Data Center Infrastructure Management:
Improve Data Center Capacity Utilization

Khaled Nassoura, PE

Session P06, 9:45 – 10:45AM, September 12, 2011

DATA CENTER WORLD® AFCOM®

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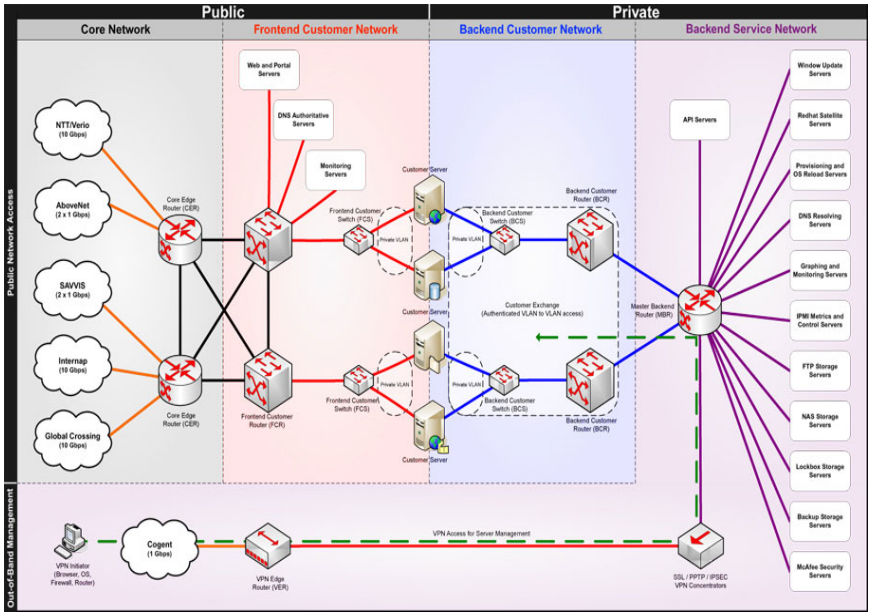
Why DCIM

Data Center Size + Density

Data Center Complexity



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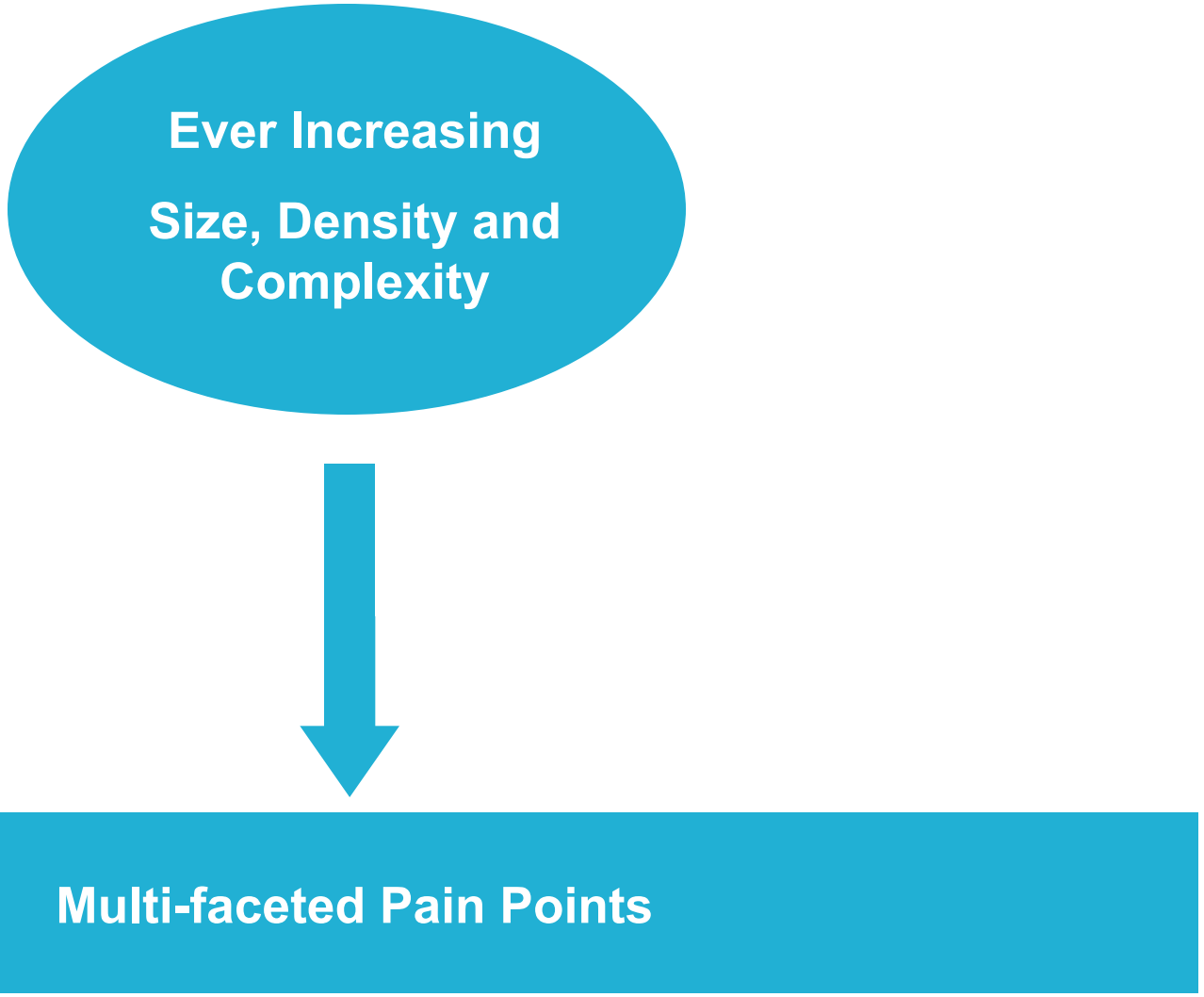
Why DCIM



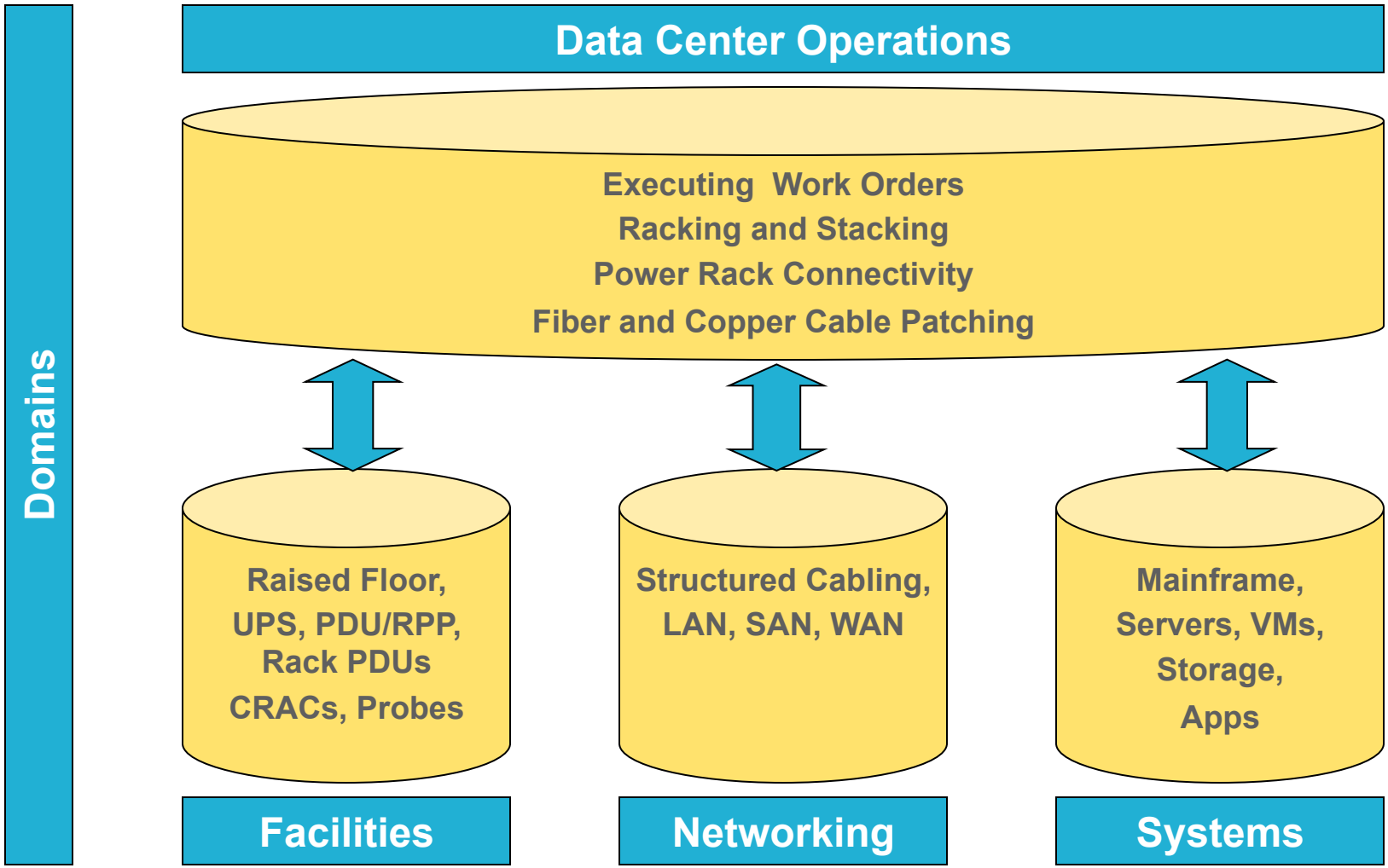
Common Pain Points in Data Center Management

- Unable to **locate assets**
- Unable to **know what is connected to what** (manage relationships and dependencies)
- Unable to **find available resources** (rack space, power, cooling, network, IP addresses, etc)
- Unable to do accurate **capacity planning**
- Unable to **manage change** and enforce best practices and processes
- Unable to comply with **internal and external regulatory audits**

What Does an Enterprise Data Center Look Like?

