OSIsoft®

USER CONFERENCE

2008

AMSTERDAM

Empowering Business in **Real Time.**

PI Infrastructure for the Enterprise.

OSIsoft®
USER CONFERENCE
2008
AMSTERDAM

PI for IT & Data Centers

Martin Otterson
Christian Luckock

OSIsoft – Mission Critical

PI System at Cal ISO

What do we make?

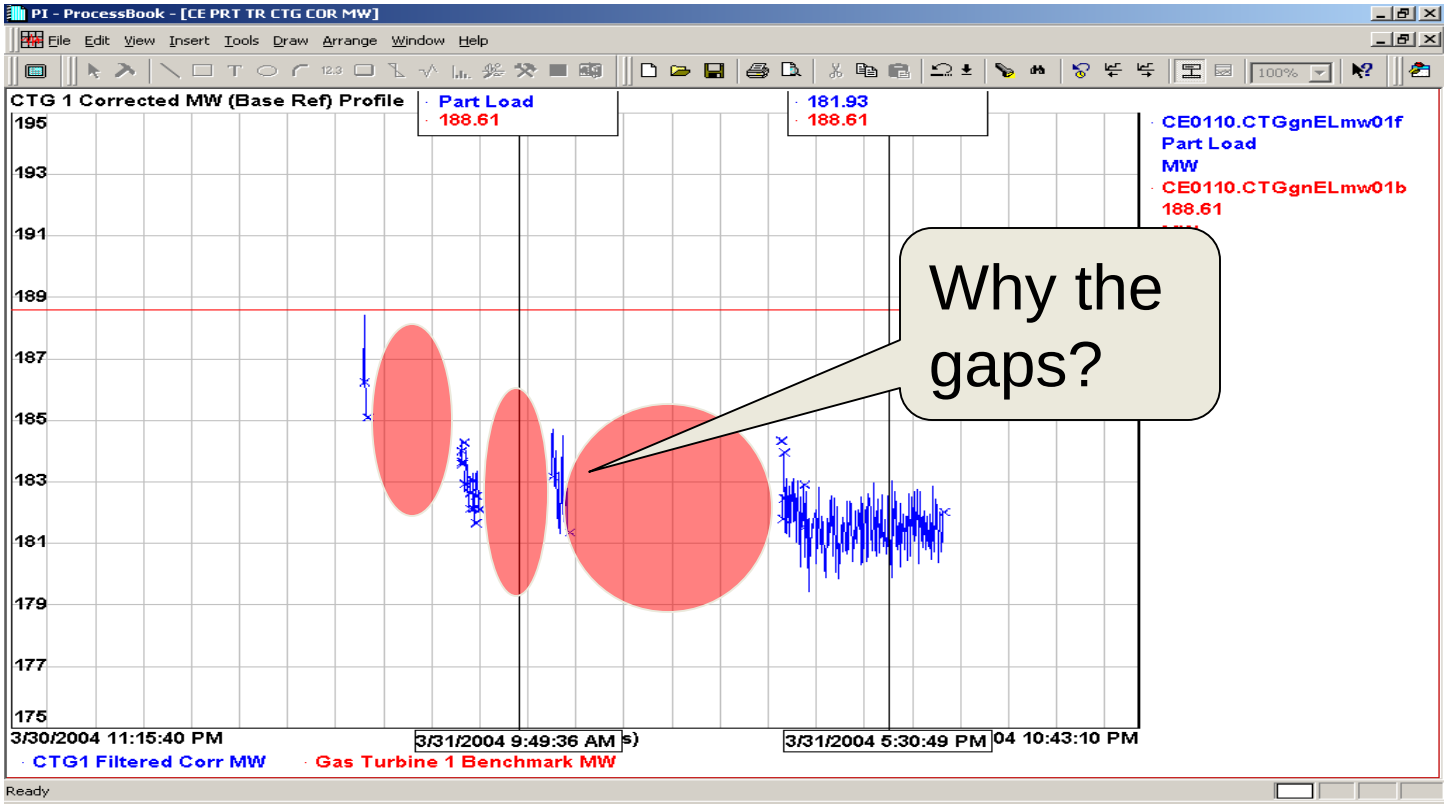
OSIsoft sells the PI System

The PI System is an Infrastructure that manages time series data and events

What is Infrastructure?

Software that enables the creativity of our users

Your IT – Mission Critical



- Communication related?
- Interface Instrument down?
- Security issues?

- Allows adaptation based upon previous experience.
- Allows common communication of degrading performance.
- Allows operators to know if the information they are acting upon is up to date, old, or justifies intelligent resource investments in the right places.

Industry Credentials

- *Power Generation, Transmission & Distribution – OSIsoft is ranked 1st in the Power industry**
  - Over **200 GW of total 350 GW** average power generated & transmitted in US daily is monitored by the PI System
- *Oil & Gas*
  - **100% of the Global Top 5** Producers (24.6MM bbl / day) use the PI System
- *Pulp & Paper*
  - **400 sites from worldwide leaders** use OSIsoft to manage their mills
- *Chemical*
  - PI Systems are installed in **more than forty of the top fifty global chemical companies**
- *Pharmaceutical*
  - **9 of the top 10 Pharmaceutical Companies** use OSIsoft
- ***Data Center & IT*- Emerging**

EPA Report – August 2, 2007

Report to Congress on Server and Data Center Energy Efficiency

"… greater energy-efficiency gains may be realized by optimizing the operation and efficiency of the data center as a holistic system (e.g., through real-time, facility-level energy monitoring and management systems)…."

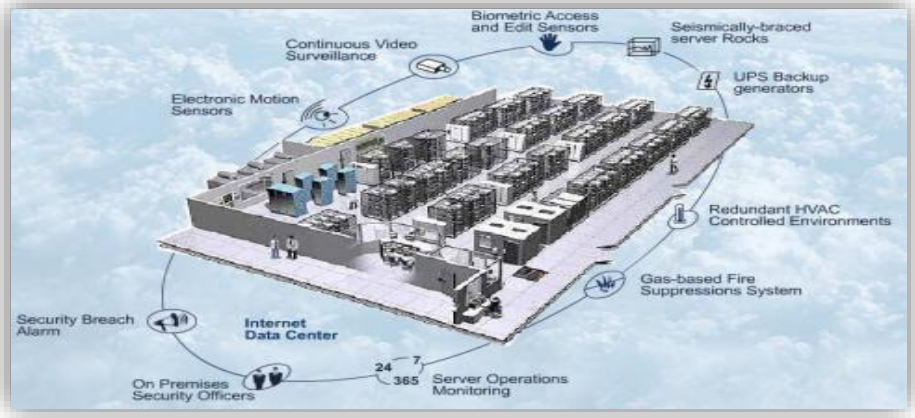
Microsoft on PI in the Data Center

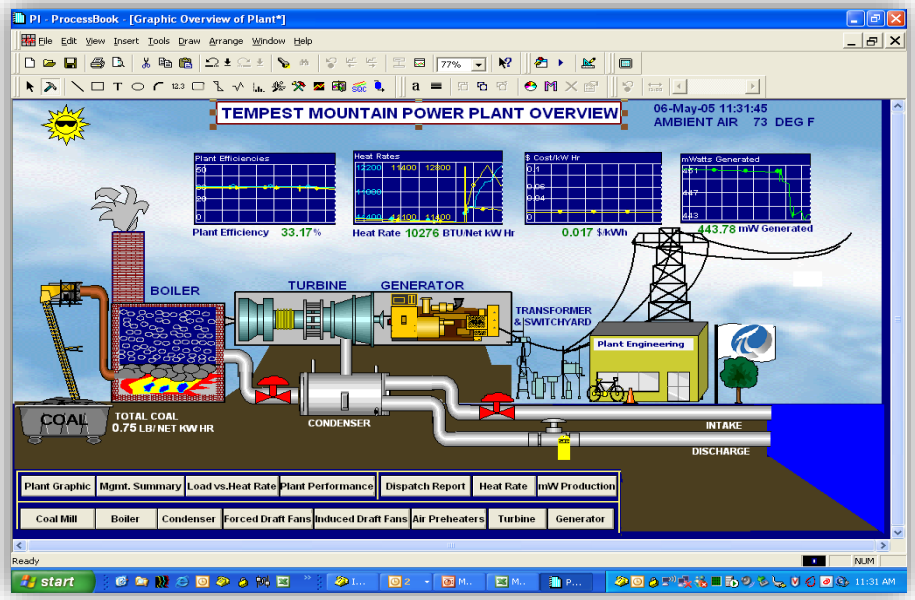
"We are using the **OSIsoft PI System to monitor all the critical points within our data centers**, and in turn are laying the foundation for a **high-availability, global Live infrastructure**,"

"The return on investment is tremendous. We are enabling innovation through increased collaboration, social networking and commerce—leading to breakthroughs in software plus services. We are setting industry standards **with increased utilization of facility resources, real time business continuity, and green computing technologies**. As we continue to expand our Live services, the combination of **OSIsoft and Microsoft technologies** are bringing new levels of performance and reliability to our world-class data centers."

