MULTI-VENDOR ANALYSIS

Cisco, EMC, and VMware Ignite the Cloud Marketplace

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Introduction

As businesses extend the benefits of virtualization from the data center to the desktop, they are laying the foundation for cloud computing: a computing environment driven by business policy that instantly reacts by automating tasks throughout the entire supporting infrastructure. Businesses are rapidly building the beginnings of internal clouds—and they may not even be aware they are doing so. Server virtualization is one of the ingredients required to build a cloud and over time, this is allowing the business to inject intelligence—security, compliance, performance, availability, etc.—in one place and then apply it universally over the server, network, and storage infrastructure.

Cloud computing requires the cooperation of multiple vendors to make the vision a reality and turn current virtualized environments into highly automated and dynamic data centers. To help accelerate this strategy and extend the benefits of virtualization, three key players: VMware, Cisco, and EMC are combining their extensive resources and complementary expertise to bring tested and supported solutions to market that enable businesses to accelerate the move down this path. They are evolving their solutions to align with next generation data center initiatives and serving customers by combining their efforts to deliver more robust systems that are tightly integrated and highly virtualized—with a clear eye on providing value and efficiencies as companies take this journey, reducing risk, and enabling rapid return on investments.

The solutions provider community will play an important role in delivering advanced virtualization and cloud computing to the market as well as educating customers on the advantages the three technology leaders bring to their businesses. VMware, Cisco, and EMC certify their solution providers to offer virtualization, networking, and infrastructure knowledge and services to help customers reduce capital and operational costs, accelerate time to value, and move toward a strategy that gives them efficiency, control, and choice. Solution providers will continue to work closely with these leading technology vendors to deliver integrated, one source solutions that build the data centers of tomorrow.

Cisco, EMC, and VMware are looking beyond basic server virtualization, physical consolidation, and improved resource utilization to deliver unified solutions that can help enable a more efficient IT infrastructure capable of responding to dynamic business and IT changes—while building tomorrow's data center.

Cisco, EMC, and VMware Combine Expertise and Resources

Before exploring the individual building blocks required to achieve success in today's new computing environments, it's important to clearly understand where technology leaders like Cisco, EMC, and VMware believe the future lies. The data center of the future is quickly shaping into a self-service, automated environment driven by business policy. Terms such as 'private cloud,' 'on-premise cloud,' 'utility computing,' and 'autonomic computing' all refer to the same basic ideas: using infrastructure resources more efficiently and with more fluidity in order to support today's applications as well as the workloads of the future. The goal of all forms of commercial computing is to achieve a high level of flexibility that drives up resource utilization, controls cost, and enables easy integration between in-house and network-based IT infrastructure. Customers want a reliable, dynamic computing platform that can be automated based on business rules and policies to eliminate operational costs and complexity. They also want to be able to choose between hosting a workload on- and offsite at a cost model that proves to be a prudent investment today and a wise investment for the future. Cisco, EMC, and VMware have each developed offerings aimed at making these user requirements a reality.

- **Cisco Data Center 3.0** includes vFrame Server Fabric Virtualization Software, the Nexus 1000V switch, and a unified server fabric that aggregates LAN and storage networking I/O onto a common networking fabric. The goal of Data Center 3.0 is to flatten the IT infrastructure and deliver tools that can dynamically

provision and manage resources in a virtualized environment. As a next step in Data Center 3.0, Cisco's Unified Computing System (UCS) architecture consolidates the server and networking infrastructure into common building blocks that tightly integrate with the sever virtualization.

- **Virtual Datacenter Operating System (VDC-OS)** is the core of VMware's cloud computing solution. It is the key enabler that will turn IT infrastructure into a common pool of resources that can ultimately be easily provisioned without changing physical infrastructure. The entire infrastructure acts and performs like a single giant computer. VMware is staging its cloud solutions to enable enterprises and service providers to deliver a tiered set of service offerings ranging from basic cloud services to more advanced capabilities enabled by new VMware Cloud vServices.

- **EMC optimized information infrastructure** for virtualized environments helps to maintain cost savings, increase availability, and leverage advanced functionality with shared storage for a VMware infrastructure and its vStorage initiatives. EMC extends its solutions to include data protection, security, and infrastructure management while adding many of the "fluidity" features enabled by server and network virtualization—and eliminating operational complexity. Further, EMC contributes automated IT management solutions such as EMC Smarts and EMC ControlCenter with server virtualization.

VMware, Cisco, and EMC channel partners are testing, designing, and delivering end to end virtualization solutions—solutions made to capitalize on the impact virtualization can make today, while, more importantly, accommodating future demands as virtualization initiatives scale and applications adapt to a new platform: the cloud.

