Configuration requirements and considerations

ONTAP 9

NetApp
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Configuration requirements and considerations

ONTAP and licensing requirements

You need to be aware of certain ONTAP and licensing requirements when creating SQL Server or Hyper-V over SMB solutions for nondisruptive operations on SVMs.

ONTAP version requirements

- Hyper-V over SMB

  ONTAP supports nondisruptive operations over SMB shares for Hyper-V running on Windows 2012 or later.

- SQL Server over SMB

  ONTAP supports nondisruptive operations over SMB shares for SQL Server 2012 or later running on Windows 2012 or later.

For the latest information about supported versions of ONTAP, Windows Server, and SQL Server for nondisruptive operations over SMB shares, see the Interoperability Matrix.

NetApp Interoperability Matrix Tool

Licensing requirements

The following licenses are required:

- CIFS
- FlexClone (for Hyper-V over SMB only)

  This license is required if Remote VSS is used for backups. The shadow copy service uses FlexClone to create point-in-time copies of files that are then used when creating a backup.

  A FlexClone license is optional if you use a backup method that does not use Remote VSS.

Network and data LIF requirements

You need to be aware of certain network and data LIF requirements when creating SQL Server or Hyper-V over SMB configurations for nondisruptive operations).

Network protocol requirements

- IPv4 and IPv6 networks are supported.
- SMB 3.0 or later is required.

  SMB 3.0 provides the functionality needed to create the continuously available SMB connections necessary to offer nondisruptive operations.

- DNS servers must contain entries that map the CIFS server name to the IP addresses assigned to the data LIFs on the storage virtual machine (SVM).

  The Hyper-V or SQL Server application servers typically make multiple connections over multiple data LIFs when accessing virtual machine or database files. For proper functionality, the application servers must make these multiple SMB connections by using the CIFS server name instead of making multiple connections to multiple unique IP addresses.

  Witness also requires the use of the CIFS server's DNS name instead of individual LIF IP addresses.

  Beginning with ONTAP 9.4, you can improve throughput and fault tolerance for Hyper-V and SQL server over SMB configurations by enabling SMB Multichannel. To do so, you must have multiple 1G, 10G, or larger NICs deployed on the cluster and clients.

Data LIF requirements

- The SVM hosting the application server over SMB solution must have at least one operational data LIF on every node in the cluster.

  SVM data LIFs can fail over to other data ports within the cluster, including nodes that are not currently hosting data accessed by the application servers. Additionally, because the Witness node is always the SFO partner of a node to which the application server is connected, every node in the cluster is a potential Witness node.

- Data LIFs must not be configured to automatically revert.

  After a takeover or giveback event, you should manually revert the data LIFs to their home ports.

- All data LIF IP addresses must have an entry in DNS and all entries must resolve to the CIFS server name.

  The application servers must connect to SMB shares by using the CIFS server name. You must not configure the application servers to make connections by using the LIF IP addresses.

- If the CIFS server name is different from the SVM name, the DNS entries must resolve to the CIFS server name.

SMB server and volume requirements for Hyper-V over SMB

You need to be aware of certain SMB server and volume requirements when creating Hyper-V over SMB configurations for nondisruptive operations.

SMB server requirements

- SMB 3.0 must be enabled.

  This is enabled by default.

- The default UNIX user CIFS server option must be configured with a valid UNIX user account.

  The application servers use the machine account when creating an SMB connection. Because all SMB access requires that the Windows user successfully map to a UNIX user account or to the default UNIX user account, ONTAP must be able to map the application server's machine account to the default UNIX user account.

- Automatic node referrals must be disabled (this functionality is disabled by default).

  If you want to use automatic node referrals for access to data other than Hyper-V machine files, you must create a separate SVM for that data.

- Both Kerberos and NTLM authentication must be allowed in the domain to which the SMB server belongs.

  ONTAP does not advertise the Kerberos service for Remote VSS; therefore, the domain should be set to permit NTLM.

- Shadow copy functionality must be enabled.

  This functionality is enabled by default.

- The Windows domain account that the shadow copy service uses when creating shadow copies must be a member of the SMB server local BUILTIN\Administrators or BUILTIN\Backup Operators group.

Volume requirements

- Volumes used to store virtual machine files must be created as NTFS security-style volumes.

  To provide NDOs for application servers using continuously available SMB connections, the volume containing the share must be an NTFS volume. Moreover, it must always have been an NTFS volume. You cannot change a mixed security-style volume or UNIX security-style volume to an NTFS security-style volume and directly use it for NDOs over SMB shares. If you change a mixed security-style volume to an NTFS security style volume and intend to use it for NDOs over SMB shares, you must manually place an ACL at the top of the volume and propagate that ACL to all contained files and folders. Otherwise, virtual machine migrations or database file exports and imports where files are moved to another volume can fail if either the source or the destination volumes were initially created as mixed or UNIX security-style volumes and later changed to NTFS security style.

