

Support for NetBackup 7.7.x, 8.x, 9.x, and 10.x in virtual environments

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Introduction

This tech note describes the general support guidelines for NetBackup 7.7.x, 8.x, 9.x, and 10.x in virtual environments. It also provides notes on NetBackup 7.7.x, 8.x, 9.x, and 10.0 support for VMware and Hyper-V.

For detailed information on supported VMware and Hyper-V environments, refer to the "Virtual Systems Compatibility" section of the *NetBackup Software Compatibility List (SCL)*, available from this location:

[NetBackup Compatibility List for all Versions](#)

Veritas is committed to serving the virtualization and hypervisor market by offering our customers the benefits of NetBackup Enterprise data protection solutions. We welcome your feedback. Please contact your Veritas account representative for assistance.

<http://www.netbackup.com>

Recent changes to this tech note

Table 1 Recent changes to this tech note

Description of changes	Publication date for this change
Added support of Windows Server 2022 (64-bit), RHEL 8 (32-bit/64-bit), SUSE 15 (32-bit/64-bit), and OEL 9 (32-bit/64-bit) to the list of Hyper-V guest operating systems supported for file-level recovery. See "Supported guest operating systems for Hyper-V" on page 54.	January 3, 2023
Added support of Windows 2022 and Red Hat Enterprise Linux (RHEL) 9 to the list of VMware guest operating systems for file-level recovery. See "Supported guest operating systems for VMware" on page 30.	October 7, 2022
Added support of Windows 2022, SuSE Linux 15, and Red Hat Enterprise Linux (RHEL) 9 to the list of VMware guest operating systems for agentless file restores. See "Supported guest operating systems for VMware" on page 30.	October 4, 2022
Updated support for BMR Direct VM conversion into VMware virtual environments. See "Support for BMR Direct VM conversion into VMware virtual environments" on page 26.	July 5, 2022
Added the requirement section for NetBackup version 10.x. See "Supported guest operating systems for VMware" on page 30.	March 8, 2022
Updated Btrfs file system notes. See "Supported file systems for VMware" on page 48.	August 19, 2021
Added support for Nutanix AHV compatibility. See "NetBackup for Nutanix AHV Compatibility" on page 48.	June 7, 2021
Added support for MSDP Instant Access files system types and LVM. See "MSDP Instant Access supported files system types and LVM" on page 27.	April 28, 2021
Added support for VMware Cloud on Azure VMware Solutions (AVS). See "NetBackup support for Azure VMware Solutions" on page 39.	March 10, 2021
Added Windows 2019 and Red Hat Enterprise Linux 8 to platforms supported as guest operating systems for agentless file restores. See "Supported guest operating systems for VMware" on page 30.	February 3, 2021
Changed title of document to include NetBackup 9.x.	February 3, 2021

Table 1 Recent changes to this tech note (*continued*)

Description of changes	Publication date for this change
<p>Added ACL limitation of 25 or less for XFS V4 file systems on RHEL Linux.</p> <p>See "Supported file systems for VMware" on page 48.</p>	October 2, 2020
<p>Added BMR client support for Solaris Sparc LDOM guest operating systems.</p> <p>See "BMR client support for Solaris Sparc LDOM" on page 23.</p>	July 29, 2020
<p>Added BMR client support for IBM AIX LPAR guest operating systems.</p> <p>See "BMR client support for IBM AIX LPAR" on page 23.</p>	July 29, 2020
<p>Added platforms supported as guest operating systems for agentless file restores.</p> <p>See "Supported guest operating systems for VMware" on page 30.</p>	July 29, 2020
<p>NetBackup 8.2 adds support for Red Hat Enterprise Virtualization.</p> <p>See "Support for Red Hat Virtualization (RHV)" on page 10.</p>	July 2, 2019
<p>NetBackup 8.2 adds BMR client support for Windows Server 2019 (64-bit).</p> <p>Revised the notes on support for Windows Server 2016 (64-bit), Red Hat Enterprise Linux 5, 6, 7, 7.1, 7.2, 7.3, 7.4, 7.5,7.6 (64-bit), SUSE Linux Enterprise Server 12 GA and SP1, SP2, SP3, Solaris 10 Update 10, 11 (64-bit) , and Solaris 11 Update 1, 2, 3 (x86-64).</p> <p>See "BMR client support for VMware" on page 12.</p>	July 2, 2019
<p>Revised the note on support for Red Hat Enterprise Linux 5, 6, 7, 7.1, 7.2, 7.3, 7.4, 7.5,7.6 (64-bit), SUSE Linux Enterprise Server 12 GA and SP1, SP2, SP3, and Windows Server 2012 R2 (64-bit), Windows Server 2016 (64-bit).</p> <p>See "BMR client support for Hyper-V" on page 17.</p>	July 2, 2019
<p>Added VMware ESX/vCenter 6.5 and VMware ESX/vCenter 6.t to the list of Hypervisor types supported for BMR Direct VM conversion into VMware.</p> <p>See "BMR Direct VM Conversion support" on page 25.</p>	July 2, 2019
<p>Added Windows Server 2019 (64-bit), RHEL 8 (64-bit), SUSE 15 (64-bit), CentOS 7 (64-bit), and CentOS 6 (64-bit) to the list of VMware guest operating systems supported for file-level recovery.</p> <p>See "Supported guest operating systems for VMware" on page 30.</p>	July 2, 2019
<p>Added information about VMware transport modes: SAN transport, Hotadd transport, and NBD and NBDSSL transport.</p> <p>See "NetBackup support for VMware transport modes" on page 39.</p>	July 2, 2019

Table 1 Recent changes to this tech note (*continued*)

Description of changes	Publication date for this change
<p>Removed NTFS (Windows NT) from the list of supported file systems for the VMware policy type.</p> <p>See “Supported file systems for VMware” on page 48.</p>	July 2, 2019
<p>Added NetBackup 8.1.2 and 8.2 to the list of NetBackup versions that support vSphere 6.7.</p> <p>See “NetBackup support for vSphere 6.7” on page 39.</p>	July 2, 2019
<p>Added vSphere 6.7 to the list of vSphere versions supported by NetBackup 8.1.</p> <p>See “NetBackup support for vSphere 6.5” on page 40.</p>	July 2, 2019
<p>Added Windows Server 2019 to the list of failover cluster components supported for Hyper-V (VSS).</p> <p>See “Supported Hyper-V components and versions (VSS backup method)” on page 52.</p>	July 2, 2019
<p>Added Windows Server 2019 (64-bit), RHEL 7 (32-bit*/64-bit), and SUSE 12 (64-bit) to the list of Hyper-V guest operating systems supported for file-level recovery.</p> <p>See “Supported guest operating systems for Hyper-V” on page 54.</p>	July 2, 2019
<p>Added Windows 2019 and Hyper-V server 2019 to the Hyper-V integration services required in the VM for online backups (VSS method).</p> <p>See “Hyper-V online backups with VSS require the proper version of Hyper-V integration services in the VM” on page 59.</p>	July 2, 2019
<p>Updated BMR support information for Windows Server 2016, Red Hat 7.x, SUSE 12, and Solaris 11.</p> <p>See “BMR client support for VMware” on page 12.</p> <p>See “BMR client support for Hyper-V” on page 17.</p> <p>See “Support for BMR Direct VM conversion into VMware virtual environments” on page 26.</p>	October 23, 2018
<p>Starting at NetBackup 8.1.2, AIX and HP-UX are no longer supported for NetBackup master or media servers.</p> <p>See “Virtual media server” on page 8.</p>	September 27, 2018
<p>NetBackup 8.1.2 adds support for individual file recovery from the Linux XFS file system in VMware and Hyper-V VMs.</p> <p>See “Supported file systems for VMware” on page 48.</p> <p>See “Supported guest operating systems for Hyper-V” on page 54.</p>	September 27, 2018

Table 1 Recent changes to this tech note (*continued*)

Description of changes	Publication date for this change
<p>NetBackup 8.1.2 adds a plug-in for vSphere Client (HTML5). See "Requirements for the NetBackup plug-in for vSphere Client (HTML5) for NetBackup version 10.x" on page 36.</p>	September 27, 2018
<p>NetBackup 8.1.2 adds support for VMware Cloud on AWS. See "NetBackup support for VMware Cloud on AWS" on page 39.</p>	September 27, 2018
<p>Added a note on a Red Hat guest OS issue: See "Red Hat guest OS file system becomes read only" on page 48.</p>	September 27, 2018
<p>Revised the note on support for granular recovery (GRT) of Exchange data, to add support for mount-point volumes. See "Supported file systems for VMware" on page 48.</p>	February 17, 2018
<p>For NetBackup 8.1.1, NetBackup Bare Metal Restore functionality is supported on Windows, Linux, and Solaris platforms for restoring the clients that have NetBackup 8.1.1 installed. See "Bare Metal Restore (BMR) for virtual environments" on page 11.</p>	February 17, 2018
<p>For VMware backups, added a note on support for granular recovery (GRT) of Exchange data that resides on a GPT disk. Added a note that file-level recovery is not supported for LVM thin provisioned volumes. See "Supported file systems for VMware" on page 48.</p>	December 4, 2017
<p>Added a support statement on fault tolerant VMs in vSphere 6.0 and later. See "Support for fault tolerant VMs in vSphere 6.0 and later" on page 45.</p>	November 10, 2017
<p>Copied the contents of tech note "Veritas NetBackup support for vSphere 6.5" (000116592) into this document and added an update for NetBackup 8.1. See "NetBackup support for vSphere 6.5" on page 40.</p>	October 9, 2017
<p>Removed all references to NetBackup versions 7.0 through 7.6.x. Support for those versions has been discontinued.</p>	September 21, 2017

Table 1 Recent changes to this tech note (*continued*)

Description of changes	Publication date for this change
<p>Updates for NetBackup 8.1:</p> <ul style="list-style-type: none"> ■ Updated the tables on supported VMware and Hyper-V guest operating systems and file systems. See “Supported guest operating systems for VMware” on page 30. See “Supported file systems for VMware” on page 48. See “Supported guest operating systems for Hyper-V” on page 54. ■ Updated the requirements for the NetBackup plug-in for vSphere Web Client. See “Requirements for the NetBackup plug-in for vSphere Web Client” on page 34. Note: Starting with NetBackup 8.1, the NetBackup plug-in for vCenter is no longer supported. It is superseded by the NetBackup plug-in for vSphere Web Client. ■ Added a note stating that NetBackup Bare Metal Restore functionality is not supported for restoring clients that have NetBackup version 8.1 installed. See “Bare Metal Restore (BMR) for virtual environments” on page 11. 	<p>September 21, 2017</p>
<p>Corrected a note on NetBackup 8.0 file-level recovery for the ext4 64-bit file system: See “Supported file systems for VMware” on page 48.</p> <p>Added notes on NetBackup 8.0 support for Windows Server 2016 shielded VMs: See “Notes on the new Hyper-V features in NetBackup 8.0” on page 52.</p>	<p>March 28, 2017</p>

General NetBackup support in virtual environments

Ideally, every NetBackup configuration supported in a traditional physical environment would also be supported in any virtual environment without qualification. While that is our mission, it is not always possible.

Therefore, the purpose of this section is to:

- Clarify differences between NetBackup support in physical vs. virtual environments.
- Describe general guidelines for support in virtual environments.
- Describe the impact of a virtual environment on specific NetBackup components, such as clients, servers, and other options.
- Provide notes on virtualization technologies and links to related tech notes.

Terminology

The following terms are used in this document.

Table 2 Terminology

Term	Definition
Guest OS	The operating system that is installed in a virtual machine.
Hypervisor	The software platform running on a physical server that hosts one or more virtual machines.
Virtual machine (VM)	The emulation of a single physical machine within a hypervisor.

General guidelines for support

Veritas provides support for NetBackup within a virtual environment. For the purpose of this document, a “virtual environment” is defined as: any on-site, off-site, or public cloud IaaS virtualization solution where NetBackup can be installed into a supported guest operating system.

NetBackup has an open support policy for virtualization platforms, as follows:

- NetBackup is qualified on physical configurations.
- If the same configuration can be virtualized, it is supported without explicit qualification on the virtualization platform (unless otherwise noted in this document).

