



The Next Trend?



IEEE Music City Power Quality Meeting - Central Tennessee Section

August 14, 2013 - Mark Welsko, P.E. - Director , Mission Critical Design

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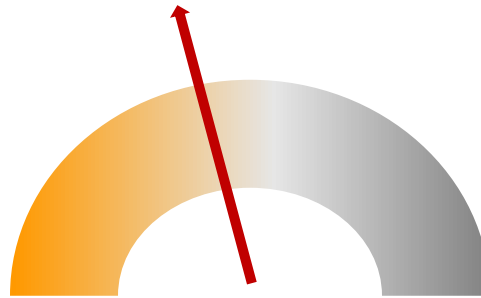
Blue Bell, Pennsylvania, 19422-0440 USA

- Over 30 Years Experience in DC Industry with several thousand engagements performed in over 40 countries.
 - Assessment & Inspection
 - Monitoring & Support
 - Mission Critical Design
 - Decontamination & Remediation
 - Training & Certification
- Corporate Philosophy
 - Optimize Existing
 - Design New to Minimize Costs & Maximize Availability



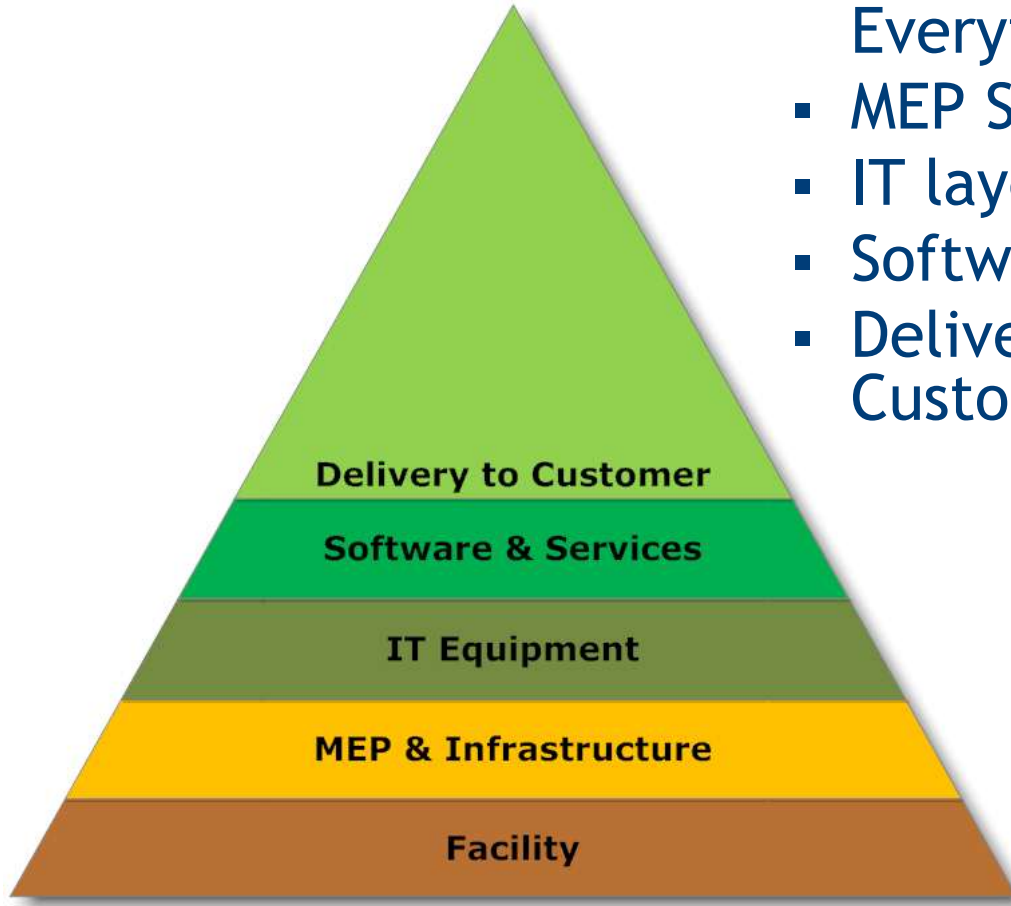


- What is DCIM?
- Is it wrong with how it's done today?
- What Drivers Change it for tomorrow?

