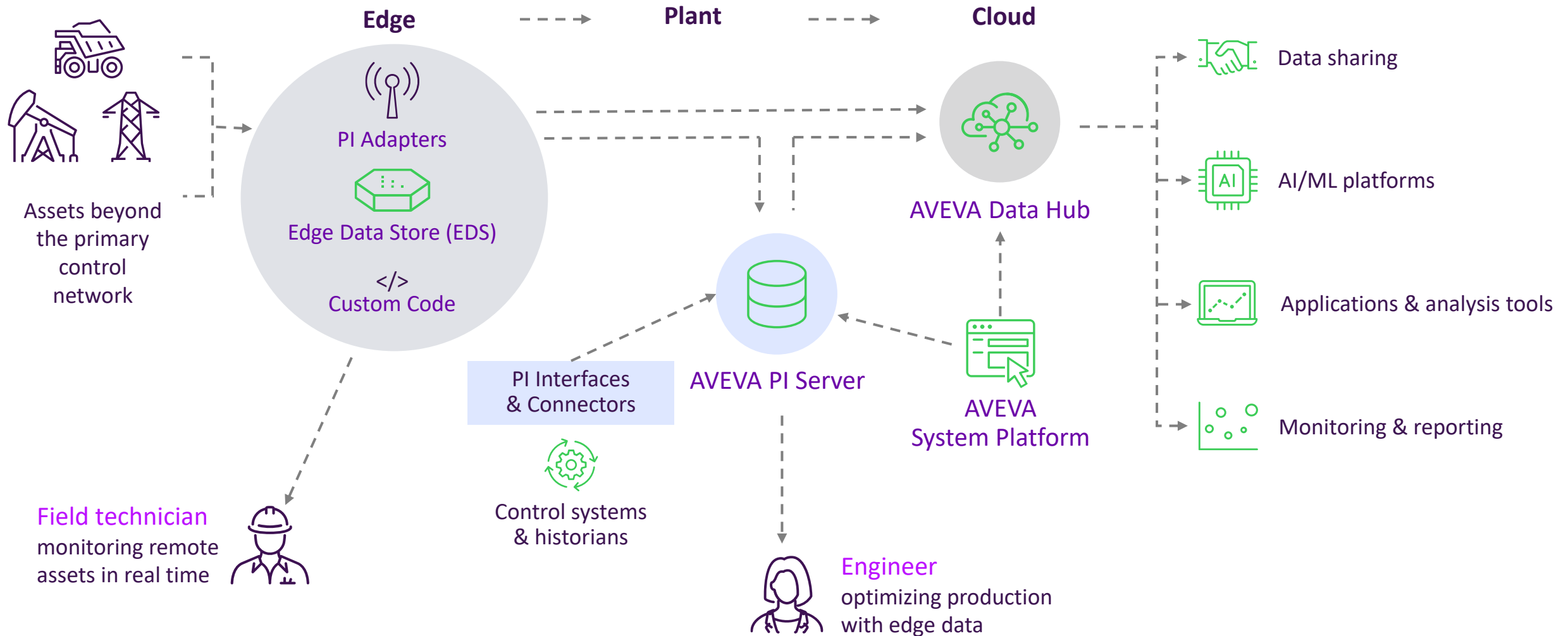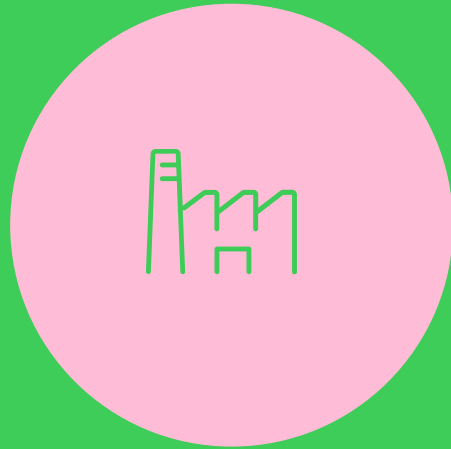
Edge → **Plant** → **Cloud**

PI Adapters

Edge Data Store (EDS)

</> Custom Code

Assets beyond the primary control network

Field technician monitoring remote assets in real time

PI Interfaces & Connectors

Control systems & historians

AVEVA PI Server

AVEVA Data Hub

AVEVA System Platform

Data sharing

AI/ML platforms

Applications & analysis tools

Monitoring & reporting

Engineer optimizing production with edge data

AVEVA PI Server (On-Premise)

Longest serving piece of PI System (+40 years)

