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ACCELERATE INDUSTRIAL INTELLIGENCE

AVEVA WORLD MILAN, MAY 2026

Breaking Down Silos: How to Integrate HMI/SCADA into a Unified Namespace (UNS) Architecture

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Contributing Member - **ISA 112** – **SCADA Systems**

SCADA standards and technical reports that address system design, implementation, operation, and maintenance of SCADA systems

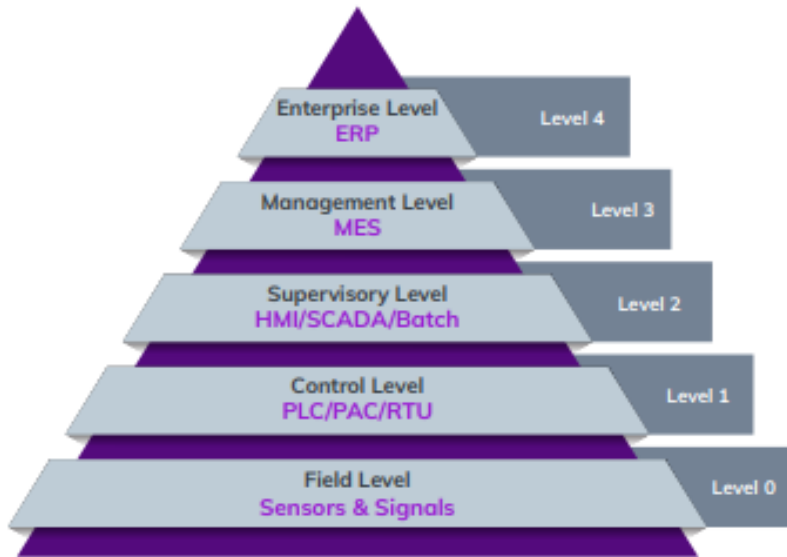
Contributing Member - **ISA 111** – **Unified Automation for Buildings**

Develop standards, recommended practices, and technical reports to communicate the necessary information to allow Buildings subsystems to be managed.



Unified Namespace (UNS)

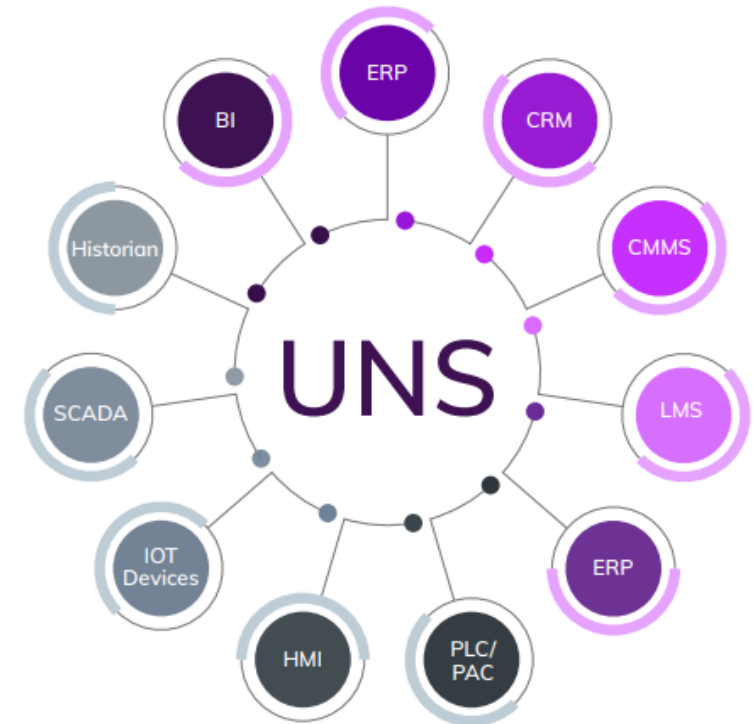
A modern **architecture approach to solving problems** using a **standardized data model & messaging /semantic layer** that represents the current state of operational and business data across an Industrial Environment



Purdue Reference Model



Point to Point Integration

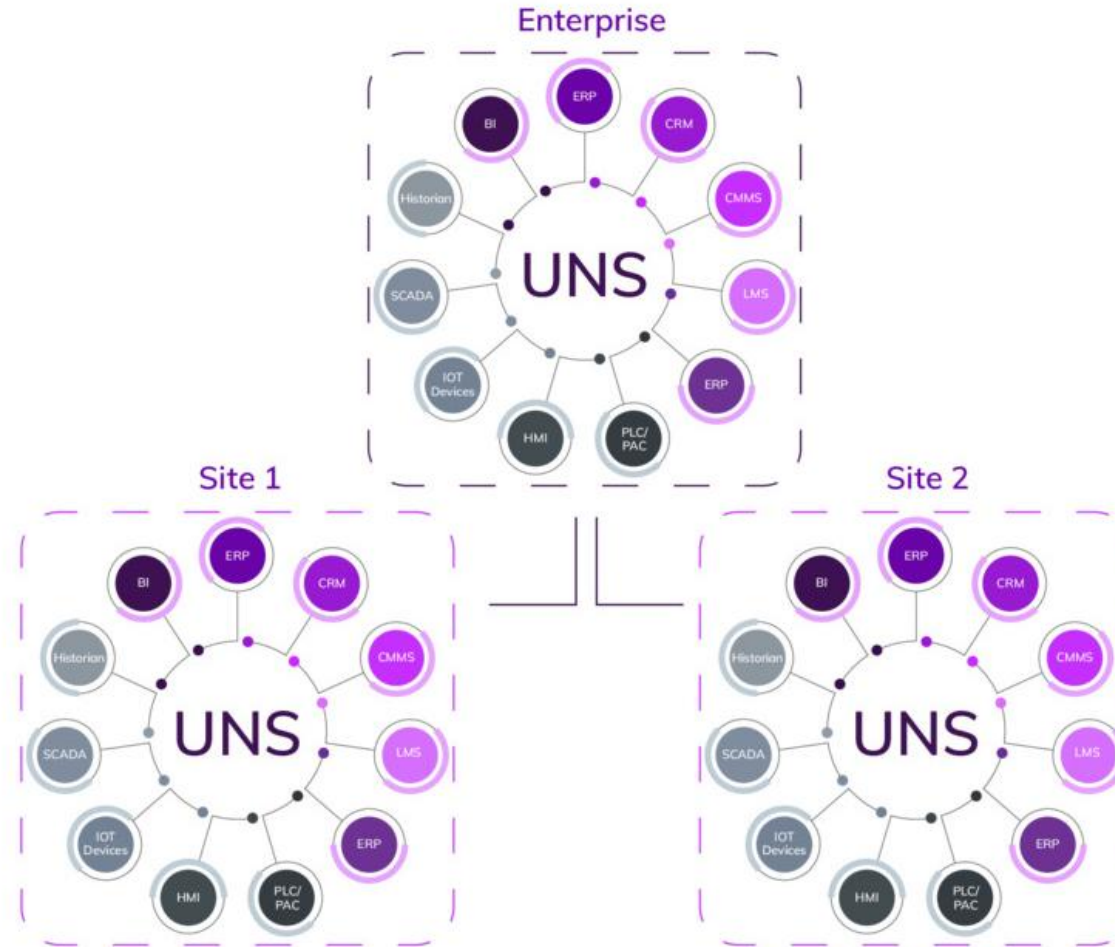


Unified Namespace

Data Integration Architecture

Unified Namespace (UNS)

- **Architecture**
 - Collection of tools
 - Not a single product
- Provides a **hierarchy** of easily discoverable **real-time data in CONTEXT** with historical signals and metadata so all consumers/producers can share and reuse the same data, creating the **single Digital Thread** needed to solve problems.



