



# Meeting the Demands of Rapid Virtualization Adoption

Senior IT managers and CIOs have always been under pressure to meet the ever-expanding demands of their end users and to deliver services that enable the organization to not only meet but exceed business objectives. But now these pressures are growing as the economy tightens, global competition grows fiercer, and operating costs (particularly for energy) continue to escalate.

This is leading many organizations to adopt virtualization and consolidation strategies that rein in data center costs and enable new operating efficiencies, allowing them to deploy new applications rapidly to keep pace with (or leapfrog) their competitors.

To get a better understanding of the factors driving the move to virtualization and consolidation, Ziff Davis Enterprise conducted a survey of 167 IT decision-makers in the spring of 2008. The survey, sponsored by the global services leader Cognizant Technology Solutions, Inc., asked managers about the major challenges they face today, their virtualization implementation strategies, issues with managing a highly virtualized environment, and their use of technologies and services to help their organization conduct its business.

The results indicate that virtualization is widely embraced and if you are not already adopting a virtualization strategy,

you are behind your peers and perhaps at a competitive disadvantage. In addition, the need to have a highly structured process framework in place such as ITIL is critical for managing the complexities of virtualized systems.

### FACTORS DRIVING CHANGE

A past President's campaign slogan — "It's the economy, stupid!" — seems to be a succinct summary of the major factors driving IT operational decisions.

The 2008 Cognizant survey found that server virtualization, server consolidation, and reducing data center complexity were three of the top four strategies cited for data center cost containment. (The fourth item was increasing automation of routine tasks.)

This is in line with other surveys. For example, in a 2007 *CIO Insight* survey<sup>1</sup> of 265 senior decision-makers, 47 percent noted they were under more pressure to reduce costs compared to the year before. This was especially the case for larger organizations, where 64 percent of the respondents from companies with over \$1 billion in revenues reported greater pressure in 2007 than the year before.

When asked about strategies for controlling costs, these managers ranked "virtualizing servers" and "consolidating data centers, servers, and storage" as delivering the greatest savings.

### WHAT MAKES VIRTUALIZATION A NATURAL FIT?

So why is there such great interest in virtualization?

The simple answer is that virtualization delivers significant costs savings and enables a more flexible approach to delivering IT services.

Specifically, virtualization allows organizations to reduce the number of physical servers they must maintain. For years, organizations have deployed new servers for

**EXECUTIVE SUMMARY:**

- Organizations believe virtualization will increase their business agility, significantly improve their server utilization rates, reduce management chores, and deliver power savings.
- Many IT organizations have budget constraints and are short staffed.
- Outsourcing the management of virtualization efforts helps provide the required technical expertise, frees up existing staff to work on projects that are more strategic to company's success, and allows companies to more rapidly realize the benefits of virtualization.



### SURVEY METHODOLOGY

To gauge the level of interest, challenges, and drivers of adopting virtualization technology, Ziff Davis Enterprise (ZDE), in conjunction with the independent research firm The Strategy Group, conducted an online survey from April 11 to May 5, 2008. The survey used a sample of technology decision makers selected from the Ziff Davis Enterprise database. In total, 167 ZDE subscribers qualified for and completed the survey.

every new application. There was good reason to do this. Many applications required dedicated servers to avoid conflicts and contention for system resources. From a practical standpoint, this approach also allowed IT to shut down and restart a troubled server or application without impacting other systems.

This one-application-per-server approach has led to what is commonly called *server sprawl*, where many servers run at very low utilization rates.

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Industry experts speculate that in most organizations, typical server utilization rates are in the single-digit to 15 percent range.

New, higher-performance multi-core servers have led many companies to consolidate several applications onto a single physical server. Virtualization builds on the

benefits of consolidation by helping to eliminate conflicts for processing and physical address space. This is accomplished by running applications as independent virtual machines, where each virtual machine has its own operating system and the application. Each machine is isolated from the others, so conflicts are kept to a minimum.

The end result is that virtualization allows organizations to use their servers more efficiently. For example, instead of having 100 operational servers all running at 10 percent utilization rates or lower, the applications on those servers could run on ten high-performance units, each of which uses a much higher percentage of its computing resources.

