MARCH 1, 2023

Collecting Data from your Enterprise with PI

Operations Information Management with the PI System

Andrew Nathan, Presales Manager - AVEVA

PI System: trusted by essential industries for over 40 years

Oil & Gas
85%

of the top oil and gas companies

Power & Utilities
1,000+

utilities worldwide

Mining & Metals
9

of the top 10 Mining companies

Pharma & Life Sciences
24

of the top 25 Pharmaceutical companies

Chemicals
9

of the top 10 Chemical companies

Manufacturing
6

of the World Economic Forum's Factories of the Future

AVEVA

Better data. Better business outcomes.

Asset health
DCP Midstream saved
$20-25 million
in first year

Energy efficiency
Air Liquide achieved
10x ROI
in operational savings in first 8 months

Process optimization
ArcelorMittal shipped
26M additional tons
for $120M in added revenue

Quality tracking
Deschutes postponed
$8 million
capital upgrade

Compliance & sustainability
TasWater sped up response time by
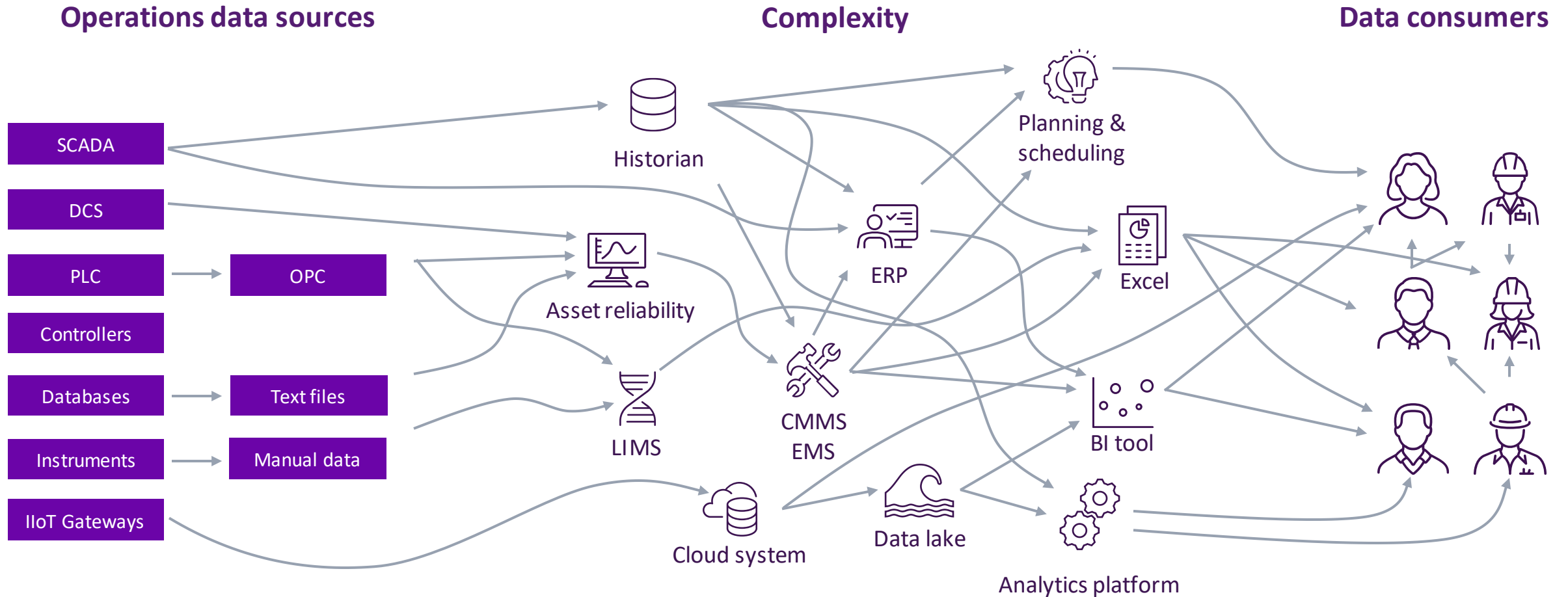**13 hours**
and saved the local oysters

