

NS2024

APRIL 15 - 17 | ANAHEIM, CA

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Niagara in Data Centers Plus Enterprise-Scale N4 Migration Success

Introductions



Mitch Reed
Division Manager
Conti Controls



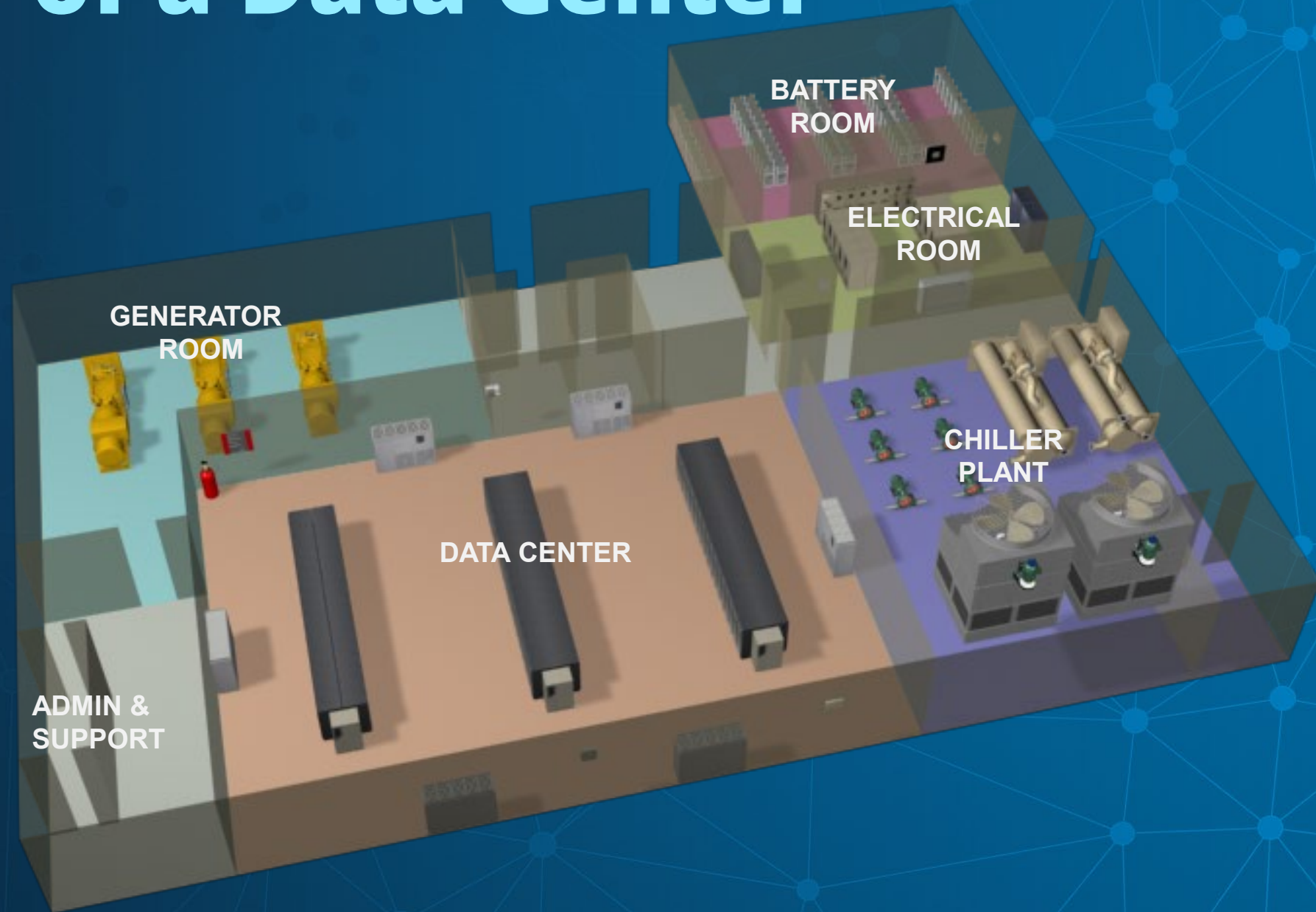
Richard Warner, P.E.
Director, Solutions Architecture
Albireo Energy

Agenda

- Quick Overview
- Data Center Challenges / Opportunities
- Solution Examples / Discussion

Anatomy of a Data Center

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Facility Challenges / Opportunities

