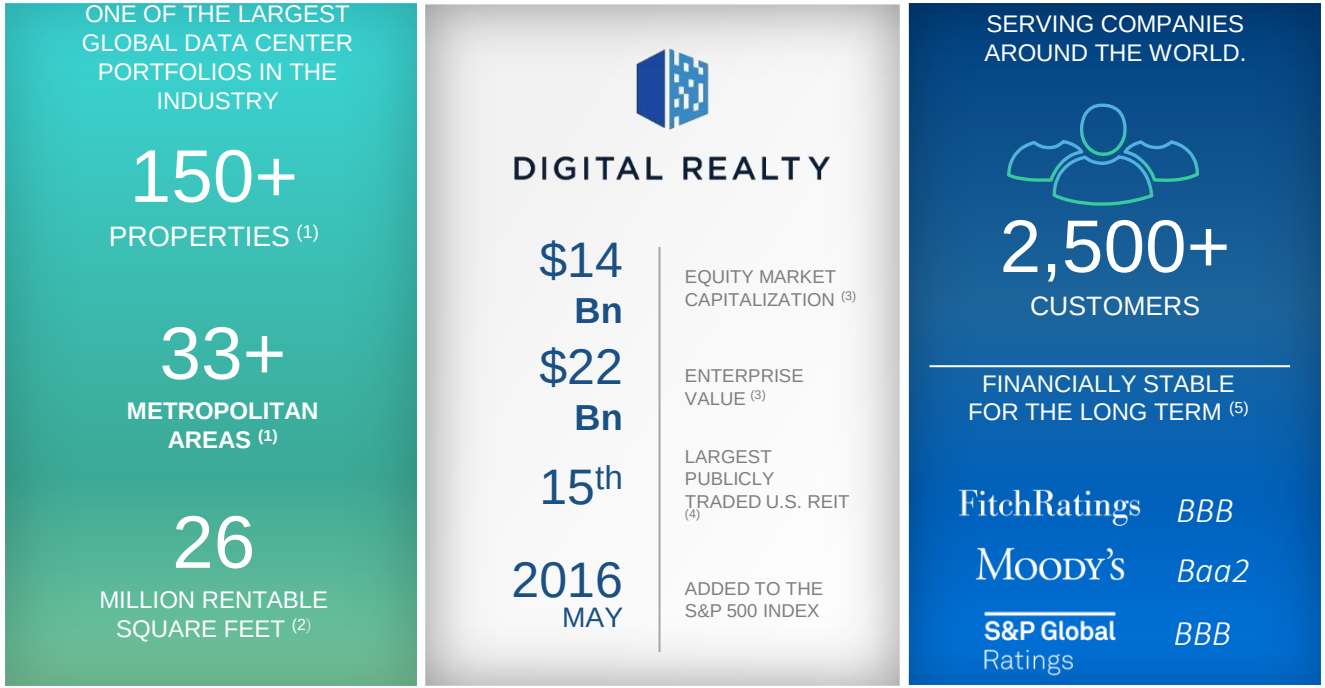
Demystifying the Data Center

Presented by **Brandon Lake (Casne Engineering) & Stephanie Gupana (Digital Realty)**

