Power Efficiency Comparison of the Dell™ PowerEdge™ M915 and HP ProLiant BL680c G7 Blade Solutions

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Solutions Performance Analysis

Dell | Enterprise Solutions Group

August 2011

Revision 1.0

Contents

Executive Summary

Introduction

Dell commissioned its Solutions Performance Analysis team to compare the power efficiency of full-chassis blade solutions using 4-socket blades from Dell and Hewlett-Packard (HP).

In July 2011, the Dell PowerEdge M915 blade server achieved the highest SPECpower_ssj2008 score of any 4-socket server on the market[1], so eight of these blades and a PowerEdge M1000e enclosure were used as the PowerEdge solution.

For the ProLiant solution, HP's similar BL685c G7 could have been chosen for this study. However, the BL680c G7 is HP's top-selling 4-socket blade[2], so it was chosen to allow examination of HP's claims of that server's unique 4P blade performance and improved power efficiency[3]. Due to its full-height, double-wide form factor, only four of these blades can fit in a 10U BladeSystem c7000 blade enclosure.

Using the industry-standard SPECpower_ssj2008 benchmark, the performance, power draw, and performance/watt of full-chassis configurations of both blade solutions were tested. The blade servers were compared configured as similarly as possible given their architectural differences, with identical memory and hard drive selections, and best known CPU choices for highest performance/watt ratio. To ensure the lowest power draw, both blade chassis were equipped with six of their Platinum-rated power supplies for all tests.

The results showed the Dell solution using **8 PowerEdge M915 costs less** than the HP solution consisting of just **4 BL680c G7 blades** (the maximum that can fit in the BladeSystem c7000 enclosure). The Dell solution also consumed **less power at idle,** provided **higher** raw **performance,** and achieved a **better performance / watt** ratio. The Dell solution also fits **twice as many servers** in a 10U blade enclosure.

Key Findings

Performance/Watt

- The Dell solution with 8 PowerEdge M915 blades achieved a **92% higher performance / watt ratio** across all load levels than the HP solution using 4 ProLiant BL680c G7 blades.

Performance

- The chassis full of 8 PowerEdge M915 blades achieved **87% higher raw performance** at 100% utilization than the chassis full of 4 HP ProLiant BL680c G7 blades.

Power

- Despite having 87% greater performance, the Dell solution with 8 PowerEdge M915 blades consumes only 14% more power at 100% utilization compared to the HP solution with just 4 ProLiant BL680c G7 blades.
- Despite having twice as many servers, the Dell blade solution consumes **35% less power at idle** than the HP blade solution.

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[1] In the published result, the 8-node M915 achieved 14,793,524 ssj_ops@100% target load and a SPECpower_ssj2008 result of 2,716 overall ssj_ops/Watt. Benchmark results based on results published at www.spec.org as of July 2011. For the latest SPECpower_ssj2008 benchmark results, visit http://www.spec.org/power_ssj2008/results/power_ssj2008.html.
2 According to IDC Q1 2011 Server Tracker, May 22, 2011
[3] http://h10010.www1.hp.com/wwpc/us/en/sm/WF05a/3709945-3709945-3328410-241641-3722793-4268690.html

Price

- Priced as configured, **the Dell PowerEdge solution**, including 8 M915 blades and the M1000e Blade Chassis, **costs 21% less** overall than the HP ProLiant solution which includes 4 BL680c G7 blades and the BladeSystem C7000 enclosure.
- The **Dell** solution's lower cost and greater power efficiency lead to a **59% better price / performance / watt ratio**.

Rack Density

- The **Dell** solution **provides 8 servers per 10U** chassis, compared to the **HP** solution which **provides only 4 servers per 10U** chassis.

Test methodology and detailed results are documented in this paper.

The comparison presented here is based on the respective enterprise-class servers configured as similarly as possible and currently shipping by Dell and HP. Results based on SPECpower_ssj2008 performance testing by Dell Labs in June 2011. For the latest SPECpower_ssj2008 benchmark results, visit http://www.spec.org/power_ssj2008/results/power_ssj2008.html. For latest SPECjbb2005 benchmark results, visit http://www.spec.org/osg/jbb2005.

Methodology

SPECpower_ssj2008 is an industry standard benchmark created by the Standard Performance Evaluation Corporation (SPEC) to measure a server's power and performance across multiple utilization levels. Appendix A details the test methodology used by Dell, Appendices B and C provide detailed configurations for the tests, and Appendix D provides detailed report data that supports the results in this paper. Full disclosure reports from the valid SPECpower_ssj2008 runs used in this comparison are attached to this whitepaper for reference.

Configurations

The blade servers in both solutions were configured for their best known SPECpower_ssj2008 configurations, and were matched as closely as possible given the differences between the architectures. Both solutions used the maximum number of DIMMs and CPUs the blades could accommodate.

The configuration used is summarized in Table 1.

Table 1: Detailed Blade Solution Configurations

Blade Component	Dell PowerEdge M915	HP Proliant BL680c G7
Sockets/Form Factor	4S/Full Height, Single-Width	4S/Full-Height, Double-Width
Blades Per Solution	8	4
Processors Per Blade	4 x AMD Opteron 6176 @ 2.3 GHz, 12 Cores each	4 x Intel Xeon X7560 @ 2.26 GHz, 8 Cores / 16 Threads each
Processors Per Solution	32	16
Physical Processor Cores Per Solution	384	128
Logical Processor Cores Per Solution	384	256
Memory Slots Per Blade	32	64
DIMMs Per Blade	32 x 4GB Dual Ranked PC3L-10600R LV RDIMMs running at 1066MHz	64 x 2GB Dual Ranked PC3-10600R RDIMMs running at 1066MHz
DIMMs Per Solution	256	256
Hard Drives Per Blade	2 x 146GB 15k 6Gb (RAID 1)	2 x 146GB 15k 6Gb (RAID 1+0[4])
Hard Drives Per Solution	16	8
Storage Controller	Dell PERC H200 (No Cache)	HP Smart Array P410i (No Cache)
Chassis Components	Dell PowerEdge M1000e Modular Blade Enclosure	HP BladeSystem c7000 Enclosure
Management	1 x Dell CMC Module	1 x HP Onboard Administrator Module
I/O	1 x Dell Ethernet Pass-Through Module	1 x 1Gb Ethernet Pass-Thru Module for c-Class BladeSystem
Power Supply Quantity/Rating	6 x 2700W Platinum Rated	6 x 2450W Platinum Rated

In order to compare the two solutions as closely as possible, each blade server had the same amount of system memory, and each blade was fully populated with memory: the M915 blades each had 32 4GB RDIMMs for a total of 128GB system memory, and the BL680c G7 blades each had 64 2GB RDIMMs, also for a total of 128GB system memory. This configuration also meant that the total number of DIMMs across all blades was 256 per solution.

