Firsthand experience of OSIsoft Product Roadmap

From the OSIsoft Team
Chris Nelson, VP Software Development
# What to expect for Day 3

| Day 3: Analytics Track  
Room 114, P1 Level | Day 3: Developer Track  
Room 115, P1 Level | Day 3: Marketplace Partner Showcase  
Room 115, P1 Level | Day 3: PI Admin Track  
Room 117, P1 Level | Day 3: Product Track  
Room 113, P1 Level |
|-------------------|-------------------|-------------------|-------------------|-------------------|
| 10:40 - 11:20  
Introduction to Time-Series Analysis with PI System Data | 10:40 - 11:20  
PI Developers Club Community Developer Technologies Roadmap | 10:40 - 11:20  
Extending the Power of your PI System with Seq Analytics | 10:40 - 11:20  
Hardcore PI System Hardening | 10:40 - 11:20  
OSIsoft Cloud Services |
| 11:30 - 12:10  
Introduction to Data Science for PI Data for PI Professionals | 11:30 - 13:00  
LiveCoding: Writing Highly Performant PI Web API Applications | 11:30 - 12:10  
Data Diode Cybersecurity for PI System | 11:30 - 13:00  
LiveCoding: Getting the Most Out of the New AFSearch | 11:30 - 12:10  
PI System 2018 |
| 12:20 - 13:00  
Advances in PI System Streaming Analytics with MATLAB and Other External Calculation Engines | 14:30 - 16:15  
HowTo: Writing applications at the Edge with OSIsoft Edge Data Store | 12:20 - 13:00  
Plantweb IIoT Solutions on PI System as an Infrastructure | 14:30 - 16:15  
HowTo: Streaming Calculations with the PI System and MATLAB and other Computation Engines | 12:20 - 13:00  
PI Vision: Enabling Real-Time Monitoring and Analysis for the Enterprise |
| 14:30 - 15:15  
Data Science with R and the PI System | 14:30 - 15:15  
FactoryTalk Analytics Platform and MES integration with the PI System Infrastructure |  | 14:30 - 15:15  
Pervasive Data Collection - Connectivity from A to Z | 15:30 - 16:15  
Actionable Insights with PI Integrators |
| 15:30 - 16:15  
PI System Analytics, Fit for Purpose |  |  |  |  |
OSIsoft Headquarters

- Leverage PI System to support the facility
- Collect data from Building Management System (BMS)
- Operational excellence
- Single pane of glass
- Energy management
- Optimize energy usage
  - HVAC performance
- Anomaly detection
OSIsoft’s new Headquarters, the SLTC story

Gregg Le Blanc – VP Product
Agenda for the next 82 minutes

• SLTC Business Challenges and Product Roadmap
• Pervasive Data Collection
• Data Storage and Management
• Analytics
• Visualization
• OSIsoft Cloud Services
• Dev Con Kickoff
• Summary
Future will extend in all directions

Pervasive Data Collection (PDC)

OSIsoft Cloud Services

Industrial IoT
- Millions of Smart Devices

Assets
- Multiple Sensors

Plant
- Multiple Assets

Enterprise
- Multiple Plants

Community
- Multiple Enterprises
OSIsoft – as a Customer

1. Situational Awareness
   - Post Commission Review
   - Asset Health & Performance
   - Data Center "Plant"
2. Sustainability
   - Efficiency Of HVAC
   - Demand Reduction Planning
3. Smart Building Microgrid
   - Energy Management
   - Partner Community
   - (Future) Battery, EV, Solar
4. Community
   - Owner Tenant Engineering
   - Asset Health & Performance
   - Events & Alarms

Started
Rollout and Development Themes

• Manageability
  • Using PI Vision to centralize UI work
  • Using OSIsoft Cloud Services to aggregate data

• Seamless infrastructure
  • Using Connectors to collect our data
  • Deploying IoT and Edge devices
  • Using new analytics features of PI System 2018
  • Connecting PI System to OSIsoft Cloud Services
Management KPI - Energy Dashboard

Quick comparison against prior year
Post Commission Review (Visualization, Data Baseline Trend Analysis)

The target for the building was an improvement from 26 kWh/sf (old building) to 8.5 kWh/sf (new building) how to validate design and evaluate the commission process for errors.