	Facilities	Networking	Systems
Domains	Raised Floor, UPS, PDU/RPP, Rack PDUs CRACs, Probes	Structured Cabling, LAN, SAN, WAN	Mainframe, Servers, VMs, Storage, Apps
Tools	**Asset Tracking:** Spreadsheets, Homegrown DBs **Floor Plan:** AutoCAD, Visio **Monitoring:** Sitescan, Foreseer, Raritan, etc.	**Cable/Net Tracking:** Spreadsheets, Homegrown DBs **Configuration:** CiscoWorks, etc. **Monitoring:** HP OpenView, IBM Tivoli	**Asset Tracking:** Spreadsheets, Homegrown DBs **CMDB:** HP OpenView, BMC BladeLogic, etc. **Monitoring:** HP Insight Manager, IBM Director

How is the Data Center Operations Model Evolving?

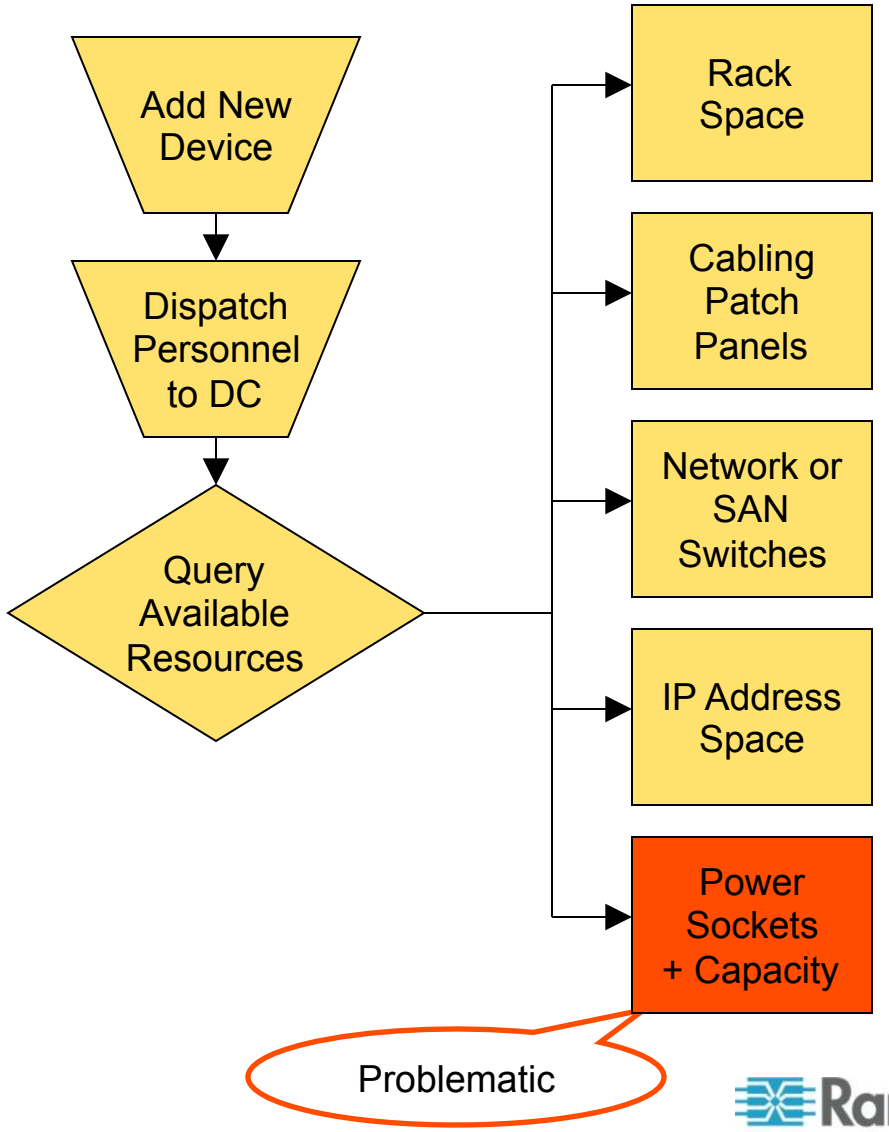


Manual Processes

- Labor-intensive processes
- Slow, time-consuming
- Unreliable
- Prone to conflict and errors

Costly

Unable to meet SLAs



Where is the Industry Heading?

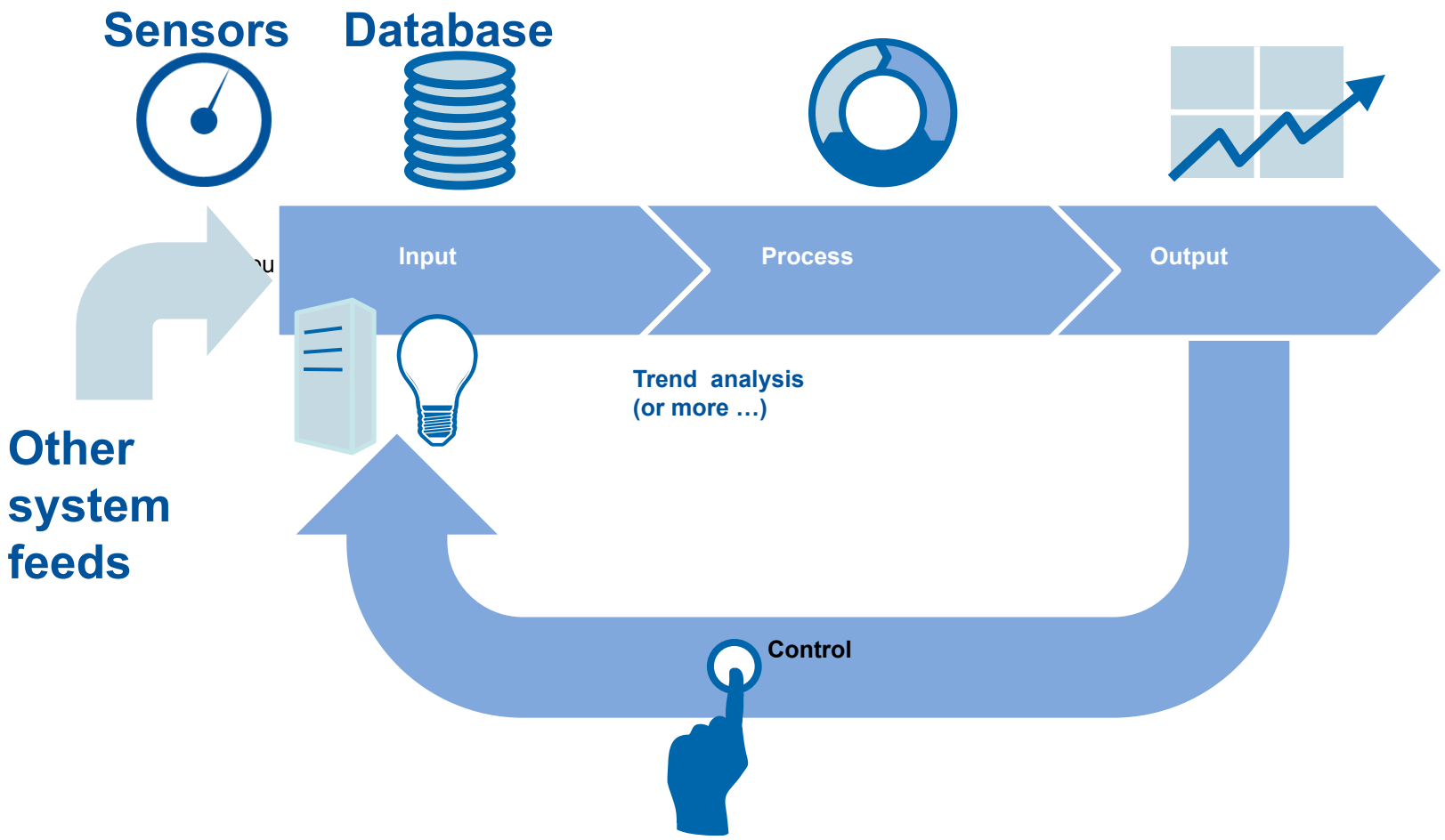
Gartner®

IDC
Analyze the Future

FORRESTER®

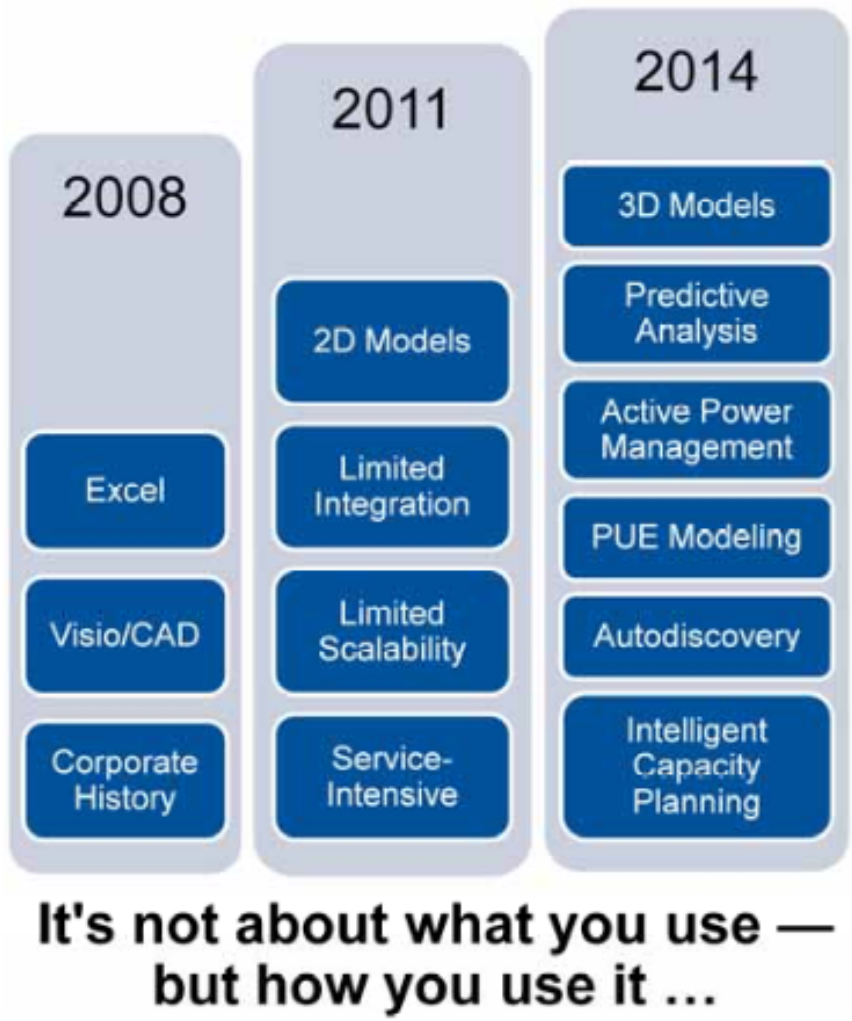
the 451 group

Gartner DCIM Model



Source: DCIM, New Tools to Monitor, Manage and control Power
Jay Pultz, Gartner Data Center Conference, December 2010