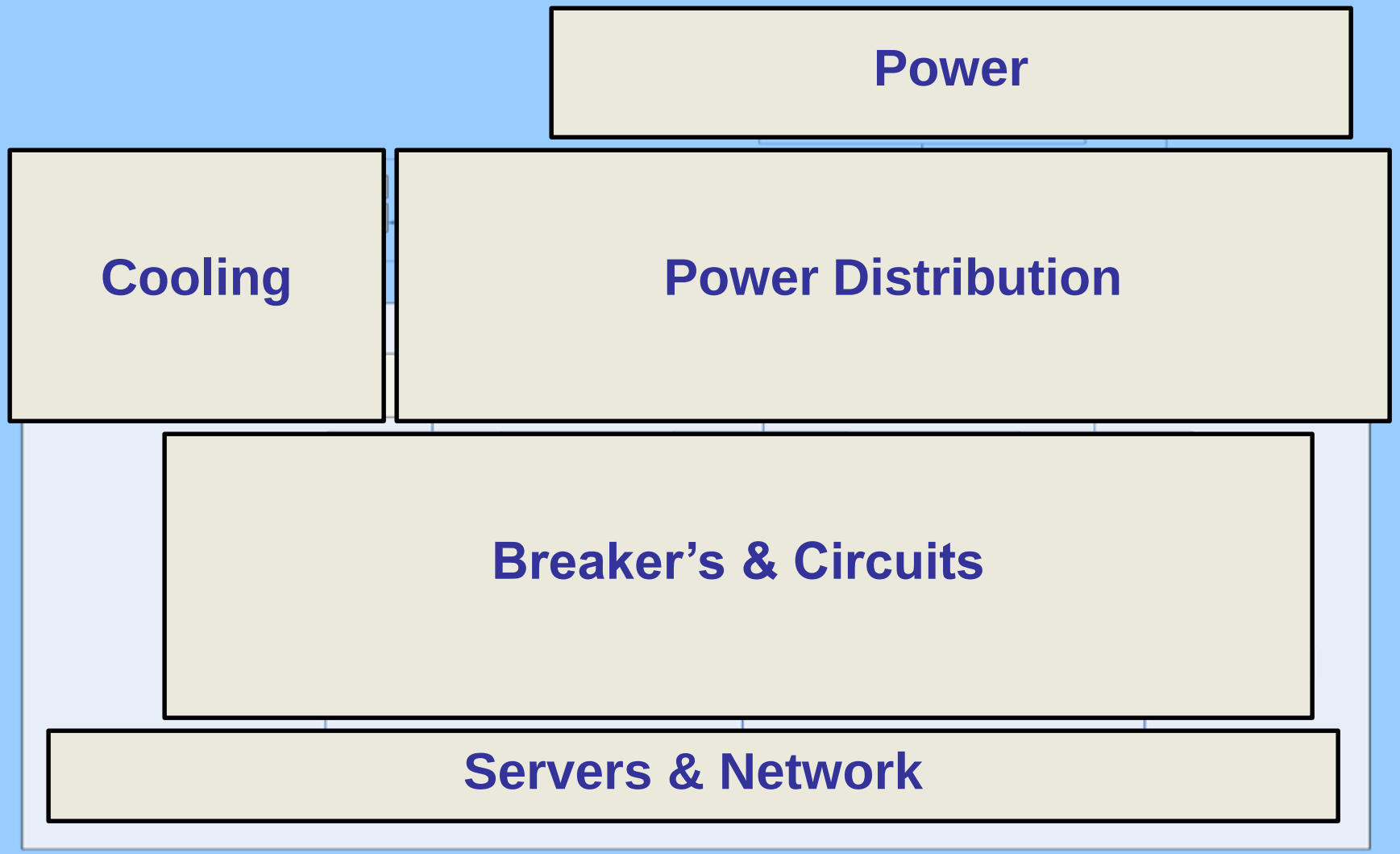
Data Centers – The "Plant for IT"

- Requires "holistic" monitoring for continuous improvement
- Efficient energy consumption with most profitable outcome
- Identify the bottlenecks
- Treat all individual systems as ONE
- Mechanical, Power, IT and Security as a complete system

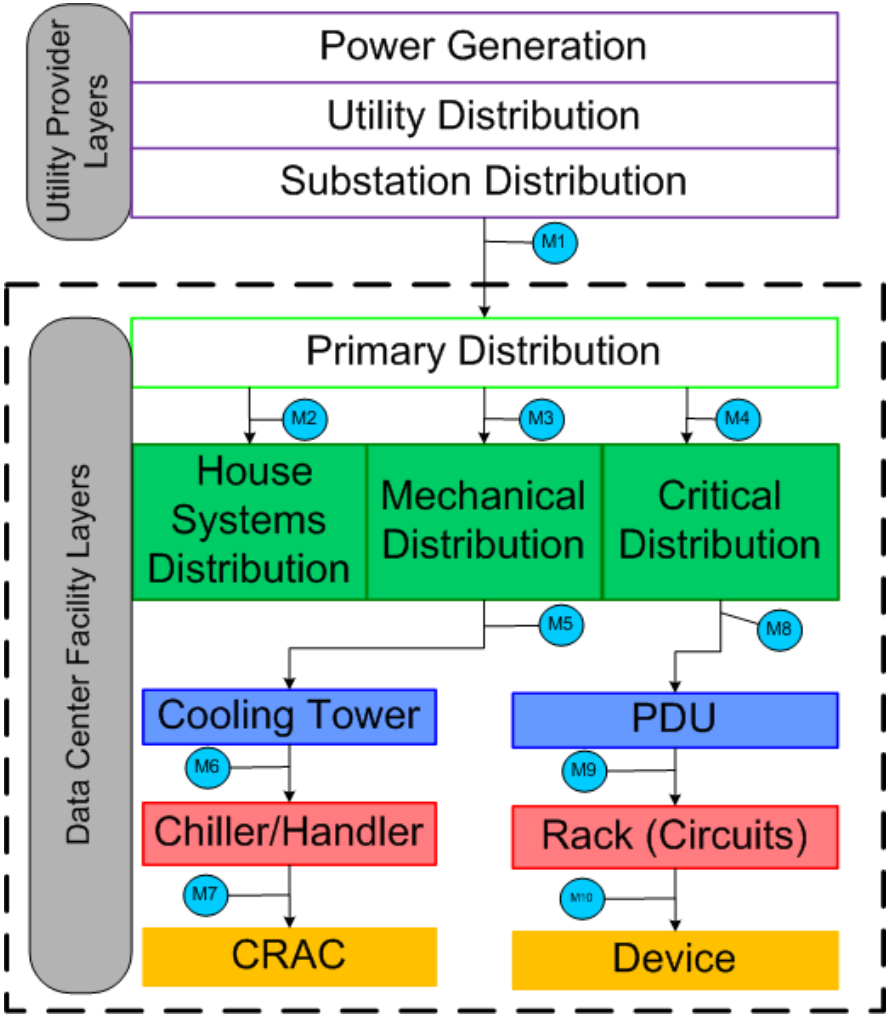




Data Center Layout



Another Perspective…



Measurement ID	Description
M1	Utility Provider Total Power Load Measurement
M2	Power Load for Non-critical systems (lighting, offices, etc.)
M3	Power Load for HVAC and Other Mechanical Systems
M4	Total Power Load for Devices and Other Critical Systems
M5	Cooling Tower Load
M6	Chiller, Air Handler Load
M7	CRAC Unit Load
M8	UPS Load Measurements
M9	Pole, Circuit and Rack Loads
M10	IT Asset

Not Just Servers

UPS

Switch Gear

Chillers

Cooling Towers

Air Conditioners

Pumps

Generators

PDU's

Batteries

Lighting

Servers

Storage

Data Center Power Usage Statistics

- 2005 power usage could supply ~15 million typical households
- Estimated at 56 – 112 Billion kWh
- Represents 1.5% to 3.0% of total US electric sales
- Data Center Energy usage doubled from 2000 to 2005
- Data Center Energy usage expected to nearly double again by 2010
- Gartner – 50% of data centers won't meet their power demands by 2008

Green Grid Study

- The biggest challenge identified by companies was the lack of tools to “monitor and manage” a data center’s energy usage and efficiency.
- Need for tools!
- Lots of (IT) software tools on the market today each with it’s own specialized purpose.
- None look at the big picture.

Why? Because they are all applications and not infrastructure.

