Xserve Transition Guide

November 2010

Introduction

Key points

- Apple will not be developing a future version of Xserve
- Orders for Xserve will be accepted through January 31, 2011
- Apple will honor all Xserve warranties and extended support programs
- Transition options to deploy Mac OS X Server include Mac Pro with Snow Leopard Server and Mac mini with Snow Leopard Server

Apple is transitioning away from Xserve. Xserve will be available for order through January 31, 2011. After that date, customers looking to upgrade, replace, or supplement existing Xserve systems with new Apple hardware have the following two server solutions to choose from.

Mac Pro with Snow Leopard Server

Mac Pro systems deliver performance and expandability equal to or surpassing Xserve, and offer an excellent server solution for customers looking for the highest levels of performance, storage, and expandability. Now preloaded with Mac OS X Server, the Mac Pro tower form factor can be deployed in an office environment on or under a desk, or in a data center environment on a shelf in a rack with two units per 12U.

Mac mini with Snow Leopard Server

Since its introduction in the fall of 2009, Mac mini with Snow Leopard Server has become Apple's most popular server system. It brings great capability in a small, efficient form factor that is affordable and can be deployed anywhere. Perfect for small business and workgroups of up to 50 people, a single Mac mini can run the full suite of Mac OS X Server services. A single Mac mini can also be deployed as a single-task server for a larger number of users in a business or education environment. Depending on the workload and number of users, a single Xserve could be replaced with one or multiple Mac mini server systems.

During the gradual transition from Xserve, Apple will continue to provide warranty service and complimentary technical support for the product.[1] Apple continues to offer Mac OS X Server on the popular Mac mini with Snow Leopard Server solution and the new Mac Pro with Snow Leopard Server solution as alternatives to Xserve. This document provides guidance and considerations for customers evaluating their Xserve transition options.

Xserve Transition

Apple will continue to take orders for current Xserve models through January 31, 2011. These systems will have Apple's full standard one-year warranty. The AppleCare Premium Service and Support program for Xserve is available as an option at time of order to extend complimentary technical support and hardware service coverage to three years from the Xserve date of purchase.[2]

Apple will honor and support all Xserve system warranties and extended support programs. Apple intends to offer the current shipping 160GB, 1TB, and 2TB Apple Drive Modules for Xserve[3] through the end of 2011 or while supplies last. Apple will continue to support Xserve customers with service parts for warranty and out-of-warranty service.[4]

Customers can rest assured that Intel-based Xserve systems will continue to provide useful service during and after this transition.

Mac Pro and Mac mini Server Alternatives

Customers looking to upgrade, replace, or supplement existing Xserve systems with new Apple hardware have two options:

- Transition to Mac Pro with Snow Leopard Server
- Transition to Mac mini with Snow Leopard Server

Details and guidance for each of these options are presented throughout this guide.

Transition to Mac Pro with Snow Leopard Server

Apple's desktop tower systems have long been utilized as servers. The most recent Mac Pro—which introduced 12-core Intel Xeon "Westmere" processing and the fast 512GB solid-state drive (SSD) to the most configurable Mac—now surpasses Xserve in processor performance. As a tower system, Mac Pro has always offered tremendous internal storage and expandability in its larger form factor. Mac Pro is a viable server alternative to Xserve except where the high-density 1U rackmount form factor is required.

Workload guidance
Built on the same high-performance Intel Xeon architecture as Xserve and now available with Intel Xeon "Westmere" processors, the latest Mac Pro systems can handle workloads comparable to those handled by a similarly configured Xserve.

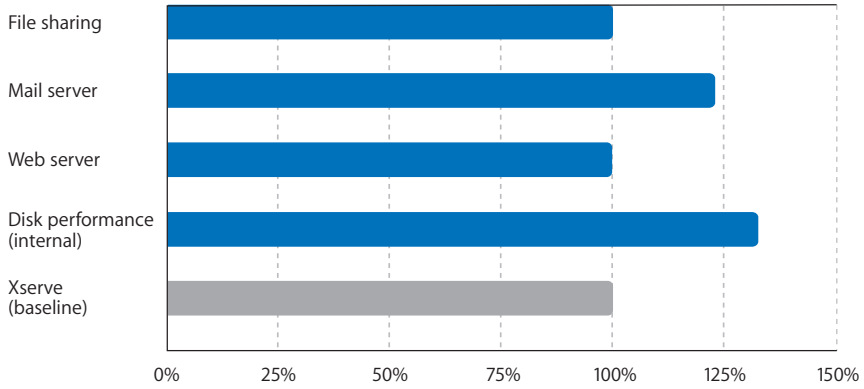
Performance versus Xserve

Configured with a similar processor, memory, and spinning disk, a Mac Pro running Mac OS X Server can deliver performance that is comparable to Xserve. Mac Pro can be configured beyond the current Xserve—supporting 12-core processing; four internal drive bays that support 512GB solid-state, 1TB, or 2TB drives; and more powerful graphics processors.

