



OSIsoft®

UC2010

Real Time Information — Currency of the New Decade

How to Monitor
Large & Live Data Centers

PI makes data centers Green!



Introduction

On an average day, someone on eBay

- sells a vehicle every minute**
- sells auto parts every second**
- sells diamond jewelry every 2 minutes.**



"The foundation of our revenue is our data centers..."

Dean Nelson, eBay
Dir, Global DC Strategy



Motivation: Improve operations

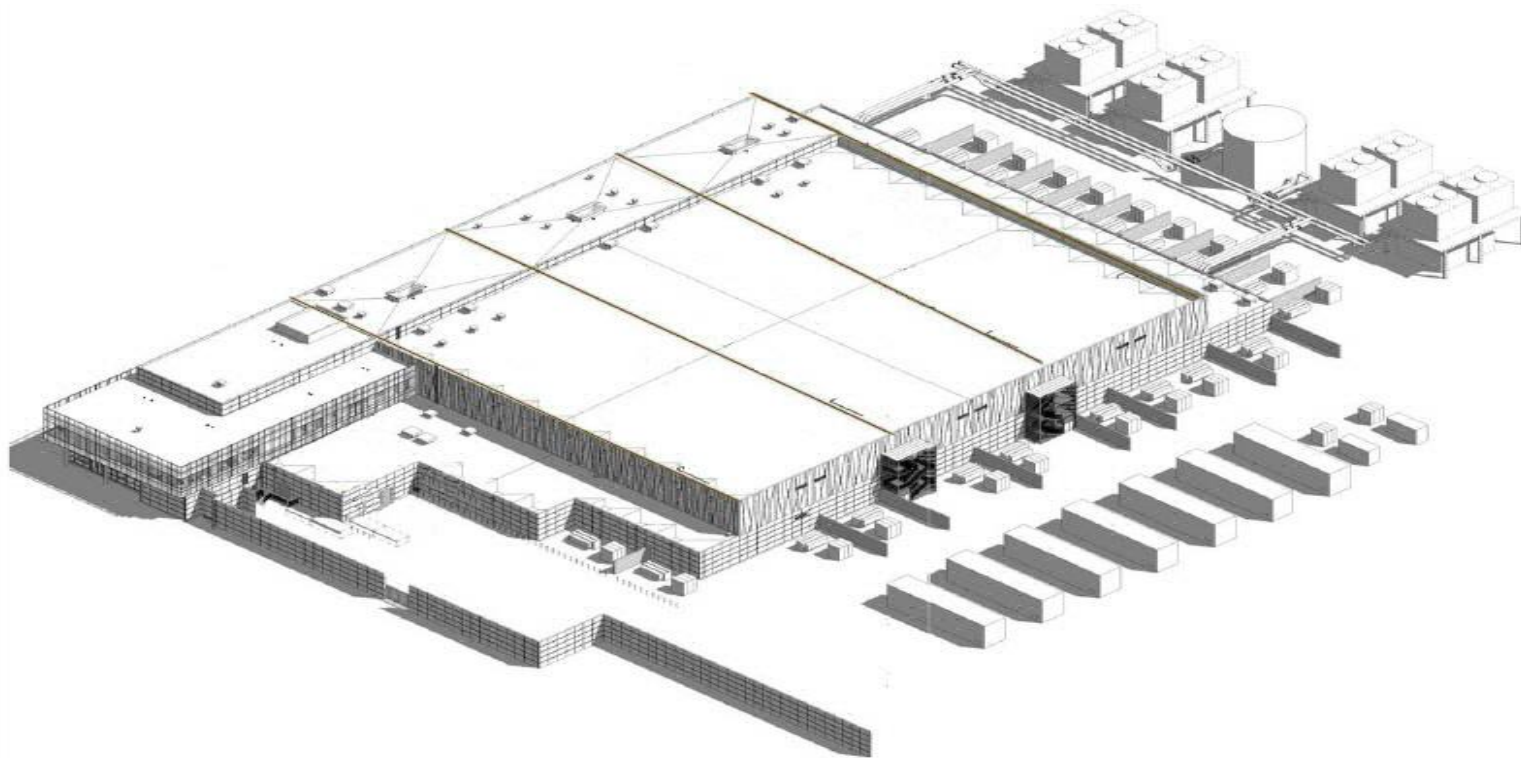
- Treat Facilities and IT as a holistic system
- Integrate real time data into corporate decision making
- Present real time data collection as a single system with an enterprise-wide interface
- Compare real time result to original building design requirements of capacity, availability and scalability

eBay Selects South Jordan For Data Center

...and seeks the U.S. Green Building Council's

[Leader in Energy and Environmental Design \(LEED\)](#) certification,

..Dean Nelson, the senior director of global data center strategy



Agenda



➤ *eBay requirements*

Monitoring system Architecture

Building the Monitoring system

- Screens and Points

How do people use it?

What did we gain?

Where to from here?

