7 Virtualization Challenges:

Building a Virtualization-Ready Application and Storage Networking Infrastructure

To ensure the full potential of your virtual platform solution, you need to make sure your application and storage network is prepared to handle the added stresses of a virtual machine (VM) infrastructure. F5® technology enables your network to adapt to virtualization needs, ensure high availability (HA), maximize resources, and improve performance so you can get the most out of your investment.

1 CHALLENGE: Depleted resources—performance and availability suffer

Performance issues—often created by a move from physical hardware to virtual hardware—and VM saturation cause application networking resources to be depleted at a much faster 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 causes performance issues, reduced bandwidth, and increased latency.

SOLUTION: F5 BIG-IP® Local Traffic Manager™ (LTM) for resource offloading, including SSL processing, caching, and compression.

- Uses resources more efficiently by keeping VM resources focused on what they do best.
- Boosts performance by putting I/O-intensive networking processes on a purpose-built appliance.

2 CHALLENGE: Lack of application awareness—OS virtualization doesn't virtualize the application

Virtual infrastructure platforms include software that can migrate running VM instances from one physical device, which often causes a lapse in app availability.

- When VMware Distributed Resource Scheduler (DRS) moves an image to a different physical box, the app is unavailable during the migration, interrupting the customer's persistence as well as shopping cart transactions.
- Bringing up new virtual images is easy, and so is bypassing typical workflows and configurations as a result. As VMs proliferate, IP addresses are lost, images are assigned to the wrong VLAN, and availability is negatively impacted.

SOLUTION: BIG-IP LTM for IP management, session management, app health, system availability, proxying connections, and more.

- Adds advanced application health checks to monitor apps running on the VMs. BIG-IP LTM monitors the state of the app and will direct traffic to the appropriate VM as app availability and response time fluctuate.
- Routes connections to another image while maintaining application connection persistence.
- Prevents VM sprawl. When all app traffic is routed through BIG-IP LTM, images are added to the pool and configured for the correct app before they are available to traffic.

3 CHALLENGE: Additional, unanticipated costs—the virtual solution costs 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.

- As VMs burden the existing infrastructure, requirements grow for app and storage networks.
- Management of new tools requires increased headcount and training.
- VM sprawl creates orphaned virtual disk images that take up critical storage space.

SOLUTION: BIG-IP LTM for load balancing VMs, SSL offload, caching, and compression. F5 Acopia® ARX® for virtualized and tiered storage.

- With BIG-IP LTM already in place, there is no need to buy new gear because it is just as effective in the virtual space when managing and delivering application traffic.
- An investment in BIG-IP LTM is smart planning for future growth because it will help optimize the virtual infrastructure and scale with it.
- ARX virtualizes the storage network and enables it to scale with VM requirements without any rearchitecting.
- Using tiered storage with ARX to put critical virtual disk images and data files on tier 1 and store less frequently used images on lower tiers will prevent sprawl and reduce backup costs.

4 CHALLENGE: Unused virtualization features—the network limits implementation

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 between VMware and the network.

- In some DRS or VMotion deployments, the current networking infrastructure often can't support live migration or virtual software switching.
- VLAN tags enable a very tight infrastructure. When ESX is implemented, the VLAN tags must be manually mapped to the virtualized infrastructure.
- Storage integration issues arise as soon as VMs are moved into production as additional storage virtualization tools are needed to migrate live machines outside the local storage domain.

SOLUTION: The F5 Deployment Guide for VMware to help make BIG-IP LTM become ESX-aware.

- Provides direct integration between BIG-IP LTM with F5 iControl™ and the VMware VirtualCenter API, enabling BIG-IP devices to feed networking and application information to VirtualCenter. DRS and VMotion decisions can now include both computing and networking resource data.
- iControl and VirtualCenter integration also enables configuration and policy information to be shared between BIG-IP LTM and VMware, allowing configuration changes to be automatically passed between the application network and VM platforms.
- By virtualizing the entire storage network, ARX can present a flat storage solution to VirtualCenter, spanning multiple storage networks in different locations. VirtualCenter can pull all VM disk images from a single mount-point while ARX can manage the location and availability of those images.

5 CHALLENGE: Overrun storage network—growth exceeds planning

OS and data files that typically reside on internal storage in physical server environments are moved to shared storage in virtual environments. OS drives are converted to flat-file virtual machine disks (VMDKs), which take up 10-100s of GBs each of networked storage. Little used or inactive VMDKs can remain on expensive storage well after they are needed, driving up storage costs.

- Storing "gold" virtual images to be cloned as needed and copied to another part of the storage network creates a proliferation of rarely used "parked" images on shared storage, adding unnecessary costs.
- OS data and files that typically reside on internal storage in physical servers are moved to shared storage. This can result in the rapid increase in the number of files and the size of the storage network.

SOLUTION: ARX for policy-based storage tiering and centralized storage management.

- Based on policy, ARX can automatically move "parked" VMDKs to inexpensive storage non-disruptively. Files can also be dynamically moved back to tier 1 storage without impacting users or applications.
- Management of large volumes of files is simplified, enabling multiple, heterogeneous storage systems to be merged into large, shared pools.

6 CHALLENGE: Congested storage network—data pipes can't handle the volume

OS virtualization can dramatically increase data storage traffic, and passing large amounts of data from multiple guests through one host storage network connection, such as NFS, can cause instant bottlenecks, flooding, and congestion.

- Moving large virtual disk images outside the LAN causes extensive delays and floods the much smaller WAN connections.
- Unplanned VM migrations resulting from VM sprawl bring the network to a standstill.

SOLUTION: F5 WANJet® for TCP optimization, data compression, and intelligent byte caching. ARX for automated storage load balancing.

- WANJet accelerates file transfer speed by up to 3x and reduces bandwidth utilization.
- ARX ensures that VMDKs are created on the highest-performing storage source and balances VMDKs across multiple storage sources, eliminating bottlenecks, aggregating capacity, and increasing utilization.

7 CHALLENGE: Management complexity—management tools don't work together

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 delivery unit.

- The hypervisor and the host system are two new components that are not part of existing data center management solutions. It is important to be able to manage these devices and understand their impact on performance.
- Built-in management tools for VM platforms only manage the virtual resources and do not take into account any external information.

SOLUTION: F5 BIG-IP and ARX products help manage the virtual infrastructure by focusing on the application and storage networks. F5 Deployment Guide for VMware helps make BIG-IP LTM become ESX-aware.

- Provides direct integration between BIG-IP LTM with iControl and the VMware VirtualCenter API.
- Enables dynamic provisioning of resources by integrating information from the network and the VMs .
- Create and manage a true Application Delivery Network focused on the applications that run within the VMs.

Learn more about:
F5 Virtualization Solutions: www.f5.com/solutions/virtualization
F5 VMware Partnership: www.f5.com/vmware

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