The published NetBackup software and hardware compatibility listings reflect this support policy. The listings are available here:

<http://www.veritas.com/docs/000033647>

Note the following limitations of NetBackup support within a virtual environment:

- Support of hardware or software as published in the NetBackup compatibility listings is subject to mutual support by the hardware/software vendor and the hypervisor vendor.

Specifically:

- The hardware/software vendors must support their products within the hypervisor.
- The hypervisor vendor must support use of the hardware/software product within the hypervisor.

Such hardware/software products include operating systems, cluster servers, peripherals, drivers, patches, databases, applications, and so forth.

- When operating NetBackup within a virtual machine, the hypervisor may introduce conditions (such as contention for shared resources or other interruptions) that were not present during standard qualification. Additional tuning may be required to address any resulting delay, retry, or timeout conditions. Contact the hypervisor vendor first for tuning suggestions.
- NetBackup may experience lesser performance within the hypervisor. It may be necessary to increase system resources to address a performance issue.
- Using a hypervisor vendor's interface to suspend, resume, or otherwise disrupt execution of NetBackup is not supported. The impact upon NetBackup operations and data is unknown. Only NetBackup management interfaces are supported for NetBackup control.
- Using NetBackup within VM high availability, replication, or transfer solutions is supported but not qualified by Veritas. Examples of such solutions are vSphere HA, host-based replication, vMotion, and Storage vMotion (but not limited to VMware). As a virtualized application, NetBackup is unaware of being deployed within a VM, and support for such operations is provided by the hypervisor vendor.
- In the event of a support escalation, NetBackup technical support will make every reasonable attempt to resolve the issue within the virtual environment. In rare circumstances, Veritas reserves the right to qualify, limit, exclude, or discontinue implicit support for a NetBackup configuration due to unforeseen incompatibilities within the hypervisor environment. In the rare case of a NetBackup failure due to a hypervisor operation, it may be necessary to recover from a backup.

Virtual master server

The NetBackup master server is supported within a virtual machine, under the limitations described in the “General guidelines for support.”

Refer to the NetBackup Software Compatibility lists for supported NetBackup master server platforms:

<http://www.veritas.com/docs/000033647>

Virtual media server

The NetBackup media server is supported within a virtual machine, under the limitations described in the “General guidelines for support.”

The following storage units are supported within a virtual machine:

- Basic Disk

- AdvancedDisk
- Media Manager (tape storage units)
 For details on the supported virtualization technologies, see [Table 3](#).
- Media Server Deduplication Pool (MSDP)
 For MSDP requirements, see the *NetBackup Deduplication Guide*.
- OpenStorage, where the Data Interface is Ethernet.
 For details on OpenStorage device compatibility, see the *NetBackup Hardware Compatibility List* (HCL):
<http://www.veritas.com/docs/000033647>

For a list of supported NetBackup media server platforms, see the *NetBackup Software Compatibility List* (SCL):

<http://www.veritas.com/docs/000033647>

Table 3 Virtualization technologies supported for Media Manager storage units

Virtualization technology	Tape support	Notes
IBM virtual machines	Shared with driver, or dedicated hardware path.	The following document contains details on NetBackup support for IBM virtual machines: http://www.veritas.com/docs/000082814 Note: Starting at NetBackup 8.1.2, AIX is no longer supported for master or media servers.
HP-UX Integrity virtual machines and vPars	Shared with driver, or dedicated hardware path.	The following document contains details on NetBackup support for HP-UX Integrity virtual machines and vPars: http://www.veritas.com/docs/000082815 Note: Starting at NetBackup 8.1.2, HP-UX is no longer supported for master or media servers.
Hitachi Virtage LPARs	Dedicated or shared hardware path.	The following document contains details on NetBackup support for Hitachi virtual LPARs: http://www.veritas.com/docs/000094965
Oracle Solaris Logical Domains (LDMs) and zones	See links under Notes.	The following documents contain details on NetBackup support for LDMs and zones: http://www.veritas.com/docs/000082869

Hard partitioning physically segments a server, by taking a single large server and separating it into distinct systems. Each separated system acts as a physically

independent, self-contained server, with its own CPUs, operating system, separate boot area, memory, input/output subsystem, and network resources.

Virtual clients and database agents

NetBackup operating system clients and database agents are supported within a virtual machine, under the limitations described in the “General guidelines for support.”

Refer to the NetBackup *Application/Database Agent Compatibility List* for a list of supported NetBackup database agent platforms:

<http://www.veritas.com/docs/000033647>

Support for Red Hat Virtualization (RHV)

NetBackup can be used to protect virtual machines within Red Hat Virtualization (RHV) deployments and the RHV Manager. For more information, see the *NetBackup Web UI RHV Administrator's Guide*.

Virtual Snapshot Client

This section describes the use of Snapshot Client when installed in a virtual machine.

Note however that NetBackup has special backup agents for VMware and Hyper-V that do not require installation of a client on virtual machines. See the NetBackup for VMware and NetBackup for Hyper-V sections in this document.

Support for VMware

NetBackup Snapshot Client can be used within a VMware virtual machine in conjunction with Raw Device Mapping (RDM) to provide off-host backup capabilities. Because of RDM limitations, other backup methods are not supported at this time. The following section contains more information:

See “[Support for VMware raw device mapping \(RDM\)](#)” on page 46.

Consult the NetBackup *Snapshot Client Compatibility List* to determine which off-host combinations are supported:

<http://www.veritas.com/docs/000033647>

See also the following section for support information on NetBackup for VMware:

See “[NetBackup for VMware Compatibility](#)” on page 30.

Support for Hyper-V

NetBackup Snapshot Client can be used within a Hyper-V virtual machine with Hyper-V pass-through disks to provide off-host backup of snapshots. The following section contains more information:

See “[Support for Hyper-V pass-through disks](#)” on page 62.

Consult the NetBackup *Snapshot Client Compatibility List* to determine which off-host combinations are supported:

<http://www.veritas.com/docs/000033647>

See also the following section for support information on NetBackup for Hyper-V:

See “[NetBackup for Hyper-V Compatibility](#)” on page 52.

Bare Metal Restore (BMR) for virtual environments

Due to the inherent physical dependencies in the Bare Metal Restore (BMR) option, BMR is not covered by the “General guidelines for support” section. Instead, BMR is explicitly qualified and supported within specific virtual environments, as listed in this topic.

Note: NetBackup Bare Metal restore functionality is not supported for restoring the clients that have NetBackup version 8.1 installed.

Note: NetBackup does not support BMR restore operations in AIX and HP-UX environments for clients with NetBackup version 8.1.1.

Note: For Bare Metal Restore of clients that have NetBackup version 8.0 and earlier installed, Veritas recommends that you use a Shared Resource Tree (SRT) that has 8.0 and earlier client versions.

Note: For general BMR support details such as the minimum NetBackup level required for the BMR client OS, see the NetBackup *Software Compatibility List* (SCL), available here:

<http://www.veritas.com/docs/000033647>

- VMware: The BMR master server, BMR boot server, and BMR client are supported on VMware guest operating systems.
See “[BMR client support for VMware](#)” on page 12.
See “[BMR Direct VM Conversion support](#)” on page 25.

- Windows Hyper-V: The BMR master server, BMR boot server, and BMR client are supported on Hyper-V guest operating systems.
See [“BMR client support for Hyper-V”](#) on page 17.
- Xen Hypervisor: For NetBackup 7.7.x, the BMR master server, BMR boot server, and BMR client are supported on Xen guest operating systems.

Note: Starting at NetBackup 8.0, BMR for Xen is no longer supported.

See [“BMR client support for Xen \(NetBackup 7.7.x\)”](#) on page 24.

- IBM PowerVM: For NetBackup 7.7.x, the BMR master server, BMR boot server, and BMR client are supported on guest operating systems.

Note: Starting at NetBackup 8.0, BMR for IBM PowerVM is no longer supported.

See [“BMR client support for IBM PowerVM \(NetBackup 7.7.x\)”](#) on page 25.

BMR client support for VMware

NetBackup supports BMR protection for guest operating systems running on VMware ESX 4.1, 5.0, 5.1, 5.5, and 6.0 servers. The following tables describe support for the BMR client on VMware in NetBackup 8.x and 7.7.x, respectively.

NetBackup 8.x: VMware guest operating systems supported for BMR client

Table 4 NetBackup 8.x: VMware guest operating systems supported for BMR client

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
Windows Server 2008 SP1, SP2 (32-bit and 64-bit)	virtual-to-virtual self restore virtual-to-virtual DSR restore virtual-to-physical DSR restore physical-to-virtual DSR restore	Yes	

Table 4 NetBackup 8.x: VMware guest operating systems supported for BMR client (*continued*)

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
Windows Server 2008 R2 (64-bit)	Same as Windows Server 2008 SP1	Yes	
Windows Server 2012 (64-bit)	Same as Windows Server 2008 SP1	Yes	
Windows Server 2012 R2 (64-bit)	Same as Windows Server 2008 SP1	Yes	
Windows Server 2016 (64-bit)	Same as Windows Server 2008 SP1	Yes	<p>Support starts at 8.1.1.</p> <p>By default, Windows Server 2016 formats ReFS volumes with ReFS version 3.1. During NetBackup 8.1.1 BMR restore of Windows Server 2016, the restored ReFS volumes are downgraded to ReFS version 1.2.</p> <p>For more information, see the Veritas tech note 100041695.</p>

Table 4 NetBackup 8.x: VMware guest operating systems supported for BMR client (*continued*)

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
Windows Server 2019 (64-bit)	Same as Windows Server 2008 SP1	Yes	<p>Support starts at NetBackup 8.2.</p> <p>By default, Windows Server 2019 formats ReFS volumes with ReFS version 3.4. During NetBackup 8.2 BMR restore of Windows Server 2019, the restored ReFS volumes are downgraded to ReFS version 1.2.</p> <p>For more information, see the Veritas tech note 100041695.</p>
Windows 7 (64-bit)	Same as Windows Server 2008 SP1	No	
Windows 8 (64-bit)	Same as Windows Server 2008 SP1	No	
Windows 8.1 (64-bit)	Same as Windows Server 2008 SP1	No	
Windows 10 (64-bit)	Same as Windows Server 2008 SP1	No	

Table 4 NetBackup 8.x: VMware guest operating systems supported for BMR client (*continued*)

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
Red Hat Enterprise Linux 5, 6, 7, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 8.0, 8.1 (64-bit)	virtual-to-virtual self restore virtual-to-virtual DDR restore Support for physical-to-virtual DSR and virtual-to-physical DSR is subject to the conditions specified in the BMR Dissimilar System Restore for UNIX tech note: DSR for UNIX	Yes	8.0 for BMR client for RHEL 7.0, 7.1, 7.2, and 7.3 guest operating systems on virtual machines that have EFI firmware. 8.1.2 for RHEL 7.4 and 7.5. 8.2 for RHEL 7.6. 8.3 for 7.7, 7.8, 8.0, 8.1
Oracle Enterprise Linux 5, 6, 7, 7.7, 8.0, 8.1 (64-bit)	Same as Red Hat	Yes	8.3 for 7.7, 8.0, 8.1
CentOS Linux 7.0 to 7.7, 8.0, 8.1 (64-bit)	Same as Red Hat	Yes	8.3 for 7.0 to 7.7, 8.0, 8.1
SUSE Linux Enterprise Server 11 SP3	Same as Red Hat	Yes	
SUSE Linux Enterprise Server 12 GA and SP1, SP2, SP3, SP4	Same as Red Hat	Yes	8.3 for SP4
Solaris 10 Update 10, 11 (64-bit)	Same as Red Hat	Yes	
Solaris 11 Update 1, 2, 3 (x86-64)	Same as Red Hat	Yes	

NetBackup 7.7.x: VMware guest operating systems supported for BMR client

Table 5 NetBackup 7.7.x: VMware guest operating systems supported for BMR client

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level
Windows Server 2008 SP1, SP2 (32-bit and 64-bit)	virtual-to-virtual self restore virtual-to-virtual DSR restore virtual-to-physical DSR restore physical-to-virtual DSR restore	Yes	
Windows Server 2008 R2 (64-bit)	Same as Windows Server 2008 SP1	Yes	
Windows Server 2012 (64-bit)	Same as Windows Server 2008 SP1	Yes	
Windows Server 2012 R2 (64-bit)	Same as Windows Server 2008 SP1	Yes	
Windows 7 (32-bit and 64-bit)	Same as Windows Server 2008 SP1	No	
Windows 8 (32-bit and 64-bit)	Same as Windows Server 2008 SP1	No	
Windows 8.1 (32-bit and 64-bit)	Same as Windows Server 2008 SP1	No	
Windows 10 (32-bit and 64-bit)	Same as Windows Server 2008 SP1	No	7.7.2
Red Hat Enterprise Linux 4, 5, 6, 7 (64-bit)	virtual-to-virtual self restore virtual-to-virtual DDR restore Support for physical-to-virtual DSR and virtual-to-physical DSR is subject to the conditions specified in the BMR Dissimilar System Restore for UNIX tech note: DSR for UNIX	Yes	
Oracle Enterprise Linux 4, 5, 6, 7 (64-bit)	Same as Red Hat	Yes	7.7.3 for Oracle Linux 7, Update 1 and Update 2
SUSE Linux Enterprise Server 10 SP3, SP4	Same as Red Hat	Yes	

Table 5 NetBackup 7.7.x: VMware guest operating systems supported for BMR client (*continued*)

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level
SUSE Linux Enterprise Server 11 GA and SP1, SP2, SP3	Same as Red Hat	Yes	
SUSE Linux Enterprise Server 12	Same as Red Hat	Yes	7.7.2
Solaris 10 Update 8, 9, 10, 11 (64-bit)	Same as Red Hat	Yes	

The following section contains information on BMR Direct VM conversion for VMware:

See [“BMR Direct VM Conversion support”](#) on page 25.