- Space Management
- Power / Energy
- Cooling / Heat Rejection
- Security / Monitoring
- Operations / Maintenance

Solution Example

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Weather Station Outside Air Conditions:

OA Temp: 88.7 °F

OA Hum: 46.4 %RH

Wet Bulb: 72.6 °F

Baro Press: 29.49 in Hg

Wind Speed: 4.2 mph

Wind Direction: N

COLO1 Critical Monitoring

Cold to Hot Aisle DP Monitoring

Pressure: 0.0194 in/wc

Pressure Sp: 0.0200 in/wc

Sup Fan Spd Cm d: 36.5 %

Min Fan Spd: 0.00

Hot Aisle to Outside DP Monitoring

Pressure: 0.0440 in/wc

Pressure Sp: 0.0600 in/wc

Rel Fan Spd Cm d: 17.0 %

Min Fan Spd: 0.10

Cold Aisle Temp Monitoring

Average Temp: 87.6 °F

Max Temp: 117.7 °F

Max Temp Sensor: HALL TET013

Min Temp: 75.8 °F

Min Temp Sensor: HALL TET01

Deviation Alarm Lim i: 3.5 °F

Deviation Alarm: Alarm

Hot Aisle Temp Monitoring

Average Temp: 91.4 °F

Max Temp: 110.5 °F

Max Temp Sensor: HALL TET34

Min Temp: 81.0 °F

Min Temp Sensor: HALL TET31

Deviation Alarm Lim i: 3.5 °F

Deviation Alarm: Alarm

Relative Humidity Monitoring

Average Hum: 55.0 %RH

Max Hum: 75.8 %RH

Max Hum Sensor: HALL NET09

Min Hum: 24.5 %RH

Min Hum Sensor: HALL NET013

Deviation Alarm Lim i: 5.0 %RH

Deviation Alarm: Alarm



Rack Pressure Control – Cold To Hot Aisle ΔP



Central Controller Control Loop Descriptions

DATA CENTER SERVER RACK PRESSURE CONTROL (COLD TO HOT AISLE DP)

Supply fan volume is controlled on a per data center basis.

Differential pressure setpoint: 0.02" wc

There are twenty (20) cold aisle to hot aisle differential pressure sensors in the data center. The central controller controls the cold aisle to hot aisle differential pressure automatically by sending an output signal (supply fan volume signal) to all the DEC unit controllers over the BAS network while the units are in auto.

The operator can select to use the average or any single sensor for control. The operator shall not be allowed to select an invalid sensor for control.

In single sensor select mode, if the selected DP sensor fails or goes out of range, then the central controller shall control to the lower of the remaining DP sensors. As subsequent DP sensors fail or go out of range, then the central controller shall control to the lowers of the available sensors.

If all DP sensors fail or go out of range, the central controller shall maintain the air volume at the last known value.

In average mode, the operator can select five (5) of the sensors for control (default initial sensors selected will be 2, 6, 10, 14, and 18) the controller uses the average of the four (4) pressure readings closest in value and excludes the one value the farthest from the group. This average value shall be filtered so that the value does not constantly change.

The excluded signal is noted at the BAS. If the excluded sensor value exceeds (from average) the deviation alarm setpoint 10 Pa, a deviation alarm is triggered. In averaging mode, if one (1) of the selected DP sensor fails or goes out of range, then the central controller shall use the remaining four (4) DP sensors for averaging calculation. If multiple DP sensors fail or go out of range, then the central controller shall use the remaining DP sensors for control. If all five (5) DP sensors fail or go out of range, the central controller shall maintain the air volume at its last know value. Once all the selected pressure sensor values have returned to a valid reading the central controller shall release the signal to the DEC's one unit at a time as described in the loss of communications section.

In averaging mode, should one (1) of the selected sensors fail, the operator can select one of the remaining unused sensors to be utilized in averaging mode and the loop calculations will continue as described above. All failed or out of range sensors shall be indicated as such in the BAS graphics.

Diff Press Monitoring

Cold Aisle to Hot Aisle Pressure Control

Mode: Single Input

Single Input Sele: P D I T 10

Multiple Input Sele: P D I T 1, P D I T 2, P D I T 3, P D I T 4, »

Master Ou: 0.00000 in/wc

No Valid Inp: true

Ignore In Fau: true

Ignore In Aler: false

Maximum Deviat: nan in/wc (ok)

Maximum Deviation In:

The Central Controller manages the hot aisle containment differential pressures in the availability

An operator can choose between single sensor, multiple sensor, or all sensor modes. When using multiple sensors, the Central Controller uses the average of all valid selected sensors while disregarding the sensor reading furthest from the average. All Sensor mode uses the average of all valid sensors.