Customer Requirements & Project Size

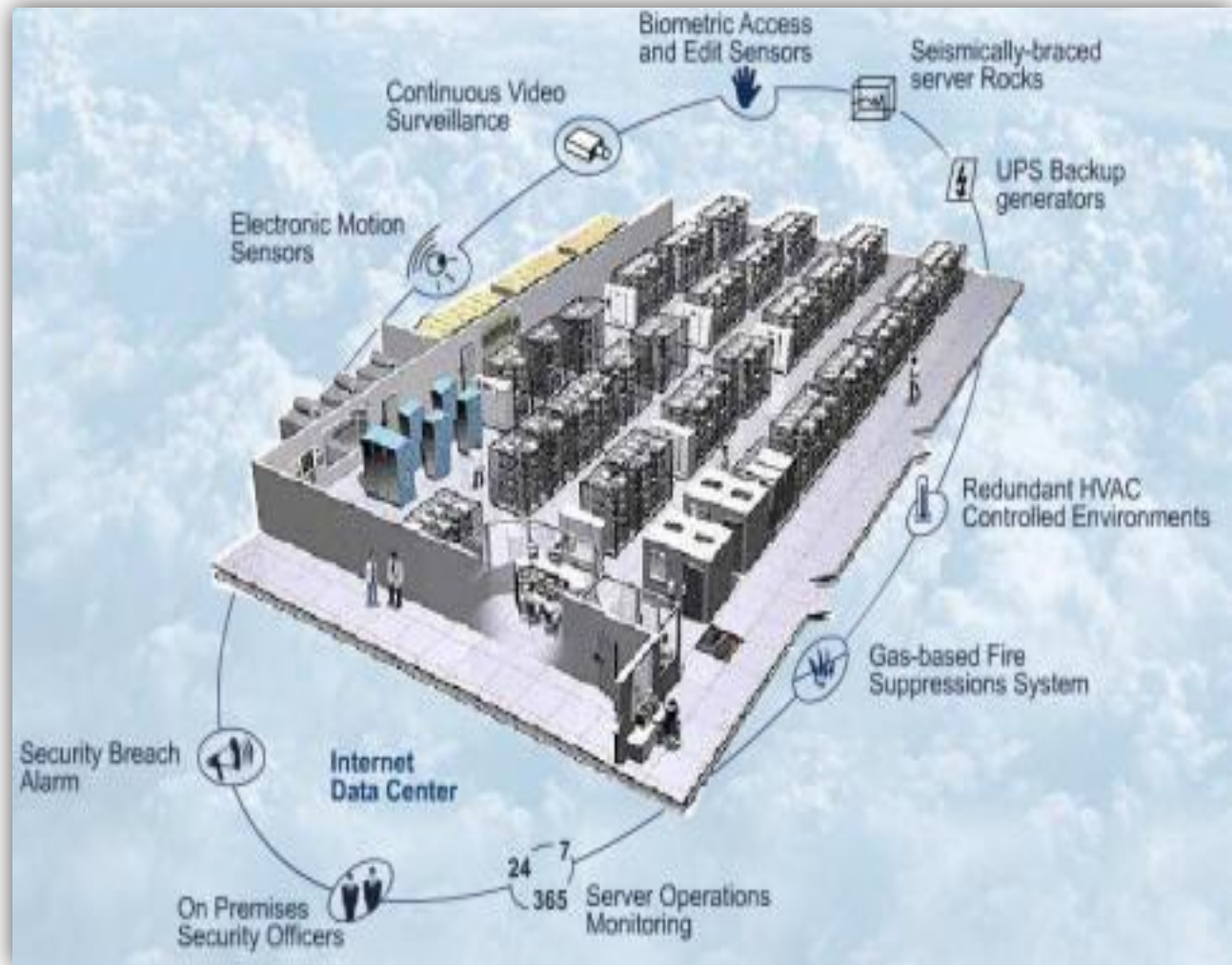
60,000 sq ft of raised floor - 7.2 Mw of N+2 IT load - 4X expandable



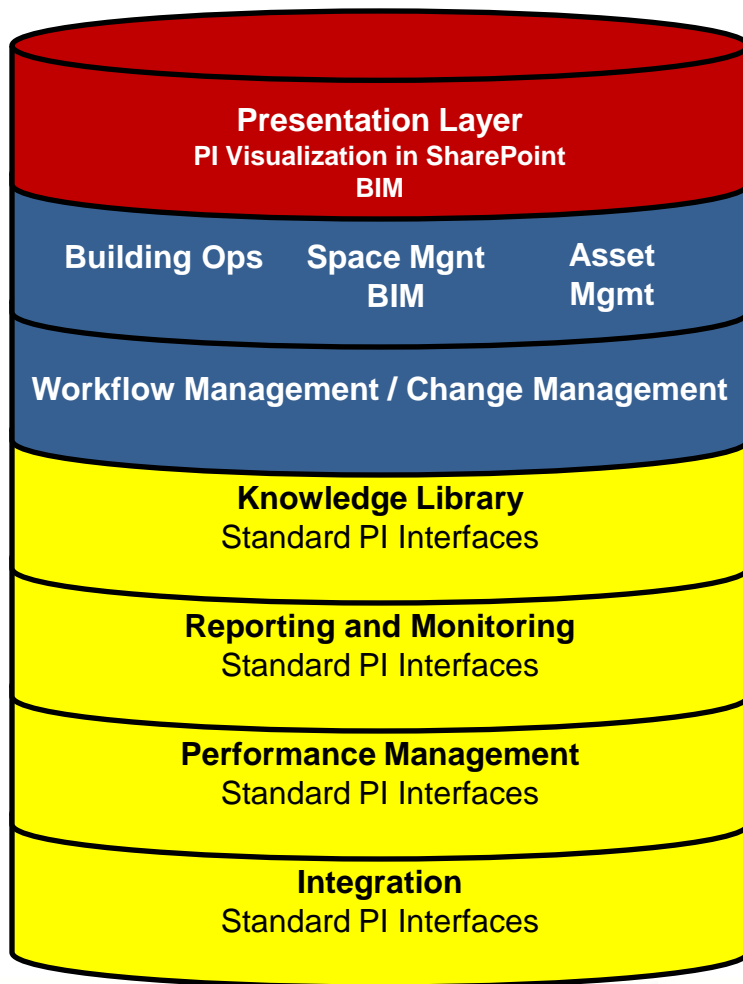
Monitoring Requirement

Treat
Mechanical,
Power, IT and
Security
as one
complete
system

- *Nearly 1000 devices*
- *Over 110,000 points*



Enterprise Integration Requirement



Capacity & Load Planning Systems

Data Center Simulation Toolkits

Power, Cooling, Space, Network

Nationwide alarming & trouble ticket systems

- 1000 points per 10 minutes
- remote from Salt Lake City by 1000 miles

Agenda

eBay requirements

➤ *Monitoring Architecture*

Building the Monitoring system

The result:

How do people use it?