<table>
<thead>
<tr>
<th>CHALLENGE</th>
<th>SOLUTION</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>The commission process is only as good as the design specifications</td>
<td>Implement PI for benchmarking the HVAC, hot water and window tinting system.</td>
<td>Found numerous gaps between the design specification and the actual system requirements.</td>
</tr>
<tr>
<td>• Design vs. actual performance</td>
<td>• BACnet Connector</td>
<td>• Failed or poorly installed equipment</td>
</tr>
<tr>
<td>• Failed equipment</td>
<td>• PI Vision</td>
<td>• Lack of BMS required features</td>
</tr>
<tr>
<td>• Inadequate or missing specifications</td>
<td>• PI UFL for Energy Data</td>
<td>• Programming errors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Building design issues</td>
</tr>
</tbody>
</table>
Management KPI – Building Benchmark

Energy Use Intensity (YTD)
8.85 kWh/sq ft

Building Size
134,051 ft²

Annual Consumption (YTD)
1,186 MWh

Outside Temperature
°F

Total Usage
(MW)

Apr 90
Sep 70
Jan 50
Apr 30
Problems with the real world

Issues they didn’t see

- Cooling faults
- No reset on manual override
- 4am start on a holiday
- One unit hunting despite vacant
Problems with the real world

Commissioning of specialized systems

How it should work

Reality = hidden faults
**Single Pane of Glass** (Visualization)

We installed new technologies that provided no management console and additional building systems were not connected to Building Management System.

<table>
<thead>
<tr>
<th>CHALLENGE</th>
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<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>We lacked completed system visibility</td>
<td>Leverage PI Vision for dashboards, troubleshooting and root cause analysis</td>
<td>Real Time Reporting for multiple stakeholders and missing HMI system</td>
</tr>
<tr>
<td>• ViewGlass window tinting system had no HMI.</td>
<td>• Dashboards for the current status of the system</td>
<td>• ViewGlass Displays (Vendor Now Interested in using PI)</td>
</tr>
<tr>
<td>• Lighting &amp; ViewGlass not in BMS</td>
<td>• Integrate trending</td>
<td>• 3 Stakeholders Access – engineering, landlord, tenant</td>
</tr>
<tr>
<td>• BMS lacked ability to share data with multiple participants</td>
<td>• Troubleshooting Analytics</td>
<td>• Internal Customer Screens</td>
</tr>
</tbody>
</table>
Single Pane of Glass

Asset View

Floor View
HVAC Performance (Trend Analysis and Machine Learning)

The BMS system included its own algorithm on the optimization of the start-up process. Plus the amount of manual temperature overrides we needed to understand system performance tied to comfort for employees.

**Challenge**

We monitored inefficient use of the HVAC system and need to understand performance.

- Start-up 4 hour duration but units achieving set point temperature in as little as 30 minutes
- Significant manual overrides causing simultaneous heating and cooling in contiguous zones

**Solution**

Analyze system performance with Machine Learning and analyze trends of manual overrides.

- Integrator for Business Intelligence
- Power BI, R, Orange
- PI Vision Adhoc Trending
- PI Vision Dashboards

**Results**

Identified multiple contributing issues contributing to a minimum of 5% energy consumption.

- BMS Software Bugs
- BMS Configuration Issues
- HVAC Design Issue
- BMS optimization algorithm not optimized for energy conservation
Problems with the real world

First Floor Failed Pre-Conditioning Prior to Occupancy

Manual Overrides created extensive heating and cooling issues
Machine Learning Insights

How long is startup taking?

- Average of Duration (hour): 1.84
- Average Duration (setpoint reached): 0.97

Are the VAV Units reaching setpoint? At what time?

