



# Hyper-V VSS Plugin

Bacula Systems Documentation

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Note  
You can download this article as a PDF

Enterprise

**Bacula Enterprise Only**  
This solution is **only** available for Bacula Enterprise. For subscription inquiries, please reach out to [sales@baculasystems.com](mailto:sales@baculasystems.com).

**Important**  
Remember to read the Best Practices chapter common for all of our hypervisor plugins.

**Important**

The Hyper-V VSS solutions are older methods for backing up Hyper-V environments. These options are not recommended for use.

- *Overview*
- *Installation and Configuration*
- *Backup*
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- *File Level Restore*
- *Single Item Restore*
- *Plugin Notes*

## 1 Overview

This chapter presents how to use the Microsoft Hyper-V Server plugin when backing up with **Bacula Enterprise** version 8.2. These solutions are not applicable to prior versions. This document is intended to be used by **Bacula Enterprise** administrators.

### 1.1 Bacula Windows Hyper-V Plugin

**Bacula Systems** provides a single plugin for Bacula Enterprise named `vss-fd.dll` that permits you to backup a number of different components on Windows machines. One of those components is Microsoft Hyper-V Server, which is the subject of this article.

Backing up and restoring Hyper-V virtual machine is supported with Full level backups. It is not possible to do Incremental or Differential backups because Microsoft does not support that backup level for the Hyper-V Server product. Use of the Global Endpoint Deduplication plugin and the `bothsides` Fileset option permits to minimize the data transfer and the storage.

## 2 Installation and Configuration

To activate the Hyper-V component you have to put the following into the Include section of the File Set which will be used to back up the Hyper-V Server:

```
Plugin = "vss:/@HYPERV/"
```

This will back up all Hyper-V Virtual Machine. The plugin directive must be specified exactly as shown above. A Job may have one or more of the `vss` plugin components specified.

You must ensure that the `vss-fd.dll` plugin is in the plugins directory on the FD doing the backup (done by default with the installer), and that the `Plugin Directory` directive line is present and enabled in the FD's configuration file `bacula-fd.conf`.

An example of the FD configuration file is shown in the screenshot below:

The status output of a client with the VSS plugin enabled:

```

FileDaemon {                                # this is me
  Name = wsb-sql08-fd
  FDport = 9102                               # where we listen for the directo
  WorkingDirectory = "C:\\Program Files\\Bacula\\working"
  Pid Directory = "C:\\Program Files\\Bacula\\working"
  Plugin Directory = "C:\\Program Files\\Bacula\\plugins"
  Maximum Concurrent Jobs = 10
}

```

Fig. 1: File Daemon Configuration Excerpt with “Plugin Directory” Line

```

*status client=wsb-sql08-fd
Connecting to Client wsb-sql08-fd at wsb-sql08:9102

wsb-sql08-fd Version: 8.2.0 (02 Feb 2015) VSS Linux Cross-compile Win64
Daemon started 20-Apr-12 13:14. Jobs: run=15 running=0.
Microsoft Windows Server 2008 R2 Standard Edition Service Pack 1 (build 7601),
→ 64-bit
Heap: heap=0 smbytes=1,061,455 ...
Sizes: boffset_t=8 size_t=8 debug=0 ...
Plugin: vss-fd.dll

```

### 3 Backup

If everything is set up correctly as above then the backup will include the Hyper-V server data. The Hyper-V server data files backed up will appear in a **bconsole** or **bat** restore like:

```

/@HYPERV/
...
etc

```

A complete example of a Fileset and Job resource for Hyper-V Server data is shown below. As for all VSS-enabled components, it is the administrator’s responsibility to make sure that the required VSS snapshots are created by explicitly mentioning at least one file or directory for each drive where data that is handled by the plugin is stored. In the example, we use the file `c:/backmeup` to ensure this.

```

Fileset {
  Name = HYPERV
  Include {
    Options {
      Signature = SHA1
      Dedup = bothsides
    }
    File = C:/backmeup
    Plugin = "vss:@HYPERV/"
  }
}

