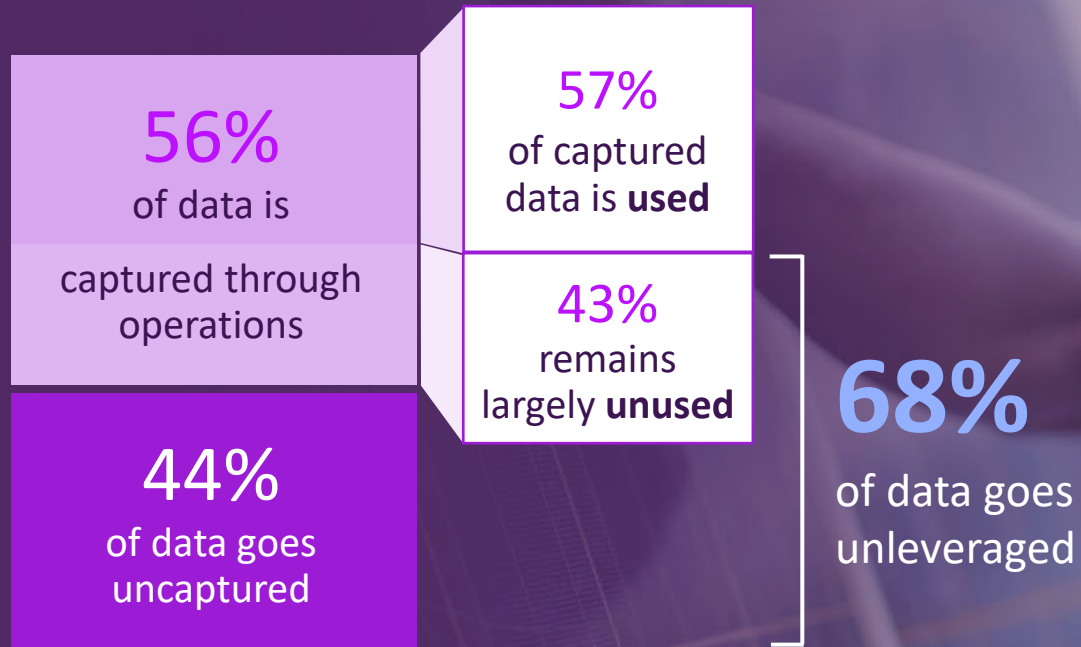APRIL 2024

PI Historian for Single Source of Truth for the Enterprise

Operational data management for essential industries

Mike Norton – Solution Consultant

AVΞVA

According to Seagate,
only **32%** of the data available
to enterprises was put to work

56%
of data is
captured through
operations

44%
of data goes
uncaptured

57%
of captured
data is **used**

43%
remains
largely **unused**

68%
of data goes
unleveraged

Source: The Seagate Rethink Data Survey, IDC, 2020

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# Real-time operations data is the lifeblood of your business

Harnessing it is essential to ensure teams and systems have reliable, relevant and timely information in context to support real-time decision making and uncover operational insights…

- ✓ Ensuring **availability** and **reliability** of assets

- ✓ Optimizing **production** and **uptime**

- ✓ Reducing **opex** and **capex**

- ✓ Minimizing **maintenance**

- ✓ Improving **energy efficiency** and **sustainability**

- ✓ Ensuring **quality control** and **compliance**

- ✓ Protecting workers **health** and **safety**

- ✓ **Creating competitive advantage**

What makes OT data so difficult to harness?

