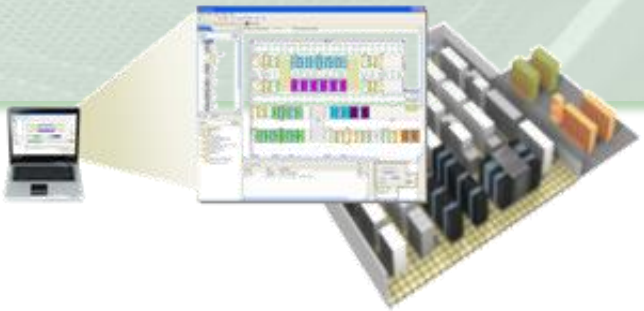
# High Availability & Security for Data Center

*Pressures from new IT technology*

*Keeping up with complex system changes*

*Staying in control of capacity, energy, and availability*



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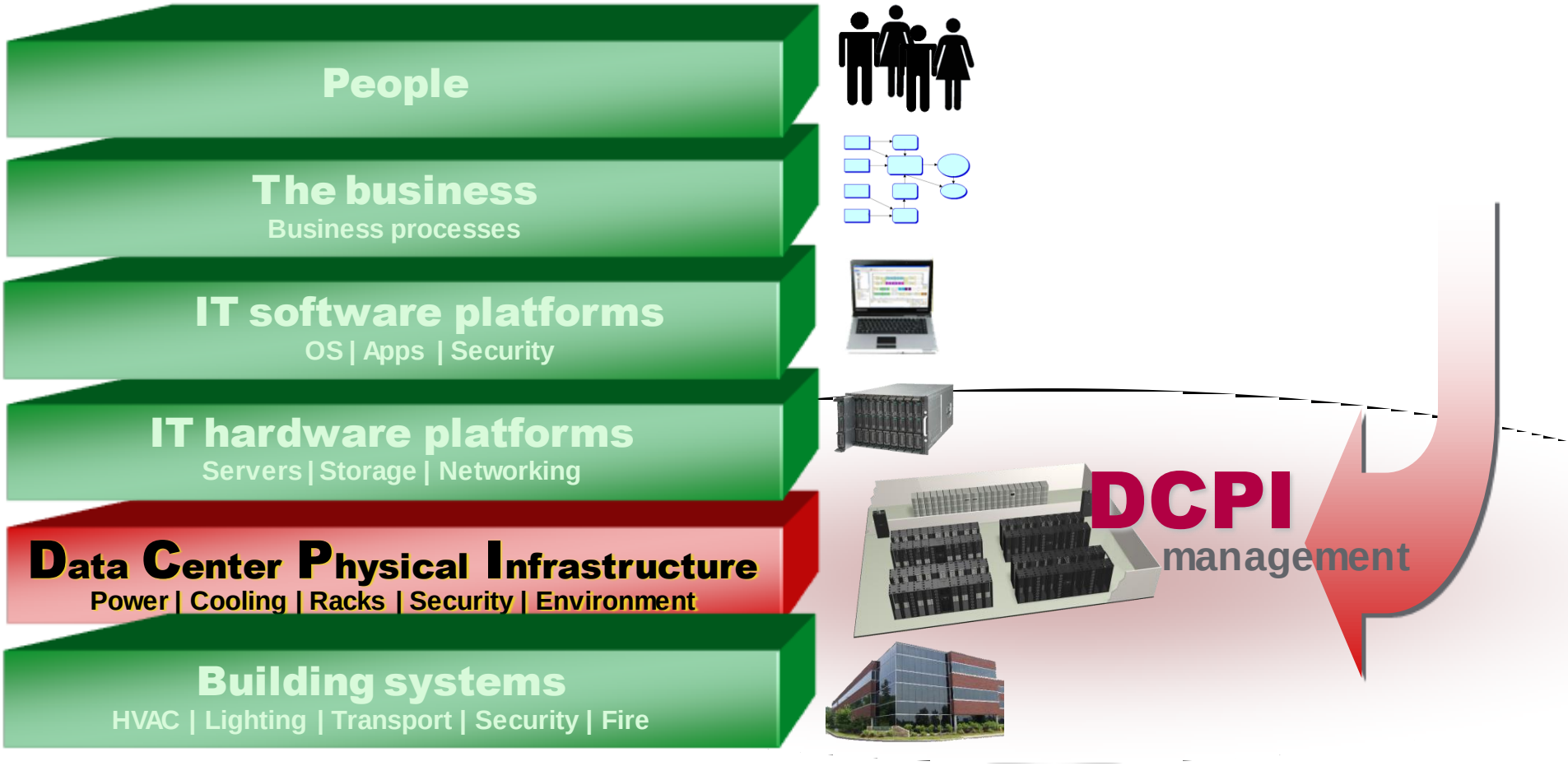
# Which “management” are we talking about?

*Layers of management*



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# The old days are over

***When density was low, energy was cheap, and management tools didn't exist, the paradigm was…***

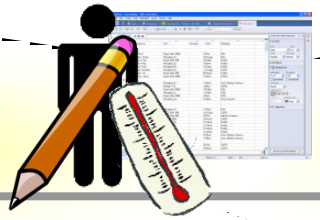
- Overprovision power and cooling to be "safe"
- Spread loads out
- Overspend on capital investment in equipment
- Pay maintenance contracts on unused equipment
- Ignore low operating efficiency and high fixed cost from underloading

***Energy constraints and rapid IT developments demand smart management to reduce waste and stay in control***

# New challenges require new methods

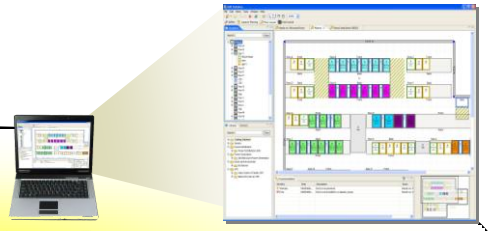
***The old way worked in the old days, but today's data centers need more***



**The OLD way**

***MANUAL methods***

- Walk around and feel for hot spots
- Keep track with spreadsheets
- Wonder if everything is okay
- Waste money on underutilzed power and cooling capacity
- Risk surprises from unforseen trouble
- Always feel "behind"



**The NEW way**

***SOFTWARE tools***

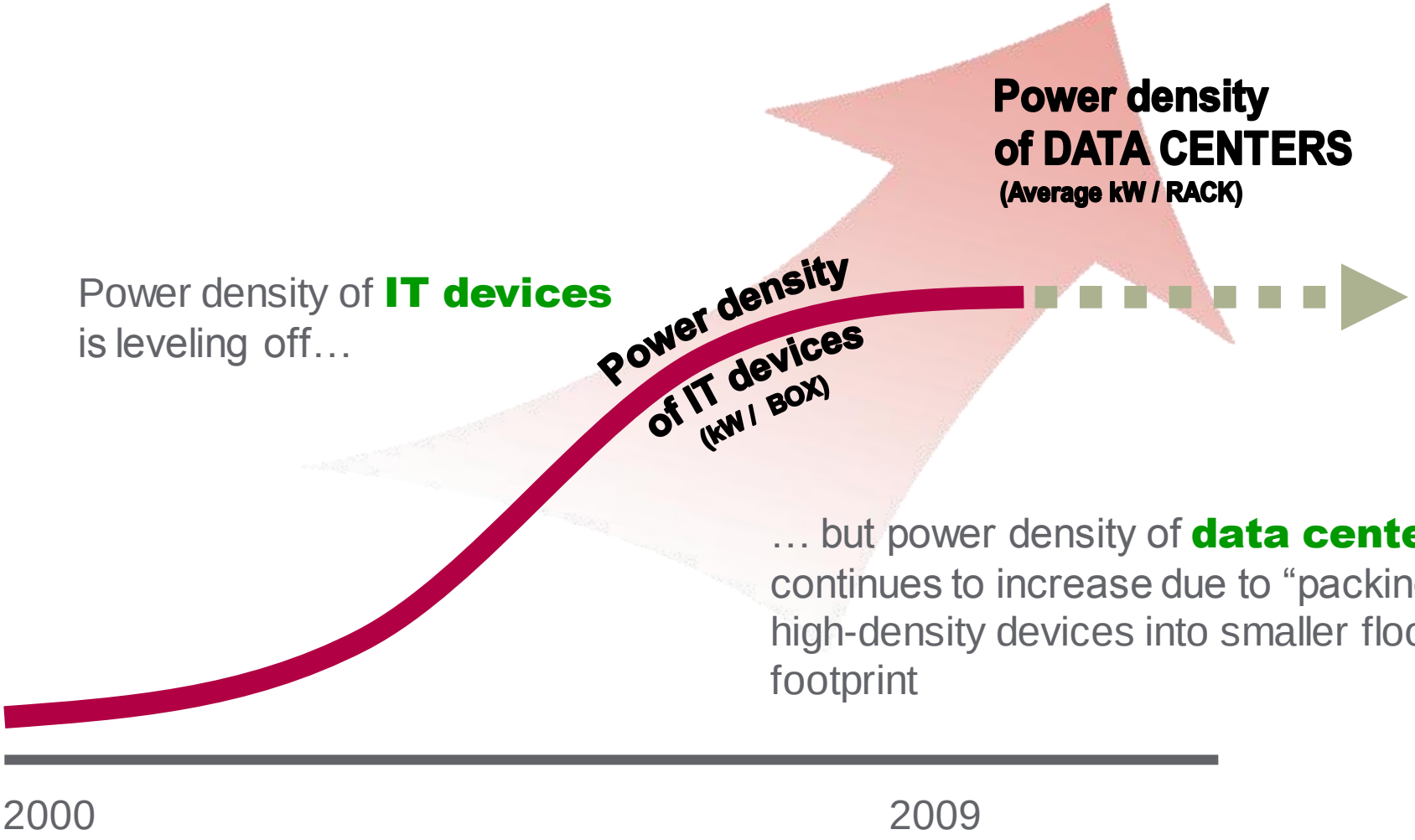
- Get automated alerts
- Take advantage of new IT technology
- Track IT assets and know where you can safely add new ones
- Optimize use of power and cooling
- Analyze, predict, plan
- Keep up with your rapidly changing data center