PI-Enabled IT Allows You To…

- Understand current power consumption – How close to the “edge” are you?
- Baseline & measure the impact of changes
- Do a better job of trend analysis and capacity planning
- Expose usage to business users
- Get credit for lower overall consumption
- Get useful predictions for expected consumption of equipment, rather than work from ratings on faceplates

PI-Enabled IT Allows You To…

- Integrate IT management and Building Management Systems, and enable remote management
- Understand what IT processes are driving power consumption
- Assess equipment performance and use it to influence vendors and purchase decisions
- Ensure your core business is up and running

Outcomes by Customers … PI in the data center and facilities

- 2 % gain in ability to correctly utilize power for their global Data Center- **Microsoft Data Center Operations**
- Reduced FTE's by eliminating manual entry of data enabling real-time reporting - **IBM RESO group**
- Visibility within IT, Facilities, and Public Works for one version of the truth has reduced down-time through rapid troubleshooting and diagnosis- **US Army, Ft Carson**
- An 8% reduction in IT server energy consumption while maintaining a high service level- **Weill Medical College of Cornell University**
- PI became an essential tool to help us take the right decision and contributes to achieve our goal of a reduction of 2% in energy usage annually- **Cascades Paper**
- The overall impact of the system is that Eastman Kodak was able, "with confidence," to shut down one of the two power plants, leading to savings in the millions of dollars and payback in 24 months.**-Eastman Kodak Company**

Measurement to Value $$$$$

MEASUREMENTS

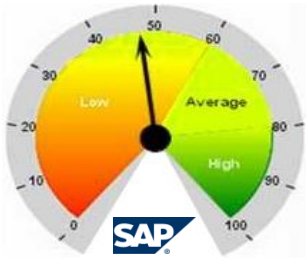
- **IT**
  - Network
    - Device performance
    - NetFlow
    - IP SLA
  - Servers
  - Applications
- **Power**
  - PDU
    - AMP/WATT
  - UPS Batteries
    - Float Voltage
    - Temperature
  - Smart Power Strips
- **Mechanical**
  - Chillers
    - Set points
    - Efficiencies
  - CRAC
    - Humidity
    - Temperature
  - Air Handlers
    - Service hours
    - Efficiency

BUSINESS RULES

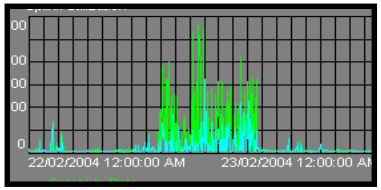
- How are these performing to provised levels?
- What is the capacity? To actual?
- Slow response times drive down productivity.
- Network failure (router or switch) drives transaction Rate to zero.
- .CPU per KW used “Useful work”
- What is our ability to handle a failure at peak loads?

KPI

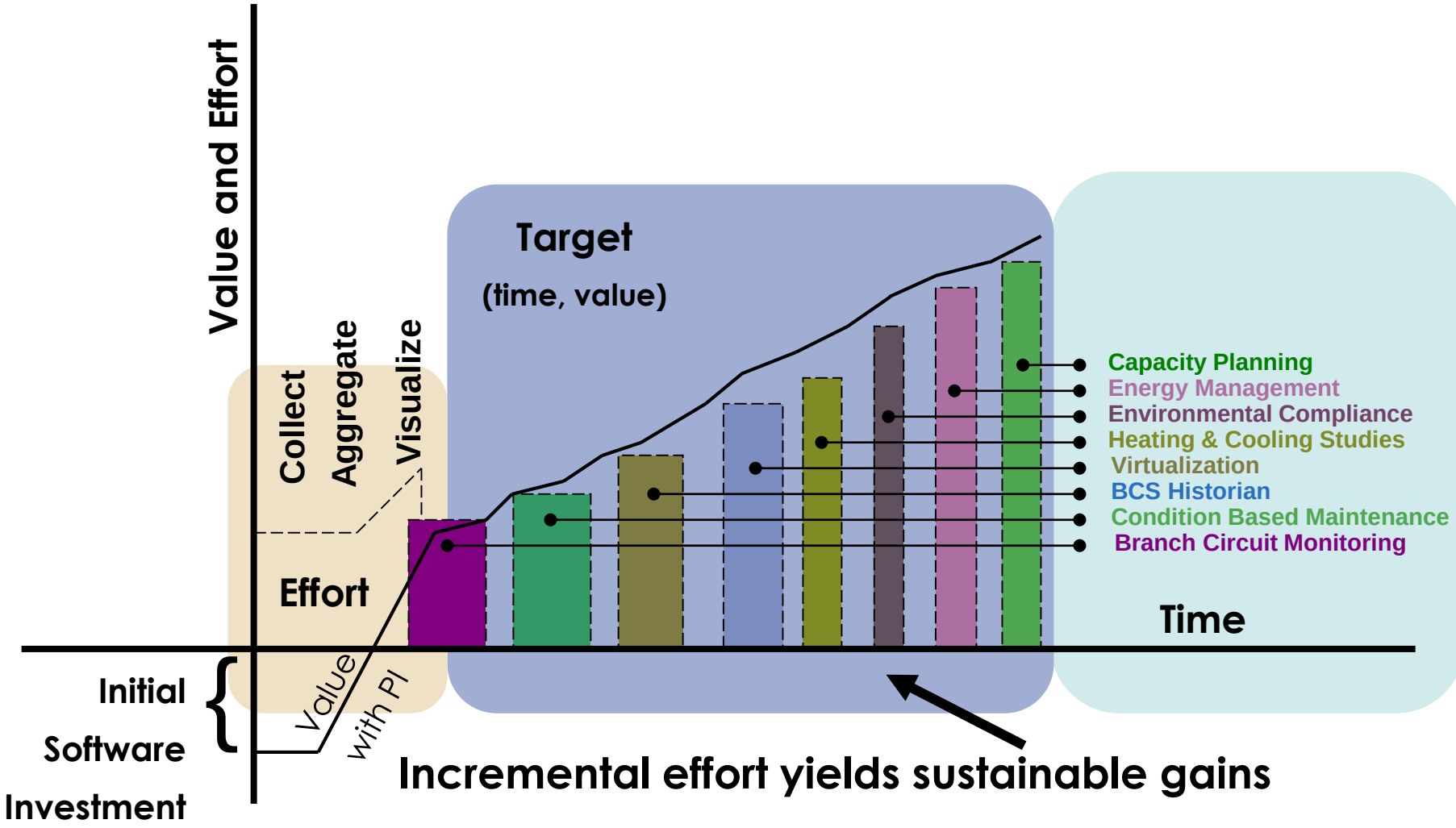
- Calculations based on actual experience
- SLA Indicators



- Display real-time and historic



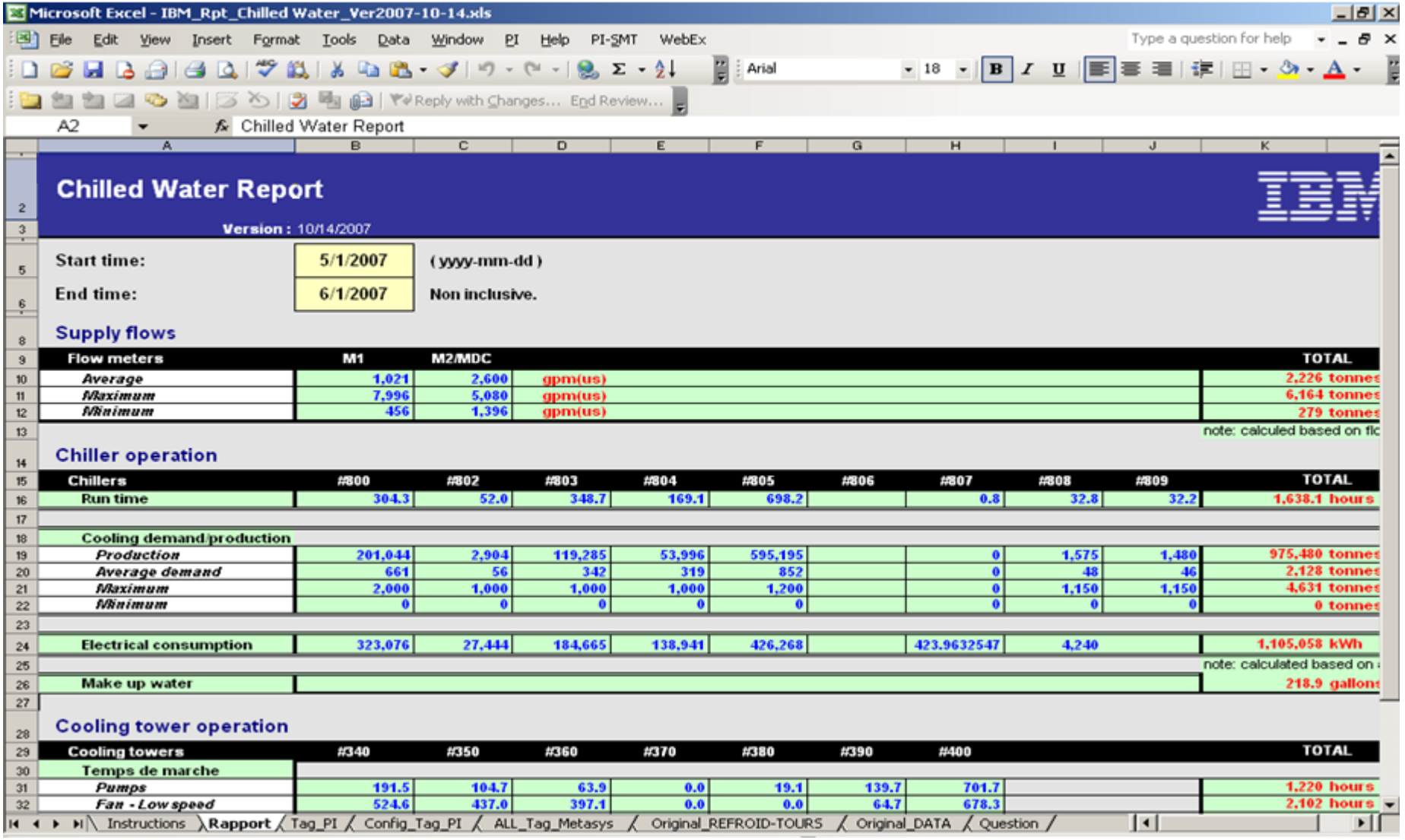
Value Now, Value Over Time…



How?

