

File System Management

Mastering Radmin & RsyncX



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Who are these guys?

Kevin Boyd - University of Michigan

- RsyncX Developer
- Steering Member macosxlabs Project
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Richard Glaser - University of Utah

- Long time radmind admin
- Steering Member macosxlabs Project



macosx labs.org

Mac OS X Labs Deployment Project





macosx labs.org
Mac OS X Labs Deployment Project

Project

- Document, communicate & collaborate on challenges of deploying Mac OS X in a lab environment.
- Joint effort with Apple, Higher Education, K-12, corporate and anybody interested.
- Webcasts, documentation, discussion forums and much more...

RsyncX

Suite of Tools to Manage Machines

Quick RsyncX Script Generator

RsyncX

Source path: <input type="text"/>		Destination path: <input type="text"/>
Source Machine IP Address: <input type="text"/>	<input type="checkbox"/> Add file(s) to destination	Destination Machine IP Address: <input type="text"/>
Alt. Source tmpdir: <input type="text"/>	<input type="checkbox"/> Use Compression	Alt. Dest. tmpdir: <input type="text"/>
Network Transport: <input type="text" value="ssh"/>	<input type="checkbox"/> Use Checksums	Save Script As: <input type="text"/>
Login To Source As: <input type="text"/>	<input type="checkbox"/> Sync without FolderIcon Info	Login To Dest. As: <input type="text"/>
Other Options: <input type="text"/>	<input type="checkbox"/> Sync without HFS+ File Info	Dest. Boot Options: <input type="text" value="Do Not Bless"/>
<input checked="" type="checkbox"/> Run As Root	<input type="checkbox"/> Push Source As Boot Volume	<input type="checkbox"/> Set OpenFirmware
<input checked="" type="checkbox"/> Show Elapsed Time	<input type="checkbox"/> scp rsync to Destination First	<input type="checkbox"/> Reboot when done

During Rsync Show:

Debugging Verbosity:
Quiet Max

Mastering RsyncX

- RsyncX: Introduction
- Firewire Installations
- Network Installations
- Using the RsyncXCD
- Using the RsyncX Package Tools
- RsyncX: Hot Tips
- Where do I get RsyncX?

RsyncX: Introduction

- RsyncX, rsync, and the RsyncXCD Explained
- Local file rsyncs
- Local Folder rsyncs
- Entire Machine rsyncs
- Examples of each

Firewire Installations

- Create script to send loadset from Firewire drive to volume mounted as /Volumes/Macintosh HD
- Send your loadset to a Firewire drive as bootable

Firewire Installs cont.

- Disconnect Firewire drive, reconnect to destination machine, boot from FW drive
- Run script you created that's on the Firewire drive to install loadset on destination machine volume named /Volumes/Macintosh HD
- Reboot destination when finished rsyncing - you're finished!

Network Installations

- Create loadset
- Push loadset to server
- Go to destination machine
- Boot from non-primary device
- Pull loadset to primary bootable device
- Reboot, and you are done

Using the RsyncXCD

- RsyncXCD can be used as a bootable non-primary boot device
- Before burning to CD, the RsyncXCD image should contain your scripts for pulling your loadset from the Network Server

Using the Package Tools

- Introduction

- Firewire Installations

- Network Installations

- Using the RsyncXCD

- Using the RsyncX Package Tools

RsyncX: Hot Tips

- Can I push loadsets without storing them on a server? Yes.
- Can I add Apps to the RsyncXCD? Yes.
- Can I control how much bandwidth rsync uses? Yes.
- Can I control in-transit file compression? Yes.

RsyncX: Hot Tips

- Why would I want to use rsync_hfs at www.opendarwin.org?
- Can I use the RsyncX GUI with any version of rsync? Yes.
- Can I use the scripts generated with the RsyncX GUI on another flavor of UNIX? Yes.

Where Do I Get RsyncX?

- macosxlabs.org
- apple.com/downloads
- VersionTracker
- TUCOWS
- macupdate.com

Radmind

Mastering Radmind



What I will cover?

- Background
- The Basic Concept
- Why Use It?
- How to deploy it?
- Terms
- Overview of the tools
- Overview of GUI tools

Background

Requirements & Resources



Who's Developing It?

■ Developed at University of Michigan

- Research Systems Unix Group (RSUG)
- radmind@umich.edu
 - Technical support & feature requests
 - Documentation, sample scripts, etc.
 - Mailing List - Archived & Searchable

Thanks for all their work & support

research systems  group

Where to get it?

Download from Radmind web site:

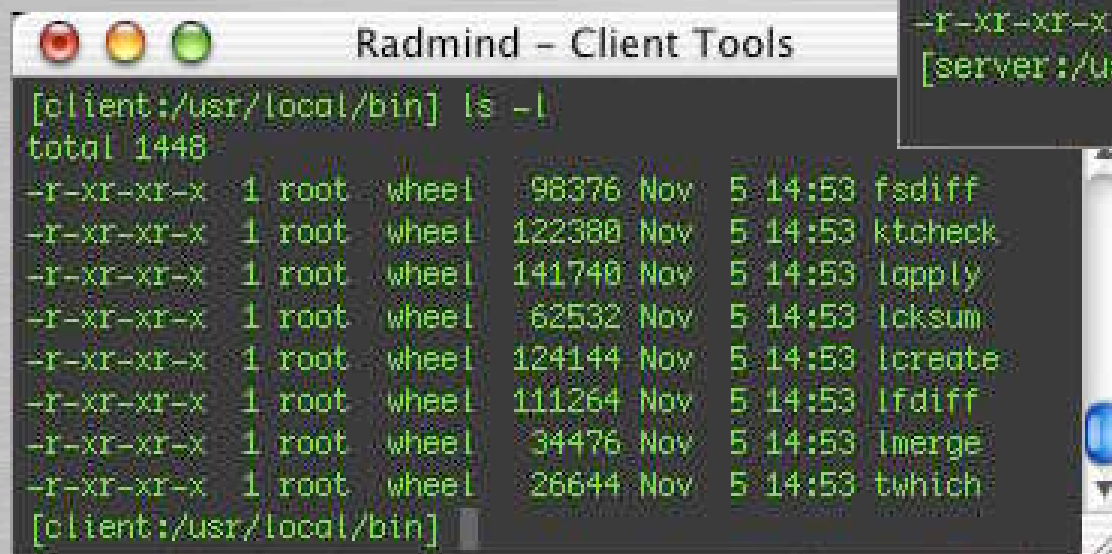
- www.radmind.org
- Mac OS X Installer & Source Code
- Radmind Assistant (GUI Front-end)
- iHook (A useful tool to use with Radmind)



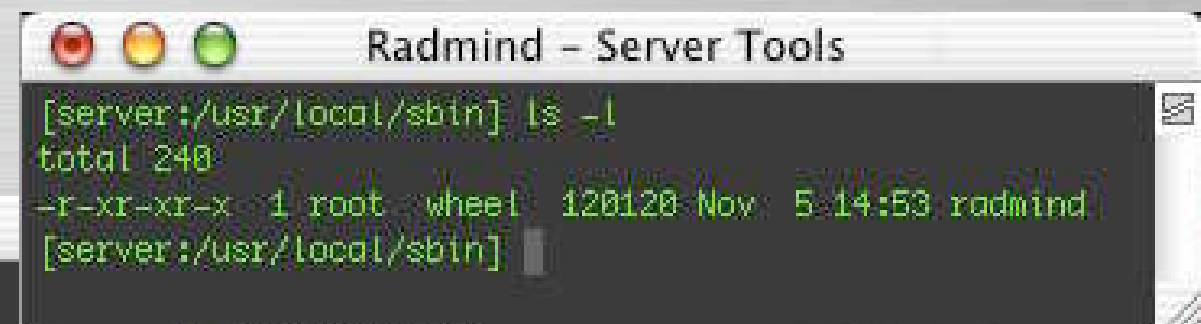
What is it?

■ Radmind is a suite of command line tools

- Tools for both client & server
- Open Source



```
[client:/usr/local/bin] ls -l
total 1448
-r-xr-xr-x  1 root  wheel   98376 Nov  5 14:53 fsdiff
-r-xr-xr-x  1 root  wheel  122388 Nov  5 14:53 ktcheck
-r-xr-xr-x  1 root  wheel  141748 Nov  5 14:53 lapply
-r-xr-xr-x  1 root  wheel   62532 Nov  5 14:53 lcksum
-r-xr-xr-x  1 root  wheel  124144 Nov  5 14:53 lcreate
-r-xr-xr-x  1 root  wheel  111264 Nov  5 14:53 lfdiff
-r-xr-xr-x  1 root  wheel   34476 Nov  5 14:53 lmerge
-r-xr-xr-x  1 root  wheel   26644 Nov  5 14:53 twhich
[client:/usr/local/bin]
```



```
Radmind - Server Tools
[server:/usr/local/sbin] ls -l
total 248
-r-xr-xr-x  1 root  wheel  120128 Nov  5 14:53 radmind
[server:/usr/local/sbin]
```

Supported Platforms

■ Can be used with any supported Unix

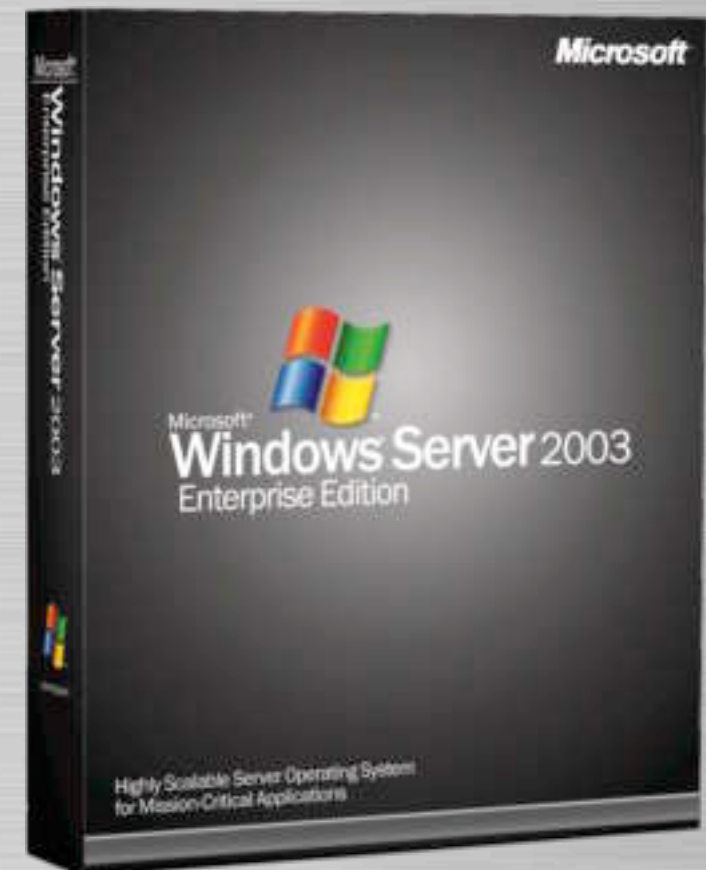
- Mac OS X
- FreeBSD
- Linux
- OpenBSD
- Solaris



Other Platforms

Windows?

- Currently not supported
- Ports are in development
 - Server only
- Unknown timeframe



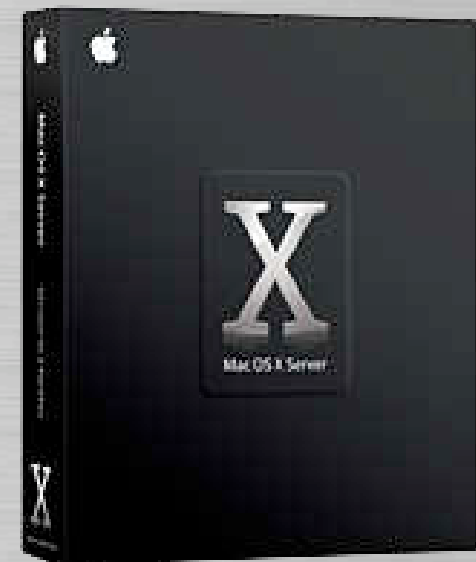
Mac OS X Requirements

Client

- Requires Mac OS X 10.2 or later

Server

- Requires Mac OS X 10.2 or later
 - Mac OS X Server NOT required
 - Server can run on Mac OS X client or any supported platform
 - Older versions can be supported by recompiling source code



The Basic Concept

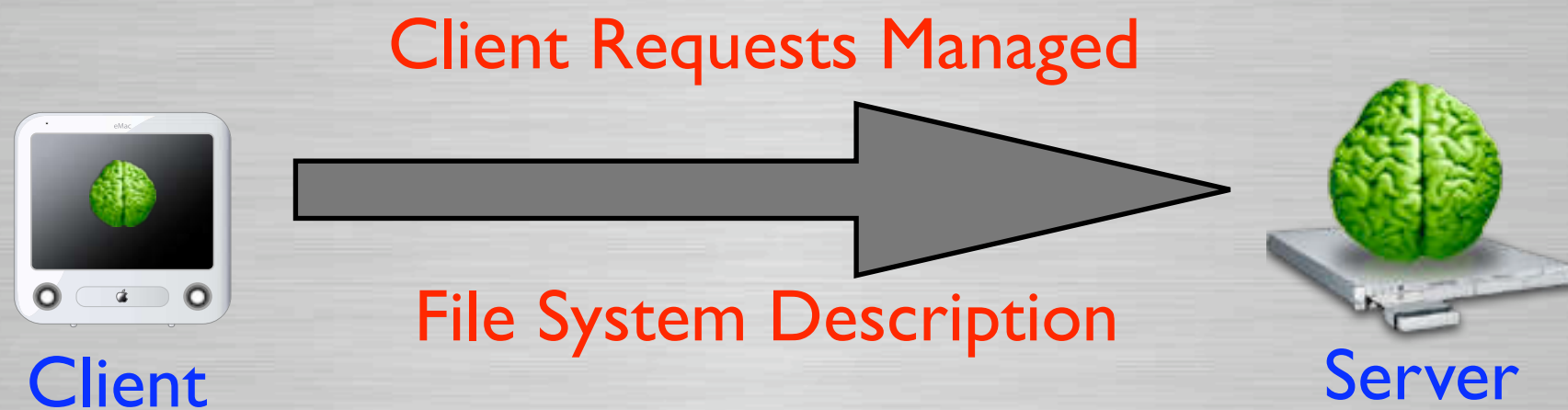
The Fundamentals of Radmind



Tripwire

- Radmind can run as a tripwire
 - Detects file system modifications
 - Can reverse modifications
- Radmind can restore to managed state
 - Downloads and/or removes files/folders
 - Sets permissions & attributes

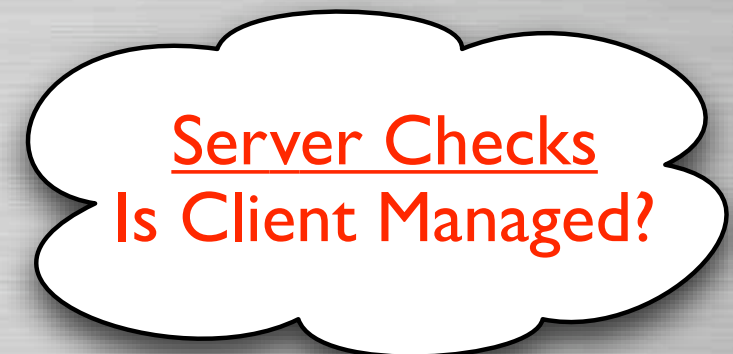
Process Overview



Process Overview



Client

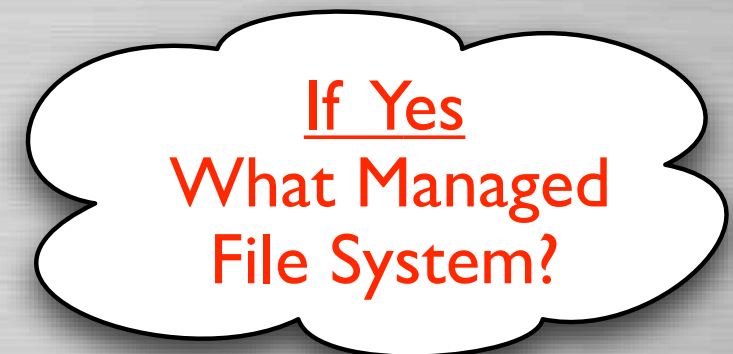


Server

Process Overview



Client



Server

Process Overview



Process Overview

Client stores
Managed
File System
Description



Client



Managed File System
Description



Server

Process Overview

Next, Client Scans
its Hard Disk and...



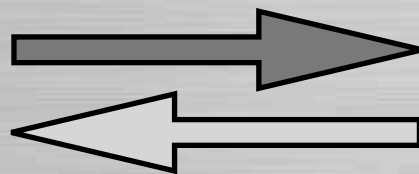
Client



Server



Managed File System
Description



Client's Hard Disk

Process Overview

...compares the
Managed File System
to Client's hard disk.



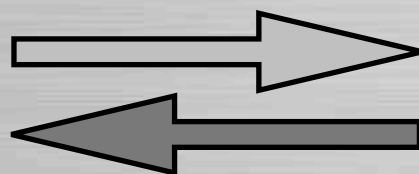
Client



Server



Managed File System
Description



Client's Hard Disk

Process Overview

Then, creates a
Differences
Description.



Client



Server



Differences Description

Process Overview

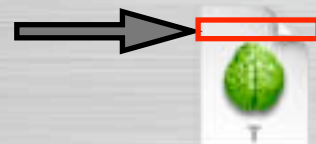
Using the Differences Description it deletes extra items on client.



Client

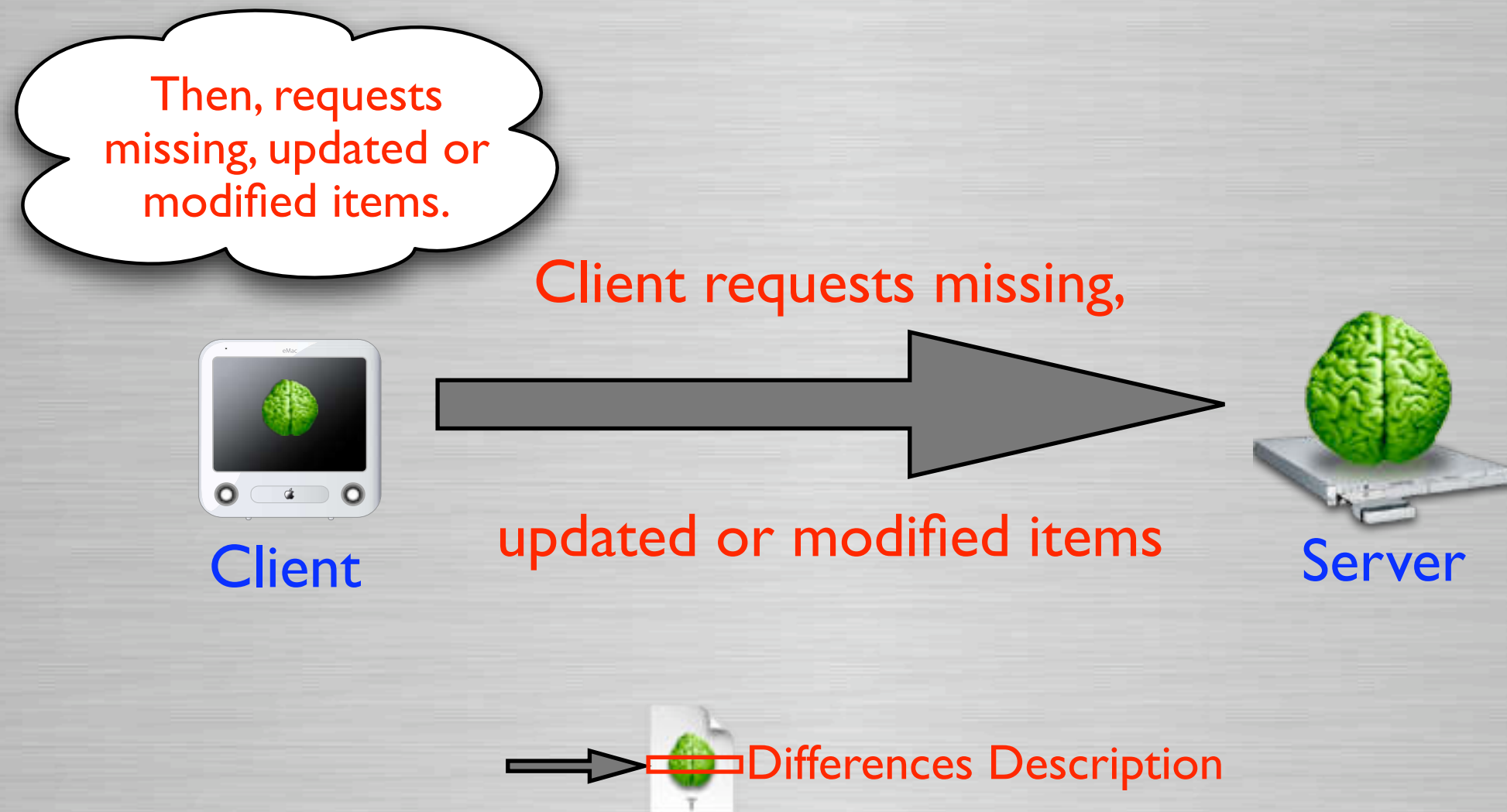


Server



Differences Description

Process Overview



Process Overview

And adds missing,
updated or modified
items to client.



Client

Server sends requested



items to client



Server



Differences Description

Process Overview

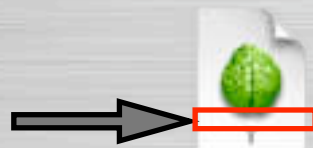
Modifies files and
directories
Permissions &
Attributes



Client



Server



Differences Description

Process Overview

Done!!!
Client Updated to
managed state



Client



Server

Why use it?

The Benefits of Radmind



Network/Server Usage

Few files are transferred

- For incremental updates
- Only needed files are downloaded

Other Tools

- Other tools transfer an entire HD image
- Even if client needs a few updates

Network/Server Usage

Scans files locally

- The client scans the hard disk locally, doesn't talk to server during scan

Other Tools

- Other tools do comparison over network

DHCP NOT Required

DHCP NOT Required

- It is flexible, you just need an IP address
- Doesn't matter how it gets assigned

Other Tools

- Some tools require; or are more difficult to setup without DHCP enabled.

