AVEVA and The PI System
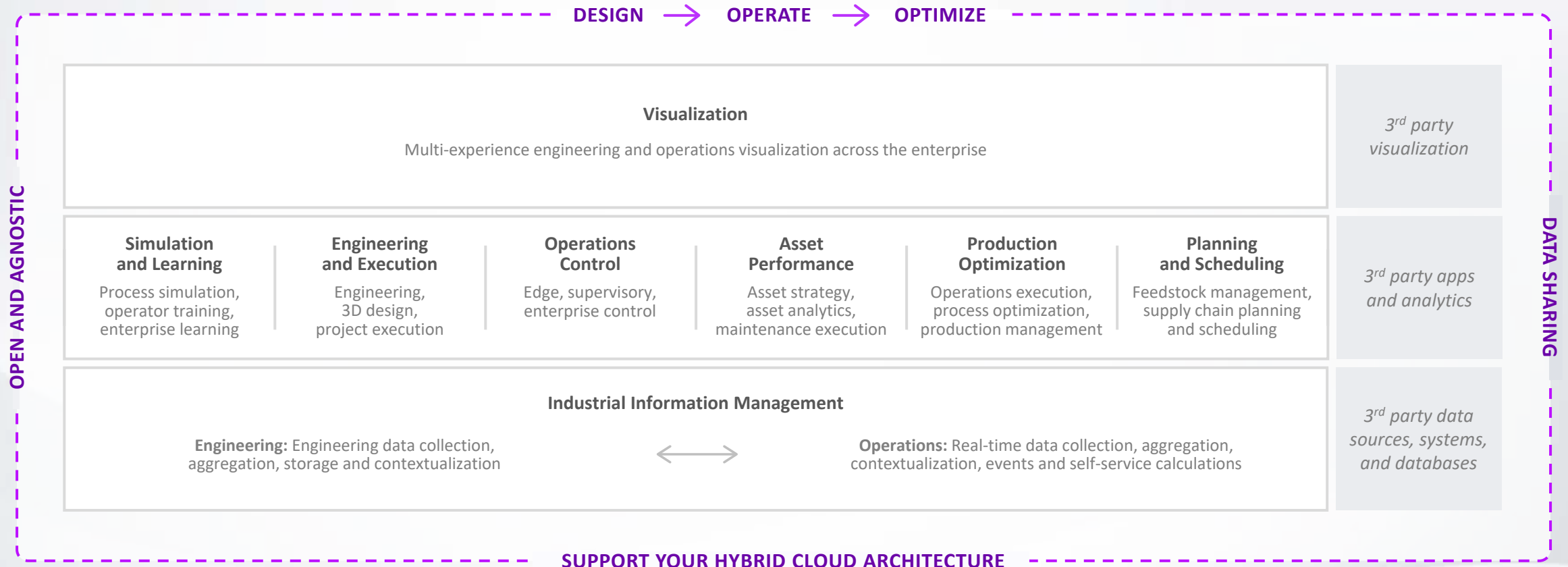
Because we're better together!

AVEVA

Unlocking real-time data and operations insights

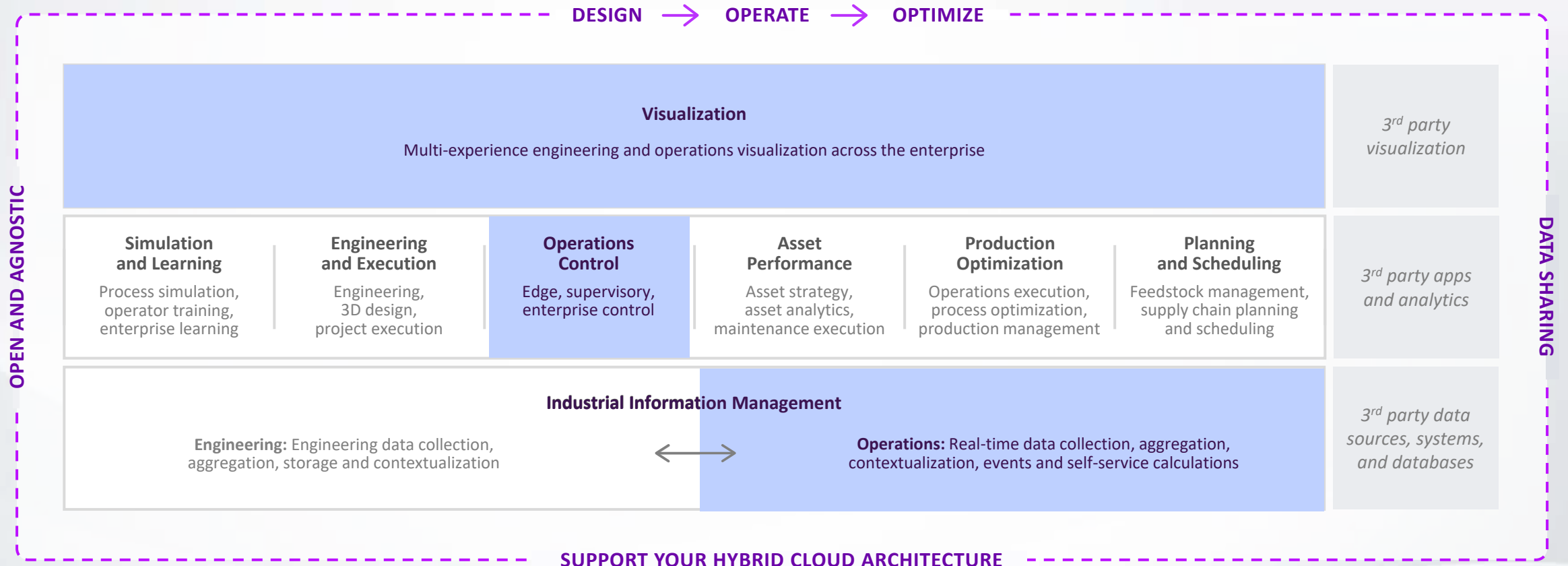Achieve ROI now and accelerate time-to-value for digital transformation

