AVEVAWORLD

Todd Brown

VP, Industrial Platform Portfolio

AVEVA

With 25-years' experience in operations industrial data, Todd leads the CONNECT industrial platform portfolio team at AVEVA.

Nagesh Nama

CEO

xLM

Mr. Nama is a distinguished entrepreneur with over three decades of experience in the technology and life sciences sectors. He currently serves as the chief executive officer of xLM in Jacksonville, Florida, a role he has held since 2015.
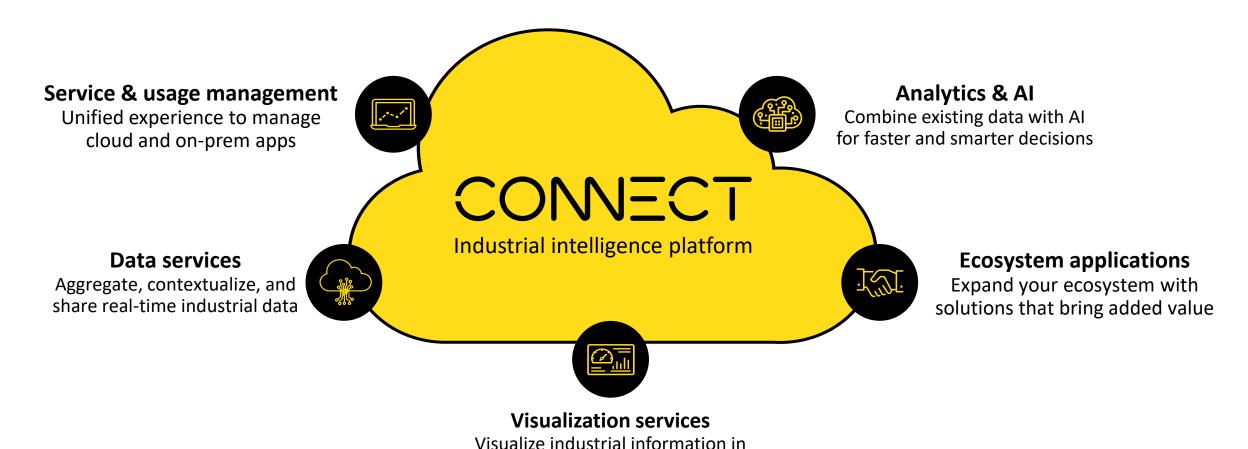
CONNECT

Agenda

- CONNECT platform overview

- CONNECT roadmap themes
  - Hybrid
  - Enterprise Insights
  - Ecosystem
  - Industrial Digital Twin

- Pharma / Life Sciences GxP Roadmap

- xLM continuous validation & demo

- Q&A

CONNECT

Open and neutral, providing rich insights for your unified industrial ecosystem

Service & usage management
Unified experience to manage cloud and on-prem apps

Analytics & AI
Combine existing data with AI for faster and smarter decisions

CONNECT
Industrial intelligence platform

Data services
Aggregate, contextualize, and share real-time industrial data

Ecosystem applications
Expand your ecosystem with solutions that bring added value

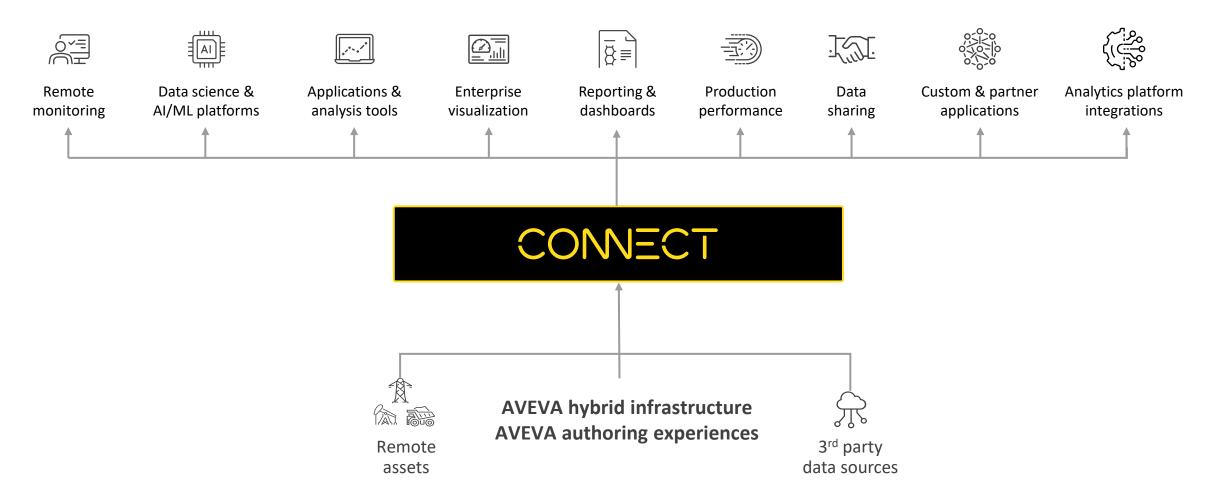**Visualization services**
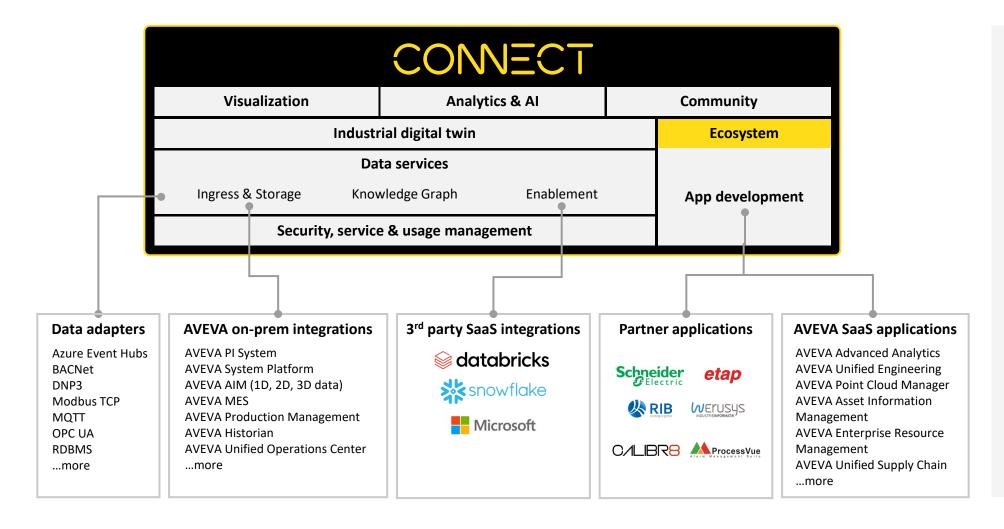Visualize industrial information in a way that is easy to understand

CONNECT

Industrial intelligence platform

Providing hybrid solutions to accelerate new value creation for AVEVA customers

| Remote monitoring | Data science & AI/ML platforms | Applications & analysis tools | Enterprise visualization | Reporting & dashboards | Production performance | Data sharing | Custom & partner applications | Analytics platform integrations |

CONNECT

AVEVA hybrid infrastructure
AVEVA authoring experiences

Remote assets

3rd party data sources

CONNECT

Extending customer value with hybrid and ecosystem capabilities

CONNECT

Visualization	Analytics & AI	Community

Industrial digital twin	Ecosystem

Data services

Ingress & Storage	Knowledge Graph	Enablement	App development

Security, service & usage management

Data adapters
Azure Event Hubs
BACNet
DNP3
Modbus TCP
MQTT
OPC UA
RDBMS
…more

AVEVA on-prem integrations
AVEVA PI System
AVEVA System Platform
AVEVA AIM (1D, 2D, 3D data)
AVEVA MES
AVEVA Production Management
AVEVA Historian
AVEVA Unified Operations Center
…more

3rd party SaaS integrations
databricks
snowflake
Microsoft

Partner applications
Schneider Electric
etap
RIB
Werusys
CALIBR8
ProcessVue

AVEVA SaaS applications
AVEVA Advanced Analytics
AVEVA Unified Engineering
AVEVA Point Cloud Manager
AVEVA Asset Information Management
AVEVA Enterprise Resource Management
AVEVA Unified Supply Chain
…more

The industrial intelligence platform with everything you need:

- Aggregate data from many sources across the enterprise

- Access and add new capabilities

- Share data with other cloud-based partners

- Manage and extend on-premises systems in a hybrid configuration

- Leverage the industrial ecosystem

CONNECT

CONNECT roadmap themes

Hybrid: Extend the value for AVEVA's existing customers
Secure, rapid connectivity – powerful new use cases
System of record for industrial data, apps, & data science capabilities

Enterprise insights: From enterprise data to industrial insights
Powerful analytics and AI models driving operations improvements
Visually relate data in context and expedite analysis with an AI Assistant

Ecosystem: Drive digital transformation
Leverage a network of partner applications and services
Flexibly use, monitor, and provision AVEVA capabilities

Industrial digital twin: Bridge engineering & operations context
Shared version of the truth for analytics, visualization, and AI
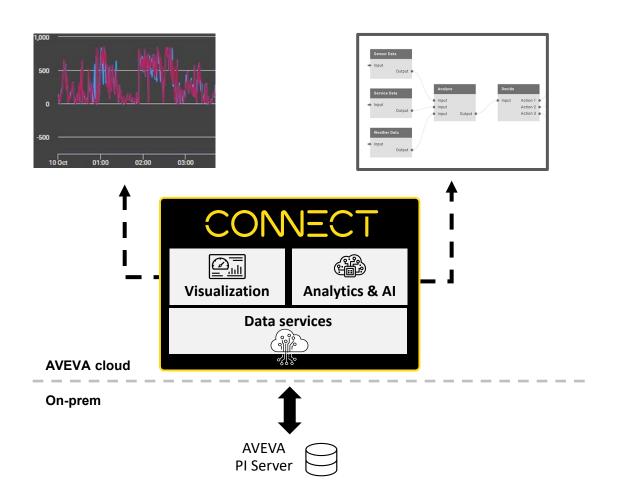Enhance visibility, consistency, and insights across operations