Compounding the situation is the fact that every application over its lifetime typically requires the use of many servers including one for application development, another for quality assurance (QA) testing, and so on.

Without using virtualization, the organization would need to purchase a physical server; install the operating system, drivers, and application; add the server to the network; and provision appropriate storage. In many cases, these servers would run at very low utilization rates and would have very short life spans. For instance, as soon as development was completed, the application would be moved to a QA server.

Virtualization would allow an organization to rapidly configure virtual machines for each stage of an application's development. These virtual machines would not require that new hardware be purchased, installed, configured, or managed. The virtual machines would be able to run on existing hardware. Additionally, once a stage is completed -- quality assurance testing, for example -- the virtual machine can be taken down, thus instantly freeing up the computing resources it used for other applications.

Virtualization also brings other savings. Servers running at low utilization rates consume power and need electricity to address their heat output. Reducing the number servers saves money on electricity. This is a major issue at many organizations, both in terms of cost reduction and in helping to meet social responsibility initiatives to become "greener."

A 2007 study<sup>2</sup> by the Lawrence Berkeley National Laboratory quantified the situation. The study found that the aggregate electricity use for servers doubled over the period of 2000 to 2005, both in the U.S. and worldwide. And, "Almost all of this growth was the result of growth in the number of servers." Again, this ties back to the issue of server sprawl.

The power consumption situation is compounded today. New systems that use higher-performance processors typically

	Before Virtualization	After Virtualization
Number of physical servers	100	10
Average utilization rate	< 10 percent	> 80 percent



require more electricity to run. In turn, these systems produce more heat, thus requiring more electricity to cool data centers.

Virtualization is seen as a key in addressing power issues, according to survey respondents. In fact, they noted that cutting electrical costs by reducing power and cooling was one of the main benefits of virtualizing their servers, storage, and infrastructure. Interestingly, a much higher percent of those who had started a virtualization effort felt this way. Specifically,

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60 percent who had started a virtualization effort noted the power costs savings benefit versus 33 percent who had not.

One explanation for this difference might simply be that seeing is believing. Those who are already virtualizing do not need to speculate about the potential savings, they can measure the benefits. For example, according to a 2007 *CIO Insight* article,<sup>3</sup> one company “saw a 79 percent reduction in power consumption in the first year,” by adopting a virtualization approach, where it used a ratio of 30 virtual machines to one physical server.

The article noted that while cost savings are a key reason organizations are adopting virtualization, business agility may be even more important. Using virtualization, organizations can quickly respond to take advantage of market conditions. Specifically, virtualization allows organizations to pilot and deploy new applications and services quickly to meet new customer and client demands.

### BEYOND DOLLARS AND CENTS

In addition to dealing with budget constraints, many IT departments are understaffed or do not have the right internal skills for new efforts. To that point, 41 percent of the Cognizant survey respondents said their IT departments were understaffed, and 14 percent said there is a mismatch between their staff members’ skills and IT requirements. So undertaking a virtualization initiative might be a challenge for some organizations.

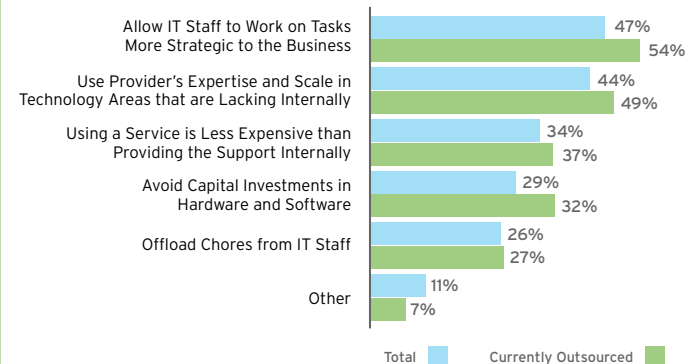
And even with these constraints, if virtualization can take hold, there are other, longer-term issues. For instance, as virtual machines proliferate, will an organization have the

IT human resources to manage these systems and perform routine administrative tasks, including backing up data and applying security patches and application updates?