The following chart provides a relative performance comparison of the 8-core Xserve model versus a similarly equipped 12-core Mac Pro model.[5]

Performance Comparison of Typical Server Tasks

Mac Pro (12-core) vs. Xserve (8-core)



Mac Pro with Snow Leopard Server
Mac Pro now is available in a configuration preloaded with Mac OS X Server. It comes with a 2.8GHz Quad-Core Intel Xeon processor, 8GB of DDR3 memory, two 1TB 7200-rpm hard drives,[3] and an unlimited-client license of Mac OS X Server. Or configure it with the processor, memory, and storage options you need.

Considerations

Customers looking to transition from Xserve to Mac Pro should consider the following key points:

- Mac OS X Server is fully supported on all configurations of Mac Pro hardware.
- When configured with equal memory and disk, Mac Pro can deliver equal (quad-core or 8-core) or better (12-core) processor performance than Xserve.
- Single-processor (quad-core or 6-core) Mac Pro systems offer four DIMM slots for memory expansion up to 32GB (using 8GB DIMMs); dual-processor (8-core or 12-core) systems offer eight DIMM slots for memory expansion up to 64GB (using 8GB DIMMs).
- With four internal drive bays, Mac Pro can support up to 8TB of SATA storage using 2TB 7200-rpm hard drives. With support for up to four internal solid-state drives (SSDs) in Mac Pro, servers needing ultrafast direct-attached storage of less than 2TB in total capacity can get it without requiring external storage.
- Mac Pro can be configured with the Mac Pro RAID Card for internal RAID capability using SATA hard drives.
- PCI Express expansion cards utilized in Intel-based Xserve systems can be moved to a Mac Pro.
- Apple Dual-Channel and Quad-Channel 4Gb Fibre Channel PCI Express Cards utilized in Intel-based Xserve systems can be moved to a Mac Pro. Fibre Channel–attached external storage subsystems used with an Xserve can connect to Mac Pro. Customers running Xserve in Xsan environments will need to consider Mac Pro systems for Fibre Channel connectivity.
- Mac Pro offers four PCI Express expansion slots versus two in Xserve; however, slot 1 comes preconfigured with a graphics card, leaving three expansion slots (one x16, two x8) available for use.

- With dual Gigabit Ethernet ports built in, Mac Pro offers the same built-in network connectivity as Xserve.
- Mac Pro does not support the lights-out management (LOM) features that Xserve offers. Built-in power management features and third-party power controllers can provide an alternative to a subset of LOM functionality.
- Mac Pro does not offer a dual redundant power supply option like Xserve. Placing a Mac Pro on a third-party uninterruptible power supply (UPS) can provide additional power protection including dual power input (on UPS models that support multiple power sources), but this will not protect against a power supply hardware failure.
- Mac Pro has a larger power supply than Xserve and, with a more powerful graphics card included as standard, will draw additional power. Consult the Apple Knowledge Base for power consumption guidance.
- The Mac Pro enclosure does not support rack mounting; however, two units can fit on a rack-mounted shelf in 12U of space.

The Mac Pro server alternative
Customers looking for the performance, expansion, and storage connectivity of Xserve and who are able to deploy the tower form factor (deskside or on a shelf in a rack environment) should consider Mac Pro.

Transition to Mac mini with Snow Leopard Server

Mac mini rackmount solutions
Several third-party rackmount solutions exist for Mac mini. The MMR-2G-1U bracket from MK1Manufacturing can mount two Mac mini systems in 1U of rack space. For more information, see mk1manufacturing.com.

A dedicated-server version of Mac mini was first introduced in October 2009 and was well received. Combining a small form factor with a dual-core processor, 4GB of RAM, and two 500GB hard drives, along with the Mac OS X Server ease of use,[3] Mac mini has been praised by customers of all types and sizes. Mac mini immediately became Apple's most popular server platform by far.

The June 2010 update of Mac mini improves its server configuration with an all-new enclosure with easy memory access, a built-in power supply, a thinner profile that fits into a 1U space, a faster dual-core processor, faster 7200-rpm hard drives, and DDR3 RAM support up to 8GB. For small/medium business (SMB) and workgroups up to 50 users, a single Mac mini running Snow Leopard Server can typically handle an entire workgroup's server needs. Workgroups with a larger number of users can consider breaking up server services across multiple Mac mini servers.

