

September 2008

BUSINESS CASE FOR IBM SYSTEM X, BLADECENTER, AND SYSTEM STORAGE: COMPARATIVE ECONOMICS FOR BUSINESS UNIT DEPLOYMENTS IN LARGE ORGANIZATIONS

The View from the Middle

At the end of 2002, the typical U.S. Fortune 1000 corporation contained approximately 2,600 x86 servers. By the end of 2007, the number had increased to more than 7,000. Although virtualization tools such as VMware and Xen have begun to slow the rate of growth in numbers of physical servers, use of these is still at an early stage in most organizations.

The challenges created by this situation have become all too familiar. Fragmented server bases expand management overhead, increase pressures on system administration and technical support staff, magnify network complexities, and make it more difficult to maintain availability and security. Power costs as well as demands on data center space and cooling infrastructures continue to escalate.

Large-scale server virtualization may mitigate some of these effects. But users are discovering that reductions in numbers of physical servers are accompanied by new challenges in managing and securing more complex, multi-layer software environments.

Many large organizations are moving aggressively to deal with these issues. New strategies are being adopted, new tools are being deployed, and new skill sets and operating practices are being developed.

But what does the picture look like for organizational units that operate smaller server bases – dozens of platforms, or at most a few hundred? The IT groups of business units, divisions, and equivalents face the same challenges as their corporate-level counterparts – but fewer resources are available to them.

Business unit and equivalent IT staffs are smaller, and skill sets are typically more limited than in corporate-level IT groups. One implication is that the benefits of simplified server administration are greater than in installations with larger, more diverse skill bases.

Another is that business unit and equivalent IT functions are less likely to have high-level storage system and network management capabilities. The challenges – and costs – of managing server and storage resources are more closely interdependent than in large installations with thousands of servers, hundreds of terabytes (TB) of storage, and sophisticated network infrastructures linking these.

This report deals with these issues. Specifically, it examines the economics of employing x86 servers, and low-end and midrange disk system supporting these, from four vendors – Dell, Hewlett-Packard (HP), IBM, and Sun Microsystems. It is based on data supplied by 34 business unit and equivalent users in large companies and government organizations in North America, Europe, and the Asia/Pacific region.

Using this data, nine composite profiles of business unit and equivalent installations with from 8 to 58 physical x86 servers, and 7 TB to 86 TB of disk system capacity supporting these, were constructed. Three-year costs for hardware, software, maintenance, server and storage administration personnel, and facilities (primarily power and cooling) were then calculated for each profile and vendors' systems.

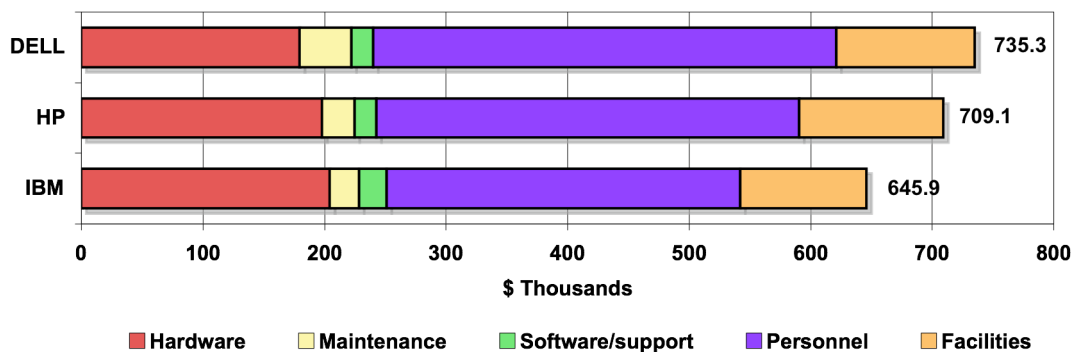
Cost Comparisons

Costs were first compared for six installations employing Dell, HP, and IBM x86 servers and disk systems. Installations included Intel- and Advanced Micro Devices (AMD) Opteron-based blade as well as rack servers running Windows and Linux directly or as VMware guests.

Results for these comparisons may be summarized as follows:

- Server costs.** Overall three-year costs, including hardware, maintenance, software, personnel and facilities for use of IBM System x and BladeCenter platforms averaged 12.2 and 8.9 percent less than for use of Dell PowerEdge and HP ProLiant and BladeSystem equivalents respectively. Figure 1 illustrates these results.

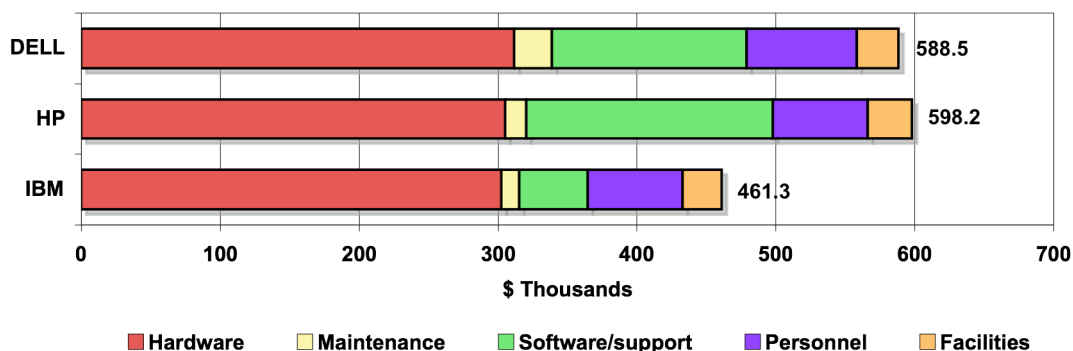
Figure 1
Three-year Costs for Dell, HP, and IBM x86 Servers: Averages for All Installations



