



CATE Storage and Backup Engineering
Citigroup Architecture & Technology Engineering

Accessing snapshots on NetApp NAS from Windows clients

CSBE-10020-TN

Technical Note

Version 1.0.1

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1 Version Control

Version	Date	Author	Reviewed	Comments
0.1	11-MAR-2011	Richard Sopp	Stephen Hopkins	Draft version
1.0	15-MAR-2011	Richard Sopp	Stakeholders	Production release
1.0.1	03-MAR-2014	Richard Sopp	Richard Sopp	Annual Review (no changes)

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3 Contact

Please address any comments or questions regarding the information contained in this document via email to the “*CATE Storage and Backup Engineering” distribution list or alternatively to gdse@citi.com.

4 Latest Versions

It is recommended that the latest version of the document be used from the CATE Storage Engineering website <https://catecollaboration.citigroup.net/domains/platstor/gdse/Pages/default.aspx>. Newer versions may include certification on additional platforms, or comments on issues discovered after deployment.

5 Regional Reviewers

The purpose of this section is to list all the stakeholders who reviewed this document during the Request for Comment process.

Region	Reviewed by
Asia Pacific / Japan	Not applicable
EMEA	Jason Palmer
Latin America / Mexico	Not applicable
North America	Abe El-Dewak, Anthony Pineda, Shibu Thayil

Table 5.1 - Regional stakeholder review

6 Technical Note - NetApp NAS snapshots and SMB 2.0

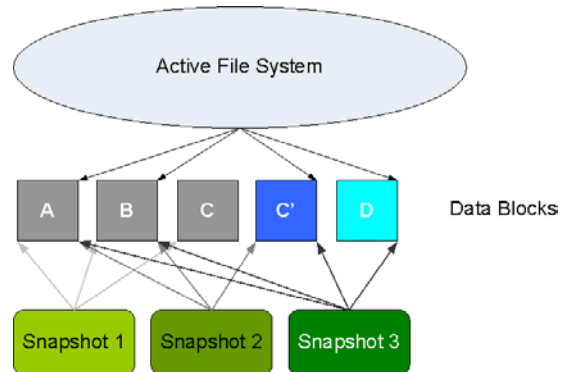
6.1 Purpose of document and intended audience

The purpose of this document is to describe the best practices for accessing snapshots on NetApp NAS storage in an SMB 2.0 enabled environment. The content of this document relates to the behavior of Windows server 2008 R1 and R2, as well as Windows 7 client; but is also applicable to the other Windows client and server platforms deployed within Citi.

The intended audience for this document is storage administrators, systems administrators and any Citi personnel involved in administering Windows user data stored on NetApp NAS.

6.2 What is a snapshot?

A Snapshot is a read-only point-in-time image of the active file system on NetApp NAS. This technology is an integrated feature of WAFL (Write Anywhere File Layout), a block based file system that uses inodes to reference files as part of the Data ONTAP micro kernel that runs on NetApp storage. A snapshot provides a logical representation of the underlying physical data blocks as they appeared at the time the snapshot was created. Snapshots are scheduled on the NetApp storage system on a per file system basis.



6.3 What is a SMB 2.0?

Server Message Block (SMB), also known as Common Internet File System (CIFS), operates as an application-layer network protocol mainly used to provide shared access to files between nodes on a network. SMB 2.0 was introduced by Microsoft in 2006 in order to optimize the original SMB 1.0 protocol by reducing the number of commands, as well as providing a compounding mechanism to make network transmissions more efficient, and durable file handles that allow a connection between a client and server to survive a brief outage.

6.4 Why SMB 2.0 with NetApp NAS

In order to maintain functional parity with the native Windows operating system, SMB 2.0 is enabled on NetApp NAS storage systems running Data ONTAP 7.3.6 or later.

As outlined in the previous section there are many benefits to enabling SMB 2.0 in a client / server file sharing environment. SMB 2.0 also provides consistent interoperability between the NetApp NAS storage device and the many versions of Windows that are deployed throughout Citi's network. For example Windows 7 clients cannot restore a file from a snapshot without SMB 2.0 being enabled on the storage system (NetApp bug # [373136](#)).