While not a rack-optimized form factor, the thinner aluminum profile of the Mac mini fits in a 1U space. Two Mac mini systems can sit side by side on a shelf in a 1U. Several different kinds of rackmount brackets are available from third-party vendors.

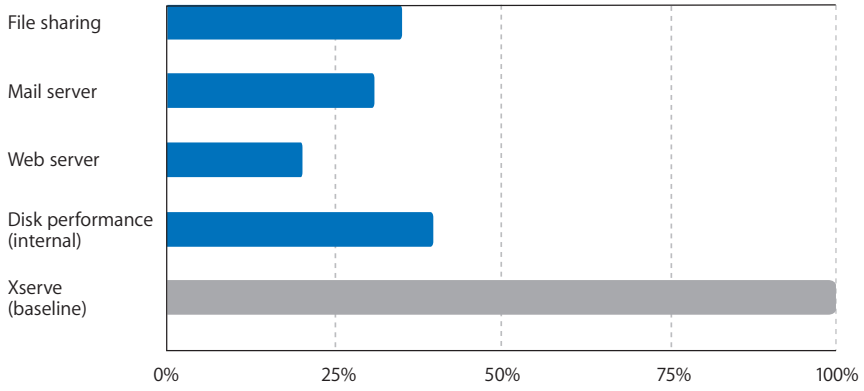
Workload guidance
Mac mini is a capable workgroup server able to provide a full set of typical workgroup services—file and print, web and wiki, instant messaging, contact and calendar sharing, and VPN—for up to 50 simultaneous users, or 25 users if Time Machine backup is included. As a single-task server, Mac mini can provide service to a larger number of users.

Performance versus Xserve
Mac mini is designed to deliver services to a workgroup of up to 50 people, or provide a single service to a larger client load. As such, it does not deliver the range of performance that Xserve does. Customers with high-performance or high-capacity storage needs or with advanced multiport network requirements will find Mac Pro a more configurable and expandable system.

The following chart provides a relative performance comparison of the 8-core Xserve model with 24GB of memory using internal SATA drives versus a Mac mini with Mac OS X Server with 8GB of memory and dual 500GB 7200-rpm internal drives.[6]

Performance Comparison of Typical Server Tasks

Mac mini vs. Xserve (8-core)



Mac mini with Snow Leopard Server
Apple's most popular server hardware, Mac mini with Mac OS X Server comes equipped with a 2.66GHz Intel Core 2 Duo processor, 4GB of DDR3 memory, and two 500GB 7200-rpm hard drives.[3] It also includes a Mac OS X Server unlimited-client license, so it's ready out of the box to serve a small business or workgroup.

Considerations

Customers looking to transition from Xserve to Mac mini with Snow Leopard Server should consider the following key points:

- Mac OS X Server is fully supported on all configurations of Mac mini hardware, but it comes preconfigured on the Mac mini with Snow Leopard Server configuration.
- Mac mini supports up to 8GB of 1066MHz DDR3 memory.
- Storage expansion beyond the internal hard drives is available through FireWire 800 or USB 2.0. Multidrive RAID systems are available from third parties, such as Promise Technology's SmartStor DS4600, which connects to Mac mini through either interface.[7] FireWire supports daisy-chaining multiple devices for added storage capacity, but sharing the same FireWire 800 bus bandwidth.
- Mac mini has a single built-in Gigabit Ethernet interface. The Apple USB Ethernet adapter is supported on Mac mini for additional 10/100BASE-T network interfaces.
- Mac mini does not support the lights-out management (LOM) features that Xserve offers. Built-in power management features and third-party power controllers can provide an alternative to a subset of LOM functionality.
- Mac mini does not offer a dual redundant power supply option like Xserve. Placing a Mac mini on a third-party uninterruptible power supply (UPS) can provide additional power protection including dual power input (on UPS models that support multiple power sources), but this will not protect against a power supply hardware failure.
- With an 85W internal power supply and a typical idle power of 11W, Mac mini uses dramatically less power than Xserve. Multiple Mac mini systems will fit into the power and cooling envelope of a single Xserve.
- The Mac mini enclosure does not support direct rack mounting; however, two units can fit on a rack-mounted shelf in 1U of space. Rack-mounting brackets are available from third-party vendors. The aluminum enclosure is robust enough to be used on its side if supported and if front-to-back airflow is not impeded.

Power efficient
Mac mini with Snow Leopard Server is very power efficient, consuming just 11W when idle. This means lower operating costs and less wasted heat. In addition, an inexpensive UPS system can provide backup power in case of a power outage.