Scope, scale, secure sharing

Secure sharing

Historical reference

Real time

Future prediction
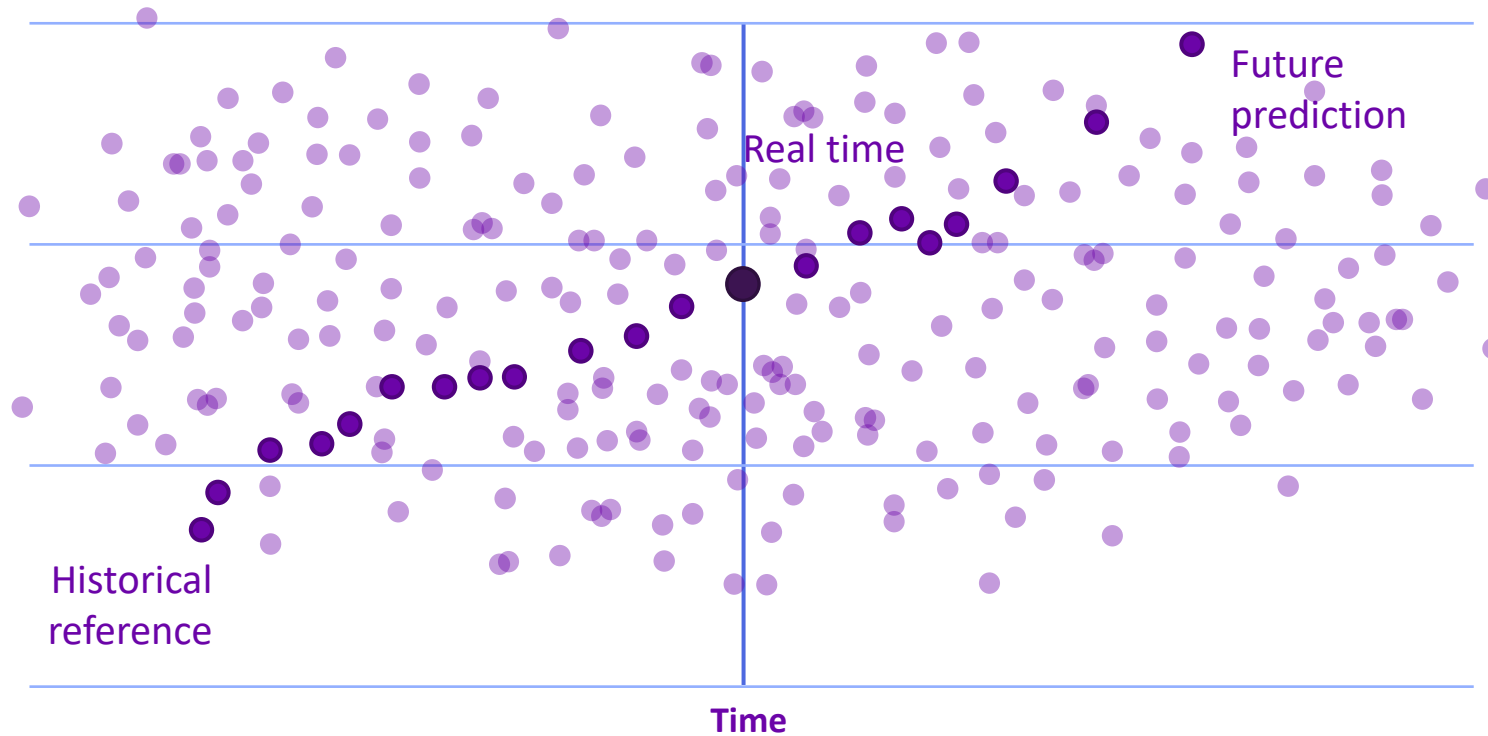
Time

SCOPE
Collect data

- Legacy and new
- High fidelity
