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AVEVA Enterprise SCADA Innovations and Roadmap

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O&G Pipeline Industry Imperatives

Industry Drivers & AVEVA Differentiation	
Public safety and environmental regulations	Most highly distributed, highly available solution with defense-in-depth security layers
	Proven Control Room Management applications to enable regulatory compliance
Operations optimization	Proven Liquids & Gas applications for safety, efficiency, and optimization
Reduced Total Cost of Ownership	Multi-year program to attack TCO and simplify upgrades

Growing / New Imperatives	
Security ++	Industry leading security to support the most stringent standards and regulations
Industrial Transformation	Intelligent Midstream: Unmatched portfolio to deliver integrated Edge to Enterprise solutions
Sustainability	Helping customers achieve sustainability goals is core to AVEVA's mission

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Intelligent Midstream

Combining the world's most trusted pipeline management system with the world's leading information management solution

Enterprise Pipeline Management

Global leader in Pipeline Management for 35+ years

- Deep domain knowledge
- 35% global market share in Midstream SCADA software *
- 1 + miles of pipe
- 60% of U.S. Oil and Gas Pipeline Movement Supported
- 30 / 40 US Liquids Pipelines trust AVEVA

OSIsoft's PI System

Industrial information management industry standard for 25+ years

- 15 of the top 20 global Midstream companies rely on PI System
- 70% of daily oil and gas production is facilitated by the PI System
- Foundational data strategy component for 85% of the largest integrated O&G companies

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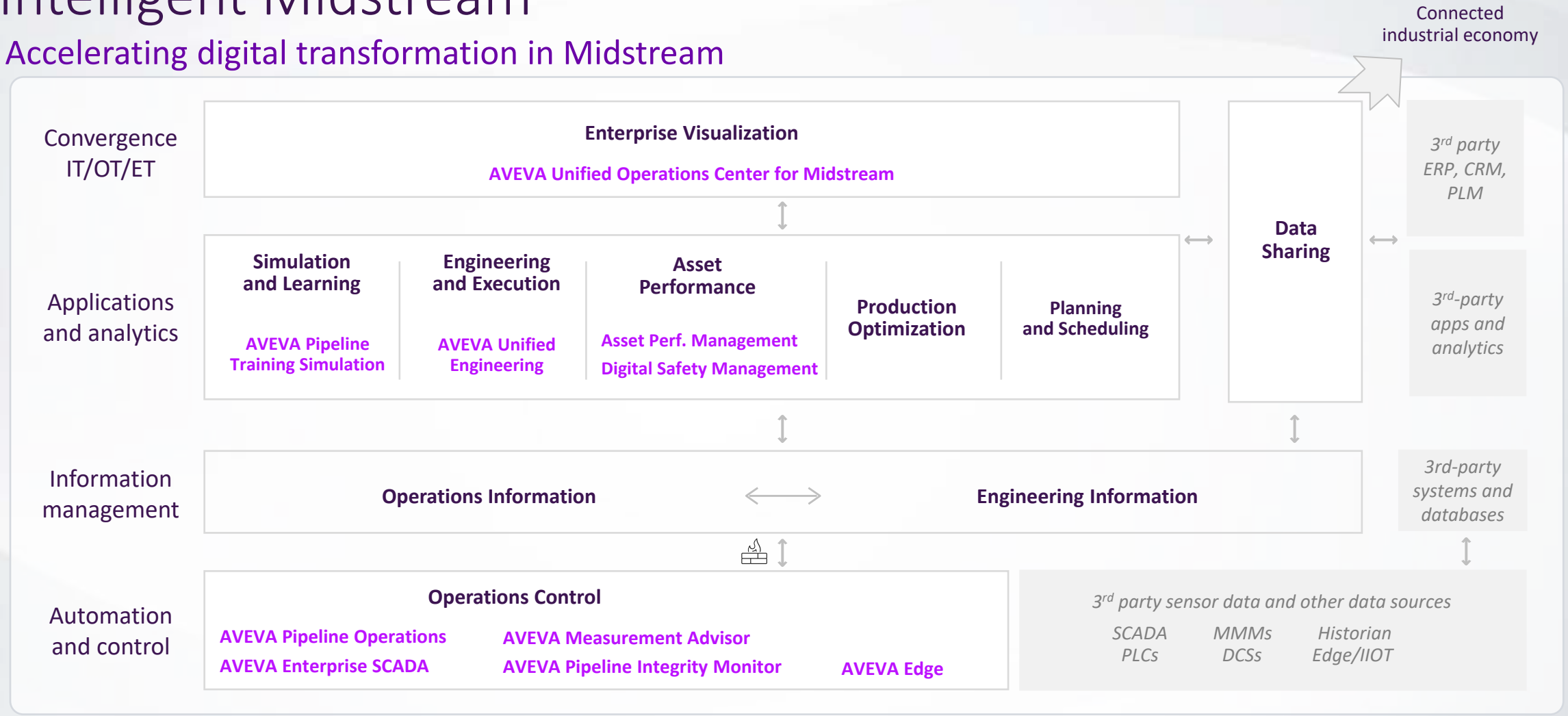
*ARC SCADA Systems for Oil and Gas (2020).

