Data Collection and Remote Monitoring from Edge to Cloud

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An ecosystem that spans from edge to plant to cloud

AVEVA’s offerings that support OT, IT, and IIoT use cases

**PI Data Infrastructure**

**At the edge**
Pervasive, real-time data collection from sensors, IIoT devices and remote assets

**In the cloud**
Scalable data services available for a wider array of users, tools and applications

**On-premises**
Enriched industrial data available 24/7 for critical operations
Collect data from every valuable data source

The scenario determines your data collection needs
Data Collection from Edge to Cloud

- **AVEVA Adapters**
- **Edge Data Store**
- **OMF**
- **AVEVA PI Server**
- **AVEVA Connect**
- **AVEVA Data Hub**
- **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

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Data Collection from Edge to Plant to Cloud
Enabling on-premises data transfer to the cloud

**PI to Data Hub | Simple installation, centralized configuration**

- **Send current, historical, or AF elements and attributes** from existing AVEVA PI Server data to AVEVA Data Hub
- **Simple installation process** to quickly get started with data transfers
- **Access configuration and health information** of the agent and data transfers from a **central location**

**AVEVA™ Data Hub π PI to Data Hub Agents**

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
<th>Version</th>
<th>Data Archive</th>
<th>AP Server</th>
<th>Region</th>
<th>Namespace</th>
<th>Host Name</th>
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<tbody>
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<td>Good</td>
<td>2.2.1163.0</td>
<td>PI Server</td>
<td>AWCPAgent</td>
<td>westus</td>
<td>AVEVA-Events</td>
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<td>CURT2016 to ADH</td>
<td>Good</td>
<td>2.2.1163.0</td>
<td>curt2016</td>
<td>CURT2016</td>
<td>westus</td>
<td>Development</td>
<td></td>
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<tr>
<td>DEMOV - Akomari</td>
<td>Bad</td>
<td>2.2.1163.0</td>
<td>PI/DEMODVM</td>
<td>pickmovm</td>
<td>westus</td>
<td>AVEVA-Events</td>
<td></td>
</tr>
</tbody>
</table>
Extending real-time data connectivity to remote assets

**AVEVA Adapters** | Ready off-the-shelf, lightweight footprint, flexible end-points

- **Lightweight, robust, real-time data collection**, buffering technology protects data during network outages or unavailability of destination endpoint

- **Out-of-the-box connectivity to common industrial protocols**: Azure Event Hubs, BACnet, DNP3, Modbus TCP, MQTT, OPC UA, RDBMS, Structured Data Files

- **Maximize uptime** with **client-side failover; server-side failover** available as provided by the data source

- **Cross-platform compatible**, installation options for Windows and Linux devices or use Docker containers

- **Simplified management**, cloud-hosted remote installation, configuration management, and health monitoring

- **Multiple data destinations**, transfer data to PI Servers, AVEVA Data Hub, and/or Edge Data Store and use filtering to reduce network bandwidth
High availability for mitigating data loss

Client-side and server-side failover for AVEVA PI Server and AVEVA Data Hub

Client and server failover modes:
- Hot
- Warm
- Cold
Lightweight data storage and integration at the industrial edge

**Edge Data Store | Local storage, self-healing, application platform**

- Lightweight, resilient data storage, purpose-built for harsh and/or uncrewed environments – self-healing to survive power loss to the device, network outages, and unavailability of destination endpoints

- Out-of-the-box connectivity to Modbus TCP and OPC UA servers, custom application connectivity available through an OMF endpoint

- Feature rich, programmatic API for custom application development such as local analytics or visualization

- Cross-platform compatible, installation options for Windows and Linux devices or use Docker containers

- Simplified management, cloud-hosted remote installation, configuration management, and health monitoring

- Multiple data destinations, directly integrate with AVEVA PI Servers and AVEVA Data Hub and use filtering to reduce network bandwidth
Homogenous connectivity to AVEVA systems

**Open Message Format (OMF) |** Scalable application development for edge, on premises, and cloud

- **Maximum developer flexibility**, any hardware platform, any operating system, any development tools
- Internet friendly, secure **REST API endpoints**, no VPNs required!
- Inbound connectivity to **Edge Data Store, AVEVA PI Servers, AVEVA Data Hub**
- **Outbound connectivity by Edge Data Store, AVEVA Adapters, and AVEVA Historian** provides interoperability with AVEVA PI Servers and AVEVA Data Hub
- Specification is **public and available to all**
Remote Monitoring from Edge To Cloud
Number of IoT devices exist in 2030 compared to number in 2020. Data from these devices will grow even faster.

