Microsoft Hyper-V Backup Set

Last modified: 2019/12/06 (Note: Content written for AhsayCBS v7+v8, and still generally apply to latest product release)

AhsayOBM allows you to back up individual Guest VMs in your Microsoft Hyper-V Host with the MS Exchange Mail Level Backup Set.

System Architecture

The following high level system architecture diagram illustrates the major elements involved in the backup process of a Hyper-V host with AhsayOBM and AhsayCBS.

Requirements

Hardware Requirement

Refer to this article for the list of hardware requirements for AhsayOBM: Ahsay Hardware Requirement List (HRL) for version 8.1 or above

Software Requirement

Refer to this article for the list of compatible operating systems and Hyper-V platforms: Ahsay Software Compatibility List (SCL) for version 8.1 or above

Antivirus Exclusion Requirement

To optimize performance of AhsayOBM on Windows, and to avoid conflict with your antivirus software, refer to the list of processes and directory paths that should be added to all antivirus software white-list / exclusion list.

AhsayOBM

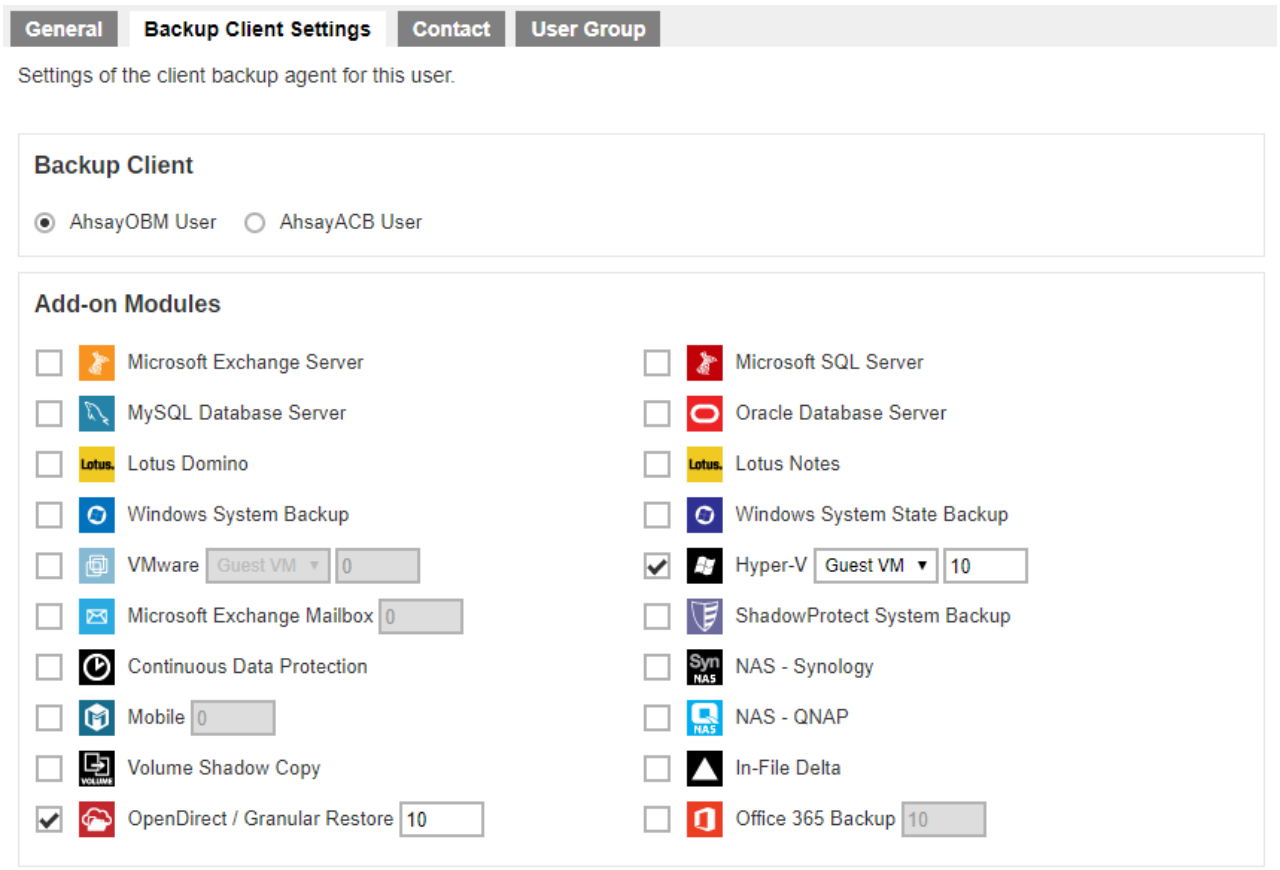
Use the Latest Version

The latest version of AhsayOBM must be installed on the Hyper-V server. For Hyper-V Cluster environment the latest version of AhsayOBM must be installed on all Cluster nodes.

Modules

AhsayOBM user account created on AhsayCBS must have sufficient Hyper-V add-on modules or

CPU sockets assigned. Hyper-V Cluster backup sets will require one AhsayOBM license per node.



Sufficient Quota

AhsayOBM user account has sufficient quota assigned to accommodate the storage of the guest virtual machines. (Please contact your backup service provider for details).

Hyper-V guest virtual machines contain three types of virtual disks:

- Fixed Hard Disk.
- Dynamic Hard Disk.
- Differencing Hard Disk.

When AhsayOBM backs up a Hyper-V guest virtual machines for an initial or subsequent full backup jobs:

- Using fixed Hard Disks it will back up the provisioned size, e.g. for a 500GB fixed virtual hard disk 500GB will be backed up to the storage designation.
- Using Dynamic Hard Disk or Differencing Hard Disk it will back up the used size, e.g. for a 500GB fixed virtual hard disk, 20GB will backed up to the storage designation if only 20GB are used.

Proper Java heap size configured

The default Java heap size setting on AhsayOBM is 2048MB, for Hyper-V backups it is highly recommended to increase the Java heap size setting to improve backup and restore performance. (The actual heap size is dependent on amount of free memory available on your Hyper-V server).

Delta generation of large VHD files is a memory intensive process; therefore, it is recommended that the Java heap size to be at least 2048MB - 4096MB. The actual required Java heap size is subject to various factors including files size, delta mode, backup frequency, etc.

Refer to this KB article for how to configure Java heap size on your AhsayOBM.

Temporary directory

For stand-alone Hyper-V server, AhsayOBM uses the temporary folder for storing backup set index files and any incremental or differential delta files generated during a backup job. To ensure optimal backup / restore performance, it should be located on a local drive with plenty of free disk space. It should not be on the Windows system C:\ drive.

