ESG Lab Review

3PAR Autonomic Groups

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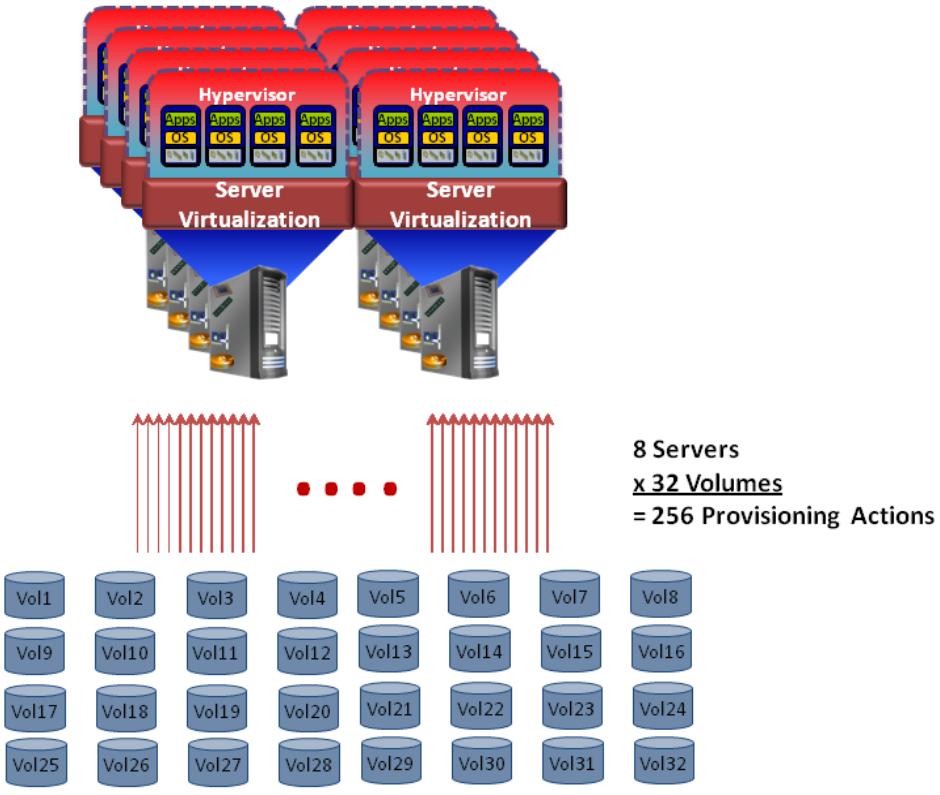
Abstract: *This ESG Lab review documents hands-on testing of 3PAR Autonomic Groups in a clustered VMware environment—paying special attention to ease of provisioning and management.*

The Challenges

The utility computing, or virtual data center, model has been gaining popularity based on its promise to reduce the inefficiencies of mainframe and client-server data center models. This new data center model is built on system and storage virtualization, automation, and clustering to provide cost effective solutions to the challenges associated with traditional technologies.

Server virtualization simplifies the virtual data center, making it more responsive by reducing the number of physical hosts, but it results in proliferation of logical hosts that intensifies pre-existing storage provisioning complexity. Traditional SAN attached storage provisioning methods, which have roots in the mainframe/client-server data center paradigm, are not well suited for applications running on virtual servers that can move at will within and outside of the physical data center. An illustrative example is shown in Figure 1.

Figure 1. Traditional Provisioning



The goal of ESG Lab reports is to educate IT professionals about emerging technologies and products in the storage, data management and information security industries. ESG Lab reports are not meant to replace the evaluation process that should be conducted before making purchasing decisions, but rather to provide insight into these emerging technologies. Our objective is to go over some of the more valuable feature/functions of products, show how they can be used to solve real customer problems and identify any areas needing improvement. ESG Lab's expert third-party perspective is based on our own hands-on testing as well as on interviews with customers who use these products in production environments. This ESG Lab report was sponsored by 3PAR.