BMR client support for Hyper-V

NetBackup supports BMR protection for guest operating systems running on Windows 2008, 2008 R2, 2012, and 2012 R2 Hyper-V servers.

The following tables describe support for the BMR client on Hyper-V in NetBackup 8.x and 7.7.x, respectively.

NetBackup 8.x: Hyper-V servers and guest operating systems supported for BMR client

Table 6 NetBackup 8.x: Hyper-V servers and guest operating systems supported for BMR client

Guest OS	Hyper-V server	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
Windows Server 2008 SP1, SP2 (32-bit and 64-bit)	Windows 2008 Windows 2008 R2 Windows 2012 Windows 2012 R2	virtual-to-virtual self restore virtual-to-virtual DSR restore virtual-to-physical DSR restore physical-to-virtual DSR restore	Yes	
Windows Server 2008 R2 (64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	Yes	
Windows Server 2012 (64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	Yes	
Windows Server 2012 R2 (64-bit)	Windows 2012 Windows 2012 R2	Same as Windows Server 2008 SP1	Yes	

Table 6 NetBackup 8.x: Hyper-V servers and guest operating systems supported for BMR client (*continued*)

Guest OS	Hyper-V server	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
Windows Server 2016 (64-bit)	Windows 2012 R2	Same as Windows Server 2008 SP1	Yes	By default, Windows Server 2016 formats ReFS volumes with ReFS version 3.1. During NetBackup 8.1.1 BMR restore of Windows Server 2016, the restored ReFS volumes are downgraded to ReFS version 1.2. For more information, see the Veritas tech note 100041695 .
Windows 7 (64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	No	
Windows 8 (64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	No	
Windows 8.1 (64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	No	
Windows 10 (64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	No	

Table 6 NetBackup 8.x: Hyper-V servers and guest operating systems supported for BMR client (*continued*)

Guest OS	Hyper-V server	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
Red Hat Enterprise Linux 5, 6, 7, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 8.0, 8.1 (64-bit)	Same as Windows Server 2008 SP1	virtual-to-virtual self restore virtual-to-virtual DDR restore Support for physical-to-virtual DSR and virtual-to-physical DSR is subject to the conditions specified in the BMR Dissimilar System Restore for UNIX tech note: DSR for UNIX	Yes	8.0 for BMR client for RHEL 7.0, 7.1, 7.2, and 7.3 guest operating systems on virtual machines that have EFI firmware. 8.1.2 for RHEL 7.4 and 7.5. 8.2 for RHEL 7.6. 8.3 for 7.7, 7.8, 8.0, 8.1
Oracle Enterprise Linux 5, 6, 7, 7.7, 8.0, 8.1, (64-bit)	Same as Windows Server 2008 SP1	Same as Red Hat	Yes	8.3 for 7.7, 8.0, 8.1
CentOS Linux 7.0 to 7.7, 8.0, 8.1 (64-bit)	Same as Windows Server 2008 SP1	Same as Red Hat	Yes	8.3 for 7.0 to 7.7, 8.0, 8.1
SUSE Linux Enterprise Server 11 SP3	Same as Windows Server 2008 SP1	Same as Red Hat	Yes	
SUSE Linux Enterprise Server 12 GA and SP1, SP2, SP3, SP4	Same as Windows Server 2008 SP1	Same as Red Hat	Yes	8.1.2 for SUSE 12 SP2 and SP3. 8.3 for SP4
Solaris 10 Update 8 (64-bit)	Windows 2008 Windows 2008 R2	virtual-to-virtual self restore virtual-to-virtual DDR restore	Yes	

Table 6 NetBackup 8.x: Hyper-V servers and guest operating systems supported for BMR client (*continued*)

Guest OS	Hyper-V server	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
Solaris 11 Update 1, 2, 3 (x86-64)	Windows 2008 Windows 2008 R2	Same as Red Hat	Yes	8.1.2 for Solaris 11 Update 2 and 3.

NetBackup 7.7.x: Hyper-V servers and guest operating systems supported for BMR client

Table 7 NetBackup 7.7.x: Hyper-V servers and guest operating systems supported for BMR client

Guest OS	Hyper-V server	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level
Windows Server 2008 SP1, SP2 (32-bit and 64-bit)	Windows 2008 Windows 2008 R2 Windows 2012 Windows 2012 R2	virtual-to-virtual self restore virtual-to-virtual DSR restore virtual-to-physical DSR restore physical-to-virtual DSR restore	Yes	
Windows Server 2008 R2 (64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	Yes	
Windows Server 2012 (64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	Yes	
Windows Server 2012 R2 (64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	Yes	
Windows 7 (32-bit and 64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	No	
Windows 8 (32-bit and 64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	No	

Table 7 NetBackup 7.7.x: Hyper-V servers and guest operating systems supported for BMR client (*continued*)

Guest OS	Hyper-V server	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level
Windows 8.1 (32-bit and 64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	No	
Windows 10 (32-bit and 64-bit)	Same as Windows Server 2008 SP1	Same as Windows Server 2008 SP1	No	7.7.2
Red Hat Enterprise Linux 4, 5, 6, 7 (64-bit)	Same as Windows Server 2008 SP1	virtual-to-virtual self restore virtual-to-virtual DDR restore Support for physical-to-virtual DSR and virtual-to-physical DSR is subject to the conditions specified in the BMR Dissimilar System Restore for UNIX tech note: DSR for UNIX	Yes	
Oracle Enterprise Linux 4, 5, 6, 7 (64-bit)	Same as Windows Server 2008 SP1	Same as Red Hat	Yes	7.7.3 for Oracle Linux 7, Update 1 and Update 2
SUSE Linux Enterprise Server 10 SP3, SP4	Same as Windows Server 2008 SP1	Same as Red Hat	Yes	
SUSE Linux Enterprise Server 11 GA, SP1, SP2, SP3	Same as Windows Server 2008 SP1	Same as Red Hat	Yes	
SUSE Linux Enterprise Server 12	Same as Windows Server 2008 SP1	Same as Red Hat	Yes	7.7.2
Solaris 10 Update 8 (64-bit)	Windows 2008 Windows 2008 R2	virtual-to-virtual self restore virtual-to-virtual DDR restore	Yes	

For the guest operating systems that Hyper-V supports, consult the following:

[Hyper-V on Windows Servers](#)

BMR client support for Solaris Sparc LDOM

The following table describes support for the BMR client on Solaris Sparc LDOM in NetBackup 8.x.

NetBackup 8.x: Solaris Sparc LDOM guest operating systems supported for BMR client

Table 8 NetBackup 8.x: Solaris Sparc LDOM guest operating systems supported for BMR client

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
Solaris Sparc 10.11	virtual-to-virtual self restore	Yes	8.x
Solaris Sparc 11.0, 11.1,11.2,11.3	virtual-to-virtual self restore	Yes	8.3

BMR client support for IBM AIX LPAR

The following table describes support for the BMR client on IBM AIX LPAR servers in NetBackup 8.x.

NetBackup 8.x: IBM AIX LPAR guest operating systems supported for BMR client

Table 9 NetBackup 8.x: IBM AIX LPAR guest operating systems supported for BMR client

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level and other notes
AIX 6.1	virtual-to-virtual self restore	Yes	8.x
AIX 7.1	virtual-to-virtual self restore	Yes	8.x
AIX 7.2	virtual-to-virtual self restore	Yes	8.x

BMR client support for Xen (NetBackup 7.7.x)

The following table describes NetBackup 7.7.x support for the BMR client on Xen.

Note: Starting at NetBackup 8.0, BMR for Xen is no longer supported.

Table 10 NetBackup 7.7.x: Xen guest operating systems supported for BMR client

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level
Windows 2008 SP1, SP2 (32-bit and 64-bit)	virtual-to-virtual self restore virtual-to-virtual DSR restore virtual-to-physical DSR restore physical-to-virtual DSR restore	Yes	
Windows 2008 R2 (64-bit)	Same as Windows 2008 SP1	Yes	
Red Hat Enterprise Linux 4, 5, 6, 7 (64-bit)	virtual-to-virtual self restore virtual-to-virtual DDR restore Support for physical-to-virtual DSR and virtual-to-physical DSR is subject to the conditions specified in the following BMR Dissimilar System Restore for UNIX tech note: DSR for UNIX NetBackup supports the xvda disk format.	Yes	
Oracle Enterprise Linux 4, 5, 6 (64-bit)	Same as Red Hat	Yes	7.7.2 for Oracle Enterprise Linux 6
SUSE Linux Enterprise Server 11 GA, SP1	Same as Red Hat	Yes	
Solaris 10 Update 8 (64-bit)	virtual-to-virtual self restore virtual-to-virtual DDR restore	Yes	

BMR client support for IBM PowerVM (NetBackup 7.7.x)

The following table describes NetBackup 7.7.x support for the BMR client on IBM PowerVM (on IBM AIX guest operating systems).

Note: Starting at NetBackup 8.0, BMR for IBM PowerVM is no longer supported.

Table 11 NetBackup 7.7.x: IBM AIX guest operating systems supported for BMR client

Guest OS	Type of restore supported	BMR client supported as boot server running in guest OS?	Minimum NetBackup level
AIX 6.1 TL6	virtual-to-virtual self restore virtual-to-virtual DSR restore virtual-to-physical DSR restore physical-to-virtual DSR restore is subject to the conditions specified in the following BMR Dissimilar System Restore for UNIX tech note: DSR for UNIX	Yes	
AIX 6.1 TL9	Same as AIX 6.1 TL6	Yes	7.7.1
AIX 7.1 TL0	Same as AIX 6.1 TL6	Yes	
AIX 7.1 TL3	Same as AIX 6.1 TL6	Yes	7.7.1

BMR Direct VM Conversion support

BMR Direct VM Conversion support has been explicitly qualified within specific virtualization environments as listed in this section.

Note: For general BMR support details such as the minimum NetBackup level required for the BMR client OS, see the NetBackup *Software Compatibility List* (SCL) available here:

<http://www.veritas.com/docs/000033647>

Support for BMR Direct VM conversion into VMware virtual environments

The following table describes NetBackup 7.7.x, 8.x, 9.x, and 10.x support for BMR Direct VM conversion into VMware.

