Backup Strategies with Scale Computing’s HC3® System

Redundancy and Failover

When infrastructure (server or storage) fails in a traditional, physical environment, there is typically resulting downtime while a complex and lengthy recovery from backups is reconstituted. In most cases, this requires time obtaining and setting up identical replacement hardware, then additional time to recover the operating system, applications and data from the backups.

With HC3, hardware failures, including the failure of disks or even entire HC3 nodes, are handled automatically with little or no disruption to the workloads running on the system. HC3 simply continues to operate with less capacity until replacement hardware (which can be of a different type) arrives and is added to the system.

In cases where applications need to be recovered from backup due to logical corruptions or human error, HC3 VM’s are abstracted from the physical hardware meaning that you can restore that VM to any HC3 system, even a different cluster at a different location. The HC3 system also includes built-in snapshot capability that can be used to protect and restore applications running on HC3 VM’s to a previous point in time. If you have multiple HC3 systems, current data plus historical snapshots can be replicated automatically to the remote cluster providing that same recovery capability using off-site data.

How to Backup HC3 VMs

To develop a backup strategy, you must first establish your Disaster Recovery needs on a VM/Application basis. Questions to answer in developing a backup strategy:

- What is your Recovery Time Objective (RTO) per VM/Application? How quickly do you need to recover your data? Do you require failover in minutes or traditional restore time?
  - The Recovery Time Objective (RTO) is the duration of time in which a VM or Application must be restored after a disaster.
- What is your Recovery Point Objective (RPO) per VM/Application? Are you okay with crash consistent VMs?
  - The Recovery Point Objective (RPO) is the maximum tolerable period in which data might be lost from an IT service due to a major incident.
- What is your bandwidth between sites? How often does the data change?
  - Having the right bandwidth in place is critical to the transfer of data from site to site.

Low RTO/RPO, Agentless, Built-in to HC3:
HC3’s built-in, cluster-to-cluster replication works by replicating selected VMs to a remote cluster on a continuous basis (often as little as every 5 minutes) depending on the change rate of your data and bandwidth between sites. From the remote cluster any VM or VM snapshot can be “restored” and started in seconds with just a few clicks. This option is appropriate for those Virtual Machines who have a Low RTO (minutes of recovery time) and is often used as a supplement to the alternatives outlined in the rest of this document. Because HC3 VM replication also replicates any point in time snapshots, historical data is also available to be restored from either the primary local cluster or the remote target cluster providing an additional level of built-in backup and roll-back capabilities.
Average RTO/RPO, Historical Retention, Granular File / Object Recovery:

HC3 Virtual Machines can be backed up using virtually any 3rd party backup software that supports the guest operating system and applications running on HC3. If you are migrating an existing physical machine to a VM, you likely do not need to change your backup strategy at all as the backup agent will be migrated with the OS, applications and data.

3rd party backup agents for OS’s and applications can be loaded into the HC3 guest operating system allowing them to be backed up over the network the same way a physical server would be backed up and with the same type of recovery options available. In most cases, using application aware in-guest backup agents is the best way to accomplish granular recovery of individual files or application objects such as mailboxes or individual databases.

Backup products that support full system backup and recovery (aka bare metal recovery), can restore an entire virtual machine to a previously backed up state by re-creating an “empty” virtual machine and booting that VM using that products bare metal recovery process, which is usually a recovery CD/DVD image (ISO file) or PXE server. Examples of products with such capability include Unitrends Enterprise Backup, Dell AppAssure, Symantec System Recovery (also available with BackupExec), Acronis True Image and many others. In addition, recent versions of Windows include their own built in backup and recovery tools that can be used inside each VM to meet backup and recovery needs.

Some HC3 customers also use the built in “import / export” function of HC3 to provide additional full VM backup and recovery. The export function allows you to specify a SMB file share such as a NAS or windows server, takes a snapshot of the running HC3 VM and then creates a full copy of that snapshot to that SMB file share. Those files can then be later used to “import” that VM and all of it’s data files and configuration back into the same or a different HC3 cluster.
Low RTO/RPO, Automatic Failover, Heterogeneous VM Replication:

For workloads that require a low RTO and RPO across different types of virtualization platforms, products such as HC3’s Availability powered by Double-Take give users immediate recovery from any system outage by continuously capturing changes as they happen and replicating those changes to one or more servers at any locations, locally or globally. This provides near-zero data loss for full-server failover in minutes. This tool can also be used to replicate backup virtual machines running in a non-HC3 environment (running on VMware, Hyper-V, etc.) to or from an HC3 system. While HC3 Availability software loads inside guest Windows and Linux VM’s, I can be purchased cost effectively based on the number of HC3 nodes and Virtual Host Servers to protect an unlimited number of virtual machines.

Scale Computing offers services and Application Notes (found on the partner and customer portal) that can help users through the implementation of the majority of options outlined in this document.