AVEVA

Delivering a complete digital thread, purpose-built for industry

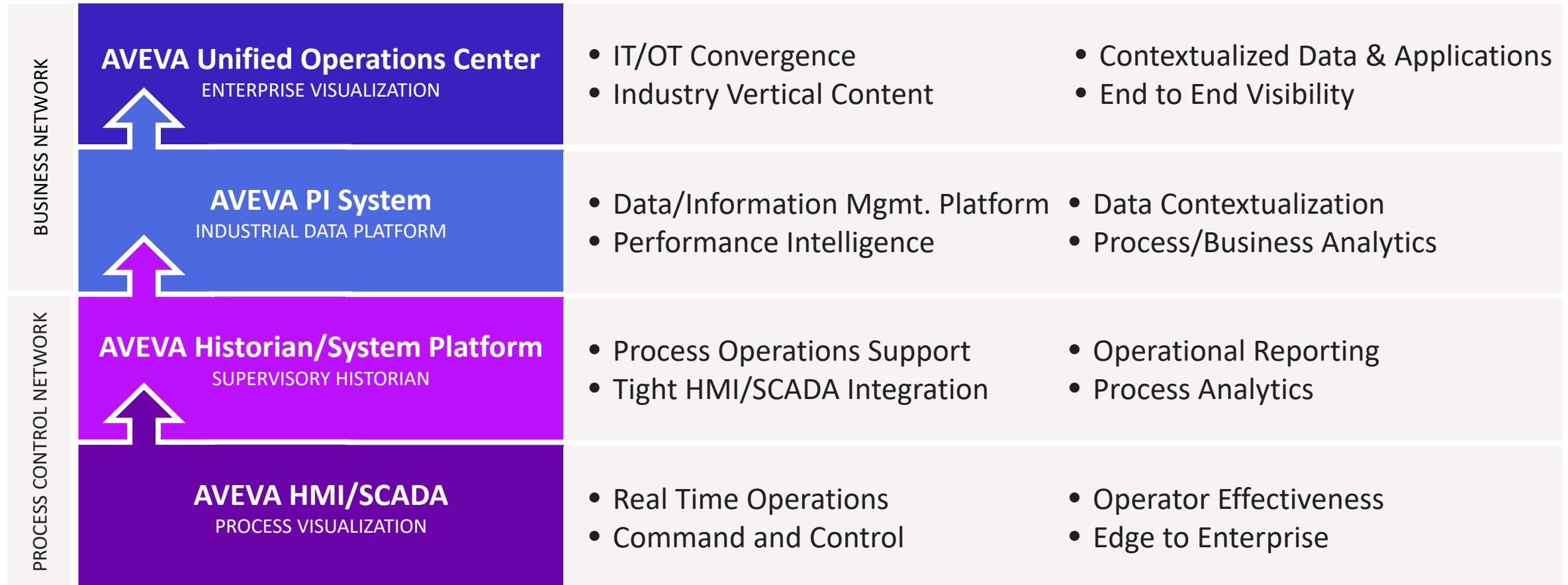## Accelerate time to value with flexible, scalable, and trusted industrial hybrid SaaS solutions

DESIGN → OPERATE → OPTIMIZE

OPEN AND AGNOSTIC

DATA SHARING

Visualization
Multi-experience engineering and operations visualization across the enterprise

3rd party visualization

Simulation and Learning	Engineering and Execution	Operations Control	Asset Performance	Production Optimization	Planning and Scheduling
Process simulation, operator training, enterprise learning	Engineering, 3D design, project execution	Edge, supervisory, enterprise control	Asset strategy, asset analytics, maintenance execution	Operations execution, process optimization, production management	Feedstock management, supply chain planning and scheduling

