

## DELL™ ACTIVE SYSTEM 800

CONVERGED INFRASTRUCTURE SOLUTION WITH



## DELL OPENMANAGE™ POWER CENTER

EASILY CAP POWER TO  
OPTIMIZE ENERGY USAGE



When building or expanding your data center, you need the ability to control energy resources and costs, and management of circuit density is essential. In the past, this required structuring your hardware purchases around maximum or peak power usage levels, and mapping those usage levels to your underlying data center energy plan. Now, however, with Dell Active System 800 and Dell™ OpenManage™ Power Center, you can build out your server infrastructure with flexibility and scalability in mind, and not be permanently bound to fixed wattage requirements.

We tested the Dell Active System 800 with Dell OpenManage Power Center running VMware vSphere 5.1 with the goal of determining the solution's flexibility and its ability to provide consistent performance with a real world workload both with and without power management policies applied. We evaluated the solution under a high-utilization scenario, and then set a power cap on the workload to evaluate the performance output with the new power policy applied.

In our tests, we determined that the Dell Active System 800 with Dell OpenManage Power Center provided a wide variety of options to optimize power usage at the chassis and server level. We also saw even levels of workload performance for all tested applications both before and after power policies were applied.



## POWER LIMITS FOR INCREASED FLEXIBILITY

When deploying any data center solution, it is critical to stay within the limits of your available power and cooling infrastructure. Dell OpenManage Power Center presents energy usage alternatives to enable your IT staff to do just that.

Upgrading to the latest in server technology not only benefits your users and workloads from a computational power standpoint, but also enables you to take advantage of new power-saving technologies. A known problem for data center managers is that as the load on servers increases, so too do the energy costs to run the servers. Advanced power management technologies present in the latest generation of Dell PowerEdge servers allow you to set caps on power utilization for your servers so that even during peak usage times you do not exceed defined thresholds.

Using power management software, it is possible to adjust limits on a data center as a whole, or with increasing granularity down to the room, aisle, rack, chassis or server level. This software also allows you to adjust your power policies by time of day or week, meaning you can set the power limit lower during non-peak hours, or raise it at times when you know that the load increases.

These techniques enable you to increase density in your data center because circuits can predictably power more servers with no fear of usage spikes. As a result, you can be more agile in your infrastructure deployment planning and reduce risk of circuit failure due to increased load on hardware.

### About Dell OpenManage Power Center

Dell OpenManage Power Center, using Intel Node Manager technology, gives administrators insight into and control over the power utilization of their data center infrastructure. Power Center utilizes open industry standards, and can read power usage information from Dell PowerEdge servers, power distribution units, uninterruptible power supplies, and Dell PowerEdge blade server chassis.

Dell OpenManage Power Center supports flexible granularity, giving you the option to view instantaneous power usage or temperature and examine power usage over specific time increments, such as sub-hour, daily, weekly, monthly, or greater. Dell OpenManage Power Center shows peak, average, and minimum power across the data center, room, aisle, rack, or server. This knowledge empowers you to make informed decisions about energy planning, server density, budgeting, and uptime improvements.

To learn more about Dell OpenManage Power Center, visit <http://www.dell.com/us/enterprise/p/dell-openmanage-power-center/pd>.

### About the Dell Fresh Air Solution

Dell 12th-generation servers conform to the Dell Fresh Air Solution, which seeks to dramatically reduce energy consumption requirements for data centers by

encouraging the use of fresh air for data center cooling, and allowing servers to run in environmental temperatures up to 113 degrees Fahrenheit. The goal of this solution is to allow users of Dell server products to run datacenters without the need for large chillers, which can be a significant cost burden in the areas of maintenance and electricity.

To learn more about the Dell Fresh Air Solution, see <http://content.dell.com/us/en/enterprise/by-need-efficient-infrastructure-data-center-energy-efficiency-energy-management>

## About the Dell Active System 800

Dell designed the Active System 800, a member of the Active Infrastructure converged infrastructure framework family, to be a comprehensive solution for rapid deployment of a pre-integrated and validated data center solution. Available in a number of base configurations with optional customizations available, the Active System 800 is simple to configure and maintain, but well suited to expand to meet additional requirements in the future.

Active Infrastructure solutions, such as the Active System 800, feature the Dell Active System Manager, which simplifies administration by combining multiple maintenance tools under a unified interface. Active System Manager provides centralized management for the solution, such as template-based configuration for provisioning and management, automated discovery and deployment of Dell PowerEdge blade infrastructure, and guided user workflows with multi-level views of I/O topology.