Source: Gartner: Predicts 2022: The distributed enterprise drives computing to the edge.
The power of AVEVA Connect, our industrial platform

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

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

Data services: aggregation, sharing, and contextualization

Visualization services: rich persona-based experiences

Modeling & analytics: robust calculations using AI and ML

Application development services: solutions to enhance customer use cases

Remote operations monitoring

Data science & advanced analysis

Applications

Data sharing with trusted ecosystem partners

Remote assets

AVEVA data sources

3rd party data sources
The power of AVEVA Connect, our industrial platform

Enabling a hybrid data architecture from edge to cloud

- Remote operations monitoring
- Data science & advanced analysis
- Applications
- Data sharing with trusted ecosystem partners

AVEVA Connect

**Edge Management**
device twin, deployment, and monitoring

**Data Hub**
aggregation, sharing, and contextualization

- Remote assets
- AVEVA data sources
- 3rd party data sources
Manage software deployments at scale with Edge Management
Edge Management – Push-button Deployment Experience

1. Create and configure device twin
2. Pair and bootstrap device
3. Deploy software
4. Manage device and software

Device List

- Device List
  - Status: PUBLISHED, DEPLOYED, NEW
  - Connection: Connected, Not Connected
  - License: AVEVA, Temp
  - Name: AVEVA World Demo Device, temp 06162023, OPCUA System Test 2

AVEVA World Demo Device

- Status: DEPLOYED
- Connection Status: Connected
- CPU: 2.4%
- Used Memory: 1.82 GB of 10.15 GB
- Used Storage: 5.20 MB of 104.35 MB
- 366 Days Remaining

Modules

- Name: AVEVA Adapter for MQTT
- Description: Edge System Version: 1.4.0.75 | Edge Module Manager Version: 1.1.0.15
- File Size

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Data Hub – Edge System Configuration

- Quick start with default config
- Validate edge system config
- Templatize/Export edge system config

AVEVA Connect

**AVEVA Connect**

Data Hub

- Export Configuration
- Remove

**AVEVA™ Data Hub** > Edge Data Store & Adapters

- Home
- Data Management
- Data Collection
- Visualization
- Analytics
- Security
- Developer Tools
- Support

**mqtt_configuration**

AVEVA Adapter for MQTT 1.2.0

```json
{
    "System": {
        "Logging": {
            "logLevel": "Information",
            "logFileSizeLimitBytes": 34653833,
            "logFileCountLimit": 31
        },
        "HealthEndpoints": [
            {
                "id": "DataHub",
                "endpoint": "https://usw.int-datahub.capdev-connect.aveva.com/api/v1",
                "clientId": "",
                "clientSecret": null
            }
        ],
        "Components": [
            {
                "componentId": "OnfEgress",
                "componentType": "OnfEgress"
            },
            {
                "componentId": "MQTTSpar",
                "componentType": "MQTTSpar"
            },
            {
                "componentId": "MQTT1",
                "componentType": "MQTT"
            }
        ]
    }
}
```
Data Hub – Edge System Health Monitoring

Filter by Status, Type, and more

Overview of system health across fleet

Easy access to edge system configuration
Accelerate Time to Value with AVEVA Connect

**AVEVA Connect**

**Edge Management**
- Push-button deployment of edge software modules
- Standardized applications in disparate remote locations

**Data Hub**
- Remote monitoring of software health and status
- Configuration authoring and editing experience

**Other Benefits**
- Improve visibility to device, software, and connection health
- Reduce TCO with centralized device, software, and configuration management

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What’s Next
What's Next for Edge Data Store and AVEVA Adapters?

Roadmap

Available Now

• Remote Device Management: Install & monitor edge modules using Edge Management

• Edge Data Store and AVEVA Adapter Edge Modules: Docker images that support remote device management; includes OPC UA & MQTT adapters

• AVEVA Adapter Failover: Available with OPC UA & MQTT adapters

In Development

• Remote Software Management: Configure & monitor Edge Data Store and AVEVA Adapters from AVEVA Data Hub (late CY 2023)

• Edge Modules for all AVEVA Adapters (early CY 2023)

• Failover for all AVEVA Adapters (early CY 2024)

Future Consideration

• Additional AVEVA Adapters: Connectivity to more sources

• Asset Handling: Collect and transfer asset data

• Event Handling: Collect and transfer event data

• Digital Twin: Collect and transfer 1D data

• OMF Endpoint Updates: Assets, events, 1D data, and relationships
Sneak Peek at Data Hub to PI
Rich visualization with AVEVA Connect
Lighthouse Program Success Stories and Highlights

Transportation
- Ship
- Edge Data Store
- PI Server

Automotive Manufacturing
- Equipment
- Edge Data Store
- AVEVA Data Hub
- Analytics

Power
- Pipelines
- Meter
- AVEVA Adapter for MQTT
- PI Server

Materials Manufacturing
- PI Server
- PI to Data Hub
- AVEVA Data Hub
- Community Sharing
- AVEVA Data Hub
- Predictive Analytics

Interested in Lighthouse Program? Email lighthouse@aveva.com
Recommended Sessions

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

AVEVA Data Hub is storing something new, and it’s a must-see Event
Wednesday, October 25 @ 9:20am
Room 2004

UNITING AVEVA DATA HUB AND ADVANCED ANALYTICS WITH IOTA VIEW, FOR PROACTIVE WELL MAINTENANCE
_Devon Energy_
Wednesday, October 25 @ 10:20am
Room 2004

AVEVA PI System Portfolio data connectivity update
Wednesday, October 25 @ 11am
Rooms 2001-2003

Facilitating Digitalization in Extra-Small Cargill Facilities using Edge Data Store
_Cargill_
Wednesday, October 25 @ 2:50pm
Room 2004

Extending your PI System infrastructure to edge and cloud
Thursday, October 26 @ 1:30pm
Rooms: 2001-2003

Bringing industrial operations data into your analytics platform with AVEVA Data Hub Data Views
Thursday, October 26 @ 10:45am
Room 2004
How can you influence the AVEVA product roadmap?

https://feedback.aveva.com

Let us know your product feedback!
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