Unified Name Space (UNS)

Enterprise

- Functional namespace
- Information namespace
- Definitional namespace

Site 1

- Functional namespace
- Information namespace
- Definitional namespace
 - Area
 - Line
 - Cell

Site 2

- Functional namespace
- Information namespace
- Definitional namespace
 - Area
 - Line
 - Cell

Digital Transformation

Connect

Collect

Store

Analyze

Visualize

Find
Patterns

Predict

Report

Solve

Manage

The steps needed for **Digital Transformation** to help
establish a foundation for a **Unified Namespace**

Digital Transformation

Connect

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Patterns

Predict

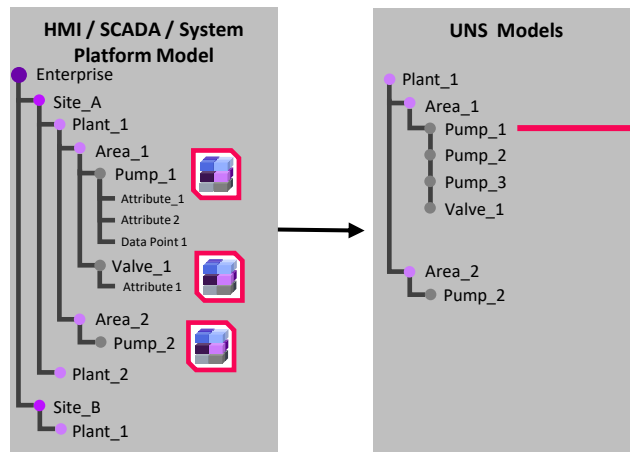
Report

Solve

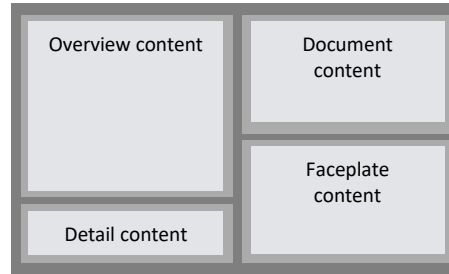
Manage

HMI & SCADA (+Process Historian) → Phase 1

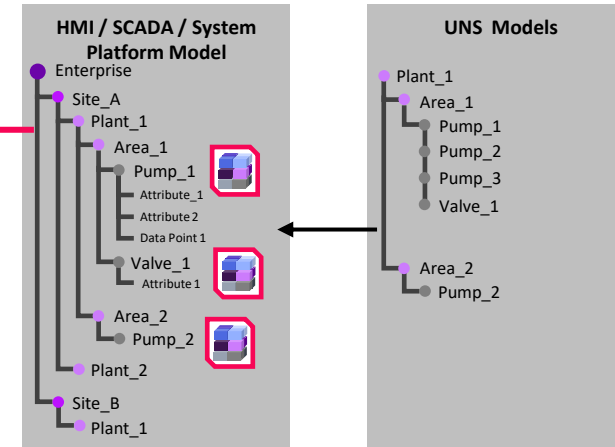
Publish Real-Time Data to UNS



CONNECT Visualization Services
HMI / SCADA Screens
(Context Driven Visuals)



Consume Production Data from UNS



Publish HMI / SCADA Data To the Unified Namespace

Consume Production Data From The UNS

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Connect

PLC

PAC

RTU

Power
Meter

Building
Automation
Controller

OT
Database

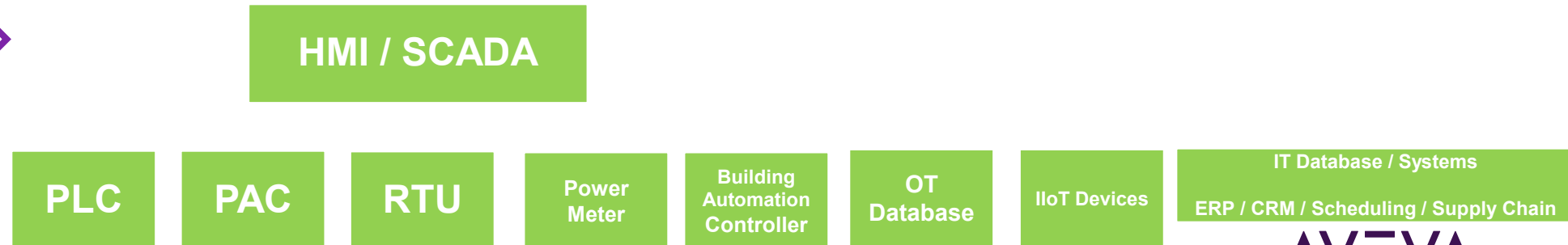
IIoT Devices

IT Database / Systems

ERP / CRM / Scheduling / Supply Chain

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Digital Transformation



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Digital Transformation



HMI / SCADA Configuration Patterns

Traditional

Manage

Configure

Execute

Poll

HMI / SCADA

PLC

PAC

RTU

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IIoT Devices

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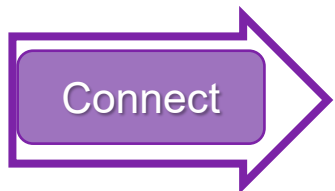
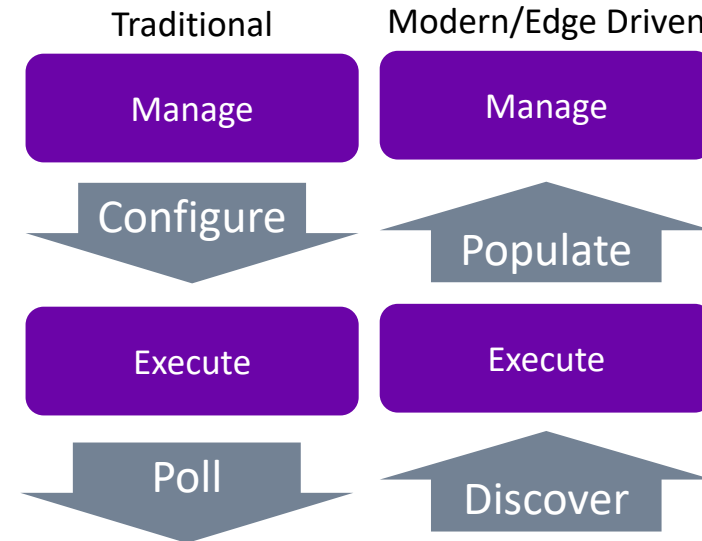
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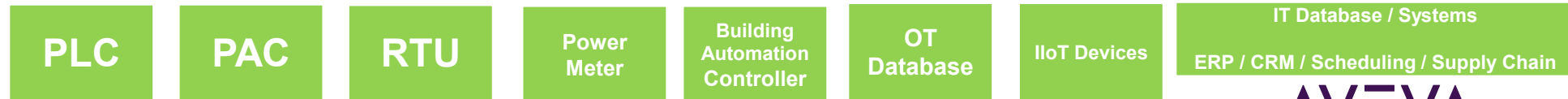
Digital Transformation



