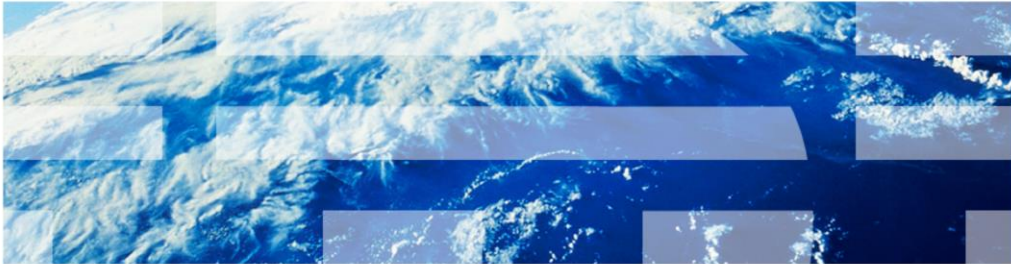


Tivoli Storage Manager 6.2

Hyper-V backups



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Welcome to the IBM Education Assistant module for Tivoli Storage Manager version 6.2 Hyper-V backups.

Assumptions

You are familiar with Tivoli Storage Manager version 5.5 or higher

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Objectives

When you complete this module, you can perform the following tasks

- Explain the Microsoft Hyper-V full guest backup process
- Describe the Tivoli Storage Manager Hyper-V guest backup and restore

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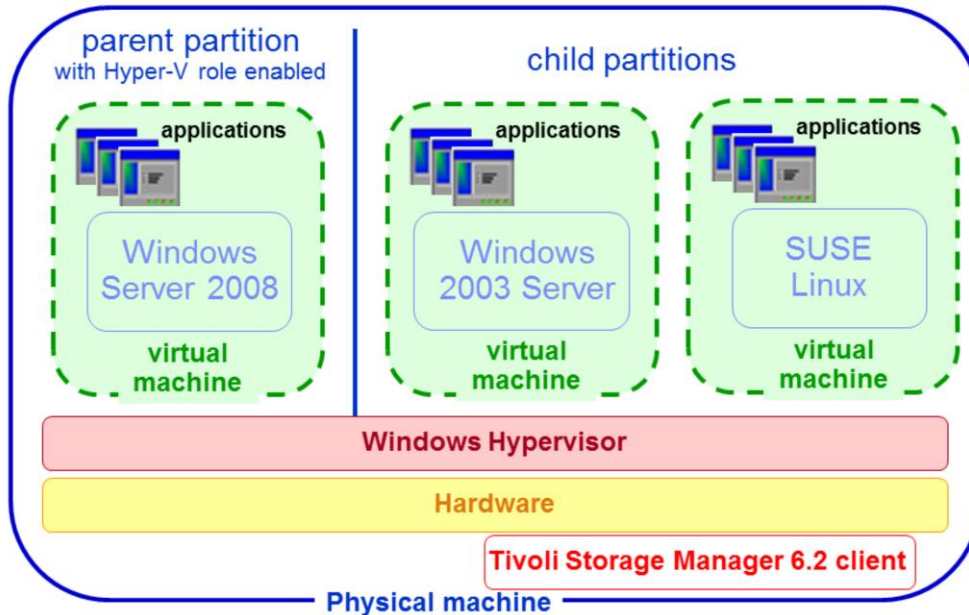
Microsoft Hyper-V full guest backup

Tivoli Storage Manager Hyper-V guest backup and restore

- Only full guest virtual machine has support (no visibility to individual files within the guest)
- Guest virtual machine is basically a single entity (a large **.vhd** file with a few supporting files) that can be backed up from the host operating system if the guest virtual machine is shut down
- Tivoli Storage Manager communicates with the Hyper-V Volume Shadow Copy Service (VSS) writer interface