***To keep up with new technology and complex change, SOFTWARE must replace manual methods***

# The increasing power density of data centers





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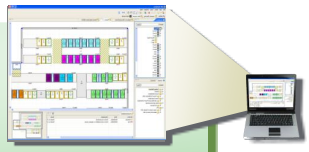
# High density is stressing power and cooling systems



***IT is getting boxed-in by limitations of power and cooling infrastructure***


- High density increases the risk of unpredictable cooling
- Capacity is "tight" in some places, extra but ***unusable*** ("stranded") in others
- High density requires informed and efficient allocation of expensive power/cooling resources
- High density increases the need to know where new devices can be "squeezed in" to available capacities

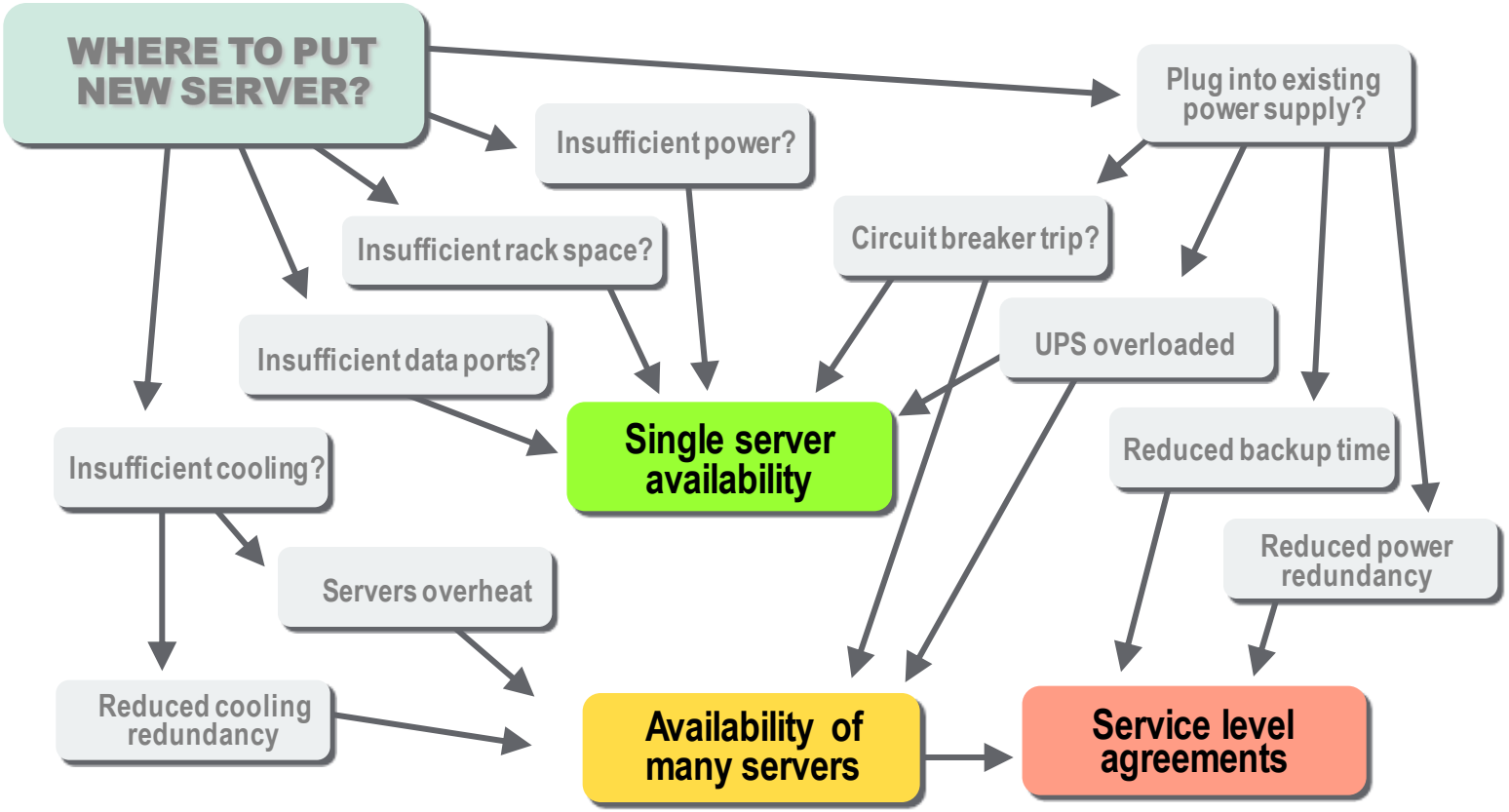
***<u>Software</u> is more effective than manual methods for managing HIGH DENSITY***

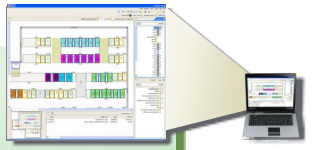


# Add a server:
# More complex than it seems

Management challenge:
**SYSTEM COMPLEXITY**



***Software* is more effective than manual methods for managing SYSTEM COMPLEXITY**

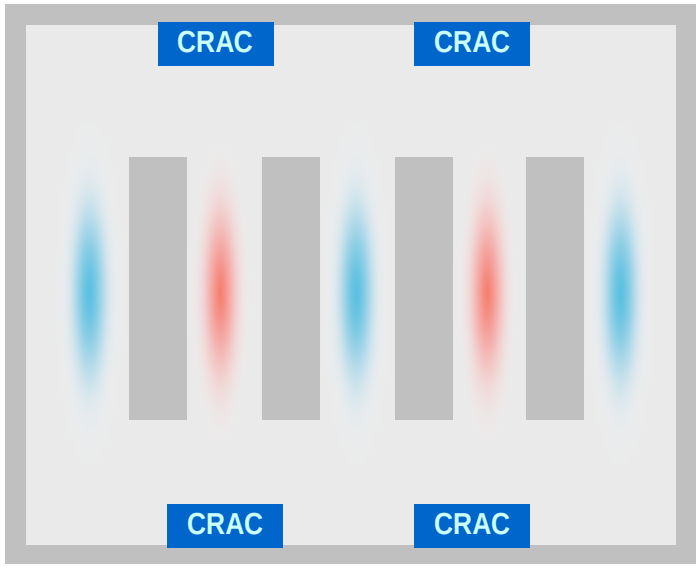
 

# Dynamic loads

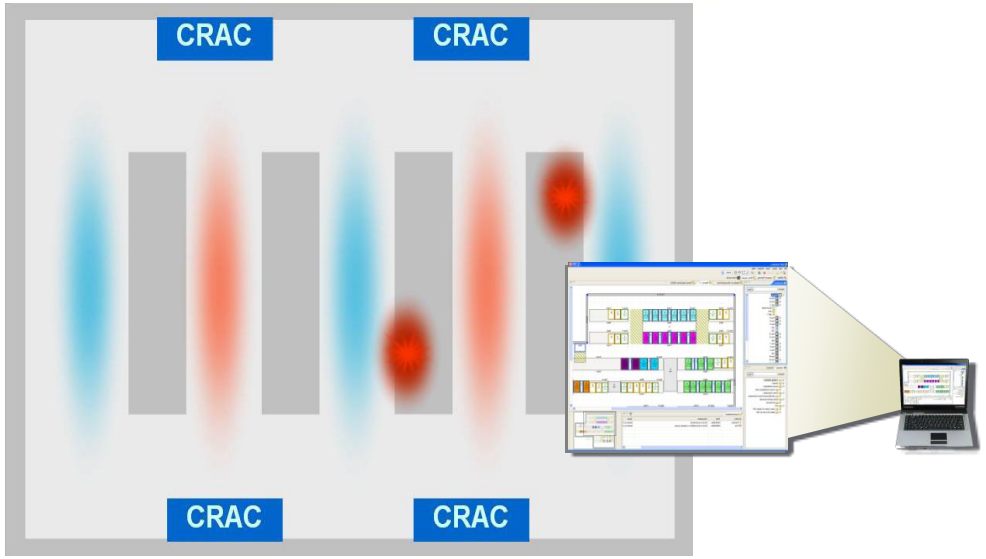


***High-density "hot spots" can vary in both power density AND location***

***Smart MANAGEMENT can track it***




*Low-density (no challenge)*




*High-density hot spots*

***<u>Software</u> is more effective than manual methods for managing DYNAMIC LOADS***

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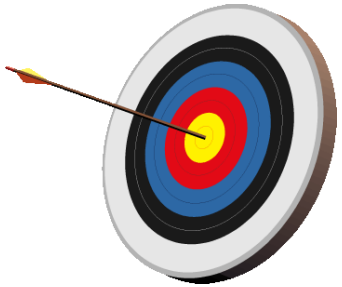
# The newest challenge: EFFICIENCY

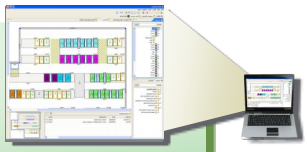


***Efficiency goal:***



Provide power and cooling in the **amount** needed, **when** needed, and **where** needed – but **no more** than what is required for redundancy and safety margins

***Software is more effective than manual methods for managing EFFICIENCY***



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# Maximize use of your capacity

Management challenge: **EFFICIENCY**

***Smart management lets you safely "run lean"***


***Software** is more effective than manual methods for helping you RUN LEAN*

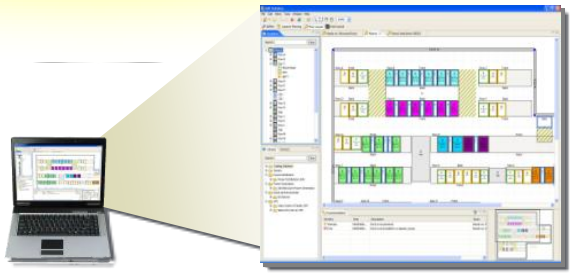
 

# Reduce STRANDED CAPACITY

Management challenge: **EFFICIENCY**

***Capacity you pay for but can't use***

***Smart MANAGEMENT can find it***



Got **POWER** ?