HMI / SCADA Configuration Patterns



HMI / SCADA



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Digital Transformation



HMI / SCADA Configuration Patterns

Traditional

Modern/Edge Driven

Scripts / Custom Code

Manage

Manage

Configure

Populate

Execute

Execute

Poll

Discover



HMI / SCADA

PLC

PAC

RTU

Power
Meter

Building
Automation
Controller

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Database

IIoT Devices

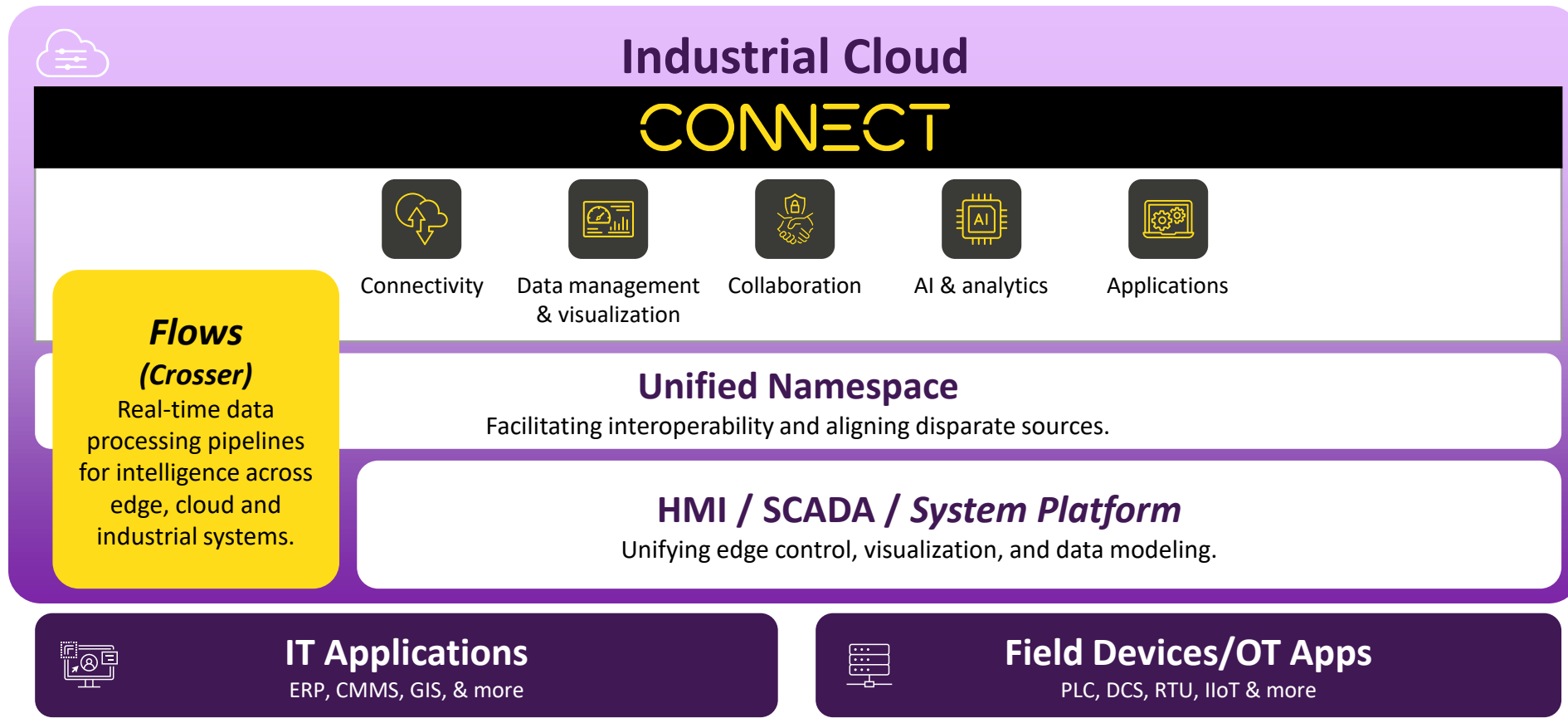
IT Database / Systems

ERP / CRM / Scheduling / Supply Chain

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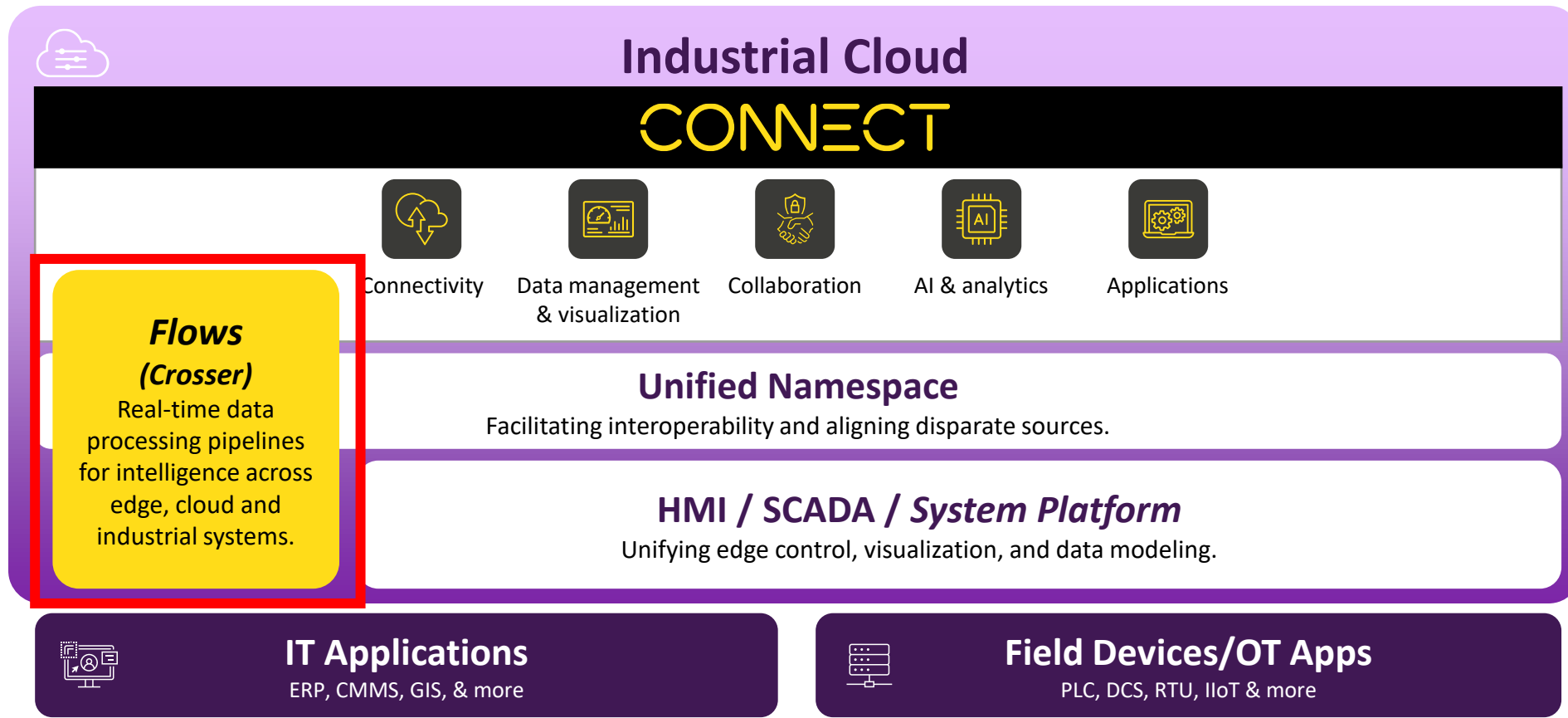


