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IoT2071

An Enterprise View of Building Intelligence, IoT, and IT

Christopher Perez

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CHRISTOPHER PEREZ

Enterprise Technology Solutions-
Advisor



About....Me

Chris Perez

- ▶ Started in Electronic Security in 1998
- ▶ Washington State Master Limited Energy Electrician (me-06)
- ▶ Specializes in Converging Facilities and IT/OT Infrastructure
- ▶ Etc..

Puget Sound Energy

Who We Are, What We Do, What We've Done, What We Want To Do

- ▶ Puget Sound Energy is Washington state's oldest local energy company
- ▶ PSE's service area is home to some of America's most recognized and respected businesses, including the Boeing Commercial Airplane Group, Microsoft, Amazon, Weyerhaeuser, Starbucks, Costco and Nordstrom.
- ▶ ~2100 employees
- ▶ ~2 million gas and electric customers
- ▶ Currently Investigating “Smart Grid” Technologies

Puget Sound Energy – Enterprise Technology Solutions

Who We Are, What We Do, What We've Done, What We Want To Do

- ▶ Hybrid IT and Facilities Team
- ▶ Manage Critical and Corporate Facilities and Critical Facilities Management Software
 - Data Centers
 - Communication Sites
 - Corporate Office Locations
- ▶ Recently Constructed Two Data Centers and Completed Critical Application Migration
- ▶ Leverage IoT to provide Holistic view of Building Health and Infrastructure Health from Layer 0-7

Key Points

The Ideas We Will Discuss

- ▶ How is PSE Facing the Following Issues:
 - Common Problems Faced When Dealing With Legacy Infrastructure
 - The Need to Engage IT early in the Building Design Process
 - Problems with Current Standards and Specifications
 - Why Layer 0 is important
 - How IoT Can Maximize Value Across All Layers for Enterprise IT Organizations

Splunk, IAI, and PSE

The Story so Far

- ▶ Monitoring PSE.com
- ▶ Created Outage Management Dashboards
- ▶ NOC Network Monitoring
- ▶ IAI beta of **Three** Aggregate Build Automation Systems
- ▶ Current Development into Major Work Streams at PSE

Building Intelligence

- ▶ Where The Problem Lies
 - ▶ Legacy Infrastructure
 - ▶ Complicated Support Models
 - ▶ Education
 - ▶ Organizational Structures



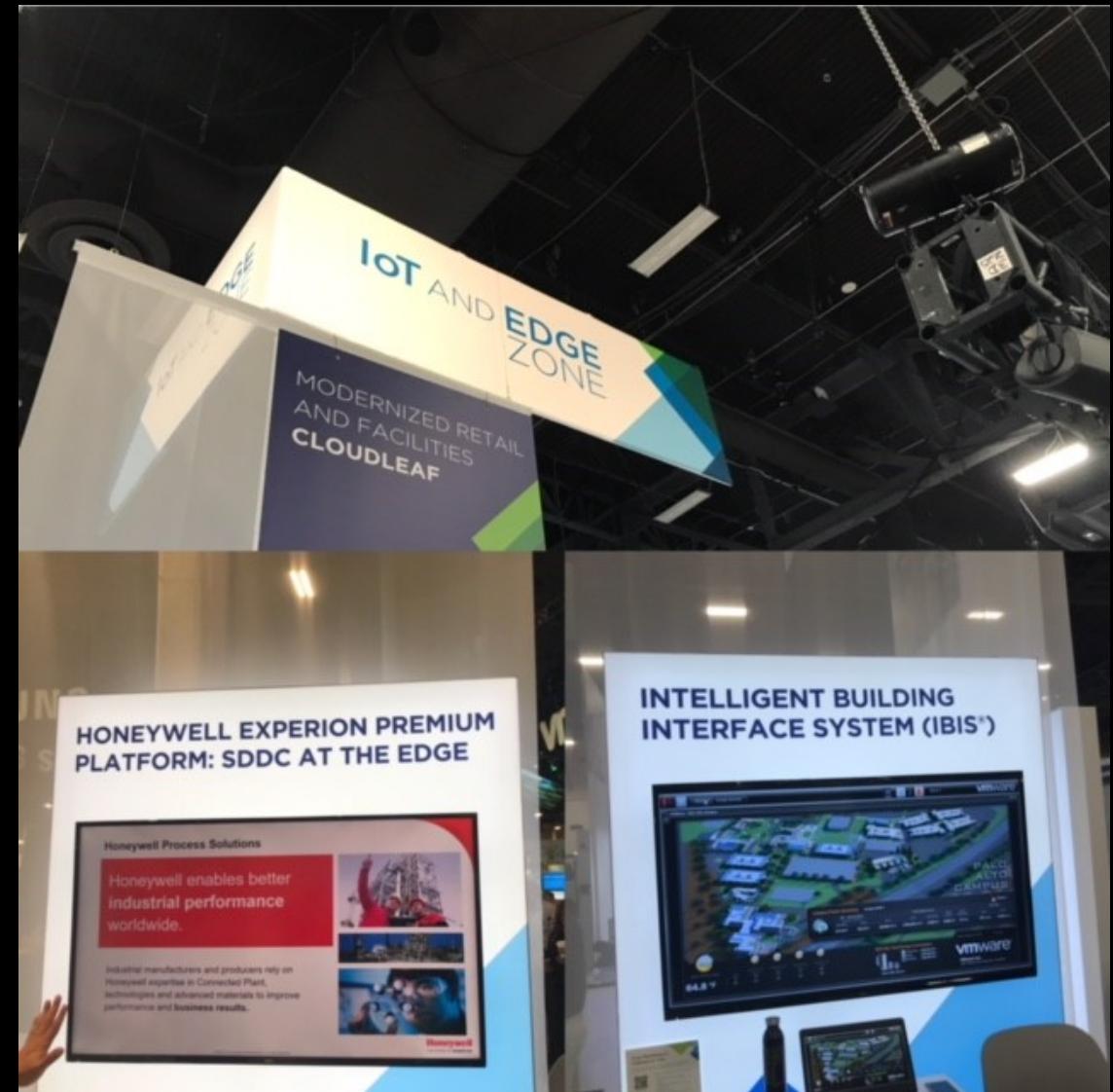
“...empowered their Owner team (the IT Team) to have direct involvement, influence, and ownership, from design through construction. With the accelerated project schedule this allowed the entire project team to make responsible, but rapid decisions, to ensure that any cost or schedule related issues were resolved with a clear understanding of the potential impact to the long term use of the facility...”