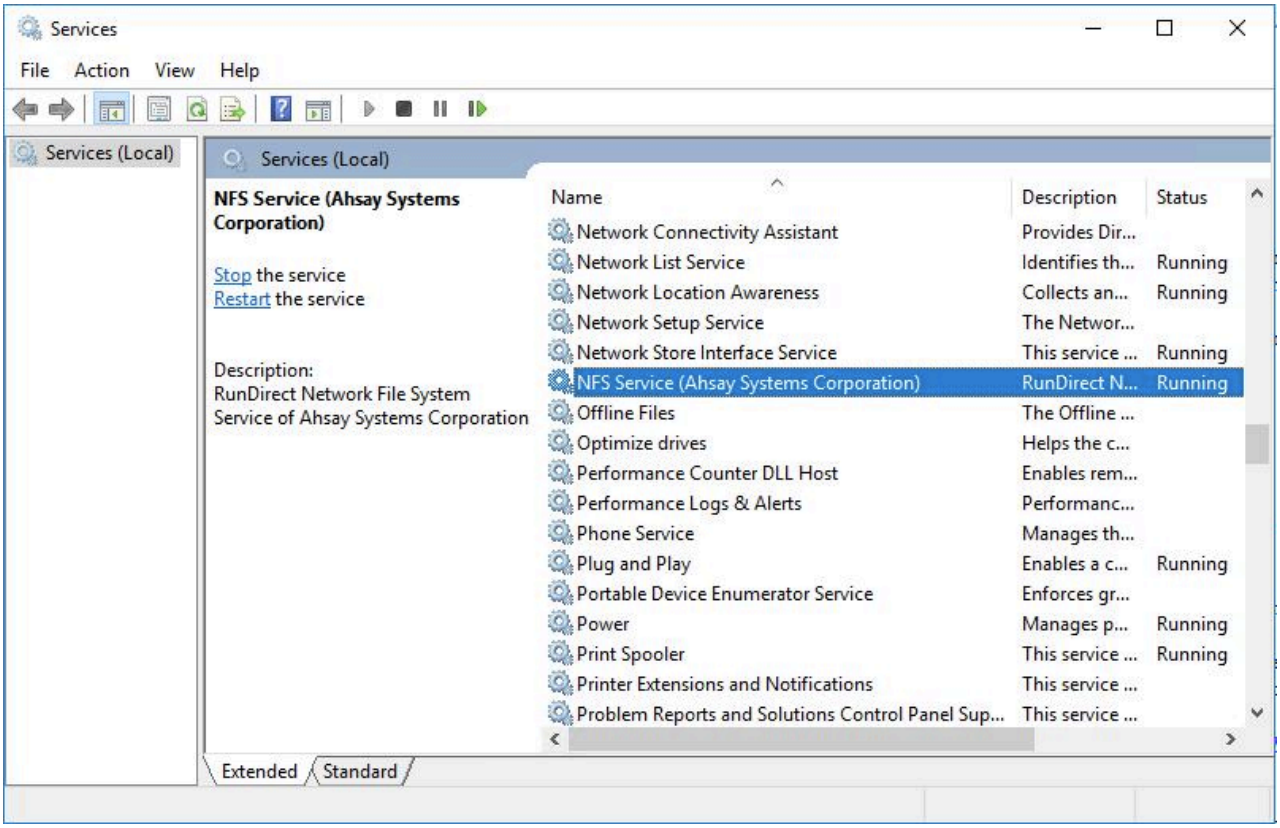
```
NOTE
For Hyper-V server in Failover Cluster environment:
- Hyper-V server 2008 / 2008 R2 and 2012 / 2012 R2 the temporary
directory must be set to a local drive of the cluster node.
- Hyper-V server 2016 / 2019  the temporary directory must be set to
the Cluster Shared Volume (CSV).
```

AhsayOBM UI during Run Direct restore or migration

AhsayOBM UI must be running when a guest virtual machine is started using Run Direct Restore or when migration process is running.

NFS server

Make sure NFS service has started for Run Direct to operate. If the backup destination is located on network drive, the logon account must have sufficient permission to access the network resources.



Administrator permission

The operating system account for setting up the Hyper-V / Hyper-V Cluster backup set must have administrator permission (e.g. administrative to access the cluster storage).

Windows User Account Control

For Granular Restore, Windows User Account Control (UAC) must be disabled.

Compression

For local, mapped drive, or removable drive storage destinations with Run Direct enabled, the compression type will always be set to No Compression and data encryption is disabled to ensure optimal backup and restore performance. The backup set compression type and data encryption settings will only be applied to CBS, SFTP/FTP, or Cloud storage destinations.