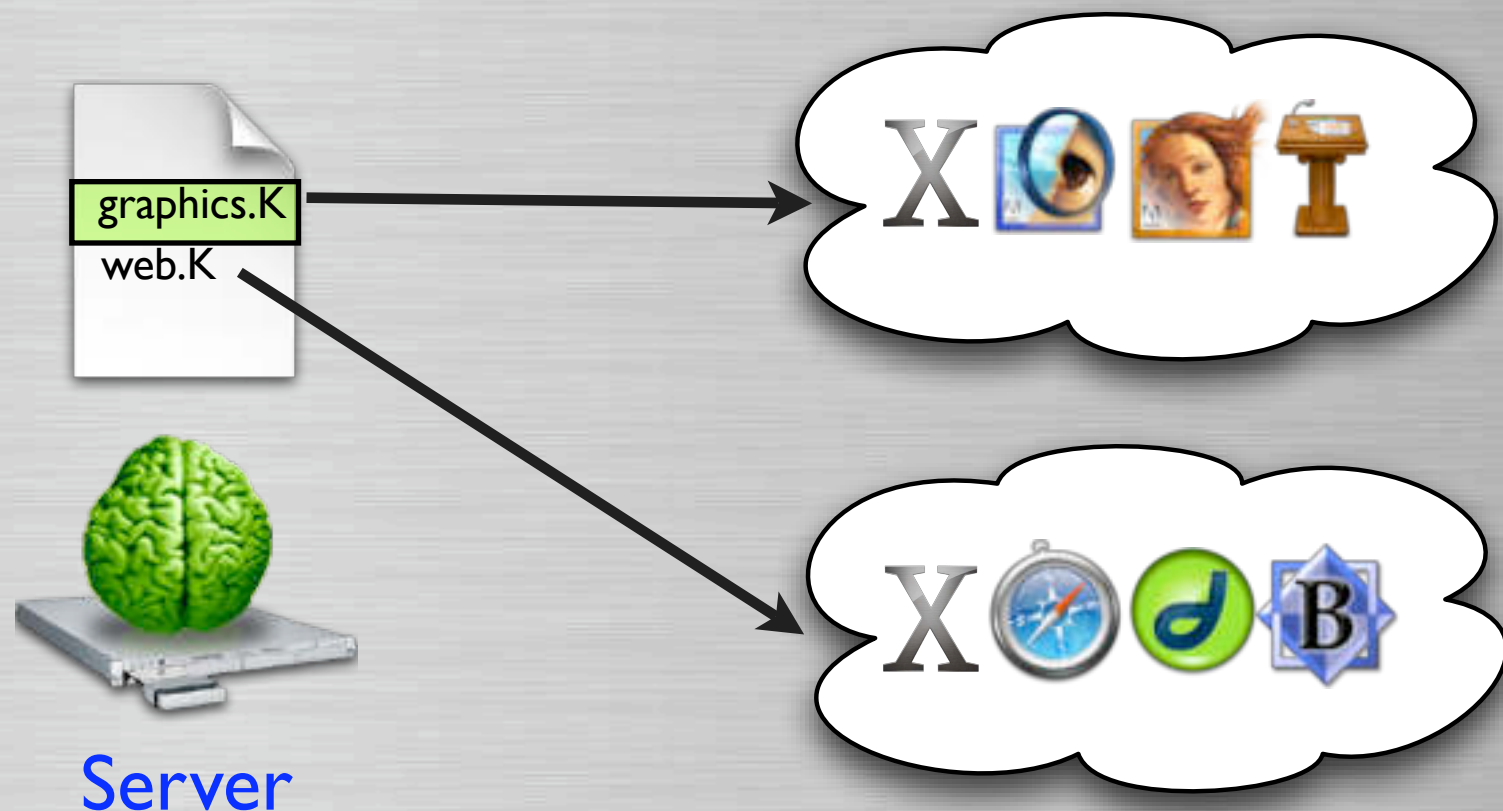
Manage by Certificate

- Allows client & server identification & verification via SSL certificate.
- IP is completely irrelevant for client identification.
- Nomadic Machines
 - Laptops used in various locations, like home & work, can be managed.
- IP Dynamic Assignments

Easy Management

- One file on server to manage file systems of multiple machines.
- Easy to switch or modify clients configurations

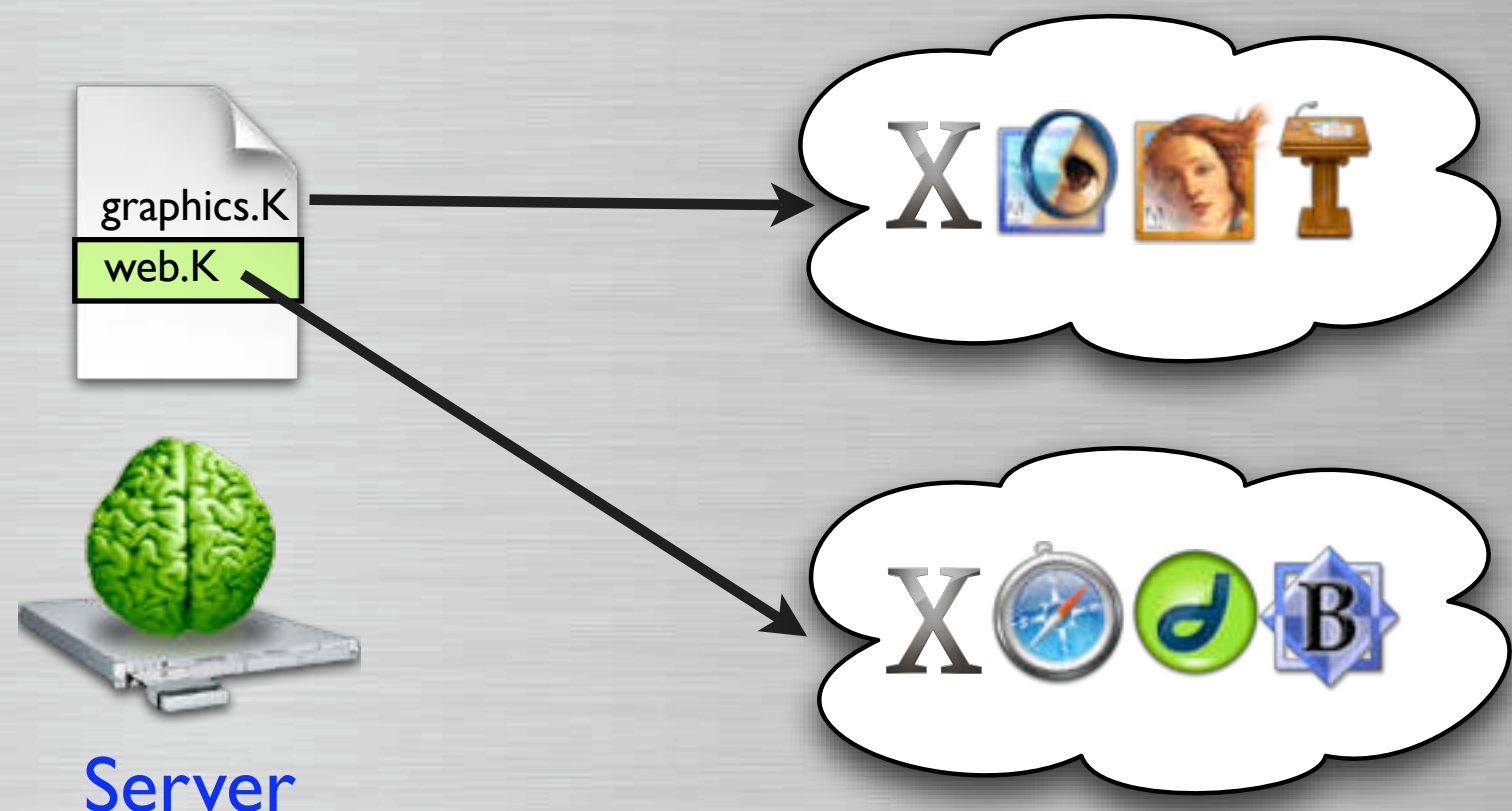
Switch one line to
distribute graphical apps.



Easy Management

- One file on server to manage file systems of multiple machines.
- Easy to switch or modify clients configurations

Switch one line to
distribute web apps



Software Tracking

- Tracks software & OS installations
- Unlike other tools, radmind has built-in support for tracking individual software or OS installations.
- And has built-in support for uploading & restoring individual software or OS installations

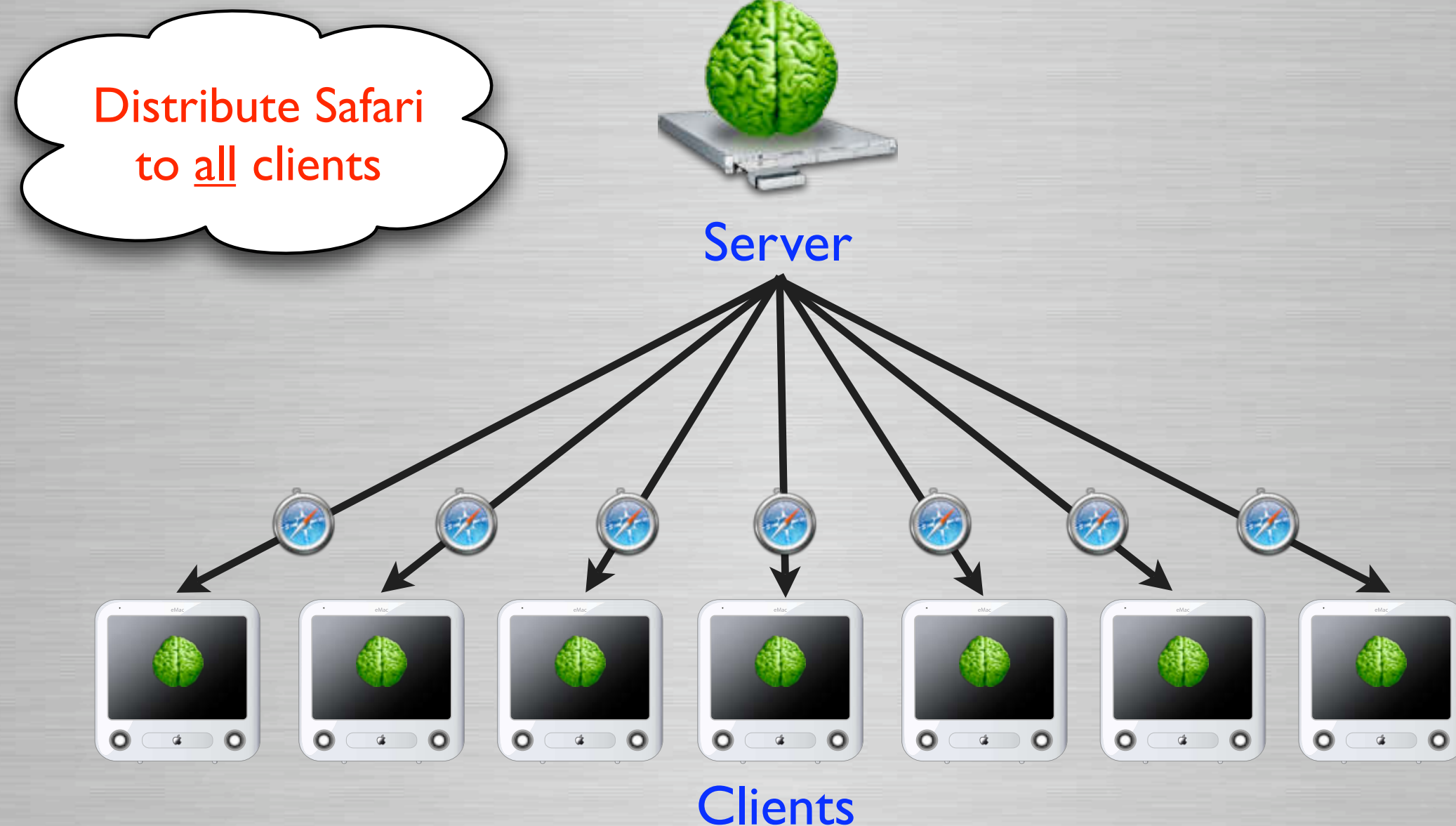
Software Distribution

■ It allows flexible software/OS distribution

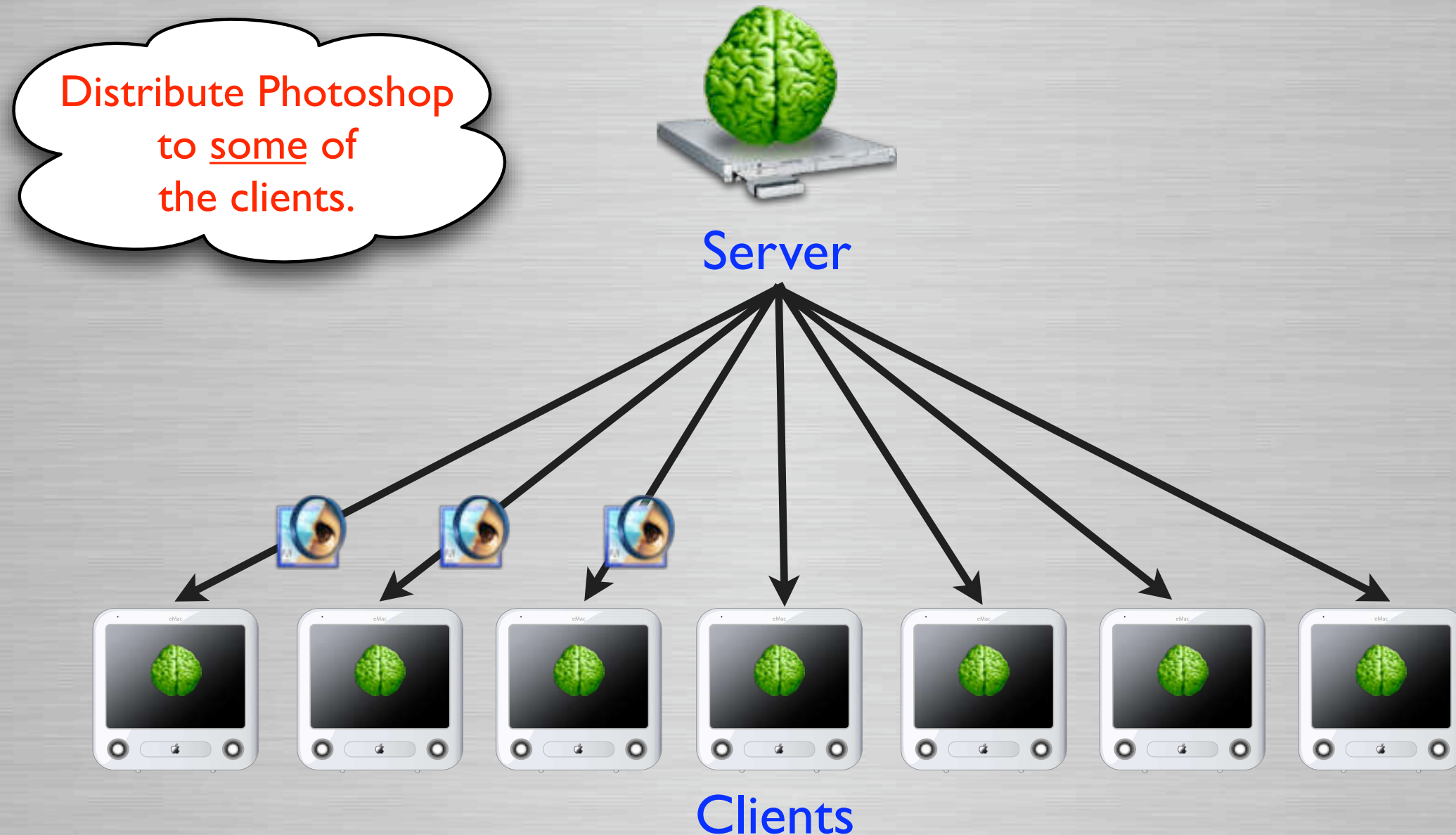
- Add, remove or upgrade or downgrade
 - OS & Software
 - Individual Clients
 - Sub-set of all Clients
 - Globally



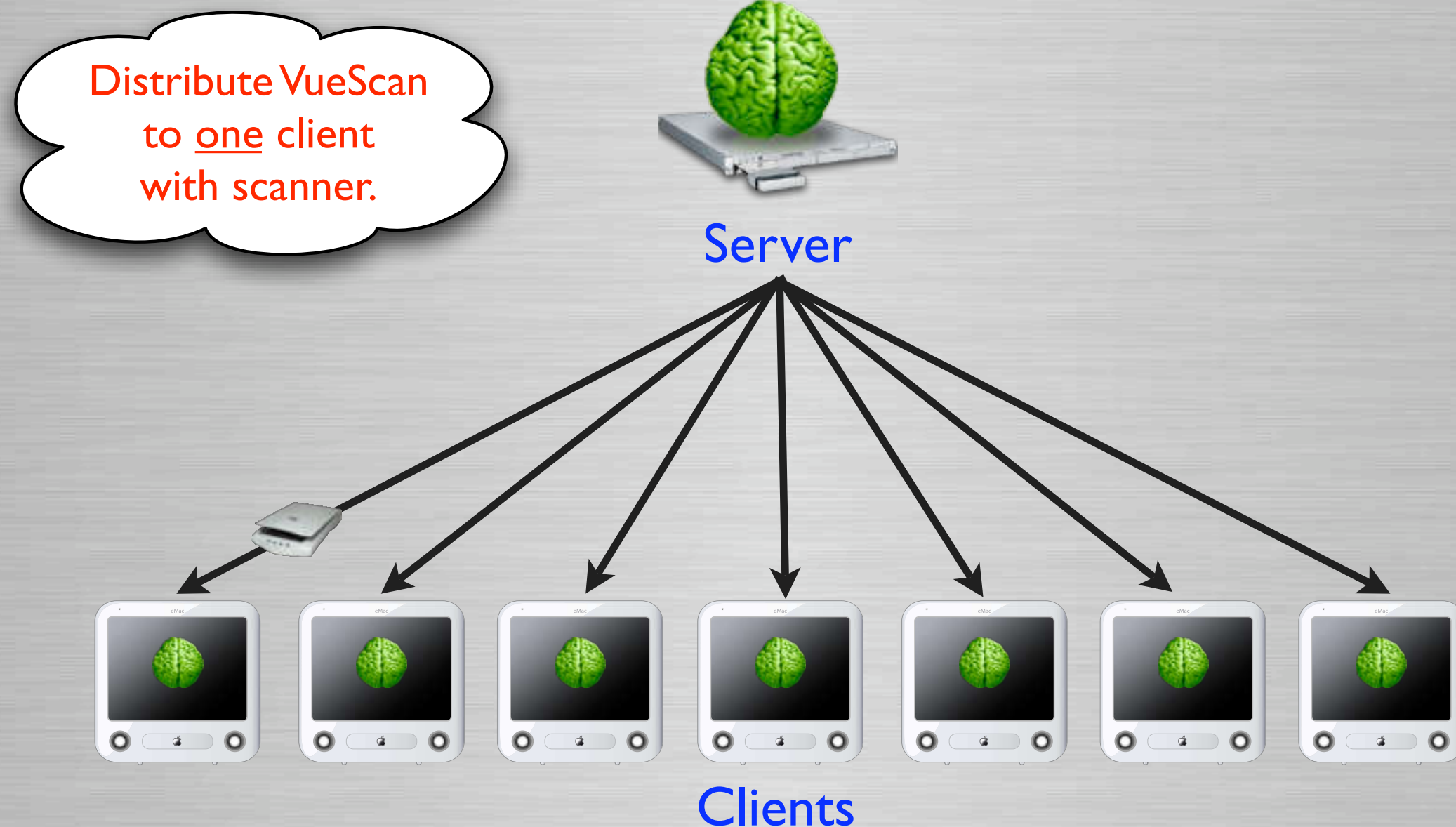
Global Distribution



Sub-Group Distribution



Individual Distribution



Find Crappy Apps

Find/modify “crappy” apps or installers

- Install or delete in locations they shouldn't
- Set permissions incorrectly
- Requires world rights, etc.

Examples

- OmniPage, QuarkXPress, Painter, many others

See page for details & workarounds

- www.macos.utah.edu/CrappyApps.html

How to deploy it?

Planning & Preparation



Management Basics

File System Management Fundamentals

- Every file & folder can not be managed
- Some files & folders should not be managed
- Some files & folders might not be managed based on administration decisions or user impact.

What Parts to Manage?

What parts of the file system to manage?

- Depends on the OS and version of OS



- Depends on the type of environment



- Depends on how you want manage it



OS Defined Management

■ Some Areas of OS Shouldn't Be Managed

- Files/Directories Managed by OS
 - /dev
 - /mach.sym
- Perpetually modified areas
 - /Library/Caches
 - /System/Library/Extensions.kextcache
- Logs
 - /private/var/log



Type of environment?

Student Lab

- Try to manage as most of the file system
- This allows restoring file system due user modifications, hacks, OS and hardware bugs.



Staff & Faculty

- Allow local admin manage?
 - Users Home Folders (i.e. /Users)
 - Users Web Folders (i.e. /private/etc/httpd/users)
 - Local Admin needs to be trusted and technical

Type of environment?

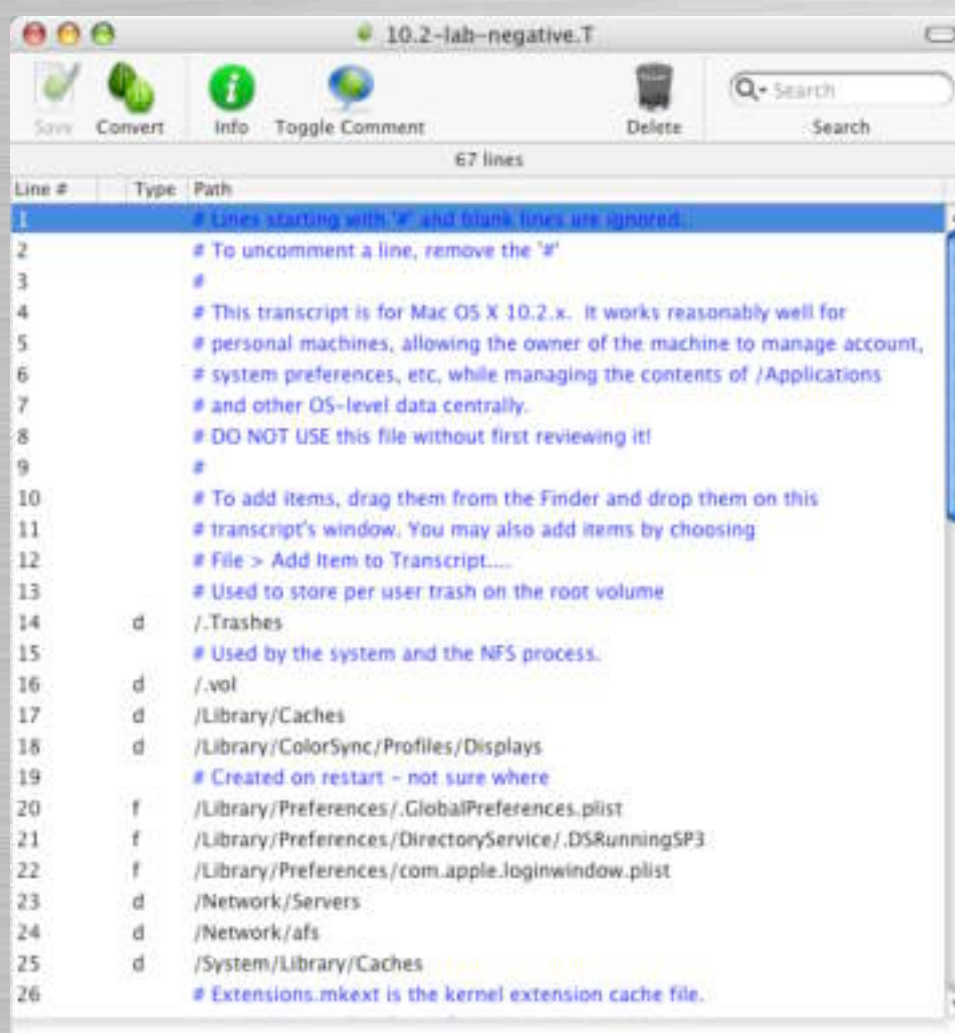
Example

- My department manages both labs & staff
- We manage both environments in same way
 - Except...
 - We offer more customization on management for Staff
 - Staff usually has an additional volume we don't manage
- Staff we manage aren't technical enough to allow them to locally administrate

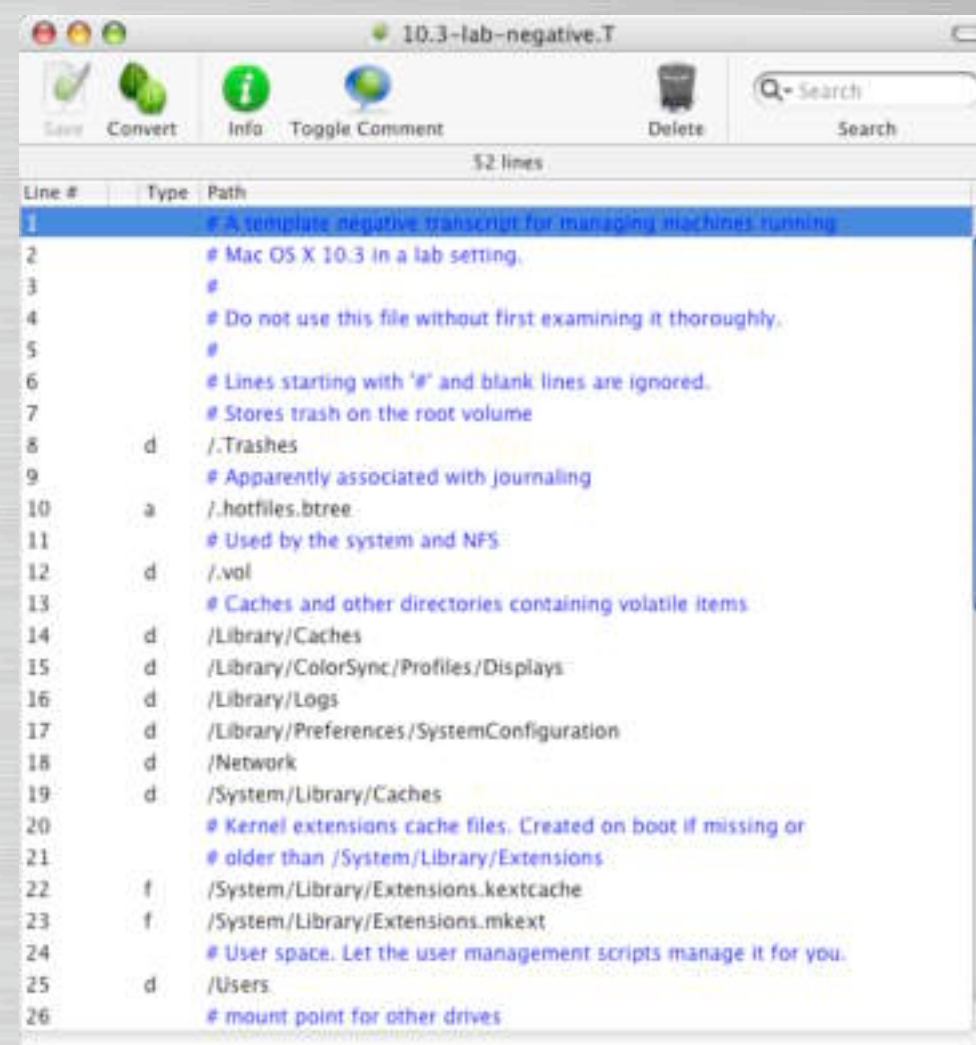
Management Templates

Radmind comes with templates

- Mac OS X 10.2 & Mac OS X 10.3



Line #	Type	Path
1		# Lines starting with '#' and blank lines are ignored.
2		# To uncomment a line, remove the '#'
3		#
4		# This transcript is for Mac OS X 10.2.x. It works reasonably well for
5		# personal machines, allowing the owner of the machine to manage account,
6		# system preferences, etc, while managing the contents of /Applications
7		# and other OS-level data centrally.
8		# DO NOT USE this file without first reviewing it!
9		#
10		# To add items, drag them from the Finder and drop them on this
11		# transcript's window. You may also add items by choosing
12		# File > Add Item to Transcript....
13		# Used to store per user trash on the root volume
14	d	/Trashes
15		# Used by the system and the NFS process.
16	d	/vol
17	d	/Library/Caches
18	d	/Library/ColorSync/Profiles/Displays
19		# Created on restart - not sure where
20	f	/Library/Preferences/.GlobalPreferences.plist
21	f	/Library/Preferences/DirectoryService/.DSRunningSP3
22	f	/Library/Preferences/com.apple.loginwindow.plist
23	d	/Network/Servers
24	d	/Network/afs
25	d	/System/Library/Caches
26		# Extensions.mkext is the kernel extension cache file.

