

NOVEMBER 2022

The value of AVEVA™ Mobile Operator for AVEVA™ PI System™ users

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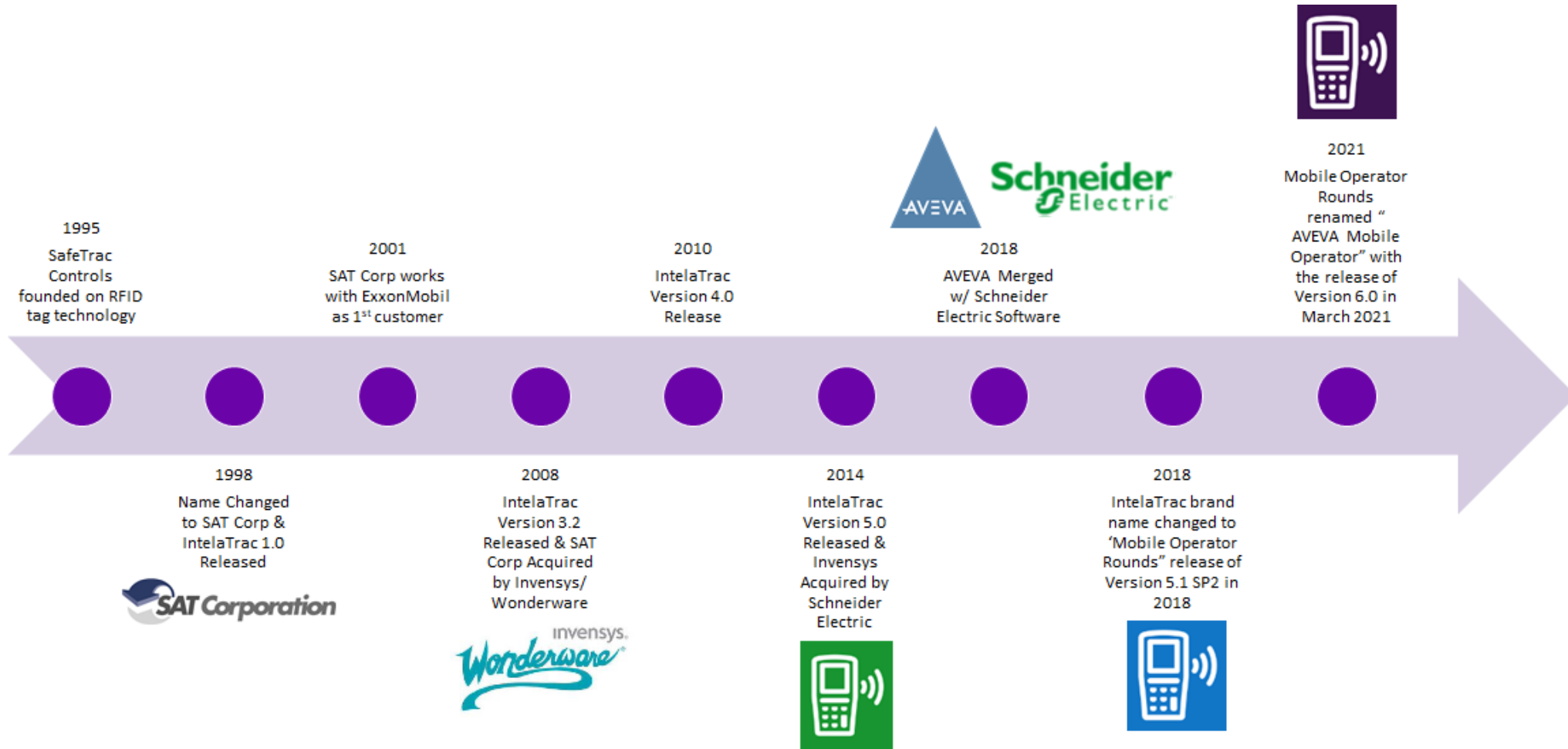
AVEVA

AVEVA APM – the Complete Picture



AVEVA Mobile Operator

25+ Years of Mobility Experience



Challenge:

Access stranded asset data – lack of visibility and information on stranded assets effectively leads to a break in the digital thread that connects people, processes and assets. This can lead to an inefficient workforce, unscheduled downtime and a lack of compliance.

Solution:

- Provide field workers a tool to collect that data
 - Provide a consistent way of capturing and navigating field workers
 - Provide actionable messaging for abnormal situations met in the field, at the point of incident
 - Capture images and/or videos as a record to the abnormal situation
 - Schedule work on various recurrence patterns
 - Work in an offline mode
 - **Connect to 3rd party / other systems**
 - Validate work is performed
- **Benefit:**
 - So that the data is available to trend, report, share, and make better decisions
 - To support best practices of field work processes
 - To reduce the primary failure problem, remove secondary and potential process upsets, derate, additional maintenance
 - A picture is worth a thousand words, so more context with image capture
 - Support shift schedules or condition-based work
 - For disconnected and stranded asset data to paint a complete picture
 - **For better decisions, better operations, reduced maintenance costs**
 - To support safety and compliance records



Business Challenge addressed

Why put stranded asset data in AVEVA PI System?

- With AVEVA Mobile Operator PI System historian integration, process data from non-instrumented field assets is delivered to the historian to be used and evaluated in context with automatically captured process data