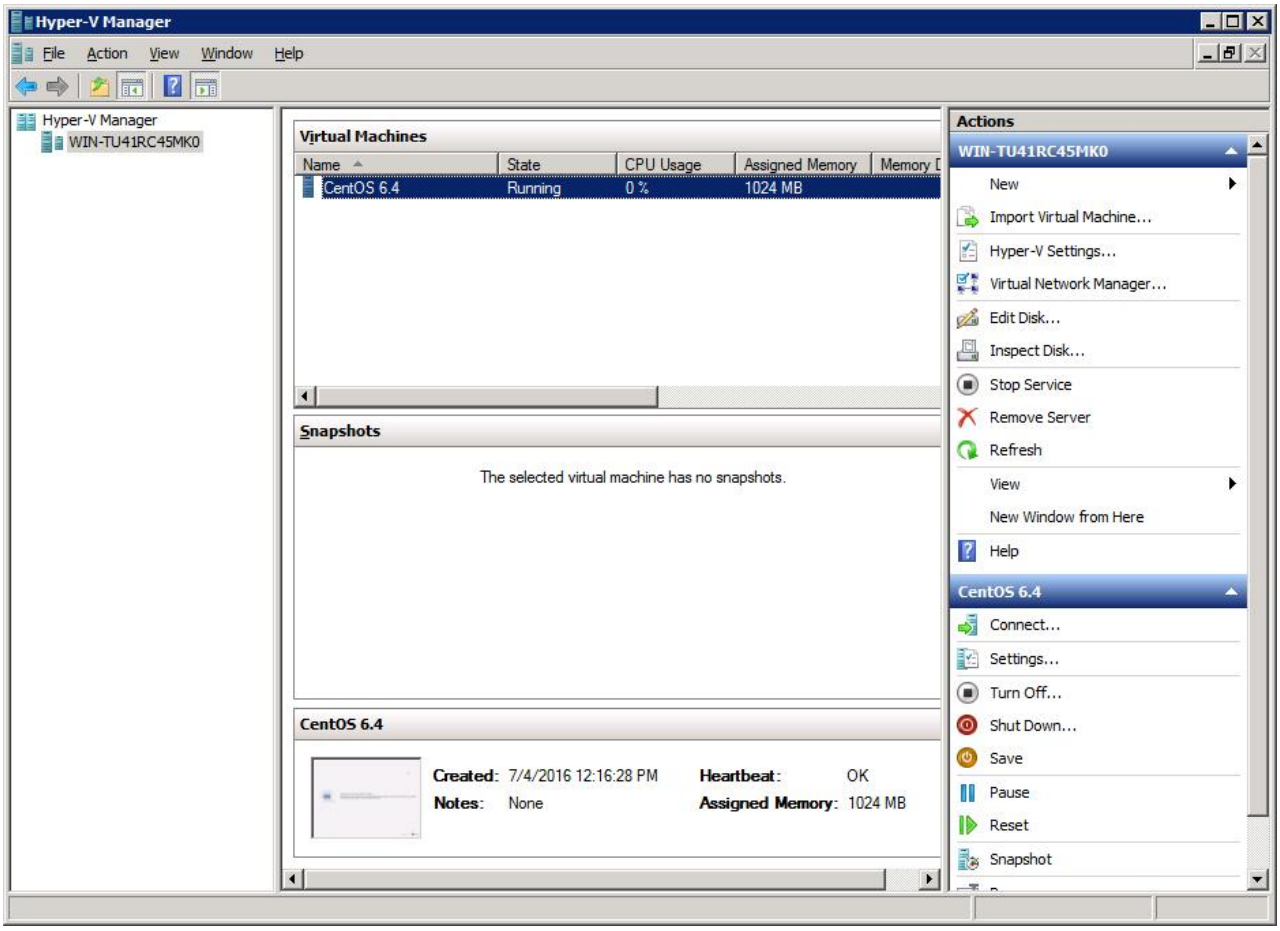
Backup whole VM

For ease of restore it is recommended to back up the whole guest machine (all the virtual disks) rather than individual virtual disks.

Hyper-V Server Requirements

Hyper-V management tools

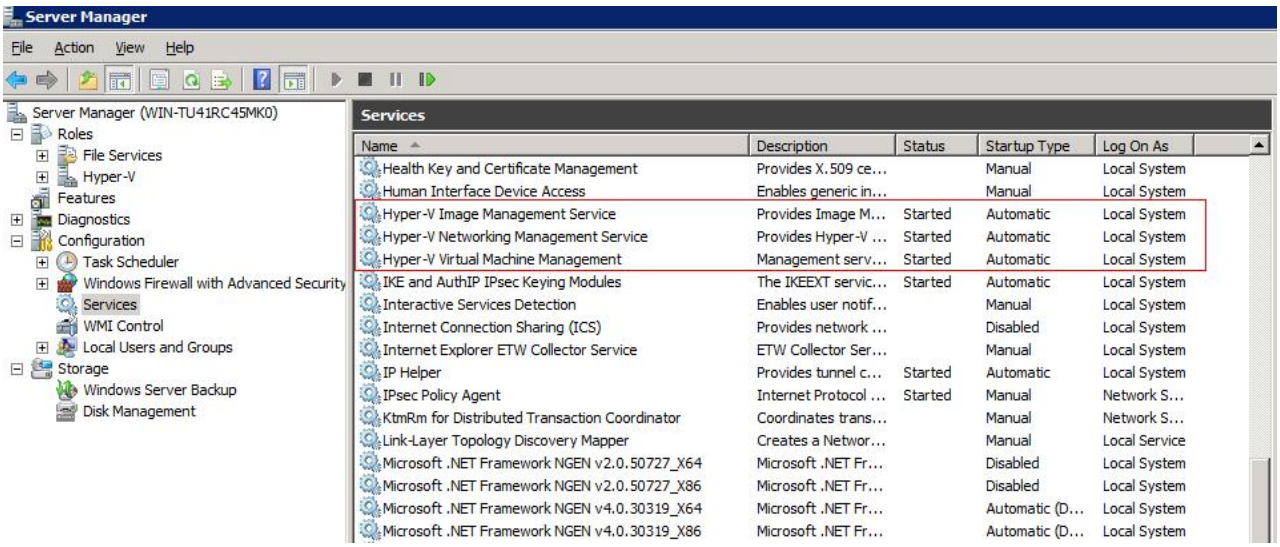
The Hyper-V management tools are installed on the server. For Hyper-V Cluster environments Hyper-V management tools is installed on all Cluster nodes.



Hyper-V services

The Hyper-V services are started on the server. For Hyper-V Cluster environments the Hyper-V services are started on all Cluster nodes.

Example: Windows 2008 R2 Hyper-V



Hyper-V VSS Writer

The Microsoft Hyper-V VSS Writer is installed and running on the Hyper-V server and the writer state is Stable. This can be verified by running the vssadmin list writers command.