- % Setpoint reached: 72%
- Average end time: 5:38:08

<table>
<thead>
<tr>
<th>Side</th>
<th>Number of Events</th>
<th>% Setpoint reached</th>
<th>Average end time</th>
</tr>
</thead>
<tbody>
<tr>
<td>East</td>
<td>7623</td>
<td>68%</td>
<td>5:48:06</td>
</tr>
<tr>
<td>NA</td>
<td>2056</td>
<td>53%</td>
<td>6:45:09</td>
</tr>
<tr>
<td>West</td>
<td>1089</td>
<td>78%</td>
<td>5:23:26</td>
</tr>
<tr>
<td>Total</td>
<td>20488</td>
<td>72%</td>
<td>5:38:08</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Floor</th>
<th>Number of Events</th>
<th>% Setpoint reached</th>
<th>Average end time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2056</td>
<td>53%</td>
<td>6:45:09</td>
</tr>
<tr>
<td>2</td>
<td>3064</td>
<td>74%</td>
<td>5:13:56</td>
</tr>
<tr>
<td>3</td>
<td>3825</td>
<td>71%</td>
<td>5:20:35</td>
</tr>
<tr>
<td>4</td>
<td>3720</td>
<td>77%</td>
<td>5:43:27</td>
</tr>
<tr>
<td>5</td>
<td>2963</td>
<td>74%</td>
<td>5:44:50</td>
</tr>
<tr>
<td>6</td>
<td>4860</td>
<td>73%</td>
<td>5:38:09</td>
</tr>
<tr>
<td>Total</td>
<td>20488</td>
<td>72%</td>
<td>5:38:08</td>
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Energy Management (Visualizations, PI AF/Analysis Server & PXiSE)

While the building is energy efficient we lacked visibility of energy consumption by system and for building two the need for multi-tenant billing support. Plus we want to plan for a 25% reduction in demand charges.

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<td>We had no real time view of energy data.</td>
<td>PXiSE solution for 10 hertz data for real time and high frequency data to determine system demand.</td>
<td>Identified building base load, 25% potential demand reduction, individual systems impact on energy.</td>
</tr>
<tr>
<td>• 48 Hour delayed utility data</td>
<td>• PXiSE Microgrid Controller with embedded PI</td>
<td>• Full PG&amp;E Bill Audit Analytics</td>
</tr>
<tr>
<td>• Building only</td>
<td>• PI UFL Connector</td>
<td>• Battery Sizing Calculated</td>
</tr>
<tr>
<td></td>
<td>• PI Vision &amp; AF Analytics</td>
<td>• Energy Impact of Window Tinting (Future)</td>
</tr>
<tr>
<td></td>
<td>• Future – Sub Metering</td>
<td>• Energy Impact of Demand Reduction Lighting System (Future)</td>
</tr>
</tbody>
</table>
Jumps in real and reactive power. The intervals between disturbances is between 21 and 26 minutes with a peak of 60 kW for 2 minutes. About 25 events per day at 365 days and $0.20 per kWh amounts to about $3650 in costs.
Energy Consumption

The data now tells us a story on where we consume energy.
## Community (PI Cloud Connect, PI System Connector, PI System Integrator)

We are part of an ecosystem as a customer and as a manufacturer of the solution. We need to share our data with the landlord, building engineering, Microgrid provider, independent software vendors, system integrators and building technology vendors.

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</thead>
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<td>A disparate group of community members with different requirements.</td>
<td>Leverage the toolkit for an appropriate solution for each customer with no additional overhead.</td>
<td>A subscriber menu based on requirements we can provide quick and easy access with history.</td>
</tr>
<tr>
<td>• Building engineering wanted real time access</td>
<td>• PI Cloud Connect</td>
<td>• 3rd party companies with PI who want streaming data took PI Cloud Connect</td>
</tr>
<tr>
<td>• ISV and SI wanted streaming data to build market solutions</td>
<td>• PI System Connector</td>
<td>• Internal we used all of the options based on use cases (ML, Training, Demo)</td>
</tr>
<tr>
<td>• Technology providers was point in time snapshots</td>
<td>• PI Datalink</td>
<td>• Building engineering just want pre-built displays</td>
</tr>
<tr>
<td></td>
<td>• PI Vision Dashboards</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• PI System Integrator</td>
<td></td>
</tr>
</tbody>
</table>
Building Performance – Out of Spec