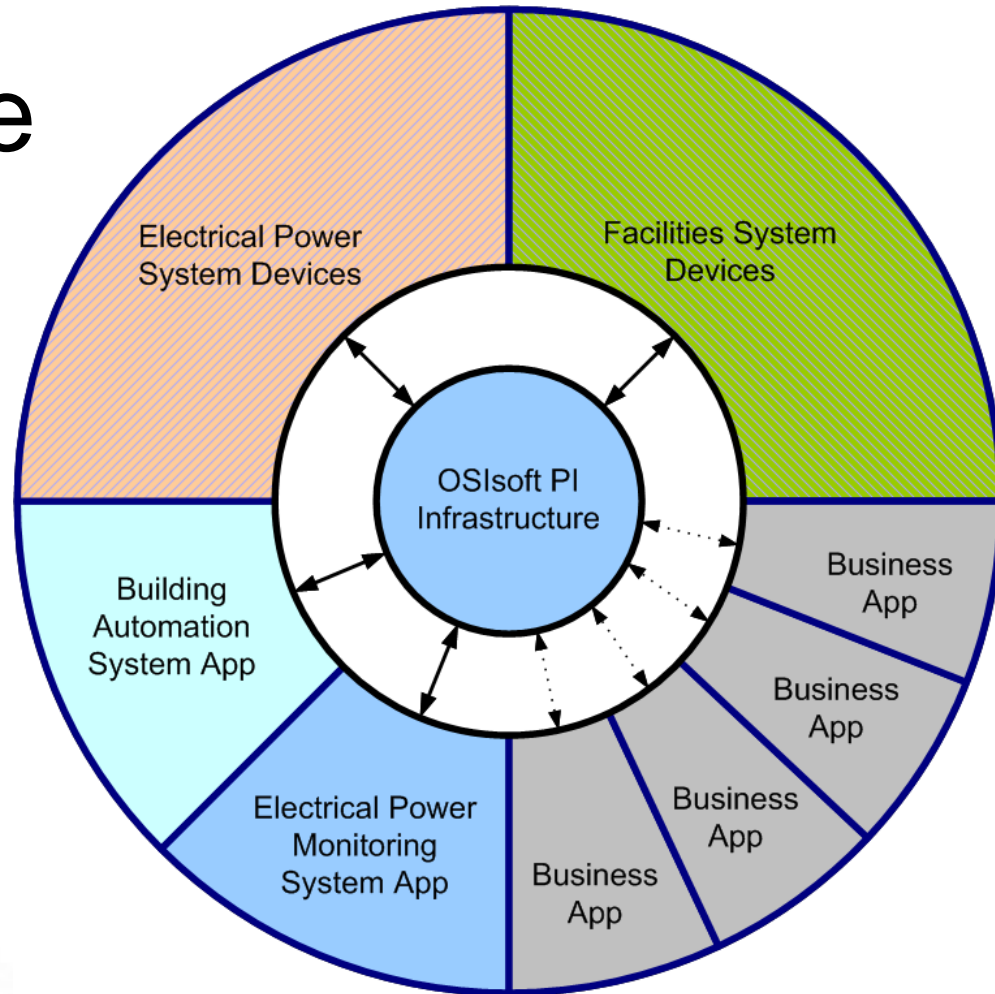
Where to from here?



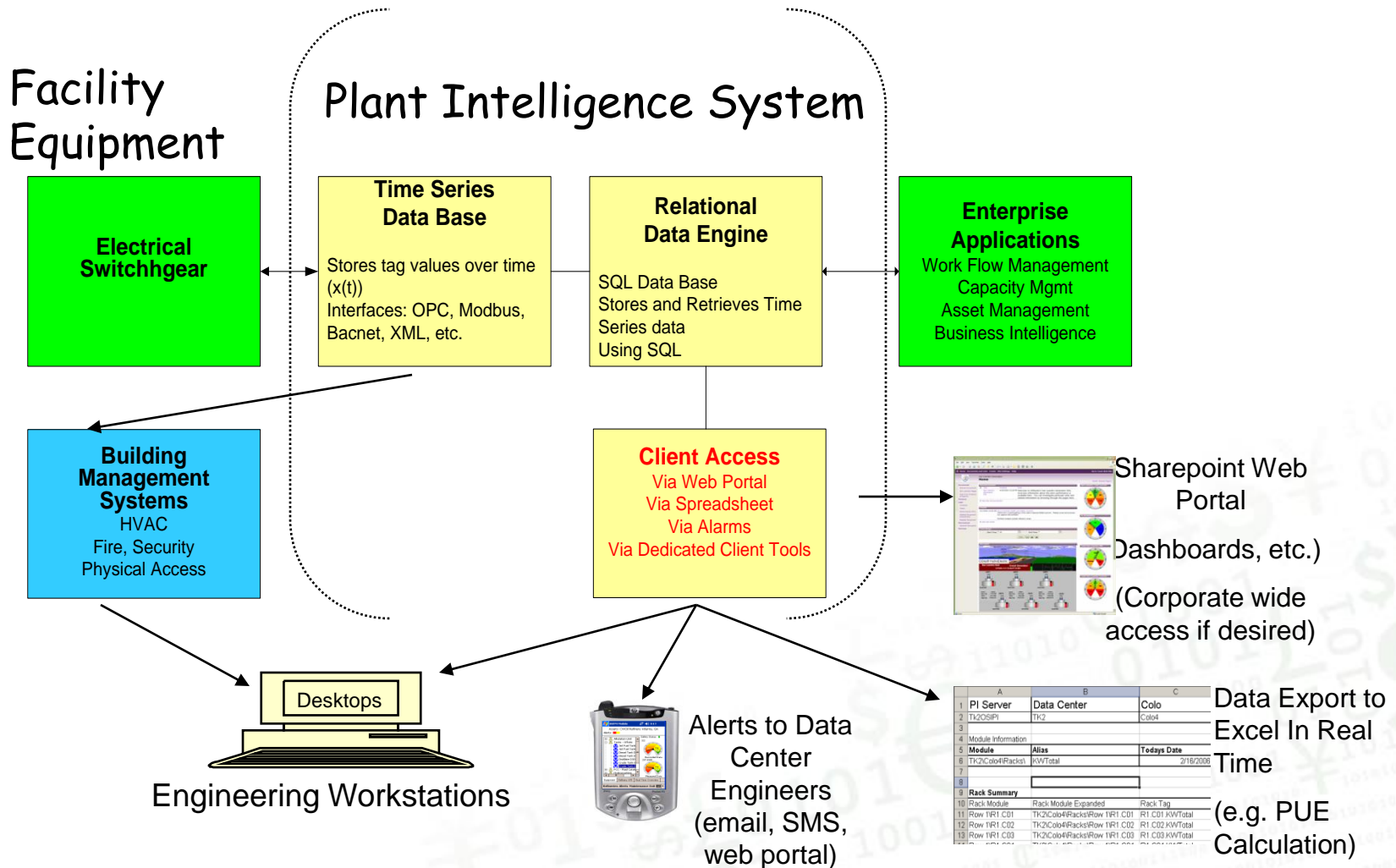
Why PI ?