CONNECT ROADMAP THEME

Hybrid

Extend the value for AVEVA's existing industrial customers

CONNECT

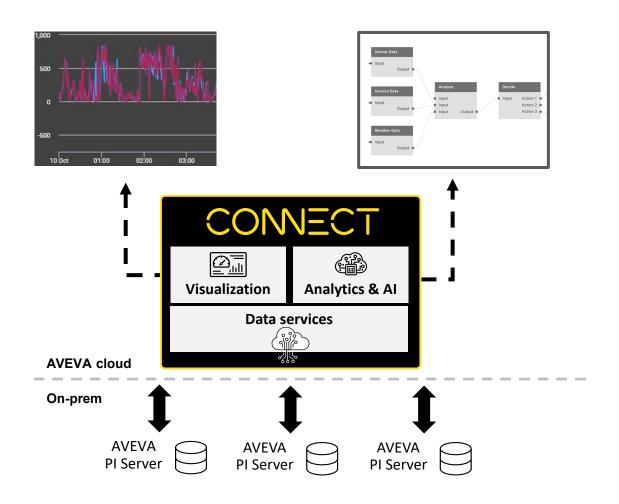# CONNECT for AVEVA PI Data Infrastructure

Bring results back on-prem from CONNECT in a safe, secure, robust manner

- Predicting quality and throughput
- Optimizing production in real time
- Optimizing for energy efficiency
- Results on-prem in operational context
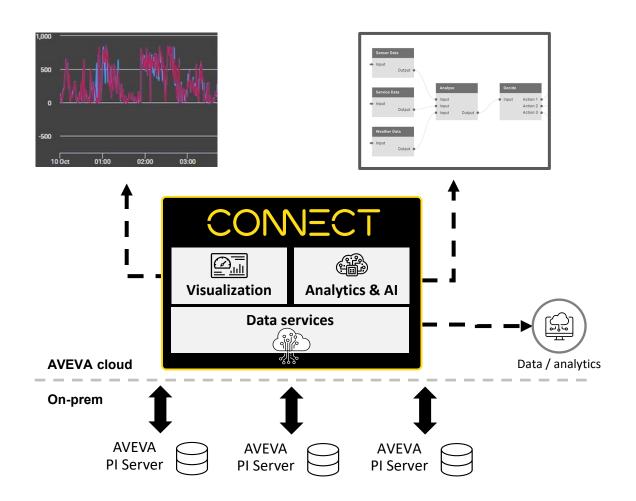
CONNECT for AVEVA PI Data Infrastructure

Easily integrate multi-site data at scale

- Predicting quality and throughput
- Optimizing production in real time
- Optimizing for energy efficiency
- Results on-prem in operational context
- Reducing TCO by replacing regional servers
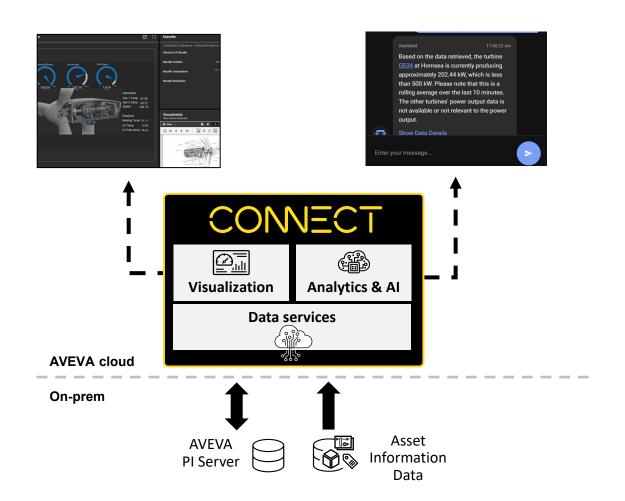
CONNECT for AVEVA PI Data Infrastructure

Curate data in context and share with 3rd party analytic and data vendors

- Predicting quality and throughput
- Optimizing production in real time
- Optimizing for energy efficiency
- Results on-prem in operational context
- Reducing TCO by replacing regional servers
- Easily curate data in context at scale

CONNECT for AVEVA PI Data Infrastructure & AVEVA Asset Information Management

Easily integrate operations and asset information

- Predicting quality and throughput
- Optimizing production in real time
- Optimizing for energy efficiency
- Results on-prem in operational context
- Reducing TCO by replacing regional servers
- Easily curate data in context at scale
- **Answering questions offering new insights across information boundaries**

AVEVA cloud

On-prem

AVEVA PI Server

Asset Information Data

CONNECT ROADMAP THEME

Enterprise Insights

Deliver enterprise industrial insights that deliver more value

CONNECT

Deliver enterprise industrial insights that deliver more value
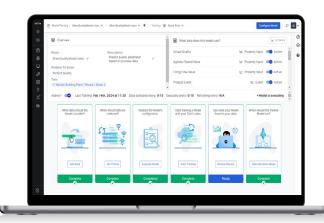
Enterprise Insights

CONNECT
visualization

AVEVA
Advanced Analytics

CONNECT
Industrial AI Assistant
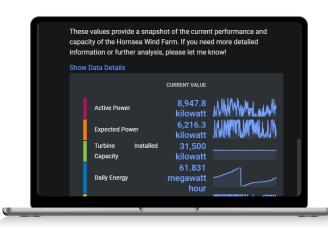
Visualization of enterprise data in context

Powerful analytics and AI models driving operations improvements

Natural language interface for your enterprise data

CONNECT

CONNECT visualization

HR data

Financial data

Event data

Asset status

Asset specifications

Production data

GIS map with weather

User-entered data

3D model
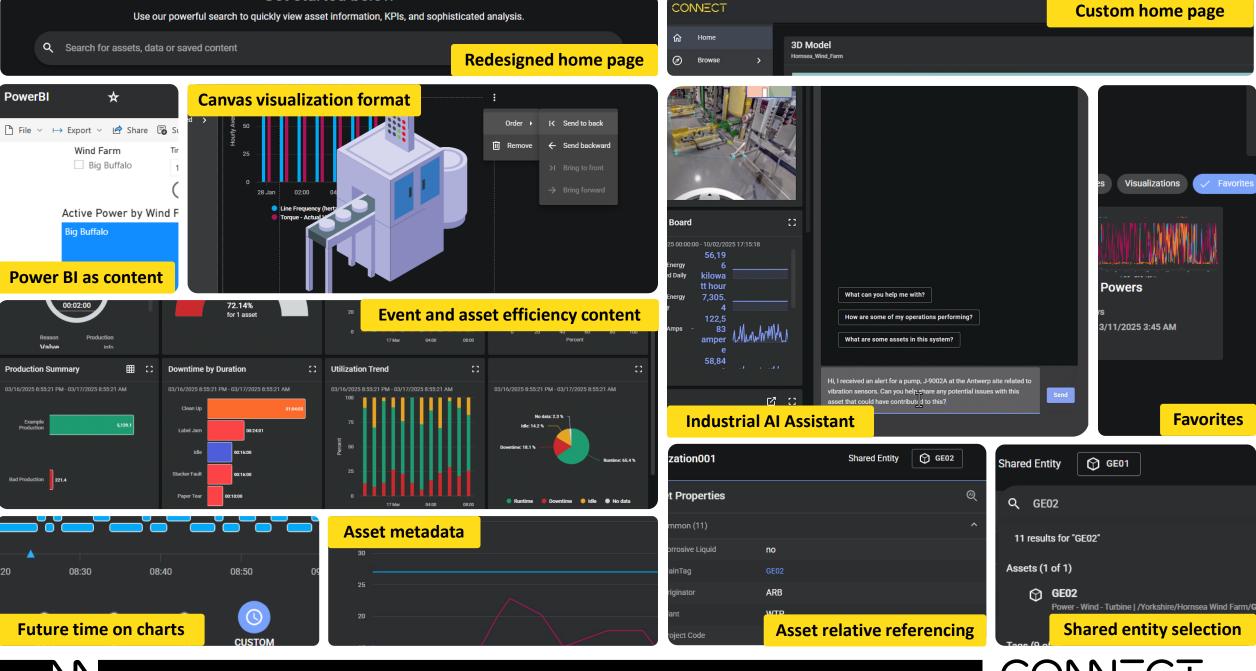
Visualize complex relationships and data-driven insights in a way that is easy to understand

- Relate disparate data sources & systems in context to each other

- Gather insights between data sources and across data types quickly and easily

- Expedite analysis using an Industrial AI Assistant to answer natural language questions

- Share actionable information with operations, reliability, business, and other teams, anywhere through a browser