Gartner DCIM Model Evolution



- Optimize the energy utilization of assets
- Visualize the power consumption of resources
- Automate and control server energy usage to optimal levels
- Dynamically move workloads based on policy
- Shut down or power on resources
- Monitor and report consumption
- Use trending and capacity planning tools to manage resource usage proactively

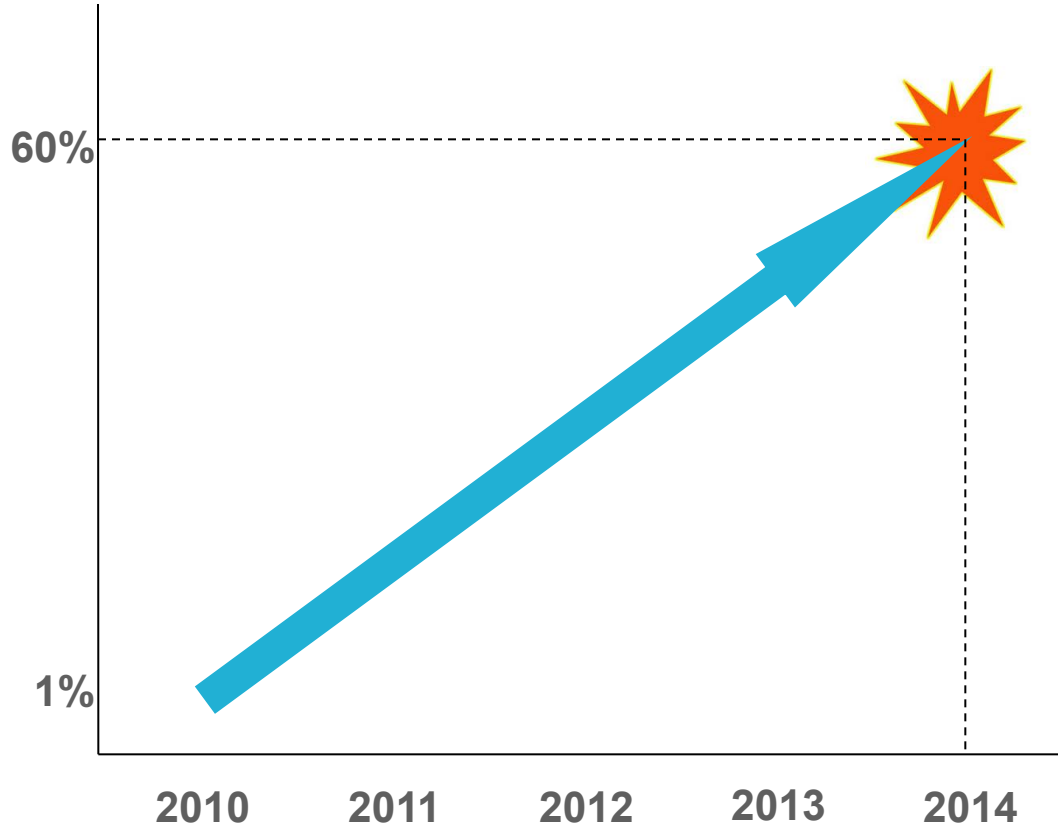
Gartner

Source: Extreme Data Centers
David Cappuccio, Gartner Data Center Conference 2010

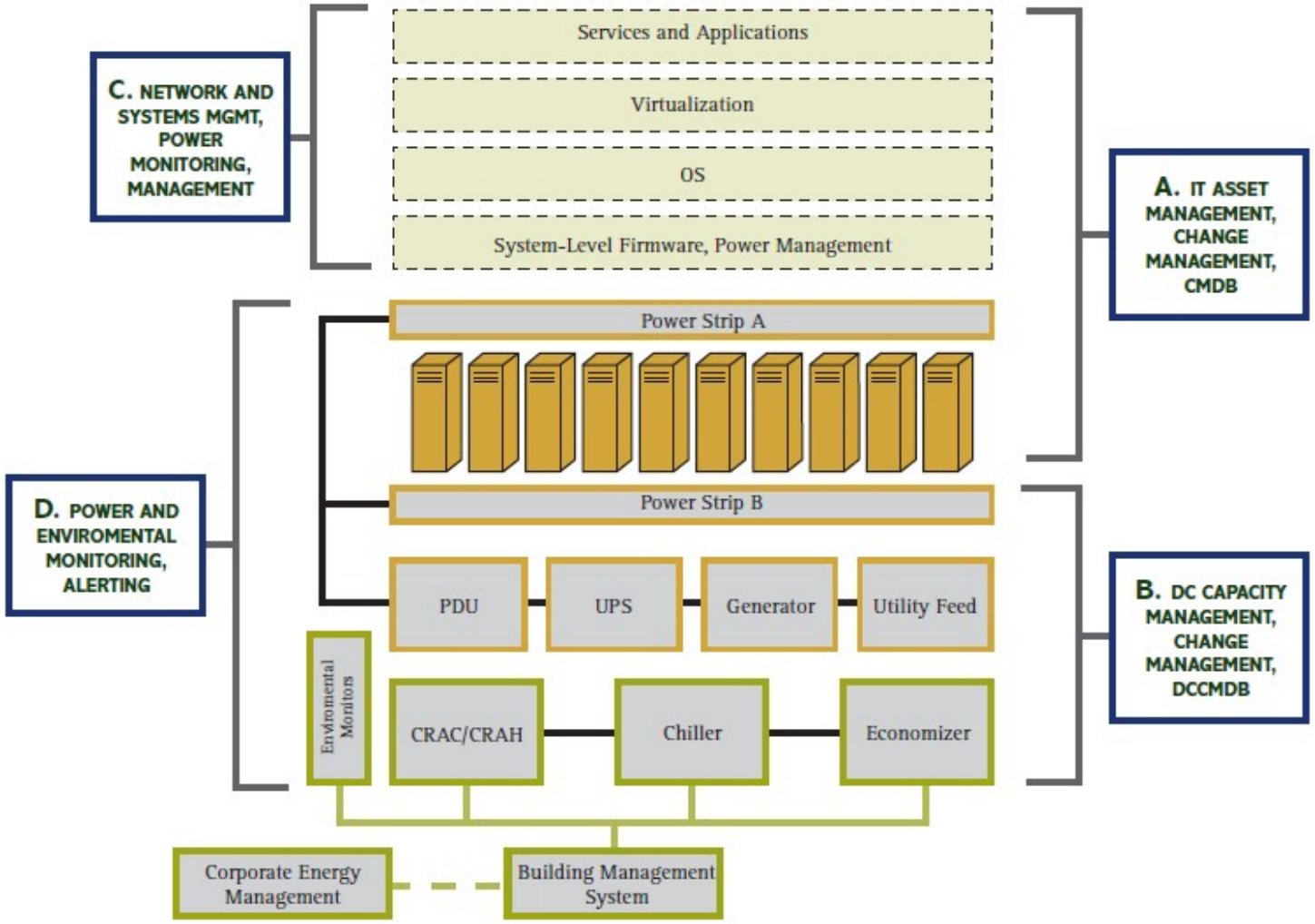
Gartner’ s Forecast

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

Source: Gartner Analysis Report by David Cappuccio, March 29, 2010



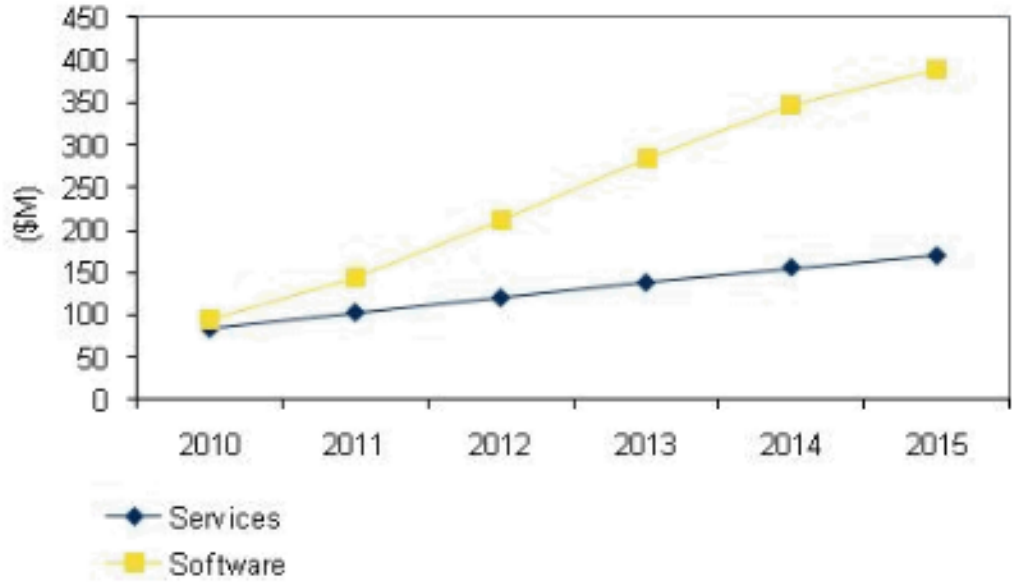
The 451Group DCIM Model



Source: 451 Group, Data Center Management & Energy-Efficiency Software Report, 2009

IDC Research Report

Worldwide Datacenter Infrastructure Management Revenue by Services and Packaged Software, 2010–2015



Source: IDC, 2011

"DCIM will grow to shape datacenter facilities and IT operations for years to come. DCIM's combined software and services revenue will grow from $179.4 million in 2010 to reach $557.7 million by 2015.“

Source: IDC, Katherine Broderick, Senior Research Analyst, 2011

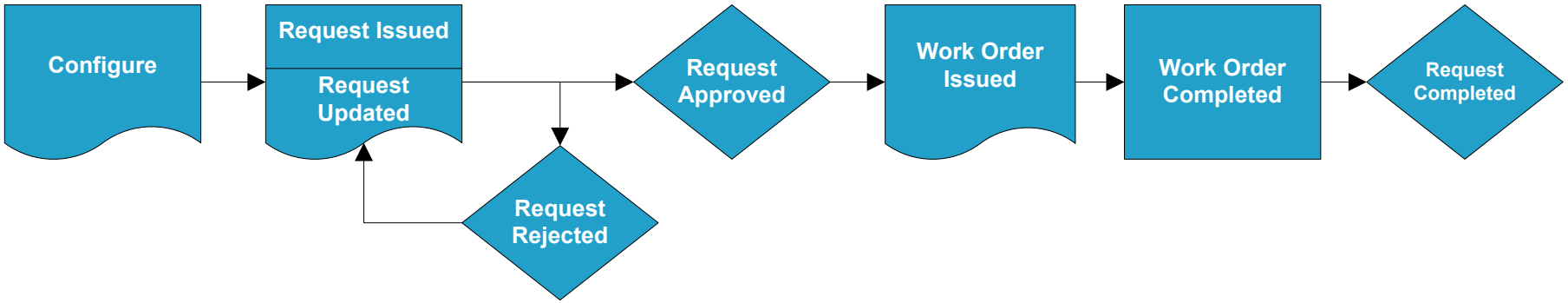
So What is Raritan's View of DCIM System?