Intelligent Midstream

Accelerating digital transformation in Midstream



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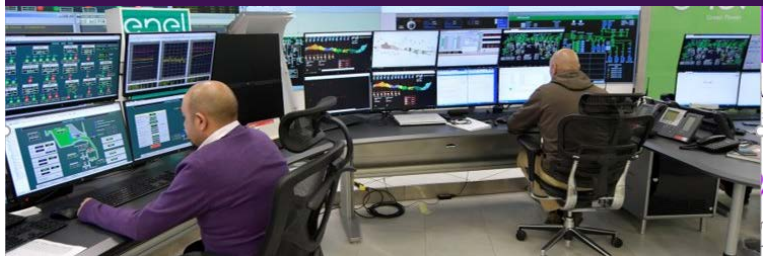
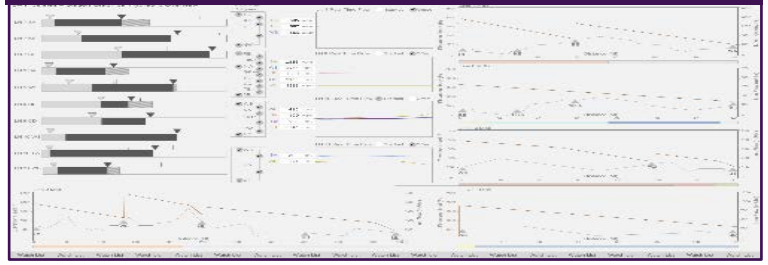
Platformed and Modernized SCADA

Modernized SCADA / Lower TCO



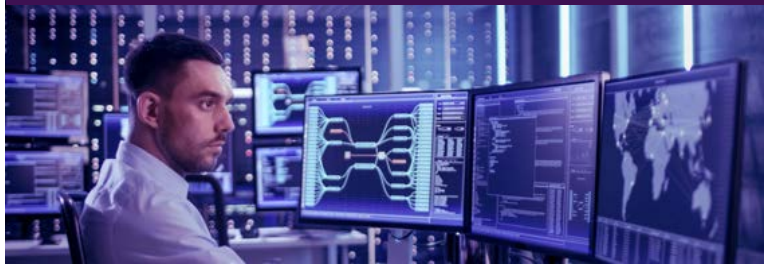
- Re-architected for upgradability and simplified deployment
  - 60%+ deployment hour decrease
- World class quality and reliability
- Performance for the world's largest pipelines
- New comprehensive extensibility
- OPC UA and MQTT Sparkplug B