***... but not enough COOLING or SPACE***

Got **COOLING** ?

***... but not enough POWER or SPACE***

Got **SPACE** ?

***... but not enough POWER or COOLING***

***Software is more effective than manual methods for managing STRANDED CAPACITY***

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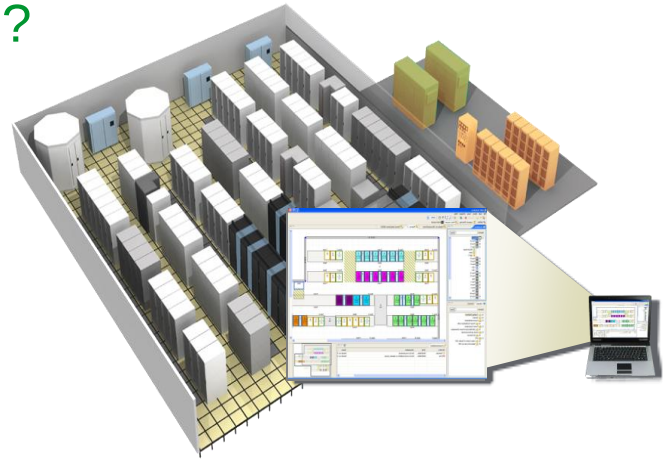
# … plus AVAILABILITY issues



***Proactive vigilance for power and cooling overloads***

- If I have a row-based cooling unit fail, where did I loose redundancy?
- Is this server at N+1 cooling or 2N?
- How many CRACs can fail before I start having a problem?
- Are any devices ALREADY over-temperature?
- Am I running within my safety margins?
- Are all my air conditioners working?
- Where am I close to a breaker trip?

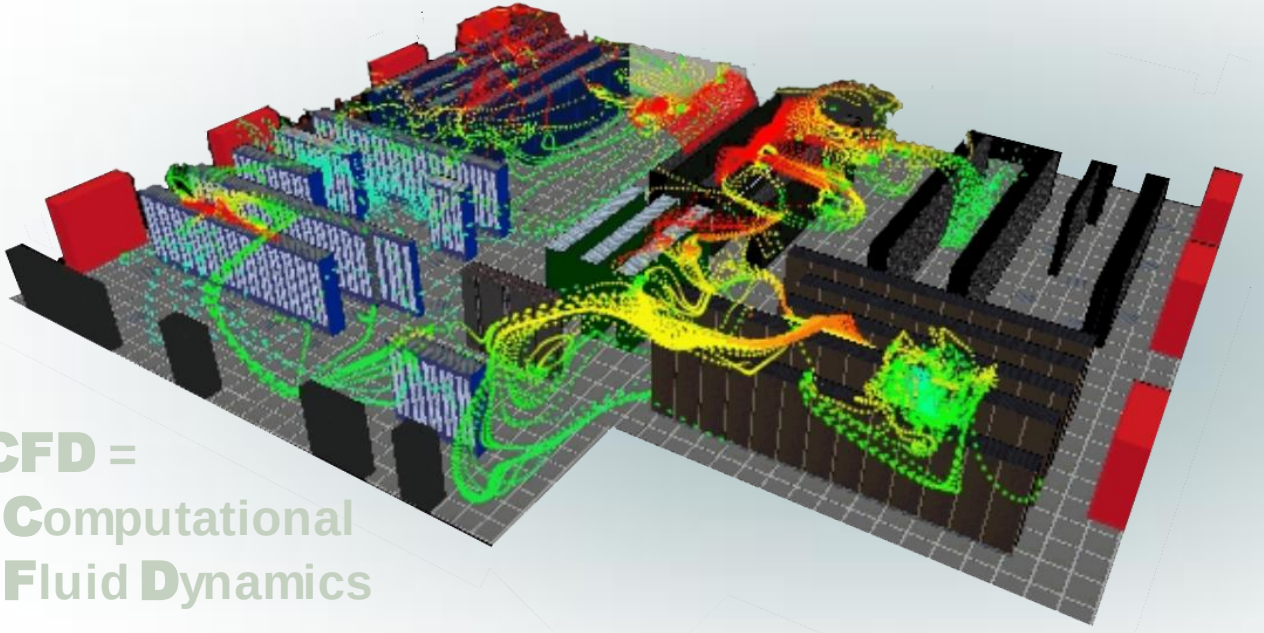


***Software is more effective than manual methods for managing AVAILABILITY***

# If this is how you manage, you're in trouble!

- CFD analysis usually means trouble has already occurred
- Not real-time – by the time you run another CFD, things have changed
- With integrated management from the start, potential problems can be identified BEFORE they escalate to trouble



**CFD =**
**C**omputational
**F**luid **D**ynamics

***This is post-mortem, not proactive!***

*CFD has legitimate uses in research, but not in real-time MANAGEMENT*

***This is NOT what we mean by software tools!***

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# Elements of a comprehensive management system

## *Data Center Physical Infrastructure Management™ (DCPIM)*

*Complete*

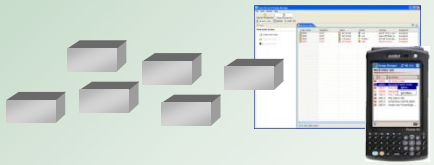
*Basic*

**4 Predictive simulation and modeling**

- Accurate simulation of real-time data
- Capacity management
- What-if analysis

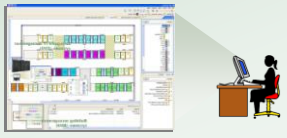
**3 Inventory management**

- Inventory
- Work flow



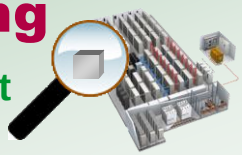
**2 Centralized monitoring**

- Unified view from anywhere
- Real-time data
- Vendor-neutral



**1 Device monitoring**

- Lowest level management at the device
- Vendor-neutral



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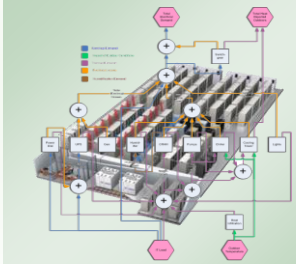
# The centerpiece:
# A true working model of the data center

***The "brain" of the management system***

## Design data

*Feeds into the database and "informs" the model*

- New installs
- Redesign
- High-density "pod"
- Constraints and capabilities

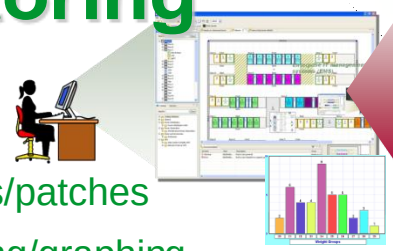


## Model and database

*Not just a "CMDB" **

## Monitoring

- Status
- Events
- Updates/patches
- Reporting/graphing



## Operations

- Inventory/asset
- Workflow
- Predictive simulation

* CMDB – Configuration management database (ITIL definition)

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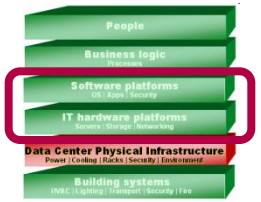
# Why not use your enterprise management system ?

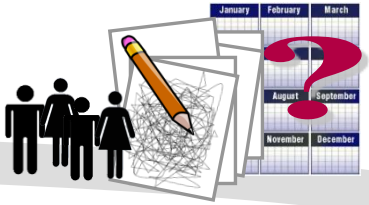



***Your enterprise management system COULD be custom programmed …***

IT Software layer

IT Hardware layer

**E**nterprise
**M**anagement
**S**ystem




*Custom programming to create "IT view" of DCPI*

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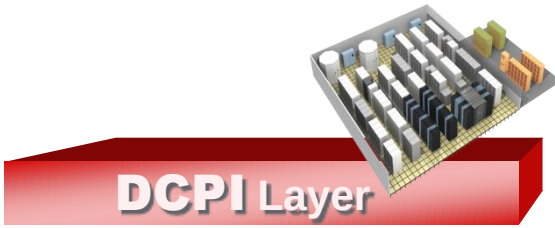
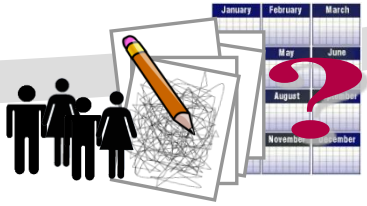
# Why not use your building management system ?