Although there were some differences in pricing practices, hardware, maintenance, and software costs for all three vendors' platforms were generally similar. Lower IBM server costs were due primarily to lower system administration personnel and energy costs enabled by distinctive System x BladeCenter hardware and software features.

- Disk system costs.** Overall three-year costs, including the same components as for servers, averaged 21.6 percent less for IBM DS3000 and DS4000 systems than for Dell/EMC AX4 and CX3 systems, and 22.9 percent less than for HP Modular Storage Array (MSA) and Enterprise Virtual Array (EVA) systems. Figure 2 illustrates these results.

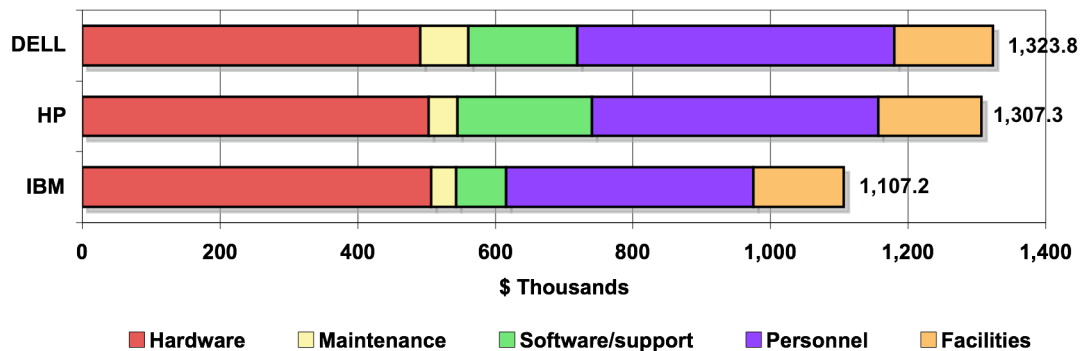
Figure 2
Three-year Costs for Dell, HP, and IBM Disk Systems: Averages for All Installations



Hardware costs for all three vendors' platforms were generally similar. License and support costs for IBM disk systems software, however, were significantly lower than for Dell/EMC and HP equivalents. Average maintenance, personnel and facilities costs for use of IBM disk systems are also lower than for Dell and HP equivalents, although differences were more incremental.

- **Combined server and disk system costs.** Reflecting the differences described above, combined three-year costs for IBM server and disk system platforms averaged 16.4 and 15.3 percent less than for Dell and HP equivalents respectively. Figure 3 illustrates these results.

Figure 3
**Combined Three-year Costs for Dell, HP, and IBM x86 Servers and Disk Systems:
 Averages for All Installations**



A second set of comparisons involves three Linux installations for which the same cost components were calculated for use of IBM System x, BladeCenter, and DS3000 and DS4000 disk systems; and Sun Fire Opteron-based x86 servers and Sun StorageTek 2500 and 6000 disk arrays.

For these comparisons, overall three-year costs for use of IBM servers averaged 17.3 percent less than for Sun equivalents, while disk system costs averaged 18.6 percent less, and combined server and disk system costs averaged 17.9 percent less than for Sun equivalents.

Comparative server costs showed more variation than for the first set of comparisons, with lower hardware, personnel, and facilities costs for IBM platforms, and lower maintenance and software costs for those of Sun. For disk systems, however, IBM costs were lower in all areas. Disparities in disk system software costs were, again, particularly significant.

Conclusions

Certain conclusions may be drawn from these results. One is that business unit and equivalent IT organizations need to pay closer attention to overall cost structures for x86 server installations.

Hardware, maintenance, and software costs for different vendors' servers may be similar, but platform choices also affect personnel and facilities costs. Over-focus on platform choices may cause organizations to neglect larger savings opportunities. As the results presented here indicate, small differences in the capabilities of individual servers may have a major impact on the economics of the installation as whole.

Storage costs in general, and disk system costs in particular, should also receive scrutiny. A low-end storage unit may be inexpensive. But this is not the case for a networked disk system equipped to manage, protect, and ensure availability of business-critical data. Functional requirements and cost structures for such systems are entirely different.

A broader conclusion also emerges. In many organizations, x86 servers and the storage resources that support them are regarded as “commodities.” This may have been a reasonable assumption in the past, but it is clearly no longer correct. The technical sophistication of x86 environments, and the value of applications deployed on Intel- and Opteron-based servers have both increased. Expectations for the capabilities of platforms and for the vendors that supply them must also change.

Additional Information

This ITG Executive Summary is based upon results and methodology contained in a Management Brief released by the International Technology Group.

For copies of this Management Brief, please email requests to info-itg@pacbell.net.



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