

File Transfer Speed Comparison

An exercise in Speed

By

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How are you transferring files?

- Is this a one-time deal?
- Are you trying to automate file moving?
- Do you have access to change both machines?
- Are you lazy?

FTP (file transfer protocol)

- Strengths
 - Quick
 - Easy to setup
- Weaknesses
 - Difficult to automate (not impossible)
 - Almost impossible to mount as local filesystem

SMB (server message block)

- Strengths
 - Interoperability (In case you have MS boxes around)
 - Ease of configuration
 - Easily mountable remote file system
- Weaknesses
 - Two sets of passwords to keep synchronized
 - Targeted for exploitation by script kiddies

NFS (network file system)

- Strengths
 - Easily mounted as local filesystem
 - Uses UDP for quick transfers
- Weaknesses
 - No authentication (can be tcp-wrapped however)
 - Uses UDP, pretty lousy over VPN over internet

The Test Hardware

- Servers
 - Dell 2.4ghz dual-zeon servers
 - 1G ram
 - 36G 15,000RPM U/ 320 SCSI drives
 - Intel 10/ 100/ 1000 Network cards
- Network
 - Dell PowerConnect 3048 managed switch
 - 48 10/ 100 ports and 2 1000 ports

The Test Software

- Linux
 - Redhat 9 server install, updates, and 2.4.20-18.9
- NFS
 - nfs-utils-1.0.1-2.9
- SMB
 - samba-2.2.7a-8.9.0
- FTP
 - server vsftpd-1.1.3-8 client ncftp-3.0.3-6

The Test Procedures

- Turn off all unnecessary services
- Unmount any previous test filesystems
- Restart all necessary services between tests
 - Needed for NFS tests (caching skewed results)
- Verify test files
 - Size and number checked against original specs

The Test Files

- First Group
 - A single file (an iso image file 638MB)
- Second Group
 - Group of files (range 3MB to 8MB) Qty 134
 - Total was 637MB

Testing FTP disk to disk

- Started FTP service on dell2
- Moved test files into / var/ ftp/ pub
- Opened ncftp client
- Cd to / test partition
- Copied files

FTP disk to disk results

- File Group 1 (638MB 1 file)
 - Time to transfer 27 sec (23.63MB/ s)
- File Group 2 (637MB 134 files)
 - Time to transfer 85 sec (07.49MB/ s)
- Observations
 - Very quick for a single large file
 - Many small files the overhead shows

Testing FTP mem to mem

- Started ftp service on dell2
- Mounted a ramfs on / var/ ftp/ pub/ mem
 - Mount -t ramfs / dev/ ram / var/ ftp/ pub/ mem
- Copied test files to / var/ ftp/ pub/ mem
- Mounted a ramfs on client / mnt/ mem
 - Mount -t ramfs / dev/ ram / mnt/ mem
- Cd to / mnt/ mem, started ncftp, copied files

FTP mem to mem results

- File Group 1 (638MB 1 file)
 - Time to transfer 16 sec (39.88MB/ s)
- File Group 2 (637MB 134 files)
 - Time to transfer 18 sec (35.39MB/ s)
- Observations
 - Very quick for both groups
 - Shows the overhead in FTP to be administrative

Testing SMB disk to disk

- Configured and started SMB service on dell2
- Moved test files to created share / mnt/ smb
- Mounted smb filesystem on dell1
 - `Mount -t smbfs -o
username=test,password=123 // dell2/ public /
test/ smb`
- Copied files
 - `Cd / home/ dean ; date ; cp / test/ smb/ * ./ ; date`

SMB disk to disk results

- File Group 1 (638MB 1 file)
 - Time to transfer 69 sec (09.24MB/ s)
- File Group 2 (637MB 134 files)
 - Time to transfer 69 sec (09.23B/ s)
- Observations
 - Not very quick
 - No difference between file groups

Testing SMB mem to mem

- Dell2 still configured for smb
 - Added directory for ramfs inside / mnt/ smb
 - Mount -t ramfs / dev/ ram / mnt/ smb/ mem
- Copied test files to / mnt/ smb/ mem
- Mounted a ramfs on client / mnt/ mem
 - Mount -t ramfs / dev/ ram / mnt/ mem
- Mounted smb from dell2 and copied as before

SMB mem to mem results

- File Group 1 (638MB 1 file)
 - Time to transfer 64 sec (09.97MB/ s)
- File Group 2 (637MB 134 files)
 - Time to transfer 60 sec (10.62MB/ s)
- Observations
 - Odd, Only slightly quicker than disk to disk