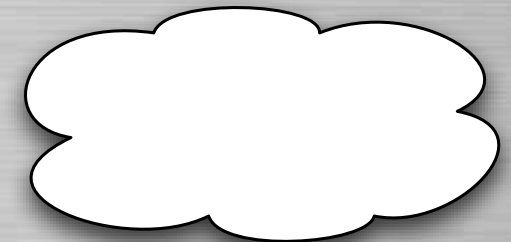


Line #	Type	Path
1		# A template negative transcript for managing machines running
2		# Mac OS X 10.3 in a lab setting.
3		#
4		# Do not use this file without first examining it thoroughly.
5		#
6		# Lines starting with '#' and blank lines are ignored.
7		# Stores trash on the root volume
8	d	/Trashes
9		# Apparently associated with journaling
10	a	/hotfiles.btree
11		# Used by the system and NFS
12	d	/vol
13		# Caches and other directories containing volatile items
14	d	/Library/Caches
15	d	/Library/ColorSync/Profiles/Displays
16	d	/Library/Logs
17	d	/Library/Preferences/SystemConfiguration
18	d	/Network
19	d	/System/Library/Caches
20		# Kernel extensions cache files. Created on boot if missing or
21		# older than /System/Library/Extensions
22	f	/System/Library/Extensions.kextcache
23	f	/System/Library/Extensions.mkext
24		# User space. Let the user management scripts manage it for you.
25	d	/Users
26		# mount point for other drives

How to setup managed FS?

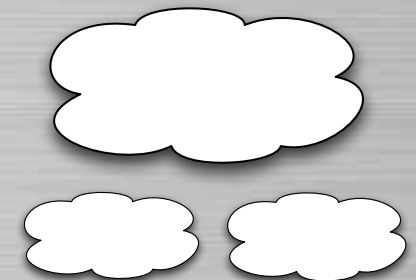
Full - File System

- Everything is in base deployment



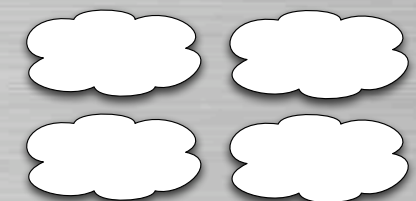
Partial - File System

- OS & Global Apps in base deployment
 - Adds more granularity



Small - File System

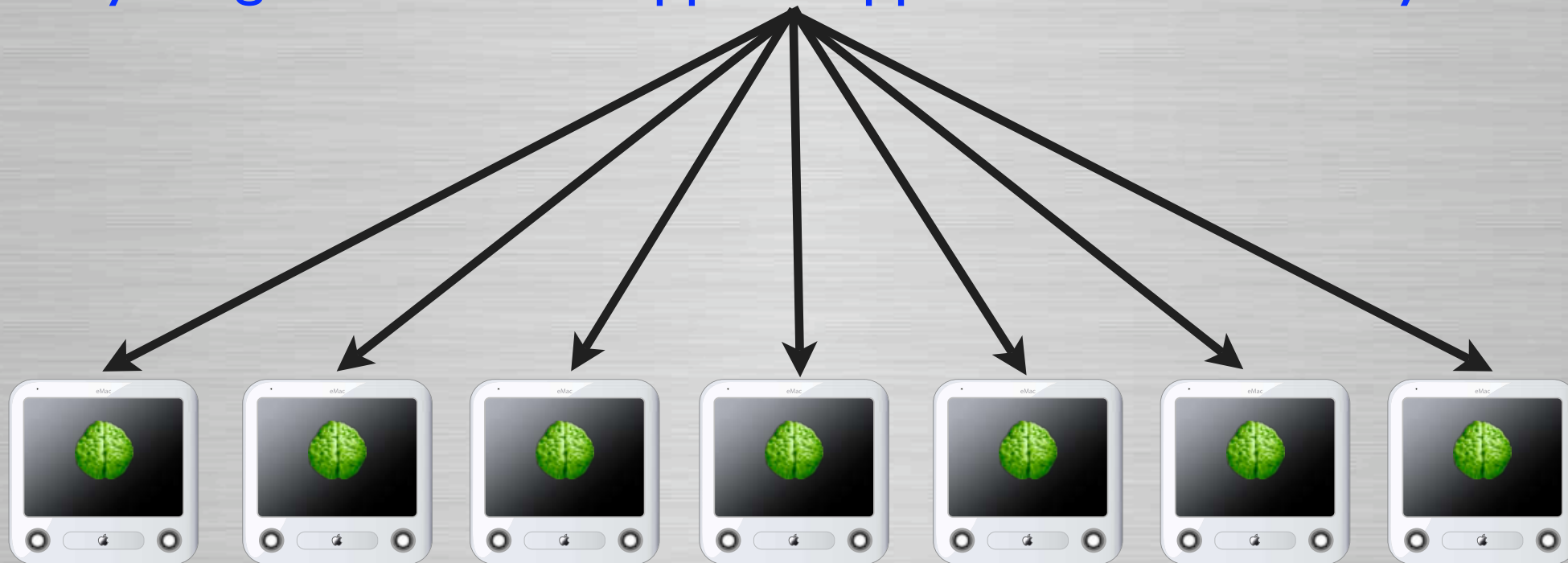
- Small base deployment (OS)
- Individual descriptions for Admin, OS, Software
- Flexible & powerful, but more complex



Full File System

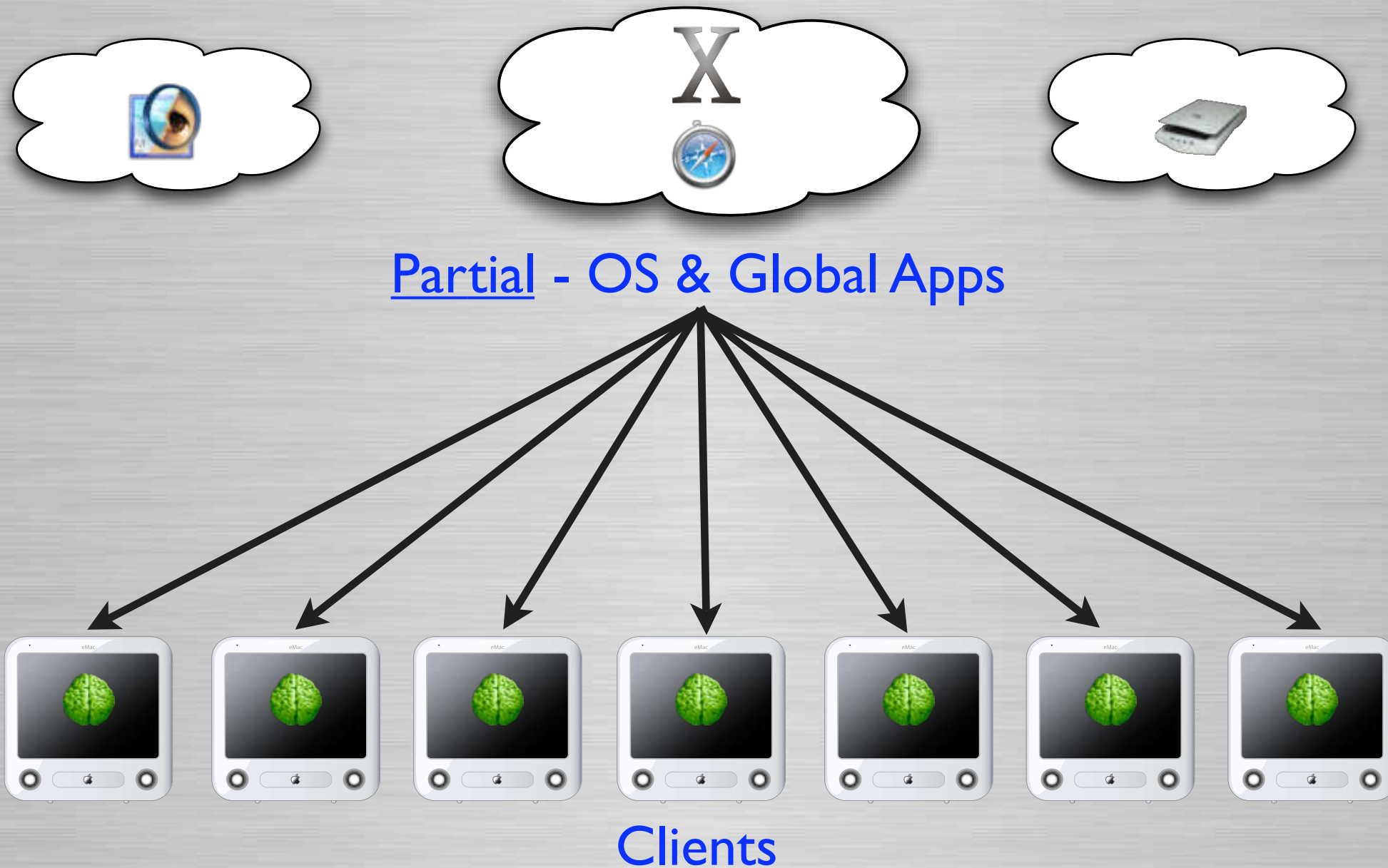


Everything - OS, Global Apps, & Apps not needed everywhere

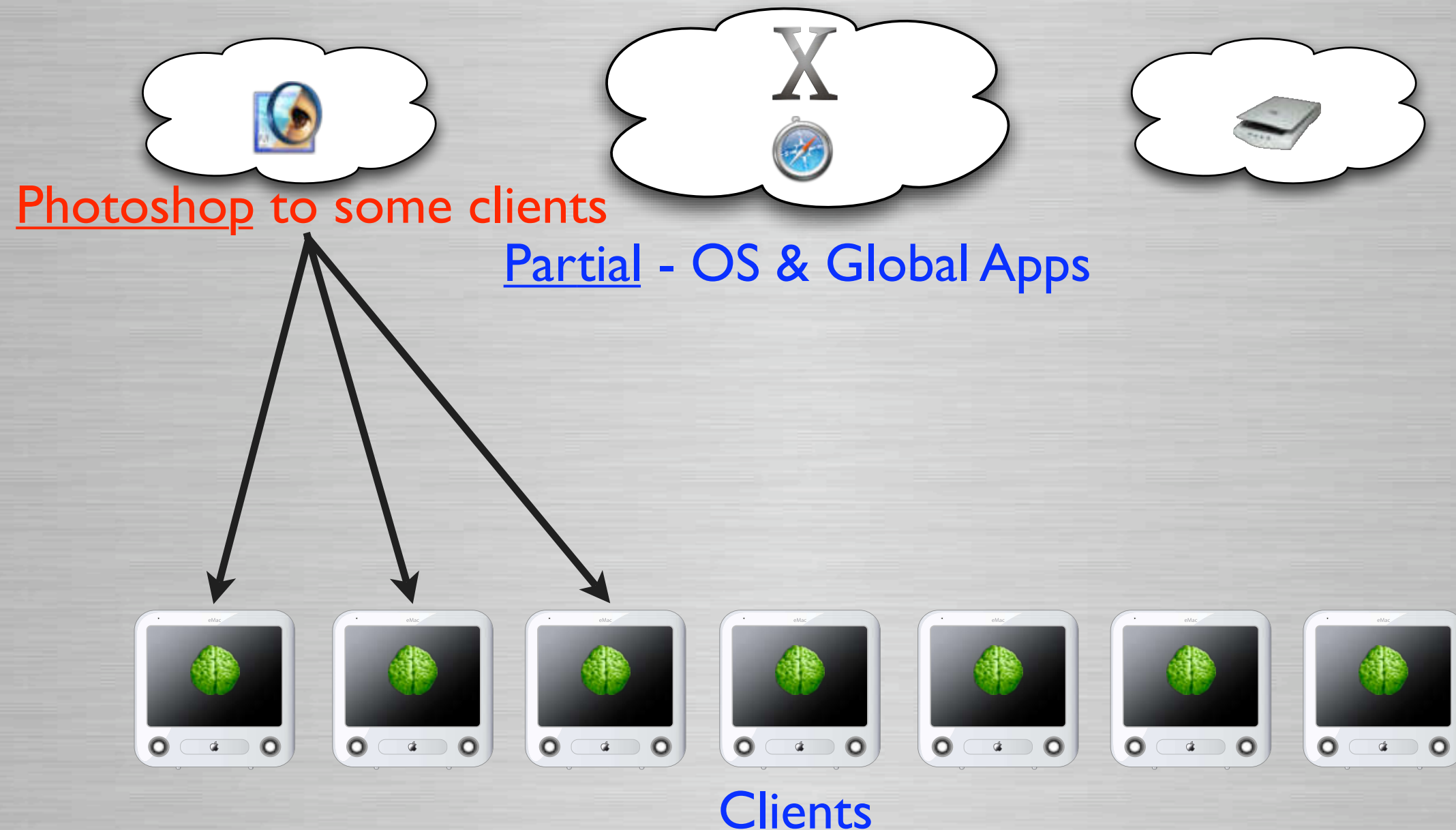


Clients

Partial File System



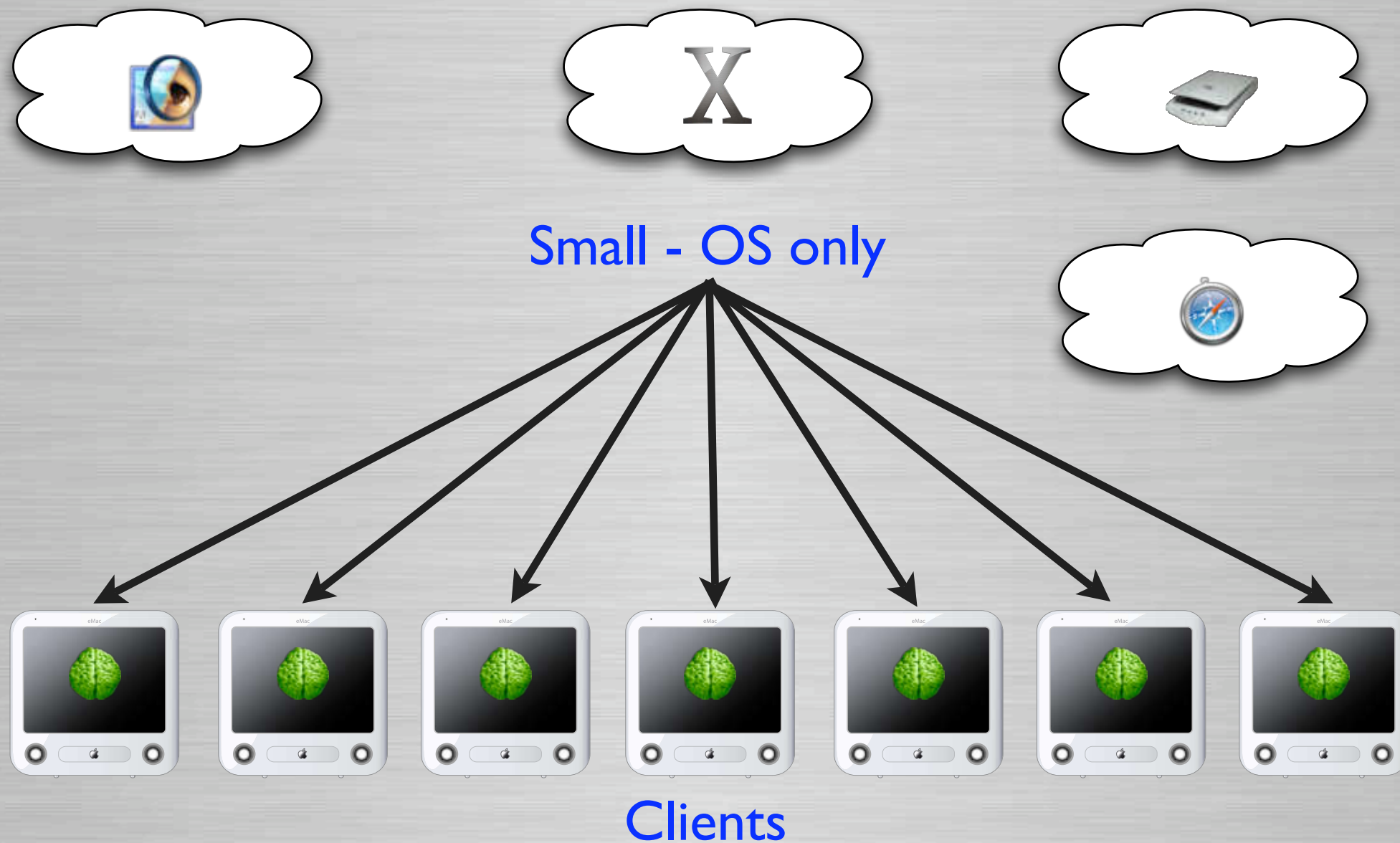
Partial File System



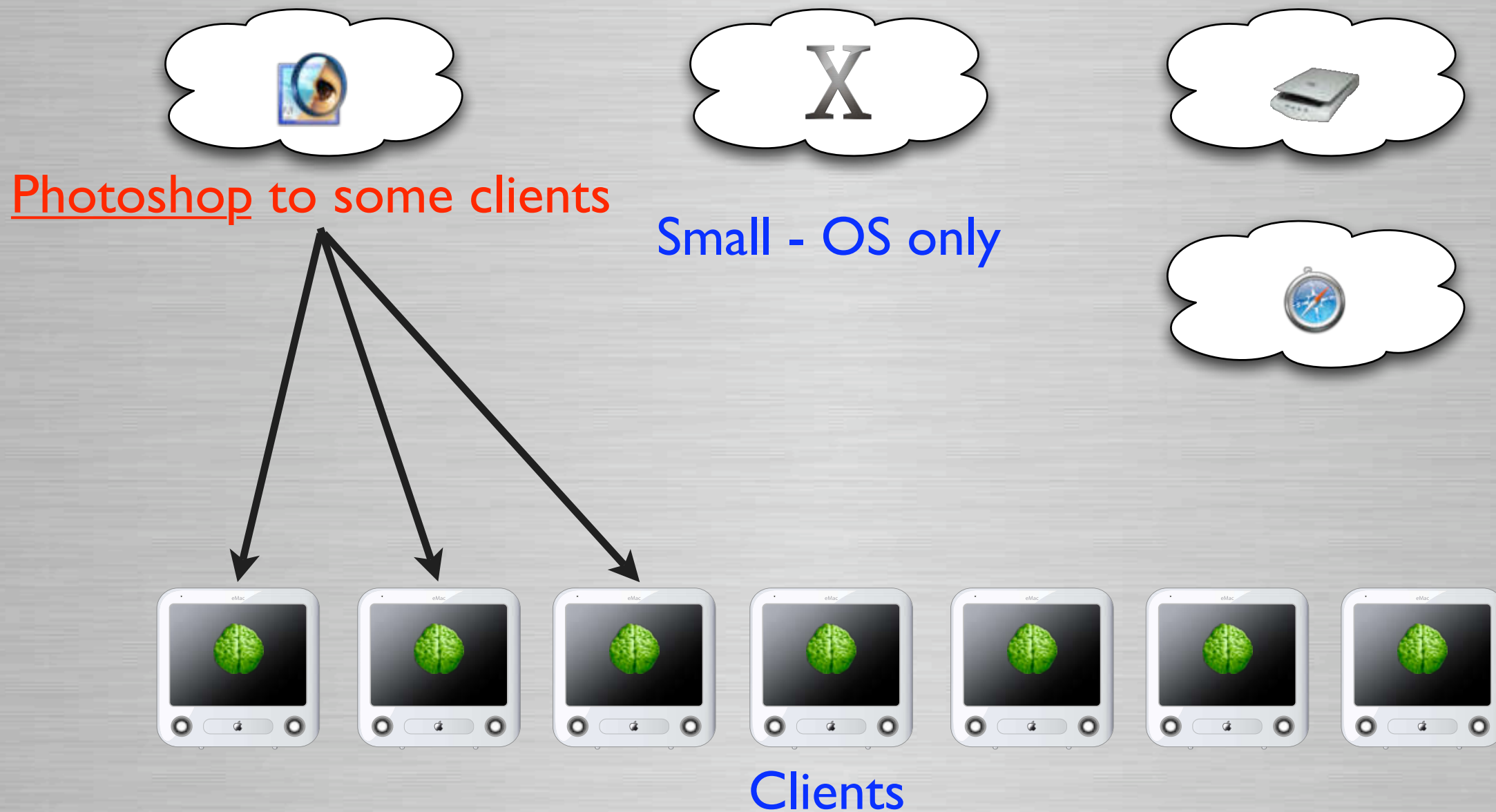
Partial File System



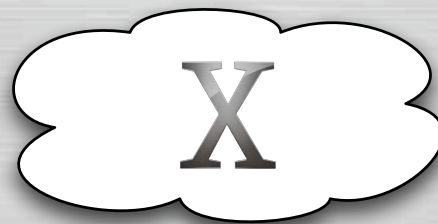
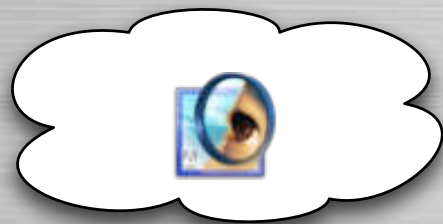
Small File System



Small File System



Partial File System



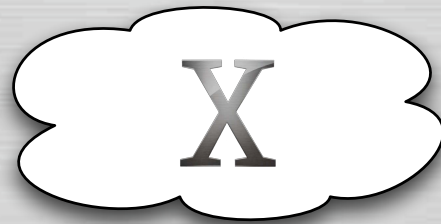
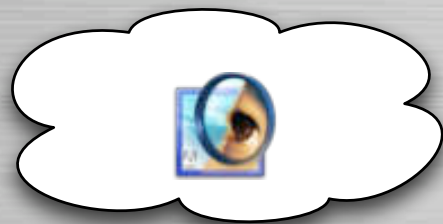
VueScan to client w/Scanner

Small - OS only



Clients

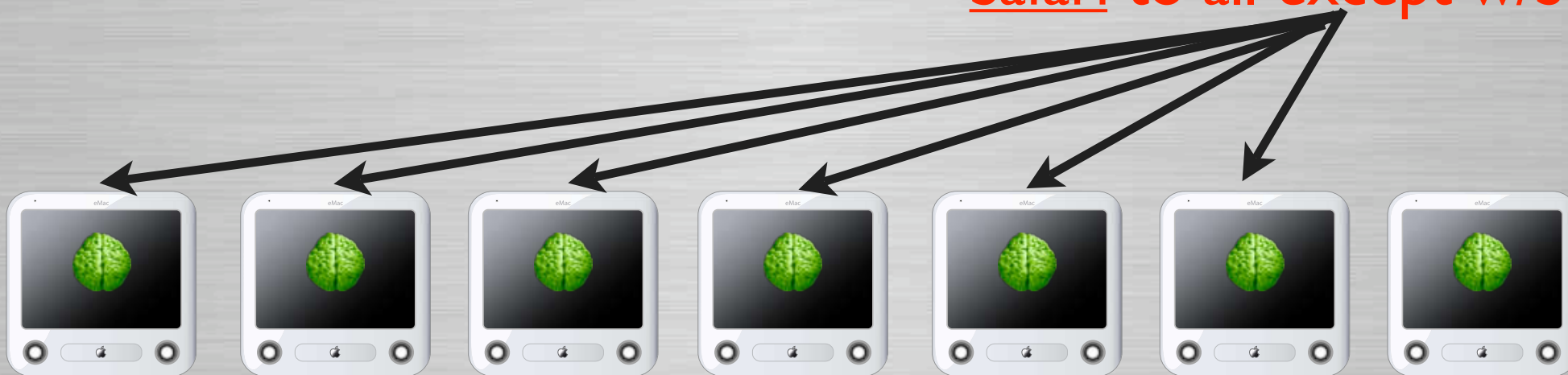
Small File System



Small - OS only



Safari to all except w/Scanner



Clients

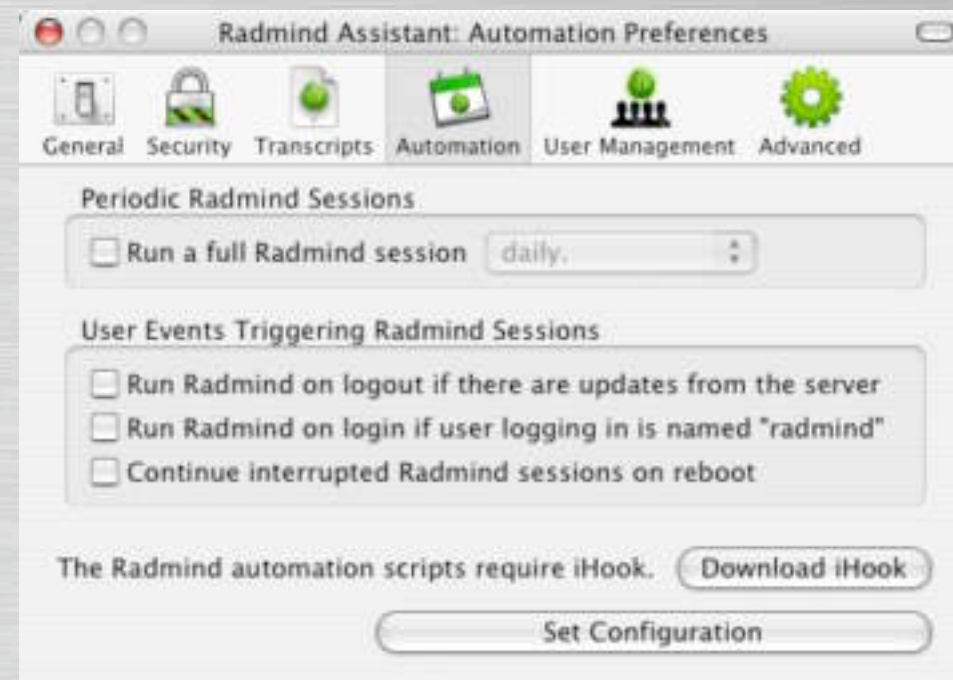
How to update client?

