Advanced Analytics for Critical Operations Joy Wang, Technical Product Manager









What is advanced analytics for critical operations?



Seamless Infrastructure







Solution San Francisco 2020



Online Definition of Advanced Analytics

Advanced Analytics is the autonomous or semi-autonomous examination of data or content using sophisticated techniques and tools, typically beyond those of traditional business intelligence (BI), to discover deeper insights, make predictions, or generate recommendations. Advanced analytic techniques include those such as data/text mining, machine learning, pattern matching, forecasting, visualization, semantic analysis, sentiment analysis, network and cluster analysis, multivariate statistics, graph analysis, simulation, complex event processing, neural networks.

Source: Gartner Glossary, Advanced Analytics, <u>https://www.gartner.com/en/information-technology/glossary/advanced-analytics</u>



What does Advanced Analytics mean for industrial businesses in 2020?



How to avoid common pitfalls of advanced analytics projects?



Common Pitfall #1

Expectation:

If we can get the data to Platform X or Tool Y, then that will be the first milestone of digitalization success. We can generate business use cases after that first technical feasibility milestone.

Reality:

Integration to the platform is the easiest part. The science is the hard part. Your use cases and criteria for success should be considered in advance of any platform and its services. What business outcome is feasible and is it S.M.A.R.T.? Use that to guide your choice of tools and services and how one or a combination of them can accomplish the outcome.





Expectation:

We will need to process all the raw data values at the highest frequencies. We will apply the context and interpolations downstream.

Common Pitfall #2

Reality:

Data preparation (including adding data about data and interpolation) takes on average 80% of the time and resources of a data science project. Leverage existing work and tools and try not to re-invent the wheel. High frequency data also means high amount of resources to store and process the data.





Expectation:

To successfully implement advanced analytics, we need to move to the cloud and stream all 10 years worth and all 500,000 points worth of data to the cloud.

Common Pitfall #3

Reality:

Suppose you have a business use case. For that much data, you will still need to create a resource-intensive architecture, establish a data governance, optimize for performance, etc. It is a large investment for a year at least, and you don't know if the data that you have validates the use case yet. Hypotheses can often be successfully tested on a small scale first.



A key point from Gartner in 2020

"Focus on real value creation — Identify the right use case for your business by involving multidisciplinary teams to identify appropriate problems that can be solved through ML. Data and analytics leaders must evaluate the project ROI and focus on creating a POC."

"Once the POC demonstrates success, a feasibility assessment must be undertaken to identify requirements and any potential roadblocks that may arise during scaling up of the POC into a full-fledged ML project."

"Gartner, Organizational Best Practices for Successful AI and ML Initiatives, Feb, 2020."



What are common success factors for advanced analytics projects?





They start out small in scope, with a goal to answer a specific question.

Henkel: Greater Operational Efficiency

CHALLENGES

- Gain experience in connecting automation layer to cloud
- Gain experience in using ML methodologies
- Apply to real use case: exothermic reaction

SOLUTION

- Collaboration with pmOne (data science partner of OSIsoft)
- Advanced analytics infrastructure with PI System, PI Integrator and Azure

BENEFITS

- Stable prediction of transition state in process 15 min in advance
- Save 5% process time in reaction!
- POC can be justified and then scaled

. 1. Simin advance the prediction stabilizes . • SM time saving . • SM time saving

Deliverables Outlook, Next steps

Deliverables

Results, justification of PoC

Reaktor 36

- Use Case: Reactor
- Make data acquisition more stable
- Deploy to the whole process, all recipes and other reactors
- Long term goal would be the replacement of manual sampling
- Anomaly detection along the exothermic reaction process (alarm system)

Machine Learning Methodology

Infrastructure design to "control" a production process needs to be validated

Possible alternative for sophisticated sensors
 Look for further use cases in the area of "In-process quality control"

Prediction of its process quality; (Ornar Janke 25,09,2018 12 (Here)

"

We are focusing purely on one phase on one recipe... to extend it to other phases and then enhance to deploy to the other recipes which are running on the reactor.

