F5 Strategic Guides: **Virtualization**

Seven Key Challenges You Can't Ignore

Optimize Your Virtual Network and Storage. Maximize Your Virtualization Investment.

Achieving a Seamless Virtual Transition

Virtualization platforms, such VMware ESX and Microsoft Hyper-V, represent the first form of virtualization that is typically introduced into the data center. These new infrastructure platforms virtualize the OS, the network, and system management in one conveniently packaged product, delivering much-needed consolidation, cost savings, and dynamic provisioning benefits to resource-constrained IT departments.

In addition to providing these considerable advantages, virtual machines (VMs) also add complexity, scale, and management challenges to your environment. And while the virtualization of physical machines can strain your application and storage networks, there are steps you can take to eliminate these concerns. By planning for your migration to VM platforms, and recognizing the inherent challenges, you can make the process seamless and optimize your virtual network and storage environment.

About the F5 Virtualization Guide Series

To ensure your virtualization solutions reach their full potential, it is critical that the underlying network and data storage be capable of handling the added stresses of a virtual server infrastructure. F5 solutions enable the environment to adapt to these demands, ensuring high availability, maximizing resources to reduce data center costs, and improving application performance. This F5 Strategic Guide series will show you how to address these challenges so your business can get the most out of its investments.

Virtual Machine Deployment: Seven Key Challenges You Can't Ignore

There are seven areas of concern that accompany any major virtual platform implementation or migration. These critical pain points directly impact two cornerstones of the data center: network and storage.

1 **Challenge:** Performance and Availability Issues

Performance and availability issues—often created by a move from physical hardware to virtual hardware—as well as VM saturation can cause your application networking resources to be depleted at a much faster, and often unanticipated, rate. I/O intensive operations get bogged down in the virtualization translation layer. Saturation of the network card and software switch on the physical host might cause performance issues, reduced bandwidth, and increased latency.

Solution: Offload Application Resources to a Purpose-Built Appliance

By offloading application networking resources onto a purpose-built appliance, your organization can conserve bandwidth, reduce latency, and improve the performance of I/O intensive operations. F5 BIG-IP® Local Traffic Manager™ (LTM) uses SSL processing, caching, and compression to dramatically improve application performance while keeping VM resources focused on what they do best.

2 **Challenge:** OS Virtualization Fails to Virtualize the Application

Virtual infrastructure platforms include software that can migrate VM instances from one physical device to another. However, there might be a lapse in the availability if the connections to the application and application persistence for the user are lost during this live migration.

Solution: Improve Application Performance with Automated Traffic Monitoring

By monitoring applications running on the VMs, and directing traffic to the appropriate VM as application availability and response time fluctuate, your organization can improve

application response times and availability while maintaining connection persistence. BIG-IP LTM accomplishes all of this automatically; when application traffic is routed through BIG-IP LTM, images are added to the pool and configured for the correct application before they become available.

3 **Challenge:** Additional, Unanticipated Costs—the Virtual Solution May Cost More than the Physical Problem

Additional costs often result from implementing OS virtualization; new hardware and software licenses can be required to solve problems with availability, performance, and management. What's more, as VMs burden the existing infrastructure, requirements grow for application and storage networks. Management of new tools requires increased headcount and training. And VM sprawl can create orphaned virtual disk images that take up critical storage space.

> "Virtualization is a proven software technology that is rapidly transforming the IT landscape and fundamentally changing the way people compute."
>
> VMware, www.vmware.com/virtualization/

Solution: Optimize Existing Resources with Automatic Storage Tiering, VM Load Balancing, and Virtual Infrastructure Scaling

Planning ahead and implementing strategies that make the most of your existing resources can ensure a smooth deployment, reduce added headcount, and limit your exposure to CapEx and OpEx overruns. With BIG-IP LTM already in place, there's no need to buy new gear because BIG-IP devices are just as effective optimizing virtual servers as physical servers. An investment in BIG-IP LTM is also smart planning for future growth because it helps optimize the virtual infrastructure and scales with it. In addition, using F5 ARX® file virtualization solutions to virtualize the storage network enables your network to adapt to VM requirements without re-architecting. Tiered storage with ARX automatically places current or critical virtual disk images and data files on tier 1 and stores less frequently used files and images on lower tiers—preventing sprawl and reducing backup costs.

4 **Challenge:** Advanced Virtualization Features Go Untapped

New virtual platforms include many advanced networking technologies, such as software switching and support for VLAN segmentation. However, these features are localized and isolated to the VM platforms. They are not integrated with the rest of the Application Delivery Network because there is no sharing of information directly between VMware or Hyper-V and the network. And in some VMware Distributed Resource Scheduler (DRS) or VMotion deployments, the current networking infrastructure might not be able to support live migration or virtual software switching.