► **Beyond Asset Tracking**	Enable visualization, tracking and management of all data center assets and their related physical and logical resources including structured cable plant, networks, power infrastructure, and cooling
► **A Holistic Approach**	Bridge the organizational and functional gaps across all domains including facilities, networking, and systems domains
► **A Single Pane of Glass**	Used by all data center domains and groups regardless of hierarchy including managers, system administrators, and technicians
► **A Single Repository**	A single database to house all data from across all data centers and sites
► **Process Driven**	A change management system by which you can provision new systems and all their related physical and logical resources

A DCIM system becomes the gate through which you will enter the data center to affect physical changes

Built-in Provisioning Through Change Management

- Process-driven provisioning
- Capacity-based provisioning
- Work orders
- E-mail notifications



Raritan’ s Solution: Award-winning dcTrack®

dcTrack™

NETWORK computing
AWARDS 2011
WINNER
NEW PRODUCT OF THE YEAR

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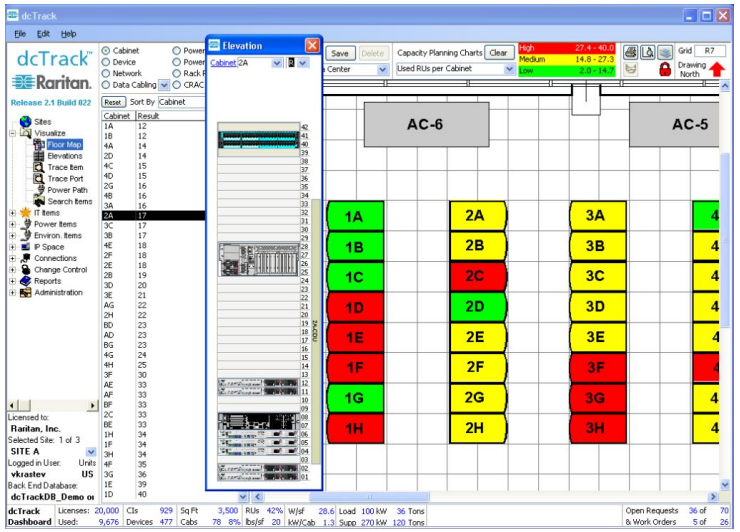
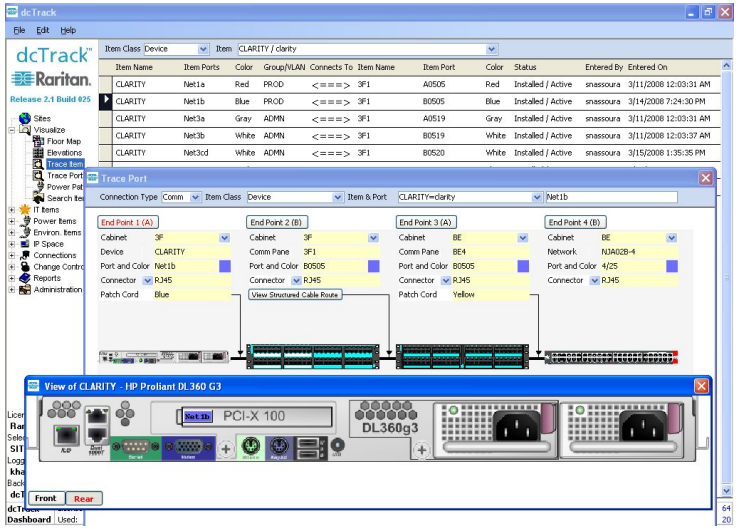
What Can dcTrack Do for Me?

- **Asset Management**
  - What do I have
  - How is it configured and connected
  - Where is it located, who owns it
  - What's the maintenance on it
- **Capacity Management**
  - How much do space, power and network do I have
  - Where do I have capacity
  - How do I optimize my current capacity
- **Change Management**
  - How do I manage moves, adds, and changes (MACs)
  - Who does the work
  - When is the work done
  - How do I know it's done correctly





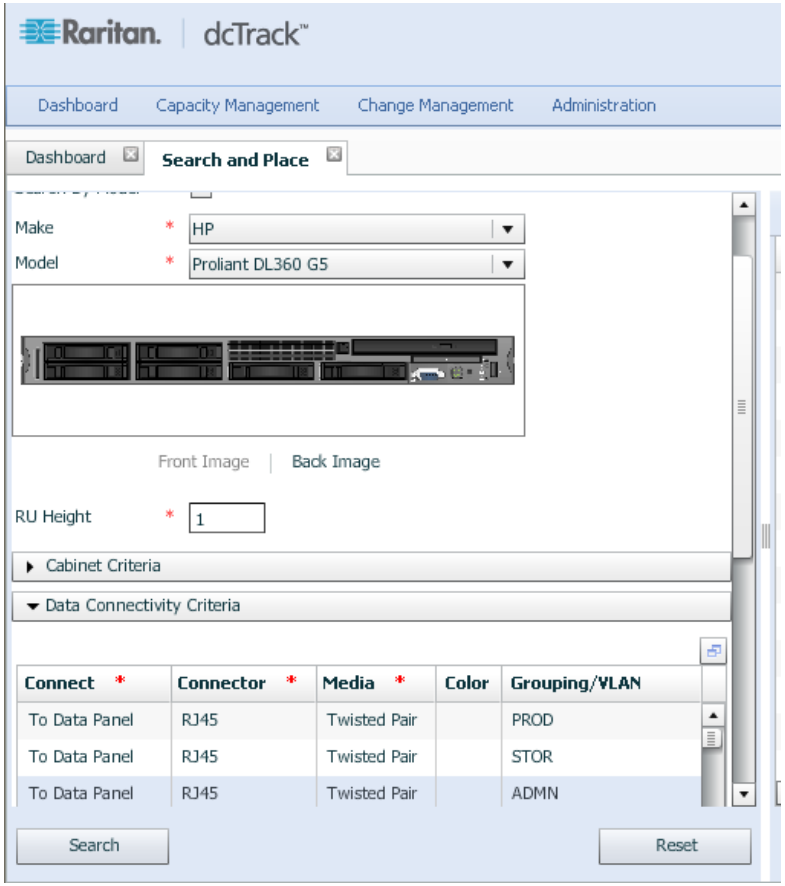
dcTrack Advantages

- **Automation**
  - Automate provisioning process
  - Automate capacity search — NEW
  - Automate data collection
- **Intelligence**
  - Add Intelligent asset tracking — NEW
  - Integrate Intelligent power monitoring
  - Embed Intelligent power provisioning
- **Simplification**
  - Simplify software deployment
  - Simply implementation
  - Simplify end-user interface
  - Simplify procurement

Automation

Automate Provisioning and Capacity Search

- **Provision** servers and configure with power supplies, network and SAN ports
- dcTrack will **automatically** recommend the best location based on multi-constraint criteria:
  - Contiguous rack space availability
  - Power Availability
  - Power Redundancy
  - Network and SAN switch port availability
  - Port VLAN, group, color-code availability



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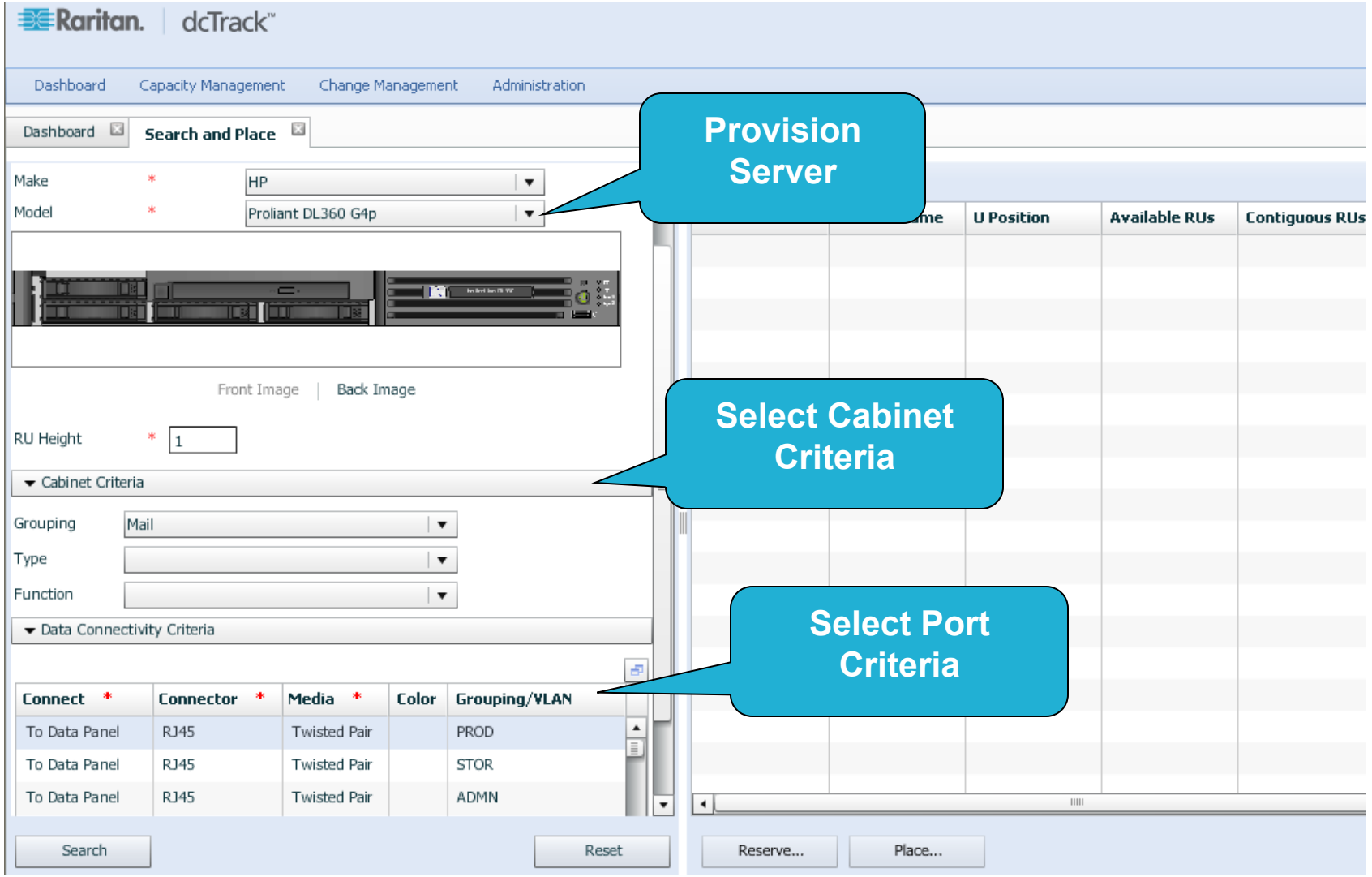
Automate Provisioning and Capacity Search