Table 12 NetBackup 7.7.x, 8.x, 9.x, and 10.x support for BMR Direct VM conversion into VMware

Hypervisor type and version	BMR client OS version	Minimum NetBackup level
VMware ESX/vCenter 4.1	Windows 2008, 2008 R2, and Windows 7	
VMware ESX/vCenter 5.0	Windows 2008, 2008 R2, and Windows 7	
VMware ESX/vCenter 5.1	Windows 2008, 2008 R2, 2012, 2012 R2, and Windows 7 and 8	
VMware ESX/vCenter 5.5	Windows 2008, 2008 R2, 2012, 2012 R2, and Windows 7 and 8	
VMware ESX/vCenter 6.0	Windows 2008, 2008 R2, 2012, 2012 R2, and Windows 7, 8, 8.1, and 10	7.7.2 for Windows 10. 8.1.1 for Windows 2016.
VMware ESX/vCenter 6.5	Windows 2012, 2012 R2, 2016, 2019 and Windows 8.1, 10	7.7.2 for Windows 10. 8.1.1 for Windows 2016. 8.2 for Windows 2019
VMware ESX/vCenter 6.7	Windows 2012, 2012 R2, 2016, 2019, 2022 and Windows 8.1, 10	7.7.2 for Windows 10. 8.1.1 for Windows 2016. 8.2 for Windows 2019 10.0 for Windows 2022
VMware ESX/vCenter 7.0	Windows 2012, 2012 R2, 2016, 2019, 2022 and Windows 8.1, 10	7.7.2 for Windows 10. 8.1.1 for Windows 2016. 8.2 for Windows 2019 10.0 for Windows 2022

Note: NetBackup Windows x86-32 clients cannot be used as Virtual Instance Converters (VICs) for BMR physical to virtual (P2V) conversions. VMware VDDK 5.5 and later libraries do not support the Windows x86-32 bit platform.

Note: BMR Direct VM Conversion does not support conversion for a Windows client that has a GPT disk or Storage Spaces configured.

MSDP Instant Access supported files system types and LVM

Note: Veritas continues to test other file systems and operating systems with MSDP Instant Access. This table will be updated when additional support information is known.

File systems that are listed in [Table 13](#) as Untested may work with MSDP Instant Access, but Veritas has not yet verified their supportability.

Table 13 MSDP Instant Access supported files system types and LVM

File system (FS)	OS and version	FS created on disk partition	FS created on LVM/LDM general volume	FS created on LVM/LDM RAID volume	FS created on BtrFS RAID volume
ext2/3/4	CentOS 7.4	Supported	Supported	Supported (RAID1, ext4)	Untested
	Red Hat 6.8	Supported	Supported	Supported (RAID1+ext2) (RAID5+ext4)	Untested
	Red Hat 7.4	Supported	Supported	Supported (RAID1, ext2)	Untested
	Red Hat 8	Not Supported for ext4			
	SUSE 12 SP1	Supported	Supported	Supported (RAID1, ext4)	Untested
	Ubuntu 17.10	Supported	Supported	Untested	Untested
XFS	CentOS 7.4	Supported	Supported	Supported (RAID5)	Untested
	Red Hat 7.4	Supported	Supported	Untested	Untested
	Red Hat 8	Not supported			
	SUSE 12 SP1	Supported	Supported	Supported (RAID5)	Untested
	Ubuntu 17.10	Supported	Supported	Untested	Untested

Table 13 MSDP Instant Access supported files system types and LVM
(continued)

File system (FS)	OS and version	FS created on disk partition	FS created on LVM/LDM general volume	FS created on LVM/LDM RAID volume	FS created on BtrFS RAID volume
BtrFS	CentOS 7.4	Supported	Supported	Untested	Untested
	Red Hat 7.4	Supported	Supported	Supported (RAID5)	Untested
	SUSE 12 SP1	Supported (removed snapshot)	Supported (removed snapshot)	Untested	Untested
	Ubuntu 17.10	Supported	Supported	Untested	Untested
NTFS		Supported	Supported with IAv2 released	Supported with IAv2 released	Not applicable
ReFS		Not supported	Untested	Untested	Not applicable
exFAT		Not supported	Untested	Untested	Not applicable

Other NetBackup options

The following NetBackup options or features are supported in a virtual machine.

- NetBackup OpsCenter

Veritas professional services

Veritas professional services can be hired for qualification of a specific configuration of NetBackup within a hypervisor. Contact your Veritas account representative for assistance, or go to the following:

<http://www.netbackup.com>

Links to related information

See the following Veritas documents for support and configuration information.

Table 14 Veritas documents related to virtualization

Document	Description and link
Main listing of NetBackup compatibility lists	Includes links to a range of NetBackup hardware and software compatibility documents. http://www.veritas.com/docs/000033647
<i>NetBackup for VMware Administrator's Guide</i>	Describes how to configure and use NetBackup for VMware to protect VMware virtual machines. Available from the following location: http://www.veritas.com/docs/000003214
<i>NetBackup Web UI VMware Administrator's Guide</i>	Describes how to use the NetBackup web UI to configure and use NetBackup for VMware to protect VMware virtual machines. Available from the following location: http://www.veritas.com/docs/000003214
<i>NetBackup Plug-in for VMware vSphere Client (HTML5) Guide</i>	Describes how to use the NetBackup plug-in in the vSphere Client (HTML5) interface to monitor virtual machine backups and recover virtual machines. Available from the following location: http://www.veritas.com/docs/000003214
<i>NetBackup Plug-in for VMware vSphere Web Client Guide</i>	Describes how to use the NetBackup plug-in in the vSphere Web Client interface to monitor virtual machine backups and recover virtual machines. Available from the following location: http://www.veritas.com/docs/000003214
<i>NetBackup Plug-in for VMware vCenter Guide</i>	Note: Starting at NetBackup 8.1, support for the NetBackup Plug-in for VMware vCenter is discontinued. Describes how to use the NetBackup plug-in in vSphere Client to monitor virtual machine backups and recover virtual machines. Available from the following location: http://www.veritas.com/docs/000003214
<i>NetBackup for Hyper-V Administrator's Guide</i>	Describes how to configure and use NetBackup for Hyper-V to protect Hyper-V virtual machines. Available from the following location: http://www.veritas.com/docs/000003214

Table 14 Veritas documents related to virtualization (*continued*)

Document	Description and link
<i>NetBackup Add-in for Microsoft SCVMM Console Guide</i>	Describes how to configure and use the NetBackup Add-in in the Microsoft System Center Virtual Machine Manager (SCVMM) console. Available from the following location: http://www.veritas.com/docs/000003214

NetBackup for VMware Compatibility

The following topics describe NetBackup for VMware support. NetBackup for VMware protects VMware virtual machines by integrating with VMware vStorage APIs for Data Protection.

Supported VMware versions and backup host operating systems

The information on supported VMware versions has moved to the "Virtual Systems Compatibility" section of the *NetBackup Software Compatibility List*, available from this location:

<http://www.veritas.com/docs/000033647>

Supported guest operating systems for VMware

NetBackup for VMware supports backup and recovery of the entire virtual machine for all guest operating systems that are supported by VMware. To determine VMware support for a particular operating system, consult the [VMware Compatibility Guide](#).

Platforms supported as guest operating systems for agentless file restores

Table 15 Platforms supported as guest operating systems for agentless file

Platform	Versions
CentOS	7.4
Red Hat Enterprise Linux	5, 6, ,7, 8, 9
SuSE Linux	11, 12, 15
Windows	7, 8, Vista, 2008, 2008R2, 2012, 2012R2, 2016, 2019, 2022

VMware guest operating systems supported for file-level recovery

Note: NetBackup does not support file-level recovery from a virtual disk on Storage Spaces. When you use the Backup, Archive, and Restore interface to browse for the files, the files do not appear. To restore the files, restore the entire virtual machine.

NetBackup for VMware supports file-level recovery from a virtual machine backup on the following guest operating systems. For the guest operating systems not listed in this table, you can recover the entire virtual machine but not individual files.

Note: NetBackup 8.1 and later does not support 32-bit clients for the operating systems listed in [Table 16](#). Consequently, file-level restore directly to a 32-bit virtual machine is not possible with NetBackup 8.1. As an alternative, you can perform a file-level restore to network shared storage. Note: Recovery of the *entire virtual machine* is supported for both 32-bit and 64-bit virtual machines.

Table 16 VMware guest operating systems supported for file-level recovery

VMware guest OS	Notes
Windows 10 (64-bit)	See the note on Storage Spaces above this table.
Windows 8 (64-bit)	See the note on Storage Spaces above this table.
Windows 7 (32-bit/64-bit)	Support for Windows 7 32-bit is discontinued starting at NetBackup 8.1.
Windows Vista (32-bit/64-bit)	Support for Vista 32-bit is discontinued starting at NetBackup 8.1.
Windows Server 2022 (64-bit)	Requires NetBackup 8.1 or later. Same restrictions as for Windows Server 2012.
Windows Server 2019 (64-bit)	Requires NetBackup 8.1 or later. Same restrictions as for Windows Server 2012.
Windows Server 2016 (64-bit)	Requires NetBackup 8.0 or later. Same restrictions as for Windows Server 2012.
Windows Server 2012 R2 (64-bit)	Same restrictions as for Windows Server 2012.

Table 16 VMware guest operating systems supported for file-level recovery
(continued)

VMware guest OS	Notes
Windows Server 2012 (64-bit)	<p>Note the following:</p> <ul style="list-style-type: none"> ■ Does not support the ReFS file system. You can back up and restore the entire VM, but files cannot be individually restored to a ReFS file system. <p>Note: File-level recovery is supported for NTFS and FAT files, but NTFS and FAT files cannot be restored to ReFS.</p> <ul style="list-style-type: none"> ■ Does not support files that use Microsoft data deduplication. ■ See the note on Storage Spaces above this table.
Windows Server 2008 R2 (64-bit)	
Windows Server 2008 (32-bit/64-bit)	Support for Windows Server 2008 32-bit is discontinued starting at NetBackup 8.1.
RHEL 9 (64-bit)	
RHEL 8 (64-bit)	Reflinking is no longer experimental and is on by default for XFS filesystem. If a shared extent is created, restores might fail if two files that reference the same extent are restored.
RHEL 7 (64-bit)	Note: File-level recovery is supported for virtual machines that use the 32-bit version of the ext4 file system. Support for file-level recovery of the ext4 64-bit file system starts at NetBackup 8.0.
RHEL 6 (64-bit)	
RHEL 5 (64-bit)	
CentOS 7 (64-bit)	Note: File-level recovery is supported for virtual machines that use the 32-bit version of the ext4 file system. Support for file-level recovery of the ext4 64-bit file system starts at NetBackup 8.0.
CentOS 6 (64-bit)	
SUSE 15 (64-bit)	
SUSE 12 (64-bit)	Note: File-level recovery is supported for virtual machines that use the 32-bit version of the ext4 file system. Support for file-level recovery of the ext4 64-bit file system starts at NetBackup 8.0.
SUSE 11 (64-bit)	
SUSE 10 (64-bit)	Support for SUSE 10 was discontinued starting at NetBackup 8.0.

Supported file systems for VMware

Table 17 Supported file systems for the VMware policy type

File system	"Enable file recovery from VM backup" option supported	Notes
ReFS (Windows 2012 and later)	No	
NTFS (Windows 2012 with Data Deduplication disabled)	Yes	
NTFS (Windows 2012 with Data Deduplication enabled)	No	
NTFS (Windows 2000 and later)	Yes	<p>Supports these partition tables:</p> <ul style="list-style-type: none"> ■ Master Boot Record (MBR) ■ Extended Boot Record (EBR) ■ GUID Partition Table (GPT) <p>Note: Starting at NetBackup 7.7.3, granular recovery (GRT) of Exchange data that resides on a GPT disk or on a mount-point volume is supported from a backup image created for a VMware backup.</p> <p>Note: Granular recovery (GRT) of SharePoint data that resides on a GPT disk is not supported from a backup image created for a VMware backup.</p> <ul style="list-style-type: none"> ■ Logical Disk Manager - dynamic (LDM) <p>Note: Availability of the partition table type depends on the particular Windows OS. Check your Microsoft documentation.</p>
FAT (all Windows versions)	Yes	

Table 17 Supported file systems for the VMware policy type (*continued*)

File system	"Enable file recovery from VM backup" option supported	Notes
ext2, ext3, ext4	Yes (but see Note)	<p>Support for ext4 starts at RHEL 5.4 and SUSE 11. LVM2 volume manager is supported.</p> <p>Support for file-level recovery for ext4 64-bit starts at NetBackup 8.0, for any supported version of RHEL or SUSE that supports ext4 64-bit.</p> <p>Note: File-level recovery is not supported for LVM thin provisioned volumes. However, the files in an LVM thin provisioned volume are restored when you restore the full VM.</p>
XFS	Yes	<p>Support for XFS starts at NetBackup 8.1.2, for any supported version of RHEL or SUSE that supports XFS.</p> <p>Note: With RHEL Linux, an XFS Version 4 (V4) file can be restored, but its Access Control Lists (ACLs) will not be restored if there are more than 25 ACLs. This limitation does not apply to XFS Version 5 (V5) or later.</p> <p>XFS experimental features are not supported, such as the following:</p> <ul style="list-style-type: none"> ■ Realtime volumes ■ Reflinking ■ Deduplication
Btrfs		Supported via Instant Access
Other (any VMware guest OS)	No	

Note: NetBackup for VMware no longer supports the FlashBackup-Windows policy type.