Dell only sells low power LV-DIMMs in the PowerEdge M915 blades, so 4GB LV-DIMMs were used for the comparison. The HP ProLiant BL680c G7 blades only offer LV-DIMMs on their Intel® Xeon® E7-4800 series

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[4] On the HP Smart Array P410i, RAID 1+0 is the only option available in a 2 hard drive configuration

models, which were not available at the time the solutions were purchased, so standard voltage 2GB RDIMMs from HP were used for the HP blade solution.

Results

The Dell blade solution with PowerEdge M915 blades delivered 87% higher raw performance than the HP solution with ProLiant BL680c G7 blades. The Dell solution also has 92% higher power efficiency, and even with 8 blades (compared to 4 blades for the HP solution) consumes 35% less power at idle.

Figure 1: Blade Solution Comparison (Normalized Values)
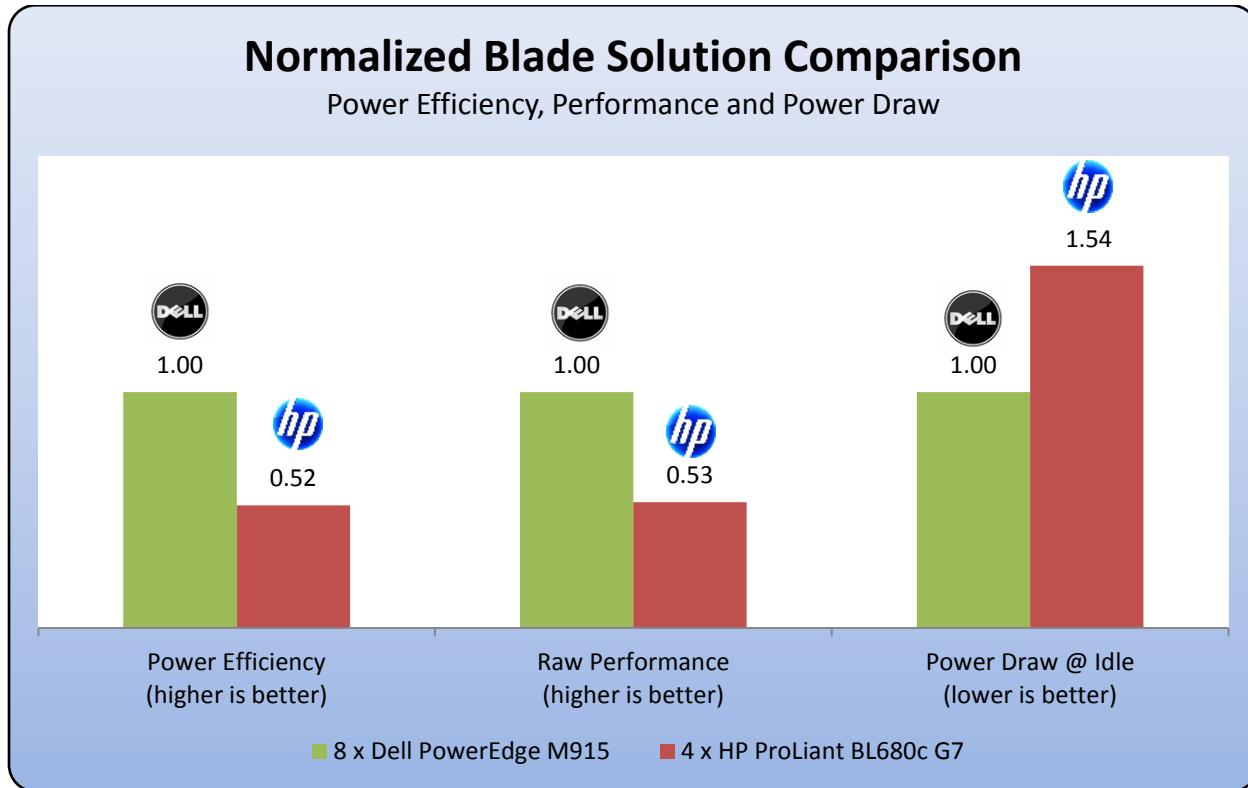
Normalized Blade Solution Comparison
Power Efficiency, Performance and Power Draw

	Power Efficiency (higher is better)	Raw Performance (higher is better)	Power Draw @ Idle (lower is better)
Dell	1.00	1.00	1.00
HP	0.52	0.53	1.54

■ 8 x Dell PowerEdge M915   ■ 4 x HP ProLiant BL680c G7

The Dell solution's greater power efficiency is illustrated in Figure 2. The SPECpower_ssj2008 overall ssj_ops/watt for the 8-node Dell solution is 2,425, 92% higher than the 4-node HP solution's 1,260 ssj_ops/watt.

Figure 2: Blade Solution Power Efficiency
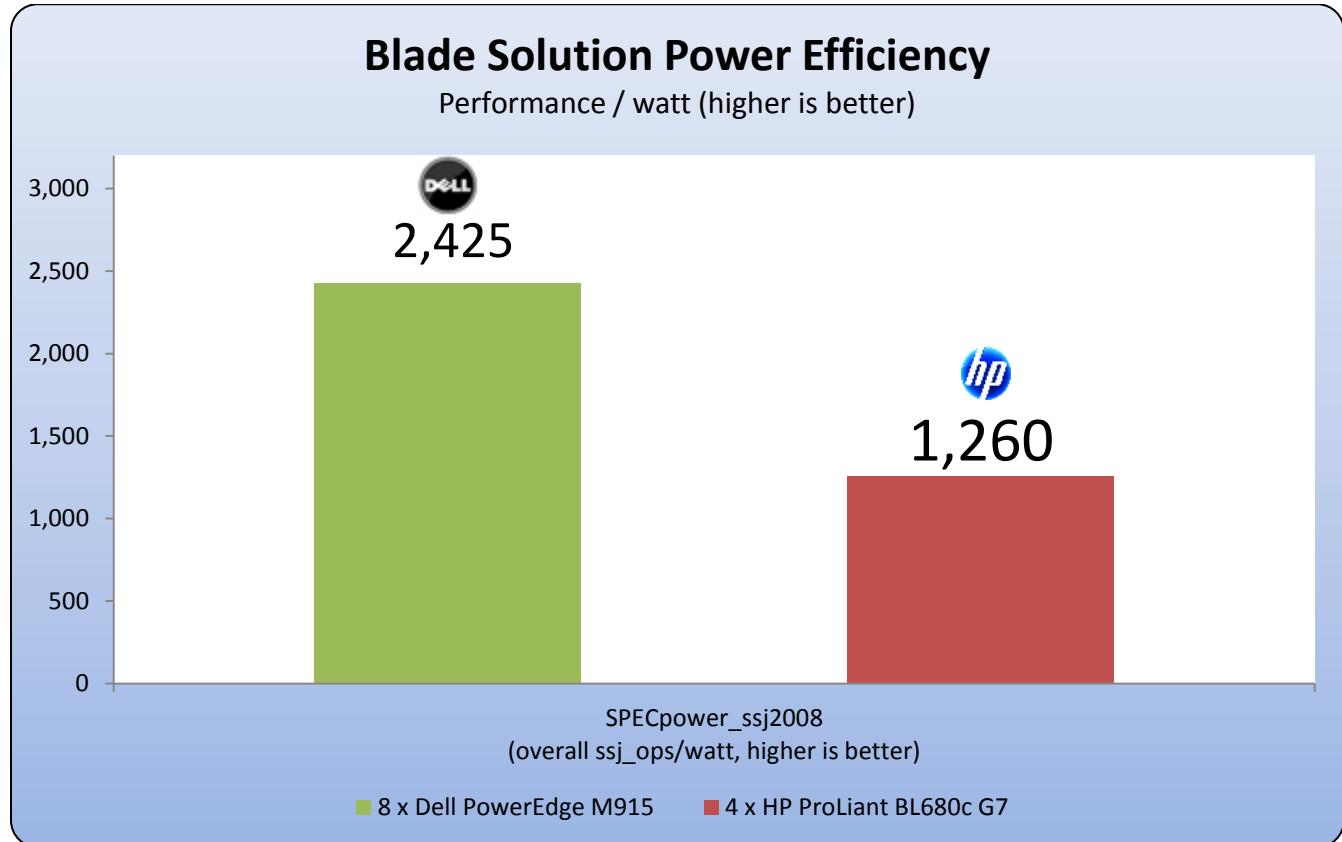
The PowerEdge M915 blade solution's density advantage is illustrated in Figure 3. While both solutions consume 10U of rack space, the Dell solution can accommodate 8 M915 blades compared to only 4 BL680c G7 blades in the HP solution. This leads to the Dell solution's 87% advantage in aggregate full-chassis performance[5].