Pressure Selected In Use			Pressure Selected In Use		
PDIT 01	nan in/wc	false Invalid	PDIT 11	nan in/wc	false Invalid
PDIT 02	nan in/wc	false Invalid	PDIT 12	nan in/wc	false Invalid
PDIT 03	nan in/wc	false Invalid	PDIT 13	nan in/wc	false Invalid
PDIT 04	nan in/wc	false Invalid	PDIT 14	nan in/wc	false Invalid
PDIT 05	nan in/wc	false Invalid	PDIT 15	nan in/wc	false Invalid
PDIT 06	nan in/wc	false Invalid	PDIT 16	nan in/wc	false Invalid
PDIT 07	nan in/wc	false Invalid	PDIT 17	nan in/wc	false Invalid
PDIT 08	nan in/wc	false Invalid	PDIT 18	nan in/wc	false Invalid
PDIT 09	nan in/wc	false Invalid	PDIT 19	nan in/wc	false Invalid
PDIT 10	nan in/wc	true Invalid	PDIT 20	nan in/wc	false Invalid

Pressure Value Used: 0.0000 in/wc

Sup Fan Spd: 25.0 %

Pressure Sp: 0.0050 in/wc

Min Fan Spd: 0.00

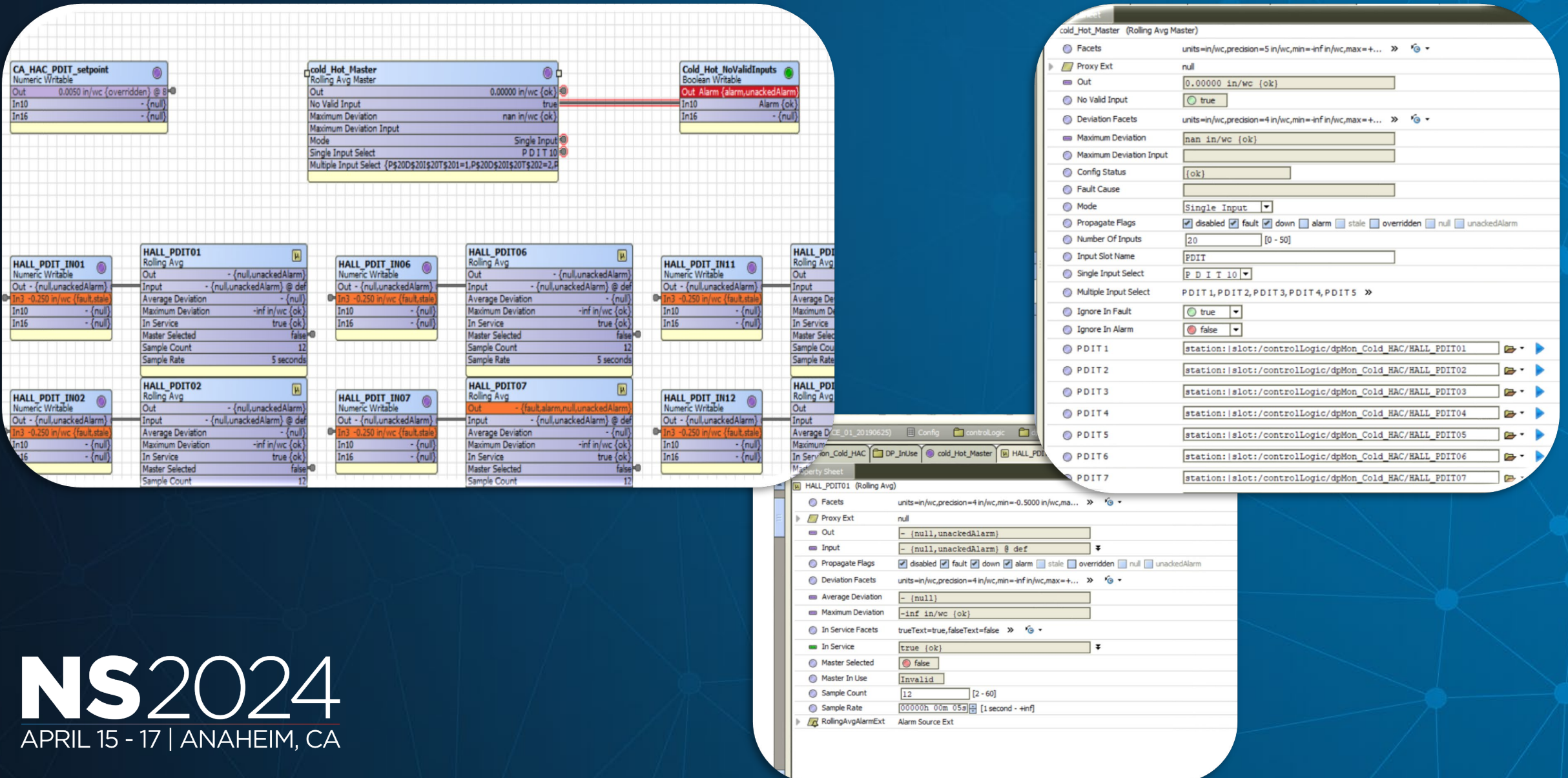
DEC 01	DEC 02	DEC 03	DEC 04	DEC 05	DEC 06	DEC 07	DEC 08
25.0 %	25.0 %	25.0 %	25.0 %	25.0 %	25.0 %	25.0 %	25.0 %
DEC 09	DEC 10	DEC 11	DEC 12	DEC 13	DEC 14	DEC 15	
25.0 %	25.0 %	25.0 %	25.0 %	25.0 %	25.0 %	25.0 %	