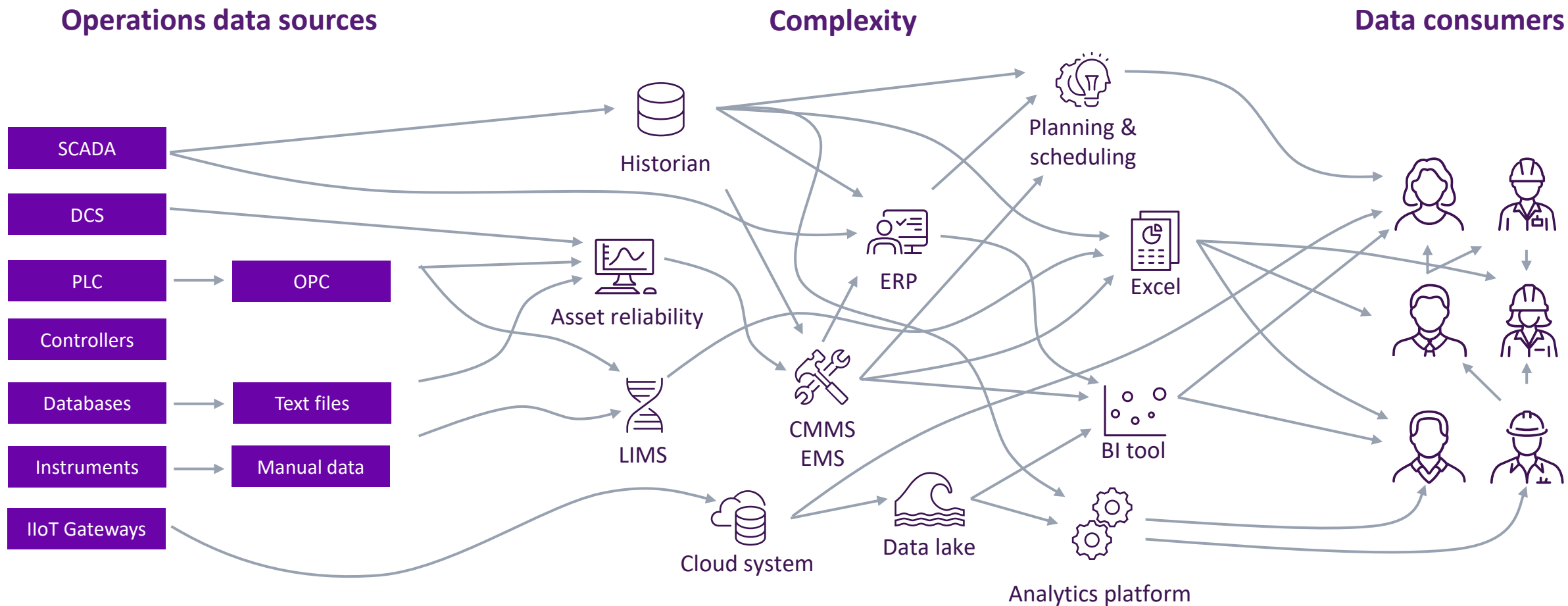- Real time and historical

SCALE
Manage data

- Store for rapid retrieval
- Secure at rest and in motion
- Clean, transformed, and contextualized
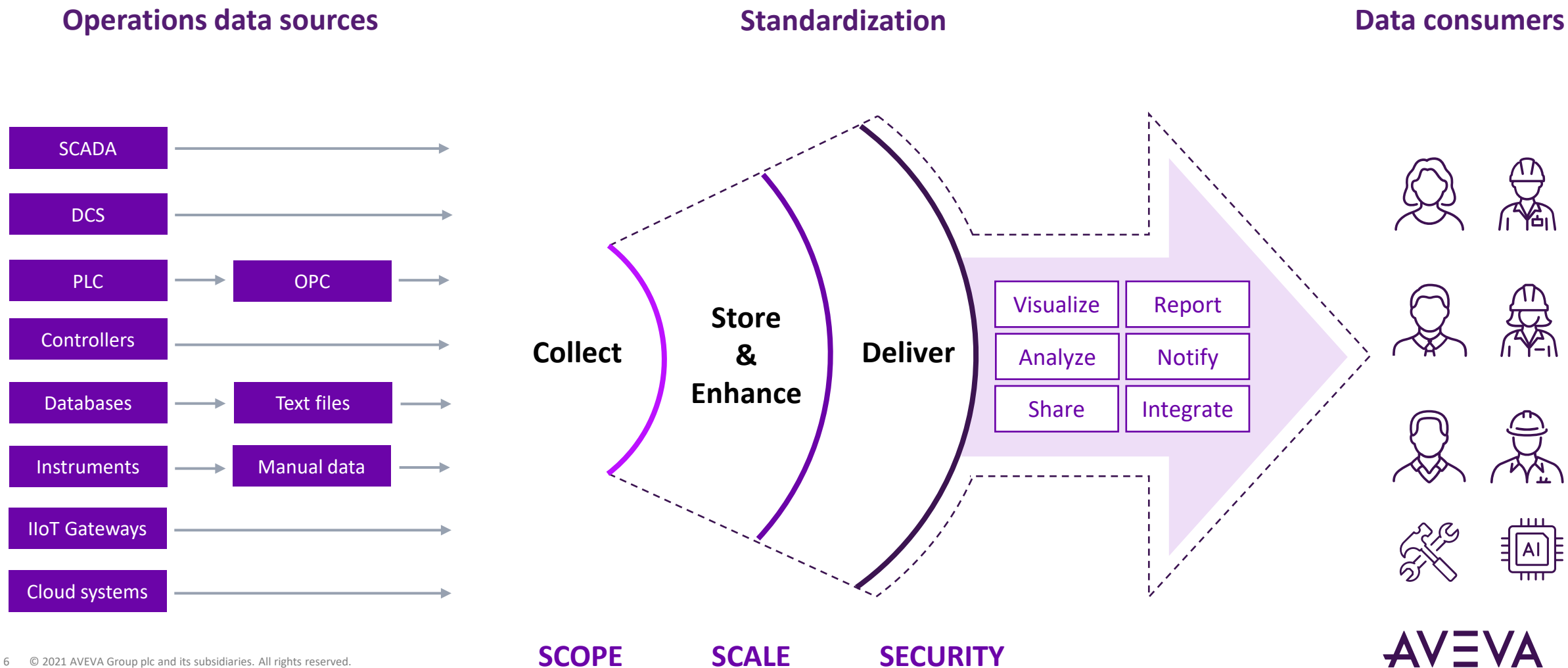
SECURITY
Use data

