Top Ways to Boost Capacity with Better Data Center Power and Networking Management

Justin Capone
Sunbird Software Sales Engineer
Networking is Often Left Behind

Data Center Operations

Provide Business Services

Data Center Domains

Facilities

Networking

Computing

UPS, PDU/RPP, Rack PDUs & CRACS

Structured Cabling, LAN, SAN & WAN

Blade Systems, Servers, & Storage
Your Objective

Maintain High Availability with the Least Resources
Networking Hero Mode

Legacy Tools
- Spreadsheets
- 2D Drawings

Manual Effort
- Walk the floor
- Trace cables
Evolution of Data Centers

Data Center
Size + Density
Evolution of Data Centers

Data Center Size + Density

- Explosion in demand for data center hosted service
- Data center consolidations
- Virtualization initiatives
Evolution of Data Centers
Evolution of Data Centers

- Complex computing
- More dynamic environment
- Do more with less
Evolution of Data Centers

Ever Increasing Data Center Size, Density and Complexity

Hero Mode Cannot Keep Up!
Evolution of Data Centers

Ever Increasing Data Center Size, Density and Complexity

Need A New Way Forward
Second Gen DCIM

- Super-Fast Deployment Time
- Complete Suite of Capabilities
- Zero-Configuration Analytics
- Automation Via Integration
- Compatibility with What You Have
- Extreme Scalability
- Ease of Use
- Data-Driven Collaboration
- AI and Machine Learning
The best data center built is one that is not.

Data Centers are often over-provisioned and excess capacity typically exists. With DCIM tools, you can find that stranded capacity, use it with confidence, and delay spending millions to build your next data center.
Do you know how much power capacity you have?

- Power consumption gauge
- Power capacity forecast trend
- Trending load by data center, room, rack, or customer
Real-Time Visibility for Better, Faster Decisions

Forecast Capacity with Real-Time Resource Management

Look into the future to plan adds, decommissions, and other changes that impact your data center capacity:

- View available and in-use resources based on a date for just-in-time capacity management, including assets that are planned to be decommissioned
- Plan and reserve capacity that will become available later, even if that capacity is currently used for other projects
- Use what-if analyses to determine the impact of changes to your data center before they happen and without impacting your current equipment
- Leverage real-time data to forecast remaining “days of capacity” left so you’ll know when you need to purchase more—before you run out of capacity
US Government Data Center Optimization Initiative
Visualize Your Capacity

• **Corollate available resources for:**
  – Space
  – Power
  – Cooling
  – Data Ports
  – Structured Cabling
Full Network Connectivity Management

- View Network relationships quickly and easily to trace for trouble shooting and audit purposes
- Automatic validation

2019 BICSI FALL Conference & Exhibition
Network Interface Card Connector, Media, Color Code & Protocol and Data Rate
Network Connectivity Points

Switch

Patch Panel
Increase Utilization of Existing Data Ports

Visualize All Your Network & Data Circuits

From end to end, document and understand every node in your data circuits to identify single points of failure and decrease troubleshooting time.

- Server with Copper or Fiber Data Connection
- Edge Switching (e.g., Top of Rack/End of Row)
- Core Routing or Switching Equipment
- Patch Panels
- Multiplexing Equipment
- Demarcation Points
- Carrier Wide Area Network
- Even KVM and Serial Console Ports & Connectivity
View Port-Level Capacity at Every Rack

Drill down from the data center health floor map and instantly get a real-time view of granular rack capacity, down to the port level.

- Available space
- Budgeted power
- Weight
- Available RU
- Potential power
- Copper, fiber and power ports
- Number of items in cabinet
- Largest number of contiguous RUs
Track Data Port Capacity and Usage
Full Power Connectivity Management

- View power chain quickly and easily to trace for trouble shooting and audit purposes
- Automatic validation
Power Port Trends
## Power Connectivity Points

- **Rack iPDU – Inlet, Line and Circuit Breakers**

### Inlet Readings

<table>
<thead>
<tr>
<th>PDU Element</th>
<th>Voltage (V)</th>
<th>Current (A)</th>
<th>Active Power (W)</th>
<th>Apparent Power (VA)</th>
<th>Power Factor</th>
<th>Active Energy (Wh)</th>
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</thead>
<tbody>
<tr>
<td>Inlet 1</td>
<td>214</td>
<td>1.3</td>
<td>404</td>
<td>466</td>
<td>0.87</td>
<td>4,121,340</td>
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</table>

