

Storage and how it is Evolving

Ryan Grimes
HoosierMac Consulting
ryan@hoosiermac.com
[@Mad_Macs](#)

Who we are

- Indianapolis, IN based Business consultancy focusing on technology.
- Client base is mainly small-medium businesses who are technologically focused as well.
- Opened in 2004.

Client Issue

- Newly renovated historical building downtown Indianapolis
- Started to get into video editing, then their department exploded.
- “SneakerNet” = Failure with HD video projects.

Old School Server Model

- Internal boot and storage. i.e. Mac Pro Server.
 - Big and not easy to rack
 - Expensive
 - Powerful
 - Limited storage (limited to 4 internal drives and RAID card)
 - External storage was either FW 800 or expensive expansion card

New School Server Model

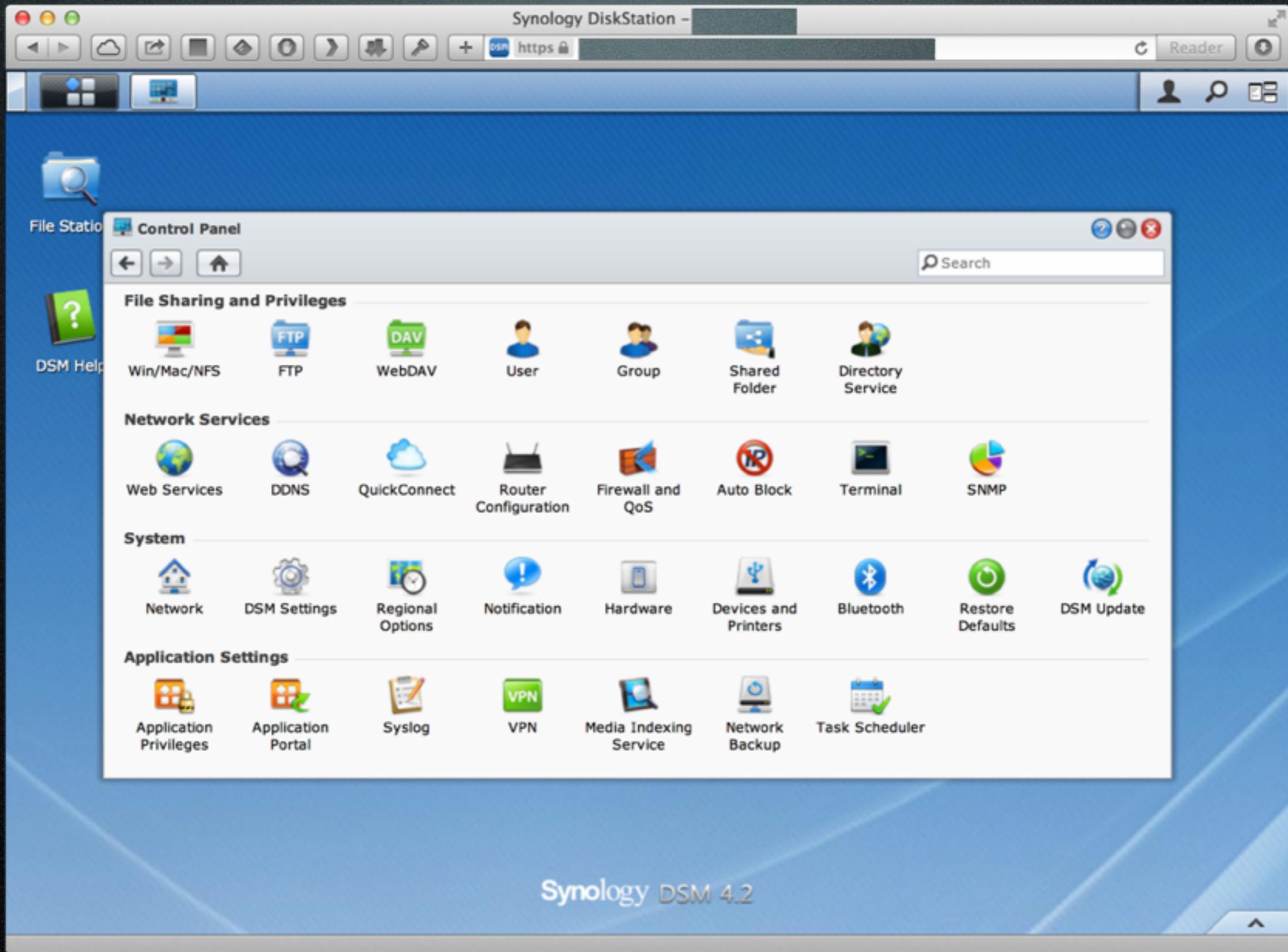
- Internal boot and external storage. i.e. Mac Mini + external RAID.
 - Fast Storage with Thunderbolt
 - Potentially Underpowered CPU
 - External Connections
 - Difficult to replace hard drives
 - Limited Internal Storage (2 internal drives)
 - Potentially slow network connection

Next Gen Storage Model

- Network Storage appliance NAS/SAN
 - NAS - Network Attached Storage
 - SAN - Storage Attached Network
- Some products are hybrid
- Flexibility is their greatest attribute
- Might not be appropriate solution