VMware, Cisco, EMC, and their partners have years of experience working together and have amassed expertise and knowledge that helps them offer solutions that incorporate best of breed technologies. Considering the impact virtualization is having and seeing firsthand how customers are implementing the technology helps these leaders and their joint partner community deliver an optimized environment from day one. Customers can implement integrated solutions with the confidence that they have been proven in the field and simply work.

Optimize as You Virtualize

Virtualization provides a new type of solution for IT organizations, offering a computing platform that dynamically adapts to business change and quickly delivers a compelling ROI. Deployments typically start at the server, but it quickly becomes evident that the entire IT infrastructure will be impacted. Server, network, and storage administrators must work cooperatively to build infrastructures that extend the benefits of virtualization across the entire IT environment, paving the way for the types of successful rollouts that are quickly making the virtualization platform a standard for all new applications within a business.

As businesses consider virtualization and all of its benefits, it's important that they follow a basic methodology for collecting current utilization data from physical servers, selecting workloads that match their initial goals, performing physical to virtual (P2V) migrations, and monitoring the application in a virtualized environment to ensure performance and availability are being delivered as planned. However, before—or at the very least, during—this process, it is imperative that companies consider the greater impact virtualization will have on data center optimization as a whole.

Too often, we see a familiar pitfall in server virtualization deployments. Many organizations tend to deploy server virtualization first and *then* try to optimize their investment. It is all too common to see companies quickly reach a plateau where they have virtualized the low hanging fruit—such as IT infrastructure applications and maybe some file servers—and then struggle to reach the next tier of mission critical applications that could potentially benefit the most from being virtualized. *Successful deployments that continue to scale at peak efficiency are those that put optimization ahead of virtualization in the planning process*. Careful consideration regarding how to optimize a virtualized deployment produces the greatest return on investment. But what, actually, are we considering when thinking optimization?

- **New physical servers** are part of nearly every production virtualization deployment. Businesses are investing in servers that are multi-processor, multi-core, and can handle large banks of memory. They also must be capable of potentially demanding I/O from both LAN and networked storage traffic. Blade servers are becoming increasing popular as companies look to consolidate, decrease data center footprints, and lower power and cooling costs.

- **Networking infrastructure** is a major consideration due to the simple fact that more workloads are sharing the same I/O connections as 5, 10, and potentially 20+ virtual machines may be running on a single physical server. This "I/O blender" issue creates potential bandwidth contention as well as quality of service problems for the applications. There is also a disconnect between current physical networking infrastructure and the creation of virtual networks—creating visibility, security, and management concerns amongst networking and operations professionals.

- **Networked storage** demand continues to grow in virtualized environments. Server virtualization is acting as a catalyst, triggering the evaluation of new types of storage solutions that otherwise may not have been considered. Data virtualization techniques such as thin provisioning, data deduplication, and snapshots—along with storage performance and overall storage system efficiency—rank high in customers' minds as they consider the impact virtualization will have on their storage infrastructure.

- **IT processes and tools** that may have worked perfectly in the physical world will not necessarily yield the same results in the virtual world. IT organizations have to consider provisioning, configuration management, and systems management tools that are currently in use and understand how virtualization will affect them. Businesses are using virtualization as an opportunity to re-evaluate current tools and processes and are turning to major technology leaders for help and direction. They want integrated tools that work across all hardware platforms and roll up into a single management view.

Organizations that drive these optimization criteria from the beginning have achieved great success as they by virtualize a large portion of their environments. Such successful deployments share a few common themes: implementations in these companies were based on executive level support, close IT and business collaboration, a desire to quickly build confidence with application owners, and interactions with a group of outside vendors and resellers that clearly understood the impacts that the different pieces of infrastructure have on one another.

Solution Providers Extend Value

Solution providers bring tremendous value to virtualization initiatives—applying their knowledge of server, software, storage, and networking technologies to act as a single source of information for the customer. They can help IT focus on key initiatives, from planning and design, to implementation, to leveraging virtualization compatibilities with the customer's current systems and infrastructure, to helping them work through the complexities of new deployments. In addition, many partners are vendor-certified to deliver virtualization services, becoming technology specialists with the knowledge and tools to integrate multi-vendor solutions to achieve IT efficiencies across the virtual environment. Customers benefit by leveraging this pool of partner expertise, making it possible for them to quickly and seamlessly deploy virtualization solutions and put them into production.