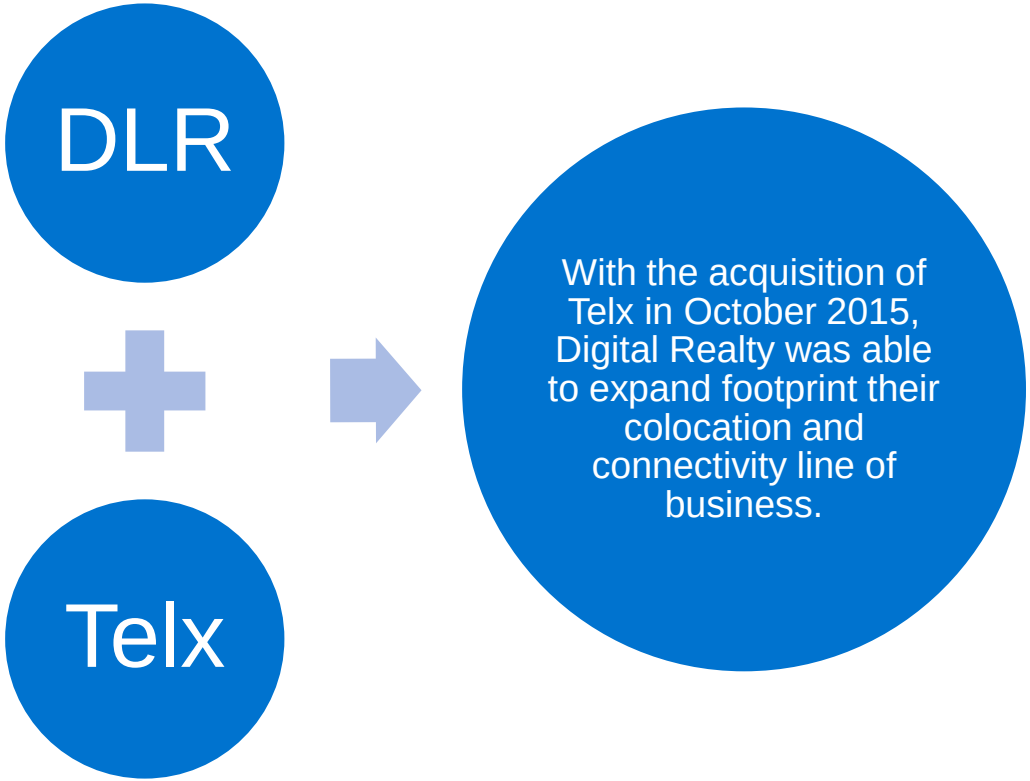
Conference Theme and Keywords

Digital Realty



- As of March 31, 2016. Includes investments in fourteen properties held in unconsolidated joint ventures.
- As of March 31, 2016. Includes 1.8 million square feet of active development and 1.2 million square feet held for future development.
- Balance sheet figures reflective of quarter end March 31, 2016, adjusted for the €600 million Euro bond offering on April 15, 2016. Closing stock price was $94.40 as of May 13, 2016.
- U.S. REITs within the RMZ. Source: companies' financials based on latest public filings. Based on equity market capitalization as of March 31, 2016.
- These credit ratings may not reflect the potential impact of risks relating to the structure or trading of the Company's securities and are provided solely for informational purposes. Credit ratings are not recommendations to buy, sell or hold any security, and may be revised or withdrawn at any time by the issuing organization in its sole discretion. The Company does not undertake any obligation to maintain the ratings or to advise of any change in ratings. Each agency's rating should be evaluated independently of any other agency's rating. An explanation of the significance of the ratings may be obtained from each of the rating agencies.

Digital Realty (DLR) & Telx



CASNE Engineering™
ADVANCED DESIGN & INTEGRATION

History

- Founded in 1979
- Employee-Owned
- Comprised of Engineers, Integrators, Technologists
- Trusted Advisors

Active Partners

- OSIsoft Partner Since 2001
- Technolgy Partner with: ESRI, Schneider, Rockwell, Siemens
- Over 500 clients
- 200 OSIsoft PI System projects

Key Industries

- Data Centers / Facilities
- Power and Utilities
- Process Industries

What is a colocation data center?

- Type of data center where space (facility/floor/suite), power, cooling, security and network equipment are available to rent for retail customers.
- Colocation data centers are able to connect retail customers to a variety of telecommunications and network service providers.

DLR operates 20+ colocation data centers across the US (some of which are landlord owned), 79 floors, 90+ suites.

What is a Colocation Product & its Requirements?

Colocation

Enabling small (1 Cabinet) to medium (300kW Cage) deployments

Ability to quickly deploy computing infrastructure in days, contract for 2-3 years

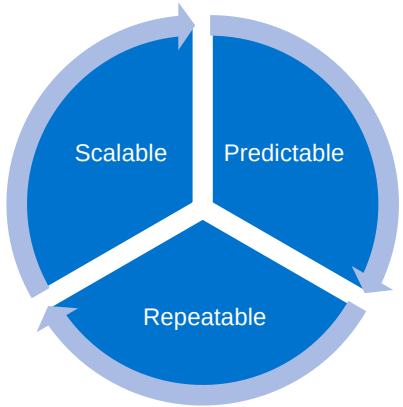
Consistent designs, operational environment and power expenses

