POWER AND COOLING CONSULTANTS MASTER CLASS 2016

HITTING THE GREEN MARK:

BEST PRACTICES IN DATA CENTER OPTIMIZATION

EMERSON
Network Power

Infrastructure & IT Optimization Through DCIM

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What is DCIM all about?

WHAT

(Need to be done| Plan it out/What to Do)

+

HOW

(You want to do | Check, act & verify)

=

DESIRED RESULT

(accountable, effective, resource-efficient over time)

BCA-IDA Green Mark

- Scoring in
  - Measurement & verification, energy metering and reporting
  - DC Planning & Design
  - DC Operations & Energy Management
- Reference to obtaining SS564 certification

BCA-IDA Green Mark for New DC Requirements

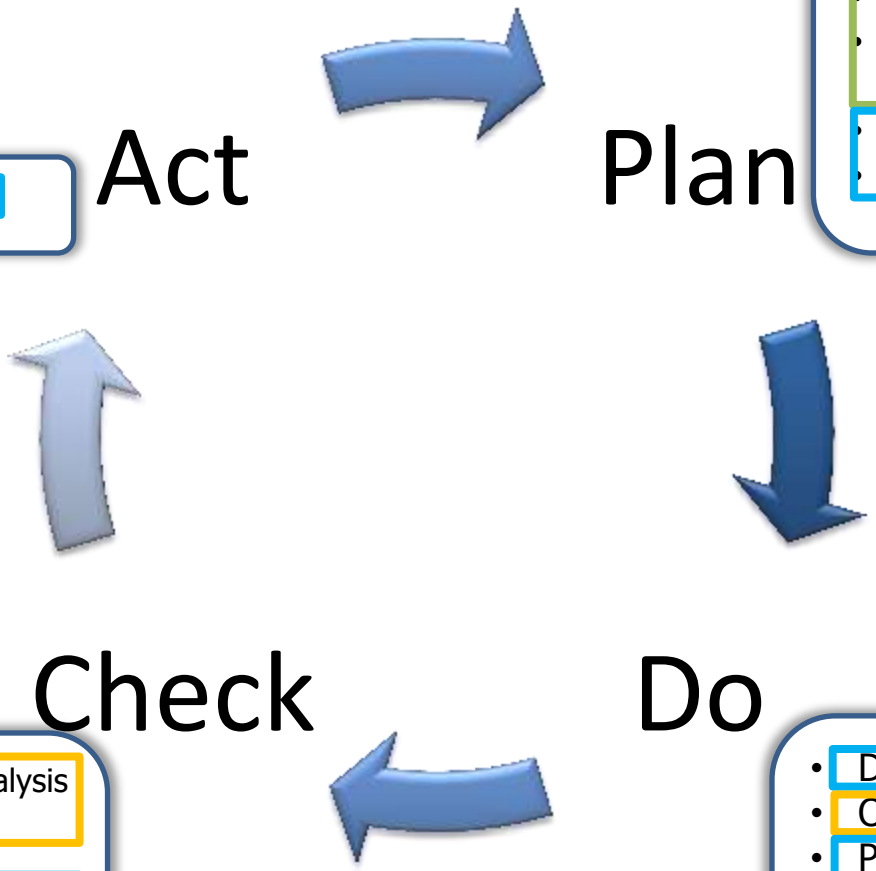
Assessment Criteria	Required Functionality	DCIM Capability Contribution
Overall Energy Efficiency	Facility Monitoring (electrical)	• Collect facility + IT load to calculate PUE. • Able to set baseline (using reference model) and trend current PUE against it. • Optimize power usage base on PUE reports to achieve max result.
Systems Energy Efficiency	Facility Monitoring (electrical & mechanical)	• Collect & calculate facility equipment efficiency to ensure accuracy.
Energy Efficiency & Performance Verification	Facility Monitoring + Reporting	• Data collection & reporting tool for M&V plan
Data Center Design & Energy Management	Planning & Reporting	• Track and provide key data center performance matrix reports. • A planning tool to assist in the DC asset's install/move/change lifecycle to ensure max efficiency. • Provide required reports for SS 564 certification.

SS 564 Green Datacenter Approach

Plan, Do, Check, Act (PDCA)

Supporting Functions

- Planning
- Operation
- Reporting



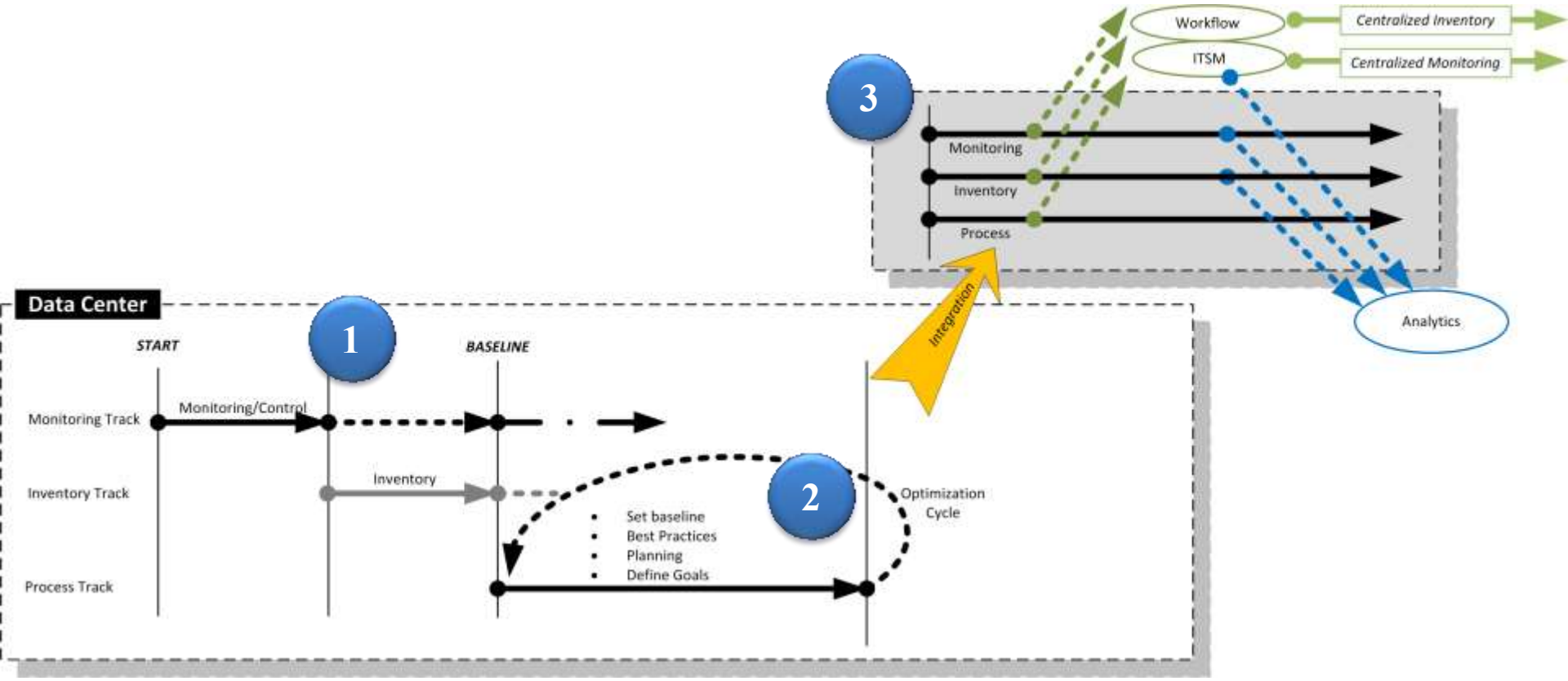
- Management review

- Policy
- Energy review & baseline
- Other environmental aspects
- Green DC metrics
- Objectives, targets & action plans