***Your building management system COULD be custom programmed …***




***Custom programming to create "Facilities view" of DCPI***




**B**uilding
**M**anagement
**S**ystem
Building layer



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# “Out-of-the-box” package eliminates custom programming


IT Software layer

IT Hardware layer

**E**nterprise
**M**anagement
**S**ystem

Custom programming

InfraStruXure Management Suite

- *Dedicated*
- *Pre-built*
- *Quick setup*

*Both can view DCPI through here*

DCPI Layer

**B**uilding
**M**anagement
**S**ystem

Building layer

Custom programming

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# What about “management platforms”?

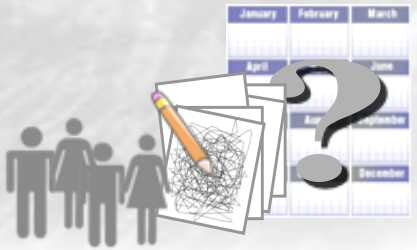
***Same answer: Custom programming is expensive, time-consuming, and a hassle***

*Dedicated DCPI management* ***product***


***Less cost***
***Faster***
***More reliable***

**VS**

*Generic management* ***development platform***



## Pre-built system

**specifically designed for the mission**

- “Shrink wrapped” product
- Minimal setup of parameters
- No custom programming
- No waiting

***Configuration Service*** *can do setup for you*

## “Development environment”

**for custom programming**

- Do-it-yourself
- Programming expertise required
- Managing, scheduling
- Testing, debugging
- **How long will it take?**

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# Make intelligent business decisions, faster

***Example: Loss of cooling redundancy***


## Old way

### Non-integrated management

**Fan failure** alert !

- *… then what?*

## New way

### Integrated management

**Fan failure** alert !

- *Correlate to affected devices*
- *Notify business process system*
- *Check against Service Level Agreements*
- *Make intelligent decision based on policy for redundancy loss*

***This is only possible with dedicated DCPI management***

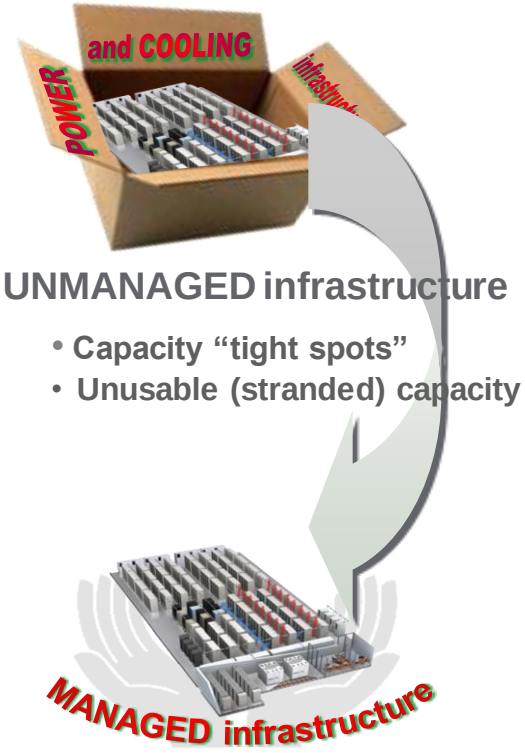
 

# Free the IT layer

*... with lean, smart infrastructure*

***Smart management can monitor, analyze, model, and forecast, so you can ...***

- **Align** capacity with demand
  *At row, rack, and server level*
- **Reduce** power consumption of power/cooling infrastructure
  - Lower the electric bill
  - Free up power/cooling for more IT
  - Increase DCiE (power/cooling efficiency)
- **Right-size** power/cooling infrastructure
  *Reduce wasteful excess capacity*




***Managed power and cooling frees the IT layer to do the REAL work of the data center***

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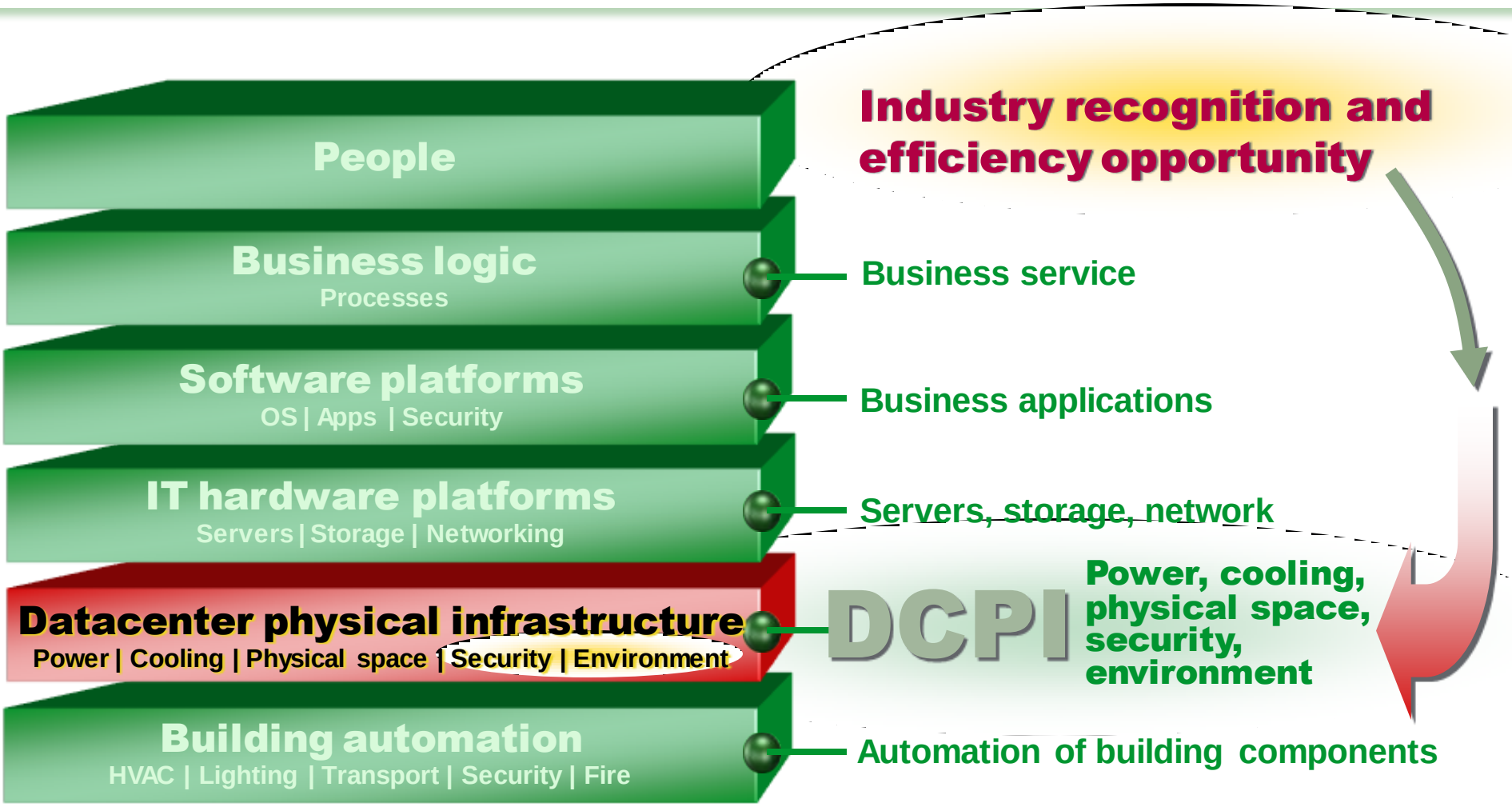
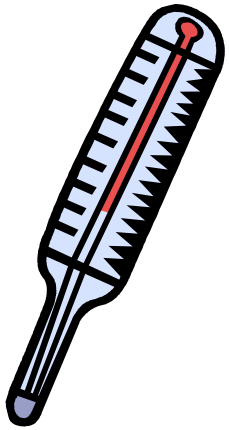
# Managing the layers – Physical infrastructure needs attention!