- Secure across OT, ET, IT, business domains
- Self-service and AI-ready
- Share across business and ecosystem

AVEVA

Managing operations data is complex

Operations data sources

- SCADA
- DCS
- PLC → OPC
- Controllers
- Databases → Text files
- Instruments → Manual data
- IIoT Gateways

Complexity

- Historian
- Asset reliability
- LIMS
- ERP
- CMMS EMS
- Cloud system
- Data lake
- Planning & scheduling
- Excel
- BI tool
- Analytics platform

Data consumers

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 & Enhance

Deliver

Visualize	Report
Analyze	Notify
Share	Integrate

SCOPE   **SCALE**   **SECURITY**
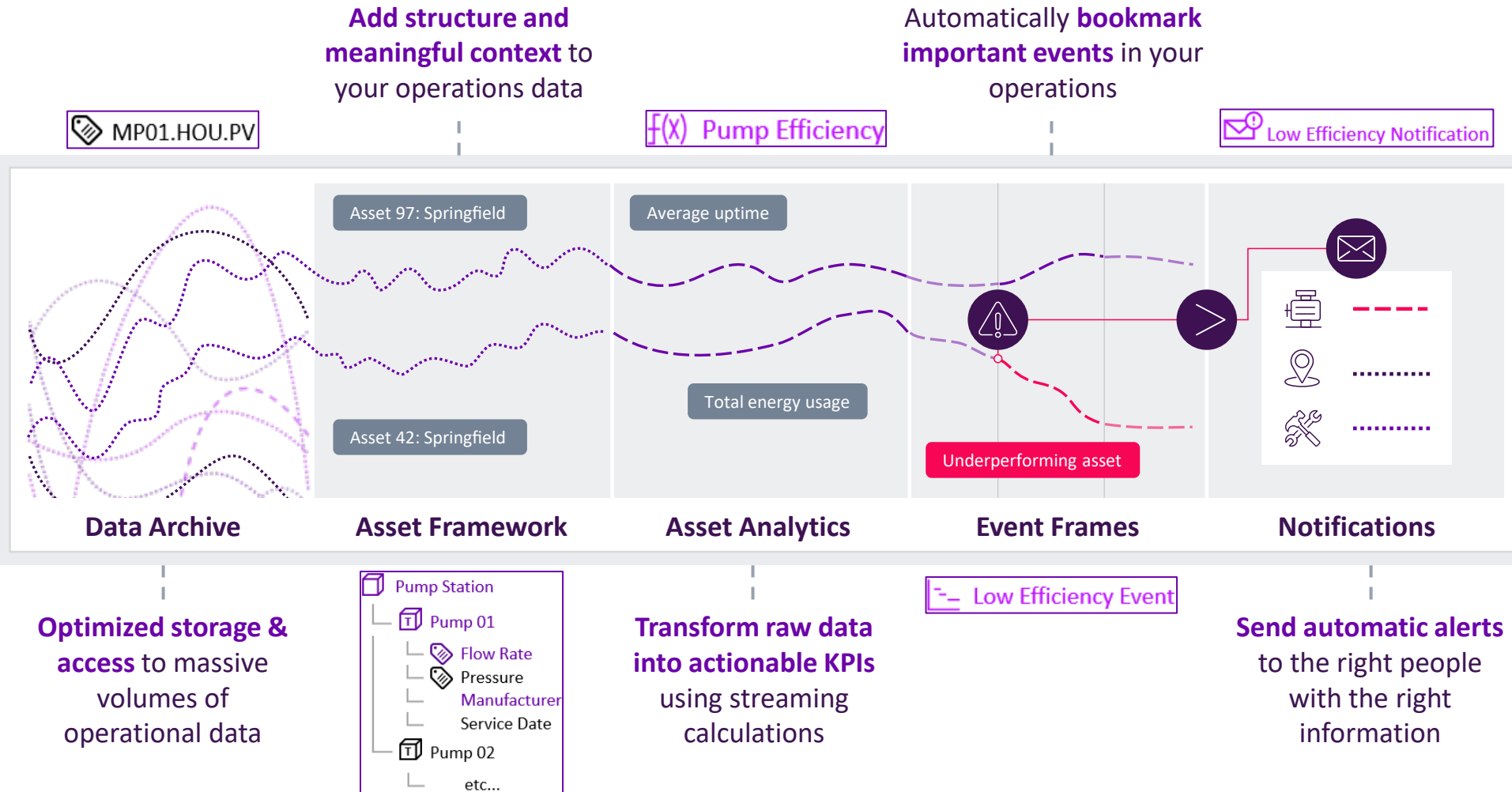
AVEVA

PI System technology layers
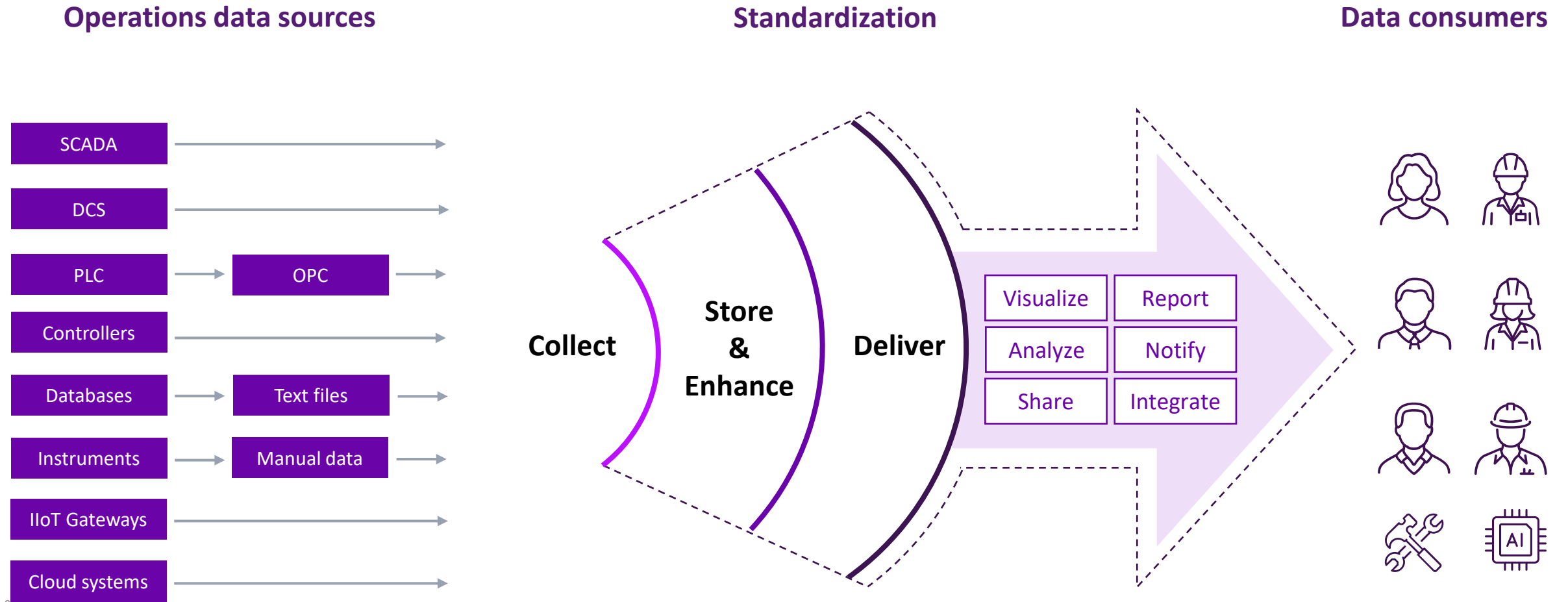
Collect

Store & Enhance
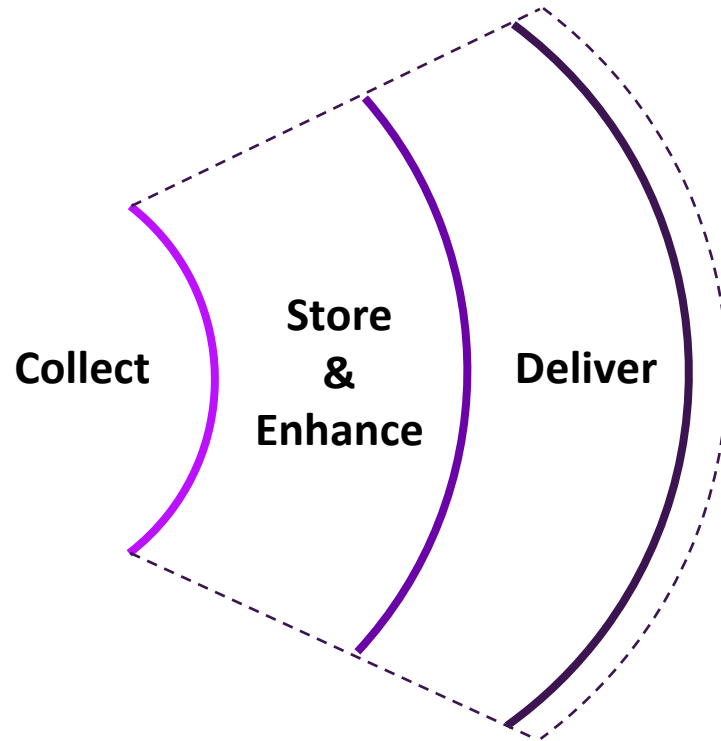
Deliver

- It can **collect** the data that you need to make decisions

- It can **enhance** that raw data to turn it into actionable information

- And it can **deliver** it where and when you need it

AVEVA

Turn raw data into decision-ready information