Example:

```
C:\Users\Administrator>vssadmin list writers
vssadmin 1.1 - Volume Shadow Copy Service administrative command-line
tool
(C) Copyright 2001-2005 Microsoft Corp.
Writer name: 'Task Scheduler Writer'
   Writer Id: {d61d61c8-d73a-4eee-8cdd-f6f9786b7124}
   Writer Instance Id: {1bddd48e-5052-49db-9b07-b96f96727e6b}
   State: [1] Stable
   Last error: No error

Writer name: 'VSS Metadata Store Writer'
   Writer Id: {75dfb225-e2e4-4d39-9ac9-ffaff65ddf06}
   Writer Instance Id: {088e7a7d-09a8-4cc6-a609-ad90e75ddc93}
   State: [1] Stable
   Last error: No error

Writer name: 'Performance Counters Writer'
   Writer Id: {0bada1de-01a9-4625-8278-69e735f39dd2}
   Writer Instance Id: {f0086dda-9efc-47c5-8eb6-a944c3d09381}
   State: [1] Stable
   Last error: No error

Writer name: 'System Writer'
   Writer Id: {e8132975-6f93-4464-a53e-1050253ae220}
   Writer Instance Id: {8de7ed2b-8d69-43dd-beec-5bfb79b9691c}
   State: [1] Stable
   Last error: No error

Writer name: 'SqlServerWriter'
   Writer Id: {a65faa63-5ea8-4ebc-9dbd-a0c4db26912a}
   Writer Instance Id: {1f668bf9-38d6-48e8-81c4-2df60a3fab57}
   State: [1] Stable
   Last error: No error

Writer name: 'ASR Writer'
   Writer Id: {be000cbe-11fe-4426-9c58-531aa6355fc4}
   Writer Instance Id: {01499d55-61da-45bc-9a1e-76161065630f}
   State: [1] Stable
   Last error: No error

Writer name: 'Microsoft Hyper-V VSS Writer'
   Writer Id: {66841cd4-6ded-4f4b-8f17-fd23f8ddc3de}
   Writer Instance Id: {a51919e3-0256-4ecf-8530-2f600de6ea68}
   State: [1] Stable
   Last error: No error

Writer name: 'COM+ REGDB Writer'
   Writer Id: {542da469-d3e1-473c-9f4f-7847f01fc64f}
   Writer Instance Id: {7303813b-b22e-4967-87a3-4c6a42f861c4}
   State: [1] Stable
   Last error: No error
```

```
Writer name: 'Shadow Copy Optimization Writer'
   Writer Id: {4dc3bdd4-ab48-4d07-adb0-3bee2926fd7f}
   Writer Instance Id: {d3199397-ec58-4e57-ad04-e0df345b5e68}
   State: [1] Stable
   Last error: No error

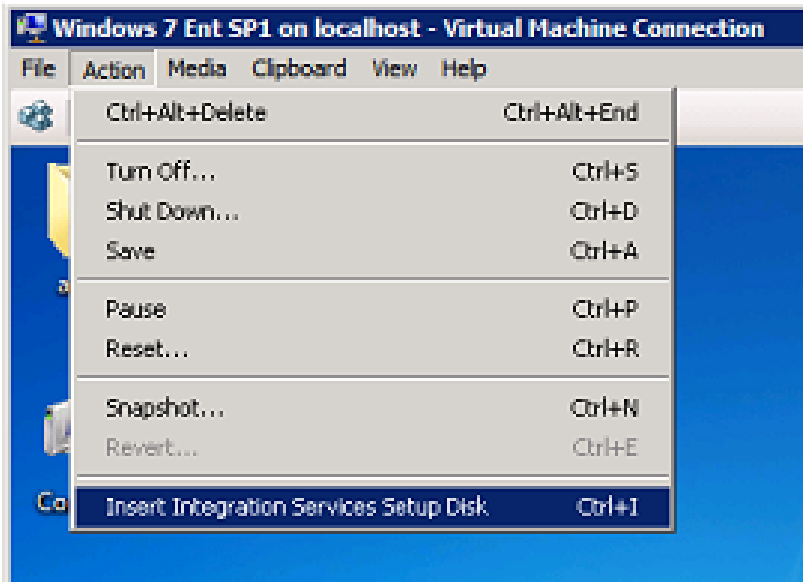
Writer name: 'Registry Writer'
   Writer Id: {afbab4a2-367d-4d15-a586-71dbb18f8485}
   Writer Instance Id: {25428453-2ded-4204-800f-e87204f2508a}
   State: [1] Stable
   Last error: No error

Writer name: 'BITS Writer'
   Writer Id: {4969d978-be47-48b0-b100-f328f07ac1e0}
   Writer Instance Id: {78fa3f1e-d706-4982-a826-32523ec9a305}
   State: [1] Stable
   Last error: No error

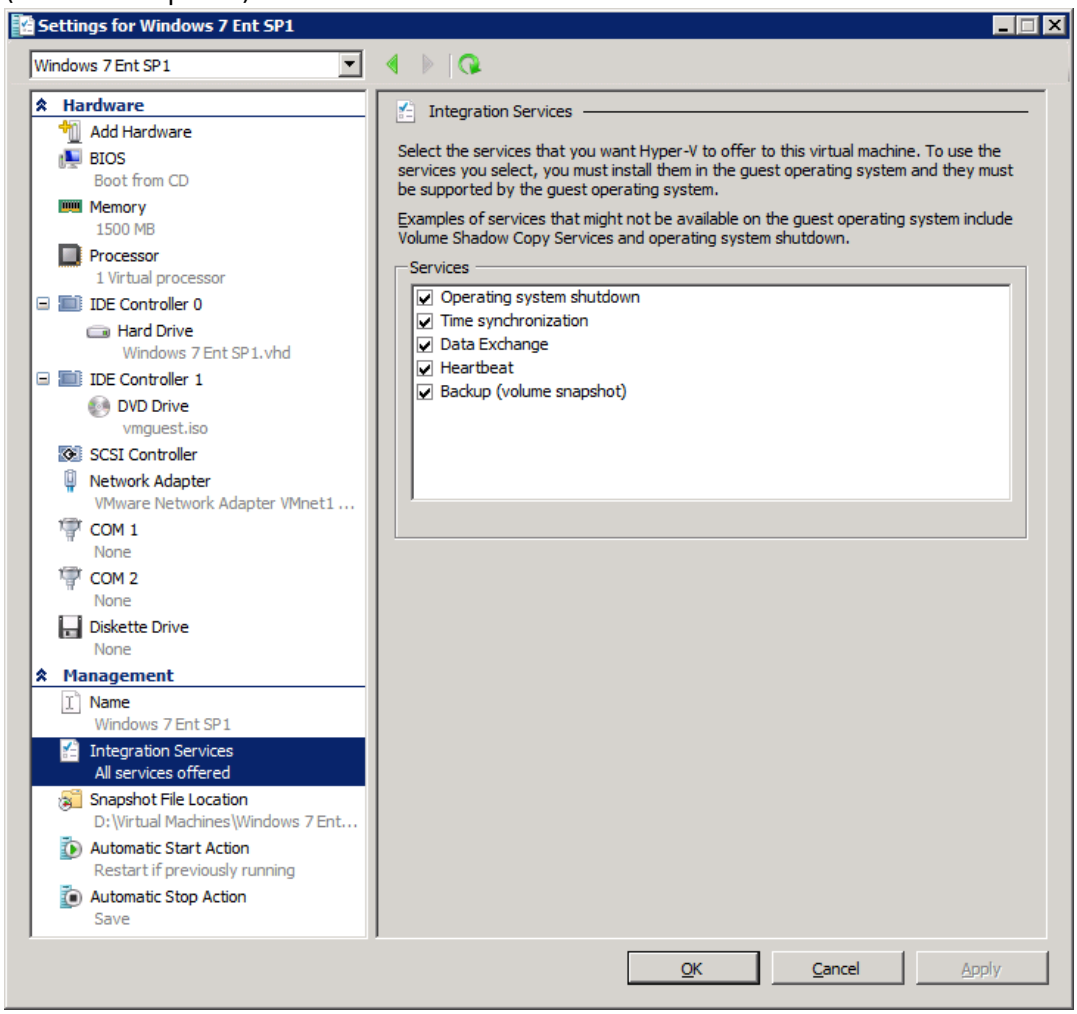
Writer name: 'WMI Writer'
   Writer Id: {a6ad56c2-b509-4e6c-bb19-49d8f43532f0}
   Writer Instance Id: {3efcf721-d590-4e50-9a37-845939ca51e0}
   State: [1] Stable
   Last error: No error
```