To help address all of these issues, organizations are increasingly looking to infrastructure service provider partners to help with their virtualization efforts.

An experienced provider can provide the expertise and staff to support an organization’s virtualization efforts. Additionally, a provider can accommodate growth as virtualization efforts expand, provide expertise in other areas such as help with security management to protect the systems and data, as well as handling routine management and backup chores. This allows organizations to offload work from their IT staff, freeing them to work on core projects that are more strategic to business success. Additionally, by using a service provider to manage a virtualization effort, organizations can more quickly realize the benefits of virtualization including saving capital expenses on servers and other equipment, and freeing up valuable real estate in their data centers.

### Factors Considered Most Critical in Decision to Outsource Virtualization Initiative



### WHY COMPANIES OPT TO OUTSOURCE

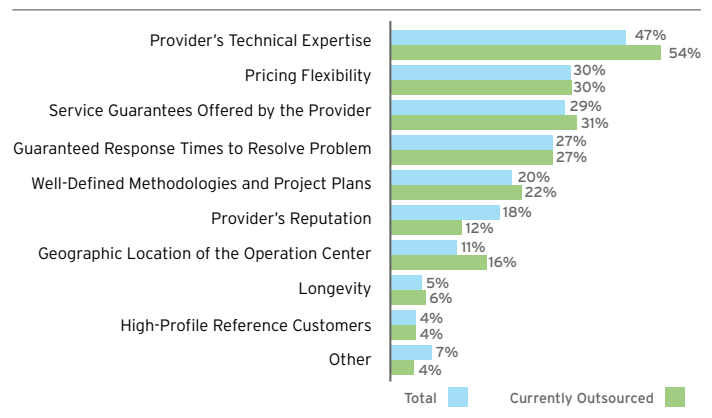
Cost containment and staffing shortfalls are among the leading factors influencing the decision to outsource virtualization efforts. Interestingly, more of those organizations that already outsource other aspects of their IT operations consider these factors to be critical in their virtualization efforts.



For example, 47 percent of the entire pool of respondents to the Cognizant consolidation and virtualization survey said that freeing up staff to work on more strategic tasks was a critical point in their decision to outsource their virtualization efforts. But that portion went up to 54 percent among those already outsourcing.

the need for help in other areas. For instance, before moving to virtualization, the majority (70 percent) of organizations consider user satisfaction as the key metric when evaluating a service provider’s performance. Only 21 percent consider adherence to service level agreements the key metric.

### Most Critical Factors When Selecting an IT Service Provider for Virtualization Project



Similarly, more of those already outsourcing noted the value of the service provider in supplying virtualization expertise their staffs might not possess. They also, in higher numbers percentage-wise, felt using a service provider was less expensive than providing virtualization support internally.

Since these factors are considered so important, it follows that an organization would look for these qualities when selecting a service provider to help with its virtualization efforts. And that is exactly the case.

Survey respondents rated the provider’s technical expertise as the most important factor when selecting a partner for their virtualization projects. This relates back to the finding that many organizations say there is a mismatch between internal IT skills and project requirements.

Falling in line after technical expertise, other key factors in the selection of a provider for virtualization projects were pricing, service level guarantees, and response time to resolve problems.

As companies get more comfortable with virtualization and use it for more mission-critical applications, they begin to see

However, once an organization embraces virtualization, the emphasis shifts from the informal “user satisfaction” to the more formal adherence to service level agreements (SLAs). Specifically, the survey found that among those that had embraced virtualization, the percentage of organizations that considered SLAs the key metric more than doubled to 49 percent, while user satisfaction as a metric dropped by about half to 38 percent.