Testing NFS disk to disk

- Configured NFS on dell2
 - Added / test/ data to / etc/ exports
 - Started portmap and nfs services
- Moved test files to / test/ data
- Configured NFS client on dell1
 - Added to / etc/ fstab
 - dell2:/ test/ data / test nfs timeo=14,intr,soft
 - Mounted nfs filesystem, copied files

NFS mem to mem results

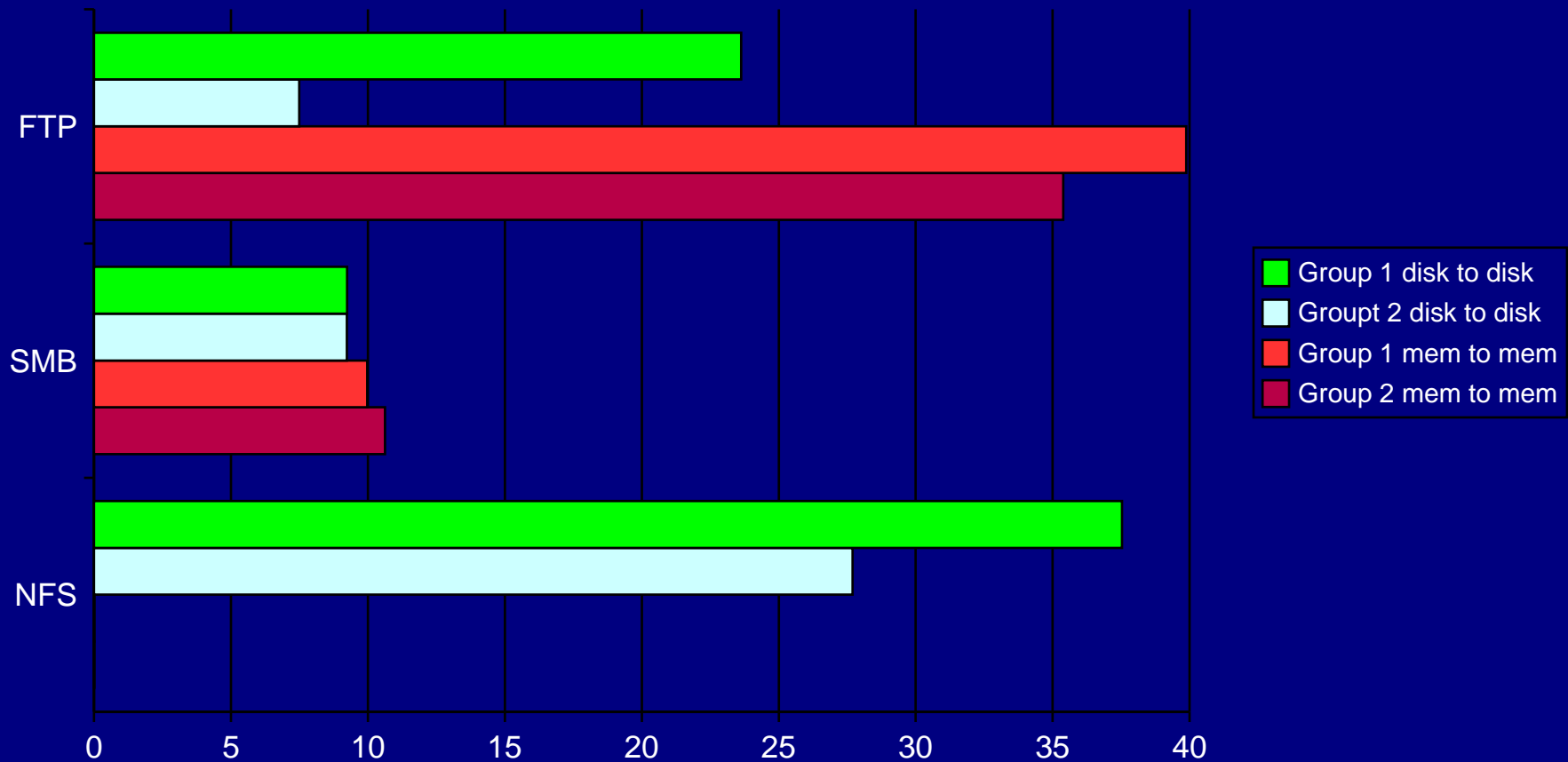
- File Group 1 (638MB 1 file)
 - Time to transfer 17 sec (37.53MB/ s)
- File Group 2 (637MB 134 files)
 - Time to transfer 23 sec (27.70MB/ s)
- Observations
 - Fast, and doesn't exhibit slow-down for multiple files like the FTP session did

Testing NFS mem to mem

- Could not figure this out so I have no results
 - I successfully mounted a ramfs onto an existing directory that was defined in / etc/ exports on the server.
 - When mounting that export on the client, I could not see the files in the mem directory