- Leader in Asset and facility management software integration into BIM
- Only Infrastructure chosen by IT providers Microsoft, IBM, HP, Cisco
- Only infrastructure capable of handling real-time data over 1M points on single server
- Only open architecture platform from Data Connectors through applications – with development platform .net
- Fastest Infrastructure available 250,000 events per second

PI is an infrastructure



PI in relation to Enterprise



Agenda

eBay requirements

Monitoring Architecture

➤ *Building the Monitoring system*

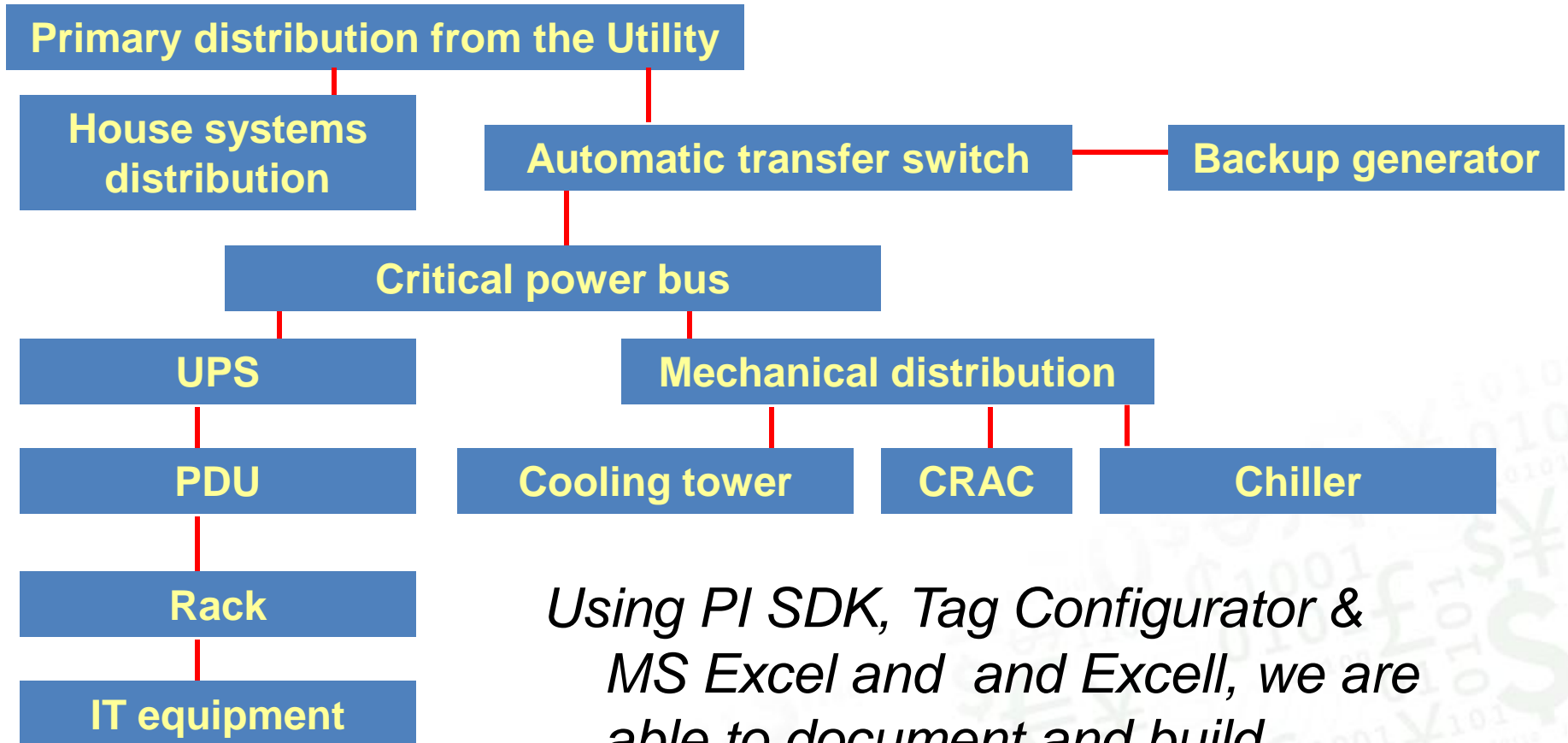
The result:

How do people use it?

Where to from here?



Building the Monitoring System- Electrical Network - 138KV to 110V



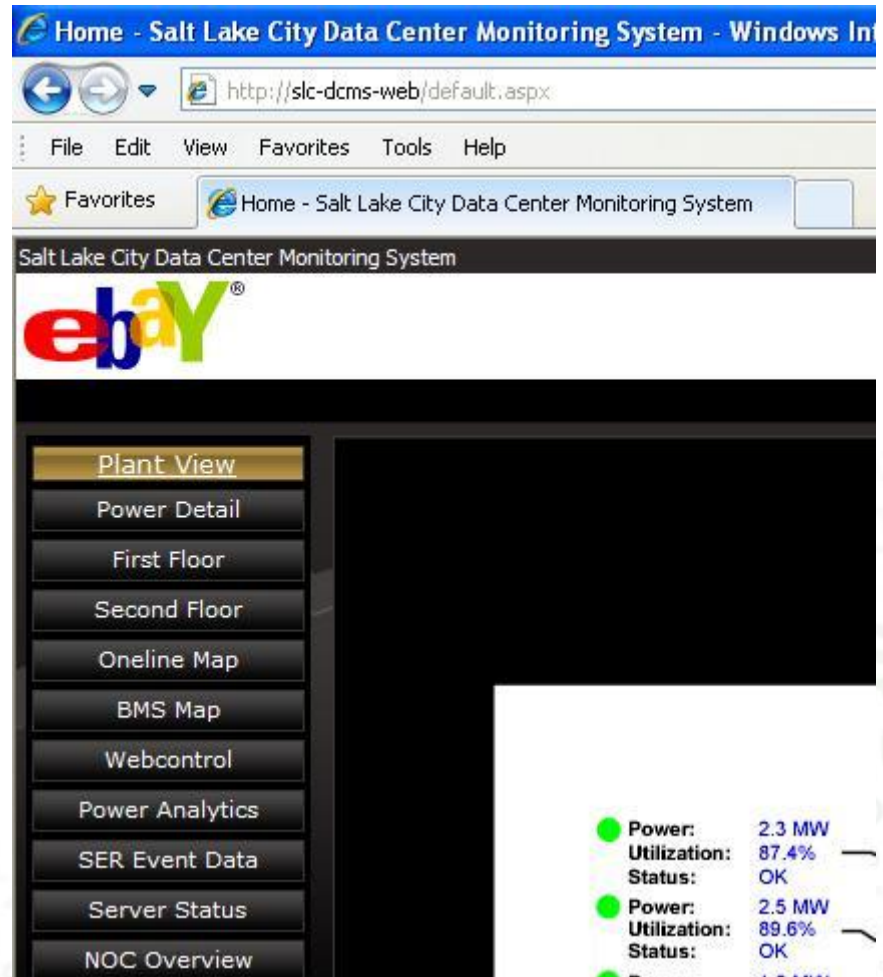
Using PI SDK, Tag Configurator & MS Excel and and Excell, we are able to document and build 60,000 tags in 20 minutes.

