



Managing Backup Generators

Presented by **Keith Ward, Sr. Staff IT Engineer**
Qualcomm

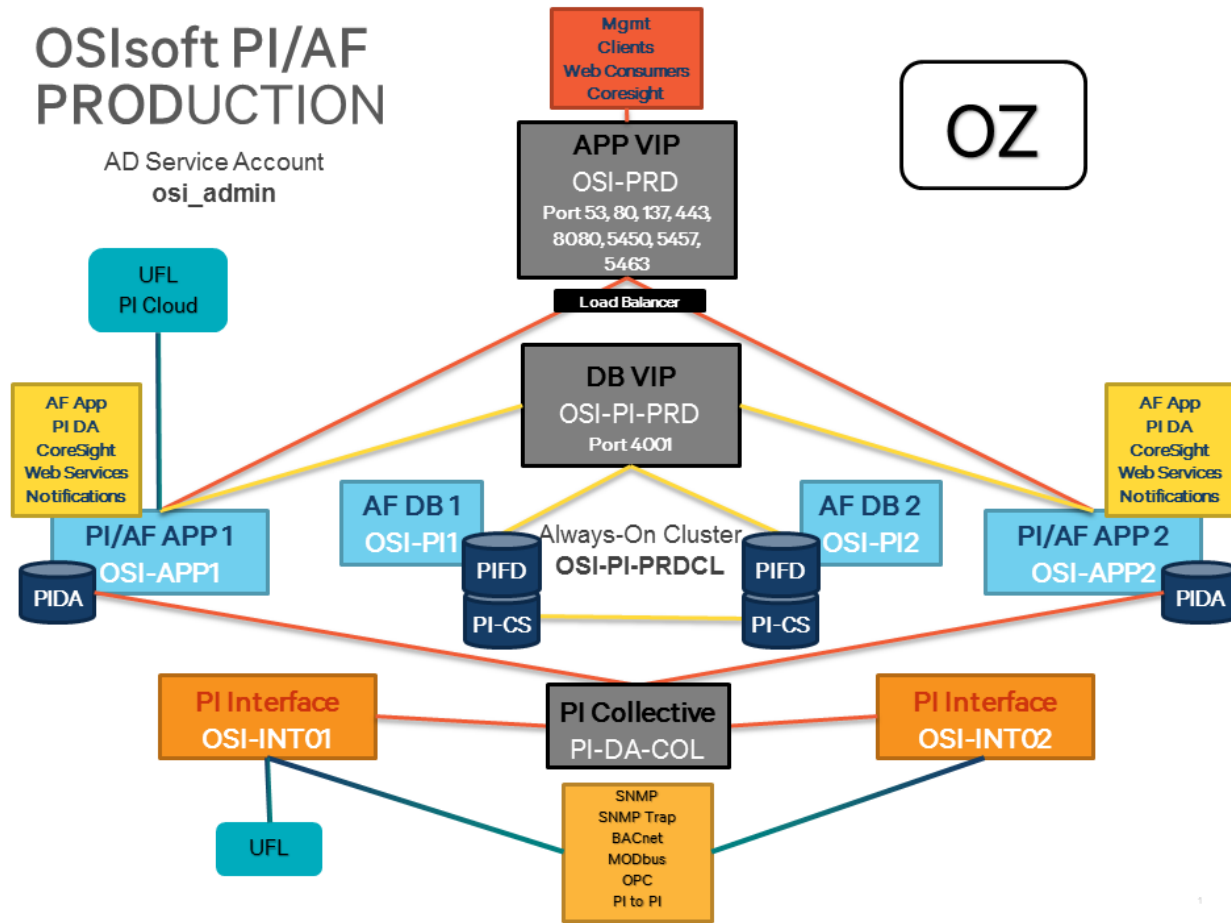
Corporate

- Designs integrated chips for all kinds of electronic devices
- Presence in almost every country
- Largest presence in San Diego, CA
- Over 50+ Critical Data Centers
- Over 500+ Labs, Server Rooms and Communications Closets

OSIsoft PI/AF PRODUCTION

AD Service Account
osi_admin

OZ



Current PI/AF Installation

- 80,000 PI Points growing to 100,000 in the next 60 days
- 10,237 Element
- 574 Element Templates
- 19,539 Analysis
- 88 Analysis Templates
- 13,254 Notifications
- 44 Notification Templates

