How AVEVA™ PI Data Infrastructure enables a next-generation AVEVA™ PI System™ for utilities

A new hybrid, edge-to-cloud data management subscription for collecting, storing, enriching, accessing, and sharing reliable, real-time industrial data

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AVEVA PI Data Infrastructure

An integrated, hybrid data solution – utilizing AVEVA FLEX credits

In the cloud:

**AVEVA™ Data Hub**
Web-native, scalable service for aggregating and sharing contextualized operations data

**AVEVA Connect, common cloud platform visualization services**
Web-based, no-code service for building customizable data dashboards

At the industrial edge:

**AVEVA Adapters**
**AVEVA Edge Data Store**
Real-time data collection from vendor-neutral remote assets, sensors & IIoT devices

On-premises:

**AVEVA™ PI Server**
**AVEVA PI Interfaces and AVEVA PI Connectors**
Vendor-neutral data collection, enrichment, analysis & access, 24/7 for critical operations

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AVEVA PI Data Infrastructure

Data without boundaries, from edge to plant to community

**Hybrid cloud offering**

*Three pillars of AVEVA Edge Data Store*
AVEVA PI Server
AVEVA Data Hub

*Connecting fabric of AVEVA Adapters, AVEVA PI Connectors, AVEVA PI Interfaces, AVEVA PI System to AVEVA Data Hub*

*And added value through AVEVA Connect, common cloud platform visualization services*

**Maintain the investment**

*Modern data infrastructure relying on hybrid capabilities delivered over time*

Continuing to keep the 2018 SP3 version of AVEVA PI Server resilient and secure

**Enterprise features**

*Modern authentication*
Reducing IT effort and enabling single sign-on (SSO)

**Easier scaling**

*New aggregate tag subscription*
More flexibility for scaling data usage in large, multi-site deployments
AVEVA PI Data Infrastructure utility use cases

AVEVA PI System + AVEVA Data Hub

• Community data sharing (internal and/or external 3rd-party)
  o Utility’s emergency operations center - during extreme weather or emergency situations, wildfires, critical events, etc. with external entities
  o Utility’s substation – equipment/asset monitoring data with equipment suppliers or 3rd party entities
  o ISO/RTO – with generation market participants

• Renewables, DER (distributed energy resources) and microgrids
  o Remote monitoring and diagnostics
  o Renewables and utility-scaled front-of-meter DER data
  o BTM (behind-the-meter)/prosumer data - thermostats, batteries, and roof-top solar, etc. 3rd party suppliers/aggregators

• AI/ML advanced analytics and data science

• IIoT
  o Edge-to-cloud and AVEVA PI System-to-cloud
  o CBM 2.0 – infrared imaging/thermal imaging data
Data infrastructure has expanded to edge and cloud

- Remote assets, sensors, & IIoT devices
- Cloud data silos
- In the cloud
  - Data sharing with trusted ecosystem partners
  - Advanced analysis via AI/ML platforms
  - Industrial applications & analysis tools
  - Monitoring & reporting
- At the edge
- Control systems & historians
- On-premises
AVEVA PI Data Infrastructure

A transformational new hybrid offering

• Native integration between edge, on-premise, and cloud solutions. Move data seamlessly from edge to plant to cloud

• Extend connectivity to IIoT devices and mobile assets, enable remote monitoring

• Aggregate real-time and historical data from plants, sites, or remote assets in the cloud for wider use and consumption

• Access to all current and future cloud-enabled AVEVA PI System and AVEVA Data Hub enhancements

• Fastest on-ramp to access, use, and share operations data in the cloud

• Take advantage of the new cloud-based AVEVA Connect, common cloud platform, visualization services, to empower business users and citizen analysts with role-based, configurable dashboards

• Subscription-based purchasing supports easy expansion without the need to purchase new products or licenses, or initiate additional purchase orders.
Streamlined, secure access: modern authentication comes to AVEVA PI System

Reducing IT effort and enabling single sign-on (SSO)