Requirements for the NetBackup plug-in for vSphere Web Client

[Table 18](#) describes the software versions that are supported for the NetBackup plug-in for vSphere Web Client.

Table 18 Software versions supported for the NetBackup plug-in for vSphere Web Client

Requirement	Details
Common requirements for monitoring VM backups or recovering VMs	<p>vSphere Web Client 5.5 and later.</p> <p>Note: The NetBackup 8.1 plug-in for vSphere Web Client requires Transport Layer Security (TLS) version 1.2 or later to be configured on the vCenter server. For that reason, the plug-in supports the following vCenter versions only: 5.5 Update 3b and later patches, 6.0 Update 1b and later patches, and 6.5 or later. These vCenter versions have TLS 1.2 configured by default.</p> <p>Note: The plug-in supports any web browser that the vSphere Web Client supports.</p> <p>Note: The NetBackup primary server's operating system must be set to the UTC time zone.</p>
Requirements for the Virtual Disk Exclusion Wizard	<p>NetBackup primary server 8.1 and later.</p> <p>Note: The Virtual Disk Exclusion Wizard is a new feature of the NetBackup 8.1 plug-in for vSphere Web Client.</p>
NetBackup primary server platforms that are supported for recovering VMs	<p>For the NetBackup Recovery Wizard, these NetBackup primary server platforms are supported:</p> <ul style="list-style-type: none"> ■ Windows ■ Red Hat ■ SUSE ■ Solaris SPARC ■ Solaris x86 <p>For the OS levels and versions that are supported for primary server, refer to the <i>NetBackup Software Compatibility List</i> available from the following location:</p> <p>NetBackup Master Compatibility List</p>
Requirements for instant recovery of virtual machines	<p>vCenter Server 5.5 and later.</p> <p>ESX server 6.0 and later.</p>

Requirements for the NetBackup plug-in for vSphere Client (HTML5) prior to NetBackup version 10.x

The NetBackup plug-in for vSphere Client (HTML5) is introduced at NetBackup 8.1.2.

For background information on vSphere Client (HTML5), see the following VMware article:

[vSphere Client \(HTML5\) and vSphere Web Client 6.5 FAQ \(2147929\)](#)

[Table 20](#) describes the software versions that are supported for the NetBackup plug-in for vSphere Client (HTML5) for NetBackup version 10.x.

Table 19 Software versions supported for the NetBackup plug-in for vSphere Client (HTML5) for NetBackup version 10.x

Requirement	Details
Common requirements for monitoring VM backups or recovering VMs	vSphere Client (HTML5) 6.5 update 1 and later.
Requirements for the Virtual Disk Exclusion Wizard	NetBackup primary server 8.1.2 and later.
NetBackup primary server platforms that are supported for recovering VMs	<p>For the NetBackup Recovery Wizard, these NetBackup primary server platforms are supported:</p> <ul style="list-style-type: none"> ■ Windows ■ Red Hat ■ SUSE ■ Solaris SPARC ■ Solaris x86 <p>For the OS levels and versions that are supported for the primary server, refer to the <i>NetBackup Software Compatibility List</i> available from the following location: NetBackup primary Compatibility List</p>
Requirements for instant recovery of virtual machines	<p>vCenter Server 6.5 update 1 and later.</p> <p>ESXi server 6.5 update 1 and later.</p>

Requirements for the NetBackup plug-in for vSphere Client (HTML5) for NetBackup version 10.x

The NetBackup plug-in for vSphere Client (HTML5) is introduced at NetBackup 8.1.2.

For background information on vSphere Client (HTML5), see the following VMware article:

[vSphere Client \(HTML5\) and vSphere Web Client 6.5 FAQ \(2147929\)](#)

[Table 20](#) describes the software versions that are supported for the NetBackup plug-in for vSphere Client (HTML5) for NetBackup version 10.x.

Table 20 Software versions supported for the NetBackup plug-in for vSphere Client (HTML5) for NetBackup version 10.x

Requirement	Details
Common requirements for monitoring VM backups or recovering VMs	vSphere Client (HTML5) 6.7 update 1 and later.
Requirements for the Virtual Disk Exclusion Wizard	NetBackup primary server 10.0 and later.
NetBackup primary server platforms that are supported for recovering VMs	<p>For the NetBackup Recovery Wizard, these NetBackup primary server platforms are supported:</p> <ul style="list-style-type: none"> ■ Windows ■ Red Hat ■ SUSE ■ Solaris SPARC ■ Solaris x86 <p>For the OS levels and versions that are supported for the primary server, refer to the <i>NetBackup Software Compatibility List</i> available from the following location: NetBackup Master Compatibility List</p>
Requirements for instant recovery of virtual machines	<p>vCenter Server 6.7 update 1 and later.</p> <p>ESXi server 6.7 update 1 and later.</p>

Requirements for the NetBackup plug-in for vCenter

Note: Starting with NetBackup 8.1, the NetBackup plug-in for vCenter is no longer supported.

The NetBackup plug-in for vCenter is provided as a virtual appliance. The requirements depend on which component of the plug-in you want to use.

The following tables describe the requirements:

[Table 21](#) describes the requirements that are common to both monitoring virtual machine backups and to recovering virtual machines.

[Table 22](#) describes the requirements that apply only to recovering virtual machines with the NetBackup Recovery Wizard. This wizard is not required for monitoring virtual machine backups.

Table 21 Common requirements for the NetBackup vCenter plug-in virtual appliance

Requirement	Details
VM hardware	<p>For the vCenter plug-in virtual appliance:</p> <ul style="list-style-type: none"> 2 vCPU Minimum 4 GB vRAM Minimum 24 GB of disk space on the datastore
Network access	The vSphere Client host must have access to the vCenter server where the virtual appliance is installed.
VMware versions	<p>vCenter Server version 4.0 and later</p> <p>vSphere Client version 4.0 and later</p> <p>ESXi version 4.0 U4 and later. (Note that ESXi version 4.1 U3 is not supported.)</p> <p>For a list of ESX versions that VMware supports for CentOS 6.4, refer to VMware documentation. (CentOS 6.4 is the guest OS of the vCenter plug-in virtual appliance.)</p> <p>For a list of VMware versions that NetBackup supports, see the <i>NetBackup Software Compatibility List</i> available from the following location:</p> <p>NetBackup Master Compatibility List</p>
Web browser in vSphere Client	Microsoft Edge

Table 22 Requirements for recovering virtual machines with the NetBackup Recovery Wizard

Requirement	Details
NetBackup master server platforms	<ul style="list-style-type: none"> ■ Windows ■ Red Hat ■ SUSE ■ Solaris SPARC ■ Solaris x86 <p>For the OS levels and versions that are supported for master server, refer to the <i>NetBackup Software Compatibility List</i> available from the following location:</p> <p>NetBackup Master Compatibility List</p>

NetBackup support for VMware Cloud on AWS

NetBackup 8.1.2 adds support for VMware Cloud on Amazon Web Services (AWS). For a description of this feature with a list of notes and limitations, see the following article in the VMware Knowledge Base:

[Veritas NetBackup for VMware Cloud on AWS \(57737\)](#)

NetBackup support for Azure VMware Solutions

NetBackup 8.2 adds support for VMware Cloud on Azure VMware Solutions (AVS). For a description of this feature with a list of notes and limitations, see the following article:

[Veritas NetBackup for Azure VMware Solutions](#)

NetBackup support for VMware transport modes

SAN transport

This mode only works with VMFS datastores. The backup host must be able to access the datastore LUN through system device paths to be able to match the datastore label. Backups do not require write access, restores do. The device path can either be fibre or iSCSI.

Note: EMC/VMware have decided that SAN transport is not supported with ScaleIO even though that does expose a device path.

Hot-Add transport

This mode works with all datastore types. The backup host must be a VM that is running on an ESXi server that has access to the datastores where the target VM resides. The backup host must have open slots available to attach the vmdks from the target VM. Backup host VM can't have a clone relationship with a target VM to disk signature collisions.

NBD and NBDSSL transport

These modes work with all datastore types. The backup host must have network access to vCenter if used and the ESXi servers that might be used to access the vmdks. In most cases this will be the ESXi server where the VM is running on but can be a different one in some rare instances that is determined by vCenter.

NetBackup support for vSphere 6.7

The following topic describes NetBackup support for vSphere 6.7.

Information about supported vSphere and VDDK versions is available in the *NetBackup Software Compatibility* list:

<http://www.netbackup.com/compatibility>

NetBackup 8.1, 8.1.1, 8.1.2, and 8.2

NetBackup 8.1, 8.1.1, 8.1.2, and 8.2 support vSphere 6.7, subject to the following notes and limitations:

- NetBackup 8.1 and 8.1.1 do not support VM hardware version 14.
- NetBackup 8.1.2 does not support VM hardware version 15.

Note: VM hardware version 14 is supported in NetBackup 8.1.2.

VM hardware version 15 is supported in NetBackup 8.2.

NetBackup support for vSphere 6.5

The following topics describe NetBackup support for vSphere 6.5.

Information about supported vSphere and VDDK versions is available in the *NetBackup Software Compatibility* list:

<http://www.netbackup.com/compatibility>

NetBackup 8.1

NetBackup 8.1 supports vSphere 6.5 and 6.7, subject to the following notes and limitations:

- NetBackup 8.1 adds support for VMs that contain disks that are attached to NVMe controllers.
- For UEFI secure boot, NetBackup backs up and restores the virtual machine. However, you must save the VMware `.nvram` file at the time of the backup. After a restore, copy the file to its original location before you attempt to start the VM.

Note: The san transport mode for VMFS 6 in vSphere 6.5 and 6.7 environments is now supported with VDDK 6.5.1.

- For VMware Change Block Tracking support, you must ensure that no snapshots exist on a virtual machine when NetBackup enables Change Block Tracking on that VM. NetBackup enables CBT on a VM if **Enable block-level incremental backup** is selected in the backup policy and CBT is not enabled already on the VM.

Note: If a snapshot exists on the VM when NetBackup enables CBT, the backup job fails and reports error 4292, "snapshot creation failed."

For more information about this issue, see the VMware Virtual Disk Development Kit Release Notes for vSphere 6.5. The following link to the vSphere 6.5 release notes was valid and accurate as of this writing, but Veritas cannot guarantee that it will remain valid:

[Virtual Disk Development Kit Release Notes](#)

- Backup of encrypted disks is supported with nbdssl and hotadd transport modes but not supported with san or nbd transport:
 - To back up encrypted virtual machines using hotadd, the backup proxy must have been encrypted as well. The backup user requires `Cryptographer.Access` permission, and hotadd backup mode requires `Cryptographer.AddDisk` also. Data on the backup media is in the clear (not encrypted).
 - Restored virtual machines are not encrypted. If you want the restored VMs to be encrypted, you must enable encryption on them manually.

NetBackup 8.0

NetBackup 8.0 supports vSphere 6.5, subject to the following notes and limitations:

- NetBackup 8.0 adds full support for VMware hardware versions 12 and 13.
- For UEFI secure boot, NetBackup backs up and restores the virtual machine. However, you must save the VMware `.nvram` file at the time of the backup. After a restore, copy the file to its original location before you attempt to start the VM.
- VMs that reside on VMFS 6.0 cannot be backed up by using the san transport mode. As a workaround, use nbd, nbdssl, or hotadd transport mode to back up such VMs. The san transport mode for VMs on VMFS 6.0 is supported by NetBackup 8.1.

Note: NetBackup support for VMFS 5 in vSphere 6.5 environments is unchanged.

