Remote Management of Data Center White Space: What to Manage and How?

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Learning Outcomes

• Need for Remote Management of Whitespace
• Understand Elements of Whitespace Management
• Solutions to Minimize Management Challenges
Data Center Trends
Need for Remote Management

- Edge Computing and IoT
- Colocation and Managed Data Centers
- Lights-Out Data Centers
## White Space Initiatives and Solutions

<table>
<thead>
<tr>
<th>Initiatives</th>
<th>Solutions</th>
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<tr>
<td>• High Availability</td>
<td>• High Density Solutions</td>
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<td>• Capacity Optimization</td>
<td>• Power Management</td>
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<tr>
<td>• Low Operating Costs</td>
<td>• Environmental Monitoring</td>
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<td>• Efficiency</td>
<td>• Access Control</td>
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<tr>
<td>• Manageability</td>
<td>• Datacenter Infrastructure Management (DCIM)</td>
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<tr>
<td>• Security and Regulatory Compliance</td>
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Power Management

Last Leg of the Power Chain Resides Within White Space
Power Management: What?

- Consumption vs capacity
- Branch circuit metering
- Redundancy monitoring
- Chargeback reports
- Equipment level consumption
Power Management: How?

- Invest in remotely manageable intelligent hardware—Rack Power Distribution Units (PDUs) and Remote Power Panels (RPPs)
- Choose rack PDUs with high temp ratings
- Deploy DCIM to provide snapshot health information as well as trend reports
## Power Management: RPP / Floor PDU

<table>
<thead>
<tr>
<th>METERING PARAMETER</th>
<th>ADVANTAGES</th>
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<tbody>
<tr>
<td>Input and Output Voltage</td>
<td>• Monitor power quality</td>
</tr>
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</table>
| Input and Output Current and Power | • Monitor overall power capacity  
• Balance loads across phases |
| Remote Metering – Outlet Level | • Monitor current draw against breaker capacity |
# Power Management: Rack PDU

<table>
<thead>
<tr>
<th>CAPABILITIES</th>
<th>ADVANTAGES</th>
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<tbody>
<tr>
<td>Remote Metering - Input</td>
<td>• Cabinet power loading</td>
</tr>
<tr>
<td></td>
<td>• Load balancing</td>
</tr>
<tr>
<td>Remote Metering – Branch Circuit</td>
<td>• Proactive overload notification</td>
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<td>• Optimize capacity usage</td>
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<tr>
<td>Remote Metering – Outlet Level</td>
<td>• Chargebacks</td>
</tr>
<tr>
<td></td>
<td>• Equipment power consumption visibility</td>
</tr>
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<td></td>
<td>• Ghost servers</td>
</tr>
<tr>
<td>Remote Power Control – Outlet Level</td>
<td>• Reboot hung up equipment</td>
</tr>
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<td></td>
<td>• Scheduled start up and shutdown</td>
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<td>• Outlet provisioning</td>
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Power Management: Rack PDU or RPP?

• Ideally at both levels
• Limited budget – choose rack PDU level
  – 1:1 association - Rack PDU and RPP breakers
  – Rack PDUs have branch circuit breakers too
  – More granular complete visibility = concrete steps to reduce power consumption
Environmental Management: Why?

- Minimize hardware failures
- Reduce cooling and (hence) operational costs
- Safety
Environmental Management: What?

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>RECOMMENDED RANGE</th>
</tr>
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<tbody>
<tr>
<td>Air Intake Temperature – Top and Bottom Front of Cabinet</td>
<td>18 – 25°C / 64° - 80°F</td>
</tr>
<tr>
<td>Air Exhaust Temperature – Top Back</td>
<td>Intake temp + 20°C / 35°F</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>40% - 60%</td>
</tr>
<tr>
<td>Leak Detection</td>
<td>Under raised floor</td>
</tr>
</tbody>
</table>
Electronic Access Control – Why?

• “58% of attacks within financial services industry and 71% within healthcare are carried out by insiders”
  - IBM X-Force Threat Intelligence Index

• Regulatory Compliance
  - HIPAA, PCI-DSS, FEMSI
Access Control - Considerations

• Cabinet Level
• Logging of all access attempts – user name, time stamp and how?
• Alerts for unlocked cabinets and open doors
• Biometric cards for multi factor authentication
• Separate system for datacenter access
  – Provides full control to datacenter personnel
  – Lower cost of deployment
White Space Management: Challenges

• High cost of networking all remotely managed equipment
• Lack of cohesive integration
• Multiple management platforms
Solutions – IP Consolidation Technologies

Reduce Network Costs  Reduce Number of IP Addresses

90%!

- IP addresses can cost as high as $500/port
- IP consolidation technologies help significantly reduce networking costs and complexity
- Consider failover capability with IP consolidation
Solutions – Integrated Hardware

- Local Power Monitoring
- Environmental Monitoring
- Network Management

EAC Front
EAC Rear
Solutions – Preconfigured Cabinet

- Saves deployment time and costs
- Seamlessly integrated
- Tested as a complete system
- Saves packaging
Solutions - DCIM

- Integrated software - power management, environmental monitoring and access control
- 24/7 data center health monitoring
- Historical trend reports
- Data and event logging
DCIM - Considerations

• Scalability
• Vendor agnostic
• Exportable database
• Integration capabilities
Summary

- Remote management of white space will become more critical
- Elements to be managed include – power, environmental and access control
- Integrated hardware and software solutions minimize management challenges