```

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```
Job {
  Name = HYPERV08
  Accurate = Yes
  File Set = HYPERV
  Client = wsb-hyp08-fd
  Job Defs = DefaultJob
  Level = Full
}
```

Note in the example above that `C:/backmeup` is explicitly included, which is required to ensure that **Bacula** creates the required VSS snapshot of that Windows drive letter. If Hyper-V Server data is also stored on other partitions, you need to create similar `File =` lines for these drives, too.

#### Note

Starting with Bacula Enterprise version 12.6, the explicit include of a dummy file (see `File = C:/backmeup` in the fileset example above) is not mandatory anymore

```
File Set {
  Name = HYPERV-TestVM
  Include {
    Options {
      Signature = SHA1
    }
  }
  File = C:/backmeup
  # backup only TestVM on the server
  Plugin = "vss:@HYPERV/ cinclude=\"Host Component\" cinclude=*/TestVM
  ↪ cexclude=*"
}
```

Hyper-V uses one of two mechanisms to back up each VM. The default backup mechanism is called the “Saved State” or “Offline” method, where the VM is put into a saved state during the processing of the `PrepareForSnapshot` event, snapshots are taken of the appropriate volumes, and the VM is returned to the previous state during the processing of the `PostSnapshot` event.

The other backup mechanism is called the “Child VM Snapshot” or “Online” method, which uses VSS inside the child VM to participate in the backup. For the “Child VM Snapshot” method to be supported, all of the following conditions must be met:

- Backup (volume snapshot) Integration Service is installed and running in the child VM. The service name is “Hyper-V Volume Shadow Copy Requestor”.
- The child VM must be in the running state.
- The Snapshot File Location for the VM is set to be the same volume in the host operating system as the VHD files for the VM.
- All volumes in the child VM are basic disks and there are no dynamic disks.
- All disks in the child VM must use a file system that supports snapshots (for example, NTFS).

To know if your VMs are “Offline” or “Online”, it is possible to use the following windows command on Windows 2012 R2:

```
C:/> echo list writers > t.txt
C:/> diskshadow /s t.txt | find "Caption: 0"
        - Caption: Offline/2012
        - Caption: Offline/windows
        - Caption: Online/centos
```

On Windows 2012 and 2008

```
C:/> echo list writers > t.txt
C:/> diskshadow /s t.txt | find /i "Caption: Backup Using"
```

- For Offline backups: Backup Using Saved State/*VMname1*
- For Online backups: Backup Using Child Partition Snapshot/*VMname2*

## 4 Restore

Restoring the VMs is done entirely by the host operating system; the VSS writers in the child VMs are not involved.

- During the processing of the PreRestore event, the Hyper-V VSS writer turns off and deletes any VMs that are about to be restored.
- After all VSS writers have processed the PreRestore event, the files are restored.
- For each VM that was restored, the Hyper-V VSS writer registers the VM with the Hyper-V management service. If the VM is restored to a nondefault location, a symbolic link is created in the default location linking to that location.
- For each VHD that was restored, the location is compared with the one specified for that VM. If the location is different, then the configuration is updated with the proper location.
- The network configuration is updated. If the virtual switches that the VM was connected to when it was backed up still exist, new ports are created and connected to the VM.

When restoring a “Offline” VM, the VM will not be re-created by Microsoft Hyper-V vss driver. It is possible to run “New-VM” powershell command to re-create the VM.

```
New-VM -VMName centos -VHDPATH C:/VM/centos.vhdx -MemoryStartupBytes 512MB -
↳ SwitchName VMNetwork
```

### 4.1 without\_vss

With Bacula Enterprise 8.2, it is possible to restore VSS files directly on disk without using the VSS restore framework. In the restore menu, it is possible to configure Plugin Options menu and set the `without_vss` option to “true”.

```
Run Restore job
JobName:      RestoreFiles
Bootstrap:    /opt/bacula/working/trusty-amd64-dir.restore.9.bsr
Where:        c:/tmp
Replace:      Always
Fileset:      Full Set
Backup Client: hyperv
Restore Client: hyperv
```

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```
Storage:      dedup
When:        2015-03-03 06:50:22
Catalog:     MyCatalog
Priority:     10
Plugin Options: *None*      <----- Plugin Options menu
```