3rd party apps and analytics

Industrial Information Management

Engineering: Engineering data collection, aggregation, storage and contextualization

⟷

Operations: Real-time data collection, aggregation, contextualization, events and self-service calculations

3rd party data sources, systems, and databases

SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

AVEVA

Operations Control Integration

Accelerate time to value with flexible, scalable, and trusted industrial hybrid SaaS solutions

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DATA SHARING

SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

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AVEVA Monitoring & Control Integration with PI System

Distinct Operational Roles

BUSINESS NETWORK

AVEVA Unified Operations Center
ENTERPRISE VISUALIZATION
- IT/OT Convergence
- Industry Vertical Content
- Contextualized Data & Applications
- End to End Visibility

AVEVA PI System
INDUSTRIAL DATA PLATFORM
- Data/Information Mgmt. Platform
- Performance Intelligence
- Data Contextualization
- Process/Business Analytics

PROCESS CONTROL NETWORK

AVEVA Historian/System Platform
SUPERVISORY HISTORIAN
- Process Operations Support
- Tight HMI/SCADA Integration
- Operational Reporting
- Process Analytics

AVEVA HMI/SCADA
PROCESS VISUALIZATION
- Real Time Operations
- Command and Control
- Operator Effectiveness
- Edge to Enterprise

AVEVA

Better together: AVEVA PI Server & Operations Control

Optimize your operations with tighter integration

- **Data integrity**: ensuring granularity, accuracy, reliability and context

- **Enterprise-wide**: delivering secure and efficient data transfer, agility and scalability

- **Unified solutions**: proving better integration while maintaining neutrality and boosting sustainability
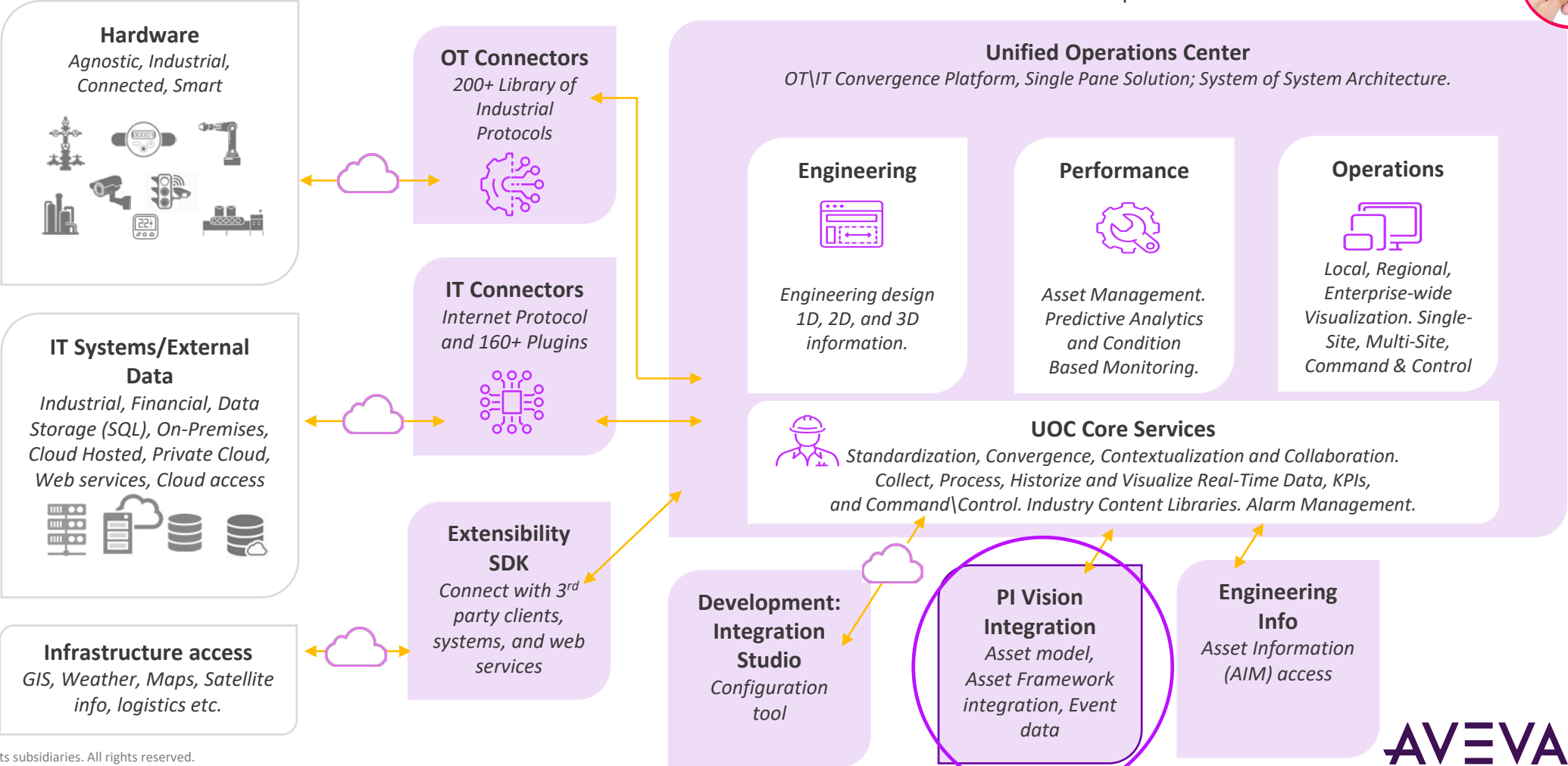
Store   See   Shape   Share