The Mac mini server alternative

As Apple's most popular server form factor, the Mac mini is as capable as it is easy to use. SMB and workgroups of up to 50 users will find the Mac mini a complete solution: powerful hardware and software in a small, efficient, and easy-to-use package that can fit in an office environment or on a shelf in a data center. Larger workgroups, education institutions, and businesses will find Mac mini a great single-task server, able to handle serious workloads.

Server Configurations and Performance

Standard Server Configurations

	Xserve	Mac Pro with Snow Leopard Server	Mac mini with Snow Leopard Server
Processor	2.26GHz Quad-Core Intel Xeon "Nehalem"	2.8GHz Quad-Core Intel Xeon "Nehalem"	2.66GHz Intel Core 2 Duo
Memory	3GB of 1066MHz DDR3	8GB of 1066MHz DDR3	4GB of 1066MHz DDR3
Storage[3]	160GB 7200-rpm	Two 1TB 7200-rpm	Two 500GB 7200-rpm
Network	Two 10/100/1000 Ethernet	Two 10/100/1000 Ethernet	10/100/1000 Ethernet
I/O	USB 2.0, FireWire 800	USB 2.0, FireWire 800	USB 2.0, FireWire 800, SD
Expansion	2 PCI Express slots (2 available)	4 PCI Express slots (3 available)	–
Lights-out management (LOM)	Built-in	–	–
Power	750W (dual redundant option)	950W	85W
Rack size	1U	12U on shelf (2 across)	1U on shelf (2 across)
Operating system	Mac OS X Server v10.6 unlimited-client license	Mac OS X Server v10.6 unlimited-client license	Mac OS X Server v10.6 unlimited-client license
Price[8]	$2999	$2999	$999

Optimized for 64-bit
Like Xserve, both Mac Pro and Mac mini are optimized for 64-bit, and boot Mac OS X Server in 64-bit mode by default—enabling them to take advantage of more physical memory, and have more open files and more concurrent network connections.

Other Server Configuration Options

	Xserve	Mac Pro with Snow Leopard Server	Mac mini with Snow Leopard Server
Processor	8-core: 2.26GHz Intel Xeon "Nehalem" 8-core: 2.66GHz Intel Xeon "Nehalem" 8-core: 2.93GHz Intel Xeon "Nehalem"	Quad-core: 3.2GHz Intel Xeon "Nehalem" 6-core: 3.33GHz Intel Xeon "Westmere" 8-core: Two 2.4GHz Intel Xeon "Westmere" 12-core: Two 2.66GHz Intel Xeon "Westmere" 12-core: Two 2.93GHz Intel Xeon "Westmere"	–
Memory	Up to 48GB of 1066MHz DDR3	Up to 64GB of 1333MHz DDR3	Up to 8GB of 1066MHz DDR3
Storage[3]	Drive bays 1–3: 160GB, 1TB, or 2TB 7200-rpm SATA HDD; 128GB SSD boot drive	Drive bays 1–4: 1TB or 2TB 7200-rpm SATA HDD; 512GB SSD	–
Expansion	Xserve RAID Card; Dual- and Quad-Channel 4Gb Fibre Channel Card	Mac Pro RAID Card; Dual- and Quad-Channel 4Gb Fibre Channel Card	–

Evaluating server performance
In additional to server management tools like Server Admin, included in Mac OS X Server, powerful command-line tools can be used to understand server performance and utilization of key hardware resources. Apple publishes a script in the AppleCare Knowledge Base to aid customers. Understanding if your current server is CPU, disk, memory, or network bound can help you make hardware configuration decisions. For more information, see support.apple.com/kb/HT1992.

Performance

Workload comparisons (single server, single service)
The following workload guidance is meant as a relative indication of performance and is provided as a reference point only. Workloads can vary widely based on numerous factors, including the number of concurrent users, file or data size, storage performance, and configuration and network design. The following guidance, based on single-server, single-service workload tests, can be considered when planning a Mac OS X Server deployment.