## 4.2 Example

We assume that a correct backup of Hyper-V data exists and you start the restore with option 5 of the `bconsole restore` command, mark the complete tree of data backed up by the Hyper-V component of the VSS plugin, then finally do `lsmark @HYPERV` to show all the files selected to be restored:

```
$ mark *
31 files marked.
$ lsmark
*@HYPERV/
  *Microsoft Hyper-V VSS Writer/
    *Host Component/
      *:component_info_5215da3c
      *c:/
        *programdata/
          *microsoft/
            *windows/
              *hyper-v/
                *initialstore.xml
                *resource types/
                  *06ff76fa-2d58-4baf-9f8d-455773824f37.xml
                  *118c3be5-0d31-4804-85f0-5c6074abea8f.xml
                  *146c56a0-3546-469b-9737-fcbcf82428f4.xml
                  *dacdcf3f-6f67-4eb8-a4d0-5d93b48a2468.xml
                  *f6293891-f32f-4930-b2db-1a8961d9cb75.xml
        *Offline/
          *ubuntu/
            *:component_info_5215da3c
            *c:/
              *programdata/
                *microsoft/
                  *windows/
                    *hyper-v/
                      *virtual machines/
                        *690f5094-ff23-411e-92c0-639fc7ebc598/
                          *690f5094-ff23-411e-92c0-639fc7ebc598.bin
                          *690f5094-ff23-411e-92c0-639fc7ebc598.vsv
                          *690f5094-ff23-411e-92c0-639fc7ebc598.xml
          *vm/
            *ubuntu.vhdx
```

```
$ lsmark
*@HYPERV/
  *Microsoft Hyper-V VSS Writer/
    *Host Component/
```

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```
*:component_info_5216cf46
*c:/
  *programdata/
    *microsoft/
      *windows/
        *hyper-v/
          *initialstore.xml
          *resource types/
            *06ff76fa-2d58-4baf-9f8d-455773824f37.xml
            *118c3be5-0d31-4804-85f0-5c6074abea8f.xml
*Online/
  *centos/
    *:component_info_5216cf46
    *c:/
      *programdata/
        *microsoft/
          *windows/
            *hyper-v/
              *snapshots/
                *acc145fb-9566-402d-9434-04f1e325a75f-backupsnapshot.xml
              *virtual machines/
                *acc145fb-9566-402d-9434-04f1e325a75f.xml
      *vm/
        *centos-childvhd.avhdx
        *centos.vhdx
```

## 5 File Level Restore

To restore a set of files from a Hyper-V VM backup without re-importing the entire VM, it is possible to restore VHD files in a directory using the `without_vss` plugin restore option (See sec *without\_vss*) and mount them in the system with the Powershell command `Mount-VHD` (or the Server Manager console (see Fig *Attach/Mount Option in Server Manager* below). Once mounted, the VHD image is accessible like other physical disks on the system.

```
Mount-VHD -Path c:\test\testvhd.vhdx -ReadOnly
```

More information about the `Mount-VHD` command can be found here:

<https://technet.microsoft.com/en-us/library/hh848551.aspx>

We advise to restore VHD files on a different system to avoid operational problems during the restore. If the `without_vss` option is not properly set, the original VM would be deleted by Hyper-V automatically during the restore.

### 5.1 Cluster Shared Volumes

Starting with Bacula Enterprise 12.6, Cluster Shared Volumes File System (CSVFS) backup is supported, so VMs located on CSVFS volumes are backed up transparently. However, mixing CSVFS and NTFS in the same backup is not supported due to a Microsoft limitation. Noticeably, Host Component are located on `C:/` which is typically a NTFS volume.

- Make sure to backup this kind of system with 2 different jobs:
- One job backups the default selection without the Host Component:

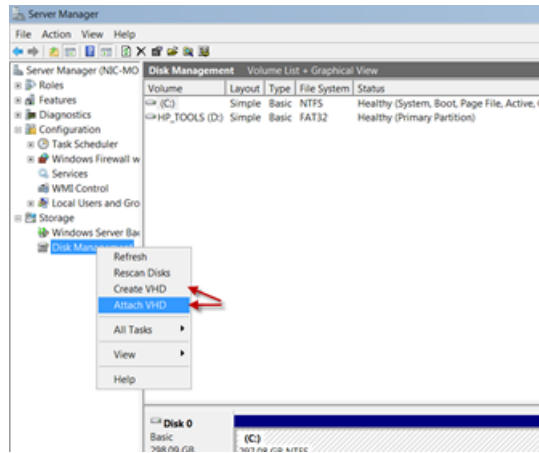


Fig. 2: Attach/Mount Option in Server Manager

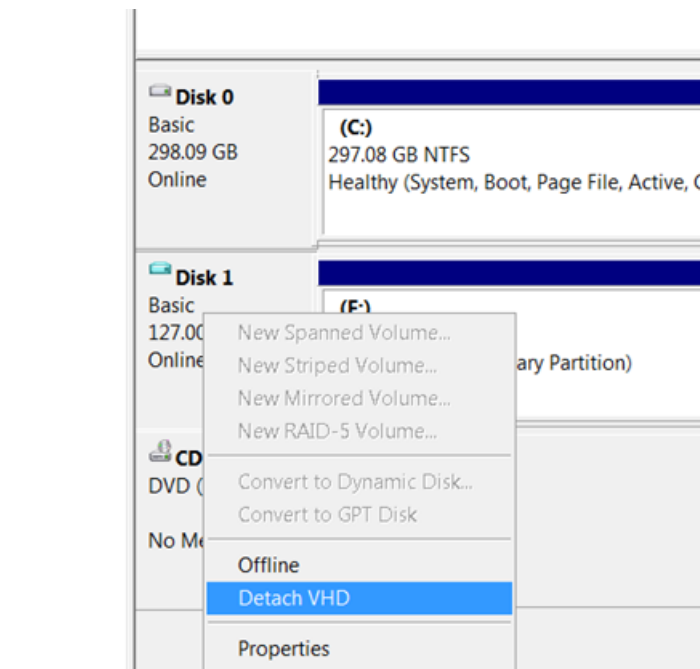


Fig. 3: Detach/Unmount Option in Server Manager