As seen in Figure 1, a group of eight physical servers hosting four virtual servers with one data volume each would require provisioning each of the 32 data volumes to all eight physical servers before performing the raw device mapping of each data volume to the owning virtual server. This is required to fully take advantage of server availability and mobility in the virtualized environment. Using traditional provisioning, this would require 256 discrete provisioning actions, not including volume creation or configuring multiple paths to volumes for HA. This manual process is cumbersome and error prone as administrators must keep track of host, volume, and LUN identifiers and their relationships as they provision. In ESG's experience, this represents a very common scenario: most organizations utilizing server virtualization have many more physical and virtual servers in their environments than shown in this example.

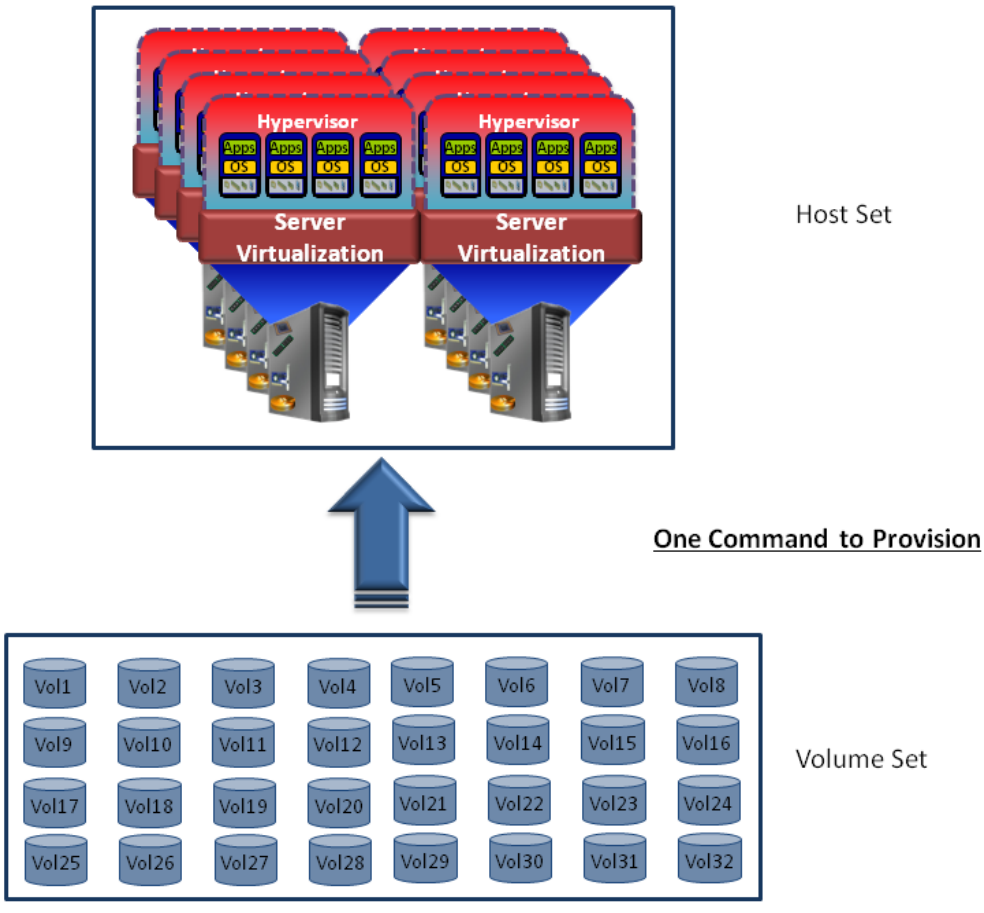
The Solution: 3PAR Autonomic Groups

The 3PAR InServ Storage Server is a highly virtualized tiered storage array designed and built for utility computing. A 3PAR storage server is an extremely easy to manage utility-class storage system as it provides cost-effective scalability and reduces the cost of capacity, power, and cooling, as well as reducing data center floor space requirements. ESG Lab examined the InServ storage platform in detail in 2008.[1]

3PAR Autonomic Groups is new software designed to enhance datacenter agility and efficiency when provisioning storage with 3PAR's InServ Storage Servers. Building on the foundation of 3PAR Rapid Provisioning, 3PAR Autonomic Groups enables users to simplify, automate, and expedite the storage provisioning process in clustered and virtual server environments.