SPACE
- Cabinets & Cages

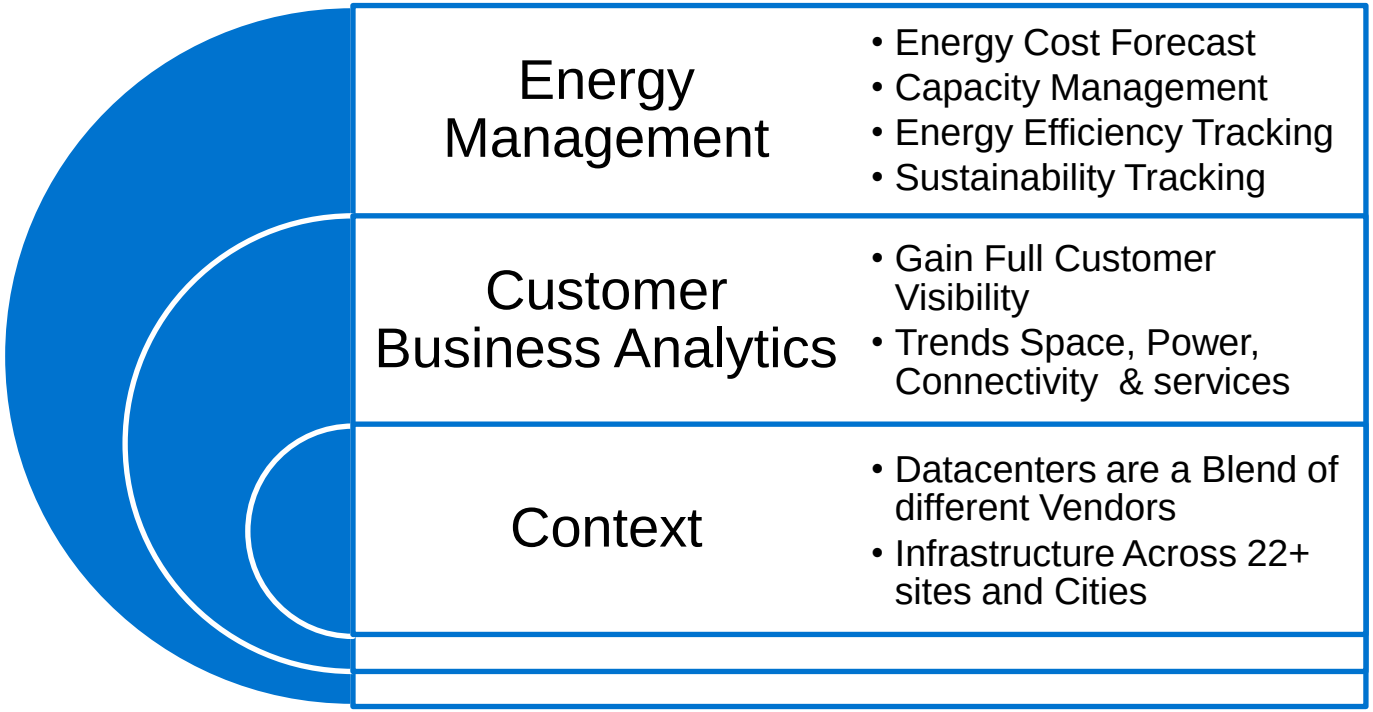
POWER
- kW model and Breaker

Requirements to be Successful?

- A Fast, Predictable & Repeatable Quote to Cash Process.
- Technical Tools that can be an Integral Part of the Colocation Process.



Colocation: Energy & Capacity Management



Challenge

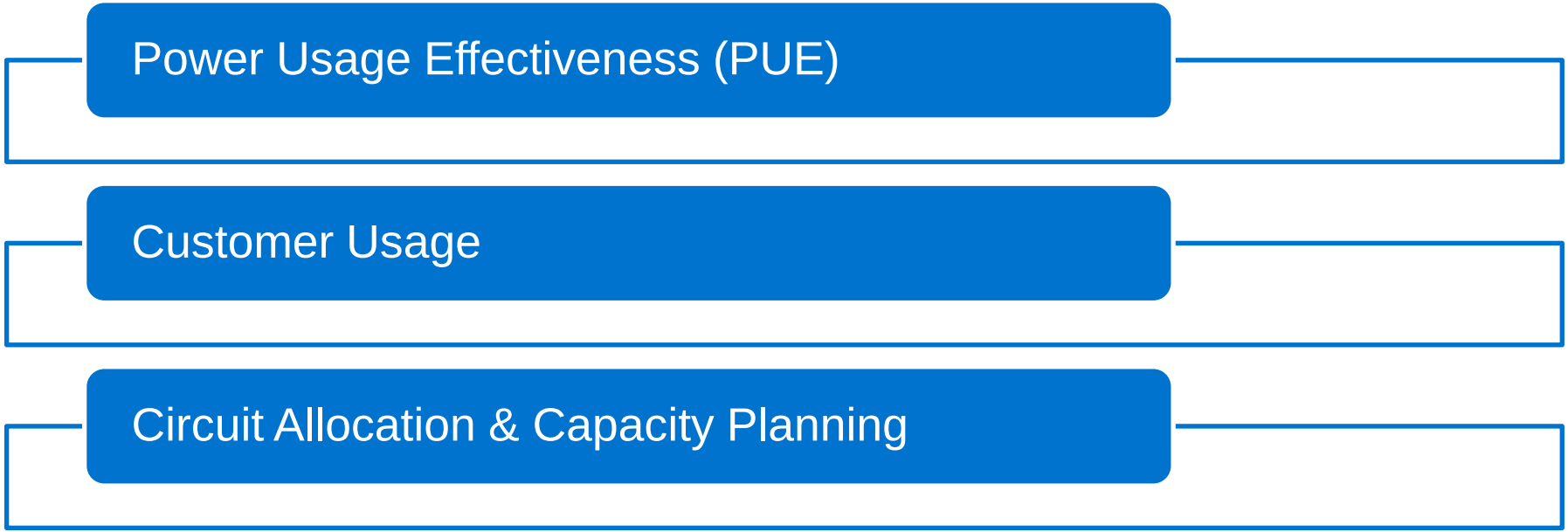
The ability to collect, aggregate, normalize, analyze, and present data center operations and asset performance information across portfolio.