Building the screens

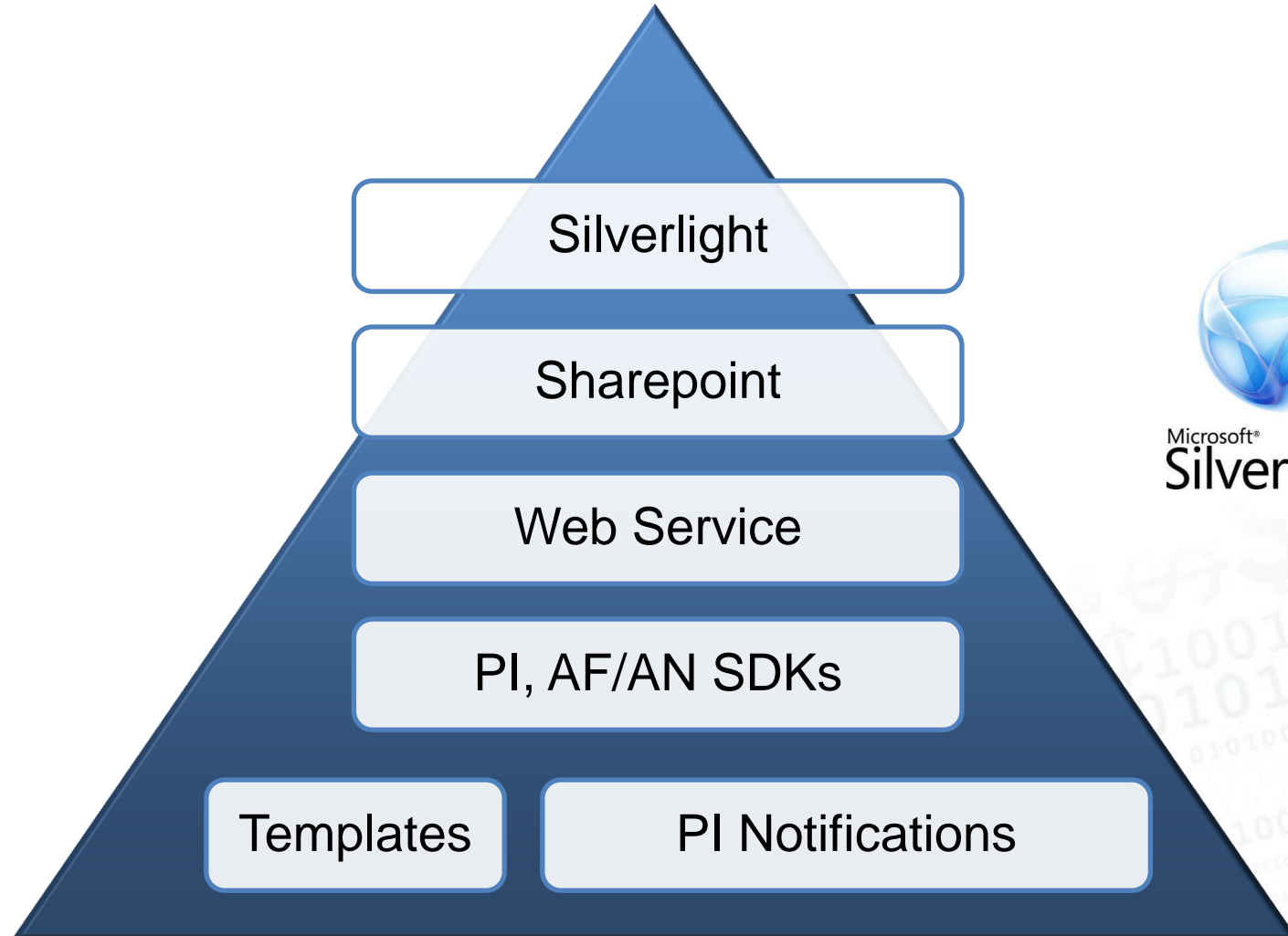
***Using PI Web Parts,
Processbook and 3rd party
tools such as AutoCad,
we built a 200 page web site***

We focused on Sharepoint and
Silverlight architecture and
tools.

We converted CAD files directly
into screens



Building the Notifications



Special Situation:

Monitoring the Primary Utility Feeds

138kv utility feed

eBay and Utility
wanted to exchange
power levels

Solution:
bi-directional info
transfer with Utility



Agenda

eBay requirements

Monitoring Architecture

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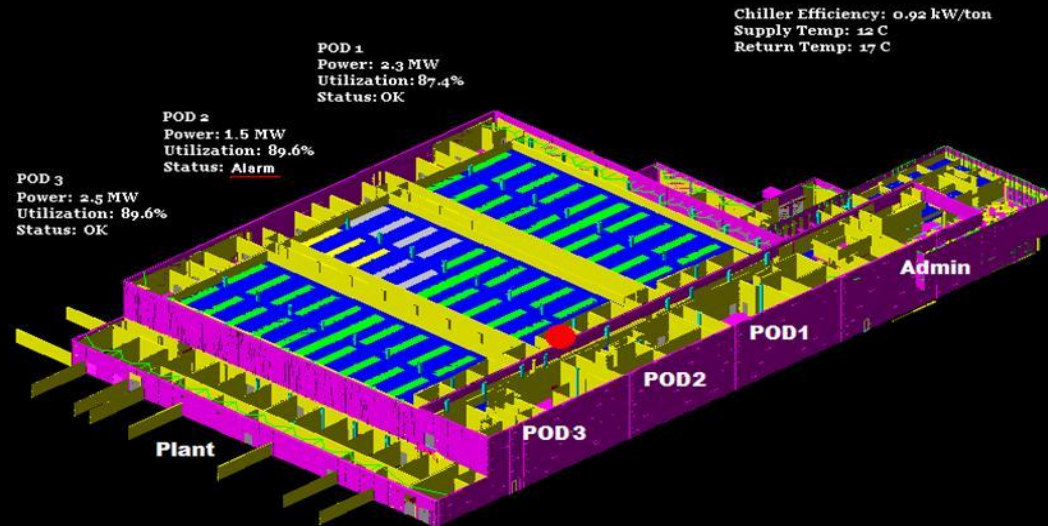
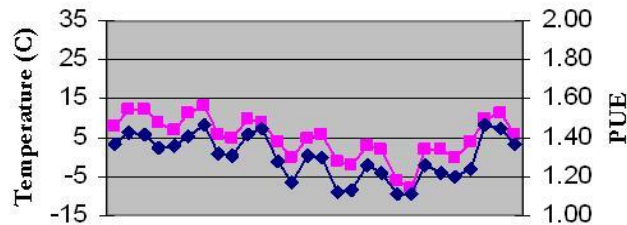
➤ *The result:*
How do people use it?