```

File Set {
  Name = HYPERV-CSVFS-1
  Include {
    Options {
      Signature = SHA1
    }
    # backup all defaults but Host Component
    Plugin = "vss:@HYPERV/ cexclude=\"Host Component\""
  }
}

Job {
  Name = HYPERV09-CSVFS-NO-HOSTCOMPONENT
  Accurate = Yes
  File Set = HYPERV-CSVFS-1
  Client = wsb-hyp09-fd
  Job Defs = DefaultJob
  Level = Full
}

```

- Another job backups specifically the Host Component:

```

File Set {
  Name = HYPERV-CSVFS-2
  Include {
    Options {
      Signature = SHA1
    }
    # backup only Host Component
    Plugin = "vss:@HYPERV/ cinclude=\"Host Component\" cexclude=*"
  }
}

Job {
  Name = HYPERV09-CSVFS-HOSTCOMPONENT
  Accurate = Yes
  File Set = HYPERV-CSVFS-2
  Client = wsb-hyp09-fd
  Job Defs = DefaultJob
  Level = Full
}

```

## 6 Single Item Restore

HyperVSIR

(see separate article about Hyper-V Single Item Restore that you can download on the top of the page of that article)

## 7 Plugin Notes

### 7.1 Windows VSS Plugin Items to Note

- One file from each drive needed by the plugins must be explicitly listed in File Set used. This is to ensure that the main **Bacula** code does a snapshot of all the required drives. At a later time, we will find a way to accomplish this automatically.
- When doing a backup that is to be used for Bare Metal Recovery, do **not** use the VSS plugin.

### 7.2 General Plugin Items to Note

- The `estimate` command does not handle plugins. When estimating a job that uses plugins, an error message regarding the plugin will be displayed. However, backup jobs will use the plugin.
- The File Set Include Option `CheckFileChanges = Yes` does not work with plugin-generated data. Thus, you must not use that Option in the Include section of the Fileset where you specify using the Hyper-V plugin.
- When an Offline virtual machine is currently backed up, it is not possible to start it (Hyper-V limitation).
- The Bacula `replace` flag is not respected by the Hyper-V plugin. Virtual machines will be always overwritten during restore.
- Microsoft Hyper-V vss interface doesn't support Differential and Incremental backup. Use of the Global Endpoint Deduplication plugin and the `bothsides` Fileset option permits to minimize the data transfer and the storage.
- When trying to restore Incremental or Differential jobs, Hyper-V VSS writer will print errors on PostRestore and PreRestore events. The virtual disk image (VHDX) should be restored despite these errors.
- The `restart` command has limitations with plugins, as it initiates the Job from scratch rather than continuing it. Bacula determines whether a Job is restarted or continued, but using the `restart` command will result in a new Job.