- Updating is extremely flexible
 - The radmind tools are unix tools and can be scripted like any other command-line tool
 - You are only limited on customizing its use based on your knowledge and imagination.
 - Radmin Assistant (Recent release has some options)
 - Or use many samples on:
 - www.radmin.org
 - www.macosxlabs.org - Tools & Scripts Button
 - www.macos.utah.edu - ULabMin

Radmind Assistant Options

Radmind Assistant

- Recent release offers some options:
 - Scheduled using daily, weekly & monthly cron
 - On login, if user logs in as “Radmind”
 - On logout if updates are available
 - Continue running if interrupted



Example - U of U

Example - At my dept. we run radmind:

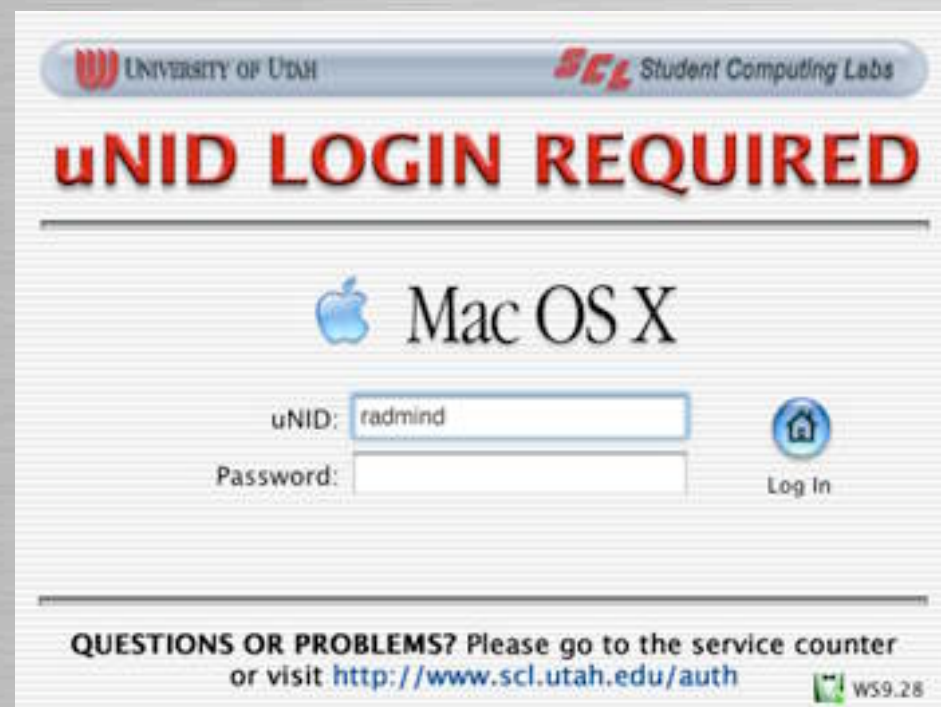
- When a specific user logs in
- Scheduled with cron
 - Load balanced client & servers
- Manually
- Single User mode
- Remotely

Note - These have been implemented since 2002

Example - Login

■ Running Radmind - Login

- Create a radmind user
- LoginHook checks for specific user
- Runs radmind if that user logs in



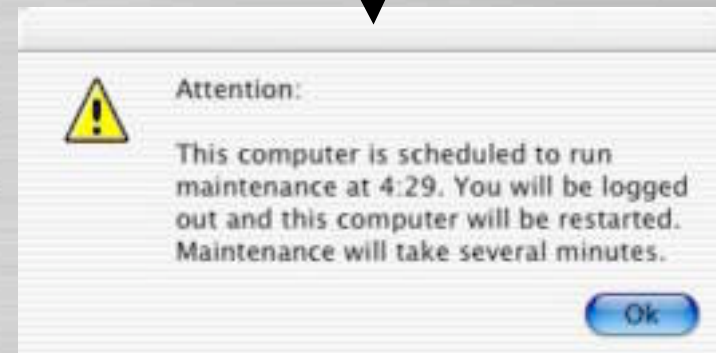
Example - Scheduled

Running Radmin - Scheduled

- Cron executes script
 - If user logged in
 - Open AppleScript
 - Warning user
 - Restart
 - Run radmin at startup



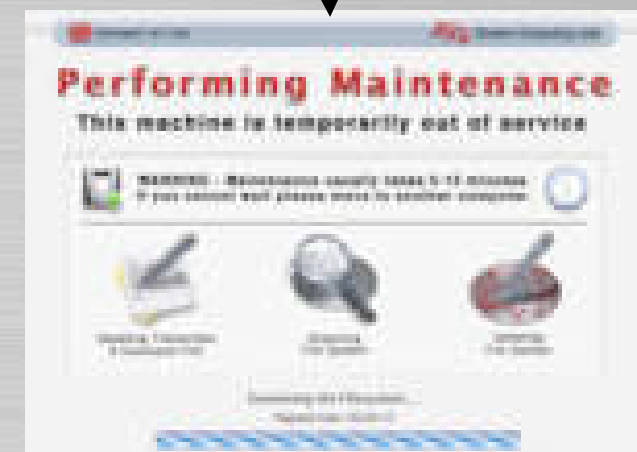
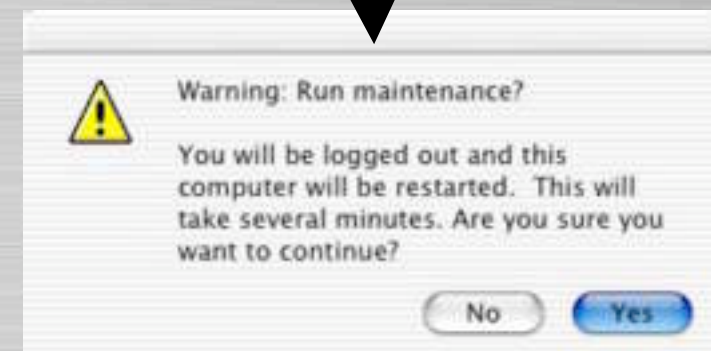
```
Terminal — tcsh (tty1)
$ cat /etc/crontab
SHELL=/bin/sh
PATH=/bin:/sbin:/usr/bin:/usr/sbin
MAILTO=/var/log
#
# Example of job definition:
# . An hour 'on the hour' between 03:00 and 04:00
#
# 30 * * * * root run-parts /etc/cron.hourly
#
# To run an hourly job at 12:00 between January and March:
# 0 12 1-3 * * root run-parts /etc/cron.hourly
#
# To do a backup every 6th month at midnight:
# 0 0 6 * * root /usr/bin/rsync /etc/crontab /usr/local/backup
#
# To run a script every 15 minutes:
# */15 * * * * root /usr/bin/rsync /etc/crontab /usr/local/backup
```



Example - Manually

■ Running Radmind - Manually

- Launch “maintenance” app
- Displays dialog warning user
- Logs out
- Runs radmind



Example - Single User Mode

Running Radmin - Single User

- Tell radmin to run **after** network loads
- Useful if machine doesn't fully boot

```
StorageBlaBla/Maxtor 90648D2Media/IOApplePartitionScheme/MacOS@5
BSD root: disk0s5, major 14, minor 5
devfs on /dev
Nov 11 16:17:3 mach_init[2]: Started with uid=0
Singleuser boot -- fsck not done
Root device is mounted read-only
If you want to make modifications to files,
run '/sbin/fsck -y' first and then '/sbin/mount -uw/'
```

Welcome!

```
sh-2.04a# runRadmin
```

This mac will reboot and run radmin. Are you sure? Yes

Saving status...

Rebooting...



Example - Continue Updating

■ Catch Force Restart

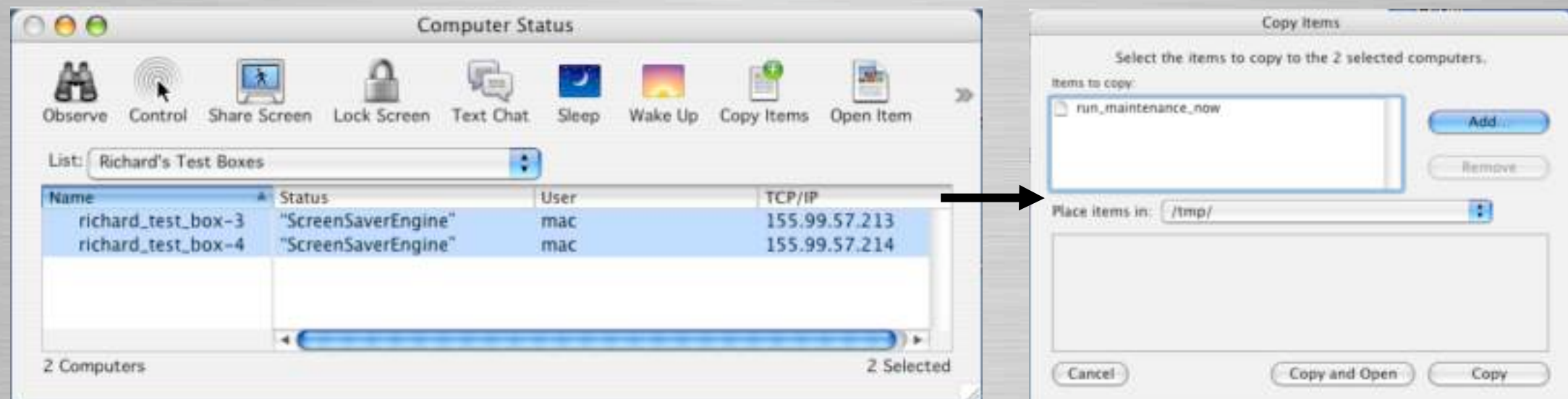
- Will continue running at startup until done.
- One script checks for trigger file.
 - Another script starts & deletes file, radmind_done
 - Same script creates radmind_done when completed
- Prevent user from bypassing radmind execution
- Power failures during execution, etc.



Example - Remote

Running Radmin - Remotely

- SSH & Timbuktu Pro
 - Only on administrative test boxes
 - Enable as few services as possible in our environment
- Apple Remote Desktop (ARD)
 - Select clients and copy trigger file
 - Idle script detects trigger file and runs radmin



Glossary


Radmind Lingo & Slang



Transcript

- A description of the file system
 - The entire hard disk
 - Or a specific section(s) like a OS update or software install.
 - A list of files, directories, links, etc.
 - Includes attributes like size, permissions, modification dates, checksums, etc.

Transcript



d /Applications/Chess.app	0775	0	80		
d /Applications/Chess.app/Contents	0775	0	80		
f /Applications/Chess.app/Contents/Info.plist	0664	0	80	1063446253	1735 fPrGFiziHmp23nXGGYH7/zwX0dw=
d /Applications/Chess.app/Contents/MacOS	0775	0	80		
f /Applications/Chess.app/Contents/MacOS/Chess	0775	0	80	1064655035	220728 8qMSlxy6IehRXlwtl3C/kDAul0k=
f /Applications/Chess.app/Contents/PkgInfo	0664	0	80	1063446253	8 NixMA6SM2esJykw100XEHK+LCd4=
d /Applications/Chess.app/Contents/Resources	0775	0	80		
f /Applications/Chess.app/Contents/Resources/1.rgb	0664	0	80	1063446253	2646 X3Pcx4F85eW8mzQ8j6XUa8fNAmg=
f /Applications/Chess.app/Contents/Resources/2.rgb	0664	0	80	1063446253	2943 /WK+7K/9LAXq4gH07UvJnkjo038=
f /Applications/Chess.app/Contents/Resources/3.rgb	0664	0	80	1063446253	2946 38k1s5NSUW/TL0JHVI6ci1dyRA=
f /Applications/Chess.app/Contents/Resources/4.rgb	0664	0	80	1063446253	2877 0n5//UDl+mk30WS4x5baC/w+I0s=
f /Applications/Chess.app/Contents/Resources/5.rgb	0664	0	80	1063446253	2988 B0omved8zMNhtHRHn9TycAexZns=
f /Applications/Chess.app/Contents/Resources/6.rgb	0664	0	80	1063446253	3063 GihR/nECjNoSkQH3kNyBqeBnagg=
f /Applications/Chess.app/Contents/Resources/7.rgb	0664	0	80	1063446253	2865 FWIi3Bzo7b5iAF0SGteiZyN3gcI=
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f /Applications/Chess.app/Contents/Resources/COPYING	0664	0	80	1063446253	17993 86Pgah4yJxZ33ueCE6KN5AfoAAw=
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Transcript for Chess 2.0

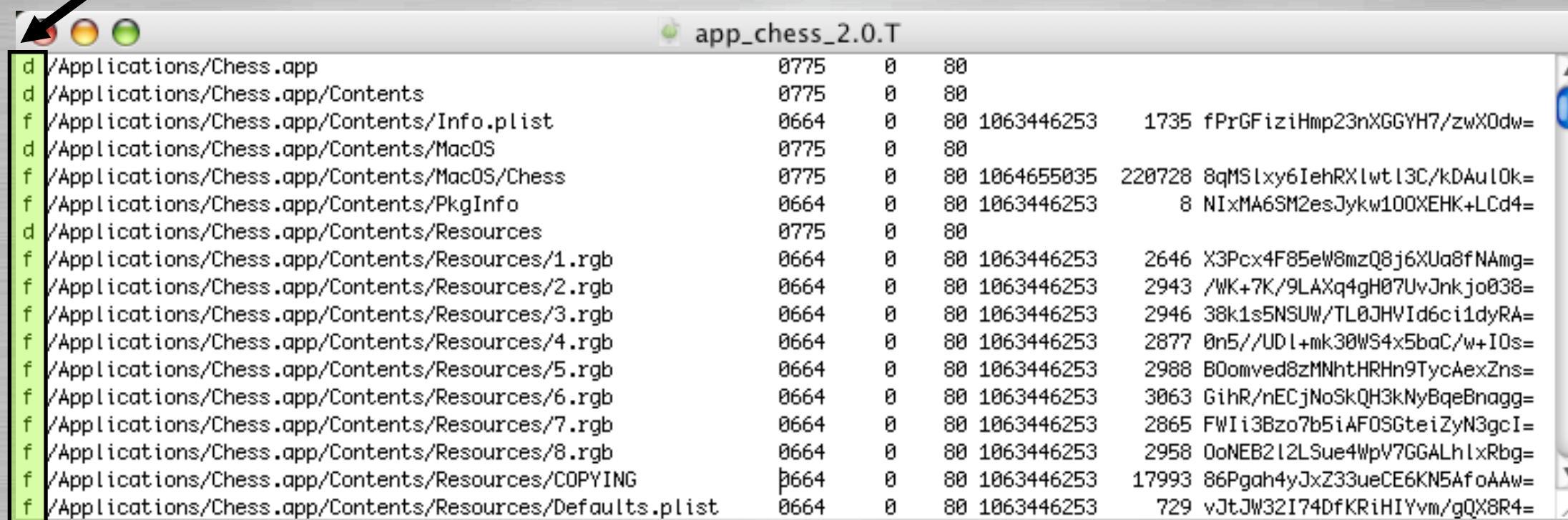
Transcript Parts



Parts & pieces of a transcript...

- File Kind

- “a” applefile, “d” directory, “f” file, “l” link, etc.



d	/Applications/Chess.app	0775	0	80		
d	/Applications/Chess.app/Contents	0775	0	80		
f	/Applications/Chess.app/Contents/Info.plist	0664	0	80	1063446253	1735 fPrGFiziHmp23nXGGYH7/zwX0dw=
d	/Applications/Chess.app/Contents/MacOS	0775	0	80		
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f	/Applications/Chess.app/Contents/PkgInfo	0664	0	80	1063446253	8 NixMA6SM2esJykw100XEHK+LCd4=
d	/Applications/Chess.app/Contents/Resources	0775	0	80		
f	/Applications/Chess.app/Contents/Resources/1.rgb	0664	0	80	1063446253	2646 X3Pcx4F85eW8mzQ8j6XUa8fNAmg=
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f	/Applications/Chess.app/Contents/Resources/3.rgb	0664	0	80	1063446253	2946 38k1s5NSUW/TL0JHVI6ci1dyRA=
f	/Applications/Chess.app/Contents/Resources/4.rgb	0664	0	80	1063446253	2877 0n5//UDl+mk30WS4x5baC/w+I0s=
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Transcript for Chess 2.0

Transcript Parts



Parts & pieces of a transcript...

- Location - path to file system item

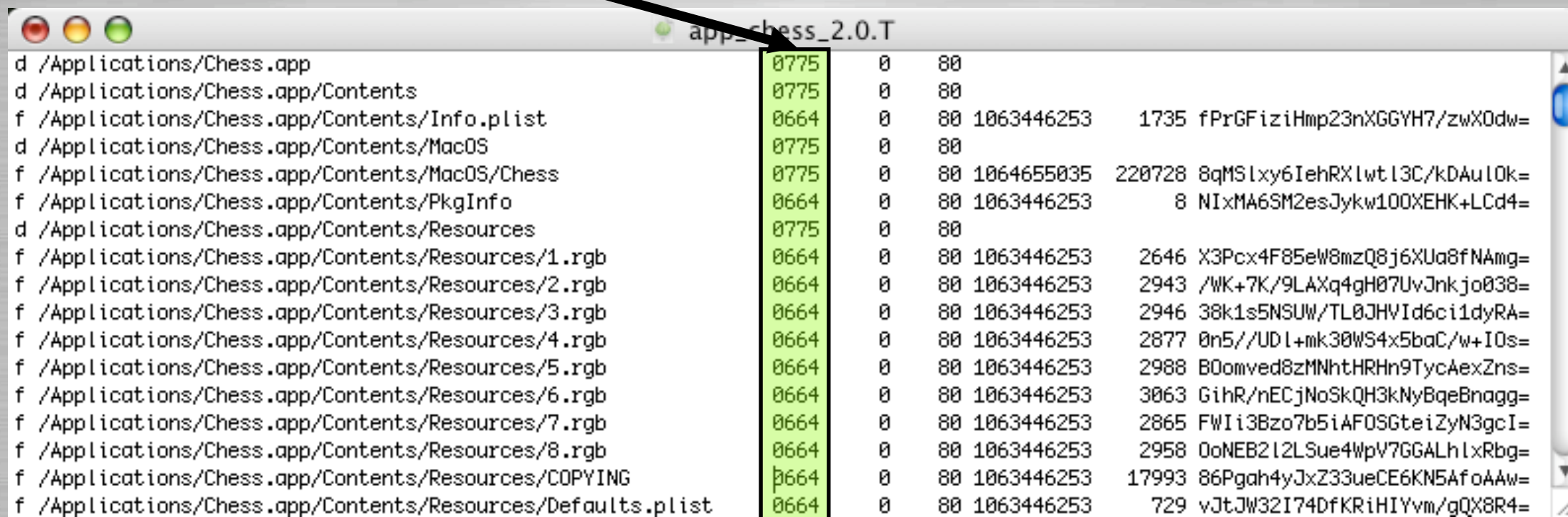
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f	/Applications/Chess.app/Contents/Resources/6.rgb	0664	0	80	1063446253	3063 GihR/nECjNoSkQH3kNyBqeBnagg=
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f	/Applications/Chess.app/Contents/Resources/Defaults.plist	0664	0	80	1063446253	729 vJtJW32I74DfKRiHIYvm/gQX8R4=

Transcript for Chess 2.0

Transcript Parts

■ Parts & pieces of a transcript...

- Permissions



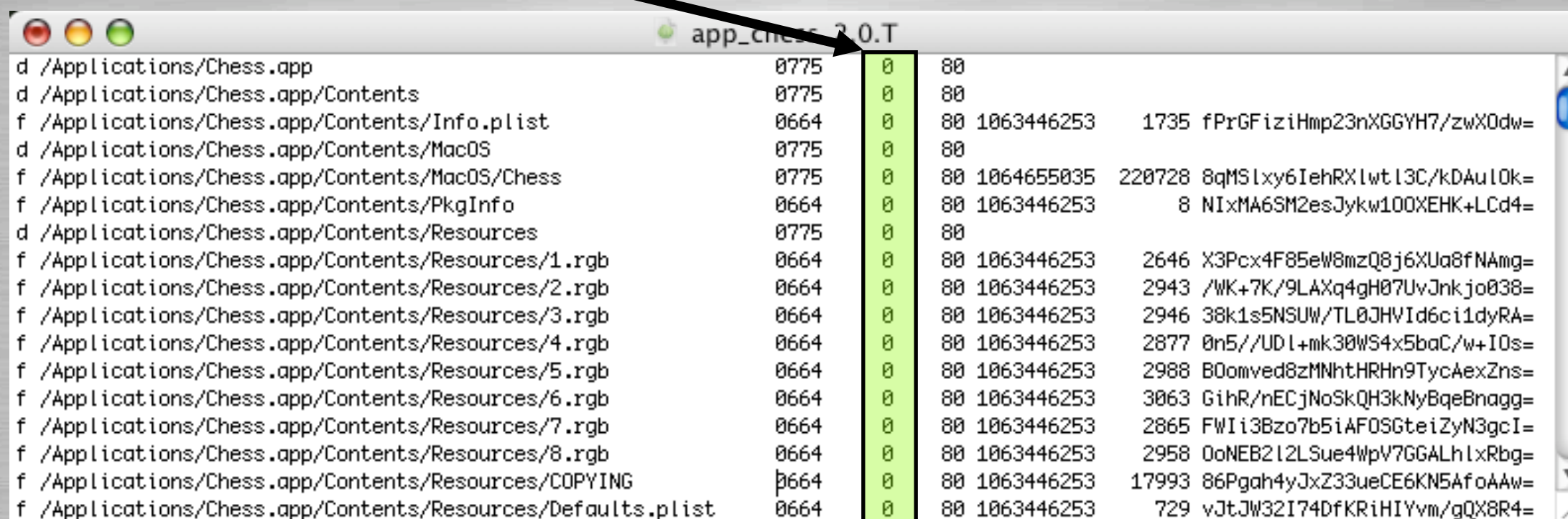
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d /Applications/Chess.app/Contents/MacOS	0775	0	80		
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Transcript for Chess 2.0

Transcript Parts

■ Parts & pieces of a transcript...

- Owner



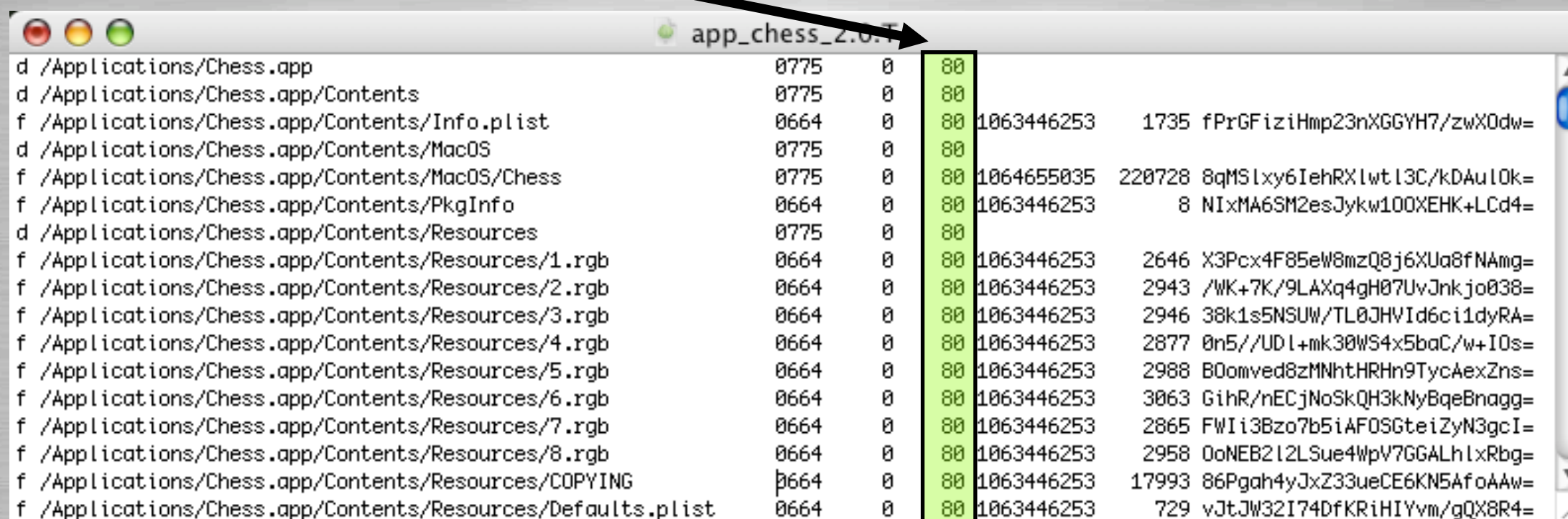
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d /Applications/Chess.app/Contents/MacOS	0775	0	80	
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f /Applications/Chess.app/Contents/Resources/1.rgb	0664	0	80	1063446253 2646 X3Pcx4F85eW8mzQ8j6XUa8fNAmg=
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f /Applications/Chess.app/Contents/Resources/7.rgb	0664	0	80	1063446253 2865 FWIi3Bzo7b5iAF0SGteiZyN3gcI=
f /Applications/Chess.app/Contents/Resources/8.rgb	0664	0	80	1063446253 2958 0oNEB2l2LSue4WpV7GGALhlxRbg=
f /Applications/Chess.app/Contents/Resources/COPYING	0664	0	80	1063446253 17993 86Pgah4yJxZ33ueCE6KN5AfoAAw=
f /Applications/Chess.app/Contents/Resources/Defaults.plist	0664	0	80	1063446253 729 vJtJW32I74DfKRiHIYvm/gQX8R4=

Transcript for Chess 2.0

Transcript Parts

■ Parts & pieces of a transcript...

- Group



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d /Applications/Chess.app/Contents	0775	0	80		
f /Applications/Chess.app/Contents/Info.plist	0664	0	80	1063446253	1735 fPrGFiziHmp23nXGGYH7/zwX0dw=
d /Applications/Chess.app/Contents/MacOS	0775	0	80		
f /Applications/Chess.app/Contents/MacOS/Chess	0775	0	80	1064655035	220728 8qMSlxy6IehRXlwtl3C/kDAul0k=
f /Applications/Chess.app/Contents/PkgInfo	0664	0	80	1063446253	8 NixMA6SM2esJykw100XEHK+LCd4=
d /Applications/Chess.app/Contents/Resources	0775	0	80		
f /Applications/Chess.app/Contents/Resources/1.rgb	0664	0	80	1063446253	2646 X3Pcx4F85eW8mzQ8j6XUa8fNAmg=
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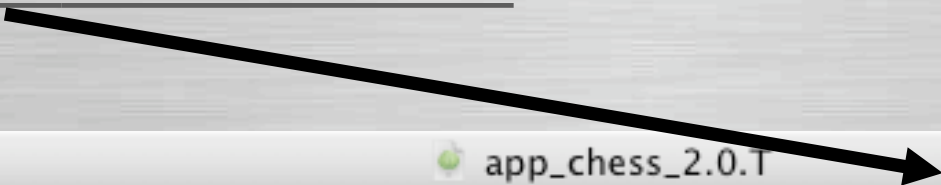
Transcript for Chess 2.0

Transcript Parts



Parts & pieces of a transcript...