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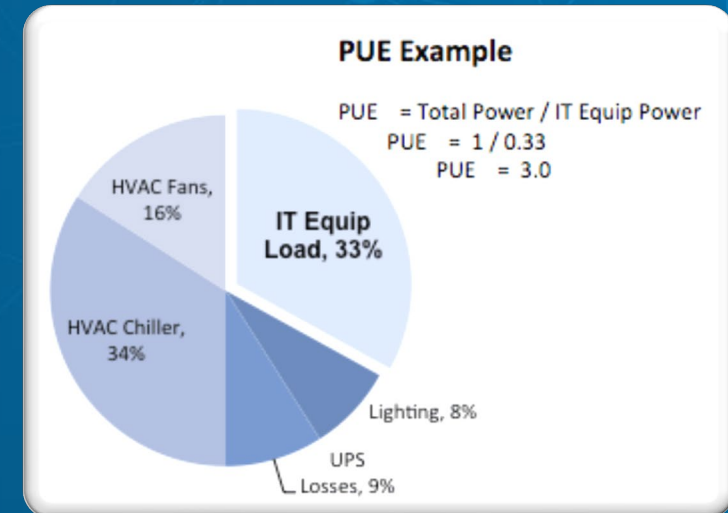
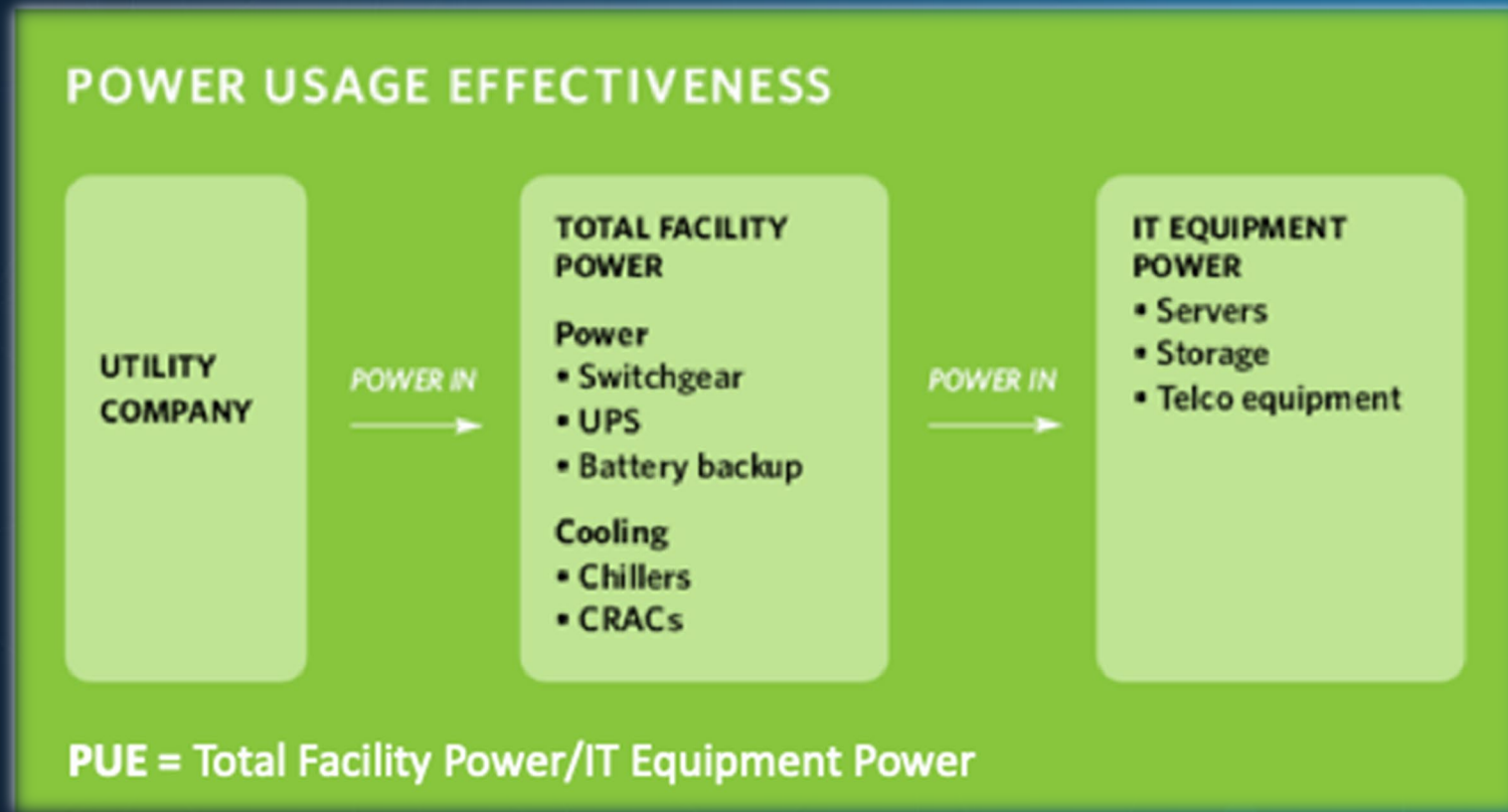
Rolling Average Block – Vykon Pro