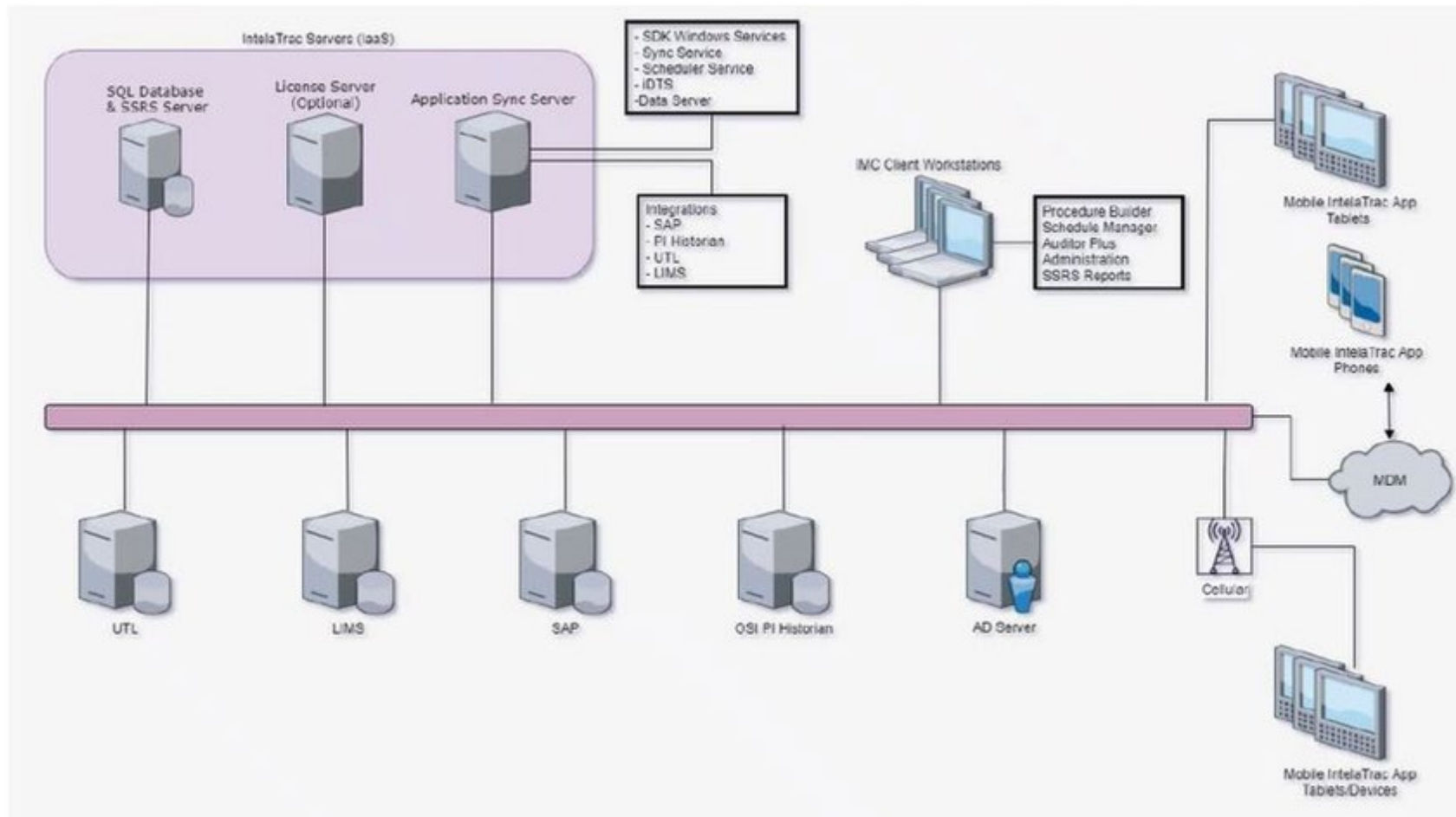


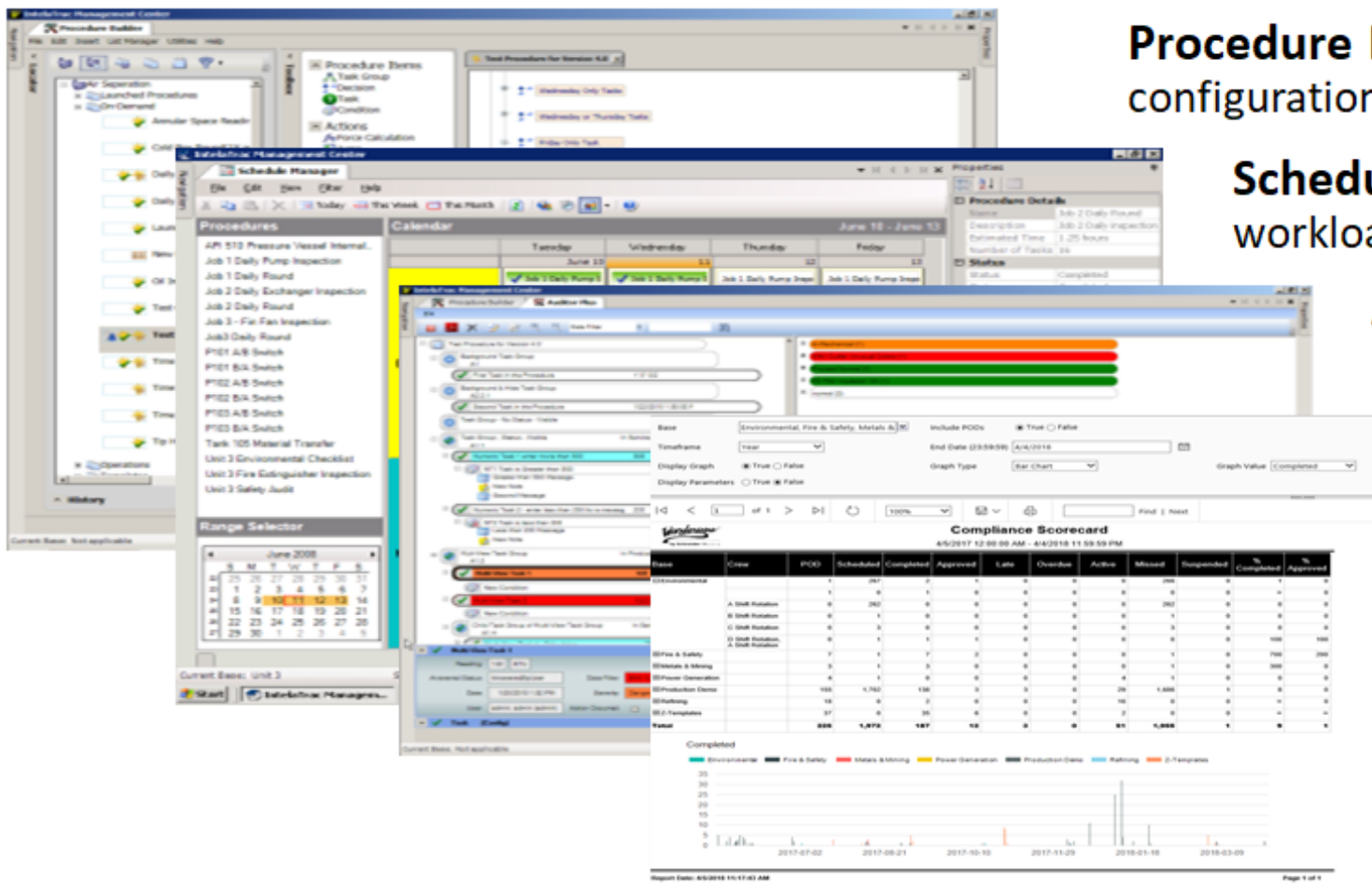
What does this integration do and why do it?

- The AVEVA Mobile Operator PI System historian integration is a two-way integration designed to deliver field data from AVEVA Mobile Operator to AVEVA PI System with configurable time stamping options to meet business and process needs
- AVEVA PI System data is also displayed on the mobile in the form of tables and trend graphs
- AVEVA PI System data can be used to trigger Exceptions (abnormal situations/bad things) in the field, so that Action Messages and further 'work' is needed to alleviate that recorded condition
- Make better decisions in PI / PI Vision alongside instrumented data – now you have a complete picture!

... and here is how it looks on your network

Sample Network Topology Diagram





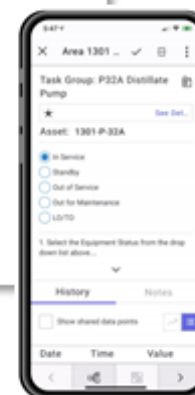
Procedure Builder– Easy to use, highly flexible, configuration environment