Data Center Monitoring

Generator



MODBUS
BACNet
SNMP

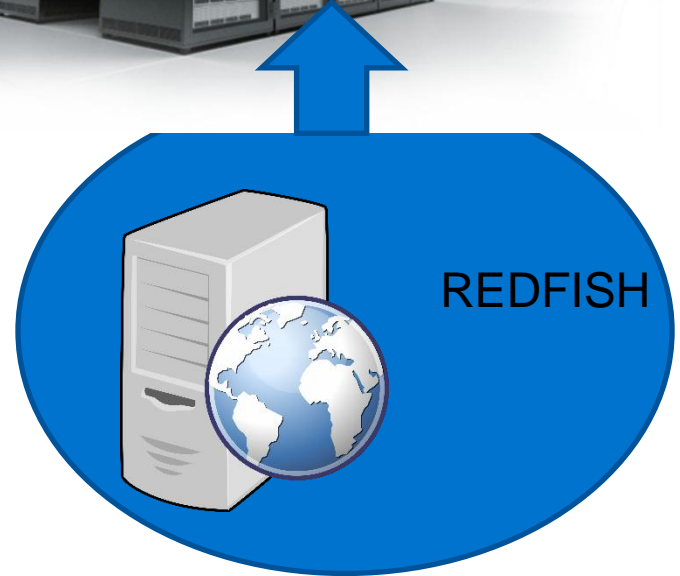
Utility



UFL
OPC
PI-to-PI



SERVERS



Operational Challenge

- Qualcomm has numerous buildings scattered around the San Diego area.
- Many of these buildings have one or more critical data centers in them.
- The Backup Generators provide electrical load to the data centers during Utility outages.
- Managing and maintaining these generators while not affecting operational availability requires considerable coordination.
- Government regulations dictate maintenance restrictions and cause copious documentation.
- Up-time is paramount over efficiency and doing both is always a challenge.

Manage vs. Monitor

- You can't manage what you don't monitor

San Diego
Domestic

Quick Status					
Generator <small>(Select to See Detail)</small>	Status	Critical	Warning	Alerts	RUN (min)
A	●	●	●	●	N/A
BB	●	●	●	●	N/A
BE	●	●	●	●	N/A
N	●	●	●	●	N/A
Q	●	●	●	●	N/A
P1	●	●	●	●	N/A
Q1	●	●	●	●	N/A
Q2	●	●	●	●	N/A
Q3	●	●	●	●	N/A
QRC1	●	●	●	●	N/A
QRC2	●	●	●	●	N/A
R1	●	●	●	●	N/A
R2	●	●	●	●	N/A
R3	●	●	●	●	N/A

Click to Manage Generator Alerting

A Generator

Generator Status

- Run
- On Load
- ATS Emergency Position

Critical Alarm Status

- Engine Failed to Start
- Battery Charger Fault
- Overcrank
- Over Speed Fault
- Breaker Open
- E-Stop
- Not Ready
- Not in Auto

Warning Alarm Status

- General Alarm
- Battery Low
- Battery High
- Fuel Level
- Fuel Leak
- Low Coolant Level
- Low Temp
- High Temp
- Pre-High Temp
- Low Oil Pressure
- Pre-Low Oil Pressure

OneIT

Generator Dashboard

Condition Definitions

- = Lost Communications
- = N/A
- = Normal Condition
- = Abnormal Condition

Alerting

Enabled

Alerting Notes

0
8/24/2016 5:56:36 PM

Supported Areas and Functions

- * Building Fire/Life-Safety
Yes
- * Building IDFs
Yes
- * Supported Spaces
A-121, A141A, A-141B, A-106

A picture is worth many words

- Grouping of PI Tags to Categories
- Multi-state image enables quick identification
- Link Asset to expanded view