- Otman Janke, Manager of Global Automation, Adhesive Technologies, Henkel







They progress gradually and build in lessons learned along the way.

Uniper: Digitalization Journey Reduced Force Outages since 2016





been improving. We've been learning when we visit different sites. We are going back to where we started before to share the new learnings with our sites.

- Nadia Beleno, Lead Reliability Engineer, Uniper; Lingli Zheng, Senior Data Engineer, Uniper





They create structured approaches to data management.

They invest in building robust, rich data infrastructures to reap benefits downstream.

Advanced Analytics Data Infrastructures @ Henkel and Uniper



Digitalization @ Generation - Infrastructure





How does the PI Integrator product line help our customers in advanced analytics?



Leverage the PI System data infrastructure



Significant reductions to data preparation time



Encourages an agile process that can start small and grow organically



PI Integrators speed the process that brings trustworthy data

to many unique analytics tools





PI Integrators



Available Today

Native Integration Integrate to AWS, Azure, Hadoop, Esri ArcGIS, SAP HANA

Diverse Destinations

Integrate to messaging hubs, data lakes, data warehouses, & BI tools

Easy Workflows Prepare operational data shapes with a drag-and-drop UI

Data Governance Schema registry with Kafka and Confluent Avro support

Iterative Workflows Modify or start from existing data shapes

Authoritative Data

Change data capture mechanisms for Asset Views

Geographical Insights

Rewind through operational data while viewing an Esri ArcGIS map

Enhanced Filters Organize data by Event Frame & Asset Framework templates

Performance Improvements

Distributed processing within a node to handle large workloads

PIWORIC SAN FRANCISCO 2020

What's new in PI Integrators 2020?

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Taking feedback from users in 2018 releases

- Synchronization between systems is a complex problem to solve. Our users challenged us with various use cases and edge cases of the PI Integrator Sync Service
- Cloud and analytics platforms are not all the same. When we introduce new targets, the PI Integrator is designed to absorb those inconsistencies within the OSIsoft platform to the extent possible for a seamless integration experience.
- As more and more users take to operationalizing their advanced analytics infrastructures, we must make this process easier and better, in terms of helping customers migrate between development, staging, and production environments.

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PI Integrator for Business Analytics 2020



