

Backups and Storage

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Arek Sokol is an Enterprise Systems Engineer at Code42 the makers of CrashPlan and SharePlan. With an “Anything Mac” mantra, Arek has designed and implemented many Mac infrastructure solutions as a Senior Client Engineer employed at Genentech and Salesforce.

Today outside of engineering and architecting Enterprise backup infrastructures he stay connected with 150+ other Mac administrators and engineers across the San Francisco Bay Area through his macbrained.org community which he co-founded in 2013.



Outline

- Local Storage
- Network Storage
- What's Coming Next?
- Backups (**You have them, right?**)

Storage 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

RAID Levels:

0 - *Striped*

1 - *Mirrored*

5 - *Striped w/ Parity*

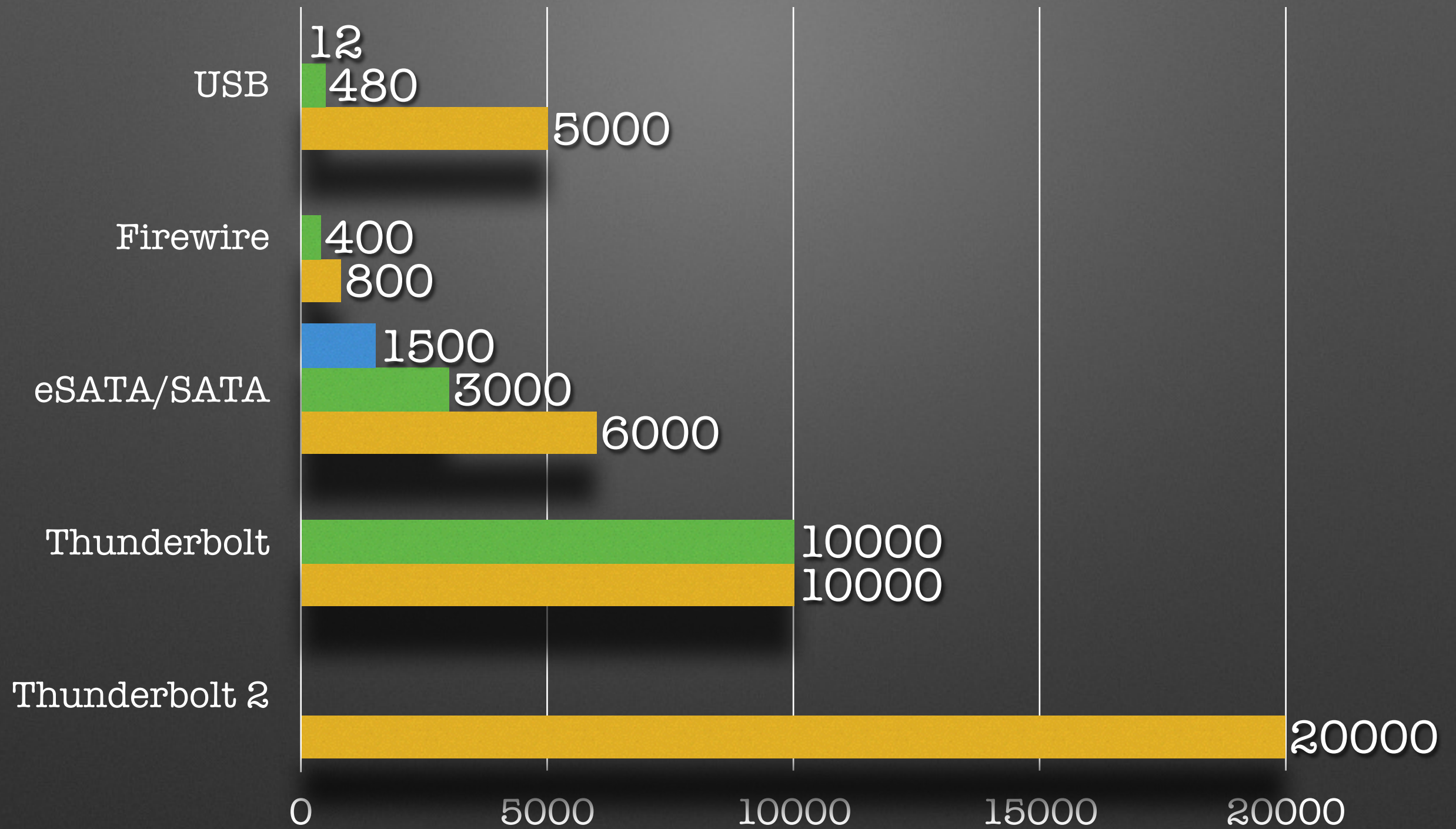
6 - *Striped w/ Double Parity*

10 - *Mirrored + Striping*

RAID in OS X

- Disk Utility
 - Striped, Mirrored and Concatenated (JBOD)
- In 10.8+ it can be a boot volume (but without a recovery partition)

Bus Speeds & Performance



Local Storage: Classic Approach

- Internal boot and storage (i.e. Mac Pro Server)
 - Big
 - Expensive
 - Powerful
 - Limited Storage (*limited to 4 internal drives and RAID card*)