Schedule Manager– advanced scheduling & workload balancing

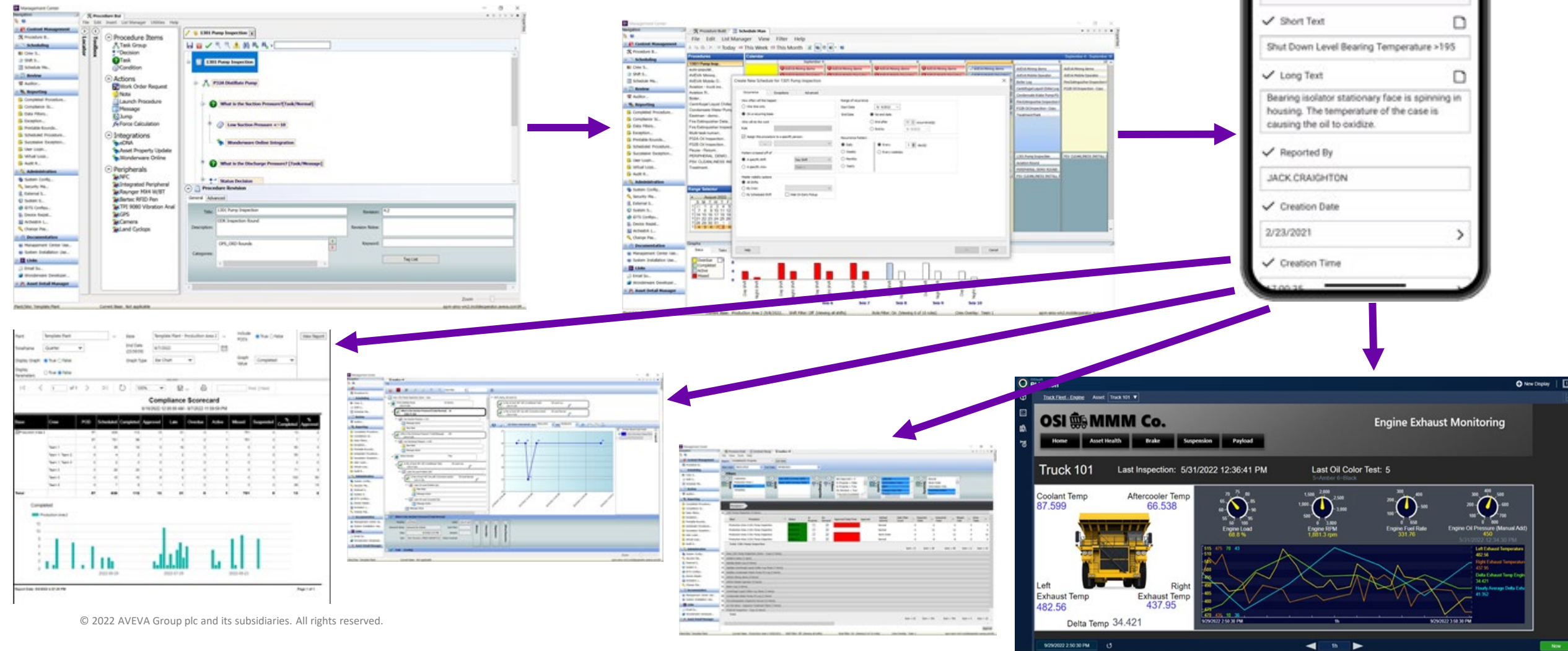
Auditor Plus– work process and procedure review and approval

Mobile Operator Reports – configurable, exportable, emailable reports

Mobile Operator App – field work execution



Overview of the AMO workflow



The Mobile Operator PI System Integration

What is it?

- The Mobile Operator - PI Integration consists of three Services + Historian Reports
 - 1- Mobile Operator PI Update Service
 - Pushes values from the Mobile Operator to PI System for each configured PI Tag
 - 2- Mobile Operator PI ADM Update Service
 - Downloads the last tag value from PI System for PI Tags configured in Asset Detail Manager
 - 3- Mobile Operator Historian Online Service
 - Will push or pull data directly from a mobile device to PI System at the time it is entered
 - Historian Reports
 - SSRS based reports to show PI Tag details

Mobile Operator PI Update Service

- This service can send values to the PI System database after a round has been completed and transferred back to the DB. Stranded asset data can be collected by manually entering values, reading with a temperature gun, vibration sensor, or by scanning an NFC, QR, or Barcode. This data is then securely stored in the mobile database on that device until the user transfers the data over an encrypted connection to the SQL DB. The Update Service will then check the SQL DB for new PI Tag data and send those values and time stamps to their PI Tags

The image displays two screenshots of the Mobile Operator PI Update Service interface. The left screenshot shows a mobile app screen titled 'Oil Inspection [Sequence...]' with a sub-header 'Check Engine Oil Pressure' and 'Asset: Haul Truck 101'. It features a 'Type Here' input field, a 'PSI' label, and a 'History' table with columns 'Date', 'Time', and 'Value'. The right screenshot shows a desktop application window titled 'MOR\Mining - PI System Explorer (Administrator)'. It displays a tree view of elements on the left and a detailed view of 'Truck 101' on the right, including a table of engine parameters and their values. A purple arrow points from the 'PSI' label in the mobile app to the 'Engine Oil Pressure Man' entry in the desktop application's table.

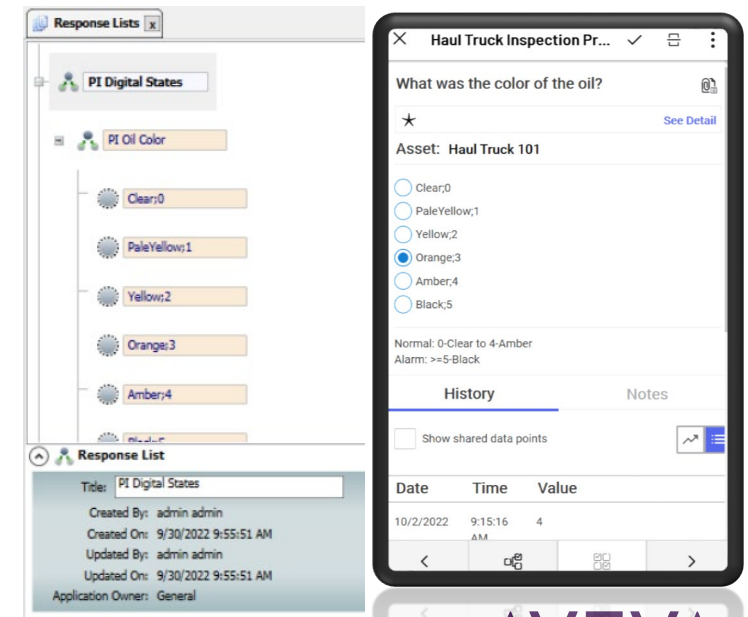
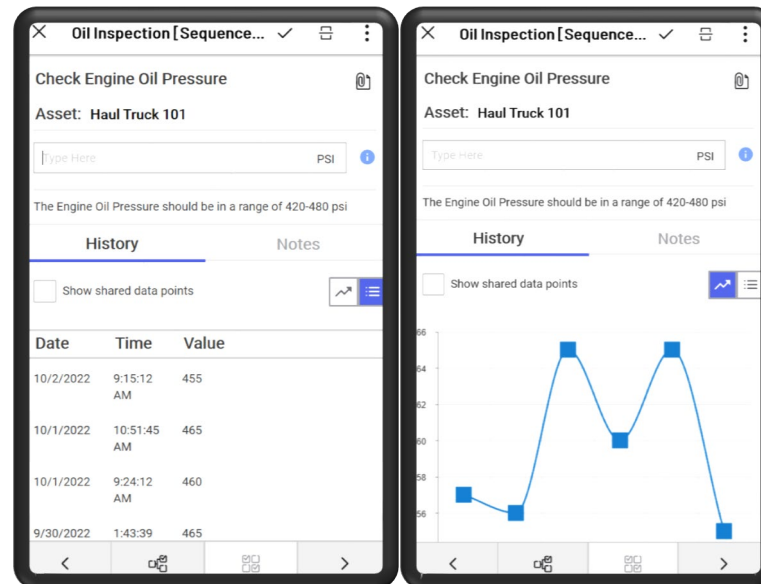
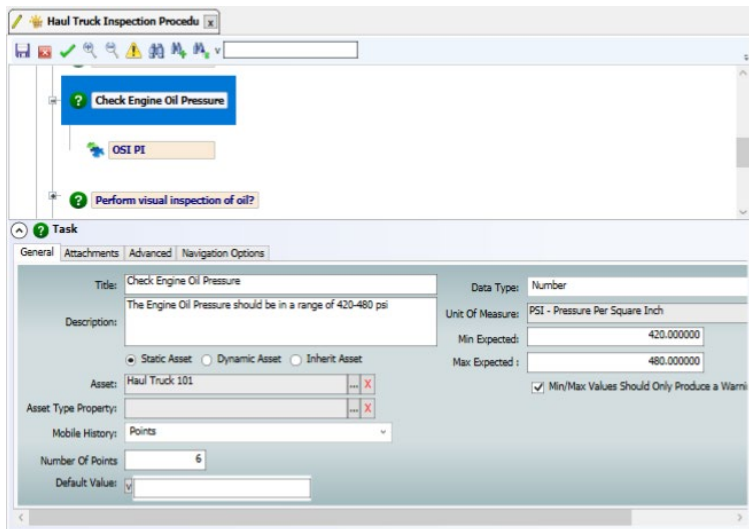
Date	Time	Value
10/2/2022	9:15:12 AM	455
10/1/2022	10:51:45 AM	465
10/1/2022	9:24:12 AM	460
9/30/2022	1:43:39	465