HMI / SCADA + Data Ops roles supporting Unified Namespace (UNS) architectures



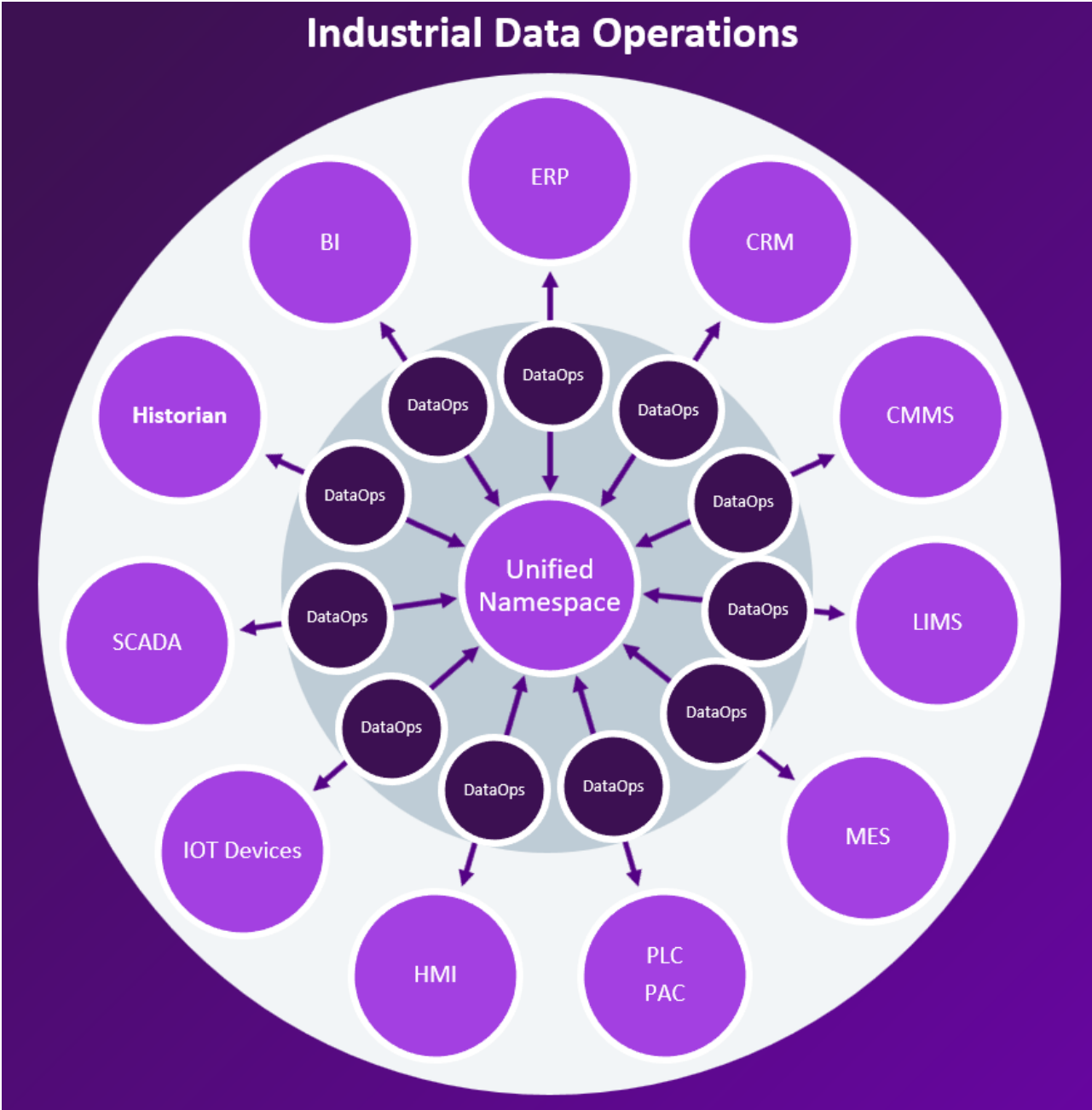
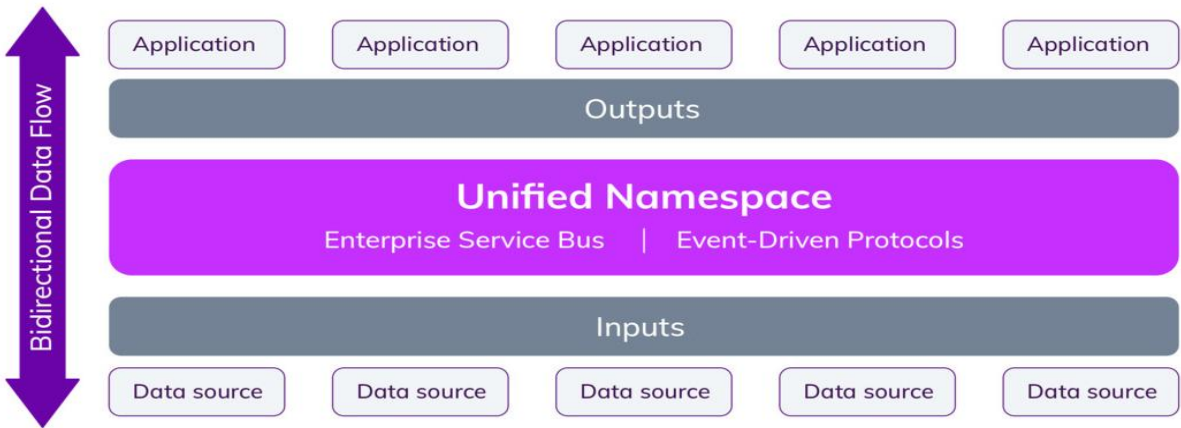
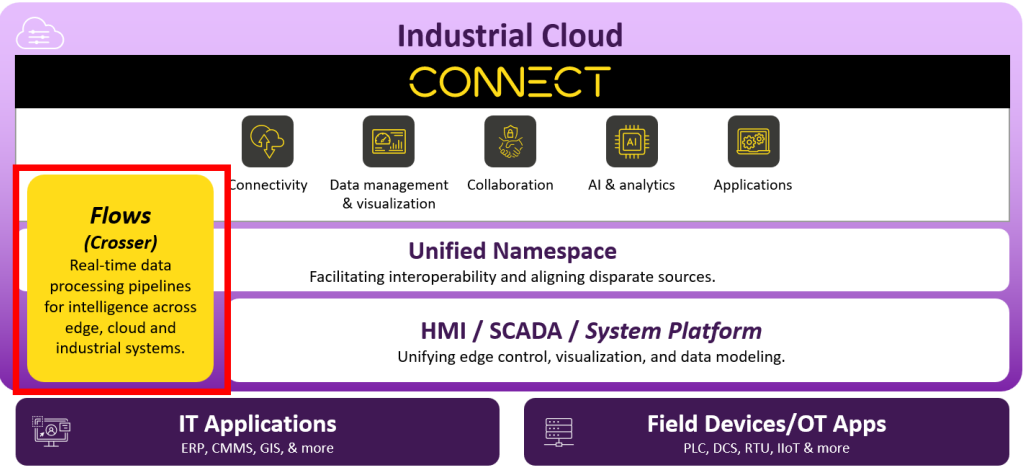
DataOps augments Unified Namespace (UNS) architectures

By automating how industrial data is collected, cleaned, contextualized, and delivered