Dan Ronco – McKinstry Special Projects

IoT and Building Intelligence

Questions for a Mature Enterprise

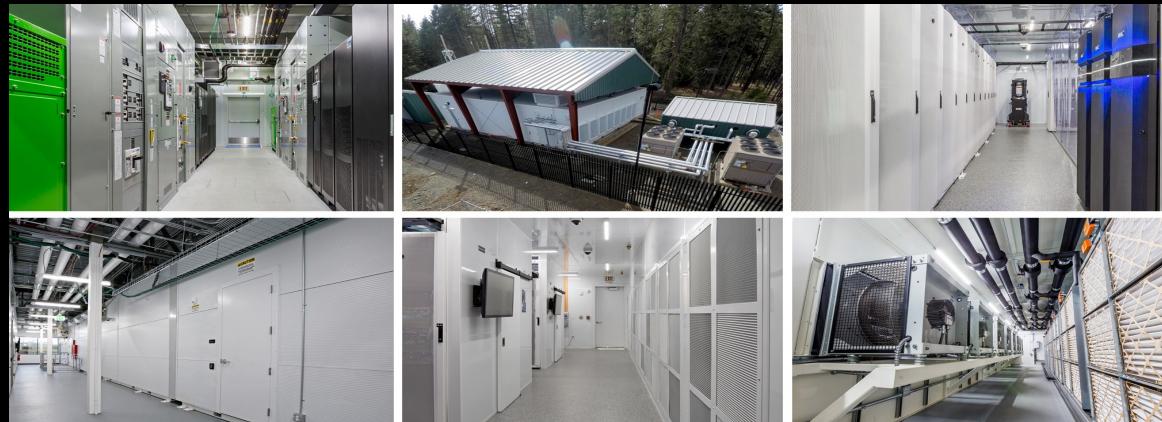
- ▶ Are Enterprise IT organizations aware of the direction of this technology?
- ▶ Do they have the internal skillsets required to drive and support this technology?
- ▶ Are there products already in place that can be leveraged?
- ▶ What are current offerings missing?