Using advanced networking technologies, the Dell Force10 switches and PowerEdge M I/O Aggregators converge LAN and SAN traffic onto a shared fabric, reducing costs, simplifying cabling and administration, and reducing load on other components in the solution by handling tasks traditionally associated with other hardware. The Active System 800 supports industry-standard Data Center Bridging (DCB) protocols for interoperability with third-party infrastructure, which maximizes traffic performance for protocols such as iSCSI. Additional open standards are supported, meaning the Active System 800 is compatible with your existing infrastructure, even those in top-of-rack (TOR) switch roles.

The Dell M1000e blade chassis, which houses the M620 blades in the solution, provides maximum flexibility, supporting a variety of compute, storage, and networking modules.

The Active System 800 fills the requirements of your business to be a flexible, cost-effective solution. The solution supports enterprise-class virtualization, as well as cloud solutions, using VMware virtualization technologies.

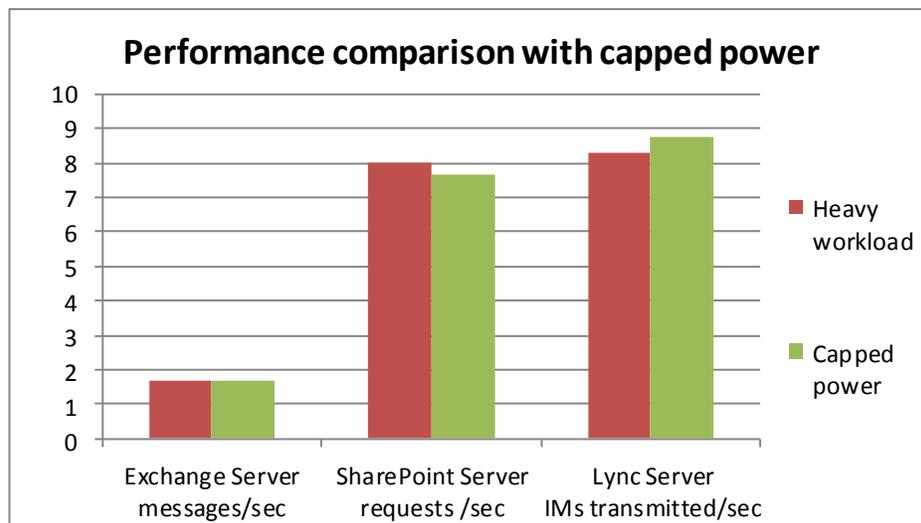
## WHAT WE FOUND

Using Dell OpenManage Power Center with the Dell Active System 800 configuration we tested, we found that setting energy management policies on the hardware did not diminish the performance of the Active System 800 in our test scenarios.

We tested with 1,000 simultaneous users generating load on server-based collaboration applications and four heavy order-processing workloads on two servers running VMware vSphere. By using a combination of the measured power usage and the Dell OpenManage Power Center upper bounds recommendations, we then implemented a power cap on the two servers in our tests.

Even with the power cap, the Active System 800 was still able to deliver the same performance to end users and the order-processing workloads (see Figure 1). This is due to the fact that the collaboration workload we used just a portion of the available CPU resources, resulting in essentially unused power.

Figure 1.  
Performance in three collaboration applications before and after power capping policy implemented.



**What does this mean for the data center manager?** Dell OpenManage Power Center technology enables administrators the flexibility to set common sense thresholds on hardware energy use. This enables increased server density, as additional server hardware can be placed on circuits that would have once been off limits due to worries of peak usage or energy consumption spikes. It also has the potential to reduce circuit failure, as now the control of energy usage rests with the data center manager, not with an out-of-control application that is consuming too many resources. Along with these benefits comes the ability to reduce physical circuits, cabling, and power-related downtime. These benefits ultimately all contribute to lowering your IT expenditures.

**What does this mean for the end user?** Users should never have to pay the price for data center power limitations or power policy changes. With the ability to implement flexible power policy and caps and still maintain even levels of service for user applications, this is no longer a concern.

## DETAILED TEST RESULTS

In these tests, we deployed Microsoft® Exchange Server 2012, SharePoint® Server 2010, Lync® Server 2010, and SQL Server 2012, all running on VMware vSphere virtual machines. Initial tests consisted of workloads using all three server applications, distributed between the two Dell PowerEdge M620 blade servers, and four order-processing workloads, with two per blade.