The latest addition to the Tivoli Storage Manager virtual machine backup capabilities is the backup and restore of Microsoft's Hyper-V virtual machine. This is a full virtual machine backup, using Volume Shadow Copy Service, or VSS, to create a snapshot. You use VSS to create a snapshot of the running guest virtual machine. Tivoli Storage Manager sends commands to a Hyper-V VSS writer interface. The writer propagates the requests to all internal VSS writers (Exchange, SQL-Server, and more). Tivoli Storage Manager does not interact with the internal writers directly. This ensures the integrity of the guest virtual machine and all internal VSS applications. A Windows Server 2008 Core installation has a limited subset of functions. You can include the Hyper-V role but not the graphical interface, so you have command-line administration only. The Tivoli Storage Manager command-line client supports the Server Core implementations, including Hyper-V functions. Windows VSS is used for creating snapshots of the Hyper-V guest virtual machine while they run. The Tivoli Storage Manager Hyper-V support is built on top of the existing Tivoli Storage Manager VSS support. The VSS snapshot awareness is propagated to applications, such as Exchange within the guest virtual machine.

Microsoft Hyper-V overview



5

Hyper-V backups

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The Hypervisor layer is an interface to hardware. It is isolated from all other layers, such as virtual machines (VM), and base operating systems. The base Windows Server 2008 operating system, known as the parent partition, has the Hyper-V role enabled. The guest virtual machine operating systems, known as the child partitions, can be Windows operating system (both 64 and 32 bit) and Linux. The virtual machines do not share memory, therefore, do not corrupt other VM or base operating systems on Windows 2008. With the Server Core Installation option, you have a command-line interface only. There is no Hyper-V GUI. It is more secure and has less overhead for the Windows 2008 parent partition. The Cluster Shared Volumes (CSV) option for Windows Server 2008 R2, has a clustered environment that all nodes access the CSV simultaneously. The environment allows for live migration to standby node without downtime for virtual machines, using a failover cluster. With this option, volumes are mounted as mount points. The Cluster Shared Volumes are supported only with the Hyper-V role. Tivoli Storage Manager's implementation of VSS is enhanced to support Hyper-V guest virtual machine backup where Cluster Shared Volumes are involved.

