



a white paper

Virtualized Storage for SMB: How Synology® DiskStations Provide an Affordable iSCSI Solution to Grow Storage Needs

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Introduction

It's common knowledge that small businesses thrive when provided with the access to the right tools and resources. Historically, enterprise level IT tools, at enterprise level prices, have been out of reach to most small businesses. In recent years, the landscape has changed and more frequently small businesses are gaining access to enterprise level features at small business prices. This means that small businesses everywhere can leverage features from surveillance solutions and remote access to cross-platform support and web hosting. Even businesses that have just a few employees can now leverage large scale features at affordable small business prices.

One of the most talked about large scale features in storage is the capability to use and manage virtual storage. Virtual storage is increasing in popularity because of its affordability and the wide range of uses it provides for business. Utilizing virtual storage to create separate, private disks for different departments or clients is extremely advantageous in managing storage space and securing data.

An iSCSI Target is a simple way to implement virtual storage. The iSCSI Target is a perfect solution for use as a backup target for servers or computers, providing an independent virtual disk within a RAID array for redundancy against disk failure.

When setting up virtual storage, hardware that is designed for small to medium sized businesses such as network-attached storage (NAS) is the perfect hardware solution. A well designed NAS device can close the gap for a business that has a limited IT budget but needs enterprise-level features such as virtual storage capabilities.

Synology DiskStations with DiskStation Manager 2.2 (DSM 2.2) are network-attached storage devices that support iSCSI Targets and make it easy to create and manage up to 10 virtualized disks on just one DiskStation. Synology DiskStations grow with the needs of the company with features such as easy storage management for on-the fly Target expansion and multiple options for physical expansion.

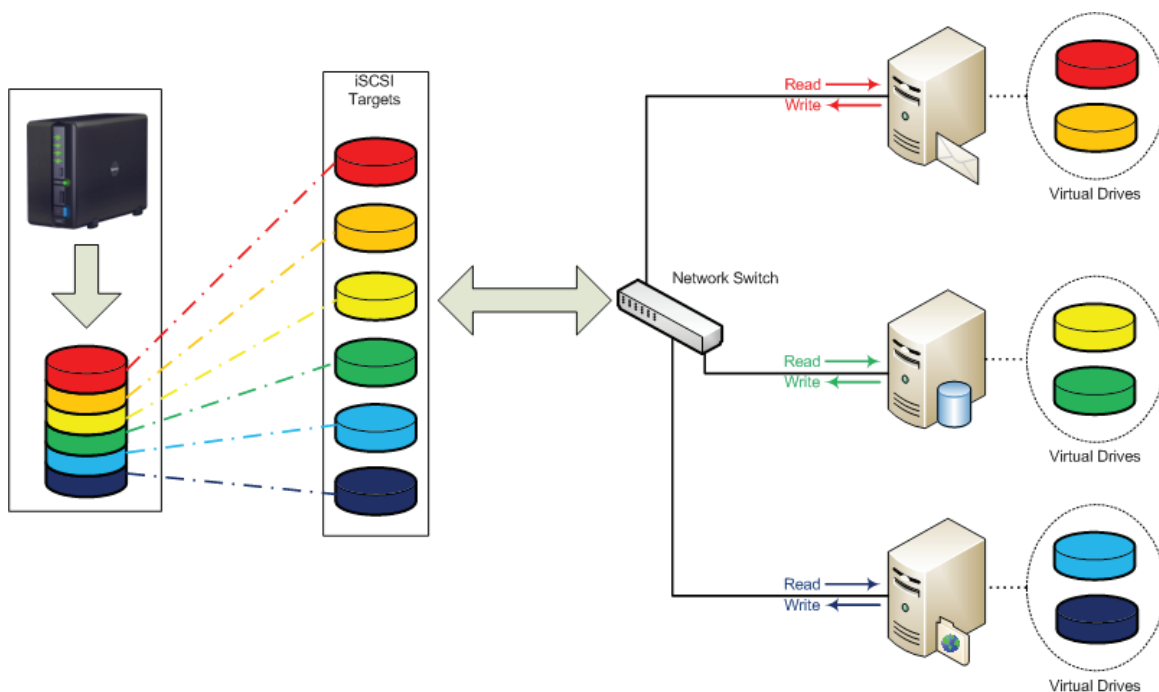
What is NAS?

Network-attached storage, or NAS, is a self-contained computer on a network which functions similarly to a server. Often used in small and medium sized businesses, NAS fills the

void between direct-attached storage and enterprise-level servers. While features differ among brands, common features include a file and print server, backup target, and multi-media services.

What is iSCSI?

iSCSI Service allows for SCSI based commands to be sent and received over an IP-based protocol. This allows for computers to store and manage non-local data, using SCSI commands sent through common network structures, such as a LAN, WAN, or even a VPN. Using the iSCSI Service provides the illusion that a local hard disk is physically attached to the computer and is managed by the local computer's operating system, when in reality, the disk is virtual and may be stored on another storage system such as a Synology DiskStation. With virtual disks, there is no need to attach disk cables, such as USB or eSATA cables, or even attach extra power cables; all communication with the virtual disk is administered over the network.



