

Cisco UCS C460 M2 Server: Best Cloud Computing Performance Available Anywhere



Powered by Intel Xeon Processors and EMC VNX Storage

Performance Brief
August 2011

Highlights

Best Performance for Cloud Computing

- A configuration consisting of four Cisco UCS™ C460 M2 High-Performance Rack-Mount Servers delivers a VMware® VMmark™ 2.1 score of 35.06@35 tiles, outperforming even 8-socket servers and delivering more than 20 percent better performance than the Fujitsu PRIMERGY RX900 S2 server.

Complete Infrastructure for Cloud Computing

- Cloud computing environments need to deliver both infrastructure and virtualization performance. The combination of Intel® Xeon® processor-powered Cisco UCS servers, Cisco Nexus® switching, and EMC® VNX™ storage accelerates virtual machine deployment and movement, providing a balanced configuration to power public, private, and hybrid clouds.

Better Performance for Your Workloads

- Whether you are implementing a virtualized data center or a public or private cloud, these VMware VMmark 2.1 benchmark results indicate the degree to which Cisco® products can deliver superior virtualization performance.

The Cisco UCS C460 M2 High-Performance Rack-Mount Server powered by Intel Xeon processors, connected by Cisco Nexus switching, and supported by EMC VNX storage delivers the best cloud computing performance of any server anywhere. With a score of 35.06@35 tiles on the VMware VMmark 2.1 benchmark, the configuration brings exceptional virtualization capacity and massive scalability to cloud computing environments—more than 20 percent better than the closest competing result.

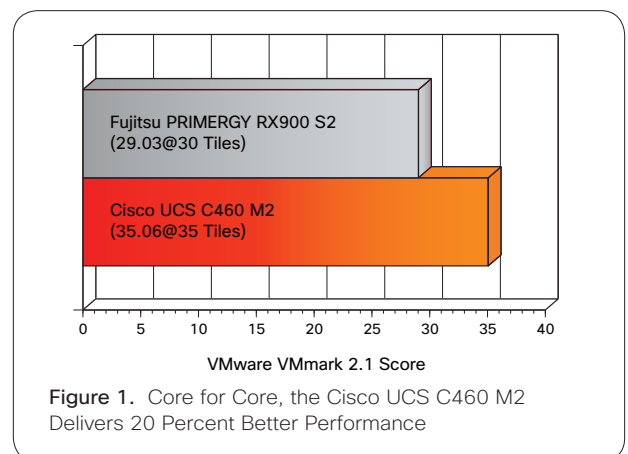


Powering Cloud Computing Environments

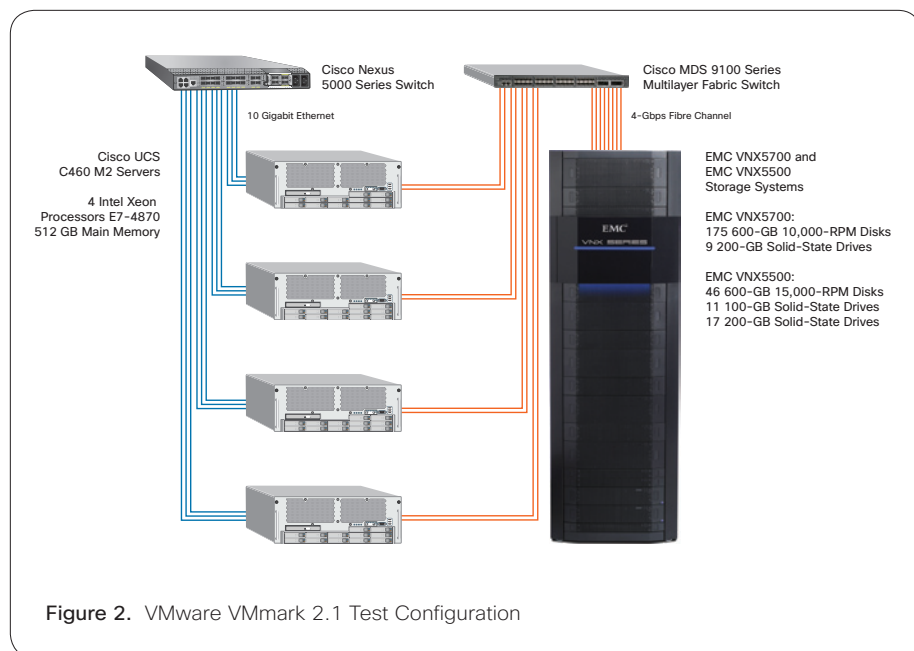
Although cloud computing environments give users the illusion of having infinite resources, they require physical servers, switches, and storage that deliver excellent infrastructure and virtualization performance along with massive scalability. All of these characteristics factor into Cisco's world-record-setting benchmark score and underscore Cisco's commitment to leadership in cloud computing.

