APRIL 2024

# AVEVA's Big Picture – CONNECT

The industrial cloud platform to accelerate digital transformation with real-time data, rich AI, and robust insights

Mike Norton – Solution Consultant

# 50%

of all industrial data was created in the last two years.

In 2024, that will still be true.

***Source: Statista, Sept 2022***

# 38%

of new operational data will be stored and processed in the cloud.

An increase of 16% in just two years.

***Source: IDC, "Worldwide IT/OT Convergence Survey, 2022", Jonathan Lang, Sept 2022.***

*Source: Data Management Poses Major Challenges and Issues for Companies: New Study, Forbes, 2022*

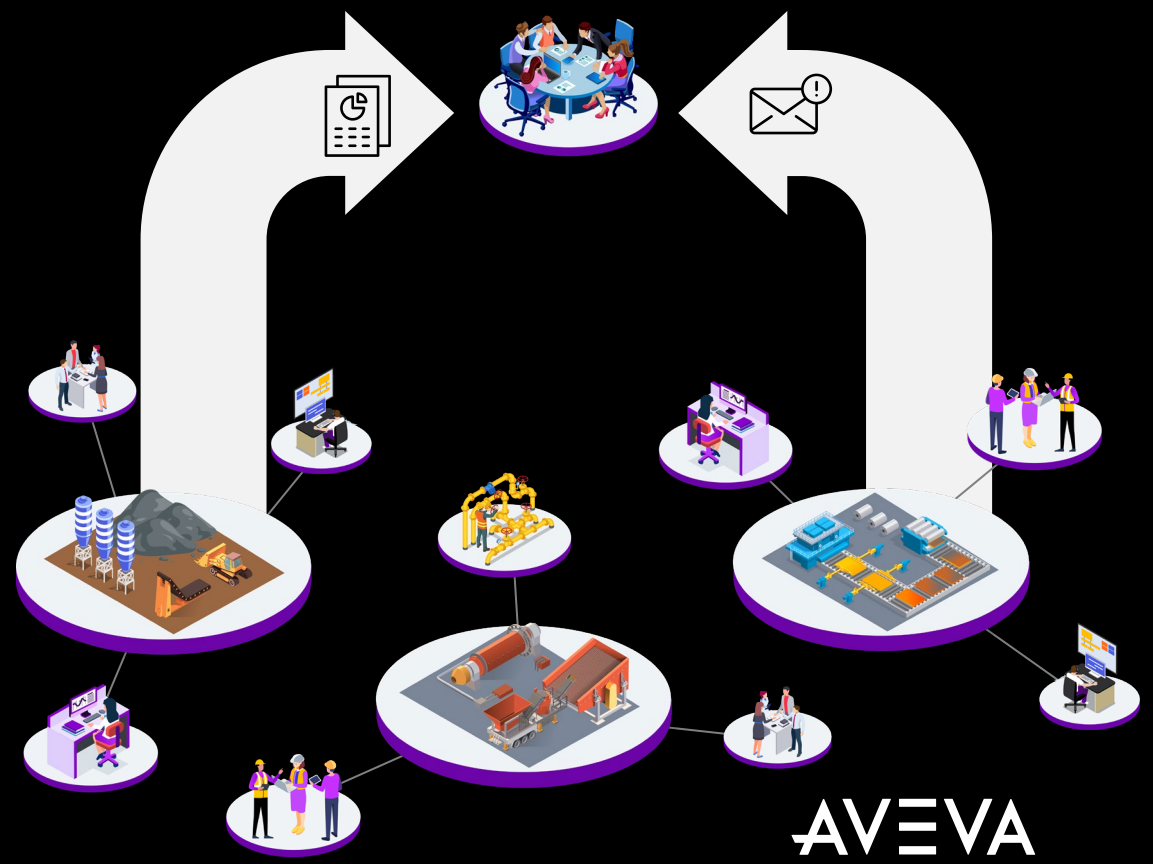



AVEVA

# The changing workspace

## Information silos, inconsistency and slow responsiveness

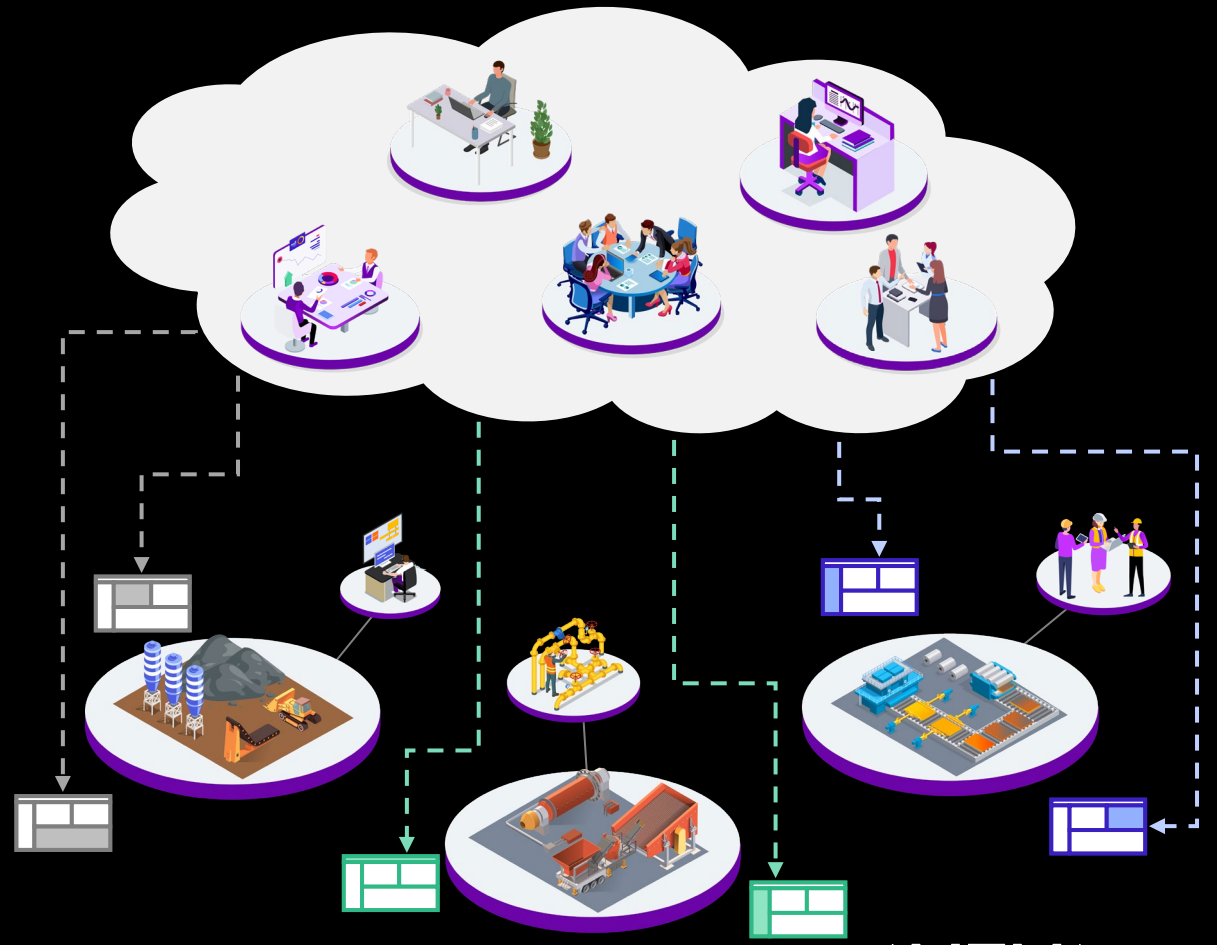
- Local teams primarily own access to information and spend time manipulating the data into other forms