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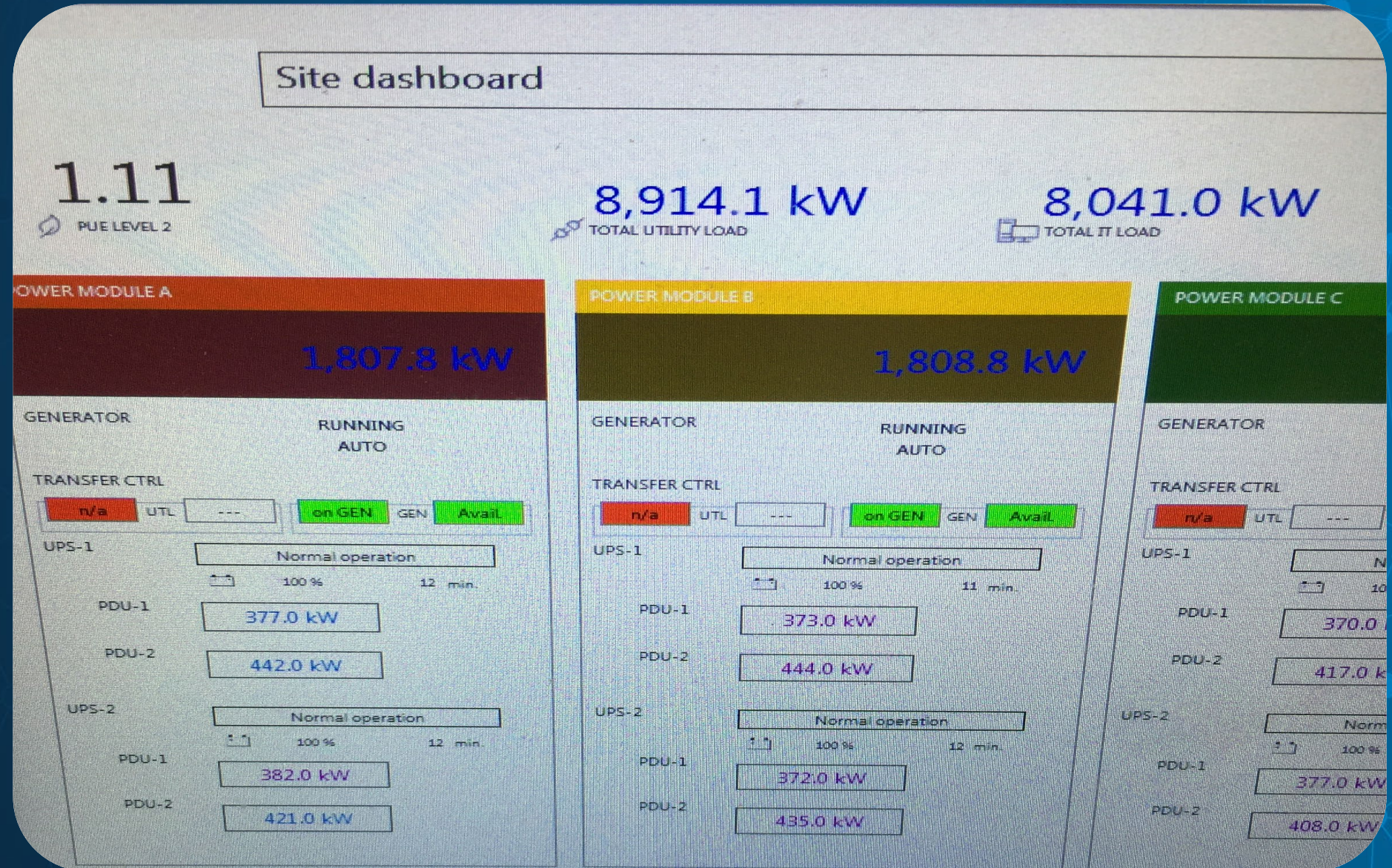