- Design
- Operational control
- Purchasing
- Control of document
- Competence, training & awareness
- Communication

- Monitor, measurement & analysis
- Evaluation of legal / other compliance
- Internal audit
- Nonconformities, corrective & preventive actions
- Control of records

Emerson DCIM Implementation Approach

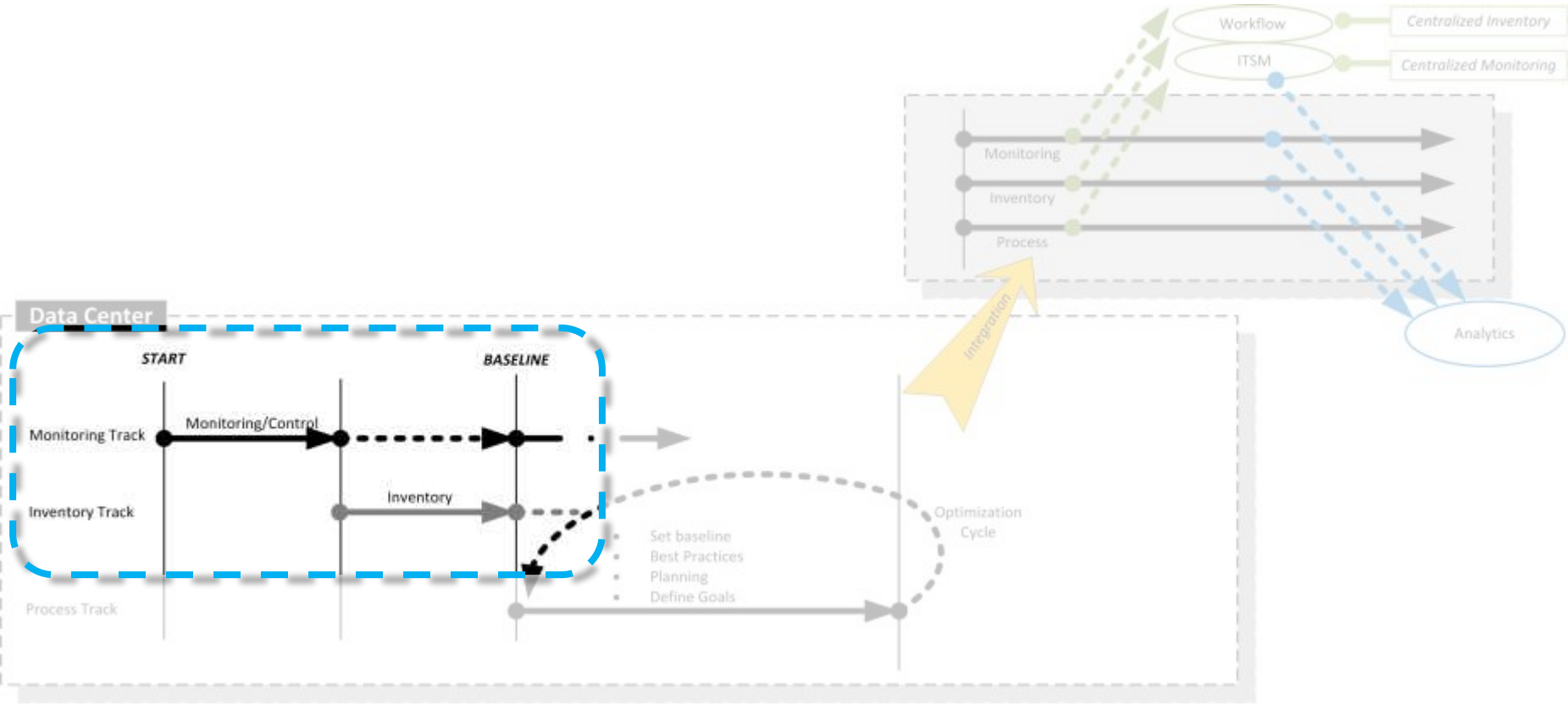


1 Infrastructure/IT Monitoring

2 Review, optimize

3 Organization level automation/optimization