How to Enable iSCSI Target Service on Synology DiskStations

To enable iSCSI Target service in Synology DiskStation Manager 2.2, from the main Management screen, choose Storage and iSCSI. In just one step, an iSCSI Target will be created and hosted on the DiskStation. The iSCSI Target will appear as a virtual hard drive that

any computer on the network can connect to. For an additional layer of security, Challenge Handshake Authentication Protocol (CHAP) support is provided, which requires a username and password before accessing the virtual disk.

Once the iSCSI Target has been created on the Synology DiskStation, the next step is to mount the virtual disk on the computer by using an iSCSI Initiator. iSCSI Initiator software is either built-in to the operating system of the computer or can be acquired through tools available on the Internet. The virtual disk then must be formatted like any traditional hard drive and will now appear on the computer and can be accessed like a “real” hard drive.



Benefits of iSCSI with Synology DiskStations

Additional Storage Systems, Without Additional Storage Hardware

Virtual storage is the easiest way to save time and money because the need to purchase, setup, and maintain several individual physical storage systems is eliminated with the use of iSCSI Targets. Using a Synology DiskStation, the setup of a virtual disk takes very little time and has no additional cost as its part of the integrated features that comes with every Synology DiskStation. Using a DiskStation to host virtual storage is a cost-effective way to provide versatile storage for a business network with many servers because there is no need to buy additional hard drives, enclosures, data cables, or any other hardware for each individual server on the network.

Synology DiskStations have built-in RAID functionality to ensure data redundancy against disk failure, and auto-notification that makes managing the RAID Volume easy and low-maintenance. One Synology DiskStation can provide up to 10 iSCSI Targets, all on a single redundant RAID volume.

Easy to Migrate

When iSCSI Targets are used with physical servers, data from the physical server can be stored on the Virtual Disk, created by the iSCSI Target with the Synology DiskStation. Separating the processing and storage duties on a server eases migration stress, as the disks need not be moved. In the event of a server failure or just an upgrade, the data remains separate from the physical server as it is stored safely on a virtual disk hosted on the Synology DiskStation.

Flexible Storage

Whether growing the company by employees or by clients, more data storage will surely be needed in the future. With flexible capacity options in Synology DiskStation Manager 2.2, iSCSI Targets can be expanded on-the-fly. This is particularly handy when virtual disk space is running low on the iSCSI Target. System administrators can create an iSCSI Target with a relatively small amount of space, perhaps even just a few gigabytes, and easily increase that storage to several terabytes if needed. Instead of migrating data to another physical storage system, the data is stored on a virtual disk and the capacity of this virtual disk can be expanded with just a few clicks to accommodate users' needs. This is achieved by simply increasing the iSCSI Target size using the DiskStation Manager and expanding the file system on the local computer.

Easy to Expand

Virtual Disks are, of course, limited to the physical space available on the Synology DiskStation. Synology has several ways to increase the available space without data migration, making it easy for the system to grow with your business while minimizing downtime. The first method is to increase the overall DiskStation capacity by migrating to larger-sized disks, simply replacing the hard drives with those of larger capacity and rebuilding the RAID array to a larger capacity. The second method is to add disks into empty bays of a Synology DiskStation and integrate them into the existing volume for additional storage. The third method, exclusive to Synology, is the ability to add the Synology DX5 or RX4 expansion

units which automatically increases the capacity of a DiskStation by adding multiple new bays⁷ of storage.

Real World Example - Database Servers

Managing and maintaining database servers is one of the most arduous tasks of the IT administrator. Moving storage duties away from multiple database processing servers to centralized storage servers through the use of iSCSI helps to ease the burden on administrative management. The IT administrator will save time because maintenance and management is performed on just one physical storage server instead of many storage systems. A smaller physical footprint also helps to free and de-clutter space.

Most database processing servers use their own disk management system with particular file system format needs, placing a burden on the IT administrator during storage expansion as replacing disks in a database server can result in interrupting data access to all users. Expanding a Synology DiskStation iSCSI Target takes only just a few clicks and saves time and money over traditional storage solutions.

Virtual disk space for each database processing server can start small and grow as needed. With iSCSI Targets, unused space on the DiskStation is not wasted and can be shared by other services. When the DiskStation needs more disk space, changing out to larger-sized disks or adding more disks to the DiskStation is also a simple task. There is also no need to worry about compatibility issues, as iSCSI operates over common network structures.

Real World Example - Working with Multimedia

Creating and editing multimedia files is another natural fit for virtualized storage through an iSCSI Target. To get the best end-results when editing audio, video, or photos it is preferable to generate and use the data in the raw file format. Using the raw file format requires more storage but produces higher quality sound, video, or pictures; instead of putting the file through filters or compressors, which sacrifice quality. If 1TB of raw hi-definition video or audio needs to be uploaded and edited, it takes only a matter of moments to create a virtual disk large enough to handle this file on the Synology DiskStation. Using raw file format means the file will not be compressed and quality will not be lost because the entire file can reside on one virtual disk for fast and accurate access. Over time, this saves money on total storage costs for multimedia editors.

Summary

Storage needs will continue to grow for businesses of all sizes, especially small and medium sized businesses. Storage flexibility and expansion are necessities for thriving companies world-wide. The ability to implement virtual storage will become imperative to small businesses because it provides the most flexible storage options at the most affordable price per user. Once thought to be a complex and arduous task, creating and maintaining virtual storage using iSCSI Targets is now a simple and affordable solution that can be deployed easily with Synology DiskStations and DiskStation Manager 2.2.

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