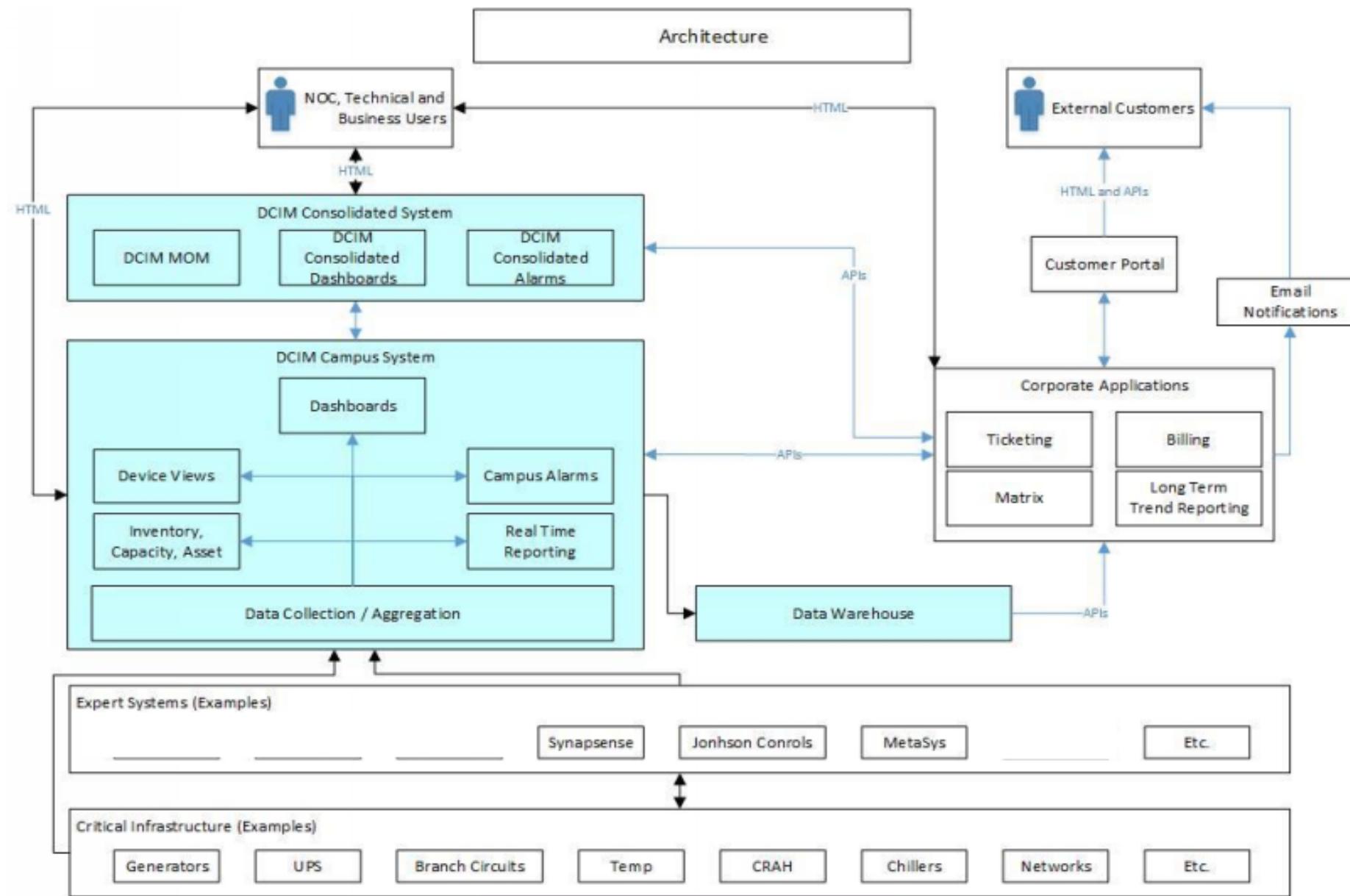


Critical Spaces

Office space is critical

- ▶ The user experience goes beyond the data center and the desktop
 - ▶ It is at the center of the technology that keeps a building running
 - ▶ Collapsing the view for all critical space is essential