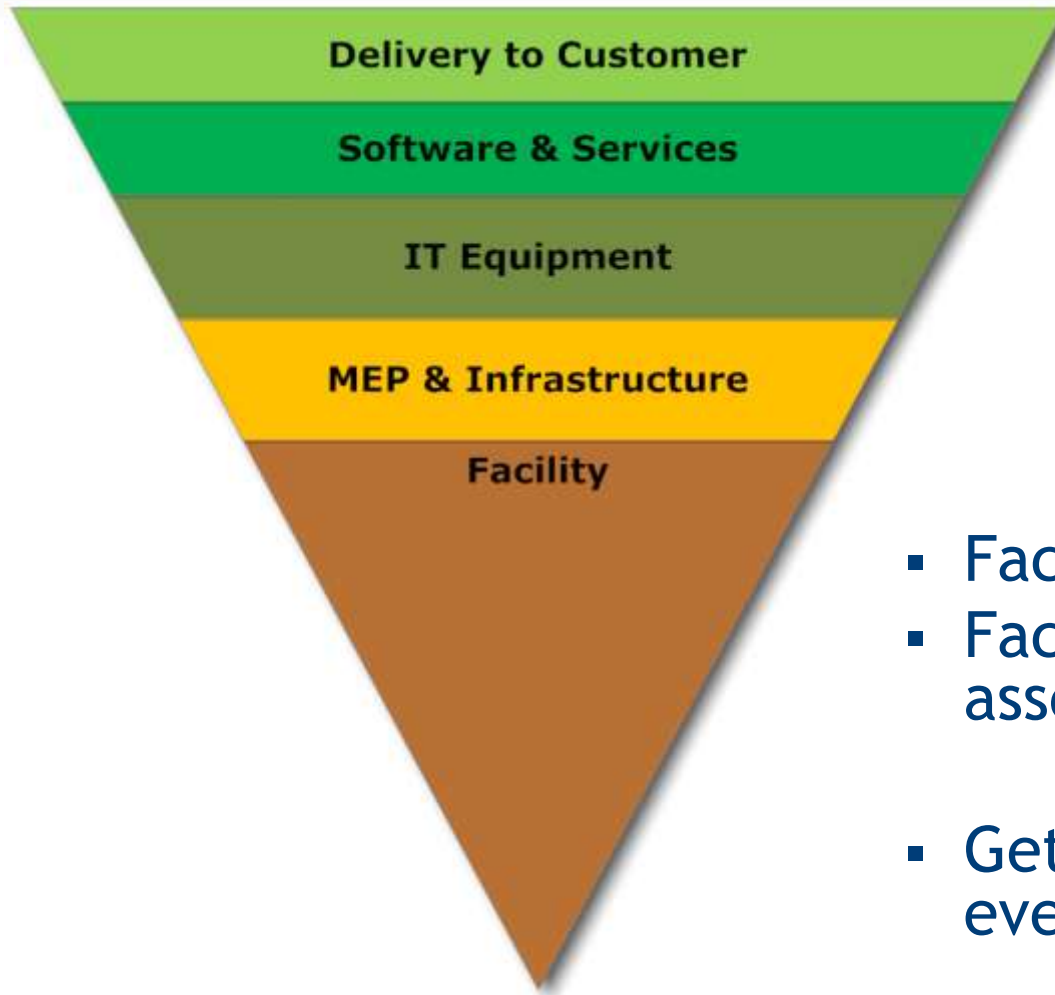


Organizationally Defined Blended Purpose

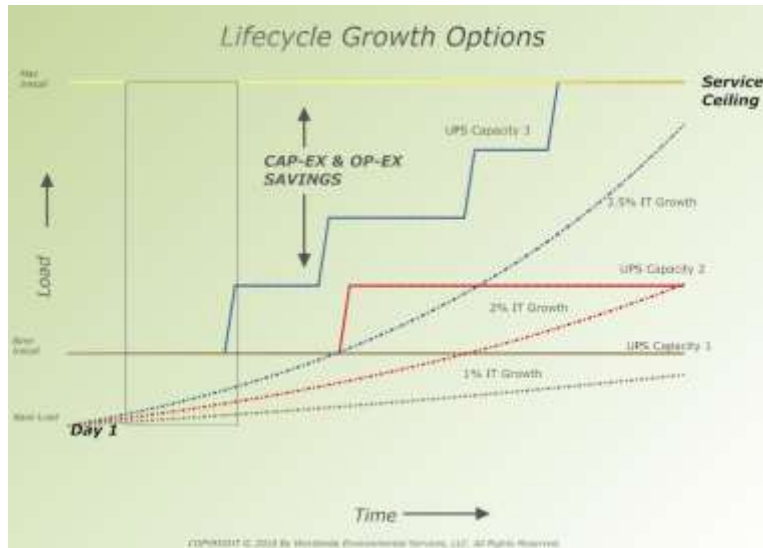
- Information Assets - Access/Protection
- Provide Revenue (Direct/Indirect)



- Facility is the Base for Everything
- MEP Systems Layer on facility
- IT layers on MEP
- Software/Services layers on IT
- Delivery of Services to Customer

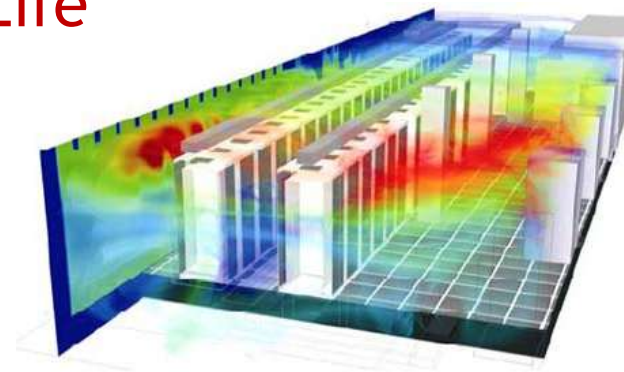


- Facility is the Base
- Facility is the least cost asset
- Get it Wrong and everything falls over fast.



- Calculations are based upon full load characteristics.
- Cooling is evaluated for a point in time at design conditions.
- Life Cycle estimates look at full utilization.
- Efficiency against deployment is often neglected.

Most DC's Designed for End of Life



DCIM has always been with us - the tools are maturing

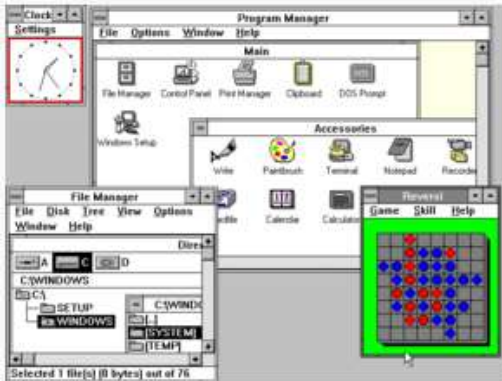
- ✓ Density and Air Cooling - Circa 1992
- ✓ Multi Vendor Servers - Circa 1996
- ✓ 5 Nines - Drive to Always On - Circa 2000
- ✓ High Density - Circa 2004
- ✓ PUE and Energy is King - Circa 2008
- ✓ Automation meets DCIM - Circa 2012



Technology 20+ Years Ago



- [AMD](#) introduces the AM386 microprocessor family in March, Intel i486SX in April.
- [Symantec](#) first release of Norton anti-virus software.
- The domain [microsoft.com](#) comes online May 2, 1991.
- [MS-DOS](#) 5.0 was released.
- Broadband did not exist.
- PCs had 20-40MB Hard Drives. Data Centers had 500MB of storage.
- Founders of Google would not meet for 4 more years.
- Mainframes Ruled the Whitespace