Figure 3: Blade Solution Full-Chassis Performance
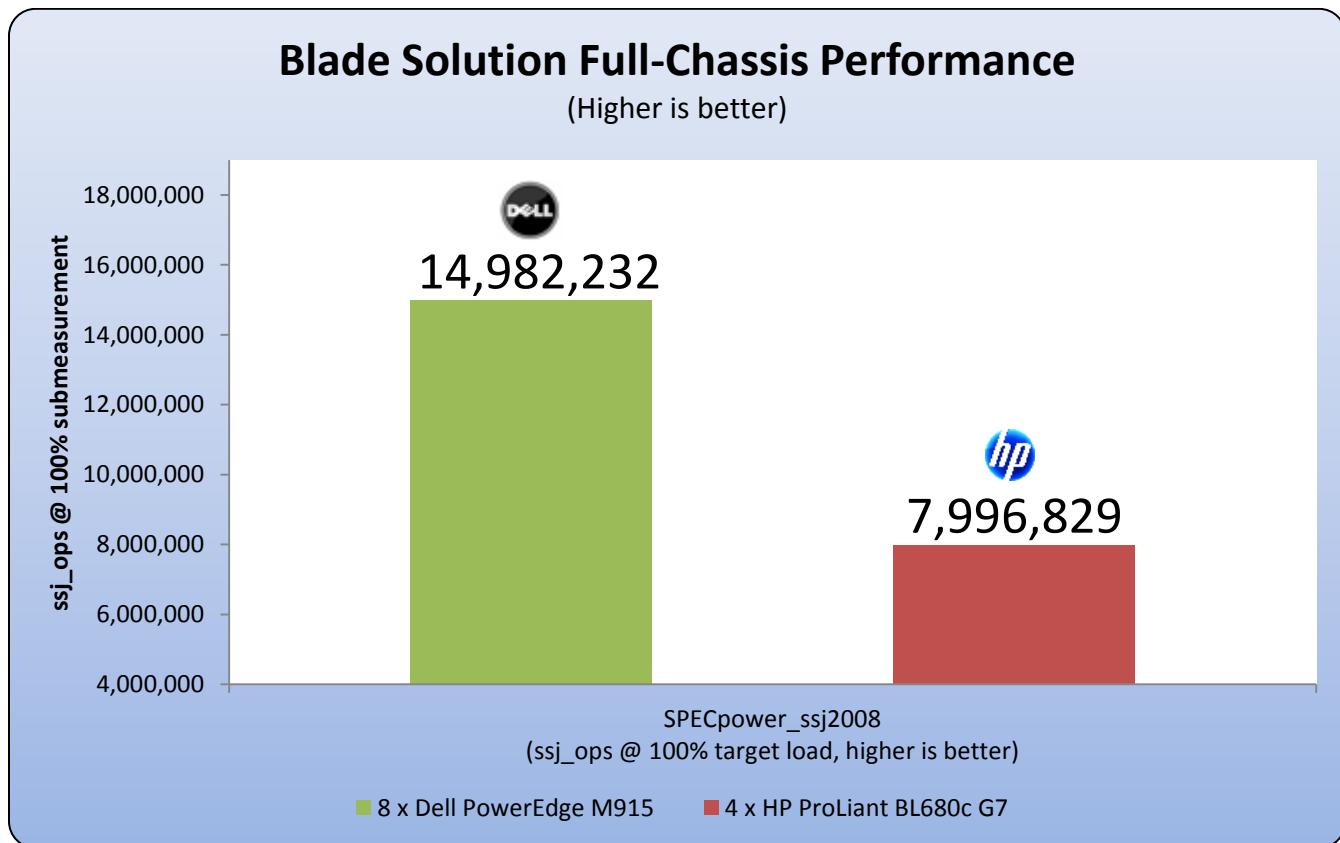
Blade Solution Full-Chassis Performance
(Higher is better)

ssj_ops @ 100% submeasurement

Dell: 14,982,232
HP: 7,996,829

SPECpower_ssj2008
(ssj_ops @ 100% target load, higher is better)

■ 8 x Dell PowerEdge M915   ■ 4 x HP ProLiant BL680c G7

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[5] The 8-node M915 achieved 14,982,232 ssj_ops@100% target load and a SPECpower_ssj2008 result of 2,425 overall ssj_ops/Watt, compared to the 4-node BL680c G7 with 7,996,829 ssj_ops@100% target load and a SPECpower_ssj2008 result of 1,260 overall ssj_ops/Watt.

SPECpower_ssj2008 includes a measurement of power while the servers are at 100% target utilization. The Dell blade solution has twice as many servers as the HP solution, but as Figure 4 shows, the Dell solution consumes just 14% more power[6] at full utilization.

Figure 4: Blade Solution Power Consumption at 100% Target Load

Blade Solution Power Consumption at 100% Target Load

Despite providing twice as many servers and three times as many physical processor cores, the Dell blade solution consumes just 14% more power at 100% utilization than the HP blade solution.