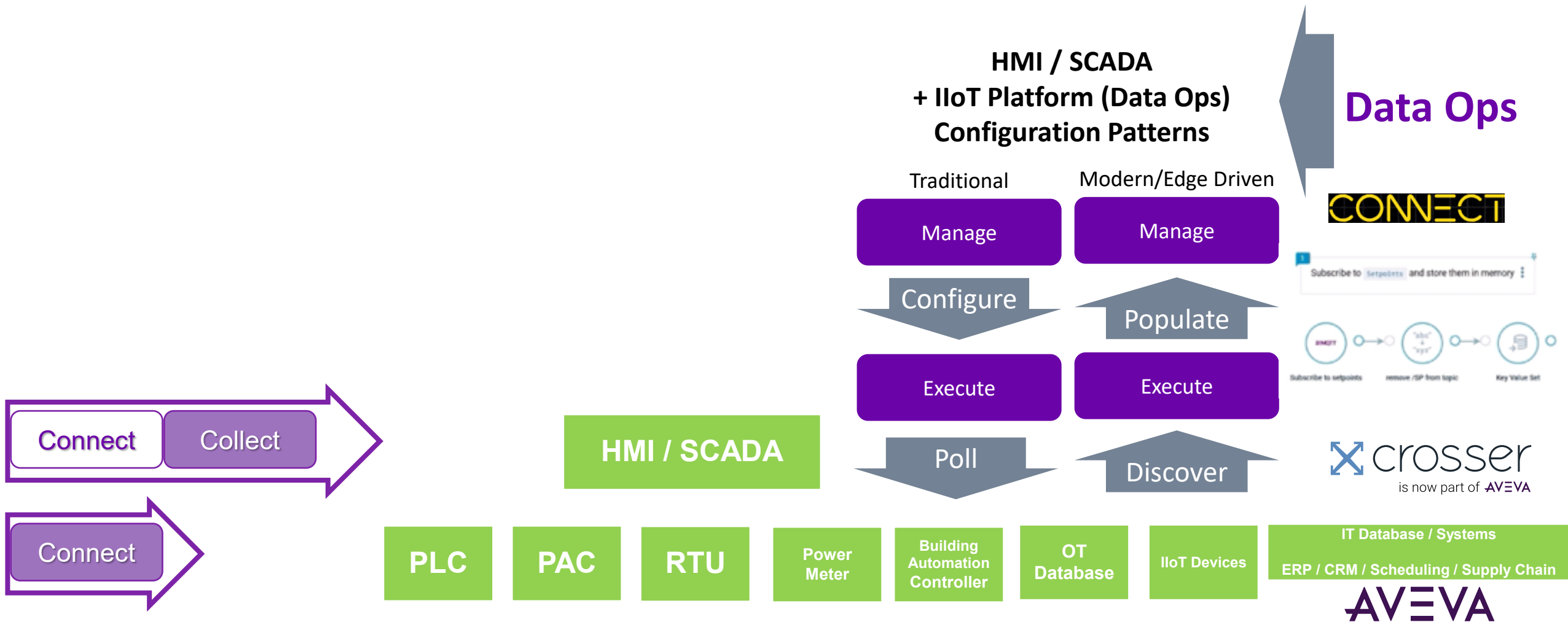


DataOps augments Unified Namespace (UNS) architectures

By automating how industrial data is collected, cleaned, contextualized, and delivered



Digital Transformation



Digital Transformation



Historian

HMI / SCADA

PLC

PAC

RTU

Power
Meter

Building
Automation
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IIoT Devices

IT Database / Systems
ERP / CRM / Scheduling / Supply Chain

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Digital Transformation

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Efficient data storage and retrieval engines

Historian is designed for high-speed acquisition of data, acquiring and storing process data many times faster than a traditional relational database.

Process values
Summary values
Engineering units
Alarms
Events
Acknowledgements
Annotations

Storing data in *history blocks* uses a fraction of the space that would be required by a normal database.



History block
file system

5,000 tags every second generates 157 billion distinct values per year. Stored efficiently in 8 bytes per value, storage requirements would be around 1 terabyte per year.

Cyclic
Delta
Full
Interpolated
BestFit
Average
Minimum
Maximum
Integral
Slope
ValueState
Counter
RoundTrip

For efficiency, slow-changing data is stored separately than fast-changing data and retrieval modes allow you to access the data stored in different ways.

Connect

Collect

Store

Historian

Connect

Collect

HMI / SCADA

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IIoT Devices

IT Database / Systems

ERP / CRM / Scheduling / Supply Chain

Traditional "VTQ"

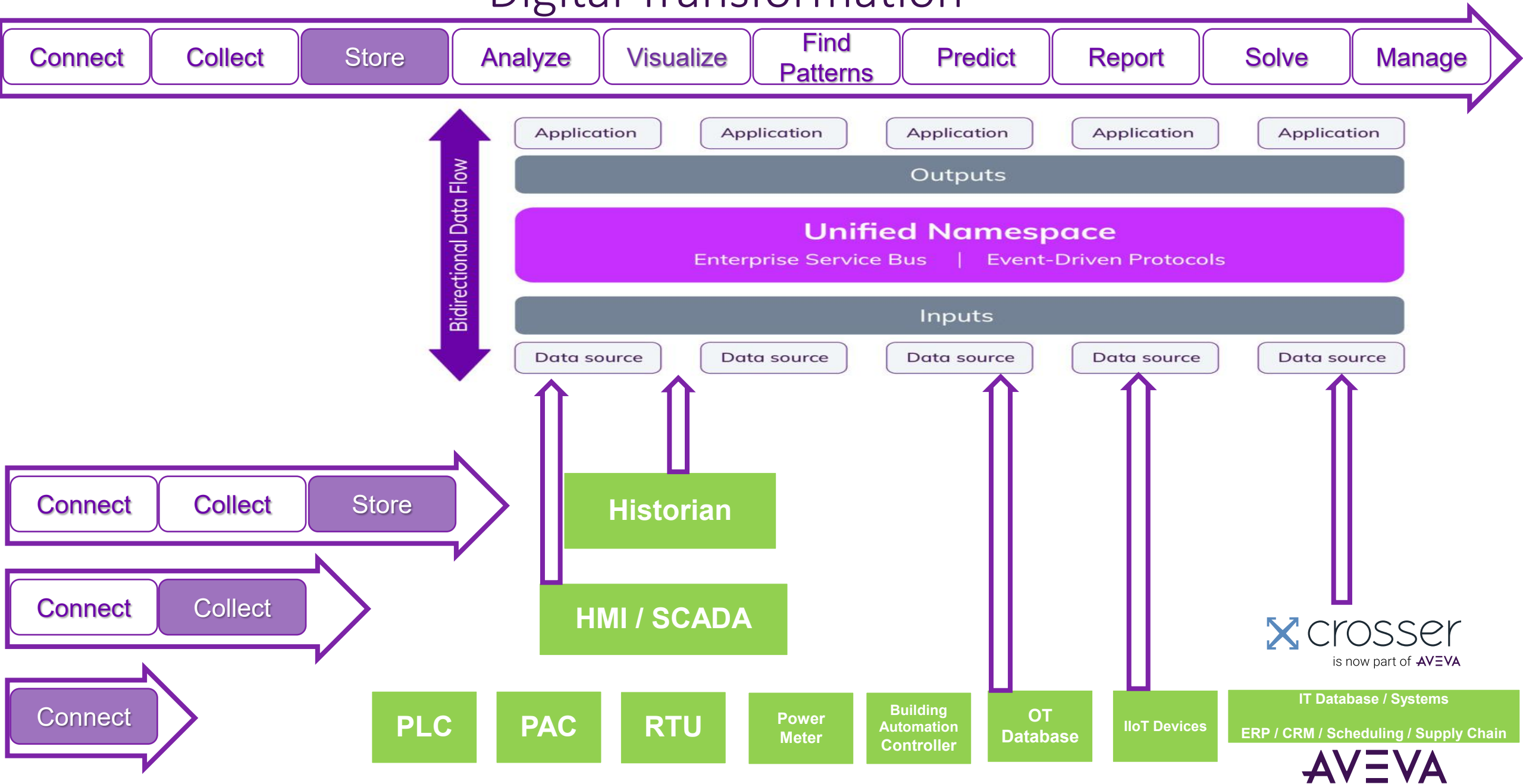
Tag	Time	Value	Quality
TI101.PV	2017-02-28 06:23:57	124.3	192

Structured ("Events")

Tag	Time	Type	Operator	Workstation	Comment	Batch	...
TI101.PV	2017-02-28 06:23:57	Ack	JohnDoe	INTCH23	Cleared jam	APL423-54	

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Digital Transformation



Publish HMI / SCADA into a *Unified Namespace* (UNS)

MQTT Publisher



MQTT Broker

Unified Namespace
Enterprise Service Bus | Event-Driven Protocols

MQTT Explorer

Search...

