Mac OS X File System Maintenance With

Radmind

By
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University of Utah

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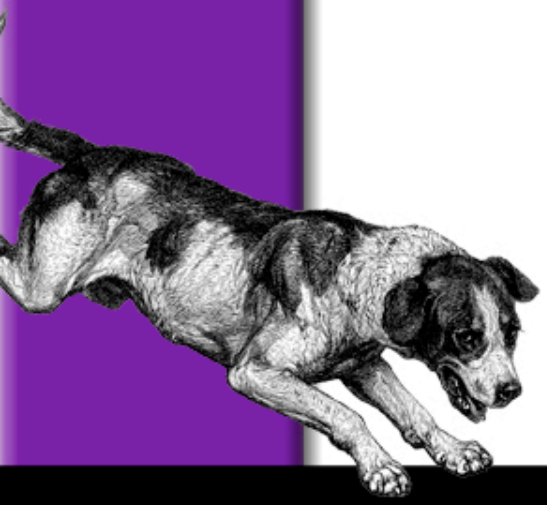

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Mac OS® X
Conference

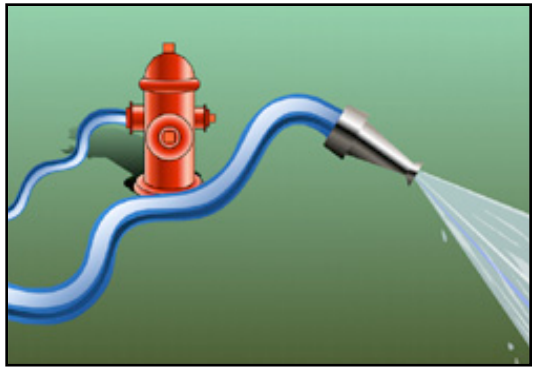
Who am I?

- System Administrator at University of Utah
  - Manage around 400 Mac OS X clients
  - Manage many servers that run multiple services
  - Provide students, staff & faculty support & training
  - Provide campus manager support & training
  - And much more...
- Long time Radmind Administrator
  - Have used it since May, 2002
- Steering Member of the MacEnterprise Project
  - Formerly MacOSXLabs Project

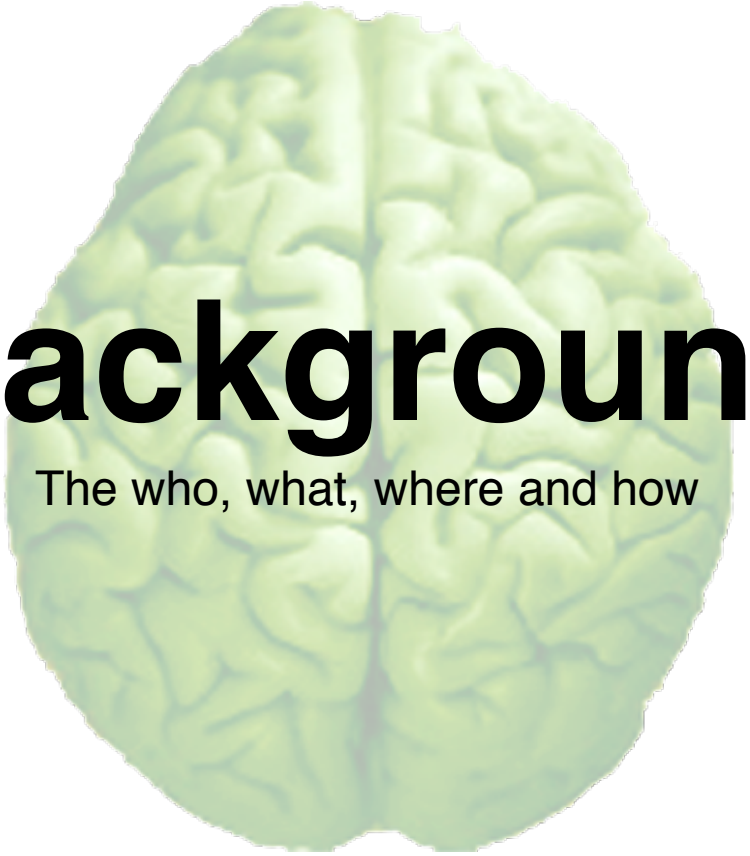
MacEnterprise.org
Mac OS X enterprise deployment project

What I will cover

- Background
- The Basic Process
- Why use it?
- How to deploy?
- Terms
- Overview of command line tools
- Brief Tutorial



A lot of material to cover...
Sorry to make you drink from a fire hose



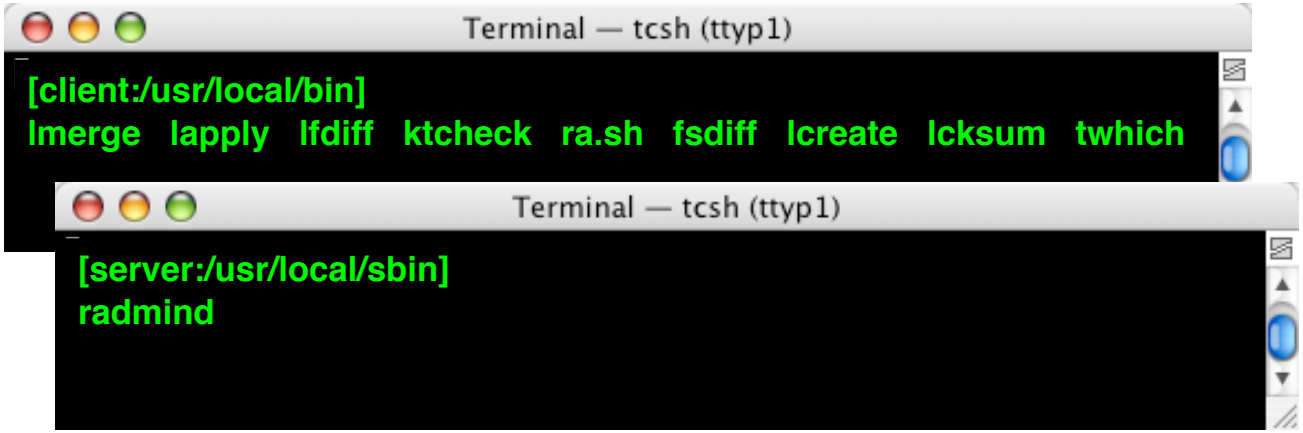
Background

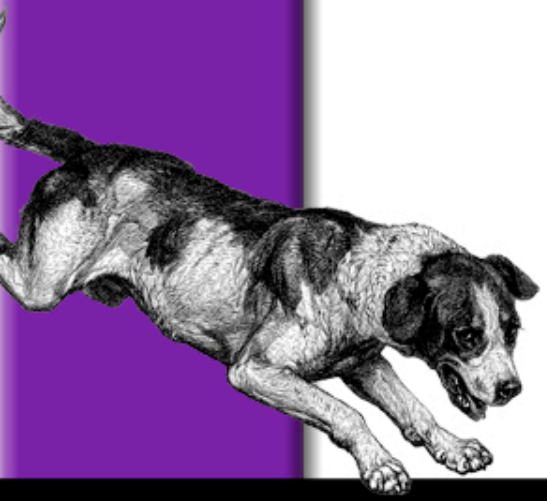
The who, what, where and how

What is it?

- Suite of command line tools
  - Both client and server

  - Remote Administration
    - Allows remote administration of multiple clients file system
  - Tripwire
    - At its core, it is a tripwire, detecting file system changes
  - Reverses Changes
    - But goes beyond just detecting changes it reverses them





Where to get it?

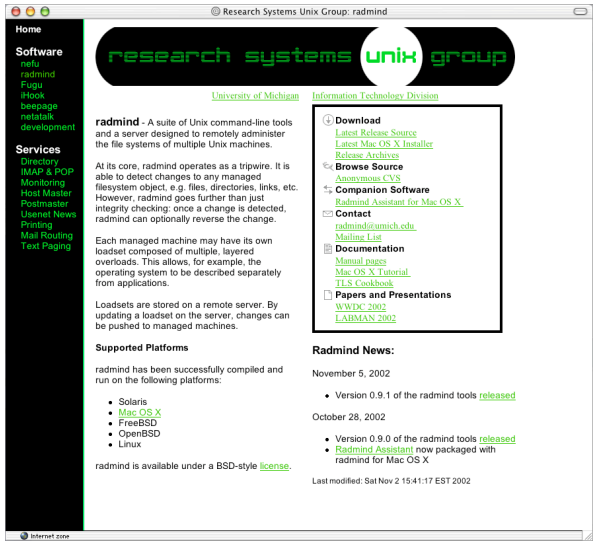
- Download from radmind web site:
  - www.radmind.org

- Mac OS X Installer

- Source Code

- Radmind Assistant
  (GUI front-end for radmind)

- iHook
  (A useful companion tool)

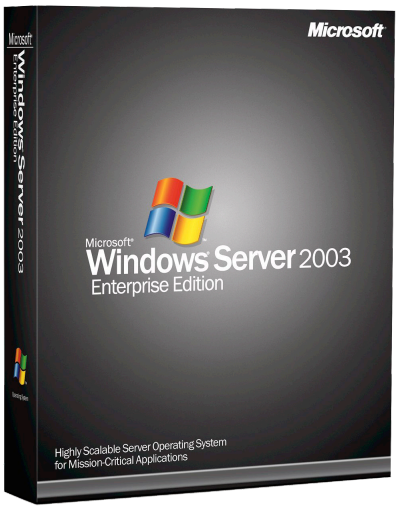


What platforms does it support?