Superior Horizontal Scalability

To grow with the speed of their workloads, cloud computing environments must be able to scale horizontally so that addition of more servers delivers a commensurate amount of performance and capacity. The Cisco UCS™ C460 M2 High-Performance Rack-Mount Server results show that four 4-socket Cisco UCS servers outperform two 8-socket Fujitsu servers, going against the conventional wisdom that vertical scaling outperforms horizontal scaling (Figure 1). In test environments comparing the same number of processor sockets and cores, Cisco UCS servers deliver more than 20



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percent better performance to cloud computing environments, providing the capability to host almost 17 percent more virtual machines.

Cisco UCS C460 M2 Server Benchmark Results

Cisco achieved a VMware® VMmark™ 2.1.1 benchmark score of 35.06@35 tiles using four Cisco UCS C460 M2 servers interconnected with a Cisco Nexus® 5000 Series Switch. Each server was connected to EMC® VNX5700™ and EMC VNX5500™ storage systems through a Cisco® MDS 9100 Series Multilayer Fabric Switch (Figure 2).

Cisco UCS C460 M2 Server

Four Cisco UCS C460 M2 servers

were configured with four top-of-the-line Intel® Xeon® processors E7-4870 with 512 GB of memory. Each server was configured with three 10 Gigabit Ethernet network interface cards (NICs) to deliver an aggregate of 30 Gbps of network bandwidth. A single dual-port Fibre Channel host bus adapter (HBA) was used to connect to storage through two 4-Gbps Fibre Channel connections.

Intel Xeon Processor E7 Family

The Intel Xeon processor E7 family is designed to solve the mission-critical IT challenge of managing and keeping business-critical data secure. Powerful, reliable servers such as the Cisco UCS C460 M2 are equipped with the top-of-the-line Intel Xeon processor E7 family to deliver performance that is ideal for the most data-

demanding workloads, with improved scalability and increased memory and I/O capacity. These features help businesses quickly adapt to short-term changes in business demands while addressing requirements for long-term business growth. Advanced reliability and security features work to maintain data integrity, accelerate encrypted transactions, and increase the availability of mission-critical applications. The powerful and reliable Intel Xeon processor E7 product family delivers flexibility for business-critical solutions.

Cisco Nexus 5000 Series Switch

The servers were networked with a Cisco Nexus 5010 Switch that contributed to the benchmark's virtualization and infrastructure scores.

The Cisco Nexus 5000 Series' low-latency, line-rate, cut-through design accelerates the flow of network traffic required to move virtual machine memory contents between servers during VMware vMotion operations.

While one 10 Gigabit Ethernet link was dedicated to VMware vMotion traffic, another was dedicated to communication between layers of the benchmark's multi-tier web application. A third link was dedicated to all other benchmark production traffic.

EMC VNX Series Storage

EMC VNX Series storage was used to support virtual disk images for each virtual machine. An EMC VNX5500 system was connected to the Cisco

MDS 9100 Series switch with eight 4-Gbps Fibre Channel connections, and an EMC VNX5700 system was connected with seven connections. (The EMC VNX Series supports 8-Gbps Fibre Channel.) The storage systems were equipped with both 10,000- and 15,000-RPM disk drives along with solid-state drives to further increase storage performance.

With industry-leading performance, EMC VNX storage systems offer:

- Unified support for block and file use protocols
- Simple and intuitive management interface
- Design for five-nines reliability
- Fully automated storage tiering
- Built-in features that support replication and disaster protection

With EMC VNX storage, cloud computing environments can be configured with discrete SANs, as described in this brief, with network-attached storage (NAS), or Fibre Channel over Ethernet (FCoE). The unified fabric supported by the Cisco Nexus family allows FCoE traffic to reach speeds of 10 Gbps while providing an end-to-end data center connectivity strategy based on 10 Gigabit Ethernet.

Conclusion

Cloud computing environments need a balanced approach to computing, networking, and storage that provides basic virtualization performance and also the infrastructure performance that is essential to maintaining a high quality of service.

The raw power of the Cisco UCS C460 M2 server and its Intel Xeon processors defies expectations by outperforming the vertically scaled Fujitsu PRIMERGY RX900 S2 server by more than 20 percent and providing the capacity to host almost 17 percent more virtual machines.

Cloud computing performance is not built on server performance alone, and the line-rate, cut-through performance of the Cisco Nexus 5000 Series demonstrates how the combination of Cisco server and networking technology delivers the best cloud computing performance available anywhere. The Cisco Nexus 5000 Series Switches and Cisco Nexus 5500 switching platform provide immense flexibility, with the capability to connect to industry-leading EMC VNX storage systems through native Fibre Channel, FCoE, and NAS modalities.

The VMware VMmark benchmark results reported in this brief

demonstrate Cisco's commitment to cloud computing as well as the level of performance and capacity that customers can expect when they choose Cisco products.

For More Information

- For more information about Cisco UCS servers, visit <http://www.cisco.com/go/ucs>
- For more information about Cisco Unified Computing System™ performance, visit <http://www.cisco.com/go/ucsatwork>
- For more information about EMC VNX storage, visit <http://www.emc.com/products/series/vnx-series.htm>

Disclosures

VMware VMmark is a product of VMware, Inc. The comparisons made in this document were based on results posted at <http://www.vmmark.com> and http://www.cisco.com/en/US/prod/collateral/ps10265/ucs_vmark2_1.pdf as of August 30, 2011.



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