Real – Time Performance Metrics

Automated Reports

Integrate with upstream and downstream systems

Use Case Focus Areas



PUE you say….?

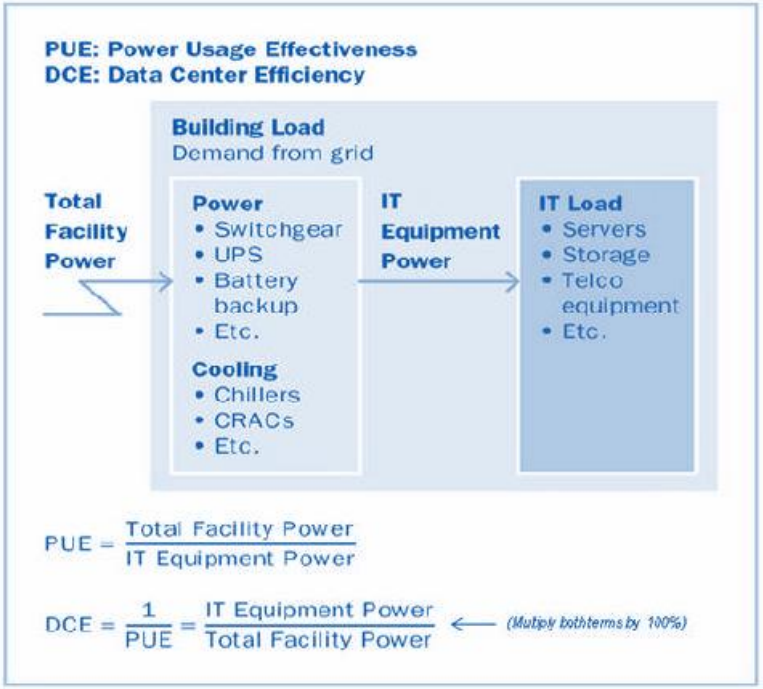
- PUE (Power Usage Effectiveness) is the metric to base efficiency or how well a data center uses energy.

$$PUE = \frac{Total\ Facility\ Load}{IT\ Load}$$

- Also used as a baseline to ensure that operational changes are showing measurable changes in efficiencies.

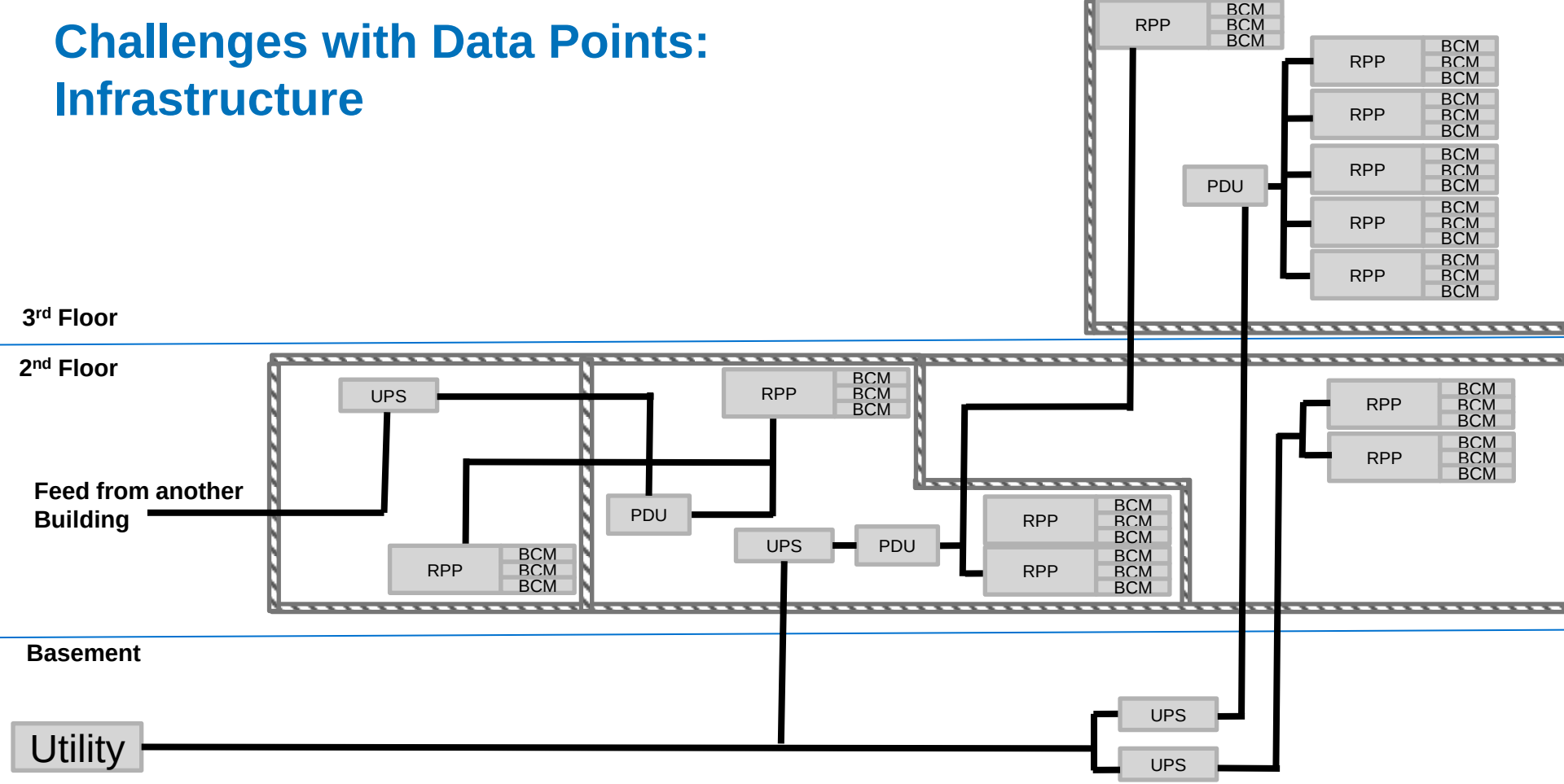
All federal agencies are mandated to report <1.4 PUE on their Data Centers by 2018 (<1.2 is encouraged)