- Can be used with any supported Unix
  - Mac OS X
  - FreeBSD
  - Linux
  - OpenBSD
  - Solaris

Other Platforms?

- Project to port radmind to Windows
  - Organized by:
    - University of Michigan & Stanford University
  - Others can join project to help code & test port
  - Mail list is setup called radmind-pc
    - To subscribe send email to majordomo@lists.stanford.edu and put in the body subscribe radmind-pc



How much is it?

- Open Source
- Available under BSD-style license

  - Can be used for **FREE** if:

    - You **ARE NOT** making profit from it and...
    - **Include** copyright & permision notice with distributed copies & documentation

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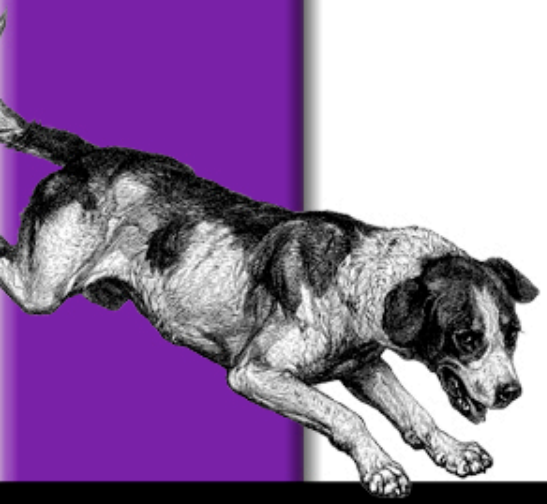
Who Developing It?

- Developed at the University of Michigan
  - By Research Systems Unix Group (RSUG)
    - Very responsive to bug reports & features requests
    - Active on mail list providing support & suggestions
  - Email

    radmind@umich.edu

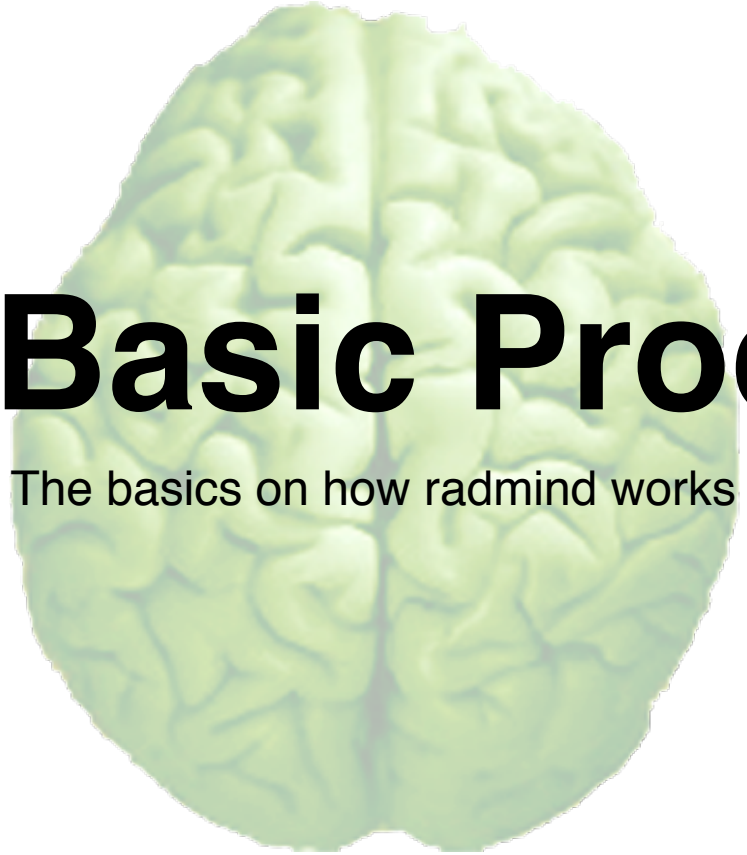
  - research systems unix group
  - Its open source project, so anybody can contribute



Resources

- Mail list at Rice University:
  - radmind-discussion
    https://mailman.rice.edu/mailman/listinfo/radmind
  - radmind-announce
    https://mailman.rice.edu/mailman/listinfo/radmind-announce
  - Web form to subscribe to radmind lists

- Resources web page
  - At University of Utah:
    http://www.macos.utah.edu/Documentation/radmind/resources.html
    - Documentation
    - Mail Lists
    - Presentations
    - Third Party Tools
    - WebCasts
    - Web Sites

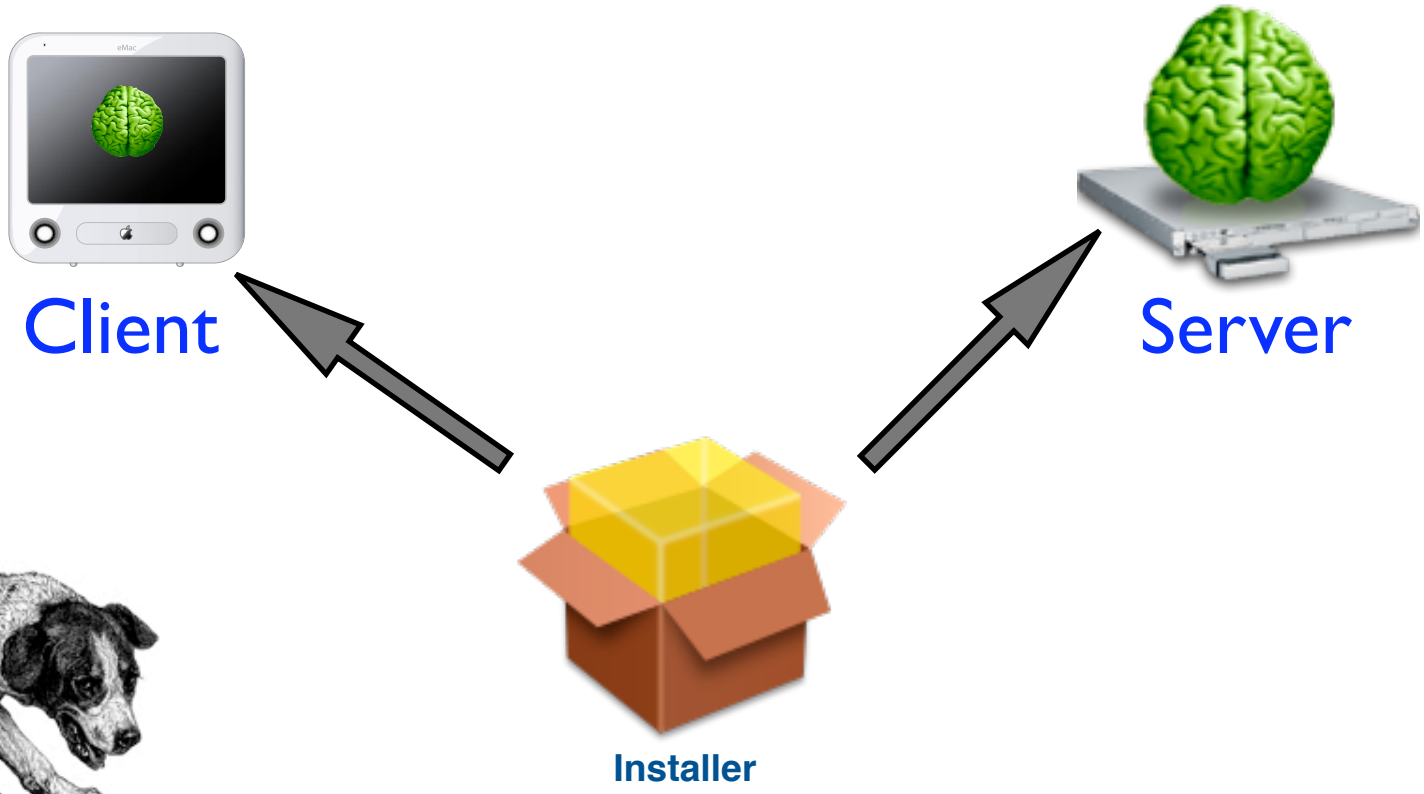


The Basic Process

The basics on how radmind works

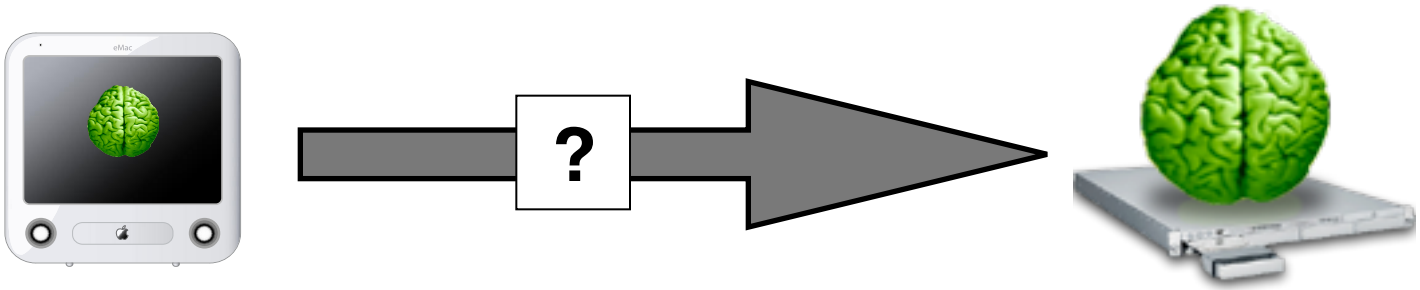
Setup & Installation

- Client & Server with radmind setup & installed
  - More to come on this later...