Screenshot of Windows 3.0



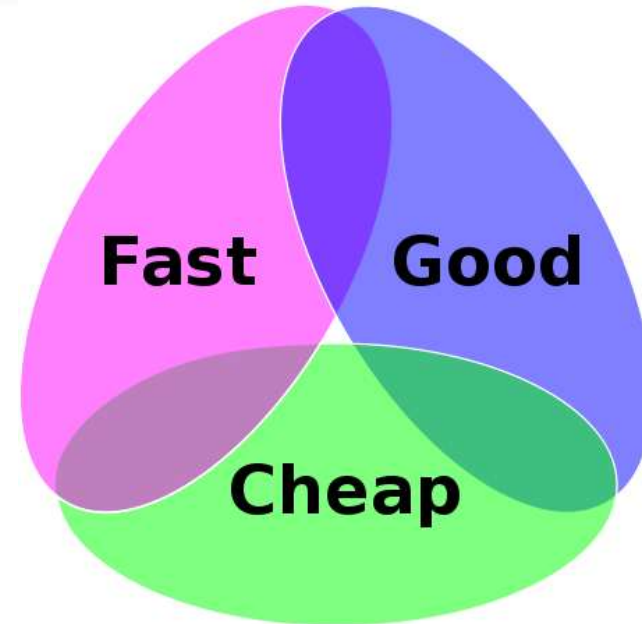


- Single Vendor
- Low Changeover
- Lower Density
- Vendor Furnished Equipment cabinets

Industry spent the 90's rebuilding for the server environment, and the early 2000's trying to fill the overbuilt environment.

*18-24 Months to deliver
me a Data Center,
We need it . .*

- Flexible
- Faster
- Cheaper
- Better



*Can we have it all?
Does the old adage
of “pick any two”
Still apply?*

- Designed to be concurrently maintainable with high availability.
- Capital Efficient
- Designed for Flexibility/Growth
- Designed for Scalability
- Incorporates ECO elements
- Simplify New IT technology deployment - Big Data, unknown future.
- CAPEX/OPEX Struggle.



- Facility should not limit Business
- Racks counts can grow independent of Core Services
- KW & BTUh capacity can be delivered where it is needed when it is needed, avoid stranded capacity without increase in risk.
- Facility may have different availability requirements by area.



HP Moonshot System

Contact us

Share

Compared to traditional servers, up to:

89% less energy *

80% less space *

77% less cost **

97% less complex *

Speed, Scale and Specialization

The HP Moonshot System is like nothing else that exists today. It's a huge leap forward in infrastructure design that addresses the speed, scale, and specialization needed for a "New Style of IT."

HP Moonshot web servers are designed and tailored for specific workloads to deliver optimum performance. These low power servers share management, power, cooling, networking, and storage. This architecture is key to achieving 8x efficiency at scale*, and enabling 3x faster innovation cycle.



[View products](#)

"With nearly 10 billion devices connected to the internet and predictions for exponential growth, we've reached a point where the space, power, and cost demands of traditional technology are no longer sustainable. HP Moonshot marks the beginning of a new style of IT that will change the infrastructure economics and lay the foundation for the next 20 billion devices."