Custom home page

Redesigned home page

Canvas visualization format

Power BI as content

Event and asset efficiency content

Industrial AI Assistant

Favorites

Future time on charts

Asset metadata

Asset relative referencing

Shared entity selection

Full page search

Search for assets by data type

Search UX improvements

Redesigned home page

Custom home page

User defined

Administrator defined

Canvas visualization format

PowerBI

Visualize external Power BI

Configurable time context

Live editing

Place visuals anywhere

Simplified dashboard creation

No code experience

Power BI as content

Info from Assets, Tags, Content

Data privacy

Chart generation

Community support

Document summaries

Citations

Chat history

Find & summarize

Full screen mode

No training on customer data

Chat favorites

Quick filter chips

Chat downloads

Data source selection

Equipment status

Event and asset efficiency content

Utilization timeline

Events grid

6+ Events widgets

Multi asset analysis

Guardrails

Production summary

Industrial AI Assistant

Favorites

Utilization Waterfall

Utilization summary

OEE KPIs, analysis, trends

Contextual updates

Asset metadata

URL sharing

Show analytics predictions

Asset name & path

Improved error messaging

Improved asset identification across namespaces

Future time ranges

Future time on charts

Chart updates

Metadata values

Asset relative referencing

Shared entity selection

CONNECT

Connect AI with all industrial data and visualization

**Calculations
First Principal Models
Alerts &
Recommendations**

**Machine Learning
Models**
Asset Anomaly
Process Anomaly
Predict Property

Solutions
Predictive Quality
Predictive Throughput
Predictive Energy
Perfect Batch

Digital Thread Engine

Digital Twin Model

Model Factory

AVEVA Advanced Analytics

CONNECT

**Service & usage
management:**
monitor budget,
consumption, and permissions

Data services:
aggregate, contextualize
and share

Visualization:
rich persona-based
experiences

Analytics & AI:
robust calculations using
AI and ML

Ecosystem applications:
solutions to enhance
customer use cases

Remote
assets

AVEVA apps and
data sources

3rd party
data sources

CONNECT

AI-driven optimization for industrial excellence

Process Optimization

Perfect Energy
Operate at the sweet spot of production and energy consumption

Perfect Production
Automate investigations and understand performance drivers with ML

Perfect Quality
Reduce variability, eliminate losses, and improve operational flexibility

Perfect Batch
Continuously evaluate batch performance and automate actions

Perfect Centerline
Identify optimal operating conditions for the best performance, yield, or quality

AVEVA Advanced Analytics

Asset Optimization

Uptime Optimization
Real-time alerts and recommendations to avoid downtime events

Throughput Optimization
Maximize production output on a per-product and per-asset basis

Asset Reliability
Predict and prevent common failure modes at scale

Asset Life
Maximize serviceable life and proactively manage failure risks at scale

Asset Anomaly Detection
Detect asset anomalies in real-time, prioritize by impact, enable early intervention
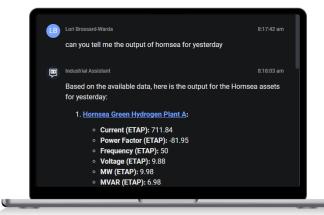
CONNECT
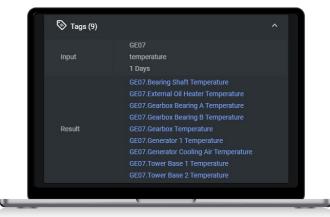
Industrial AI Assistant
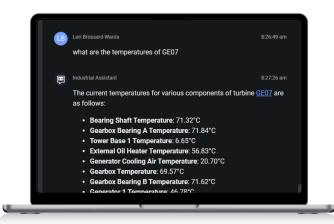
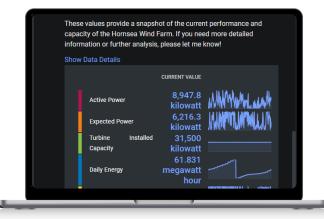**Natural language interface to your data in CONNECT**

Natural language interface

Content search & summarization

Citations show work (transparency & traceability)
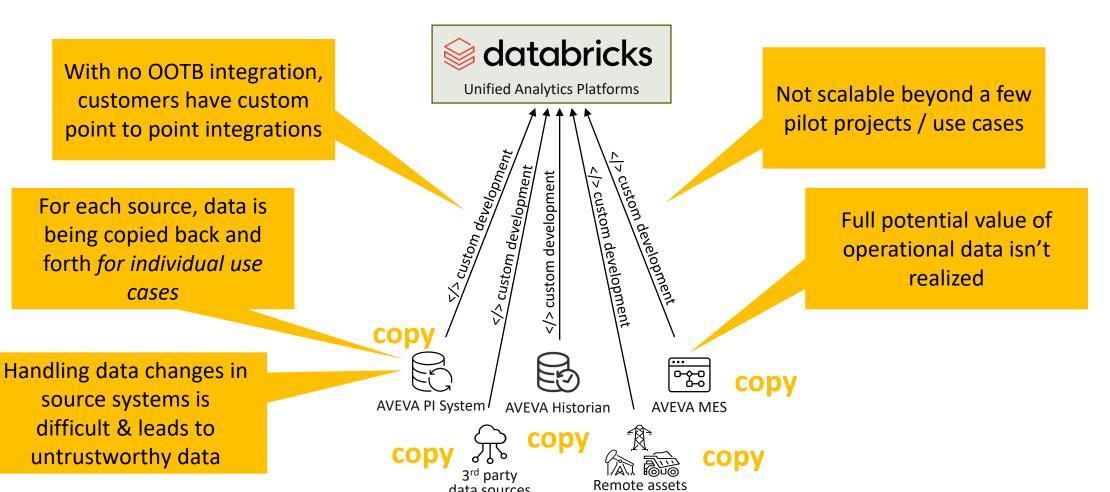
Generate dashboards & charts inline

CONNECT ROADMAP THEME

Industrial Ecosystem

Drive industrial transformation through a network of partner applications and services

CONNECT
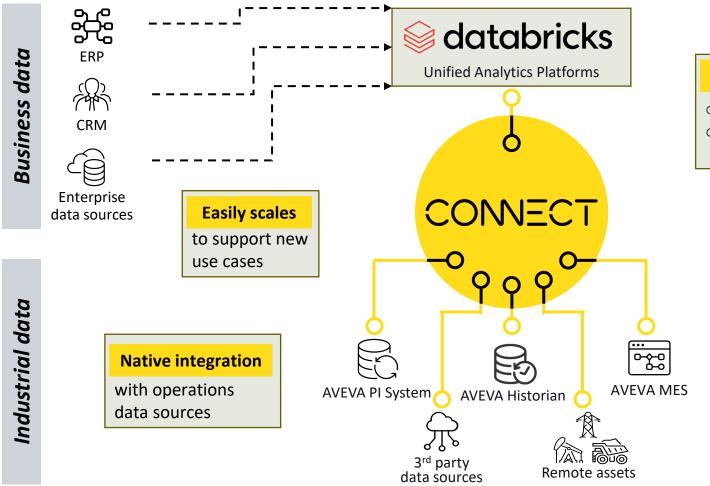
Past: Custom fragmented solutions that aren't scalable

databricks
Unified Analytics Platforms

With no OOTB integration, customers have custom point to point integrations

For each source, data is being copied back and forth *for individual use cases*

Handling data changes in source systems is difficult & leads to untrustworthy data

Not scalable beyond a few pilot projects / use cases

Full potential value of operational data isn't realized

</> custom development

copy

copy

copy

copy

copy

AVEVA PI System   AVEVA Historian   AVEVA MES

3rd party data sources

Remote assets

CONNECT

Today: Live industrial data for data science

Authoritative, high quality, contextualized live sharing of data between OT and IT environments

Business data

ERP

CRM

Enterprise data sources

databricks

Unified Analytics Platforms

CONNECT

Out-of-the-box integration
- No custom development
- No maintenance by end customer

Easily scales to support new use cases

Industrial data

Native integration with operations data sources

AVEVA PI System

AVEVA Historian

AVEVA MES

3rd party data sources

Remote assets
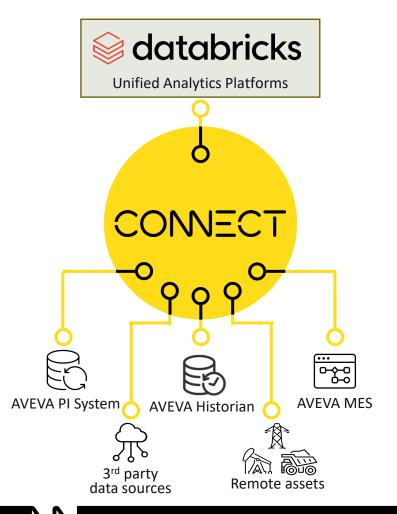
Aggregated industrial data
- Maintain and augment contextualization of data across sites and sources
- Ensure accurate capture of updates and changes to the system of record
- Results and insights return to OT environments
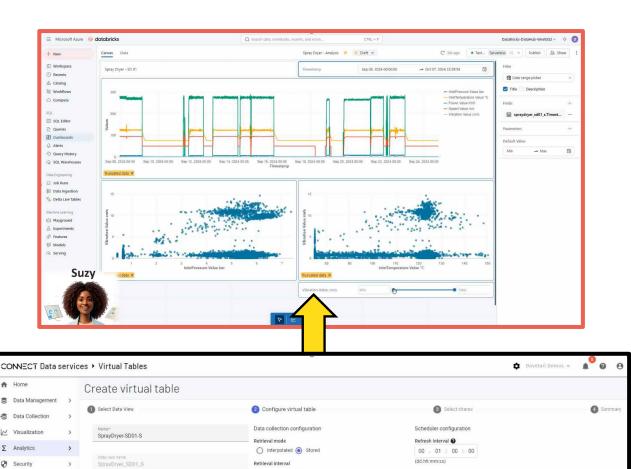
CONNECT

Today: Live industrial data for data science

Authoritative, high quality, contextualized live sharing of data between OT and IT environments