Advanced Control Room Management



- Built over many years with industry
- Situational awareness, safety, & regulatory compliance
- Out of the box ASM / API-1165 compliant displays
- Industry leading alarm handling
- High performance trending

Industry Leading Cybersecurity



- "Baked In" from the beginning
- ISASecure SDLA and ISO 270001 certified
- Defense in-depth focus
- Hardened Reference Architecture
- U.S. TSA Security Directives compliance assistance

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Trusted Advanced Pipeline Applications

Modernized Pipeline Applications

- Productized 30+ years of functionality
- Expanded leak detection methods
- Pipeline Training Simulator
  - Comprehensive Unified Learning solution
  - Options to meet every training need
- Comprehensive Measurement solutions
  - Measurement Analyst efficiency
  - Cloud (coming soon)

Augmented Intelligence & Automated Operations

- Automatically detect and avoid unsafe operating conditions
- Predictive and Lookahead gas apps
- Enhanced leak detection analytics and visualization
- No code / low code automated operations
- AI & Simulation driven optimization

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What's New: No Code / Low Code Automated Operations

Simplified & flexible automation

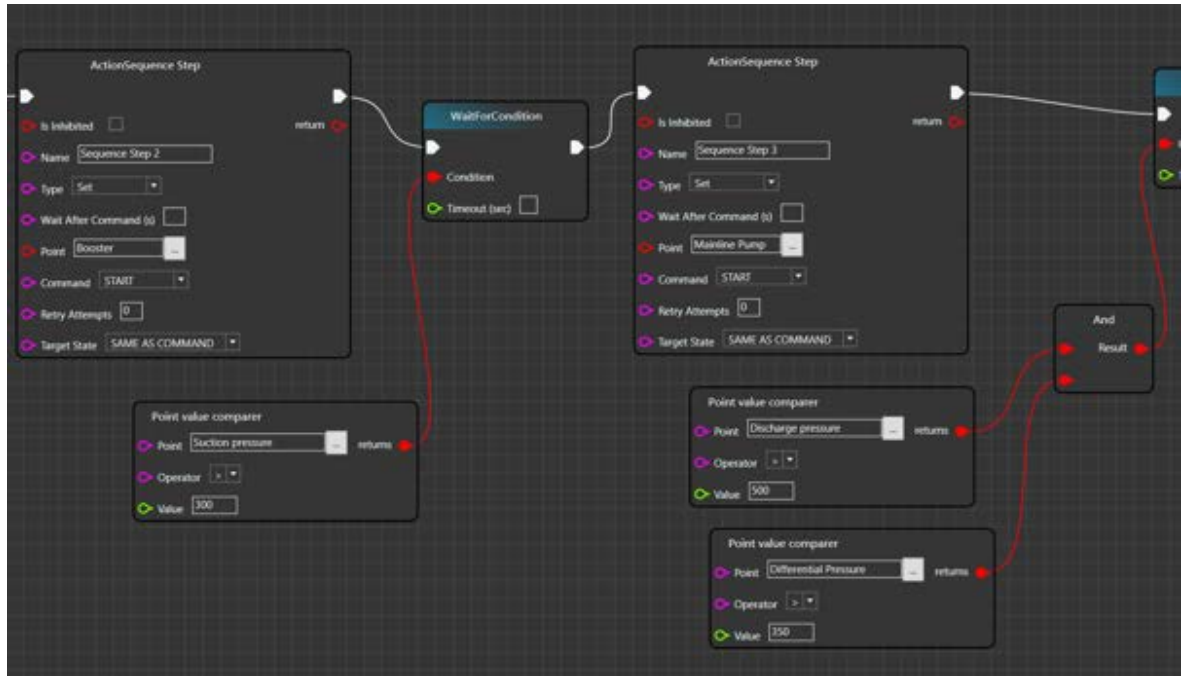
- Graphical coding environment
- Pipeline shutdown, pump startup, automated procedures…