- Offsite stakeholders must wait for report and insight delivery
- Access often depends on a select few experts
- Limited ability to enhance data digitally for more value
- Further inquiries or inconsistencies require restarting the information cycle



# The changing workspace

## Remote and virtual teams still need access to reliable data

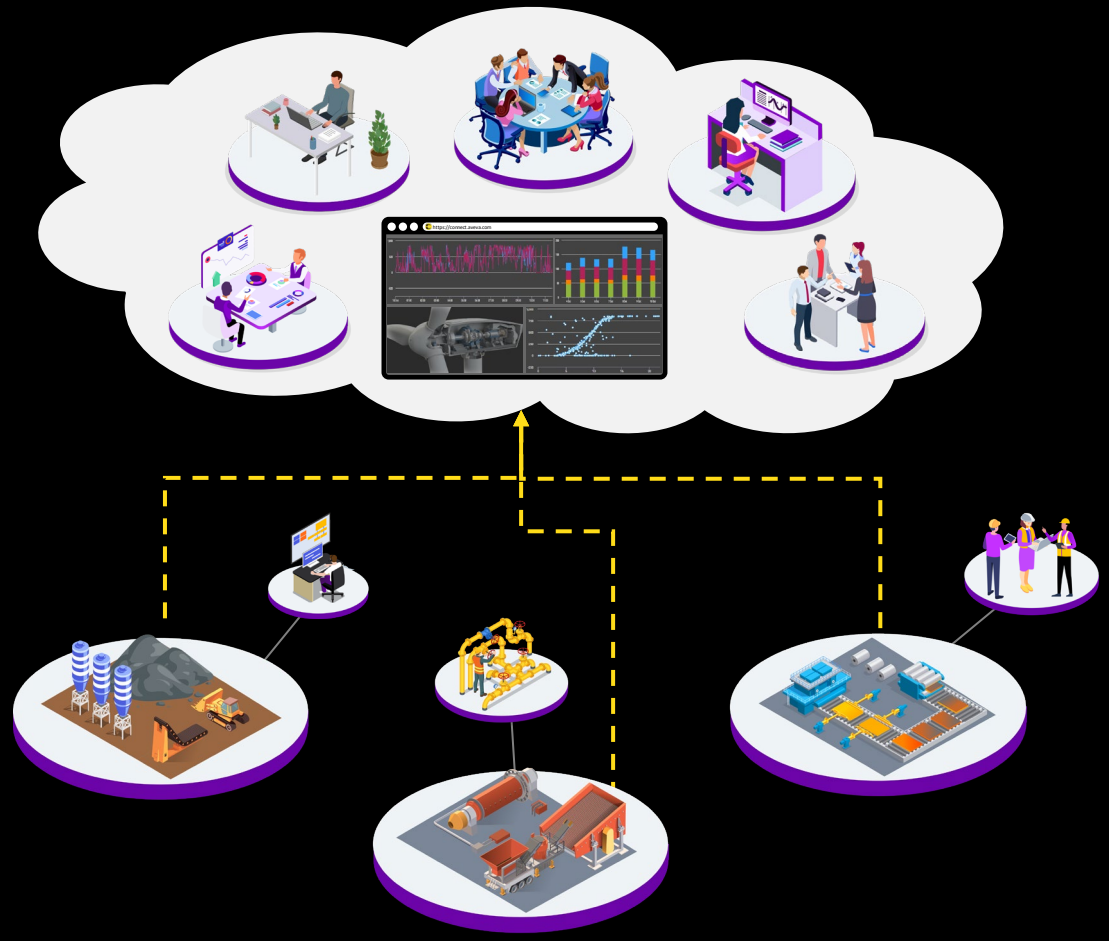
- Labor shortages, costs, and other dynamics are shifting workforces offsite
- These remote and virtual teams still require access to on-premises generated information
- Scale and complexity of data alignment impedes progress
- Tunneling into on-premises applications can present cybersecurity, accessibility, and maintenance challenges
- Users might still need to spend time extracting and manipulating data from on-premises tools