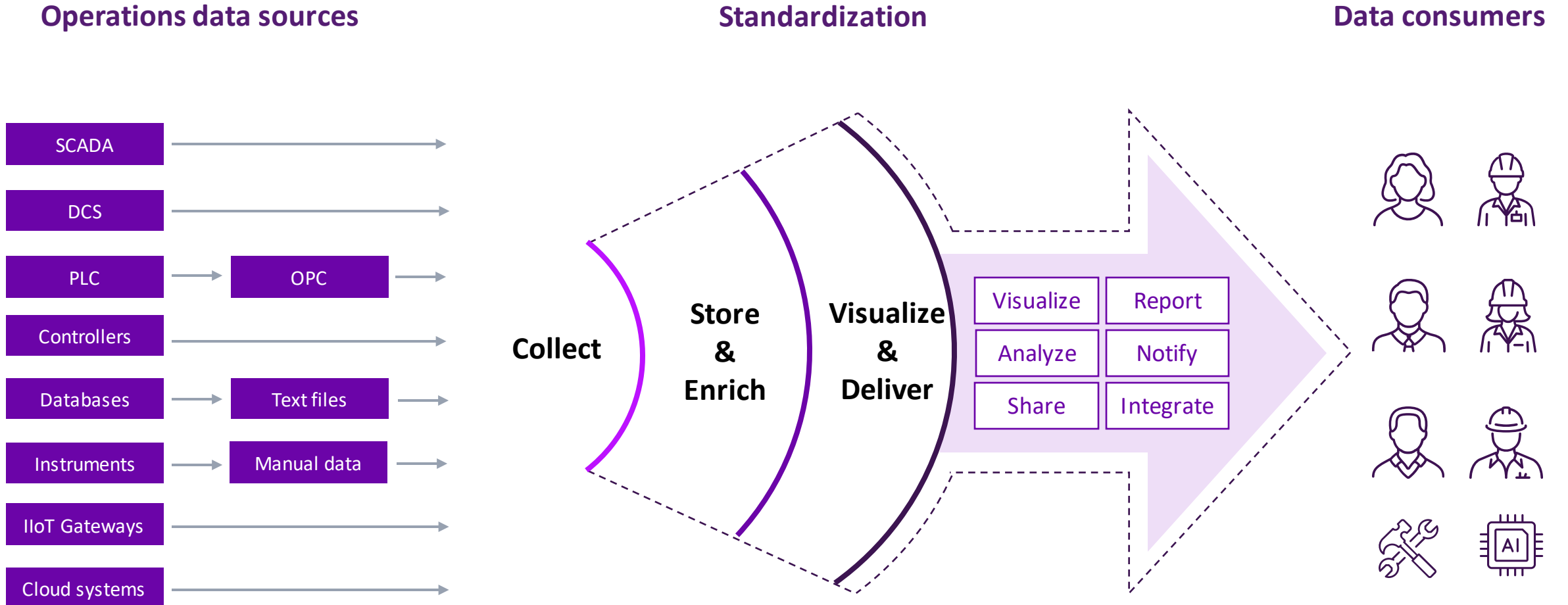### Safety & resilience
Qatar Power operated over
3,452 days
without lost-time accidents

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Managing operations data is complex