Where to from here?



Network Ops Center Main Screen

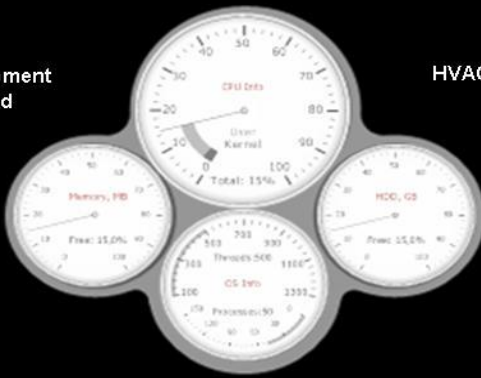
Site Power Performance
7 Day, 6 hr Average



Power Capacity Utilization

IT Equipment Load

HVAC Equipment Load



Current PUE
1.37

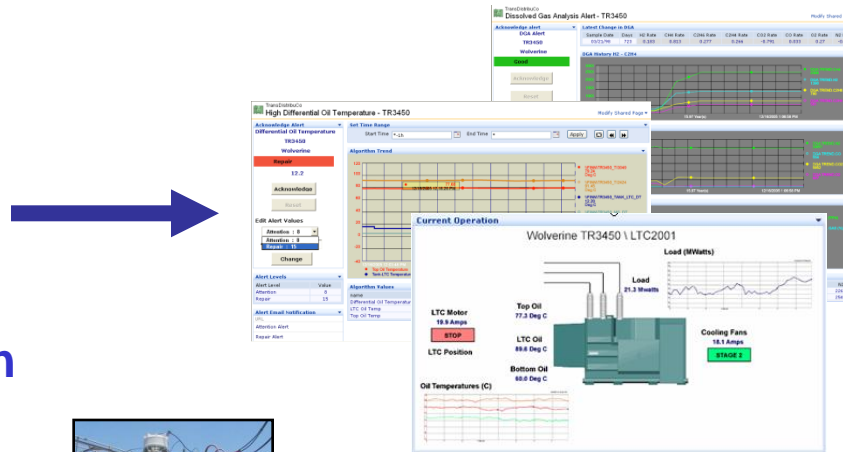
Announcements:

1. Data for demonstration only
2. December PM assigned
3. November PM complete
4. None

Adding a Rack: Data Flow

**Alert Notification
Work Order Generation**

The screenshot shows the 'Configuration' window for an alert. The 'Name' is 'TR1123 Differential Oil Temperature Repair Alert'. The 'Owner' is 'Coburn'. The 'Status' is 'Enabled/Disabled'. The 'Alert Trigger' is set to 'LTC Oil Temp'. The 'Message Definition' includes a 'Subject' of 'TR1123 Differential Oil Temperature Repair Alert' and a 'Body' that includes a pre-defined body and a link to a repair order.



**Integrated Asset
Information**

Dissolved Gas Analysis

Sample Date	H2	CH4	C2H6	C2H4	C2H2	CO2	CO
09/26/90	193	115	137	38	<1	3004	223
08/01/94	279	185	164	51	<1	4213	341
03/06/95	489	399	320	109	<1	1652	315
03/28/96	1258	1980	590	369	<1	6524	530
03/21/98	1390	2568	790	561	<1	5952	554
						927	24651
							6361

**Asset Information
Structure
(PI and RDB)**

**Real-time Rule
Assessment**

TransDistribCo - Asset Maintenance Report

Reporting Period: 12/05/05 04:04 PM through 02/03/06 04:04 PM

Asset ID: TR3450 Substation: Wolverine

Serial No. Manufacturer Year Model MVA Rating kV Rating Fluid Capacity
X9945 SIEMENS 1959 G-4567 50 120 3440

Maintenance Algorithm Status Summary

Time In Hours	Good	Attention	Attention (ACK)	Repair	Repair (ACK)
Asset Status	311	73	953	103	
Differential Oil Temperature (Elevated oil Temp)	2	23	999	414	

Station Reliability

Asset	Good	Attention	ack	Repair	ack
TR6676	0.0%	0.0%	100.0%	0.0%	
TR5493	100.0%	0.0%	0.0%	0.0%	
TR4085	100.0%	0.0%	0.0%	0.0%	
TR3450	0.0%	1.2%	98.8%	0.0%	
TR1123	100.0%	0.0%	0.0%	0.0%	