# Environment Poses a Risk to Availability

- Racks were already hot in 2005
  - "10% of all racks are already too hot and fail to meet industry standards for maximum IT reliability and performance." (Uptime Institute)
  - Virtualization is forcing more processing power out of a smaller space, causing hot spots (Forrester 2008)
    - Need to monitor at rack level is more important because of variance within single rack.
- "For every 15 degrees over 75 degrees your equipment is subjected to, its lifetime is cut in half" (Uptime Institute)
- Technology exists for manufacturers to validate operating condition compliance
  - Particle sensors, leak sensors



***If you cannot verify you are running within operating specifications you will shorten the life of your equipment.***

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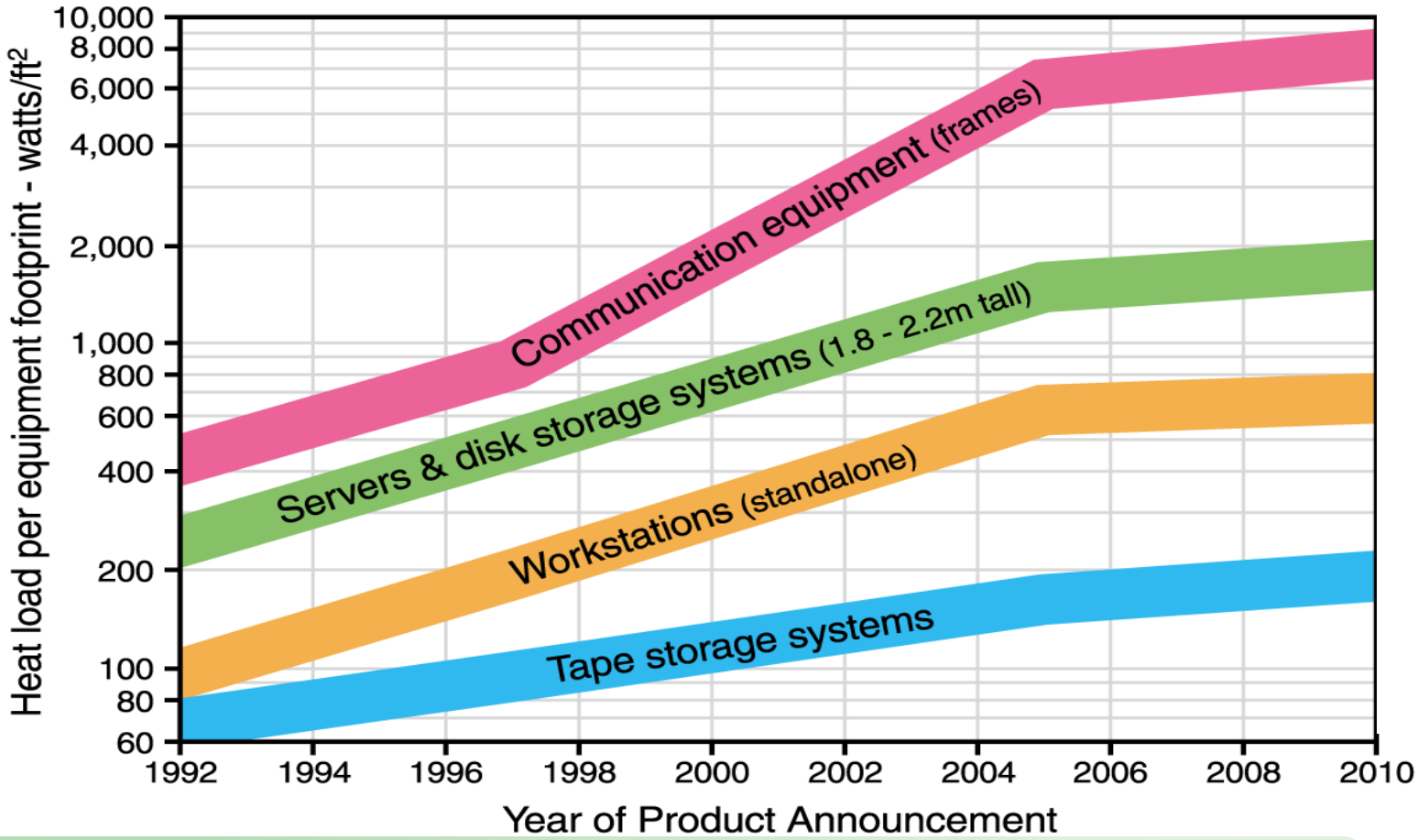
# Heat Density Trends

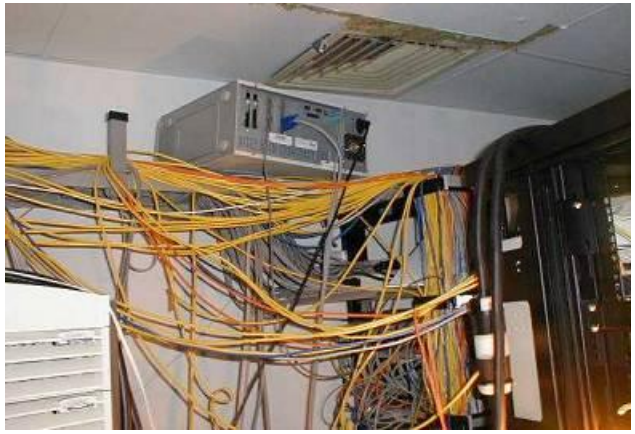



***Converged Networks demand higher power consumption & new levels of monitoring.***

*Source: 2000 The Uptime Institute - Reprinted with permission from a White Paper titled "Heat Density Trends in Data Processing, Computer Systems, and Telecommunications Equipment" v1.0*

# Network Closets are Business Critical

- Power consumption has increased 10X over the past 10 years* (Cisco 2008)
  - VOIP, Network Convergence, PoE
- 97% of all IT spaces are network closets and server rooms
  - Over 2.2 M in NAM alone (IDC 2006)
- VOIP is growing at 26% annually (IDC); $2.2B market in 2008
- Companies are realizing the criticality of IT spaces (Forrester 2008)
  - 42% percent of IT managers said business continuity and disaster recovery are very important, up from 33 percent from last year.

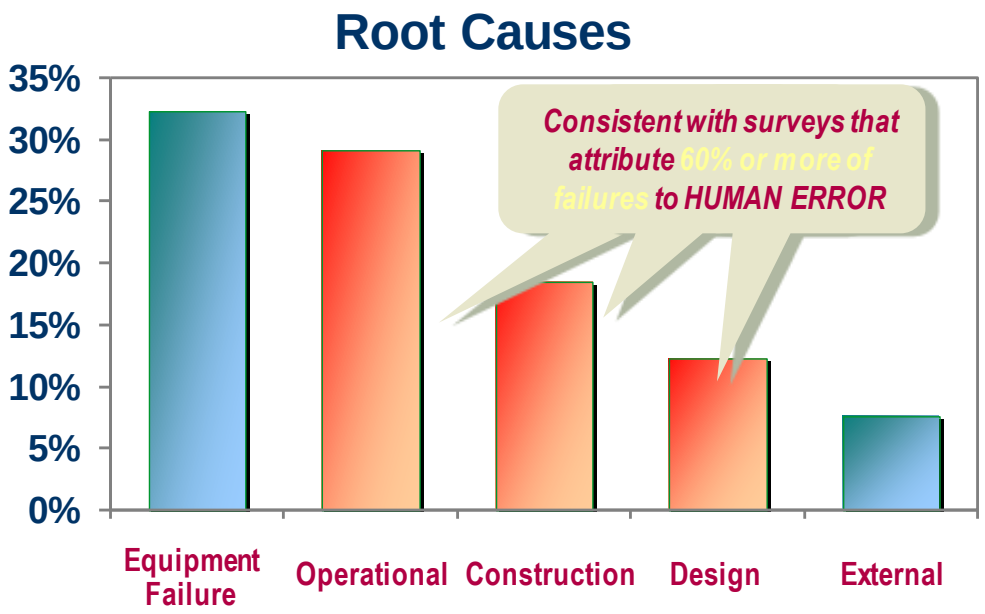


***Business critical applications are running in suboptimal environments.***

*in a 100 phone network closet

# Security is Increasing in Criticality

- Security is a top issue with customers
  - 76% of security decision makers expect to either maintain or increase their IT security budget for 2009 (Forrester 2008)
  - Security makes up 10 percent of overall IT operating budgets in 2008, up from 8 percent last year.
  - Over 60% of downtime is caused by human error (Uptime Institute)
  - Cost of downtime increased 3X in last 10 years (Wall Street Journal 2008)
- Stringent Access control procedures are enforced in Data Centers
  - Sisters of Mercy only allows IT personnel in Data Center when it is physically necessary
  - Switch Communications enforces that only one of three redundant power distribution paths can be down for maintenance at any given time
- Regulatory Compliance forces a focus on security




***Knowing who accessed your Data Center or Network Closet is best practice.***

# NetBotz Combats Physical Security Threats

- **Physical Safeguards from HIPPA Act Title II**
  - Controlling physical access to protect against inappropriate access to protected data
  - Controls must govern the introduction and removal of hardware and software from the network. (When equipment is retired it must be disposed of properly to ensure that PHI is not compromised.)
  - Access to equipment containing health information should be carefully controlled and monitored.
  - Access to hardware and software must be limited to properly authorized individuals.
  - Required access controls consist of facility security plans, maintenance records, and visitor sign-in and escorts.
  - Policies are required to address proper workstation use. Workstations should be removed from high traffic areas and monitor screens should not be in direct view of the public.
  - If the covered entities utilize contractors or agents, they too must be fully trained on their physical access responsibilities.