AVEVA Edge Management   AVEVA Data Hub   AVEVA Insight

Ecosystem partners

AVEVA Connect

AVEVA PI Server

Applications   AI, analytics

AVEVA Edge   AVEVA System Platform   Plant Scada (Citect)   AVEVA InTouch HMI   AVEVA Historian

AVEVA

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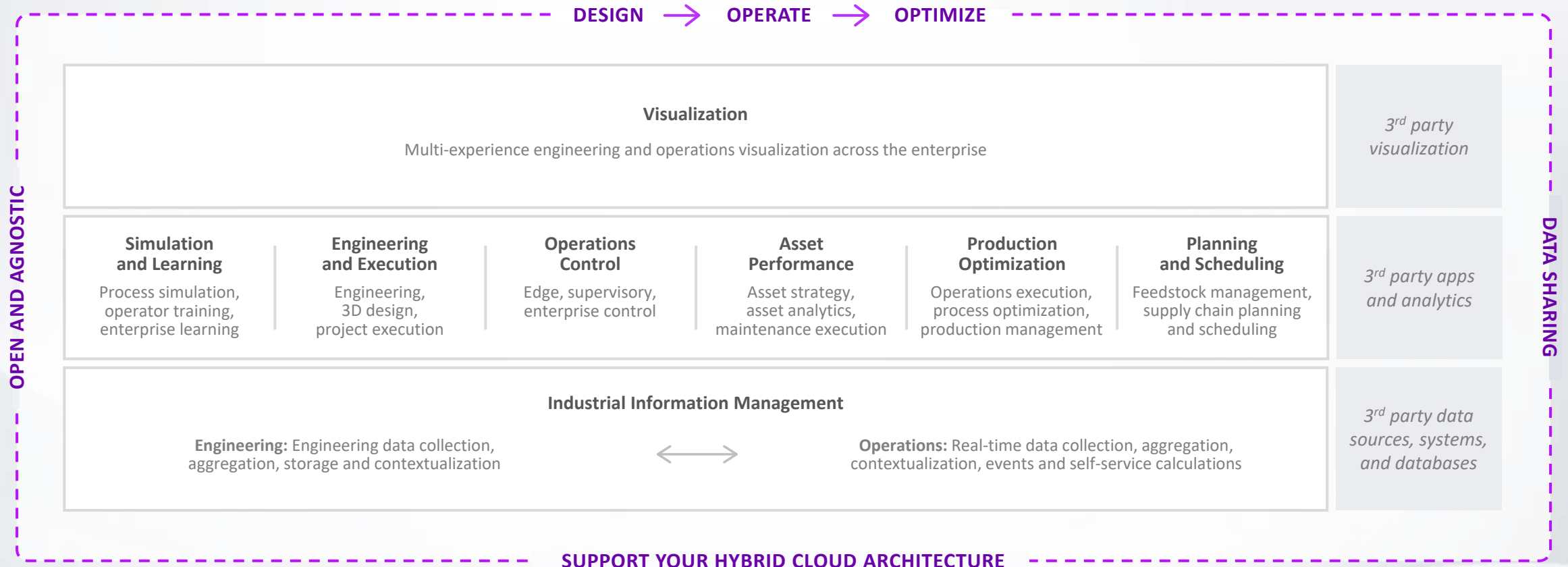# AVEVA Unified Operations Center
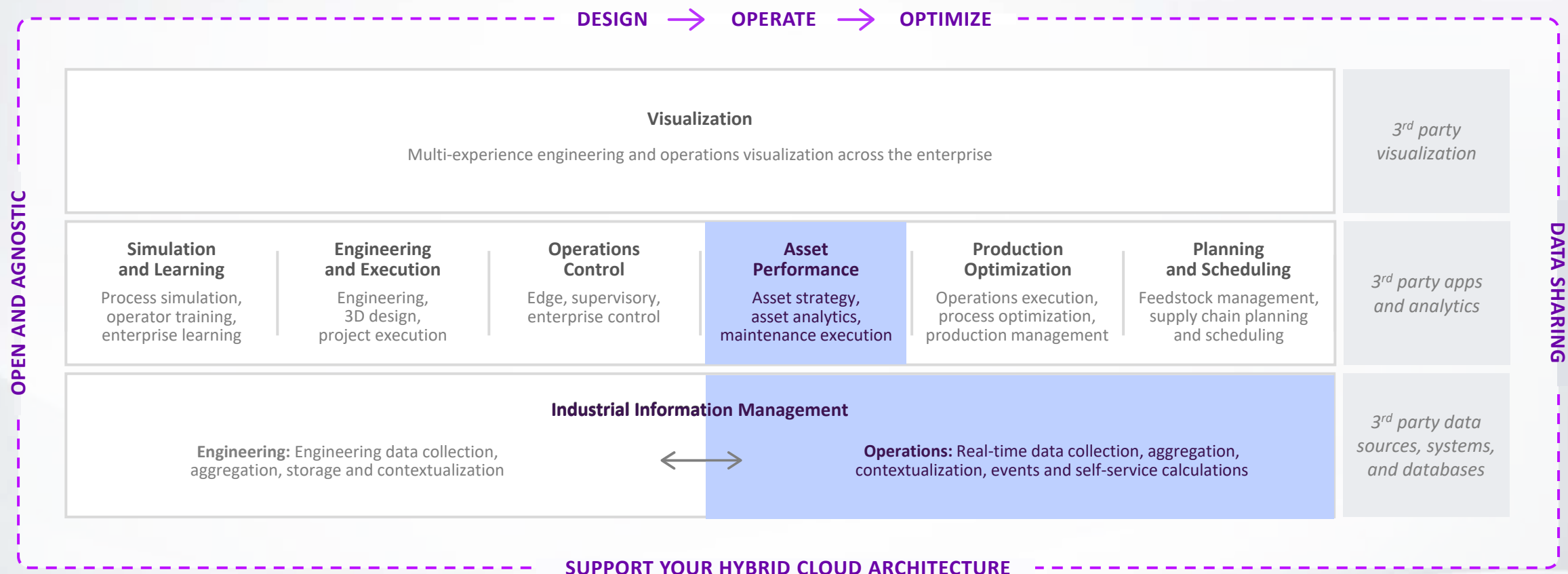