Showing 1 to 5 of 6

Asset Reliability



Plant View

Power Detail

First Floor

Second Floor

Online Map

BMS Map

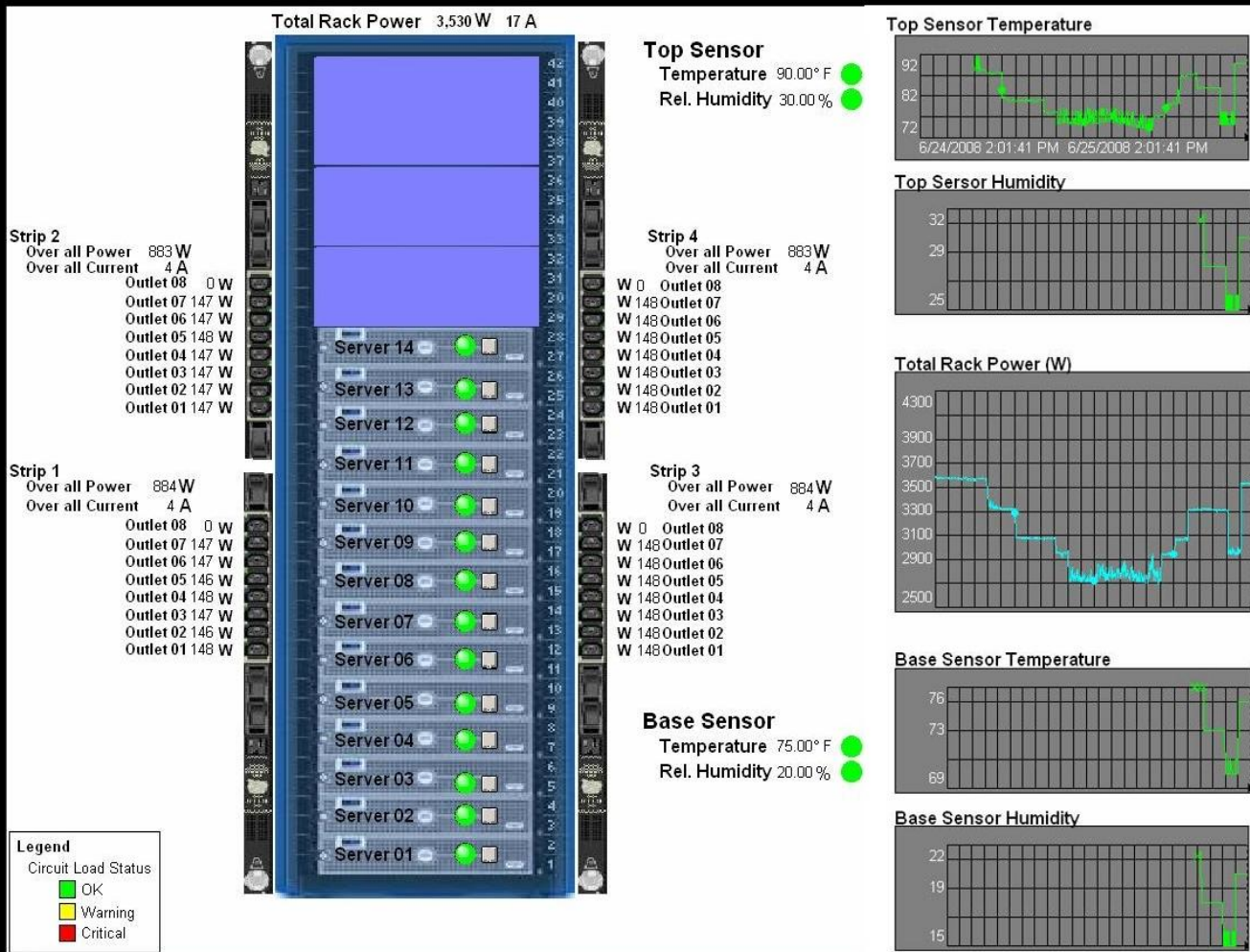
Webcontrol

Power Analytics

SER Event Data

Server Status

NOC Overview



Alarm History

Rack Installed !



- Plant View
- Power Detail
- First Floor
- Second Floor
- Online Map
- BMS Map
- Webcontrol
- Power Analytics
- SER Event Data
- Server Status
- NOC Overview

DATA CENTER 3 SOUTH



Alarm History

Agenda



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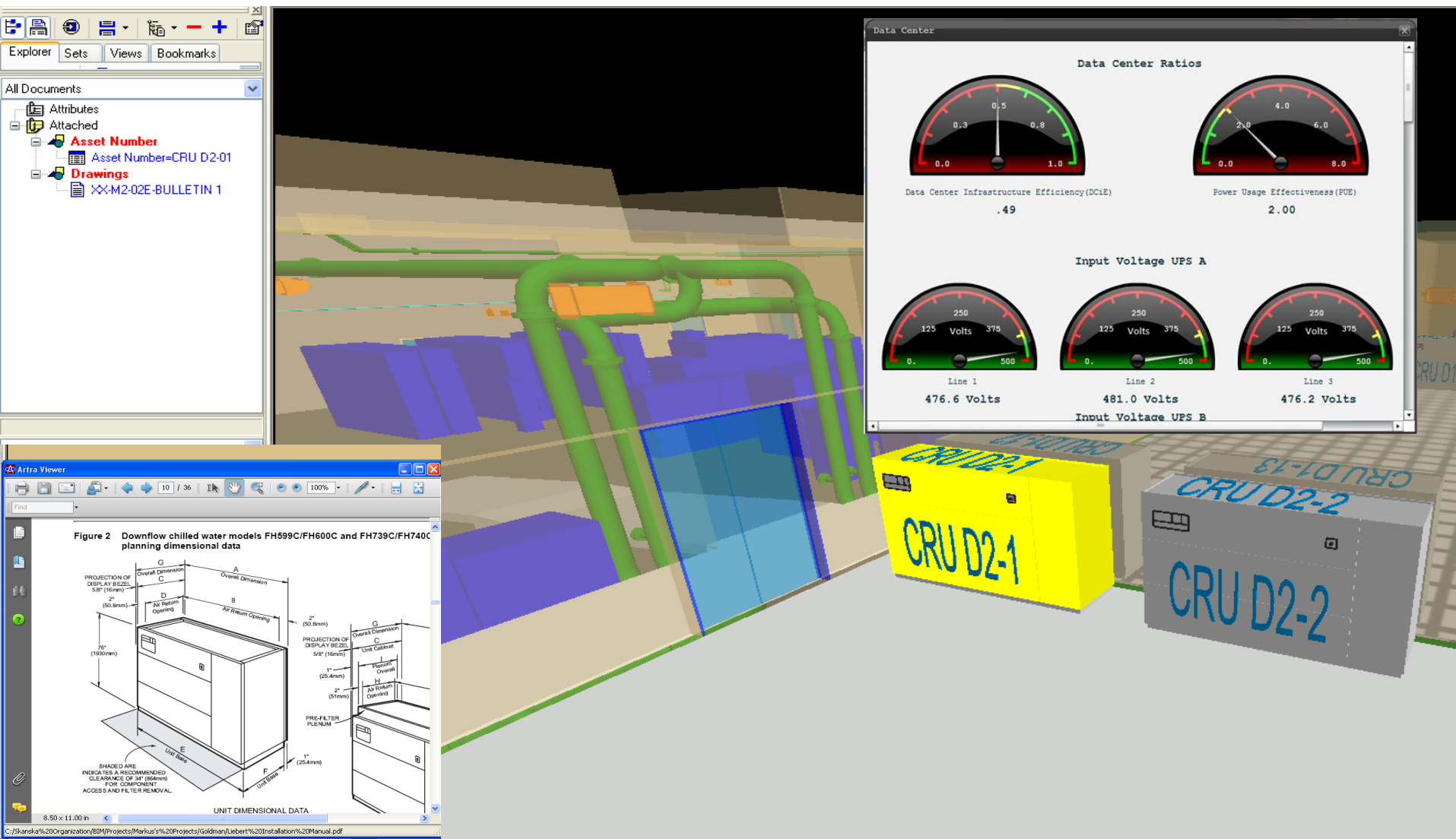
- Screens and Points

The result:

How do people use it?