INCREASE Scope & Value of Data





San Francisco 2020

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DAVCO 1=01 2020-02-24 04:03:12,043000-08:00 0 ISLTCLAC UnitsLAC Unit 1 T57,0542270751 VAVCO 1=01 2020-02-24 04:05:12,043000-08:00 0 ISLTCLAC UnitsLAC Unit 1 57,0542270751 VAVCO 1=01 2020-02-24 04:05:12,043000-08:00 0 ISLTCLAC UnitsLAC Unit 1 57,054804952 VAVCO 1=01 2020-02-24 04:05:12,043000-08:00 0 ISLTCLAC UnitsLAC Unit 1 57,054804952 VAVCO 1=01 2020-02-24 04:05:12,043000-08:00 0 ISLTCLAC UnitsLAC Unit 1 57,054804952 VAVCO 1=01 2020-02-24 04:09:12,043000-08:00 0 ISLTCLAC UnitsLAC Unit 1 57,0549812075 VAVCO 1=01 2020-02-24 04:11:32,0430000-08:00 0 ISLTCLAC UnitsLAC Unit 1 57,063223050 VAVCO 1=02 2020-02-24 04:11:32,0430000-08:00 0 ISLTCLAC UnitsLAC Unit 1 57,0632342050 VAVCO 1=01 2020-02-24 04:11:32,0430000-08:00 0 ISLTCLAC UnitsLAC Unit 1 57,0634324051 VAVCO	AVCO 1-01	2020-02-24 04:02:32.0430000-08:00	Θ	\SLTC\AC Units\AC Unit 1	57.66876983642
WXC0 1=01 2020-02-24 04:04:12,043000-06:00 0 LSLTCL/C UnitsLV/CUNIT 1 75.53540400 VXXC0 1=01 2020-02-24 04:05:12,043000-06:00 0 LSLTCL/C UnitsLV/CUNIT 1 57.468697736 VXXC0 1=01 2020-02-24 04:05:12,043000-06:00 0 LSLTCL/C UnitsLV/CUNIT 1 57.468697736 VXXC0 1=01 2020-02-24 04:05:12,043000-06:00 0 LSLTCL/C UnitsLV/CUNIT 1 57.35464000 VXXC0 1=01 2020-02-24 04:05:12,043000-06:00 0 LSLTCL/C UnitsLV/CUNIT 1 57.35464000 VXXC0 1=01 2020-02-24 04:10:12,043000-06:00 0 LSLTCL/C UnitsLV/CUNIT 1 57.35464000 VXXC0 1=01 2020-02-24 04:10:12,043000-06:00 0 LSLTCL/C UnitsLV/CUNIT 1 57.356124077 VXXC0 1=01 2020-02-24 04:11:12,043000-06:00 0 LSLTCL/C UnitsLV/CUNIT 1 57.356494020 VXXC0 1=01 2020-02-24 04:11:12,043000-06:00 0 LSLTCL/C UnitsLV/CUNIT 1 57.3564942051 VXXC0 1=01 2020-02-24 04:11:12,043000-06:00 0 LSLTCL/C UnitsLV/C Unit 1 57.3564942051 </td <td>VAVCO 1-01</td> <td>2020-02-24 04:03:32.0430000-08:00</td> <td>0</td> <td>\SLTC\AC Units\AC Unit 1</td> <td>57.60212707519</td>	VAVCO 1-01	2020-02-24 04:03:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.60212707519
VAVCO 1=01 2020-02-24 04:05:12,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 7.4480377384 VAVCO 1=01 2020-02-24 04:06:52,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.4480377384 VAVCO 1=01 2020-02-24 04:06:52,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.4480377384 VAVCO 1=01 2020-02-24 04:06:52,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.355448008 VAVCO 1=01 2020-02-24 04:06:52,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.355458018248 VAVCO 1=01 2020-02-24 04:16:12,0,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.3085124487 VAVCO 1=01 2020-02-24 04:11:22,0,430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.04861267126 VAVCO 1=01 2020-02-24 04:11:52,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.364532407 VAVCO 1=01 2020-02-24 04:15:12,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.37647377 VAVCO 1=01 2020-02-24 04:15:12,0430000-08:00 LSLTCVAC UnitsVAC Unit 1 57.357649747	VAVCO 1-01	2020-02-24 04:04:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.53548049926
VAVCD 1-01 2020-02-24 04:06:12,043000-08:00 0 LSTCVAC UnitsVAC Unit 1 77.402101021 VAVCD 1-01 2020-02-24 04:06:12,043000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.3555464000 VAVCD 1-01 2020-02-24 04:06:12,043000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.3555464000 VAVCD 1-01 2020-02-24 04:06:12,043000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.3555464000 VAVCD 1-01 2020-02-24 04:10:12,043000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.3555464000 VAVCD 1-01 2020-02-24 04:11:21,043000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.355120110 VAVCD 1-01 2020-02-24 04:11:32,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.3663612011 VAVCD 1-01 2020-02-24 04:15:12,0430000-08:00 0 LSTCVAC Unit 1 57.316061411 VAVCD 1-01 2020-02-24 04:15:12,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.316061411 VAVCD 1-01 2020-02-24 04:15:12,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.316763707	VAVCO 1-01	2020-02-24 04:05:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.46883773803