DISCONNECT

▼ virtualfactory.proveit.services

- ▶ Enterprise B (3544 topics, 14459809 messages)
- ▶ Enterprise C (453 topics, 1576090 messages)
- ▼ Enterprise A
 - ▶ opto22 (810 topics, 10430110 messages)
 - ▶ maintainx (18 topics, 399 messages)
 - ▶ jpi (2 topics, 24123 messages)
 - ▶ Dallas (120 topics, 838680 messages)
 - ▶ phoenixcontact (1 topic, 47 messages)
 - ▶ abelara (705 topics, 4036147 messages)
 - ▶ spBv1.0 (56 topics, 510147 messages)
 - ▶ phoenixcontact (1 topic, 1 message)

Topic

Enterprise A

Value

History

Publish

Topic

Enterprise A/aveva/Dallas/Site/Line 1/HotEnd

raw xml json

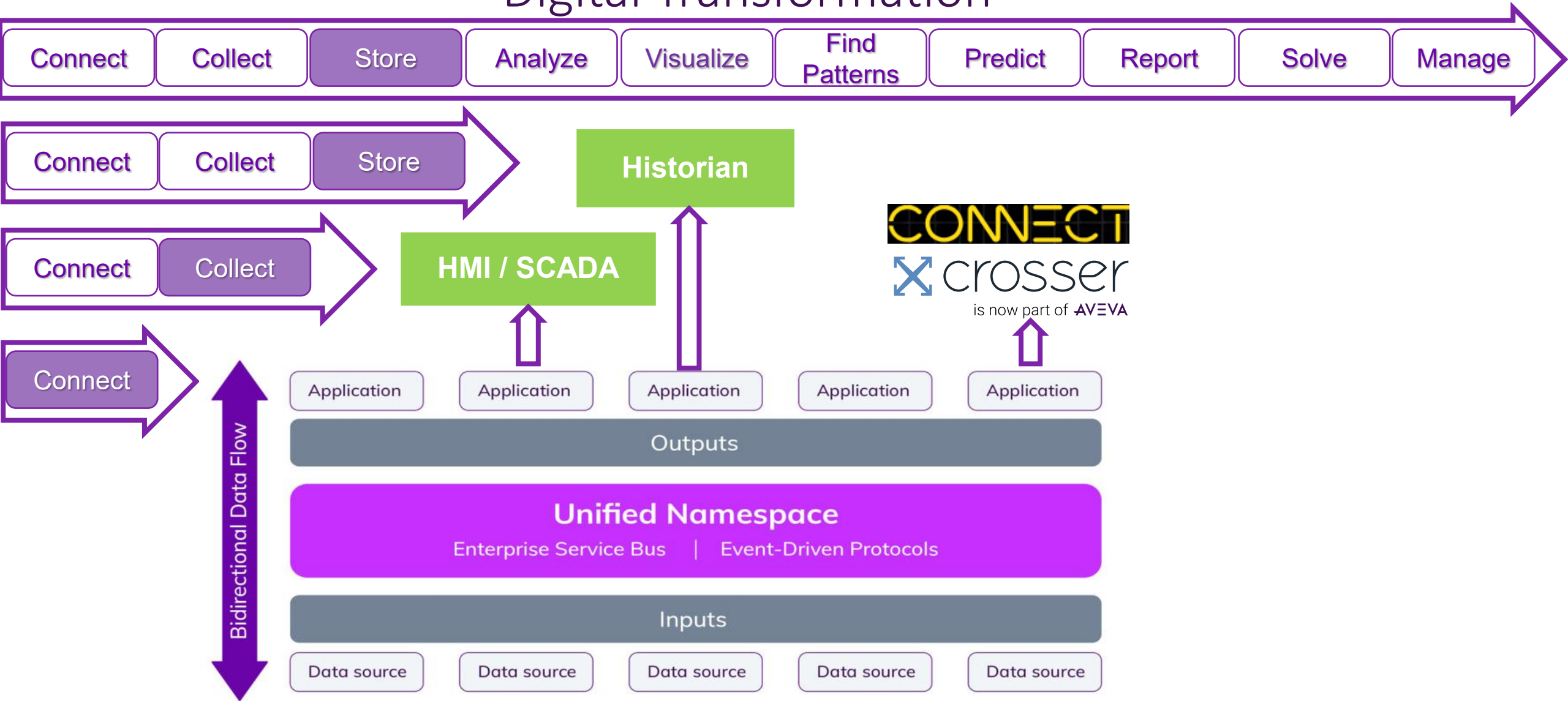
PUBLISH

QoS 0 retain

7:30 PM 1/30/2026

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Digital Transformation



HMI / SCADA Consumes Production data FROM the UNS

MQTT Client ←

MQTT Broker

Unified Namespace
Enterprise Service Bus | Event-Driven Protocols

The screenshot displays the MQTT Explorer application interface. The top bar includes a search bar and a 'DISCONNECT' button. The left sidebar shows a tree view of topics under the 'virtualfactory.proveit.services' namespace. The main panel on the right shows details for the 'Dallas' topic, including a 'Value' field, a 'History' section, and a 'Publish' section with a 'PUBLISH' button. The bottom status bar shows 'QoS 0' and 'retain' options.

virtualfactory.proveit.services

- Enterprise B (3512 topics, 826886 messages)
- Enterprise C (447 topics, 70487 messages)
- Enterprise A
 - opto22 (676 topics, 710388 messages)
 - maintainx (18 topics, 33 messages)
 - jpi (2 topics, 1367 messages)
 - aveva (36 topics, 88888 messages)
 - Dallas (120 topics, 47400 messages)**
 - abelara (578 topics, 220792 messages)
 - spBv1.0 (36 topics, 27010 messages)