➤ *Where to from here?*

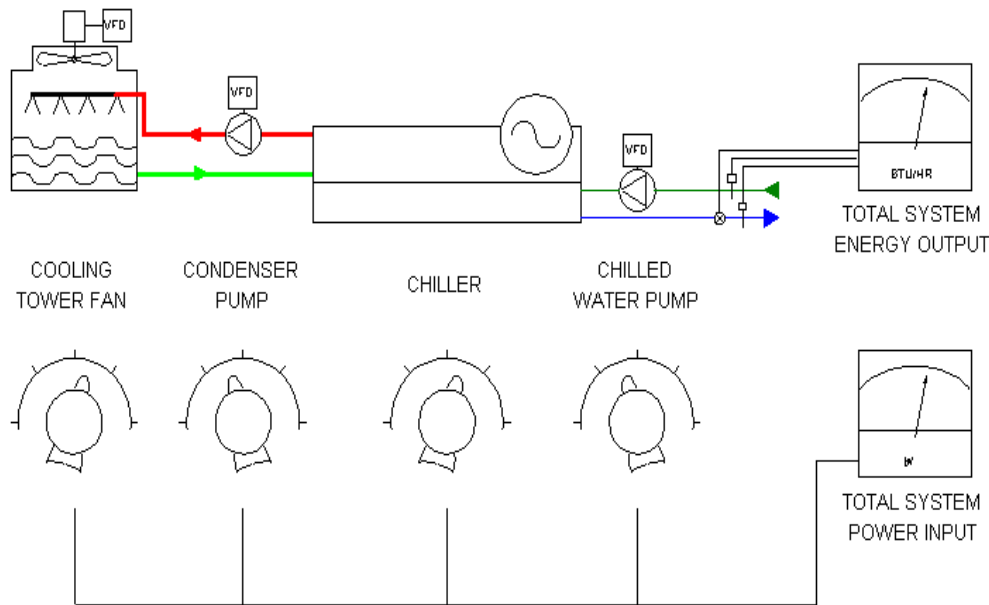
Link Building design (BIM) to real time data center monitoring systems.



“Green Plant” *by Skanska*

Green Plant Technology:

Controls + Calculus + Experience =
Breakthrough Efficiency

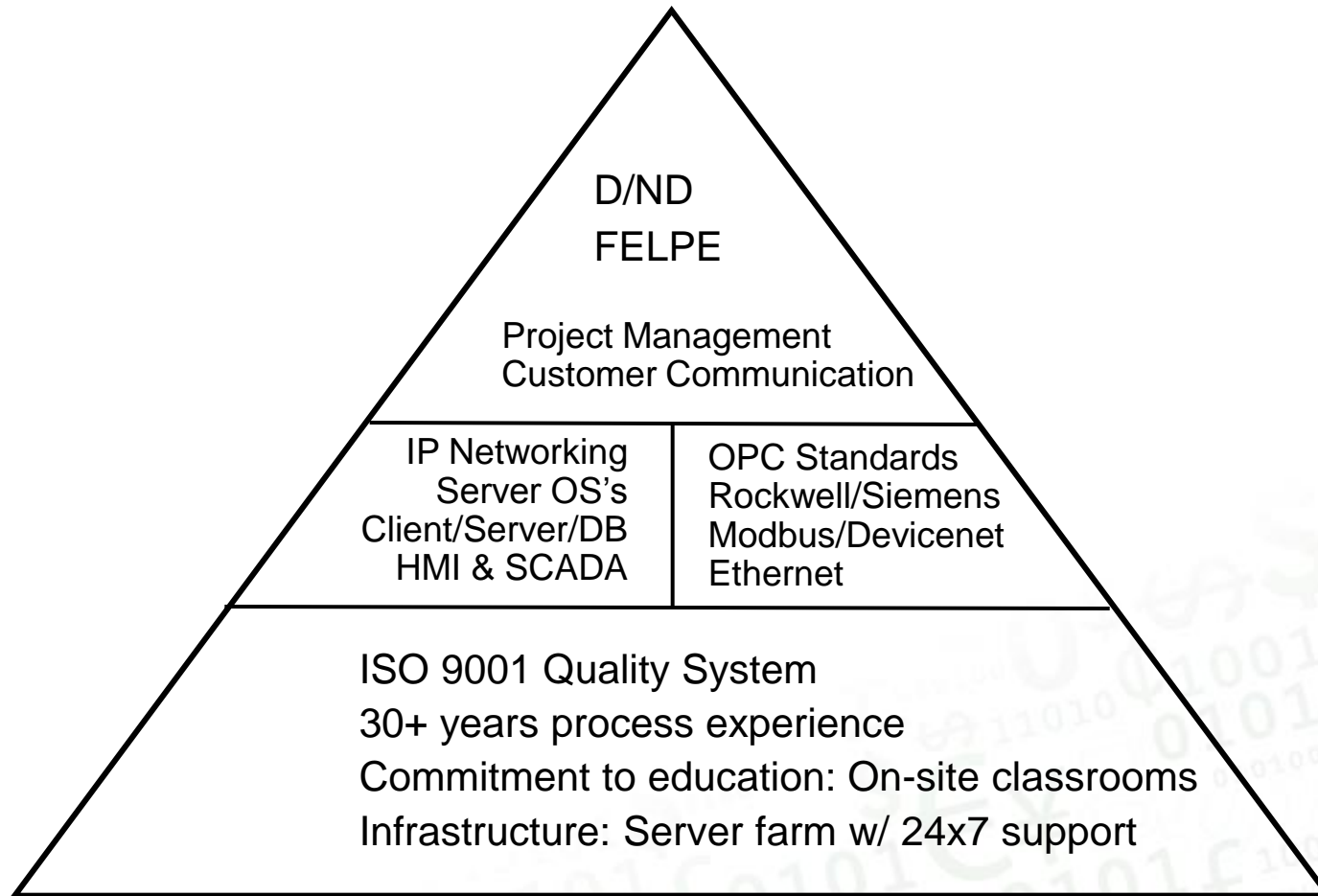


“The chiller sequencing algorithms developed by Skanska are very advanced.

Your team’s understanding of chiller system operation is similar to that of chiller manufacturer engineering personnel”



Who is DST Controls?



Questions ?