- Modification Date



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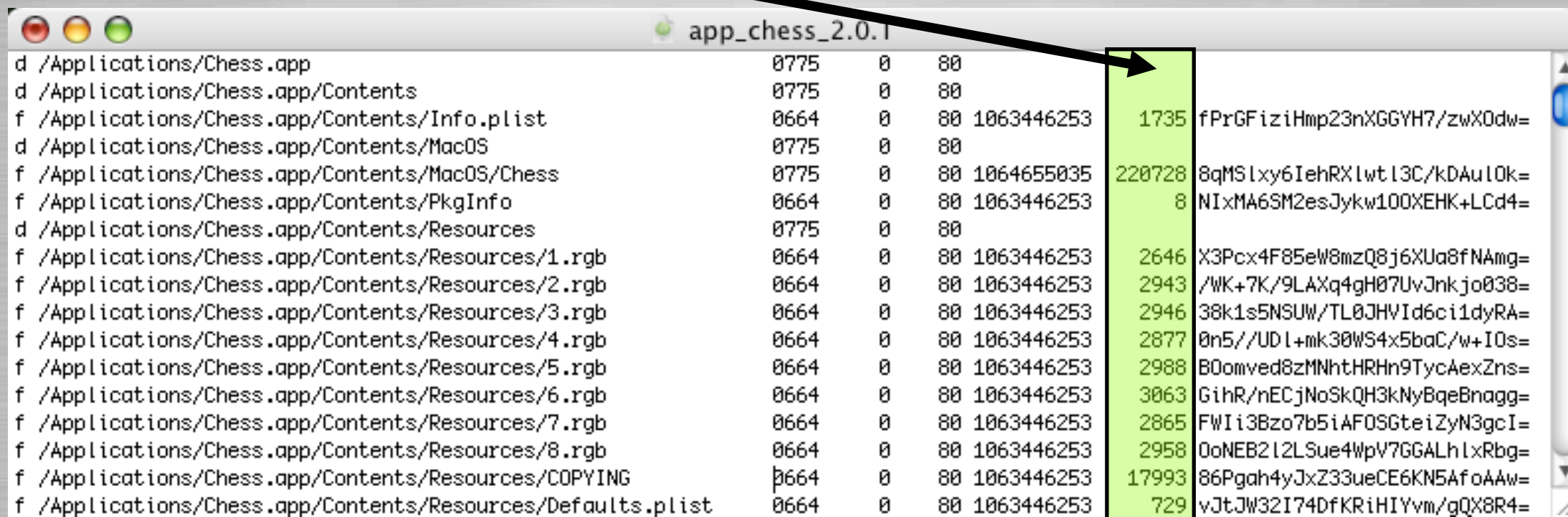
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Transcript for Chess 2.0

Transcript Parts

■ Parts & pieces of a transcript...

- Size



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d	/Applications/Chess.app/Contents/MacOS	0775	0	80					
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Transcript for Chess 2.0

Transcript Parts

■ Parts & pieces of a transcript...

- Checksum



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f	/Applications/Chess.app/Contents/MacOS/Chess	0775	0	80	1064655035	220728 8qMSlxy6IehRXlwtl3C/kDAul0k=
f	/Applications/Chess.app/Contents/PkgInfo	0664	0	80	1063446253	8 NIxMA6SM2esJykw100XEHK+LCd4=
d	/Applications/Chess.app/Contents/Resources	0775	0	80		
f	/Applications/Chess.app/Contents/Resources/1.rgb	0664	0	80	1063446253	2646 X3Pcx4F85eW8mzQ8j6XUa8fNAmg=
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f	/Applications/Chess.app/Contents/Resources/5.rgb	0664	0	80	1063446253	2988 B0omved8zMNhtHRHn9TycAexZns=
f	/Applications/Chess.app/Contents/Resources/6.rgb	0664	0	80	1063446253	3063 GihR/nECjNoSkQH3kNyBqeBnagg=
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Transcript for Chess 2.0

Positive Transcript

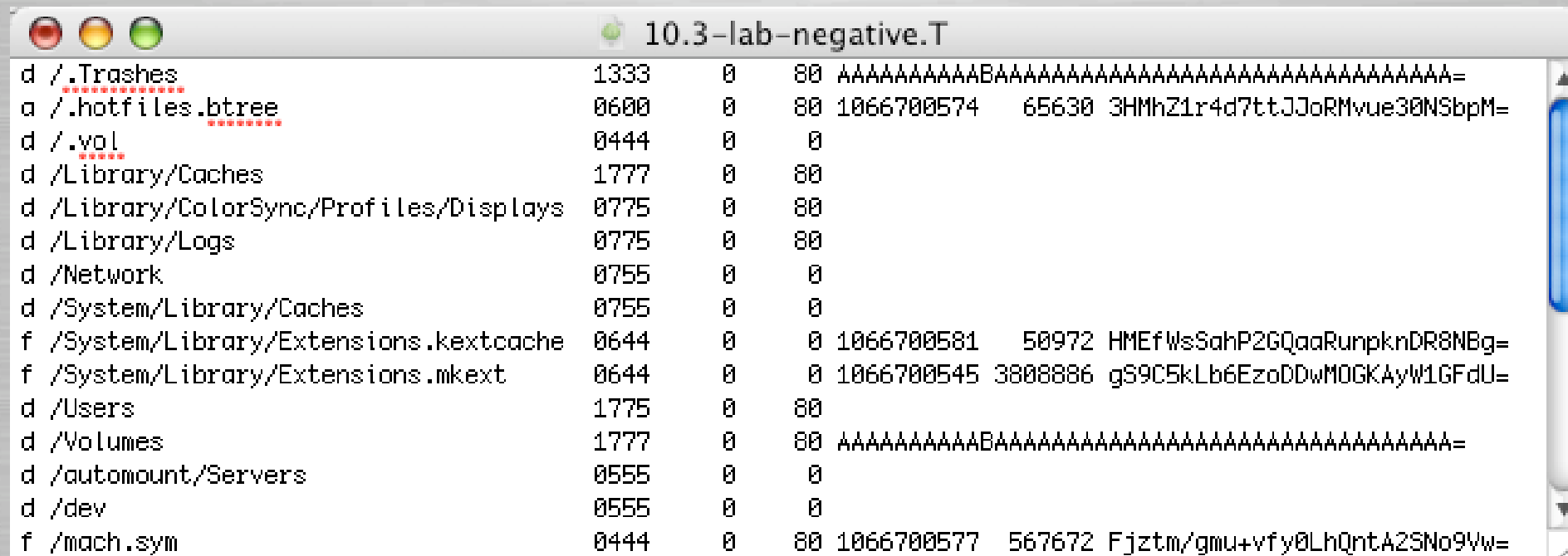
- Lists file system objects that must exist
- All objects must exist & attributes match
 - Note - Directory contents are read



```
d /Applications/Chess.app                0775    0    80
d /Applications/Chess.app/Contents        0775    0    80
f /Applications/Chess.app/Contents/Info.plist 0664    0    80 1063446253    1735 fPrGFiziHmp23nXGGYH7/zwX0dw=
d /Applications/Chess.app/Contents/MacOS  0775    0    80
f /Applications/Chess.app/Contents/MacOS/Chess 0775    0    80 1064655035 220728 8qMSlxy6IehRXlwtl3C/kDAu10k=
f /Applications/Chess.app/Contents/PkgInfo 0664    0    80 1063446253      8 NixMA6SM2esJykw100XEHK+LCd4=
d /Applications/Chess.app/Contents/Resources 0775    0    80
f /Applications/Chess.app/Contents/Resources/1.rgb 0664    0    80 1063446253    2646 X3Pcx4F85eW8mzQ8j6XUa8fNAmg=
f /Applications/Chess.app/Contents/Resources/2.rgb 0664    0    80 1063446253    2943 /WK+7K/9LAXq4gH07UvJnkjo038=
f /Applications/Chess.app/Contents/Resources/3.rgb 0664    0    80 1063446253    2946 38k1s5NSUW/TL0JHVId6ci1dyRA=
f /Applications/Chess.app/Contents/Resources/4.rgb 0664    0    80 1063446253    2877 0n5//UDl+mk30WS4x5baC/w+I0s=
f /Applications/Chess.app/Contents/Resources/5.rgb 0664    0    80 1063446253    2988 B0omved8zMNhtHRHn9TycAexZns=
f /Applications/Chess.app/Contents/Resources/6.rgb 0664    0    80 1063446253    3063 GihR/nECjNoSkQH3kNyBqeBnagg=
f /Applications/Chess.app/Contents/Resources/7.rgb 0664    0    80 1063446253    2865 FWIi3Bzo7b5iAF0SGteiZyN3gcI=
f /Applications/Chess.app/Contents/Resources/8.rgb 0664    0    80 1063446253    2958 0oNEB2l2LSue4WpV7GGALhlxRbg=
f /Applications/Chess.app/Contents/Resources/COPYING 0664    0    80 1063446253 17993 86Pgah4yJxZ33ueCE6KN5AfoAAw=
f /Applications/Chess.app/Contents/Resources/Defaults.plist 0664    0    80 1063446253    729 vJtJW32I74DfKRiHIYvm/gQX8R4=
```


Negative Transcript

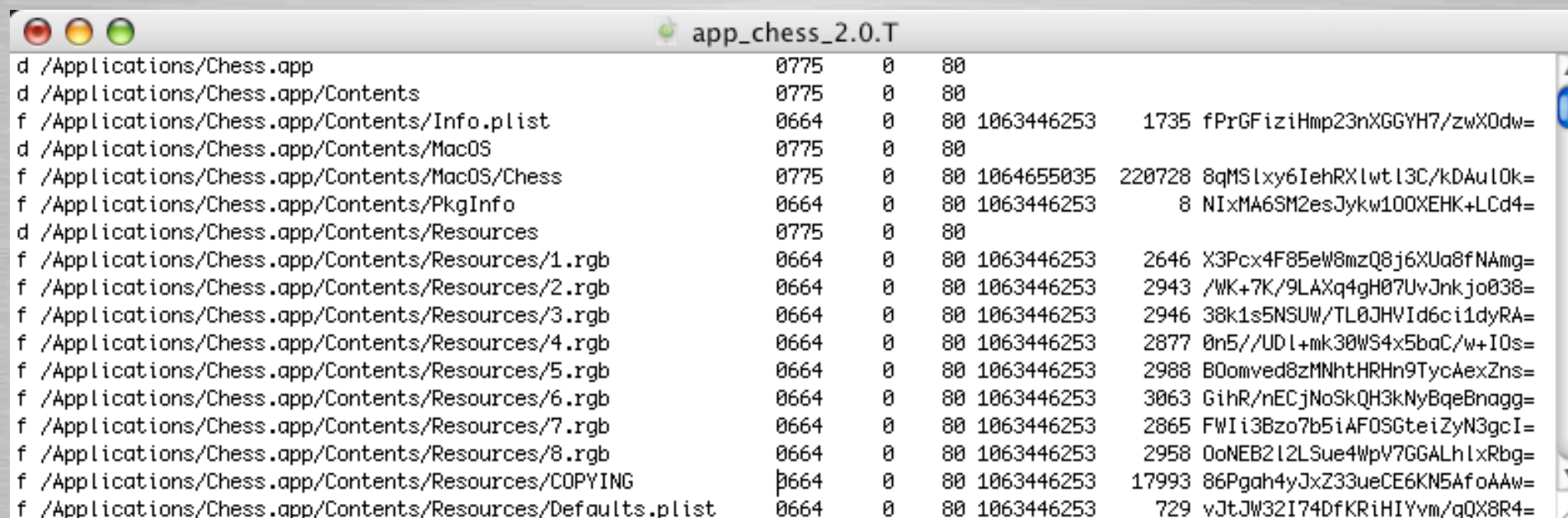
- Lists file system objects that aren't managed
 - But they must exist on client
- Only some attributes checked
 - For directories only UID & GID set
 - Directory contents are not read



```
10.3-lab-negative.T
d /.Trashes 1333 0 80 AAAAAAAAAABAAAAAAAAAAAAAAAAAAAAAAAAAAAA=
a /.hotfiles.btree 0600 0 80 1066700574 65630 3HMHZ1r4d7ttJJorMvue30NSbpM=
d /.vol 0444 0 0
d /Library/Caches 1777 0 80
d /Library/ColorSync/Profiles/Displays 0775 0 80
d /Library/Logs 0775 0 80
d /Network 0755 0 0
d /System/Library/Caches 0755 0 0
f /System/Library/Extensions.kextcache 0644 0 0 1066700581 50972 HMEfWsSahP2GQaaRunpkndR8NBg=
f /System/Library/Extensions.mkext 0644 0 0 1066700545 3808886 gS9C5kLb6EzoDDwMOGKAyW1GFdU=
d /Users 1775 0 80
d /Volumes 1777 0 80 AAAAAAAAAABAAAAAAAAAAAAAAAAAAAAAAAAAAAA=
d /automount/Servers 0555 0 0
d /dev 0555 0 0
f /mach.sym 0444 0 80 1066700577 567672 Fjztm/gmu+vfy0LhQntA2SNo9Vw=
```

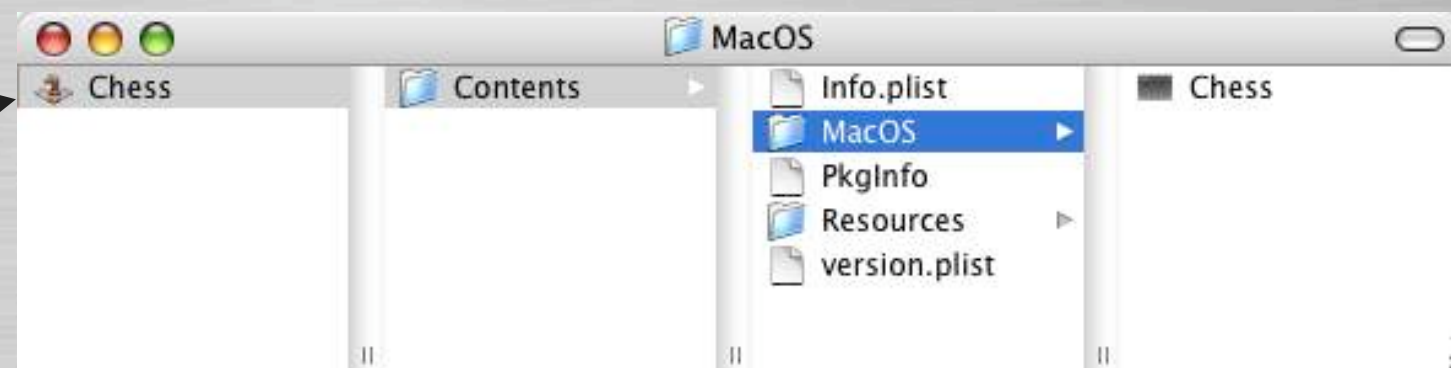
Loadset

A transcript & its associated files



d /Applications/Chess.app	0775	0	80		
d /Applications/Chess.app/Contents	0775	0	80		
f /Applications/Chess.app/Contents/Info.plist	0664	0	80	1063446253	1735 fPrGFiziHmp23nXGGYH7/zwX0dw=
d /Applications/Chess.app/Contents/MacOS	0775	0	80		
f /Applications/Chess.app/Contents/MacOS/Chess	0775	0	80	1064655035	220728 8qMSlxy6IehRXlwtl3C/kDAu10k=
f /Applications/Chess.app/Contents/PkgInfo	0664	0	80	1063446253	8 NIxMA6SM2esJykw100XEHK+LCd4=
d /Applications/Chess.app/Contents/Resources	0775	0	80		
f /Applications/Chess.app/Contents/Resources/1.rgb	0664	0	80	1063446253	2646 X3Pcx4F85eW8mzQ8j6XUa8fNAmg=
f /Applications/Chess.app/Contents/Resources/2.rgb	0664	0	80	1063446253	2943 /WK+7K/9LAXq4gH07UvJnkjo038=
f /Applications/Chess.app/Contents/Resources/3.rgb	0664	0	80	1063446253	2946 38k1s5NSUW/TL0JHVId6ci1dyRA=
f /Applications/Chess.app/Contents/Resources/4.rgb	0664	0	80	1063446253	2877 0n5//UDl+mk30WS4x5baC/w+IOs=
f /Applications/Chess.app/Contents/Resources/5.rgb	0664	0	80	1063446253	2988 B0omved8zMNhtHRHn9TycAexZns=
f /Applications/Chess.app/Contents/Resources/6.rgb	0664	0	80	1063446253	3063 GihR/nECjNoSkQH3kNyBqeBnagg=
f /Applications/Chess.app/Contents/Resources/7.rgb	0664	0	80	1063446253	2865 FWIi3Bzo7b5iAF0SGteiZyN3gcI=
f /Applications/Chess.app/Contents/Resources/8.rgb	0664	0	80	1063446253	2958 0oNEB212LSue4WpV7GGALhlxRbg=
f /Applications/Chess.app/Contents/Resources/COPYING	0664	0	80	1063446253	17993 86Pgah4yJxZ33ueCE6KN5AfoAAw=
f /Applications/Chess.app/Contents/Resources/Defaults.plist	0664	0	80	1063446253	729 vJtJW32I74DfKRiHIYvm/gQX8R4=

Transcript

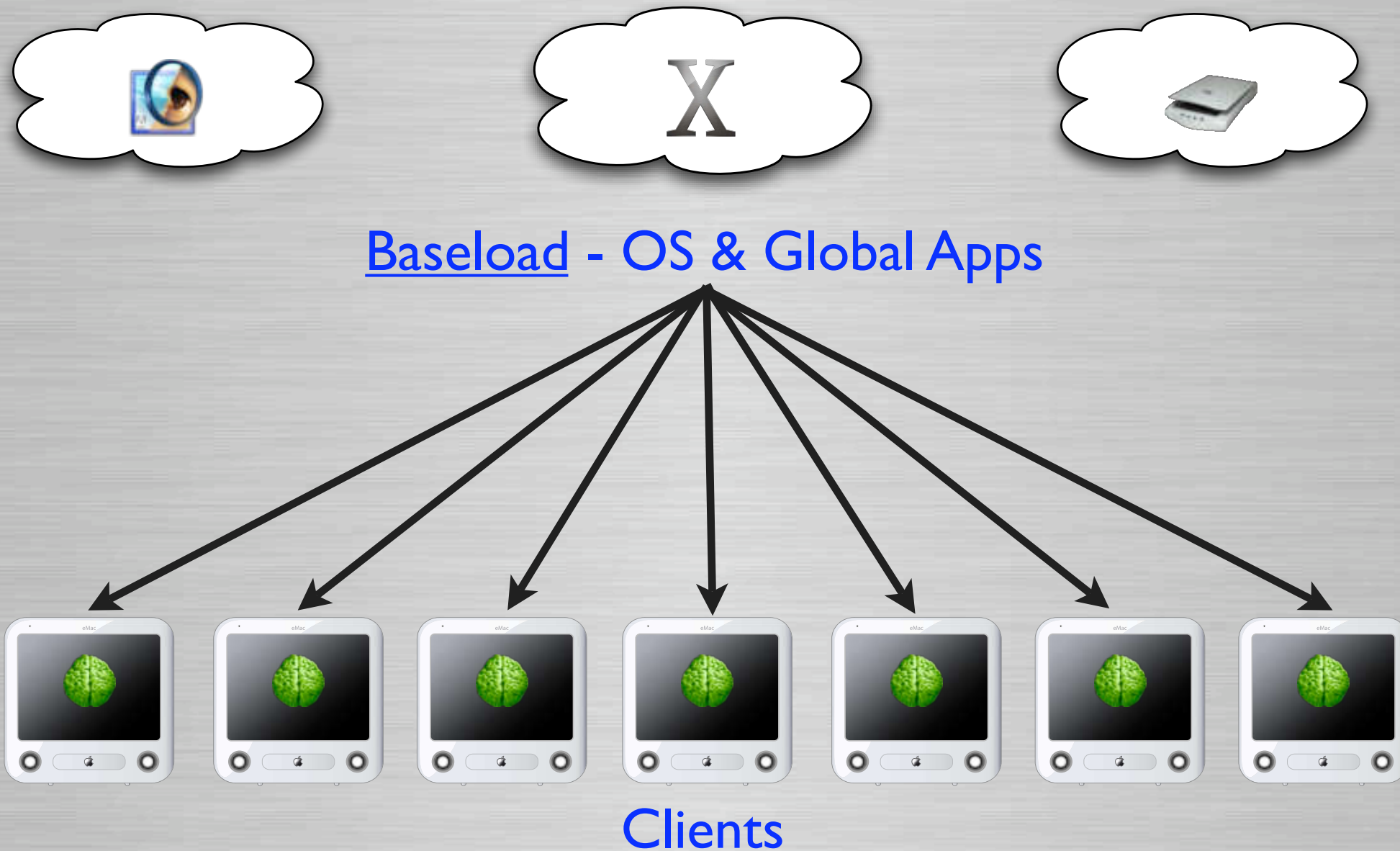


Associated Files

Baseload

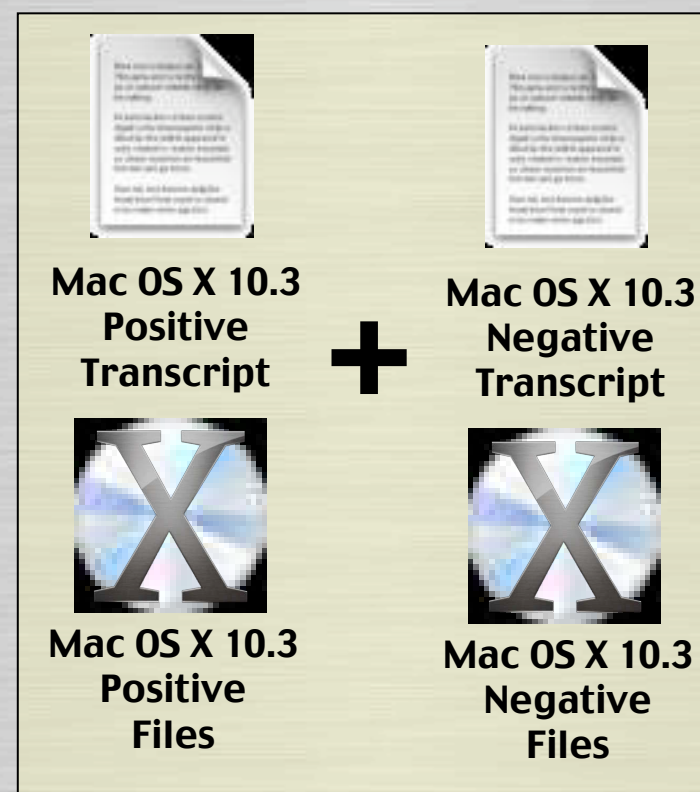
- The primary file system loadset
- Usually a large transcript & associated files.
 - A base load could be:
 - Mac OS X (Small)
 - Mac OS X and global applications (Medium)
 - Or the entire client file system deployment (Full)
 - Including Mac OS X
 - Applications
 - Admin Modifications
(users & groups, directory setup, scripts, etc.)