- For shadow copy operations to succeed, you must have enough available space on the volume.

  The available space must be at least as large as the combined space used by all files, directories, and subdirectories contained within the shares included in the shadow copy backup set. This requirement only applies to shadow copies with auto-recovery.

Related information

Microsoft TechNet Library: technet.microsoft.com/en-us/library/

SMB server and volume requirements for SQL Server over SMB

You need to be aware of certain SMB server and volume requirements when creating SQL Server over SMB configurations for nondisruptive operations.

SMB server requirements

- SMB 3.0 must be enabled.

  This is enabled by default.

- The default UNIX user CIFS server option must be configured with a valid UNIX user account.

  The application servers use the machine account when creating an SMB connection. Because all SMB access requires that the Windows user successfully map to a UNIX user account or to the default UNIX user account, ONTAP must be able to map the application server's machine account to the default UNIX user account.

  Additionally, SQL Server uses a domain user as the SQL Server service account. The service account must also map to the default UNIX user.

- Automatic node referrals must be disabled (this functionality is disabled by default).

  If you want to use automatic node referrals for access to data other than SQL server database files, you must create a separate SVM for that data.

- The Windows user account used for installing SQL Server on ONTAP must be assigned the SeSecurityPrivilege privilege.

  This privilege is assigned to the SMB server local BUILTIN\Administrators group.

Volume requirements

- Volumes used to store virtual machine files must be created as NTFS security-style volumes.

  To provide NDOs for application servers using continuously available SMB connections, the volume containing the share must be an NTFS volume. Moreover, it must always have been an NTFS volume. You cannot change a mixed security-style volume or UNIX security-style volume to an NTFS security-style volume and directly use it for NDOs over SMB shares. If you change a mixed security-style volume to an NTFS security style volume and intend to use it for NDOs over SMB shares, you must manually place an ACL at the top of the volume and propagate that ACL to all contained files and folders. Otherwise, virtual machine migrations or database file exports and imports where files are moved to another volume can fail if either the source or the destination volumes were initially created as mixed or UNIX security-style volumes and later changed to NTFS security style.

- Although the volume containing the database files can contain junctions, SQL Server does not cross junctions when creating the database directory structure.
- For SnapCenter Plug-in for Microsoft SQL Server backup operations to succeed, you must have enough available space on the volume.

  The volume on which the SQL Server database files reside must be large enough to hold the database directory structure and all contained files residing within the share.

Related information

Microsoft TechNet Library: technet.microsoft.com/en-us/library/

Continuously available share requirements and considerations for Hyper-V over SMB

You need to be aware of certain requirements and considerations when configuring continuously available shares for Hyper-V over SMB configurations that support nondisruptive operations.

Share requirements

- Shares used by the application servers must be configured with the continuously available property set.

  Application servers that connect to continuously available shares receive persistent handles that allow them to reconnect nondisruptively to SMB shares and reclaim file locks after disruptive events, such as takeover, giveback, and aggregate relocation.

- If you want to use Remote VSS-enabled backup services, you cannot put Hyper-V files into shares that contain junctions.

  In the auto-recovery case, the shadow copy creation fails if a junction is encountered while traversing the share. In the non auto-recovery case, the shadow copy creation does not fail, but the junction does not point to anything.

- If you want to use Remote VSS-enabled backup services with auto-recovery, you cannot put Hyper-V files into shares that contain the following:
  - Symlinks, hardlinks, or widelinks
  - Non-regular files

    The shadow copy creation fails if there are any links or non-regular files in the share to shadow copy. This requirement only applies to shadow copies with auto-recovery.

  - For shadow copy operations to succeed, you must have enough available space on the volume (for Hyper-V over SMB only).

    The available space must be at least as large as the combined space used by all files, directories, and subdirectories contained within the shares included in the shadow copy backup set. This requirement only applies to shadow copies with auto-recovery.

- The following share properties must not be set on continuously available shares used by the application servers:
  - Home directory
  - Attribute caching
  - BranchCache

Considerations

- Quotas are supported on continuously available shares.
- The following functionality is not supported for Hyper-V over SMB configurations:
  - Auditing
  - FPolicy
- Virus scanning is not performed on SMB shares with the `continuously-availability` parameter set to `Yes`.

Continuously available share requirements and considerations for SQL Server over SMB

You need to be aware of certain requirements and considerations when configuring

continuously available shares for SQL Server over SMB configurations that support nondisruptive operations.

Share requirements

- Volumes used to store virtual machine files must be created as NTFS security-style volumes.