On-premises

Enriched industrial data available 24/7 for critical operations

Collect

Store & Enrich

Visualize & Deliver

AVΞVA
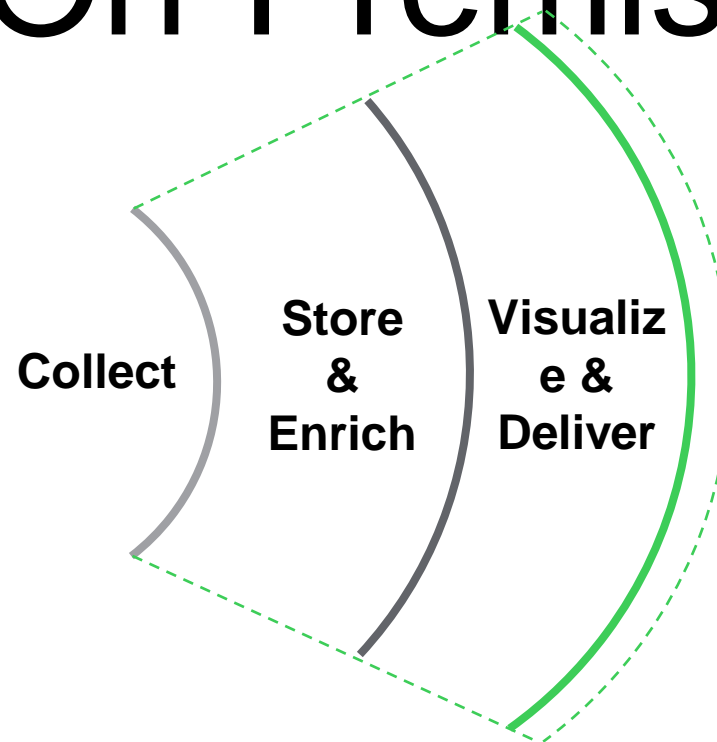
PI Vision - MB Pumps

OSIsoft
PI Vision

New Display | 4 OSI\dlopez ?

MB Pumps (read-only) (explorer-mode)   Asset: ANA FCC Pump 1+ ▼   Export

ANA FCC Pump 1

Anacortes
2,006 rpm — ANA FCC Pump 1
1,972 rpm — ANA FCC Pump 2
1,972 rpm — ANA FCC Pump 3
2,026 rpm — ANA FCC Pump 4

Baton Rouge
3,017 rpm — BAT FCC Pump 1
1,982 rpm — BAT FCC Pump 2
2,028 rpm — BAT FCC Pump 3
3,026 rpm — BAT FCC Pump 4

Houston
2,018 rpm — HOU FCC Pump 1
1,996 rpm — HOU FCC Pump 2
1,999 rpm — HOU FCC Pump 3
1,985 rpm — HOU FCC Pump 4

Martinez
2,028 rpm — MAR FCC Pump 1
1,980 rpm — MAR FCC Pump 2
2,022 rpm — MAR FCC Pump 3
1,975 rpm — MAR FCC Pump 4

Sarnia
1,980 rpm — SAR FCC Pump 1
1,971 rpm — SAR FCC Pump 2
1,977 rpm — SAR FCC Pump 3
1,975 rpm — SAR FCC Pump 4

Data Entry   Home

Name	Value
ANA FCC Pump 1|Manufacturer	Federation Pumps
ANA FCC Pump 1|Serial Number	NCC1701A
ANA FCC Pump 1|Asset	ANA FCC Pump 1
ANA FCC Pump 1|FCC	ANA FCC 1
ANA FCC Pump 1|Refinery	Anacortes Refinery
ANA FCC Pump 1|Date - Installed	1/1/2017 12:00:00 AM
ANA FCC Pump 1|Date - Last Service	12/26/2019 8:30:00 AM

Temp 140.3 °F   Temp 84.9 °F
X 0.1992 mils
2.1854 mils
Y 0.1988 mils
Y 2.1993 mils
Motor Vibration

Vibration X - Inboard Bearing 0.1992 mils
Vibration X - Outboard Bearing 2.1854 mils
Vibration Y - Inboard Bearing 0.1988 mils
Vibration Y - Outboard Bearing 2.1993 mils

12/7/2019 2:51:18 PM   31d   1/7/2020 2:51:18 PM

Run Hours
Since Installed 26,438 h   Since Last Service 293.5 h

Pump Operations
748.4 °F 75.4 psi
100 A
2,006 rpm
100.8 US gal/min
Troubleshooting Checklist

Pump Performance Curve (PSI vs GPM)
75 70 65 60 55 50 45
40 50 60 70 80 90 100 110 120
GPM
● Last 7 Days   ○ Current   ◆ Performance Curve

High Vibration Events

Event Name	Start Time	End Time	Reason	Acknowledged By
ANA FCC Pump 1 Pump Upset 2020-01-07 00:17:07	1/7/2020 2:17:07 AM	In Progress		
ANA FCC Pump 1 Pump Upset 2019-12-26 21:07:07	12/26/2019 11:07:07 PM	12/27/2019 7:00:07 PM		
ANA FCC Pump 1 Pump Upset 2019-12-08 17:17:07	12/8/2019 7:17:07 PM	12/9/2019 2:00:07 AM		

Bearing Temperature Events

Event Name	Start Time	End Time	Reason	Acknowledged By
ANA FCC Pump 1 Pump Upset 2020-01-07 01:49:07	1/7/2020 3:49:07 AM	In Progress		
ANA FCC Pump 1 Pump Upset 2019-12-26 21:07:07	12/26/2019 11:07:07 PM	1/6/2020 2:09:46 PM		

Cavitation Events

Event Name	Start Time	End Time	Reason	Acknowledged By
ANA FCC Pump 1 Pump Upset 2019-12-09 11:43:07	12/9/2019 1:43:07 PM	1/6/2020 2:09:46 PM		
ANA FCC Pump 1 Pump Upset 2019-11-18 11:46:07	11/18/2019 1:46:07 PM	1/6/2020 2:09:46 PM		