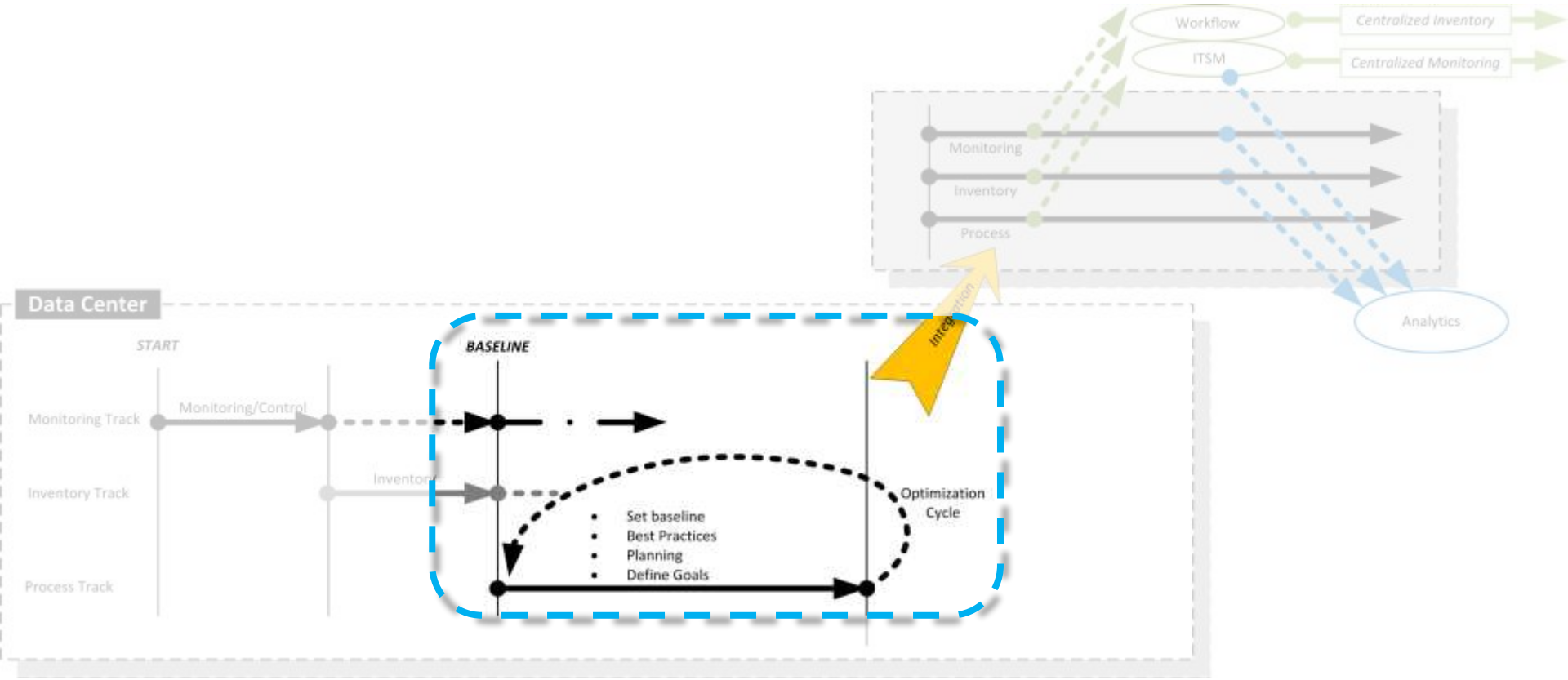
Emerson DCIM Implementation Approach



Stage Objectives:

- Baseline model creation for single source of truth
- Monitoring infrastructure/IT

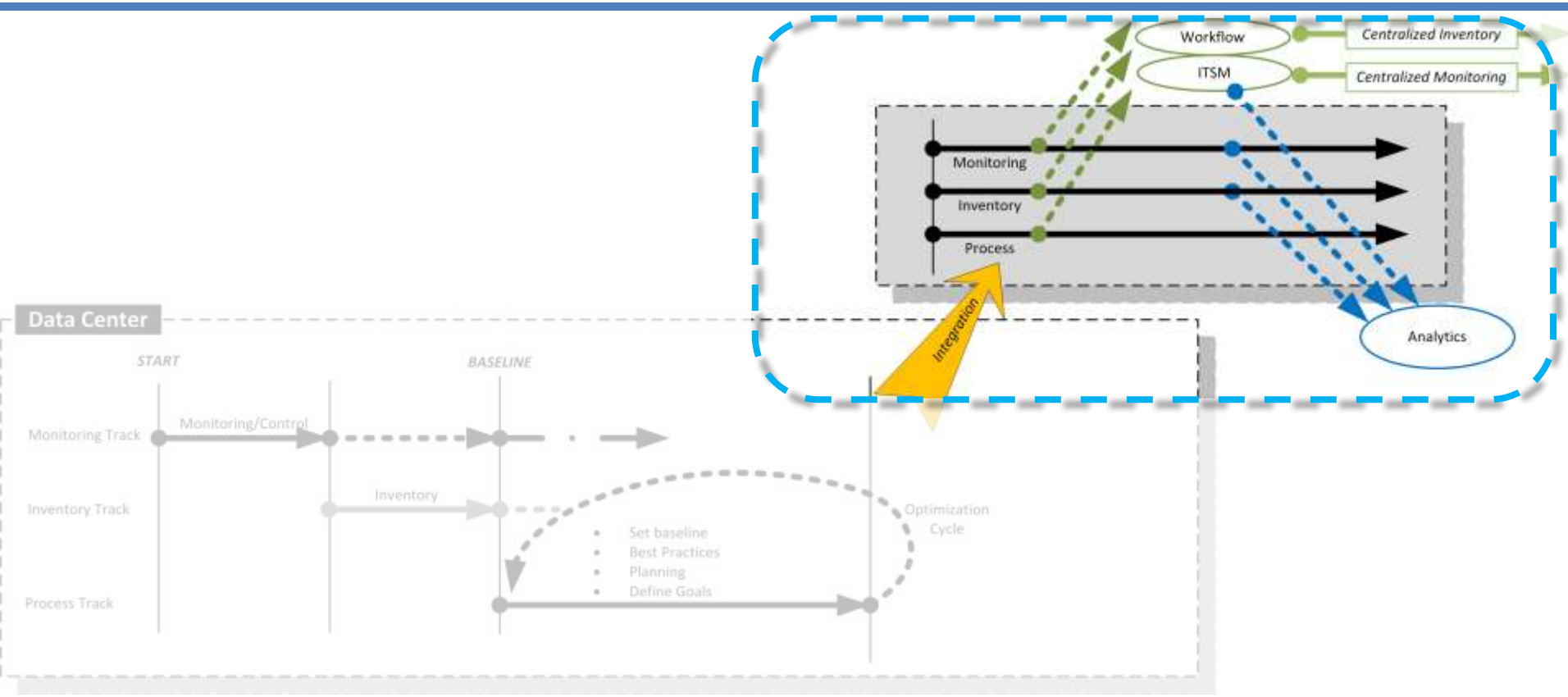
Emerson DCIM Implementation Approach



Stage Objectives:

- Plan, track & verify
- Best practices implementation
- Optimization via feedback

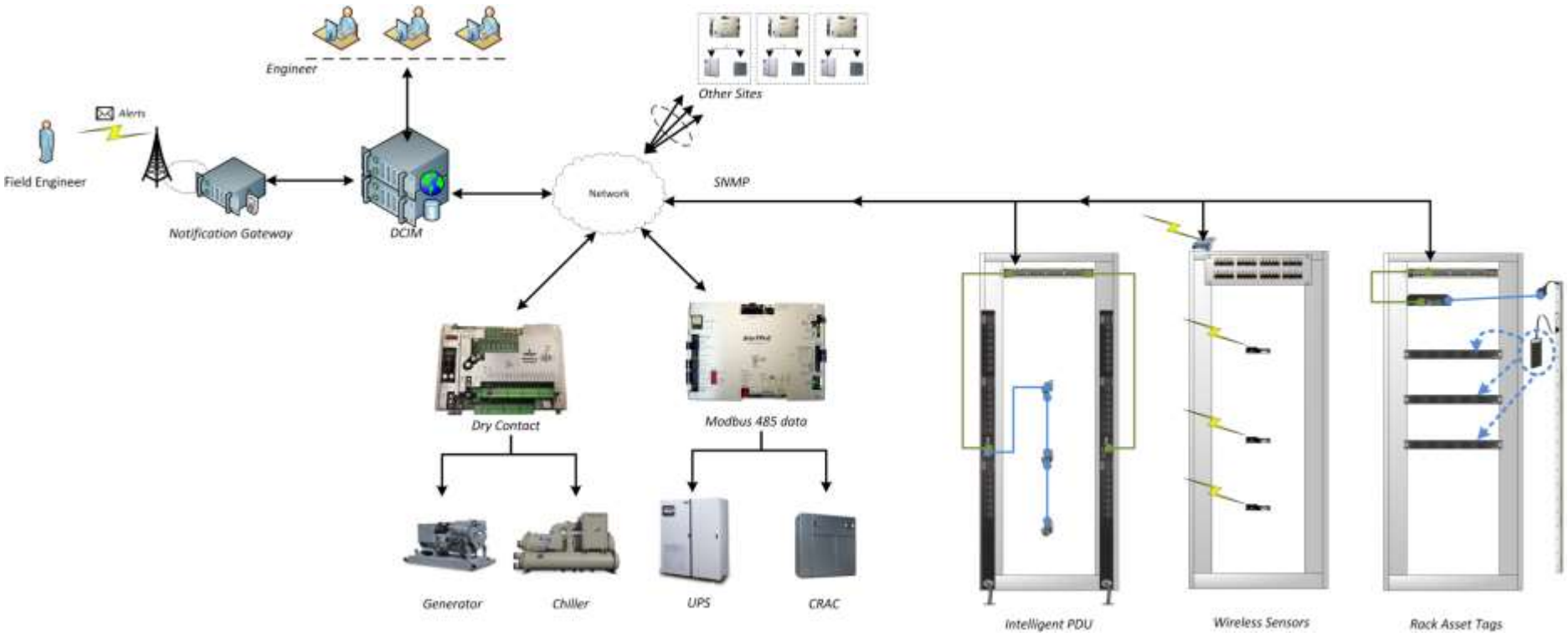
Emerson DCIM Implementation Approach



Stage Objectives:

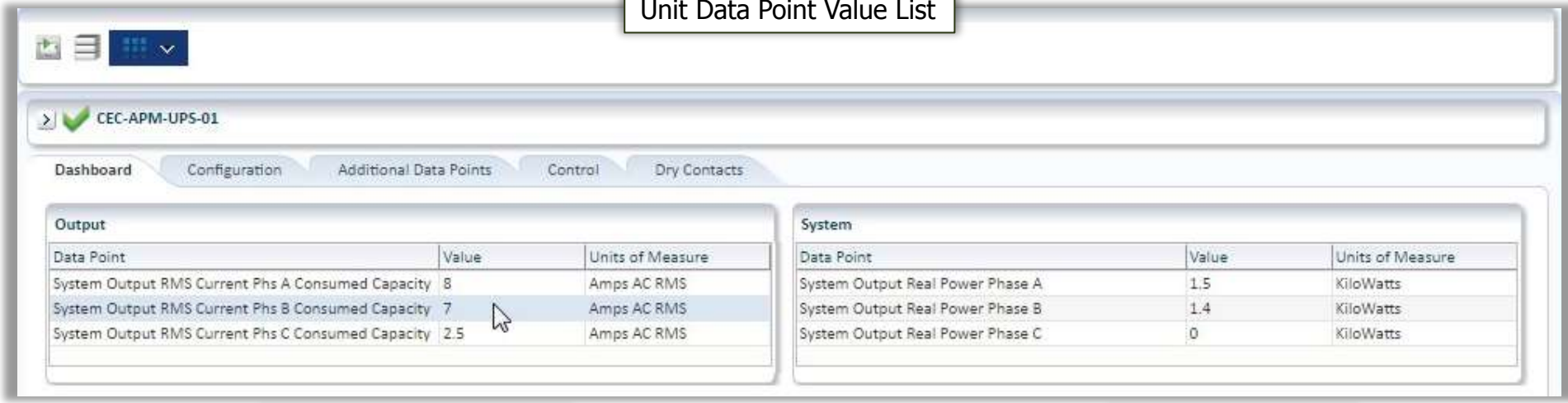
- Expansion to include organization level systems/processes
- Optimization through automation/integration
- Periodic review and verification at various levels