Local Storage: Modern Approach

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

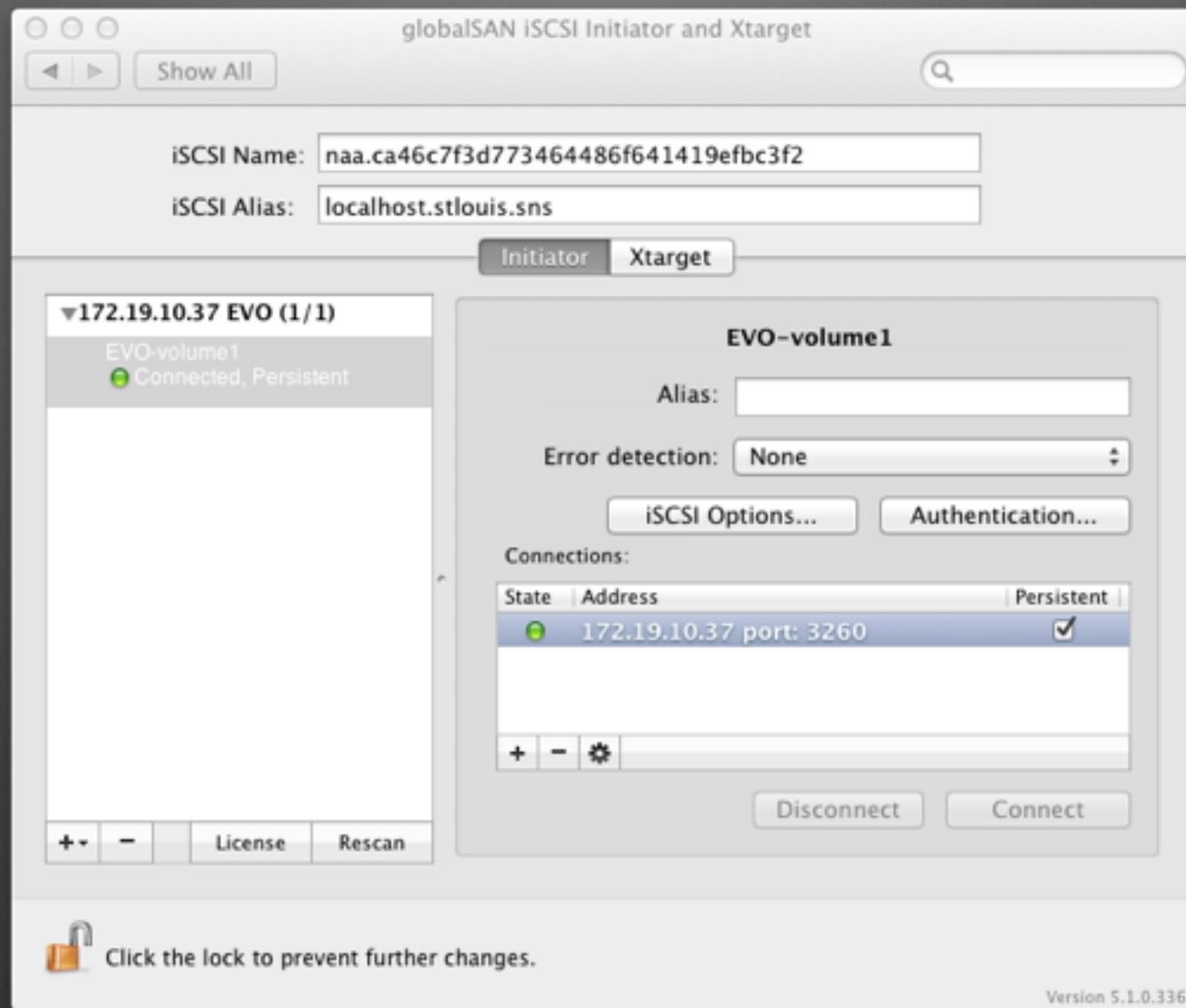
Network Storage

- Network Storage appliance NAS/SAN
 - NAS - Network Attached Storage
 - SAN - Storage Attached Network
- Servers may be combined in multi-protocol or unified storage arrays offering both NAS and SAN
- Network limitations - single network port, link aggregation
- Might not be appropriate solution

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

What's Coming Next?

- Faster storage:
 - Mac Mini Server HD - 100MBps
 - SATA SSD drive - 550MBps
 - Macbook Air SSD drive - 800MBps
 - Mac Pro SSD Drive - 1.2GBps
- Faster Networking:
 - 1Gbe - 125MBps Duplexed 250MBps
 - 10Gbe - 1.25GBps Duplexed 2.5GBps



Backup



Backups - Why?

- Constructing a safe and sane backup plan that allows your customers to recover from likely threats to their 'working' data:
 - Accidental deletion
 - Intentional deletion (malicious intent)
 - Hardware failure
 - Software corruption
 - Natural disaster, fire, flood...
 - Theft
 - IT Oops



First Published: 19:36 IST(29/8/2011)
Last Updated: 19:38 IST(29/8/2011)

Branson loses autobiography in blaze

Airline tycoon Richard Branson has lost his autobiography and 15 years of handwritten notes after his British Virgin Islands house caught fire.

Actress Kate Winslet and 20 other guests were holidaying at the billionaire's home when lightening hit the wooden property and set it ablaze, reports contactmusic.com.

"My office was in the house and I lost everything in it. I'd got a long way into writing my autobiography and it's lost. Fifteen years of handwritten notebooks went and photographs and so on," Branson told Britain's The Sunday Times.

"Running a business, we have a meticulous computer backup system so I'd assumed all that was completely safe. But it turns out the backup was also in the house.