- Slides are boring…
- A picture is worth a thousand words…
- I have 11 pictures…do the math!

DataLink Reporting



Microsoft Excel - IBM_Rpt_Chilled Water_Ver2007-10-14.xls

File Edit View Insert Format Tools Data Window PI Help PI-SMT WebEx

Type a question for help

Arial 18 B I U

Reply with Changes... End Review...

A2 Chilled Water Report

Chilled Water Report

IBM

Version : 10/14/2007

Start time:	5/1/2007	(yyyy-mm-dd)
End time:	6/1/2007	Non inclusive.

Supply flows

Flow meters	M1	M2/MDC		TOTAL
Average	1,021	2,600	gpm(us)	2,226 tonnes
Maximum	7,996	5,080	gpm(us)	6,164 tonnes
Minimum	456	1,396	gpm(us)	279 tonnes
				note: calculed based on flo

Chiller operation

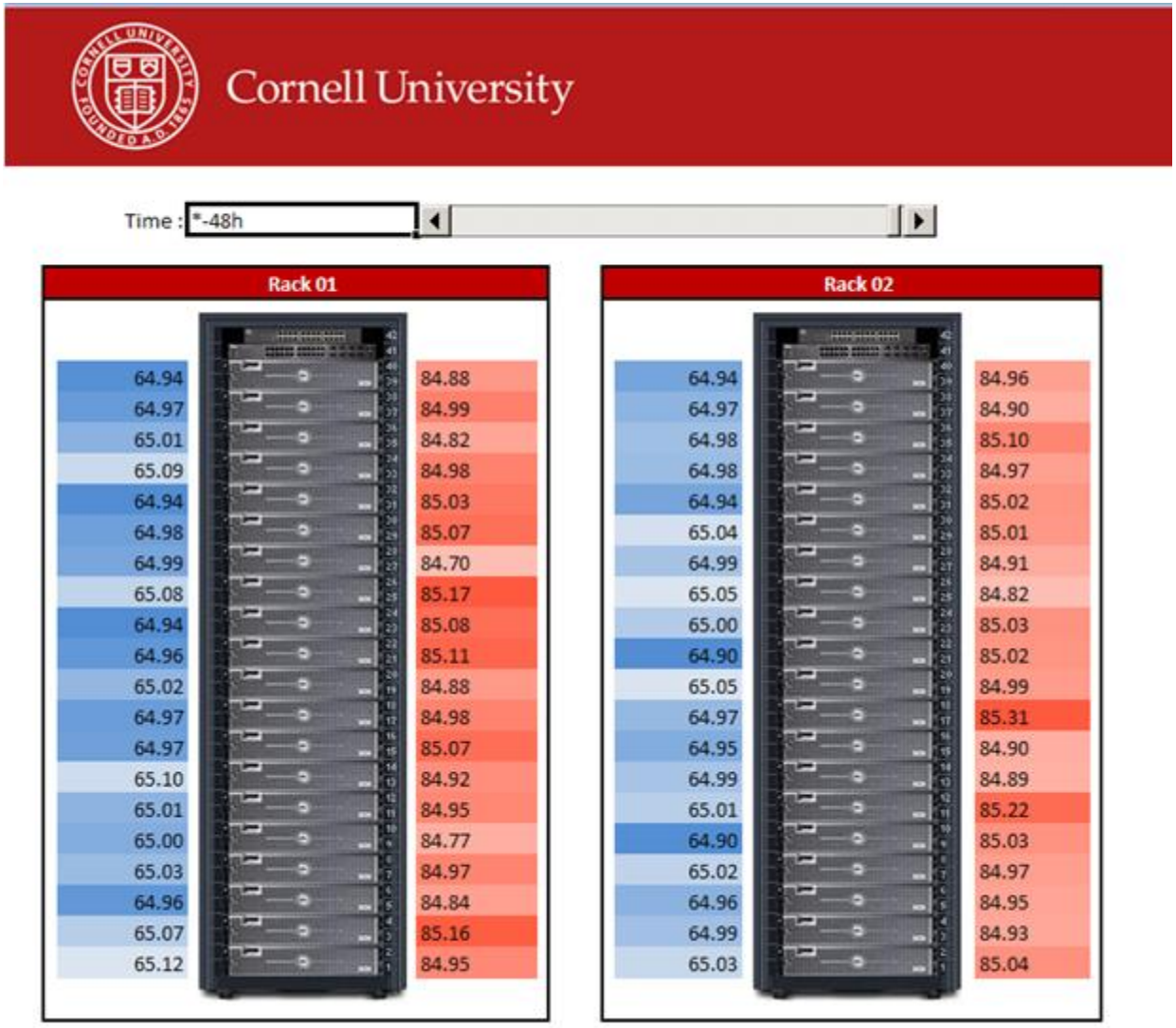
Chillers	#800	#802	#803	#804	#805	#806	#807	#808	#809	TOTAL
Run time	304.3	52.0	348.7	169.1	698.2		0.8	32.8	32.2	1,638.1 hours
Cooling demand/production										
Production	201,044	2,904	119,285	53,996	595,195		0	1,575	1,480	975,480 tonnes
Average demand	661	56	342	319	852		0	48	46	2,128 tonnes
Maximum	2,000	1,000	1,000	1,000	1,200		0	1,150	1,150	4,631 tonnes
Minimum	0	0	0	0	0		0	0	0	0 tonnes
Electrical consumption	323,076	27,444	184,665	138,941	426,268		423.9632547	4,240		1,105,058 kWh
										note: calculated based on
Make up water										218.9 gallons

Cooling tower operation

Cooling towers	#340	#350	#360	#370	#380	#390	#400	TOTAL
Temps de marche								
Pumps	191.5	104.7	63.9	0.0	19.1	139.7	701.7	1,220 hours
Fan - Low speed	524.6	437.0	397.1	0.0	0.0	64.7	678.3	2,102 hours