  To provide nondisruptive operations for application servers using continuously available SMB connections, the volume containing the share must be an NTFS volume. Moreover, it must always have been an NTFS volume. You cannot change a mixed security-style volume or UNIX security-style volume to an NTFS security-style volume and directly use it for nondisruptive operations over SMB shares. If you change a mixed security-style volume to an NTFS security style volume and intend to use it for nondisruptive operations over SMB shares, you must manually place an ACL at the top of the volume and propagate that ACL to all contained files and folders. Otherwise, virtual machine migrations or database file exports and imports where files are moved to another volume can fail if either the source or the destination volumes were initially created as mixed or UNIX security-style volumes and later changed to NTFS security style.

- Shares used by the application servers must be configured with the continuously available property set.

  Application servers that connect to continuously available shares receive persistent handles that allow them to reconnect nondisruptively to SMB shares and reclaim file locks after disruptive events, such as takeover, giveback, and aggregate relocation.

- Although the volume containing the database files can contain junctions, SQL Server does not cross junctions when creating the database directory structure.
- For SnapCenter Plug-in for Microsoft SQL Server operations to succeed, you must have enough available space on the volume.

  The volume on which the SQL Server database files reside must be large enough to hold the database directory structure and all contained files residing within the share.

- The following share properties must not be set on continuously available shares used by the application servers:
  - Home directory
  - Attribute caching
  - BranchCache

Share considerations

- Quotas are supported on continuously available shares.
- The following functionality is not supported for SQL Server over SMB configurations:
  - Auditing
  - FPolicy
- Virus scanning is not performed on SMB shares with the `continuously-availability` share property set.

Remote VSS considerations for Hyper-V over SMB configurations

You need to be aware of certain considerations when using Remote VSS-enabled backup solutions for Hyper-V over SMB configurations.

General Remote VSS considerations

- A maximum of 64 shares can be configured per Microsoft application server.

  The shadow copy operation fails if there are more than 64 shares in a shadow copy set. This is a Microsoft requirement.

- Only one active shadow copy set per CIFS server is allowed.

  A shadow copy operation will fail if there is an ongoing shadow copy operation on the same CIFS server. This is a Microsoft requirement.

- No junctions are allowed within the directory structure on which Remote VSS creates a shadow copy.
  - In the automatic recovery case, the shadow copy creation will fail if a junction is encountered while traversing the share.
  - In the nonautomatic recovery case, the shadow copy creation does not fail, but the junction does not point to anything.

Remote VSS considerations that apply only for shadow copies with automatic recovery

Certain limits apply only for shadow copies with automatic recovery.

- A maximum directory depth of five subdirectories is allowed for shadow copy creation.

  This is the directory depth over which the shadow copy service creates a shadow copy backup set. Shadow copy creation fails if directories containing virtual machine file are nested deeper than five levels. This is intended to limit the directory traversal when cloning the share. The maximum directory depth can be changed by using a CIFS server option.

- Amount of available space on the volume must be adequate.

  The available space must be at least as large as the combined space used by all files, directories, and subdirectories contained within the shares included in the shadow copy backup set.

- No links or non-regular files are allowed within the directory structure on which Remote VSS creates a shadow copy.

  The shadow copy creation fails if there are any links or non-regular files in the share to the shadow copy. The clone process does not support them.

- No NFSv4 ACLs are allowed on directories.

  Although shadow copy creation retains NFSv4 ACLs on files, the NFSv4 ACLs on directories are lost.

- A maximum of 60 seconds is allowed to create a shadow copy set.

Microsoft specifications allow a maximum of 60 seconds to create the shadow copy set. If the VSS client cannot create the shadow copy set within this time, the shadow copy operation fails; therefore, this limits the number of files in a shadow copy set. The actual number of files or virtual machines that can be included in a backup set varies; that number is dependent on many factors, and must be determined for each customer environment.

ODX copy offload requirements for SQL Server and Hyper-V over SMB

ODX copy offload must be enabled if you want to migrate virtual machine files or export and import database files directly from source to the destination storage location without sending data through the application servers. There are certain requirements that you must understand about using ODX copy offload with SQL Server and Hyper-V over SMB solutions.

Using ODX copy offload provides a significant performance benefit. This CIFS server option is enabled by default.

- SMB 3.0 must be enabled to use ODX copy offload.
- Source volumes must be a minimum of 1.25 GB.
- Deduplication must be enabled on volumes used with copy offload.
- If you use compressed volumes, the compression type must be adaptive and only compression group size 8K is supported.

  Secondary compression type is not supported

- To use ODX copy offload to migrate Hyper-V guests within and between disks, the Hyper-V servers must be configured to use SCSI disks.

  The default is to configure IDE disks, but ODX copy offload does not work when guests are migrated if disks are created using IDE disks.

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