Emerson DCIM Architecture

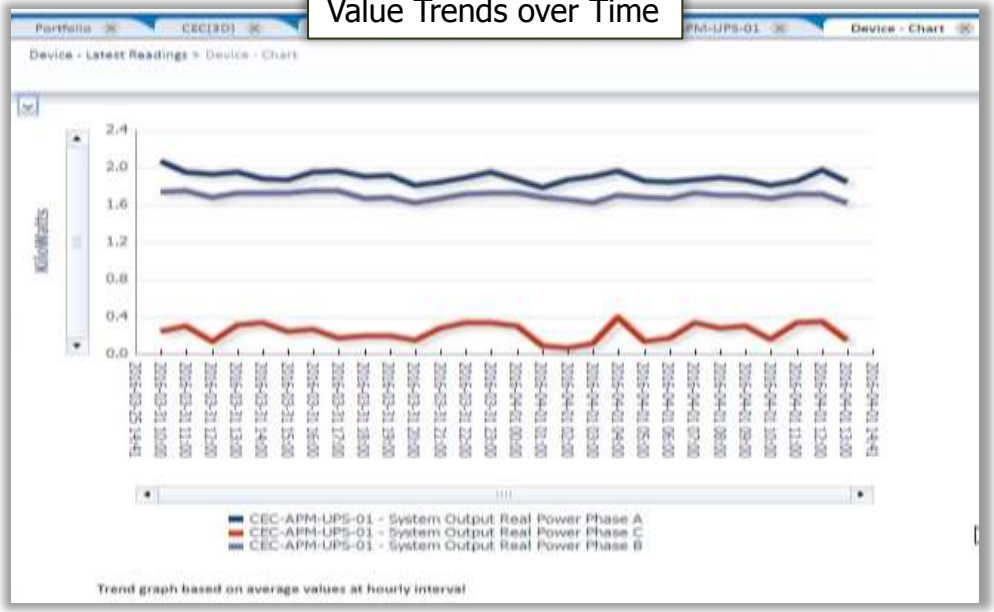


Infrastructure Optimization – Electrical

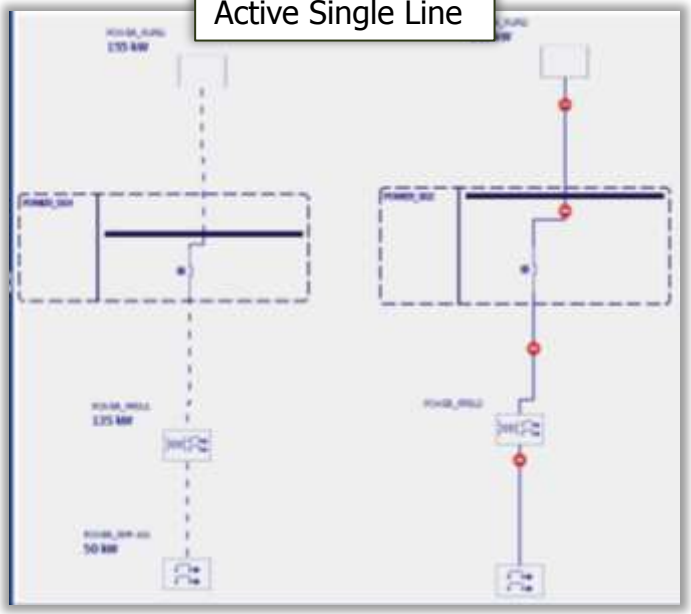
Unit Data Point Value List



Value Trends over Time

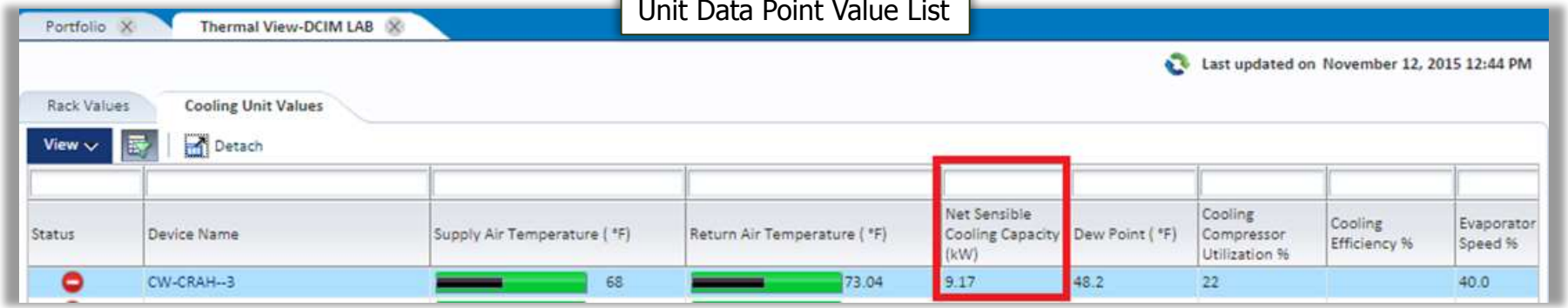


Active Single Line



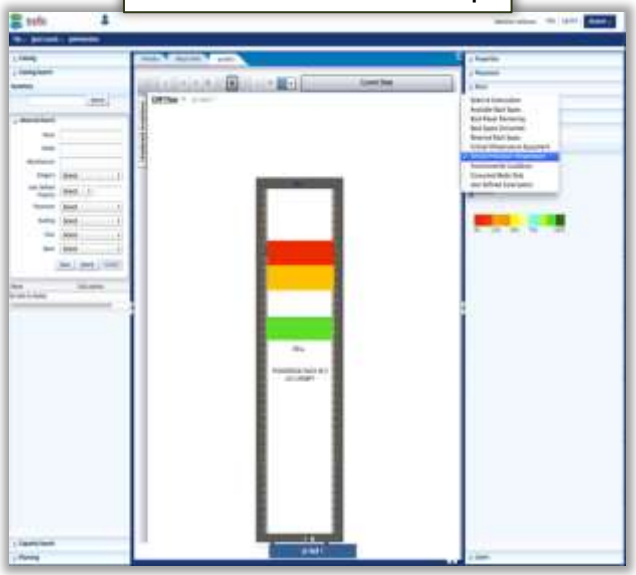
Infrastructure Optimization – Thermal

Unit Data Point Value List

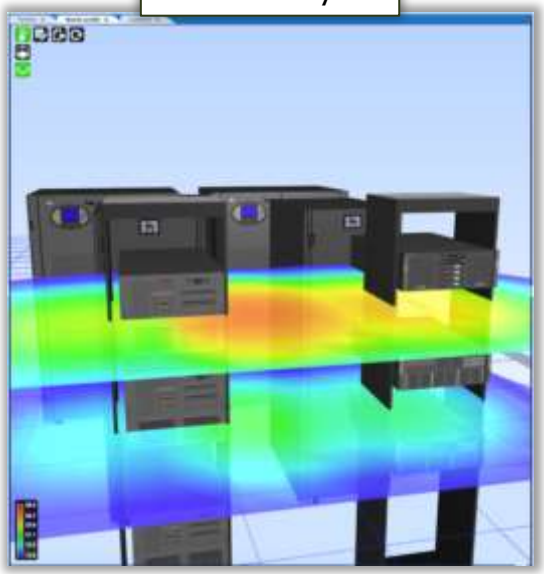


Status	Device Name	Supply Air Temperature (°F)	Return Air Temperature (°F)	Net Sensible Cooling Capacity (kW)	Dew Point (°F)	Cooling Compressor Utilization %	Cooling Efficiency %	Evaporator Speed %
	CW-CRAH--3	68	73.04	9.17	48.2	22		40.0