Operations data sources

Complexity

Data consumers

SCADA

DCS

PLC → OPC

Controllers

Databases → Text files

Instruments → Manual data

IIoT Gateways

Historian

Asset reliability

LIMS

Planning & scheduling

ERP

Excel

CMMS EMS

Cloud system

Data lake

BI tool

Analytics platform

AVEVA

Connect people to data with an infrastructure approach

Operations data sources

Standardization

Data consumers

SCADA

DCS

PLC → OPC

Controllers

Databases → Text files

Instruments → Manual data

IIoT Gateways

Cloud systems

Collect

Store & Enrich

Visualize & Deliver

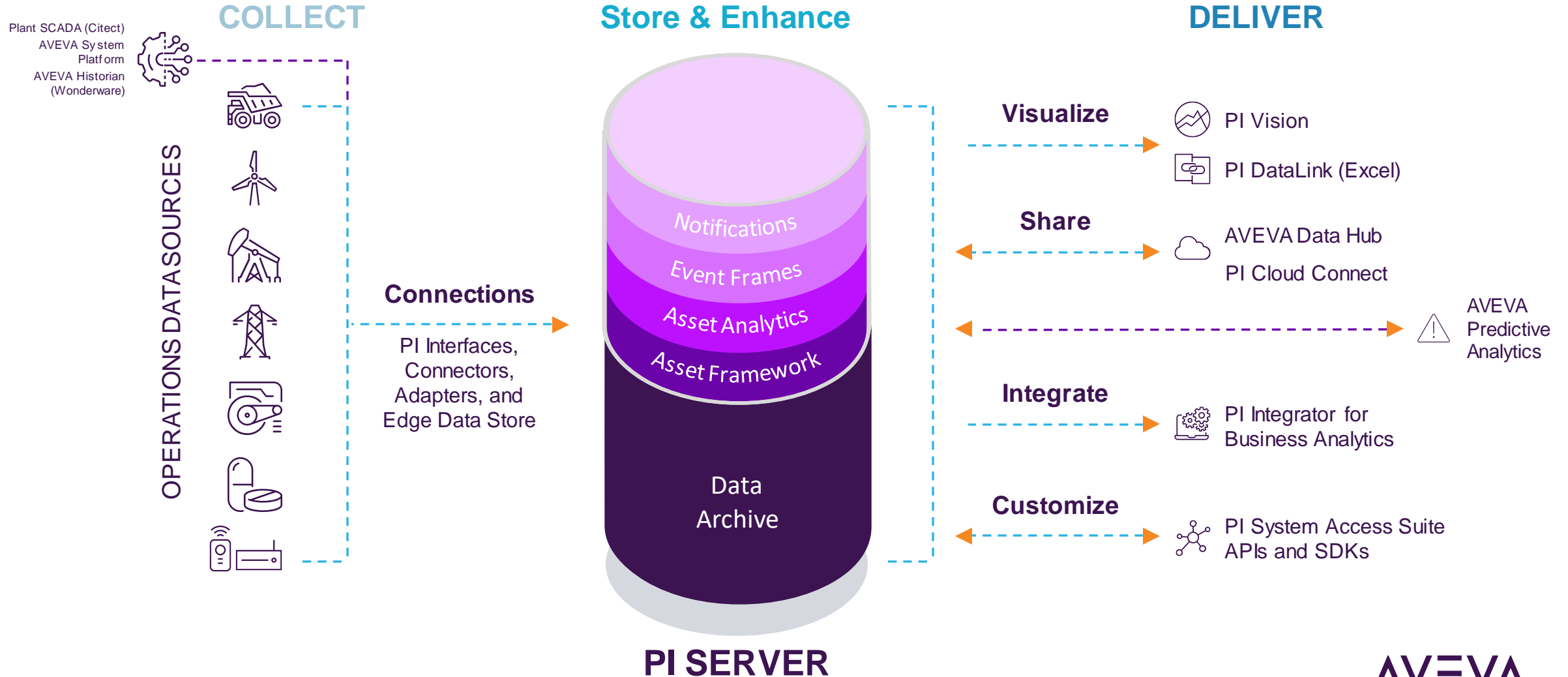| Visualize | Report |
| Analyze | Notify |
| Share | Integrate |

AVEVA

AVEVA PI System's edge to plant to cloud data management

An integrated, edge-plant-cloud architecture supports OT, IT and IIoT use cases

In the cloud

Scalable data services available for a wider array of users, tools and applications

At the edge

Pervasive, real-time data collection from sensors, IIoT devices and remote assets

On-premises

Enriched industrial data available 24/7 for critical operations

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The On-prem PI System

COLLECT

Store & Enhance

DELIVER

Plant SCADA (Citect)
AVEVA System Platform
AVEVA Historian (Wonderware)

OPERATIONS DATASOURCES

Connections

PI Interfaces, Connectors, Adapters, and Edge Data Store

Notifications
Event Frames
Asset Analytics
Asset Framework
Data Archive

PI SERVER

Visualize — PI Vision
PI DataLink (Excel)