12/7/2019 2:51:18 PM   ◄ 31d ►   Now   1/7/2020 2:51:18 PM

Gather past, present, & forecast data from hundreds of sources

Collect

PLC
DCS
SCADA

OPC

Collect
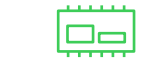
Store & Enrich

Visualize & Deliver

Manual

IoT sensors

SQL & other databases

- Connect to any asset regardless of vendor

- Supports 225+ industrial protocols

- Developed and maintained by us

- Configuration only. No programming required

Collect

PI Interfaces
PI Connectors
PI Adapters

Internal

Turn raw data into actionable information

Store & Enrich

Collect

Store & Enrich

Visualize & Deliver

AVEVA PI Server

- Store high-frequency and large volumes of data

- Provide context to your data

- Run real-time analytics on your raw data

- Bookmark & notify on key events and batches in your data

Internal
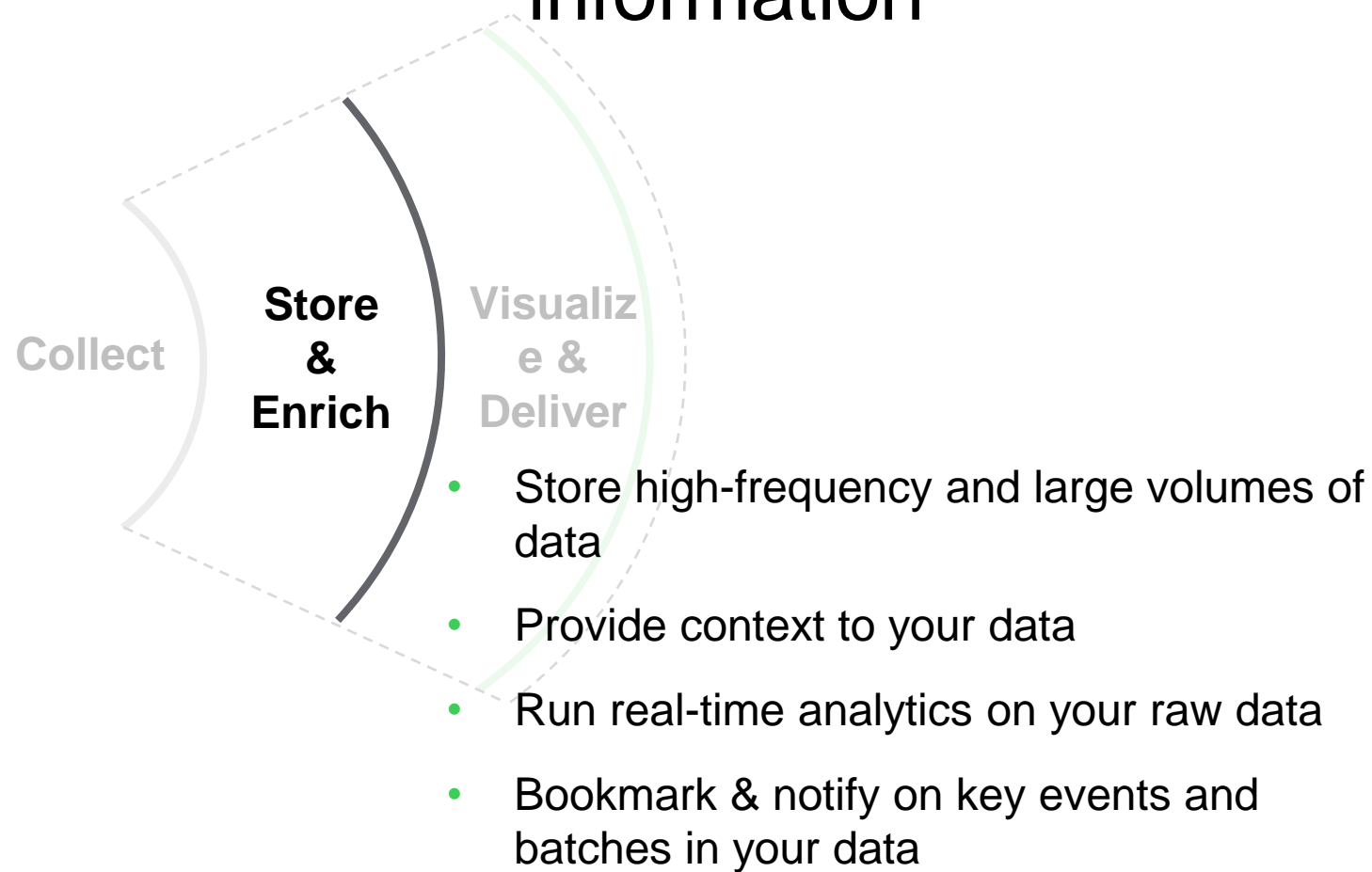
Enrichment features turn data into decision-ready information

Add structure and meaningful context to your operations data

Automatically pinpoint important events in your operations

Data Archive **Asset Framework** **Asset Analytics** **Event Frames** **Notifications**