Command Center

Remote Operations Center

Casual User

Hardware
Agnostic, Industrial, Connected, Smart

OT Connectors
200+ Library of Industrial Protocols

IT Systems/External Data
Industrial, Financial, Data Storage (SQL), On-Premises, Cloud Hosted, Private Cloud, Web services, Cloud access

IT Connectors
Internet Protocol and 160+ Plugins

Infrastructure access
GIS, Weather, Maps, Satellite info, logistics etc.

Extensibility SDK
Connect with 3rd party clients, systems, and web services

Unified Operations Center
OT\IT Convergence Platform, Single Pane Solution; System of System Architecture.

Engineering
Engineering design 1D, 2D, and 3D information.

Performance
Asset Management. Predictive Analytics and Condition Based Monitoring.

Operations
Local, Regional, Enterprise-wide Visualization. Single-Site, Multi-Site, Command & Control

UOC Core Services
Standardization, Convergence, Contextualization and Collaboration. Collect, Process, Historize and Visualize Real-Time Data, KPIs, and Command\Control. Industry Content Libraries. Alarm Management.

Development: Integration Studio
Configuration tool

PI Vision Integration
Asset model, Asset Framework integration, Event data

Engineering Info
Asset Information (AIM) access

Delivering a complete digital thread, purpose-built for industry

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SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

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AVEVA Predictive Analytics

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SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

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Industry Challenges

Maintenance Optimization

70%

Operators are unaware of when to replace, upgrade or maintain assets [3]

Asset Failures

82%

82% of asset failures are random[1]
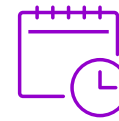
Unscheduled Downtime Avoidance

$260K

Average cost of industrial asset downtime/hour [2]

Safety Risk Management

Major Accident Hazards

Failure to address major accident hazards leads to injury, loss of profits and reputational damage

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AVEVA PI System + AVEVA APM – the Complete Picture

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ASSET PERFORMANCE MANAGEMENT

Site 1

Site 2

Site 3

Site (n)

AVEVA PI System

| ASSET STRATEGY OPTIMIZATION & INTEGRITY MANAGEMENT |
| ASSET INFORMATION MANAGEMENT |
| ENTERPRISE ASSET MANAGEMENT |
| MOBILITY |
| OPERATIONAL SAFETY MANAGEMENT |
| PREDICTIVE ANALYTICS |
| PRESCRIPTIVE ANALYTICS |
| ASSET LIBRARY |

DATA DRIVEN OUTCOMES

| FINANCIALLY OPTIMIZED APM |
| REGULATORY COMPLIANCE |
| CONNECTED WORK & CONTROL OF WORK |
| KNOWLEDGE RETENTION & TRAINING |
| SUSTAINABLE OPERATIONS |

AVEVA DIGITAL TWIN

AVEVA CLOUD

AVEVA

AVEVA Predictive Analytics

Anomaly detection for business-critical equipment.