# How to address the changing workspace?

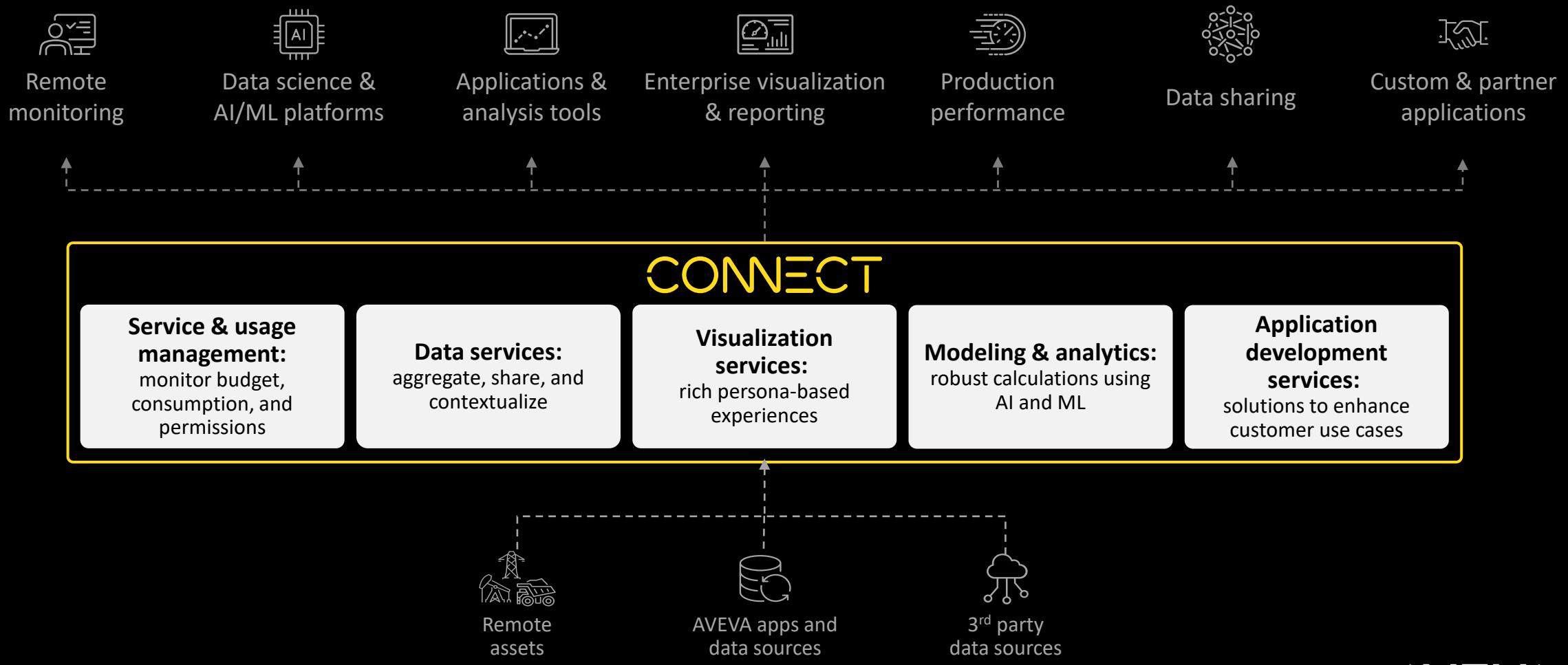
## Aggregated data with a cloud-based platform provides seamless access

- Utilizing the cloud to aggregate and display information reduces on-premises data gathering hurdles
- Diverse teams across operations, reliability, sustainability and others can access the information that matters most to them
- Users can customize and retain the structure, design and format of their work
- Data can be enhanced with AI and data sharing capabilities for new value-providing use cases
- Scalability of the cloud ensures short time to value with the ability to grow systematically as ROI justifies



# CONNECT, our industrial intelligence platform

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



# CONNECT service & usage management

## A single interface for both cloud and on-premises applications

### Consume

- Access the full portfolio of AVEVA software
- Subscribe and configure your solutions
- Rapid deployment and provisioning of cloud services
- Manage your budget and monitor your consumption through the AVEVA™ Flex subscription program

### Analyze

- Management reporting offers a central hub of information and insights about Flex credit consumption, usage and adoption, and audit logs
- Subscribe to alerts from the status dashboard for notifications of planned and unplanned events

### Access

- Guaranteed >99% uptime
- Centralized user management and permissions
- Import credentials directly into CONNECT from Microsoft™ Azure Active Directory

