

Backup, Archiving & File Transfers for Mac OS X

Leonard Rosenthol (<mailto:leonardr@pdfsages.com>)
Chief Technology Officer, PDF Sages, Inc.

Craig Isaacs (mailto:craig_isaacs@dantz.com)
VP Sales and Marketing, Dantz Development Corp.

Adam Engst (<mailto:ace@tidbits.com>)
Publisher, TidBITS

Overview

- Under the hood of Mac OS X – Leonard
- Enterprise backup problems, or “Where’s my Retrospect?” – Craig
- Tips and Tricks – Adam
- Open Discussion/Q&A

Under the Hood

AQUA

CLASSIC

CARBON

COCOA

JAVA

QUARTZ

OPENGL

QUICKTIME

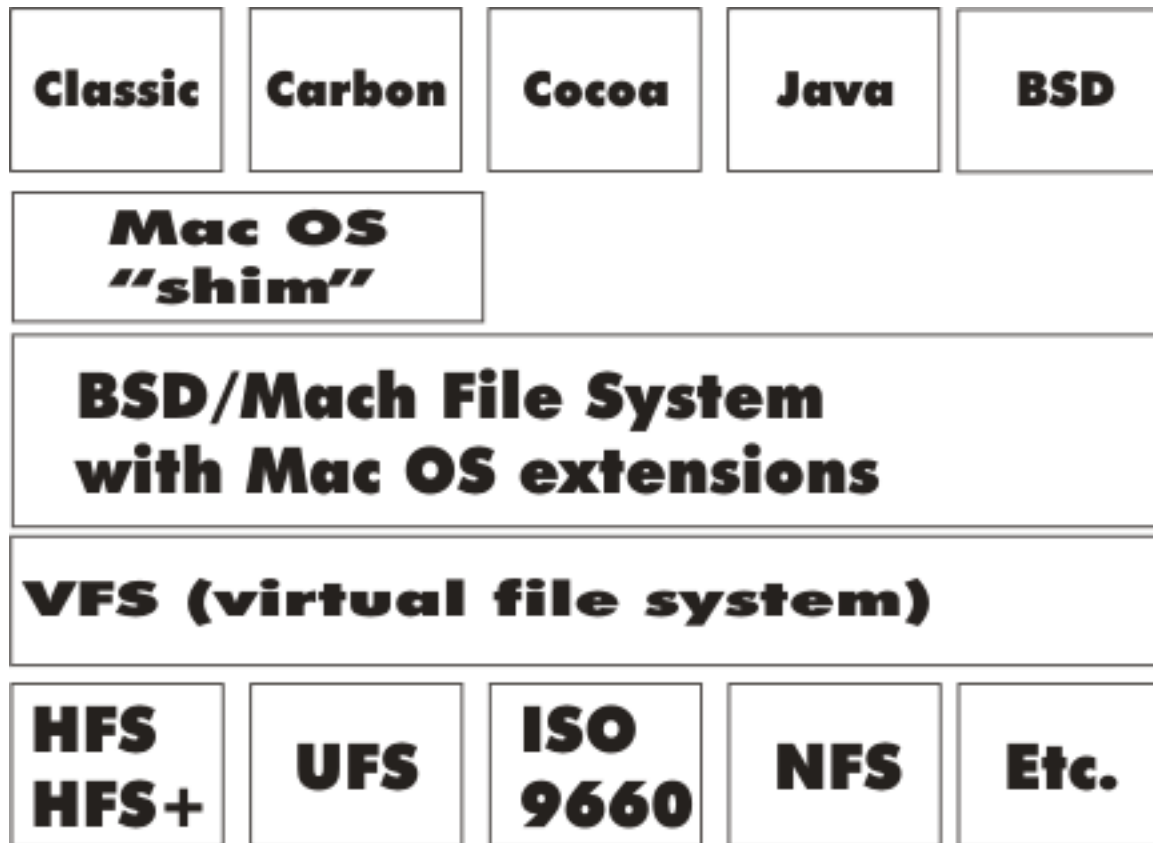
DARWIN

Under the Hood – 2

- For discussions of backup & archiving, we only care about the kernel and file system layers of Darwin and how they interact with the different application environments.



Into the File Systems



What does that mean?

- Classic and Carbon applications think they are dealing with the Mac OS
 - Case insensitive filenames
 - Non-rooted file system
 - Mac OS attributes/metadata (type/creator, etc.)
 - Resource forks
- Cocoa, Java & BSD apps think they are dealing with Unix
 - Case sensitive names
 - Rooted (/)
 - Unix attributes & permissions

Application Support Table

Feature	Classic	Carbon	Cocoa	Java	BSD
Case Sensitivity	NO	NO	YES	YES	YES
Multiple Forks	YES	YES	NO	NO	NO
Metadata	YES	YES	NO	NO	NO
Path Separators	:	:	/	/	/
Create & Mod Dates	YES	YES	Mod Only	Mod Only	Mod Only
Sparse Files	NO	NO	YES	YES	YES
Alias (soft links)	YES	YES	YES	YES	YES
Hard links	NO	NO	YES	YES	YES
Line ending	CR	CR	LF	LF	LF
Delete open files	NO	NO	YES	YES	YES

Volume Format Support Table

Feature	HFS/HFS+	UFS	ISO 9660	NFS
Case Sensitivity	NO	YES	YES	YES
Multiple Forks	YES	NO*	NO*	NO*
Metadata	YES	NO*	NO*	NO*
Create & Mod Dates	YES	Mod Only*	Mod Only*	Mod Only*
Sparse Files	NO	YES	NO	NO
Alias (soft links)	YES	YES	NO	YES
Hard links	NO	YES	NO	YES
Unicode Filenames	YES	YES	NO	NO

- AppleDouble is used when an Classic or Carbon application creates or manipulates a file on a non-HFS volume

Archive/Encoding Support Table

Feature	MacBinary	AppleSingle	Tar	StuffIt
Case Sensitivity	NO	NO	YES	NO
Multiple Forks	YES	YES	NO	YES
Metadata	YES	YES	NO	YES
Create & Mod Dates	YES	YES	Mod Only	YES
Sparse Files	NO	NO	NO	NO
Alias (soft links)	YES	YES	NO	YES
Hard links	NO	NO	NO	NO
Unicode Filenames	NO	NO*	NO	YES
Files > 2 Gig	NO	NO*	YES	YES
Unix Permissions	NO	NO*	YES	YES
“True” Hierarchy	NO	NO	NO	YES

- AppleSingle/Double are being extended to address these limitations

Rounding it all up

- The standard BSD tools (tar, cpio, etc.) weren't designed to maintain all the information contained on an HFS+ volume and processed by Carbon and Classic apps.
- Cocoa applications are also limited by their NeXTStep heritage when it comes to working with the file system.
- Carbon applications are in the best position to archive and backup ALL relevant information about files and folders accessible via Mac OS X.

Enterprise Backup

Tips and Tricks

Q & A

Q & A