CIOs and other IT leaders have probably had their fill of hearing from corporate executives that they need to do more with less. The “less” usually refers to IT budgets, which suffered during the lean economic years of late. Increasingly, however, IT departments suffer additional restrictions on their operations, including limits in data center power, cooling and rack-and-floor space. They may also need to do more in terms of applications and users they support, the complexity of applications and the data they manage.

Certainly, many IT managers need to increase compute capacity of operations while staying within existing data-center power and square-footage. For growing numbers of IT shops the solution includes advanced servers that combine increased processing capabilities with power-efficient subsystems, power management automation and self-aware server intelligence.

These servers can greatly enhance operational efficiencies—including, but not limited to, power and space demands. They can also help IT staff reduce time spent on manual tasks such as configuring and maintaining servers, troubleshooting power and thermal-related issues or performing other time-intensive tasks.

A recent survey of 124 IT executives and managers at organizations with 100 or more servers shed light on their needs and objectives as they relate to data center efficiency and automation. Conducted by IDG Research Services, the survey received responses from a wide range of industry sectors and organization sizes. This paper highlights key findings from the survey, including the various IT needs and opportunities that fall under the “automated energy optimization” umbrella, concluding with a look at the intelligence, automation and optimization capabilities delivered by HP ProLiant Gen8, the latest generation of advanced servers.

Automated Energy Optimization Rates as a High Priority

It’s no surprise that most IT leaders list energy optimization as a key objective. Among the IT decision-makers responding to the IDG Research Services survey, 56 percent said investments in data center energy optimization should be either a critical or a very-important priority. Another 27 percent said such investments should be a moderately important priority. On the surface, automated energy optimization may mean little more than maintaining or reducing data center energy demands, sometimes even as compute workloads grow. While intelligent and automated...
Survey Highlights Need for Better Server Energy Efficiency

servers can certainly help deliver on energy-specific goals, the benefits they confer can radiate well beyond holding energy use and energy costs in check.

The Never-Ending Search for Greater Efficiency

The goal of improving efficiency, broadly defined, is a mainstay on IT top-objects lists. That held true with this survey, in which three-quarters of respondents identified improving efficiency as their highest priority. Of course, improving efficiency can mean different things to different people. “To me, data center efficiency means better space utilization and reduced power consumption,” says survey respondent Larry Liss, chief technology officer at law firm Blank Rome LLP. “It also means how readily we can provision new servers and additional disk storage, and this is what enables us to meet the rapidly growing demands of the business in a timely manner.”

For other IT executives, improving efficiency can encompass raising server utilization rates, lowering IT staff workloads or increasing the effectiveness of a wide range of management and maintenance operations. Based on the survey results, there is much data center efficiency of all types still to be gained.

There appear to be three pressing areas of data-center inefficiency that afflict 85 percent or more of the survey respondents’ organizations sometimes, frequently or always: Manually tracking server locations and configurations, server workloads are not optimized, and data center staff is overworked.

Data center staff “are often overworked because of the increasing sophistication of the systems they manage, the critical importance of the workloads running on them and the need to keep things running twenty-four-by-seven,” explains Michael Kendall, group manager of ISS options and infrastructure at Hewlett-Packard.

Ranking somewhat lower on the inefficiency scale were two energy-related issues, with approximately 45 percent saying they exceed their monthly cooling or power budget sometimes, frequently or always. The frequency of these incidents, while lower, is troubling. If there is even one instance of a power shortage causing an IT service outage, the penalty in lost revenue, opportunity and company reputation can be huge.

Solving Inefficiencies with Server Intelligence and Automation

Clearly, problems related to data center inefficiencies are by no means rare or trivial. Nearly seven out of 10 survey respondents said they experienced one or more potentially serious issues in the past year. These issues included difficulty determining the physical location of a particular server or rack of servers and running out of power capacity at one or more data center locations, among other challenges.

Because of these problems, 75 percent of respondents want to not only improve data center efficiency, but 69 percent also want to reduce data center complexity, and 52 percent want to increase data center automation.

Each of these objectives can deliver key dividends to stressed IT executives and staff: more time and fewer down-time errors. By simplifying and automating operations, IT employees gain precious time that can be reallocated to perform more strategic and valuable activities, all while reducing manual operations that can introduce configuration or documentation errors.

HP ProLiant Gen8 Servers Deliver Intelligent Automation

When Hewlett-Packard set out to develop HP ProLiant Gen8 servers, a top objective was to dramatically reduce the burden of deploying, operating and managing advanced platforms. By making its new servers

Areas of Data Center Inefficiency

THE TYPICAL DATA CENTER IS RIFE WITH OPPORTUNITIES TO INCREASE EFFICIENCY AND MORE THEN TWO-FIFTHS OF RESPONDENTS REPORT SOMEWHAT REGULAR POWER AND COOLING BUDGET OVERAGES.