- For VMware Change Block Tracking support, you must ensure that no snapshots exist on a virtual machine when NetBackup enables Change Block Tracking on that VM. NetBackup enables CBT on a VM if **Enable block-level incremental backup** is selected in the backup policy and CBT is not enabled already on the VM.

For more information about this issue, see the VMware Virtual Disk Development Kit Release Notes for vSphere 6.5. The following link to the vSphere 6.5 release notes was valid and accurate as of this writing, but Veritas cannot guarantee that it will remain valid:

[Virtual Disk Development Kit Release Notes](#)

- Backup of encrypted disks is supported with nbdssl and hotadd transport modes but not supported with san or nbd transport.
To back up encrypted virtual machines using hotadd, the backup proxy must have been encrypted as well. The backup user requires `Cryptographer.Access` permission, and hotadd backup mode requires `Cryptographer.AddDisk` also. Data on the backup media will be in the clear (not encrypted). Restored virtual machines are not encrypted. If you want the restored VMs to be encrypted, you must enable encryption on them manually.
- VMs that contain disks that are attached to NVMe controllers cannot be backed up. You can exclude VMs that contain NVMe controllers from backups by using the `VMHasNVME` keyword in a VMware Intelligent Policy. Note that NetBackup 8.1 adds support for VMs that contain disks that are attached to NVMe controllers.

NetBackup 7.7.3

NetBackup 7.7.3 supports vSphere 6.5, subject to the following limitations:

- Backup and restore of encrypted VMs are not supported.
- VMs that reside on VMFS 6.0 cannot be backed up by using the san transport mode. As a workaround, use nbd, nbdssl, or hotadd transport mode to back up such VMs. Note that the san transport mode for VMs on VMFS 6.0 is supported by NetBackup 8.1.

Note: NetBackup support for VMFS 5 in vSphere 6.5 environments is unchanged.

- For VMware Change Block Tracking support, you must ensure that no snapshots exist on a virtual machine when NetBackup enables Change Block Tracking on that VM. NetBackup enables CBT on a VM if **Enable block-level incremental backup** is selected in the backup policy and CBT is not enabled already on the VM.

For more information about this issue, see the VMware Virtual Disk Development Kit Release Notes for vSphere 6.5. The following link to the vSphere 6.5 release notes was valid and accurate as of this writing, but Veritas cannot guarantee that it will remain valid:

[Virtual Disk Development Kit Release Notes](#)

- Support for hardware versions 12 and 13 is limited, as follows:
 - New VMware features in hardware versions 12 and 13 are not supported.
 - Hardware versions 12 and 13 can be backed up, but they are not supported for restores. Restores are downgraded to the default hardware version.
 - The NetBackup VMware Intelligent Policy (VIP) **VMVersion** keyword does not accept hardware versions 12 and 13 for selecting VMs to backup. To select those hardware versions using VIP, use the Greater operator.
 - For UEFI secure boot, NetBackup backs up and restores the virtual machine. However, you must save the VMware `.nvram` file at the time of the backup. After a restore, copy the file to its original location before you start the VM.

NetBackup support for vSphere 6.0

NetBackup 7.7 uses VDDK 6.0 to support additional vSphere 6.0 functionality.

Note the following about NetBackup and vSphere 6.0.

For ESXi 6.0, backups that use VMware Change Block Tracking (CBT) may fail

By default, a NetBackup VMware policy selects the **Enable block-level incremental backup** option on the policy's **VMware** tab. That option uses VMware's Change Block Tracking (CBT). Because of a VMware issue, a backup of an ESXi 6.0 VM may fail if the backup uses Change Block Tracking (CBT).

See the following VMware article for more information:

[When Changed Block Tracking is enabled, backing up the virtual machine fails](#)

Note: This CBT problem is fixed in VMware ESX 6.0 patch release ESXi600-201505001 (Build 2715440). See the following VMware article for more information:

[VMware ESXi 6.0, Patch Release ESXi600-201505001 \(2116125\)](#)

When using Storage vMotion to migrate a VM to a different vCenter, backup of the VM is not supported

NetBackup does not support backup of a VM that is migrating to a different vCenter through Storage vMotion. The backup or restore job starts but then waits for the migration to complete. When the migration is complete, NetBackup tries to take a snapshot of the virtual machine but cannot find it at its original location in vSphere. The following error messages appear in the job's detailed status tab. The backup eventually fails with status 156.

```
04/01/2015 12:32:02 - snapshot backup of client flvm1 using method
VMware_v2
04/01/2015 12:41:25 - Info bpbrm (pid=7872) INF - vmwareLogger:
RetrieveObjPropertiesEx: for mor = vm-24 failed, SYM_VMC_ERROR:
SOAP_ERROR
04/01/2015 12:41:25 - Info bpbrm (pid=7872) INF - vmwareLogger:
SOAP 1.1 fault: "":ServerFaultCode [no subcode]
04/01/2015 12:41:25 - Info bpbrm (pid=7872) INF - vmwareLogger:
getObjectProperty: Could not get property summary for, mor=<vm-24>
<VirtualMachine>
04/01/2015 12:41:25 - Info bpbrm (pid=7872) INF - vmwareLogger:
getObjectProperty: SYM_VMC_ERROR: FAILED_TO_GET_OBJECT_PROPERTY
04/01/2015 12:41:25 - Info bpbrm (pid=7872) INF - vmwareLogger:
CreateSnapshotExAPI: SYM_VMC_ERROR: FAILED_TO_GET_OBJECT_PROPERTY
04/01/2015 12:41:35 - Info bpbrm (pid=7872) INF - vmwareLogger:
RetrieveObjPropertiesEx: for mor = vm-24 failed, SYM_VMC_ERROR:
SOAP_ERROR
```

As a workaround, do the following:

- 1 Make sure that NetBackup has credentials for the original vCenter and for the vCenter where the VM now resides. In the NetBackup Administration Console, click **Media and Device Management > Credentials > Virtual Machine Servers**.

If the VM was selected manually in the policy, the next run of the policy should locate the VM and back it up. If the policy cannot locate the VM, edit the policy by browsing for the VM in its new location.

- 2 If the policy uses automatic selection of VMs (VMware Intelligent Policy), revise the policy as follows:
 - On the NetBackup policy's **Clients** tab, refresh the discovery cache by means of the **Reuse VM selection query results for** option. You can set the option to 0, or run the backup after the timeout has occurred for the discovery cache.
 - Make sure that the Query Builder rules can find the VM in its new location. Click **Test Query** to test for discovery of the VM. Revise the rules as needed.

If the policy is correctly revised, the next backup of the VM should succeed. For more details on VMware Intelligent Policy, see the [NetBackup for VMware Administrator's Guide](#).

Support for fault tolerant VMs in vSphere 6.0 and later

NetBackup support for backing up fault tolerant VMs in vSphere 6.0 and later starts with NetBackup 8.0. Note however that when the VM is restored from the backup, the VM's fault tolerance is not restored.

With earlier versions of NetBackup, an attempt to back up a fault tolerant VM fails with status code 156.

NetBackup feature support for vSphere and vCloud Director

The following table describes NetBackup support for vSphere and vCloud Director on a feature-by-feature basis.

Table 23 NetBackup support for vSphere and vCloud Director

NetBackup feature	vSphere	vCloud Director
NetBackup for VMware, including VMware Intelligent Policy and all forms of recovery (VM, file, database, granular).	Yes	Yes
Accelerator for VMware	Yes	Yes
Replication Director for VMware	Yes	Yes
NetBackup Plug-in for vCenter	Yes	No
NetBackup Plug-in for vSphere Web Client	Yes	No
Instant Recovery for VMware	Yes	No
VM recovery command (nbrestorevm)	Yes	Yes

Guidelines for using NetBackup with vCloud Director

NetBackup can protect virtual machines that are provisioned by vCloud Director (vCD).

For a list of the vCloud Director versions that NetBackup supports, see the "Virtual Systems Compatibility" section of the *NetBackup Software Compatibility List*, available from this location:

<http://www.veritas.com/docs/000033647>

NetBackup for VMware supports the use of load balancers to manage multiple cells (nodes) in a vCloud environment. To configure NetBackup credentials for a vCloud environment that uses a load-balancer, see "Adding NetBackup credentials for VMware" in the *NetBackup for VMware Administrator's Guide*:

<http://www.veritas.com/docs/000003214>

Follow these guidelines to protect virtual machines within the vCloud provider's vSphere infrastructure:

Table 24 Guidelines for using NetBackup with vCloud Director

NetBackup operation	Description and notes
Backup	<ul style="list-style-type: none"> ■ When you create a virtual machine in a vApp, enter complete, descriptive names for the virtual machine. Do not rely on the GUID-based template names. A detailed name makes it easier to identify a particular virtual machine. ■ vCloud organizations map to vSphere resource pools. This mapping may influence your backup selections in the NetBackup policy.
Restore	<ul style="list-style-type: none"> ■ Use the NetBackup Backup, Archive, and Restore interface to recover the virtual machine to an alternate location. For NetBackup recovery procedures, see the vCloud Director topics in the <i>NetBackup for VMware Administrator's Guide</i>. ■ When you restore virtual machines previously associated with a linked clone, the restored image does not take advantage of linked clones or shadow copies. As a result, the restored image may require more storage than the original image.

Support for VMware raw device mapping (RDM)

Raw device mapping allows a non-VMDK disk to be accessed by the guest OS. To back up a raw mapped device (RDM), you must install NetBackup client software in the virtual machine. Any device that NetBackup supports in a physical (non hypervisor) environment is supported for RDM, provided that the device vendor supports the device in a virtual environment.

For more information on using NetBackup to back up a disk in RDM mode, refer to the "Backup of VMware raw devices (RDM)" appendix of the *NetBackup for VMware Administrator's Guide*.

Notes on Replication Director for virtual machines

NetBackup supports Replication Director for protecting virtual machines in a snapshot and replication environment.

Note the following about Replication Director:

- Supports vCenter version 4.0 and later. Earlier vCenter versions are not supported.
- Supports NFS datastores only. Does not support replication solutions that are deployed with RDM or VMFS datastores.

To protect virtual machines on unsupported datastores, do one of the following:

- Use the NetBackup policy type **VMware** but without Replication Director.
- Use Replication Director and install a NetBackup client in each virtual machine.

With a client in the virtual machine, you can use Replication Director to protect each virtual machine as though it is a physical computer, with a policy type other than **VMware**.

Minimum permissions for the NetBackup account that performs VMware backup and restore

The account that NetBackup uses to access the VMware vCenter requires privileged roles with particular rights for backup and restore operations. That account is specified in the NetBackup Administration Console under **Media and Device Management > Credentials > Virtual Machine Servers**.

The following tech note lists the permissions that the NetBackup account needs to perform backup and restore:

<http://www.veritas.com/docs/000007351>

Hotadd backup issues caused by Windows disk signature collisions

For the hotadd transport mode with a backup host on Windows 2008 server or earlier, a Windows disk signature collision may cause the following problems:

- A backup using the hotadd transport mode may change a VM's disk signature in the backup image if multiple VMs are backed up simultaneously and some of their disks have the same Windows disk signature. This problem can occur in any of the following cases:
 - One or more of the VMs in the backup is a clone of another VM that is backed up simultaneously by the same backup host.
 - VMs that are backed up simultaneously are linked clones that share disks with the same parent.
 - A VM in the backup is a clone of the backup host.

In any of these cases, file-level recovery from the VM's file systems may not succeed.

In addition: If the guest OS of the backed up VM is Windows Server 2008, the recovered virtual machine may fail to start. In that case, the disk signature issue on the recovered VM must be fixed. See the following Veritas article:

<http://www.veritas.com/docs/000095000>

- If the backup was made with the Accelerator feature, a VM disk signature collision may cause a hotadd backup to fail with status 84, “media write error.”

Workaround: Use a different transport mode (not hotadd), or avoid simultaneous backup of the VMs. If a VM in the backup is a clone of the backup host, use a different backup host that is not a clone of the VM.

For further information on this issue, see “Windows proxy HotAdd can cause differing disk signatures” in the following VMware article:

<https://www.vmware.com/support/developer/vddk/vddk-550-releasenotes.html>

Note: These issues do not apply if the backup host is Windows Server 2008 R2 or later.