Asset 97: Springfield
Asset 42: Springfield
Average uptime
Total energy usage
Underperforming asset
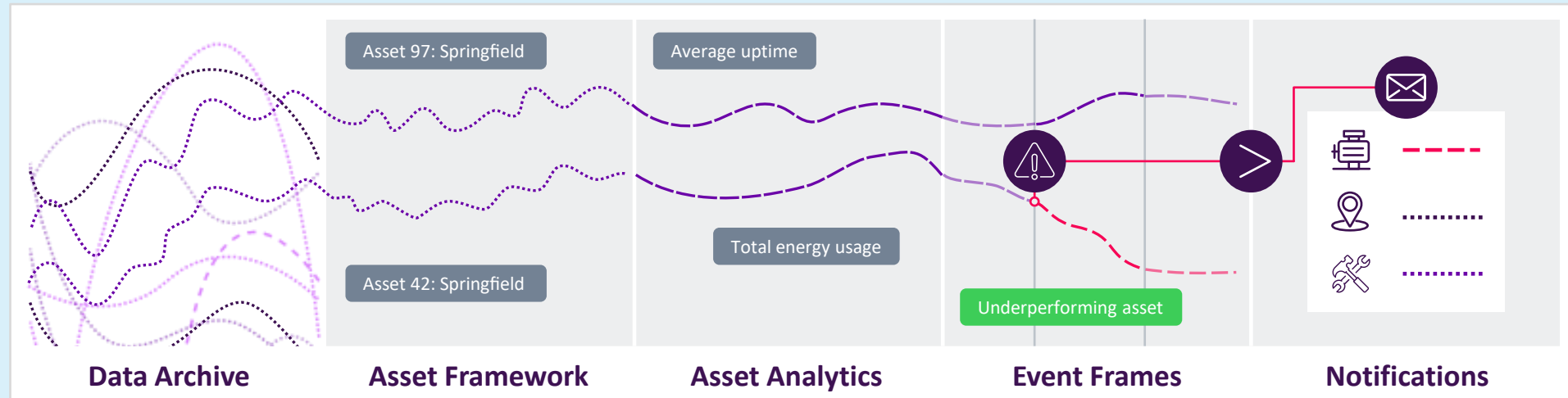
Optimized storage & access to massive volumes of operational data

Transform raw data into actionable KPIs using streaming calculations

Send automatic alerts to the right people with the right information

Internal

Deliver operations insights in real-time to anyone, anywhere

Deliver

PI Vision
PI DataLink
PI Integrator
PI System Access

Store & Enrich

Collect

Visualize & Deliver
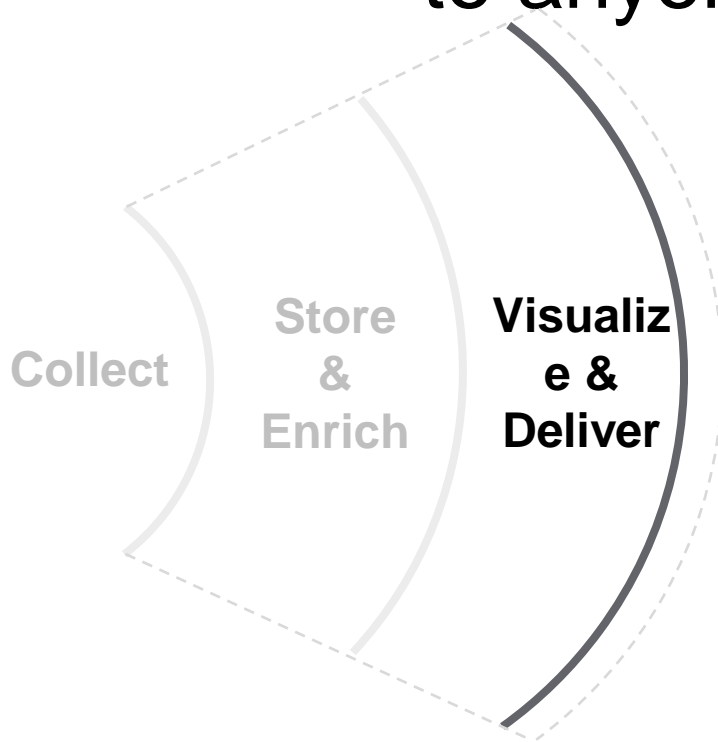
- Dynamic, **real-time displays** that update in seconds, not minutes

- View KPI's in Microsoft Excel or on any web-browser enabled device

- **Build dashboards or reports without requiring assistance from IT**

- **Publish large-scale real-time exports and streams of data and metadata** to third-party geospatial, big data, or business analysis platforms