Name	Value
Engine Fuel Rate	336
Engine Load	99.254 %
Engine Oil Pressure	460.19 psi
Engine Oil Pressure Man	455 psi
Engine RPM	1921.1 rpm
OilColor	4
Category: Engine_Inlet_System	
Air Filter	6.9859
Boost Pressure	188.74
Category: Exhaust System	
Delta Exhaust Temp Engine Load	60.928
Hourly Average Delta Exhaust ...	29.862
Left Exhaust Temperature	503.06
Right Exhaust Temperature	442.13

Mobile Operator PI Update Service

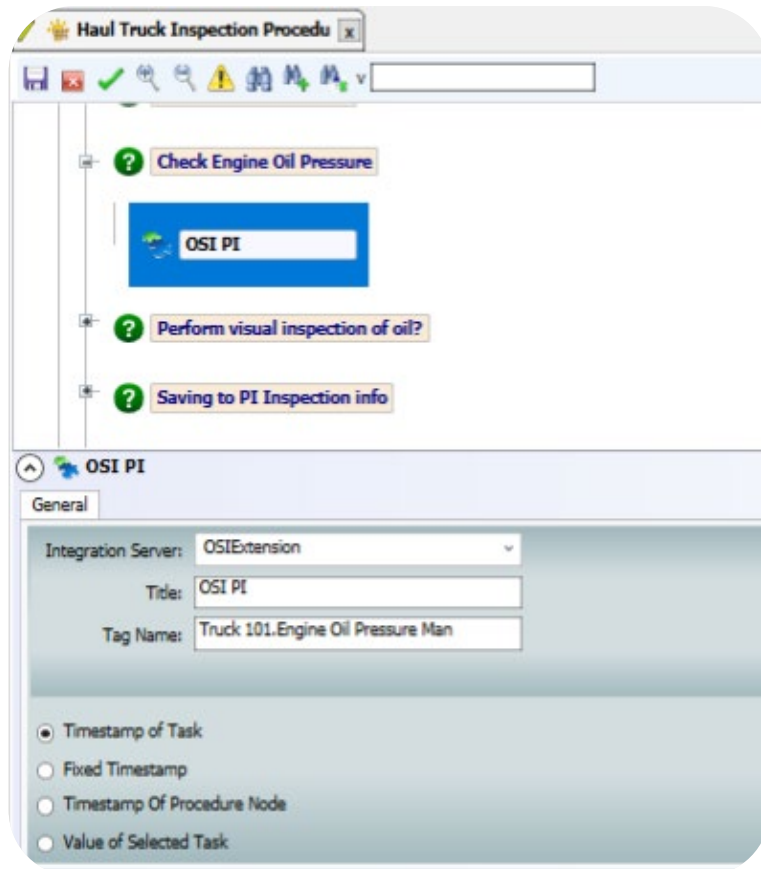
How it's configured

- Using Procedure Builder, a task is built to collect the correct data type and value range
- Trends can be viewed in the round on a mobile device to be displayed as historical values as a table or graph, going back by data point or date range
- Response lists can also be used to replicate Digital States in PI and viewed as either a drop-down list or radio buttons



Mobile Operator PI Update Service

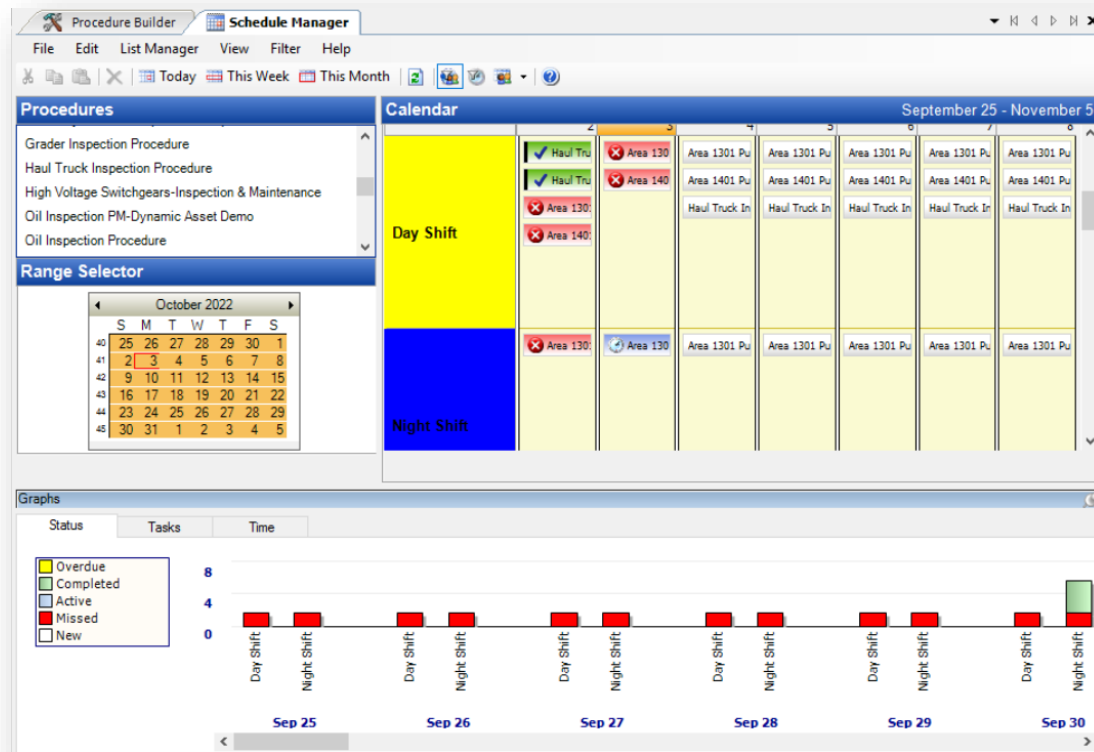
How it's configured



- Once the task is configured, an PI Integration icon can be dragged over from the toolbox and nested under the Task. This is where the PI Tag is entered, and the type of Timestamp is selected