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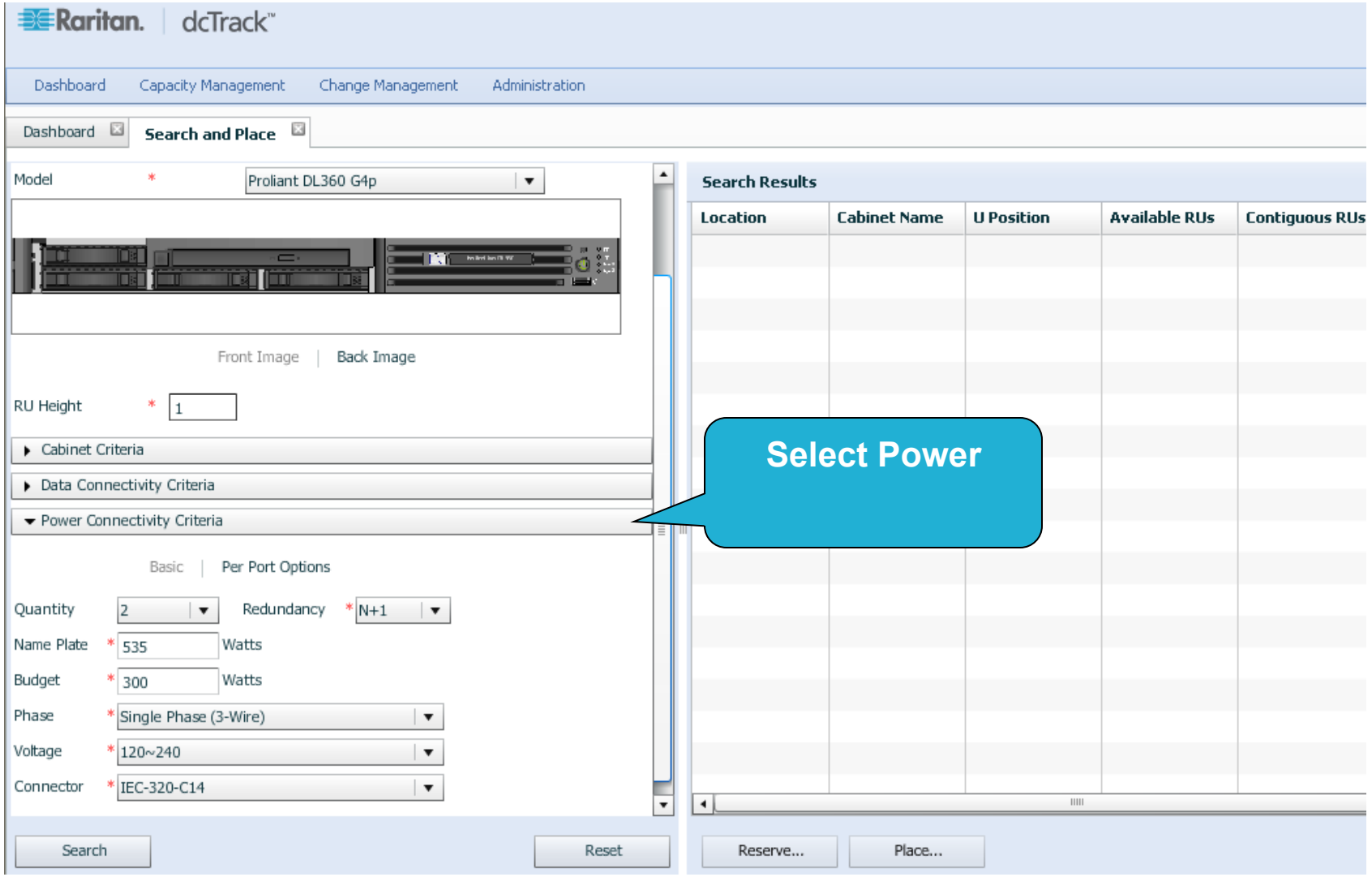
Automate Provisioning and Capacity Search



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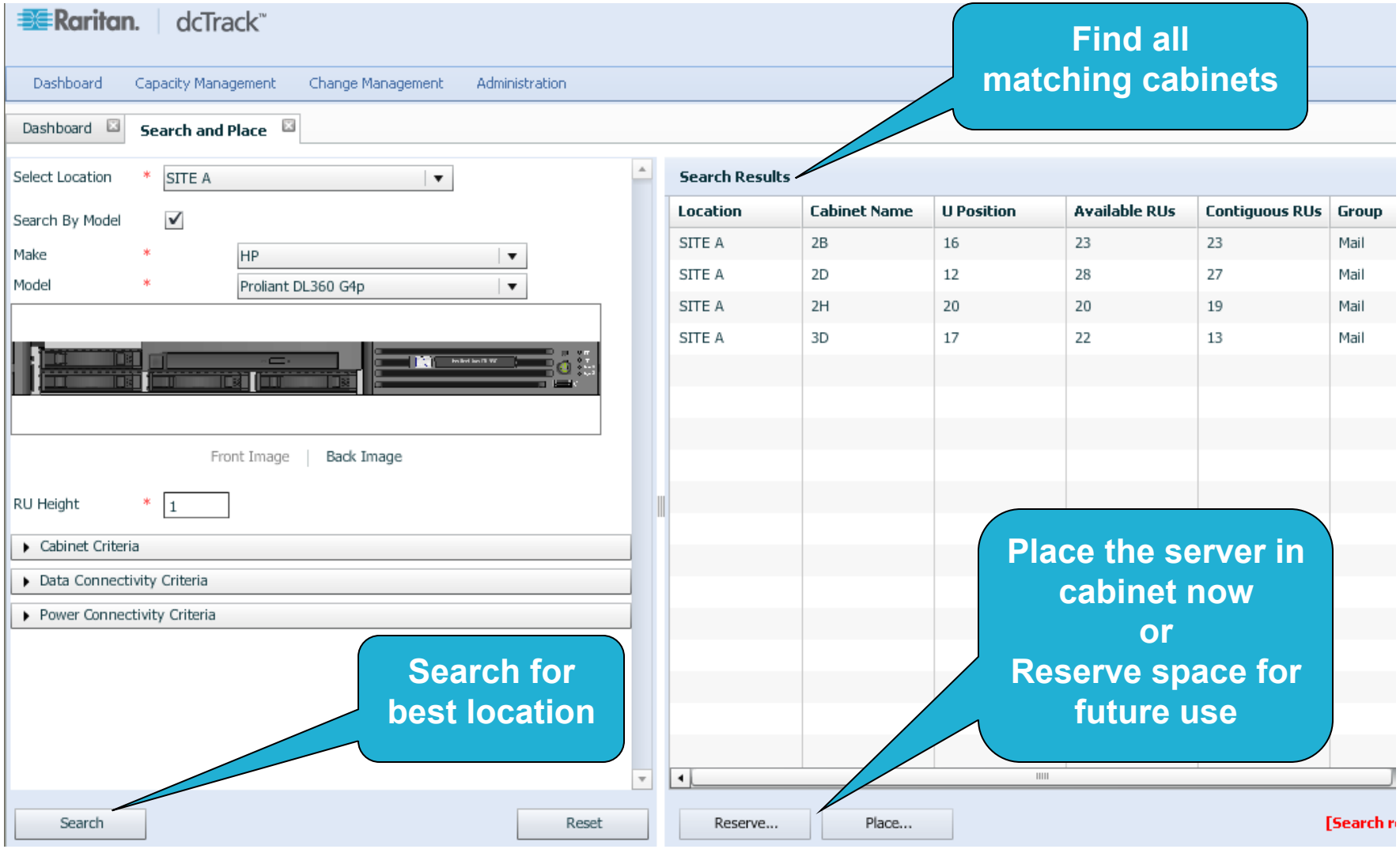
Automate Provisioning and Capacity Search



