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Virtualization and Private Clouds: Trends and Directions

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Virtualization technology is no longer exclusively being used as a tactical tool to drive server consolidation and higher system utilization. The use of virtualization has matured; many organizations are now leveraging the mobility of virtual machines to improve management and operations of IT environments. This next phase of virtualization includes a host of new use cases that range from high availability and disaster recovery to hosted clients and true utility computing in a private cloud.

Server virtualization is now the default approach for new server deployments at many enterprise IT organizations and is quickly becoming the foundational platform for cloud computing initiatives. The next phase in virtualization will require a reinvention of IT policies and procedures as well as continued adoption of automation and management tools as IT moves to a more agile service delivery model.

The following questions were posed by EMC to Frank Gens, IDC's senior vice president and chief analyst, on behalf of EMC's customers.

Q. The IT industry is excited about virtualization and private cloud initiatives. What market trends and value propositions are driving these initiatives?

A. Virtualization and private clouds are the latest, vitally important, ingredients in IT leaders' long-term strategy to create much more efficient and agile IT service delivery.

Let's talk about virtualization, which is the more established of the two. For the past several years, many datacenters have adopted virtualization, with the initial, simple goal of driving greater efficiency around infrastructure by consolidating hardware in order to drive out costs. And that's been a successful first step: IDC research shows that the IT shops that have virtualized their servers have seen savings in the range of 20–25% or greater.

Although IDC research shows that we are still in the early stage of virtualization adoption — worldwide only around 15% of servers installed are virtualized — in large shops, as many as 30% of servers are virtualized on average. As some of these customers have developed more experience with virtualization, they are starting to evolve their virtualization strategy to go beyond simple hardware consolidation. They are intelligently managing their virtualized infrastructures to provide greater speed, agility, and availability into their IT service delivery. For example, they are able to more dynamically deploy additional capacity, as needed, to mission-critical workloads; more quickly and cost-effectively deploy new applications; more

quickly provision (and deprovision) test and development resources; and more cost-effectively provision for disaster recovery. These are among the emerging — and most exciting — benefits of virtualization.

Q. So where do private cloud initiatives fit into this picture?

A. The idea of private clouds is exciting: to bring the efficiency, simplicity, and adoption speed benefits of public clouds into datacenters, and yet IT still maintains control. So what are private clouds exactly? They build on the highly efficient and flexible foundation of virtualization and add other important elements that bring those benefits more directly to end users — such as on-demand self-service, usage-based metering and chargeback, and simplified packaging. Private clouds, in effect, package the benefits of virtualization in a way that makes them easier for IT groups to provide to their internal customers and for those users to leverage for greater business value.

For CIOs, the holy grail has been to be able to deliver IT services at the lowest possible cost and at the highest possible speed in order to adapt quickly to changing business requirements, including new business applications, support for mergers and acquisitions, integrating new development and distribution partners, and supporting new business configurations (e.g., outsourcing/offshoring). With virtualization and the private cloud, CIOs are much closer to that goal of efficient and dynamic IT service delivery capability.

Q. Despite the benefits, some enterprises are holding back. Why? What do the slower adopters see as the obstacles and risks?

A. IDC research shows that customers' number 1 concern is security. As IT resources are shared in a virtualized or cloud environment, customers worry whether their applications and data will be more vulnerable to tampering, theft, or loss. Performance and availability — which you could think of together as "dependability" — are also concerns; while it's cost-efficient to share resources, some IT executives worry that in a shared environment, a spike in one workload's needs may siphon resources away from other workloads.

These concerns, and others, tie to an overall concern about the manageability of these environments. While the ability to virtualize IT resources has come into the market pretty rapidly, tools that help IT executives *manage* those virtual resources as expertly as they manage their physical IT resources have been slower to emerge. The good news is that within the past year or so, we've started to see many more tools designed for managing virtual environments come to market, but the industry is playing catch-up. After all, compared with tools to manage physical IT resources, which have decades-long track records, tools to manage virtual IT resources are still in the early stages of development. Customers are saying "show me" to virtualization and private cloud vendors; they are demanding the same kind of sophistication — and the ability to monitor and deliver appropriate service levels — with this new generation of virtualization and cloud management tools.