Baseload - Example



Baseload - Example

Base Load

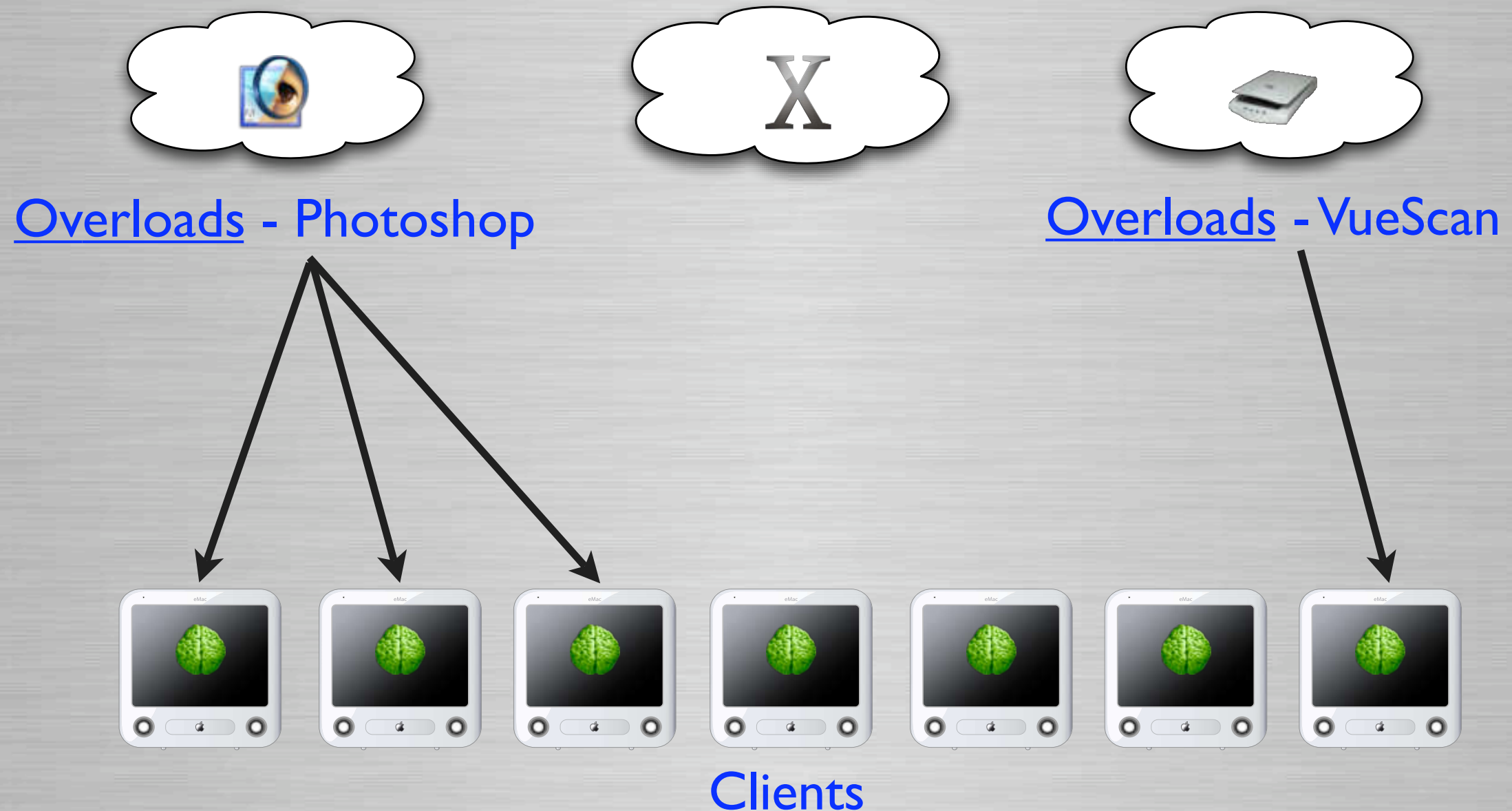


Baseload that only contains OS

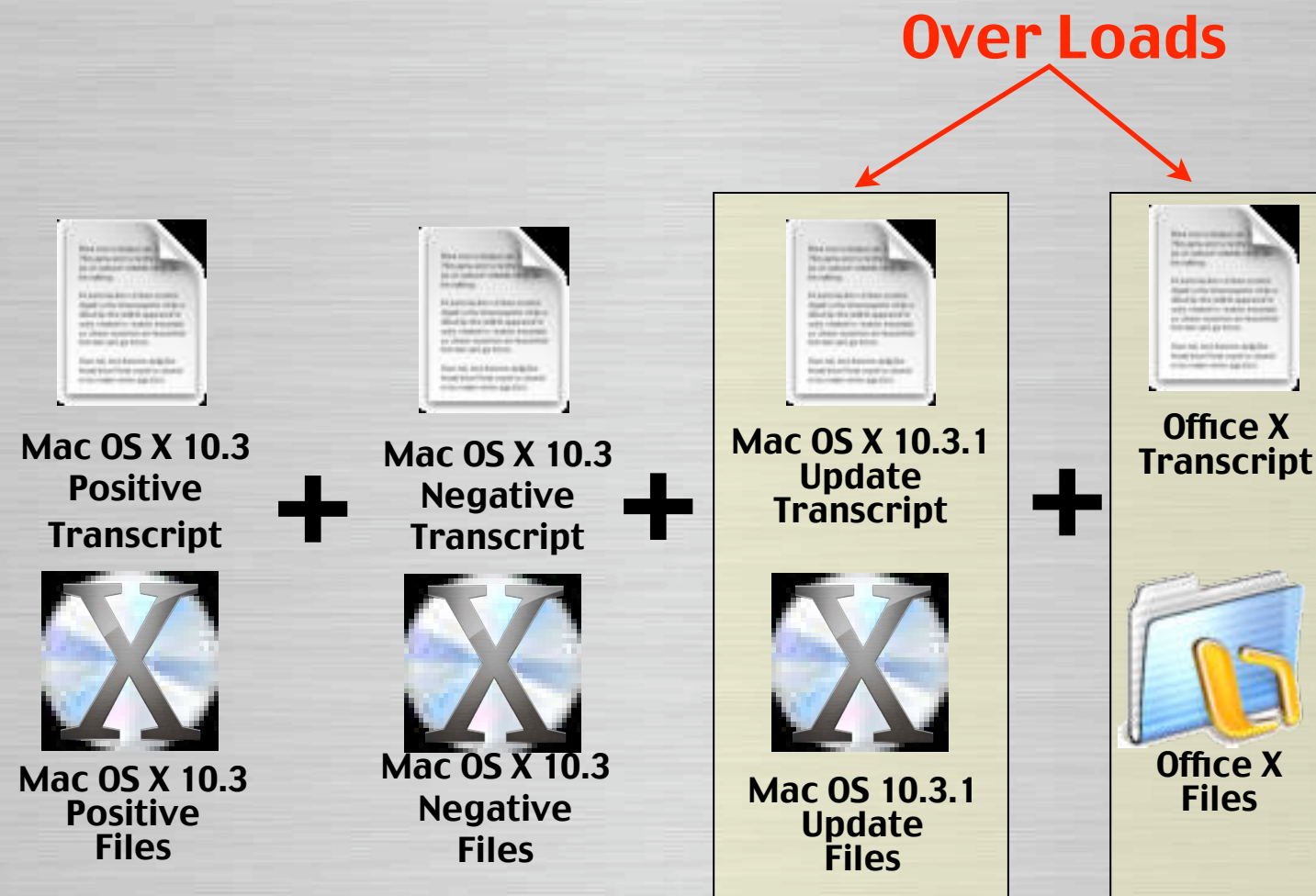
Overload

- A smaller additional loadset
- Used with the baseload for the machine deployed file system.
- Examples
 - Software Updates like “Mac OS X 10.3.1”
 - Applications like “Office X 10.1.4”
 - Printer Configuration
 - Etc.

Overload - Example



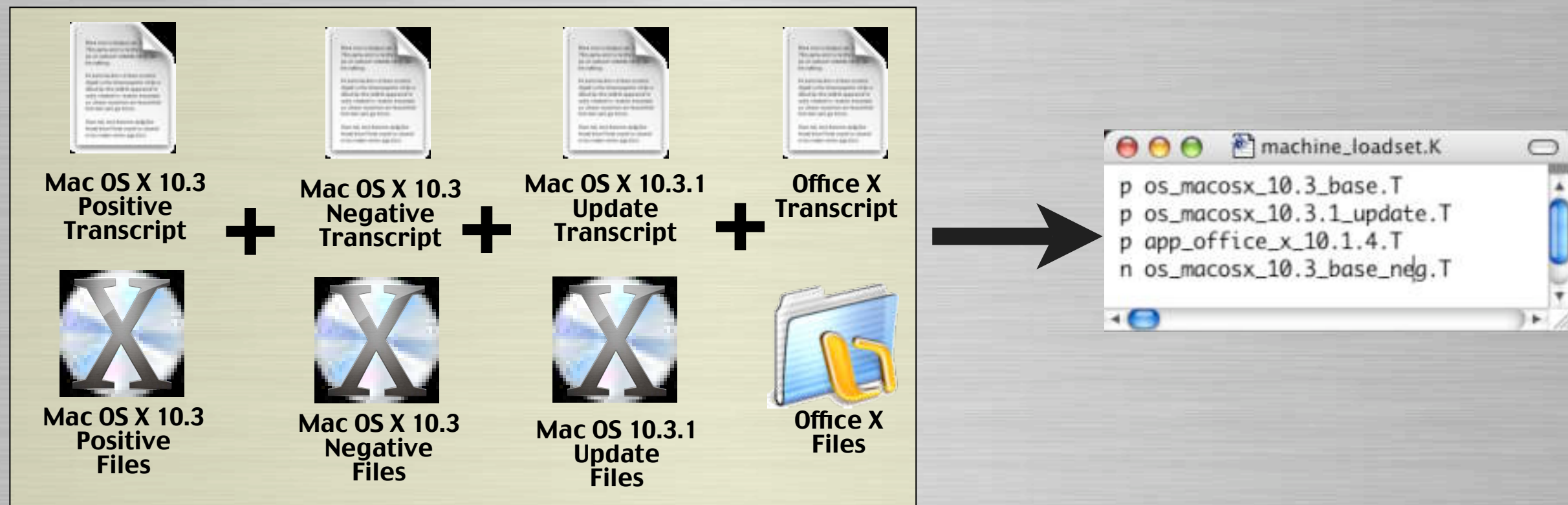
Overload - Example



Overload - Mac OS X 10.3.1 & Office X

Command File

- Defines the machine's managed file system
- A list containing the names of the base load and additional overloads.



Apply-able Transcript

Differences on Client

- Is a transcript containing the differences between the managed & local client file system.



Update Client

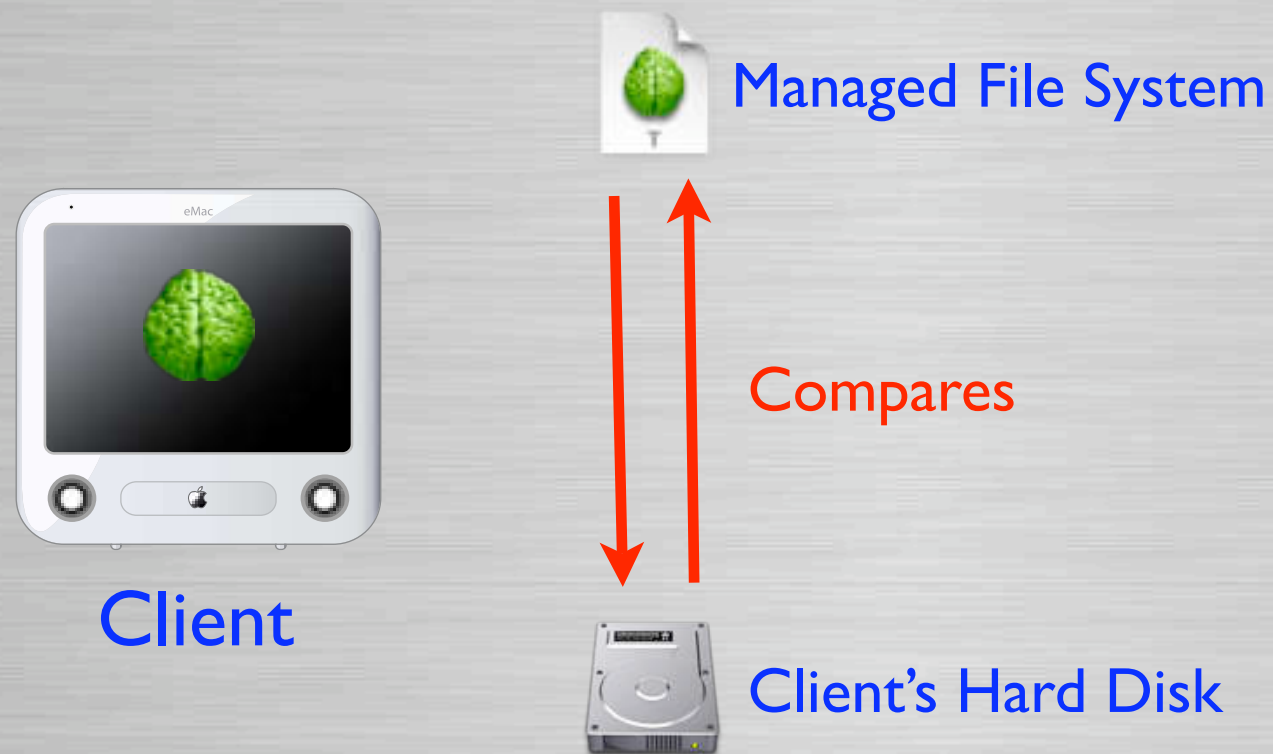
- These are the modifications that must be applied to the client for it to match the deployed file system.

Used to restore client to managed state

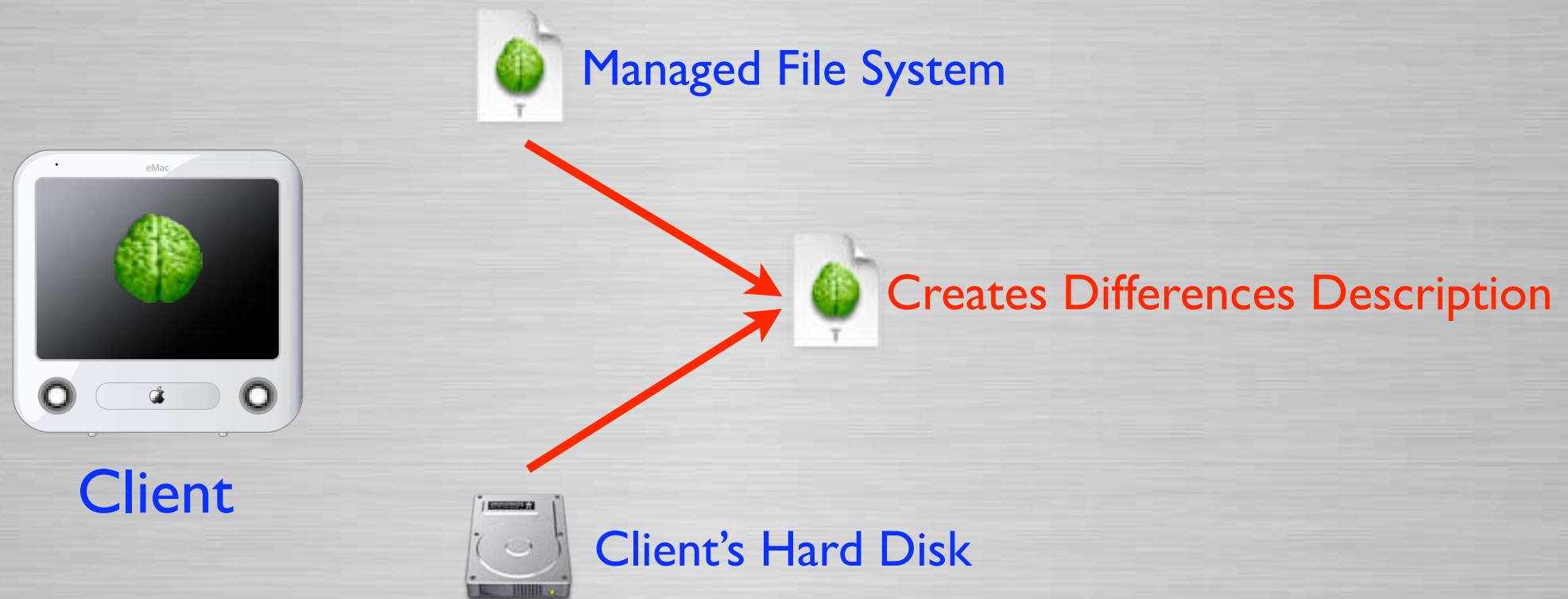
Apply-able Transcript - Example



Apply-able Transcript - Example



Apply-able Transcript - Example



Apply-able Transcript - Example



Client



Applies differences to client HD



Client's Hard Disk

Create-able Transcript

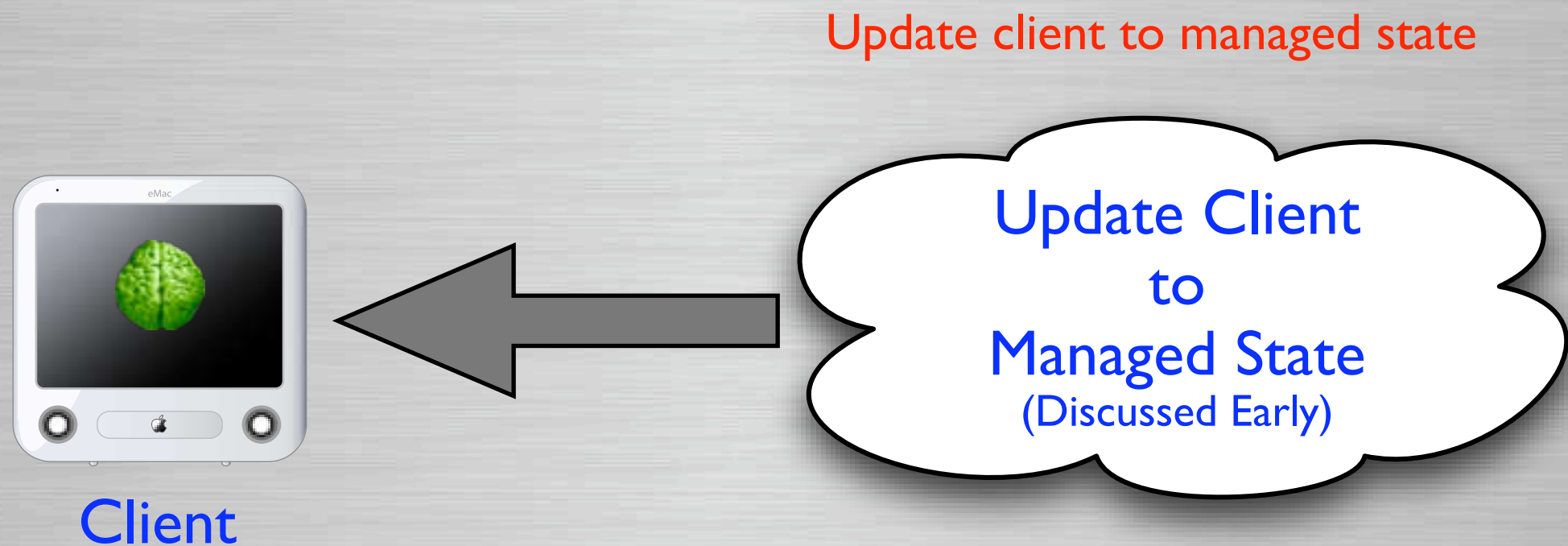
Additions on Client

- Is a transcript containing the additions on the local client but not on the managed file system.
- These are the additions that must be created on the deployed file system to match the client.

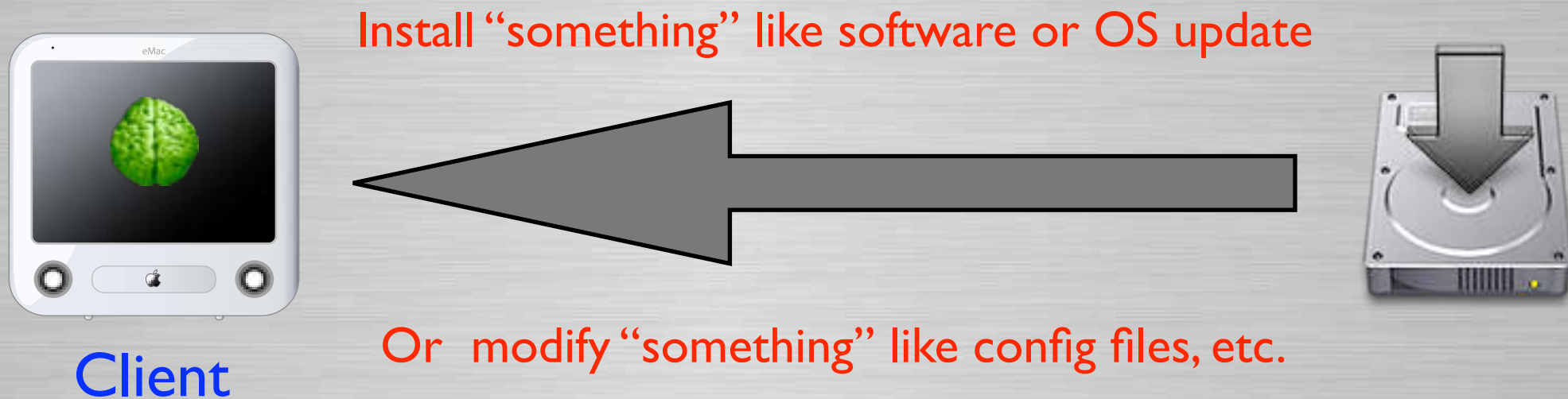
Used to create loadsets

- Like OS Updates, software installs, printer configurations, etc.