"Nodes" specific to pipeline automation

- Specific SCADA commands
- Timed and condition-based wait options
- Conditional logic to control execution path

Designed for Mission Critical Systems

- High Availability & Disaster Recovery features



Easy drag and drop interface

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EXAMPLE USE CASES

Intelligent Midstream solutions that deliver results

Rapid return on investment scalable across your organization

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- Asset Health
- Process Optimization
- Energy Efficiency
- Regulatory Compliance
- Quality Tracking
- Carbon Emissions
- Safety & Security
- Energy Efficiency

Example Use Cases

- Energy optimization
- Carbon footprint tracking and minimization
- Gas Quality Tracking
- Compressor modeling and optimization
- Look-ahead and what-if simulation
- DRA optimization
- Pump efficiency
- Batch tracking / landing
- Swing operation optimization
- Product compatibility checking
- Pipeline startup and shutdown
- Hydraulic optimization
- Schedule optimization

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EXAMPLE USE CASE

Energy optimization and decreased carbon footprint

Using reinforcement learning and AI

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Energy Optimization and Lower Emissions

Lower costs and decreased carbon footprint

Challenge

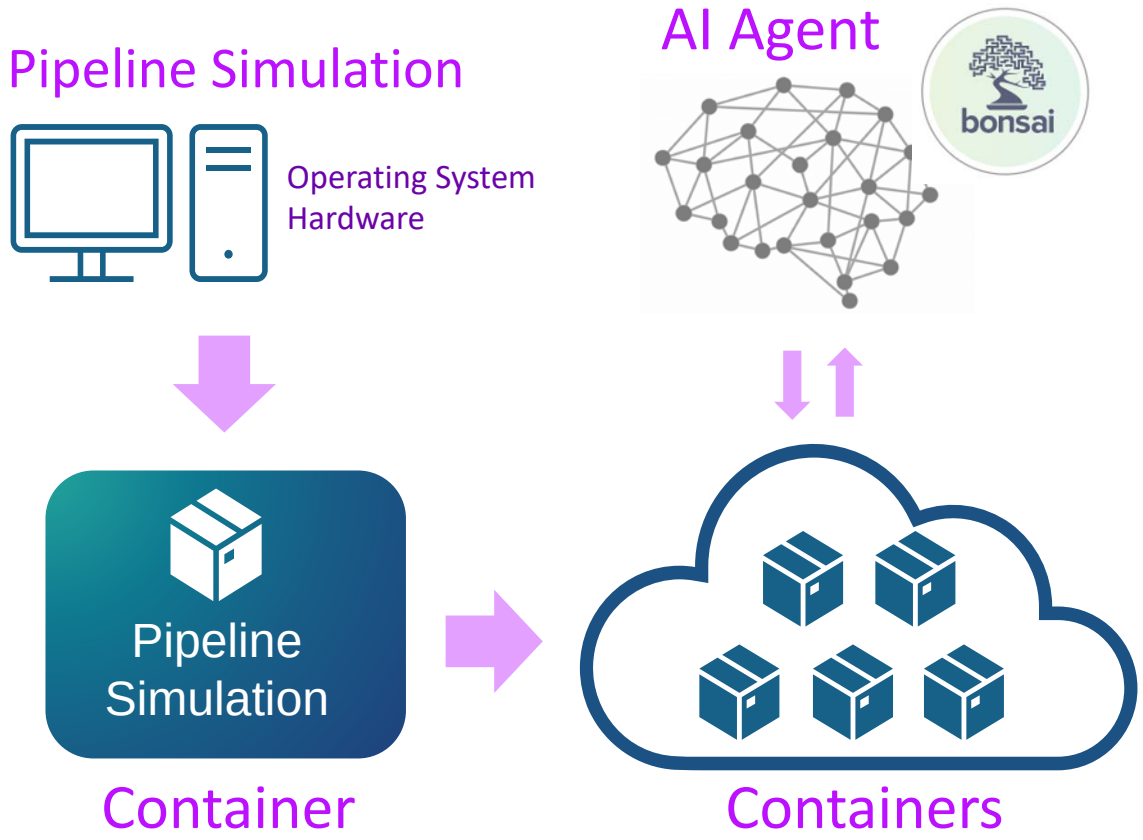
- Incorporate energy utilization and carbon emissions in daily operating decisions to decrease costs and carbon emissions
- Energy is the #1 cost of most pipelines; Rising year over year
- Ambitious greenhouse gas reduction targets to meet