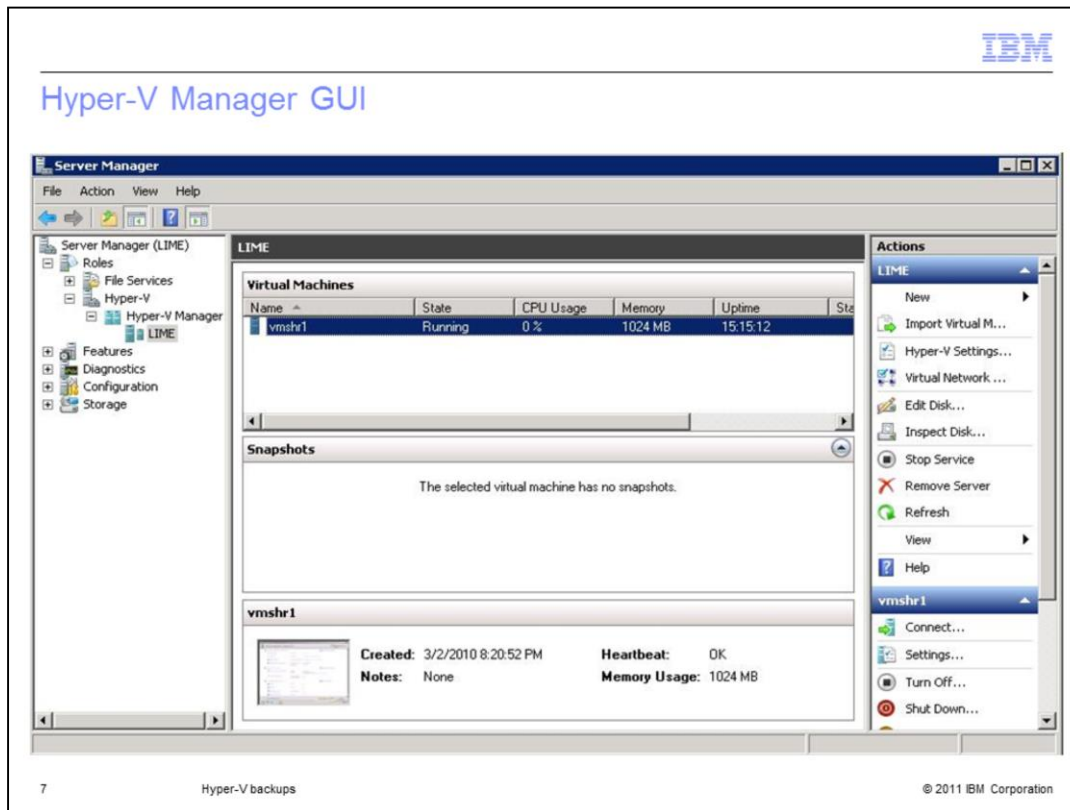
Overview of Tivoli Storage Manager role

- Backup and restore of Microsoft Hyper-V guest virtual machines (VMs)
 - Use of Volume Shadow Copy Service (VSS) snapshots
 - Snapshot that contains the entire virtual machine (all files that are used for defining the VM)
 - Snapshot that is stored by using the grouping feature of the Tivoli Storage Manager
 - Support for typical Tivoli Storage Manager versioning of the backups
- Capabilities
 - Backing up and restoring of VMs from the base Windows 2008 operating system
 - One install of the Tivoli Storage Manager client on a physical machine
 - No requirement for Tivoli Storage Manager client to be installed on the VMs
 - Hyper-V VSS writer control of the backup of the resources of the VMs
 - Taking of a VSS snapshot of the VM (if possible)
 - No disruption of service on the VM if a VSS snapshot occurs
 - Graphical user interface (GUI)
 - Support for Microsoft's newest technology
- Usage

Disaster recovery of Hyper-V VMs. Hyper-V provides local machine backup and restore snapshot capability

With Tivoli Storage Manager 6.2, you can back up your Hyper-V virtual machines with or without using the Hyper-V GUI. The backup is like a Tivoli Storage Manager node data snapshot backup that you obtain by using Volume Shadow Copy Service. When backing up a Hyper-V virtual machine, the Hyper-V VSS writer controls the backup to Tivoli Storage Manager. You need to have only one Tivoli Storage Manager client installed on each physical machine, not on the virtual machines. The Hyper-V graphical user interface is a separately installed component.

Hyper-V Manager GUI



The slide shows a screen capture of the Hyper-V GUI. The left side has a navigation tree. When a role is selected, the center pane displays the virtual machines for that role. The right pane has actions that you can take to manage your Hyper-V virtual machines.

Microsoft Hyper-V software requirements

- Windows Server 2008 (or R2) 64-bit versions
 - Hyper-V role must be added or installed when installing Windows 2008
 - Windows Server 2008 Core installation is supported
- Tivoli Storage Manager v6.2 Client required
No changes to Tivoli Storage Manager Server needed for supporting Hyper-V
- Microsoft VSS services must be running (normal condition)
 - Microsoft Hyper-V VSS writer
 - Microsoft VSS Standard System provider
 - Tivoli Storage Manager Client acts as a VSS requestor
- Other considerations (installation)
[technet.microsoft.com/en-us/library/ee344837\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/ee344837(WS.10).aspx)

To back up Microsoft Hyper-V virtual machines, you need Windows Server 2008 with the Hyper-V role added and Microsoft VSS services running. You also need the Tivoli Storage Manager 6.2 backup-archive client installed on the physical machine. The Microsoft installation guides have more details.

Microsoft Hyper-V hardware requirements

- 64-bit processor required
Not available for 32-bit or Itanium processors
- Multi-core processor (for examples, dual-core or quad-core)
- Hardware assisted virtualization, BIOS-enabled
 - Intel processors: Intel Virtualization Technology (Intel-VT)
 - AMD processors: AMD Virtualization Technology (AMD-V)
- Data Execution Prevention (DEP), BIOS-enabled
 - Intel processors: XD bit (execute disable)
 - AMD processors: NX bit (no execute)
- Windows Server catalog at go.microsoft.com/fwlink/?LinkId=111228
 - Availability of Hyper-V as additional search parameter
 - Other machines that are usable, but not certified
- Other hardware considerations (memory, network, and more)
[technet.microsoft.com/en-us/library/cc816844\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc816844(WS.10).aspx)

The physical machine must have a 64-bit, multi-core processor with hardware-assisted virtualization enabled. Refer to the Microsoft installation guides for more details.