Mobile Operator PI Update Service

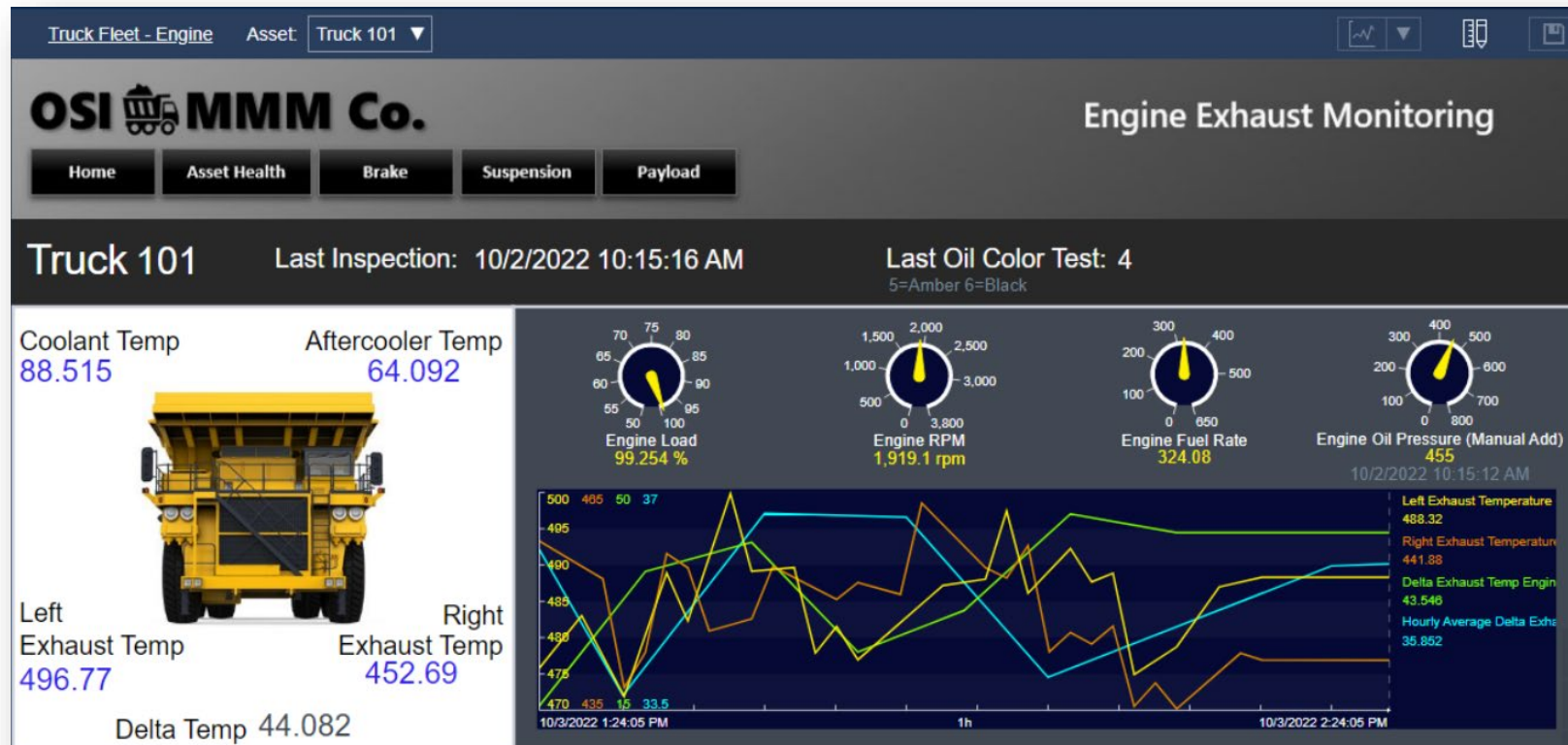
How it's configured



- Using Schedule Manager, the Round can be scheduled on different recurrence patterns to meet the business process needs; like for example, to a shift, a crew, a role, on a daily, weekly, or monthly pattern

Mobile Operator PI Update Service

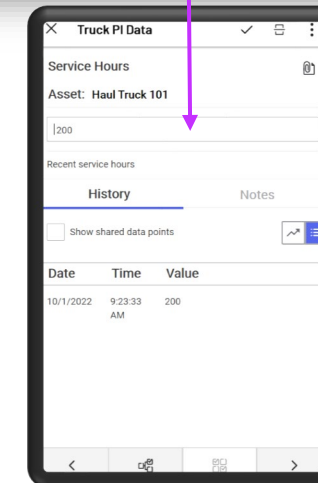
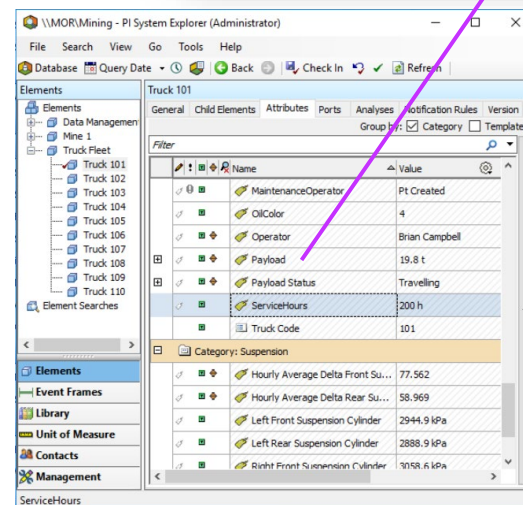
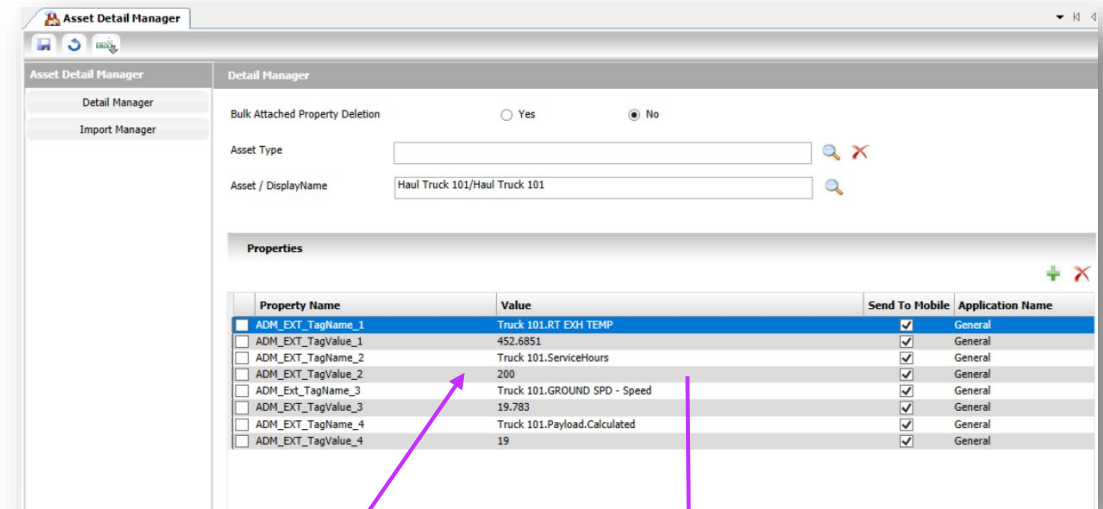
How it's configured



- Once the round is completed, the service will sync and send the new values over to PI System for view in PI Vision and other systems as you see fit.