- **Programmatic access** to build anything on AVEVA PI System

AVEVA PI Vision: Real-time data visualization for decision makers

- An **easy to use, self-service, scalable** visualization solution

- Dynamic displays

- Access real-time OT data from **any device** – phone, tablet, laptop, desktop

- **Share** real-time displays across your organization

AVEVA PI DataLink: Deliver formatted data directly to Excel

- Create **live, interactive, spreadsheet reports** that easily compare and analyze assets
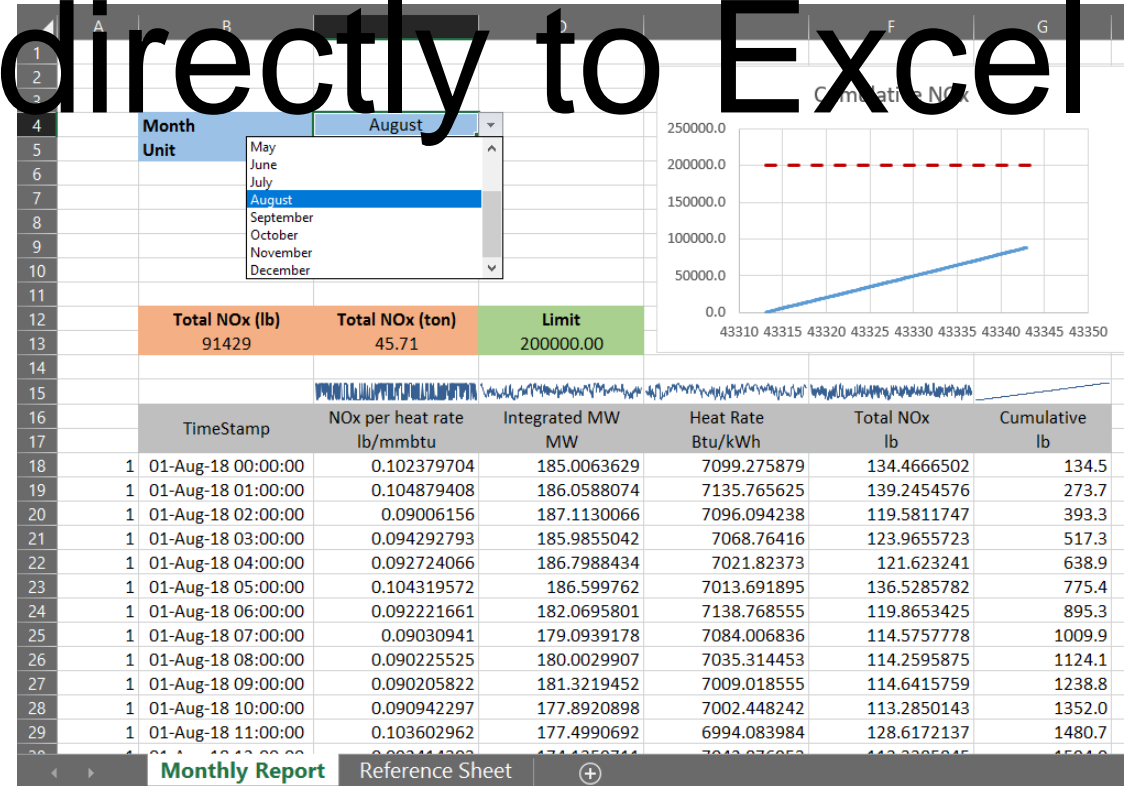
Data Sources

IIoT & sensors

Edge data stores

Plant control systems

Historian

Remote

AVEVA PI Server

Asset data and event frames

Transmit

Shape

Augment

Cleanse

AVEVA PI Integrator for Business Analytics

AI/ML platforms

3rd party analytic tools

Enterprise reporting

- Apache Kafka
- Amazon Kinesis
- Amazon Redshift
- Amazon S3
- Cognos
- Google Cloud Pub/Sub
- Google Cloud Storage
- Google Big Query
- Hadoop
- Hive
- Microsoft SQL
- MS Azure
- Oracle
- PowerBI
- SAP HANA
- Spotfire
- SAS
- Tableau

5
3

A developer technologies suite to build custom applications or integrate PI with other systems