Meg Whitman
President and CEO, HP

Mainframe



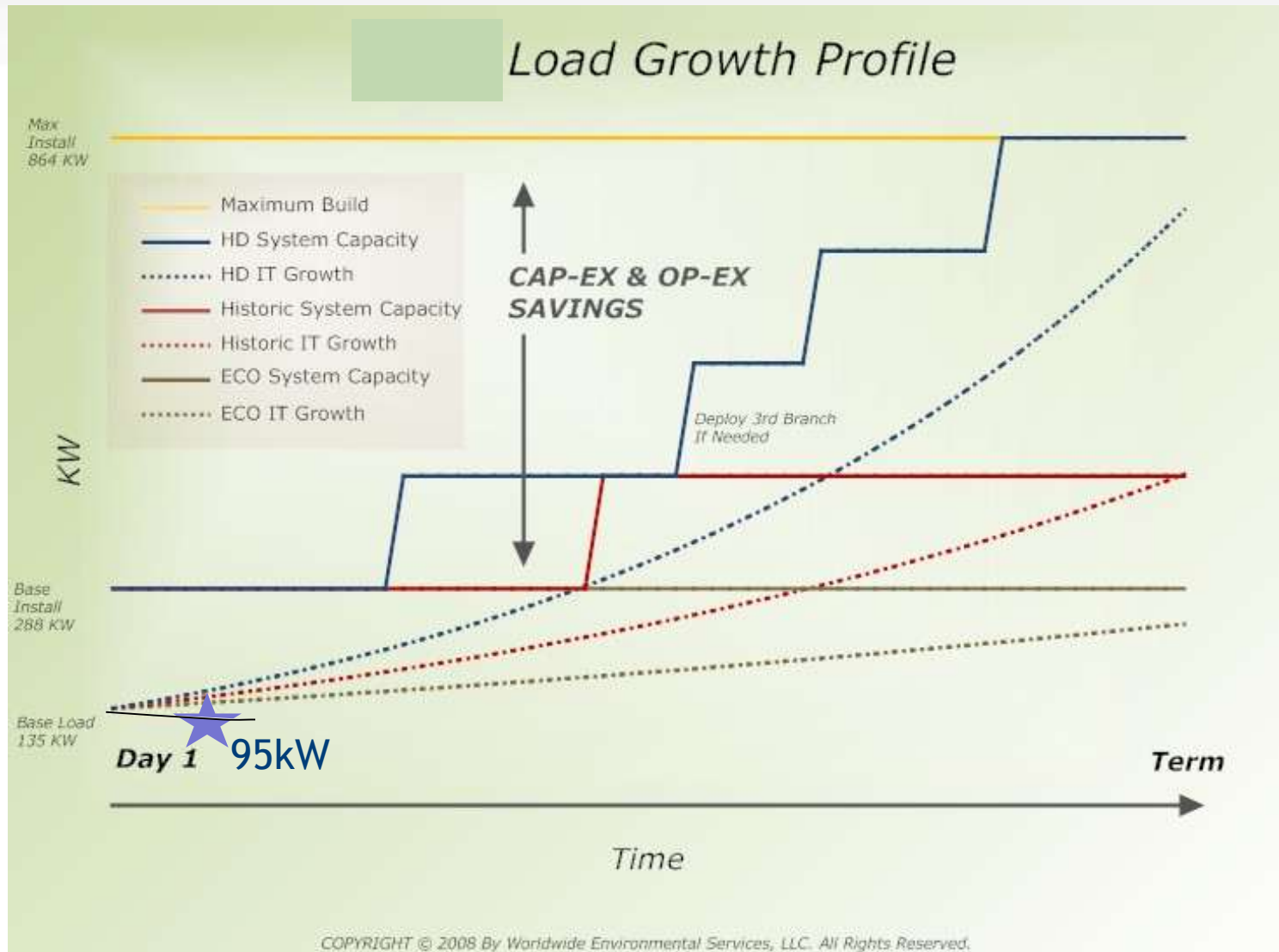
Server



Blade



Software



“In 2012, the DCIM market generated around \$429M in revenue and had record demand in the first quarter of 2013.” Furthermore, DCIM sales are expected to grow 42% to reach \$1.8B in aggregate revenue by 2013.” – 451 Research

“DCIM tools and processes will become mainstream in data centers, growing from 1% penetration in 2010 to 60% in 2014.” – Gartner Research

ComputerWeekly.com

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Home > Topics > Data centre > Data centre systems management > Another datacentre infrastructure management (DCIM) tool

NEWS

Another datacentre infrastructure management (DCIM) tool hits the market

Archana Venkatraman 
Monday 13 May 2013 12:20

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- Fastest Growing Section of the Data Center Market Place \$ \$ \$ \$.
- Well over 100 Vendors Claiming DCIM Solutions and/or components and growing daily.
- Hardware Vendors Offering DCIM Suits.
- Data Center Managers are demanding it.
- Information is widespread.



Confused !





- Data Center Manager (Bottom up)
 - Maximize Space, Power, & Cooling
 - Improve Availability
 - Improve Efficiency
 - Future Plan Projects/Deployments
- Exec's & C Levels (Top Down)
 - KPI's & Analytics
 - Strategies to Actions
 - Performance Improvements
 - Business Process Improvements

Where the DCIM Focus starts will drive the initial system definition and deployments methodologies

- Energy & Operations
- Availability
- Risk Compliance
- Service Management
- Asset/Supply Chain
- IT Automation
- Static to Full 3D Live Modeling



Organization
Specific KPI's
Records and High
Level Presentations



- What Perspective are you coming into the issue?
- What will be the Primary Motivator for Sponsorship in your organization?
- What immediate needs will this solve?
- How large of a initial deployment are you willing to support to understand your above assumptions?

- How can this system grow from initial deployment to meet all needs?
- What components may push themselves towards second order deployment?
- How can this grow both Geographically and in Scope?
- Will the data repository allow for access via other systems and tools?



- Understand whether your organization must competitively bid a solution or work with a single vendor for a defined solution.
- Project Origination Documents must have clear definition as to intent and purpose to obtain comparable results from various vendors.
- Spend time with Solution Providers and Vendors of products to understand the strengths of each. Integrated approaches can be very successful if the needs are understood and can be deployed over time.

- KPI & Records Centric Approach
- Assets and Space Plan Centric Approach
- Availability and Efficiency Approach



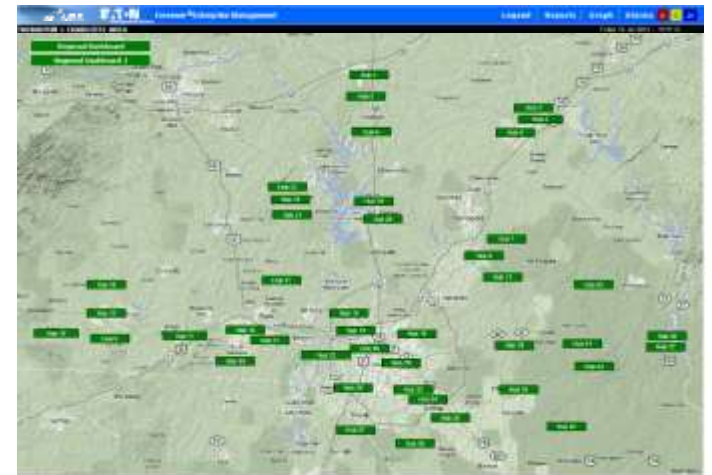
Each approach has a different start point but most of the underlying data and acquisition can be shared over time.

Protect Customer Services from Source to Edge

- Scalable/Flexible
- Real Time Data
- Equipment Agnostic
- Uniform Interface
- Monitoring & Trending
- Alerts & Notifications
- Analysis
- Forecasting



- Eaton Foreseer Platform
 - Integration of multi-vendor controllers & devices
 - WES Set-up & Integration
- Data Centers
 - 13 National & Market Centers
 - Expanding by 30% in 2013
- Headends & Hubs
 - 300 remote sites
 - Expanding by 100% in 2013