6.5 The ~snapshot folder cannot be accessed

This happens with Windows 2008 server and Windows 7 clients when the SMB 2.0 protocol is enabled on the NetApp storage system (options cifs.smb2.enable on) and on the Windows client. Windows Vista uses a different implementation and is not affected.

Microsoft has included a new directory caching feature in the SMB2 implementation of Windows 7 and Server 2008. When accessing the ~snapshot folder, these Windows clients do not request the folder directly from the storage system. Instead, they send a wildcard request (*) in an attempt to retrieve all folders at once and cache that information. As the ~snapshot folder is (by default) not shown to the user, the storage system does not include it in the list returned for a wildcard query. Since Windows 7 and Server 2008 do not find the ~snapshot folder in the returned list, they assume it does not exist and display a "Windows cannot access" error (error code 0x80004005).

Historically system administrators have been able to access snapshots on NetApp NAS storage by appending ~snapshot to the UNC or mapped network drive path in the Windows Explorer interface. Due to changes introduced in the most recent versions of Windows, as well as the introduction of SMB 2.0, attempting to perform an on-line file restore by browsing ~snapshot is no longer a consistent approach among all Windows platforms. Instead the recommended approach is now to use the previous versions tab as discussed in the following section.

6.6 How to access a snapshot – Windows Explorer Previous Versions tab

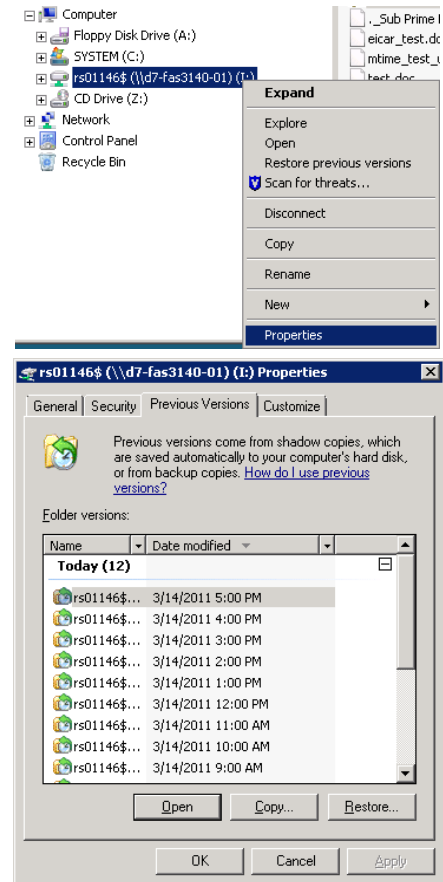
The following example uses an ‘exaggerated’ snapshot schedule of once an hour for demonstration purposes only. The number and timing of your recovery points will vary according to the operational support model for your file system.

From Windows Explorer, right click on the network drive / file system / directory for which you wish to browse snapshots. Select the ‘Properties’ option.

When the properties screen is displayed select the ‘Previous Versions’ tab.

Scroll through the list of snapshots¹ and find the one that represents the time from which you want to recover a file. Select the snapshot from the list and click the ‘Open’ button. Another Explorer window will open showing the state of the file system at the time the snapshot was taken. Files and / or directories maybe copied from this window back to the active file system to complete the restore process.

Be careful if using the ‘Restore’ button as it will overwrite or rollback the contents of the active file system or directory to the state of the snapshot. You will be prompted to confirm the restore operation. A restore operation of this type cannot be undone, and may cause the file system to run out of disk space.



6.7 References and further reading

NetApp bug [373136](#) - Previous-versions tab does not list entries on Windows 7 and Windows Server 2008 R2

NetApp bug [401456](#) - Unable to access the ~snapshot directories from Windows7 clients

NetApp bug [403828](#) - Failed to restore a deleted directory from the Previous Version tab in Windows 7 over SMB2.0

NetApp KB [2011417](#) - The ~snapshot folder cannot be accessed from Windows 7 and Server 2008 Clients

¹ Storage administrators should note this is the equivalent to the output of a ‘snap list’ command on the Filer