- Advanced pattern recognition with sensors contribution, failure modes and prescriptive actions for reliable troubleshooting.

- Advanced Alert and Case Management for Knowledge capture and Reporting.

- Data playback capability for testing models.

- Templates for scale-up configuration/deployment.
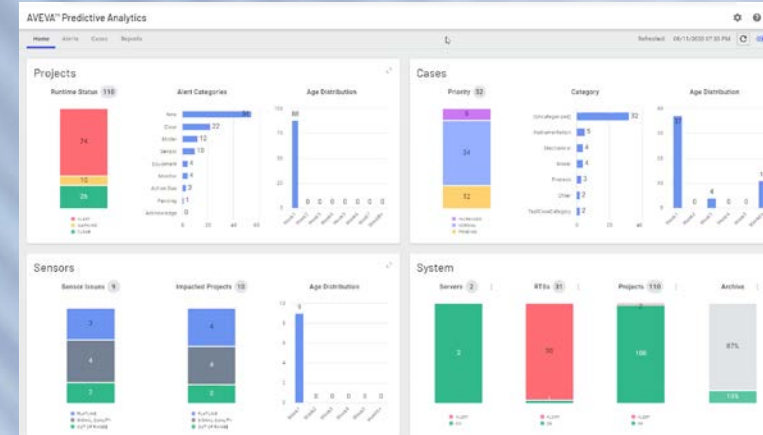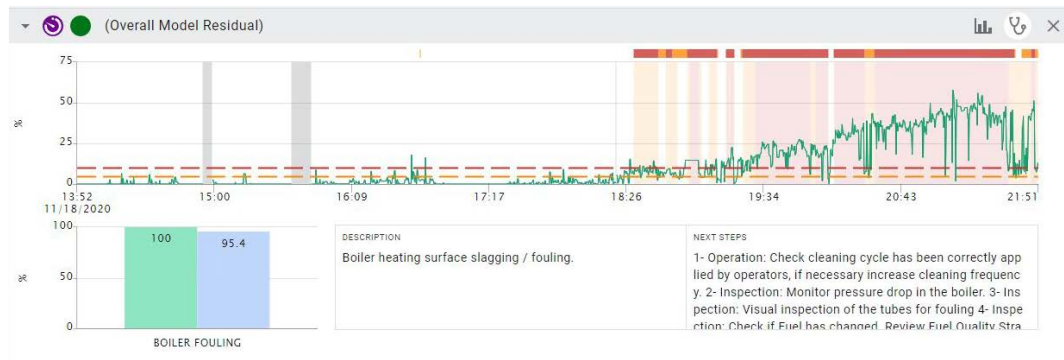
Predictive Analytics and PI System

From proven integration patterns towards a native integration

High-performance Integration

Core PI System

PI Data

Process data & Performance analytics

Predicted asset health

PA Agent

Predictive Analytics

PI AF

Asset hierarchy navigation

Dynamic linking to Predictive Asset AI models
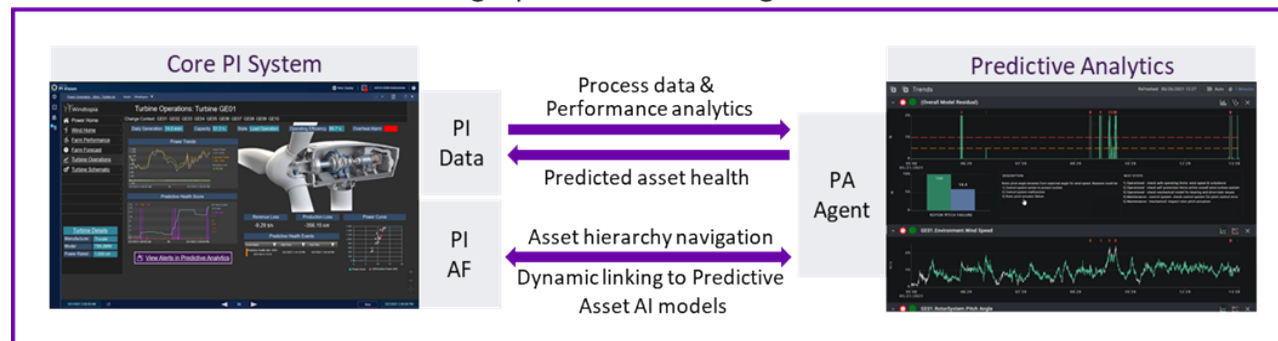
(High-availability through AF SDK)