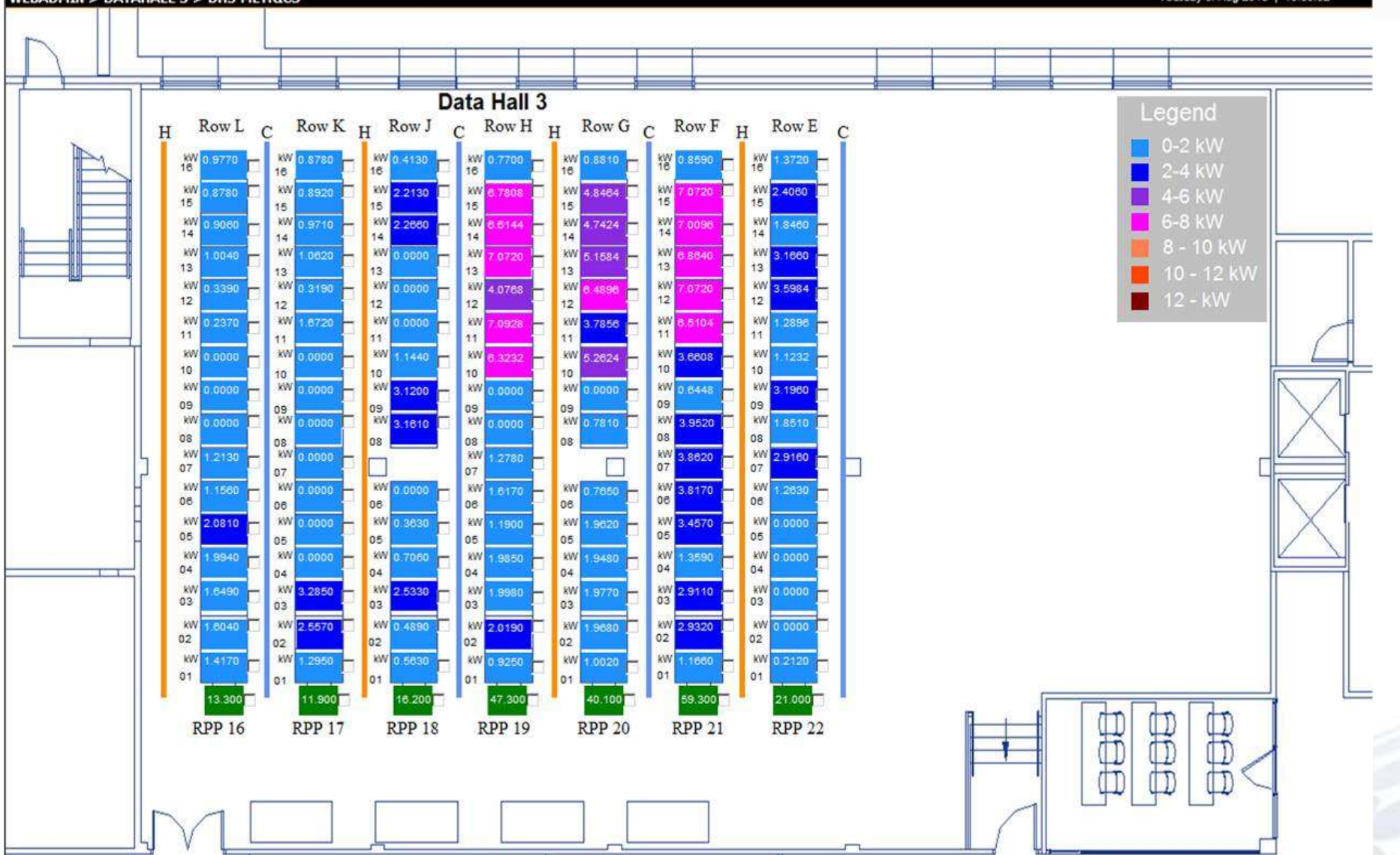


Customized Dashboards and Reporting

- Energy Load Flows
- Capacity Planning
- Utilization Monitoring
- Real-time critical metrics
- Customized notifications, views and reports
 - Technician
 - NOC
 - Management