Dell: 4,573
HP: 4,020

SPECpower_ssj2008
(power draw @ 100% target load, lower is better)

■ 8 x Dell PowerEdge M915   ■ 4 x HP ProLiant BL680c G7

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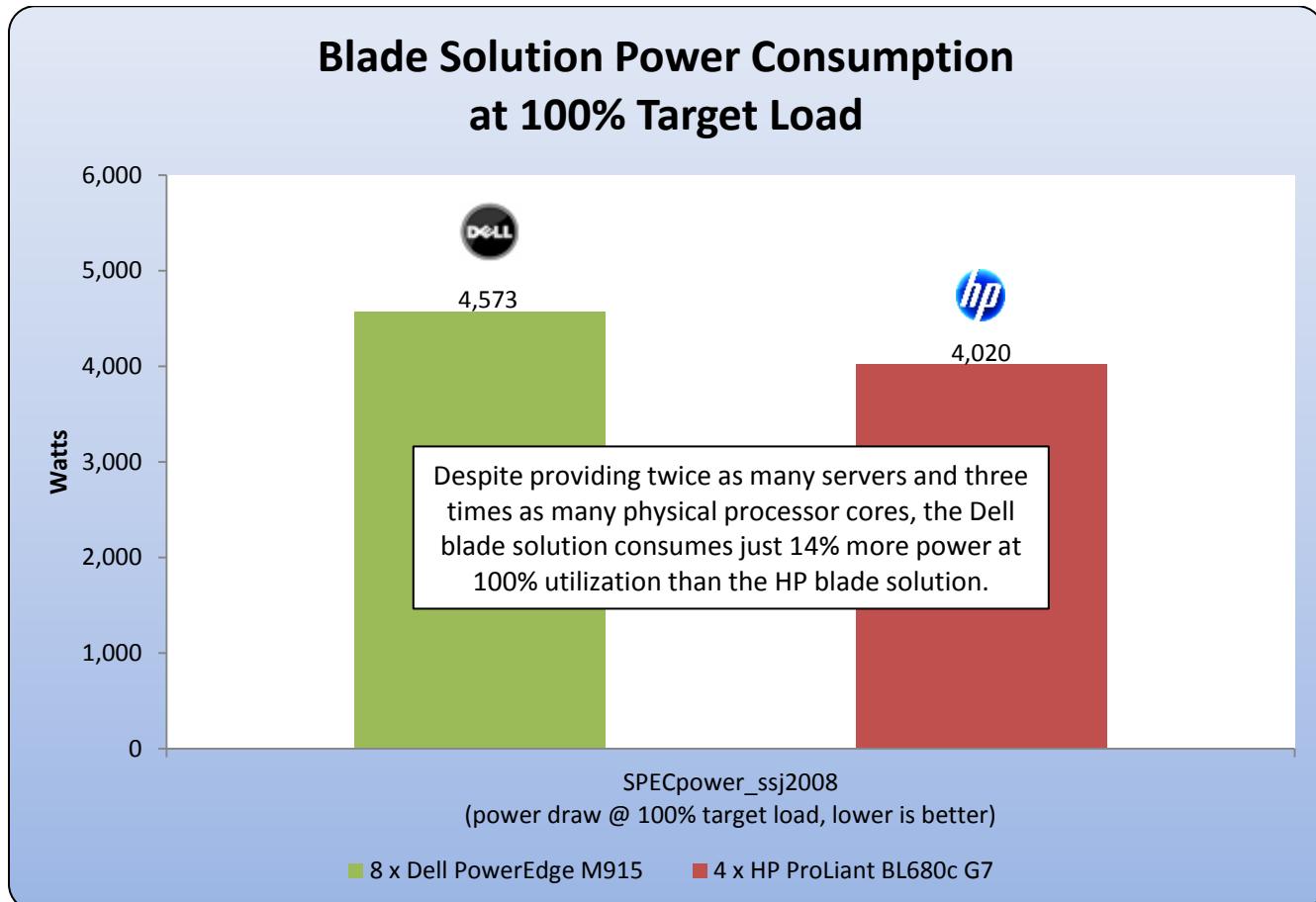
[6] The 8-node M915 consumed just 4,573 W at 100% target utilization, compared to 4,020 W for the 4-node BL680c G7. The 8-node M915 achieved 14,982,232 ssj_ops@100% target load and a SPECpower_ssj2008 result of 2,425 overall ssj_ops/Watt, compared to the 4-node BL680c G7 with 7,996,829 ssj_ops@100% target load and a SPECpower_ssj2008 result of 1,260 overall ssj_ops/Watt.

SPECpower_ssj2008 also includes a measurement of power while the servers are at 0% target utilization (Active Idle). Despite having twice as many blade servers, the Dell solution consumes 799 W[7] **less** power at idle than the HP blade solution, as seen in Figure 5.

Figure 5: Blade Solution Power Consumption at Idle

Blade Solution Power Consumption at Idle

(Lower is better)

Dell: 1,492

HP: 2,291

SPECpower_ssj2008
(power draw @ Active Idle, lower is better)

