Virtualization: From Individual Servers to Data Center Cloud

Companies have adopted server virtualization because of its many potential benefits, including lower operating costs, faster provisioning and deployment, and more efficient use of IT resources. Unfortunately, virtualization in data centers is not as widespread as it could be.

A 2010 eWEEK article reporting on an industry study noted that “despite the fact that more than 80% of enterprises have a virtualization program or project, only 25% of all server workloads [were expected to be running on] a virtual machine by the end of 2010.”

Several issues are holding back wider use. Some organizations hesitate to use virtualization for critical business applications. Others note the need for more sophisticated solutions to extend the benefits of single-server hypervisors to multiple systems.

What’s needed today is a way to expand the benefits of virtualization from individual servers to the entire data center. In other words, companies need a private cloud approach that enables the pooling of all of a company’s IT resources. This approach will provide companies with a dynamic IT infrastructure to support new business initiatives, while keeping operating costs down. Such an infrastructure also will allow for new approaches for IT service delivery to potentially support initiatives such as IT-as-a-Service, rapid provisioning of IT services, pay-as-you-go IT, and self-serve IT services.

Source: Fujitsu model for data center optimization and management

Dynamic Data Center: Driving Agility, Efficiency, Economy

3: PRIVATE CLOUD
Your Data Center, Your Cloud

This white paper discusses challenges to data center virtualization, resiliency, security, and agility and how Fast Track solutions from Fujitsu and Microsoft can help.

1 "Server Virtualization Remains an Infrastructure Challenge: Gartner,” eWEEK, September 27, 2010
Concerns about Virtualization and Private Clouds

Virtualization has allowed companies to consolidate workloads onto fewer servers. This helps improve utilization rates and reduce operating costs, since fewer systems need to be managed, maintained, and serviced. These benefits can be complemented when moving to a private cloud approach, thereby further reducing infrastructure costs and potentially increasing application availability. However, several factors are causing companies to delay the move to a private cloud. These include:

- **Monitoring and Management.** Many companies are concerned that basic virtualization solutions lack the sophisticated monitoring and management capabilities needed to ensure smooth cloud operations. In particular, for critical applications, companies need more insight into resource utilization in a virtualized environment to ensure that internal service-level agreements (SLAs) are met. They also need solutions that provide a more robust operating environment that allows for automatic load balancing and dynamic shifting of workloads without interrupting users.

  A 2010 eWEEK article notes that companies frequently face difficulties monitoring such environments. The article cites an industry study of more than 250 network professionals that found that 56% lacked appropriate tools to troubleshoot cloud problems.

- **Privacy and Security.** Today’s multi-tenant data center environments also demand better control over virtualized elements to ensure privacy and security. And while security principles remain fundamentally the same across virtualized data centers and private cloud environments, HOW security services are provisioned and delivered will have to change. “Security must be integrated from the outset...and not bolted on later as organizations shift to private clouds,” advises consulting and research firm Gartner.

Requirements for a Private Cloud

Several things are needed to overcome these concerns, enable a dynamic infrastructure, and make the transition to a private cloud easier. They include:

- **More Sophisticated and Powerful Management.**
  The solution must be able to manage physical and virtual assets together across the entire data center. This will simplify management by providing a single console view of all elements.

  The solution must also be able to identify resource usage. This is essential when trying to meet SLAs and understand the root cause of performance problems. Having this capability will allow IT departments to isolate and rectify the performance issues of specific applications. For example, if an order-entry application running in a virtualized environment is sluggish, a robust performance-assessing capability will be able to determine if too many applications are vying for a limited pool of resources. And if so, the manager would need a way to allocate more resources to the critical (in this case, revenue-generating) applications.

- **Better Security for Data and Applications.** A virtualization solution for the data center must also ensure that applications and data remain secure. This is crucial, as hacker attacks and internal threats continue to rise. Plus, the growing number of privacy and data-handling regulations and laws further complicate security and access control.