CONNECT ROADMAP THEME

Industrial Digital Twin

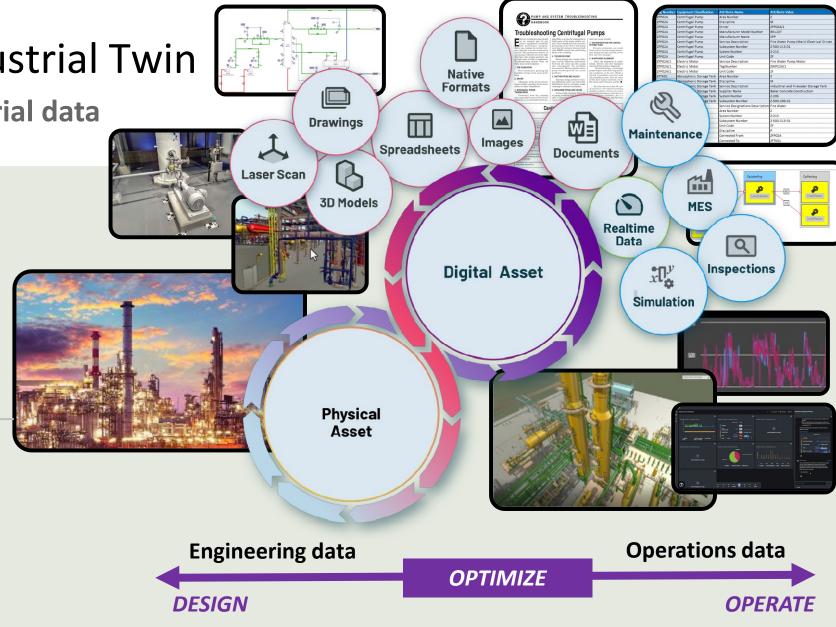**Harmonize siloed engineering and operations data together for a shared version of industrial truth**

CONNECT

AVEVA's Digital Industrial Twin

A map for ALL YOUR industrial data

AVEVA'S Industrial Twin is a digital representation, which **harmonizes data** from a variety of systems/sources, **in context** to form a **digital representation** of a system, plant or piece of equipment and includes the **visualization** of the information.

Digital twins can help many kinds of organizations **rapidly access information** and simulate real situations and their outcomes, ultimately allowing them to **make better decisions**.

CONNECT
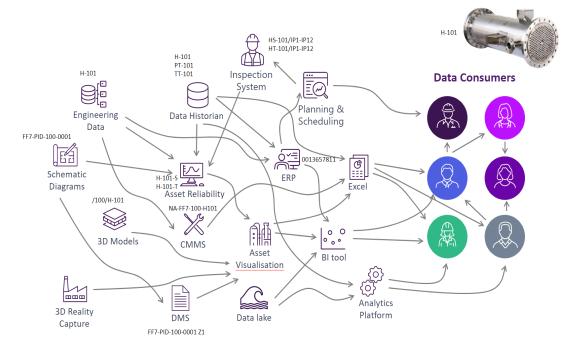
Digital twins are a *hard problem*

The data challenge: industrial data trapped in silos

- Increasing data over time + documents from 1997
- Different representations across different silos
- Data conflicts

- Lack of trust in the data
- Scale up: 16M assets & 40B relationships
- Scale down: 100 assets
- No info. standards in place

- Varying rates of change
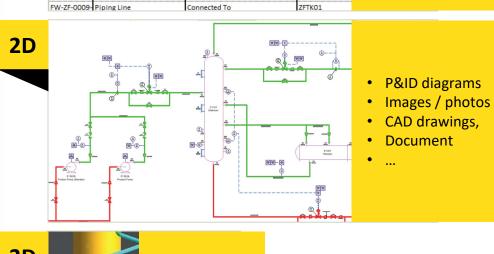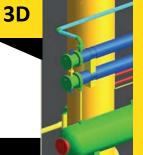- Resource intensive projects with specialized expertise required

Many data silos with different representations of the same equipment

1D

Tag Number	Equipment Classification	Attribute Name	Attribute Value
ZFP02A	Centrifugal Pump	Area Number	Z
ZFP02A	Centrifugal Pump	Discipline	M
ZFP02A	Centrifugal Pump	Driver	ZFP02A/1
ZFP02A	Centrifugal Pump	Manufacturer Model Number	BR12DT
ZFP02A	Centrifugal Pump	Manufacturer Name	SPP
ZFP02A	Centrifugal Pump	Service Description	Fire Water Pump
ZFP02A	Centrifugal Pump	Subsystem Number	Z-500-213-01
ZFP02A	Centrifugal Pump	System Number	Z-213
ZFP02A	Centrifugal Pump	Unit Code	ZF
ZFP02A/1	Electric Motor	Service Description	Fire Water Pump
ZFP02A/1	Electric Motor	Tag Number	ZWP22A/1
ZFP02A/1	Electric Motor	Unit Code	ZF
ZFTK01	Atmospheric Storage Tank	Area Number	Z
ZFTK01	Atmospheric Storage Tank	Discipline	M
ZFTK01	Atmospheric Storage Tank	Service Description	Industrial and F
ZFTK01	Atmospheric Storage Tank	Supplier Name	Baker Concrete
ZFTK01	Atmospheric Storage Tank	System Number	Z-206
ZFTK01	Atmospheric Storage Tank	Subsystem Number	Z-500-206-01
FW-ZF-0009-	Piping Line	Service Designations Description	Fire Water
FW-ZF-0009-	Piping Line	Area Number	Z
FW-ZF-0009-	Piping Line	System Number	Z-213
FW-ZF-0009-	Piping Line	Subsystem Number	Z-500-213-01
FW-ZF-0009-	Piping Line	Unit Code	ZF
FW-ZF-0009-	Piping Line	Discipline	P
FW-ZF-0009-	Piping Line	Connected From	ZFP02A
FW-ZF-0009-	Piping Line	Connected To	ZFTK01

- Assets / equipment
- Properties
- Material definitions
- Work words
- Quality
- Documents
- …

2D

- P&ID diagrams
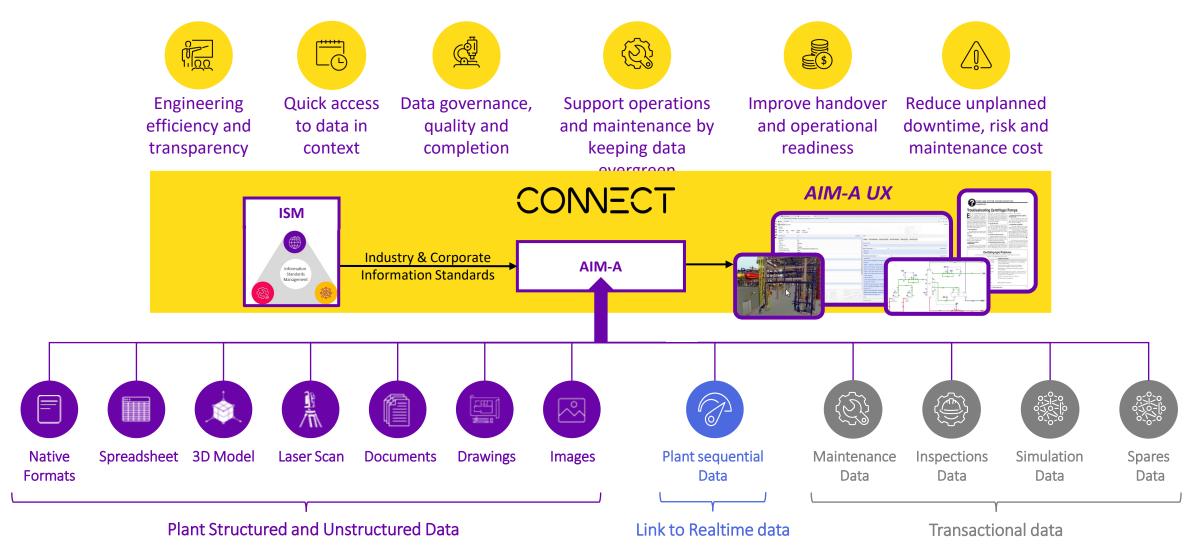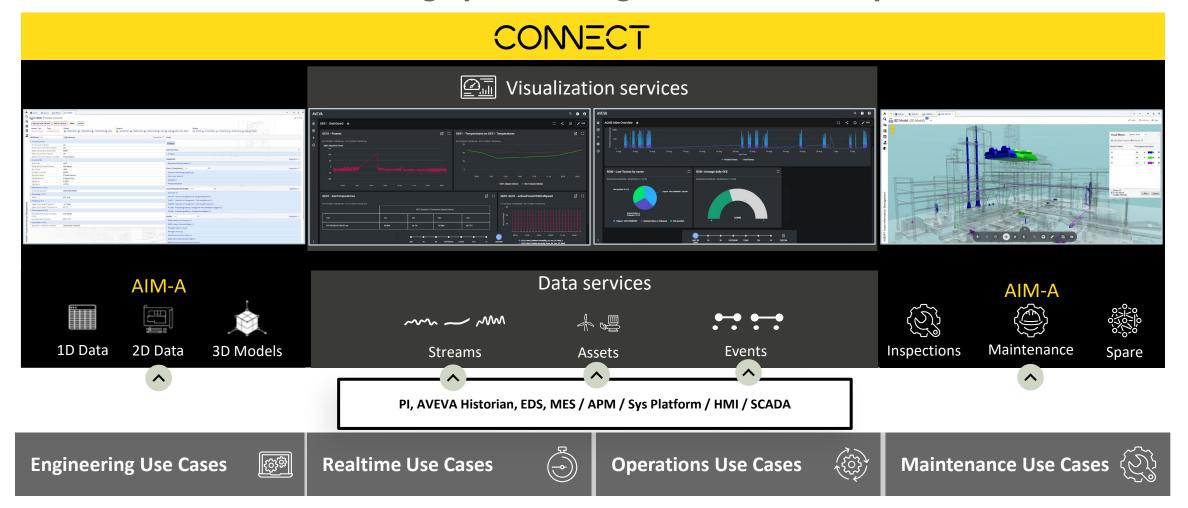- Images / photos
- CAD drawings,
- Document
- …