■ 8 x Dell PowerEdge M915   ■ 4 x HP ProLiant BL680c G7

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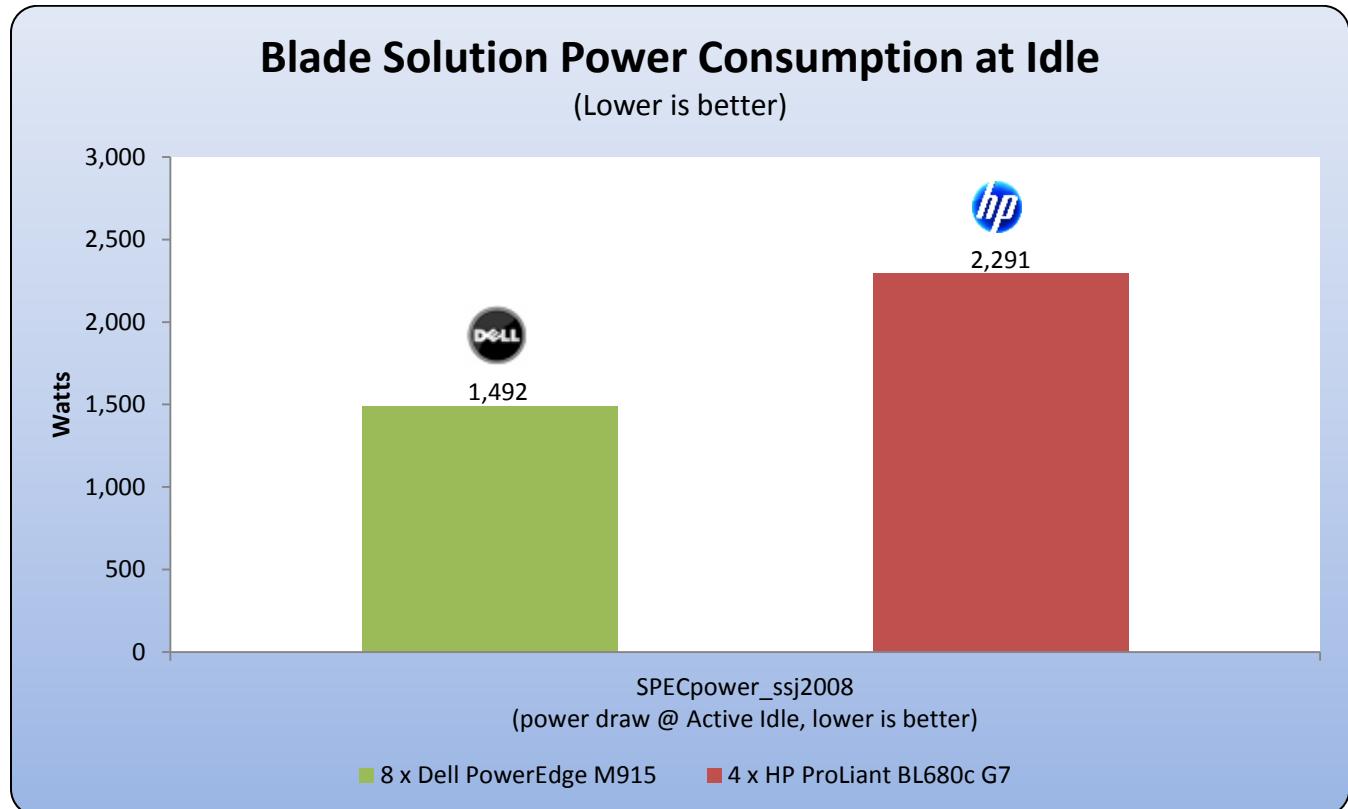
[7] The 8-node M915 consumed only 1,492W at the Active Idle Point, compared to 2,291W for the 4-node BL680c G7. The 8-node M915 achieved 14,982,232 ssj_ops@100% target load and a SPECpower_ssj2008 result of 2,425 overall ssj_ops/Watt, compared to the 4-node BL680c G7 with 7,996,829 ssj_ops@100% target load and a SPECpower_ssj2008 result of 1,260 overall ssj_ops/Watt.

Price as Tested

Data in the previous section shows that the PowerEdge blade solution with M915 blades is more power efficient and higher performing that the ProLiant blade solution with BL680c G7 blades. Despite having twice as many blade servers, the Dell solution costs 21% less as tested (Figure 6).

Figure 6: Price as Tested[8]

Blade Solution Price as Tested
U.S. Dollars (lower is better)

Dell Blade Solution: $106,704.00
HP Blade Solution: $137,980.00

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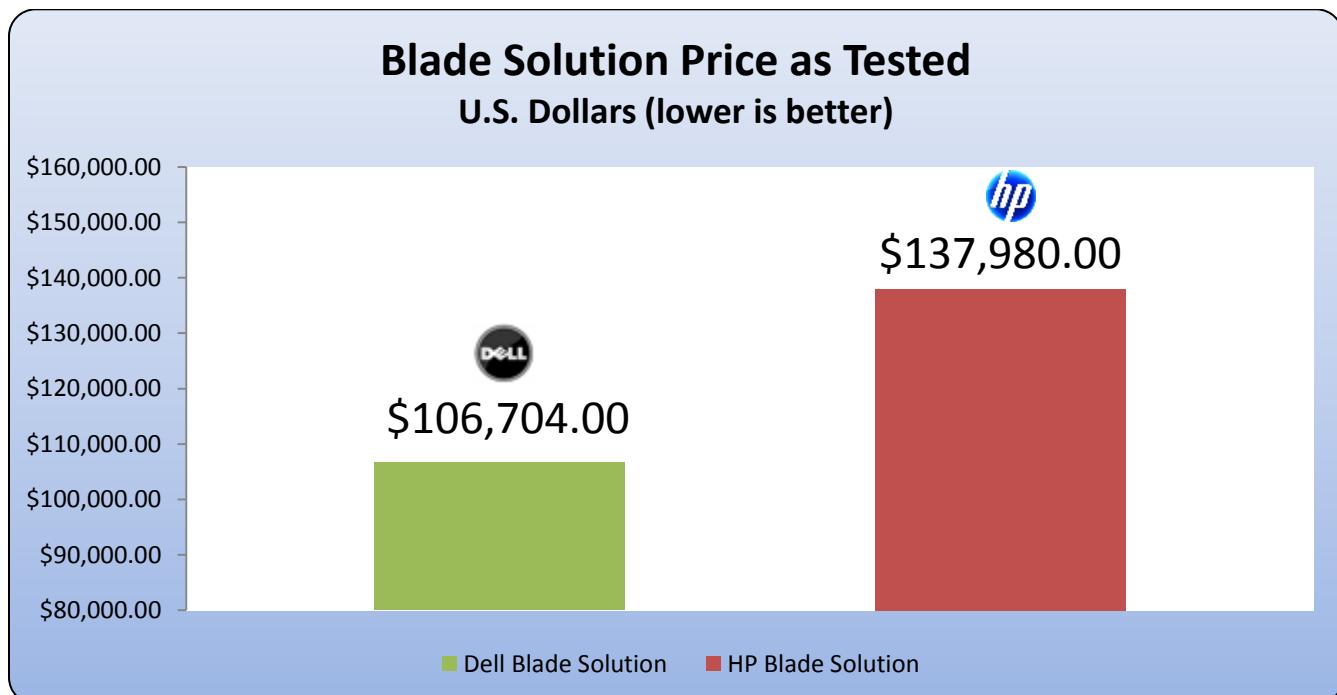
[8] M915 and M1000e prices in U.S. dollars from Dell.com, June 14, 2011. BL680c G7 and C7000 prices in U.S. dollars from HP authorized reseller, June 14, 2011.

Price to Power Efficiency Ratio

Table 2 and Table 3Table 3 detail the price for both solutions including the blades, blade enclosures, chassis controller modules, I/O modules, and power supplies necessary for the testing.

Table 2: Dell Blade Solution Cost Breakdown[9]

Dell Blade Solution	Qty	Each	Total
PowerEdge M915 blades	8	$13,338.00	$106,704.00
M1000e Modular Blade Enclosure	1	$9,701.00	$9,701.00
Dell Total Cost			$116,405.00
Percent less cost for the Dell Solution			21%
SPECpower_ssj2008 Overall ssj_ops / watt			2,425
Dell Solution $ / ssj_ops / watt			$48.00
Dell Percent less $ / ssj_ops / watt			59%

Table 3: HP Blade Solution Cost Breakdown[10]

HP Blade Solution	Qty	Each	Total
ProLiant BL680c G7 blades	4	$34,495.00	$137,980.00
BladeSystem c7000 Enclosure	1	$10,123.00	$10,123.00
HP Total Cost			$148,103.00
SPECpower_ssj2008 Overall ssj_ops / watt			1,260
HP Solution $ / ssj_ops / watt			$117.54

The lower cost and higher power efficiency of the Dell solution lead to a cost of just $48.00 for each point of overall SPECpower_ssj2008 score, 59% less than the $117.54 per point of overall SPECpower_ssj2008 score with the HP solution.[11]

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[9] M915 and M1000e prices in U.S. dollars from Dell.com, June 14, 2011
[10] BL680c G7 and C7000 prices in U.S. dollars from HP authorized reseller, June 14, 2011
[11] The 8-node M915 achieved 14,982,232 ssj_ops@100% target load and a SPECpower_ssj2008 result of 2,425 overall ssj_ops/Watt, compared to the 4-node BL680c G7 with 7,996,829 ssj_ops@100% target load and a SPECpower_ssj2008 result of 1,260 overall ssj_ops/Watt.