Integration Service

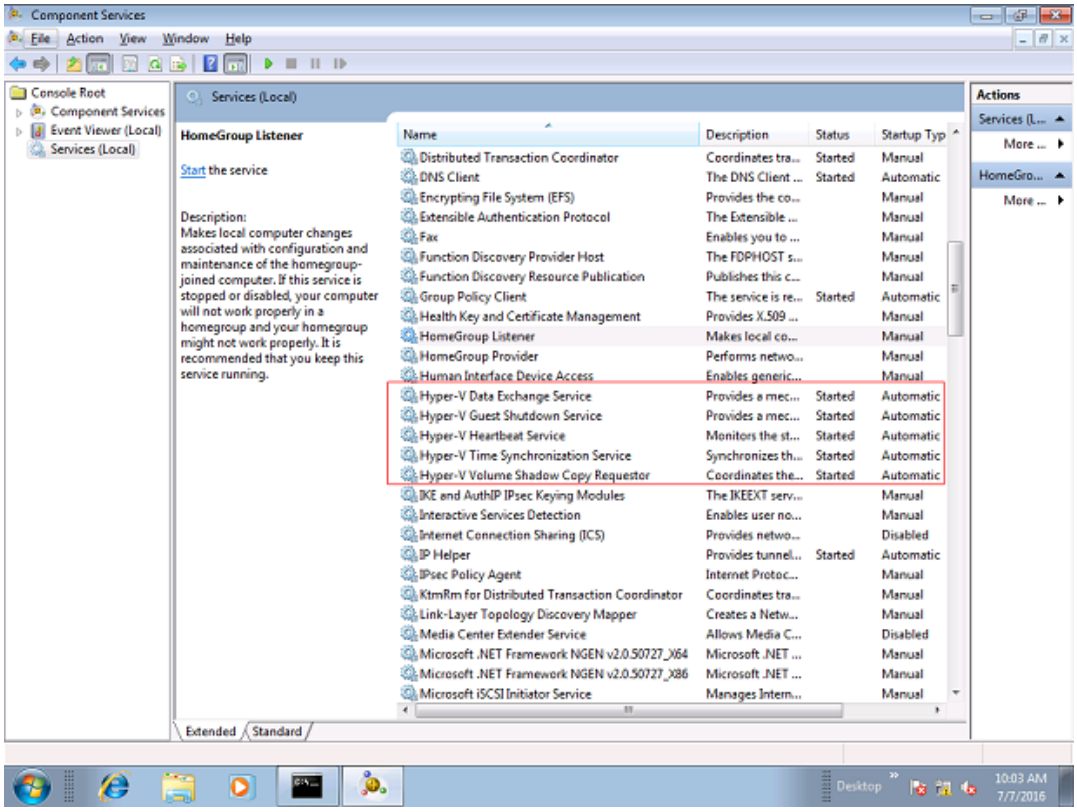
- If Integration services is not installed / updated on a guest virtual machine or the guest operating system is not supported by Integration Services, the corresponding virtual machine will be paused or go into a saved state during the snapshot process for both backup and restore, and resume when the snapshot is completed. Furthermore, the corresponding virtual machine uptime will also be reset to 00:00:00 in the Hyper-V Manager.
- Installing or updating Integration Services guest virtual machine(s) may require a restart of the guest virtual machine to complete the installation.
    - To install Integration Services
    - In Hyper-V Manager connect to the guest virtual machine and select Action > Insert Integration Services Setup disk
      Example: Windows 7 Enterprise guest



- If the guest operating system supports live virtual machine backup the Backup (volume snapshot) is enabled.



- The related Integration Services are running on the guest virtual machine: Example: Windows 7 Enterprise guest



Example: CentOS 6.4 Linux guest

To check if Linux Integration Services is running on the Linux guest:

```
 # lsmod | grep hv

hv_netvsc            23667  0
hv_utils             7012  0
hv_storvsc           10022  2
hv_vmbus             91567  4
hv_netvsc,hv_utils,hid_hyperv,hv_storvsc

# ps -ef|grep hv
root       267     2  0 18:07 ?        00:00:00
[hv_vmbus_con/0]
root       268     2  0 18:07 ?        00:00:00
[hv_vmbus_ctl/0]
root       269     2  0 18:07 ?        00:00:00
[hv_vmbus_ctl/0]
root       270     2  0 18:07 ?        00:00:00
[hv_vmbus_ctl/0]
root       271     2  0 18:07 ?        00:00:00
[hv_vmbus_ctl/0]
root       272     2  0 18:07 ?        00:00:00
[hv_vmbus_ctl/0]
root       273     2  0 18:07 ?        00:00:00
[hv_vmbus_ctl/0]
root       274     2  0 18:07 ?        00:00:00
[hv_vmbus_ctl/0]
root       275     2  0 18:07 ?        00:00:00
[hv_vmbus_ctl/0]
root       276     2  0 18:07 ?        00:00:00
```

```
[hv_vmbus_ctl/0]
root       277     2  0 18:07 ?        00:00:00
[hv_vmbus_ctl/0]
root      1174     1  0 18:07 ?        00:00:00
/usr/sbin/hv_kvp_daemon
root      1185     1  0 18:07 ?        00:00:00
/usr/sbin/hv_vss_daemon
root      1332  1316  0 18:11 pts/0    00:00:00 grep hv
```

- Please refer to the following articles for further details on:
  - Considerations for backing up and restoring virtual machines https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-R2-and-2012/dn798286(v=ws.11)
  - Supported Windows Guest Operating Systems for Hyper-V in Windows Server 2012 https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-R2-and-2012/dn792028(v=ws.11)
  - Supported Windows Guest Operating Systems for Hyper-V in Windows Server 2012 R2 https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2012-R2-and-2012/dn792027(v=ws.11)
  - Supported Linux and FreeBSD virtual machines for Hyper-V on Windows https://docs.microsoft.com/en-us/windows-server/virtualization/hyper-v/Supported-Linux-and-FreeBSD-virtual-machines-for-Hyper-V-on-Windows
  - Supported CentOS and Red Hat Enterprise Linux virtual machines on Hyper-V https://docs.microsoft.com/en-us/windows-server/virtualization/hyper-v/supported-centos-and-red-hat-enterprise-linux-virtual-machines-on-hyper-v
  - Supported Ubuntu virtual machines on Hyper-V https://docs.microsoft.com/en-us/windows-server/virtualization/hyper-v/supported-ubuntu-virtual-machines-on-hyper-v
  - Linux Integration Services Version 4.0 for Hyper-V https://rlevchenko.com/2015/08/18/linux-integration-services-version-4-0-for-hyper-v/
  - Managing Hyper-V Integration Services https://msdn.microsoft.com/en-us/virtualization/hyperv_on_windows/user_guide/managing_ics
  - Hyper-V on Window Server https://docs.microsoft.com/en-us/windows-server/virtualization/hyper-v/hyper-v-on-windows-server

Hyper-V 2008 R2

For Hyper-V 2008 R2 server in order to use Run Direct restore feature the “Microsoft Security Advisory 3033929” security update must be installed.

Please refer to the following KB article from Microsoft for further details:
https://support.microsoft.com/en-us/kb/3033929

Run Direct Hyper-V Cluster

For Run Direct Hyper-V Cluster backup sets the storage destination must be accessible by all Hyper-V nodes.