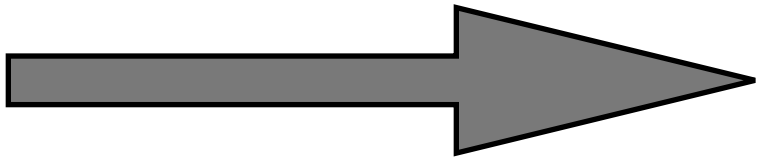
Client Requests File System

- Client requests managed file system from server



Is client managed?

- Server checks if client managed?

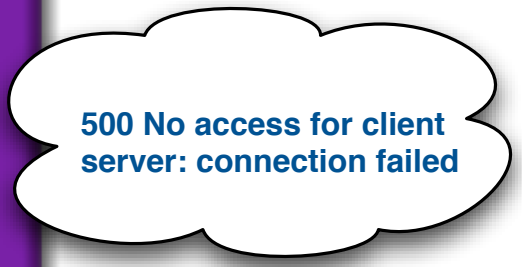


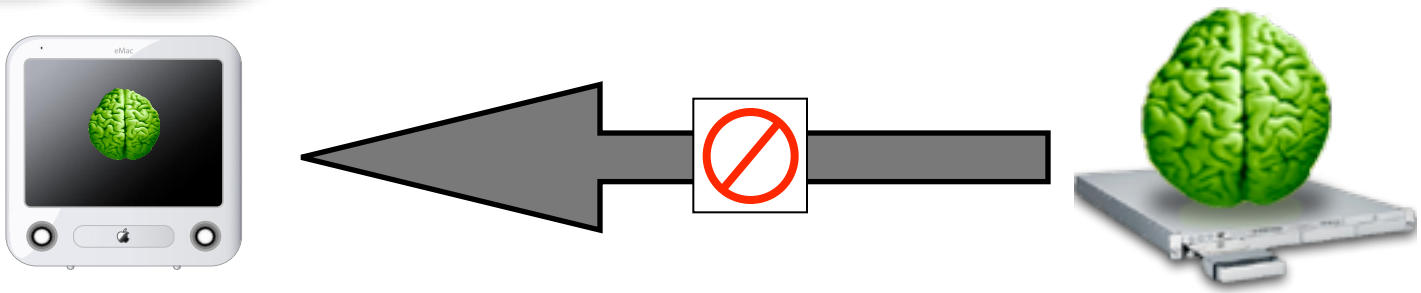
Client

Server

Client NOT Managed

- If client is NOT managed
  - Server rejects connection from client



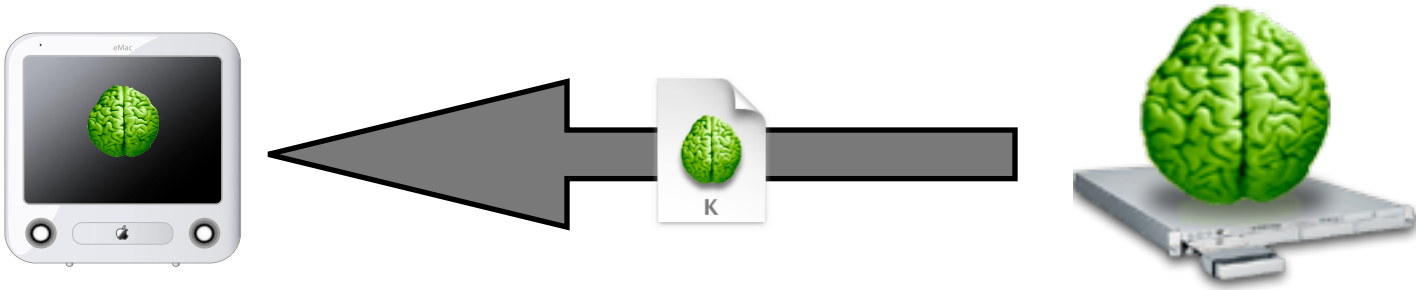


Client

Server

Client Managed - Sends Description

- If client is managed,
  - Server sends client managed file system description.



Client Stores Description

- Client stores managed file system description

Client

Server

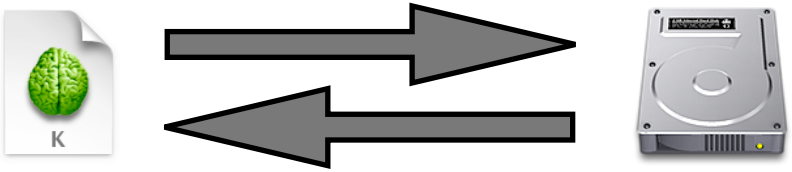
/var/radmind/client

Client Compares Local & Managed

- Next, client scans local file system
- And compares against managed file system

Client

Server



Managed File System Description

Client File System

Client Creates Differences

- Then creates a differences description

Client

Server

Differences Description

Managed File System Description

Client File System

Applies Differences to Client

- Using the differences description...
- It removes additional items on local file system