***NetBotz Access Control and Surveillance applications provide tools to help ensure compliance with these Safeguard Requirements.***

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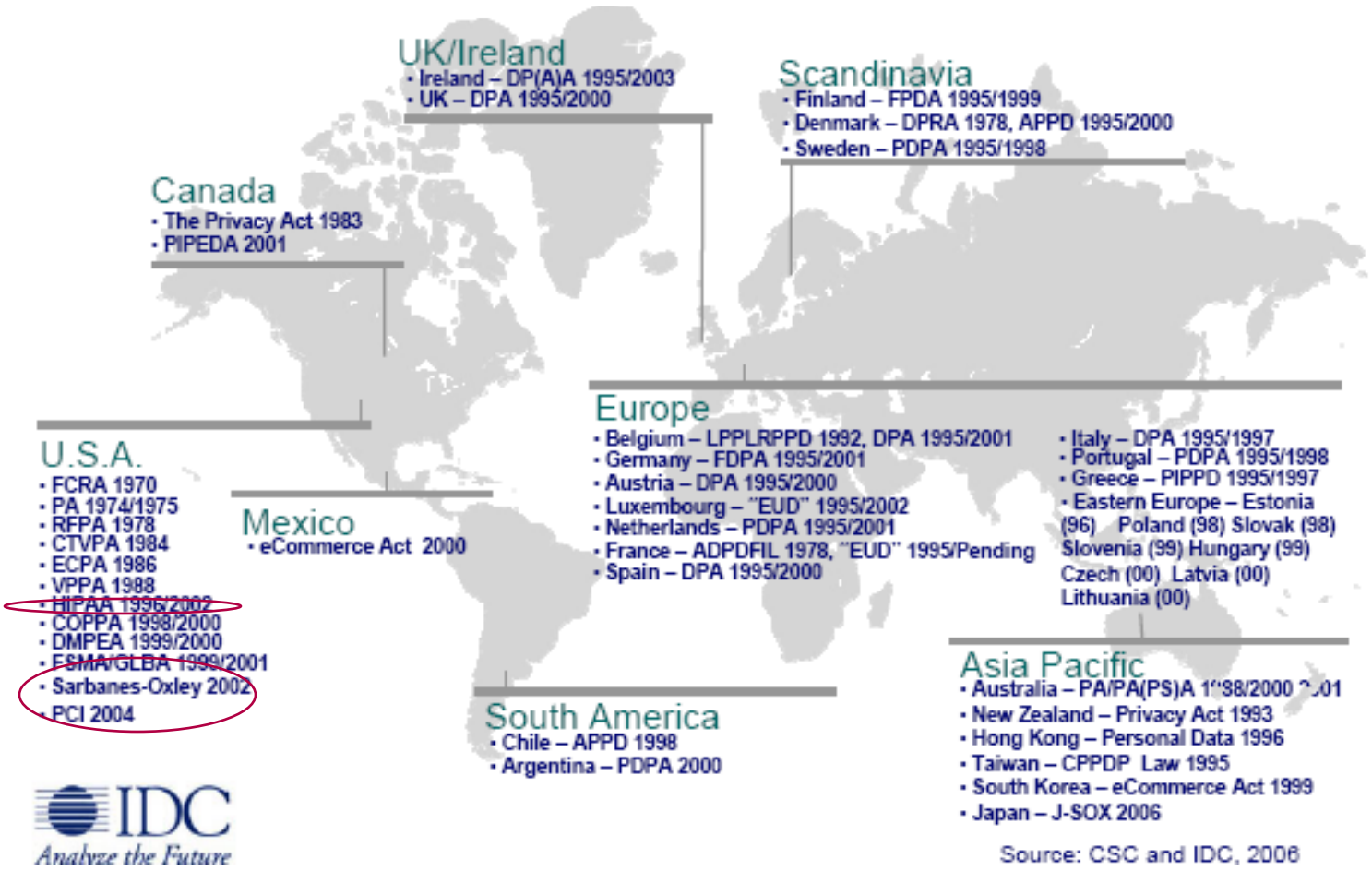
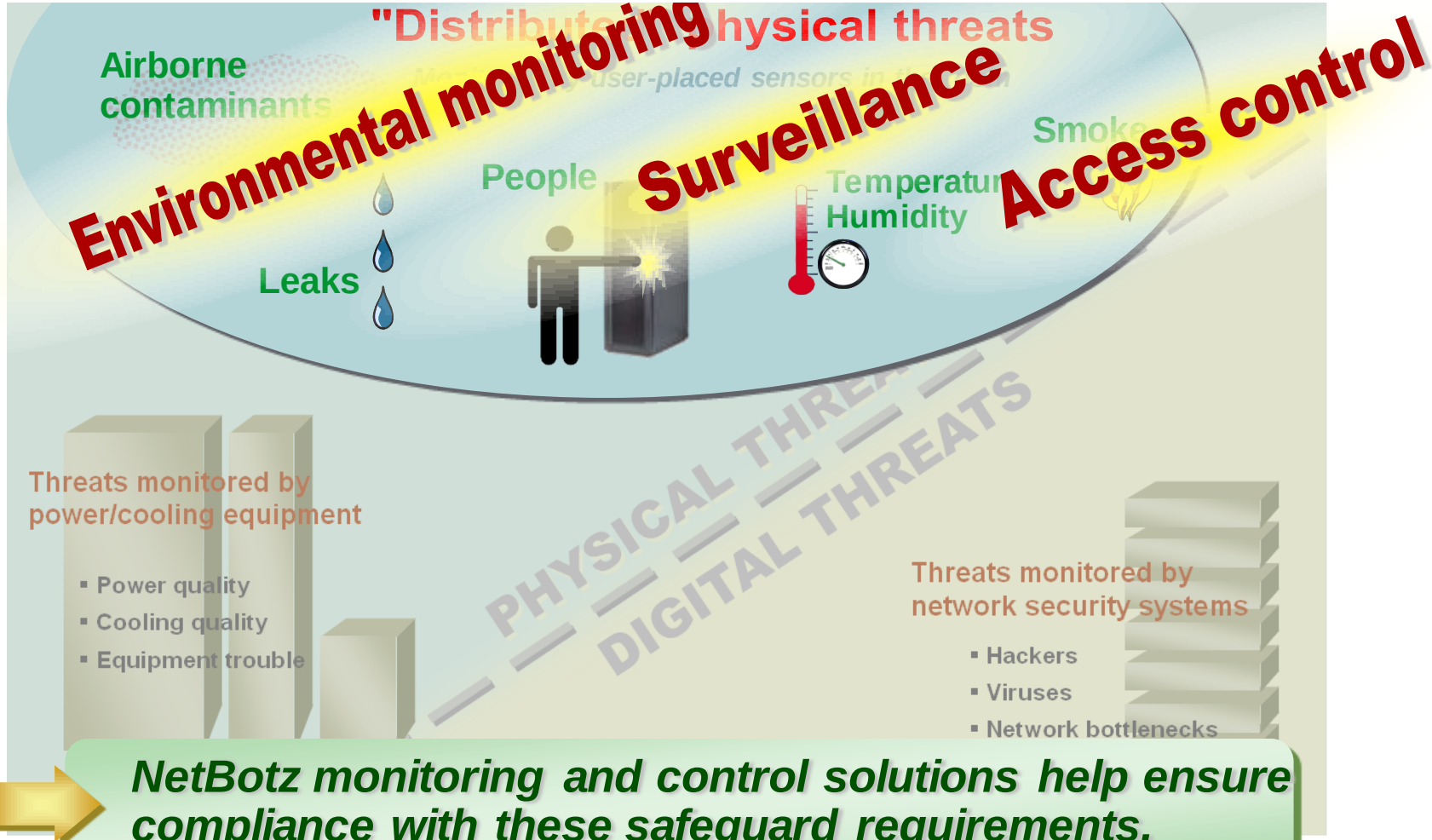
# Compliance around the World




***Regulatory compliance is a global physical security concern.***

# Physical Threats vs Digital Threats




***NetBotz monitoring and control solutions help ensure compliance with these safeguard requirements.***

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# Customer Benefits

| | |
|---|---|
| **Availability**<br>• Track and record environment and physical access<br>• Reduce human errors<br>• Help ensure compliance with government physical security regulations<br>• Leverage experts for remote problem resolution | **Agility**<br>• Pay as you grow modular architecture provides expandability<br>• Centrally trend and receive alarms on environment, surveillance, and access control data to quickly find the root cause for failures |
| **TCO**<br>• Optimize IT asset life by ensuring operating parameters are met<br>• Ensure business continuity by monitoring for disruptions<br>• Reduce travel needs to remote sites | **Energy Efficiency**<br>• Enable verification that systems are running within designed operating parameters and reducing waste (leaks, temperature, humidity) |

***Protect against physical threats, environmental or human, that can cause disruption to IT assets***

 