3D

- 3D CAD models
- Laser scans
- Point clouds
- …

CONNECT

AVEVA Asset Information Management (AIM-A)

Engineering efficiency and transparency

Quick access to data in context

Data governance, quality and completion

Support operations and maintenance by keeping data evergreen

Improve handover and operational readiness

Reduce unplanned downtime, risk and maintenance cost

CONNECT

AIM-A UX

ISM

Information Standards Management

Industry & Corporate Information Standards →

AIM-A

Native Formats

Spreadsheet

3D Model

Laser Scan

Documents

Drawings

Images

Plant sequential Data

Maintenance Data

Inspections Data

Simulation Data

Spares Data

Plant Structured and Unstructured Data

Link to Realtime data

Transactional data

CONNECT

CONNECT Industrial digital twin roadmap journey

Leverage your existing investments today

CONNECT

Visualization services

Data services

AIM-A

1D Data   2D Data   3D Models

Streams   Assets   Events

AIM-A

Inspections   Maintenance   Spare

PI, AVEVA Historian, EDS, MES / APM / Sys Platform / HMI / SCADA

| Engineering Use Cases | Realtime Use Cases | Operations Use Cases | Maintenance Use Cases |

CONNECT

CONNECT Industrial digital twin roadmap journey
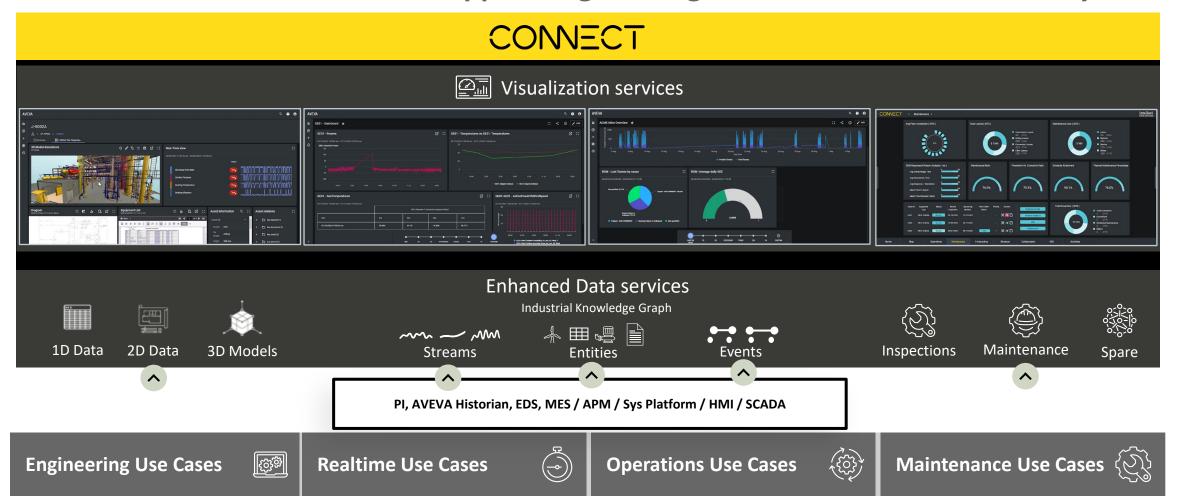
Visualization supports engineering & maintenance data in AIM-A

CONNECT

Visualization services

Data services

AIM-A
- 1D Data
- 2D Data
- 3D Models

- Streams
- Assets
- Events

AIM-A
- Inspections
- Maintenance
- Spare

PI, AVEVA Historian, EDS, MES / APM / Sys Platform / HMI / SCADA

| Engineering Use Cases | Realtime Use Cases | Operations Use Cases | Maintenance Use Cases |

CONNECT

CONNECT Industrial digital twin roadmap journey

Visualization, Analytics, & Ecosystem leverage an AI assisted digital twin
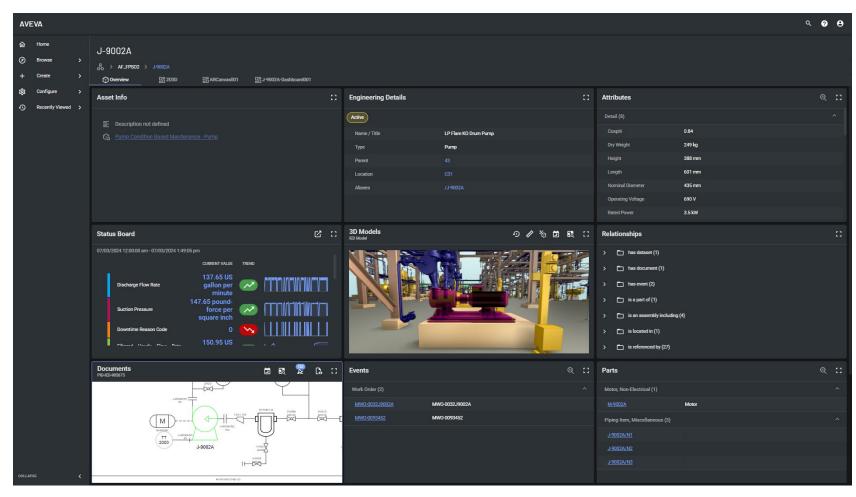
CONNECT: Engineering data visualization

Visualize engineering data from AVEVA Asset Information Management (AIM-A)
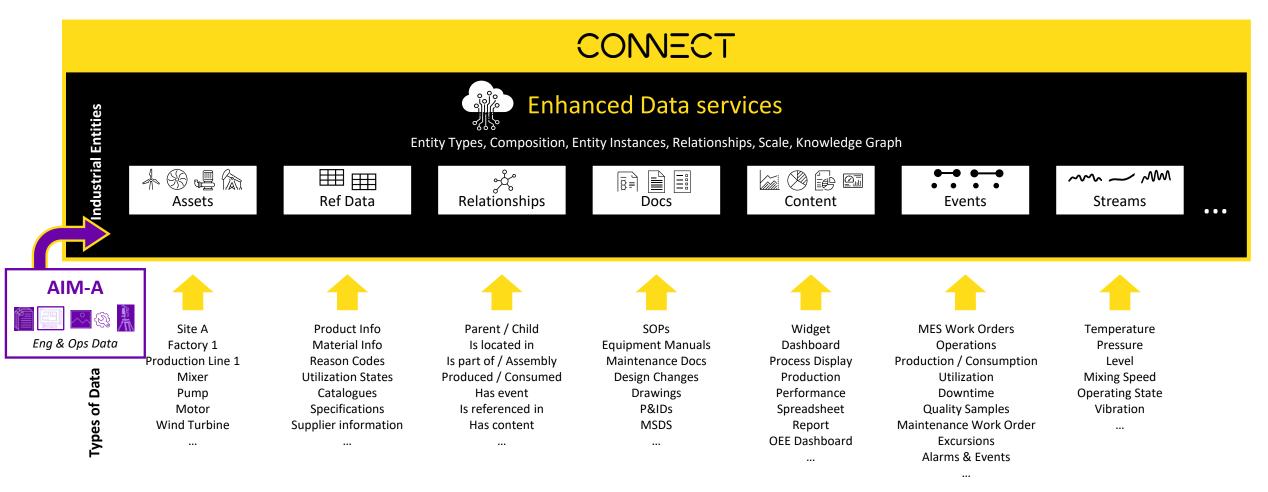
Library of configurable 1D, 2D and 3D data content types:

- 3D viewer
- Doc viewer
- Point cloud viewer
- Properties
- Relationship explorer
- Relationship viewer
- Report viewer
- Microsoft Power BI
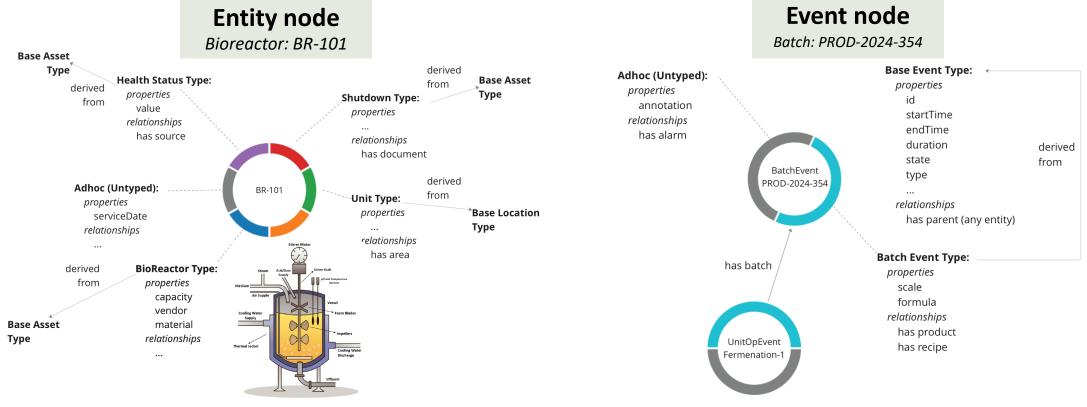
CONNECT: Storing broader types of industrial data

CONNECT

Enhanced Data services

Entity Types, Composition, Entity Instances, Relationships, Scale, Knowledge Graph

Industrial Entities

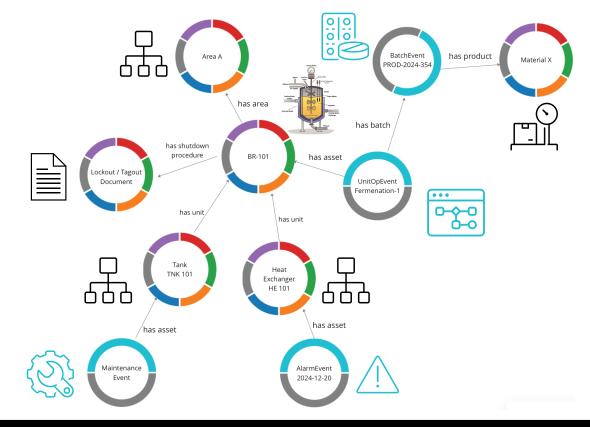| Assets | Ref Data | Relationships | Docs | Content | Events | Streams | ... |

AIM-A

Eng & Ops Data

Types of Data

Site A	Product Info	Parent / Child	SOPs	Widget	MES Work Orders	Temperature
Factory 1	Material Info	Is located in	Equipment Manuals	Dashboard	Operations	Pressure
Production Line 1	Reason Codes	Is part of / Assembly	Maintenance Docs	Process Display	Production / Consumption	Level
Mixer	Utilization States	Produced / Consumed	Design Changes	Production	Utilization	Mixing Speed
Pump	Catalogues	Has event	Drawings	Performance	Downtime	Operating State
Motor	Specifications	Is referenced in	P&IDs	Spreadsheet	Quality Samples	Vibration
Wind Turbine	Supplier information	Has content	MSDS	Report	Maintenance Work Order	...
...	...	...	...	OEE Dashboard	Excursions	
				...	Alarms & Events	
					...	