Solution: Integrate the Application Delivery Network and VM Platforms for Policy and Information Sharing

Direct integration between Application Delivery Networks and VM platforms enables your organization to get the most out of those platforms while reducing costs and management

duties. The F5 deployment guides for VMware ESX/vCenter and Microsoft Hyper-V/System Center help make BIG-IP LTM hypervisor-aware. They provide instructions for direct integration between BIG-IP LTM with F5 iControl® API and the VMware vCenter and Microsoft System Center API, enabling BIG-IP devices to feed networking and application information to the respective VM management platforms. iControl integration also enables configuration and policy information to be shared between BIG-IP LTM and the management platforms, allowing configuration changes to be automatically passed between the application network and those platforms.

60% of companies recently surveyed say the server team is leading their virtualization initiatives.

Source: F5 Customer Survey, November, 2008

5 **Challenge:** Managing Explosive and Unexpected Storage Growth While Maximizing Resources

Prior to server virtualization, OS and data files typically reside on internal storage in the physical server. These files are moved to external shared storage in virtual environments. OS drives are converted to flat-file VM disks which consume 10 to 100s of gigabytes of networked storage each. Little used or inactive virtual disks can remain on expensive storage well after they are needed, driving up storage costs.

Solution: Move Virtual Disks to Lower-Cost Storage with Automated Storage Tiering

Storage tiering—the process of moving stored assets according to their value—can dramatically drive down costs and improve resource utilization. Automating the process takes it a step further, simplifying storage administration and freeing up IT resources. Using ARX file virtualization solutions for policy-based storage tiering and centralized storage management enables your "inactive" virtual disks to automatically and non-disruptively move from expensive tier 1 storage to more cost-effective tier 2 storage. Virtual disks can also be dynamically moved back to tier 1 storage without impacting users or applications. Management of large volumes of virtual disks is simplified, enabling multiple, heterogeneous storage systems to be merged into large, shared pools.

6 **Challenge:** Congested Storage—Data Pipes Can't Handle the Volume

OS virtualization can dramatically increase data storage traffic. Passing large amounts of data from multiple guests through one host storage network connection, such as network file system (NFS), can cause instant bottlenecks and flooding. Moving large virtual disk images outside the LAN causes extensive delays and floods the much smaller WAN connections. And unplanned VM migrations resulting from VM sprawl can bring the network to a standstill.

Solution: Reduce Data Volume with TCP Optimization, Data Compression, and Automated Storage Capacity Balancing

By optimizing TCP connections, improving file transfer speeds, and effectively balancing storage capacity, your organization can reduce bottlenecks, lower bandwidth costs, and optimize its bandwidth usage. F5 WAN optimization solutions deliver TCP optimization,

data compression, and intelligent byte caching—accelerating file transfer speeds by up to three times and reducing bandwidth utilization. In addition, ARX file virtualization solutions provide automated storage capacity balancing, ensuring that virtual disks are created on your highest performing storage resource while balancing virtual disks across multiple storage resources—eliminating bottlenecks, aggregating capacity, and increasing utilization.

Challenge: Management Complexity

Managing VMs as part of the complete management solution can be a struggle. This includes managing the VMs themselves, as well as managing all parts of the data center as one unit. The hypervisor and the host system are two new components that are not part of existing data center management solutions; it is critical to be able to manage these devices and understand their impact on performance. What's more, built-in management tools for VM platforms only manage the virtual resources and do not take into account any external information.

Solution: Create a True Application Delivery Network

By managing VMs, the application network, and the storage network together, your organization can dynamically provision resources, simplify administration, and free up IT resources. F5 BIG-IP and ARX products help manage the virtual infrastructure by focusing on application and storage networks. The F5 deployment guides for VMware and Microsoft virtual platforms help make BIG-IP LTM hypervisor-aware, providing direct integration between F5 solutions with iControl and the VMware vCenter and Microsoft System Center APIs. This means you can dynamically provision resources by integrating information from the network and the VMs, which enables your business to create and manage a true Application Delivery Network focused on your applications.

Take a Closer Look

To dig a little deeper into each of the challenges presented in this overview, make sure you read all the other guides in this series. Simply go to http://info.f5.com/virtualizationguides/ to download them directly or send an email to us at virtualization-solutions@f5.com. You can also call us at 888-88BIGIP (888-882-4447).

The other guides in the series include:

Virtualization Guide #2
Maximizing Resources and Reducing Data Center Costs

Virtualization Guide #3
Ensuring High Availability of Virtual Solutions

Virtualization Guide #4
Improving Performance and Managing Complexity

F5 Networks, Inc. 401 Elliott Avenue West, Seattle, WA 98119 888-88BIGIP info@f5.com

F5 Networks, Inc.
Corporate Headquarters
www.f5.com

F5 Networks
Asia-Pacific
info.asia@f5.com

F5 Networks Ltd.
Europe/Middle-East/Africa
emeainfo@f5.com

F5 Networks
Japan K.K.
info@f5networks.co.jp