Client

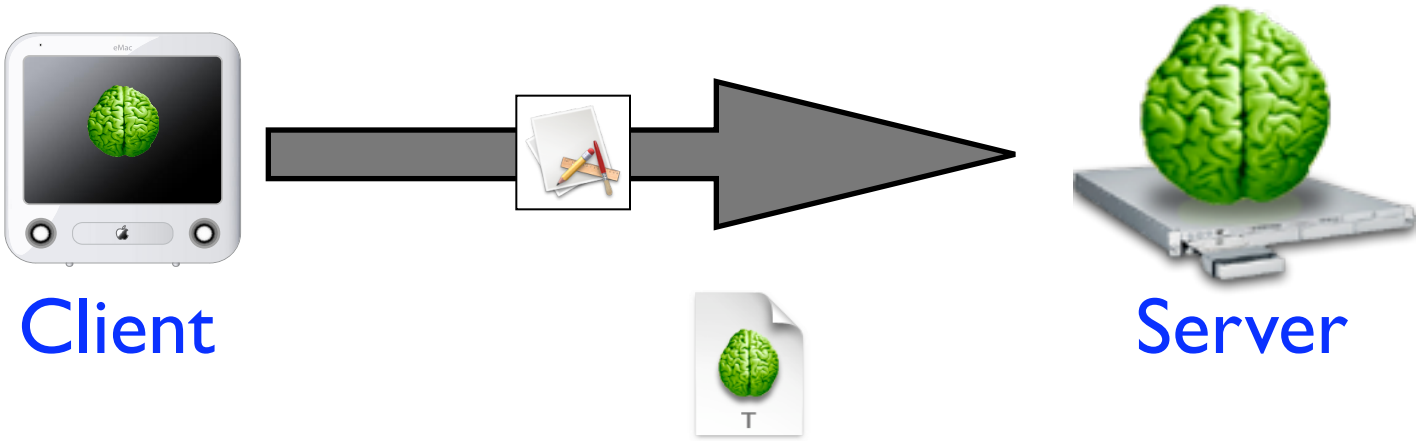
Server

Differences Description

Removes Additional Items

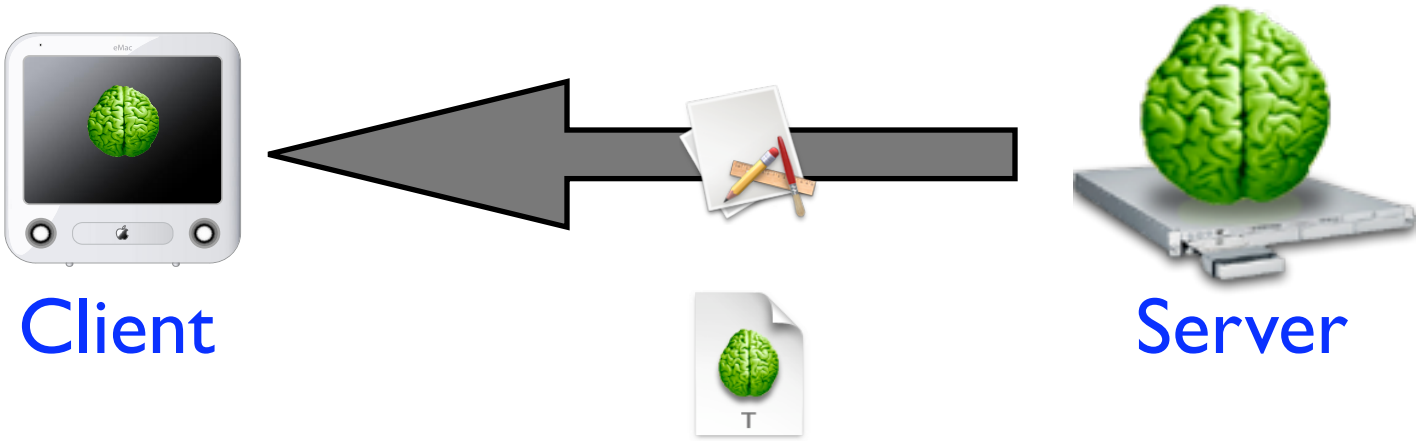
Client Requests Missing Items

- If item(s) are missing, client request items from server



Server Sends Requested Items

- And item(s) is downloaded from server



Updates Permissions & Attributes

- Then modifies permissions or attributes on items

Client

Differences Description

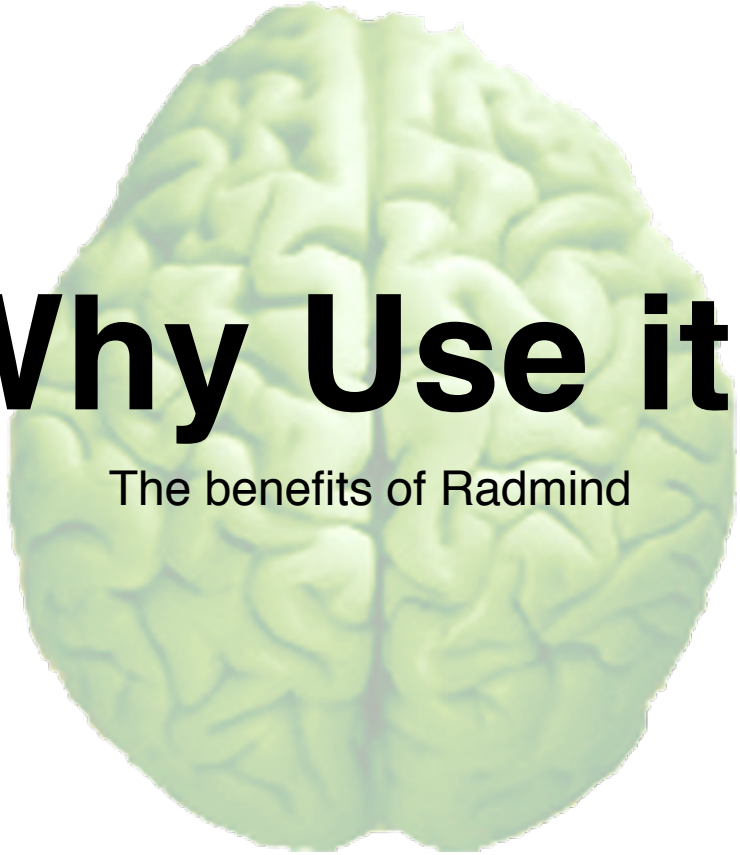
Server

Client Updated to Match Managed

- DONE!!!
  - Client file system updated to match managed

Client

Server



Why Use it?

The benefits of Radmind

Why use it? (Part I)

- Security
  - Quickly find & fix security issues
  - Tripwire & Reverse Changes
  - SSL Authentication & Encryption

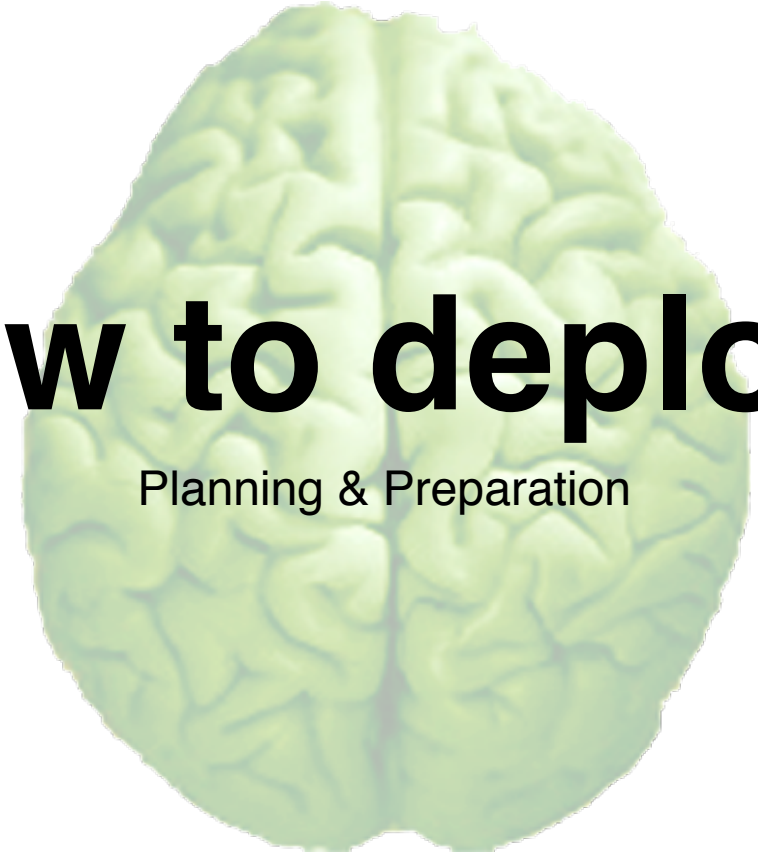
OpenSSL

- Manage Nomadic Machines
  - Manage laptops & dynamically assigned Mac's
  - Identify clients using certificates

- Network & Server Utilization
  - Tools minimize network/server traffic
  - Few files transfered for incremental updates
  - Comparison done locally NOT over network

Why use it? (Part II)

- Package Management
  - Track & Test installation
  - Control distribution & installation
  - Fix, upgrade, downgrade or remove distribution
- Crappy Apps
  - Troubleshoot enterprise unfriendly applications
  - World Writable, SUID/GUID, Permissions, Attributes
  - Solve installation & distribution issues
- Granularity
  - Control & customized Application & OS distribution
  - Layered file system control
- Easy Management
  - One file on server to manage clients file system
  - Quickly change file systems between clients



How to deploy?

Planning & Preparation

How to deploy it? (Part I)

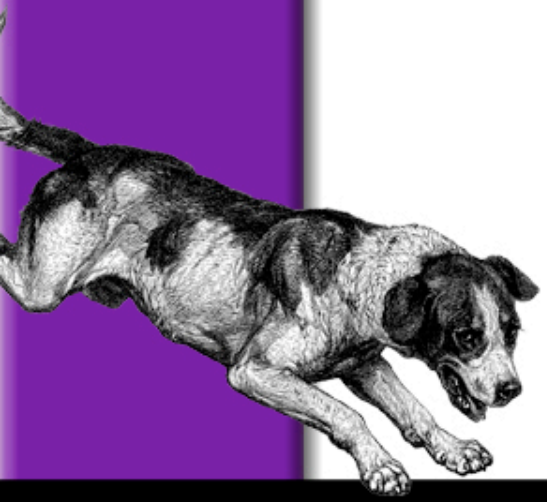
- Environment
  - Student, staff or server environments
- Policy
  - Administrative policy & procedures
  - What you want to allow user to do or not do?
  - Allow staff be local admin?
- Updating Client
  - How often?
  - Automated vs Manual?
  - Allow users to manually initiate updates?
- File System Management
  - Broad vs Granular
  - Less Complex vs Flexibility, Power & Customization

How to deploy it? (Part II)

- Client File System Organization
  - Consider & define naming scheme
  - Building or Lab? Purpose? Person's Name?
- File System Descriptions Organization
  - Application vs OS vs administrative vs customization
- Separate Software System Components
  - Reduce dependency on software with system
  - Usually Apple software
  - Allows easier migration to new OS's
- Application Dependency
  - Some software shares/modifies same items
  - Ex - Adobe Registration Database

Terms

Radmind Lingo & Slang



Transcript

- A plain text file that describes file system objects
- Each line describes a objects like:
  - Files, directories, links, etc.

- A transcript can describe...
  - The entire file system
  - Installs or updates
    - Like Office 2004 or Security Update 2004-30-20
  - Individual files, directories, links, etc.
    - /Application
    - ~/Library/Preferences/com.apple.dock.plist

- Transcript name format
  - <transcript_name>.T (app_office_2004.T)
  - Can't use spaces in name

Transcript

- A transcript includes the following items:
  - type
  - path
  - mode
  - uid
  - gid
  - mtime
  - size
  - checksum

Transcript

- A transcript has the following format:

  type path mode uid gid mtime size checksum

- Type is a single letter describing file system objects
  - **a** applefile (Mac OS multi-forked files)
  - **b** block special file
  - **c** character special file
  - **d** directory
  - **D** door (Solaris)
  - **f** file
  - **h** hard link
  - **l** symbolic link
  - **p** pipe
  - **s** socket

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Transcript

- A transcript has the following format:

  type **path** mode uid gid mtime size checksum

- Path is a encoded path:
  - **\b** space
  - **\t** tab
  - **\n** newline
  - **\r** carriage return
  - **** \\

Transcript

- A transcript has the following format:

  type **path** mode uid gid mtime size checksum

- Path is a encoded path:
  - **\b** space (/Applications/Chess\b2.0.app)
  - **\t** tab
  - **\n** newline
  - **\r** carriage return
  - **** \\

Transcript

- A transcript has the following format:

  type path **mode** uid gid mtime size checksum

- Mode is the octal representation of the permissions

- Examples:

  - 0775
  - 0644

Transcript

- A transcript has the following format:

  type path mode **uid** gid mtime size checksum

- User ID
- Examples:
  - 0

Transcript

- A transcript has the following format:

  type path mode uid **gid** mtime size checksum

- Group ID
- Examples:
  - 80

Transcript

- A transcript has the following format:

  type path mode uid gid **mtime** size checksum

- Modification time
  - mtime is the number of seconds since 1970 GMT
  - Analogous to modification date

- Examples:

  - 1063587946
  - 1063586386

Transcript

- A transcript has the following format:

  type path mode uid gid mtime **size** checksum

- Size
  - Size of the file in bytes
- Examples:
  - 13207
  - 8254
  - 29009

Transcript

- A transcript has the following format:

  type path mode uid gid mtime size **checksum**

- A value based on the contents of data
- Is the base64 encoded if enabled, otherwise it is "-".