Topic: 120

Enterprise A / Dallas

Value

History

Publish

Topic: Enterprise A/aveva/Dallas/Site/Line 1/HotEnd

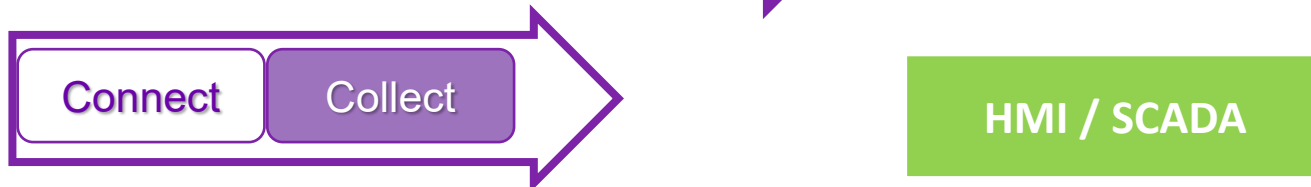
raw xml json

PUBLISH

QoS 0 retain

9:40 PM 1/30/2026

Digital Transformation



PLC

PAC

RTU

Power
Meter

Building
Automation
Controller

OT
Database

IIoT Devices

IT Database / Systems
ERP / CRM / Scheduling / Supply Chain

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Digital Transformation

Connect

Collect

Store

Analyze

Visualize

Find
Patterns

Predict

Report

Solve

Manage

Connect

Collect

Collect

Analyze

Historian Clients
Trends & Reports

Connect

Collect

Store

Historian

Connect

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HMI / SCADA

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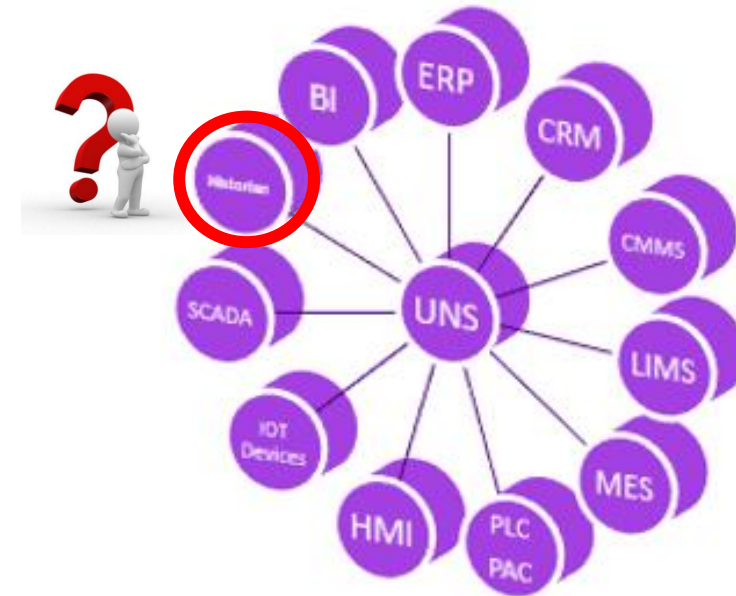
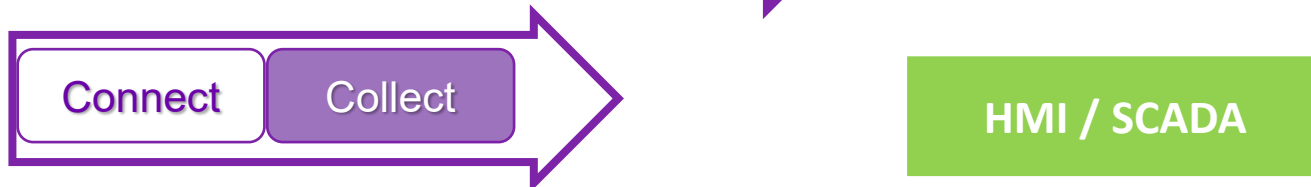
IT Database / Systems

ERP / CRM / Scheduling / Supply Chain

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Digital Transformation



Unified Namespace

Digital Transformation

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Manage

Historian Data REST API

Connect

Collect

Collect

Analyze

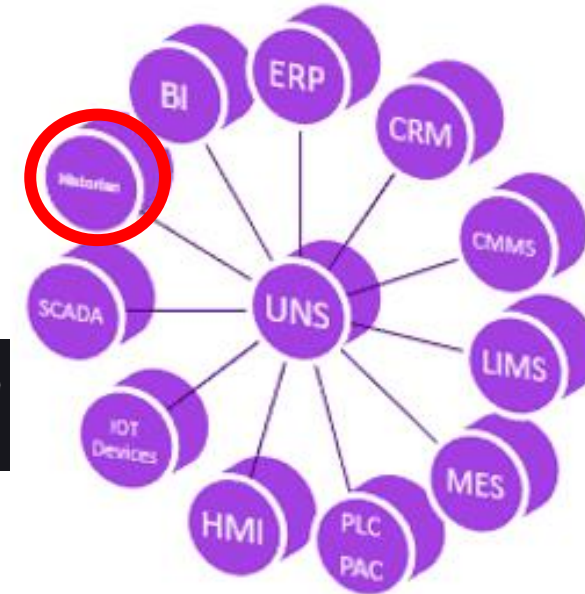
Connect

Collect

Store



Historian

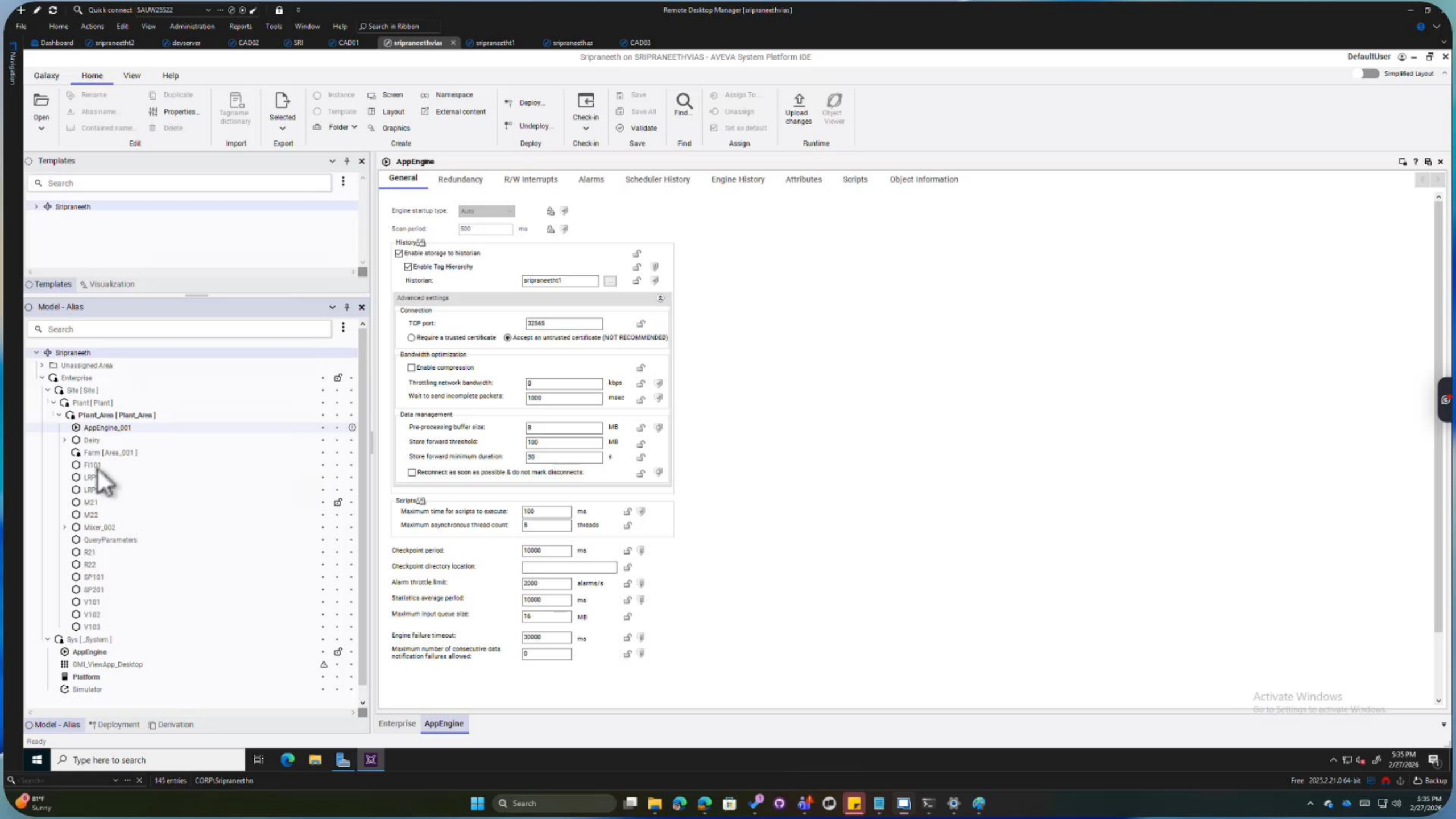


Industrial Information Interoperability eXchange (i3X)

Unified Namespace

The Industrial Information Interoperability Exchange (i3X™) is an open, common API initiative proposed to address a growing interoperability challenge in modern manufacturing architectures: **manufacturing data silo proliferation and API chaos**. As manufacturers adopt heterogeneous software stacks from multiple vendors, the industry risks repeating past fragmentation seen with protocols, platforms, and namespaces – this time at the API layer.