Running Out Building Spec – Failed Temperature Alarms

Running In Building Spec – Failed Temperature Alarms
1. 15 Minute Utility Meter is like driving at midnight with sunglasses on
2. High Velocity data shows the impact of poor performance and improvements from tuning
3. See the change in fan usage by changing set points to within building design specifications
Facility Analytics – Multiple Issues

No Supply Air Fan, Dampers Open or Closed
Several VAV Systems with significant airflow
We found several VAV boxes with either poor calibration or broken dampers.

**Airflow With Damper Closed Examples**
Real Power in Real Time
Pervasive Data Collection

Chris Felts – Product Manager
Abbas Saboowala – Product Manager
Pervasive Data Collection

- **PI Connectors**: PI Interfaces, Plants
- **Edge Data Store**: Assets
- **Open Source**: Devices
- **OMF Application**: Sensors

Data Streams: 10,000's → High
Compute Resources: Low → 10's
MESSI AND NOT A MESS
PI Connectors help you be strategic

Streamlined Configuration
Auto create PI Points and AF reference model with rules-based data selection.

Auto discover data, now and later
PI Connectors monitor the source so you don’t have to.

Unified Admin Experience
A one-stop shop to manage data collection across your sources.

Secure & Flexible Architectures
Send data securely across diverse networks to multiple destinations.
What do we collect

- BACnet
- UFL
- Redfish

Collect Building Management Data

Parse Energy Data

Server monitoring for IT Operations

PI Server

OSIsoft Cloud Services

Edge Data Store
What do you see here?
Edge Data Store Built for Purpose

Persistent Data Storage
Collect and store thousands of data streams easily and securely.

Self-Healing
Designed from the ground up for unmanned, remote operation.

Upload to PI and OCS
Automatic data transfer for advanced viewing, analytics, data sharing and long term storage.

Application & Analytics Ready
Modern, RESTful APIs for local and remote data access for application and analytics integration.
OMF Expands Data Connectivity

**Maximum Flexibility**
Application developer is only required to adhere to the specification, otherwise is free to develop any required features and functions.

**Lightweight Footprint**
Targeting the smallest device and sensor data sources.

**Any Environment**
Any hardware, any operating system, any development tools.

**Partner Enablement**
Message structure abstracts the backend OSIsoft storage technology, easing the application development effort.
Rooftop Solar – Parking Garage
Data Collection
Emerging Technologies
Live demos
Ask questions
Speak with Developers

Pervasive Data Collection – Connectivity from A to Z (Product Track)
14:30
How To: Writing Applications at the Edge with OSIsoft Edge Data Store (Developer Track)
14:30

Fog Computing: Develop Data Ingress Applications from Edge to Cloud (pre-registration required)
14:30
Data Storage and Management
Calculations and Events

Stephen Kwan – Product Manager
What are customers telling us?

https://feedback.osisoft.com
Make it easy
Make it work
Make it fast
Make it scale
Help me manage it
Tell me when something is wrong
Fix it for me
I want to do more with my data
........
Make it easy and make it work

- Attribute display digits
- Arrays in asset analytics
- Dynamic output timestamps
- Recalculate dependent analyses
- Notify at end of event
- Implicit event frame generation
Make it fast and make it scale

- Improved AF searches
- Improved event frame searches
- Bulk event frames checkout and deletes
- Improved data archive reads in some situations
- Improved handling of dependent analyses
- Better handle missing or un-configured PI Points
Help me manage it

Easier to migrate AF DBs

Improved AF audit trails

AF connections history

Analyses status via AF SDK

Single PI Server setup kit

Scheduled archive shifts
Improved Archive Management

• Archive shifts at fixed duration – daily, weekly, monthly
• Auto archive sizing
  • Based on data rate and expected archive duration
• Align archives amongst collective members
  • Handles time zone differences