Tivoli Storage Manager client actions

- Tivoli Storage Manager Command Line Client:
 - New options are `VMBACKUPTYPE=HYPERVFULL` on the `QUERY VM`, `BACKUP VM`, and `RESTORE VM` commands
 - These commands are originally introduced to support VMware. Parameters that are not applicable are disallowed
- Tivoli Storage Manager GUI Client:
 - When the GUI client detects that it is running on a Hyper-V server, the GUI displays a list of Hyper-V guest virtual machines that can be backed up or restored
 - Tivoli Storage Manager backs up or restores all files that are associated with a guest virtual machine. Tivoli Storage Manager server uses the file grouping function to maintain integrity of the guest files
 - Hyper-V guest virtual machine backups can create versions
 - Multiple guest virtual machines can be restored. For example, all the guest virtual machines for particular host are stored under one node name

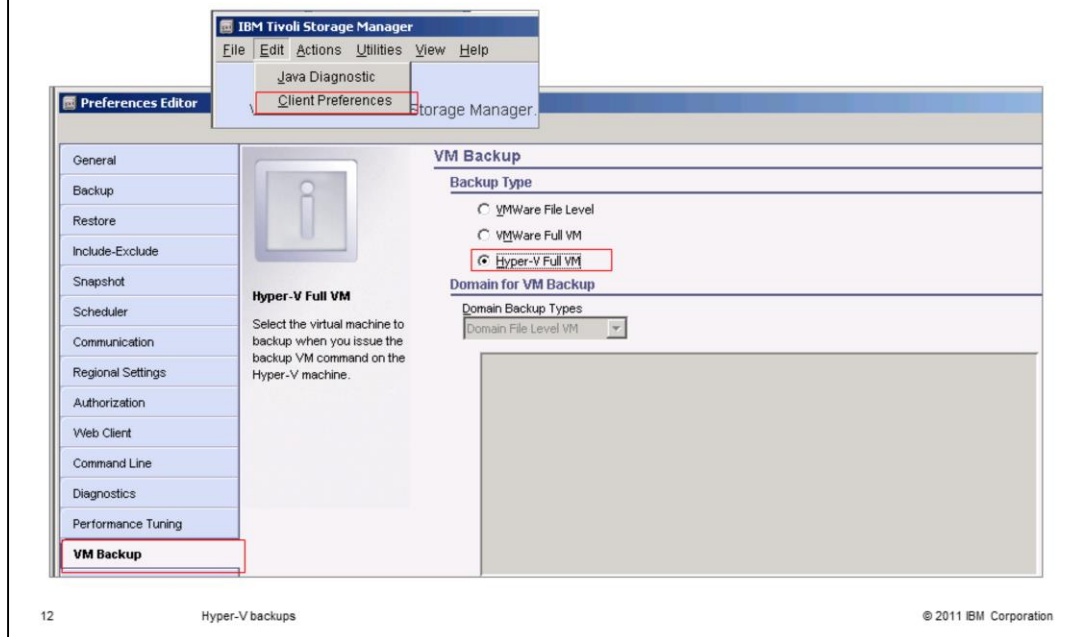
The Tivoli Storage Manager backup-archive client is enhanced to support the backup and restore of Hyper-V guest virtual machines. The backup and restore of Hyper-V guest virtual machines use the same TSM commands as VMware (VCB): `QUERY VM`, `BACKUP VM`, `RESTORE VM`. The option of `-vmbackuptype=HYPERVFULL` can be specified in **dsm.opt**. If it is not specified, VMware (VCB) is the default virtual machine backup type.