- **Compliance.** In addition to employing the normal methods of protecting applications and data, today companies must also selectively guard access to data to meet the requirements of new compliance laws. Here, a solution must be very granular to address today’s varied security requirements. For example, some HR records cannot be viewed by all managers, while others can. Strategic merger and acquisition plans may need to be shared with the legal staff, but kept under wraps from corporate managers. What’s needed is a solution that can provide security in such multi-tenancy environments.

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• **Resiliency and Availability.** Finally, the solution must provide a solid platform on which to run today’s mission-critical applications. This might require capabilities to dynamically allocate resources and automatically shift workloads off of slower, unavailable, or soon to be repaired systems.

To satisfy these requirements, organizations need to extend virtualization’s benefits to the full data center(s).

The Fujitsu and Microsoft partnership offers pre-configured solutions that combine Microsoft Windows Server 2008 R2, Microsoft Hyper-V, and Microsoft System Center with Fujitsu PRIMERGY servers. Installed with the world-class experience and proven methodology of Fujitsu consulting services, these solutions can serve as the cornerstone of data center optimization and virtualization efforts, while providing a solid foundation for a private cloud architecture.

• **Microsoft’s Fast Track for Hyper-V solution.** in partnership with Fujitsu, provides a pre-integrated and pre-tested package of hardware and software perfect for a virtualization starter project. The small footprint and minimal overhead involved in deploying a Fast Track solution enables IT departments to pilot virtualization projects and begin their transition to a more optimized data center.

This and other partner “server in a box” and “cloud in a box” offerings are built on:

- **The Fujitsu PRIMERGY server** line offers a complete range designed to fill any role in today’s business. The line includes rack-mount and blade servers that deliver the computing performance to support running even the most demanding applications as virtual instances. Fujitsu server technology enables more virtual sessions to run per server.

- **The Fujitsu ETERNUS storage family** is based on the company’s own intellectual property and its successful, longtime experience in data center projects. Fujitsu offers a variety of tailor-made solutions that meet customers' needs for high performance, reliability, innovation, quality, and cost efficiency. ETERNUS storage products provide a unique combination of highly sophisticated features and functionalities that protect data.

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**Fujitsu and Microsoft: Your Private Cloud Partners**

To help organizations address these challenges, Fujitsu and Microsoft have partnered to design, develop, and jointly market innovative solutions for enterprise data centers, encompassing physical, virtual, and private cloud-based offerings.

The alliance is working to become an integrated, full-solution provider of Microsoft products and services, tightly coupled with Fujitsu’s consulting, systems integration, products, and infrastructure services. These pre-integrated, pre-tested, “plug and play” solutions enable faster deployment and reduce risks implementing the new technology.

A 2010 Ziff Davis Enterprise survey of IT decision makers found 79% wanted an integrated virtualization solution. Some 46% specifically wanted a vendor in an alliance with other vendors to offer a tightly integrated virtualization solution.
• With its own management software products—ServerView Suite and ETERNUS SF—Fujitsu complements the benefits of compute, network, and storage resources. Among other benefits, ServerView Suite delivers permanent status monitoring and extensive control—which can result in less downtime and better maintenance and service quality. ETERNUS SF is ideal for extended storage monitoring and management, helping to achieve business continuity and reduce total cost of ownership.

• Windows Server 2008 R2 helps Fujitsu servers easily integrate into an existing environment. The familiarity with the operating system helps lower operating costs as most companies already have the internal expertise to operate and manage the solution. And educational costs can be lowered as well, as the above solutions negate the need for new training. Furthermore, Windows Server 2008 R2 includes technology and features that increase the reliability and flexibility of a server infrastructure. This again helps lower operating costs.

The ongoing management of servers in the data center is one of the most time-consuming tasks facing IT professionals today. Windows Server 2008 R2 offers improved remote administration, management of file services, and data center power consumption management. Windows Server 2008 R2 provides a comprehensive set of features that make deploying and managing servers easier. And the Server Manager console in Windows Server 2008 R2 eases the task of managing and securing multiple server roles in an enterprise.

