HP’s Virtualization Bundles
Integrate the Virtual Storage Engine

At first blush, server virtualization can be deceptively easy. IT managers can take a handful of less-than-critical applications and consolidate them onto one or a few idle, spare, or underutilized servers. Cobbling together a virtual infrastructure in the lab without the management and other add-ons is a relatively simple and inexpensive proposition. Moving from the lab to production can also be relatively easy when only lower-tier applications are migrated to the virtual infrastructure. The result is low risk/high impact virtualization projects that pay big dividends relative to their initial investment, and that leave IT managers with a strong incentive to virtualize their way up through the application stack.

But as we’ve previously noted,1 after the low-hanging fruit has been harvested, IT managers begin to see that a potentially much larger investment of both time and resources must be made in order to progress through their application inventory toward finally virtualizing their critical business applications. They realize that virtualization projects will need:

- More powerful servers
- Networked storage
- Additional network resources and bandwidth
- New software tools to monitor, visualize, and manage the virtualized IT environment
- Someone to integrate and support all of the above

Not surprisingly, the IT vendor community is now responding to the need to ease the transition from physical to virtual. Here we highlight HP’s approach, the introduction of pre-configured and tested Virtualization Bundles.

1 See our Bridging the Virtual Server Chasm

**Article I. The Significance of HP’s Virtualization Bundles**

On June 2, 2009, HP announced the availability of five turnkey Virtualization Bundles. These range from an essential starter version (Entry Virtualization Bundle) to a multi-rack version (Multi-site High Availability Virtualization Bundle). Each bundle includes:
• VMware vSphere software
• 1-4 HP ProLiant G6 servers
• HP LeftHand P4000 iSCSI-based SAN storage
  or HP LeftHand P4000 Virtual SAN Appliance
  Software (except in the Entry version)
• HP ProCurve Gb Ethernet switch
• Additional memory and processing power via
  optional performance packs

The announcement is essentially an integration of
VMware Infrastructure software with HP systems
and software, including the HP LeftHand SAN.

We view this as significant for three reasons:

IT is Moving from Disaggregation to Aggregation

The IT systems vendors are moving away from
selling disaggregate infrastructure toward the
systematic integration of servers, storage, and
networking gear all packaged together, up to and
including within a single enclosure. The impetus
for this collapsing of infrastructure components
comes from the rampant adoption of server
virtualization within IT organizations of all shapes
and sizes. With VMware, for example, at the core of
an integrated system that includes servers,
networking gear, and storage, an IT administrator
can envision a unified compute infrastructure,
managed by VMware and other “orchestration”
tools, all in support of multiple applications. Cisco,
for example, has touted its Unified Computing
System (UCS). We will see more from other
vendors. Virtualization Bundles are one of HP’s
opening salvos.

IP-based Storage Protocols Will Dominate

Fibre Channel over Ethernet (FCoE) is now
emerging as a datacenter-quality server/storage
interconnect protocol. However, the “venerable”
iSCSI protocol is also establishing a position in the
datacenter on the coattails of server virtualization
projects. Virtualization Bundles include HP
LeftHand Virtual SAN Appliances (VSAs): iSCSI-
based SAN appliances that virtualize and manage
SAS or SATA disk arrays that are inside or directly
attached to servers. Unlike Fibre Channel,
commonly used as a SAN network/protocol, iSCSI
uses ubiquitous Ethernet connections to transport
standard SCSI storage commands between the host
OS and disk. In this case the VSA virtualizes the
presentation of server disks to the host OS running
within each Virtual Machine (VM) under VMware
ESX.

Modular, Virtual Storage Engines Will Proliferate

The HP LeftHand P4000 is a modular, virtual
storage engine that complements server
virtualization with storage virtualization. Other
examples include Dell’s EqualLogic, which is also
iSCSI-based, and Hitachi’s USP-VM which is FC-
based and OEM’d by HP and Sun. Modularity is
key to the desirability of these virtual storage
engines within the context of unified compute
infrastructures.

Article II.Two Target Markets

HP is targeting two distinct markets with its
virtualization bundles—SMB and enterprise. Each
has different sets of requirements and points of
entry. Two “Entry” configurations and one
“Scalable HA” configuration are aimed at the SMB
segment, where HP anticipates that users will be
satisfied with basic VMware ESX functionality,
either with or without a failover capability, and/or
with limited ability to scale the configuration’s
performance and capacity over time. Call the Basic
configurations “instant VMware” if you like. In
SMB, the points of entry are normally IT
generalists who support both the applications and
the systems environments.