Native Integration

Coming Soon

Core PI System

- Shared PI internal data store
  - Shared AF hierarchy
  - Shared calculations
- Automated model building based on AF

Predictive Analytics

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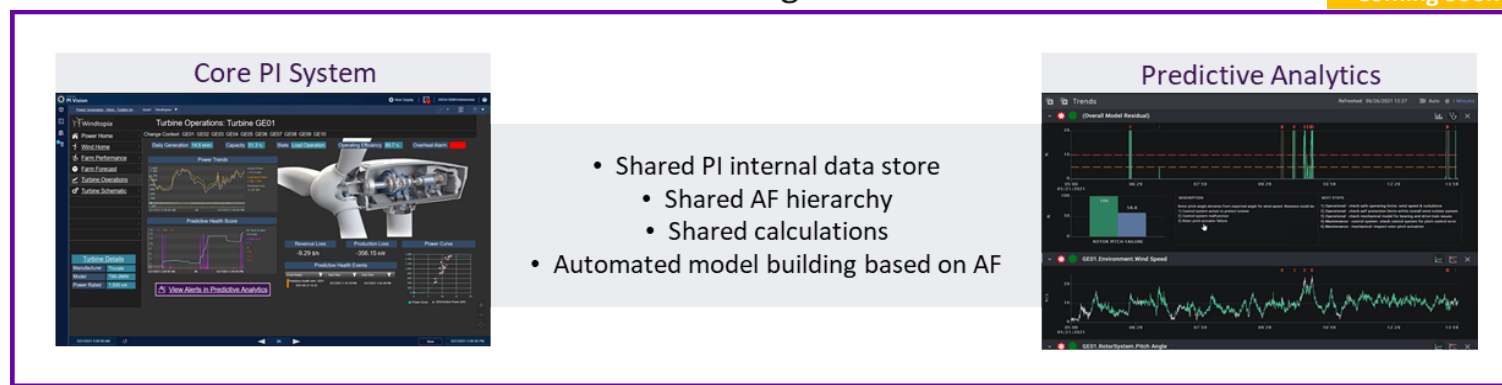
Best-in-class anomaly analysis

🔔 An anomaly was detected!
OK, but what are the next steps?

Which sensors are contributing to the anomaly?

- Overall anomaly score trending
- Individual sensor deviations trending
- Sensor contribution score to anomaly
- Diagnostics based on sensor deviation signature
- Ranking of potential faults
- Fault match trending
- Prescriptive guidance on inspections to perform
- Forecasting of sensors

What are the potential faults and related inspections?

What is the urgency level before breakpoint?

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AVEVA Predictive Analytics Benefits

Off the shelf solution:
no programming or data science knowledge required. Model building is a point and click operation.

Unparalleled breadth and depth of analyses with a proven approach.

Prescriptive actions provide guidance, reduce uncertainty and errors.

Operationalize AI at scale by leveraging templates and deploying models in minutes instead of weeks or months.

Achieve Asset Excellence

100s
of Millions Saved in Early Warning Catches

30%
Reduction in Maintenance Costs

25%
Improvement in Workforce Efficiency

25%
Reduction in Unplanned Downtime

AVEVA

Experience Matters - Mature APM Install Base

Air Liquide

Air Liquide uses AVEVA for SIO Predict digital transformation program

Artificial Intelligence based predictive analytics for early warning notification and diagnosis of equipment and process problems

BASF

BASF uses AVEVA for digital transformation initiative

Artificial Intelligence based predictive analytics for early warning notification and diagnosis of equipment and process problems and augmented reality

EDF

EDF uses AVEVA for centralized predictive asset health and performance monitoring of power production assets

Artificial Intelligence based predictive analytics for early warning notification and diagnosis of equipment and process problems
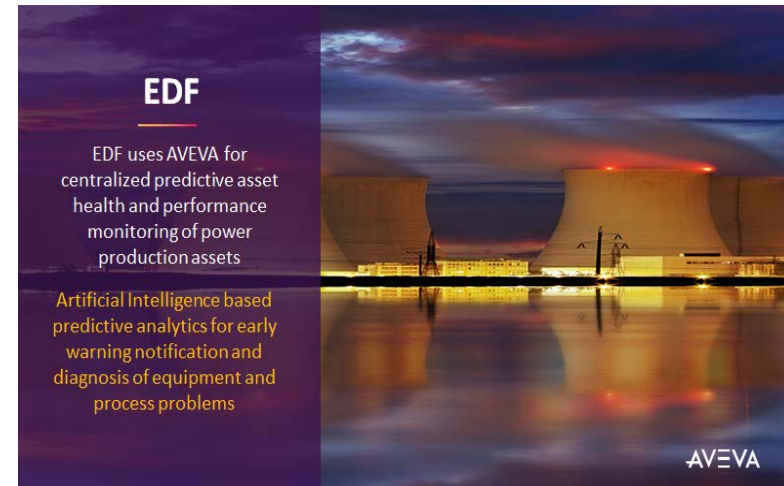
Total