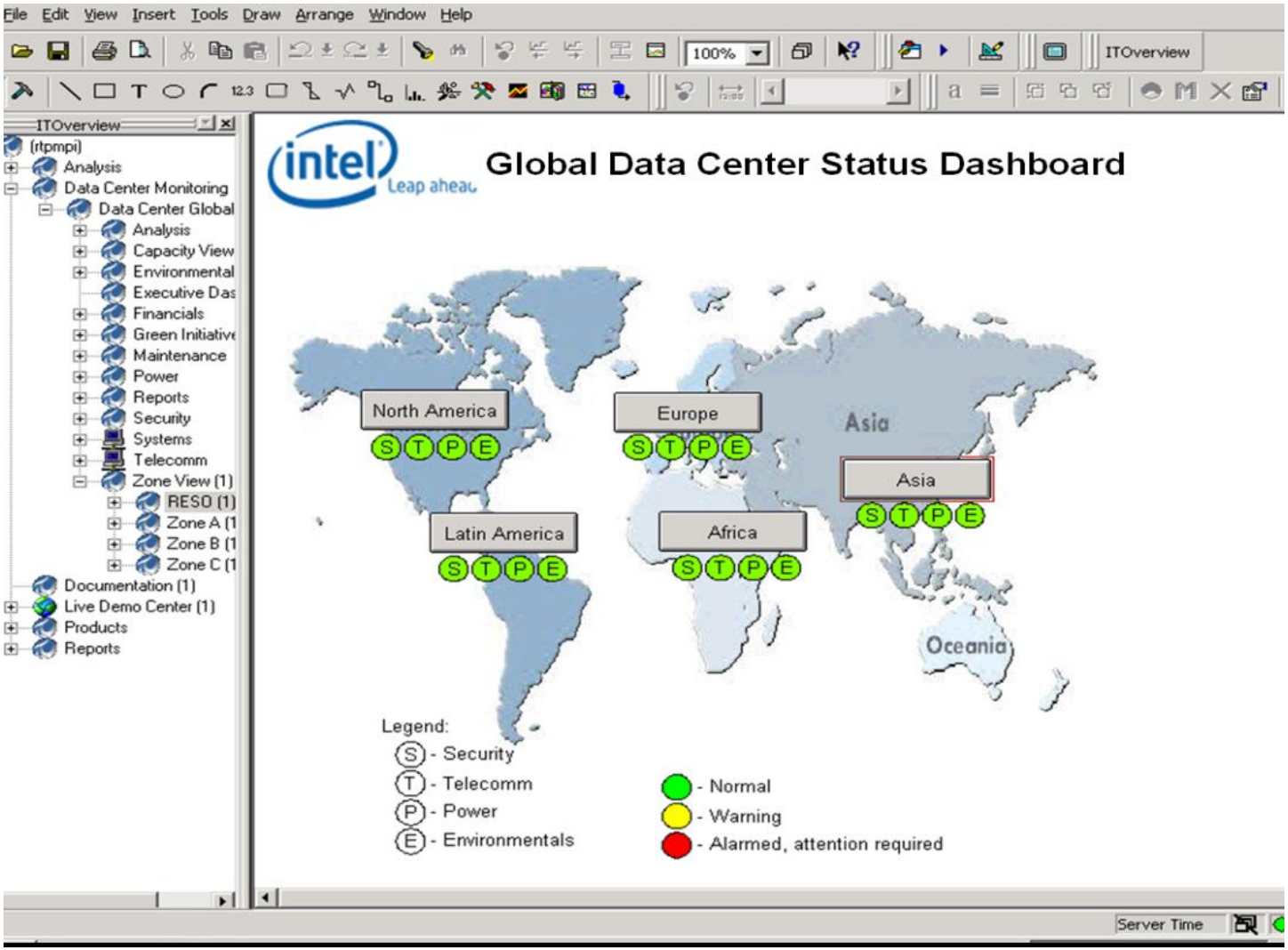
Instructions | Rapport | Tag_PI | Config_Tag_PI | ALL_Tag_Metasys | Original_REFROID-TOURS | Original_DATA | Question

DataLink Reporting

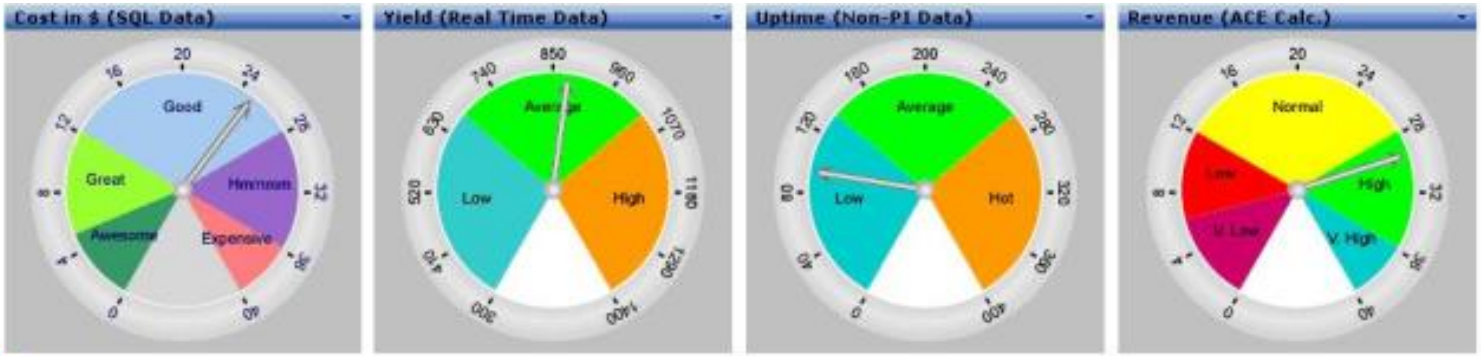


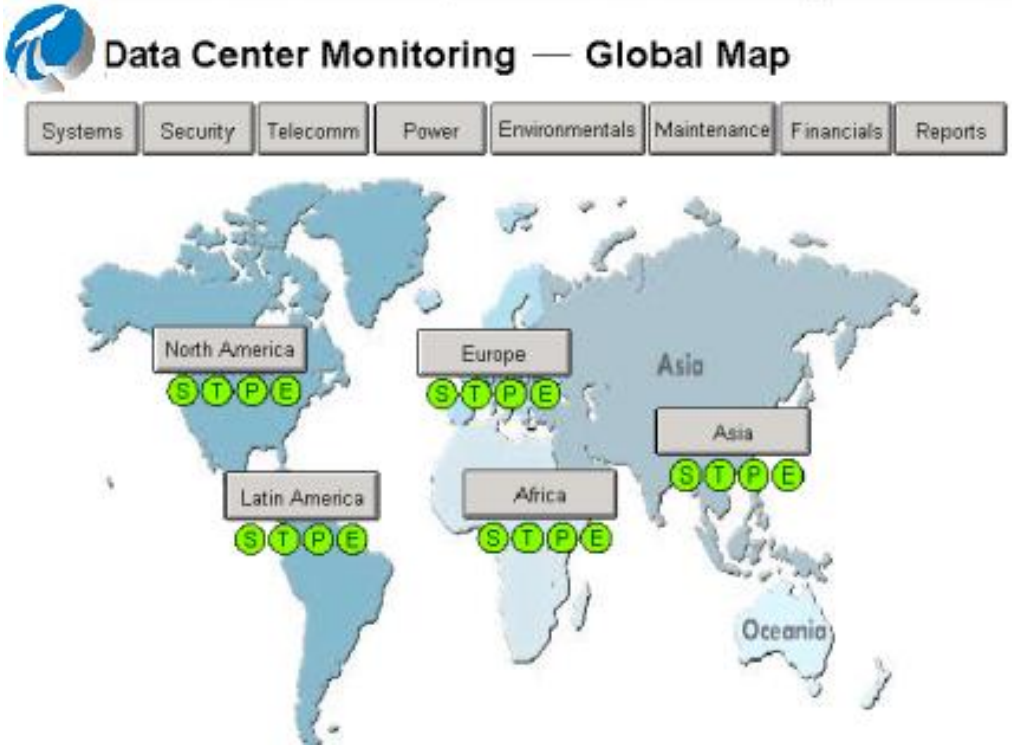
- Monitor server temperatures
- IPMI data via XML interface
- Native IPMI interface coming soon