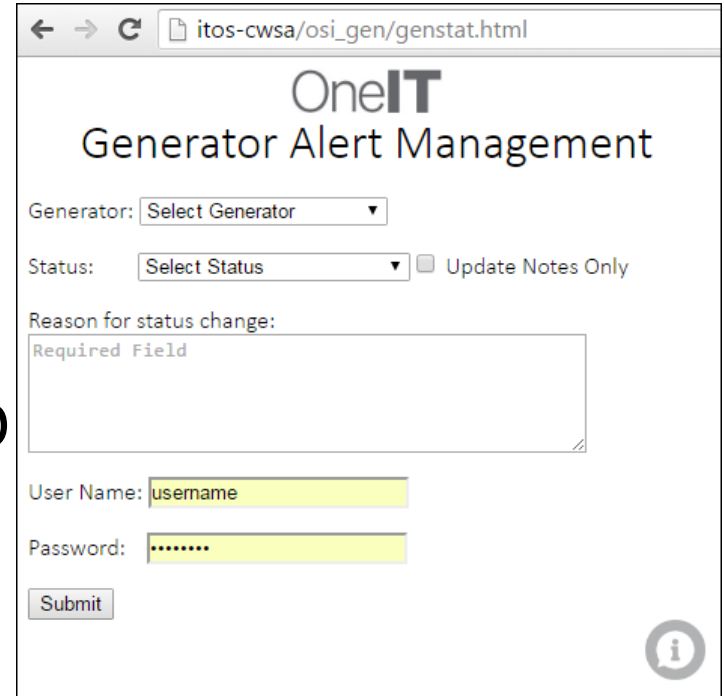
Quick Status

Generator (Select to See Detail)	Status	Critical	Warning	Alerts	RUN (min)
A	●	●	●	●	N/A
BB	●	●	●	●	N/A
BF	●	●	●	●	N/A
N	●	●	●	●	N/A
Q	●	●	●	●	N/A
P1	●	●	●	●	N/A
Q1	●	●	●	●	N/A
Q2	●	●	●	●	N/A
Q3	●	●	●	●	N/A
QRC1	●	●	●	●	N/A
QRC2	●	●	●	●	N/A
R1	●	●	●	●	N/A
R2	●	●	●	●	N/A
R3	●	●	●	●	N/A

[Click to Manage Generator Alerting](#)

Mobile Alert Management

- Alert Management
 - Enable/Disable
- Authentication
- Notes are appended with user ID
- Mobile device friendly







The screenshot shows a web browser window with the URL `itos-cwsa/osi_gen/genstat.html`. The page title is "OneIT Generator Alert Management". The form includes the following elements:

- Generator:** A dropdown menu with the text "Select Generator".
- Status:** A dropdown menu with the text "Select Status" and a checkbox labeled "Update Notes Only".
- Reason for status change:** A text area with a "Required Field" error message.
- User Name:** A text input field containing the text "username".
- Password:** A password input field with masked characters ".....".
- Submit:** A button labeled "Submit".
- Info:** An information icon (i) in a circle in the bottom right corner.

Change acknowledgement

- Group notification on change
- Reminder of Disabled Assets

	Success. Changes made.
	Failure to authenticate and or not in <u>Qgroup</u>
	Requirements not met. No changes made
	Information about the tool

PI Asset Framework Data View

- History
- Date and time and duration with reason

(DROMERO-100) GEN-1

General | Child Elements | Attributes | Ports | Analyses | Version

Filter

Name	Value
Category: Administration Information	
Alerting	Enabled
Alerting Notes	User: DROMERO changed status to "Enabled" on 07/05/2016 at 02:17:28 PM. Notes have been updated with: "Enabled".
Element Type	Equipment
Name	(DROMERO-100) GEN-1
PI Audit	

Consolidated View

- Legend
- Detailed Information
- Quick Status

San Diego
Domestic

Quick Status					
Generator <small>(Select to See Detail)</small>	Status	Critical	Warning	Alerts	RUN (min)
A	●	●	●	●	N/A
BB	●	●	●	●	N/A
BF	●	●	●	●	N/A
N	●	●	●	●	N/A
Q	●	●	●	●	N/A
P1	●	●	●	●	1.07
Q1	●	●	●	●	N/A
Q2	●	●	●	●	N/A
Q3	●	●	●	●	N/A
QRC1	●	●	●	●	N/A
QRC2	●	●	●	●	N/A
R1	●	●	●	●	N/A
R2	●	●	●	●	N/A
R3	●	●	●	●	N/A

A Generator

Generator Status

- Run
- ⊗ On Load
- ⊗ ATS Emergency Position

Critical Alarm Status

- Engine Failed to Start
- Battery Charger Fault
- ⊗ Overcrank
- ⊗ Over Speed Fault
- ⊗ Breaker Open
- E-Stop
- ⊗ Not Ready
- Not in Auto

Warning Alarm Status

- General Alarm
- Battery Low
- ⊗ Battery High
- Fuel Level
- Fuel Leak
- ⊗ Low Coolant Level
- Low Temp
- High Temp
- ⊗ Pre-High Temp
- Low Oil Pressure
- ⊗ Pre-Low Oil Pressure