VAVCO 1-01 2020-02-24 04107:32,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 7.35544000 VAVCO 1-01 2020-02-24 04109:32,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.25554000 VAVCO 1-01 2020-02-24 04109:32,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.25554000 VAVCO 1-01 2020-02-24 04109:32,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.25550124877 VAVCO 1-01 2020-02-24 04113:22,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.2556124877 VAVCO 1-01 2020-02-24 04113:22,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.056324077 VAVC0 1-01 2020-02-24 04113:22,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.056324077 VAVC0 1-01 2020-02-24 04113:22,0430000-08:00 0 LSTCVAC Unit 1 57.75763104141 VAVC0 1-01 2020-02-24 04113:22,0430000-08:00 0 LSTCVAC Unit 1 57.75723433009 VAVC0 1-01 2020-02-24 04113:22,0430000-08:00 0 LSTCVAC Unit 1 57.75310097411 VAVC0 1-01 2020-02-24 0413:22,0430000-08:00 0 LSTCVAC UnitsVAC Unit 1 57.75310097411 <td>VAVCO 1-01</td> <td>2020-02-24 04:06:32.0430000-08:00</td> <td>0</td> <td>\SLTC\AC Units\AC Unit 1</td> <td>57.40219116210</td>	VAVCO 1-01	2020-02-24 04:06:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.40219116210
VAVCO 1-01 2020-02-24 04:06:12,043000-06:06 0 LSTCLAC UnitsLAC Unit 1 77.2659012324 VAVCO 1-01 2020-02-24 04:06:12,043000-06:06 0 LSTCLAC UnitsLAC Unit 1 57.2659012324 VAVCO 1-01 2020-02-24 04:11:22,043000-06:06 0 LSTCLAC UnitsLAC Unit 1 57.2659012324 VAVCO 1-01 2020-02-24 04:11:22,043000-06:06 0 LSTCLAC UnitsLAC Unit 1 57.36512407 VAVCO 1-01 2020-02-24 04:11:22,0430000-06:06 0 LSTCLAC UnitsLAC Unit 1 57.736512407 VAVCO 1-01 2020-02-24 04:15:22,0430000-06:06 0 LSTCLAC UnitsLAC Unit 1 57.7364332017 VAVCO 1-01 2020-02-24 04:15:22,0430000-06:06 0 LSTCLAC UnitsLAC Unit 1 57.7364342017 VAVCO 1-01 2020-02-24 04:15:22,0430000-06:06 0 LSTCLAC UnitsLAC Unit 1 57.736434217 VAVCO 1-01 2020-02-24 04:15:22,0430000-06:06 0 LSTCLAC UnitsLAC Unit 1 57.7364754505 VAVCO 1-01 2020-02-24 04:15:22,0430000-06:06 0 LSTCLAC UnitsLAC Unit 1 57.7364754505	VAVCO 1-01	2020-02-24 04:07:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.33554840087
WXC0 1=01 2020-02-24 04109:12,0430000-08:00 0 LSTCVAC Unit1 VAC Unit1 1 77.202250027 WXC0 1=01 2020-02-24 04101:22,0430000-08:00 0 LSTCVAC Unit1 VAC Unit1 1 57.202250027 WXC0 1=01 2020-02-24 0411:12,0430000-08:00 0 LSTCVAC Unit1 VAC Unit1 1 57.202250027 WXC0 1=01 2020-02-24 041:11:22,0430000-08:00 0 LSTCVAC Unit1 VAC Unit1 1 57.0685027264 WXC0 1=01 2020-02-24 041:11:22,0430000-08:00 0 LSTCVAC Unit1 VAC Unit1 1 57.0682424001 WXC0 1=01 2020-02-24 041:11:22,0430000-08:00 0 LSTCVAC Unit1 VAC Unit1 1 57.0682424001 WXC0 1=01 2020-02-24 041:15:22,0430000-08:00 0 LSTCVAC Unit1 VAC Unit1 1 57.310095111 VXC0 1=01 2020-02-24 041:15:22,0430000-08:00 0 LSTCVAC Unit1 VAC Unit1 1 57.3310095111 VXC0 1=01 2020-02-24 041:19:22,0430000-08:00 0 LSTCVAC Unit1 VAC Unit1 1 57.3310095111 VXC0 1=01 2020-02-24 041:19:22,0430000-08:00 LSTCVAC Unit1 VAC Unit1 1 57.3573734	VAVCO 1-01	2020-02-24 04:08:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.26890182495