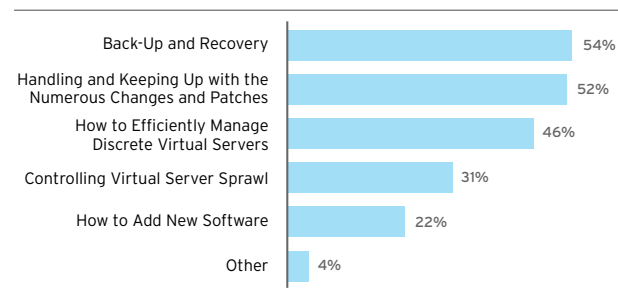
### CONCERNS ABOUT VIRTUALIZATION

As organizations adopt virtualization, one of its greatest benefits—ease of server and application deployment—becomes a management problem.

In fact, the ability to set up a new virtual machine quickly can lead to virtual server sprawl. So organizations face a new challenge: managing and securing all the virtual server instances. According to a 2008 *eWEEK* article,<sup>4</sup> “The benefits of virtualization are eroded when virtual machines are not controlled by a life-cycle process.”

In that article, long-time *eWEEK* Lab editor Cameron Sturdevant noted that, “Virtual machine sprawl has virtualization instances popping up with nobody keeping track of them. Simply stated, organizations won’t be able to secure these things, given that nobody knows how many have been created.”

### Concerns with Managing a Highly Virtualized Environment





This point was echoed by David F. Carr, Technology Editor for *Baseline Magazine*, in a 2007 *CIO Insight* article.<sup>5</sup> “The worry is that taking away the traditional, practical obstacles to procuring and setting up a new server, and replacing it with a process of activating a new virtual machine that can be accomplished in minutes, may make things just a little too easy,” said Carr. “In other words, you could wind up with a lot more virtual machines than you actually need because the creation of these new servers is seen as free. And virtual or not, they still have to be managed and tracked, and they still consume computing resources.”

These factors are compounding the problems faced by IT managers. The Cognizant survey found that more than half the respondents are highly concerned about backup and recovery and keeping up with the numerous changes and patches in a highly virtualized environment.

### COGNIZANT AS YOUR TECHNOLOGY PARTNER

Virtualization is being embraced rapidly in enterprises everywhere. Most organizations see the technology yielding cost savings, power reduction, and business agility. But there are obstacles to adoption, including lack of IT skills, staff shortages, and long-term management issues.

Organizations that want to move to a virtualized architecture quickly now have help. Cognizant offers the solutions and expertise to deploy virtualization rapidly and then provide management of the environment going forward. In particular, Cognizant can work with an organization to develop a technology roadmap to meet a company’s business goals. It can then offer virtualization and management

expertise within an ITIL process framework to bring solutions online as quickly as possible. Cognizant will also help manage the complexities of these systems especially in the areas of problem and change management. This allows organizations that lack virtualizations skills to catch up with competitors and it helps understaffed IT organizations to overcome their limitations.

Additionally, Cognizant offers industry-leading technology architecture, program management capabilities, and powerful business analysis and business process management in key vertical industries and horizontal application areas.

### ABOUT COGNIZANT

Cognizant (NASDAQ:CTSH) is a leading provider of information technology, consulting and business process outsourcing services. Cognizant’s single-minded passion is to dedicate our global technology and innovation know-how, our industry expertise and worldwide resources to working together with clients to make their businesses stronger. With more than 40 global delivery centers and 58,000 employees as of March 31, 2008, we combine a unique onsite/offshore delivery model infused by a distinct culture of customer satisfaction. A member of the NASDAQ-100 Index and S&P 500 Index, Cognizant is a Forbes Global 2000 company and a member of the Fortune 1000 and is ranked among the top information technology companies in BusinessWeek’s InfoTech 100, Hot Growth and Top 50 Performers listings. ■

For more information go to:  
[www.cognizant.com/go/virtual](http://www.cognizant.com/go/virtual)

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- 2 “Estimating Total Power Consumption by Servers in the U.S. and the World,” by Jonathan G. Koomey, Staff Scientist, Lawrence Berkeley National Laboratory and Consulting Professor, Stanford University, February 15, 2007  
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- 3 “Virtualization: Agility More Significant Than Cost Cutting,” *CIO Insight*, October 26, 2007  
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- 4 “How to Tame Virtualization Sprawl,” *eWEEK*, February 12, 2008  
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