When Fujitsu PRIMERGY servers are combined with Windows Server 2008 R2, they can support unprecedented workload size, dynamic scalability, and across-the-board availability and reliability. All of these attributes are highly desirable when implementing a dynamic IT infrastructure.

• Microsoft Hyper-V. Virtualization software further enhances these benefits. Server virtualization using Hyper-V technology has been an integral part of the operating system since Microsoft released Windows Server 2008. Windows Server 2008 R2 introduces a new version of Hyper-V that increases availability, improves management, increases performance and hardware support for Hyper-V Virtual Machines, and improves Virtual Networking Performance.

• Microsoft System Center solutions allow physical and virtual assets to be managed efficiently across a data center. In particular, System Center solutions capture and aggregate knowledge about the infrastructure, policies, processes, and best practices so companies can optimize IT structures to reduce costs, improve application availability, and enhance service delivery. Using the automated management solutions within System Center, IT organizations can be more productive service providers to their internal customers and business units.

• Microsoft Windows Azure is a cloud services operating system that provides a comprehensive development, service hosting, and service management environment that enables a company to approach the public cloud with confidence. Microsoft’s cloud services platform reduces — or even eliminates altogether — the hassle of buying, managing and maintaining infrastructure. The Windows Azure cloud computing services can be used with a private cloud implementation or independently, offering powerful flexibility and scalability, low total cost of ownership, and a familiar toolset for building cloud applications. The flexible Azure platform supports multiple languages and integrates companies’ existing on-premises environment.

• Fujitsu Data Center Services. Many vendors can offer server hardware. Fujitsu stands above the pack by combing top-performing hardware and software with a broad range of proven services. Additionally, Fujitsu offers customized consulting and professional services to help with server consolidation, deployments, and optimizing specific solutions.

• TRIOLE Methodology. Building an IT infrastructure from scratch can be both expensive and difficult to support; and trying to save on design and setup costs may sacrifice reliability. By purchasing PRIMERGY servers with Windows Server 2008 R2 installed, data center managers
can tap the proven advantages of Fujitsu’s TRIOLE methodology for design, setup, and management. TRIOLE is a state-of-the-art process for creating an industrialized IT infrastructure that is efficient and reliable, quick to implement, and easy to change as business demands fluctuate.

Treating the various IT infrastructure components as mix-and-match modules speeds development while ensuring the data center is set up to operate with the greatest flexibility and reliability. Using TRIOLE preconfigured processes to install and manage the PRIMERGY server environment using Windows Server 2008 R2 and Hyper-V ensures that the technology infrastructure is virtualized in a way that fully optimizes resources and reduces costs throughout the entire life cycle.

Conclusion: Private Cloud Begins Now
Virtualization and cloud computing can improve utilization rates and operational efficiency for almost any company, but remain poorly understood. Many organizations are concerned about security, availability, and control when trusting their critical data to a cloud environment where physical locations may shift dynamically. Issues of training and implementation complexity also arise when companies consider cloud deployments.

Using solutions from the Fujitsu-Microsoft alliance will help cut operating costs, enable scaling, and provide a more flexible and reliable infrastructure to meet today’s business requirements. And the solutions position companies to move, if desired, to a public cloud in the future.

Fujitsu is a world-leading IT infrastructure solution provider, offering integrated and optimized hardware, software, and services for today’s most demanding requirements.

Microsoft is the world leader in IT software, and Fujitsu is the third-largest IT vendor on the planet. Their combined decades of IT leadership expertise make the PRIMERGY/Windows Server 2008 R2 bundle a superlative choice for virtualization deployments.

And when you’re considering the move to cloud computing, whether implementing a private cloud, in which resources are held behind an enterprise firewall, or a public cloud, in which resources are provisioned on-demand over the Internet, Microsoft and Fujitsu are prepared to help.

Partnering with these best-in-class vendors can help your organization meet today’s biggest challenges by starting you on a road to success that begins with data center optimization and virtualized servers, extends to storage and networking, and culminates in the cloud. By leveraging the Fujitsu-Microsoft partnership you get results today, success tomorrow.