Hyper-V Cluster

For Hyper-V Cluster backup sets the guest virtual machines must be created and managed by the Failover Cluster Manager.

Hyper-V Backup Methods

AhsayOBM v8 supports two methods for Hyper-V guest VM backup, VM Snapshot and Saved State.

VM Snapshot

The VM snapshot method is the preferred backup option, as it supports live guest VM backups. This means guest VM will not be put into a saved state when a VSS snapshot is taken during a backup job. So it will not affect the availability of any applications or services running on the guest VM every time a backup job is performed.

> If the VM Snapshot method cannot be used, AhsayOBM will automatically use the Saved State method.

Requirements 1. The guest VM must be running.

2. Integration services must be enabled on the guest VM.

3. The Hyper-V Volume Shadow Copy Requestor service is running on the guest VM installed with Windows operating system. Please refer to the following article for further details: https://docs.microsoft.com/en-us/virtualization/hyper-v-on-windows/reference/integration-services#hyper-v-volume-shadow-copy-requestor

4. For guest VMs installed with Linux / FreeBSD operating systems, the VSS Snapshot daemon is required for live backups, not all Linux / FreeBSD versions support live backup on Hyper-V. For example, only FreeBSD 11.1 supports live backup while for Ubuntu, version 14.04 LTS to 17.04 LTS supports live backups. Please refer to the following article for further details: https://docs.microsoft.com/en-us/windows-server/virtualization/hyper-v/supported-linux-and-freebsd-virtual-machines-for-hyper-v-on-windows

5. The guest VM volumes must use a file system which supports the use of VSS snapshots, for example NTFS.

6. The guest VMs snapshot file location must be set to the same volume in the Hyper-V host as the VHD file(s).

7. The guest VM volumes have to reside on basic disks. Dynamic disks cannot be used

within the guest VM.

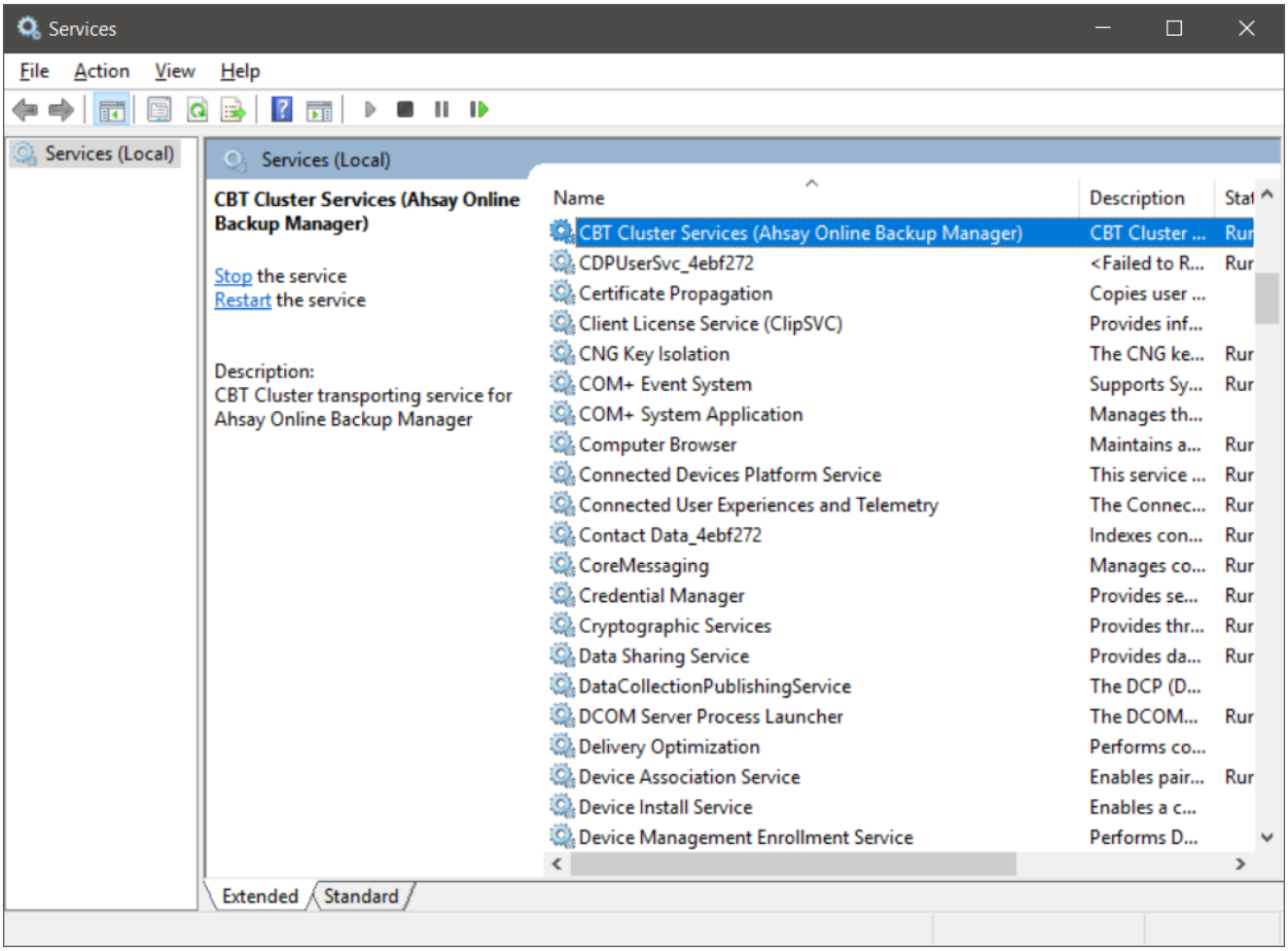
> Some older Windows operating systems installed on guest VM's which do not support either Integration Services or the Hyper-V Volume Shadow Copy Requestor Service, will not support VM snapshot method, for example, Microsoft Windows 2000, Windows XP, or older Linux/FreeBSD versions.

Saved State

If any of the VM Snapshot method requirements cannot be fulfilled, AhsayOBM will automatically use the Save State method. When the Saved State method is used, the guest VM is placed into a saved state while the VSS snapshot is created (effectively shut down), and the duration is dependent on the size of VM and performance of Hyper-V host. The downside is it may affect the availability of any applications or services running on the guest VM every time a backup job is performed.

CBT Requirement

CBT Cluster Services (Ahsay Online Backup Manager) is installed and enabled upon installation / upgrade to version AhsayOBM v8.1.0.0 or above.



1. CBT (Changed Block Tracking) is used to optimize incremental backups of virtual machines by keeping a log of the blocks of data that have changed since the previous snapshot making incremental backups much faster. When AhsayOBM performs a backup, CBT feature can request transmissions of only the blocks that changed since the last backup, or the blocks in use.