"Everything filed on the computers there in the past few years is lost, both business-related and personal... But these are things. And as long as you have your family and friends around you, they're not that important," he added.

<http://www.hindustantimes.com/StoryPage/Print/739287.aspx>

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Backups - Manual

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

Backup - Automated

- Using unproven third-party file servers or NAS devices as network Time Machine destinations
- Offering BackBlaze, Carbonite, MozyPRO, Dolly or other Cloud services
- Enterprise capabilities: CrashPlan, Druva, Retrospect, Archiware, etc...

Things to think about

- Manual backup vs. Automated backup
- Distributed data set backup
- Full vs. Incremental vs. Differential backup
- Disk Encryption: How it impacts backups
- Encryption in backups:
 - To the cloud and In the cloud
 - Protected disk images
 - External hardware encrypted volumes and thumb drives

Live Databases: Special Case Backups

- FileMaker, MySQL...
- Use scripts for those!

Sync: Is it a backup?



- Google Drive, OneDrive, Dropbox, Box, and other cloud services like them are great.
- Their primary function is synchronization and collaboration. Should protect all but sync/share only some.
- Intrinsically less private and less secure. Potential leakage.
- Not truly built for restoration, but can help to some degree.

Archive: Is it a backup?

- DMG: Great for storing files in one enclosure for long period of time.
- Archive: Great for quickly collecting a set of files and keeping them all together.
- Not quite “backup” until you move them somewhere else (preferably offsite)



Specification \neq Reality

Regardless of which tools or approaches you use or suggest...

- Test fire-drill type restores regularly
- **Never trust yourself, a vendor, or a product completely!**

Beyond Backup?

- Multiple Destinations (3 destinations)
- Data Governance
 - Legal Holds
 - eDiscovery
 - Audit / Reporting

Arek Sokol

arek@macbrained.org