- TLS certificates and OIDC for trusted connections in support of claims-based authentication
  - Backward compatible with clients leveraging Windows Integrated Security (WIS)
- Integrate AVEVA PI System with your identity provider of choice
  - Enabling SSO, helping you to more easily and securely manage resources and users across your enterprise
Extend the value of AVEVA PI System via the cloud

Engage new personas, enable new use cases, expand value of industrial data

• **Purpose-built** to meet the demands and challenges of industrial information. High-speed, scalable, elastic, and resilient

• Simple, **secure data sharing** with trusted partners and experts

• Rapid time-to-value with **native integration** to AVEVA PI Server and AVEVA Edge Data Store

• Scalable foundation for new digital service business. Get up and running in **minutes, not months**

• **Operated & maintained** by AVEVA
AVEVA Data Hub

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

- Managed, secure, multi-tenant platform
- Operated & maintained by AVEVA
- High-speed, scalable, elastic, & resilient
- Modern, secure REST APIs
- Built & deployed on Microsoft Azure

Supported Regions
- West US (California)
- North Europe (Ireland)
- Australia East (New South Wales)

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Visual trending enables asset root cause analysis & investigations

- Stream & asset search
- Common trend interactions
- Stacked trends
- Trend summary calcs
- Min/max easy cursors
- Multiple cursor delta summary calcs
- Trend sharing
- URL parameters
- String & enum trending
- Seamless contextual navigation from Asset Explorer
- Trending asset properties
- Asset swapping

Trending

Sharing with URL Parameters

https://cloud.osisoft.com/tenant/osisoft-events/trend?namespace=Production&trace=a;GE02;Expected%2520Power;Value;%25231f77b4&trace=a;GE02;Wind%2520Speed;Value;%2523ff7f0e&trace=a;GE02;Active%2520Power;Value;%25232ca02c&mode=stacked&startIndex=2021-09-15T22:20:43.592Z&endIndex=2021-09-22T22:20:43.591Z&cursor=2021-09-17T07:32:48.627Z&cursor=2021-09-20T06:09:07.796Z&selectedTrace=null;
Assets give useful context to your data streams

Asset types & assets

- Assets displayed in the card view
- Filter tenant assets by:
  - Asset name
  - Asset type
  - Asset metadata
- Static metadata
- Stream properties
- Asset-relative trends
AVEVA PI System to AVEVA Data Hub agent provides easy transfer of AVEVA PI System data to the cloud

- Agent posted in ADH postal
- Self-service installation and configuration
- PI Point or asset framework element transfer selection
- Supports asset framework replication of assets and attributes having PI Point and static value data references
- Current and historical data
Demo: Adding transformer assets to existing AVEVA PI System to AVEVA Data Hub transfer
Data views curate operational data for external consumption

Enabling data exploration, integration, & data science

Data science tools & data exploration
Data science via code
Partners & apps
Cloud platforms
Easily slice and dice your AVEVA Data Hub data in Power BI

✓ Import AVEVA Data Hub data views into Power BI
✓ Stored and interpolated retrieval modes
✓ No coding required
✓ Power BI Desktop and Power BI Service (through on-premises data gateway)
Modern REST API to enable your applications

REST API

ADH Platform Enabling Custom Apps

C#  
Python  
Java  
NodeJS  
Angular

GitHub.com/OSIsoft

Custom development  
Partner applications  
Data pipelines & workflows  
Machine learning  
Collaboration tools  
Business intelligence

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# AVEVA Data Hub connected community

Enables simple & secure operational data sharing across organizations

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<tr>
<th>Feature</th>
<th>Description</th>
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<tr>
<td>Achieve a more secure way of sharing your data</td>
<td>Manage users in your AVEVA Connect common cloud platform account</td>
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A more secure way to share operational data

- **True multi-tenant system**
- **Natural separation of authentication, users, and data**
  - Each tenant manages their own authentication & users
  - No external users logging directly into your tenant
  - Better protection of intellectual property (IP)

- **Sharing provides access to data stored in your tenant**
- **Data is not copied outside of your tenant** by AVEVA Data Hub