Share — AVEVA Data Hub
PI Cloud Connect

AVEVA Predictive Analytics

Integrate — PI Integrator for Business Analytics

Customize — PI System Access Suite APIs and SDKs

AVEVA

PI Server

PI Server is the real-time data storage, normalization, analytics, and notification engine at the **heart of on-prem deployments.**

- Single source of truth for all users
- Layered capabilities enhance operations data

PI Server

AVEVA
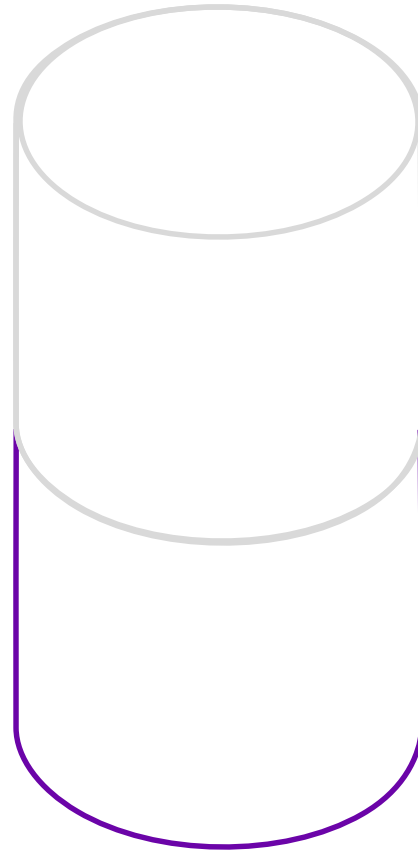
Data Archive

Optimized storage & access to massive volumes of operational data

- Store millions of data streams and thousands of values per second over multiple decades

- Maintain the original fidelity of your data

- Keep your data online for immediate, real-time retrieval

- Store future data from predictive models and other sources

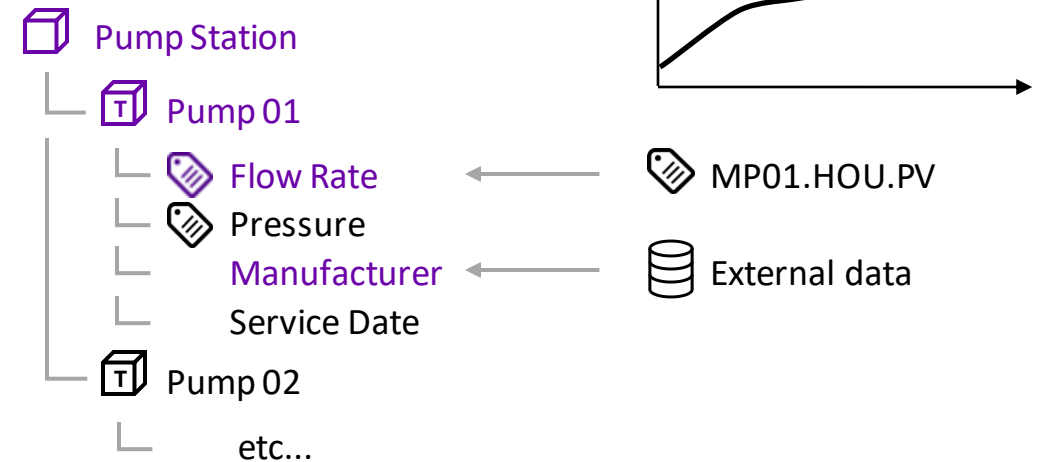**Data Archive**

PI Server

🏷 MP01.HOU.PV

AVΞVA
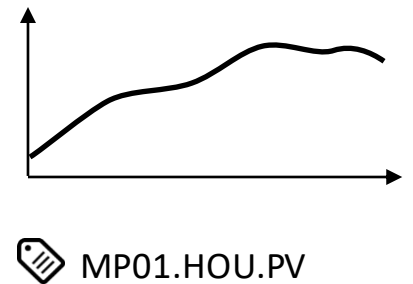
Asset Framework

Organize and contextualize your operational data in a way that makes sense to users across your enterprise — not just SCADA experts