AI/ML platforms   3rd party analytic tools   Enterprise reporting

Available Protocols

AF SDK (.NET)	PI Web API (REST)	PI SQL CLIENT			PI OPC DA Server	PI OPC HDA Server
		OLEDB	ODBC	JDBC		

AVEVA PI Server

IIoT & sensors

Edge Data Stores

Plant control systems

Historians

Remote assets

Internal
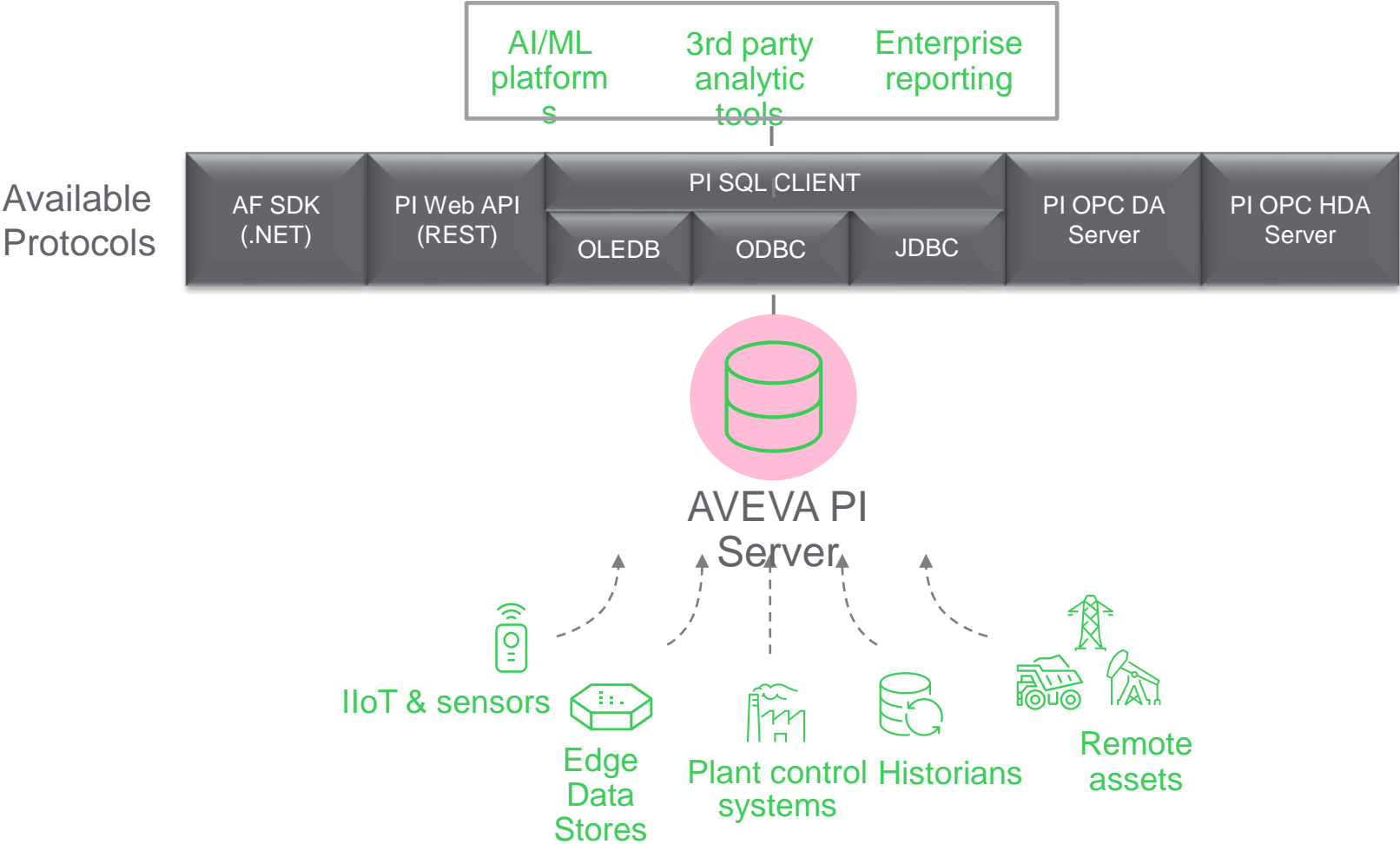
How to start selling PI System

What Problems Are We Solving

unlabeled data that goes no where after prolonged neglect).
- Enterprise-scale data visibility and management – Single source of truth
- Enable knowledge capture and transfer between transitioning workforce.
- Engage experts within and beyond the enterprise to gain competitive advantage.
- Transform massive amounts of raw sensor data into actionable insights.

Target Personas

- VP Operations/Maint./CDO
- Director of Asset Reliability/Performance/Maintenance
- Director of Operations
- Director of IT

- Asset Manager
- Plant Manager
- Chief Information Officer
- Chief Data/Analytics Officer
- Chief Digital Officer

Target Industries

- Oil and Gas
- Power (both Power Gen and T&D)
- Pharma
- F&B
- Metals & Mining
- Chemicals
- Pulp & Paper
- Transportation
- Facilities
- Water

Equipment efficiency optimization and cost reduction

Asset health

Continuous monitoring

Saved **$20-25M** in first year

Minimize energy usage by leveraging real-time data

Energy efficiency

Automation and reporting

10x ROI from operational savings in first 8 months

Maximizing production and product quality

Process optimization

Real time data

$120M additional revenue by shipping 26M tons

Saving costs while saving the planet

Compliance and sustainability

Data management

Reduced response time by **13 hours** and saved local oysters

Improving transparency and quality with right data

Quality tracking

Quality audits

Postponed **$8M** capital upgrade

Increase ability to react to volatile market

Operational resilience

Operational transparency

Operated over **3,452** days without lost-time accidents

Reference: Customer Stories

Internal

3. PI System is more than

| | =Strong | | =Some gaps | | =Limited | | =Restricted | | =Deficient |

High-Level Positioning

	HMI/ SCADA specific features	Low-cost solution	Alarm history	Proven in essential industries	COTS, no ongoing dev costs	IIoT, edge data sources	Wider ops data focus	Enterprise scale data mgmt	Built for millions of tags	No-code data access	Ability to view data in context	App/tool integra-tion	Secure, online data sharing
AVEVA PI System	Limited	Limited	Limited	Strong	Strong	Some gaps	Strong	Strong	Strong	Strong	Strong	Strong	Strong
AVEVA Historian	Strong	Strong	Strong	Strong	Strong	Limited	Deficient	Limited	Restricted	Strong	Limited	Limited	Strong

Historian caters to the demands of real-time processes on the control network, aligned with HMI/SCADA, to aid optimization and troubleshooting activities.

PI System is an enterprise-wide information management solution. It's ability to collect & enrich data from edge, plant, cloud is unmatched.

PI Server includes context, calculation, event tracking, and notification capabilities at no additional cost.

Primarily for HMI/SCADA

Lead with AVEVA Historian

Broader Information Management play

Lead with AVEVA PI Server

See notes. When not obviously one of these, see more-specific decision tree (next slide)

Operations Information Management

Accelerate time to value with flexible, scalable, and trusted industrial hybrid SaaS solutions

DESIGN → OPERATE → OPTIMIZE

OPEN AND AGNOSTIC

Visualization

Multi-experience engineering and operations visualization across the enterprise

Simulation and Learning

Process simulation, operator training, enterprise learning

Engineering and Execution

Engineering, 3D design, project execution

Operations Control

Edge, supervisory, enterprise control

Asset Performance

Asset strategy, asset analytics, maintenance execution

Production Optimization

Operations execution, process optimization, production management

Planning and Scheduling

Feedstock management, supply chain planning and scheduling

Industrial Information Management

Engineering: Engineering data collection, aggregation, storage and contextualization

Operations: Real-time data collection, aggregation, contextualization, events and self-service calculations

3rd party visualization

3rd party apps and analytics

3rd party data sources, systems, and databases

DATA SHARING

SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

AVEVA

This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

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AVEVA

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@avevagroup

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.