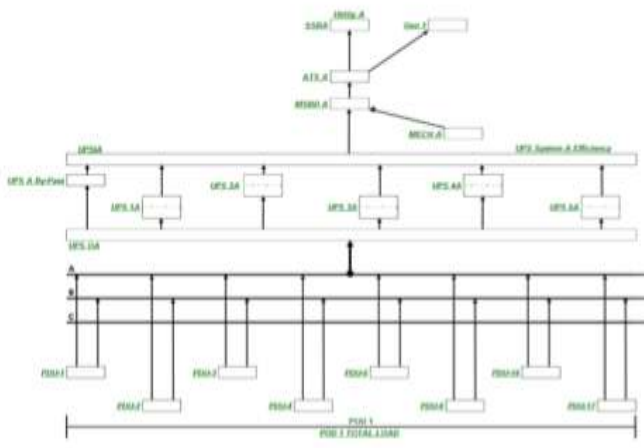
Cabinet Loading



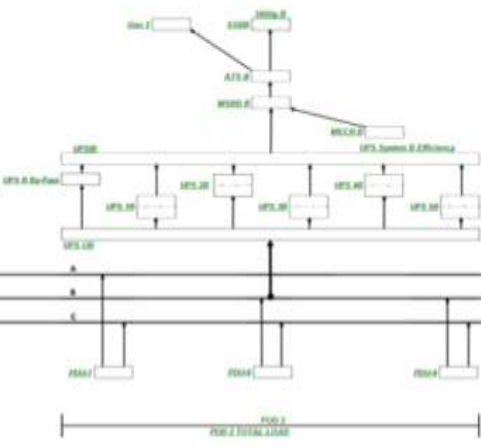
Redundancy and Availability

Utilization Summary

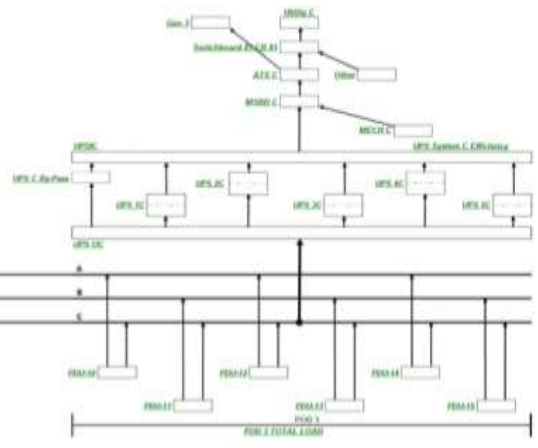
POD 1



POD 2



POD 3



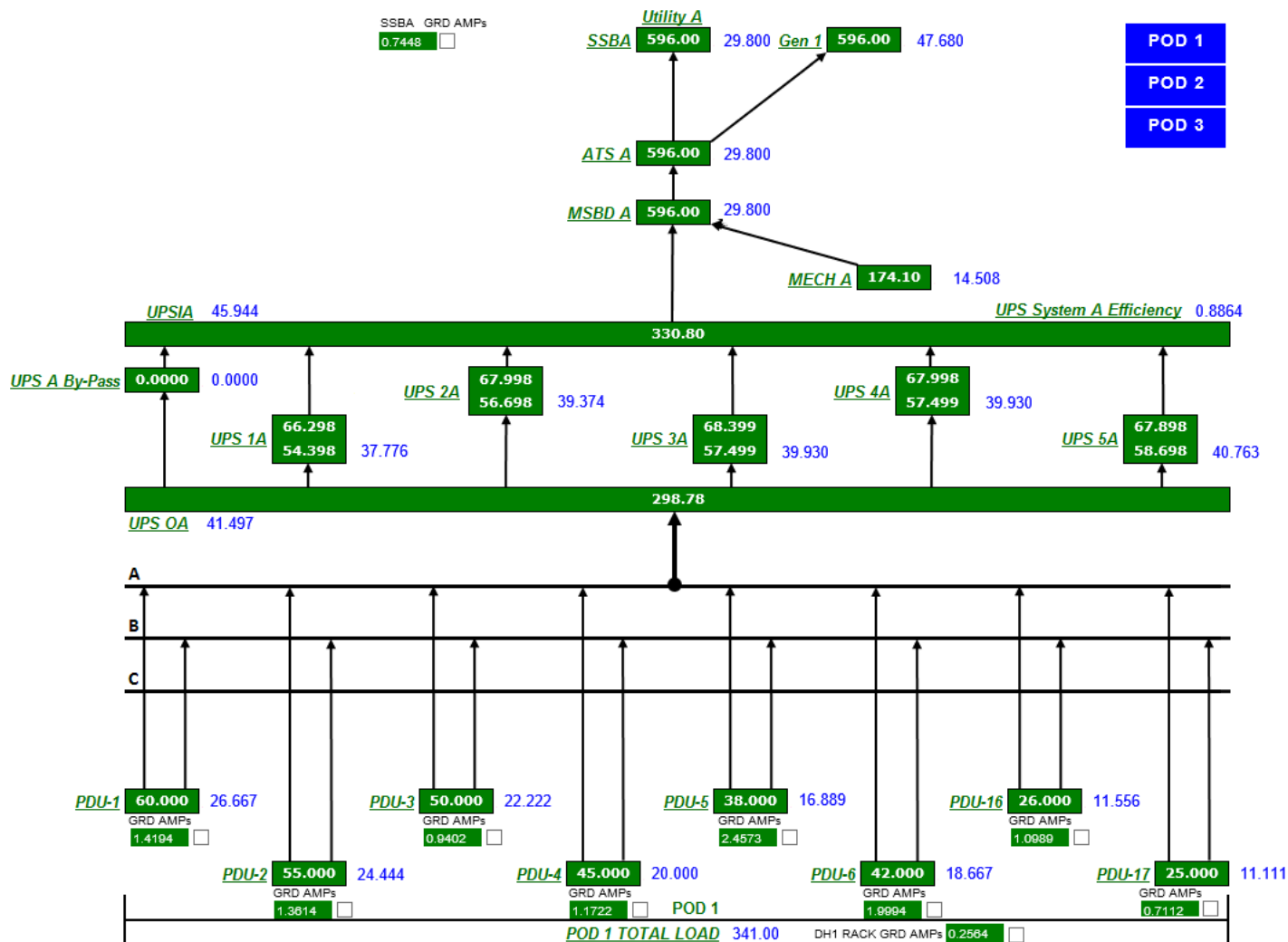
Power Metrics							
Utility A kW	591.00	UPS A Input kW	330.20	UPS A Output kW	298.30	UPS A kWh Forward	6160423.0
Utility B kW	578.00	UPS B Input kW	297.04	UPS B Output kW	260.87	UPS B kWh Forward	5725370.0
Utility C kW	400.30	UPS C Input kW	216.18	UPS C Output kW	181.60	UPS C kWh Forward	1343093.0
PDU-1 kW Total	62.000	PDU-4 kW Total	45.000	PDU-7 kW Total	65.000	PDU-10 kW Total	50.000
PDU-2 kW Total	55.000	PDU-5 kW Total	39.000	PDU-8 kW Total	45.000	PDU-11 kW Total	38.000
PDU-3 kW Total	50.000	PDU-6 kW Total	42.000	PDU-9 kW Total	54.000	PDU-12 kW Total	58.000
				PDU-13 kW Total	59.000	PDU-16 kW Total	26.000
				PDU-14 kW Total	38.000	PDU-17 kW Total	25.000

Data Hall IT Load Real Time				
System Loads				
KW	A	B	C	TOTAL
POD 1	177.00	167.00	0.0000	345.00
POD2	65.000	45.000	54.0000	165.00
POD3	50.000	38.000	117.00	205.00
TOTAL	293.00	251.00	171.00	715.00