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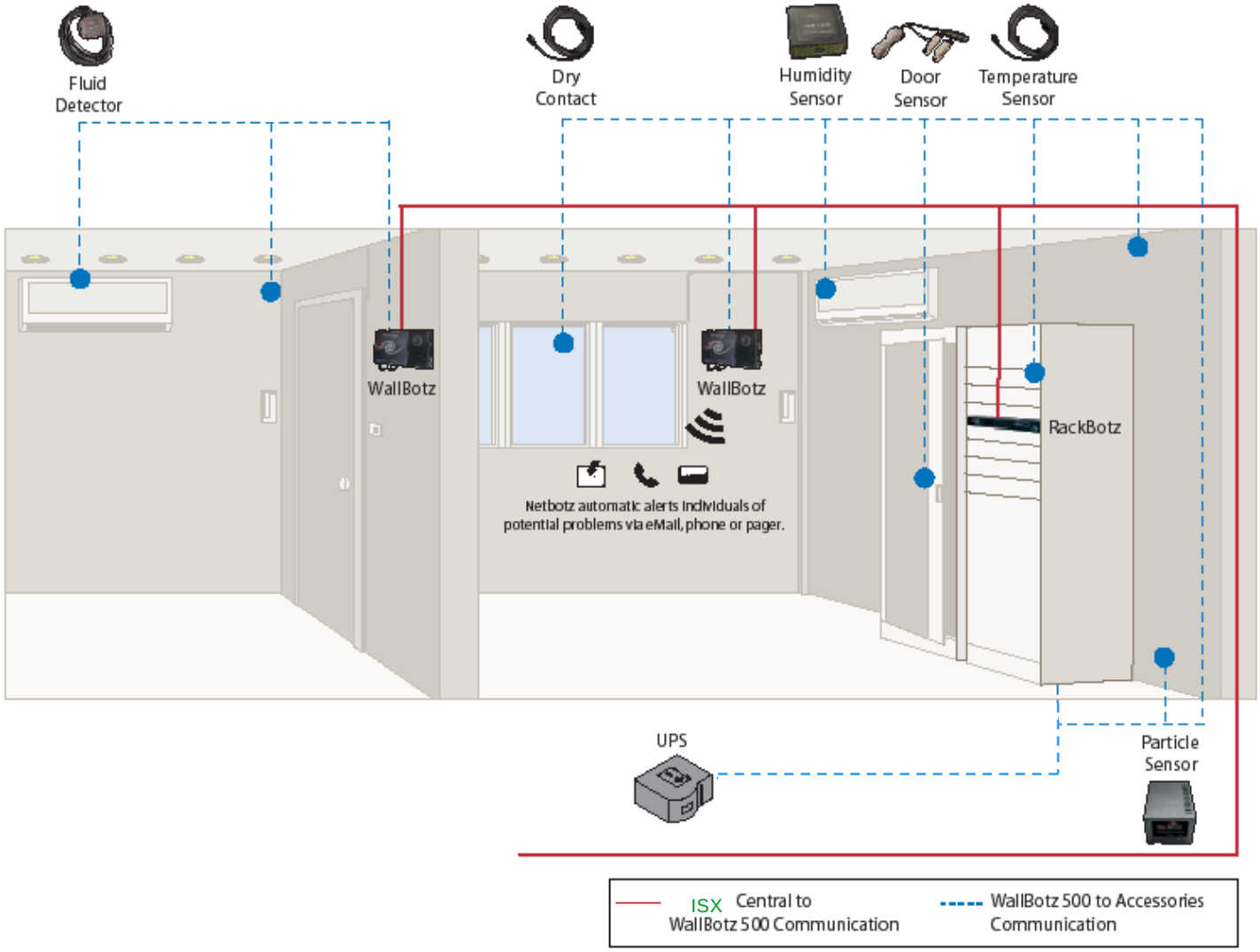
# NetBotz Flexibility of Deployment



# Monitoring Appliance Selection

| | APC | | NetBotz | | |
|---|---|---|---|---|---|
| | EMU | EMS | 320 | 420 | 500 |
| Temperature | X | X | X | X | X |
| Humidity | X | X | X | X | X |
| Leak | | X | X | X | X |
| Motion | | X | X | X | X |
| Smoke | | X | X* | X* | X* |
| Beacon | | X | | | |
| Video Surveillance | | | X | X | X |
| Particle Sensor | | | X | X | X |
| 0-5V | | | X | X | X |
| Dry Contact | | | X | X | X |
| Airflow | | | X | X | X |
| Dewpoint | | | X | X | X |

**third party smoke sensor*

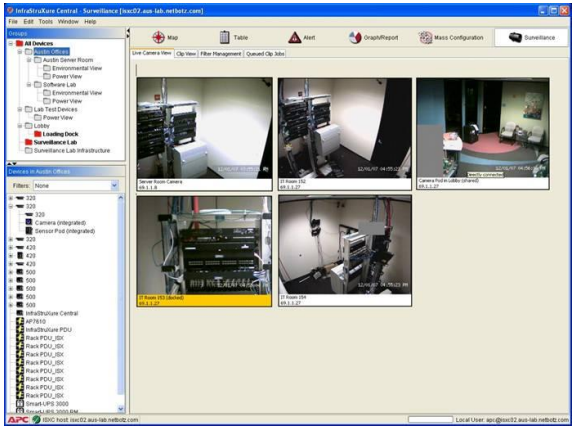
# NetBotz Features


**Environmental Monitoring:**

- Wide range of sensor support to monitor the health of your IT assets
  - Temperature, humidity, leak, door, smoke, vibration, dew point, airflow, dry contact, 4-20mA, and 0-5V

**Surveillance:**

- Leverage NetBotz and CCTV camera technology to monitor IT assets remotely
- InfraStruXure Central and the NetBotz Surveillance package allow multiple site camera views on a single page



**Access Control:**

- Control and manage access privileges for APC NetShelter SX enclosures over the network
- View audit trails
- Alarm notifications indicate a compromised security state

**Management Capabilities:**

- Alarming allows alerts, multiple notification methods, scheduling, graph and video attachments, escalation.
- InfraStruXure Central available for centralized monitoring of multiple appliances

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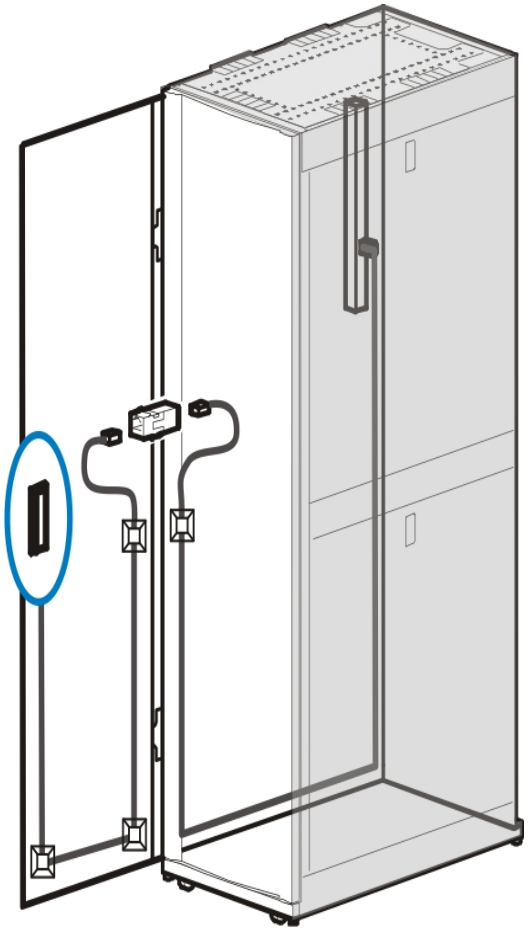
# NetBotz Platform Comparison

| | NetBotz 500 | | NetBotz 420 | | NetBotz 320 | |
|---|---|---|---|---|---|---|
| |  | |  | |  | |
| Expandability | High scalability | | Medium scalability | | Low scalability | |
| Mounting Options | Wall-mount form factor. Rack-mount brackets optional | | Wall-mount and Rack-mount form factors | | Wall-mount and Rack-mount form factors | |
| SKU Number | NBWL0500 | NBWL0500N* | NBWL0420/ NBRK0420 | NBRK0420E | NBWL0320/ NBRK0320 | NBRK0320E |
| Maximum Image Resolution | 1280 x 1024 | --- | 640 x 480 | --- | 640 x 480 | --- |
| Integrated Environmental Sensors | T, H, DP, Air, AU, Door, Motion | T, H, DP, Air, AU, Door, Motion | T, H, DP, Air, AU, Door, Motion | T, H, DP, Air, AU, Door, Motion | T, H, DP, Air, AU, Door, Motion | T, H, DP, Air, AU, Door, Motion |
| Additional Sensor Pods | 16 | 16 | 4 | 4 | 0 | 0 |
| External USB Ports | 4 | 4 | 1 | 1 | 0 | 0 |
| External Sensor Ports Available | 68 | 68 | 20 | 20 | 4 | 4 |
| Additional Camera Pods (or CCTV Adapter Pods) | 3 | 3 | 1 | 1 | --- | --- |
| Camera – Real-time Image and Alerts | X | --- | X | --- | X | --- |

# Electronic Access Control for Racks

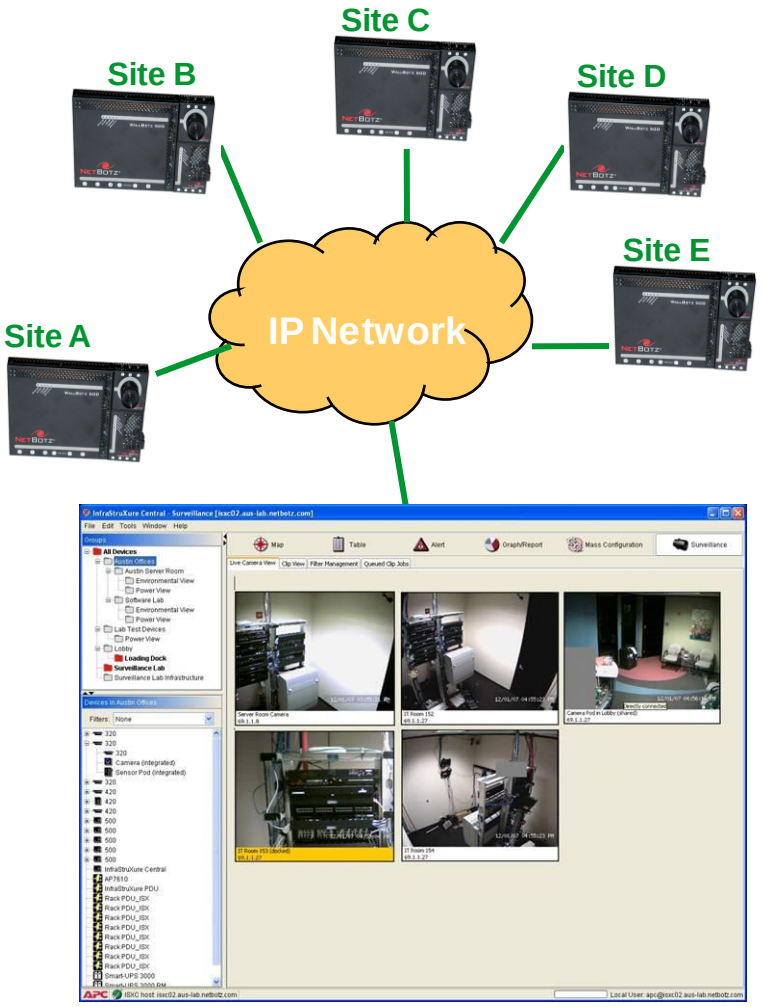
- NetBotz Rack Access PX-HID
  - Compatible with NetShelter SX
  - Proximity Card based solution
  - Access Audit Trail
  - Remote door control via web
  - One SKU per rack

