Data Protection Planning in a Virtual World

According to IDC, 39 percent of new servers deployed over the next five years will be virtual servers[1] and the sprawl of Virtual Machines (VMs) will increase the demands and complexity of data protection. If you haven't already thought about how virtualization affects your backup, business continuity and Disaster Recovery plans, now is the perfect time…

Data Protection Requirements

Server Virtualization affects storage and data protection requirements in four ways:

1. **Consolidation of I/O** - By consolidating many virtual machines (VMs) onto one physical server, the I/O demands on the consolidated server are aggregated and your storage devices need to be able to support higher IOPs and data transfer rates

2. **More Concurrent IOPS and Data Streams** - As more applications are running simultaneously, multi-threaded and multi-pathed storage support is vital for consistent performance and to eliminate bottlenecks

3. **Increased SAN Connectivity** - Virtual server environments are driving growth in SAN connectivity (iSCSI and FC) to support VM mobility, support aggregated I/O and shared SAN devices[2]

4. **Server and Storage Resource Contention** - Many storage applications such as backup are very resource intensive. Running those concurrently across multiple VMs on the same physical server can cause undesired contention for resources

Data Protection Strategies

As VMs consolidate on fewer physical servers, data protection planning in a virtual world becomes more critical. Even though VMs often exist within smaller environments, compared to traditional product implementations, backup is still resource intensive (CPU, memory, network and storage) even if run on a VM. The first thing to remember when planning data protection for virtual servers is that the large number of best practices and policies from traditional physical server data protection still apply to virtual server data protection. However, with VM data protection, you have to ensure that your backup plans anticipate the real resource impact of consolidating many VMs on a single system. Backup is no longer a stand-alone application, affecting only a single server or application. Consolidation of servers provides many benefits, but it also creates some new challenges and this means that each VM backup can have a material affect on the other VMs sharing the same physical server. Data protection planning for VM-based production applications adds a new layer of complexity that needs to be considered carefully as you define your virtual server strategy – what is the impact on other VMs and the physical resources they rely upon?

As you plan your VM data protection strategy, you also need to consider the introduction of the virtual server environment (e.g., VMware ESX, Microsoft Hyper-V, Citrix XenServer, Virtual Iron) and their supporting file systems which are not quite the same as backup in the traditional single OS and physical server environment. The added layer of the virtual server and files system to your environment creates a new set of data protection strategy questions:

1 Worldwide Enterprise Server 2008 Top 10 Predictions Dec. 2007
2 Worldwide Enterprise Server 2008 Top 10 Predictions Dec. 2007

- **Do you back up the core server platform? (ESX, Hyper-V, Xen, VI)**
- **Do you back up the guest OS platform? (Windows, Linux, Solaris)**
- **Do you back up the VM data or the full VM? (File, Snapshots, DBs)**
- **How do you support live data protection of databases? (Hot Online Backup)**
- **What is the impact to my data protection software licensing? (Agent-based vs. Capacity)**
- **Do I need to restore a full VM? If so, how? (BC and DR)**
- **How do I restore individual files to a VM?**
- **How many concurrent backups will be running to support multiple VMs?**
- **How are my VMs protected from a site failure or disaster?**

Fortunately, the answer to these questions can be addressed by looking at the three basic models to support VM data protection:

1. Virtual Server Console Backup: can provide basic file and image backup solutions when the backup is loaded on a virtual server console
2. Virtual Machine-Based: with the backup software and agents loaded on the VMs as if they were actual physical servers
3. Group VM Consolidated Backup: Leverages virtual server-based tools for consolidated or group backup of VMs

The following chart illustrates how the three models are compared:

	Virtual Server Console Backup	VM Machine Based Backup & Agents	Group VM Consolidated Backup
VIRTUAL SERVER PLATFORM SUPPORT			
Impact on virtual server performance	High	High	Med
VM performance impact	High	High	Low
Backup performance impact	Med	Med	High
Same as physical server backup	No	Yes	No
NAS	Yes	Yes	Yes
SAN (FC)	Yes	Yes	Yes
iSCSI	Yes	Yes	Yes
DAS	Yes	Yes	Yes
BACKUP CAPABILITIES			
Easy to install	Yes	Yes	Yes
Full VM backup	Yes	Yes	Yes
Backup individual files from VM disk	No	Yes	Yes
Incremental backups	Yes	Yes	No
Support 3rd party backup agents	No	Yes	No
Backup Guest OS	Yes	Yes	No
Multi-site Data Protection	Yes	Yes	Yes
Live Database backups	No	Yes	No
Live Exchange backups	No	Yes	No
RESTORE CAPABILITIES			
Restore full VM	Yes	No	Yes
Restore individual files to VM disk	No	Yes	Yes
Restore Guest OS	Yes	Yes	No
Live Restore Database	No	Yes	No
Live Restore Exchange	No	Yes	No

End-to-End Data Protection Solutions

With 27 years of data protection expertise, Overland Storage can help optimize data protection solutions for VM environments. We do this in seven ways:

1. **Snap Server for Virtualization Storage** – the Snap Server appliances understand that virtual server environments present unique data protection challenges beyond traditional physical server data protection. Snap Server combines the right-sized software and hardware into reliable, cost-effective storage infrastructure appliances for storage consolidation and disaster recovery with minimal IT overhead.

2. **ULTAMUS RAID for VM I/O Consolidation** – eliminates I/O bottlenecks with multiple 4 Gb/s ports and support for intermixing high performance SAS and low cost, high capacity SATA drives within a single enclosure. Dual active/active controllers with dynamic load balancing provides the ability to support many VM data streams and requests and ensure high availability without compromising performance

3. **ULTAMUS RAID for Reliable and Scalable VM Storage Growth** – is able to provide dynamic online expansion as VMs are added with storage capacities up to 96 TB. Dynamic online expansion, no single point of failure and hot-swap components increase uptime and are crucial as multiple applications require access to a single array.

4. **ULTAMUS RAID for VM Snapshot, Clones and Replication** – the high performance system provides support for leading backup, replication and VM cloning software. This enables better BC and DR for virtual machines and their host virtual server platforms in the data center and at remote hot-sites.

5. **REO VTL with Concurrent Streams for each VM backup** – as the leader in VTL (Virtual Tape Libraries) with the ability to support dozens of concurrent backup streams, REO can be used to optimize VM backup performance, leverage SAN connectivity, reduce virtual server resources and lower data protection costs

6. **REO VTL with Deduplication Reduces VM Backup sizes** – the use of deduplication reduces the amount of data that has to be backed up and reduces the impact of data protection on other VMs running on the shared physical host. This helps optimize your backup licensing and lowers ongoing data protection costs.

7. **NEO Tape Automation, Offsite DR for Every VM** – the use of tape off-site archive is a fundamental requirement for all business critical and regulatory data and NEO delivers this for every VM.

Building a data protection strategy for VMs will require thought and consideration. When you look forward to planning your VM data protection plans, the above items should help you build a solid plan, and understand the overall impact of VM backup to your business.

For more information or guidance on building your virtualization data protection strategy, please see **www.overlandstorage.com** or contact your authorized Overland Storage reseller.