Add structure and meaningful context to your operations data

Automatically **bookmark important events** in your operations

MP01.HOU.PV

f(x) Pump Efficiency

Low Efficiency Notification

Asset 97: Springfield

Average uptime

Asset 42: Springfield

Total energy usage

Underperforming asset

Data Archive

Asset Framework

Asset Analytics

Event Frames

Notifications

Pump Station
└ Pump 01
  └ Flow Rate
  └ Pressure
  └ Manufacturer
  └ Service Date
└ Pump 02
  └ etc...

Low Efficiency Event

Optimized storage & access to massive volumes of operational data

Transform raw data into actionable KPIs using streaming calculations

Send automatic alerts to the right people with the right information

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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 & Enhance

Deliver

Visualize	Report
Analyze	Notify
Share	Integrate

9

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WaterWorld_PumpDetailed

Water World

Pump Detailed Display

Water Leakage | Equipment | Geospatial

Select a pump by clicking on name

Woodlands
PMP-DMA01A-11
Efficiency — Discharge Flow (hourly) **0.61** m³/min

Woodlands
PMP-DMA01B-12
Efficiency — Discharge Flow (hourly) **0.45** m³/min

Woodlands
PMP-DMA01C-13
Efficiency — Discharge Flow (hourly) **0.00** m³/min

Woodlands
PMP-DMA01C-14
Efficiency — Discharge Flow (hourly) **0.00** m³/min

Woodlands
PMP-DMA01D-15
Efficiency — Discharge Flow (hourly) **0.25** m³/min

Yishun
PMP-DMA02A-16
Efficiency — Discharge Flow (hourly) **1.42** m³/min

Yishun
PMP-DMA02B-17
Efficiency — Discharge Flow (hourly) **1.15** m³/min

Yishun
PMP-DMA02B-18
Efficiency — Discharge Flow (hourly) **1.15** m³/min

Yishun
PMP-DMA02C-19
Efficiency — Discharge Flow (hourly) **0.03** m³/min

Yishun
PMP-DMA02C-20
Efficiency — Discharge Flow (hourly) **0.03** m³/min

Yishun
PMP-DMA02D-21

Yishun
PMP-DMA02E-22

PMP-DMA03C-04 Upper Thomson

Navigate to **Pump Comparison**

Capacity **55** m³/min
Total Head **65.092** m H2O
Efficiency **69.7** %
Speed **6** rpm
Amps **0** A
Rated Voltage **480** V