VMBACKUPTYPE=HYPERVFULL option

- Perform a full backup of all virtual machines that are defined on the HYPER-V host system:
`dsmc backup vm -vmbackuptype=hyperfull`
- Display a list of virtual machines that are defined on the Hyper-V host system:
`dsmc backup vm -vmbackuptype=hyperfull -vmlist=?`
- Perform a full backup for a specific virtual machine:
`dsmc backup vm -vmbackuptype=hyperfull <vm_name>`

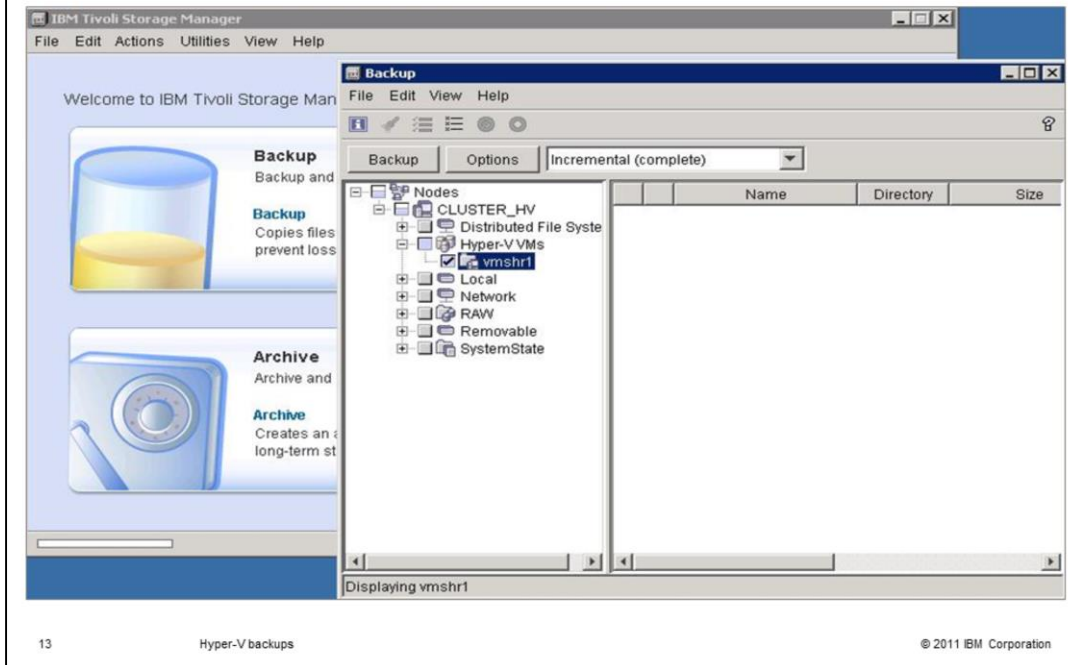
The slide shows some examples of using the command line for Hyper-V backups: To initiate a full backup of all virtual machines that are defined on the HYPER-V host system, issue `dsmc backup vm -vmbackuptype=hyperfull` command. To display a list of virtual machines that are defined on the Hyper-V host system, add the `-vmlist=?` option. To back up only a specific virtual machine, add the virtual machine name to the command.

Setting VMBACKUPTYPE=HYPERVFULL in the backup-archive GUI



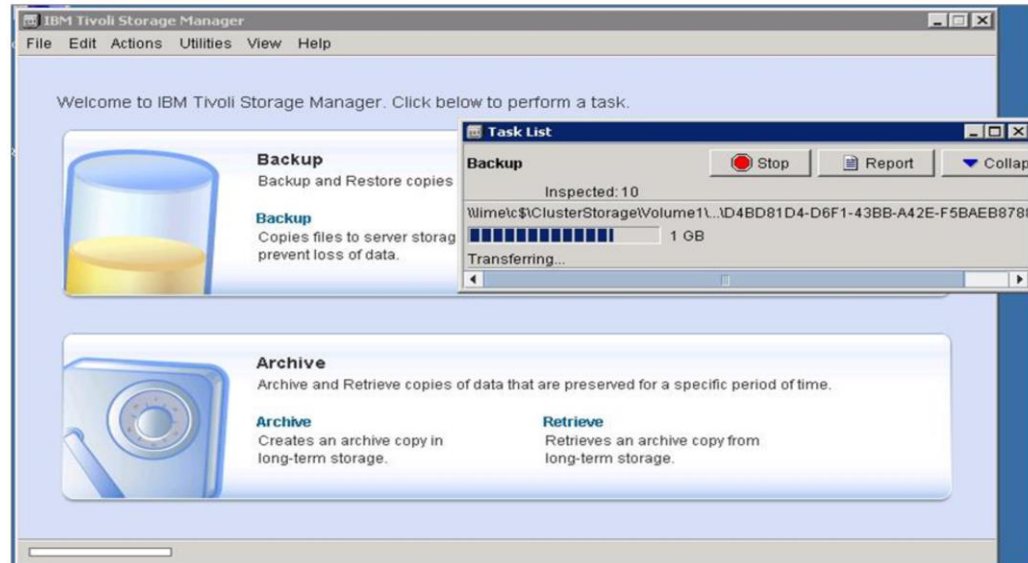
1. Open the backup-archive GUI.
2. Select **Edit > Client Preferences** from the menu.
3. In the Preference Editor window, select **VM Backup** from the menu on the left.
4. Select the **Hyper-V Full VM** option, and click **Apply**.