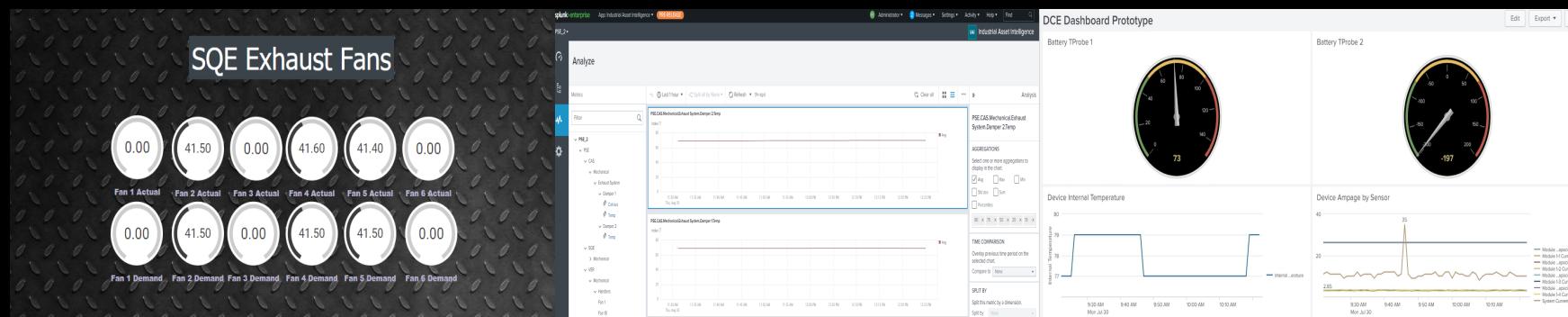


Single Pane of Glass

Looking Ahead For PSE



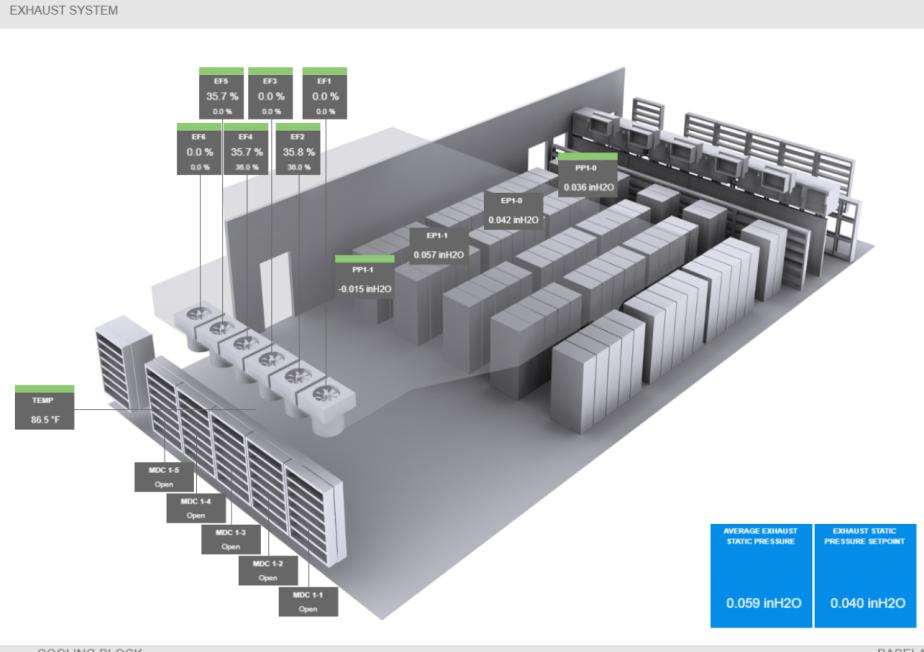
Single Pane Of Glass



SNOQUALMIE OVERVIEW

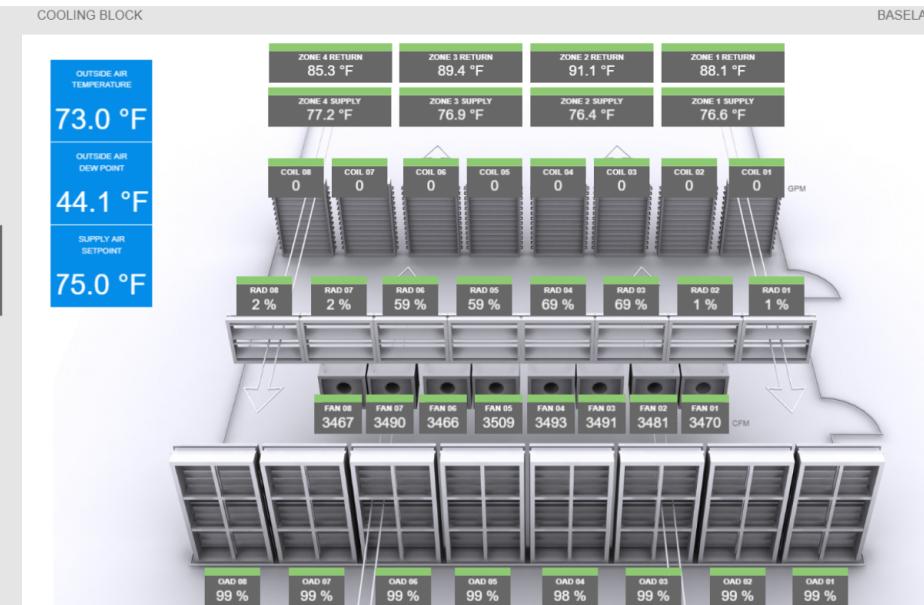
EXHAUST SYSTEM

ELECTRICAL DISTRIBUTION	
158	138
UTILITY KW	
0	0
CRITICAL KW	
CHILLED WATER SYSTEM	
0	0
CHILLERS RUNNING	
COOLING BLOCK	
1	38288
MODE	
EXHAUST SYSTEM	
2	38288
FANS RUNNING	
DAMPER COMMAND	
OUTSIDE TEMP	
69 °F	60 %
OUTSIDE HUMIDITY	
CB FIRE	MCU
PB FIRE	



CLE ELUM OVERVIEW

ELECTRICAL DISTRIBUTION	
106	91
UTILITY KW	
0	24
CRITICAL KW	
CHILLED WATER SYSTEM	
0	24
GPM	
COOLING BLOCK	
1	27880
CFM	
PUE	
1.16	