Performance per Dollar

The lower price and higher overall performance of the Dell solution allow it to provide 129 ssj_ops at 100% target load for each U.S. dollar spent on the solution, compared to just 54 ssj_ops at 100% target load[12] for each dollar spent on the HP solution, as seen in Figure 7.

Figure 7: Blade Solution Performance per Dollar

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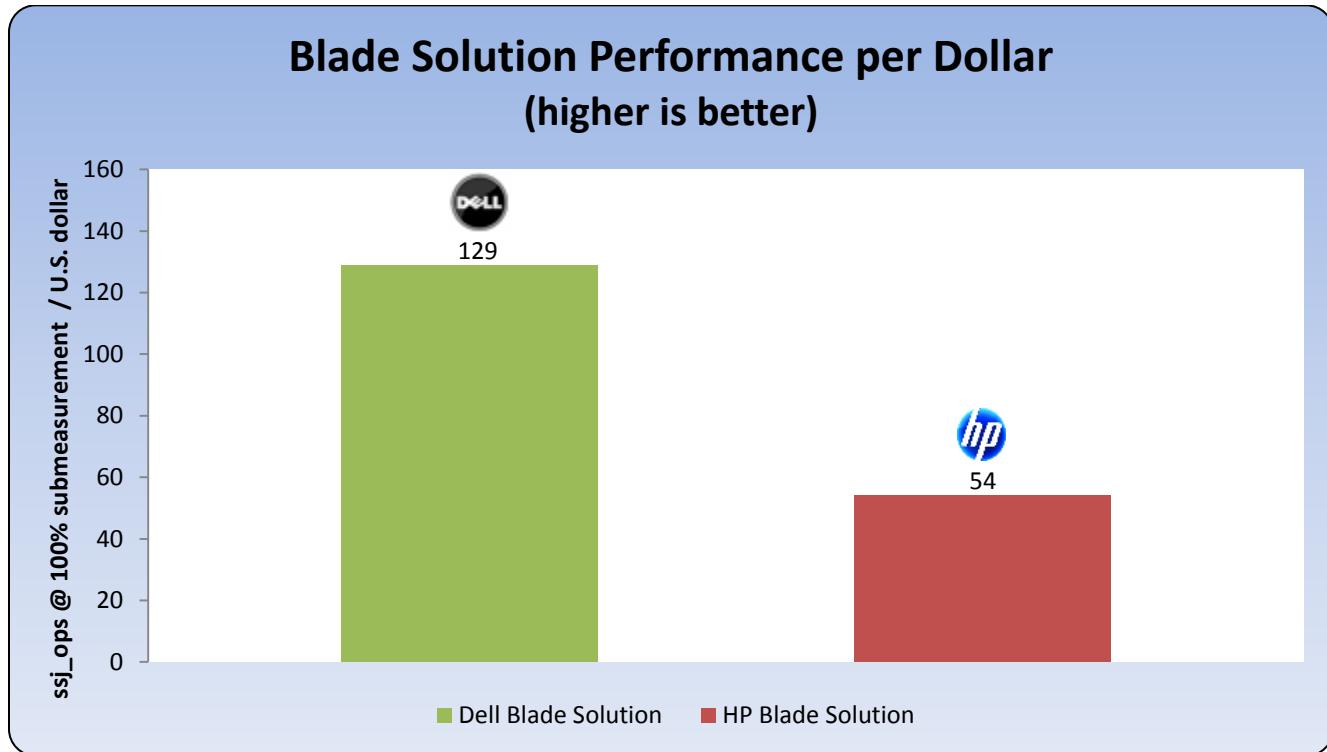
[12] The 8-node M915 achieved 14,982,232 ssj_ops@100% target load and a SPECpower_ssj2008 result of 2,425 overall ssj_ops/Watt, compared to the 4-node BL680c G7 with 7,996,829 ssj_ops@100% target load and a SPECpower_ssj2008 result of 1,260 overall ssj_ops/Watt.

Industry Leading 4-Socket Server Power Efficiency

The 8-node Dell M915 blade solution in this comparison achieved an overall SPEC score of 2,425 even when configured as it would in a typical datacenter, with redundant hard drives and all DIMM slots filled. With minor changes to the configuration, using hardware which can be ordered standard from www.dell.com, the 8-blade M915 solution achieved an overall SPECpower score of 2,716, which is the highest score of any 4-socket rack or blade server published at www.spec.org as of July, 2011[13].

Future Platform Updates

The PowerEdge M915 blades in the Dell solution were equipped with AMD Opteron™ model 6176 processors, the most power efficient processors available for the M915 blades at the time equipment for this study was purchased. Likewise, the ProLiant BL680c G7 blades in the HP solution were equipped with Intel Xeon X7560 processors, the most power efficient processors available for that platform at the time equipment for the testing was purchased. When AMD Opteron 6200-series processors are available for the Dell solution, and Intel Xeon E7-series processors are available for the HP solution, Dell plans to update this study to show what changes, if any, these next generation processors bring to the relative performance of the two blade solutions.

Summary

The focus of this study was to examine the overall performance and power efficiency of full-chassis solutions utilizing the latest blades released by Dell (M915) and HP (BL680c G7). The Dell solution with eight PowerEdge M915 blades was shown to provide 92% greater overall performance, with 87% greater power efficiency, for 21% less cost than the HP solution, which could only accommodate four BL680c G7 blades.

An HP solution comprised of eight BL685c G7 blades could also have been used for the comparison. Given the PowerEdge M915 blade's 6% performance advantage over the BL685c G7 in the SPECjbb2005 benchmark[14], the Dell PowerEdge M915 blade solution would be expected to have an overall performance advantage in such a comparison.

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[13] Based on results for the 8-node M915 as published at www.spec.org as of 15 July 2011. For more information about SPECpower, see www.spec.org/power_ssj2008/.

[14] Source: Dell PowerEdge M915 (4 chips, 48 cores, 48 threads) 1,949,160 SPECjbb2005 bops, 8 JVMs, 243,645 SPECjbb2005 bops/JVM; HP ProLiant BL685c G7 (4 chips, 48 cores, 48 threads) 1,832,929 SPECjbb2005 bops, 8 JVMs, 229,116 SPECjbb2005 bops/JVM. Based on best SPECjbb2005 results published on http://www.spec.org as of July 7, 2011. For latest SPECjbb2005 benchmark results, visit www.spec.org/osg/jbb2005.