CONNECT

CONNECT: New entity & event store – composition

CONNECT

☁ **Enhanced Data services**

Entity Types, Composition, Entity Instances, Relationships, Scale, Knowledge Graph

Entity node
Bioreactor: BR-101

Event node
Batch: PROD-2024-354

Entity node — Bioreactor: BR-101

Base Asset Type

derived from

Health Status Type:
properties
  value
relationships
  has source

Adhoc (Untyped):
properties
  serviceDate
relationships
  ...

derived from

BioReactor Type:
properties
  capacity
  vendor
  material
relationships
  ...

Base Asset Type

BR-101

derived from

Shutdown Type:
properties
  ...
relationships
  has document

Base Asset Type

derived from

Unit Type:
properties
  ...
relationships
  has area

Base Location Type

Event node — Batch: PROD-2024-354

Adhoc (Untyped):
properties
  annotation
relationships
  has alarm

BatchEvent PROD-2024-354

has batch

UnitOpEvent Fermenation-1

Base Event Type:
properties
  id
  startTime
  endTime
  duration
  state
  type
  ...
relationships
  has parent (any entity)

derived from

Batch Event Type:
properties
  scale
  formula
relationships
  has product
  has recipe

CONNECT

CONNECT: Industrial knowledge graph

Enhanced Data services

Entity Types, Composition, Entity Instances, Relationships, Scale, Knowledge Graph

Industrial Knowledge Graph

Example knowledge graph questions

- What are the alarms for all assets and sub-equipment where my batch PROD-2024-354 was running on?
- What are the streams reporting data from the Heat Exchanger HE-101?
- What Piping & Instrumentation (P&ID) documents related to this Heat Exchanger?
- What Isolation does this Heat Exchanger have?
- What are the Safety instructions and any Lockout/Tagout procedures for the Heat Exchanger for Bioreactor 101?
- What batches and equipment had Material X running through it?
- Which equipment across my enterprise do I have maintenance events for Lubrication Oil Pumps and Hydraulic Pump seizures?
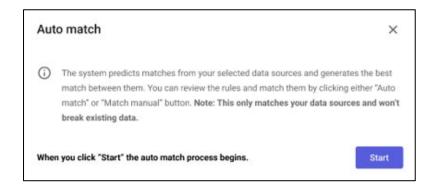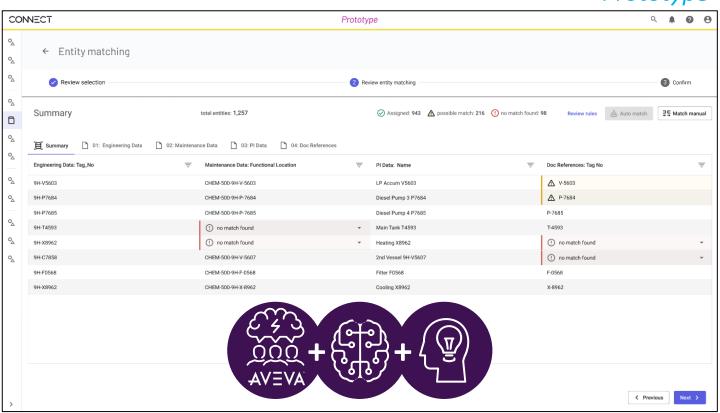
AI assisted data harmonization: Entity matching

Prototype

AI Assisted Entity Matching
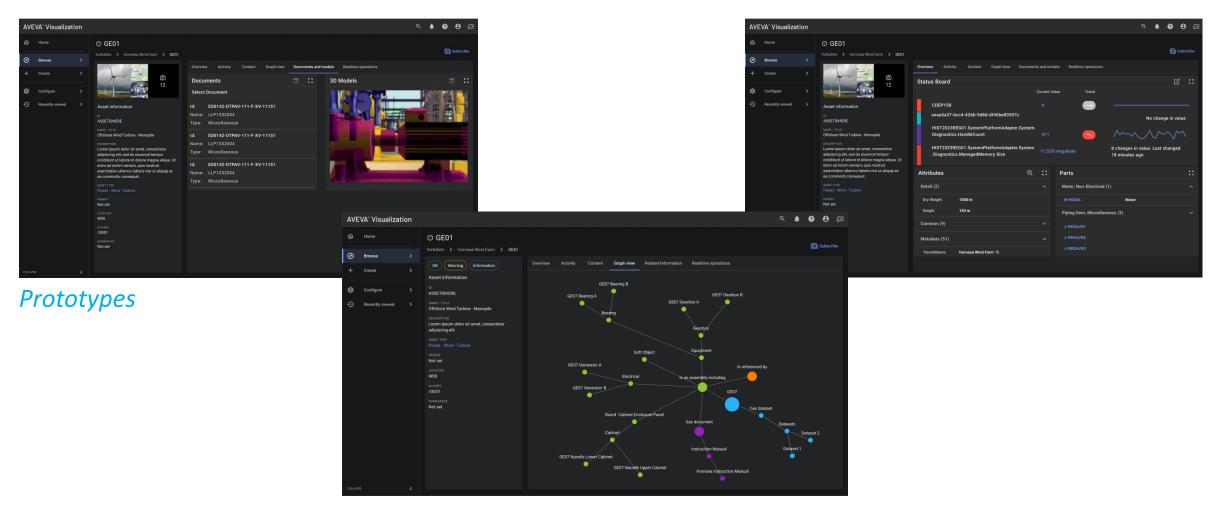
Bringing AVEVA's industrial expertise,
AI, and the end user together

CONNECT: Complete harmonized view of your assets

Prototypes

Pharma / Life Sciences GxP Roadmap

CONNECT

Known gaps for leveraging CONNECT for GxP in Life Sciences

- Make appropriate changes to internal processes to incorporate Continuous Validation and become audit ready.

Audit Readiness

- Enhance 21 CFR Part 11 / Annex 11 compliance features into the new CONNECT infrastructure.

Audit Trail

- CONNECT may be updated daily by AVEVA
- Need an industry accepted approach to support cloud native app like CONNECT.

Validation Approach for cloud SaaS

CONNECT

PI Server / CONNECT
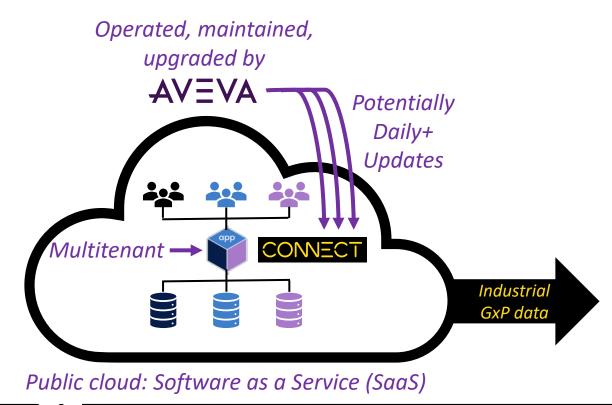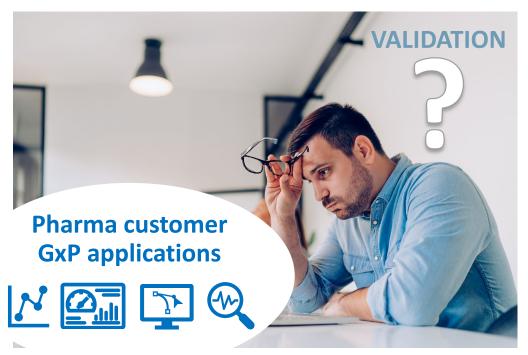
	AVEVA PI Server	CONNECT industrial platform
Tenancy model	Single Tenant	Multi-tenant
Installed at	On premises: Customer Site / Customer Cloud (IaaS)	AVEVA's public cloud on Azure
Offering	Perpetual License w/yearly SRP → AVEVA Flex Hybrid	Software as a Service (SaaS) w/AVEVA Flex
Developed by	AVEVA	AVEVA
Development approaches	Historically waterfall but more agile today, with more automated testing.	Agile, Continuous Integration / Continuous Delivery (CI/CD), Significant Automated Testing
Operated by	Customer	AVEVA
System maintained & updated by	Customer	AVEVA
Frequency of system updates / upgrades	In pharma, usually 6-24 months … or longer	Daily+ (could be multiple deployments per day)
Configuration maintained & updated by	Customer	Customer
Data owned by	Customer	Customer
Regulatory Validation Approach	Customer [+ vendor audit]	❓ Need to engage & collaborate w/industry
Regulatory Accountability	Customer	Customer