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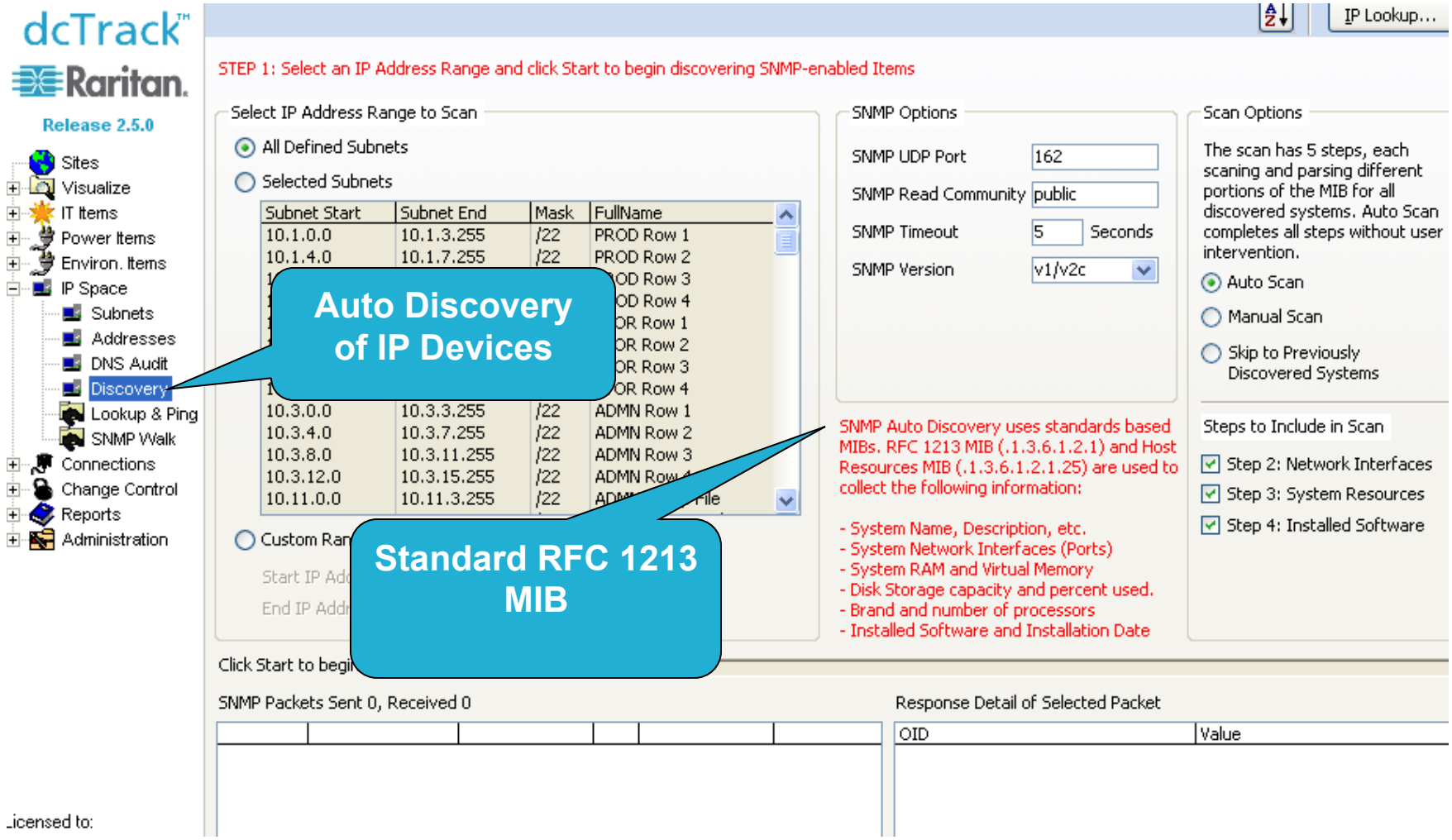
Auto Discovery of Devices



Real-Time Reporting to Manage Energy

- Monitor Power Consumption in Real-time at the Device Level
- Eliminate "Ghost" Servers
- Refresh Energy Inefficient Servers
- Target Servers for Virtualization

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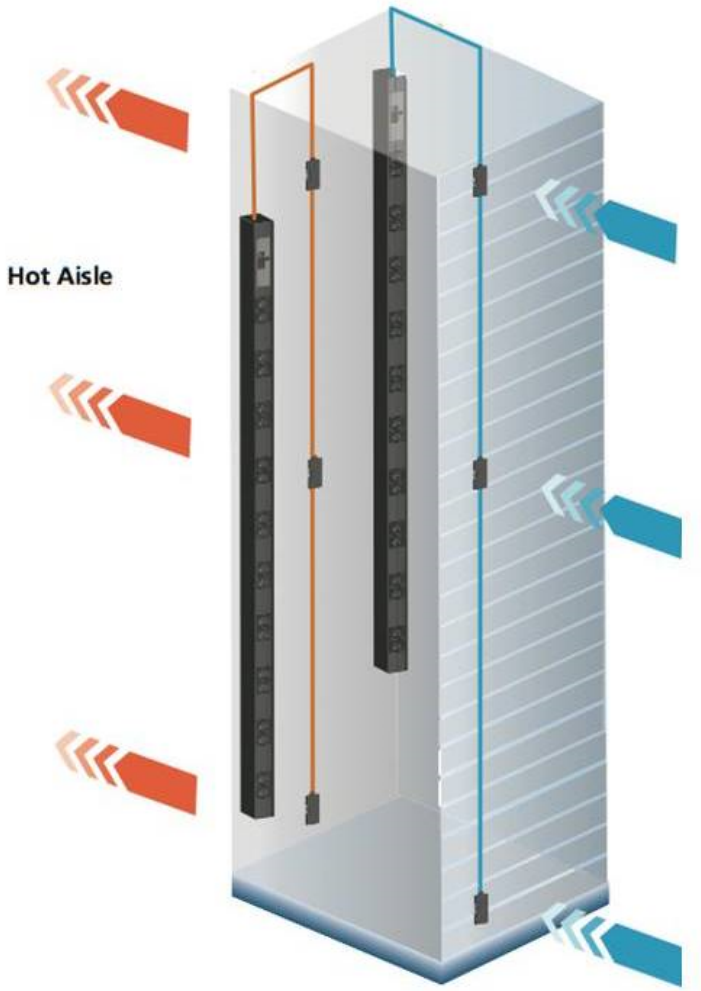
Intelligent Asset Management System

Intelligent Asset Management System



The Cabinet:
The last "dumb" data center component is about to get 'smarter"

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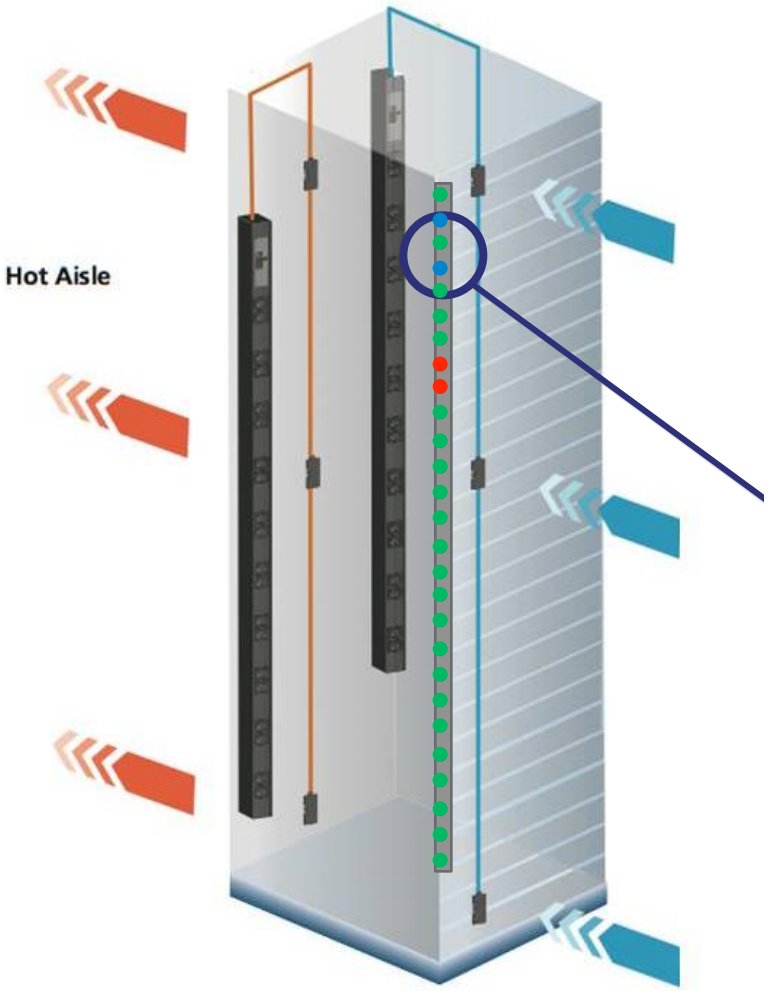
Intelligent Asset Management System



- Locate assets with precision: rack + U position
- Color LEDs at each U-space: verifies connection and shows state
- Integrate with dcTrack change control

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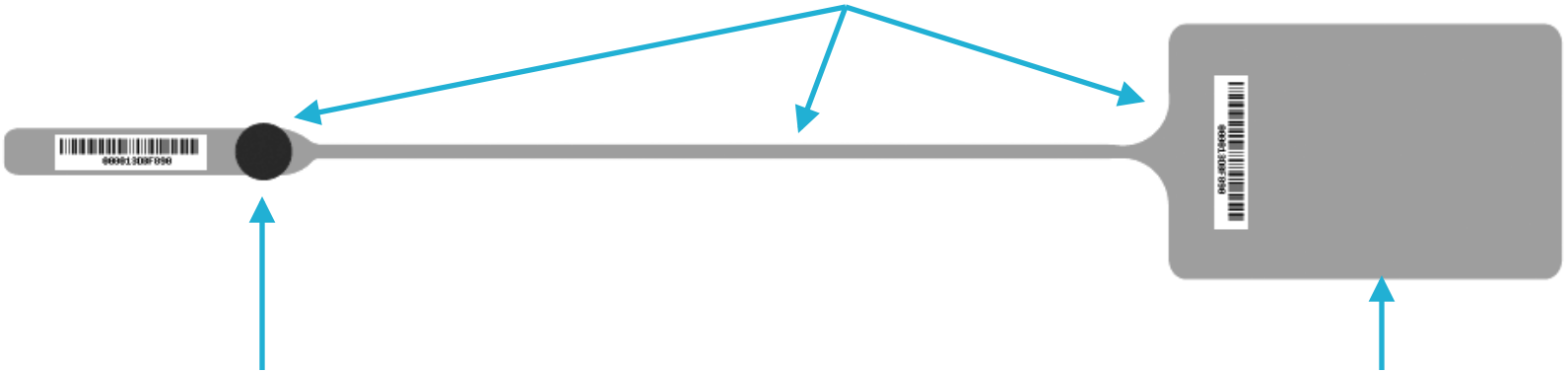
How it Works: Intelligent Asset Tag

Entire tag fabricated from extremely-durable plastic sheathing.

Flexible, yet durable interconnect.