In contrast, two more advanced configurations—
Advanced HA and Multi-site HA—are aimed at
medium-to-large scale enterprises with a need for
advanced VMware and management functionality,
up to and including multi-site support. The point of
entry in this enterprise segment is assumed to be
server managers within the IT organization
understand the nature of critical application
migrations from the physical server world to
VMware where predictability and user
transparency is essential. Typically, these managers are more specialized, but nonetheless more familiar with VMware—and with the uncertainty and complexity in building, testing, and qualifying a virtualization configuration with regard to processing power, memory, switch ports, and storage. They should see significant value in a bundle where HP has pre-integrated, pre-configured, and tested to assure that a given workload can be supported and business objectives can be achieved.

**SMB-targeted Virtualization Bundles**

**Entry** – For those just starting a VMware implementation, the Entry bundle is designed to support from two to five applications under VMware Essentials, where significant growth is not anticipated, and where high availability (at least in the classical multi-system failover sense) is not a requirement. In this configuration, internal server storage is not virtualized. The Entry bundle can be upgraded with the addition of a second quad core CPU, 12GB RAM and 512MB of battery-backed write cache (BBWC).

**Entry HA** – The Entry High Availability (HA) bundle adds failover capability and a virtualized

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**Table 1: SMB-targeted Bundles**

<table>
<thead>
<tr>
<th></th>
<th>Entry</th>
<th>Entry HA</th>
<th>Scalable HA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Storage</strong></td>
<td>1.4 TB Internal</td>
<td>(2) P4000 VSA licenses to pool server disks as virtual SANs</td>
<td>P4300 SAS SAN (4.8 TB)</td>
</tr>
<tr>
<td><strong>Networking</strong></td>
<td>ProCurve 2510G-24 Switch</td>
<td>ProCurve 2910al-24G Switch</td>
<td></td>
</tr>
<tr>
<td><strong>Virtualization Software</strong></td>
<td>vSphere Essentials</td>
<td>vSphere Essentials Plus</td>
<td>(2) vSphere Standard vCenter Foundation</td>
</tr>
</tbody>
</table>

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2 Some loss in performance using a “virtual” SAN can be expected depending on a number of factors. HP advises that a VSA running in a vSphere ESX host will show 90% of random read performance, and 70% sequential read performance vs. a physical P4000 series SAN. The standard “mileage may vary” caveat applies here. Contact HP for more information.
Insight Control Environment (ICE) for more extensive system management capabilities.

**Enterprise-targeted Bundles**

Advanced HA and Multi-site DR configurations leverage the integration of vSphere Advanced with HP P4300 SANs. The P4000 storage products in these bundles represent storage clusters and can reside in physically separate systems. Stored data blocks are automatically replicated upon writes to disk among all storage nodes in a cluster, allowing data blocks to be stored in at least two different locations. These locations can be within the same building or remote locations. In the event of a datacenter failure for example, P4000 systems provide continuous data availability while VMware moves applications to a working system, either on-site or at a remote location.

The **Advanced HA** Bundle is configured for customers who don’t have the ability to implement at least one additional vSphere system at a remote location, but need the features included in vSphere Advanced HA. Hardware-wise, it includes everything in the Scalable HA Bundle does, but swaps the ProCurve switch with a beefier model. The **Multi-site HA** Bundle essentially duplicates the Advanced HA bundle, yielding a turnkey vSphere system with off-site business continuance.

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**Table 2:Enterprise-targeted Bundles**

<table>
<thead>
<tr>
<th></th>
<th>Advanced HA</th>
<th>Multi-site HA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System</strong></td>
<td>(3) ProLiant DL380 G6 Servers:      Quad core CPU</td>
<td>(4) ProLiant DL380 G6 Servers:      Quad core CPU</td>
</tr>
<tr>
<td></td>
<td>12 GB RAM</td>
<td>12 GB RAM</td>
</tr>
<tr>
<td></td>
<td>(2) SAS LFF Disk</td>
<td>(2) SAS SFF Disk</td>
</tr>
<tr>
<td></td>
<td>HP Integrated Lights out Server Management Advanced</td>
<td>HP Integrated Lights out Server Management Advanced</td>
</tr>
<tr>
<td></td>
<td>HP Insight Control Management</td>
<td>HP Insight Control Management</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>P4300 SAS SAN (4.8 TB)</td>
<td>(2) P4300 SAS SAN (4.8 TB each)</td>
</tr>
<tr>
<td></td>
<td>ProCurve 6600-48G Switch</td>
<td>ProCurve 6600-48G Switch</td>
</tr>
<tr>
<td><strong>Virtualization Software</strong></td>
<td>(2) vSphere Advanced</td>
<td>(4) vSphere Advanced</td>
</tr>
</tbody>
</table>