- Label data with human-friendly names

- Group related data into assets

- Add metadata and context manually or from external systems
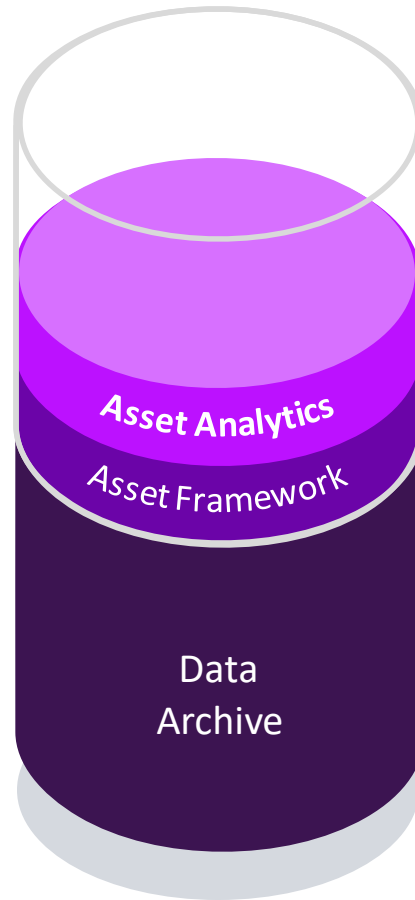
- Standardize groupings, labels, and units with templates
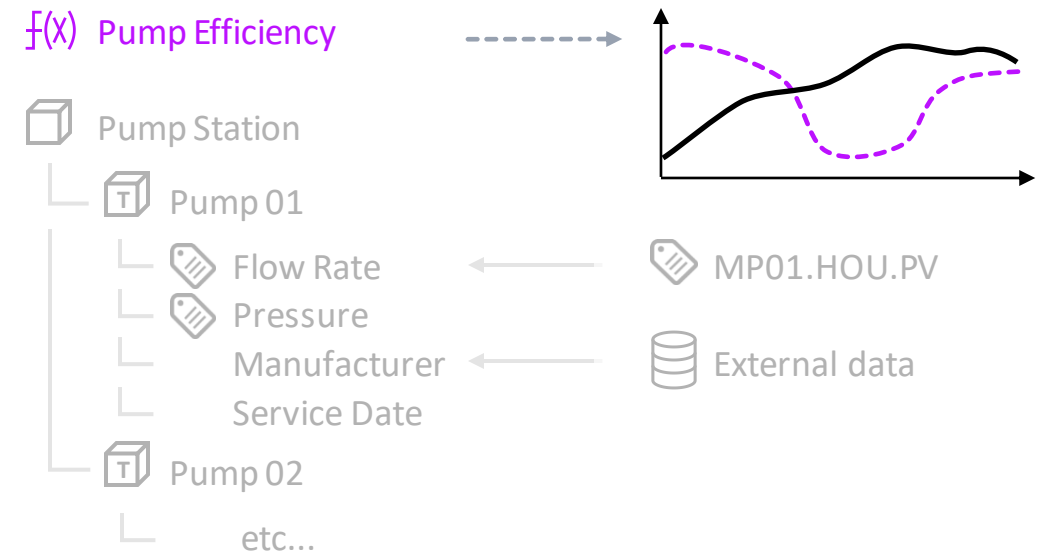

PI Server

Pump Station
  └─ Pump 01
      ├─ Flow Rate ← MP01.HOU.PV
      ├─ Pressure
      ├─ Manufacturer ← External data
      └─ Service Date
  └─ Pump 02
      └─ etc...