Magnetic "button" contains chip with asset tag ID (identical to barcode).

Magnetic "button" easily snaps in asset sensor bar RU port.

Industrial-strength adhesive joins main asset tag body to top/ bottom of device.

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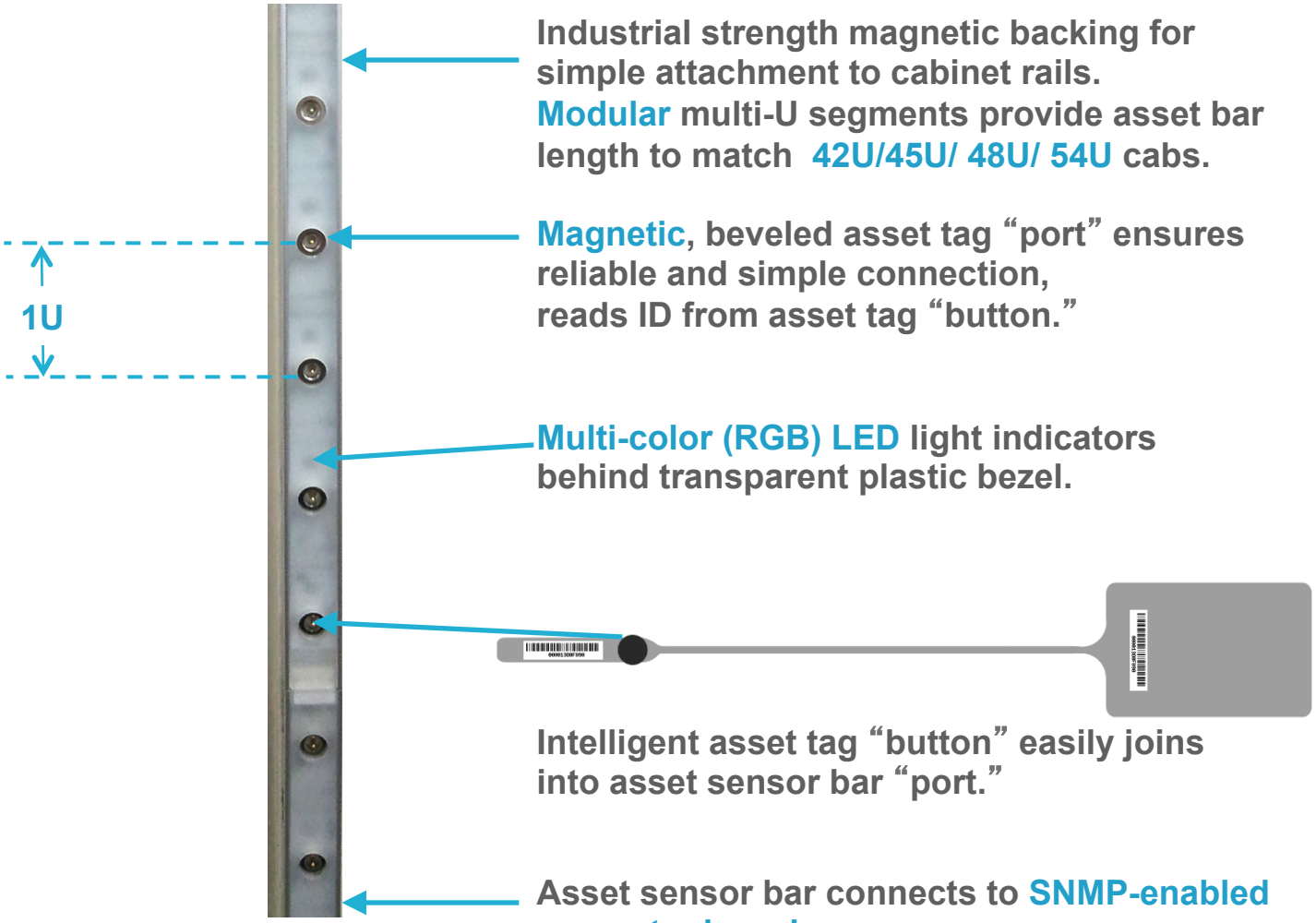
How it Works: Intelligent Asset Sensor Bar



Industrial strength magnetic backing for simple attachment to cabinet rails.
Modular multi-U segments provide asset bar length to match **42U/45U/ 48U/ 54U** cabs.

Magnetic, beveled asset tag "port" ensures reliable and simple connection, reads ID from asset tag "button."

Multi-color (RGB) LED light indicators behind transparent plastic bezel.

Intelligent asset tag "button" easily joins into asset sensor bar "port."

Asset sensor bar connects to **SNMP-enabled computer board.**

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How it Works: SNMP-enabled Computer Boards

Two Choices

EMX Serial Consolidator

- 1U 8-port Unit
- WiFi (802.11 a/b/g/n) or Wired Ethernet;
- Supports 8 Intelligent Asset Sensor Bars
- Also supports environmental monitoring probes (temp + humidity)
- **SNMP communications with dcTrack**

Intelligent Rack PDU PX Series

- Sensor bar connects to PX serial port
- PX supports wired Ethernet or WiFi
- **SNMP communications with dcTrack**

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Integration with dcTrack 2.6

- **Add New Device**
  - Build and configure new device in dcTrack
  - Attach “Intelligent Asset Tag” to device
  - Generate Work Order
  - Intelligent Asset Sensor Bar LED blinks “Blue” at the destination RU port
  - Install new device in cabinet
  - Intelligent Asset Sensor Bar LED turns “Green” at the destination RU port
  - Confirmation is received by dcTrack that new device with the correct asset tag is installed in the correct cabinet and RU position
- **Remove Device**
  - Request device move in dcTrack
  - Generate Work Order
  - Intelligent Asset Sensor Bar LED blinks “Blue” at the destination RU port
  - Remove Device
  - Intelligent Asset Sensor Bar LED turns “White” at the destination RU port
  - Confirmation is received by dcTrack

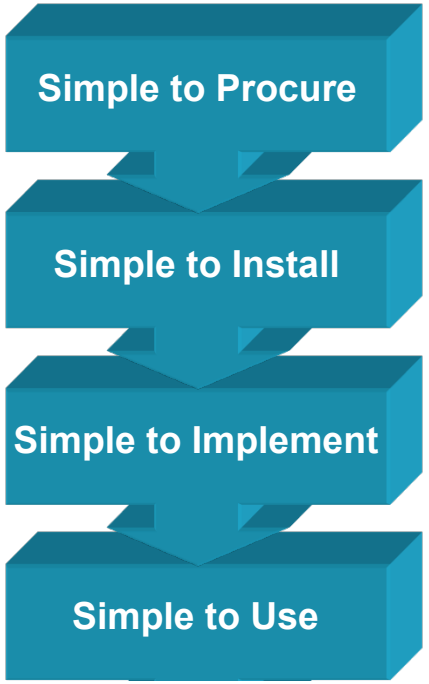
Integration with dcTrack 2.6

- **Unauthorized Changes**
  - Device is either installed in an incorrect RU position; or
  - Device is removed from cabinet without a Work Order
  - Intelligent Asset Sensor Bar LED blinks “Red” at the destination RU port
  - SNMP trap is received by dcTrack

dcTrack: Simplicity by Design

dcTrack: Simple to Procure

- **Simple licensing model**
  - Perpetual software license
  - Based on number of cabinets
  - Pay as you go
  - Unlimited sites, devices, users
- **Sliding scale pricing**
  - Starts at $525/cab for 25 cabs
  - Drops to $360/cab for 2,000 cabs
- **Easy to order**
  - Single part number for software license and 1st year maintenance bundle
  - 18% annual maintenance



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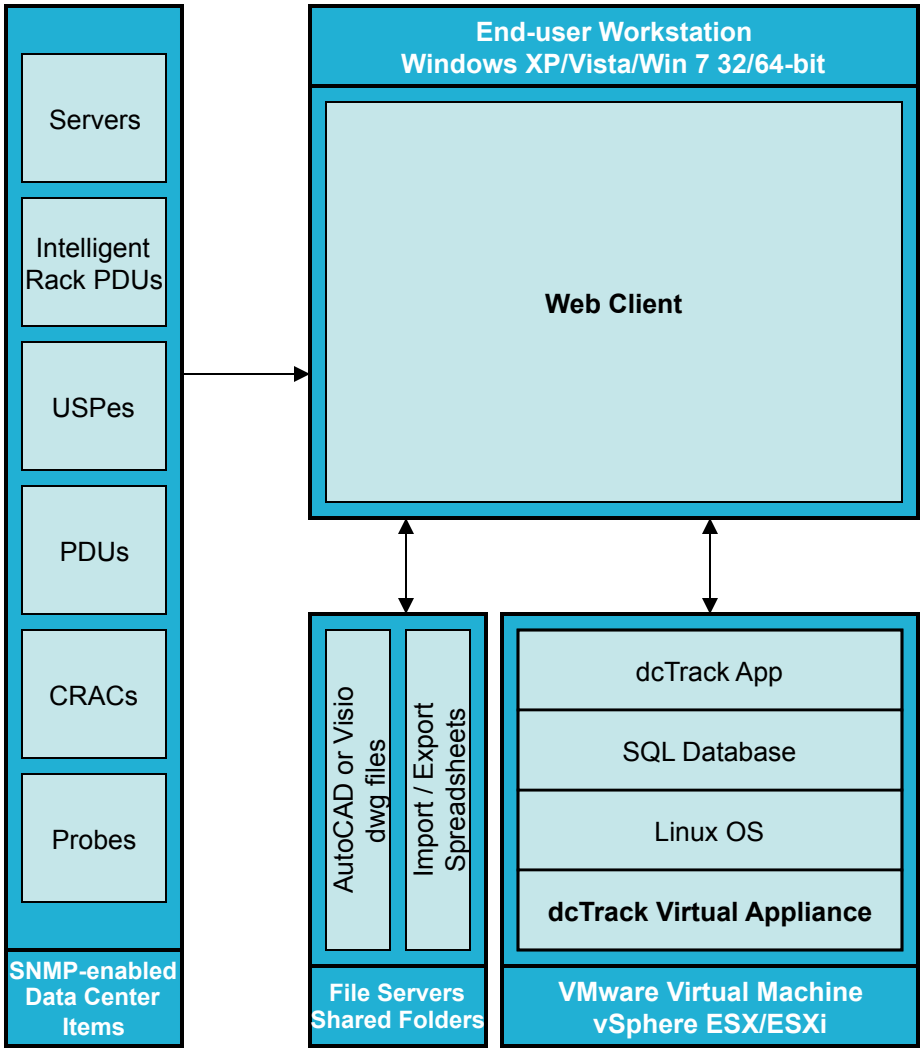
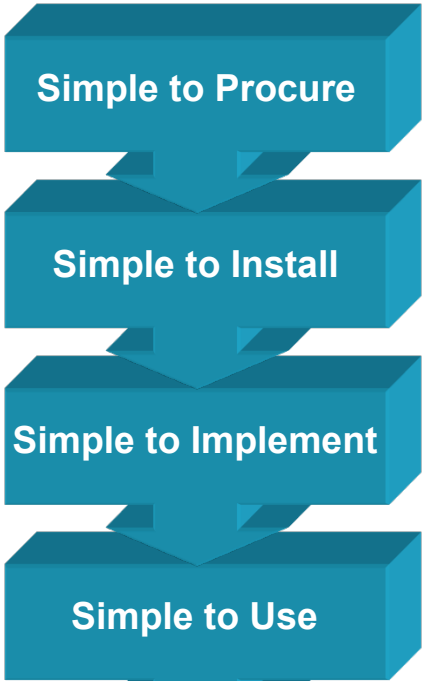
dcTrack: Simple Architecture