Looking at our example of eight physical servers with 32 virtual servers, 3PAR Autonomic groups condenses the provisioning action down to one command, presenting all volumes in a set to all hosts in a set as seen in Figure 2.

Figure 2. 3PAR Autonomic Groups



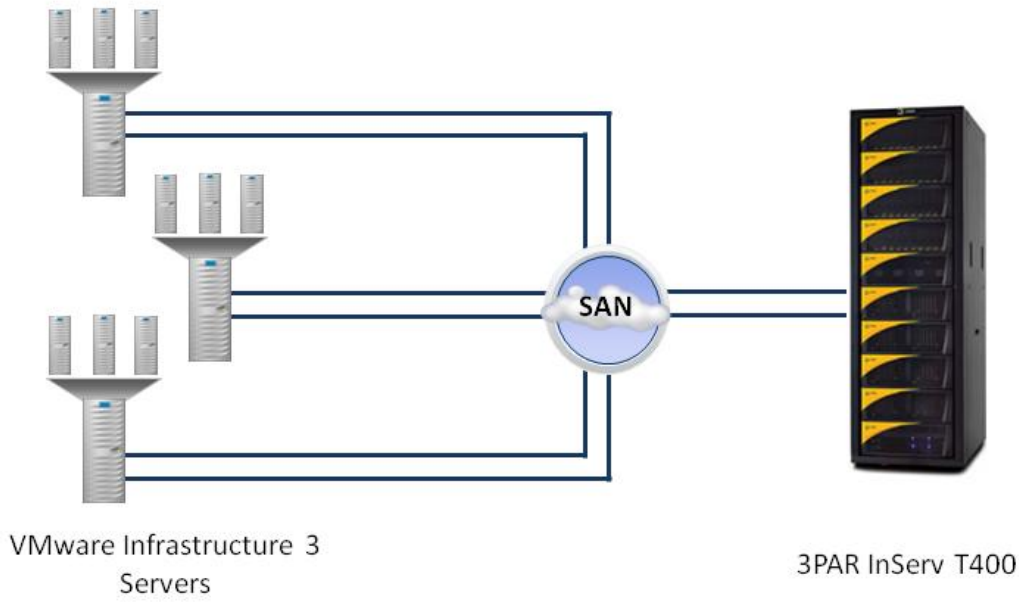
[1] See: ESG Lab Validation Report, *3PAR 3cV - Virtual Utility Computing*, November 2008.

Autonomic Groups also increase the agility of virtual datacenter environments since changes are handled autonomically at a sub-system level, without any intervention from administrators. When a new host is added to a group, all volumes are simultaneously exported to the new host. When a host is removed, all exports are deleted. Likewise, when a new volume is added to or removed from a volume group, that volume is also exported to or removed from all hosts in the host group at the same time, with no intervention required.