- **3-way handshake for community formation & requires tenant admin approval**
  - Communities are private
  - Each tenant manages their community members
  - Only community members can read shared data
  - (or via an application accessing data via API)

- **You control who your “data stewards” are who have resource-sharing privileges**
  - Sharing privilege must be explicitly assigned

- **Business partners don’t need to install hardware/software within your site to get access to your data**
Connected community: powering the energy resource ecosystem
AVEVA Data Hub connected community

- Data science tools & data exploration
  - Data science via code
  - Partners & apps
  - Cloud platforms

Data Views support shared streams

Power BI (via data views & AVEVA Data Hub Power BI Connector)

Custom applications (via REST API)

Trending supports shared streams

Grafana (via REST API)

Spreadsheets (via REST API)

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AVEVA™ Connect, common cloud platform visualization services
Data visualization through AVEVA Connect, common cloud platform

Rapid information synthesis for the citizen analyst

- Self-service dashboard creation in a browser, accessible on any device
- Craft unique experiences by role and use case
- Save, edit, and share displays
- Create and arrange a variety of content, including:
  - Process data streams
  - Production event and contextualized metadata
  - Engineering 1D, 2D, 3D materials (coming soon)
  - Graphical elements library
  - Operational tower views
  - Third-party information
- Managed service provided by AVEVA in the cloud
Visualize AVEVA Data Hub data through AVEVA Connect, common cloud platform

Self-service building of content and dashboards with mobility support
AVEVA™ Advanced Analytics
AVEVA Advanced Analytics

**Predictive asset health**
- Mean time between failure
- Remaining time to failure
- Probability of failure

**Predictive asset life**
- Asset aging assessment
- Asset deterioration analysis
- End-of-life calculation

**Predictive uptime/runtime**
- Runtime %
- Remaining time to shutdown
- Probability of shutdown

AKEVA Data Hub tenant

AVEVA PI Servers

Operate at optimized condition of supply and demand with efficient and economic benefits

Maximize asset utilization with proactive real-time assessment and future recommendations

Improve reliability by predicting failure before it happens

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Comprehensive platform drives innovation

Combine your existing data with AI-enabled applications for faster and smarter decisions

**PERVASIVE CONNECTIVITY with AVEVA Data Hub**

AVEVA Data Hub is a system of record for AVEVA Advanced Analytics – direct read/write data in/out of AVEVA Data Hub

**DIGITAL TWIN – Linked to asset framework and AVEVA Data Hub assets**

Calculations
- First principal models
- Machine learning models
- Alerts & recommendations

**“AI” ENABLED APPLICATIONS**

Predictive quality
- Predictive throughput
- Predictive energy efficiency

**SCALE EFFORTLESSLY**

Create “classes” that can apply calculations and models to tens, hundreds, or thousands of assets or processes

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Data collection

Use data from various data sources

- AVEVA PI System to AVEVA Data Hub architecture
- AVEVA Edge Data Store & adapters
- Open message format (OMF) connections

AVEVA Data Hub asset context can persist as advanced analytics twins
Model factory

Templates to solve fundamental maintenance problems

- Use cases templatized model selection
- Automate machine learning (ML) model creation
- Easy-guided twin configuration steps - product segmentation, operational state, rate
- Automatically evaluates and selects the best-performing algorithm
- Visualized model creation process

A digital assembly line for automating machine learning (ML) model creation and deployment
Model customization

Logical workflow to support operations

• User-defined tasks to extend out-of-the-box model tasks:
  o Verification of model task output
  o Custom visualization
  o Python code

• User-defined train blocks:
  o Add a custom algorithm to train data
  o Choose specific columns to train
  o Add "derived" columns to the train input dataset

Flexibility with user-defined algorithms and transforms
Explore more in the Expo!

- Hybrid data infrastructure – **Booth # 70**
- AVEVA Data Hub – **Booth # 64**
- Edge & IIoT – **Booth # 72**
- AVEVA Connect, common cloud platform – **Booth # 65**
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Questions?
Please wait for the microphone.
State your name and company.

Please remember to...
Navigate to this session in the mobile app to complete the survey.

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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.

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