> CBT service is supported on all the backup destinations for AhsayOBM.

2. CBT cluster service is only installed on Windows x64 machine.

3. Check if CBTFilter is enabled.

Example:

i. This can be verified by running the net start CBTFilter command.

```
C:\Users\Administrator>net start CBTFilter
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

ii. **Note:** For Windows Server 2008 R2, if the following error is displayed

```
C:\Users\Administrator>net start CBTFilter
System error 577 has occurred.

Windows cannot verify the digital signature for this file. A recent
hardware or software change might have installed a file that is signed
incorrect or damaged, or that might be malicious software from an
unknown source.
```

The issue may be related to the availability of SHA-2 code signing support for Windows Server 2008 R2 (https://technet.microsoft.com/en-us/library/security/3033929).

To resolve the issue, install the following patch from Microsoft
https://www.microsoft.com/en-us/download/confirmation.aspx?id=46083

Restart the affected server afterward for AhsayOBM to operate properly.

4. CBT Cluster Service and CBTFilter will NOT be installed on Windows Server 2016 where a built-in system called Resilient Change Tracking (RCT) will be used instead. For details of RCT, please refer to Windows Server 2016 and 2019 RCT Requirement.

Windows Server 2016 and 2019 RCT Requirement

RCT Requirement

1. AhsayOBM would not install CBT Cluster Services (Ahsay Online Backup Manager) but use

the native built-in RCT (Resilient Change Tracking) feature of Windows server 2016 and 2019 instead.

2. The guest virtual machine version in Hyper-V must be 8.0 or above.

Example:

i. This can be verified by using Windows PowerShell.

```
get–VM | format–table name, version
```

ii. If the version is not 8.0 or above, then need to upgrade the virtual machine configuration version.

```
Update-VMversion <vmname>
```

Please refer to the following link of Microsoft for details about virtual machine version:
https://docs.microsoft.com/en-us/windows-server/virtualization/hyper-v/deploy/Upgrade-virtual-machine-version-in-Hyper-V-on-Windows-or-Windows-Server

Guest VM Dependencies Requirements

To get full use of Hyper-V, install the appropriate linux-tools and linux-cloud-tools packages to install tools and daemons, e.g. VSS Snapshot Daemon, for use with virtual machines. Please refer to the following link for the details of requirements for Ubuntu relating to Hyper-V daemons:
https://docs.microsoft.com/en-us/windows-server/virtualization/hyper-v/supported-ubuntu-virtual-machines-on-hyper-v

Limitations

1. Backup of guest machines located on a SMB 3.0 shares is not supported.

2. Backup of virtual machine with pass through disk (directly attached physical disk) is not supported.

3. For backup of individual virtual disks, the restored virtual machine does not support the reversion of previous snapshots, if the snapshot contains disks which are not previously backed up by AhsayOBM.

4. A guest virtual machine can only be restored to the Hyper-V server with the same version, e.g. backup of a guest on Hyper-V 2012 R2 server cannot be restored to Hyper-V 2008 R2 Server or vice versa.

5. The guest virtual machine will not start up if the virtual disk containing the guest operating system is not restored.

6. Run Direct Restore of VM containing .VHDS shared virtual disk(s) is not supported.

7. Restore of individual virtual disks is only supported using the Restore raw file option for a virtual disk with no snapshots.

> This will require modification of Hyper-V guest configuration files, and this only should be done if you have in-depth knowledge and understanding of Hyper-V, otherwise the guest virtual machine may not startup properly.

8. Replication must be disabled for the VM selected for backup, otherwise there may be following error occurring during backup job:

```
Failed to backup virtual machine "guest_guid"., Reason = "Failed to take
VM snapshot. Error = [CreateVirtualSystemSnapshotV2] Error="The method
call failed." (32775)".
```

Refer to here for more details.

Run Direct

Hyper-V Run Direct is a recovery feature helps to reduce disruption and downtime of your production guest virtual machines.

Unlike normal recovery procedures where the guest virtual machine(s) are restored from the backup destination and copied to production storage, which can take hours to complete. Restore with Run Direct can instantly boot up a guest virtual machine by running it directly from the backup file in the backup destination; this process can be completed in minutes.

The following steps are taken when a Run Direct restore is initiated:

1. **Delete Guest Virtual Machine** - AhsayOBM will delete the existing guest virtual machine on the original or alternate location (if applicable).

2. **Create Virtual Hard Disk Image Files** - Empty virtual hard disk image files are created on the Hyper-V server (either on the original location or alternate location).

3. **Create VSS Snapshot** - A VSS snapshot is created to make the backup data read only and track changes made within the guest virtual machine environment.

4. **Start Up Virtual Machine** - The guest virtual machine is started up. To finalize recovery of the guest virtual machine, you will still need to migrate it from the backup destination to the designated permanent location on the Hyper-V server.

5. **Copy Data** - Copy the data from the backup files in the backup destination to empty hard disk images on the Hyper-V server.

6. **Apply Changes** - Apply any changes made within the guest virtual machine environment to the hard disk image files on the Hyper-V server.

7. **Delete VSS Snapshot** - The VSS snapshot will be deleted after the Run Direct restoration is completed.

The restored virtual machine, at this stage (e.g. before the restore is finalized) is in a read-only state to avoid unexpected changes. All changes made to the virtual disks (e.g. operation within the guest virtual machine) are stored in a VSS snapshot created for the Run Direct restore. These changes are discarded when Run Direct is stopped, where the restored guest virtual machine will be removed and all changes will be discarded, or the changes will be consolidated with the original virtual machine data when the restore is finalized.

Granular Restore

AhsayOBM granular restore technology enables the recovery of individual files from a guest VM without booting up or restoring the whole guest VM first. Granular restore is one of the available restore options for Hyper-V backup sets. AhsayOBM makes use of granular restore technology to enable a file level restore from a virtual disk file (VHD) of guest VM backup possible. It is particularly useful if you only need to restore individual file(s) from a guest VM which would normally take a long time to restore and then startup before you can gain access to the files on the virtual disks. Granular restore gives you a fast and convenient way to recover individual files from a guest VM. During the granular restore process, the virtual disks of the guest VM can be mounted on the Windows machine as a local drive. This will allow the individual files on the virtual disks to be viewed via the file explorer within AhsayOBM or from the Windows File Explorer on the Windows machine you are performing the restore on, without having to restore the entire virtual machine. Granular restore can only mount virtual disks if the guest VM is running on a Windows Platform and it is supported for all backup destinations, e.g. AhsayCBS, Cloud storage, or Local/Network drives. The mounting of Linux/Unix file systems from virtual disk file is currently not available due to limitations of the file system drivers.

> Granular restore requires an additional OpenDirect / Granular restore add-on module license to work. Contact your backup service provider for further details.

How does Granular Restore work?

Benefits of using Granular Restore

Comparison between Granular Restore and Traditional Restore

	Granular Restore	Traditional Restore
Description	Granular restore allows you to quickly mount virtual disk(s) directly from the backup file of a guest VM, so that individual files from virtual disk(s) can be exposed via the file explorer on AhsayOBM, or to be copied from the file explorer on to a 32 bit or 64 bit Windows machine you are performing the restore.	The traditional restore method for guest VMs, restores the entire backup files either to the original VM location or another standby location. The files or data on the guest VM can only be accessed once the guest VM has been fully recovered and booted up.
Pros	**Restore of Entire Guest VM Not Required** - Compared to a traditional restore where you have to restore the entire guest VM first, before you can access any individual files/folders, granular restore allows you to view and download individual files, without having to restore the entire guest VM first. **Ability to Restore Selected Files** - In some cases, you may only need to restore a few individual file(s) from the guest VM, therefore, granular restore gives you a fast, convenient, and flexible tool to restore selected file(s) from a guest VM quickly. **Only One Backup Set Required** - With traditional restore methods, if you wish to restore individual file(s) from a guest VM, you will have to create two different backup sets; a Hyper-V guest VM backup set and a separate file backup set for the file(s) you wish to restore. You will require an additional AhsayOBM installation on the guest VM environment, with Granular Restore feature, only one backup set is required. * Fewer CAL (Client Access License) required - you will only need one AhsayOBM CAL to perform guest VM, Run Direct, and Granular restore. * Less storage space required - as you only need to provision storage for one backup set. * Less backup time required - As only one backup job needs to run. * Less time spent on administration - As there are fewer backup sets to maintain.	**Backup with Compression and Encryption** - Guest VM is encrypted and compressed, therefore is in a smaller file size, and encrypted before being uploaded to the backup destination.
Cons	**No Encryption and Compression** - To ensure optimal restore performance, the backup of the guest VM will NOT be encrypted and compressed, therefore, you may have to take this factor in consideration when using this restore method.	**Slower Recovery** - As the entire guest VM has to be restored before you can access any of it's file(s) or data, the restore time could be long if the guest VM size is large. **Two Backup Sets and CALs Required** - If you only wish to restore individual files from VM, two separate backup sets are required, one for the VM image and the other for the individual files, and therefore two CALs (client access licenses) are required.

Requirements

Supported Backup Modules

Granular restore is supported on Hyper-V backup sets created and backed up using AhsayOBM installed on a Windows platform with the Granular Restore feature enabled on the backup set.

License Requirements

An OpenDirect / Granular restore add-on module license is required per backup set for this feature to work. Contact your backup service provider for more details.

Backup Quota Storage

As compression is not enabled for Granular backup sets, to optimize restore performance, the storage quota required will be higher than non-Granular backup sets. Contact your backup service provider for details.

Operating System

AhsayOBM must be installed on a 64 bit Windows machine as libraries for Granular only supports 64 bit Windows operating system. AhsayOBM must be installed on the following Windows Operating Systems:

Windows 2012	Windows 2012 R2	Windows 2016	Windows 2019
Windows 8	Windows 8.1	Windows 10	

Temporary Directory Requirement

1 . For Hyper-V server 2008 / 2008 R2 / 2012 / 2012 R2 / 2016 / 2019 in a Non Cluster environment, the temporary directory must be set to a local drive on the Hyper-V server.

2. For Hyper-V server in Failover Cluster environment: - Hyper-V server 2008 / 2008 R2 and 2012 / 2012 R2 the temporary directory must be set to a local drive of the cluster node. - Hyper-V server 2016 / 2019 the temporary directory must be set to the Cluster Shared Volume (CSV).

The temporary directory should have at least the same available size as the guest VM to be restored.

Available Spare Drive Letter

One spare drive letter must be available on the Windows machine for the granular restore process, as the VHD virtual disk is mounted on Windows as a logical drive. AhsayOBM will automatically take the next available drive letter in alphabetical order for the mounted virtual disk.

1. The Windows drive letters A, B, and C are not used by granular restore.
2. The granular restore assigned drive letter(s) will be released once you exit from AhsayOBM UI.

Network Requirements

Recommended minimum network speed is at least 100Mbps download speed.

The network bandwidth requirements will increase in proportion to the size of the guest VM and or the incremental delta chain length to ensure optimal performance. Working with limited network bandwidth may severely affect the granular restore performance.

You can use an online network speed test website (e.g. www.speedtest.net) to get an idea of the actual bandwidth of the machine.

Other Dependencies

The following dependencies are required for restore and therefore they are verified by AhsayOBM only when a granular restore is performed. Absence of these dependencies will not affect the backup job but would cause the granular restore to fail.

- Microsoft Visual C++ 2015 Redistributable (x86) / (x64)
  https://www.microsoft.com/en-us/download/details.aspx?id=48145
- Update for Universal C Runtime in Windows
  https://support.microsoft.com/en-us/help/2999226/update-for-universal-c-runtime-in-windows

Permissions

The Windows login account used for installation and operation of the AhsayOBM client machine requires Administrator privileges.

> **Recommendation** - It is recommended that a local destination is added to the backup set for faster granular restore. Since granular restore of large guest VM from CBS server over the internet can be slow depending on network bandwidth and CBS server load.

Documentation

- Microsoft Hyper-V Backup and Restore Guide

Issues

- Cannot restore a Hyper-V virtual machine with Run Direct enabled (Microsoft Security Advisory 3033929 update not installed)
- Incorrect error message 'Another backup job is still running' is displayed (Hyper-V VM backup)
- Hyper-V VM backup job cannot run to completion (for backup set with backup schedule disabled)
- Scheduled / continuous backup jobs of Hyper-V Cluster VM backup set are not running (Run scheduled backup on computers named setting is incorrect)

- Hyper-V VM backup job completes with warning - Fail to load CBT, will perform normal in-file delta
- When attemtping a Hyper-v Run Direct restore with “Failed to open driver: Error = System error 577 has occurred. Windows cannot verify the digital signature for this file." error
- "VHD Mounter - Operating System (Platform Not Support)" error when performing a granular restore on a Hyper-V guest VM
- VHD Mounter - Administrator Privilege (No)" error when performing a granular restore on a Hyper-V guest VM
- "Failed to mount virtual disk "%virtual_disk_name%.vhd" (No Valid Partition Found)" when performing a granular restore on a Linux or Unix guest VM on Hyper-V
- "Failed to list file (The volume does not contain a recognized file system. Please make sure that all required file system drivers are loaded and that the volume is not corrupted)" when performing a granular restore on Hyper-V guest
- "Volume Shadow Copy Service error: Unexpected error querying for the IVssWriterCallback interface. hr = 0x80070005, Access is denied." error is shown in Windows Event viewer for Hyper-V backup/restore job

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