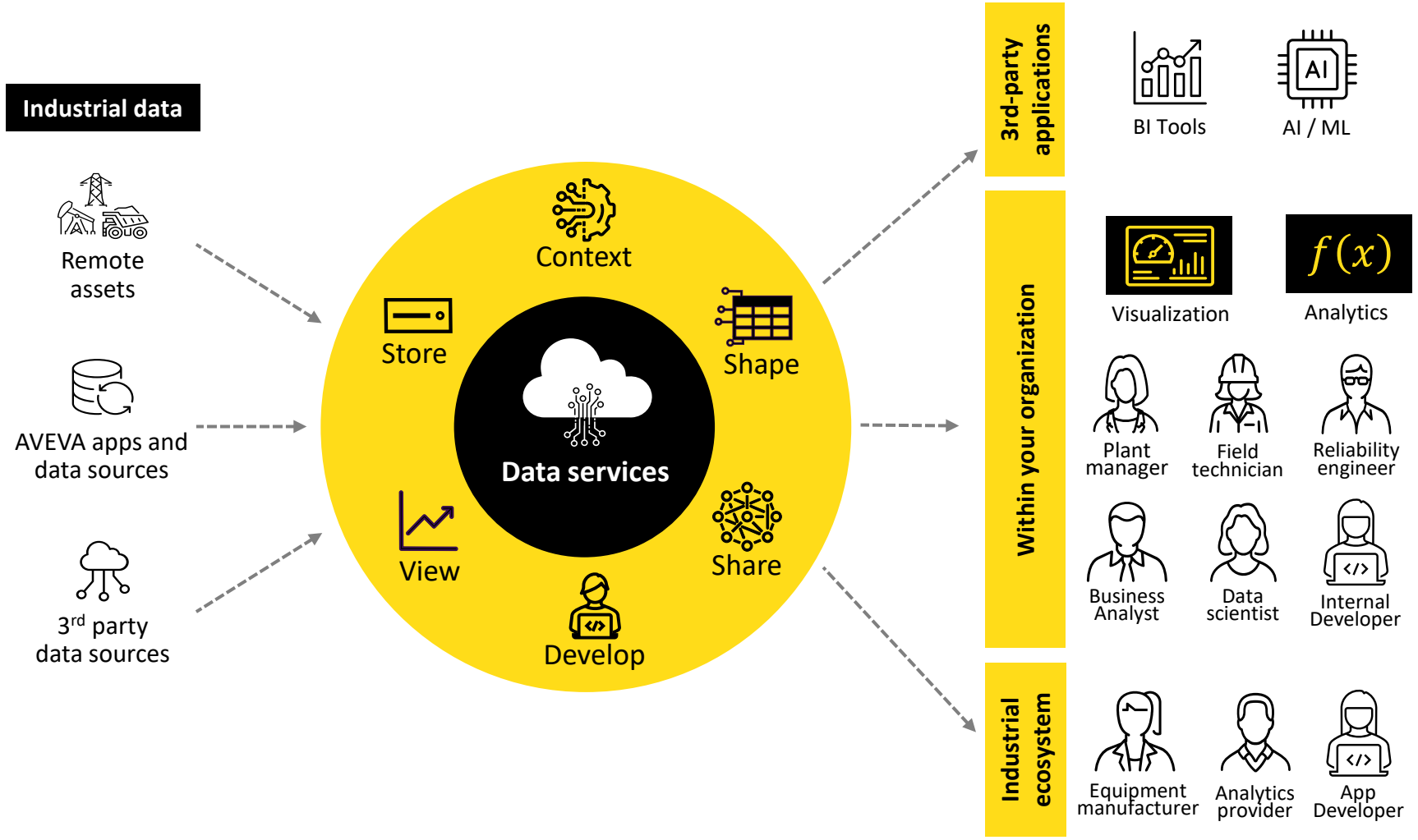
### Integrate

- Manage and configure integrations between CONNECT services, partner and other third-party applications from cloud to edge
- Leverage shared services for cloud storage, applications, licensing and entitlement

- Accelerate time to value with flexible, scalable, and trusted industrial hybrid SaaS solutions
- Optimize your industrial software investments centrally
- Extend your ecosystem of teams and partners with a purpose-built industrial cloud platform

# CONNECT data services (AVEVA Data Hub)

## Aggregate, contextualize, and share real-time industrial data




A cloud-native industrial platform designed for aggregating, storing, enriching, accessing, analyzing, and securely sharing real-time operations data from historians, edge devices, and more

- Remote monitoring
- Reporting and dashboarding
- Data science & AI/ML platforms
- 3rd party analytic tools
- Data sharing with business partners
- Custom & partner applications

# Why CONNECT data services (AVEVA Data Hub)?

**AVEVA Data Hub is the data services layer within CONNECT**

Makes it easier to aggregate, store, enrich, access, analyze, and securely share real-time to improve efficiency, sustainability and drive digital transformation.

## Strengths/Differentiators

Ready to use SaaS, requires no development or integration and can **start delivering value in hours**, not months

Provides the easiest path to get industrial operations data to the cloud & optimized for OT data, at scale

Handles any kind of sequential data and allows raw data streams contextualization to support users from any functional area

Protects control networks with a separate data layer and one-way communication

Is a more secure, multi-tenant way of sharing data with granular control over what data is shared to which partners

Is a SaaS available via CONNECT and fully managed by AVEVA; nothing for you to manage or maintain

- Purpose-built for OT from the leader in industrial software solutions, ready for the enterprise
- Native integration to AVEVA PI System, AVEVA Historian, Edge Data Store, & connectivity to other data sources

Home
Data Management
Data Collection
Visualization
Analytics
Security
Developer Tools
Support

COLLAPSE

Assets | Search for Assets | + Add Asset

Power - Wind - Turbine

| | | |
|---|---|---|
| GE X | GE01 | GE02 |
| GE03 | GE04 | GE05 |
| GE06 | GE07 | GE08 |
| GE09 | GE10 | GE11 |
| GE11 | GE12 | GE13 |
| GE14 | GE15 | GE16 |
| GE17 | GE18 | GE19 |
| GE20 | GE21 | Power - Wind - Turbine |