Mobile Operator PI ADM Update Service

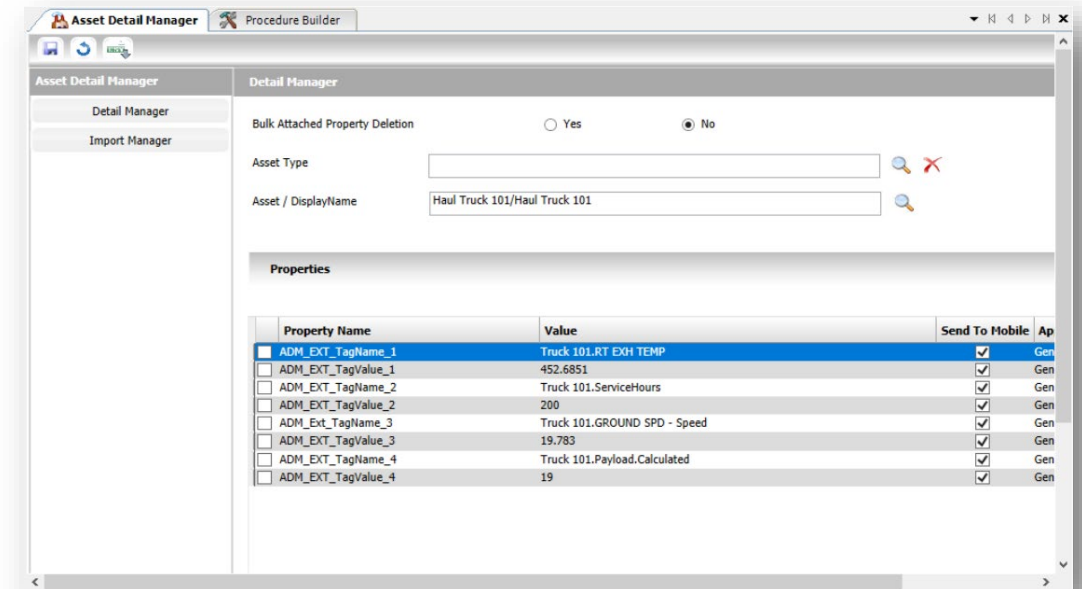
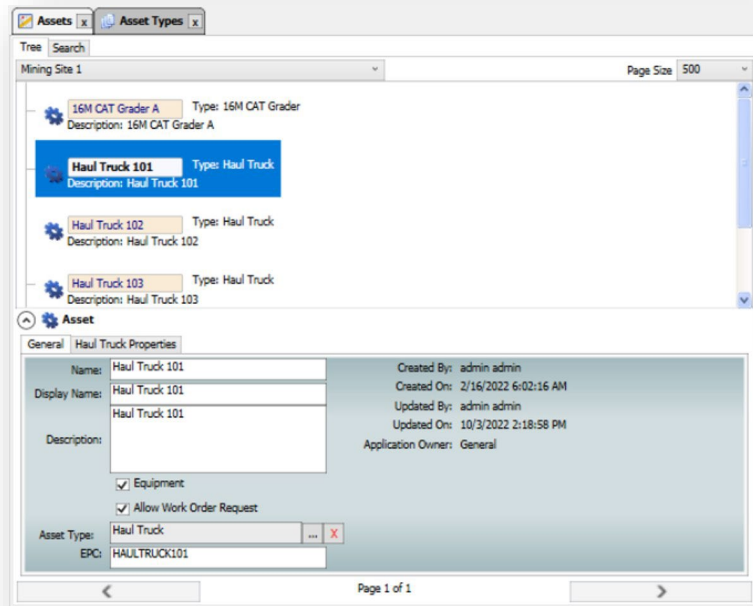
- This service allows the last PI Tag value to be downloaded and viewed in Mobile Operator while working on a Procedure. Multiple PI Tags or Attributes can be associated to a single asset, much like in the PI System. This service also works with Mobile Operator Dynamic Assets feature, to allow a user to select the Asset being worked on during the Procedure



Mobile Operator PI ADM Update Service

How it's configured and used in Mobile Operator.

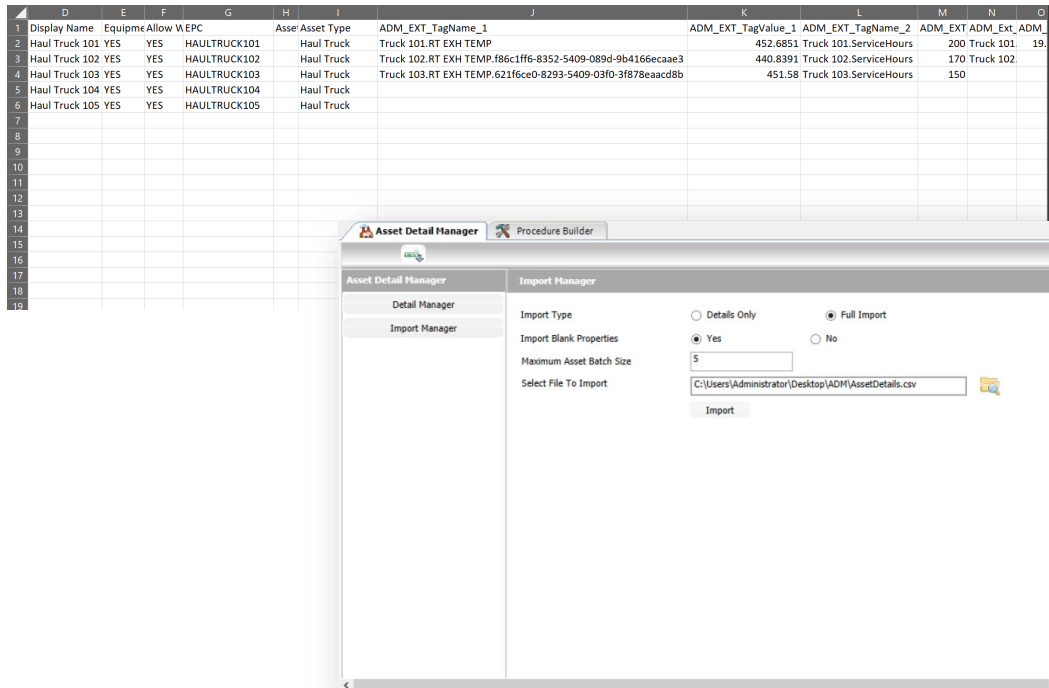
- PI System assets can be created in Mobile Operator Management Center. If there are multiple assets of the same type, this asset type can be created and attributed to it's assets
- Multiple PI Tags or Properties can be attached to an asset using the Asset Detail Manager. Each attribute uses two rows, a TagName for the PI Tag, and a TagValue used to hold the last value



Mobile Operator PI ADM Update Service

How it's configured

- Multiple Assets and their attached properties can also be imported in bulk using ADM's Import Manager
- Last values for these tags will now be imported into Asset Detail Manager periodically depending on the frequency set for the ADM Update Service. They are downloaded to the Mobile Operator app during a transfer



Mobile Operator PI ADM Update Service

How it's configured

- The last value from ADM can be shown in a procedure using the "GetAssetProperty()" function in Expression Editor. This can be displayed as the value in a task, or as a message displayed to the user.

The screenshot shows the configuration for a task named "Service Hours". The "Default Values" field is highlighted with a red box and contains the expression: `Convert to Number(GetAssetProperty("ADM_EXT_TagValue_2"))`. Other fields include "Title" (Service Hours), "Description" (Recent service hours), "Data Type" (Number), and "Unit Of Measure".