NVC0 1=01 2020-02-24 04:10:12,043000-08:00 0 LSLTCVAC UnitsVAC Unit 1 77.1356124077 NVC0 1=01 2020-02-24 04:11:32,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.0655097265 NVC0 1=01 2020-02-24 04:11:32,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.0655097265 NVC0 1=01 2020-02-24 04:11:32,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.0653242407 NVC0 1=01 2020-02-24 04:11:32,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.063432407 NVC0 1=01 2020-02-24 04:15:32,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.365432407 NVC0 1=01 2020-02-24 04:15:32,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.310703777 NVC0 1=01 2020-02-24 04:15:32,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.3130695141 NVC0 1=01 2020-02-24 04:15:32,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.3130695141 NVC0 1=01 2020-02-24 04:15:32,0430000-08:00 0 LSLTCVAC UnitsVAC Unit 1 57.3130693141 <td>VAVCO 1-01</td> <td>2020-02-24 04:09:32.0430000-08:00</td> <td>0</td> <td>\SLTC\AC Units\AC Unit 1</td> <td>57.20225906372</td>	VAVCO 1-01	2020-02-24 04:09:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.20225906372
NVC0 1-01 2020-02-24 04:11:2:0.403000-06:00 0 LSTCVAC UnitsVAC Unit 1 77.0669697252 NVC0 1-01 2020-02-24 04:11:2:0.403000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.0669627262 NVC0 1-01 2020-02-24 04:11:2:0.403000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.066324264 NVC0 1-01 2020-02-24 04:13:2:0.4030000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.066324264 VAVC0 1-01 2020-02-24 04:15:2:0.4030000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.066324264 VAVC0 1-01 2020-02-24 04:15:2:0.4030000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.0664342647 VAVC0 1-01 2020-02-24 04:15:2:0.4030000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.0664342629 VAVC0 1-01 2020-02-24 04:15:2:0.4030000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.066767324 VAVC0 1-01 2020-02-24 04:15:2:0.4030000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.753069767324 VAVC0 1-01 2020-02-24 04:2:13:2:0.4030000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.7564549	VAVCO 1-01	2020-02-24 04:10:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.13561248779
NVC0 1=01 2020-02-24 04113:22.8430000-08:00 0 \SLTC\AC Units\AC Unit1 T>07.021231000 NVC0 1=01 2020-02-24 0413:32.8430000-08:00 0 \SLTC\AC Units\AC Unit1 T>7.021231000 NVC0 1=01 2020-02-24 0413:32.8430000-08:00 0 \SLTC\AC Units\AC Unit1 T>7.03707370 NVC0 1=01 2020-02-24 0415:152.0430000-08:00 0 \SLTC\AC Units\AC Unit1 T>7.376737370 NVC0 1=01 2020-02-24 0415:32.0430000-08:00 0 \SLTC\AC Units\AC Unit1 T>7.364312617 NVC0 1=01 2020-02-24 0416:32.0430000-08:00 0 \SLTC\AC Units\AC Unit1 T>7.364312617 VAVC0 1=01 2020-02-24 041:91:32.0430000-08:00 0 \SLTC\AC Units\AC Unit1 T>7.364342617 VAVC0 1=01 2020-02-24 041:91:32.0430000-08:00 0 \SLTC\AC Units\AC Unit1 T>7.3664340299 VAVC0 1=01 2020-02-24 041:91:32.0430000-08:00 0 \SLTC\AC Units\AC Unit1 T>7.3664340299 VAVC0 1=01 2020-02-24 041:91:32.0430000-08:00 0 \SLTC\AC Units\AC Unit1 T>7.3664340219 <td>AVCO 1-01</td> <td>2020-02-24 04:11:32.0430000-08:00</td> <td>0</td> <td>\SLTC\AC Units\AC Unit 1</td> <td>57.06896972656</td>	AVCO 1-01	2020-02-24 04:11:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.06896972656
DAVCO 1=01 2020-02-24 04:13:22,0430000-08:00 0 USLTCL/C UnitsL/C Unit 1 77.064344007 VAVCO 1=01 2020-02-24 04:13:23,0430000-08:00 0 USLTCL/C UnitsL/C Unit 1 57.054344007 VAVCO 1=01 2020-02-24 04:15:23,0430000-08:00 0 USLTCL/C UnitsL/C Unit 1 57.054344007 VAVCO 1=01 2020-02-24 04:15:22,0430000-08:00 0 USLTCL/C UnitsL/C Unit 1 57.054342021 VAVCO 1=01 2020-02-24 04:15:22,0430000-08:00 0 USLTCL/C UnitsL/C Unit 1 57.35745605 VAVCO 1=01 2020-02-24 04:15:22,0430000-68:00 0 USLTCL/C UnitsL/C Unit 1 57.35745605 VAVCO 1=01 2020-02-24 04:21:22,0430000-68:00 0 USLTCL/C UnitsL/C Unit 1 57.75757324 VAVCO 1=01 2020-02-24 04:21:22,0430000-68:00 0 USLTCL/C UnitsL/C Unit 1 57.757575324 VAVCO 1=01 2020-02-24 04:21:22,0430000-68:00 0 USLTCL/C UnitsL/C Unit 1 57.73664340755 VAVCO	AVCO 1-01	2020-02-24 04:12:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.00232315063