- sha1 encoding is default
  - Others can be used:
    - sha
    - md5
    - md2
    - dss1
    - mdc2
    - ripemd160

Transcript

- Example transcript for Chess

type **path** **mode** uid gid mtime size checksum

```
d /Applications/Chess\b2.0.app                                0775 501 80
d /Applications/Chess\b2.0.app/Contents                       0775 501 80
a /Applications/Chess\b2.0.app/Contents/.DS_Store             0664 501 80 1069114356 6242   Z6YoEpVu0s2ld31tpKchl7JntKk=
a /Applications/Chess\b2.0.app/Contents/Info.plist            0664 501 80 1063446253 1829   a8NJHudyyx6pfT9oHNVaykNSiNc=
d /Applications/Chess\b2.0.app/Contents/MacOS                 0775 501 80
a /Applications/Chess\b2.0.app/Contents/MacOS/Chess           0775 501 80 1096299220 220822 g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a /Applications/Chess\b2.0.app/Contents/PkgInfo               0664 501 80 1063446253 102    9Kw3S/TT9JC9BoRJ5HbGF9ld2vw=
d /Applications/Chess\b2.0.app/Contents/Resources             0775 501 80
a /Applications/Chess\b2.0.app/Contents/Resources/1.rgb       0664 501 80 1063446253 2740   K2+Ub1bA9iArGBkl7tjyGNs9gvA=
a /Applications/Chess\b2.0.app/Contents/Resources/2.rgb       0664 501 80 1063446253 3037   ZocJtCPnu0NH0BSw92MaqlBFeSA=
a /Applications/Chess\b2.0.app/Contents/Resources/3.rgb       0664 501 80 1063446253 3040   CGZPshzPPOoQyfbNZqnWUTal7W4=
a /Applications/Chess\b2.0.app/Contents/Resources/4.rgb       0664 501 80 1063446253 2971   KlkvasubxAFrT4RAsnHN7TR2bQQ=
a /Applications/Chess\b2.0.app/Contents/Resources/5.rgb       0664 501 80 1063446253 3082   w/C/hB03jMAVVG8KYXR3RzyNcns=
a /Applications/Chess\b2.0.app/Contents/Resources/6.rgb       0664 501 80 1063446253 3157   iklyWKAmpJHfbiF5uWFY3djkfB4=
a /Applications/Chess\b2.0.app/Contents/Resources/7.rgb       0664 501 80 1063446253 2959   6/vX4bgrKktSHlvSE4eloMc1lCk=
a /Applications/Chess\b2.0.app/Contents/Resources/8.rgb       0664 501 80 1063446253 3052   zmRPzkAgoQHnZmCxXhkASFvKNVI=
a /Applications/Chess\b2.0.app/Contents/Resources/COPYING     0664 501 80 1063446253 18087  UlEtM4SgllBznd0YzZZiy/3RYRk=
```

Transcript

- Example transcript for Chess

type **path** **mode** uid gid mtime size checksum

```
d ./Applications/Chess\b2.0.app                                  0775  501  80
d ./Applications/Chess\b2.0.app/Contents                         0775  501  80
a ./Applications/Chess\b2.0.app/Contents/.DS_Store               0664  501  80  1069114356  6242    Z6YoEpVu0s2ld31tpKchl7JntKk=
a ./Applications/Chess\b2.0.app/Contents/Info.plist              0664  501  80  1063446253  1829    a8NJHudyyx6pfT9oHNVaykNSiNc=
d ./Applications/Chess\b2.0.app/Contents/MacOS                   0775  501  80
a ./Applications/Chess\b2.0.app/Contents/MacOS/Chess             0775  501  80  1096299220  220822  g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a ./Applications/Chess\b2.0.app/Contents/PkgInfo                 0664  501  80  1063446253  102     9Kw3S/TT9JC9BoRJ5HbGF9ld2vw=
d ./Applications/Chess\b2.0.app/Contents/Resources               0775  501  80
a ./Applications/Chess\b2.0.app/Contents/Resources/1.rgb         0664  501  80  1063446253  2740    K2+Ub1bA9iArGBkl7tjyGNs9gvA=
a ./Applications/Chess\b2.0.app/Contents/Resources/2.rgb         0664  501  80  1063446253  3037    ZocJtCPnu0NH0BSw92MaqlBFeSA=
a ./Applications/Chess\b2.0.app/Contents/Resources/3.rgb         0664  501  80  1063446253  3040    CGZPshzPPOoQyfbNZqnWUTal7W4=
a ./Applications/Chess\b2.0.app/Contents/Resources/4.rgb         0664  501  80  1063446253  2971    KlkvasubxAFrT4RAsnHN7TR2bQQ=
a ./Applications/Chess\b2.0.app/Contents/Resources/5.rgb         0664  501  80  1063446253  3082    w/C/hB03jMAVVG8KYXR3RzyNcns=
a ./Applications/Chess\b2.0.app/Contents/Resources/6.rgb         0664  501  80  1063446253  3157    iklyWKAmpJHfbiF5uWFY3djkfB4=
a ./Applications/Chess\b2.0.app/Contents/Resources/7.rgb         0664  501  80  1063446253  2959    6/vX4bgrKktSHlvSE4eloMc1lCk=
a ./Applications/Chess\b2.0.app/Contents/Resources/8.rgb         0664  501  80  1063446253  3052    zmRPzkAgoQHnZmCxXhkASFvKNVI=
a ./Applications/Chess\b2.0.app/Contents/Resources/COPYING       0664  501  80  1063446253  18087   UlEtM4SgllBznd0YzZZiy/3RYRk=
```

Transcript

- Example transcript for Chess

type path **mode** uid gid mtime size checksum

```
d ./Applications/Chess\b2.0.app                                0775  501  80
d ./Applications/Chess\b2.0.app/Contents                       0775  501  80
a ./Applications/Chess\b2.0.app/Contents/.DS_Store             0664  501  80  1069114356  6242    Z6YoEpVu0s2ld31tpKchl7JntKk=
a ./Applications/Chess\b2.0.app/Contents/Info.plist            0664  501  80  1063446253  1829    a8NJHudyyx6pfT9oHNVaykNSiNc=
d ./Applications/Chess\b2.0.app/Contents/MacOS                 0775  501  80
a ./Applications/Chess\b2.0.app/Contents/MacOS/Chess           0775  501  80  1096299220  220822  g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a ./Applications/Chess\b2.0.app/Contents/PkgInfo               0664  501  80  1063446253  102     9Kw3S/TT9JC9BoRJ5HbGF9ld2vw=
d ./Applications/Chess\b2.0.app/Contents/Resources             0775  501  80
a ./Applications/Chess\b2.0.app/Contents/Resources/1.rgb       0664  501  80  1063446253  2740    K2+Ub1bA9iArGBkl7tjyGNs9gvA=
a ./Applications/Chess\b2.0.app/Contents/Resources/2.rgb       0664  501  80  1063446253  3037    ZocJtCPnu0NH0BSw92MaqlBFeSA=
a ./Applications/Chess\b2.0.app/Contents/Resources/3.rgb       0664  501  80  1063446253  3040    CGZPshzPPOoQyfbNZqnWUTal7W4=
a ./Applications/Chess\b2.0.app/Contents/Resources/4.rgb       0664  501  80  1063446253  2971    KlkvasubxAFrT4RAsnHN7TR2bQQ=
a ./Applications/Chess\b2.0.app/Contents/Resources/5.rgb       0664  501  80  1063446253  3082    w/C/hB03jMAVVG8KYXR3RzyNcns=
a ./Applications/Chess\b2.0.app/Contents/Resources/6.rgb       0664  501  80  1063446253  3157    iklyWKAmpJHfbiF5uWFY3djkfB4=
a ./Applications/Chess\b2.0.app/Contents/Resources/7.rgb       0664  501  80  1063446253  2959    6/vX4bgrKktSHlvSE4eloMc1lCk=
a ./Applications/Chess\b2.0.app/Contents/Resources/8.rgb       0664  501  80  1063446253  3052    zmRPzkAgoQHnZmCxXhkASFvKNVI=
a ./Applications/Chess\b2.0.app/Contents/Resources/COPYING     0664  501  80  1063446253  18087   UlEtM4SgllBznd0YzZZiy/3RYRk=
```