Inboard
Temp **44** °C
X **0.355** m/s
Y **0.361** m/s

Motor Vibration

Outboard
Temp **50** °C
X **0.466** m/s
Y **0.354** m/s

Discharge Flow (& Hourly Avg)
4/17/2024 9:43:19 AM — 4/18/2024 9:43:19 AM
Discharge Flow **0.0** m³/min Hourly Avg **0.1** m³/min

Discharge & Suction Pressure
4/17/2024 9:43:19 AM — 4/18/2024 9:43:19 AM
Discharge Pressure **811.8** kPa Suction Pressure **191.6** kPa

Pump Curve (Flow vs. Head)
Total Head (m) vs Flow Rate (m3/min)
Reference / Last Day
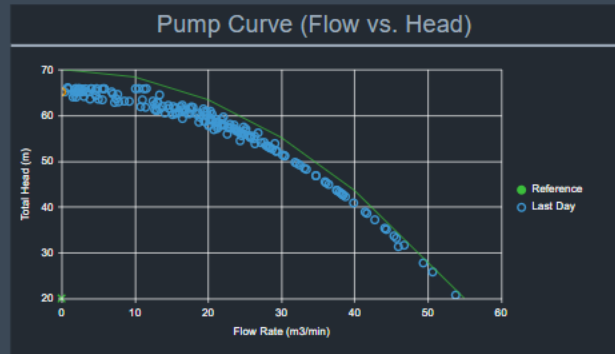
Maintenance Information
Last Maintenance
2/15/2024 2:00:00 AM
Run Hours Since **1,518** h

Date Installed
6/7/2020 10:00:00 PM **33,851** h

Manufacturer
Imperial Pumps

Serial Number
2856

Energy Information
Specific Energy **0** kWh/m3
Volume Discharged Daily **11,534.79** kL
Brake Power **0** kW
Hydraulic Power **0** kW
Rated Power **420** kW

Energy Consumed
3/18/2024 9:43:19 AM — 31d — 4/18/2024 9:43:19 AM

Energy Cost
Daily **2,725.33** kWh $ **354.29**
Current Month **53,858.9** kWh $ **11,738.69**

Assign Reason Code (with pencil icon)

Event Name	Start Time	Duration	Reason

Reason Code Assigned

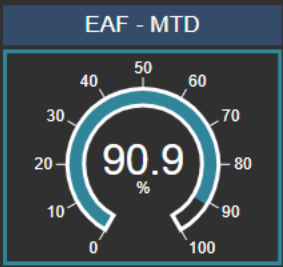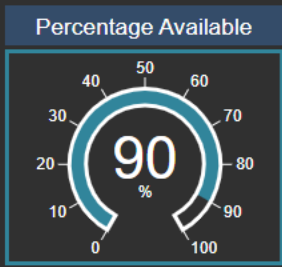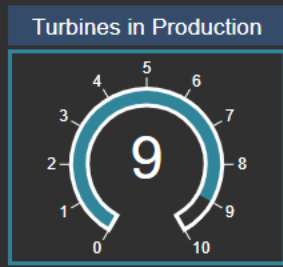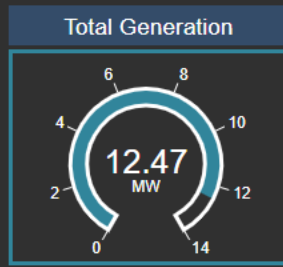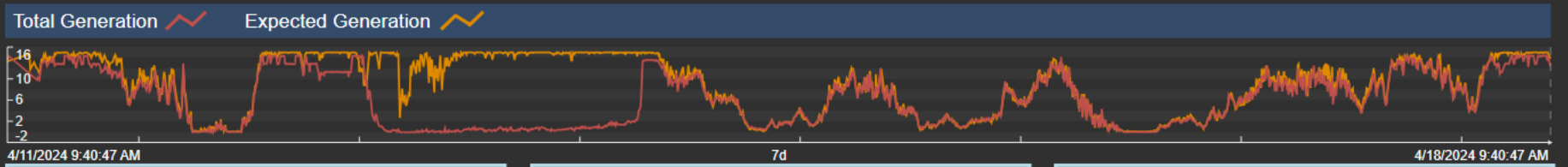| Event Name	Start Time	Duration	Reason
PMP-DMA03C-04 Pump Bearing Temperature High 2024-04-18 06:26:26	4/18/2024 6:26:26 AM	3m	Mechanical\Lubrication
PMP-DMA03C-04 Pump Bearing Temperature High 2024-04-18 06:17:26	4/18/2024 6:17:26 AM	3m	
PMP-DMA03C-04 Pump High Vibration 2024-04-18 06:07:00	4/18/2024 6:07:00 AM	19m 30s	
PMP-DMA03C-04 Pump Bearing Temperature High 2024-04-18 05:34:26	4/18/2024 5:34:26 AM	3m	Operations\Did Not Follow Procedure
PMP-DMA03C-04 Pump Bearing Temperature High 2024-04-18 05:05:26	4/18/2024 5:05:26 AM	3m	