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Power Utilization Effectiveness



Solution Example



Migration Challenges / Opportunities

- Standardization
- Planning Downtime
- Mitigating Data Loss
- Improving Data Modeling
- Optimizing User Experience

Solution Example

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case study

70's-Era Big-City Plaza Transforms from Inside Out With N4 Upgrade

Owners and operators of large metropolitan buildings have many reasons to keep their building automation and controls infrastructure up to date. When you are managing a portfolio with assets that are typically 50 to 100 years old, deploying the latest tech is one thing you can do to modernize. Buildings in the Midwest USA, for example, are estimated to be responsible for nearly two-thirds of a city's greenhouse gas emissions, and building owners there have been aggressive in their use of technology to cut carbon use, ease demands on the local power grid and save money. Now, in the 2020s, Big-metro property owners are pioneering solutions to additional challenges like:

- ▶ Encouraging occupants to return to the city and to offices after the Covid-19 pandemic.
- ▶ 'Electrifying' buildings — getting them zero-carbon and electric-car ready by incorporating more battery storage and renewable energy infrastructure.

Building controls and data strategy are core to the success of all this, which has led to strong, trust-based relationships between large building owners and those MEP (Mechanical/Electrical/Plumbing) contractors that have risen to the call to expand their practices into OT networking, open protocol building automation and digitalization. Conti Corporation is one such multi-trade firm who is working to deliver on on-going contracts for IT/OT services to large-building owners in the Midwest.

CHALLENGE

Mitchell Reed, a Division Manager with Conti, had this to say about a retrofit project involving a skyscraper property and adjoining buildings in a downtown plaza: "The customer asked us to standardize their Building Management System (BMS) deployment across their campus portfolio, allowing the operators to have a single pane of consistent glass to operate the facilities. The overarching challenge for this project was the sheer size of the integration. We needed to accommodate data from all the equipment and devices serving more than 50 floors of diverse space utilization — including open office space, restaurants, and plant & operations."

This Conti project involved integration to Siemens, Honeywell, Distech, Trane, Cicon and Johnson Controls brands, along with a migration from



"50+ floors, 60,000+ points, 6 different protocols, and a multitude of control lines. We need to put this jigsaw together in a way that is unified and useful to building operators. Harnessing the Niagara Framework® has allowed us to simplify the complexities of building automation."