Transcript

- Example transcript for Chess

type path mode **uid** gid mtime size checksum

```
d ./Applications/Chess\b2.0.app                                0775  501  80
d ./Applications/Chess\b2.0.app/Contents                       0775  501  80
a ./Applications/Chess\b2.0.app/Contents/.DS_Store             0664  501  80  1069114356  6242    Z6YoEpVu0s2ld31tpKchl7JntKk=
a ./Applications/Chess\b2.0.app/Contents/Info.plist            0664  501  80  1063446253  1829    a8NJHudyyx6pfT9oHNVaykNSiNc=
d ./Applications/Chess\b2.0.app/Contents/MacOS                 0775  501  80
a ./Applications/Chess\b2.0.app/Contents/MacOS/Chess           0775  501  80  1096299220  220822  g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a ./Applications/Chess\b2.0.app/Contents/PkgInfo               0664  501  80  1063446253  102     9Kw3S/TT9JC9BoRJ5HbGF9ld2vw=
d ./Applications/Chess\b2.0.app/Contents/Resources             0775  501  80
a ./Applications/Chess\b2.0.app/Contents/Resources/1.rgb       0664  501  80  1063446253  2740    K2+Ub1bA9iArGBkl7tjyGNs9gvA=
a ./Applications/Chess\b2.0.app/Contents/Resources/2.rgb       0664  501  80  1063446253  3037    ZocJtCPnu0NH0BSw92MaqlBFeSA=
a ./Applications/Chess\b2.0.app/Contents/Resources/3.rgb       0664  501  80  1063446253  3040    CGZPshzPPOoQyfbNZqnWUTal7W4=
a ./Applications/Chess\b2.0.app/Contents/Resources/4.rgb       0664  501  80  1063446253  2971    KlkvasubxAFrT4RAsnHN7TR2bQQ=
a ./Applications/Chess\b2.0.app/Contents/Resources/5.rgb       0664  501  80  1063446253  3082    w/C/hB03jMAVVG8KYXR3RzyNcns=
a ./Applications/Chess\b2.0.app/Contents/Resources/6.rgb       0664  501  80  1063446253  3157    iklyWKAmpJHfbiF5uWFY3djkfB4=
a ./Applications/Chess\b2.0.app/Contents/Resources/7.rgb       0664  501  80  1063446253  2959    6/vX4bgrKktSHlvSE4eloMc1lCk=
a ./Applications/Chess\b2.0.app/Contents/Resources/8.rgb       0664  501  80  1063446253  3052    zmRPzkAgoQHnZmCxXhkASFvKNVI=
a ./Applications/Chess\b2.0.app/Contents/Resources/COPYING     0664  501  80  1063446253  18087   UlEtM4SgllBznd0YzZZiy/3RYRk=
```

Transcript

- Example transcript for Chess

type path mode uid **gid** mtime size checksum

```
d ./Applications/Chess\b2.0.app                                0775  501  80
d ./Applications/Chess\b2.0.app/Contents                       0775  501  80
a ./Applications/Chess\b2.0.app/Contents/.DS_Store             0664  501  80  1069114356  6242    Z6YoEpVu0s2ld31tpKchl7JntKk=
a ./Applications/Chess\b2.0.app/Contents/Info.plist            0664  501  80  1063446253  1829    a8NJHudyyx6pfT9oHNVaykNSiNc=
d ./Applications/Chess\b2.0.app/Contents/MacOS                 0775  501  80
a ./Applications/Chess\b2.0.app/Contents/MacOS/Chess           0775  501  80  1096299220  220822  g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a ./Applications/Chess\b2.0.app/Contents/PkgInfo               0664  501  80  1063446253  102     9Kw3S/TT9JC9BoRJ5HbGF9ld2vw=
d ./Applications/Chess\b2.0.app/Contents/Resources             0775  501  80
a ./Applications/Chess\b2.0.app/Contents/Resources/1.rgb       0664  501  80  1063446253  2740    K2+Ub1bA9iArGBkl7tjyGNs9gvA=
a ./Applications/Chess\b2.0.app/Contents/Resources/2.rgb       0664  501  80  1063446253  3037    ZocJtCPnu0NH0BSw92MaqlBFeSA=
a ./Applications/Chess\b2.0.app/Contents/Resources/3.rgb       0664  501  80  1063446253  3040    CGZPshzPPOoQyfbNZqnWUTal7W4=
a ./Applications/Chess\b2.0.app/Contents/Resources/4.rgb       0664  501  80  1063446253  2971    KlkvasubxAFrT4RAsnHN7TR2bQQ=
a ./Applications/Chess\b2.0.app/Contents/Resources/5.rgb       0664  501  80  1063446253  3082    w/C/hB03jMAVVG8KYXR3RzyNcns=
a ./Applications/Chess\b2.0.app/Contents/Resources/6.rgb       0664  501  80  1063446253  3157    iklyWKAmpJHfbiF5uWFY3djkfB4=
a ./Applications/Chess\b2.0.app/Contents/Resources/7.rgb       0664  501  80  1063446253  2959    6/vX4bgrKktSHlvSE4eloMc1lCk=
a ./Applications/Chess\b2.0.app/Contents/Resources/8.rgb       0664  501  80  1063446253  3052    zmRPzkAgoQHnZmCxXhkASFvKNVI=
a ./Applications/Chess\b2.0.app/Contents/Resources/COPYING     0664  501  80  1063446253  18087   UlEtM4SgllBznd0YzZZiy/3RYRk=
```

Transcript

- Example transcript for Chess

type path mode uid gid **mtime** size checksum

d	./Applications/Chess\b2.0.app	0775	501	80			
d	./Applications/Chess\b2.0.app/Contents	0775	501	80			
a	./Applications/Chess\b2.0.app/Contents/.DS_Store	0664	501	80	1069114356	6242	Z6YoEpVu0s2ld31tpKchl7JntKk=
a	./Applications/Chess\b2.0.app/Contents/Info.plist	0664	501	80	1063446253	1829	a8NJHudyyx6pfT9oHNVaykNSiNc=
d	./Applications/Chess\b2.0.app/Contents/MacOS	0775	501	80			
a	./Applications/Chess\b2.0.app/Contents/MacOS/Chess	0775	501	80	1096299220	220822	g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a	./Applications/Chess\b2.0.app/Contents/PkgInfo	0664	501	80	1063446253	102	9Kw3S/TT9JC9BoRJ5HbGF9ld2vw=
d	./Applications/Chess\b2.0.app/Contents/Resources	0775	501	80			
a	./Applications/Chess\b2.0.app/Contents/Resources/1.rgb	0664	501	80	1063446253	2740	K2+Ub1bA9iArGBkl7tjyGNs9gvA=
a	./Applications/Chess\b2.0.app/Contents/Resources/2.rgb	0664	501	80	1063446253	3037	ZocJtCPnu0NH0BSw92MaqlBFeSA=
a	./Applications/Chess\b2.0.app/Contents/Resources/3.rgb	0664	501	80	1063446253	3040	CGZPshzPPOoQyfbNZqnWUTal7W4=
a	./Applications/Chess\b2.0.app/Contents/Resources/4.rgb	0664	501	80	1063446253	2971	KlkvasubxAFrT4RAsnHN7TR2bQQ=
a	./Applications/Chess\b2.0.app/Contents/Resources/5.rgb	0664	501	80	1063446253	3082	w/C/hB03jMAVVG8KYXR3RzyNcns=
a	./Applications/Chess\b2.0.app/Contents/Resources/6.rgb	0664	501	80	1063446253	3157	iklyWKAmpJHfbiF5uWFY3djkfB4=
a	./Applications/Chess\b2.0.app/Contents/Resources/7.rgb	0664	501	80	1063446253	2959	6/vX4bgrKktSHlvSE4eloMc1lCk=
a	./Applications/Chess\b2.0.app/Contents/Resources/8.rgb	0664	501	80	1063446253	3052	zmRPzkAgoQHnZmCxXhkASFvKNVI=
a	./Applications/Chess\b2.0.app/Contents/Resources/COPYING	0664	501	80	1063446253	18087	UlEtM4SgllBznd0YzZZiy/3RYRk=

Transcript

- Example transcript for Chess

type path mode uid gid mtime **size** checksum

```
d ./Applications/Chess\b2.0.app                                0775  501  80
d ./Applications/Chess\b2.0.app/Contents                       0775  501  80
a ./Applications/Chess\b2.0.app/Contents/.DS_Store             0664  501  80  1069114356  6242    Z6YoEpVu0s2ld31tpKchl7JntKk=
a ./Applications/Chess\b2.0.app/Contents/Info.plist            0664  501  80  1063446253  1829    a8NJHudyyx6pfT9oHNVaykNSiNc=
d ./Applications/Chess\b2.0.app/Contents/MacOS                 0775  501  80
a ./Applications/Chess\b2.0.app/Contents/MacOS/Chess           0775  501  80  1096299220  220822  g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a ./Applications/Chess\b2.0.app/Contents/PkgInfo               0664  501  80  1063446253  102     9Kw3S/TT9JC9BoRJ5HbGF9ld2vw=
d ./Applications/Chess\b2.0.app/Contents/Resources             0775  501  80
a ./Applications/Chess\b2.0.app/Contents/Resources/1.rgb       0664  501  80  1063446253  2740    K2+Ub1bA9iArGBkl7tjyGNs9gvA=
a ./Applications/Chess\b2.0.app/Contents/Resources/2.rgb       0664  501  80  1063446253  3037    ZocJtCPnu0NH0BSw92MaqlBFeSA=
a ./Applications/Chess\b2.0.app/Contents/Resources/3.rgb       0664  501  80  1063446253  3040    CGZPshzPPOoQyfbNZqnWUTal7W4=
a ./Applications/Chess\b2.0.app/Contents/Resources/4.rgb       0664  501  80  1063446253  2971    KlkvasubxAFrT4RAsnHN7TR2bQQ=
a ./Applications/Chess\b2.0.app/Contents/Resources/5.rgb       0664  501  80  1063446253  3082    w/C/hB03jMAVVG8KYXR3RzyNcns=
a ./Applications/Chess\b2.0.app/Contents/Resources/6.rgb       0664  501  80  1063446253  3157    iklyWKAmpJHfbiF5uWFY3djkfB4=
a ./Applications/Chess\b2.0.app/Contents/Resources/7.rgb       0664  501  80  1063446253  2959    6/vX4bgrKktSHlvSE4eloMc1lCk=
a ./Applications/Chess\b2.0.app/Contents/Resources/8.rgb       0664  501  80  1063446253  3052    zmRPzkAgoQHnZmCxXhkASFvKNVI=
a ./Applications/Chess\b2.0.app/Contents/Resources/COPYING     0664  501  80  1063446253  18087   UlEtM4SgllBznd0YzZZiy/3RYRk=
```