AuxCO 1=01 2020-02-24 04:14:12,043000-06:00 0 LSTCVAC UnitsVAC Unit 1 757.31300814301 VAVCO 1=01 2020-02-24 04:15:12,0430000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.3170737376 VAVCO 1=01 2020-02-24 04:15:12,0430000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.3170813431 VAVCO 1=01 2020-02-24 04:15:12,0430000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.3310089111 VAVCO 1=01 2020-02-24 04:15:12,0430000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.3310089111 VAVCO 1=01 2020-02-24 04:19:12,0430000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.3310087411 VAVCO 1=01 2020-02-24 04:19:12,0430000-06:00 0 LSTCVAC Unit 1 57.53106753124 VAVCO 1=01 2020-02-24 04:21:22,0430000-06:00 0 LSTCVAC Unit 1 57.53106757314 VAVCO 1=01 2020-02-24 04:21:22,0430000-06:00 0 LSTCVAC Unit 1 57.57645430279 VAVCO 1=01 2020-02-24 04:21:22,0430000-06:00 0 LSTCVAC UnitsVAC Unit 1 57.57645430279 <t< td=""><td>VAVCO 1-01</td><td>2020-02-24 04:13:32.0430000-08:00</td><td>0</td><td>\SLTC\AC Units\AC Unit 1</td><td>57.06434249877</td></t<>	VAVCO 1-01	2020-02-24 04:13:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.06434249877
VAVCO 1=01 2020-02-24 04:15:2:0.4930000-08:00 0 USLTCL/C UnitsL/C Unit 1 77.197737707 VAVCO 1=01 2020-02-24 04:15:2:0.4930000-08:00 0 USLTCL/C UnitsL/C UnitsL/C Units 1 57.2643432617 VAVCO 1=01 2020-02-24 04:15:2:0.4930000-08:00 0 USLTCL/C UnitsL/C UnitsL/C Units 1 57.76745605 VAVCO 1=01 2020-02-24 04:15:2:0.4930000-08:00 0 USLTCL/C UnitsL/C UnitsL/C Units 1 57.976745605 VAVCO 1=01 2020-02-24 04:15:2:0.4930000-08:00 0 USLTCL/C UnitsL/C Units 1 57.976745605 VAVCO 1=01 2020-02-24 04:15:2:0.4930000-08:00 0 USLTCL/C UnitsL/C Units 1 57.976751243 VAVCO 1=01 2020-02-24 04:21:32:0.4930000-08:00 0 USLTCL/C UnitsL/C Units 1 57.78645407253 VAVCO 1=01 2020-02-24 04:23:32:0.4930000-08:00 0 USLTCL/C UnitsL/C Units 1 57.7976764648 VAVCO 1=01 2020-02-24 04:23:32:0.4930000-08:00 0 USLTCL/C UnitsL/C Units 1 57.7976764648 VAVCO 1=01 2020-02-24 04:23:32:0.4930000-08:00 0 U	VAVCO 1-01	2020-02-24 04:14:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.13100814819
VAVCO 1=01 2020-02-24 0416173.2.0430000-08:00 0 \SLTCL/C UnitsL/CLUT11 T7.364342015 VAVCO 1=01 2020-02-24 041173.2.0430000-08:00 0 \SLTCL/C UnitsL/C Units1 57.3310009111 VAVCO 1=01 2020-02-24 041195.2.0430000-08:00 0 \SLTCL/C UnitsL/C Units1 57.346430209 VAVCO 1=01 2020-02-24 041195.2.0430000-08:00 0 \SLTCL/C UnitsL/C Units1 57.3467430209 VAVCO 1=01 2020-02-24 041213.2.0430000-08:00 0 \SLTCL/C UnitsL/C Units1 57.57537234 VAVCO 1=01 2020-02-24 041213.2.0430000-08:00 0 \SLTCL/C UnitsL/C Units1 57.57553246 VAVCO 1=01 2020-02-24 041213.2.0430000-08:00 0 \SLTCL/C UnitsL/C Units1 57.57553246 VAVCO 1=01 2020-02-24 0412312.0430000-08:00 0 \SLTCL/C UnitsL/C Units1 57.757646340279 VAVCO 1=01 2020-02-24 0412312.0430000-08:00 0 \SLTCL/C UnitsL/C Units1 57.757646340279 VAVC0 1=01 2020-02-24 0412312.0430000-08:00 0 \SLTCL/C UnitsL/C Units1 57.79767606	VAVCO 1-01	2020-02-24 04:15:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.19767379766
VAVCD 1=01 2020-02-24 04:17:22.0430000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.337089311 VAVCD 1=01 2020-02-24 04:15:22.0430000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.3370763508 VAVCD 1=01 2020-02-24 04:15:22.0430000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.337049511 VAVCD 1=01 2020-02-24 04:19:12.043000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.33100695141 VAVCD 1=01 2020-02-24 04:19:12.043000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.3100695141 VAVCD 1=01 2020-02-24 04:22:12.0430000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.7364300272 VAVCD 1=01 2020-02-24 04:23:12.0430000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.7366430027 VAVCD 1=01 2020-02-24 04:23:12.0430000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.7367645408 VAVCD 1=01 2020-02-24 04:23:12.0430000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.7367645408 VAVCD 1=01 2020-02-24 04:23:12.0430000-08:00 0 LSLTCLAC UnitsLAC Unit 1 57.736	VAVCO 1-01	2020-02-24 04:16:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57.26434326171