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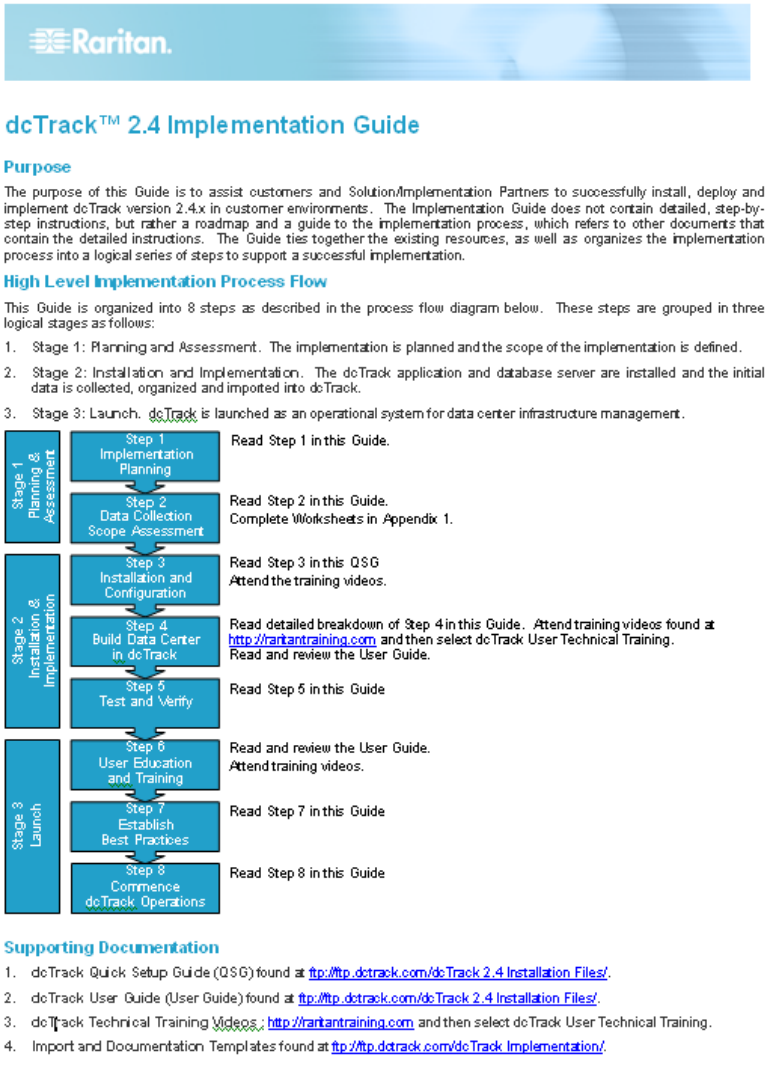
dcTrack: Simple to Implement

- **Well Documented Process**
  - Implementation and User Guides
  - In depth online training videos
- **Quick Start Services**
  - If help is needed to jump start
  - Pre-defined SOW
- **Turnkey Implementation**
  - Delivered by trained and certified partners
  - Customized SOW
- **Tools**
  - Import Wizards
  - Auto Discovery
  - Auto linking to existing floor plans



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dcTrack™ 2.4 Implementation Guide

Purpose

The purpose of this Guide is to assist customers and Solution/Implementation Partners to successfully install, deploy and implement dcTrack version 2.4.x in customer environments. The Implementation Guide does not contain detailed, step-by-step instructions, but rather a roadmap and a guide to the implementation process, which refers to other documents that contain the detailed instructions. The Guide ties together the existing resources, as well as organizes the implementation process into a logical series of steps to support a successful implementation.

High Level Implementation Process Flow

This Guide is organized into 8 steps as described in the process flow diagram below. These steps are grouped in three logical stages as follows:

1. Stage 1: Planning and Assessment. The implementation is planned and the scope of the implementation is defined.
2. Stage 2: Installation and Implementation. The dcTrack application and database server are installed and the initial data is collected, organized and imported into dcTrack.
3. Stage 3: Launch. dcTrack is launched as an operational system for data center infrastructure management.

Supporting Documentation

1. dcTrack Quick Setup Guide (QSG) found at ftp://ftp.dctrack.com/dcTrack 2.4 Installation Files/.
2. dcTrack User Guide (User Guide) found at ftp://ftp.dctrack.com/dcTrack 2.4 Installation Files/.
3. dcTrack Technical Training Videos : http://raritantraining.com and then select dcTrack User Technical Training.
4. Import and Documentation Templates found at ftp://ftp.dctrack.com/dcTrack Implementation/.

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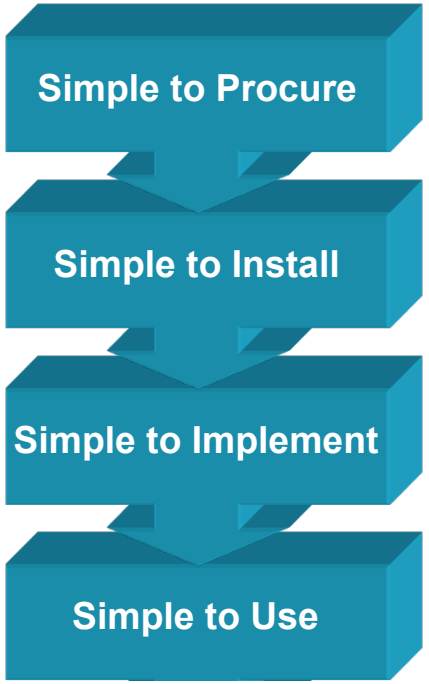
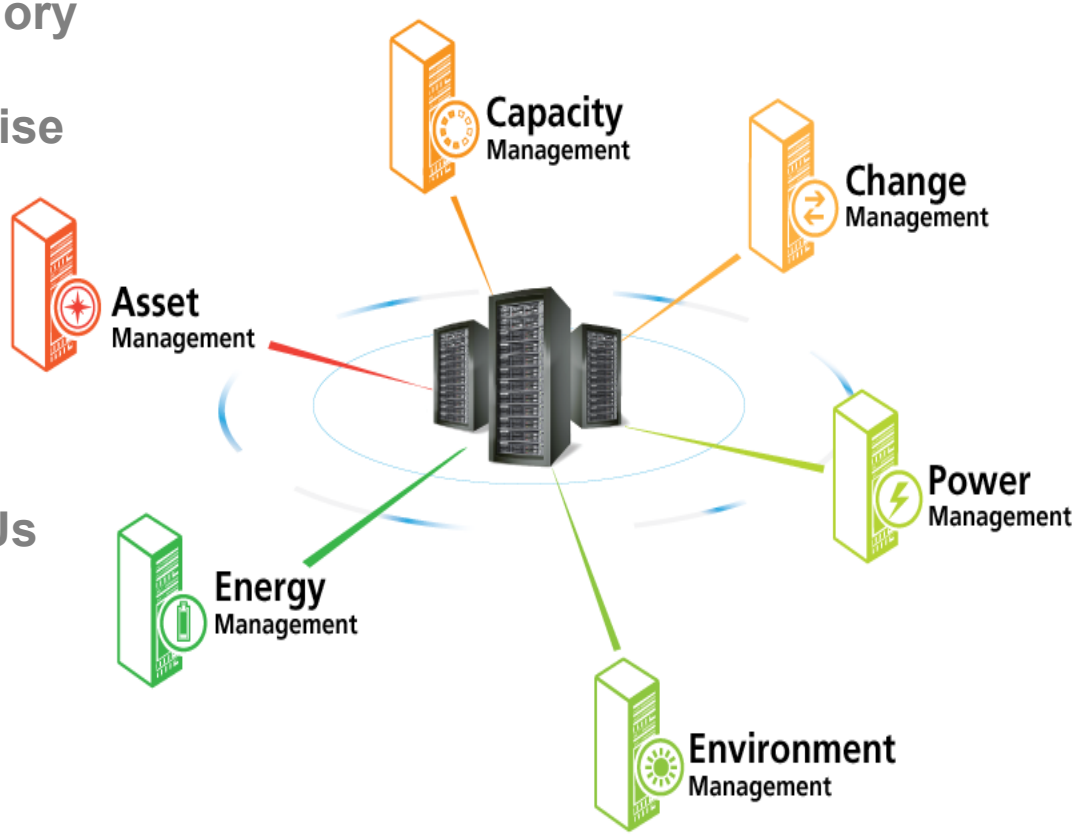
dcTrack: Simple to Use

- **Easy to Navigate GUI**
  - Intuitive layout
  - Explorer-style menu
  - Always visible dashboard
- **Operator-optimized Screens**
  - No cascading screens and pop-ups to perform a single task
  - All item-related information is one screen
- **Import Wizards**
  - Import any tabular spreadsheet
  - Map any spreadsheet column to any dcTrack field
  - Error-checking and data validation



Raritan is Well Positioned to Respond to Customer Needs

- Early Leader in DCIM Category
- Data Center Domain Expertise
- Leading Provider of Data Center KVM and Remote Access
- Leading Provider of Data Center Intelligent Rack PDUs



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Questions and Answers

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Learn about DCIM Solutions at

dcTrack.com