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Frequently</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manually track server locations and configurations</td>
<td>17%</td>
<td>40%</td>
<td>32%</td>
<td>8%</td>
<td>2%</td>
<td>90%</td>
</tr>
<tr>
<td>Server workloads are not optimized</td>
<td>11%</td>
<td>35%</td>
<td>42%</td>
<td>9%</td>
<td>2%</td>
<td>89%</td>
</tr>
<tr>
<td>Data center staff is overworked</td>
<td>17%</td>
<td>37%</td>
<td>31%</td>
<td>10%</td>
<td>5%</td>
<td>85%</td>
</tr>
<tr>
<td>Short on physical data center space</td>
<td>9%</td>
<td>19%</td>
<td>31%</td>
<td>20%</td>
<td>21%</td>
<td>59%</td>
</tr>
<tr>
<td>Manually take temperature readings</td>
<td>6%</td>
<td>17%</td>
<td>29%</td>
<td>27%</td>
<td>21%</td>
<td>52%</td>
</tr>
<tr>
<td>Exceed our monthly cooling budget</td>
<td>4%</td>
<td>12%</td>
<td>30%</td>
<td>25%</td>
<td>29%</td>
<td>46%</td>
</tr>
<tr>
<td>Exceed our monthly power budget</td>
<td>4%</td>
<td>11%</td>
<td>29%</td>
<td>27%</td>
<td>28%</td>
<td>44%</td>
</tr>
</tbody>
</table>
Survey Highlights Need for Better Server Energy Efficiency

Tangible Issues Encountered in the Data Center in the Last Twelve Months
NEARLY SEVEN OF TEN RESPONDENTS REPORT THEY HAVE EXPERIENCED SERIOUS ISSUES WITH RESPECT TO THEIR SERVERS’ LOCATIONS, CONFIGURATIONS, RELIABILITY, POWER, OR CAPACITY IN THE PAST YEAR.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty determining the physical location of a particular server or rack of servers</td>
<td>34%</td>
</tr>
<tr>
<td>Run out of data center space at one or more data center locations</td>
<td>31%</td>
</tr>
<tr>
<td>Unplanned outages or downtime as a result of non-redundant power supplies</td>
<td>31%</td>
</tr>
<tr>
<td>Difficulty determining the power configuration of a particular server or rack of servers</td>
<td>28%</td>
</tr>
<tr>
<td>Run out of power capacity at one or more data center locations</td>
<td>27%</td>
</tr>
<tr>
<td>Unplanned outages or downtime as a result of temperature-related equipment failure</td>
<td>23%</td>
</tr>
<tr>
<td>None of the above</td>
<td>31%</td>
</tr>
</tbody>
</table>

(int) One or more issues encountered 69%

intelligent and self-aware, HP gives data centers a means to automate many time-intensive tasks and address a range of operational, energy and space inefficiencies.

HP ProLiant Gen8 servers tout the following innovations:

• **Automated energy optimization**: With embedded intelligence across three dimensions—sense of location, power utilization and thermal demand—IT gains a unique level of visibility and control over the energy efficiency of the data center.

• **Servers and infrastructure so intelligent they maximize the use of space, power and cooling**: As data centers grow, power and cooling costs grab an ever-larger piece of the IT budget. HP helps organizations fight back with ProActive Insight architecture and its technologies for automated energy optimization. These technologies reduce the power and airflow needed to operate ProLiant Gen8 servers, enabling IT to reclaim limited space, power and cooling resources for needed workloads. All the while, they reduce the need for error-prone manual processes for asset tracking, checking and documenting power and rack configurations. The automated energy optimization capabilities in the new ProLiant family are enabled by HP 3D Sea of Sensors technologies. With this innovation, HP has created HP Location Discovery Services, HP Thermal Discovery Services and HP Power Discovery Services to help reduce energy use, reclaim data center power capacity and extend the life of the data center.

• **HP Location Discovery Services**: Optimize workload placement with servers that self-identify and inventory themselves. In yet another industry first, HP provides built-in location awareness in the new ProLiant servers, a capability that works hand-in-hand with technology in the new HP Intelligent Series racks. Together these technologies send the rack identification number and precise U location to the servers. This capability provides important location information to HP Insight Control software, along with power and temperature data. In addition, HP uses secure non-emitting and radio-free technology to meet the security requirements of many organizations.

HP Location Discovery Services provides detailed server information by location, eliminating hours of tedious manual data entry into spreadsheets. The combination of this location data with real-time auto-populated power and thermal data enables optimal workload placement.