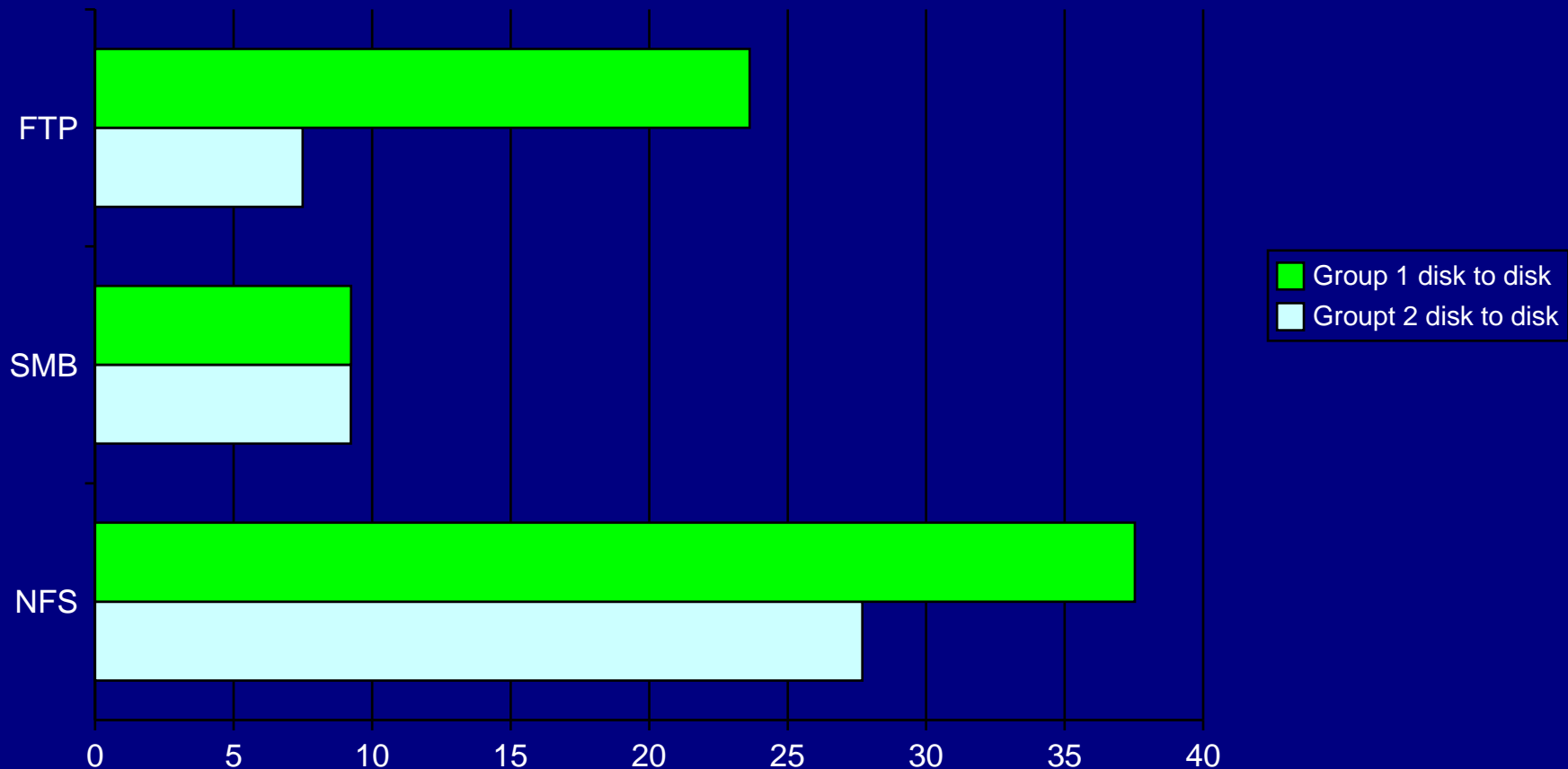
Results Graph

Transfer speed in MB/s



Results Graph without mem test

Transfer speed in MB/s



Tweaks

- SMB
 - Could not find anything in the smb.conf that made a difference
- FTP
 - Could not find anything in the / etc/ ftp* files to change that made a difference
- NFS
 - Playing with options in / etc/ exports mainly ro vs rw and sync vs async. Change at your own risk

Conclusion

- SMB
 - Good interoperability but doggy on speed
- FTP
 - Fast, but difficult to use files remotely, can be scripted/ automated
- NFS
 - Fast and easy, security issues with portmap and due to mainly UDP, slow across vpn/ internet