Cisco UCS Power Efficiency Beats HP, IBM, and Dell Solutions

Performance Brief
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Highlights

**Compare Equivalent Systems**
- For power and performance comparisons to be meaningful, they must be made using the same hardware configuration, BIOS settings, OS power management settings, and workloads.

**Power Calculators Don’t Add Up**
- The method for estimating power consumption in power calculators is not standardized, allowing vendors to distort and miscalculate power estimates.

**Greater Efficiency with Cisco UCS**
- The power efficiency of Cisco Unified Computing System™ (Cisco UCS®) exceeds that of all similarly configured solutions, especially as the solution scales up.

**Evaluate the Whole System**
- Servers are based on a reference design using industry-standard components. True power savings are based on hardware and software: operations, management and utilization. The unified architecture and stateless computing design of Cisco UCS optimizes operations and management to increase resource utilization.
- Traditional blade architecture is narrowly focused on power consumption for a single blade chassis. As systems scale beyond a single chassis, the power efficiency of the traditional architecture is lost.

For better performance and power efficiency than HP, IBM, or Dell, choose the Cisco Unified Computing System™ (Cisco UCS®).

Cisco UCS eliminates the need for chassis management and switching modules in every chassis. That’s why Cisco UCS has better performance and power efficiency than HP, IBM, and Dell solutions—and the savings increase the more chassis you deploy.

Power consumption is often a significant factor when businesses assess the benefits of a particular system. This is particularly true when companies are constrained by limited power resources, tight carbon footprint goals, or co-location fees. Although most servers are based on a reference specification that uses industry-standard components with little variance in power consumption, many vendors focus their attention on the competitive benefits of their solutions as they relate to power and cooling efficiency. Frequently, vendor comparisons are narrowly focused on a single blade chassis, made using unrelated server configurations, or based on meaningless power calculator estimates.

To assess the power efficiency of Cisco UCS and competitive solutions, Cisco performed exhaustive testing across a variety of configurations. The results show that Cisco UCS is more efficient, consuming less power while providing equivalent performance compared to solutions from other vendors.

Power savings are made possible by hardware refresh cycles that use newer-generation silicon and implement modern architectures that use fewer management and blade switch modules, require less overprovisioning, increase utilization through virtualization and are connected with a unified network infrastructure. Designed with these factors in mind, Cisco UCS increases energy efficiency and reduces operating expenses for customers.

**Power Calculators Don’t Add Up**

Vendors are in complete control and are not constrained by standards that govern the way that power calculator estimates are generated. Therefore, vendors can publish calculators for any workload, or no workload at all. Rather than using power calculators as marketing tools, Cisco approaches power calculators in the traditional way: as engineering tools to estimate maximum power consumption and help prevent customers from overloading electrical circuits. Other vendors may choose
to create liberal power calculators that appear to underestimate power consumption, and then encourage customers to use their tools to compare servers across vendors. (See the video All Power Calculators Are Not Created Equal for details.) Yet no two production application environments are exactly alike, and no single tool characterizes all workloads.

We Conduct Real Testing

Rather than using power calculators or limited testing of unequal configurations to skew power results, Cisco performed power efficiency tests on equivalent Cisco, HP, IBM, and Dell blade solutions. These tests spanned a variety of configurations to show baseline and scalable power efficiency.

The same hardware configurations were used when performing these tests, including the same Intel® Xeon® processor E5-2660, the same type and amount of memory, identical BIOS and OS power management settings, and identical workloads. Cisco enabled the power efficiency capabilities available in each solution.

The SPECpower°_ssj2008 benchmark was used to compare performance, power, and efficiency. SPEC is a nonprofit corporation formed to establish, maintain, and endorse a standardized set of relevant benchmarks. SPECpower°_ssj2008 is the first industry-standard benchmark that evaluates power and performance characteristics of volume server-class and multinode-class computers.

We tested the following systems:

- **Cisco UCS 5108 Blade Server Chassis** configured with Cisco UCS B200 M3 Blade Servers
- **HP BladeSystem c7000 Enclosure** configured with HP ProLiant BL460c Gen8 Blade Servers
- **IBM Flex System Enterprise Chassis** configured with IBM Flex System x240 Compute Nodes
- **Dell PowerEdge M1000e Chassis** configured with Dell PowerEdge M620 G12 Blade Servers

The results provide several insights. The first insight relates to system performance as the workload varies from idle to maximum target load. Figure 1 shows that baseline performance is nearly identical across all four solutions, as expected. All competitive solutions were equally configured and ran the same workload.

The power-efficiency results for the SPECpower°_ssj2008 tests for eight blades at the maximum target load (Figure 2) show that the Cisco UCS B200 M3 Blade Server combined with the Cisco UCS 5108 Blade Chassis have the best power efficiency. This means that for the amount of power used, the Cisco solution uses power more efficiently.