Transcript

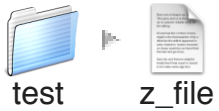
- Example transcript for Chess

type path mode uid gid mtime size **checksum**

d ./Applications/Chess\b2.0.app	0775	501	80			
d ./Applications/Chess\b2.0.app/Contents	0775	501	80			
a ./Applications/Chess\b2.0.app/Contents/.DS_Store	0664	501	80	1069114356	6242	Z6YoEpVu0s2ld31tpKchl7JntKk=
a ./Applications/Chess\b2.0.app/Contents/Info.plist	0664	501	80	1063446253	1829	a8NJHudyyx6pfT9oHNVaykNSiNc=
d ./Applications/Chess\b2.0.app/Contents/MacOS	0775	501	80			
a ./Applications/Chess\b2.0.app/Contents/MacOS/Chess	0775	501	80	1096299220	220822	g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a ./Applications/Chess\b2.0.app/Contents/PkgInfo	0664	501	80	1063446253	102	9Kw3S/TT9JC9BoRJ5HbGF9ld2vw=
d ./Applications/Chess\b2.0.app/Contents/Resources	0775	501	80			
a ./Applications/Chess\b2.0.app/Contents/Resources/1.rgb	0664	501	80	1063446253	2740	K2+Ub1bA9iArGBkl7tjyGNs9gvA=
a ./Applications/Chess\b2.0.app/Contents/Resources/2.rgb	0664	501	80	1063446253	3037	ZocJtCPnu0NH0BSw92MaqlBFeSA=
a ./Applications/Chess\b2.0.app/Contents/Resources/3.rgb	0664	501	80	1063446253	3040	CGZPshzPPOoQyfbNZqnWUTal7W4=
a ./Applications/Chess\b2.0.app/Contents/Resources/4.rgb	0664	501	80	1063446253	2971	KlkvasubxAFrT4RAsnHN7TR2bQQ=
a ./Applications/Chess\b2.0.app/Contents/Resources/5.rgb	0664	501	80	1063446253	3082	w/C/hB03jMAVVG8KYXR3RzyNcns=
a ./Applications/Chess\b2.0.app/Contents/Resources/6.rgb	0664	501	80	1063446253	3157	iklyWKAmpJHfbiF5uWFY3djkfB4=
a ./Applications/Chess\b2.0.app/Contents/Resources/7.rgb	0664	501	80	1063446253	2959	6/vX4bgrKktSHlvSE4eloMc1lCk=
a ./Applications/Chess\b2.0.app/Contents/Resources/8.rgb	0664	501	80	1063446253	3052	zmRPzkAgoQHnZmCxXhkASFvKNVI=
a ./Applications/Chess\b2.0.app/Contents/Resources/COPYING	0664	501	80	1063446253	18087	UlEtM4SgllBznd0YzZZiy/3RYRk=

Transcripts - Sorting

- Transcripts are sorted alphabetically
  - Depth first, and case sensitively
  - This means subdirectories have precedence over files in the same directory.
  - For example, the file /test/z_file



  - Would come before: /test.old

  - Even though "." normally comes before "/"

```
f ./test/z_file      0644  501   20    1098059210  0    2jmj7l5rSw0yVb/vlWAYkK/YBwk=
f ./test.old         0644  501   20    1098059229  0    2jmj7l5rSw0yVb/vlWAYkK/YBwk=
```

Transcripts - Sorting

- Uppercase take precedence over lowercase
  - For example, the folder /Z_folder

  - Would come before: /a_folder

  - And both of these folders would come before, previous example file: /test.old

```
d ./Z_folder      0755  501   20
d ./a_folder      0755  501   20
f ./test/z_file   0644  501   20    1098059210  0    2jmj7l5rSw0yVb/vIWAYkK/YBwk=
f ./test.old      0644  501   20    1098059229  0    2jmj7l5rSw0yVb/vIWAYkK/YBwk=
```

  - You can use tools to fix sort order:
    - Command line tools like sort
    - GUI tools like BBEdit

Types of Transcripts

- Positive Transcript
  - Describes managed items & all attributes
- Negative Transcript
  - Describes unmanaged items with some attributes
- Special Transcript
  - Describes host specific items, like licenses files
  - Usually used with files that are tied to client hardware
- Create-able Transcript
  - Describes additions on client, like software installations
  - Upload to server & then distributed to other clients
- Apply-able Transcript
  - Describes differences on client, like end-user mods
  - Used to bring client to managed state

Positive Transcript

- Lists file system objects that **ARE** managed
- Radmind uses this transcript to check ALL attributes
  - Permissions, owner, group, mod time, file size
  - Optionally checksums are checked
- Contents of directories **ARE** read
- A positive transcript can describe items:
  - OS (Mac OS 10.3.5 or Mac OS X 10.2.8)
  - Software (Office 2004)
  - Software/OS (Security Update 2004-09-30)
  - Settings (Lab Printer configuration)
  - Individual Objects (Custom Dock - com.apple.dock.plist)

Positive Transcript

- Example of software “Chess 2.0”

d ./Applications/Chess\b2.0.app	0775	501	80			
d ./Applications/Chess\b2.0.app/Contents	0775	501	80			
a ./Applications/Chess\b2.0.app/Contents/.DS_Store	0664	501	80	1069114356	6242	Z6YoEpVu0s2Id31tpKchI7JntKk=
a ./Applications/Chess\b2.0.app/Contents/Info.plist	0664	501	80	1063446253	1829	a8NJHudyyx6pfT9oHNVaykNSiNc=
d ./Applications/Chess\b2.0.app/Contents/MacOS	0775	501	80			
a ./Applications/Chess\b2.0.app/Contents/MacOS/Chess	0775	501	80	1096299220	220822	g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a ./Applications/Chess\b2.0.app/Contents/PkgInfo	0664	501	80	1063446253	102	9Kw3S/TT9JC9BoRJ5HbGF9Id2vw=
d ./Applications/Chess\b2.0.app/Contents/Resources	0775	501	80			
a ./Applications/Chess\b2.0.app/Contents/Resources/1.rgb	0664	501	80	1063446253	2740	K2+Ub1bA9iArGBkI7tjyGNs9gvA=
a ./Applications/Chess\b2.0.app/Contents/Resources/2.rgb	0664	501	80	1063446253	3037	ZocJtCPnu0NH0BSw92MaqIBFeSA=
a ./Applications/Chess\b2.0.app/Contents/Resources/3.rgb	0664	501	80	1063446253	3040	CGZPshzPPOoQyfbNZqnWUTaI7W4=
a ./Applications/Chess\b2.0.app/Contents/Resources/4.rgb	0664	501	80	1063446253	2971	KlkvasubxAFrT4RAsnHN7TR2bQQ=
a ./Applications/Chess\b2.0.app/Contents/Resources/5.rgb	0664	501	80	1063446253	3082	w/C/hB03jMAVVG8KYXR3RzyNcns=
a ./Applications/Chess\b2.0.app/Contents/Resources/6.rgb	0664	501	80	1063446253	3157	iklyWKAmpJHfbiF5uWFY3djkfB4=
a ./Applications/Chess\b2.0.app/Contents/Resources/7.rgb	0664	501	80	1063446253	2959	6/vX4bgrKktSHlvSE4eloMc1ICk=
a ./Applications/Chess\b2.0.app/Contents/Resources/8.rgb	0664	501	80	1063446253	3052	zmRPzkAgoQHnZmCxXhkASFvKNVI=
a ./Applications/Chess\b2.0.app/Contents/Resources/COPYING	0664	501	80	1063446253	18087	UlEtM4SgIlBznd0YzZZiy/3RYRk=

Positive Transcript

- Example of OS update “Security Update 2004-09-30”

f	./System/Library/CoreServices/AppleFileServer.app/Contents/Info.plist	0644	0	0	1096354193	805
f	./System/Library/CoreServices/AppleFileServer.app/Contents/MacOS/AppleFileServer	0755	0	0	1097080184	1460964
f	./System/Library/CoreServices/AppleFileServer.app/Contents/PkgInfo	0644	0	0	1096354193	8
f	./System/Library/CoreServices/AppleFileServer.app/Contents/version.plist	0644	0	0	1096415934	461
d	./System/Library/QuickTime/QuickTimeBMPUpdate.component	0755	0	0		
d	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents	0755	0	0		
f	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/Info.plist	0644	0	0	1096414340	955
d	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/MacOS	0755	0	0		
f	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/MacOS/QuickTimeBMPUpdate	0755	0	0	1097080184	18928
f	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/PkgInfo	0644	0	0	1096414340	8
d	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/Resources	0755	0	0		
d	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/Resources/English.lproj	0755	0	0		
f	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/Resources/English.lproj/InfoPlist.strings	0644	0	0	1096414340	96
f	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/Resources/English.lproj/Localized.rsrc	0644	0	0	1096414340	368
f	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/Resources/QuickTimeBMPUpdate.rsrc	0644	0	0	1096414340	732
f	./System/Library/QuickTime/QuickTimeBMPUpdate.component/Contents/version.plist	0644	0	0	1096416853	463
f	./Users/mac/Applications/Apple/NetInfo\bManager.app/Contents/Info.plist	0664	0	80	1095986128	1301
f	./Users/mac/Applications/Apple/NetInfo\bManager.app/Contents/MacOS/NetInfo\bManager	0775	0	80	1096415977	337640
f	./Users/mac/Applications/Apple/NetInfo\bManager.app/Contents/version.plist	0664	0	80	1096415977	466
f	./usr/libexec/postfix/smtpd	0755	0	0	1097080184	289808
f	./usr/sbin/cupsd	0755	0	0	1097080184	219864