NAS

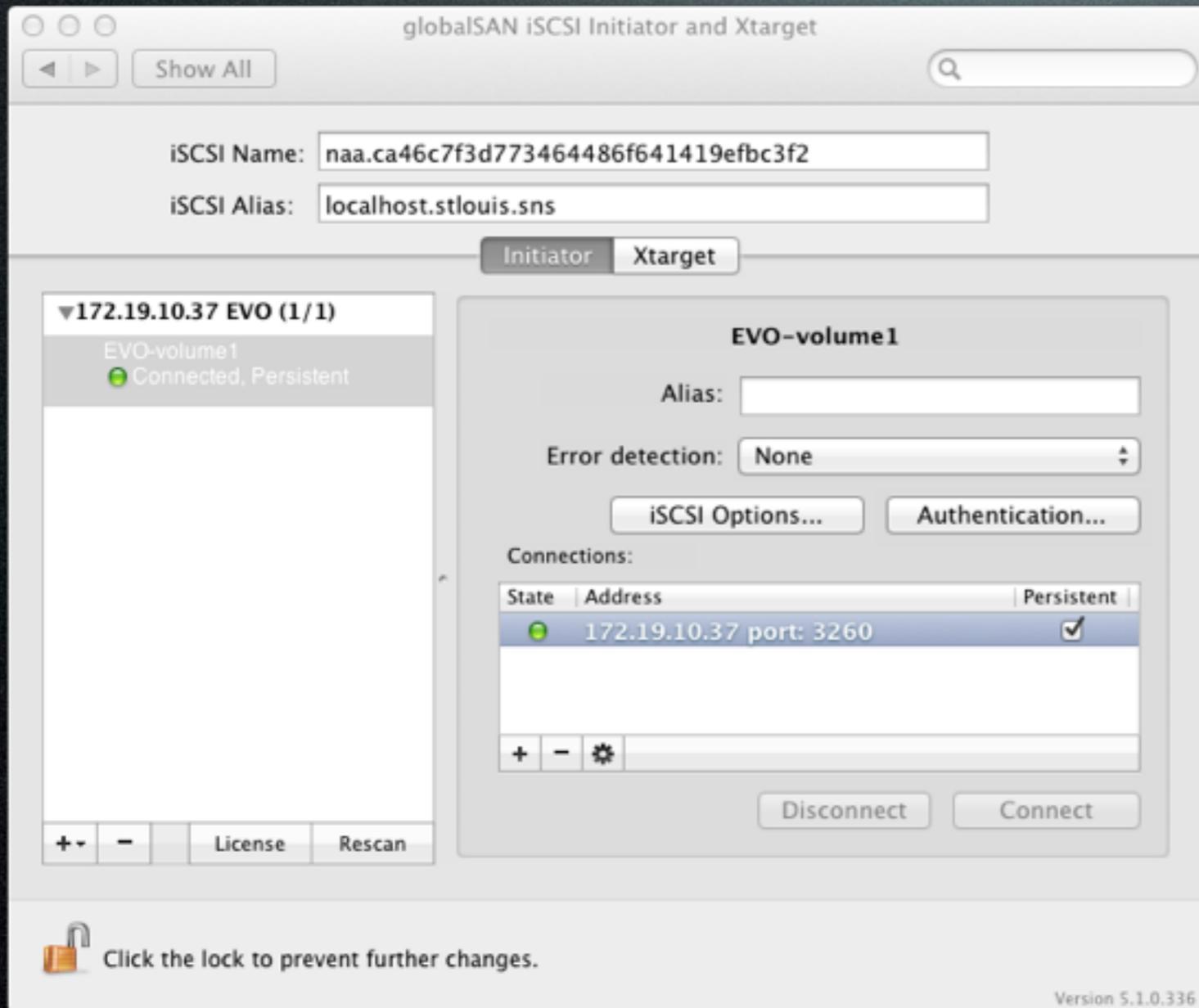
- File based network storage - it is a server
- Can be bound to a directory server
- Web based administration
- Not just storage anymore
- Tons of ways to connect (webdav, mobile apps/AFP/SMB)
- Capable of running real applications



SAN

- Block level based network storage - it is storage FOR a server
- One large SAN can be shared to multiple servers for storage
- Web based administration

iSCSI



- Allows you to connect a network volume as if it was local.

Mac Mini Server

- 100MBps hard drive.
- 500-700MBps Thunderbolt array.
- 125MBps gigabit ethernet port.
- A server is only as powerful as the weakest link.

Link Aggregation

- Link Aggregation is the teaming of ethernet ports for the purposes of redundancy and higher throughput.
- It does not increase the network speed, but rather allows more traffic at the rated speed.
- It also gives redundancy in case of network failure.

10Gb is here

- 10Gb ethernet is here and the price is dropping.
- Thunderbolt -> PCIe/10Gbe cards are available
- Thunderbolt 2 with dual port 10Gbe cards coming soon for link aggregation.

Storage Flexibility

- Network based storage offers flexibility where static Direct Attached storage fails.
- With iSCSI you can “carve” off pieces of your storage array and allocate them to servers, increasing and decreasing as needed.

Let's Achieve some Balance

- Make sure fast data interconnects aren't being wasted.
- Link aggregation can help offset network traffic woes.
- Faster networking if needed, 10Gb is here.
- Network based storage offers increased flexibility for storage needs.

Client Solution

- 10Gbe adapters in 4 Mac Pro Towers.
- 10Gbe switch blade for HP 5406 Chassis
- Synology RS3412RPxs with dual 10Gb links, RAID 10, and 2 SSD's for caching
- SSD drives in Mac Pro Towers
- 500MBps sustained read/write to server over network

Benchmarks

- Storage:
 - Mac Mini HD- 100MBps
 - SATA SSD - 550MBps
 - Macbook Air/Pro SSD - 800MBps
 - Mac Pro SSD - 1.2GBps
- Faster Networking:
 - 1 Gbe - 125MBps
 - 10Gbe - 1.25GBps