

Local Storage, Network Storage, and Backups

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Nomenclature

- Hard Drive - Uses Magnetic Platters
- SSD(Solid State Drive) - Uses Flash Memory
- Hybrid Drive - Uses Hard Drive with Flash
- Fusion Drive - Uses Hard Drive and SSD
- RAID types (0, 1, 5, 6, and 10)
- RAID in Disk Utility - Striped, Mirrored and Concatenated (JBOD)

RAID

- In OS X 10.8, you can RAID a boot volume but lose the recovery partition.
- Why external RAID a great idea
- Hardware RAID vs. software RAID
- 3rd party RAID software options
- 3rd party RAID hardware options

RAID

- Regardless of which RAID level you choose, there are benefits to all RAID types.
- Improves Speed
- Improves the resiliency
- Even with RAID, recoverability after deletion / corruption / theft is not improved

Fusion

- Benefits of a Fusion Drive
- Apple's Fusion Drive is different from a Hybrid drive from Seagate in that the flash storage is not used as storage instead it is used for cache.
- Partitioning a Fusion Drive will exclude the partition in the Fusion Drive.

Scale Out Storage

- Scale-out storage architecture uses a number of storage nodes -- consisting of multiple low-cost computer servers and storage components -- that are configured to create a storage pool or are configured to increase computing power to exceed a traditional storage array.
- File Based vs Block Based

Bus speeds and how they affect performance

- Bus speeds for today's storage devices
 - USB: 12Mbit/s, 480Mbit/s & 5Gbit/s
 - Firewire: 400Mbit/s & 800Mbit/s
 - eSATA/SATA: 1.5Gbit/s, 3Gbit/s & 6Gbit/s
 - Thunderbolt: 2 lanes at 10Gbit/s
- Performance chain, and identifying bottlenecks

Performance (cont'd)

- External drive speeds to it's connection bus
- Data throughput of a 5400 RPM drive to it's connection bus is 750MBs
- Data throughput of a 7200 RPM drive to it's connection bus is 1030MBs
- Data throughput of an average SSD to it's connection bus depends on the tech

Performance (cont'd)

- There is a point where the drive in the case can't keep up with the bridge technology leading to the data bus.
- What is that sweet spot?
- Parity vs Performance
- NAS vs Direct Attached

Performance (cont'd)

- Parity vs Performance
- NAS vs Direct Attached What storage solution is best for you?
- What are IOPS?

Backups

- Constructing a safe and sane backup plan that allows your customers to recover from likely threats to their data
 - accidental deletion
 - intentional deletion (mal intent)
 - hardware failure
 - software corruption
 - natural disaster, fire, flood

Backups (cont'd)

- Using Time Machine connected to a local drive
- Using Time Machine connected to a Time Capsule
- Using Time Machine connected to a Mac OS X Server Time Machine Network Destination

Backups (cont'd)

- Using unproven third party File Servers, or NAS devices as network Time Machine destinations
- Using Carbonite and other Cloud offerings
- Using CrashPlan
- Using Retrospect

Backups (cont'd)

- Clone utilities
 - Carbon Copy Cloner
 - SuperDuper
 - Disk Utility
- Using other backup utilities
- The importance of "off-site" storage in a disaster recovery scenario.

Archive and Nearline Storage

- Archive Storage: data storage that represents offline storage.
- Nearline Storage: intermediate type of data storage that represents a compromise between online storage and offline storage/archiving

The real test

- Regardless of which tools / approaches you suggest to your client, implore them to run (or have you run) fire-drill type restore tests, for both their protection and yours.

Where to Go?

- What works best for me?
- Will I need to expand?
- How large is my organization?
- What is my budget?