Service	Xserve	Mac Pro with Snow Leopard Server	Mac mini with Snow Leopard Server
File sharing	Up to 1000 concurrent connected users	Up to 1000 concurrent connected users	Up to 100 concurrent connected users
	File-sharing performance is quickly dominated by the number of concurrent users, network throughput and storage performance. An Xserve or Mac Pro will quickly become network limited on a single Gigabit Ethernet connection for most file sharing workloads using internal SATA disks; maximum file-sharing performance requires multiple network interfaces on these machines. Under most typical file-sharing workloads Mac mini will become network and disk saturated before processor or memory limits are obtained.		
Mail	Up to 6500 concurrent users	Up to 8000 concurrent users	Up to 250 concurrent users
	Mail server performance requires storage performance to scale with the expected user workload. Frequent reading and writing of small files require heavy metadata updates. Large workgroups should spread user mail stores across multiple volumes for the highest performance. Mail services will scale with processor cores, assuming the disk subsystem and server memory are sized to keep up with the workload.		
Web	Up to 8000 concurrent users	Up to 8000 concurrent users	Up to 800 concurrent users
	Web server performance requires a mix of disk performance, server memory, and sufficient network bandwidth to serve the expected user workload. Server requirements will vary widely based on the nature of the content being served. Static content will often be cached if server memory is available, whereas database-driven content or media serving requires the disk subsystem to be sized to the workload.		
Calendar	Up to 10,000 concurrent users	Up to 10,000 concurrent users	Up to 800 concurrent users
	Calendar server performance requires storage performance to scale with the expected user workload. Frequent reading and writing of small files require heavy metadata updates. Large workgroups should spread user calendar data across multiple volumes for the highest performance. Calendar server will scale with processor cores, assuming the disk subsystem and server memory are sized to keep up with the workload.		
Directory Services	Up to 250,000 user records in database Up to 25,000 authorizations/minute	Up to 250,000 user records in database Up to 25,000 authorizations/minute	Up to 10,000 user records in database Up to 10,000 authorizations/minute
	Directory Services consists of LDAP database reads and writes and user authentication. As most LDAP databases can fit into server memory providing quick lookup performance, the cryptographic computation of authentication will drive performance requirements.		
Time Machine	250 users	250 users	25 users
	Time Machine relies on the AFP service to operate and requires sufficient storage and network performance to serve Mac clients. Time Machine backup places a heavy load on storage and metadata operations.		

Summary

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- Transition to Mac mini with Snow Leopard Server

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Mac mini is Apple's most popular server system and brings great capability in a small, efficient form factor that is affordable and can be deployed anywhere. Perfect for small business and workgroups of up to 50 people, a single Mac mini can run the full suite of services that Mac OS X Server has to offer. For a larger number of users in a business or education environment, a single Mac mini can provide a single service. Depending on the workload and size of the workgroup, a single Xserve could be replaced with one or multiple Mac mini server systems.

During the gradual transition from Xserve, Apple will continue to provide warranty service and complimentary technical support for the product.[1] Meanwhile, Apple offers two server solutions as an alternative to Xserve. Combine Mac OS X Server with a Mac Pro or Mac mini system and the result is reliable high-performance hardware, Mac ease of use, and flexible configuration options. These incredibly capable servers are ideal for education, business, and workgroup customers.

For more information

For more information about Xserve, visit www.apple.com/server.

[1]See warranty and complimentary technical support details at http://images.apple.com/legal/warranty/docs/cpuwarranty.pdf and www.apple.com/support/complimentary/. [2]Coverage ends three years after date of Xserve purchase. Telephone numbers and hours of operation may vary and are subject to change; local telephone fees may apply. Represents typical response times; times based on Apple's hours of operation. For full details of support and service coverage, see terms at www.apple.com/legal/applecare/acpssgeos.html. [3]1GB = 1 billion bytes and 1TB = 1 trillion bytes; actual formatted capacity less. [4]Service parts are available from the end of Xserve production for seven years for customers in California and for five years for customers in other parts of the world. [5]Testing conducted by Apple in October 2010 using preproduction Mac Pro 12-core 2.93GHz unit with 48GB of RAM and internal SATA hard drives and production Xserve 8-core 2.93GHz unit configured with 48GB of RAM and internal SATA hard drives. Both systems were configured with a SmallTree 6-port Gigabit Ethernet card and an Apple quad-port 4Gb Fibre Channel card and connected to a Promise VTrak RAID subsystem configured with 80 15,000-rpm SAS hard drives. Performance tests are conducted using specific computer systems and reflect the approximate relative performance of Mac Pro and Xserve. [6]Testing conducted by Apple in October 2010 using production Mac mini with Snow Leopard Server with 8GB of RAM and internal SATA hard drives and production Xserve 8-core 2.93GHz unit configured with 24GB of RAM and internal SATA hard drives. Performance tests are conducted using specific computer systems and reflect the approximate relative performance of Mac Pro and Mac mini. [7]Mention of third-party products is for information purposes only and constitutes neither an endorsement nor a warranty. Apple assumes no responsibility with regard to the selection, performance, or use of these vendors or products. [8]Prices are Apple Store prices as of November 2010, are subject to change, do not include taxes or shipping, and are listed in U.S. dollars.

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