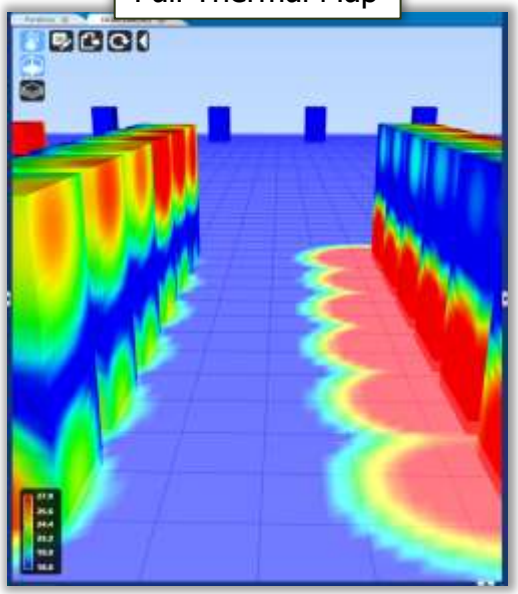
Rack Level Thermal Map



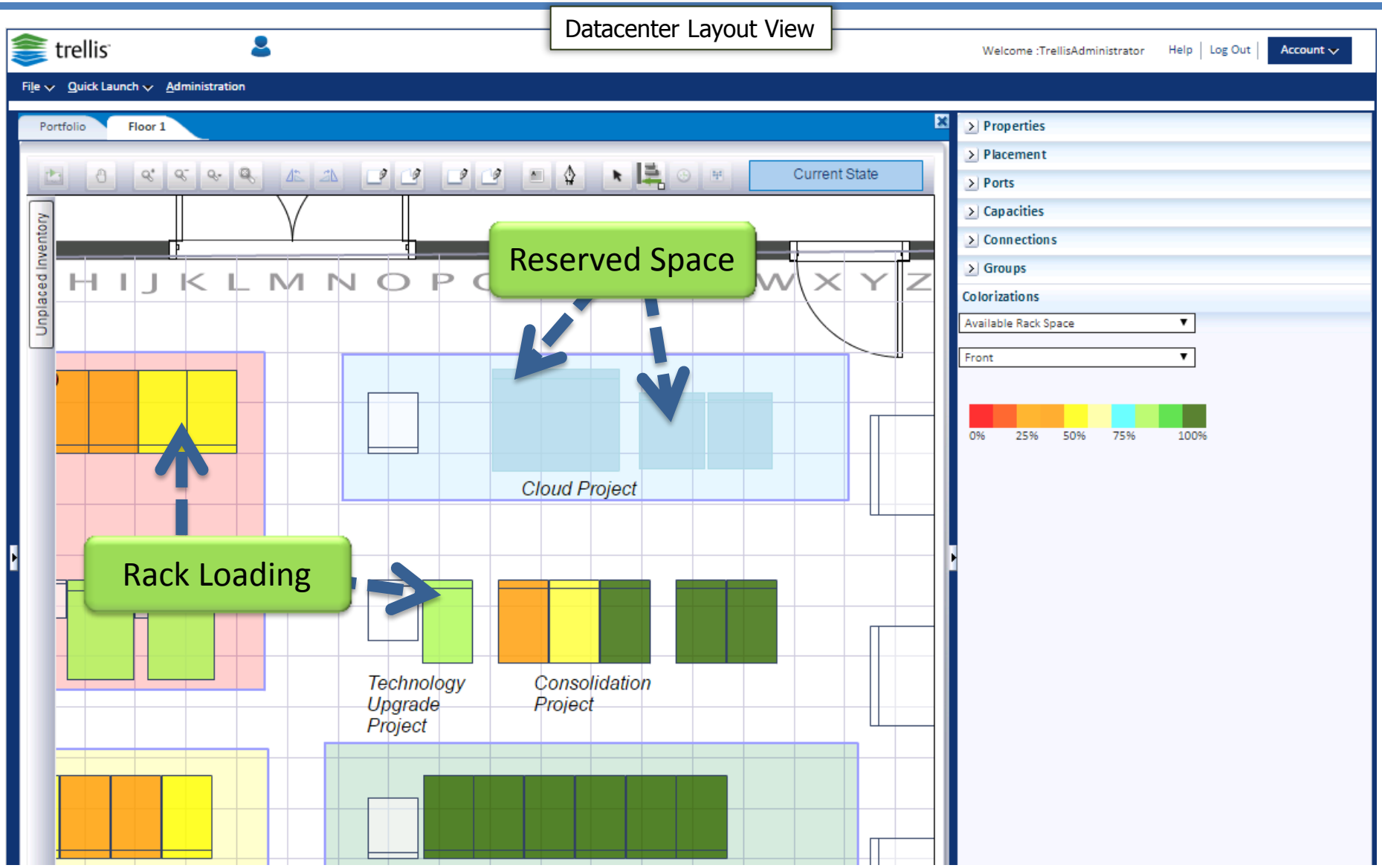
Thermal Layers



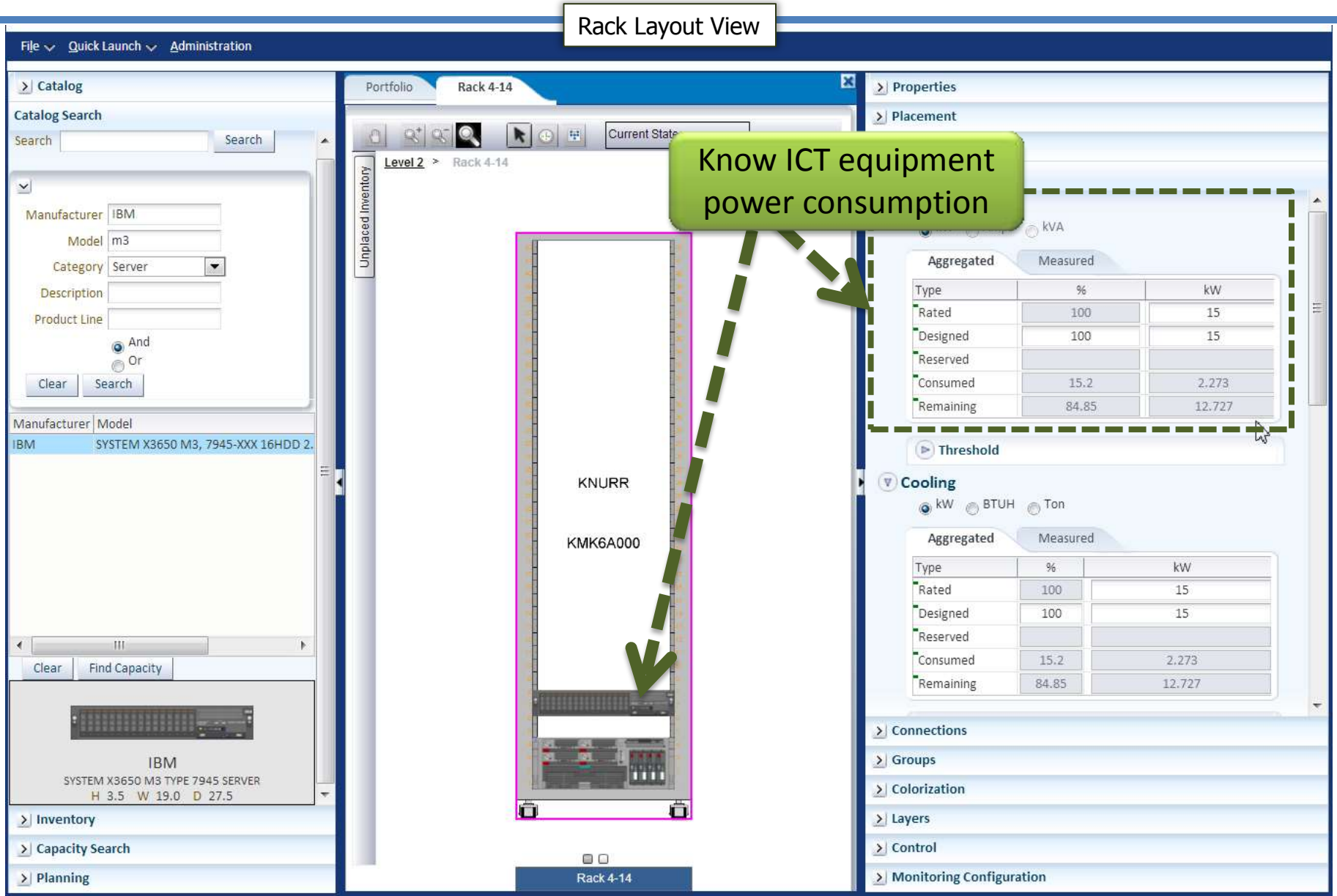
Full Thermal Map



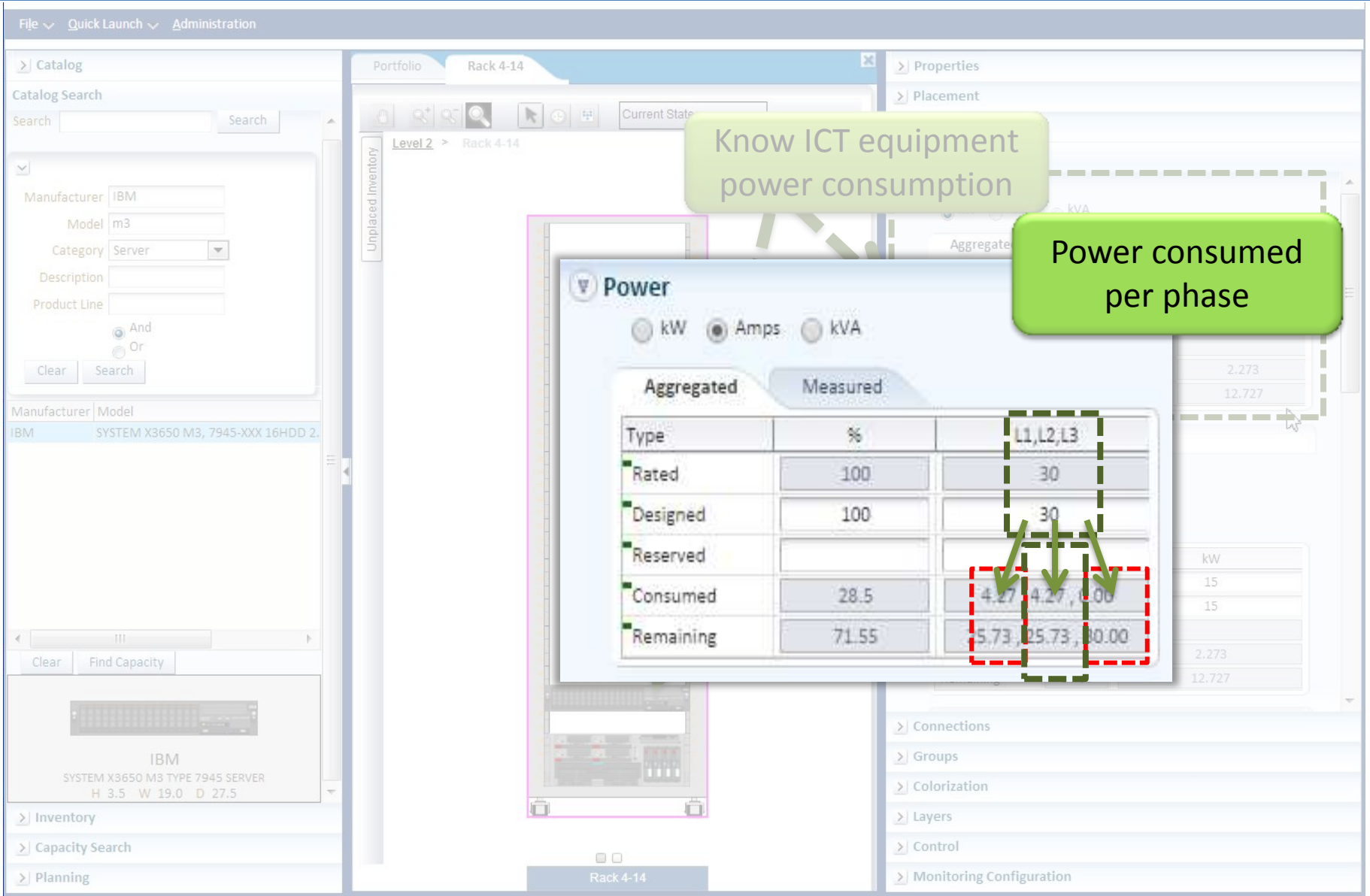
IT Optimization – DC Design/Layout



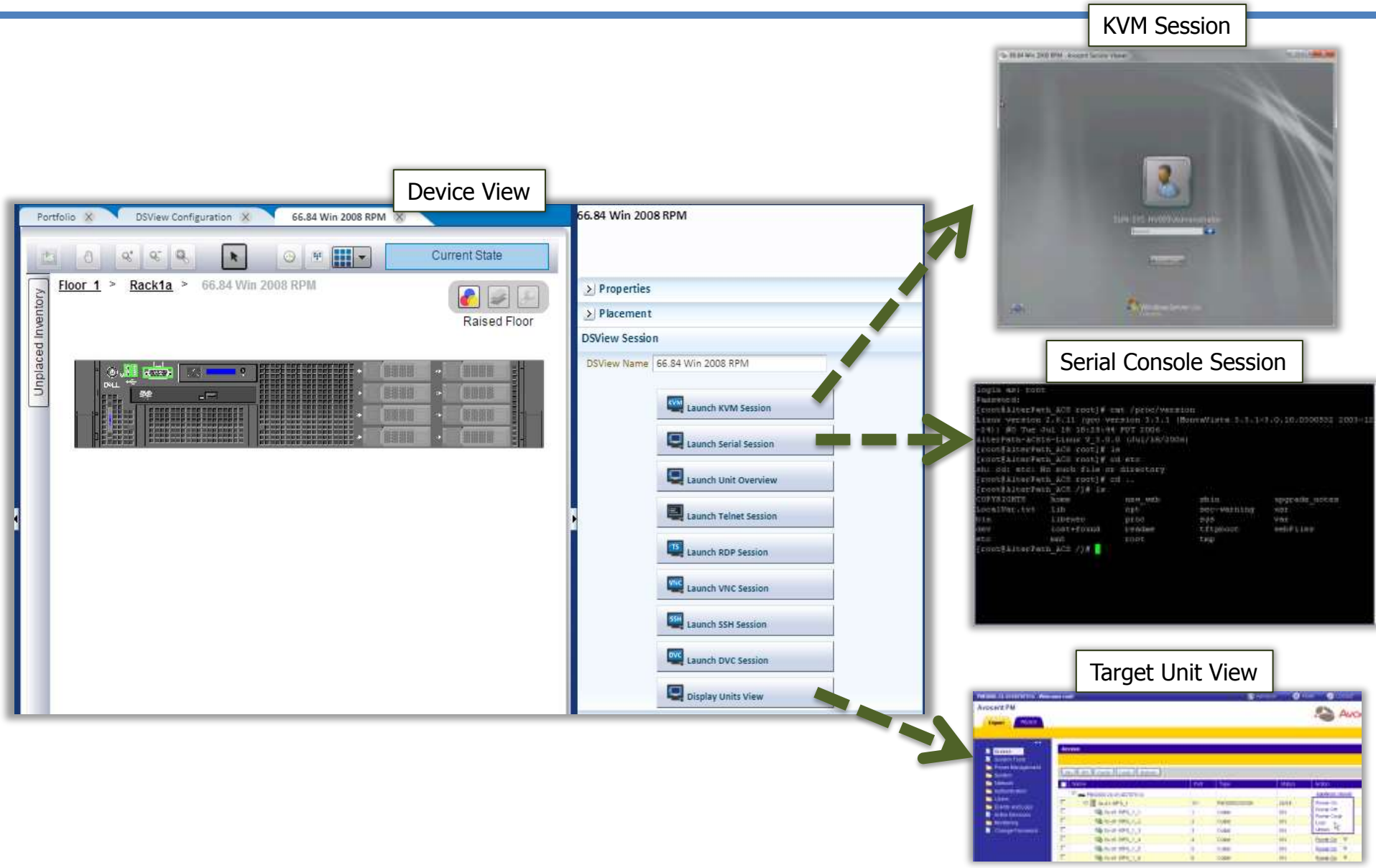