Learn more at www.aveva.com

AVEVA

Schneider Electric Alliance Program

How the Schneider Electric Alliance Program helps you to win and profit from more projects

Life Is On | Schneider Electric

What is the Alliance Program?

Alliance Partner Program is a tiered program for System integrators and Machine Integrator that deliver industrial automation and software solutions using Schneider Electric offers and EcoStruxure technology.

... to bring value to partners

➢Increase **joint business co-operation** to win more projects together

➢Improve your **technical capabilities** so you are more competitive in the market

➢**Support** you and your customers locally and globally in times of need

➢Be **easy to work with** through access to everything you need to do business

The Alliance Program

More value for System Integrators

- Recognition of your differentiating capabilities

Badges to showcase your expertise

- Locator on Schneider Electric website
- Global & local awards

Promotion of our partnership to the market

- Access to online Extranet

Online portal exclusively for Alliance Partners

- Access to the Certified Expert Program

Tailored education program for your engineers

- Dedicated Account manager
- Local technical presales team

Resources to support you locally

- Marketing Development Fund
- Strategic planning

Business enablers for key partners

- Bundled software tools
- Updated regularly online

Alliance Software Suites

- Access to Tailored Care Experts

Remote support pre and post sales

Partnership levels

Alliance
Registered
System Integrator

Schneider Electric

Alliance
Certified
System Integrator

Schneider Electric

Alliance
Master
System Integrator

Schneider Electric

Three levels

- ❑ **Registered**, where most partners start
- ❑ **Certified**, where most partners aim for
- ❑ **Master**, invitation only for top partners

Advancement based on

- ❑ Performance
- ❑ Loyalty
- ❑ Experience
- ❑ Competence

Alliance Partners Program

Key figures

70
Countries where program is in place

1035
Alliance Partners

195
Certified Alliance Partners

14
Master Alliance Partners

+15%
Growth (FY 2018)

250
Obtained Certification Badges

Life Is On | Schneider Electric

Badges & Segment presentation partners

Certified
Alliance System Integrator
Telemetry & SCADA
Schneider Electric

Certified
Alliance System Integrator
Water & Wastewater
Schneider Electric

Training programs and badges	
Control systems	Triconex safety systems
Process Expert	Modicon safety systems
Remote Operations	Cybersecurity
PLC modernization	EcoXpert critical power
AVEVA Software	Intelligent motor control
Machine motion	HVAC control
High performance motion	Robotics

Highlight the technical competence of our partners to end users Provide access to new, specialised offers

Dedicated training paths for engineers matched to the needs of the market.

Complete the certification program and differentiate your business

Industry sectors covered
Water & Wastewater
Food & Beverage
Oil & Gas
Mining, Minerals & Metals
Machinery Hoisting
Machinery Pumping
Machinery Material Working
Machinery Packaging
Machinery HVAC&R

Alliance Portal site

- All partners have exclusive access to the Alliance Portal website where you can:

    – Download

        - Pre-sales configuration tools
        - Tested, validated and documented libraries (TVDAs)
        - Tested object libraries

    – Access automation knowledge base containing more than 100 years of automation insight

    – Manage training and credentials

    – Receive timely news on Schneider Electric product and industry trends

- Not yet a partner? Visit https://www.se.com/myschneider/ for more information on how to become one.

-

The Schneider Electric Alliance Portal website is constantly being updated to help partners deliver services for digital transformation

Schneider IA Online Catalog

Digicat.se.com

Internal

Life Is On | Schneider Electric

Special Promotion

PLC TM200

FREE — EcoStruxure — Schneider Electric — EcoStruxure Machine Expert - Basic software

- Removable terminal
- SD Card
- Max I/O = 168 with ethernet
- Run/Stop Switch
- Mini USB port
- Cartridge card available

Communication
- Ethernet port
- 1 RS485 SL port

AC | DC
Relay outputs | Transistor outputs

TM	200	CE	40	R
Product Family TM=Modicon	Product Series 200 series	Communication Ethernet C= Without Ethernet CE= With Ethernet	Number of I/Os The letter gives the number of I.Os. 16= 16 I/Os 24 = 24 I/Os 40 = 40 I/Os 60 = 80 I/Os	Type of I/Os R= relay U = transistor sink T = transistor source

Pro-face HMI PFXET6400WAD

ความละเอียดสีมากถึง 16 ล้านสี

หน้าจอขนาด 7 นิ้ว
ความคมชัด 800 x 480 pixels

เชื่อมต่อได้หลากหลาย

For operation
Ethernet | Serial | USB

For Maintenance
USB

Enhanced Cyber security

Panel cut
190 x 135 มม.