<table>
<thead>
<tr>
<th>#</th>
<th>Start Time</th>
<th>End Time</th>
<th>Duration</th>
<th>Size (MB)</th>
<th>% Full</th>
<th>Corrupt</th>
<th>Archive File</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4/18/2018 12:00:00 AM</td>
<td>Current Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C:\Program</td>
</tr>
<tr>
<td>1</td>
<td>4/17/2018 12:00:00 AM</td>
<td>4/18/2018</td>
<td>00d 20:26:03</td>
<td>338</td>
<td>5.3</td>
<td></td>
<td>C:\Program</td>
</tr>
<tr>
<td>2</td>
<td>4/16/2018 12:00:00 AM</td>
<td>4/17/2018</td>
<td>01d 00:00:00</td>
<td>416</td>
<td>79.2</td>
<td></td>
<td>C:\Program</td>
</tr>
<tr>
<td>3</td>
<td>4/15/2018 12:00:00 AM</td>
<td>4/16/2018</td>
<td>01d 00:00:00</td>
<td>416</td>
<td>97.7</td>
<td></td>
<td>C:\Program</td>
</tr>
</tbody>
</table>
Improved Installation Experience

Select Server Role
Improved Installation Experience

- **Fine-tune your feature selections**
- **Default Server Role Features**
Improved Installation Experience
Analytics

Stephen Kwan – Product Manager
Joy Wang – Product Manager
OSIsoft Headquarters

- Leverage PI System to support the facility
- Collect data from Building Management System (BMS)
- Operational excellence
- Single pane of glass
- Energy management
- Optimize energy usage
  - HVAC performance
- Anomaly detection

How can we predict Energy Usage?
Advanced Streaming Calculations

• Asset Analytics released in 2014
• PE replacement
• Leverages AF and PI System
• Configuration experience
• Robust engine with scheduler
• Widely used, but users want more
  • Advanced calculations
  • More flexibility
  • Retain “ease of use”
Integration with MATLAB Production Server

- Requirements
  - PI Asset Framework 2018
  - MATLAB Production Server 2018a
  - MATLAB, MATLAB Compiler and MATLAB Compiler SDK
```matlab
function forecast = streamingFunction(t)
t = sortrows(t);
[~,ia] = unique(t.Time);
t = t(ia,:);
t = smoothdata(t,'DataVariables','isnumeric');
t = fillmissing(t,'linear','DataVariables','isnumeric');
% Load model
load('trainedModel.mat','trainedModel');
% Predict
forecast = trainedModel.predictFcn(t);
end
```

To make predictions on a new table, T:
```matlab
yfit = trainedModel.predictFcn(T)
```
For more information, see How to predict using an exported model.
```matlab
>> yfit = trainedModel.predictFcn(tLater);
>> save trainedModel.mat trainedModel
```
<table>
<thead>
<tr>
<th>Name</th>
<th>Expression</th>
<th>Value at Evaluation</th>
<th>Value at Last Trigger</th>
<th>Output Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable1</td>
<td>Type an expression</td>
<td></td>
<td></td>
<td>Map</td>
</tr>
</tbody>
</table>
Learn more…

**Product Booth**

Data Management Area Calculation and Events Area

- Live demos
- Ask questions
- Hang out with Developers and Product Manager

**Other Talks Today**

PI System 2018

- 11:30

Advances in PI System Streaming Analytics with MATLAB and Other External Calculation Engines

- 12:20
PI Integrators speed the process that brings trustworthy data to many unique analytical tools.
PI Integrators 2018

- Refined user experience for effortless data preparation
- Distributed processing to parallelize jobs in queue
- Live streaming updates for evergreen algorithms
Recall…

Can we optimize our current energy usage?
Data Science Enablement with PI Integrators