Backing up the Hyper-V virtual machines (1 of 3)



To use the Tivoli Storage Manager backup-archive GUI, select **Backup**. Expand the navigation tree to list the Hyper-V virtual machines, and select the virtual machine to back up. Click the **Backup** button.

Backing up the Hyper-V virtual machines (2 of 3)



The Task List window shows the progress of the backup.

Backing up the Hyper-V virtual machines (3 of 3)

The screenshot displays the IBM Tivoli Storage Manager (TSM) interface. The main window shows a welcome message and two primary actions: **Backup** (Backup and Restore copies of data) and **Archive** (Archive and Retrieve copies of data). Overlaid on this are two smaller windows: a **TSM** message box stating "ANS5014I Backup completed" with an "OK" button, and a **Backup Report** window titled "Detailed Status Report".

The **Detailed Status Report** window provides the following performance metrics:

Performance	
Total Bytes Inspected:	21.54 GB
Bytes Transferred:	21.55 GB
LanFree Data Bytes:	0 B
Compressed By:	0%
Total Data Reduction:	0%
Subfile Reduction:	0%

Transfer Rate

Network (KB/s):	98,769
Aggregate (KB/s):	47,393

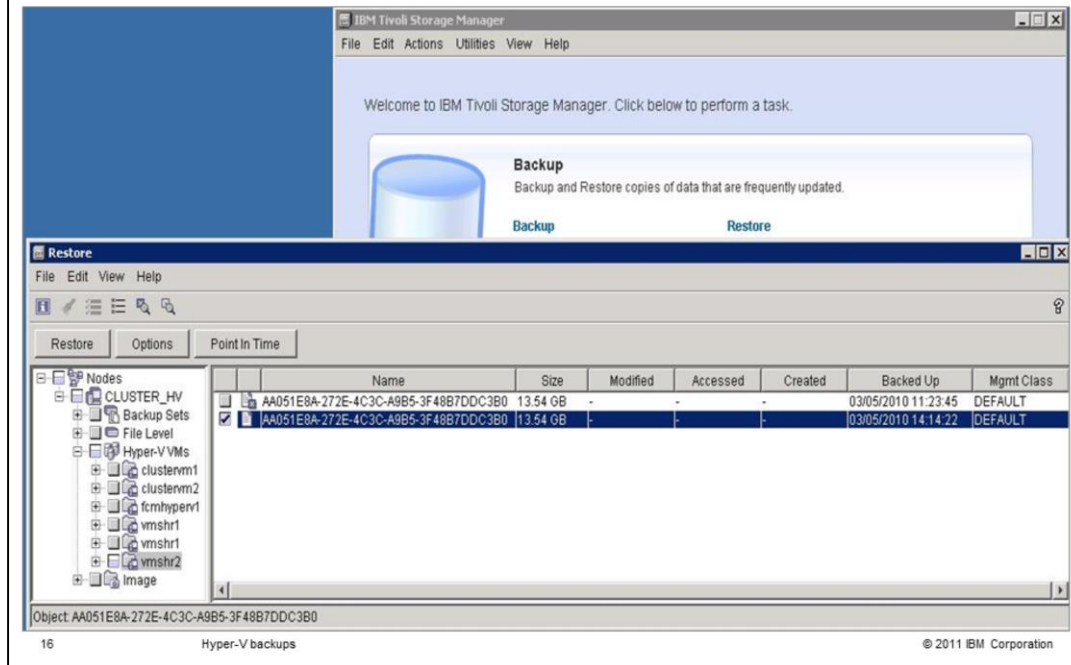
Object Count

Inspected:	10	Backed Up:	10
Updated:	0	Rebound:	0
Marked Inactive:	0	Failed:	0
Subfile:	0		

The report also includes a "Last Error Message" section and a "View" button. The footer of the TSM window shows "15 Hyper-V backups" and "© 2011 IBM Corporation".