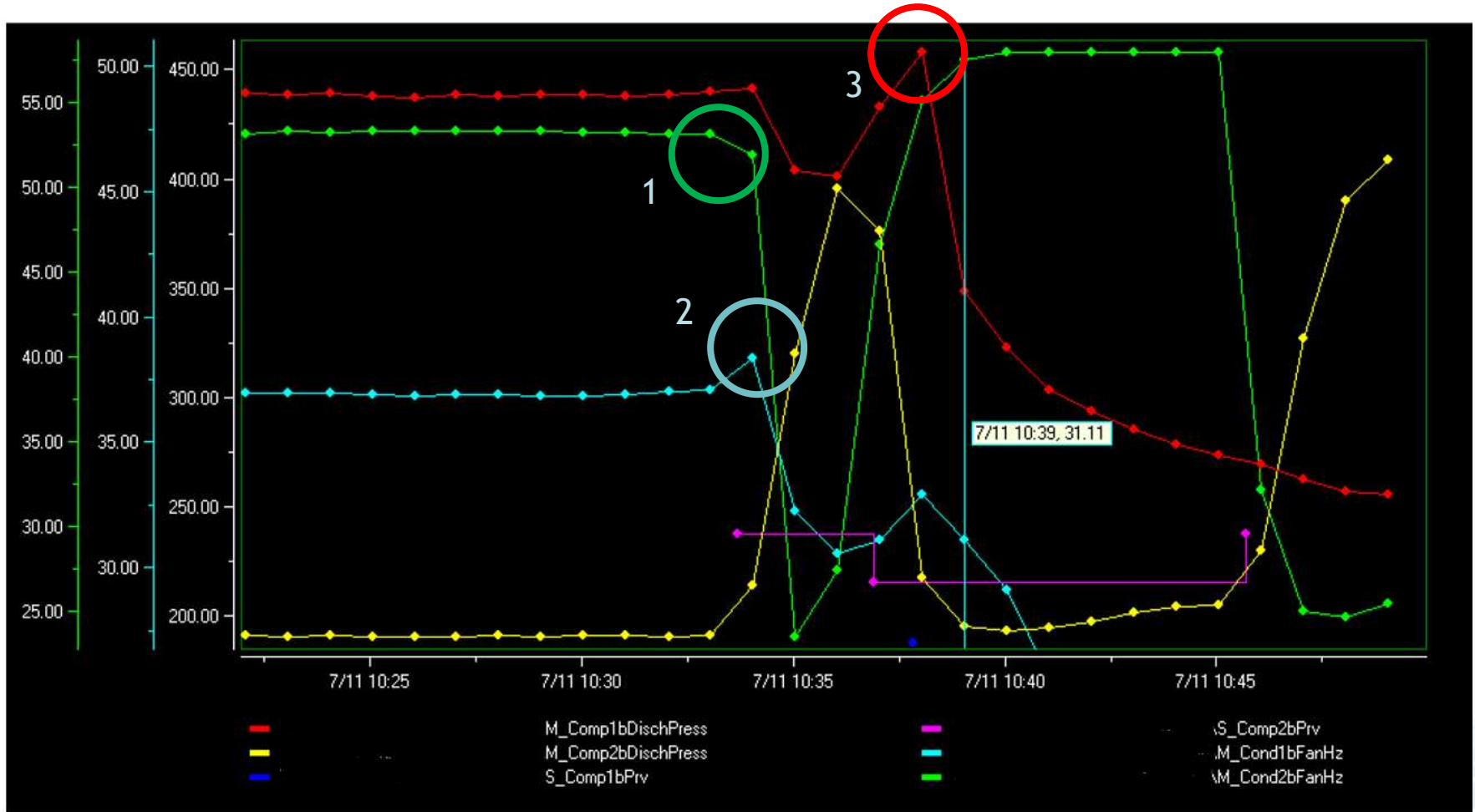
DH1 MpPUE 2.0172
 DH2 MpPUE 1.8807
 DH3 MpPUE 1.8493

Fail Over scenario					
System Loads					
KW	A	B	C	TOTAL	PERCENT
Fail A		437.00	296.00	735.00	63.802
Fail B	404.00		329.00	735.00	63.802
Fail C	360.00	373.00		735.00	63.802
POD POD1			379.00	379.00	65.572

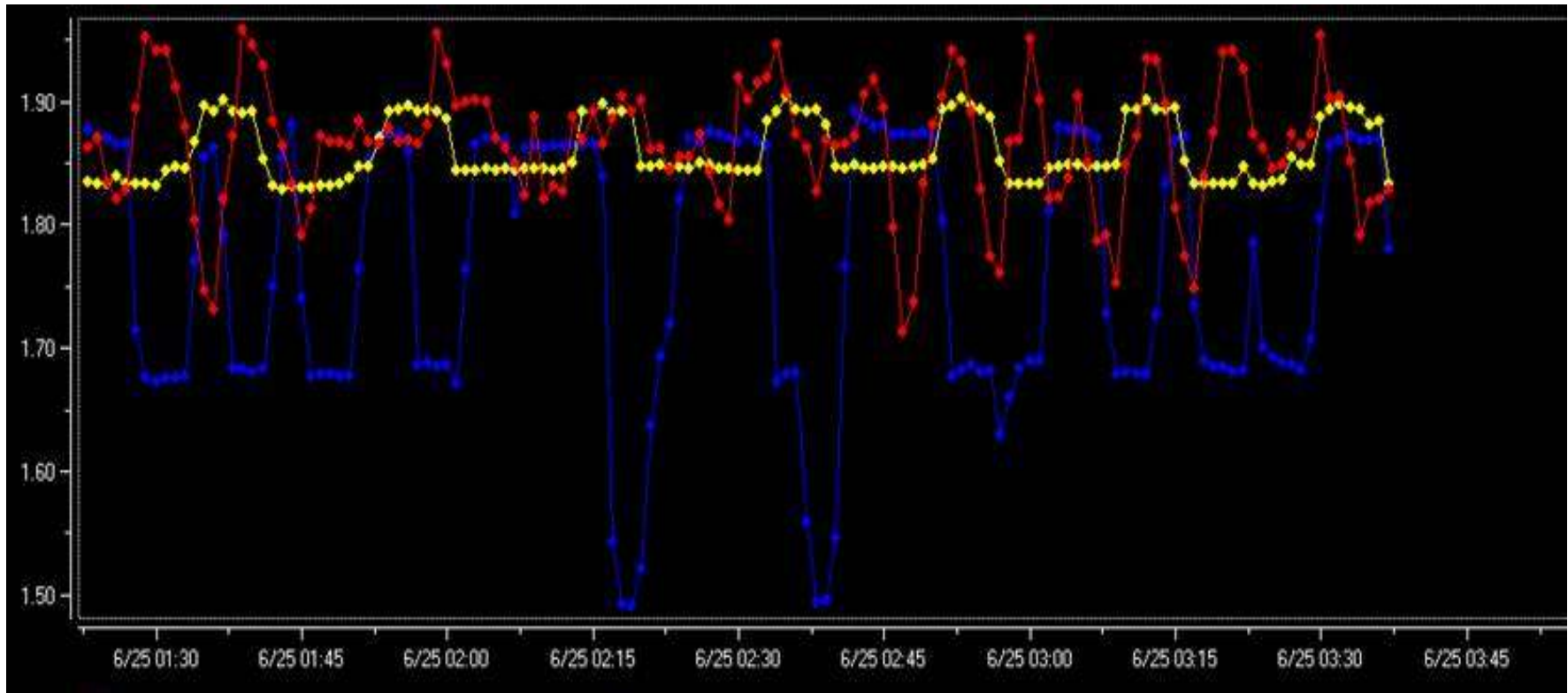
Capacity Utilization



Proactive problem detection through data analysis



Tracking Efficiency in real time.