Items per page: 50 | 1 – 24 of 24

## GE04

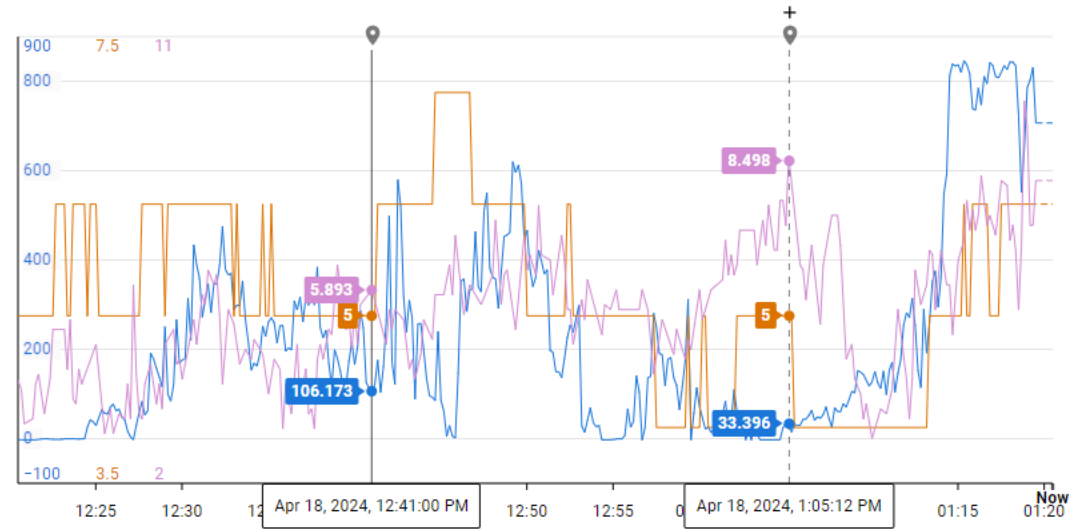
<No Description>

**Asset Type:** Power - Wind - Turbine

Metadata | Properties | Status

| Property | Last Value | UOM | Timestamp |
|---|---|---|---|
| Active Power \| Value | 706.700 | kW | 4/18/24, 1:19 PM |
| Active Power\|Predicted \| Value | 679.510 | kW | 4/18/24, 1:19 PM |
| Active Power - 10 min rolling avg ... | 66.176 | kW | 4/18/24, 12:59 PM |
| Ambient Temperature \| Value | 6.000 | °C | 4/18/24, 1:19 PM |
| Ambient Temperature\|Predicted \|... | 7.000 | °C | 4/18/24, 1:19 PM |
| Apparent Power \| Value | 744.414 | kW | 4/18/24, 1:19 PM |
| Apparent Power - 10 min rolling a... | 79.661 | kW | 4/18/24, 12:59 PM |
| Availability \| Value | 1.000 | | 4/17/24, 11:10 PM |
| Bearing A Temperature \| Value | 45.771 | °C | 4/18/24, 4:34 AM |

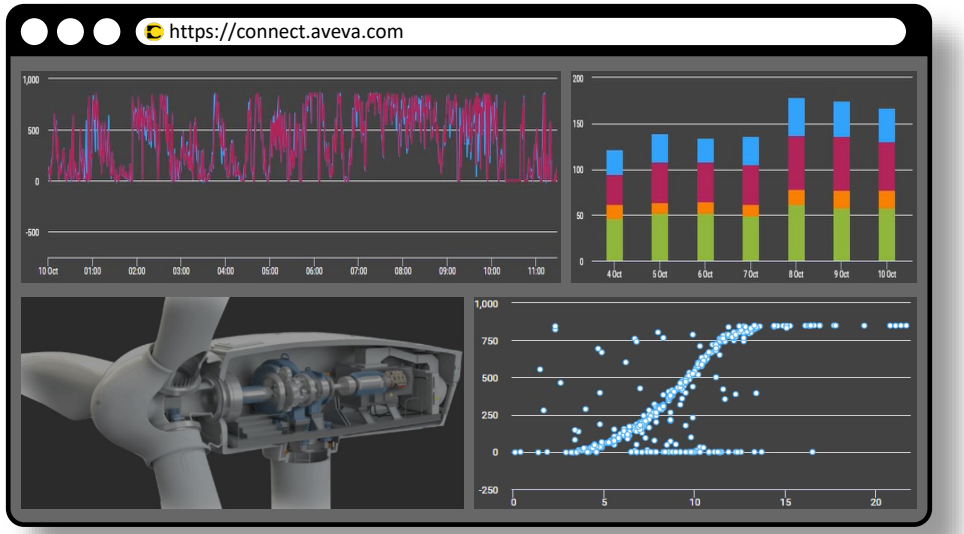
Active Power | Value (kW) | Ambient Temperature | Value (°C) | Wind Speed | Value (m/s)




Last 1 hour

# CONNECT visualization

Visualize industrial data using self-service and pre-defined dashboards




Data services

3rd party data sources

## Self-service

- Editable dashboards
- Arrange various content types
- No code experience
- Search for content
- Adjustable historical view

## Pre-defined

- Custom developed experiences
- Rich animations and dynamic styling
- Asset driven navigation
- Complex interactions
- Holistic operations view

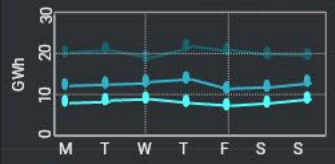
- Visually relate disparate data sources & systems in context to each other
- Gather insights between applications and across data types quickly and easily
- Share actionable information with operations, reliability, business, and other teams, anywhere through a browser

## Total Generation (YTD)


| | | |
|---|---|---|
| Solar | 5 TWh | (17%) |
| Wind | 8 TWh | (27%) |
| Hydrogen | 7 TWh | (23%) |
| Coal | 2 TWh | (7%) |
| Gas | 5 TWh | (17%) |
| Nuclear | 3 TWh | (10%) |

