



Apple's Server Biz: Building on Unix (Again)

Quick Note

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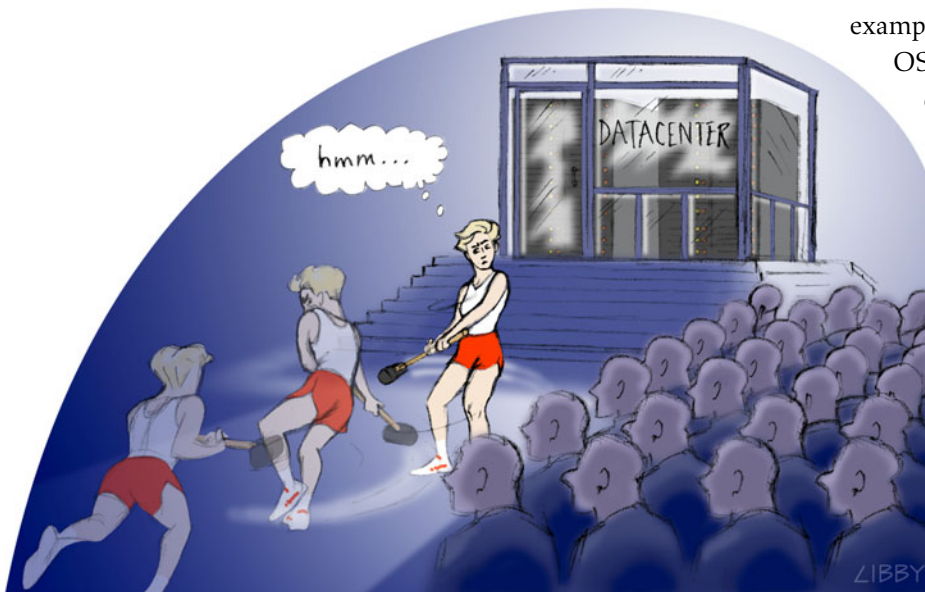
Apple's image is that of a quintessential client-side computer company at which the graphical user interface (GUI) is king. It built its reputation on its GUI and the hot design concepts behind it and the slick desktops and laptops it comes on.

But, in an enterprise setting, desktops need servers to manage them and store their files. So Apple made servers, too, serious ones. It came out with its own Unix version, A/UX, for its Workgroup Server 95 in 1993, during a period when it was trying to make its servers as solid and scalable as possible. Later, Apple branched out to higher-end server boxes, the Network Server 500 and 700 running IBM's AIX brand of Unix.

But its server development was just dabbling compared to its work on desktops and portables. A/UX and AIX were sideshows that never really made it onto Apple's main stage. Their design needs were too different from those at which Apple's desktop divisions excelled; they needed different features and capabilities in both software and hardware.

Now that Apple has built Unix into the very core of its desktop OS, however, its servers are gaining as well. In the server version of Mac OS X, the Macintosh GUI fronts a BSD 4.4 Unix-based core that is the same basic OS as on the desktop, but with additional server-specific features. For

example, a tool called NetBoot lets Mac OS X clients boot from customized disk images that are stored on a server. In a classroom or similar setting, the benefit is obvious: non-technical users can rapidly repurpose desktops—such as they might do to start a class session with “clean” systems configured specifically for the task at hand. A related tool, Network Install, can install similarly customized images onto clients—thereby speeding their initial installation or repurposing.



Why Unix?

At the lowest level, BSD provides a well-engineered foundation for a server, including capabilities like multiprocessing support. Of course, no one's talking about Big Iron scale points here—BSD is no Solaris, HP-UX, or AIX. Even the “other” open source Unix-like OS¹—Linux—has received more scale-up enhancements through such efforts as the Open Source Development Lab. However, as with Linux, BSD and Mac OS X are much more about distributed computing than traditional large boxes; a scale point of two or four CPUs is plenty.² More important is the maturity of the OS, its reliability, its adherence to the standard protocols like LDAP, NFS, SMB, SMTP and the availability of widely-used packages like Apache, Perl, and the rest.

Macs traditionally lived in isolated islands, elegantly cloistered in enclaves where the main languages were those of MacOS and AppleTalk, and communication with the outside world was rare. However, such isolationism has fallen out of favor—to put it mildly. Once it was common for vendors to try to lock in customers by making products that were incompatible with those of rivals. Today even monolithic IBM mainframes and HP NonStop Himalaya systems have, and continue to add, features such as TCP/IP networking and Java engines that let them better co-exist with, and interact with, other, more “standard” systems.

Basing OS X on Unix helped shove Apple into a more peaceful coexistence with less provincial environments. Interoperability at the network level is one part of the story. Another is greater overlap with the way that LAN administrators configure and troubleshoot other system types, which helps

1. BSD uses its own open source license (the BSD license) as opposed to the GPL license favored by Linux. Unlike the GPL, the BSD license does not require the release of source code for derived products. Many companies, including Apple, find these terms more commercially acceptable than the GPL alternative, even if they sometimes invoke the ire of open-source purists.
2. See Illuminata note “Looking the Right Way at Linux” (November 2002).

them deal with MacOS as an unfamiliar relative of Unix, Linux, and Windows rather than an incomprehensibly alien presence. This distinction will be critical to Apple's ability to selectively seed its gear in individual departments or for specific tasks. If an Apple is the best tool for the job *and* is easy to integrate, organizations dominated by IT may well buy them. If they're the best, but are grossly difficult to integrate? “Sorry, it's just too costly to support.”