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Asset Analytics

Standardize and centralize your operations calculations and KPIs with continuous real-time results

- Easy-to-use interface and a rich set of built-in functions

- Migrate equations from Excel or other tools

- Templatize and roll out calculations across multiple assets in bulk

- Backfill calculation results as far back as you have source data

PI Server

ƒ(X) Pump Efficiency

Pump Station
└ Pump 01
  └ Flow Rate ← MP01.HOU.PV
  └ Pressure
  └ Manufacturer ← External data
  └ Service Date
└ Pump 02
  └ etc…

Asset Analytics
Asset Framework

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Examples

Calculate daily average flow rate

TagAvg('Pump Flow Rate','YESTERDAY','NOW')

Convert numbers to a status

IF 'Current Draw' > 1 THEN "On" ELSE "Off"

See how long an asset has been running since maintenance
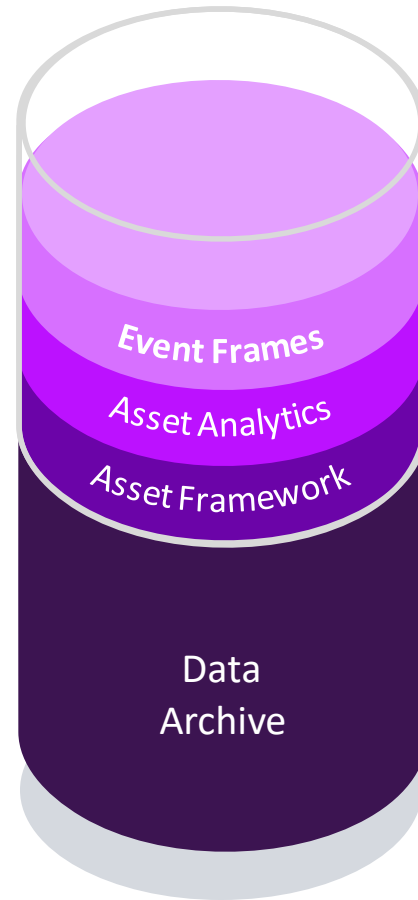
TimeEq(Status, Service Date,'NOW',"Running")

Functions   *Tag values or Attributes*   *Time*

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Event Frames

Automatically **bookmark important events** in your operations

- Find the minute that matters in a decade's worth of data

- Capture events based on user-defined process thresholds or other KPI triggers

- Store related context and calculations within Event Frames

- Easily analyze and compare these events in bulk

Event Frames

Asset Analytics

Asset Framework

Data Archive

PI Server

Low Efficiency Event

ƒ(X) Pump Efficiency

Pump Station

Pump 01

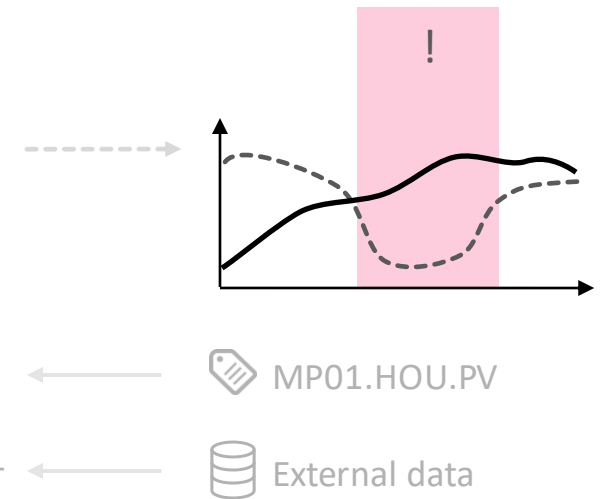Flow Rate ⟵ MP01.HOU.PV

Pressure

Manufacturer ⟵ External data

Service Date

Pump 02

etc...

!

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Event Frames

Automatically **bookmark important events** in your operations

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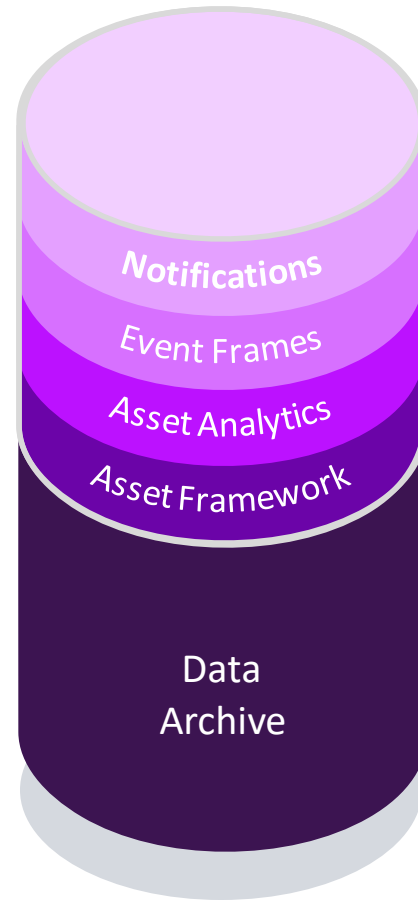
Examples