• **HP Thermal Discovery Services**: IT can reduce energy use and increase compute capacity with HP Thermal Discovery Services. This HP innovation helps squeeze the most IT out of every bit of data-center power and cooling capacity. Increased power efficiency is driven in part by the new HP Intelligent Series rack, the first server rack with built-in intelligence to correlate server temperature and workload with the exact location of each server to deliver the right level cooling. The new racks also include an innovative rack door that has an industry-leading 81 percent of open door airflow, resulting in a 25 percent increase in airflow efficiency to cool servers with less airflow and less computer room air handling power.

The new HP ProLiant Gen8 servers themselves build upon a track record of delivering the highest compute capacity per watt. With new high-efficiency HP Platinum Plus Power Supplies, a 3D Sea of Sensors and HP SmartMemory, IT can power and cool 20 HP ProLiant Gen8 servers for the same cost as 18 HP ProLiant G6 servers. The new ProLiant family also builds upon the efficiency achievements of HP ProLiant Gen7 servers, which were the industry’s first servers to earn the ENERGY STAR® Qualification rating. The next-
generation servers continue this leadership by being the first to include a 3D array of temperature sensors to help precisely control server fans to direct cooling and reduce unnecessary fan power by dozens of watts per server.

• HP Power Discovery Services: Eliminate power configuration errors and precisely track power use by rack and server. The HP Intelligent Power Distribution Unit (PDU) is the first with full remote outlet control, outlet-by-outlet power tracking and automated documentation of power configuration. Only HP Intelligent PDUs track outlet power use at 99 percent accuracy, showing system-by-system power usage and available power. The HP Intelligent PDU uniquely records server ID information by outlet and forwards this to Insight Control, saving hours of manual spreadsheet data-entry time and eliminating human wiring and documentation errors.

HP ProLiant Gen8 servers

Automated energy optimization
With embedded intelligence across three dimensions—sense of location, power utilization, and thermal demand—you gain a unique level of visibility and control over the energy efficiency of your data center.

Servers and infrastructure so intelligent they maximize the use of space, power, and cooling
As data centers grow, power and cooling costs grab an everlarger piece of the IT budget. HP helps you fight back with server infrastructure so smart it automatically maximizes the use of space, power, and cooling. That’s the story of the next-generation HP ProLiant servers with the ProActive Insight architecture and its technologies for automated energy optimization.

These technologies reduce the power and airflow needed to operate ProLiant Gen8 servers, enabling you to reclaim limited space, power, and cooling resources for needed workloads. All the while, they reduce the need for error-prone manual processes for asset tracking, checking, and documenting power and rack configurations.

The automated energy optimization capabilities in the new ProLiant family are enabled by HP 3D Sea of Sensor technologies. With embedded intelligence across three dimensions—sense of location, power utilization, and thermal demand—you gain a unique level of visibility and control over the energy efficiency of your data center. With this innovation, HP has created HP Location Discovery Services, HP Thermal Discovery Services, and HP Power Discovery Services to help reduce energy use, reclaim data center power capacity, and extend the life of your data center.

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Reduce energy usage and increase compute capacity. You’ll reduce energy usage and increase compute capacity with HP Thermal Discovery Services. This HP innovation helps you squeeze the most IT out of every bit of data center power and cooling capacity.

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**HP Power Discovery Services**
Eliminate power configuration errors and precisely track power usage by rack and server. HP Intelligent PDU is the first power distribution unit with full remote outlet control, outlet-by-outlet power tracking, and automated documentation of power configuration. Only HP Intelligent PDUs track outlet power usage at 99 percent accuracy, showing system-by-system power usage and available power. The HP Intelligent PDU uniquely records server ID information by outlet and forwards this to Insight Control, saving hours of manual spreadsheet data-entry time and eliminating human wiring and documentation errors.

Industry-first, high efficiency HP Platinum Plus server power supplies, available as standard on many of the new ProLiant servers, communicate with the HP Intelligent PDU to automatically record servers as they are plugged in and to automatically verify that redundant power supplies are correctly connected to redundant power sources or alert you if they are not.

Teaming the new HP Platinum Plus high efficiency power supplies and the HP iPDU with HP Insight Control v7 Power Management software enables the collection and display of critical temperature, workload, power, and location data for servers in the new HP Intelligent Series rack-level enclosure. This combination of data enables you to automatically track your server assets and locations and place workloads for optimal performance.

**The world’s most self-sufficient servers**
In today’s data centers, small advances in technology won’t solve the big problems. To respond effectively to exploding demand for applications, data, and digital content, your IT organization needs intelligent technology built for the challenges of the cloud era. That’s the next-generation HP ProLiant family.

With an unprecedented set of innovations, the new ProLiant family provides the heart and mind of a self-aware and intelligent converged infrastructure. From core to cloud, HP is transforming the expectations and economics of the data center with the world’s most self-sufficient servers.

To learn more about the new ProLiant family, visit hp.com/go/proliantgen8

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