Technology leaders like VMware, Cisco, and EMC see the benefits that virtualization offers beyond the physical server and are working closely with one another to enable their large community of common resellers to deliver solutions and services that extend the benefits and efficiencies of virtualization deep into their customers' IT infrastructure. Together this trifecta of leading vendors delivers virtualization solutions, through their partners, that return immediate value to the customer and lay an infrastructure foundation for the future. They also extend interoperability and certification testing to the channel so customers can move on their virtualization initiatives with confidence—turning their data centers into efficient operating environments that support business objectives.

The Foundation of the Future Data Center

VMware's vision of how clouds should operate includes the concept of a "private cloud." This means a similar expectation of SLAs, security, etc., regardless of location. A private cloud can span both internal and external environments to meet the business needs. Cloud service providers such as Google, Amazon, and Nirvanix are all seeing an uptick in interest around cloud computing, but most commercial businesses will be hesitant to fully trust and rely on unproven entities to host top tier business applications and business critical data. Additionally, companies don't want to—or don't have the luxury to—rewrite their applications to run in a different environment, but they do want a more efficient and cost effective way to deliver existing applications.

Transforming data centers into cloud computing entities is not going to happen overnight, but as leaders in the virtualization marketplace, VMware, Cisco, and EMC have the opportunity to guide customers on a journey that will change the way IT designs, delivers, and deploys applications. The reality is that cloud computing may not be of interest today as a majority of virtualization initiatives are still being led by data center consolidation, disaster recovery, and workload availability initiatives, but knowing that Cisco, EMC, and VMware are collaborating for the future should instill confidence in today's buyers if and when they ever consider such a project. Regardless of the driving force behind virtualization, once deployed, IT quickly recognizes the impact it will have across the data center. Learning how to design, develop, and deliver the infrastructure can be a gating factor that often slows implementation.

Customers also want a solution that is easy to implement and comes backed by reliable technology leaders. The reputation of the vendor and the existing relationship play considerable roles in helping determine the best solution for the customer. IT technology leaders that understand the value of a fluid data center want the confidence that their vendors share a common vision. Even if the vendor doesn't necessarily offer what the customer needs from day one, users still want a high level of reassurance that they are headed in the same direction. The last thing any company needs in today's economic climate is to invest in IT infrastructure that will only last a couple of years.

Ease of management also plays a critical role in selecting new IT infrastructure. IT wants to begin eliminating routine and mundane tasks and start automating them with reliable management tools. Management tools must be capable of being integrated into a single pane of glass accessing the entire infrastructure. Equally important are API integration points that are open for seamless transfer of intelligence and visibility between disparate pieces of infrastructure.

Customers struggle to get started deploying virtualization in production due to its complexity. Yes, for all its simplification and a laundry list of benefits, complexity is still an issue. It is relatively simple to spin up a virtual machine on a single server, but planning to run mission critical workloads requires some careful upfront planning. As mentioned earlier, a common hazard many customers encounter is virtualizing before they consider not only optimization, but also the greater impact virtualization will have on the entire data center, including physical servers, networking, and storage. Successful implementations that continue to scale and run at peak efficiency are those that involved careful consideration around optimization before deploying virtualization in production. Considering the sheer number of applications being evaluated for enterprise virtualization, it is important to reflect on all the moving parts—and how to manage them. In a recent survey, ESG discovered that 82% of early server virtualization adopters were running virtual machines in production, with 42% being used for what respondents considered mission critical applications.[1]

[1] Source: ESG Research Report, *The Impact of Server Virtualization on Storage*, December 2007.

ESG's View

Customers see value in solutions that improve efficiency, like server virtualization, but do not consider the entire impact a new technology will have across the data center. VMware, Cisco, and EMC are taking a holistic, customer-centric view of the current state of IT infrastructure and are uncovering new ways for virtualization to transform the data center and support the business with improved SLAs and the ability to quickly adapt to business requirements. Technology leadership, combined with the expertise and services of the partner channel community, is what customers need to gain the confidence that investments made today will continue to deliver value as they journey into the future. With VMware, Cisco, and EMC coming together—supported by their respective channel partners—to deliver products, services, and solutions today, customers should have that confidence to accelerate their investment in virtualization and the infrastructure needed to support cloud initiatives.

The initial wave of cloud computing has to be spearheaded by technology leaders to quickly demonstrate the value of a highly automated data center. A tightly coupled integrated solution, combined intelligence, and experience have an initial advantage to customers that want to rapidly adopt virtualization and transform the existing computing environment into the private cloud. All companies, regardless of size or industry, will gain massive leaps in efficiency and control that enable the business to grow, meet compliance, mitigate risk, and leverage the ideal price/ performance model without the IT infrastructure being an anchor. Each technology leader delivers a critical piece of infrastructure that has the ability to stand on its own, but when combined and delivered as a single integrated solution, the customer wins.

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