### Line Readings

<table>
<thead>
<tr>
<th>PDU Element</th>
<th>Voltage (V)</th>
<th>Current (A)</th>
<th>Unused Capacity (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>214</td>
<td>1.3</td>
<td>22.7</td>
</tr>
<tr>
<td>L2</td>
<td>214</td>
<td>1.1</td>
<td>22.9</td>
</tr>
<tr>
<td>L3</td>
<td>216</td>
<td>1.3</td>
<td>22.7</td>
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</table>

### Circuit Breaker Readings

<table>
<thead>
<tr>
<th>Circuit Breaker</th>
<th>Current (A)</th>
<th>Unused Capacity (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit Breaker 1 (C1)</td>
<td>0.7</td>
<td>19.3</td>
</tr>
<tr>
<td>Circuit Breaker 2 (C2)</td>
<td>0.6</td>
<td>19.4</td>
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<tr>
<td>Circuit Breaker 3 (C3)</td>
<td>0.5</td>
<td>19.1</td>
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</tbody>
</table>
## Power Connectivity Points

- **Rack iPDU – Outlets**

<table>
<thead>
<tr>
<th>#</th>
<th>Outlet</th>
<th>IT Device</th>
<th>Active Power (W)</th>
<th>Apparent Power (VA)</th>
<th>Voltage (V)</th>
<th>Current (A)</th>
<th>Unutilized Capacity (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HP DL140.122</td>
<td>HP DL140.122</td>
<td>112</td>
<td>122</td>
<td>120</td>
<td>1.025</td>
<td>10.975</td>
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<td>2</td>
<td>DRAC 860.120</td>
<td>DRAC 860.120</td>
<td>89</td>
<td>93</td>
<td>120</td>
<td>0.776</td>
<td>11.224</td>
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<tr>
<td>3</td>
<td>Win XP.122</td>
<td>Win XP.122</td>
<td>82</td>
<td>85</td>
<td>120</td>
<td>0.719</td>
<td>11.281</td>
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<tr>
<td>4</td>
<td>Windows XP.122</td>
<td>Windows XP.122</td>
<td>107</td>
<td>112</td>
<td>120</td>
<td>0.926</td>
<td>11.074</td>
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<td>5</td>
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<td>Linux.122</td>
<td>102</td>
<td>107</td>
<td>120</td>
<td>0.903</td>
<td>11.097</td>
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<td>6</td>
<td>Cisco 2500.122</td>
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<td>30</td>
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<td>0.261</td>
<td>11.739</td>
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<td>7</td>
<td>Vista.122</td>
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</table>

There are 8 outlets on this device.
Power Connectivity Points

- PDU – Power Panel

### Downstream Power Sum

<table>
<thead>
<tr>
<th>Phase</th>
<th>Volts</th>
<th>Nameplate Sum</th>
<th>Budget Sum</th>
<th>Measured†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Power (kW)</td>
<td>Current (Amps)</td>
<td>Power (kVA)</td>
</tr>
<tr>
<td>A</td>
<td>208</td>
<td>2.49</td>
<td>23.96</td>
<td>1.25</td>
</tr>
<tr>
<td>B</td>
<td>208</td>
<td>2.49</td>
<td>23.96</td>
<td>1.25</td>
</tr>
<tr>
<td>C</td>
<td>208</td>
<td>2.49</td>
<td>23.96</td>
<td>1.25</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>4.98</td>
<td>23.96</td>
<td>2.49</td>
</tr>
</tbody>
</table>

†From selected node.
Power Chain Management to Maximize Resources

- Monitoring Maximum Load Under Compute Stress over Long Period of Time

Nameplate = 500W
Budget = 400W
Actual Load = 300W
Saving = 25%
Track Cabinet Power Utilization
Track Stranded Power Per Model

Stranded Power per Model Instance (Average of Instances)
How to Eliminate Stranded Power
Charge Back to Drive Efficient Use of Capacity
Real-time PUE is now at your fingertips. It’s automatic

- Automatically collect data from Building feeds, IT loads, and non-IT loads
- Automatically calculate and trend PUE in all data centers across the world
- Immediately see the impact of energy efficiency initiatives
- Compare your PUE Year over Year and with industry peers
Benefits

• **Reduce and/or Defer Capital Expenses**
  — Maximize utilization of existing resources through better capacity planning
  — Increase utilization of power systems by better balancing of 3-phase power
  — Identify unused structured cabling to defer need to install new cable runs
Thank You