Appendix A—Test Methodology

SPECpower_ssj2008 Standard

SPECpower_ssj2008 is an industry standard benchmark created by the Standard Performance Evaluation Corporation (SPEC) to measure a server's power and performance across multiple utilization levels. SPECpower_ssj2008 consists of a Server Side Java (SSJ) workload along with data collection and control services. SPECpower_ssj2008 results portray the server's performance in ssj_ops (server side Java operations per second) divided by the power used in watts (ssj_ops/watt). SPEC created SPEcpower_ssj2008 for those who want to accurately measure the power consumption of their server in relation to the performance that the server is capable of achieving with ssj2008 workload.

SPECpower_ssj2008 consists of three main software components:

- Server Side Java (SSJ) Workload—Java database that stresses the processors, caches and memory of the system, as well as software elements such as OS elements and the Java implementation chosen to run the benchmark.
- Power and Temperature Daemon (PTDaemon)—Program that controls and reports the power analyzer and temperature sensor data.
- Control and Collect System (CCS)—Java program that coordinates the collection of all the data.

For more information on how SPECpower_ssj008 works, see http://www.spec.org/power_ssj2008/.

All results discussed in this whitepaper are from "compliant runs" in SPEC terminology, which means that although they have not been submitted to SPEC for review, Dell is allowed to disclose them for the purpose of this study. All configuration details required to reproduce these results are listed in Appendices A, B, and C and all result files from the runs compared are included in Appendix D.

Both servers were configured by installing a fresh copy of Microsoft® Windows Server® 2008 Enterprise R2 (Service Pack 1) with the operating system installed on a two-hard drive RAID 1, choosing the "full installation" option for each.

The latest driver and firmware update packages available to both servers were installed at the beginning of this study. Refer to Appendix B for details.

The Dell System Performance Analysis Team ran SPECpower_ssj2008 ten times per configuration across both servers and chose the run with the highest overall ssj_ops/watt for each configuration to compare.

BIOS Settings

BIOS settings differed between the two manufacturers, so we tuned for best-known SPECpower_ssj2008 performance results. To improve power efficiency, we changed the memory speed of the M915 blades to 1066MHz from the default of 1333MHz, and changed their HyperTransport frequency to HT1. Virtualization was not used in these tests, so AMD Virtualization support was disabled on both servers.

For the Dell PowerEdge M915 blades, the following settings were used:

- DRAM Prefetcher Disabled.
- Hardware Prefetch Training on Software Prefetch Disabled.
- Hardware Prefetcher Disabled.
- HT mode set to HT1.
- Memory Speed set to 1066MHz in BIOS.
- AMD Virtualization was disabled.

For the HP ProLiant BL680c G7 blades, the following settings were used:

- Disabled Intel Turbo Boost Technology.
- Dynamic Power Savings Mode Response set to Slow.
- Enabled DIMM Idle Power Saving Mode.
- Disabled HP NC553i 10Gb 2-Port FlexFabric Adapter 2 in BIOS.
- Disabled HP NC553i 10Gb 2-Port FlexFabric Adapter 3 in BIOS.
- Disabled Intel SATA Controller #1 in BIOS.
- Disabled Hardware Prefetcher in BIOS.
- Disabled Adjacent Sector Prefetch in BIOS.
- The HP ProLiant BL680c G7 blades provide an option called Collaborative Power Control in its ROM-Based Setup Utility (RBSU) which is Enabled by default. Disabling this option on all blades did not improve overall SPECpower_ssj2008 results, and resulted in Invalid runs, so this setting was left at the default Enabled setting for the runs which produced the data used in the comparison.

OS Tuning

To improve Java performance, large pages were enabled by entering **Control Panel->Administrative Tools->Local Security Policy->Local Policies->User Rights Assignment->Lock Pages in Memory**. An option was changed to add Administrator.

Operating System Power Management mode for both solutions was left at **Balanced** (the default) and **Balanced** mode was edited to turn off the Hard Drive after 1 minute. On the HP ProLiant BL680c G7 blades, the Minimum Processor State was changed to 0%.

Some platforms produce better overall SPECpower_ssj2008 scores using the Windows 2008 Power option "Power saver" with Maximum Processor set to 100%, but on both blade solutions, this did not significantly change the overall score, so this setting was left at the default Balanced setting for the runs which produced the data used in the comparison.

We configured all servers with a separate IP address on the same subnet as our SPECpower_ssj2008 controller system where the Director, CCS, and PTDaemon components were located, and connected all servers and the controller system to an external PowerConnect Gigabit Ethernet switch through NIC 1 for their respective runs.

SPECpower_ssj2008 Configuration

IBM® J9 Java Virtual Machine (JVM)[15] was used for both solutions, as this JVM provided the best performance for SPECpower_ssj2008 of any of the available choices at the time that this study was undertaken.

The following JVM options were used on both servers, as they are the best-known JVM tunings for SPECpower_ssj2008 for the IBM J9 JVM when running with larger memory configurations:

```
–Xms1875m –Xmx1875m –Xmn1400m –Xaggressive –Xcompressedrefs –Xgcpolicy:gencon –
XlockReservation –Xnloa –XtlhPrefetch –Xlp
```

On the PowerEdge M915 blades, the following bindings were used to ensure that each of the eight JVMs ran on six logical processors:

```
start /affinity [3F,FC0,3F000,FC0000,3F000000,FC0000000,3F000000000,FC0000000000]
```

---

[15] JVM build 2.4, J2RE 1.6.0 IBM J9 2.4 Windows Server 2008 amd64-64 jvmwa64 60sr5-20090519_35743

On the ProLiant BL680c G7 blades, the following bindings were used to ensure that each of the 16 JVMs ran on 4 logical processors:

```
start /affinity [F, F0, F00, F000, F0000, F00000, F000000, F0000000, F00000000,
F000000000, F0000000000, F00000000000, F000000000000, F0000000000000,
F00000000000000, F000000000000000]
```

Power Meter Configuration

Power consumption for each blade chassis under test was monitored by two Yokogawa WT210 Digital Power Meters. Both chassis under test had a total of 6 PSUs, so each Yokogawa WT210 monitored power for 3 PSUs.