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Connect

Collect

Collect

Analyze

Visualize

HMI / SCADA Screens

Realtime Value's, Trends, Alarms, KPI's

Connect

Collect

Collect

Analyze

**Historian Clients
Trends & Reports**

Connect

Collect

Store

Historian

Connect

Collect

HMI / SCADA

Connect

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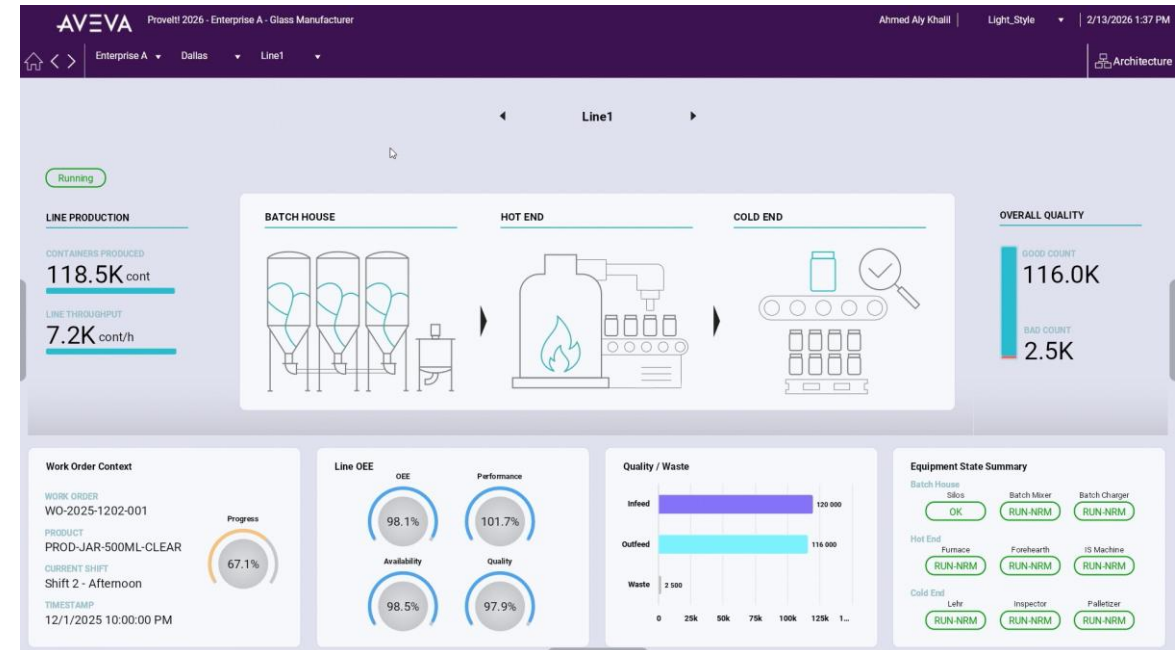
OT
Database

IIoT Devices

IT Database / Systems

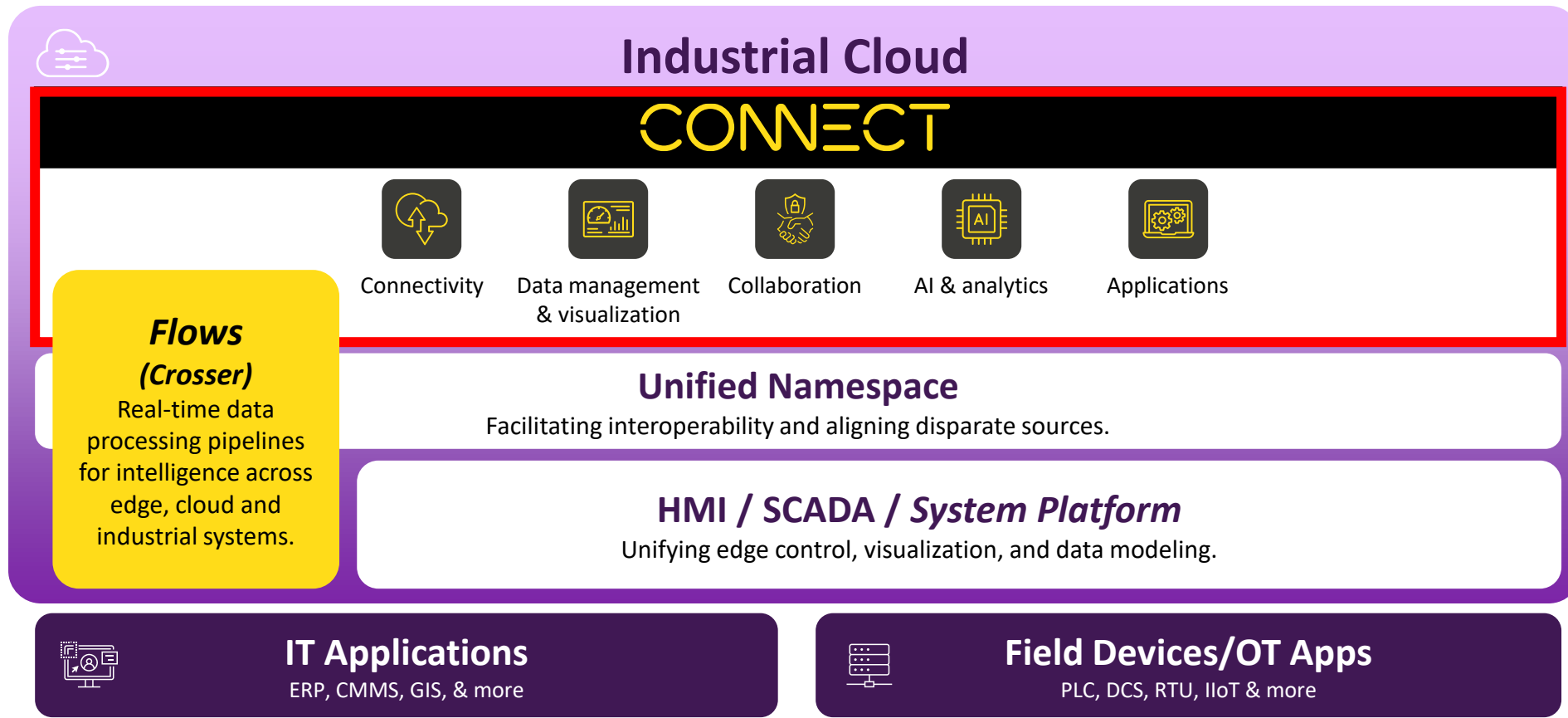
ERP / CRM / Scheduling / Supply Chain

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Core Aspects of a Unified Namespace (UNS) architecture

Publish HMI / SCADA screens to your Industrial Cloud (Historical Data Access Views)



-  Home
-  Browse >
-  Create >
-  Configure >
-  Recently Viewed

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Use our powerful search to quickly view asset information, KPIs, and sophisticated analysis.



Search for assets, streams, or saved visualizations

ASSETS

4,678



STREAMS

3,751



VISUALIZATIONS

2



✓ Experiences

Visualizations



Enterprise B - Cappy Ho...

Published 02/05/2026

Modified: 02/05/2026 12:05:34 PM

pierre.hery@aveva.com

Run ▶



CPG_Glass_Container

Published 02/13/2026

Modified: 02/13/2026 4:12:33 AM

ruben.rueda@aveva.com

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Thank you!

Download the Whitepaper!





WHITE PAPER

Practical steps integrating HMI & SCADA into a Unified Namespace (UNS)

Authored by:
Nathan Slider
Product Manager, AVEVA

Executive summary:
Businesses require access to operational data sets that partially overlap yet differ—whether due to use cases or functional department requirements. Each department needs data structures tailored to its unique requirements, ensuring accurate analysis, efficiency, and seamless integration with existing systems.
HMI and SCADA systems can play a crucial role in addressing these challenges by enabling data collection, contextualization, and secure integration within a unified namespace (UNS). By adhering to open standards such as ISA-95 / IEC 62264, organizations can effectively bridge operational technology (OT) and information technology (IT) systems, improving efficiency, visibility, and scalability.
UNS is a relatively new terminology that has come to the forefront of architecture design, so it is hardly a surprise that even people working in the industrial automation field can be unfamiliar with this term and the technology stack that typically comprises its architecture. UNS helps companies digitally transform the way they manufacture, improve, and distribute their products, elevating their digital maturity for smart manufacturing. This paper outlines practical steps for leveraging HMI and SCADA within a UNS framework.

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