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VXC0 1-01 2020-02-24 04:20:22.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.5310067401 VXC0 1-01 2020-02-24 04:21:32.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.5753204 VXC0 1-01 2020-02-24 04:21:32.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.7564340725 VXC0 1-01 2020-02-24 04:23:32.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.7564340725 VXC0 1-01 2020-02-24 04:23:32.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.7564340725 XXC0 1-01 2020-02-24 04:23:32.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.7976760463 XXC0 1-01 2020-02-24 04:23:32.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.7976760453 XXC0 1-01 2020-02-24 04:23:32.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.7976760453 XXC0 1-01 2020-02-24 04:25:12.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.7976760453 XXC0 1-01 2020-02-24 04:27:32.0430000-08:00 0 \SLTC\AC Units\AC Unit 1 57.7976764543 <td>VAVCO 1-01</td> <td>2020-02-24 04:19:32.0430000-08:00</td> <td>0</td> <td>\SLTC\AC Units\AC Unit 1</td> <td>57,46434020996</td>	VAVCO 1-01	2020-02-24 04:19:32.0430000-08:00	0	\SLTC\AC Units\AC Unit 1	57,46434020996
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	VAVCO 1-01	2020-02-24 15:00:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	90.07364654541016	637181532036260000	
	VAVCO 1-01	2020-02-24 19:46:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	179.0	637181703636260000	
	VAVCO 1-01	2020-02-24 15:25:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	195.19813537597656	637181547036260000	
	VAVCO 1-01	2020-02-24 17:30:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	171.4986572265625	637181622036260000	
	VAVCO 1-01	2020-02-24 16:22:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	174.367431640625	637181581236260000	
	VAVCO 1-01	2020-02-24 13:09:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	58.0	637181465436260000	
	VAVCO 1-01	2020-02-24 18:01:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	176.0	637181640636260000	
	VAVCO 1-01	2020-02-24 17:21:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	174.03619384765625	637181616636260000	
0	VAVC0 1-01	2020-02-24 14:15:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	57.83385467529297	637181505036260000	
1	VAVCO 1-01	2020-02-24 15:23:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	202.5332489013672	637181545836260000	
2	VAVCO 1-01	2020-02-24 12:28:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	57.96722412109375	637181440836260000	
3	VAVCO 1-01	2020-02-24 16:50:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	171.99847412109375	637181598036260000	
4	VAVCO 1-01	2020-02-24 17:57:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	175.93124389648438	637181638236260000	
5	VAVCO 1-01	2020-02-24 15:54:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	174.2339630126953	637181564436260000	
6	VAVCO 1-01	2020-02-24 14:42:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	57.0	637181521236260000	
7	VAVC0 1-01	2020-02-24 12:58:03.626 UTC	0.0	\SLTC\AC Units\AC Unit 1	58.0	637181458836260000	
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Publish time Feb 24, 2020, 12:12:58 PM	Attribute keys	("VAVC0 1-01";"VAVC0 1-01";"% cooling":0.0,"AC Unit Path":'\\SLTC\\AC Units\\AC Unit 1","Actual Airflow":189.0,"Timestamp":"2020-02-24T12:12:56.6370000-08:00"}	ACK	^
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Google Cloud Storage, BigQuery, Pub/Sub – What's the Difference?