Mitchell Reed
Division Manager
Conti Corporation

FAST FACTS

Project Type: Controls Retrofit of Class-A Office Complex

Property: Three buildings in a city plaza, the tallest having 25 floors and total structural height of 114.0 m (374 ft).

Project Area: 3,000,000+ square feet

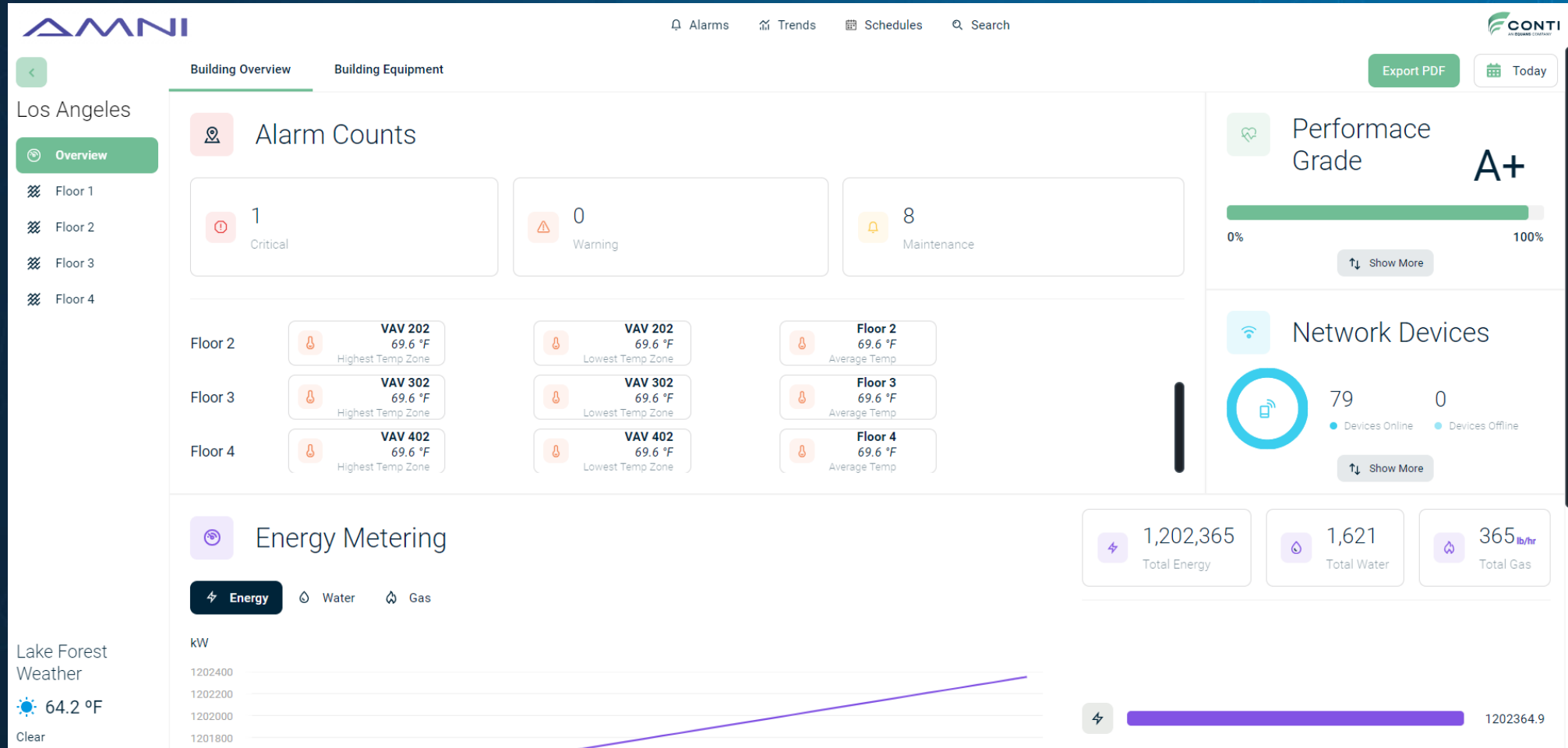
Project Scope: Services under Niagara management include HVAC, Energy Metering, Steam Monitoring, Gas Detection and Envelope Pressurization.

Key Technologies: Niagara

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Solution Example

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Thank You!
Mitch and Rick