Q. What about virtualization and mission-critical applications? Is virtualization just for "second-tier" applications?

A. This is an area where there's a lot of misperception about what workloads can and should be run in virtualized environments. I already mentioned that only 15% of servers are virtualized — a clear minority. Yet, here's an interesting statistic: *Over half of those servers that are virtualized run mission-critical workloads*. While it's true that early adopters of virtualization were more focused on second-tier applications, as a way to minimize risk, it is now becoming clear that many customers are *already* running some of their mission-critical applications in a

virtual environment. So as virtualization and the cloud model expand and mature, there is no doubt that many of these workloads will be mission critical.

I already mentioned that the "low-hanging fruit" benefit of virtualization is significantly reduced infrastructure expenses. Yet there are other important benefits when mission-critical applications are virtualized. One is the ability to scale dynamically, which is extremely important, for example, for those industries that have seasonal fluctuations in business and therefore in the demands of their business systems. For these organizations, the dynamic characteristics of virtualized environments actually support greater availability for service levels and mission-critical workloads.

Another important benefit of a virtualized environment is that it supports much greater ability to fail over in the event of an outage or disaster. The scalability, the cost, the higher availability, and the built-in disaster recovery support are very compelling benefits for mission-critical work loads.

Q. What can enterprises do to alleviate the risk of virtualizing mission-critical applications?

A. To alleviate the risks of virtualization, enterprises are turning to next-generation governance tools, management tools, testing tools, and security tools. In addition to the tools themselves, there needs to be a level of integration among them as well as between them and the existing tools for managing the physical environment. That is the key to mitigating the risks; if IT shops have the same level of tools to manage and secure the virtual environment as their traditional environment, then there's a tremendous upside opportunity for virtualizing mission-critical applications.

However, for enterprises to reap the full benefits of virtualizing, tools are not enough. It's important that IT rethink its organizational structure. Getting the full speed and agility benefits of virtualization really requires IT to break down the silos between traditional, product-centric domains within IT operations. In a dynamic IT delivery environment — one in which virtualization and service management tools support better end-to-end visibility of the IT resources supporting a business process — the traditional silos among applications, servers, storage, networks, and security management have to come down. Organizations can greatly amplify the benefits of virtualization by better organizing IT operations around end-to-end services delivery rather than around traditional IT product domains.

There is also a great opportunity to break down the walls that exist between operations and development. The pioneers that are getting the most out of virtualization are those that are strengthening the communication around applications among the developers, the testers, and the people in operations who are running those applications. That ability to have communication around the full application life cycle in a virtualized environment — from development to test to deployment — is very important to getting the most out of virtualization.

Q. In that case, what should enterprise customers look for when bringing in a vendor?

A. For enterprises considering virtualization and beyond — looking at using virtualization in a private cloud for dynamic IT service delivery — it's important to start with a vendor that has a very strong and solid understanding of infrastructure. Look for a vendor with a great track record in designing scalable infrastructures and excellent capabilities around tools that let customers manage those infrastructures.

It's also important that IT leaders look for vendors that work closely with application vendors, early in the product development process — with codevelopment and joint testing programs

— to test the performance of all the other operational attributes of packaged applications in standard virtualized environments. Total solutions need to be tested together — and customers should increasingly look for that testing to have been done programmatically by the vendors, long before the solutions are deployed in the customer's environment.

It's also essential that a vendor understand virtualization and cloud architectures in the broader context of the CIO's IT transformation agenda. IT executives aren't trying to just consolidate infrastructure in order to squeeze more from their budgets; they are trying to migrate to a dynamic IT service delivery model. Therefore, a vendor needs to understand that virtualization has to work with the other elements of that model, including service management, automation, increasing user self-service, transparent chargeback mechanisms, and governance. Typically, vendors that understand this strategic context also have a strong understanding of and practice in IT service management and best practice models such as ITIL.

Selecting a vendor is not just about installing the right and latest technology; it's about helping organizations build and then transform IT around those technologies to get the most out of them.

ABOUT THIS ANALYST

As IDC's senior vice president and chief analyst, Frank Gens guides IDC's research into broad IT industry trends, particularly the strategic adoption of technology by Global 2000 businesses and the industries in which they compete.

Mr. Gens is the producer of IDC eXchange, IDC's blog and podcast on the state and future of the IT industry, and is a frequent speaker at executive forums around the world. He is also the author of IDC Predictions, the company's annual forecast of major changes in the global development and use of technology.