ESG Lab Tested

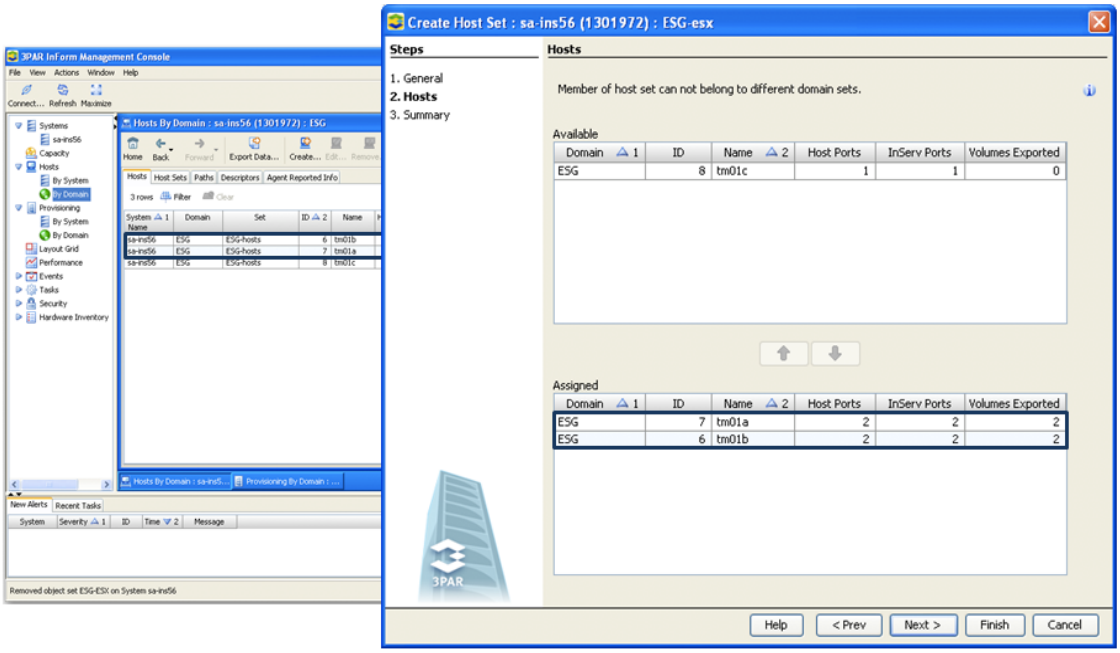
ESG lab testing was performed using the pre-wired test bed shown in Figure 3. Three Dell l1950 servers were connected through a Fibre Channel SAN to a 3PAR InServ T400 array. The 3PAR T400 was configured with two controllers and 240 146 GB 15K RPM FC disk drives. Each Dell server was pre-installed with VMware Infrastructure 3 and three Windows 2003 virtual machines.

Figure 3. *3PAR Autonomic GroupsTest Bed*



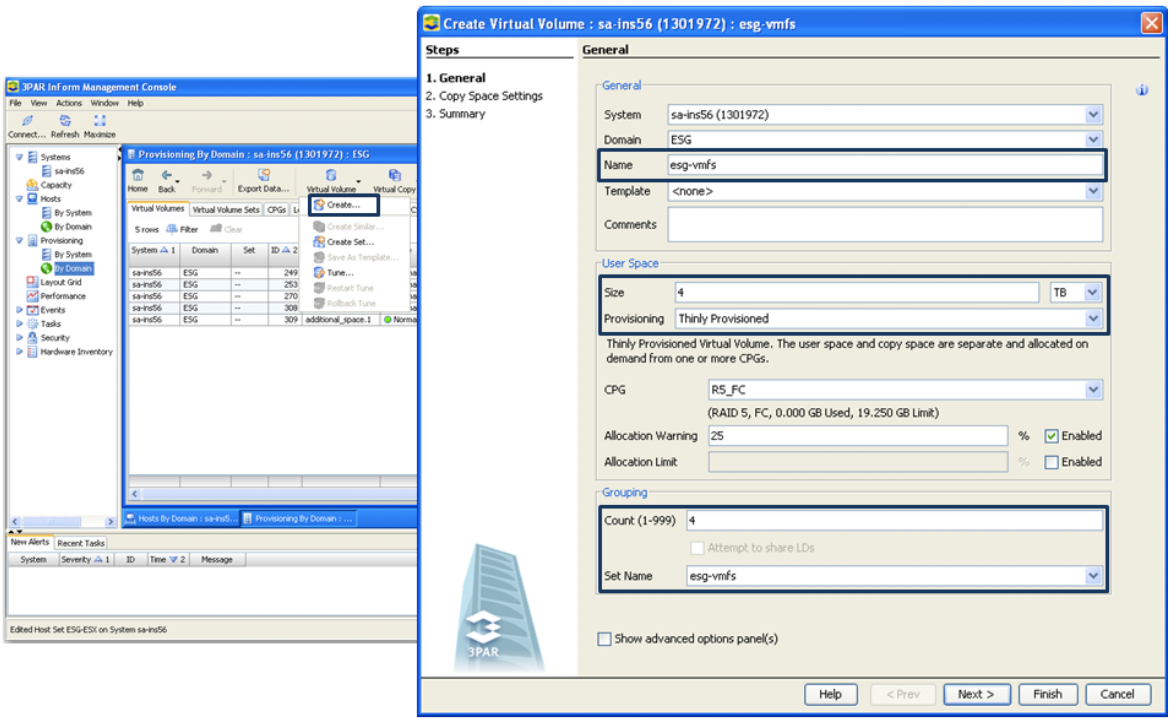
To test Autonomic Groups, ESG Lab first created a host set using the InServ Management console as seen in Figure 4. From the Host provisioning screen, a single click launched the Create Host Set dialog. After specifying a name for the set (ESG-esx) and selecting the hosts to include from a list, ESG Lab clicked 'Finish,' creating a host group in seconds.