EASE Management of PI Systems



Example Architecture of Multiple Deployments





SUPPORT a Seamless Infrastructure





PI Integrators – Roadmap

PI Integrator for BA 2020 to release soon!

Developing Now

Native Integration to Google Cloud Platform

Google Cloud Storage, Google BigQuery, Google Pub/Sub

Native Integration to SAP HANA

Supported for SAP HANA 2.0 SPS03 via ODBC specification

Considering Next

 \gg

Updates to Azure Targets Native integration to ADLS Gen 2, and continuous improvements to currently supported writers based on user feedback

Researching Future

Updates to Existing Targets

Improvements to Manageability & Reliability

Manageability Enhancements

Silent installations, gMSA support, share resources across deployments, and bug fixes

Last Updated: 2020-03

Roadmap themes: Manageable Systems | Seamless Infrastructure | Increased Value & Scope of Data

SAN FRANCISCO 2020

OSIsoft's Product Roadmap is for INFORMATIONAL PURPOSES ONLY and is SUBJECT TO CHANGE.

Summary



What is advanced analytics for critical operations?

How to avoid common mistakes?





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Communicate with OSIsoft Product Managers



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Speaker Information



Joy Wang

- Technical Product Manager
- OSIsoft, LLC
- jwang@osisoft.com



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Please wait for the **microphone**

State your name & company



Save the Date...



AMSTERDAM October 26-29, 2020







San Francisco 2020