IT Optimization – Rack Layout



IT Optimization – 3-Phase Load Balancing

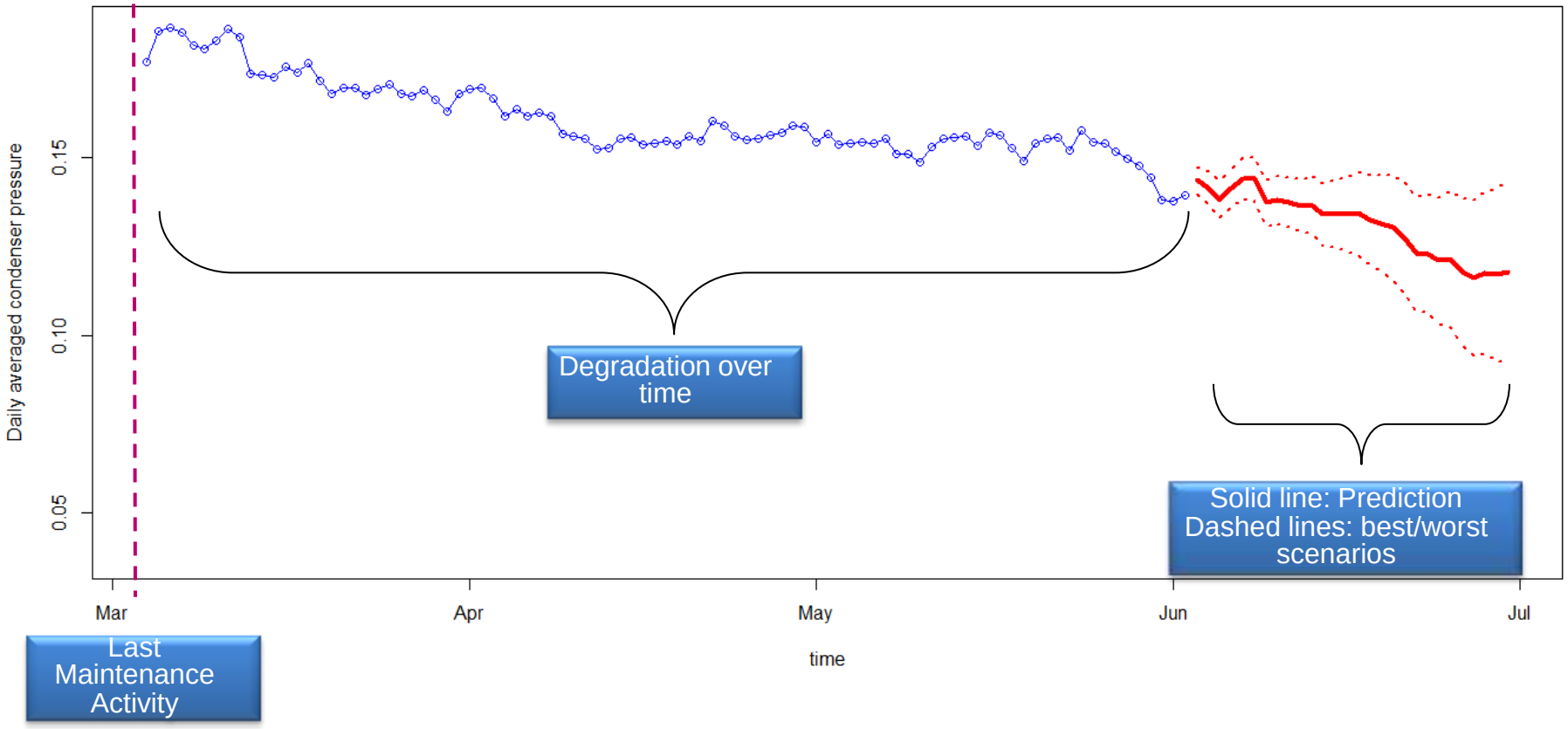


IT Optimization – Remote Access Management



Optimization with Analytics

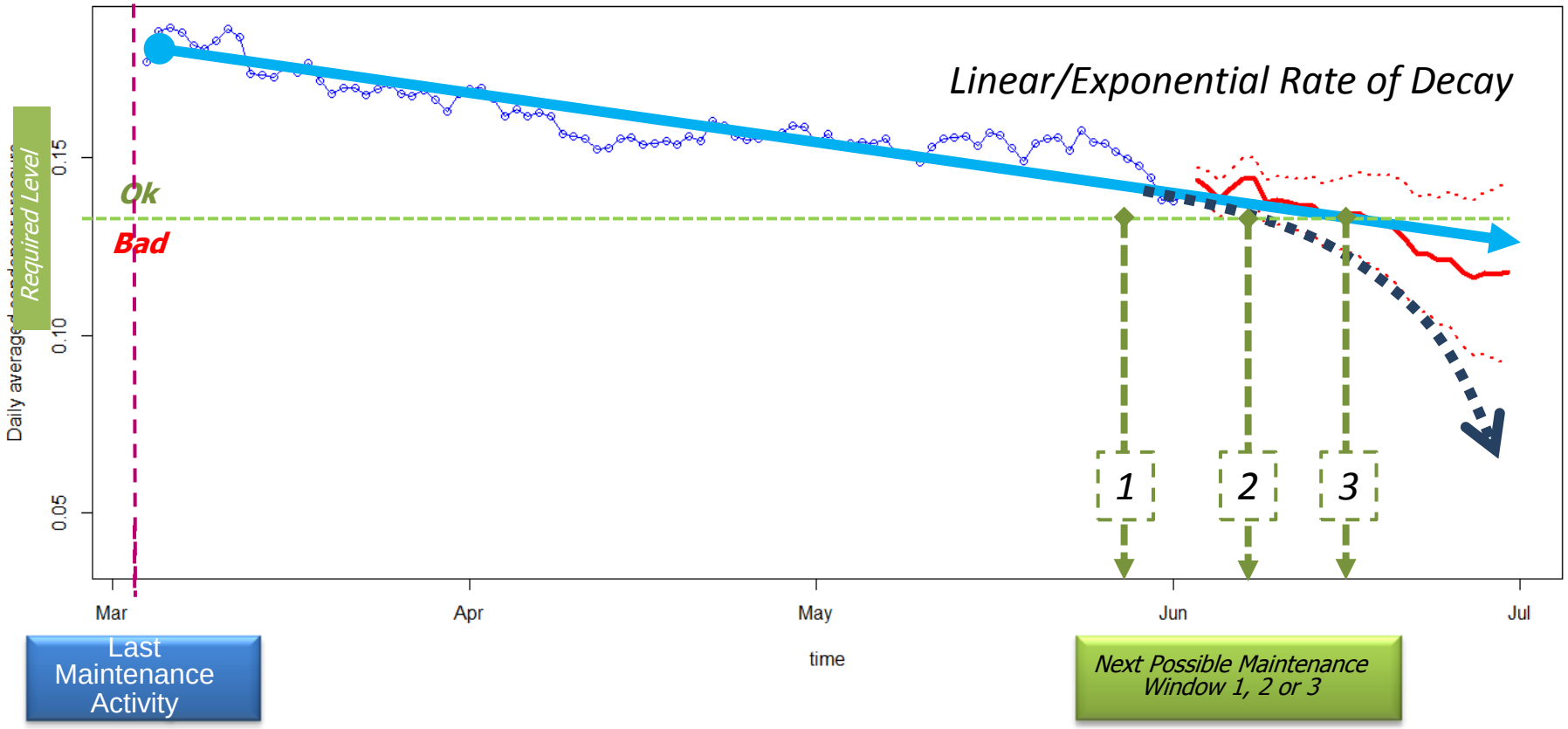
- 4 weeks (28days) ahead prediction for daily average pressure[1]



1. *With permission from Mr Liu Xiao, Staff Member, IBM T.J. Watson Research Center*

Optimization with Analytics

- Allow for Performance and Maintenance Cycle optimization.



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Questions & Answers

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