The screenshot shows the "Truck PI Data" mobile app interface. It displays the "Service Hours" section for "Asset: Haul Truck 101". A text input field shows the value "200". Below this, there is a "History" tab with a table showing recent service hours.

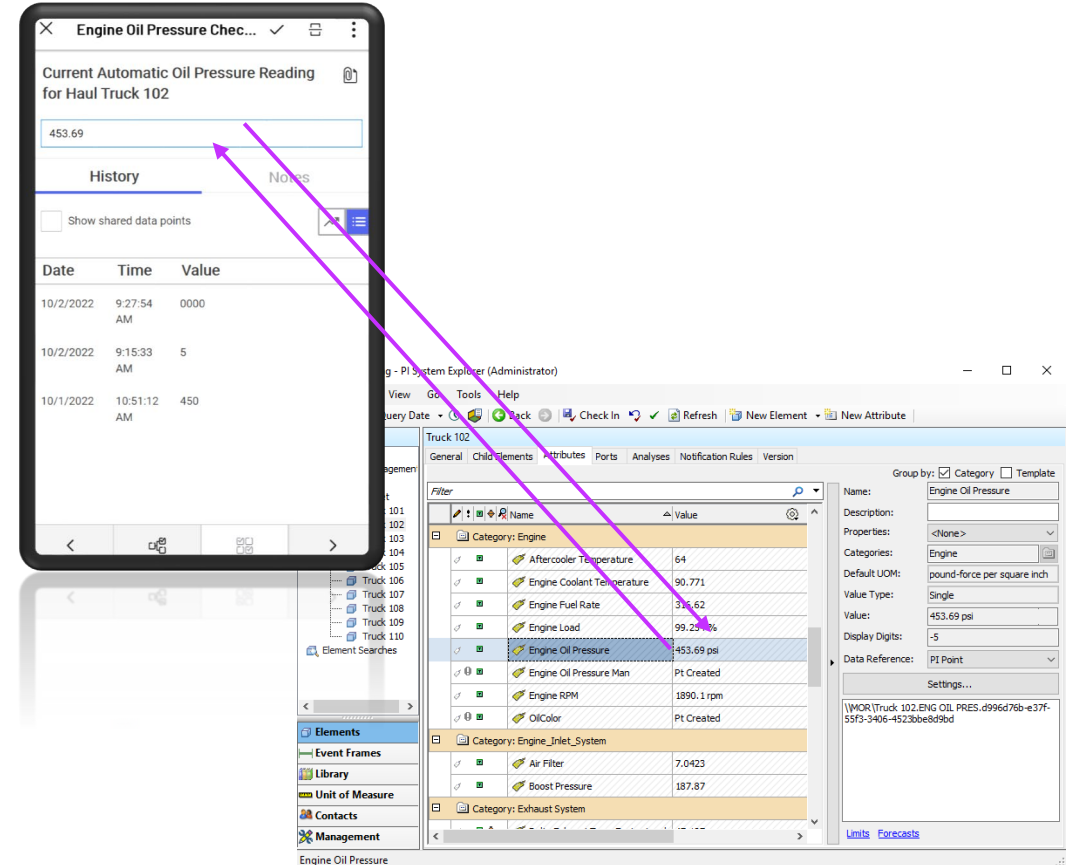
Date	Time	Value
10/1/2022	9:23:33 AM	200

This is another view of the "Truck PI Data" mobile app interface, showing the same "Service Hours" section for "Asset: Haul Truck 101". The text input field shows the value "200". Below this, there is a "History" tab with a table showing recent service hours.

Date	Time	Value
10/1/2022	9:23:33 AM	200

Mobile Operator Historian Online Service

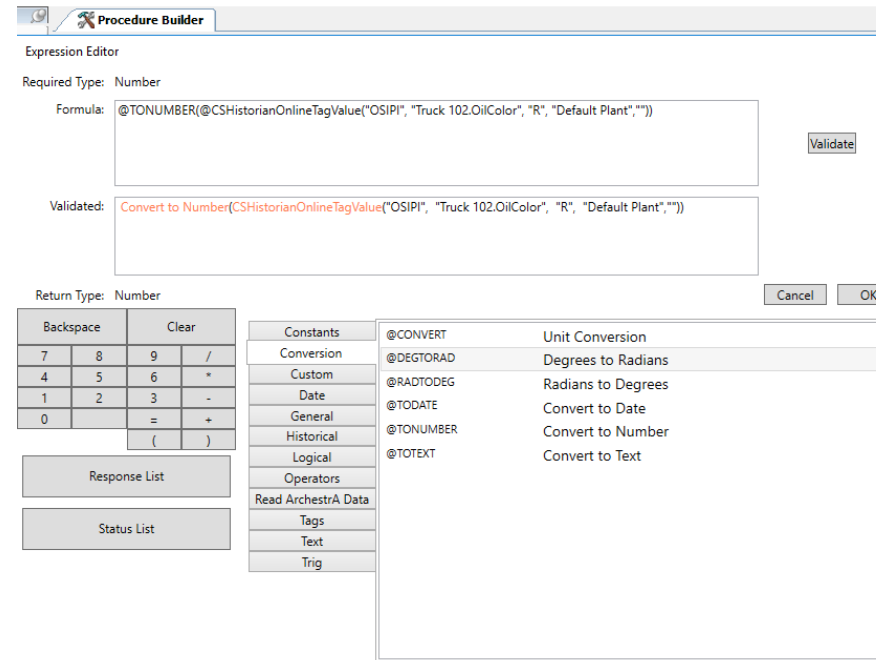
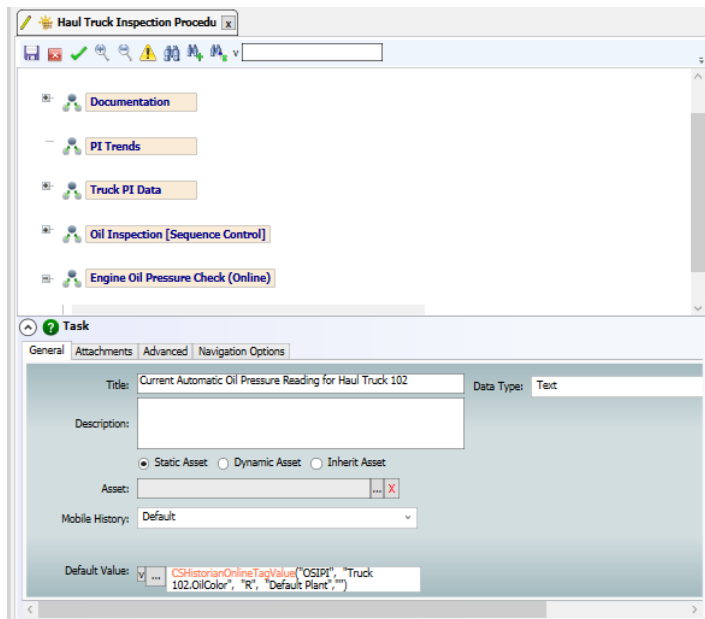
- This service allows Mobile Operator to read or write data to and from a PI Tag/Attribute directly from the mobile device. Using a Web API, the values are read or written in as the Task with the PI reference is worked on.
- Sending data using this service is great for situations requiring stranded asset data to be updated at the time they are recorded
- Reading data using this service works well for PI Tags that are updated frequently and current values are needed