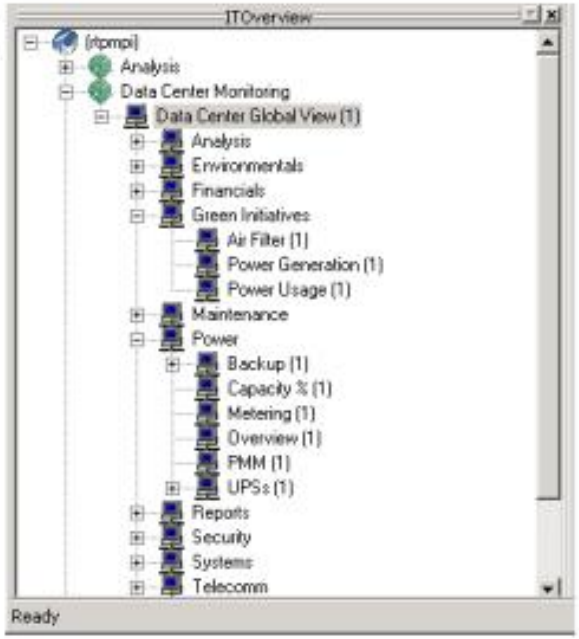
ProcessBook – High Level Dashboard



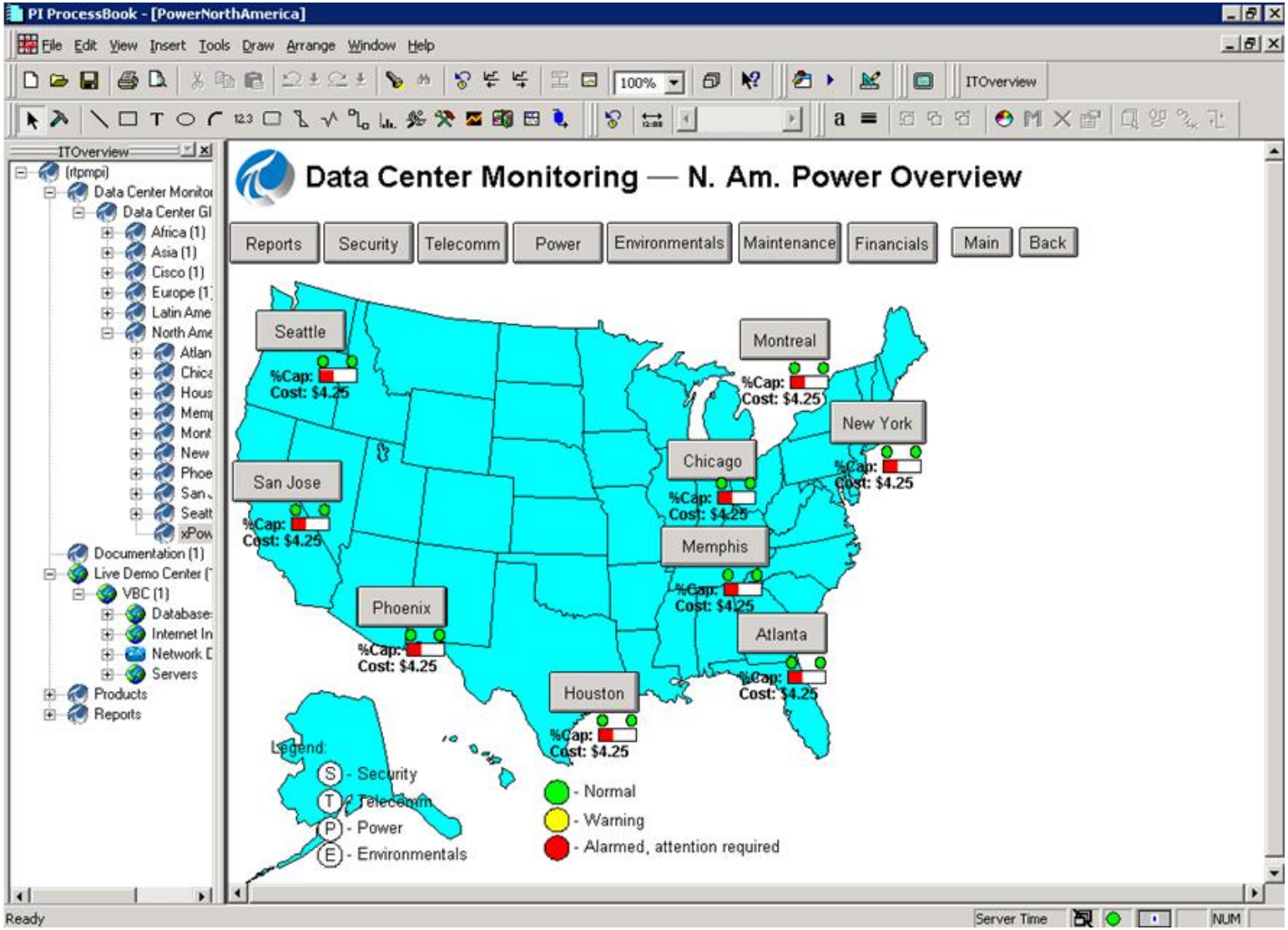
RtWebParts – High Level Dashboard



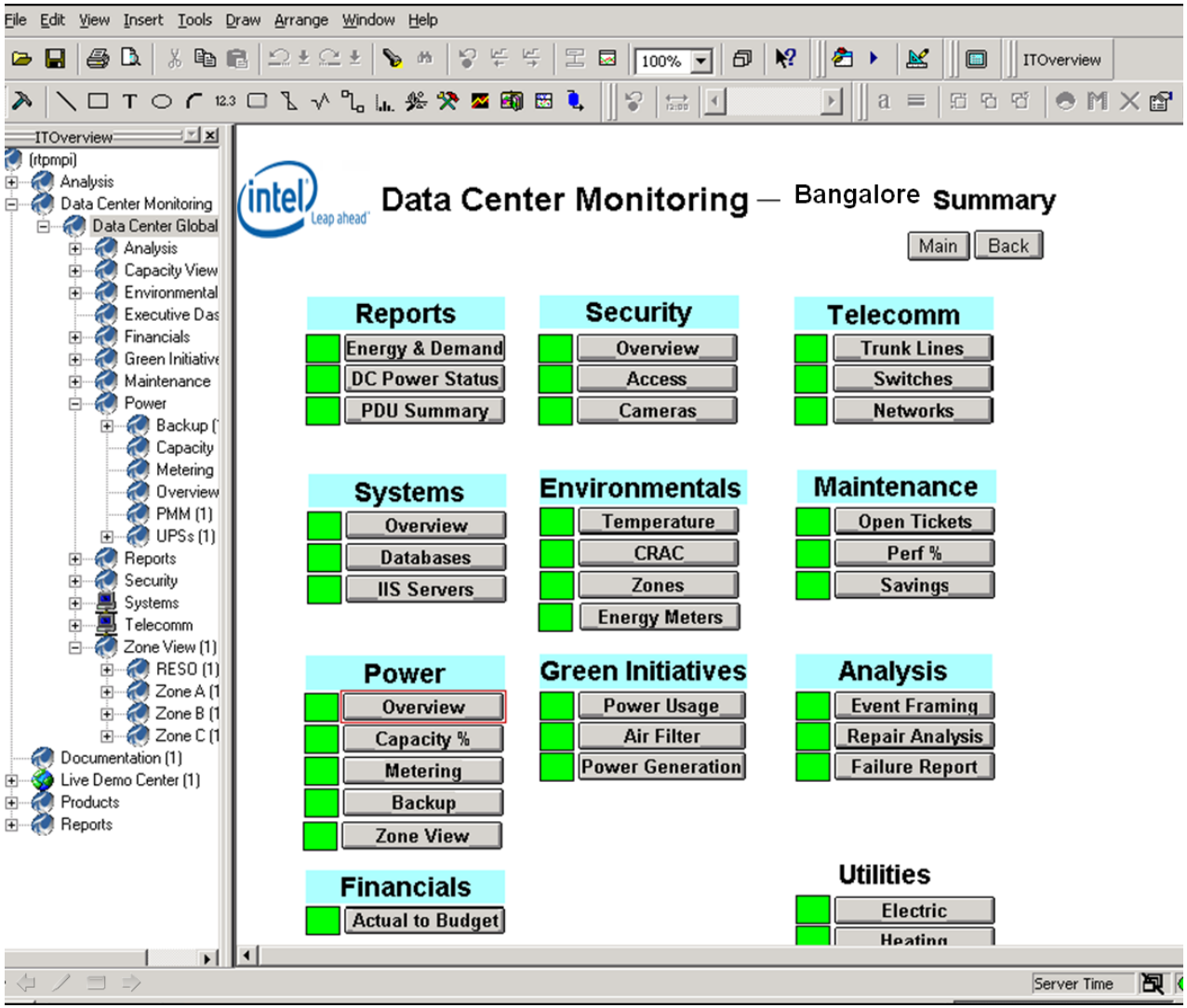




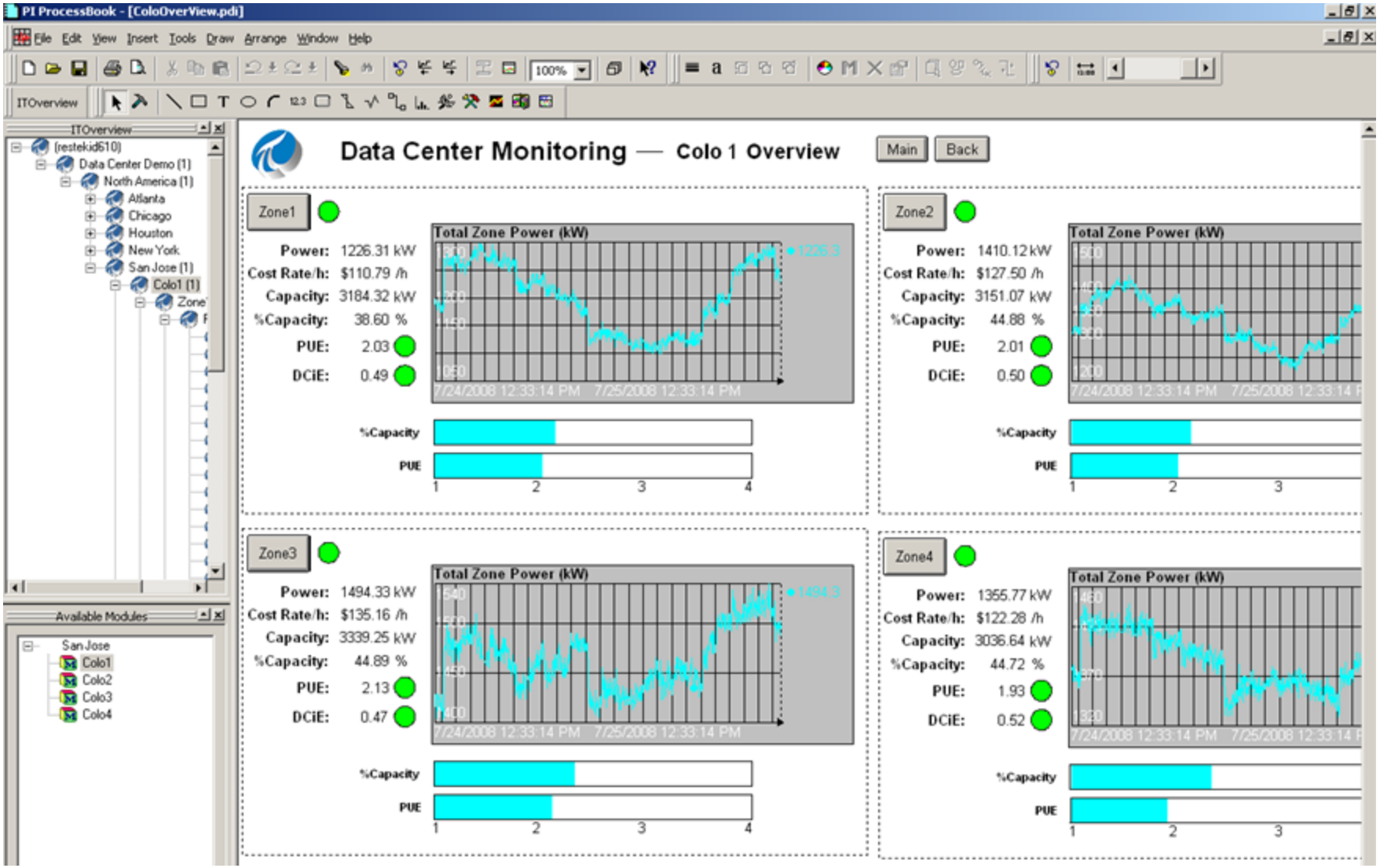
ProcessBook – North America Overview



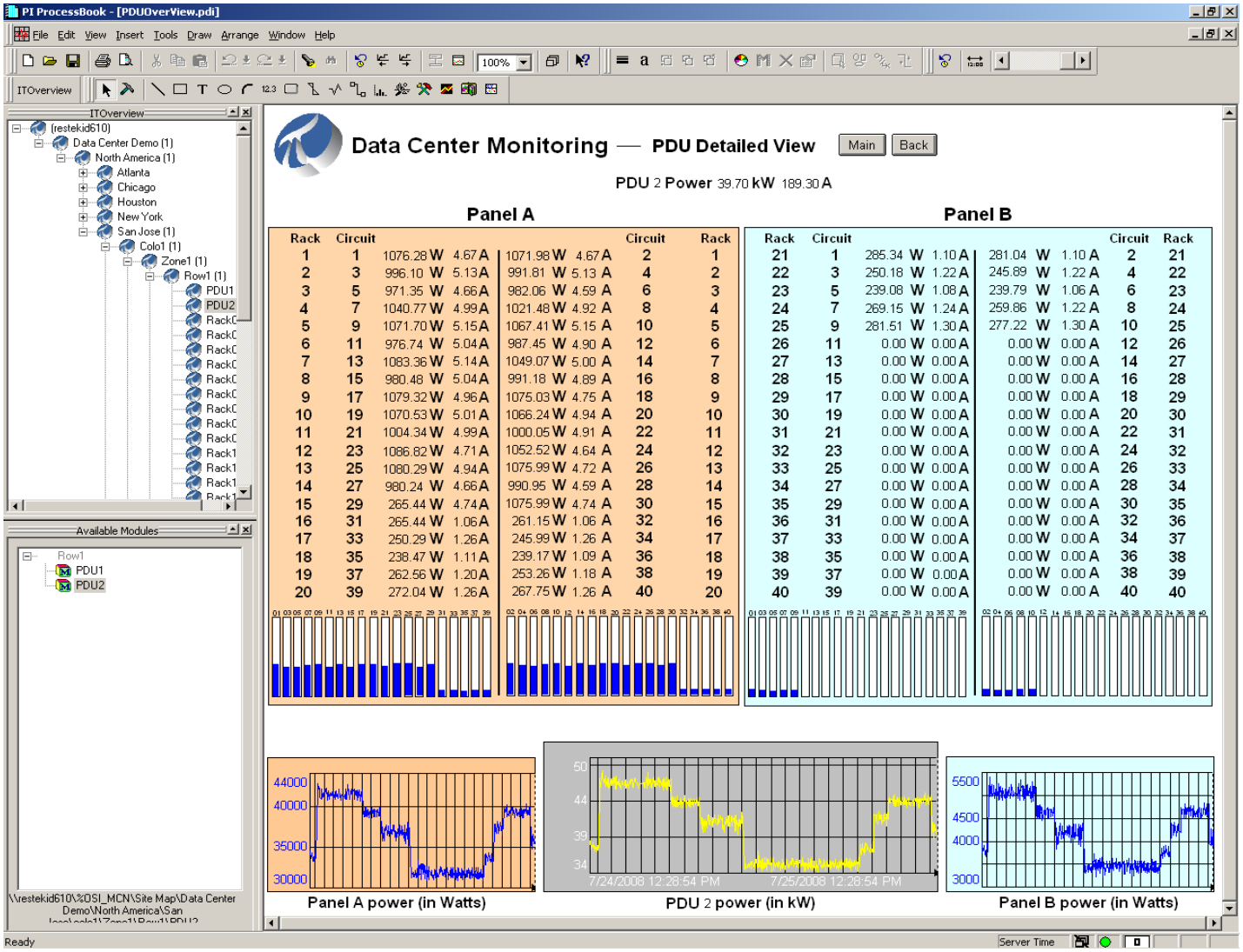
ProcessBook - Drilldown