PUE Data Points



Source: The Green Grid

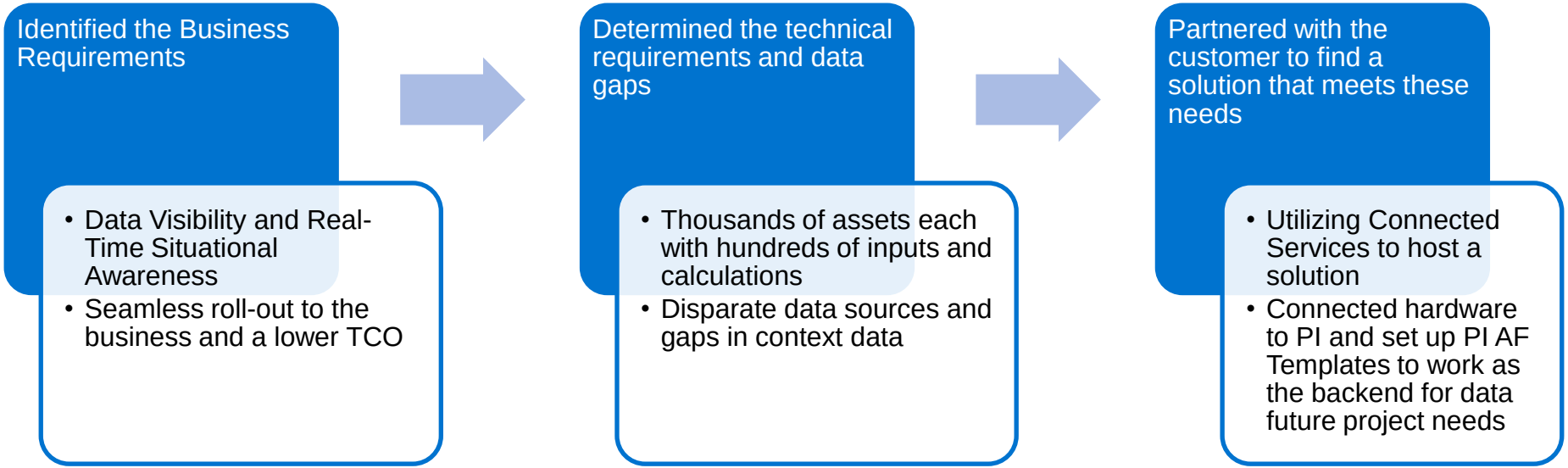
Challenges with Data Points: Infrastructure