OUTSIDE TEMP	
70 °F	37 %
OUTSIDE RH	
CB FIRE	MCU
PB FIRE	



LG_FCU

FCU_01_OpenOffice

Points Extensions Totalizations Alarms History Home

FCU Status

Run Command : On

Outdoor Unit : On

Occupancy : On

Schedule : Click to Set

Zone Temp Setpoints

Occ Heat Sp : 70.0 °F

Occ Cool Sp : 75.00 °F

UnOcc Heat Sp : 68.0 °F

UnOcc Cool Sp : 78.0 °F

Return Air

Filter: Filter OK

Discharge Air

Filter Alarm Reset: Off

Filter Time Remaining 119.00

Command : On
Fan Speed : Medium

LG Errors

Zone Information

Mode : Auto

Zone Temp : 74.00 °F

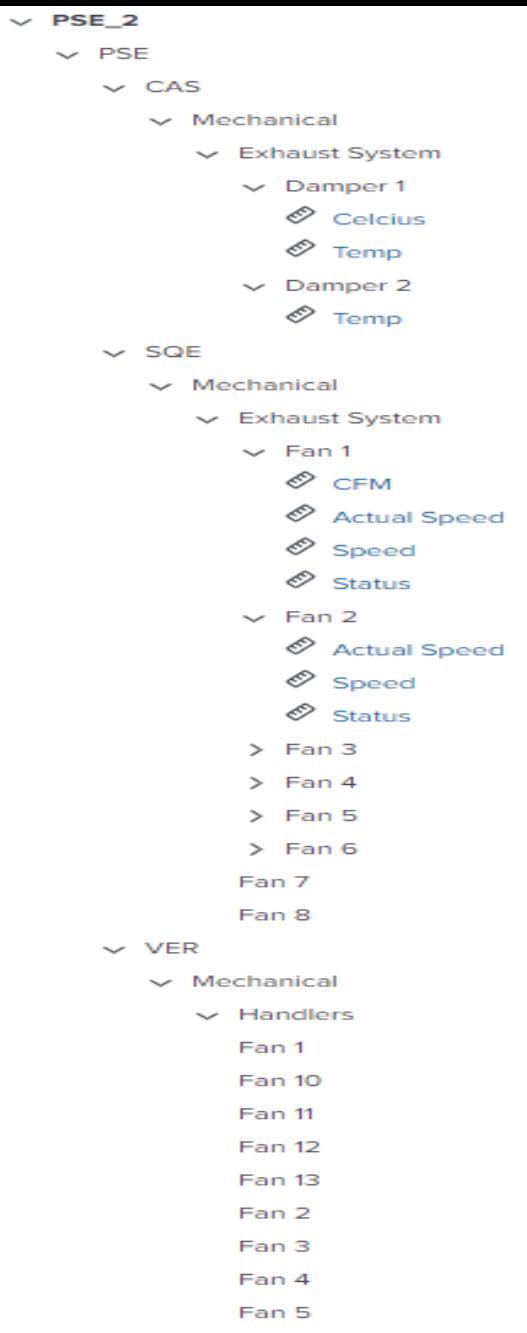
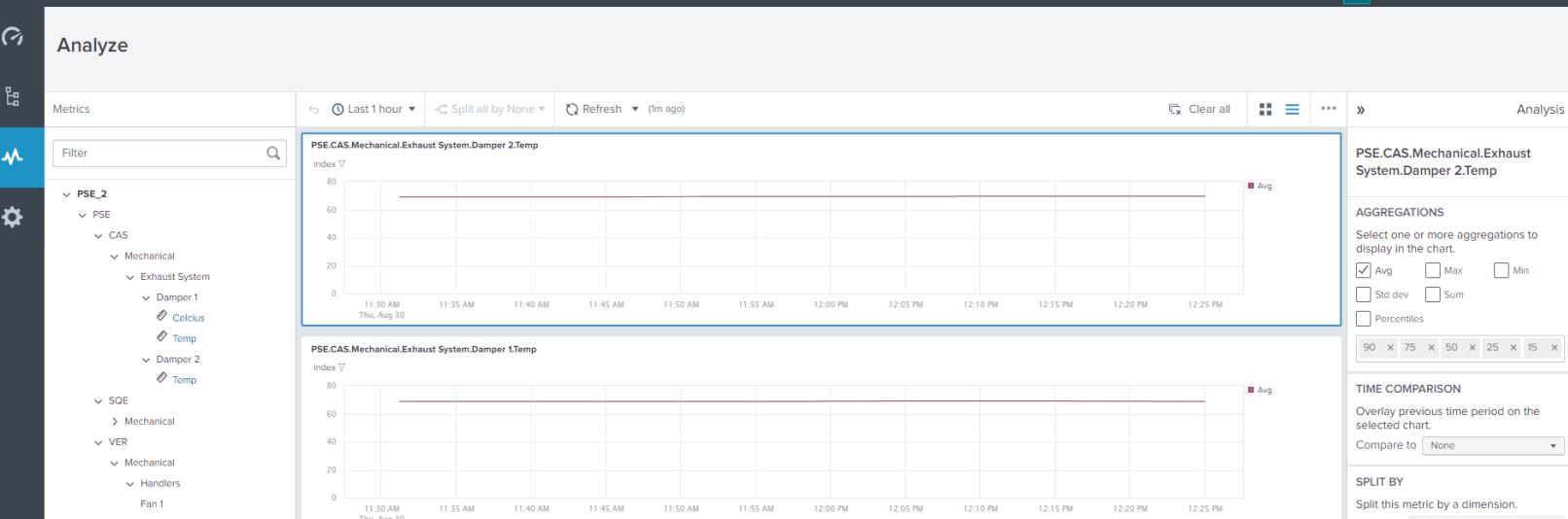
Current Error : 0.00