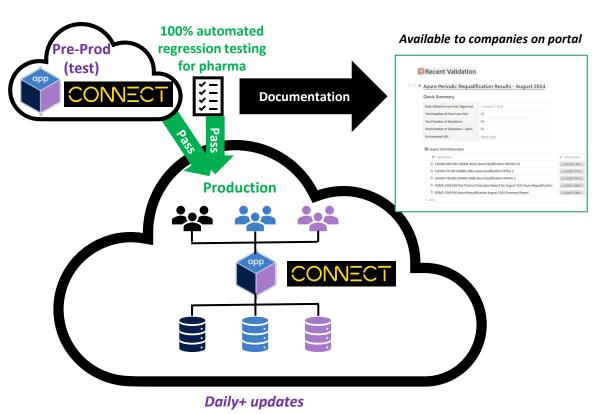# The shared industry problem we need to solve *together*

*How does a **pharma customer validate** a public vendor multitenant SaaS software offering when the SaaS software is potentially updated with new versions, bug fixes, etc. by the vendor potentially daily or multiple times per day?*

Operated, maintained, upgraded by

AVEVA

Potentially Daily+ Updates

Multitenant →

CONNECT

Industrial GxP data

Public cloud: Software as a Service (SaaS)

VALIDATION ?

Pharma customer GxP applications

CONNECT

What if: AVEVA qualified CONNECT within existing workflows

How does a **pharma customer validate** *a public vendor multitenant SaaS software offering when the SaaS software is potentially updated with new versions, bug fixes, etc. by the vendor potentially daily or multiple times per day?*

Pre-Prod (test)

CONNECT

100% automated regression testing for pharma

Pass **Pass**

Documentation

Production

CONNECT

Daily+ updates

Available to companies on portal

Recent Validation

Azure Periodic Requalification Results - August 2024

Quick Summary

Date Validation was Post-Approved	August 5, 2024
Total Number of Test Cases Run	29
Total Number of Deviations	00
Total Number of Deviations - Open	00
Environment URL	Azure Login

August 2024 Deliverables

Deliverable	Attachment
142200-URS-001 (XQMS-4041) Azure Qualification URS Rev 01	1_142200-URS-...
142200-TP-001 (XQMS-4061) Azure Qualification TP Rev 1	2_142200-TP-0...
142200-TM-001 (XQMS-4098) Azure Qualification TM Rev 1	3_142200-TM-0...
XQMS-5308 R00 Test Protocol Execution Report for August 2024 Azure Requalification	1_XQMS-5308 T...
XQMS-5309 R00 Azure Requalification August 2024 Summary Report	2_XQMS-5309 ...

What if AVEVA continuously qualified the system we are operating & maintaining in a partnership with our pharma customers?

- Partner relationship, not vendor relationship
- Integrate pharma GxP automated testing into AVEVA's existing automated testing & deployment pipelines.
- 100% regression testing in Pre-Prod testing environment before every deployment to Production. If tests fail, the changes do NOT get pushed to production, by design.
- Automated validation documentation (including executed test results) must be accessible to pharma customers for every version after the system is initially validated.
- 👍 Pharma customers get *faster innovation* AND *increased compliance* AND *increased data integrity*.

CONNECT

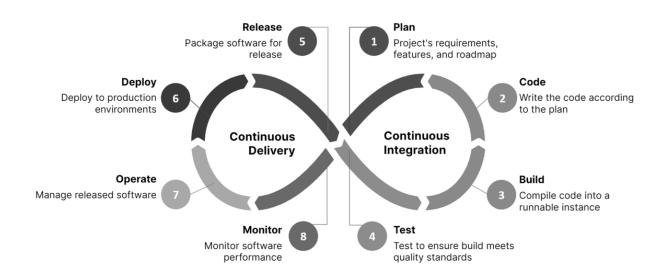# Releasing more frequently and with greater stability

The first sentence in the introduction of our internal CONNECT release procedure:

*"**Successful cloud computing companies deliver software orders of magnitude more frequently than their peers.** Companies like Capital One deploy 50 times per day and companies like Amazon, Google and Netflix deploy thousands of times per day. **And they do so while achieving greater stability.**"*

CONNECT

Why release so frequently?

🔄 **Always Up-to-Date:** New features delivered fast — no waiting for major releases.

🐞 **Fast Bug Fixes:** Issues are resolved quickly, often before you even notice them.

🔒 **Stronger Security:** Security patches deployed rapidly to protect your data.

🚀 **Smooth, Stable Experience:** Smaller, safer updates with minimal disruption; greater stability.

📈 **Built Around You:** Product evolves with your real-world usage and feedback.

🕐 **Less Downtime, Faster Adoption:** Seamless updates — no more scheduled maintenance delays, results in faster customer adoption at scale.

🛡️ **Compliance Confidence:** Ongoing alignment with security and regulatory standards.

Releasing more frequently and with greater stability (+ validation)

Continuous Integration

- Continuous integration (CI) is a development practice that requires developers to **integrate code into a shared version-controlled repository** several times a day.
- Each check-in is then **verified by an automated build**, allowing teams to **detect problems early**.

Continuous Delivery

- Continuous delivery (CD) **automates application delivery to selected environments**, including production, development, and testing environments. CD may execute additional tests.
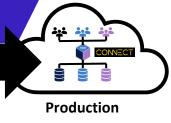
Continuous Validation

- Continuous validation (CV) adds an additional output to the pipeline - **a Validation Package that bundles up all the evidence required for GxP compliance**. Also, provides a larger validation package based on Connect QMS.

NEW PROPOSED

CI/CD/CV Pipeline

Production
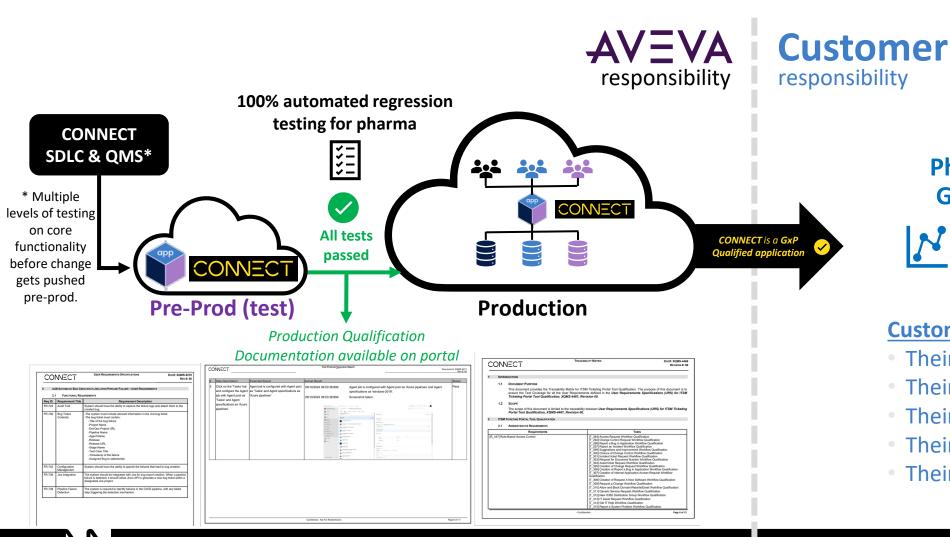
A partnership with shared responsibilities

100% automated regression testing for pharma

AVEVA responsibility | Customer responsibility

CONNECT SDLC & QMS*

* Multiple levels of testing on core functionality before change gets pushed pre-prod.

All tests passed

Pre-Prod (test)

Production

Production Qualification Documentation available on portal

CONNECT is a GxP Qualified application

Pharma customer GxP applications

Customer validates:
- Their CONNECT tenancy
- Their configuration & data
- Their data connections
- Their data integrations
- Their GxP applications

xLM demo

Nagesh Nama – CEO xLM

CONNECT

Who are we?

01 **Established** in 1996 with a focus on providing **software products, managed services and** compliance **solutions** to clients in North & South America, Europe, Asia and Australia.

02 **Expertise**
- **GxP Continuous Validation**
- **cDI – Continuous Data Integrity**
- **cAI – Continuous Intelligence**

03 **Serving** Top Fortune 500 Pharmaceutical Biotech and Medical Devices Companies.

CONNECT
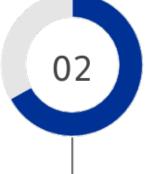
What is Continuous Intelligent Validation (cIV)?

01 — Innovative AI Integration

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02 — Elevating Testing Standards

We aim to set new standards in automated testing by using advanced AI to enhance test coverage, reduce false results, and adapt easily to changing environments.

03 — 10X Mantra

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Why cIV?

01 ÐÈÍ ̧Ğ̈ Ç̂D̂G̃Ĝ ̧H̃H̃Ģ̆ Î Ĥ Î Í È Ĥ ̧Ğ̈Ḧ Ï Ĥ Ğ̈ È Í G Ï È ̧È Î Ģ̂Ĥ Ã

02 Built from the ground up on AI to make testing more efficient, accurate, and adaptable. Setting new industry standards.