Solution

- AVEVA Pipeline Simulation, Microsoft Bonsai AI, AVEVA Connect, AVEVA Enterprise SCADA
- Machine Learning algorithm tuned with simulation and live data to accurately model and optimize power consumption and emissions
- Operator provided with optimal equipment line up and DRA injection rates for current operating conditions and objectives

Results

- 14% reduction in power consumption
- Reduced DRA costs
- Opportunity to decrease $52MM/year -> $45MM/year



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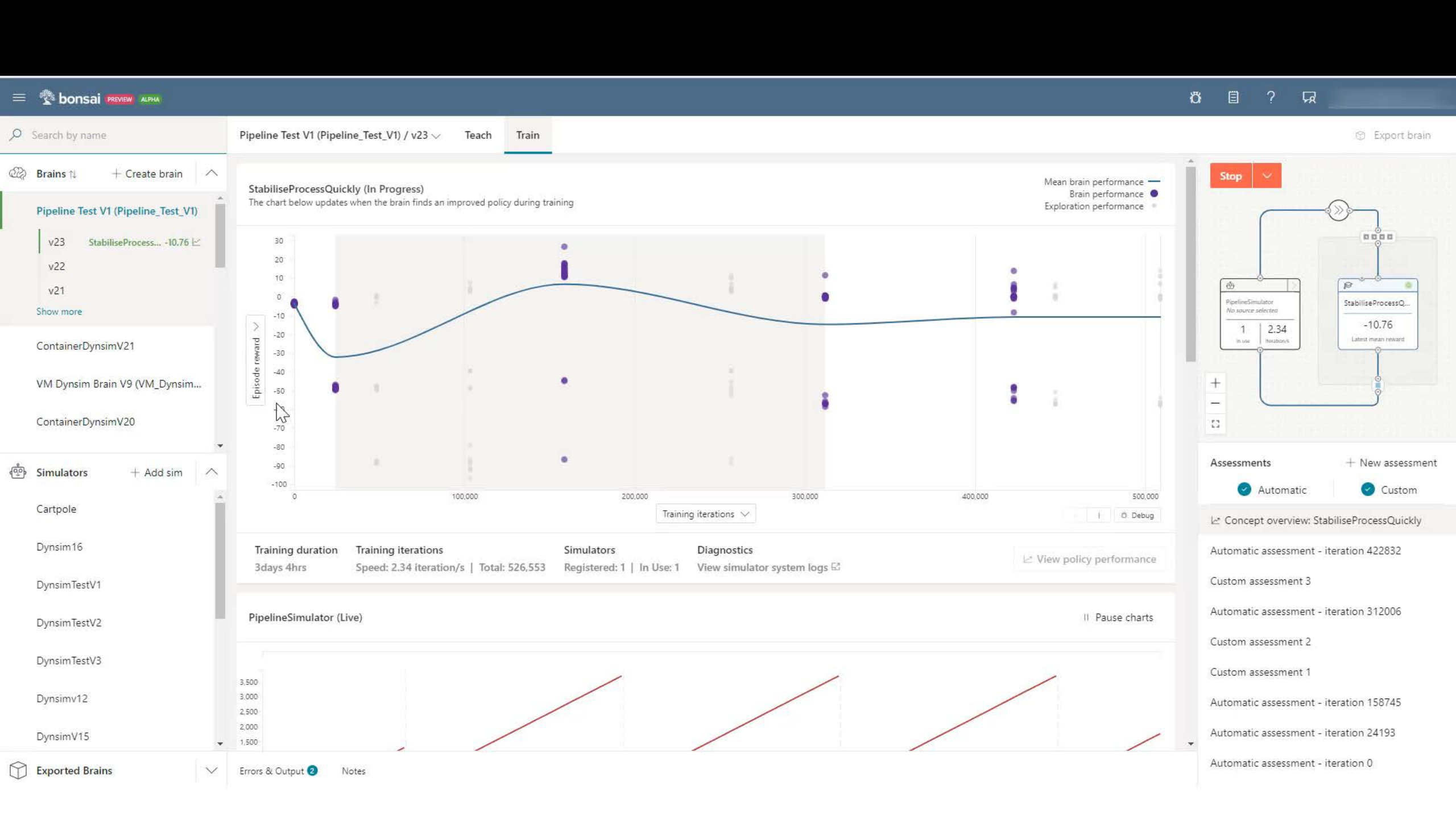
bonsai PREVIEW ALPHA
Search by name
Pipeline Test V1 (Pipeline_Test_V1) / v23
Teach
Train
Export brain
Brains
Create brain
Pipeline Test V1 (Pipeline_Test_V1)
v23 StabiliseProcess... -10.76
v22
v21
Show more
ContainerDynsimV21
VM Dynsim Brain V9 (VM_Dynsim...
ContainerDynsimV20
Simulators
Add sim
Cartpole
Dynsim16
DynsimTestV1
DynsimTestV2
DynsimTestV3
Dynsimv12
DynsimV15
Exported Brains
StabiliseProcessQuickly (In Progress)
The chart below updates when the brain finds an improved policy during training
Mean brain performance
Brain performance
Exploration performance
Episode reward
Training iterations
Debug
Training duration
3days 4hrs
Training iterations
Speed: 2.34 iteration/s | Total: 526,553
Simulators
Registered: 1 | In Use: 1
Diagnostics
View simulator system logs
View policy performance
PipelineSimulator (Live)
Pause charts
Errors & Output 2
Notes
Stop
PipelineSimulator
No source selected
1
2.34
StabiliseProcessQ...
-10.76
Latest mean reward
Assessments
New assessment
Automatic
Custom
Concept overview: StabiliseProcessQuickly
Automatic assessment - iteration 422832
Custom assessment 3
Automatic assessment - iteration 312006
Custom assessment 2
Custom assessment 1
Automatic assessment - iteration 158745
Automatic assessment - iteration 24193
Automatic assessment - iteration 0