Previous Error : 204.00

- 3 Sites
 - 2 Critical
 - 1 General Use



splunk>enterprise App: Industrial Asset Intelligence ▾ PRE-RELEASE H Administrator ▾ 2 Messages ▾ Settings ▾ Activity ▾ Help ▾ Find IAI Industrial Asset Intelligence



Outage Management System

Real-time Monitoring and Reporting



About OMS

Welcome to the Outage Management System Spunk app. This application provides Systems Operators and other users of the GE PowerOMS real-time monitoring and alerting.

The dashboards contained within this app provide application visibility into operations, system data, and statuses of various interfaces.

?

- OMS Portal Page
 - Outage Map
 - Splunk Enterprise



Use Cases

The following content comes built-in with this solution and maps to HIPAA Security Rules 'Standard' Under Technical Safeguards:

Executive Dashboard

- 1. Outage Management System
 - Storm Bases Status
 - Top Expiring ETRs
 - Circuit Lockouts Last 24Hrs
 - 2. Incident and Orders Tracking
 - Open Orders / Priority
 - Orders by Incident ID
 - Order Details
 - 3. Struxureware Systems
 - Devices Accessed
 - Current Access
 - Users Logins



Data & Settings

Manage the data sources that feed into the Arcus PPM App. Click the links below to enable specific data sources in your environment.



Configure Data Inputs

Databases:

- GE PowerOn
 - StruxureWare
 - Oracle 12c

System Logs:

