Building an edge to cloud operations data infrastructure with AVEVA™ PI System™

Victor Zhang - Senior Product Manager
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1. The evolving operations landscape
2. Requirements for hybrid data architecture
3. Data collection from edge to cloud
4. AVEVA Data Hub: key capabilities & use cases
5. Closing the loop
Industrial operations have expanded to edge and cloud

How can we leverage our operations data for BI dashboards and data science initiatives? How can we build trust between OT/IT?

How do we collect more data, without significant resource costs or impact to existing infrastructure?

Is there a way to securely engage partners / vendors for expanded expertise and to enable new business models / revenue streams?

Is there a more effective way of aggregating and accessing operations data across my enterprise?
Requirements for hybrid data management

**Purpose-built, ready for the enterprise**
- Vendor-neutral data ingress from any edge to cloud
- Native integration to AVEVA PI Server – flexibility in where and how you manage, process, and access data
- Make contextualized, operational data available to enterprise business apps, IT apps, data science

**Ready-to-use industrial cloud service**
- Be operational in hours, not months, nothing for you to manage and scale on demand
- No DIY assembly; key capabilities & security functionality already interoperable
- REST API that makes it easy to integrate with existing IT cloud applications & investments

**Secure data sharing internally and externally**
- Securely engage vendors and partners for expanded expertise and new insights
- Scalable & transparent data sharing that puts you in control of your data
- Reduced security risks with sharing data externally
A hybrid data infrastructure from edge to plant to community

AVEVA PI Data Infrastructure

AVEVA CONNECT

AVEVA Data Hub

Edge Data Store

AVEVA Adapters

PI Interfaces

PI Connectors

PI to Data Hub

Data Hub to PI*

AVEVA PI Server - core

AVEVA PI Server - hybrid

AVEVA Data Hub

AVEVA Connect visualization services

AVEVA Advanced Analytics

AVEVA Data Hub data views

AVEVA Data Hub community

AVEVA Data Hub Community

AVEVA PI Vision

AVEVA PI Vision

AVEVA PI DataLink

PI System Access

AVEVA PI DataLink

AVEVA PI Vision

PI System Access

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AVEVA™ Data Hub

Remote monitoring  Data science & AI/ML platforms  3rd party analytic tools  Custom & partner applications  Data sharing with business partners  Reporting & Dashboards  Production Performance  Self Service Visualization

<table>
<thead>
<tr>
<th>AVEVA Data Hub</th>
<th>Connected Community</th>
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<tr>
<td>Trending</td>
<td>Data Views</td>
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<tr>
<td>Reference Data</td>
<td>Relationships</td>
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<td>Sequential</td>
<td>Assets Events</td>
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REST APIs  Web Portal

OMF Apps & Remote assets  AVEVA Adapters  Edge Data Store  AVEVA PI Server  AVEVA Historian  AVEVA MES  AVEVA System Platform  Cloud apps & silos
AVEVA™ Data Hub

- Remote monitoring
- Data science & AI/ML platforms
- 3rd party analytic tools
- Custom & partner applications
- Data sharing with business partners
- Reporting & Dashboards
- Production Performance
- Self Service Visualization

- Connected Community
  - Trending
  - Data Views
- Reference Data
  - Relationships
- Sequential
  - Assets
  - Events

- Security
- Power BI Connector

- REST APIs
- Web Portal
  - EDS & Adapter Config & Monitoring

- OMF Apps & Remote assets
- AVEVA Adapters
- Edge Data Store
- AVEVA PI Server
- AVEVA Historian
- AVEVA MES
- AVEVA System Platform
- Cloud apps & silos

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Data scientist including edge data in AI & advanced analytics

Service provider enhancing custom services with edge data

Equipment manufacturer using edge data for asset monitoring and predictive maintenance

Field technician monitoring remote assets in real time

Engineer optimizing production with edge data

AVEVA Adapters

Edge Data Store

OMF

AVEVA Connect

AVEVA Data Hub

AVEVA PI Server

Data collection from edge to cloud

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PI to Data Hub Agent

- Easily send your existing PI System data to AVEVA Data Hub
  - Current data
  - Historical (optional)
  - AF Elements and Attributes (optional)
AVEVA™ Data Hub: key capabilities and use cases

Storage, context, data science enablement, and data sharing
Flexible Sequential Data Store that keeps related data together

Stream types & Streams: Define simple or complex schemas

STREAM PROPERTIES

- Timestamp
- Depth
- Pressure
- Speed
- Latitude
- Longitude
- Quality information

COMPLEX STREAM EXAMPLE

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Showing 1 - 50 of 100
Assets give useful context to your data streams

- **Static metadata** (Region: North America, Wind farm: Big Buffalo Wind Farm, Asset Type: GE Wind Turbine, Manufacturer: Truvale, ...)

- **Stream reference properties** (Active power, expected power, operating state, wind speed, etc.)

- **Asset status** (stream property values mapped to status: good, warning, bad)
Data Views curate operational data for external consumption

REST API

Third-party applications
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

- Business partners don’t need to install hardware/software within your site to get access to your data
AVEVA™ Data Hub
Connecting your industrial ecosystem
IGI Wax, along with its partner Lityx, uses AVEVA Data Hub to simplify real-time data sharing and improve wax yields.

IGI reduced crude waste by 49% and eliminated 20 hours of off-specification processing every two weeks. Higher yields generated $10M in profit over a single year.
Closing the loop
Underutilized data is a gold mine for data scientists...

...but the real value is found when you return it to operations.
Sneak Peek at Data Hub to PI

In Development

Data Hub to PI

Wind Forecast

Wind Speed Forecast

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‘Low hanging fruits’ & ‘food for thought’

Where are your opportunities?

**Ask impactful and focused questions** this is the key for valuable data science outcomes
What are your impactful questions? Build trust between stakeholders. Proving the value of the process helps validate technology choices

**Start connecting your ecosystem.** Industry leaders are already capitalizing... think of possibilities afforded by secure and efficient data sharing across your value-chain.

**Illuminate your dark data.** Remote operations monitoring can generate large savings & create new business models. Where in your operations can you gain better real-time awareness? ... Start small for PoC but think about scalability!
Recommended Sessions

Secure data sharing at scale with the AVEVA Data Hub Community
Tuesday, October 24 @ 2:50pm
Room 2004

Unlocking the power of AIOps for IIoT with AVEVA Data Hub and AVEVA Advanced Analytics Accenture
Tuesday, October 24 @ 3:50pm
Room 2004

Data Collection and Remote Operations Monitoring from Edge to Cloud
Wednesday, October 25 @ 8:00am
Room 2004

Enabling end-to-end continuous biomanufacturing by leveraging real-time data in the cloud
Biosana
Wednesday, October 25 @ 8:40am
Room 2004

Sharing data across Quebec Iron Ore’s IT and OT ecosystem with AVEVA’s cloud technologies
Quebec Iron Ore
Wednesday, October 25 @ 1:30pm
Room 2004

Bringing industrial operations data into your analytics platform with AVEVA Data Hub Data Views
Thursday, October 26 @ 10:45am
Room 2004
Influence the AVEVA product roadmaps

https://feedback.aveva.com

Let us know your product feedback!
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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.

Thank you!
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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