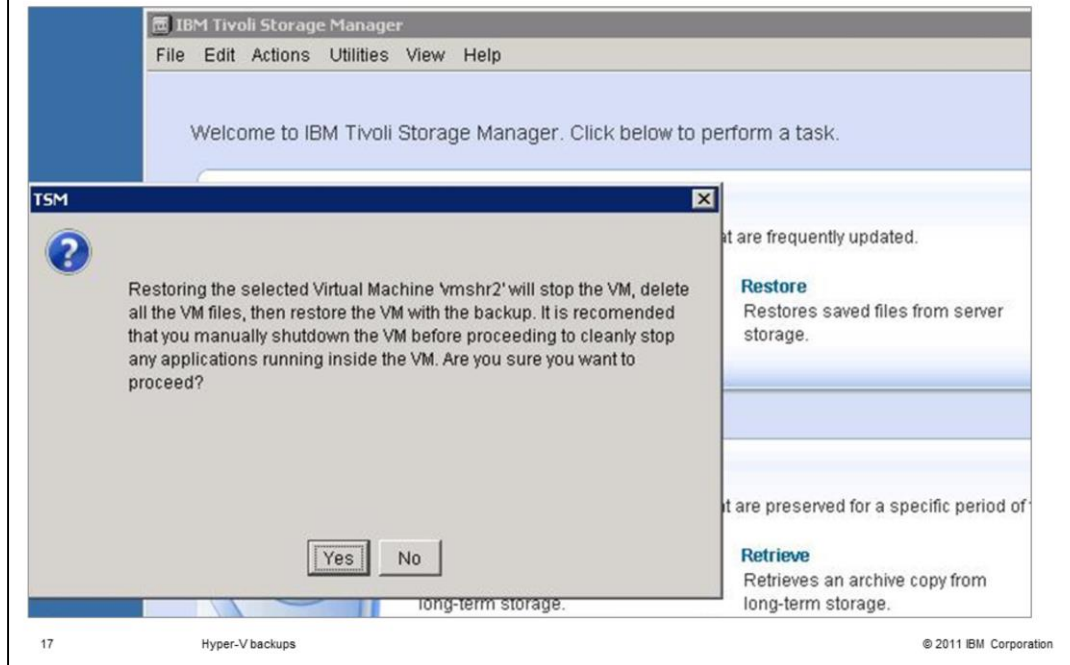
Review and close the Detailed Status Report.

Restoring the Hyper-V virtual machines (1 of 4)



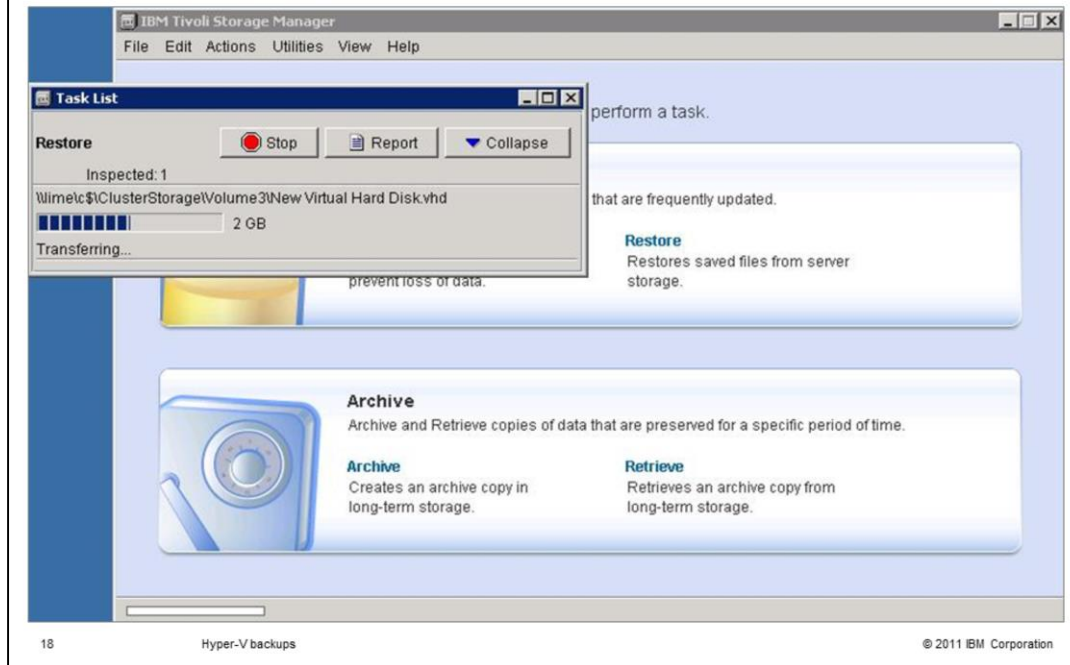
To restore a Hyper-V image with the backup-archive GUI, select **Restore**. Navigate to the snapshot of the image to restore. Click the **Restore** button.