Other challenges with Data Points

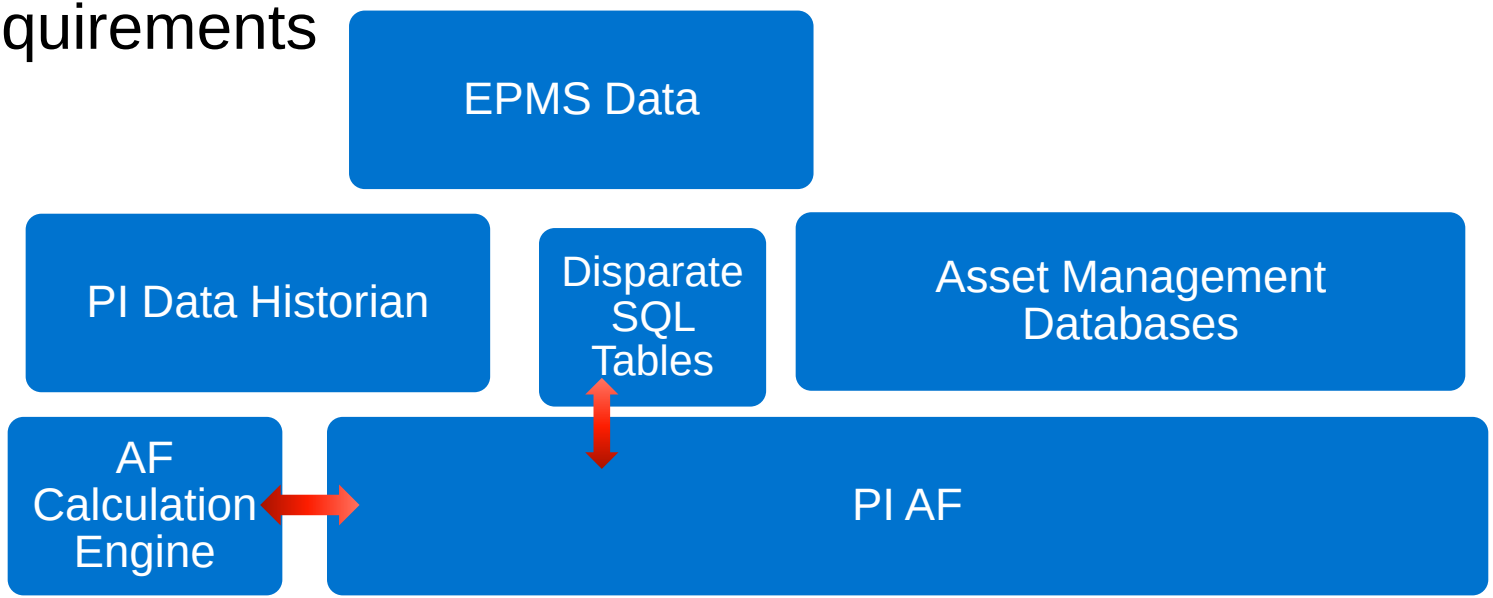
- PUE calculations can become very complex anytime power leaves or enters a boundary.
- DLR colocation teams had to manually take down data every week.
- Data tracking tool was based in excel.