- APC / UPC
 - Windows and Linux Servers
 - Networking Equipment

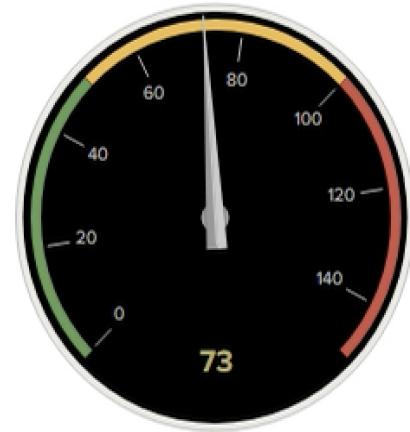
DCE Dashboard Prototype

Edit

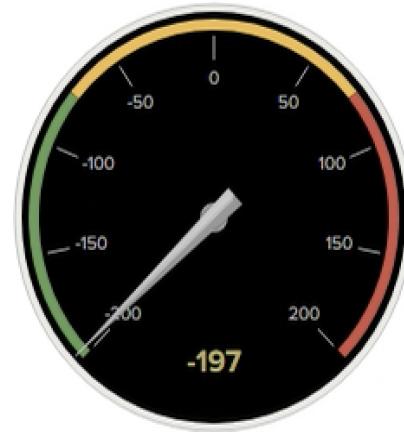
Export ▾

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Battery TProbe 1



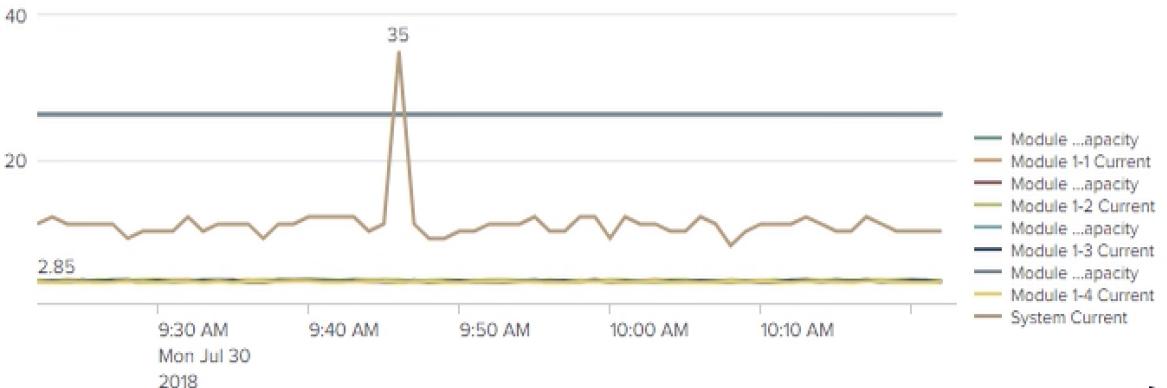
Battery TProbe 2



Device Internal Temperature



Device Ampage by Sensor

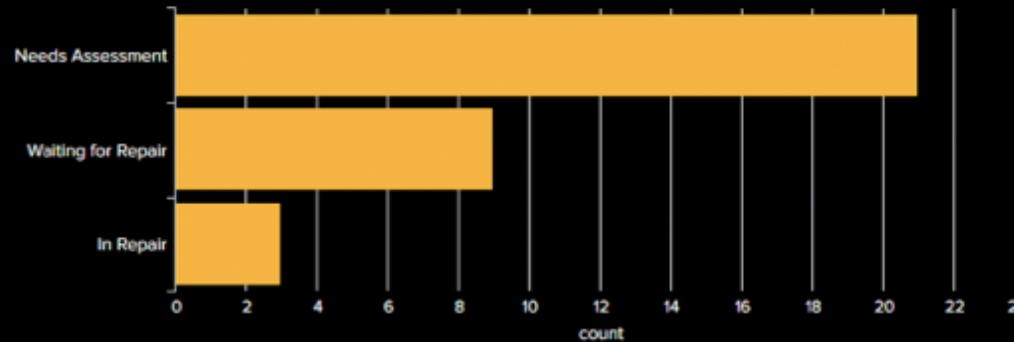


Ramp Rate - Outages

Outages



Status



Outages by County

Island



Pierce

Kitsap



Skagit

Kittitas



South King

North King

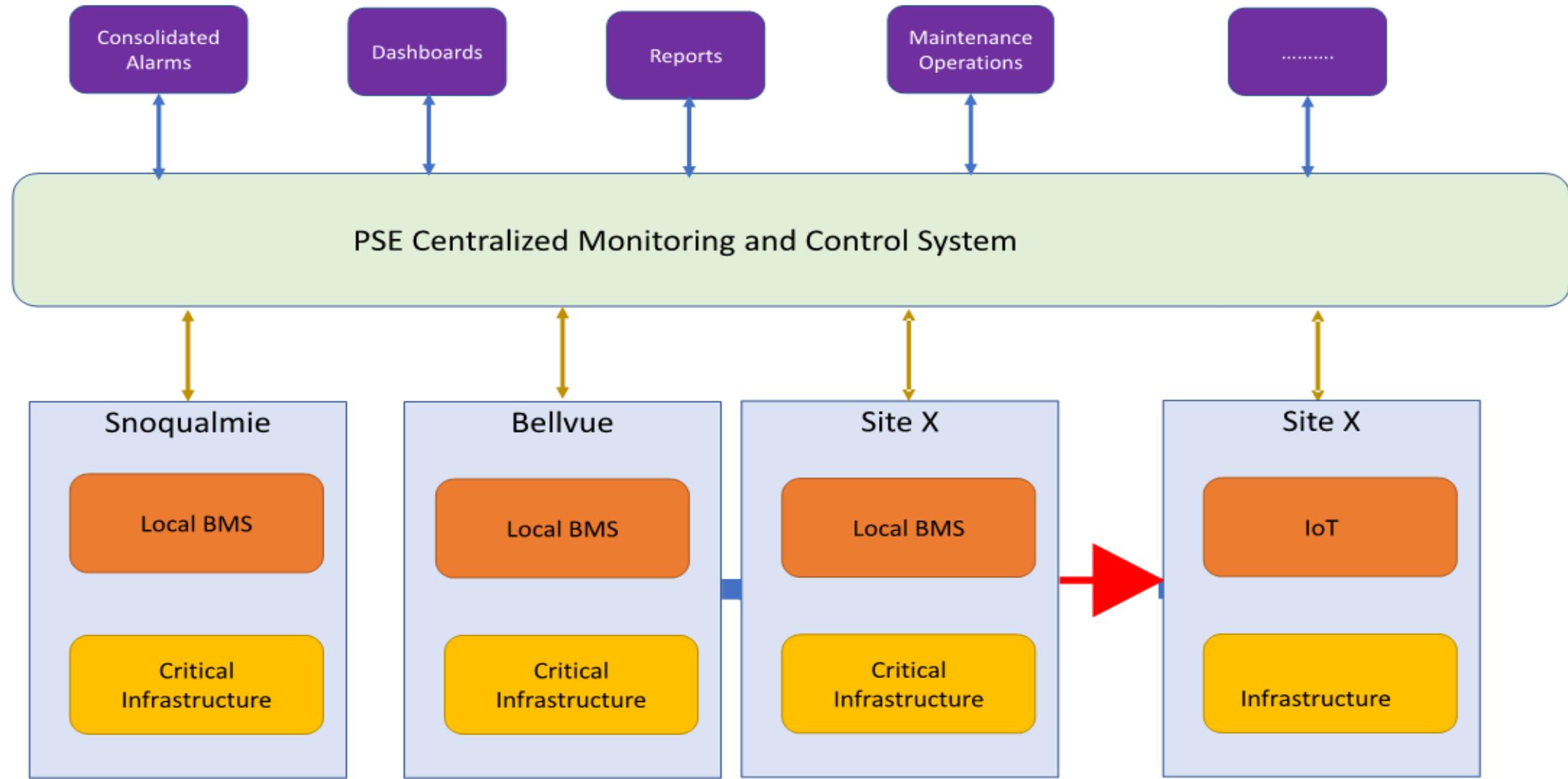


Thurston

Building Intelligence and IoT

Finding the Solution

- Standardizing on products that have a view to the future and can span multiple organization verticals
- Educating vendors and employees on the need for awareness and knowledge across all legs of technology
- **Shift the Best Practices – Bridge the Gap between IT and OT and Construction**
- Make Data Driven Decisions
- Find Internal Buy In
- Leverage Existing Everything



Acknowledgements

Key Contributors

Splunk Team - Local

- ▶ Zach Carney
- ▶ Joel Schoenberg
- ▶ Menno Vanderlist

IAI Posse

- ▶ Melissa Gannes (Program Lead)
- ▶ Jay Slay (Advisory Engineer)
- ▶ Chris Duffy (Advisory Engineer)
- ▶ Yukti Ahuja (Advisory Engineer)
- ▶ Janini Kropf – (Advisory Engineer)
- ▶ Ronald Perzul (Sales Engineer)
- ▶ Erick Dean (Product Manager)
- ▶ Marvin Green (Product Manager)

PSE

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- ▶ Mark Swenson (Sr. App Configuration Analyst)
- ▶ Chris Ramsay (IT Fac. Engineer)
- ▶ Rashmi Lella (Sr. App Development Analyst)

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- ▶ Rob Harshman

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- ▶ Zach Tembi
- ▶ Greg Sullivan

Q&A

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