The Xserve

Apple servers have generally been pedestrian products within a company that reserved the flash and sizzle of its famous designs for the desktop. And the function of those pedestal servers was pretty pedestrian too—mostly routine workgroup-level file- and print-sharing. The Xserve is a departure; it's a dual-processor, rackmount system designed very much to deliver the density and other attributes that are important to modern servers.

In application-level performance the Xserve is generally competitive with boxes with similar density from other vendors. For example, it approximately equals the Dell PowerEdge 1650 in WebBench, a measurement of Web-hosting ability.³ Each of upto four internal hot-swap disk drives runs off an independent channel—albeit an Ultra ATA channel rather than the SCSI more commonly associated with servers.⁴

The Xserve isn't cast in the role of the lone departmental or small-office server as were past Apple servers. Rather its slim (1U or 1.75-inches high), rack-optimized form factor is clearly designed for environments that need multiple systems, and a

3. The Dell system is built around older Pentium III processors; it only offers Xeon processors in its physically larger (2U) rackmount servers.
4. SCSI drives are generally more reliable than ATA drives as well as being higher performance (because of features like command queuing). Apple decided to use ATA drives primarily to keep costs down and to mitigate potential performance downsides by providing the independent channels.

design that makes it convenient to house and maintain them. Today, even some smaller businesses need multiple servers to handle functions SOHO servers never had to support in the past, including e-mail, Web serving, processing multimedia, and compute-intensive business applications.

But high density designs like the Apple Xserve really come into their own when there are large numbers of servers—dozens, even hundreds. It's applications like large render farms and clusters that tackle bioinformatics analyses or other highly parallelized problems that are the true sweet spot for a system like the Xserve. However, it is also a role in which the Xserve competes directly with every major Unix and Windows system vendor, most of which have larger installed bases, longer histories, and therefore more credibility than Apple's building computers for server farm roles.

Formidable Challenges

It would be hard to overestimate the challenges Apple will face in moving beyond its desktop-centric niches in education and publishing. Over the past decade or so, the computer industry has largely marched down a path toward fewer system vendors and even fewer OS choices. Dozens of computing environments have disappeared during that time, including Steve Jobs' own NeXT Computer. HP is retiring Alpha and Tru64 UNIX; SGI has unveiled the beginning of a migration away from MIPS/IRIX and toward Itanium/Linux. User organizations are streamlining the number of vendors and, most important, the number of environments they'll support, in order to trim staff costs that dwarf the money spent on hardware and software. This may be bad news for Apple because, despite its reputation for user-friendliness, its products still function as the "extra" environment in most companies.

Another major question is how truly committed Apple is to pushing beyond its comfortable niches. It will take more than software and hardware that is technically suitable or even superior to win it new friends and new enterprise accounts. The thrust of the company's marketing and sales push remains its

war with Microsoft for the consumer—*vis* Apple's "Switch" ad campaign, its consumer phenom iPod, and snazzy laptops that play DVD's so very smoothly. Apple seems to argue that it can be competitive as a departmental rack-mounted server or server-farm provider, while focusing the vast bulk of its energies on areas that have nothing to do with any of the priorities of that arena. And Apple continues to present OS server capabilities primarily through the lens of its installed base. For example, OS X Server's Network Install performs many of the same provisioning functions as do products like the Control Tower product that RLX Technologies provides for its server blades,⁵ but instead of focusing on the provisioning of large server farms, Apple's presentation of these capabilities often focuses on showing non-technical end-users how to manage multiple clients in a classroom.

To really break through in the server arena and go beyond customers who already favor Apple would take a full-blown corporate commitment to expanding product horizons beyond the desktop, beyond cool consumer technology, and into the mundane-but-critical environment of the data center. So far, Apple has released a sweet product but hasn't demonstrated any substantial shift in server thinking and commitment.

The Opportunity

Even so, Apple has an incumbent's advantage in several potentially lucrative areas, including biotech and other scientific research arenas that draw many of their people from academia, publishing, video production, and research. Xserve and Mac OS X go a long way toward removing the objections that have often arisen in the past when users asked for Macs and IT said no. Now moot are historical objections to the Mac such as the limited availability of server-specific hardware, fair-to-middling OS reliability and scalability, and lack of some server software

5. See Illuminata note "RLX's Slice of the Blade Server Pie" (December 2002). The RLX example is especially germane in that RLX specifically targets many of the same high-performance computing and life-sciences customers that Apple is addressing.

features like file-system journaling that have become almost *de rigeur*.⁶ Xserve is a sweet and solid product that nicely blends the strengths of Unix and the Macintosh.

The door is hardly open wide. Other OSs—often Linux, but also Windows, BSD, or some other Unix flavor—still predominate behind the scenes. How-

6. Journaling protects data and helps the system get back up and running quickly after a failure. The latest Mac OS X Server version, v10.2, recently got file-system journaling through an update.

ever, given its technical capabilities and the indisputable advantages of having a common platform for both desktop and server, Apple can now make the case: why *not* choose Apple to provide the server?

It will take more than a good product to systematically capture opportunities in the larger markets beyond Apple's traditional ken. But for environments that already include Mac desktops, it has perhaps even swung the "overall cost of support" argument its way.



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