<table>
<thead>
<tr>
<th>DATA SOURCES</th>
<th>PREPARE</th>
<th>STREAM</th>
<th>ANALYZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI System</td>
<td>PI Integrator for Business Analytics 2018</td>
<td>Apache Kafka</td>
<td>Machine Learning Algorithm</td>
</tr>
</tbody>
</table>

Predictions into PI via PI Web API
DEMO
<table>
<thead>
<tr>
<th>Name</th>
<th>Run Status</th>
<th>Type</th>
<th>Run Mode</th>
<th>Start Time</th>
<th>End Time</th>
<th>Last Run Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASTOB1</td>
<td>Stopped By User</td>
<td>Streaming Out</td>
<td>Scheduled Stream</td>
<td>-</td>
<td>Apr 17, 2018 11:11:53 PM</td>
<td>Apr 17, 2018 11:11:53 PM</td>
</tr>
<tr>
<td>SLTC Cooling Assets</td>
<td>Scheduled</td>
<td>Asset</td>
<td>Continuous</td>
<td>*-1h</td>
<td>Apr 17, 2018 11:38:02 PM</td>
<td>Apr 17, 2018 11:38:02 PM</td>
</tr>
<tr>
<td>SLTC VAVCO</td>
<td>Scheduled</td>
<td>Asset</td>
<td>Continuous</td>
<td>*-8h</td>
<td>Apr 17, 2018 11:36:40 PM</td>
<td>Apr 17, 2018 11:36:40 PM</td>
</tr>
</tbody>
</table>
Next Steps for Building Management
PII4BA 2018 R2 – Amazon Web Services

Amazon QuickSight

Amazon S3

Amazon Redshift

Amazon Kinesis

push trained algorithm

Amazon SageMaker

Enterprise Operations Infrastructure

Assets

Automation Systems

Edge Devices / Sensors

IoT solutions
Learn more…

Talks
Introduction to Data Science for PI Professionals
11:30
Product Talk: Actionable Insights with PI Integrators
15:30

Product Booth
Visit the Data Integration Booth
10:00-15:00
Talk to developers and product specialists

Hands-On Lab
Apply Predictive Machine Learning Models to Operations
10:40
Visualization

Alicia Coppock – Product Manager
What is PI Vision?

The fastest, easiest way to visualize PI System data

• Access data from any web browser, including mobile device browsers

• Collaborate and share comments across the company

• Deploy and roll-out rapidly
We are embarking on a **unified visualization infrastructure** to deliver a seamless, powerful, extensible experience.
PI Vision 2019

- PI ProcessBook Migration Tool
- New Ad-hoc Experience
- Streamlined security for XY plot and Events Table
Learn more...

Talk
PI Vision: Real-time Monitoring and Analysis for the Enterprise

TODAY 12:20

Product Expo
Talk to developers and PMs
Ask questions
Demos
OSIsoft Cloud Services (OCS)

Laurent Garrigues – Product Manager
Michael Saucier – CEO, Transpara
Develop & maintain an operational data ecosystem that connects you (the customer) with best-in-class Analytics and your community of vendors & partners.
OCS Partner Preview Participants
OCS Partner Preview Participants

Toumetis
CLARIANT
ELEMNT
ANALYTICS
DIANOMIC
Seeq
ARM mbed
SWIM.AI
PETUUM
OtoSense
PI-DAS
Transpara
VISUAL ENERGY
falkonry
LARSEN & TOUBRO
New Possibilities

- Low cost, commodity sensors
- Low power, small footprint, high volume, no touch
- Occasionally connected, wireless-ready
- Remote and/or mobile assets
- Outside the DCS or PLC (due to age, cost, effort)
- Benchmarking / compositing

New Opportunities

- Industrie 4.0 & Brownfield modernization
- New applications (e.g. vertical farming, drones)
- Smart cities / infrastructure as a service
- Autonomous vehicles
- Data as a business (e.g. Streamr, Quandl, PJM, National Grid)
- Uptime as a service

Source: McKinsey Global Institute, June 2015
DEMO

Edge Data Store with Transpara Visual KPI

Try it yourself on any device:
http://dev.transpara.com/demo
Learn more...