4/17/2024 9:43:18 AM | 1d | Now | 4/18/2024 9:43:18 AM

AVEVA™ PI Vision™   New Display   OSI\mnorton

Power Generation - Wind - Home   Asset: Windtopia ▼

Windtopia

Wind Home

- Power Home
- Wind Home
- Farm Performance
- Farm Forecast
- Turbine Operations
- Turbine Schematic

Total Generation
12.47 MW

Turbines in Production
9

Percentage Available
90 %

EAF - MTD
90.9 %

Revenue
| Cumulative Today | $ 3,867.98 |
| Total Yesterday | $ 6,922.78 |

Total Generation   Expected Generation

4/11/2024 9:40:47 AM   7d   4/18/2024 9:40:47 AM

Big Buffalo Wind Farm

Revenue	
Cumulative Today	$ 1,397.03
Forecasted Today	$ 3,678.25
Total Yesterday	$ 2,366.57

Turbines In Production
0   0.5   1   1.5   2   2.5   3   3.5   4

Equivalent Availability Factor
0   10   20   30   40   50   60   70   80   90   100

Black Mesa Wind Farm

Revenue	
Cumulative Today	$ 979.90
Forecasted Today	$ 3,894.12
Total Yesterday	$ 1,893.17

Turbines In Production
0   0.5   1   1.5   2   2.5   3

Equivalent Availability Factor
0   10   20   30   40   50   60   70   80   90   100

Black Wolf Wind Farm

Revenue	
Cumulative Today	$ 1,491.04
Forecasted Today	$ 3,826.07
Total Yesterday	$ 2,663.04

Turbines In Production
0   0.5   1   1.5   2   2.5   3

Equivalent Availability Factor
0   10   20   30   40   50   60   70   80   90   100

4/11/2024 9:40:47 AM   7d   Now   4/18/2024 9:40:47 AM

GC-Overview-MNorton   Asset: Continuous Chemicals+ ▼

Run of Day - Enterprise

| 🏠 | Enterprise | Chemicals | Operations | Data Quality | Reports |

Feed Capacity
93,750 lb

Demand Target
83,831 lb

Actual Feed
63,620 lb

Production
50,186 lb

Revenue
10,020 US$

Plant Operations

| H-1 | Av | Perf | Conv | Qual | ▶ |
| 10,496 lb | | | | | |

| H-2 | Av | Perf | Conv | Qual | ▶ |
| 7,956 lb | | | | | |

| Line 1 | Av | Perf | Conv | Qual | ▶ |
| 14,317 lb | | | | | |

| String 3 | Av | Perf | Conv | Qual | ▶ |
| 4,610 lb | | | | | |

| String 8 | Av | Perf | Conv | Qual | ▶ |
| 12,807 lb | | | | | |

Planning Effectiveness

Plan Capacity
95 %
0   100

89 %
0   100

Demand
94 %
0   100

Operations Effectiveness

60 %
0   100

Availability
86.6 %

Performance
87.7 %

Conversion
78.9 %

Quality
100.0 %

Run of Day as of:
4/18/2024 9:00:00 AM

4/18/2024 1:43:34 AM   ↻   ◀   8h   ▶   Now   4/18/2024 9:43:34 AM

PI System: trusted by essential industries for over 40 years

PI System's **capabilities** have **proven** their **value** time and time again

Oil & Gas
85%
of the top oil and gas companies

Power & Utilities
1000+
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

AVΞVA

Better data. Better business outcomes.

PI Systems have allowed **incredible business success** for over **4 decades**

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

AVEVA

Thank you

AVEVA