## Renewable

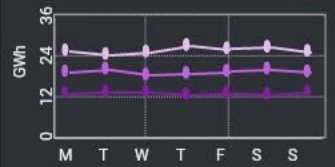
Yesterday
24.7 GWh



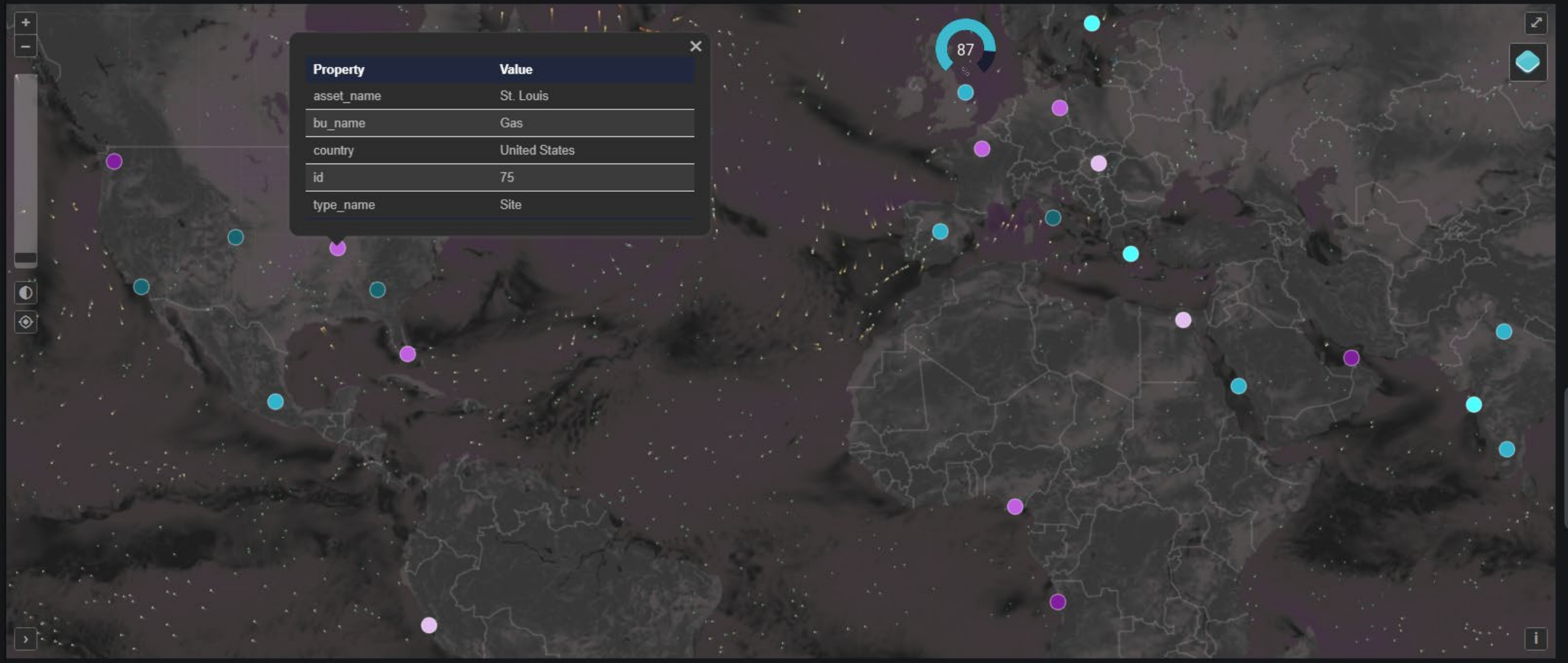

Solar
Wind
Hydrogen

## Non Renewable

Yesterday
29 GWh




Coal
Gas
Nuclear




| Property | Value |
|---|---|
| asset_name | St. Louis |
| bu_name | Gas |
| country | United States |
| id | 75 |
| type_name | Site |

Selected KPI: None ▾

(Size based on count) Solar Wind Hydrogen Coal Gas Nuclear

### Americas 3.94 TWh

| Solar | Wind | Hydrogen | Coal | Gas | Nuclear |
|---|---|---|---|---|---|
| 23% | 26% | 8% | 14% | 16% | 13% |

### Europe 3.16 TWh

| Solar | Wind | Hydrogen | Coal | Gas | Nuclear |
|---|---|---|---|---|---|
| 24% | 28% | 10% | 12% | 12% | 14% |

### Asia Pacific 2.87 TWh

| Solar | Wind | Hydrogen | Coal | Gas | Nuclear |
|---|---|---|---|---|---|
| 22% | 21% | 7% | 24% | 23% | 3% |

### Middle East and Africa 2.1 TWh

| Solar | Wind | Hydrogen | Coal | Gas | Nuclear |
|---|---|---|---|---|---|
| 20% | 19% | 6% | 25% | 20% | 10% |

# CONNECT modeling & analytics

(AVEVA Advanced Analytics)

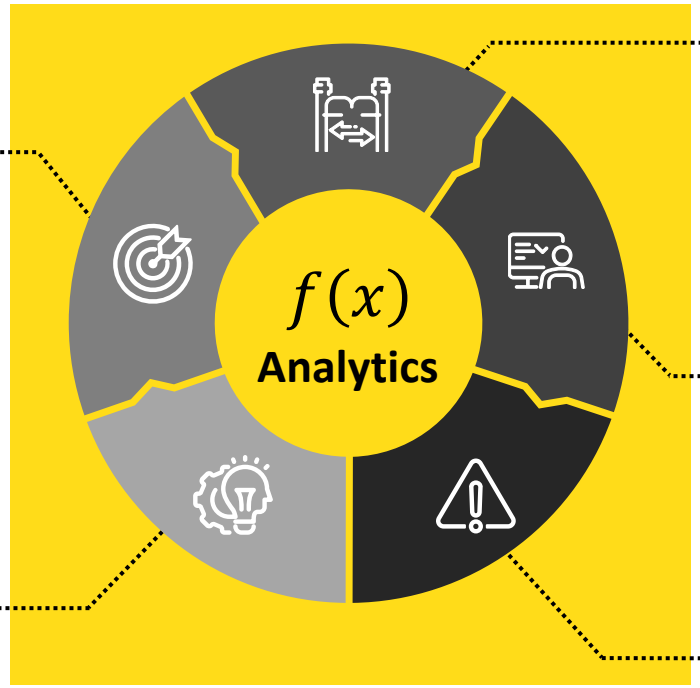
## Combine existing data with AI for faster and smarter decisions

### 1 Learn

Automate investigations and understanding of performance drivers with ML

### 2 Solve

Consolidate learnings and apply solutions that mitigate problems and improve performance




### 3 Model

Combine data from multiple sources to mirror physical assets & processes on digital twins