AVEVA

Special Promotion

PLC TM200

- Removable terminal
- SD Card
- Max I/O = 168 with ethernet
- Run/Stop Switch
- Mini USB port
- Cartridge card available

FREE
EcoStruxure
Schneider Electric
EcoStruxure Machine Expert - Basic software

Communication
- Ethernet port
- 1 RS485 SL port

AC | DC
Relay outputs | Transistor outputs

TM	200	CE	40	R
Product Family TM=Modicon	Product Series 200 series	Communication Ethernet C= Without Ethernet CE= With Ethernet	Number of I/Os The letter gives the number of I.Os. 16= 16 I/Os 24 = 24 I/Os 40 = 40 I/Os 60 = 60 I/Os	Type of I/Os R= relay U = transistor sink T = transistor source

Easy Harmony HMI ET6400

ใช้งานผ่านซอฟต์แวร์
Vijeo Designer Basic

หน้าจอขนาด 7 นิ้ว
ความคมชัด 800 x 480 pixels

เชื่อมต่อได้หลากหลาย
- Ethernet
- Serial: RS232C, RS 422/RS 485
- USB-A, USB-B

ET6 16M colors
Legacy 65K colors

มีความคมชัดสูง และความละเอียดสีมากถึง 16 ล้านสี

เพิ่ม Cybersecurity

Panel cut
190 x 135 มม.

AVEVA

Special Promotion

Harmony HMI

ราคาพิเศษ!!!

รหัสสินค้า	Harmony ST6	ราคา (บาท)
HMIST6200	4"W Basic operator terminal	17,999
HMIST6400	7"W Basic operator terminal	26,499
HMIST6500	10"W Basic operator terminal	34,499
HMIST6600	12"W Basic operator terminal	47,999
HMIST6700	15"W Basic operator terminal	63,499

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Harmony ST6 Series

Ecostruxure Operator Terminal Expert

Ecostruxure Machine SCADA Expert

ใช้งานร่วมกับซอฟต์แวร์
Ecostruxure Operator Terminal Expert และ
Ecostruxure Machine SCADA Expert

มีขนาดหน้าจอให้เลือกมากมาย
ตั้งแต่ 4-15 นิ้ว
อัตราส่วนแสดงผลแบบ **Wide screen**

Web Viewer feature แสดงผลและ
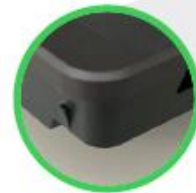ใช้งาน HMI แบบ remote ผ่าน
(PC, tablet, smartphone).

Multi-Screen
แสดงผลข้อมูลได้มากขึ้น

Communications

- RS-232C/485 RJ45
- Ethernet
- USB-A
- USB-B

มีความคมชัดสูง และความ
ละเอียดสีมากถึง 16 ล้านสี

Aluminum front panel

Truetype fonts	Gradient, transparency	Anti-aliasing

AVEVA

Special Promotion

VSD สุดคุ้ม

ซื้อ 1   แถม 2

ATV310/ATV320
ATV340/ATV610
รุ่นใดก็ได้

A9F74106   LC1D09M7

ซื้อ 1   แถม 1

ATV630/ATV930
รุ่นใดก็ได้

METSEPM2230

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NEW! Pro-face engineering Software BLUE
Versatile software for more interactive manufacturing

จำนวนผู้อบรม	ระยะเวลา	หลักสูตร		ระดับคอร์ส
15 คน	2 วัน	70% ทฤษฎี	30% ปฏิบัติ	Basic

Course Outline

- การติดตั้ง software BLUE
- เรียนรู้องค์ประกอบแต่ละส่วนของ software
- การเลือกรุ่นหน้าจอและ setup PLC communication
- การสร้าง screen ในแต่ละแบบ
- อธิบายการสร้าง object ต่างๆเช่น switch, lamp, data display, alarm, trend, recipe เป็นต้น
- ทดลองสร้างโปรเจ็คและ download ลงหน้าจอ ST6000

สแกน QR-Code
หรือคลิ๊กที่นี่เพื่อลงทะเบียน

BLUE Line Management Lite SCADA

Open Studio

SCADA Software - BLUE Open Studio
Line Management Lite SCADA Software

จำนวนผู้อบรม	ระยะเวลา	หลักสูตร		ระดับคอร์ส
15 คน	3 วัน	30% ทฤษฎี	70% ปฏิบัติ	Basic

Course Outline

- เรียนรู้ส่วนประกอบของโปรแกรม Blue Open Studio Development
- เรียนรู้การสร้าง Project และการเรียกใช้ส่วนแสดงผลต่างๆ ในโปรแกรม
- การสร้าง Custom Library ไว้สำหรับการใช้งาน
- การตั้งค่าและเรียกใช้งาน Trend และ Alarm
- การตั้งค่าและเรียกใช้งาน Recipe และ Report
- การตั้งค่าและการเชื่อมต่อกับ Database
- การทดสอบและจำลองการแสดงผลจริง

สแกน QR-Code
หรือคลิ๊กที่นี่เพื่อลงทะเบียน

New! Motor soft starter ATS480

จำนวนผู้อบรม	ระยะเวลา	หลักสูตร		ระดับคอร์ส
15 คน	1 วัน	40% ทฤษฎี	60% ปฏิบัติ	Intermediate

Course Outline

- เรียนรู้ชนิดและช่วงการใช้งานของ New soft start ATS480
- รายละเอียดของ Soft Start และ การเจาะลึกการใช้งานเฉพาะด้าน
- รายละเอียดฟังก์ชั่นหลักของ Soft Start
- การติดตั้งและตั้งค่าของ Soft Start
- ส่วนประกอบเสริมของ Soft Start และการเลือกใช้งาน
- การทดลองสตาร์ทอัพ Soft Start จริง และการปรับตั้งค่าอย่างเหมาะสม

สแกน QR-Code
หรือคลิ๊กที่นี่เพื่อลงทะเบียน

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