Figure 4. Configuring 3PAR Autonomic Groups: Host Set



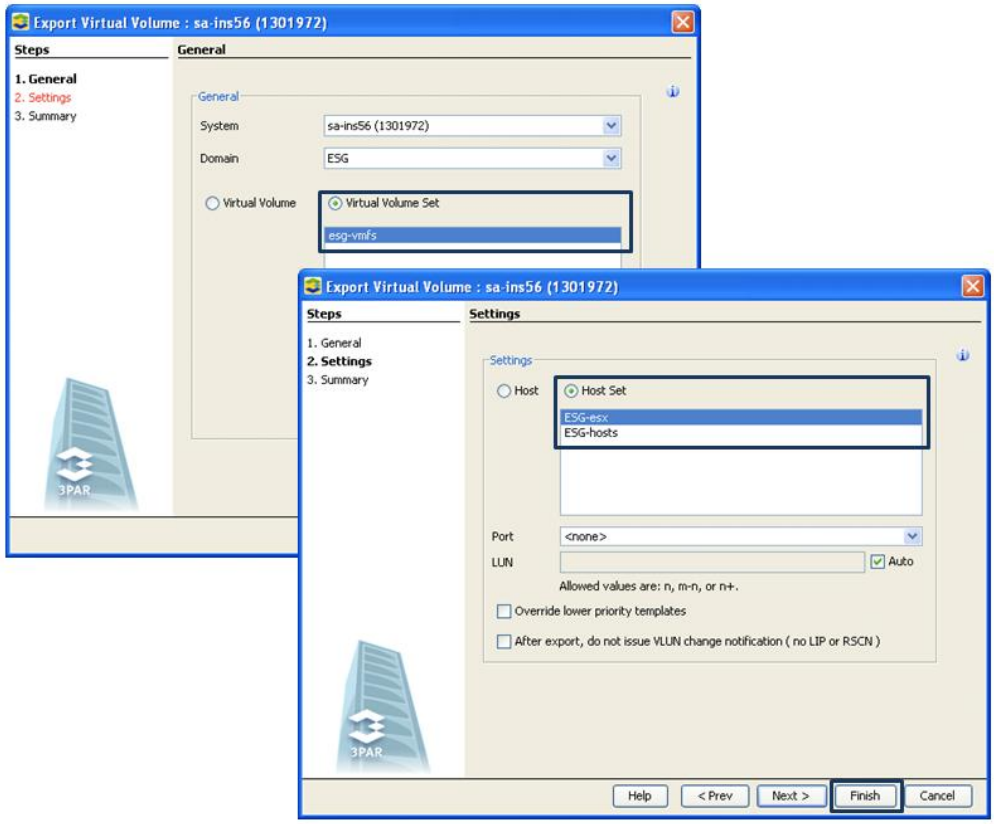
Next, a group of volumes to be used by the virtual servers was created. ESG Lab clicked 'Virtual Volume,' then selected 'Create' from the drop down list. In the Create Virtual Volume dialog, the volume name, size, quantity, and set name(esg-vmfs) were specified as seen in Figure 5. Thin provisioning, the default for new volumes, was enabled. Creating the volumes and placing them in a group was completed in one operation and took less than a minute.