Mobile Operator Historian Online Service

How it's configured

- Using the Expression Editor in Procedure Builder, PI Tag data can be pushed to or pulled from using the "CSHistorianOnlineTagValue()" function
- The third parameter can be set to "R" to read or "W" to write
- The "@TONUMBER" conversion can also be used for numeric value types



Historian Reports

Pre-built SSRS Reports used to display PI and other Historian Tag information

Historian Tag Search Report

- This report allows the user to view PI Tag information from Mobile Operator based on the Plant, Base, and Tag names selected

Plant: Default Plant

Base: Default Plant - Maintenance Base,D

View Report

Tag Name: Tag1,Tag2,Tag3,Tag5

1 of 1

100%

Find | Next

Plant Name	Procedure Name	Task Name	Data Type	Historian Name	Tag Name	UOM	Server N
Default Plant - Maintenance Base	OSIPI Test Procedures	T11	Integer	OSI PI	Tag1		10.66.92.73
Default Plant - Template Base	OSIPI Test Procedure 2	T13	Integer	OSI PI	Tag2		10.66.92.73
Default Plant - Template Base	OSIPI Test Procedure 2	T14	Integer	OSI PI	Tag3		10.66.92.73
Default Plant - Template Base	OSIPI Test Procedure 2	T15	Integer	OSI PI	Tag5		10.66.92.73

Historian Tag Status Report

- This report provides the user with Information on the status of PI Tags, such as Tag Value, Process Status, Time Stamp, and the user who completed the task

Plant: Default Plant

Historian: OSI PI

View Report

Status: All

TimeFrame: Sliding

Specific Start Date: ☒ NULL

Specific End Date: ☒ NULL

Slide From: From Midnight

Sliding Days: 345

Sliding Hours: 0

Sliding Minutes: 0

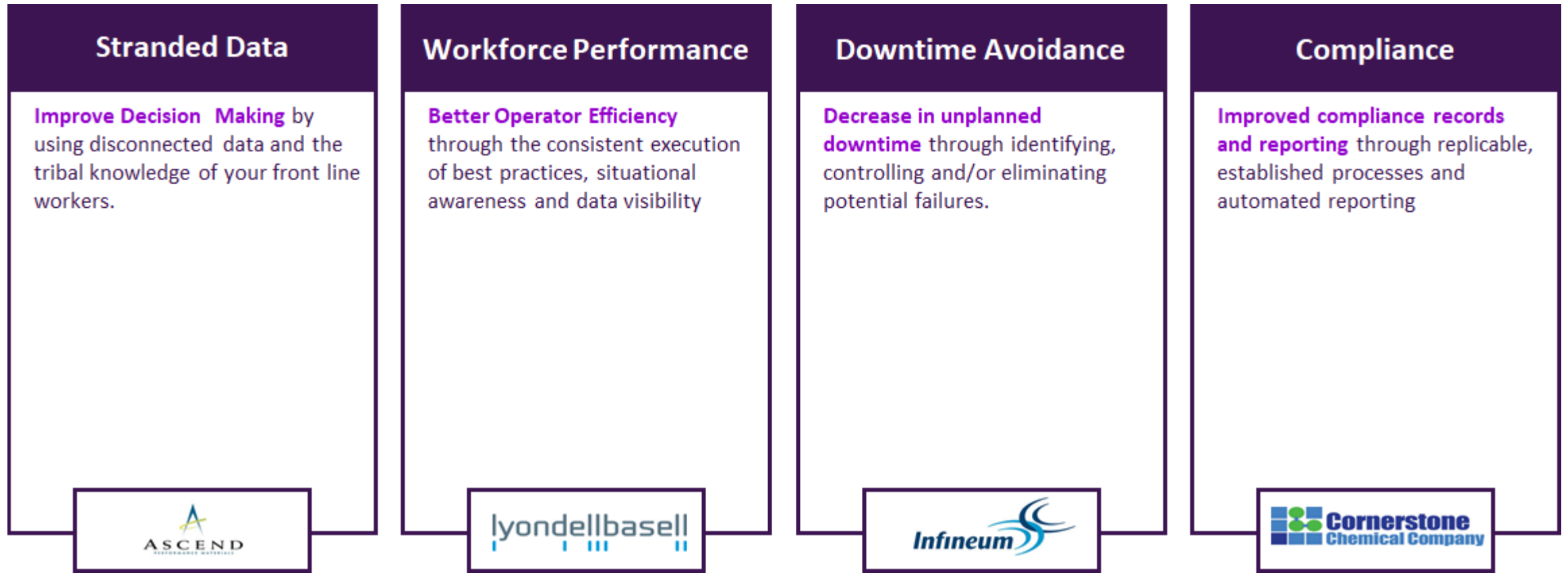
1 of 1

100%

Find | Next

Plant Name	Procedure Title	Schedule Start	Schedule End	Tag Name	Tag Value	UOM	Suspended	Process Status	3/2/2
Default Plant - Component Base	OSIPI Test Procedure 3	3/2/2021 6:02:02 PM +05:30	3/2/2021 6:02:09 PM +05:30	Tag8	0 Inactive		No	Processed	3/2/2
Default Plant - Maintenance Base	IPI21TestProcedure	3/15/2021 7:30:18 PM +05:30	3/15/2021 7:36:25 PM +05:30	Tag67	178		No	Not Processed	3/15/2
Default Plant - Component Base	OSIPI Test Procedure 3	3/3/2021 11:12:07 AM +05:30	3/3/2021 11:12:13 AM +05:30	Tag8	0 Inactive		No	Processed	3/3/2
Default Plant - Component Base	OSIPI Test Procedure 3	3/4/2021 12:33:46 PM +05:30	3/4/2021 12:33:52 PM +05:30	Tag8	2 Cascade		No	Processed	3/4/2
Default Plant - Maintenance Base	OSIPI Test Procedures	3/3/2021 11:25:22 AM +05:30	3/3/2021 11:25:28 AM +05:30	Tag1	12		No	Processed	3/3/2
Default Plant - Component Base	Test ADM OSIPI Data Value	3/5/2021 1:48:55 PM +05:30	3/5/2021 1:49:04 PM +05:30		23		No	Processed	3/5/2
Default Plant - Component Base	Test ADM OSIPI Data Value	3/5/2021 2:26:50 PM +05:30	3/5/2021 2:26:55 PM +05:30		34		No	Processed	3/5/2
Default Plant - Maintenance Base	OSIPI Test Procedures	3/3/2021 11:25:22 AM +05:30	3/3/2021 11:25:28 AM +05:30	TestTag	12		No	Processed	3/3/2
Default Plant - Component Base	OSIPI Test Procedure 3	3/2/2021 7:40:49 PM +05:30	3/2/2021 7:40:55 PM +05:30	Tag8	1 Active		No	Processed	3/2/2

How the challenge was solved



Additional AMO capabilities



"the world of work is realizing that the outdated tech which deskless industries have been relying on for years simply isn't good enough."

<https://www.forbes.com/sites/forbestechcouncil/2022/05/18/heres-why-deskless-workers-need-better-tech-in-2022/?sh=3c8a3b7562b6>



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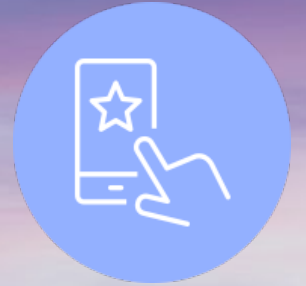
Questions?

Please wait for the microphone
State your name and company



Please remember to...

Navigate to this session in the mobile
app to complete the survey.



Thank you

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