Red Hat guest OS file system becomes read only

VMware and Red Hat have identified an issue that causes the root file system in a Red Hat Enterprise guest OS to become read-only. This problem can interrupt the normal functioning of a Red Hat VM, including a VM that was created by means of the Instant access feature of the NetBackup web UI.

For potential solutions to this issue, see the following VMware and Red Hat articles:

<https://kb.vmware.com/s/article/51306>

<https://access.redhat.com/solutions/35329>

NetBackup for Nutanix AHV Compatibility

The following topics describe NetBackup for Nutanix AHV support. NetBackup for AHV protects AHV virtual machines by integrating with AHV APIs for Data Protection.

Supported Nutanix AHV AOS versions and backup host operating systems

The information on supported Nutanix AHV versions has moved to the [Virtual Systems Compatibility](#) section of the [NetBackup 9.1 Software Compatibility List](#)

Supported file systems for Nutanix AHV

To enable the file level restore operation from the entire VM backup, the following supported file systems must be configured on the AHV guest VM:

Table 25 Supported file systems for Nutanix AHV

File system	File level recovery supported	Notes
ReFS (Windows 2012 and later)	No	
NTFS (Windows 2012 with Data Deduplication disabled)	Yes	
NTFS (Windows 2012 with Data Deduplication enabled)	No	
NTFS (Windows 2000 and later)	Yes	<p>Supports these partition tables:</p> <ul style="list-style-type: none"> ■ Master Boot Record (MBR) ■ Extended Boot Record (EBR) ■ GUID partition table (GPT) <p>Note: Starting at NetBackup 7.7.3, granular recovery (GRT) of Exchange data that resides on a GPT disk or on a mount-point volume is supported from a backup image that is created for an AHV backup.</p> <p>Note: Granular recovery (GRT) of SharePoint data that resides on a GPT disk is not supported from a backup image that is created for an AHV backup.</p> <ul style="list-style-type: none"> ■ Logical Disk Manager - dynamic (LDM) <p>Note: Availability of the partition table type depends on the particular Windows OS. Check your Microsoft documentation.</p>
FAT (all Windows versions)	Yes	
ext2, ext3, ext4	Yes (but see Note)	<p>Support for ext4 starts at RHEL 5.4 and SUSE 11. LVM2 volume manager is supported.</p> <p>Support for file-level recovery for ext4 64-bit starts at NetBackup 8.0, for any supported version of RHEL or SUSE that supports ext4 64-bit.</p> <p>Note: File-level recovery is not supported for LVM thin provisioned volumes. However, the files in an LVM thin provisioned volume are restored when you restore the full VM.</p>

Table 25 Supported file systems for Nutanix AHV (*continued*)

File system	File level recovery supported	Notes
XFS	Yes	<p>Support for XFS starts at NetBackup 8.1.2, for any supported version of RHEL or SUSE that supports XFS.</p> <p>Note: With RHEL Linux, an XFS Version 4 (V4) file can be restored, but its Access Control Lists (ACLs) are not restored if there are more than 25 ACLs. This limitation does not apply to XFS Version 5 (V5) or later.</p> <p>XFS experimental features are not supported, such as the following:</p> <ul style="list-style-type: none"> ■ RealTime volumes ■ Reflinking ■ Deduplication
Btrfs	No	
Other (any AHV guest file systems)	No	

Recovery platform support

Platforms support for entire VM backup and recovery

NetBackup for Nutanix AHV supports backup and recovery of the entire virtual machine for all guest operating systems that are supported by AHV.

Platforms supported for target host operating system for agentless file restore

The following platforms are supported for target host operating system for agentless file restore:

- Windows
- Red Hat Enterprise Linux
- SUSE Linux
- Ubuntu

For target host operating system version supportability, see [NetBackup client](#) section in [NetBackup Software Compatibility List - 9.1 and later](#).

Platforms supported for target host operating system for file restore using a NetBackup client

NetBackup for Nutanix AHV supports file-level recovery from a virtual machine backup on the mentioned supported guest operating systems. For the unsupported guest operating systems, you can recover the entire virtual machine but not individual files.

The following platforms are supported for target host operating system for file level recovery using NetBackup client:

- Windows
- Red Hat Enterprise Linux
- SUSE Linux
- CentOS
- Ubuntu

Only NetBackup 8.1 and later for Windows and NetBackup 8.2 and later for Linux are supported client platforms for file-level recovery. Refer the [8.x and 9.x Software Compatibility List](#) for compatible OS versions deployed on AHV guest OS.

Notes:

- NetBackup 8.1 and later does not support 32-bit clients for the operating systems listed in the software compatibility list. Consequently, file-level restore directly to a 32-bit virtual machine is not possible. As an alternative, you can perform a file-level restore to network shared storage. However, recovery of the entire virtual machine is supported for both 32-bit and 64-bit virtual machines.
- For Windows server guest operating system:
 - ReFS file system is not supported. You can back up and restore the entire VM, but files cannot be individually restored to a ReFS file system.
 - File-level recovery is supported for NTFS and FAT files, but NTFS and FAT files cannot be restored to ReFS.
 - Files that use Microsoft data deduplication are not supported
 - NetBackup does not support file-level recovery from a guest VM with Storage Spaces. When you browse for the files, the files do not appear. To restore the files, restore the entire virtual machine.
- For RHEL 8 (64-bit), Reflinking is no longer experimental and is on by default for XFS file system. If a shared extent is created, restores may fail if two files that reference the same extent are restored.

NetBackup for Hyper-V Compatibility

This section provides support information on NetBackup for Hyper-V. NetBackup for Hyper-V provides snapshot-based backup of virtual machines that run on Windows Hyper-V Server.

Note: Before configuring NetBackup for Hyper-V, make sure that you have Windows and the Hyper-V role installed correctly. Refer to your Windows and Hyper-V documentation and Hyper-V release notes for requirements and installation instructions.

Supported Hyper-V components and versions (VSS backup method)

NetBackup for Hyper-V supports the following components.

Note: This information applies only to the VSS backup method, not to WMI.

Table 26 Components supported for Hyper-V (VSS)

Components	What is supported
Failover Cluster	Windows Server 2008, 2008 R2, 2012, 2012 R2, 2016, 2019.
VSS providers	NetBackup for Hyper-V has an open support policy for VSS providers, as described in the <i>NetBackup Snapshot Client Compatibility List</i> , available from this location: http://www.veritas.com/docs/000033647 NetBackup for Hyper-V is supported on the Windows versions that are listed in the "Virtual Systems Compatibility" section of the <i>NetBackup Software Compatibility List</i> (SCL). Any vendors that support VSS snapshot providers on those versions are supported for NetBackup for Hyper-V.
CSV-based virtual machine backups	NetBackup for Hyper-V has an open support policy for CSV-based virtual machine backups. Any vendors that support CSV-based virtual machine backup on the Windows versions listed in the "Virtual Systems Compatibility" section of the <i>NetBackup Software Compatibility List</i> (SCL) are supported for NetBackup for Hyper-V.

Notes on the new Hyper-V features in NetBackup 8.0

NetBackup 8.0 adds features for faster backup and recovery of Hyper-V virtual machines on Windows Server 2016.

- For a description of those features, see the *NetBackup for Hyper-V Administrator's Guide* for 8.0 or later, available here:

<http://www.veritas.com/docs/000003214>

- For detailed information on supported Hyper-V environments, see the "Virtual Systems Compatibility" section of the *NetBackup Software Compatibility List (SCL)* for 8.x, available here:
[NetBackup Master Compatibility List](#)

Note the following additional points.

Table 27 Requirements for the new Hyper-V features in NetBackup 8.0

Requirement	Supported versions
NetBackup servers and clients	The following must be at NetBackup 8.0 or later: The NetBackup master server, and the NetBackup client (the NetBackup client must be installed on all Hyper-V servers and SCVMM servers).

Additional notes about the new Hyper-V features in NetBackup 8.0:

- When protecting Windows Server 2016 and above shielded VMs, consider the following:
 - Shielded VMs can run only on trusted hosts that are guarded with the Host Guardian Service. When restoring virtual machines to an alternate location, the alternate location must be guarded with the same Host Guardian Service as the source location. Otherwise, you will not be able to power on the restored VMs.
 - If BitLocker was used to encrypt the VM disks, NetBackup will not be able to access the contents and restore individual guest OS files or applications from the encrypted disks.
- The following is due to a Microsoft limitation: The WMI backup method does not support user-created checkpoints. The VM is backed up but any user-created checkpoints of the VM are omitted from the backup. As a result, the user-created checkpoints cannot be restored from the backup.
- For VMs in a cluster, SAN Client is not supported with the WMI backup method. Clustered VMs are supported with the VSS backup method by means of a Hyper-V Intelligent Policy.
- The policy Advanced Attributes (available from the **Hyper-V** tab) include a **Consistency level** parameter. Note these prerequisites for the **Application consistent** option of that parameter:
 - The latest version of Hyper-V integration services must be installed and running inside the VM.
 - The Hyper-V integration services must be enabled in the VM settings.

Support for Hyper-V on Windows 2012

Note the following about NetBackup support for Hyper-V on Windows 2012 and 2012 R2:

- Backup of virtual machines within Cluster Shared Volumes (CSV) is supported. In Hyper-V Server 2008 R2, CSV has a limitation that requires serialized backups. In Hyper-V Server 2012, CSV supports concurrent backups without that limitation. Consequently, the CSV timeout setting in the NetBackup Hyper-V policy is only used in Hyper-V Server 2008 R2 deployments.

Supported guest operating systems for Hyper-V

NetBackup for Hyper-V supports virtual machine backup and recovery on all guest operating systems supported by Hyper-V. For a list of operating systems that Hyper-V supports, consult the Microsoft topics available here:

[Hyper-V on Windows Servers](#)

For more information about NetBackup-supported Hyper-V environments, see "Hyper-V Servers Compatibility" in the "Virtual Systems Compatibility" section of the NetBackup Software Compatibility List (SCL) for 8.x, available here:

[NetBackup Compatibility List for all Versions](#)

Hyper-V guest operating systems supported for file-level recovery

NetBackup for Hyper-V supports file-level recovery from a virtual machine backup on the following operating systems.

Note: NetBackup 8.1 and later does not support 32-bit clients for the operating systems listed in [Table 28](#). Consequently, file-level restore directly to a 32-bit virtual machine is not possible with NetBackup 8.1. As an alternative, you can perform a file-level restore to network shared storage. Note: Recovery of the *entire virtual machine* is supported for both 32-bit and 64-bit virtual machines.

Table 28 Hyper-V guest operating systems supported for file-level recovery

Hyper-V guest OS	Notes
Windows 10	Requires NetBackup 8.0 or later.
Windows 8	Support has the same limitations as for Windows 2012. See " Support for Hyper-V on Windows 2012 " on page 54.
Windows 7	

Table 28 Hyper-V guest operating systems supported for file-level recovery
(continued)

Hyper-V guest OS	Notes
Windows Vista (32-bit/64-bit)	Support for Vista 32-bit is discontinued starting at NetBackup 8.1.
Windows Server 2022 (64-bit)	Requires NetBackup 8.0 or later. Note the following: <ul style="list-style-type: none">▪ Note: File-level recovery is also supported for NTFS and FAT files with the WMI or VSS backup method, but NTFS and FAT files cannot be restored to ReFS.▪ Does not support files that use Microsoft data deduplication.
Windows Server 2019 (64-bit)	Requires NetBackup 8.0 or later. Note the following: <ul style="list-style-type: none">▪ Note: File-level recovery is also supported for NTFS and FAT files with the WMI or VSS backup method, but NTFS and FAT files cannot be restored to ReFS.▪ Does not support files that use Microsoft data deduplication.
Windows Server 2016 (64-bit)	Requires NetBackup 8.0 or later. Note the following: <ul style="list-style-type: none">▪ Note: File-level recovery is also supported for NTFS and FAT files with the WMI or VSS backup method, but NTFS and FAT files cannot be restored to ReFS.▪ Does not support files that use Microsoft data deduplication.
Windows Server 2012 R2 (64-bit)	Same restrictions as for Windows Server 2012. See "Support for Hyper-V on Windows 2012" on page 54.