OneIT
Generator Dashboard

Condition Definitions

- = Lost Communications
- ⊗ = N/A
- = Normal Condition
- = Abnormal Condition

Alerting

Enabled

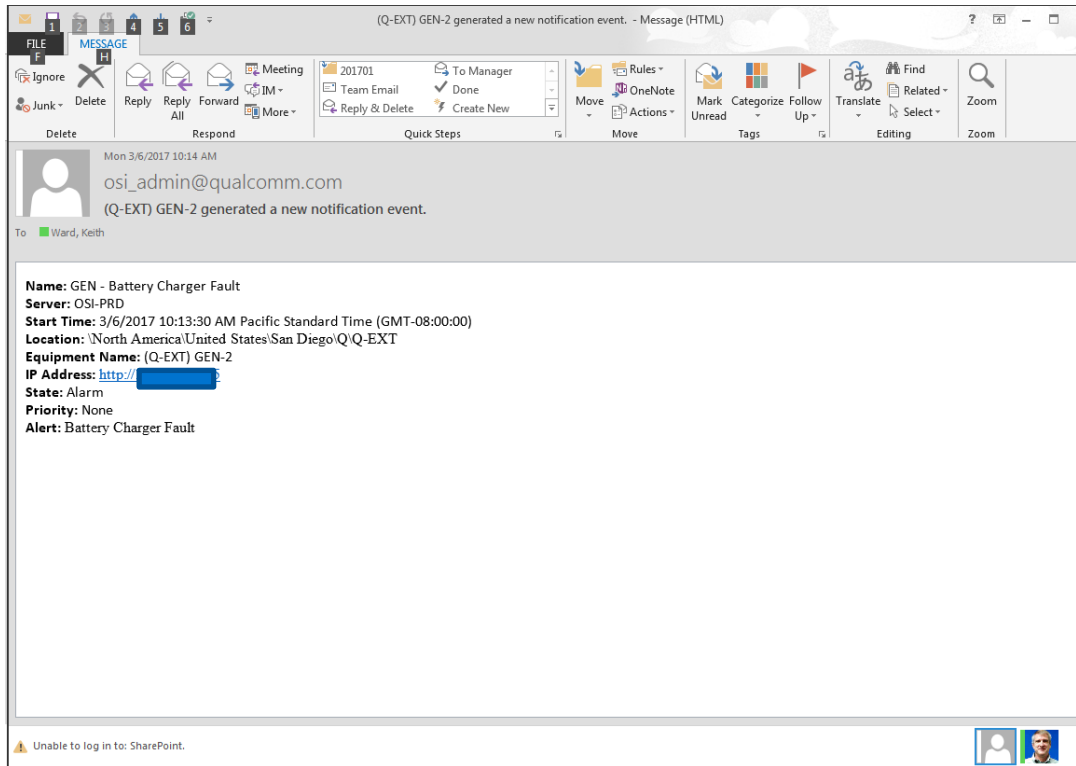
Alerting Notes

0
6/17/2016 10:19:12 AM

Supported Areas and Functions

- * Building Fire/Life-Safety
- Yes
- * Building IDFs
- Yes
- * Supported Spaces
- A-121, A141A, A-141B, A-106

Notification Email



Carbon Emission Report (Developing)

- Last Run Time and Date
- Current Year Total
- Last years total
- Automated Log Books
- Operational Allocation

GENERATOR APCD REPORT

GENERATOR	Last Year Total Runtime (Hours)	Year to Date Runtime (Hours)	Last Run	Last Run Time (min)
(A-EXT) GEN-1	13.7	10	9/6/2016 8:00:20.019012 AM	30
(BB-EXT) GEN-1	14.92	11	9/6/2016 9:00:40.028015 AM	29.98
(BF-EXT) GEN-1	14.51	10	8/9/2016 8:27:06.423004 AM	28.25
(N-EXT) GEN-1	8.17	8	9/6/2016 7:58:59.254013 AM	32.05
(O-EXT) GEN-1	6.37	7	9/6/2016 4:01:56.236007 PM	28.98
(P-EXT) GEN-1	4.79	12	9/12/2016 2:07:16.031006 PM	30.98
(Q-EXT) GEN-2	2.75	16	9/7/2016 8:06:17.057007 AM	29.98
(Q-EXT) GEN-3	10.78	10	9/7/2016 7:33:48.166 AM	26.92
(QRC-EXT) GEN-1	7.16	10	8/25/2016 8:01:16.011002 AM	30
(QRC-EXT) GEN-2	7.12	10	8/25/2016 8:02:11.012008 AM	28.98
(R-EXT) GEN-1	10.34	10	9/7/2016 8:40:00.539001 AM	29.98
(R-EXT) GEN-2	10.69	6	9/7/2016 9:16:14.030014 AM	29.98
(R-EXT) GEN-3	13.11	11	9/7/2016 9:17:32.030014 AM	28.98
(A-EXT) GEN-1	13.7	10	9/6/2016 8:00:20.019012 AM	30