### 4 Monitor

Apply algorithms & logic to continuously assess performance

### 5 Alert

Give early warnings of performance issues with improvement suggestions


3rd party data sources

- Utilize AI and ML to improve process efficiency
- Understand production outcomes and get recommended corrective actions
- Collaborate with trusted partners to enable cross-company collaboration and discover new opportunities

# Training Results Summary

for MixerQualityModel

## Dataset

VIEW

## Statistical Model

VIEW

## Predictive Model

NEXT

### Evaluating Your Data

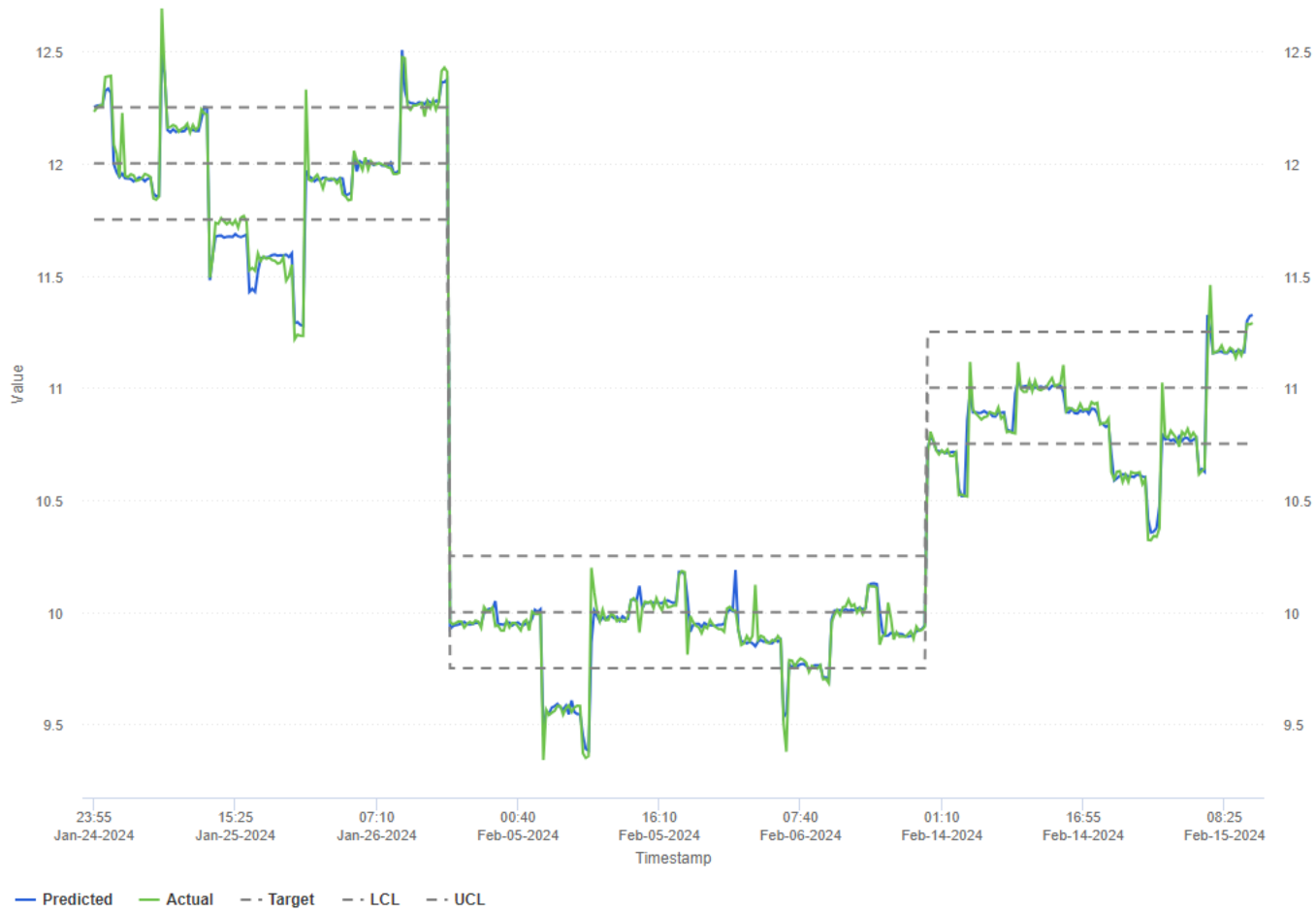
Finally, we train machine learning models to understand your system and predict **Actual Quality**. We trained 2 algorithms and used a train/test split to evaluate their performance on your data. We selected **Predict Property with Multi Layer Random Forest** as the best model for your data. See the analyses below to better understand how this model performed and what insights it can give about your system.

- Predicted vs. Actual
- Actual Quality Drivers
- Model Comparison Table
- Brix Actual.Value Drivers