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**Article III. HP LeftHand Networks P4000: The Foundation Storage Engine**

LeftHand Networks, founded in 1999, was acquired by HP in 2008. LeftHand was instrumental in bringing SANs based on the iSCSI protocol to market. By the time it was acquired by HP, it had over 9,000 customers and had formed a close relationship with VMware that resulted in producing the first virtual storage appliance to be included in VMware’s SAN/Storage Hardware Compatibility List. LeftHand also worked with VMware to establish VMware’s Infrastructure Acceleration Kits, a concept that is now being extended with HP’s Virtualization Bundles.

A major contributor to the value of what HP offers in these bundles is the fact that the requirement for acquiring, integrating and testing external SAN storage can be avoided. The perceived need on the part of the IT administrator to replace internal server-based storage with an external SAN is often a major consideration that can complicate a VMware deployment. This statement is particularly true of small and medium business IT managers who may be unfamiliar with SAN technologies and concepts, and who may have been avoiding Fibre Channel SANs for both cost and skills reasons. Integrating P4000 series storage also eliminates the need to implement and support two physical SANs when establishing a business.
continuance-capable VMware configuration, as exemplified by the Mulit-site HA Bundle.

As mentioned earlier, HP LeftHand VSAs are clustered to form a single virtual storage pool available to all VMs within the configuration. VSA software can run within a vSphere ESX host and use internal rack-mounted server disk to form the iSCSI SAN as in the Entry HA Bundle (see graphic below), or be implemented in a separate storage enclosure as is seen in the Scalable, Advanced, and Multi-Site HA Bundles.

The result is a pre-integrated and tested internal iSCSI SAN that offers the functionality for VMware features that are required to support applications and systems high availability and business continuance requirements including:

- VMotion—Live Migration
- VMware HA
- VMware FT

New storage features introduced to the market in vSphere 4.0 and now supported by the P4000 series include:

- Virtual Disk Thin Provisioning
- Dynamic Expansion of VMFS Volumes
- Enhanced Storage vMotion
- VMDirectPath I/O

Article IV. Functionality Specific to the P4000 Storage Engine vs. vSphere

Prior to the acquisition by HP, LeftHand had built a number of advanced storage and data management functions—including thin provisioning, advanced replication and snapshots, and I/O bandwidth management—into its P4000 series. These features not only remain functional within the HP Virtualization bundles, in most cases they enhance VMware’s overall capabilities. On the surface however, IT managers may perceive some overlap.

This can be seen, for example, in both vendors’ implementing thin provisioning, a function that can greatly increase storage utilization by allowing managers to automatically deploy storage capacity on an as-needed basis. This avoids the need to reserve unused storage capacity. vSphere now includes Virtual Disk Thin Provisioning at the server level. P4000s also support thin provisioning, but at the storage array level. Is there a conflict? Not really. Both VMware and HP’s functions can work in conjunction with one another. However, IT managers must first understand how both forms of thin provisioning work before moving forward. This statement is also true for other storage and data management features available in both vSphere and the P4000 series including snapshot copy, local and remote data copy, and server/storage I/O. We suggest consulting with HP and VMware on this issue to understand the best ways to implement these features for a given set of applications and environmental conditions.

Article V. Conclusion

Moving applications across the physical-to-virtual chasm can be a daunting task, once IT managers understand all of the requirements for server virtualization projects. In addition, once applications are migrated there’s no easy turning back. Once an application is moved to the virtual world, there it will stay unless there’s some very pressing reason—such as performance is compromised and users insist on returning it to the physical server world. Such situations should be avoided at all reasonable cost because one may not
be able to virtualize that application again. Virtualization induces permanent changes in the way IT functions. That’s another one of the reasons IT managers stop short as they virtualize their way through the application inventory.

For these and other reasons, HP’s Virtualization Bundles address a significant need to make the server virtualization process as simple and predictable as possible—a need felt by both first time VMware users and seasoned veterans.

Going forward, we note that virtualization is a key enabler of adaptive and cloud based computing. Virtualization “encapsulates” applications, allowing them to be easily introduced into cloud architectures, and allowing them behave fluidly within a physical infrastructure. It is easier to provision and scale hardware resources non-disruptively in a virtualized environment—a fundamental attribute of cloud computing. We expect to see HP market Virtualization Bundles in the context of cloud computing as well.