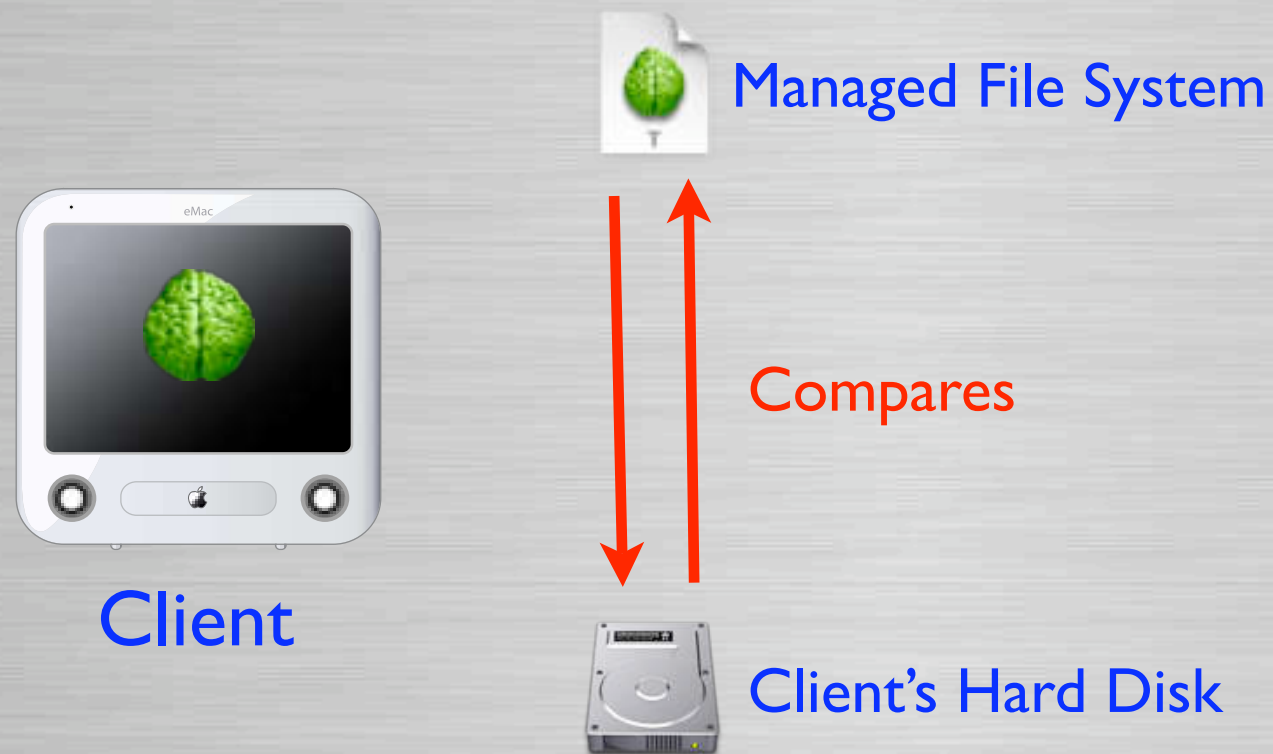
Create-able Transcript - Example



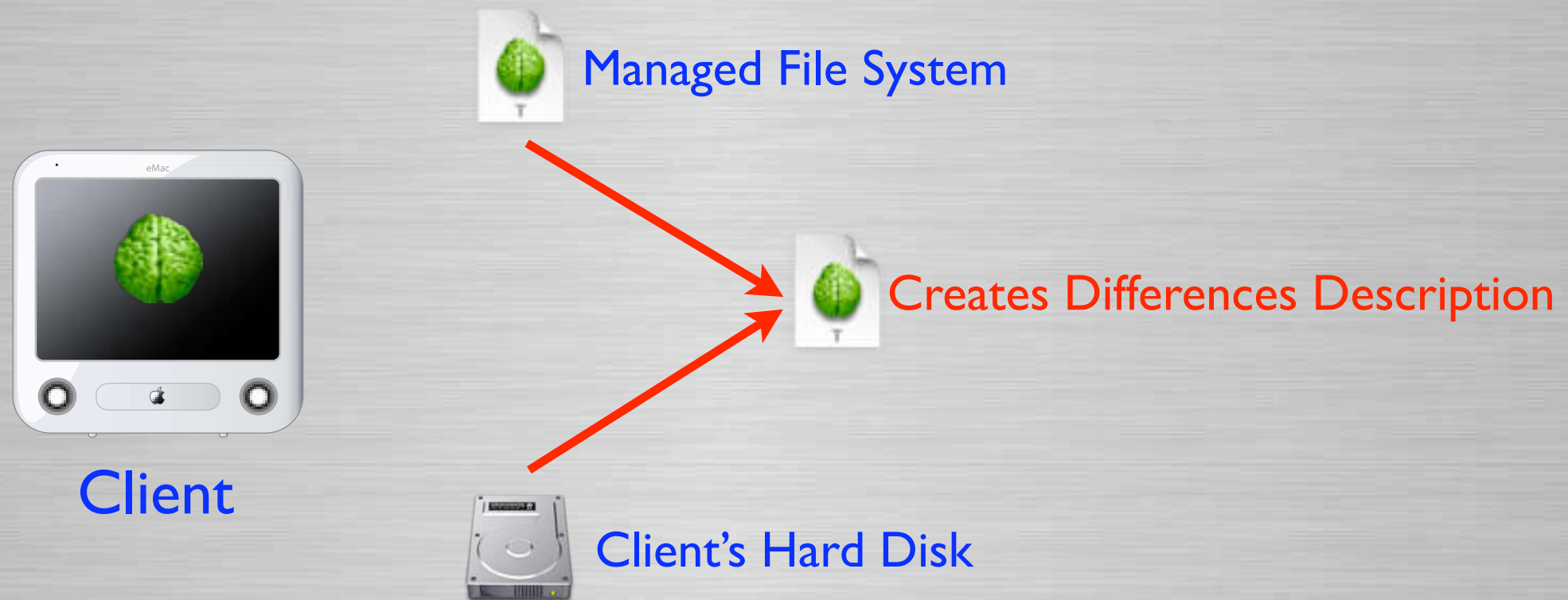
Create-able Transcript - Example



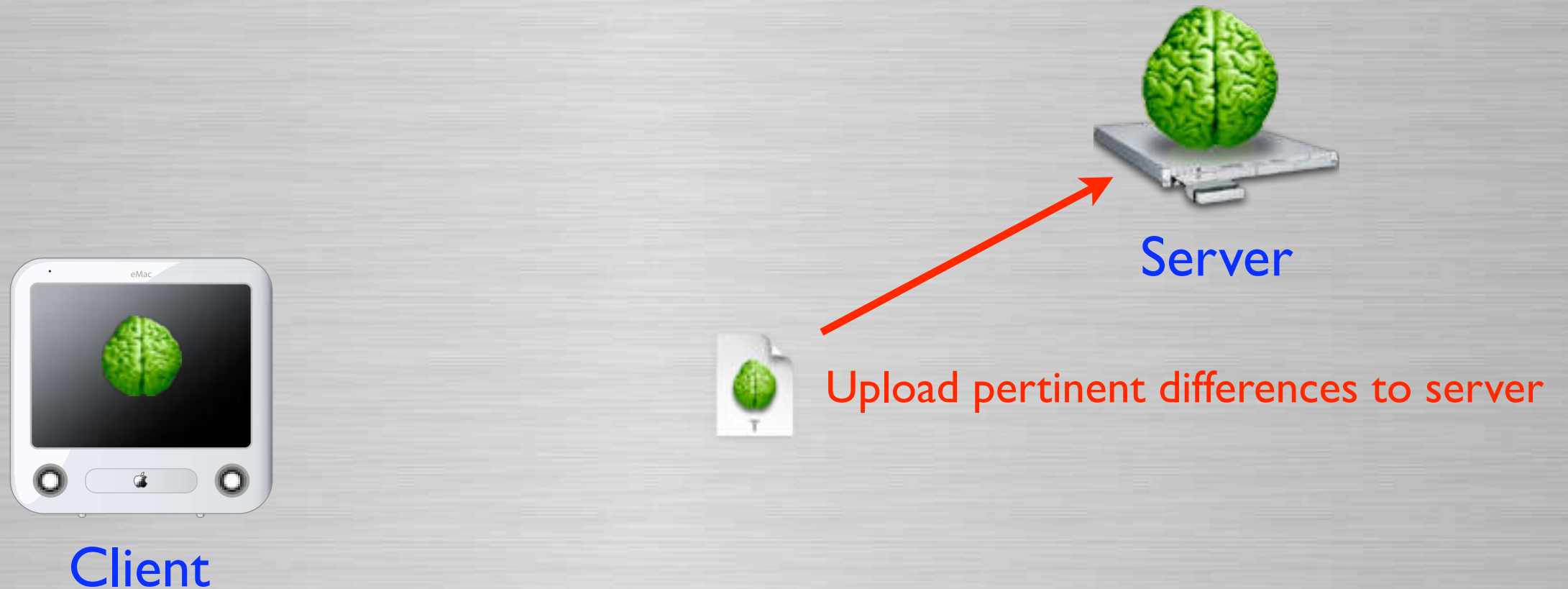
Create-able Transcript - Example



Create-able Transcript - Example



Create-able Transcript - Example



Radmind Tools

Description of the Tools

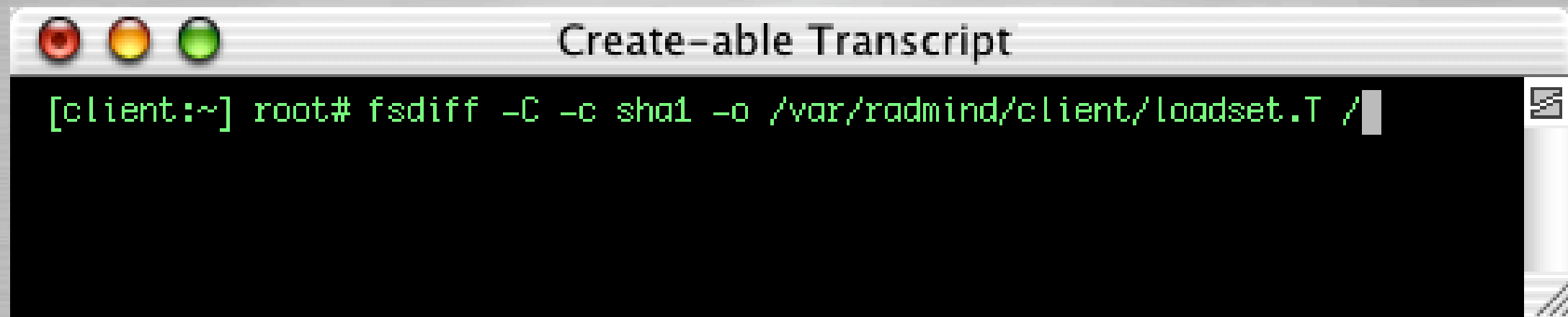


fsdiff

File System Differences

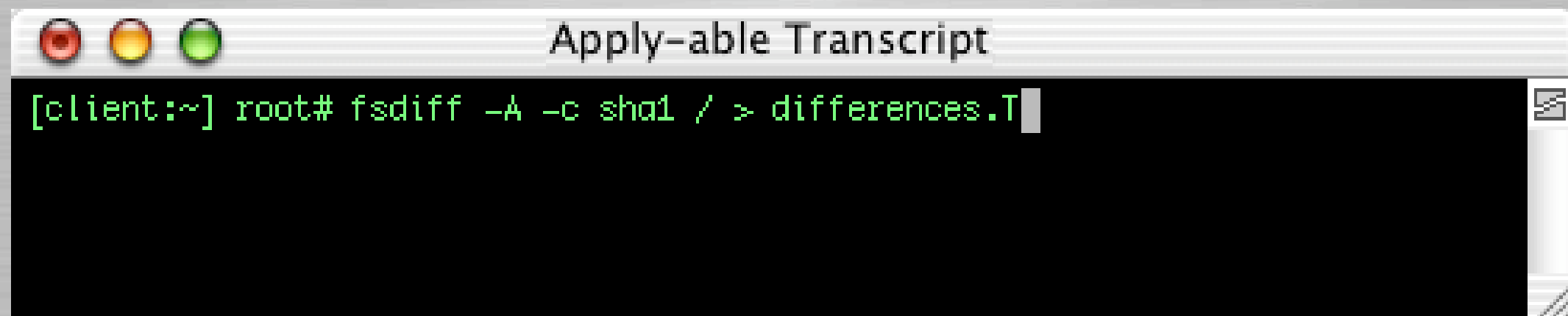
- The primary radmind tool
 - Compares the file system to a set of transcripts described by a command file
 - Produces the differences in the form of a transcript
 - Never talks on the network
 - Detects file system modifications (Tripwire)

fsdiff - Example



```
[client:~] root# fsdiff -C -c sha1 -o /var/radmind/client/loadset.T /
```

Create-able transcript named loadset.T



```
[client:~] root# fsdiff -A -c sha1 / > differences.T
```

Apply-able transcript named differences.T

lcreate

loadset create

- Uploads a transcript and associated files to the server



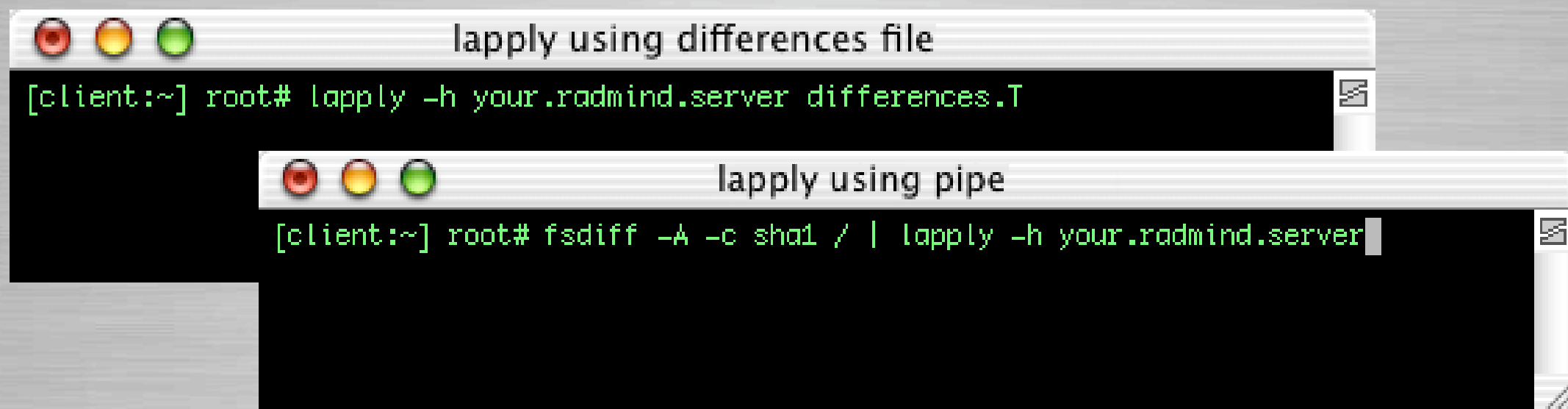
```
Terminal — tcsh (tty1)
[client:~] root# lcreate -h your.radmind.server /var/radmind/client/loadset.T
```

Uploads transcript loadset.T with associated files

lapply

Loadset Apply

- Modifies local file system as described by an apply-able transcript
- Retrieves updated files as required from the server.



The image shows two overlapping terminal windows. The top window is titled 'lapply using differences file' and shows the command `lapply -h your.radmind.server differences.T` being executed. The bottom window is titled 'lapply using pipe' and shows the command `fsdiff -A -c sha1 / | lapply -h your.radmind.server` being executed. Both windows have a black background with green text and standard window control buttons (red, yellow, green) in the top-left corner.

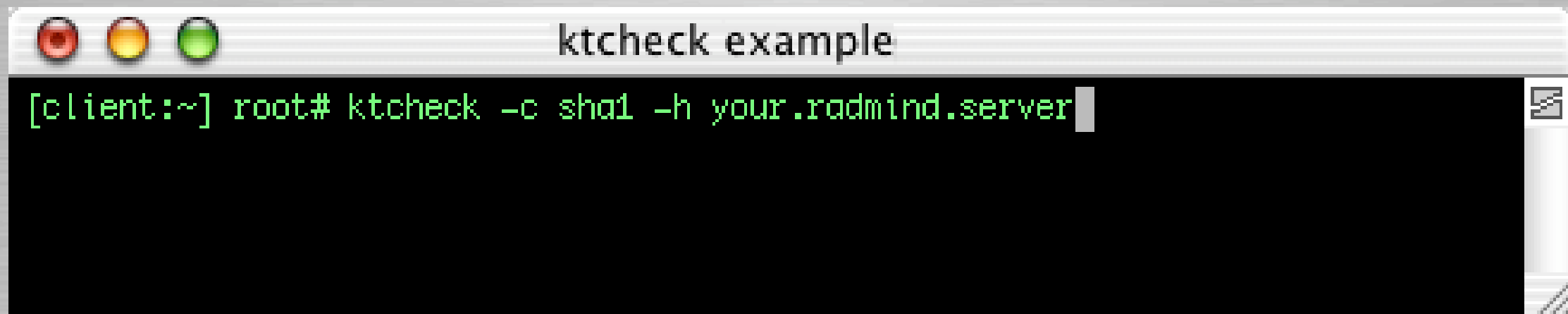
```
lapply using differences file
[client:~] root# lapply -h your.radmind.server differences.T

lapply using pipe
[client:~] root# fsdiff -A -c sha1 / | lapply -h your.radmind.server
```


ktcheck

Command & transcript check

- Compares local command file and associated transcripts with those stored on the server
- Retrieves updated command files and transcripts from the server

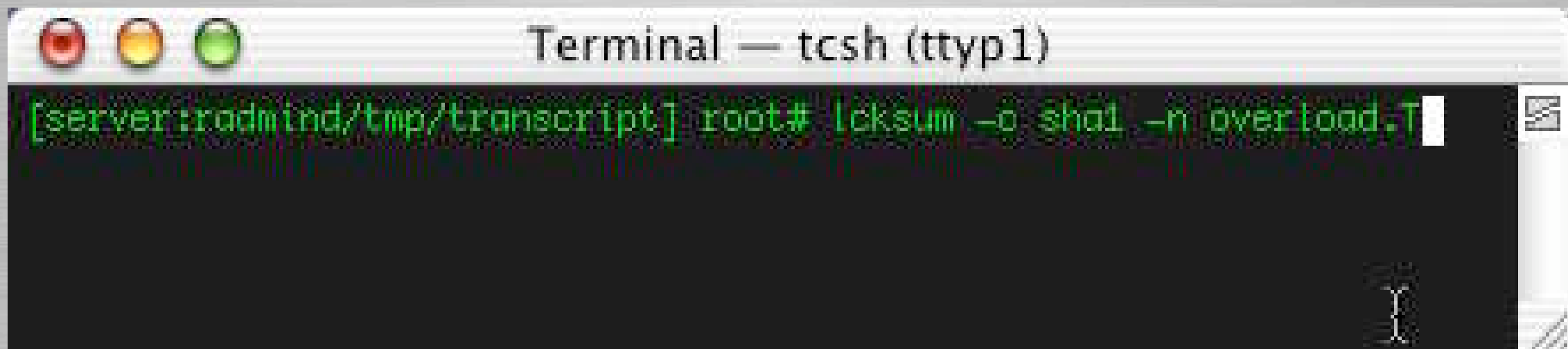


```
ktcheck example
[client:~] root# ktcheck -c sha1 -h your.radmind.server
```

lcksum

Loadset checksum

- Verifies the checksum & size of files associated with a transcript on the server.

A screenshot of a terminal window titled "Terminal — tcsh (tty1)". The window has three colored window control buttons (red, yellow, green) in the top-left corner. The terminal text shows the user is in the directory [server:radmind/tmp/transcript] and is running the command root# lcksum -o sha1 -n overload.T. The command is partially executed, with a cursor at the end of the line.

```
Terminal — tcsh (tty1)
[server:radmind/tmp/transcript] root# lcksum -o sha1 -n overload.T
```

Imerge

Loadset Merge

- Combines two or more transcripts and corresponding files into one loadset



```
Terminal — tcsh (ttyp1)
[server:/var/radmind/transcript] root# lmerge loadset_update.T loadset.T loadset_new.T
```



Radmind Tools

Overview of GUI



GUI Frontends

■ GUI Frontends available for Mac OS X



Radmind Assistant



Radmind Transcript Editor



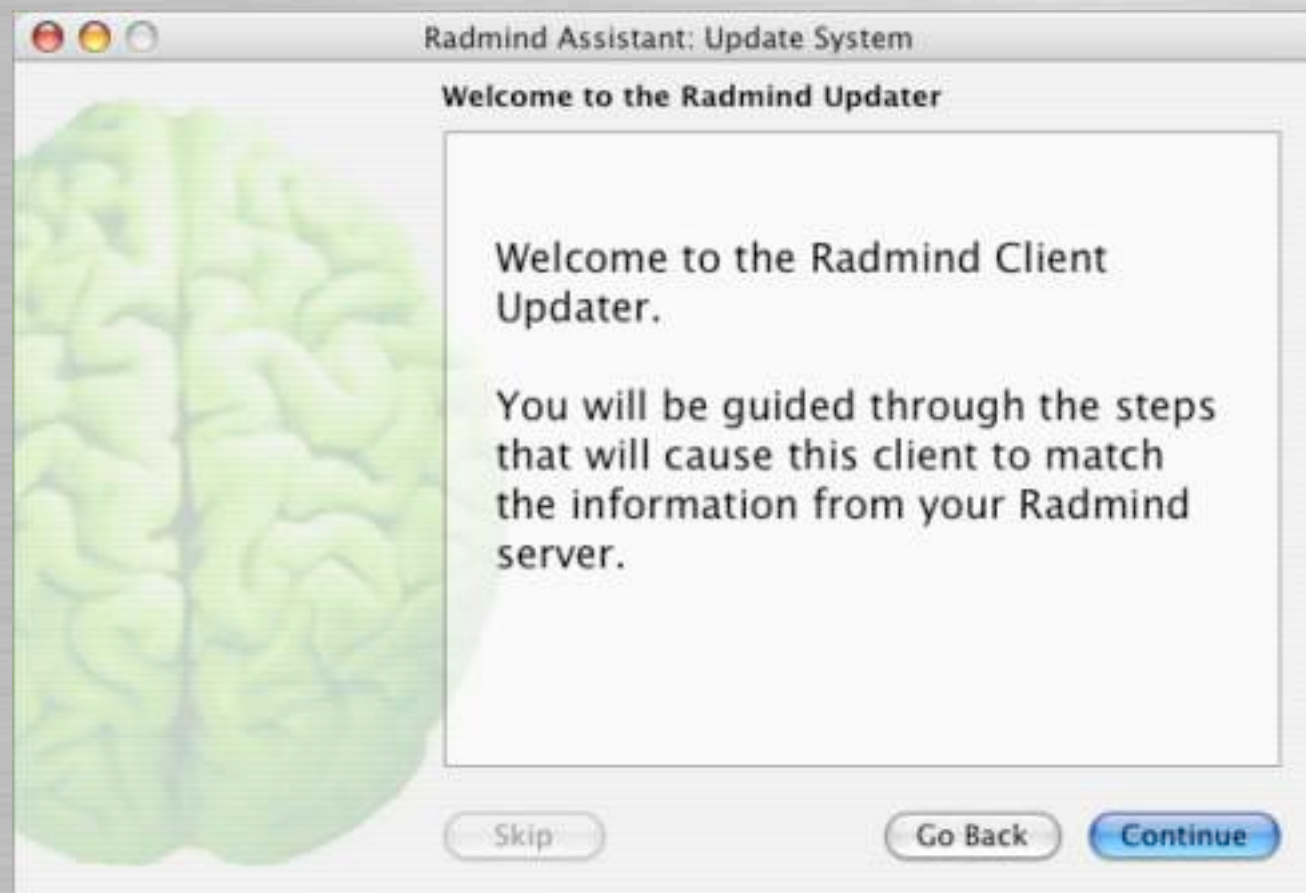
Radmind Server Manager

Radmind Assistant

- Supports most options of CLI tools
 - Updates Client
 - Creates File System Descriptions
 - Uses authentication & encryption
 - Enables some automation options (update client)
 - User Management

Radmind Assistant

- Updates Client
- Creates loadsets (baseload & overloads)



Session	Edit	Window	Help
Update This Machine	⌘ A		
Create New Radmind Loadset	⌘ C		
Open Transcript Editor	⌘ T		
Open Server Manager	⌘ S		
Run Setup Steps			

Radmind Assistant

Setup authorization & encryption

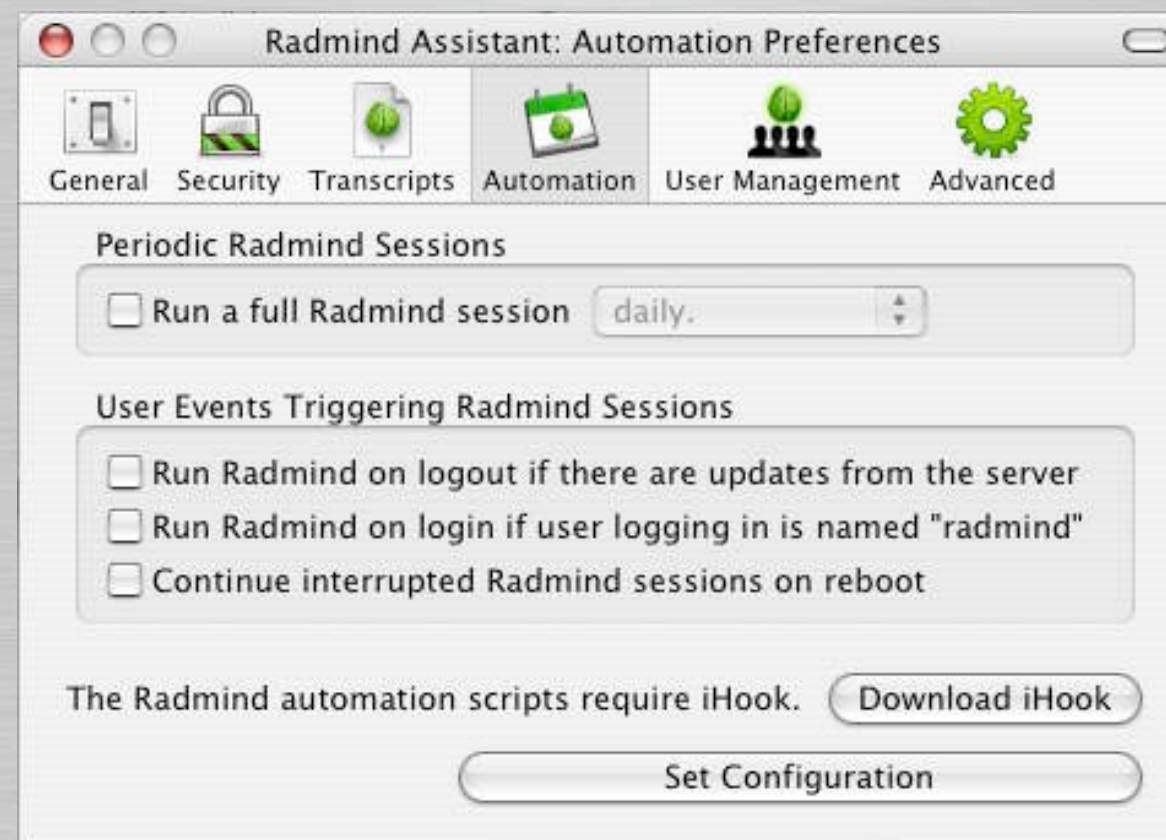
- Verify Server
- Verify Client and Server



✓ None
Verify Server
Verify Client and Server

Radmind Assistant

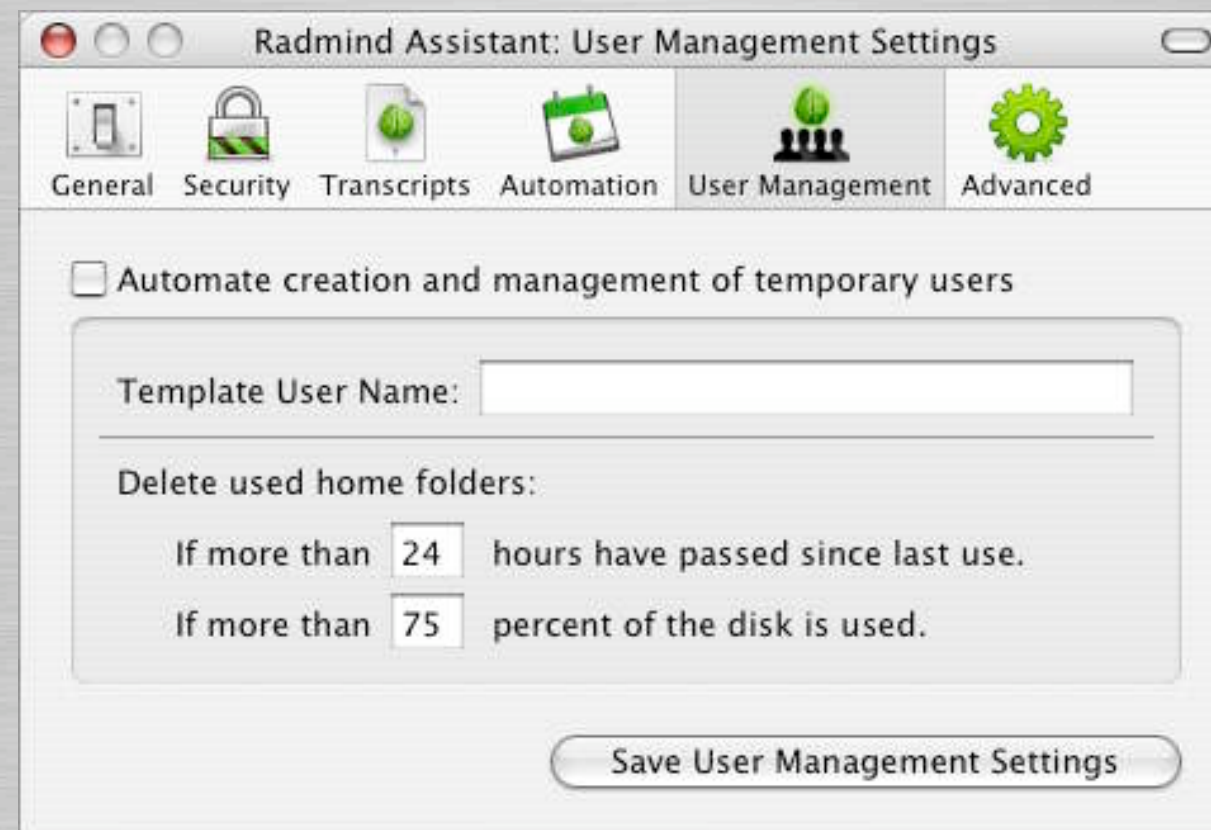
- Setup some automation options
 - Scheduled - Periodic Radmind Sessions
 - User Events - Login, Logout or continue interrupted



Radmind Assistant

User Management

- Creation of Home Folders
- Removal based on date & disk space used



Radmind Assistant: User Management Settings

General Security Transcripts Automation **User Management** Advanced

☐ Automate creation and management of temporary users

Template User Name:

Delete used home folders:

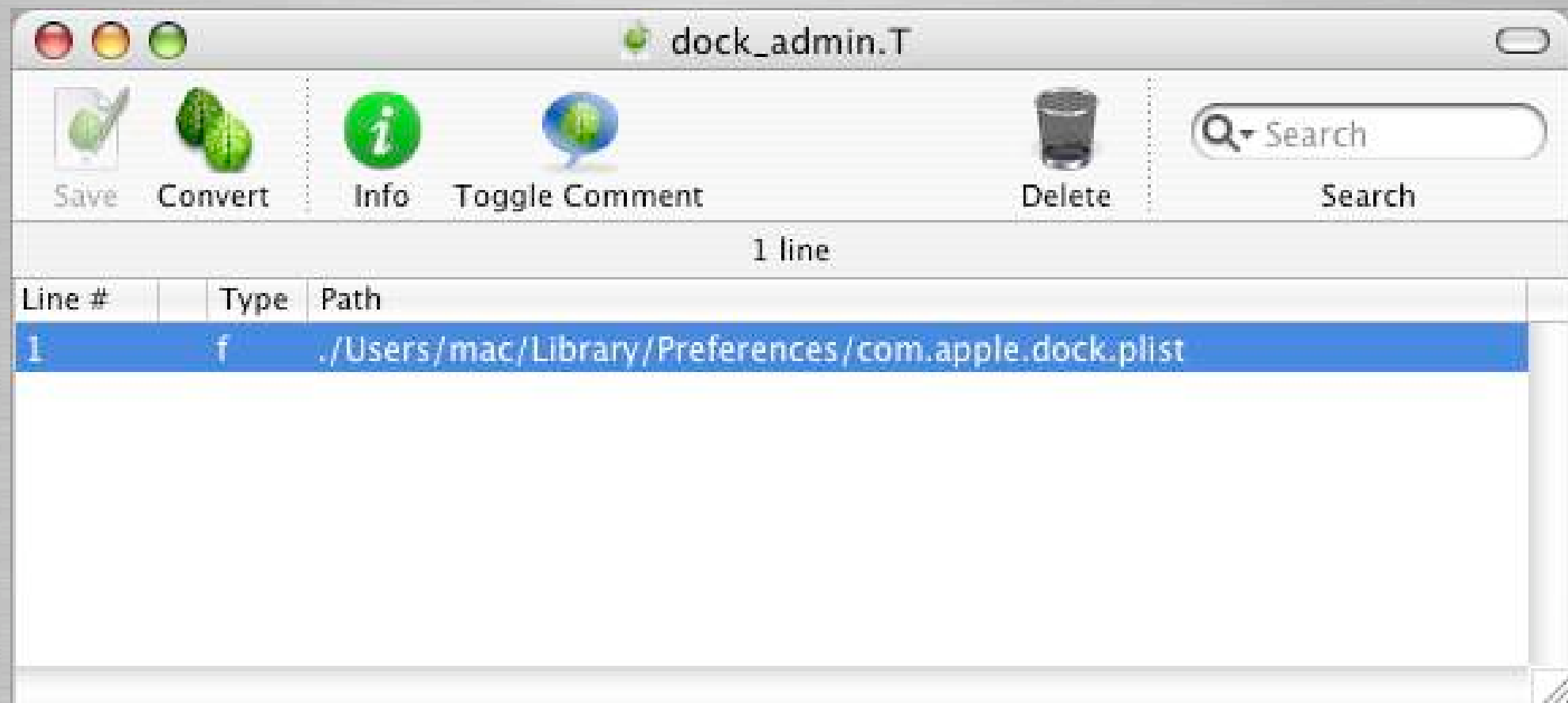
If more than hours have passed since last use.