## Conclusion

VIEW

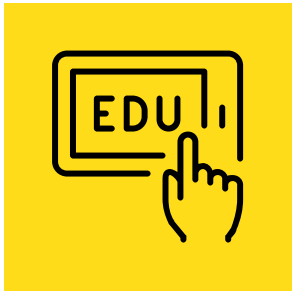
Predicted vs. Actual - Line



# CONNECT application development services

## Build solutions that extend and enhance use cases

Development environment and development tools




Technical enablement materials

Technical support and consulting services

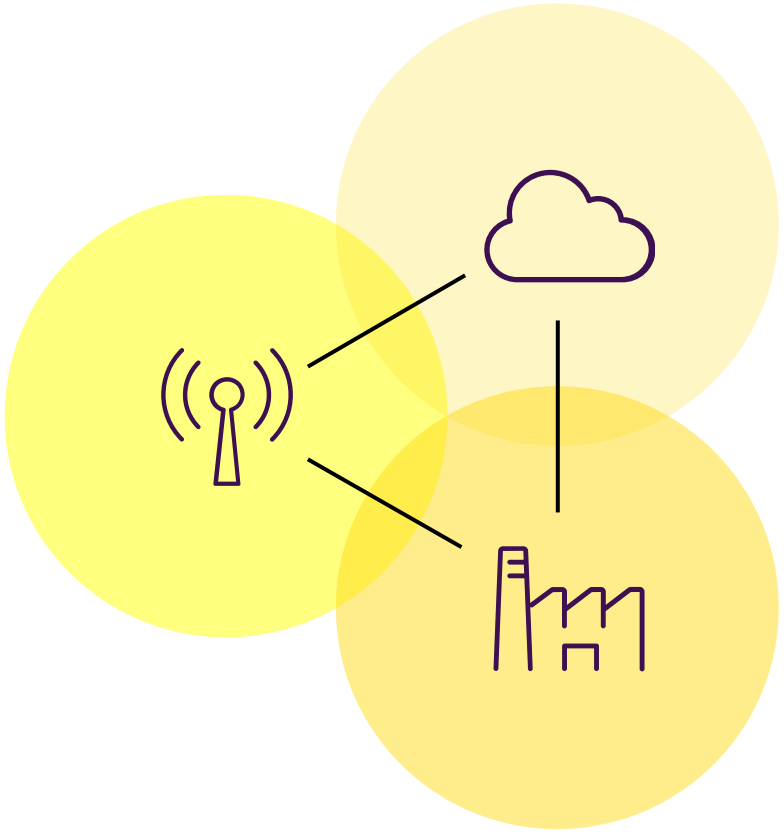
*“It’s been so prosperous. We’re seeing such benefit from this [partnership]. The intersection of what we can do for AVEVA clients and the value they can get out of this will be tremendous for all parties involved.”*

- Gary Robinson, CEO, Lityx

- Empowering partners and developers to build solutions that extend and enhance use cases
- Gain access to development toolsets, exclusive events, and industrial solution expertise
- Out-of-the-box data-sharing infrastructure enabling design and provisioning of value-added solutions

# The industrial world is hybrid

An integrated, edge-plant-cloud architecture supports OT, IT and IIoT use cases

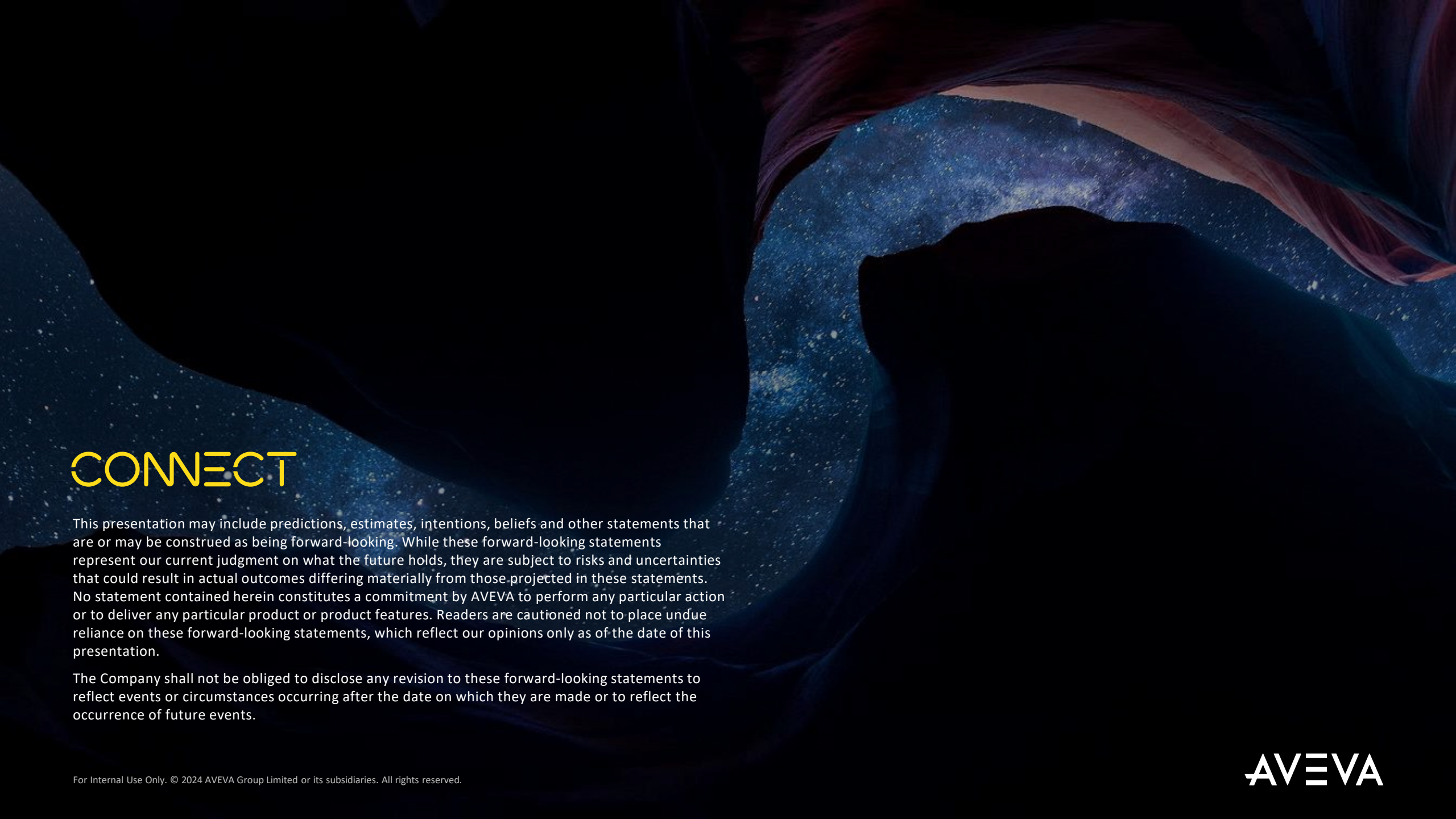


At the edge

In the cloud

On-premises

# Thank you!



# CONNECT

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