Appendix B—Blade Server Hardware Configuration

Table 4: Blade Server Hardware Configuration

	Dell PowerEdge M915	HP ProLiant BL680c G7
Memory Modules		
Total RAM in each blade (GB)	128	128
Vendor and model number	Samsung M393B523CH0-YH9	Samsung M393B5673FH0-CH9Q5
Type	PC3L-10600R	PC3-10600R
Speed (MHz)	1333	1333
Speed in system as tested	1066	1066
Timing/latency	CAS 9	CAS 9
Number of RAM modules	32 x 4 GB	64 x 2 GB
Rank organization	Dual Rank	Dual Rank
Hard Disk		
Vendor and model number	Dell P/N 0J084N	HP 518216-002
Number of disks in system	2	2
Size (GB)	146	146
RPM	15,000	15,000
Type	SAS 6 Gbps	SAS 6 Gbps
RAID Type	RAID 1	RAID 1 + 0[16]
Controller	Dell PERC H200	HP Smart Array P410i
Operating System		
Name	Microsoft Windows Server 2008 R2 Enterprise SP1	Microsoft Windows Server 2008 R2 Enterprise SP1
Build number	7601	7601
File system	NTFS	NTFS
Language	English	English
Network Adapter		
Vendor and model number	2 x Broadcom BCM57712-k Dual Port 10Gb	6 HP NC553i 10Gb FlexFabric adapter ports
Type	Integrated	Integrated

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[16] On the HP Smart Array P410i, RAID 1+0 is the only option available in a 2 hard drive configuration.

Appendix C—Server Firmware and Drivers

Table 5: Server Firmware and Drivers

Driver/Firmware Versions	Dell PowerEdge M915	HP ProLiant BL680c G7
System BIOS	1.0.3	2011.02.19 (Released 3/21/2011)
Network Firmware	6.2.16	3.102.517.7
Network Drivers	16.2.1	2.104.277.3
HBA Firmware	07.02.42.00	3.52
HBA Drivers	4.31.1.64	6.20.2.64
Video Driver	1.1.3.0	OS Native
Integrated Management Controller Firmware	3.21 build 48	1.20
Management Controller Driver	N/A	3.3.0.0

Appendix D—Results

The full reports from the SPECpower_ssj2008 runs used in this comparison are attached to this whitepaper for reference. The first page of each is shown here for convenience.

Figure 8: Dell Blade Solution Benchmark Results

SPECpower_ssj2008

Copyright © 2007-2011 Standard Performance Evaluation Corporation

Dell Inc. PowerEdge M915				SPECpower_ssj2008 = 2,425 overall ssj_ops/watt	
Test Sponsor:	Dell Inc.	**SPEC License #:**	55	**Test Method:**	Multi Node
Tested By:	Dell Inc.	**Test Location:**	Round Rock, TX, USA	**Test Date:**	Jun 7, 2011
Hardware Availability:	Jun-2011	**Software Availability:**	Feb-2011	**Publication:**	Unpublished
System Source:	Single Supplier	**System Designation:**	Server	**Power Provisioning:**	Line-powered

Set sut WARNING: For point 8, elapsed nanoTime=240108845676 ms, elapsed currentTimeMillis=240007 ms
Set sut WARNING: For point 3, elapsed nanoTime=240015647518 ms, elapsed currentTimeMillis=240131 ms
Set sut WARNING: For point 1, elapsed nanoTime=240250333681 ms, elapsed currentTimeMillis=240132 ms
Set sut WARNING: For point 2, elapsed nanoTime=240125634304 ms, elapsed currentTimeMillis=240287 ms
Set sut WARNING: For point 0, elapsed nanoTime=240093929556 ms, elapsed currentTimeMillis=240241 ms
Set sut WARNING: For point 0, elapsed nanoTime=240060738204 ms, elapsed currentTimeMillis=240178 ms
Set sut WARNING: For point 1, elapsed nanoTime=240030140492 ms, elapsed currentTimeMillis=240131 ms

Benchmark Results Summary

Performance			Power	Performance to Power Ratio
Target Load	**Actual Load**	**ssj_ops**	**Average Active Power (W)**	
100%	99.5%	14,982,232	4,573	3,277
90%	90.0%	13,553,545	4,293	3,157
80%	80.0%	12,058,174	3,853	3,130
70%	70.0%	10,544,958	3,539	2,979
60%	59.9%	9,027,181	3,294	2,740
50%	50.0%	7,537,676	3,063	2,461
40%	39.9%	6,010,474	2,834	2,121
30%	30.0%	4,525,575	2,644	1,712
20%	20.0%	3,016,079	2,387	1,264
10%	10.0%	1,507,683	2,163	697
Active Idle		0	1,492	0
		∑ssj_ops / ∑power =		2,425

Performance to Power Ratio

2,425 overall ssj_ops/watt

| Target Load	
100%	3,277
90%	3,157
80%	3,130
70%	2,979
60%	2,740
50%	2,461
40%	2,121
30%	1,712
20%	1,264
10%	697
Active Idle	

Average Active Power (W)

Figure 9: HP Blade Solution Benchmark Results

SPECpower_ssj2008

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Hewlett Packard Company ProLiant BL680c G7		SPECpower_ssj2008 = 1,260 overall ssj_ops/watt			
Test Sponsor:	Dell Inc.	**SPEC License #:**	55	**Test Method:**	Multi Node
Tested By:	Dell Inc.	**Test Location:**	Round Rock, TX, USA	**Test Date:**	Jun 7, 2011
Hardware Availability:	Nov-2010	**Software Availability:**	Feb-2011	**Publication:**	Unpublished
System Source:	Single Supplier	**System Designation:**	Server	**Power Provisioning:**	Line-powered

Set sut WARNING: For point 3, elapsed nanoTime=240026385114 ms, elapsed currentTimeMillis=240241 ms
Set sut WARNING: For point 1, elapsed nanoTime=240200467528 ms, elapsed currentTimeMillis=240349 ms
Set sut WARNING: For point 0, elapsed nanoTime=240054160612 ms, elapsed currentTimeMillis=240178 ms
Set sut WARNING: For point 1, elapsed nanoTime=240133818681 ms, elapsed currentTimeMillis=240349 ms
Set sut WARNING: For point 3, elapsed nanoTime=240027992607 ms, elapsed currentTimeMillis=240178 ms
Set sut WARNING: For point 1, elapsed nanoTime=240020123996 ms, elapsed currentTimeMillis=240225 ms
Set sut WARNING: For point 0, elapsed nanoTime=240205610034 ms, elapsed currentTimeMillis=240412 ms
Set sut WARNING: For point 3, elapsed nanoTime=240021225761 ms, elapsed currentTimeMillis=240225 ms

Benchmark Results Summary

Performance			Power	Performance to Power Ratio
Target Load	Actual Load	ssj_ops	Average Active Power (W)	
100%	99.3%	7,996,829	4,020	1,990
90%	90.0%	7,249,115	3,864	1,876
80%	79.9%	6,436,987	3,711	1,734
70%	70.1%	5,641,408	3,560	1,585
60%	59.9%	4,825,740	3,410	1,415
50%	50.0%	4,024,637	3,250	1,238
40%	39.9%	3,213,900	3,060	1,050
30%	30.1%	2,421,491	2,848	850
20%	20.0%	1,607,010	2,627	612
10%	10.1%	809,899	2,448	331
Active Idle		0	2,291	0
∑ssj_ops / ∑power =				1,260