Figure 5. Configuring 3PAR Autonomic Groups: Virtual Volume Set



Finally, the volume set was exported to the host set using the simple dialog seen in Figure 6. When ESG Lab clicked 'Finish,' the volume set and host set were assigned to the same group and every volume was exported to every host on every attached path automatically and without further intervention.

Figure 6. Configuring 3PAR Autonomic Groups: Exporting the Virtual Volume Set



ESG Lab confirmed that the volumes were visible to each of the physical and virtual servers using the ESX administration console and Windows Disk Administrator. The entire process of creating multiple volumes and assigning them to multiple virtual servers on multiple paths took less than two minutes. This same procedure could be used to create dozens or hundreds of volumes for dozens or hundreds of servers just as easily. This entire procedure was repeated using the InServ command line utility and found to be even faster as multiple GUI dialogs were condensed into single commands. ESG Lab also removed volumes from the volume set and confirmed that the exports were automatically removed from all hosts.

Why This Matters

Provisioning SAN-attached clusters of servers to a virtual pool of storage is complex and difficult using traditional methods. Time and money is wasted and errors are likely as administrators manually configure each path for each host and volume. In the best case, errors are discovered and corrected when an application can't find the storage it needs. In the worst case, silently mis-configured HA leaves an organization vulnerable to a hardware failure.

3PAR Autonomic Groups saves time and money as it increases efficiency and reduces risk. ESG Lab found that 3PAR Autonomic Groups allowed a group of virtual servers to be seamlessly provisioned with storage using a simple, repeatable procedure. ESG lab used 3PAR Autonomic Groups to create and export volumes to multiple virtual servers with one command nearly instantly and with no manual configuration required.

The Bigger Truth

Server virtualization is being deployed by a large and growing number of organizations with the ambitious, parallel goals of lowered costs, improved resource utilization, non-disruptive upgrades, and increased availability. Each of these benefits is fundamentally enabled by decoupling servers, applications, and data from specific physical assets. Storage virtualization takes those very same benefits and extends them from servers to the underlying storage domain—bringing IT organizations one step closer to the ideal of a completely virtualized IT infrastructure.

IT teams are feeling significant pressure to more effectively support the business, increase asset utilization, and improve information management and security—all while holding down costs across the board. Recent ESG research indicates that a majority of organizations are making significant commitments to server and storage virtualization in the hopes of improving the performance, cost-effectiveness, and utilization of IT resources.

3PAR has been providing easy to use, highly virtualized utility storage since 2002 to serve as the foundation of a utility computing ecosystem. 3PAR architected its platform to work in unison with server virtualization technologies to create a complete utility computing environment. 3PAR's Autonomic Groups functionality is an intuitive and valuable extension to the already extremely easy to set up and manage InServ platform.

ESG has interviewed dozens of IT managers that have embraced virtual server clustering technology who have confirmed that traditional provisioning methods have gotten too complex in clustered virtual server environments. ESG has confirmed that within environments with a large number of servers in a cluster (8 or more) attached to a large pool of shared SAN storage (10TB or more); traditional provisioning methods can take hours.

Many traditional storage vendors have tried to address this added complexity by layering wizards over traditional provisioning methodologies. ESG Lab's hands-on testing has confirmed that 3PAR has developed a solution that can not only reduce provisioning time by up to 90% as compared to traditional storage systems that use wizards, but which works with any high-availability cluster, database cluster, or virtual server environment.

The total time elapsed from the first click on the InServ Management console to fully provisioned and exported storage to our ESX server farm was less than two minutes. This elapsed time included server set configuration, storage provisioning, and export of all volumes to all servers on multiple paths. ESG Lab was quite impressed with the straightforward and intuitive methodology of the solution.

ESG Lab hands-on testing has confirmed that 3PAR Autonomic Groups brings efficient storage provisioning to the virtual data center. Autonomic Groups reduces the opportunity for human error, making the provisioning process not only faster but more reliable. Provisioning 3PAR storage with Autonomic Groups in clustered virtual server environments increases the efficiency and agility of IT while reducing risk to the business.