



TechFAQ

The Interesting Challenge of
Backing Up NAS

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Rubrik is pleased to announce support for backing up Network Attached Storage (NAS) such as NetApp, Isilon, VNX, and more with our 3.0 Firefly release. Given NAS support being one of the most common customer requests in 2016, we are excited to announce an innovative solution for managing NAS data that provides faster Recovery Point & Recovery Time Objectives (RPO & RTO), incremental forever backups, and cloud archive capabilities without sacrificing storage efficiency or tying the customer into a complex NDMP-based (Network Data Management Protocol) solution.

To provide some variety, we'll use a more explanatory FAQ format for this topic.

WHAT IS NAS?

NAS is one of the two main mechanisms for serving storage over the network. Typically sold as an appliance, NAS is known for its simplicity in serving files as opposed to a SAN serving blocks. Another difference is that NAS is served over ethernet, whereas SAN is typically served over FCP (albeit with some adoption of iSCSI or FCoE).

WHAT MAKES NAS SO DIFFICULT TO BACKUP?

Two characteristics make NAS backups difficult:

1. It is not possible to install an agent since NAS is sold as an appliance.
2. NAS systems and datasets have grown in size with the industry. When NDMP was first introduced, a very large NAS dataset might have been 10 TB. Today, NAS datasets typically tend to be huge running into 100's of TBs to PBs.

For these reasons, traditional backup vendors using ancient approaches like NDMP have failed to keep pace in providing fast, incremental forever backups, efficient storage, and fast RTOs.

In response to these needs, we have developed an innovative solution for managing NAS data that provides faster RPO/RTO, incremental forever backups, without giving up on storage efficiency or locking the customer into a proprietary solution.

WHAT CAPABILITIES ARE SUPPORTED FOR NAS?

We will be supporting all of the capabilities that the Rubrik platform provides including:

- Backup & Recovery
- Disaster Recovery (DR)
Replication+Restore
- Archive to Cloud & Local Object Storage
- Encryption - Replication, Cloud Archive

All of the core values of the Rubrik platform also underly our NAS capabilities, including:

- a simple, intuitive policy-driven interface
- REST API-driven functionality
- infinitely scalable architecture
- storage efficiency
- global file catalog & search

WHAT VENDORS AND PROTOCOLS ARE SUPPORTED?

The approach we are using is intentionally vendor agnostic and hence not bound to any particular vendor. Using this approach we are able to support all NAS vendors, including NetApp, Isilon, HNAS, VNX, SONAS, and more.

Most NAS filesystems are exposed through either NFS or SMB (sometimes referred to as CIFS) protocols. We are able to backup filesystems exposed through either protocol and preserve the corresponding metadata including the ACLs.

In the same vein, we are agnostic to the NAS protocol version. We support NFS 3.x, NFS 4.0 and NFS 4.1. Similarly, for SMB, we support SMB 1.x, 2.x, and 3.x.

HOW DOES IT WORK? WHAT IS OUR APPROACH?

The overall workflow includes creating filesets (selecting the folders and file to be protected) and setting include/exclude information when applicable. Please see the 3.0 user guide for more detailed information.

WHAT ARE THE ADVANTAGES/DIFFERENTIATORS OF OUR APPROACH?

There are several advantages of our approach:

- Vendor Agnostic - It works with all NAS vendors and with all NAS protocols. There are no vendor specific plugins and no need to keep up with changing vendor proprietary formats and APIs.
- Native Format - The data is stored on Rubrik in the “native” format. This is in contrast to an opaque format like NDMP, which needs to be “unpacked” before any restores can take place. In our approach, the backup data is instantaneously recoverable. This results in significantly reduced RTO.
- True Incremental Forever - Our approach supports “incremental forever,” obviating the need for periodic full backups (unlike NDMP). This reduces backup windows (shorter RPO) while making efficient use of the network bandwidth as well as the storage on the secondary system.
- Full Rubrik Capabilities - As mentioned before, our approach to backing up NAS gives you instant access to all of the data management capabilities of the Rubrik platform, including DR, cloud archive, global search, erasure coding, and more.

WHY ARE WE NOT USING NDMP?

NDMP is a 20-year-old protocol that was developed in an age when the datasets were small and the destination for backup data was tape. NDMP is only a control protocol and does not dictate the format of the backup stream. As a result, each vendor sends the backup stream in a proprietary format that is usually not meant to be unpacked.

To keep your RTO at a reasonable level, NDMP requires periodic fulls, resulting in wasted bandwidth and space on the secondary system. Our approach sidesteps all these issues and provides superior RPO/RTO plus the full suite of data management capabilities (see above).

WHY ARE WE NOT USING VENDOR NATIVE SNAPSHOTS?

Another approach to backing up NAS is to make use of the vendor’s native snapshots. This approach is popular with other backup products.

At a high level, the disadvantage with this approach is that most NAS vendors require the backup data to be stored on their own arrays which results in a significantly higher TCO. Additionally, this results in a complex solution because the backup software and the secondary storage have to be managed through separate management interfaces.

At a deeper level, disadvantages center around performance inconsistencies between NAS vendors having different snapshot engines, complex development SDK’s to call these snapshot engines (when supported at all), and typically requiring a replicated copy of the data to the same NAS platform limiting and restricting ability to manage TCO. In addition, NDMP implementation is complex from a development and troubleshooting perspective and has to be developed individually to work with the NAS platform of choice. In stark contrast, using a standard Network Protocol like NFS or SMB to directly access the data to be protected allows ingest to be widely distributed across

multiple nodes' interfaces to increase backup performance as well as deeper visibility into the data being protected.

As noted above, many large NAS vendors advocate for a simple Snap and Replicate solution. This leads to a potential 2x storage cost while becoming locked into a single NAS vendor. Using Rubrik paves the way for a vendor agnostic approach to NAS protection since you can backup from one NAS and restore into another while maintaining history in the cloud.

Some backup products focus on this solution because unlike Rubrik they do not have an integrated, hardware+software+storage solution and ignore the true storage cost in their TCO.

We believe the Rubrik approach is superior in that it provides all of the benefits of native NAS snapshots (faster RPO/RTO, great storage efficiency, etc.) without the prohibitive cost and complexity of the NAS array on the secondary storage.

ARE THERE ANY LIMITS TO THE CURRENT SOLUTION?

We are often asked if there are any limits such as on the size of data set or the number of files that can be protected. Generally speaking, as long as the sizing guidelines are followed, there really are not any scalability limits to the size of the data sets or the number of files that can be protected. The solution scales linearly as filesets are ingested in parallel across the entire cluster.

ARE THERE EXAMPLES OF EXISTING SUCCESSFUL IMPLEMENTATIONS?

We have several key customers already using this solution to backup their NAS. It is common

to have 50-100TB of documents and ~10 million total files. One very large customer is using this solution to backup >2PB of NAS with more than **1 billion files**. This makes us confident that the solution is scalable and robust.

If you have further questions we would love to hear from you.

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