Total uses AVEVA for centralized predictive asset health and performance monitoring of assets

Artificial Intelligence based predictive analytics for early warning notification and diagnosis of equipment and process problems

Duke Energy

Duke Energy uses AVEVA for predictive fleet asset health and performance monitoring

Enabling $100's millions saving

Early warning identification and diagnosis of equipment problems – improved reliability and performance

ADNOC

Abu Dhabi National Oil Company (ADNOC) implemented the Panorama Command Center

Enabling $100's millions saving per year

Improved visibility for faster decision making

AVEVA

Check out these great presentations!

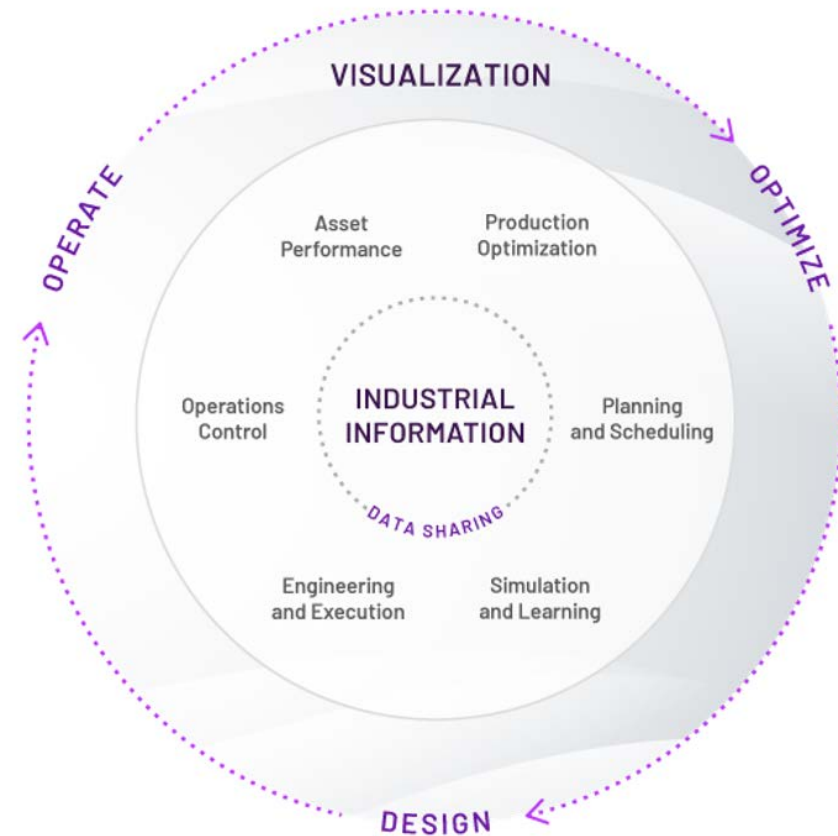## Underscoring the value and driving into the details

Today:

- Enterprise Visualization, A Step Change in Operational Awareness (Recording available soon!)

Wednesday:

- How SCG Chemicals' Digital Reliability Platform harnesses AI-infused APM to prevent unplanned downtime

- How AF is becoming an essential cornerstone to leverage multiple streams of Air Liquide SIO programs

- Increasing reliability of Pulp and Paper operations with AVEVA Predictive Analytics and AVEVA PI System

Thursday:

- Asset Performance Tech Track

- The Winning Integrations Track on Thursday

VISUALIZATION

OPERATE

OPTIMIZE

Asset Performance

Production Optimization

Operations Control

INDUSTRIAL INFORMATION

Planning and Scheduling

DATA SHARING

Engineering and Execution

Simulation and Learning

DESIGN

AVEVA

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AVEVA

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ABOUT AVEVA

AVEVA is a global leader in industrial software, driving digital transformation and sustainability. By connecting the power of information and artificial intelligence with human insight, AVEVA enables teams to use their data to unlock new value. We call this Performance Intelligence. AVEVA's comprehensive portfolio enables more than 20,000 industrial enterprises to engineer smarter, operate better and drive sustainable efficiency. AVEVA supports customers through a trusted ecosystem that includes 5,500 partners and 5,700 certified developers around the world. The company is headquartered in Cambridge, UK, with over 6,500 employees and 90 offices in over 40 countries.

Learn more at www.aveva.com

AVEVA