03 Our 10x promise for enhancing testing speed, minimizing manual effort, and boosting reliability.
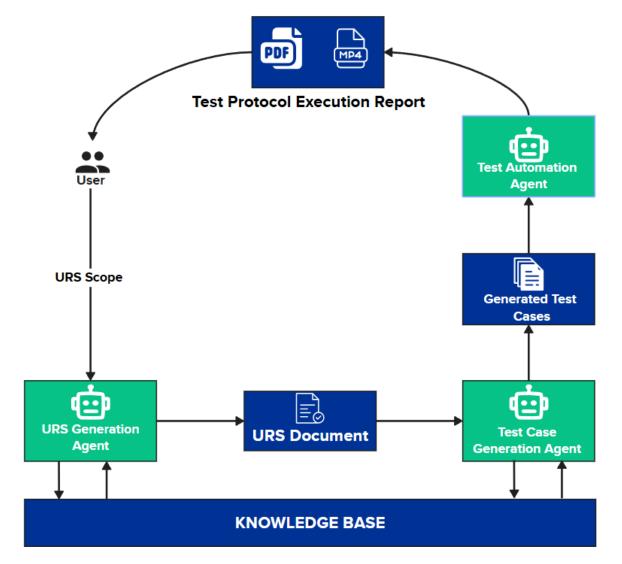
Architecture

cIV's three key components:
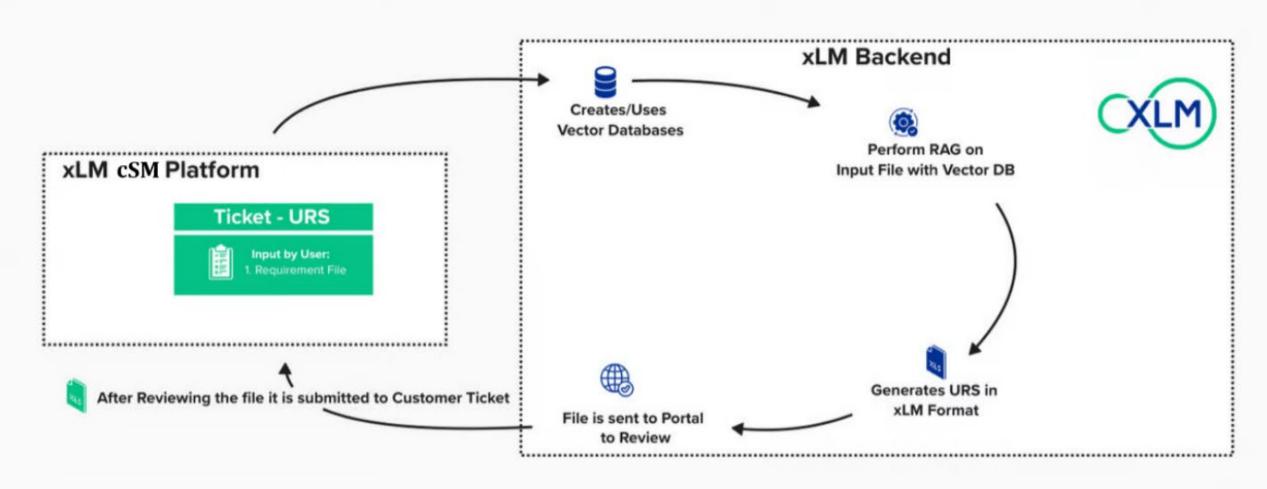
- User Requirements Specification (URS) Generation Agent
- Test Case Generation Agent
- Test Automation Agent
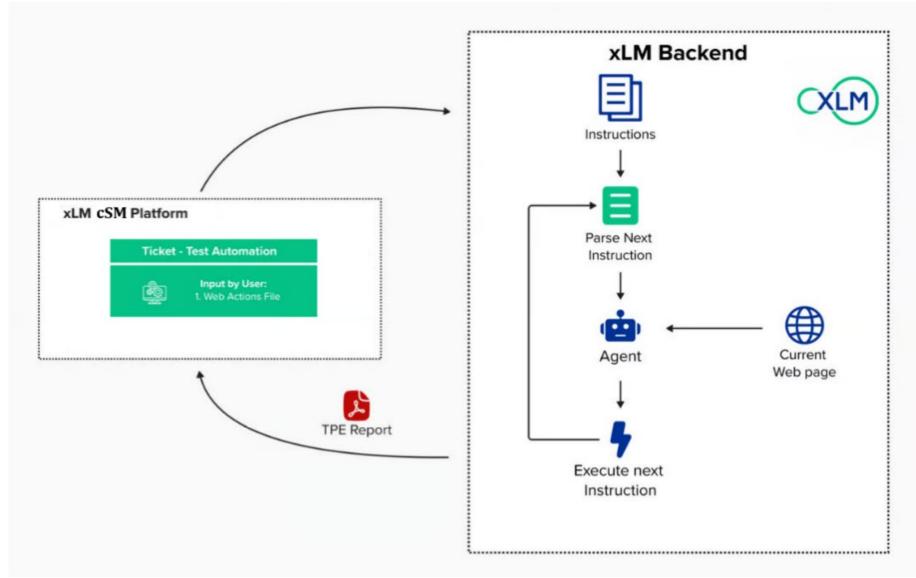
Test Execution Agent

CONNECT Proof of Concept Demo with cIV
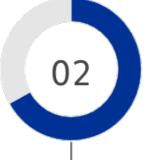
01 **Trend Validation**

Using cIV, we are going to **validate the trend data visualization** in the Aveva CDS platform.

02 **New Dashboard Creation**

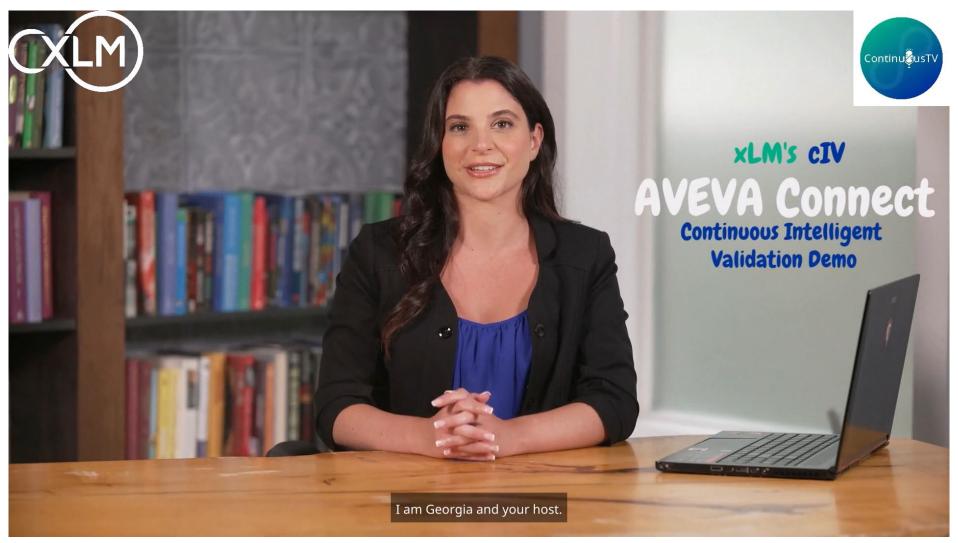Using cIV, to create a new visualization dashboard in the Aveva CDS platform.

03 **Validation of Data Ingestion**

Using cIV, in the current stream available on CONNECT platform, an event will be inserted, and same event will be verified using Trend Visualization feature on CONNECT.

cIV Demo

CONNECT

Wrap-up

CONNECT

Future CONNECT audit trail and continuous validation

Enable Life Sciences / Pharma customers to leverage CONNECT for GxP applications

Qualification Docs

Automated Testing

Automated Test Docs

Audit Trail

Continuous Validation

Features

- 21 CFR Part 11 / Annex 11 compliance

- Continuous validation approach with 100% automated regression testing for CONNECT.

- Customer access to historical platform versioning, release notes, and qualification documentation.

Benefits

- CONNECT is always up to date with the latest features & fixes & security patches.

- Reduced compliance risks – 100% regression testing.

- Compressed validation timelines while increasing quality.

- Improved compliance even while system has frequent changes.

- Increased data integrity through modern software testing.

Looking for pharma customer engagement & feedback on proposed validation approach for cloud multi-tenant SaaS!

CONNECT

The pharma journey with CONNECT

Today

2H25 / 1Q26

2026+

Leverage CONNECT for non GxP use cases

Enhanced data services coming (entity store +)

Digital twin bringing engineering & operations data together

Audit trail & continuous validation (data services to start)

CONNECT

CONNECT

We need your feedback!

- *Please review slides with your quality / computer validation experts and gather feedback.*

- Please contact **Todd Brown** and **Tom McCarthy** with a summary of your feedback and questions.
  - todd.brown@aveva.com
  - thomas.mccarthy@aveva.com

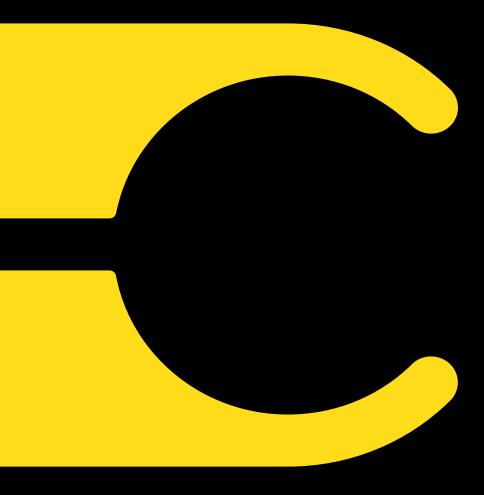- ***Looking for a few engaged customers to collaborate with deeply on this topic!***

CALL to ACTION

CONNECT

https://view-su1.highspot.com/viewer/924181e85bce3e885aada7cf5daa2141

CONNECT

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.

The Company shall not be obliged to disclose any revision to these forward-looking statements to reflect events or circumstances occurring after the date on which they are made or to reflect the occurrence of future events.

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ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life's essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world's most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com

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