If more than percent of the disk is used.


Save User Management Settings

Radmind Transcript Editor

- Used to edit file system descriptions
 - Modify, Remove & Add Items



Radmind Transcript Editor

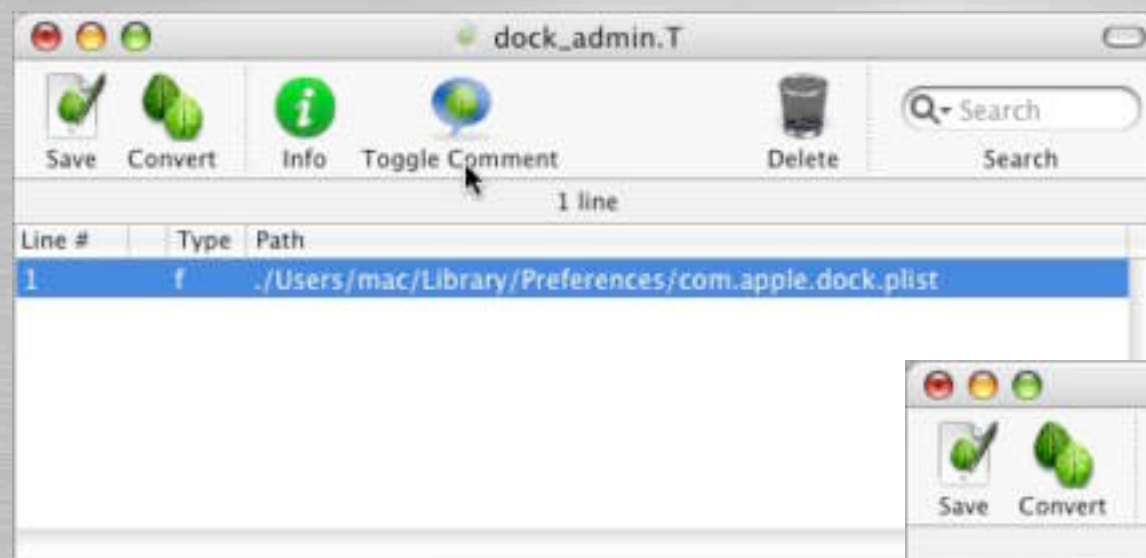
 Used to edit file system descriptions

- Edit owner & Group and Permissions
- Comment & Uncomment Items
- Display/hide file system item details



Radmind Transcript Editor

- Used to edit file system descriptions
 - Comment & Uncomment Items



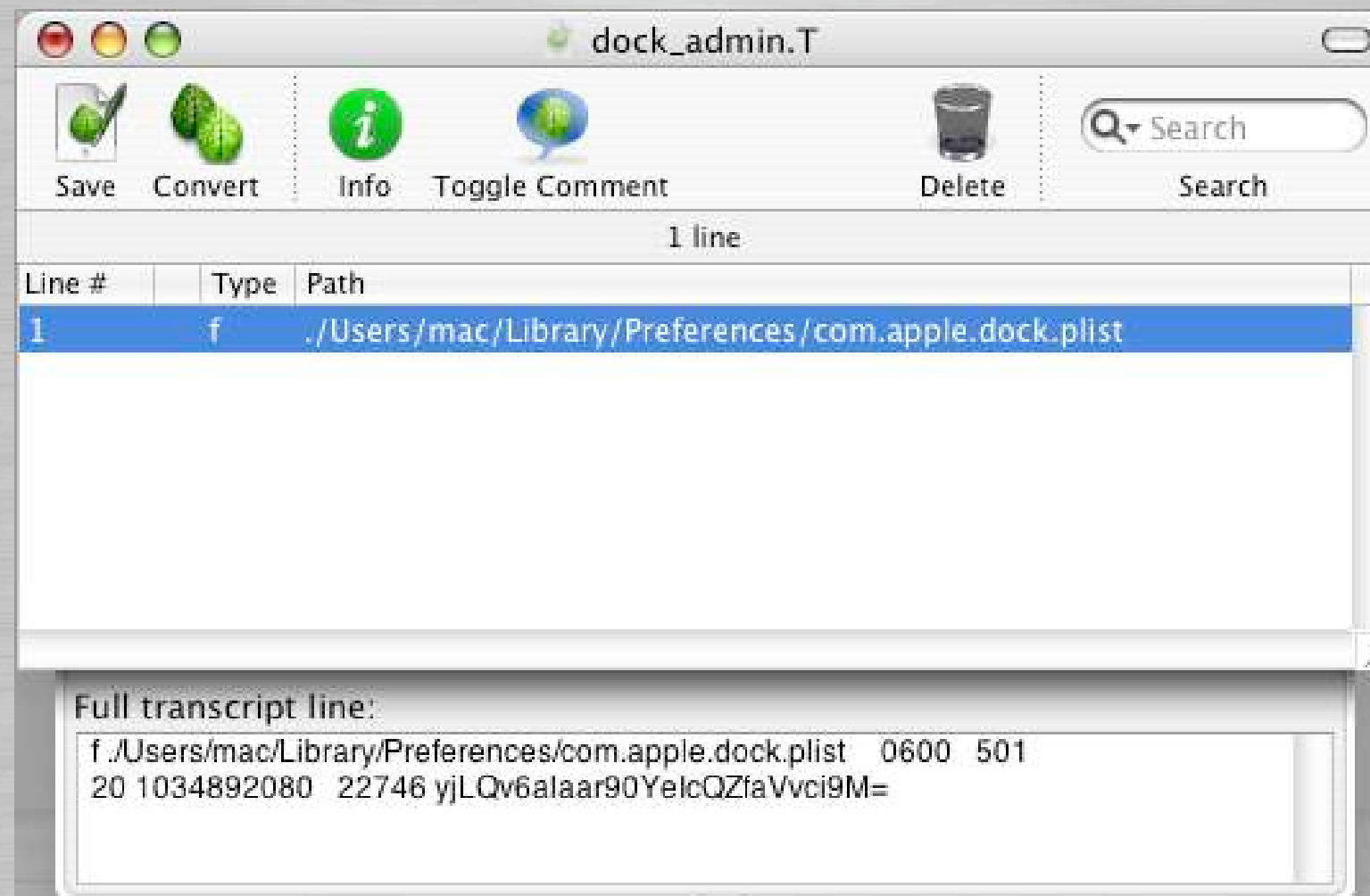
Un-comment



Comment

Radmind Transcript Editor

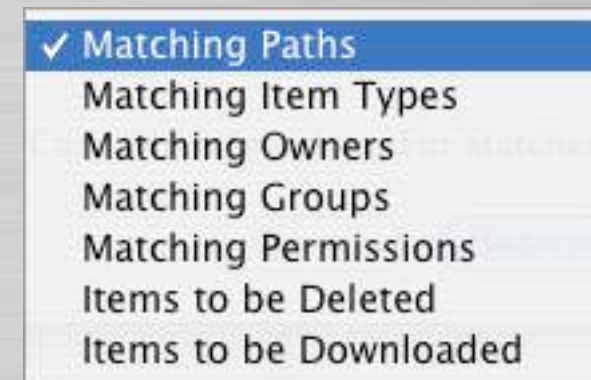
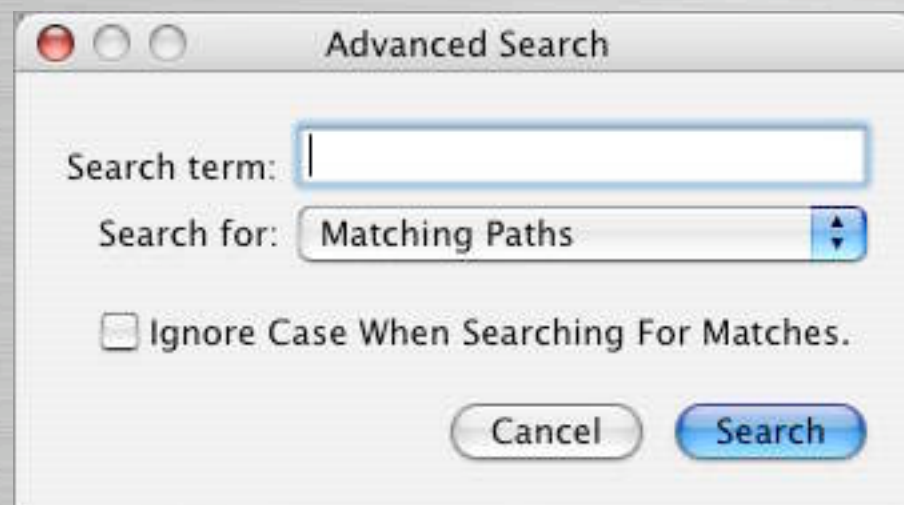
- Used to edit file system descriptions
 - Display/hide file system item details



Radmind Transcript Editor

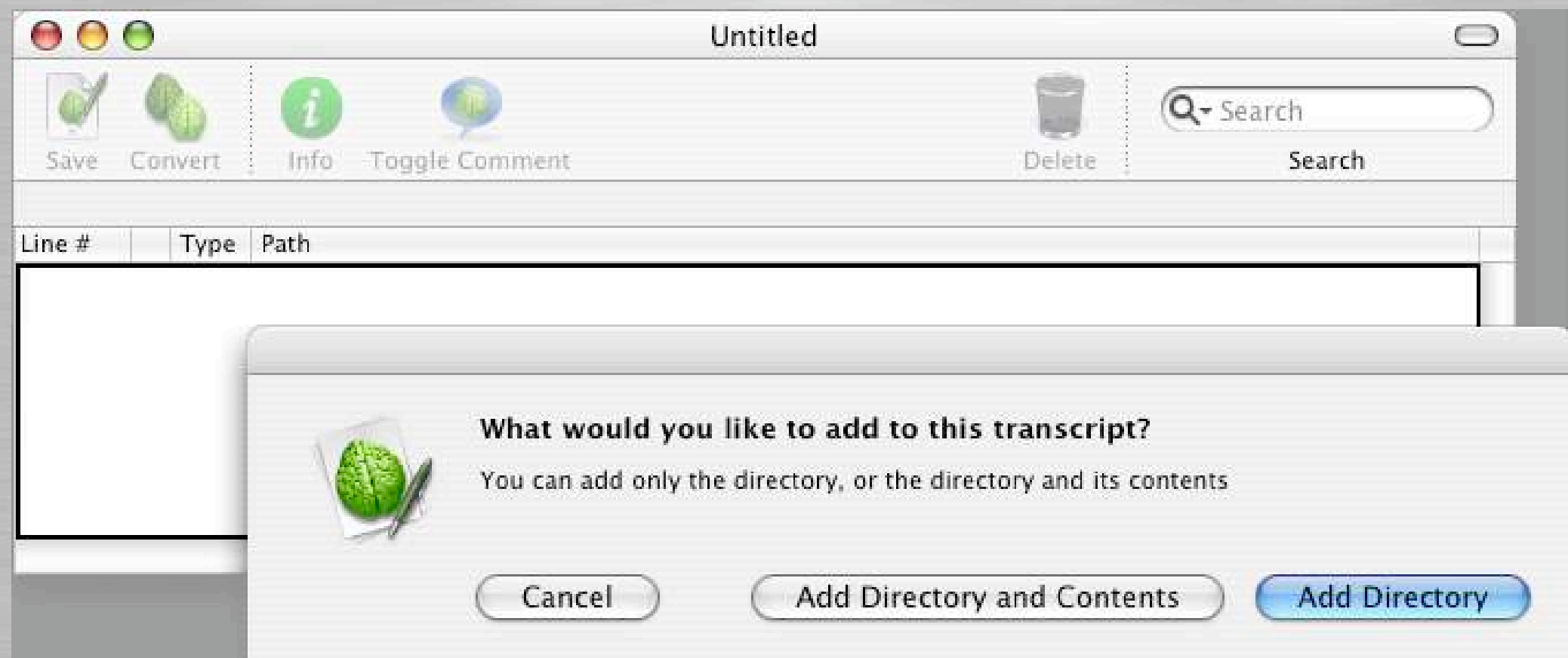
Used to edit file system descriptions

- Searching based on multiple criteria
 - Paths, Item Types, Owner & Group & Permissions
 - Items to be deleted or downloaded



Radmind Transcript Editor

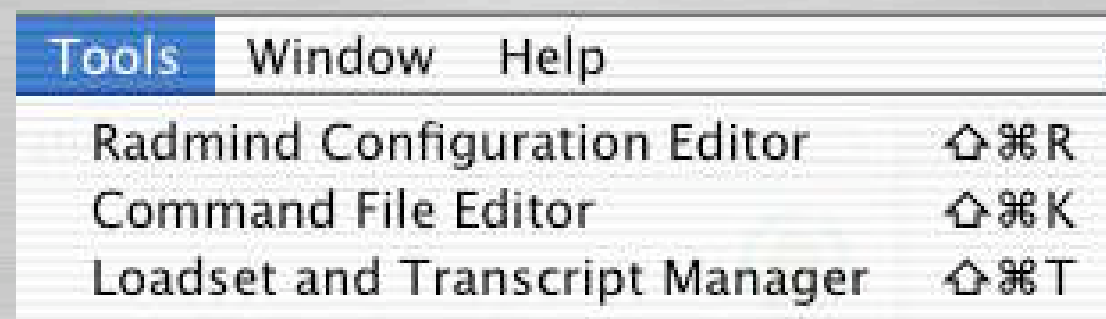
- Create individual file or dir. descriptions
 - Either directory or directory & contents



Radmind Server Manager

Radmind Server Manager

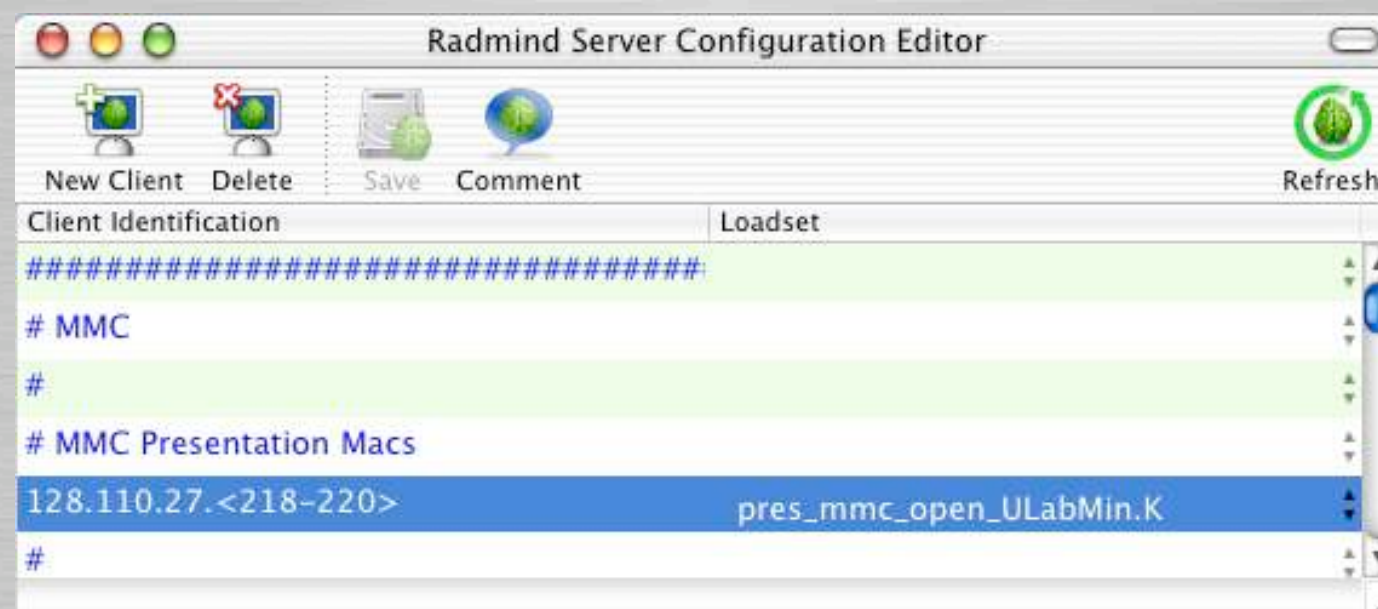
- Comprised of three tools
 - Configuration Editor
 - Command File Editor
 - Loadsets & Transcript Manager



Configuration Editor

Configuration Editor

- Add, remove client file system configurations
- Edit how to define client
 - IP, wildcard, range, and SSL certificate
- Comment & Un-comment

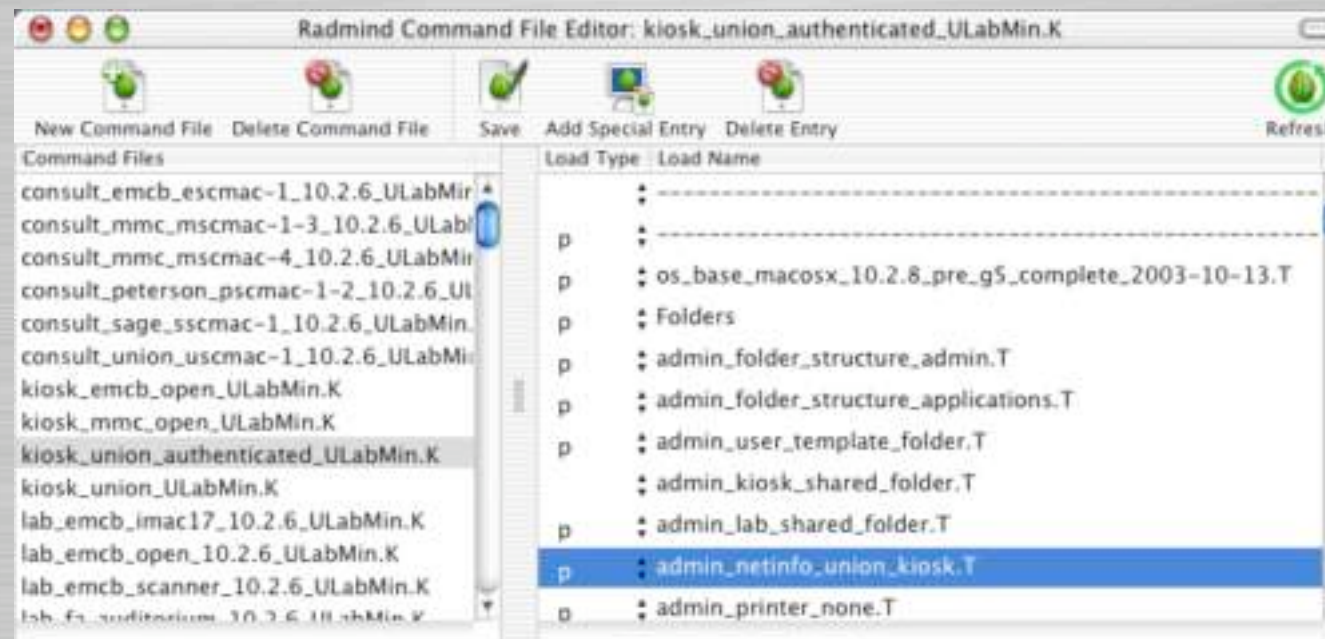


Command File Editor



Command File Editor

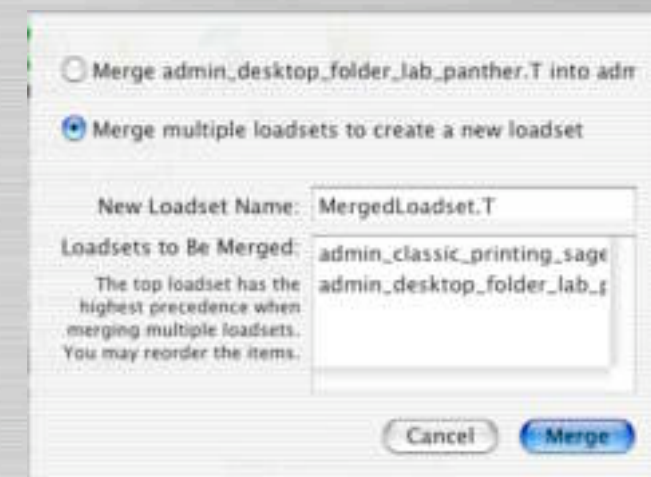
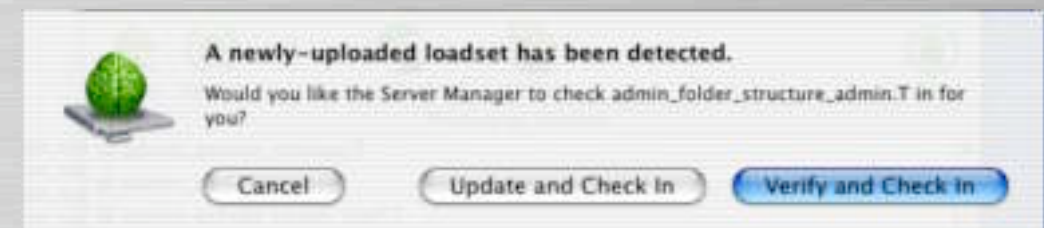
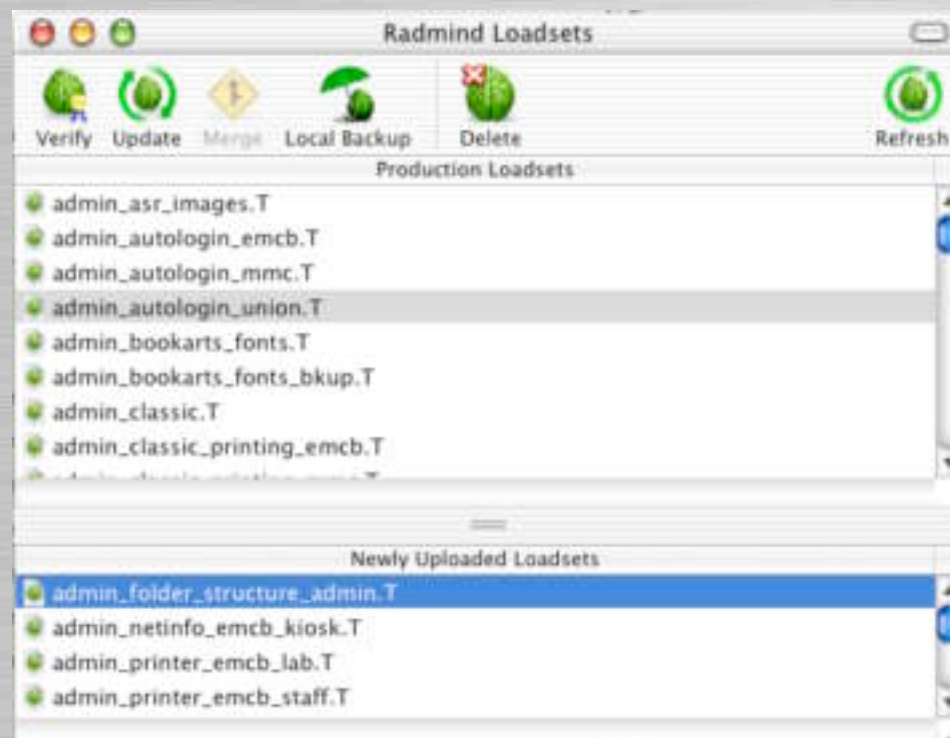
- Manage individual client file system descriptions
- Specify client file system description
- Specify type of load (Positive, Negative or Special)
- Add, remove or change ordering



Radmind Server Manager

Loadsets & Transcript Manager

- Verifies & updates loadsets (checksum & file size)
- Merges loadsets (update + original = merged)
- Check In loadsets into production
- Delete or backup loadsets



Questions & Answers?

Mastering Radmind & RsyncX



File System Management

Mastering Radmin & RsyncX



Kevin Boyd
University of Michigan

Richard Glaser
The University of Utah



Macworld Conference & Expo, San Francisco
January 8, 2004