Restoring the Hyper-V virtual machines (2 of 4)



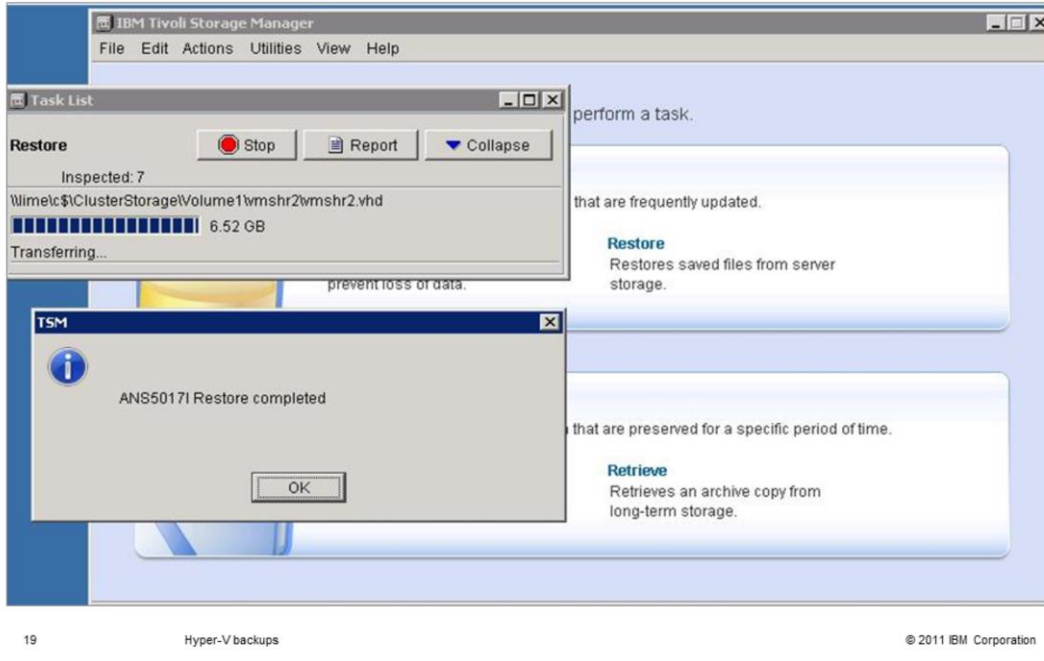
A warning message opens if your Hyper-V machine is running, with a recommendation to manually shut down the virtual machine before proceeding.

Restoring the Hyper-V virtual machines (3 of 4)



The Task List window shows the progress of the restore.

Restoring the Hyper-V virtual machines (4 of 4)



Review and close the Detailed Status Report. This is how to perform a Microsoft Hyper-V backup and restore with the Tivoli Storage Manager 6.2 backup-archive client.

Summary

Now that you have completed this module, you can perform the following tasks:

- Explain the Microsoft Hyper-V full guest backup process
- Describe the Tivoli Storage Manager Hyper-V guest backup and restore

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