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# Two new tools that CIOs want

Among the many technologies that CIOs are investigating, server virtualization and software as a service are emerging as key priorities.

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**While many** promising new technologies vie for the attention of IT leaders and CIOs, only a few of these innovations actually end up improving top-line performance or bottom-line productivity. Our recent survey of senior US IT executives[1] and our experience with clients suggest that companies view two new technologies as highly promising tools for obtaining real business benefits: server virtualization (which helps companies improve the match between their computing capacity and their application workloads, so that they can do more with fewer machines) and software as a service (which allows IT departments to offload the delivery and maintenance of software applications). Companies clearly view these technologies as priorities that promise to help them become more efficient and agile.

Virtualization is a software technology that helps raise the utilization rates of servers. It allows companies to run several different operating systems—UNIX, Linux, and Windows, for example, as well as the applications that run on top of them—on a single machine. Distributed servers running a single operating system typically utilize only about 5 to 15 percent of their full processing capacity. Virtualization can make it possible for companies to boost their average server utilization rates to 40 percent or higher while still meeting peak demand. IT departments can then consolidate their servers, reduce the complexity of their environments, and, over time, buy less hardware (though the servers they do buy may be higher-capacity boxes). Related technologies let a single application run across several machines, further boosting reliability and utilization rates, since a machine that isn't too busy can take some of the load off others that are. Finally, the flexibility to set up and tear down test environments quickly and to move applications across physical servers helps to increase administrative productivity and to reduce hardware outlays still further.

Most companies have already begun consolidating their servers—86 percent of the CIOs we asked cited progress in this area. Virtualization is the next natural move. Consolidation aims to combine multiple instances of identical or similar applications on fewer machines. Virtualization goes a step further by making it possible to run more applications on them and by increasing a company's flexibility, so that it can meet shifting workloads without excess hardware. One CIO with a budget of $600 million told us that his company has virtualized 30 percent of its servers and plans to have 60 percent of them virtualized within two or three years. He expects to reduce capital expenditures during the next server-refresh cycle by 30 percent and to reallocate the savings to different projects.

The other trend cited by the IT executives we surveyed is the delivery of software as a service over the Internet. Rather than purchasing and deploying applications inside the enterprise, many companies are buying access to externally hosted applications, so they pay for the software as they use it.[2] The software-as-a-service model can cut the total cost of deploying some classes of enterprise applications by 30 to 40 percent as compared with the total cost of purchasing and maintaining them in house. Of the senior IT executives we talked with, 38 percent said that they plan to use the software-as-a-service approach during the next 12 months. Popular applications include business software for human-resource management (including payroll), billing and order entry, and sales management, as well as security services that guard against spam and viruses. The range of applications delivered in this mode continues to grow, though to date few companies are using software as a service in systems (such as those for production planning and forecasting) that need a lot of tailoring or customization.

Software as a service differs from the fad of the late 1990s for application service providers (ASPs) because the most successful companies offering this latest generation of hosted software have redesigned their applications for scalable delivery over the Web. In this way, these companies innovate more quickly and thus have lower total costs—and pass the benefits on to their customers. Contrary to some expectations, the acceptance of this model isn't limited to midsize

companies with understaffed IT departments; some very large enterprises are among the earliest adopters.

IT executives are shifting to the software-as-a-service model for some applications not only for lower licensing and maintenance fees but also because implementation is usually quicker and companies don't have to maintain special skills in software-specific areas. Some enterprise applications can cost tens of millions of dollars and take 6 to 24 months to implement, and many executives prefer to outsource the task. Web services protocols—transport rules that make it easier to link applications flexibly—are helping to speed this migration: 60 percent of our survey respondents said they were implementing Web services, in some cases to integrate externally hosted applications into their own systems.

Taken together, these two adoption trends indicate that a technology architecture transformation is beginning to take shape in many large and midsize organizations. In the past, CIOs deployed their own self-contained application architectures on their own servers and storage systems. This old model is giving way to a hybrid application architecture that combines hosted functionality with in-house applications running on consolidated and virtualized commodity servers. We believe that this transformation will drive efficiencies across the full stack, from business processes to physical infrastructure, while increasing IT's ability to meet new demands in a rapidly changing business environment. Of course, technology alone won't deliver this vision: IT and business leaders will need to rethink governance models and management processes to take full advantage of new technology trends.[3]

## About the Authors

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## Notes

[1]During the summer of 2005, McKinsey surveyed 77 senior IT executives from US companies with more than $1 billion in revenue. Participants were selected from various industries, with the aim of mirroring the US GDP and so capturing trends in the overall economy. For further results from this survey, see Kishore Kanakamedala, Vasantha Krishnakanthan, and David Mark, "CIO spending in 2006," *McKinsey on IT*, Number 7, Spring 2006, pp. 22-4.

[2]This simple description masks many complexities. Companies don't actually buy a large enterprise application, for instance; they license it. But for the purposes of this article, the simplified description of the new model is useful.

[3]For more details, see James M. Kaplan, Markus Löffler, and Roger P. Roberts, "Managing next-generation IT infrastructure," *McKinsey on IT*, Number 3, Winter 2004, pp. 2-9.