Approach



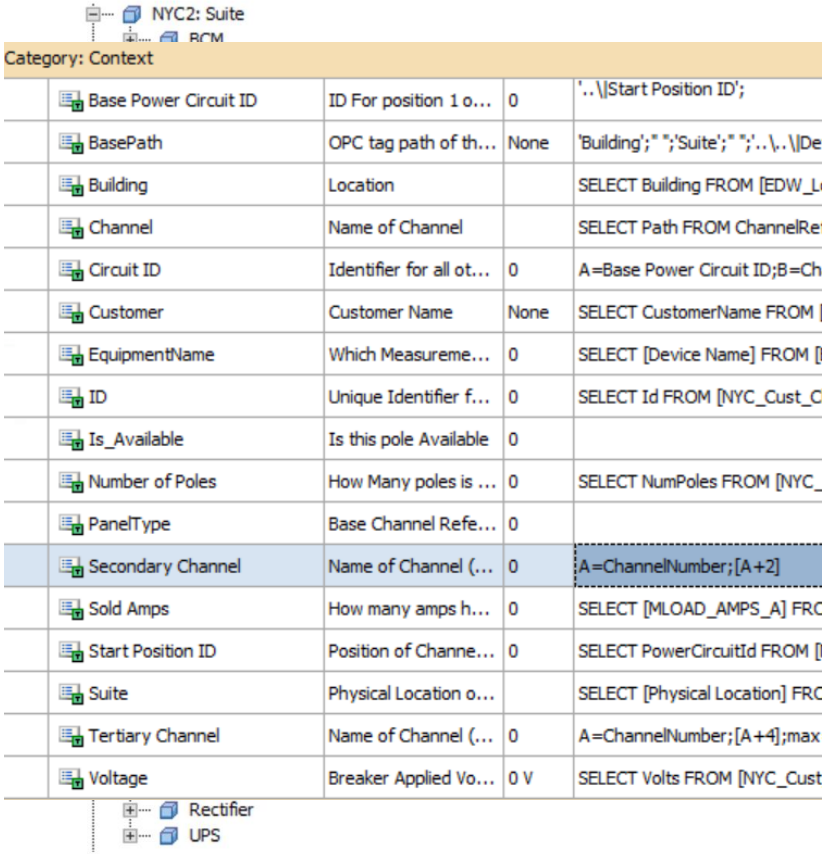
Approach – A solution infrastructure

- We needed a platform that could handle these requirements

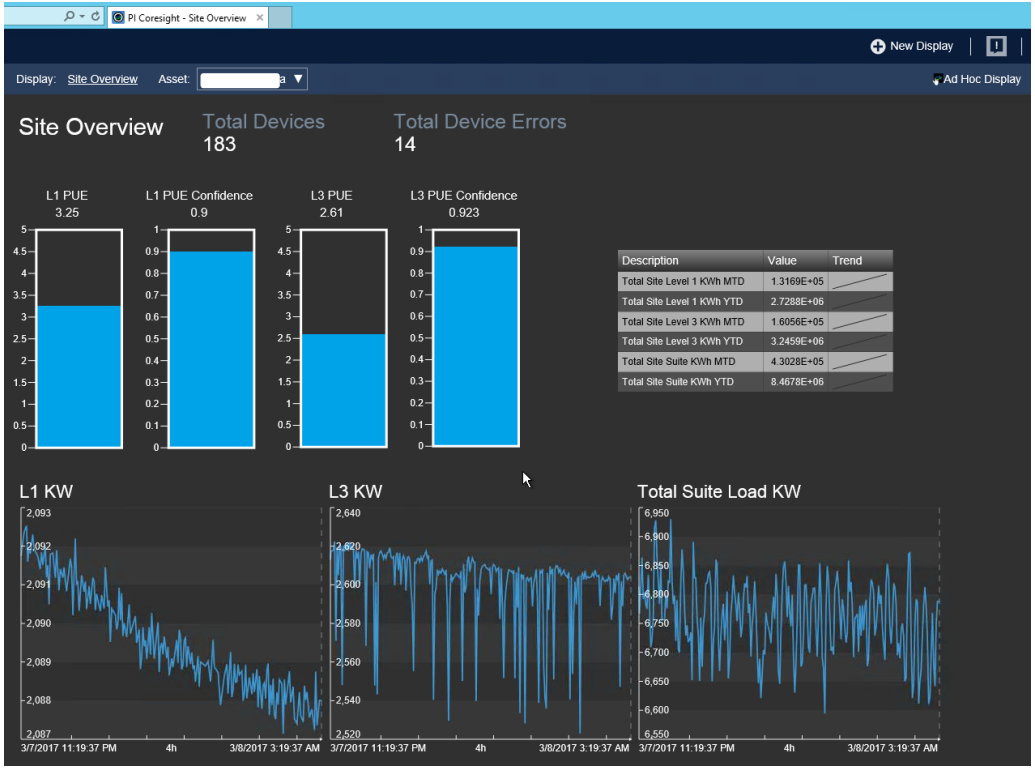


Data Structuring Model

- Worked with Digital Realty to understand data requirements.
- Developed a templated data model in PI AF to help with tag consistency, situational awareness, and reporting

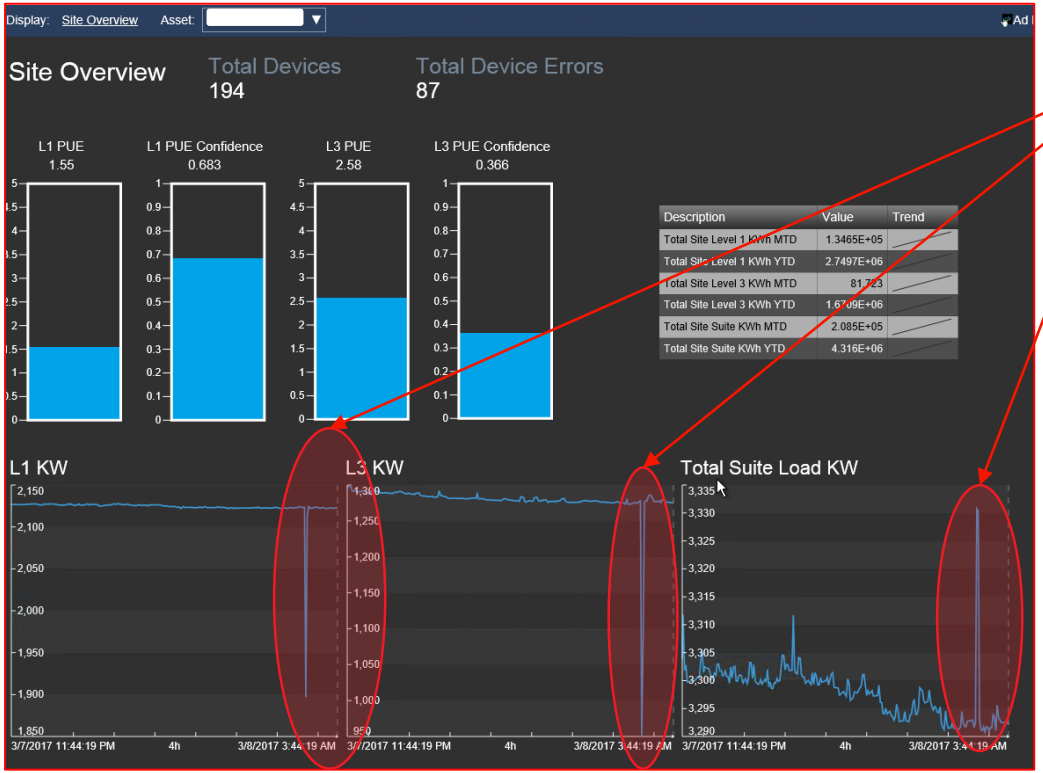


Data Visibility and Reporting



- Utilized data from calculations in PI AF in PI Coresight

Data Visibility and Reporting



- Visualize and alert on sudden changes in load
- See this for any Suite in the portfolio