The Cisco UCS chassis was:

- **17.9 percent more efficient** than the HP BladeSystem enclosure, using 350 watts (W) less power at 100 percent of the target load
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- 10.2 percent more efficient than the IBM Flex System Enterprise chassis, using 145W less power at 100 percent of the target load
- 9.3 percent more efficient than the Dell PowerEdge M1000e chassis, using 294W less power at 100 percent of the target load

As the Cisco UCS solution scales, the power consumed by the redundant pair of Cisco UCS fabric interconnects is amortized across more blade chassis.

A single pair of redundant fabric interconnects eliminates the need for the dedicated chassis management and blade switch modules that are required by traditional blade architectures. The result is significant power savings as the Cisco UCS solution scales.

The Greatest Waste of Power Comes from Underutilized Resources

Most IT departments overprovision traditional blade systems from the start because adding blades and chassis to the infrastructure as business needs change is difficult and complex. Although it is easy to place a new blade in a chassis, many physical and management touch points are required to integrate it into a working system (including LAN and SAN connectivity). This traditional approach results in the creation of islands of blades that are inflexible, overprovisioned, and underutilized (Figure 3).

In contrast, Cisco UCS is intelligent infrastructure with a unified fabric that is wired once. New blades can be deployed in less than 10 minutes to scale existing or support new applications (Figure 3). The intelligent infrastructure recognizes the new blade and automatically places it in a spare pool. To deploy a blade, an administrator simply drags and drops a Cisco UCS service profile onto the desired blade to automatically configure the resource for the desired application.

Although all solutions can power off blades when they are not being used, a better solution is to right-size the configuration from the beginning and rapidly scale the infrastructure as demand increases. Adding and provisioning new resources for traditional architecture from HP, IBM, and Dell is time consuming and difficult.

**Figure 2. SPECpower_ssj2008 Results Show That the Cisco Solution Has the Best Power Efficiency Compared to Equivalent Blade Server Solutions That Are Configured Identically and Running the Same Workload**

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SPEC Fair Use Rule disclosure: At 100 percent target load, the Cisco UCS 5018 blade chassis with eight Cisco UCS B200 M3 servers installed achieved 11,252,295 ssj_ops using 2311W, HP BladeSystem c7000 enclosure with eight HP BL460c Gen8 servers installed achieved 11,349,890 ssj_ops using 2661W, IBM Flex System Enterprise Chassis with eight IBM x240 computing nodes installed achieved 11,173,554 ssj_ops using 2456W, and Dell PowerEdge M1000e blade enclosure with eight Dell M620 G12 servers installed achieved 11,269,813 ssj_ops using 2605W. SPEC and SPECpower are registered trademarks of Standard Performance Evaluation Corporation.
For example, to configure 48 blades, the administrator must interact with more than 17 management and physical touch points, including adapter and switch installation, configuration, and cabling. This complexity leads to overprovisioning during initial deployment and results in higher initial costs, with underutilized resources consuming power without performing useful work.

The unified fabric of Cisco UCS radically simplifies the architecture. Organizations do not need to purchase, power, cool, maintain, and configure redundant chassis management and blade switch modules for every blade enclosure. The entire Cisco UCS solution shares a high-bandwidth, low-latency, unified fabric that is managed and controlled by a redundant pair of fabric interconnects.

Cisco UCS service profiles enable fine-tuning of the solution from the start, and ease scalability with the rapid deployment of additional resources. With Cisco UCS, organizations can reduce capital expenses by purchasing fewer servers, reducing power consumption. Deployments can grow as the business needs them to, increasing resource efficiency and IT staff productivity.

Cisco UCS can also make better use of resources and power through consolidation. Because the system was designed for virtual environments, Cisco UCS has achieved more than 15 world-record VMware VMmark and VMware View Planner benchmarks. Large numbers of virtual servers and virtual desktops can be deployed efficiently and effectively to make the best use of resources and power.

**Save Power and Increase Efficiency with Cisco UCS**

Cisco UCS has excellent power-to-performance ratings compared to solutions from other vendors. But power is not measured only by the amount of energy needed to run a particular solution; it is also measured by the efficiency and effectiveness with which the solution’s resources are used. Cisco UCS allows you to get the most from your servers by running highly consolidated workloads. Using a unified fabric and policy-based design, your IT staff can expand or shrink...
applications quickly while providing efficient workload mobility. This capability is what provides true power efficiency in the data center and what continues to set Cisco UCS apart from the competition.

For More Information

- For more information about Cisco power efficiency, please visit White Papers and Technical Documents.
- For more information about power calculators, please visit All Power Calculators Are Not Created Equal.
- For more information about Cisco UCS performance, please visit http://www.cisco.com/go/ucsatwork.
- For more information about Cisco UCS, please visit http://www.cisco.com/go/ucs.