Once we determined the normal usage of our workloads, we implemented a power cap to ensure that this power threshold would never be exceeded, and then retested our workloads. By using a combination of the measured power usage and the Dell OpenManage Power Center upper bounds recommendations, we calculated a power cap of 771W, 58 percent of the total recommended upper bound limit on the two servers.

This test was a simulation of what one would typically experience in a data center – adjusting maximum energy down to normal and predictable levels allows for greater levels of planning, resource consumption, all while still providing even service to the users.

Figure 2 shows the results of each test run as related to the order-processing workloads.

Workload	Measurement
Order-processing workload	126,448 orders per minute
Microsoft Exchange	10.217ms latency (<50ms is acceptable <sup>1</sup> ) 1.662 messages per second
Microsoft SharePoint	8.004 requests per second
Microsoft Lync Server	8.302 IMs per second

Figure 2. Results from heavy workload testing of Microsoft collaboration and database workloads.

Concurrent with the order-processing workloads, we ran Microsoft SharePoint, Microsoft Lync, and Microsoft Exchange server workloads. Again, the implementation of the power cap had no appreciable impact on the performance of the server applications or end-user experience as reflected by the transactions per second shown for each application (see Figure 3).

<sup>1</sup> 50ms or lower, <http://technet.microsoft.com/en-us/library/aa998266.aspx>

Workload	Measurement
Order-processing workload	127,753 orders per minute
Microsoft Exchange	14.341ms latency (<50ms is acceptable) 1.685 messages per second
Microsoft SharePoint	7.684 requests per second
Microsoft Lync Server	8.775 IMs per second

Figure 3. Results from capped power testing of Microsoft collaboration and database workloads.

For more detailed results and test methodologies we used, see the companion report “Dell Active System 800 converged infrastructure solution: User collaboration performance” at

[http://www.principledtechnologies.com/Dell/ActiveSystem\\_CI\\_1212.pdf](http://www.principledtechnologies.com/Dell/ActiveSystem_CI_1212.pdf).

## CONCLUSION

When deploying a converged infrastructure solution, you must consider the power and cooling challenges that you may face.

The Dell OpenManage Power Center with Intel Node Manager Technology enables the Active System 800 to deliver reliable service, even under power policies that set necessary thresholds. In addition, Dell data center technology using Fresh Air allows the servers to run at 113 degrees, further reducing your data center’s power and cooling requirements.

Using the Dell OpenManage Power Center with the Active System 800 permits your administrators to not only use energy predictably and efficiently, but also dynamically allocate power, ultimately providing better performance, circuit density, and cost savings over the long run.

## ABOUT PRINCIPLED TECHNOLOGIES



Principled Technologies, Inc.  
1007 Slater Road, Suite 300  
Durham, NC, 27703  
[www.principledtechnologies.com](http://www.principledtechnologies.com)

We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help our clients assess how it will fare against its competition, its performance, its market readiness, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.

---

Principled Technologies is a registered trademark of Principled Technologies, Inc.  
All other product names are the trademarks of their respective owners.

---

**Disclaimer of Warranties; Limitation of Liability:**

PRINCIPLED TECHNOLOGIES, INC. HAS MADE REASONABLE EFFORTS TO ENSURE THE ACCURACY AND VALIDITY OF ITS TESTING, HOWEVER, PRINCIPLED TECHNOLOGIES, INC. SPECIFICALLY DISCLAIMS ANY WARRANTY, EXPRESSED OR IMPLIED, RELATING TO THE TEST RESULTS AND ANALYSIS, THEIR ACCURACY, COMPLETENESS OR QUALITY, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE. ALL PERSONS OR ENTITIES RELYING ON THE RESULTS OF ANY TESTING DO SO AT THEIR OWN RISK, AND AGREE THAT PRINCIPLED TECHNOLOGIES, INC., ITS EMPLOYEES AND ITS SUBCONTRACTORS SHALL HAVE NO LIABILITY WHATSOEVER FROM ANY CLAIM OF LOSS OR DAMAGE ON ACCOUNT OF ANY ALLEGED ERROR OR DEFECT IN ANY TESTING PROCEDURE OR RESULT.

IN NO EVENT SHALL PRINCIPLED TECHNOLOGIES, INC. BE LIABLE FOR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH ITS TESTING, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL PRINCIPLED TECHNOLOGIES, INC.'S LIABILITY, INCLUDING FOR DIRECT DAMAGES, EXCEED THE AMOUNTS PAID IN CONNECTION WITH PRINCIPLED TECHNOLOGIES, INC.'S TESTING. CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES ARE AS SET FORTH HEREIN.

---