Data is structured and available down to the Channel level

Column2	1Pole Available	2 Poles Available	3 Pole Available
NYC2: : RPP_101 Panel 5B\Channels\Channel01	Available		
NYC2: : RPP_101 Panel 5B\Channels\Channel37	Available	Available	Available
NYC2: : RPP_101 Panel 5B\Channels\Channel39	Available	Available	
NYC2: : RPP_101 Panel 5B\Channels\Channel41	Available		
NYC2: : RPP_101 Panel 5B\Channels\Channel42	Available		
NYC2: : RPP_101-D\Channels\Channel14	Available		
NYC2: : RPP_101-D\Channels\Channel37	Available	Available	Available
NYC2: : RPP_101-D\Channels\Channel39	Available	Available	
NYC2: : RPP_101-D\Channels\Channel41	Available		
NYC2: : RPP_101-D\Channels\Channel42	Available		
NYC2: : RPP_101E\Channels\Channel17	Available		
NYC2: : RPP_101E\Channels\Channel25	Available	Available	Available
NYC2: : RPP_101E\Channels\Channel27	Available	Available	Available
NYC2: : RPP_101E\Channels\Channel29	Available	Available	Available
NYC2: : RPP_101E\Channels\Channel31	Available	Available	Available
NYC2: : RPP_101E\Channels\Channel33	Available	Available	Available
NYC2: : RPP_101E\Channels\Channel35	Available	Available	Available
NYC2: : RPP_101E\Channels\Channel37	Available	Available	Available
NYC2: : RPP_101E\Channels\Channel39	Available	Available	
NYC2: : RPP_101E\Channels\Channel41	Available		
NYC2: : RPP_101-G\Channels\Channel20	Available		
NYC2: : RPP_101-G\Channels\Channel29	Available		
NYC2: : RPP_101-G\Channels\Channel36	Available	Available	Available
NYC2: : RPP_101-G\Channels\Channel38	Available	Available	Available
NYC2: : RPP_101-G\Channels\Channel40	Available	Available	
NYC2: : RPP_101-G\Channels\Channel42	Available		
NYC2: : RPP_102E\Channels\Channel17	Available		
Total	61.81		

- Reports filtered by Panel, kW, Customer or any other parameter.
- Quick Views on Pole Availability

Next Steps

- Automatic PI AF Updates for physical changes
- OSIsoft PI Integrator for Business Analytics
  - Phase Balancing
  - Cooling Zone Modeling
  - Sq. Footage Accounting

Goal

The ability to collect, aggregate, normalize, analyze, and present data center operations and asset performance information across portfolio.

Real – Time Performance Metrics

Automated Reports

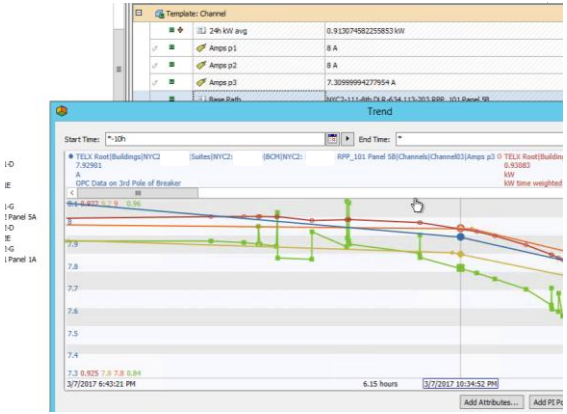
Integrate with upstream and downstream systems

Summary

COMPANY and GOAL

Digital Realty aims to collect, normalize, and store high fidelity real-time and history-based data across multiple colocation facilities.

DIGITAL REALTY



CHALLENGE

Infrastructure challenges and integrating a variety of upstream and downstream data systems for centralized visibility.

- 19/21 facilities in portfolio are landlord owned, resulting in data visibility & data acquisition challenges.
- IT security restrictions.

SOLUTION

Connected services from OSIsoft and Casne made bringing in millions of data points from a variety of sources sensible

- A hosted solution with data storage and full integration to all equipment
- Not held back by data point counts or point license limitations

RESULTS

An infrastructure platform that makes finding data across multiple colocation facilities simple

- Time Savings (over 50%) in viewing reports
- Cost savings in identifying and alerting on problems earlier
- Multi-use tool
- Reduction of manual editing
- Immediate data availability

Contact Information

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Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Please remember to…

Complete the Online Survey for this session

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谢谢

Danke

Gracias

Merci

Thank You

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Спасибо

Obrigado