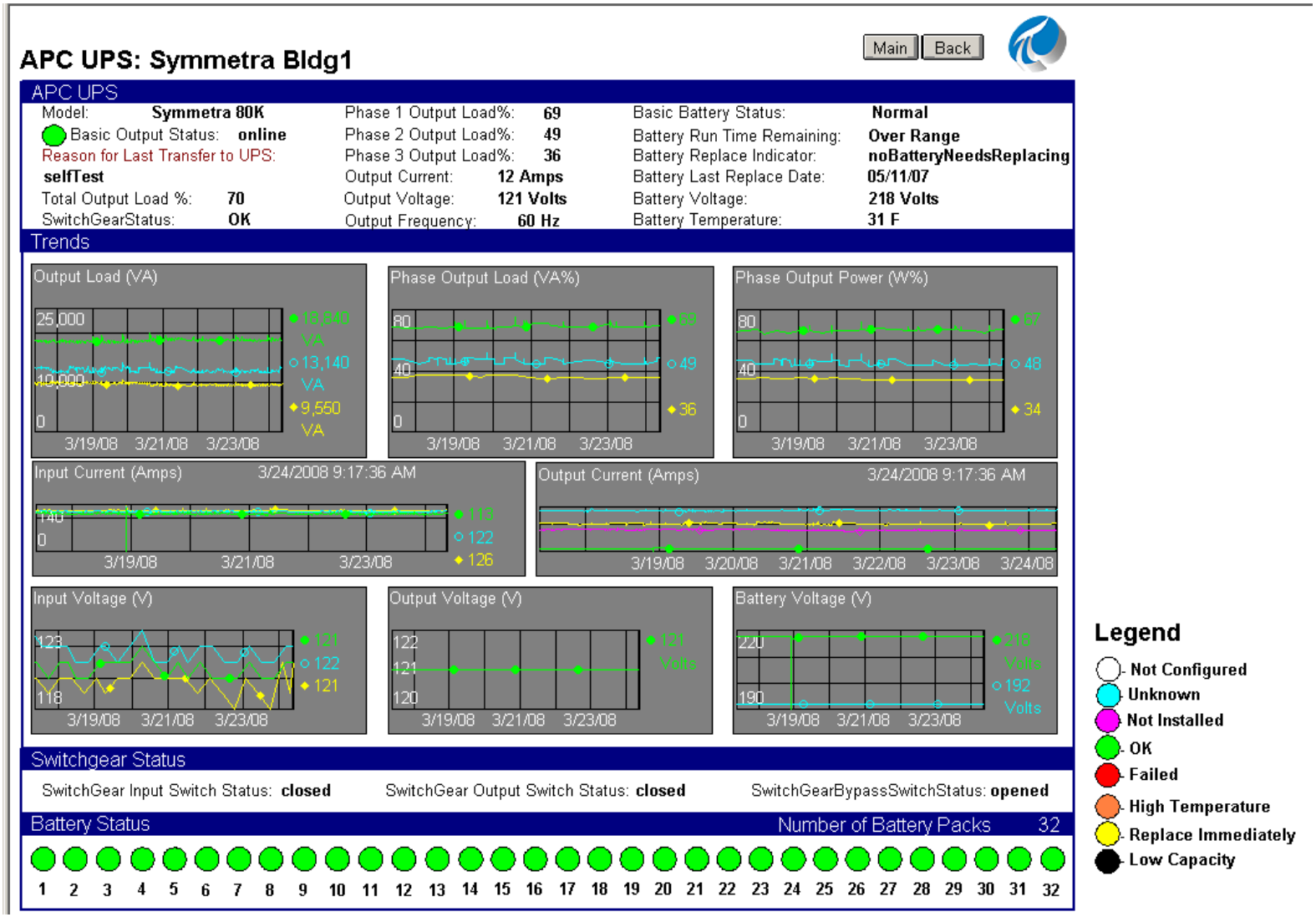
ProcessBook – Power Usage



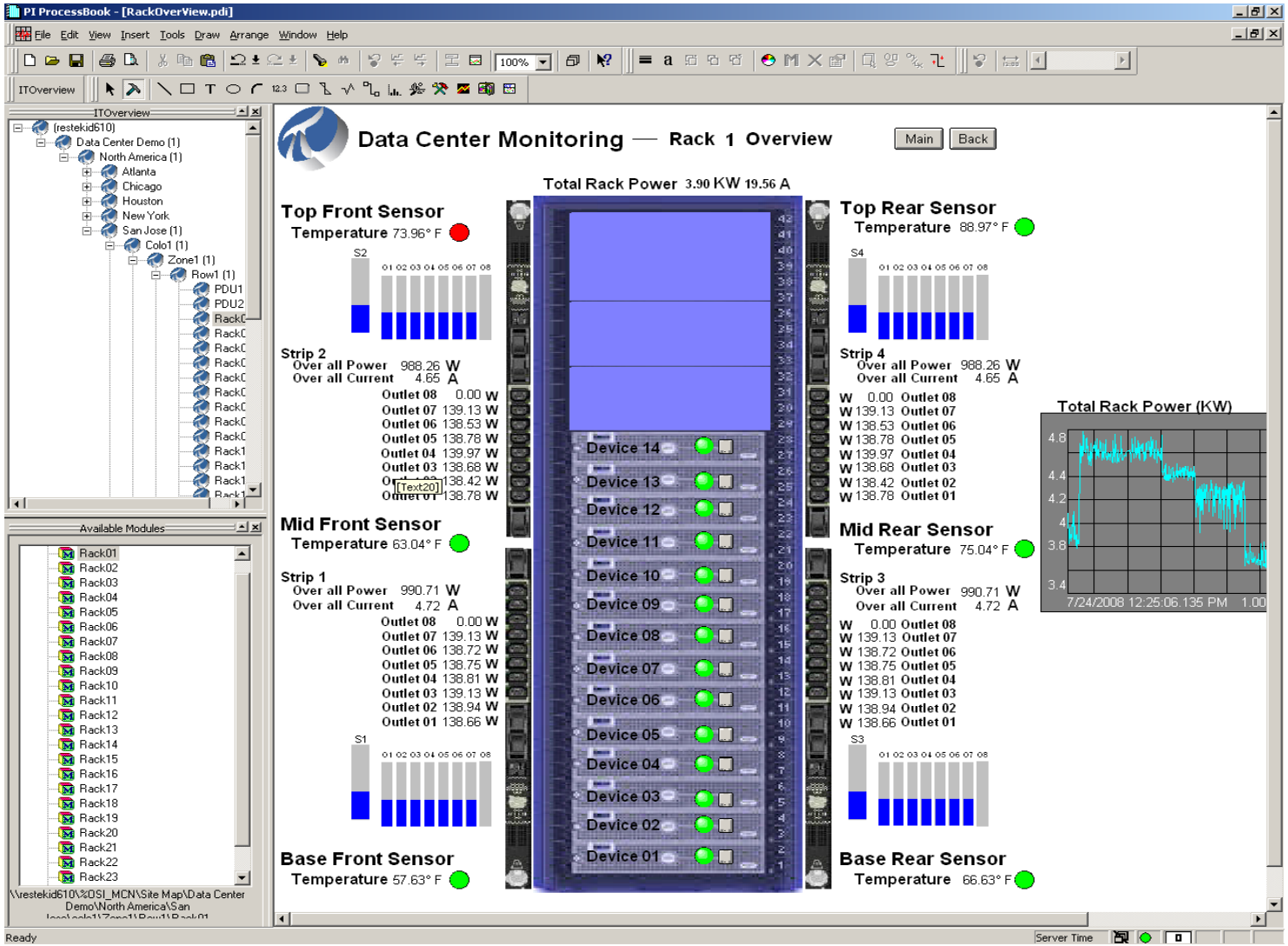
ProcessBook – PDU Detail



ProcessBook – UPS Detail

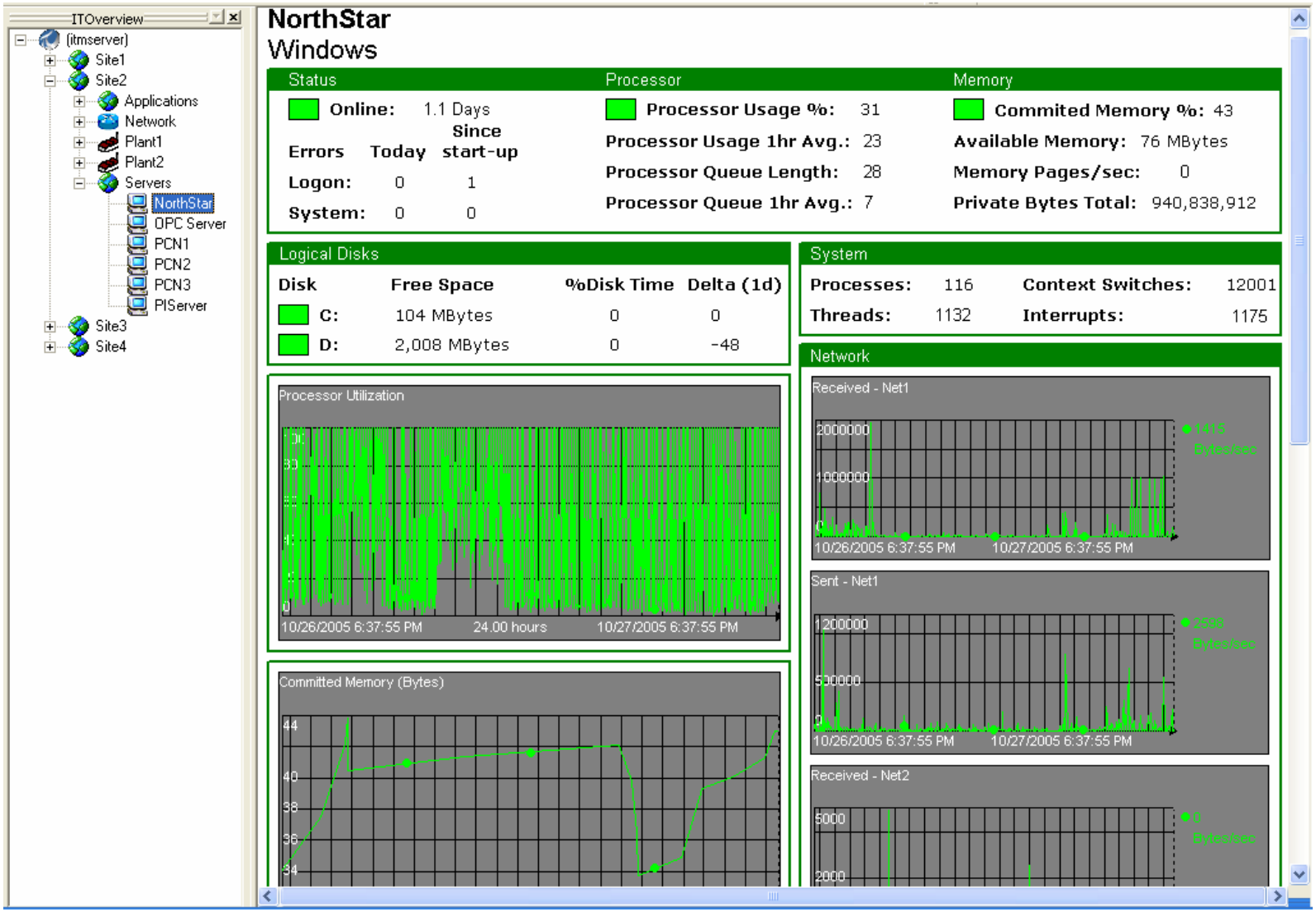


ProcessBook – Rack Detail



- Power
- Temperature
- Humidity
- Capacity

ProcessBook – IT Data



Call To Action

- Leverage PI for your IT / Facilities environment
- Baseline today
- Understand your infrastructure and power usage
- Make improvements and gain efficiencies
- Become **green**…. Save money
- **Apply the PI System (infrastructure) you use to run your business…**

  …to the infrastructure your business relies on to run.

OSIsoft®

USER CONFERENCE

2008

AMSTERDAM

THANK YOU