Intelligent Midstream

Additional reinforcement learning and AI use cases

Optimize		Trained to optimize energy use, emissions, throughput, or cost
Operate		Trained to automate pipeline operations such as startup, shutdown, and batched operations
Advise		Provide real time alerts and recommendations to the Operator
Train		Used for Operator training and qualification scenarios

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EXAMPLE USE CASE

Agile decision making to seize a revenue opportunity

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Capacity Optimization to Deliver Additional Volume

Challenge

- Spot opportunity to deliver 30 Mbbls additional volume
- Evaluate capacity across multiple pipeline systems
- Quickly analyze power, DRA, and re-allocation options to deliver more volume

Solution

- AVEVA Unified Operations Center, PI System, Pipeline Simulation, 3rd-party power optimization
- Increase capacity through DRA, re-allocate volumes across systems, and manage storage to deliver the additional 30 Mbbls

Results

- Incremental revenue
- Improved service levels
- Increased asset utilization

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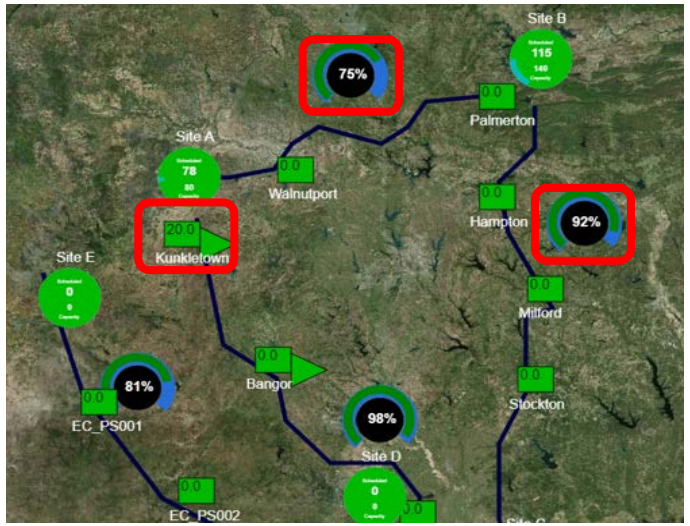
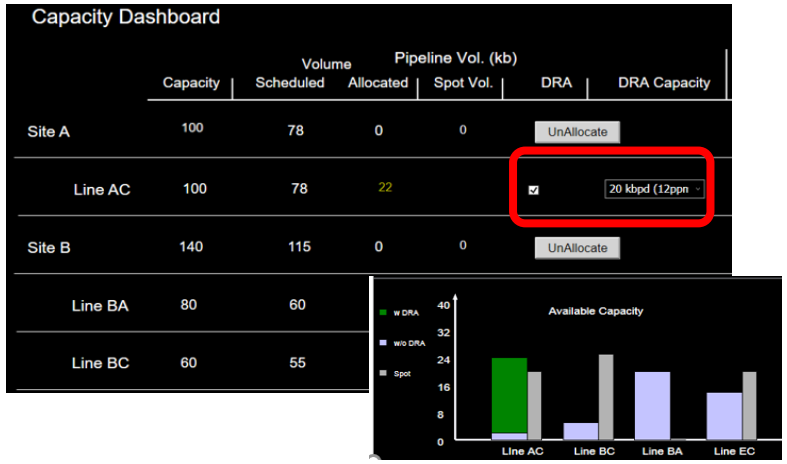
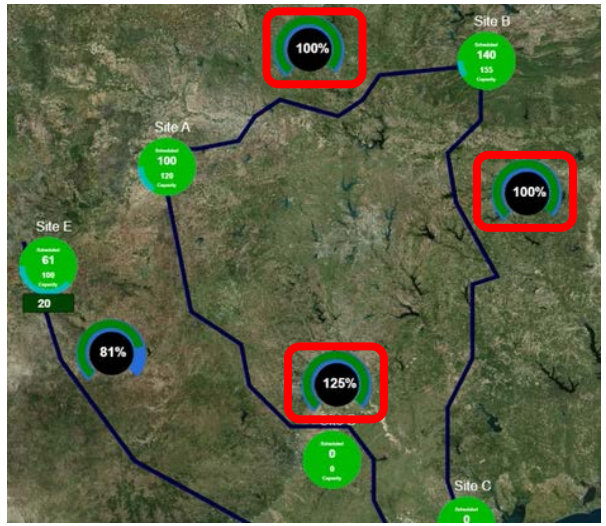
Capacity Optimization to Deliver Additional Volume







- Easily see capacity, storage, and DRA utilization across systems
- Drill down for increasing detail
- Pinpoint bottlenecks and opportunities across systems

- Check and lock in DRA scenario on A-C
  - In AVEVA Pipeline Simulation or 3rd-party tool
- Quickly evaluate Re-allocation options across systems
- Target can be achieved
  - Increase A-C capacity with DRA
  - Split incremental volumes between B-A and B-C

- Submit new nominations across systems
- Lock in new DRA and re-allocation plan
- Decision made in hours vs. days
  - Eliminate manual data gathering and difficult cross group communication challenges

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