- Anomalies, failures, KPI changes

- Downtime, curtailment, production loss

- Batches (recipes, units, procedures, phases)

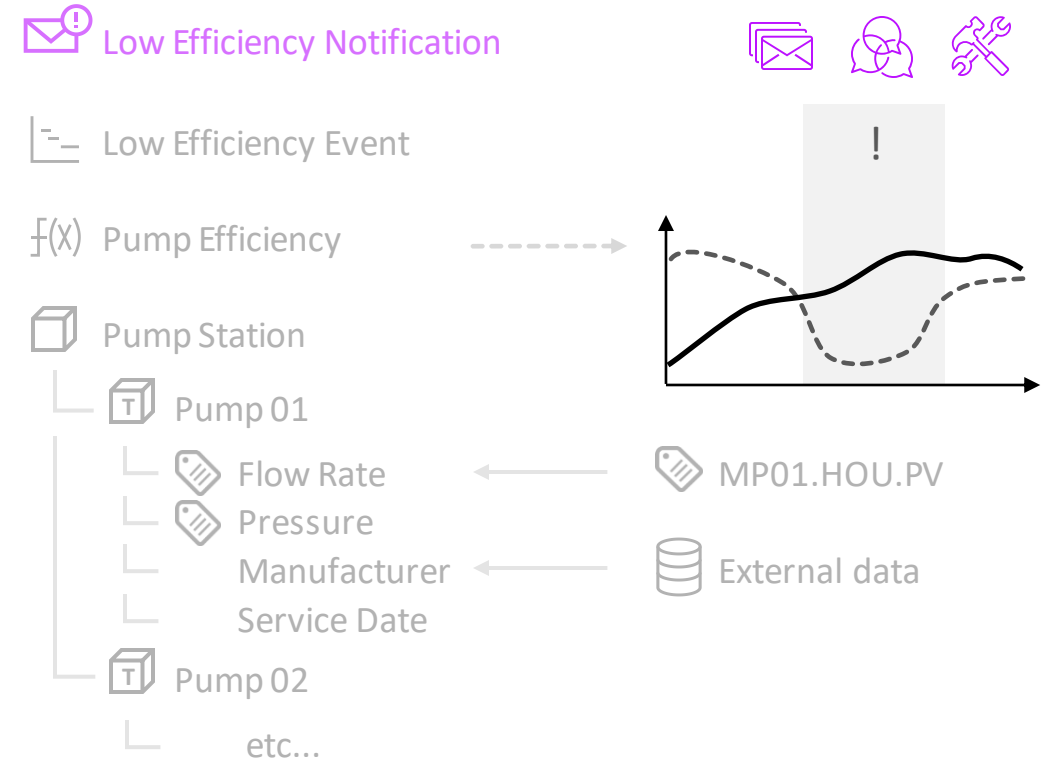- Repeating events: start-up, shift performance

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Notifications

Automatically send alerts to the right people with the right information

- Configure notification emails to contain values, trends, links, and attachments

- Design specific email formats for different recipients

- Send to individuals or groups, and automatically escalate if unacknowledged

- Send directly to web services for integrating with 3rd-party systems

PI Server

Notifications

Event Frames

Asset Analytics

Asset Framework

Data Archive

Low Efficiency Notification

Low Efficiency Event

Pump Efficiency

Pump Station

Pump 01

Flow Rate ← MP01.HOU.PV

Pressure

Manufacturer ← External data

Service Date

Pump 02

etc...

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The PI System

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AVEVA

PI Server turns data into decision-ready information

| Data Archive | Asset Framework | Asset Analytics | Event Frames | Notifications |

Asset 97: Springfield

Asset 42: Springfield

Average uptime

Underperforming asset

Energy usage: Site 1

Energy usage: Site 2

Total energy usage

Shift change

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