Larger Status Board (Future)



Generator <small>(Select to See Detail)</small>	Status	Critical	Warning	Alerts
A	●	●	●	●
BB	●	●	●	●
BF	●	●	●	●
N	●	●	●	●
O	●	●	●	●
P1	●	●	●	●
Q1	●	●	●	●
Q2	●	●	●	●
Q3	●	●	●	●
QRC1	●	●	●	●
QRC2	●	●	●	●
R1	●	●	●	●
R2	●	●	●	●
R3	●	●	●	●
AUS B GEN1	●	●	●	●
BLDR E GEN2	●	●	●	●
BOX A GEN1	●	●	●	●
BQFA GEN1	●	●	●	●
CANAD K GEN1	●	●	●	●
LV1 GEN1	●	●	●	●
LV1 GEN2	●	●	●	●
RAL A GEN1	●	●	●	●
RAL B GEN1	●	●	●	●
SCLA GEN1	●	●	●	●

Condition Definitions

- = Lost Communications
- X = N/A
- = Normal Condition
- = Abnormal Condition

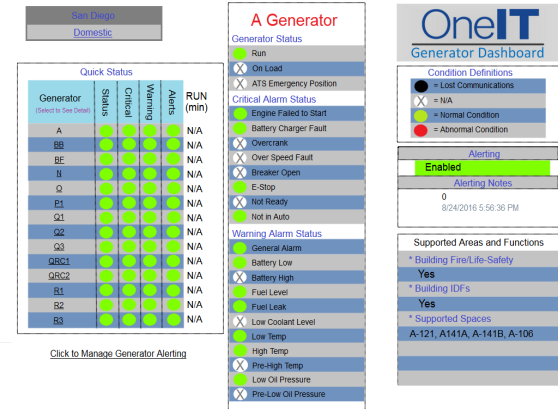
ROOM	Q-132	Q-146	QP-200	QRC-004	R-007	R-009A	R-009C	R-012																														
EPO	●	●	●	●	●	●	●	●																														
UPS	(O-111A) A	(O-111A) B	(Q-146) B	(QP-200B) BLUE1	(QP-200B) BLUE2	(QP-200R) RED1	(QP-200R) RED2	(QRC-004) B	(QRC-004) C02	(QRC-004) D01	(QRC-006) E	(QRC-006) F	(QRC-007) A	(R-007) T02	(R-007) U02	(R-007) V02	(R-007) Y02	(R-009A) A01	(R-009A) B01	(R-009A) C01	(R-009A) D01	(R-009C) E07	(R-009C) E20	(R-009C) F07	(R-009C) G07	(R-009C) F20	(R-009C) G20	(R-009C) H06	(R-009C) H18	(R-009C) J02	(R-009C) J13	(R-012) MGE	(R-009C) Y02					
Alerts	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Warning	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Critical	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Status	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

ROOM	R-014A	R-014B	R-015													
UPS	(R-014A) K02	(R-014A) L02	(R-014A) L14	(R-014A) M02	(R-014A) M13	(R-014A) N08	(R-014A) N16	(R-014B) P01	(R-014B) P05	(R-014B) Q01	(R-014B) Q10	(R-014B) R01	(R-014B) R10	(R-014B) S01	(R-014B) S10	(R-015) 1
Alerts	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Warning	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Critical	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Status	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Managing Backup Generators

COMPANY and GOAL

Save time, money, and reduce errors while improving quality



CHALLENGE

Multiple interested parties with differing requirements

- Diverse skill level
- Hesitation towards dependence on technology

SOLUTION

Integration and use of many tools and capabilities

- OSIssoft PI System
- PI Coresight
- PI Web API

RESULTS

Real-time data availability through dashboard and email

- Automating Logbook entries
- Centralized Monitoring
- Simple recognition of issues
- Diversity of use

Contact Information

Keith Ward

ksward@qualcomm.com

Sr. Staff IT Engineer

Qualcomm



Questions

Please remember to...

Complete the Online Survey
for this session



Download the Conference App for
OSISOFT Users Conference 2017

- View the latest agenda and create your own
- Meet and connect with other attendees



search OSISOFT in the app store

<http://bit.ly/uc2017-app>

감사합니다

谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado

Monitor What You Manage