Class	maximum particles/m ³						FED STD 209E equivalent
	≥0.1 μm	≥0.2 μm	≥0.3 μm	≥0.5 μm	≥1 μm	≥5 μm	
ISO 1	10	2.37	1.02	0.35	0.083	0.0029	
ISO 2	100	23.7	10.2	3.5	0.83	0.029	
ISO 3	1,000	237	102	35	8.3	0.29	Class 1
ISO 4	10,000	2,370	1,020	352	83	2.9	Class 10
ISO 5	100,000	23,700	10,200	3,520	832	29	Class 100
ISO 6	1.0 × 10 ⁶	237,000	102,000	35,200	8,320	293	Class 1,000
ISO 7	1.0 × 10 ⁷	2.37 × 10 ⁶	1,020,000	352,000	83,200	2,930	Class 10,000
ISO 8	1.0 × 10 ⁸	2.37 × 10 ⁷	1.02 × 10 ⁷	3,520,000	832,000	29,300	Class 100,000
ISO 9	1.0 × 10 ⁹	2.37 × 10 ⁸	1.02 × 10 ⁸	35,200,000	8,320,000	293,000	Room air

Conditions

Sample Temperature 81.543

Sample Humidity 37.324

Communications

■ Device Communications Online

Raw 10 Second Particle Data

■ 03 Micron particle 14675.0

■ 05 Micron particle 405.00

■ 1 Micron Particle 37.000

■ 3 Micron particle 1.0000

■ 5 Micron particle 1.0000

■ 10 Micron particle 1.0000

ISO 14644-1 Class 8 Equivalent

■ ISO 03 Micron particle per M³ 30484866.0

ISO 03 Micron percent 298.87

■ ISO 05 Micron particle per M³ 841320.0

ISO 05 Micron percent 23.901

■ ISO 1 Micron particle per M³ 76861.3

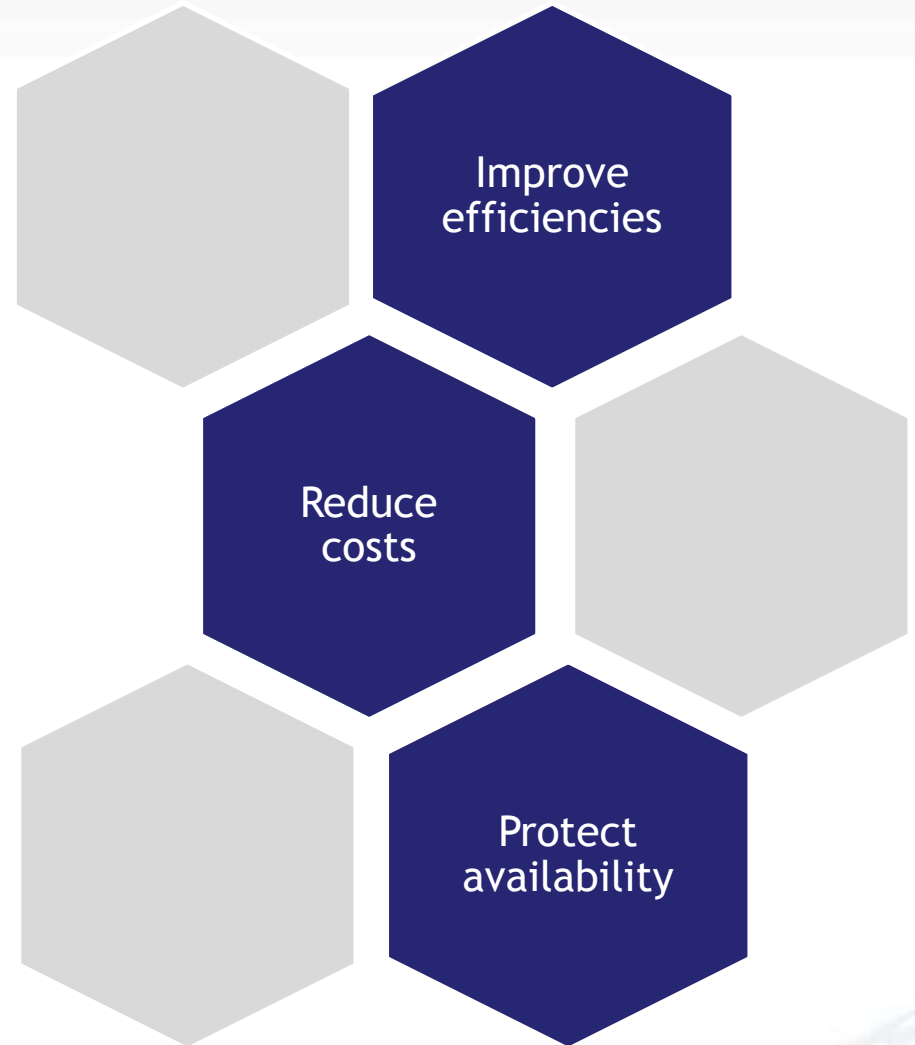
ISO 1 Micron percent 9.2381

■ ISO 5 Micron particle per M³ 2077.33

ISO 5 Micron percent 7.0899



Making Informed Decisions



Questions?