Table 28 Hyper-V guest operating systems supported for file-level recovery
(continued)

Hyper-V guest OS	Notes
Windows Server 2012 (64-bit)	<p>See "Support for Hyper-V on Windows 2012" on page 54.</p> <p>Note the following:</p> <ul style="list-style-type: none"> ■ Does not support the ReFS file system. You can back up and restore the entire VM, but files cannot be individually restored to a ReFS file system. <p>Note: File-level recovery is supported for NTFS and FAT files, but NTFS and FAT files cannot be restored to ReFS.</p> <ul style="list-style-type: none"> ■ Does not support files that use Microsoft data deduplication.
Windows Server 2008 R2 (64-bit)	
Windows Server 2008 (32-bit/64-bit)	Support for Windows Server 2008 32-bit is discontinued starting at NetBackup 8.1.
RHEL 8 (32-bit*/64-bit)	<p>ext2, ext3, ext4, XFS file systems, LVM2 volume manager.</p> <p>Support for ext4 64-bit starts at NetBackup 8.0.</p> <p>Support for XFS starts at NetBackup 8.1.2.</p> <p>XFS experimental features are not supported, such as the following:</p> <ul style="list-style-type: none"> ■ Realtime volumes ■ Reflinking ■ Deduplication
RHEL 7 (32-bit*/64-bit)	<p>ext2, ext3, ext4, XFS file systems, LVM2 volume manager.</p> <p>Support for ext4 64-bit starts at NetBackup 8.0.</p> <p>Support for XFS starts at NetBackup 8.1.2.</p> <p>XFS experimental features are not supported, such as the following:</p> <ul style="list-style-type: none"> ■ Realtime volumes ■ Reflinking ■ Deduplication

Table 28 Hyper-V guest operating systems supported for file-level recovery
(continued)

Hyper-V guest OS	Notes
RHEL 6 (32-bit*/64-bit)	<p>ext2, ext3, ext4, XFS file systems, LVM2 volume manager.</p> <p>Support for ext4 64-bit starts at NetBackup 8.0.</p> <p>Support for XFS starts at NetBackup 8.1.2.</p> <p>XFS experimental features are not supported, such as the following:</p> <ul style="list-style-type: none"> ■ Realtime volumes ■ Reflinking ■ Deduplication
RHEL 5 (32-bit*/64-bit)	<p>ext2, ext3, ext4, XFS file systems, LVM2 volume manager.</p> <p>Support for ext4 starts at RHEL 5.4. Support for ext4 64-bit starts at NetBackup 8.0.</p> <p>Support for XFS starts at NetBackup 8.1.2. See under RHEL 6 in this table for limitations on XFS experimental features.</p>
SUSE 15 (32-bit*/64-bit)	<p>ext2, ext3, ext4, XFS file systems, LVM2 volume manager.</p> <p>Support for ext4 starts at SUSE 11. Support for ext4 64-bit starts at NetBackup 8.0.</p> <p>Support for XFS starts at NetBackup 8.1.2.</p> <p>XFS experimental features are not supported, such as the following:</p> <ul style="list-style-type: none"> ■ Realtime volumes ■ Reflinking ■ Deduplication
SUSE 12 (32-bit*/64-bit)	<p>ext2, ext3, ext4, XFS file systems, LVM2 volume manager.</p> <p>Support for ext4 starts at SUSE 11. Support for ext4 64-bit starts at NetBackup 8.0.</p> <p>Support for XFS starts at NetBackup 8.1.2.</p> <p>XFS experimental features are not supported, such as the following:</p> <ul style="list-style-type: none"> ■ Realtime volumes ■ Reflinking ■ Deduplication

Table 28 Hyper-V guest operating systems supported for file-level recovery
(continued)

Hyper-V guest OS	Notes
SUSE 11 (32-bit*/64-bit)	<p>ext2, ext3, ext4, XFS file systems, LVM2 volume manager.</p> <p>Support for ext4 starts at SUSE 11. Support for ext4 64-bit starts at NetBackup 8.0.</p> <p>Support for XFS starts at NetBackup 8.1.2.</p> <p>XFS experimental features are not supported, such as the following:</p> <ul style="list-style-type: none"> ■ Realtime volumes ■ Reflinking ■ Deduplication
OEL 9 (32-bit*/64-bit)	<p>ext2, ext3, ext4, XFS file systems, LVM2 volume manager.</p> <p>Support for ext4 starts at SUSE 11. Support for ext4 64-bit starts at NetBackup 8.0.</p> <p>Support for XFS starts at NetBackup 8.1.2.</p> <p>XFS experimental features are not supported, such as the following:</p> <ul style="list-style-type: none"> ■ Realtime volumes ■ Reflinking ■ Deduplication

* NetBackup no longer includes Linux 32-bit clients. Consequently, file-level restore directly to a Linux 32-bit virtual machine is not possible. As an alternative, you can perform a file-level restore to network shared storage. Recovery of the entire virtual machine is supported for both 32-bit and 64-bit Linux virtual machines.

Support for Hyper-V Intelligent Policy

NetBackup can automatically select virtual machines for backup by means of the search filters that are specified in the policy. The policy **Clients** tab includes a **Query Builder** for creating the filters. This feature is called Hyper-V Intelligent Policy.

Note the following requirements.

Table 29 Support for Hyper-V Intelligent Policy

Components	Notes
Hyper-V	Windows Server 2012 R2 or later.

Table 29 Support for Hyper-V Intelligent Policy (*continued*)

Components	Notes
Hyper-V server configuration	<p>NetBackup requires the following roles and features as part of Hyper-V server configuration:</p> <ul style="list-style-type: none">■ Windows PowerShell 3.0 or later.■ Hyper-V cmdlets in the Windows PowerShell.■ Failover cluster cmdlets in the Windows PowerShell for Hyper-V clusters.■ .NET Framework 4.5 or later. <p>Note: These roles and features are available with both Windows Server Core and Windows Server with GUI installation. The administrator enables these roles and features when setting up Hyper-V and failover clustering on the Windows server.</p>

Hyper-V online backups with VSS require the proper version of Hyper-V integration services in the VM

To allow online backups of Hyper-V virtual machines using the VSS backup method, the proper version of the Hyper-V integration services must be installed in the virtual machines. Without the proper version, online backup may not succeed (NetBackup status 4201). The following may appear in the job's detailed status log:

```
2/17/2014 1:39:17 PM - Critical bpbrm(pid=7492) from client RHEL_60_GPT:  
FTL - snapshot processing failed, status 4201  
2/17/2014 1:39:17 PM - Critical bpbrm(pid=7492) from client RHEL_60_GPT:  
FTL - snapshot creation failed, status 4201
```

Note: The WMI backup method (for Hyper-V Server 2016 and later) does not employ online vs. offline backups. For more information on the WMI method, see the *NetBackup for Hyper-V Administrator's Guide* for 8.0 or later, available here:

<http://www.veritas.com/docs/000003214>

Table 30 describes the required versions of the integration services.

Table 30 Hyper-V integration services required in the VM for online backups (VSS method)

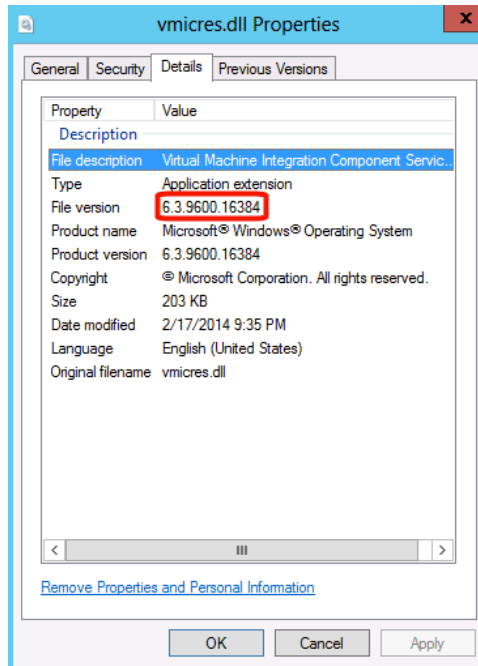
Guest OS	Notes and requirements on the integration services in the VM
<p>Windows 2008, 2008 R2, 2012, 2012 R2, 2016, 2019</p>	<p>Required minimum versions of integration services:</p> <ul style="list-style-type: none"> ■ Hyper-V server 2016 and 2019: Integration services are automatically updated. ■ Hyper-V server 2012 R2: Integration services 6.3.9600.16384. ■ Hyper-V server 2012: The integration services are built in to the Windows 2012 guest OS. For other guest operating systems, see "Software requirements (for supported guest operating systems)" in the following Microsoft TechNet article: http://technet.microsoft.com/library/hh831531 ■ Hyper-V server 2008 R2: Integration services 6.1.7600.16385 ■ Hyper-V server 2008: Integration services 6.0.6001.18016. <p>To upgrade the integration services, see the TechNet article "Install Hyper-V and create a virtual machine:" http://technet.microsoft.com/en-US/library/hh846766</p>
<p>RHEL, SUSE</p>	<p>Required minimum version of Linux integration services:</p> <ul style="list-style-type: none"> ■ Hyper-V server 2016 and above: Linux Integration Services 4.1. ■ Hyper-V server 2012 R2: Linux Integration Services 3.5. ■ Hyper-V server 2012: Microsoft does not support online backup of Linux VMs on Windows 2012 Hyper-V hosts. ■ Hyper-V server 2008 / 2008 R2: 2008 and 2008 R2 do not support Linux Integration Services in the VM. <p>Note: Linux Integration Services is not built in to the RHEL VM. You may have to download and install the services in the VM.</p> <p>For assistance downloading and installing Linux Integration Services, see the TechNet "Linux Integration Services 3.5 Announcement:" http://blogs.technet.com/b/virtualization/archive/2014/01/02/linux-integration-services-3-5-announcement.aspx</p>

To determine the current integration services version in a Windows VM

In the VM, right-click on the following file and click **Properties > Details**:

`drive_letter\Windows\System32\vmicres.dll`

This file is the integration services running in the virtual machine.



It should be the same version as the following file on the Hyper-V server:

`drive_letter\Windows\System32\vmms.exe`

To determine the current integration services version in a Linux VM

In the VM, enter the following:

```
/sbin/modinfo hv_vmbus
```

Example output:

```
filename:      /lib/modules/2.6.32-71.el6.x86_64/extra/microsoft-  
              hyper-v/hv_vmbus.ko  
version:      3.5  
license:      GPL  
srcversion:   ACE0AA64B58744D00E54C12  
alias:        acpi*:VMBus:*  
alias:        acpi*:VMBUS:*  
depends:  
vermagic:    2.6.32-71.el6.x86_64 SMP mod_unload modversions
```

For assistance with downloading and installing the service, see the following Microsoft article:

[Linux Integration Services 3.5 Announcement](#)

Support for Hyper-V pass-through disks

To back up Hyper-V pass through disks, you must install NetBackup client software in the virtual machine. You can perform the backup with or without the features of Snapshot Client.

Any device that NetBackup supports in a physical (non hypervisor) environment is supported for pass through disks, provided that the device vendor supports the device in a virtual environment. For a hardware snapshot of an array configured as a pass-through device, only off-host alternate client backup is supported (requires Snapshot Client).

Note: NetBackup does not support point in time rollback for arrays that are configured as pass-through devices.

For more information on using NetBackup to back up Hyper-V pass through disks, refer to the “Hyper-V pass-through disks” appendix of the *NetBackup for Hyper-V Administrator’s Guide*.

Note on VSS and disk arrays

- To use a hardware array snapshot, make sure that the hardware array's VSS provider supports snapshots that involve the Hyper-V writer. Check the release notes of the array vendor or VSS provider.
- Make sure to install the VSS provider on the Hyper-V servers and on any off-host servers (alternate client hosts).

Red Hat Enterprise Linux 6.4 VM may need OS updates

The RHEL 6.4 guest OS may be missing a Hyper-V package. As a result, you cannot add a RHEL 6.4 VM as a client to a Hyper-V policy by its host name. To solve this issue, install all the necessary RHEL OS updates that are listed in the following Red Hat article:

[redhat-release enhancement update for Red Hat Enterprise Linux 6.4](#)

The following Red Hat article contains the bug details:

[Bug 883306 -\[Hyper-V\]Hypervkvpd is not in the RHEL6.4 install group](#)

You can work around this issue by adding the VM to the policy using either the VM display name or UUID, under the **Primary VM identifier** option.