# Centralized Management

- Advanced alert customization capabilities:
  - Warning alerts, critical alerts, and alert escalation
  - Multiple notification methods
  - Scheduling
  - Graphing
  - Video attachments
- If deployment is bigger than 2 NetBotz appliances use InfraStruXure Central to optimize management efficiency
- NetBotz Surveillance nodes allow consolidated camera views through InfraStruXure Central



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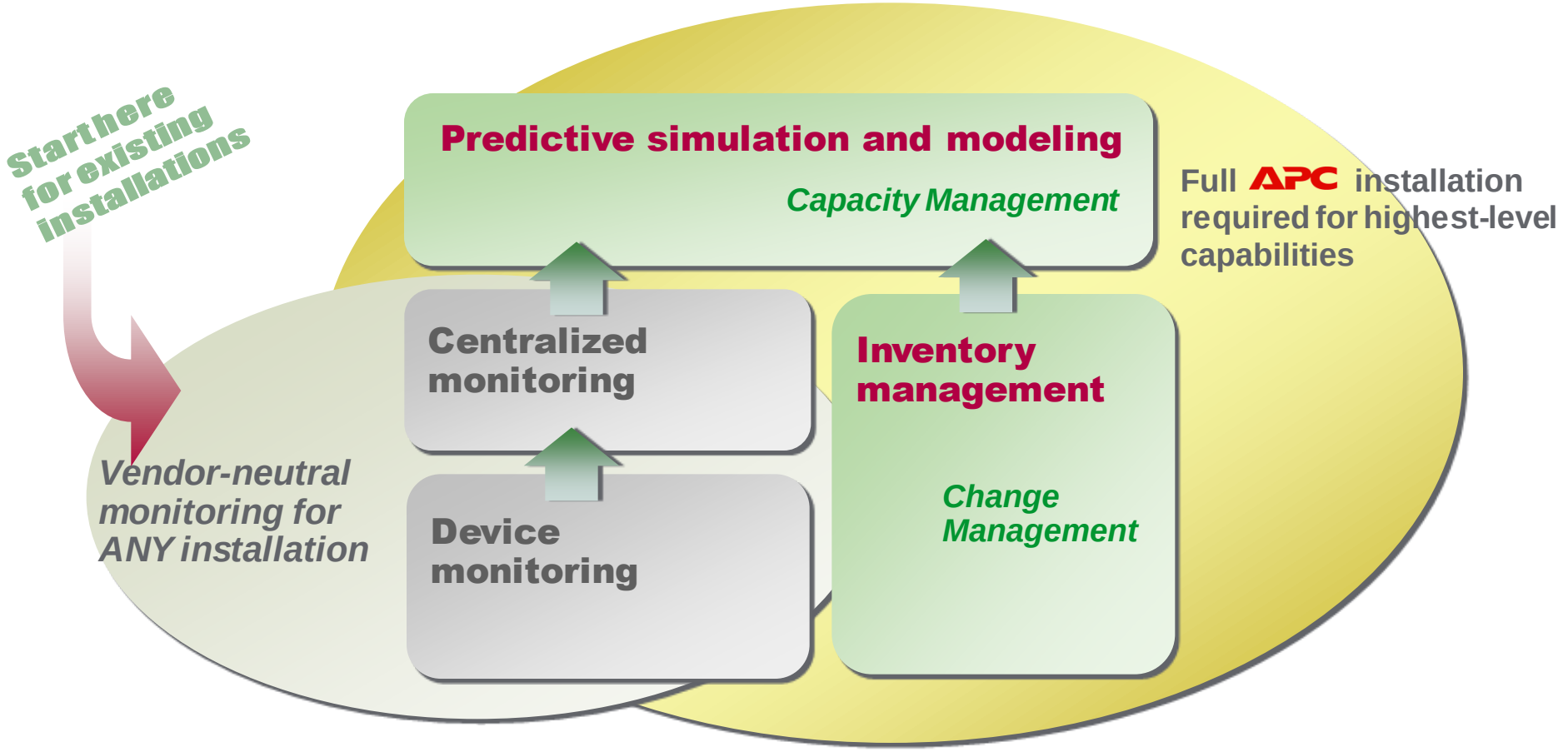
# How to get there

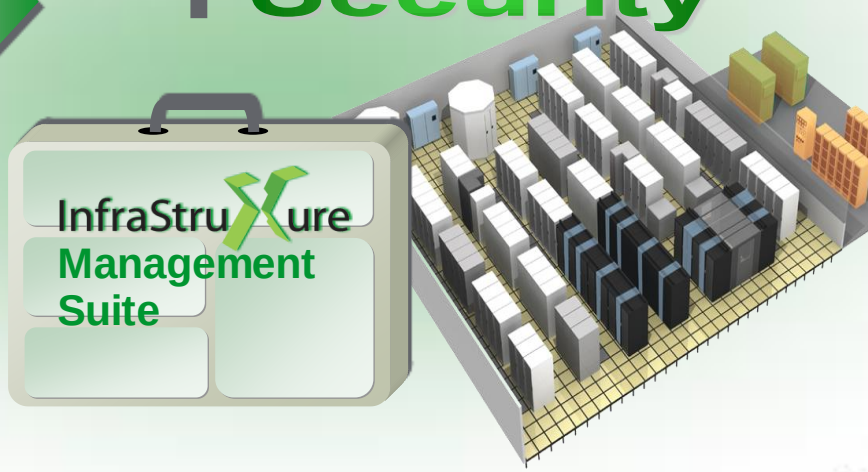
- ***MONITORING functions are vendor-neutral***
- ***Full APC installation enables complete management suite***



# The old tradeoff … no more!
# Smart management lets you HAVE IT ALL


Availability
+ High density
+ Security




*No longer a blancing act – you don't need to compromise one to get the others*

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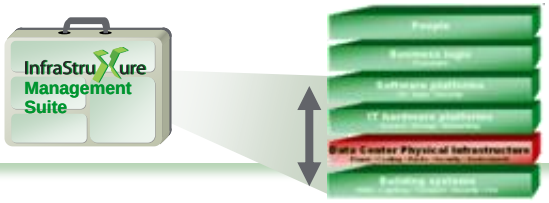
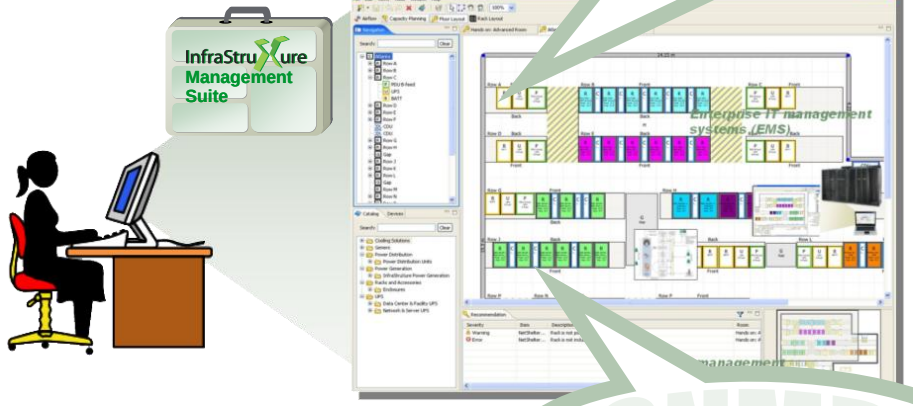
# Toward the future …




## *Join us for the next step in data center management*

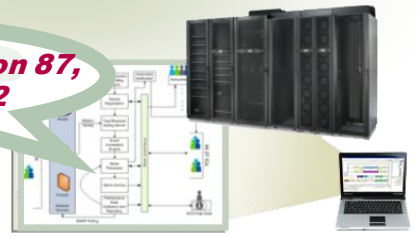
**Brownout mandate:**
**Cut building power by 25% !**

*Got extra power at racks 35 and 87 – what's riding on them?*




*Running financials on 87, but you can have 42*

**Enterprise IT management systems (EMS)**



*We can lower lighting and raise AC to 80º - that's 12%*

*AC supply is at 60º -- raise it to 68º*

**Building management systems (BMS)**

**Partnerships with EMS and BMS providers will provide inter-layer coordination**

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# Summary

**Pressures from new IT technology**

***The old days of walking around with a thermometer are over. Smart management software enables you to align capacity with demand, identify trouble spots, and maximize efficiency.***

**Keeping up with complex system changes**

***Data centers need dedicated management tools. Today's rapidly changing IT environment requires physical infrastructure management with the same advanced level of capabilities as the business processes they support.***

**Staying in control of capacity, energy, and availability**

***Dedicated management tools that comprehend physical infrastructure enable you to have high density, high availability, and high efficiency all at the same time.***

# Question?

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THANK YOU