**Product Booth**
- Emerging Tech.
- Toumetis
- Trendminer
- Seeq

See software live demo
Ask questions Get answers

**Other Talks This week**
OCS Overview
Thursday - 10:40 am
*Product Track*

**Sign up for Updates**
www.osisoft.com/solutions/cloud/
Or
cloud.osisoft.com
PI World Day 3 Summary

Chris Nelson, OSIsoft, VP Engineering
Gregg Le Blanc, OSIsoft, VP Product
### Day 3 Highlights

**Product Track**

- **PI System 2018 & OSIsoft Cloud Services**
- **Pervasive Data Collection**
- **Visualization**
- **Integrators and Integration**

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<td>11:30 - 12:10</td>
<td>11:30 - 13:00</td>
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<td>11:30 - 12:10</td>
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<tr>
<td>Introduction to Data Science for PI Data for PI Professionals</td>
<td>LiveCoding: Writing Highly Performant PI Web API Applications</td>
<td>LiveCoding: Getting the Most Out of the New AFSearch</td>
<td>PI System 2018</td>
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<td>12:20 - 13:00</td>
<td>14:30 - 16:15</td>
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<td>Advances in PI System Streaming Analytics with MATLAB and Other External Calculation Engines</td>
<td>HowTo: Writing applications at the Edge with OSIsoft Edge Data Store</td>
<td>HowTo: Streaming Calculations with the PI System and MATLAB and other Computation Engines</td>
<td>PI Vision: Enabling Real-Time Monitoring and Analysis for the Enterprise</td>
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<td>Data Science with R and the PI System</td>
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<td>Pervasive Data Collection - Connectivity from A to Z</td>
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<td>PI System Analytics, Fit for Purpose</td>
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<td>Actionable Insights with PI Integrators</td>
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Welcome to PI World 2018
Dev Con
Mike Sloves, OSIsoft, Director Technology Enablement
A Dedicated Time for PI Geeks

• Day 3 AND Day 1!
• Talks
• Hands-On Labs
• Exciting new changes
• Hackathon Awards Tonight
Who should attend?

• If you are…
  • A Developer
  • A Data Scientist
  • A Business Analyst
  • A Security Professional
  • A PI System Administrator
  • Someone that LOVES being a GEEK!
What’s going on at Dev Con

• Talks and a Roadmap Discussion
  • Customer or Partner interested in upcoming features
  • Extreme PI System Hardening
  • Streaming Calculations using MATLAB and PI
  • Fog Computing
  • Writing Highly Performant Web API Code

• Hands-On Labs
  • Building Symbols in PI Vision 2018 Extensibility
  • Advanced Analytics for PI Data for Data Scientists
  • Introduction to PI Developer Technologies

• And A LOT MORE!
What’s Changed This Year

• Live-Coding
• How-To’s
• The "PI Geek" Track on Day 1
  • YOU provide the content!
  • DataOps toolchain for Continuous Control Monitoring
  • Migrating Performance Equations to AF Analytics
  • Accelerate PI AF with Cognitive Computing
  • Monitoring Data Quality with Asset Analytics
Hackathon Changes

• Programming Hackathon is now the *Innovation Hackathon*!
  • Solution to Challenges are more Data Science than Programming
  • All skillsets are welcome to participate
  • Bring your own tools or use ours

• Special Thanks to DEME for being Data Sponsor
• 70 People Registered!
Awards

• At the Closing Fiesta this evening @ 4:30
• Hackathon Winners
  • 1st Place – Intel NUC, Free Registration
  • 2nd Place – BOSE SoundLink Wireless Headphones, 50% Registration
  • 3rd Place – Raspberry PI Retro Gaming Kit
Final Words of Wisdom

// How real programmers play Russian Roulette

$bash-4.4 [${$RANDOM} % 6]==0] && rm -rf /* || echo *Click*
Questions?

Please wait for the *microphone*

State your name & company

Please rate this session in the mobile app!

Search "OSIsoft" in your app store
Thank you!

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