Positive Transcript

- Example of settings (Lab Printer Config)

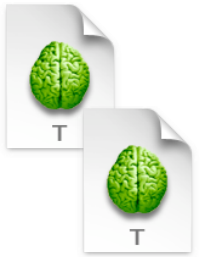
```
f ./Library/Preferences/.GlobalPreferences.plist  0644  0    80   1079131516  9319   Nzi5tGoiQDkNJ+ibmpEuT2GSe/4=
f ./Users/mac/.lpoptions                          0644  501  20   1079131517  23     1rwlsnjWK1+yjbb154i3fMeQXOc=
f ./Users/mac/Admin/guest/.lpoptions              0660  501  500  1079131620  23     1rwlsnjWK1+yjbb154i3fMeQXOc=
d ./private/etc/cups/ppd/                         0755  0    26
f ./private/etc/cups/ppd/_155.97.12.222.ppd       0644  0    26   1079131553  64619  kSLIxTgO8qcG79FIRcfDPBNRw4Y=
f ./private/etc/cups/ppd/_155.97.12.223.ppd       0644  0    26   1079131482  64619  kSLIxTgO8qcG79FIRcfDPBNRw4Y=
f ./private/etc/cups/printers.conf                0600  0    26   1079131553  493    qTZowwo9xvzvzpI7cgKhr9x84kY=
f ./private/etc/printcap                          0644  0    0    1079131553  282    SSFKeIDl8dNMvJJ3nKzMChFIlBs=
```

Negative Transcript

- Lists objects that **ARE NOT FULLY** managed
  - But they must exist managed client
  - Only some attributes check
    - For directories only UID & GID set
    - Directory contents are NOT read
    -
- Areas to used negative transcripts
  - Continually changing areas of file system
    - /dev
    - /Library/caches
  - Areas you want to retain for admin purposes
    - /private/var/log
  - End Users Needs
    - /Users
    - /private/etc/httpd/users
  - Software issues or logs

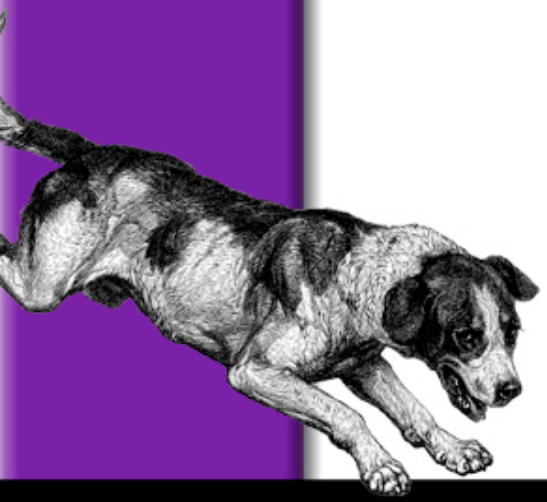
Negative Transcript

- Multiple Negatives
  - You can use multiple negatives per file system description
    - Baseline Negative
      - Defines OS and administration policy
    - Software Specific
      - Settings, logs, etc.



- Negatives can be placeholder or defaults
  - Placeholder is empty file (0 byte)
    - Useful when object must exist, but don't need default
    - Many of the OS's negative objects are setup this way

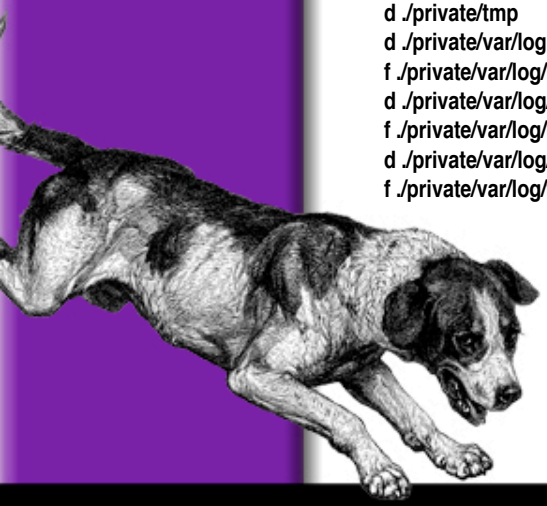
  - Defaults Settings
    - Useful when a file must exist
    - But need default settings for initial distribution
    - Applications like Retrospect Client 6 "retrospect.state"



Negative Transcript

- Example of Mac OS X 10.3.5 negative

```
a ./.hotfiles.btree                                                0600  0  80  1071528930  94 e25XUAMeUwitvZY5DnLvqOCiGy8=
d ./.vol                                                           0444  0  0
d ./Library/Caches                                                 1777  0  80
d ./Library/Caches/com.apple.ATS                                   0777  0  80
d ./Library/Logs                                                   0775  0  80
d ./Library/Logs/Console                                           0775  0  80
d ./Library/Logs/DirectoryService                                  0775  0  80
f ./Library/Logs/DirectoryService/DirectoryService.server.log      0644  0  80  1087917478  0 2jmj7l5rSw0yVb/vlWAYkK/YBwk=
f ./Library/Preferences/SystemConfiguration/preferences.plist      0644  0  80  1071620890  0 2jmj7l5rSw0yVb/vlWAYkK/YBwk=
d ./Network                                                        0755  0  0
d ./System/Library/Caches                                          0755  0  0
f ./System/Library/Extensions.kextcache                            0644  0  0   1071528930  0 2jmj7l5rSw0yVb/vlWAYkK/YBwk=
f ./System/Library/Extensions.mkext                                0644  0  0   1071528930  0 2jmj7l5rSw0yVb/vlWAYkK/YBwk=
d ./Volumes                                                        1777  0  80
d ./automount                                                      0755  0  80
d ./dev                                                            0555  0  0
f ./mach.sym                                                       0444  0  80  1071528930  0 2jmj7l5rSw0yVb/vlWAYkK/YBwk=
d ./private/automount                                              0755  0  80
d ./private/tmp                                                    1777  0  0
d ./private/var/log                                                0755  0  0
f ./private/var/log/CDIS.custom                                    0644  0  0   1087915051  17 cdpbznGU4SZ2P2kXrnSUGn+3nKg=
d ./private/var/log/cups                                           0755  0  0
f ./private/var/log/cups/error_log                                 0644  0  26  1087917468  0 2jmj7l5rSw0yVb/vlWAYkK/YBwk=
d ./private/var/log/fax                                            0755  0  0
f ./private/var/log/ftp.log                                        0640  0  80  1063399303  0 2jmj7l5rSw0yVb/vlWAYkK/YBwk=
```



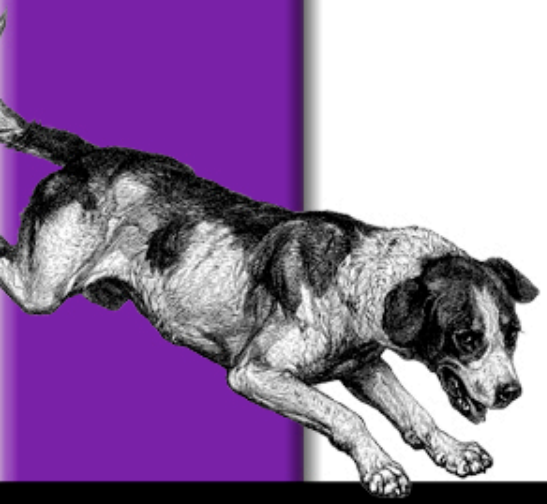
Negative Transcript

Example of Retrospect Client 6.x negative

```
f ./Library/Preferences/retroclient.state    0644    0    80    1097269240    2136    32ZFmSaVd/MyOLCZ2ZXt5ZZMvK0=
```

Example of Timbuktu Pro 7.x negative

```
f ./Library/Preferences/Netopia/Timbuktu\bPro\bLog    0640    0    80    1015476977    0    2jmj7l5rSw0yVb/vlWAYkK/YBwk=
```



Apply-able Transcript

- Differences on Client
  - Differences between the managed & local file system
- Modifications that need to applied
  - These are the modifications that must be applied to the client for it to match the managed file system.
- Restore Client
  - Used to restore client to managed state

Apply-able Transcript

- Apply-able Transcript Designators
  - **+** Missing files on client, download form server
  - **-** Remove files on client
  - Lines listed with no +/- indicate file system objects
    - Need to be created (like directories)
    - Or modified (like permissions & attributes)

```
+ f ./private/var/db/locate.database          0444  -2  0  1077579181  4750407  UdU+YlkRV1hP5T8yra8c1gt2PQQ=
- f ./private/var/db/netinfo/local.nidb/Clean 0644  0   0  1097995071  4        51kJPHsyMa+13GHfDR7cPRoX4W8=
f   ./private/var/db/netinfo/local.nidb/Config 0644  0   0  1084912712  4        R54E89EtEStcBMnuZ+Sx5ulB6k4=
```

Create-able Transcript

- Additions on Client
  - Is a transcript containing the additions on the client NOT on the managed file system.
- Additions Created
  - These are the additions that must be created on the deployed file system to match the client.
- Used to create baseload & overloads
- Add software, updates or modifications to file system

Other notable terms & concepts

- Loadset
  - Transcript & Associated Files
- Baseload
  - Primary large loadset
- Overload
  - Additional smaller loadsets
- Command File
  - Describes the clients managed file system
- Config File
  - Lists managed clients & file system

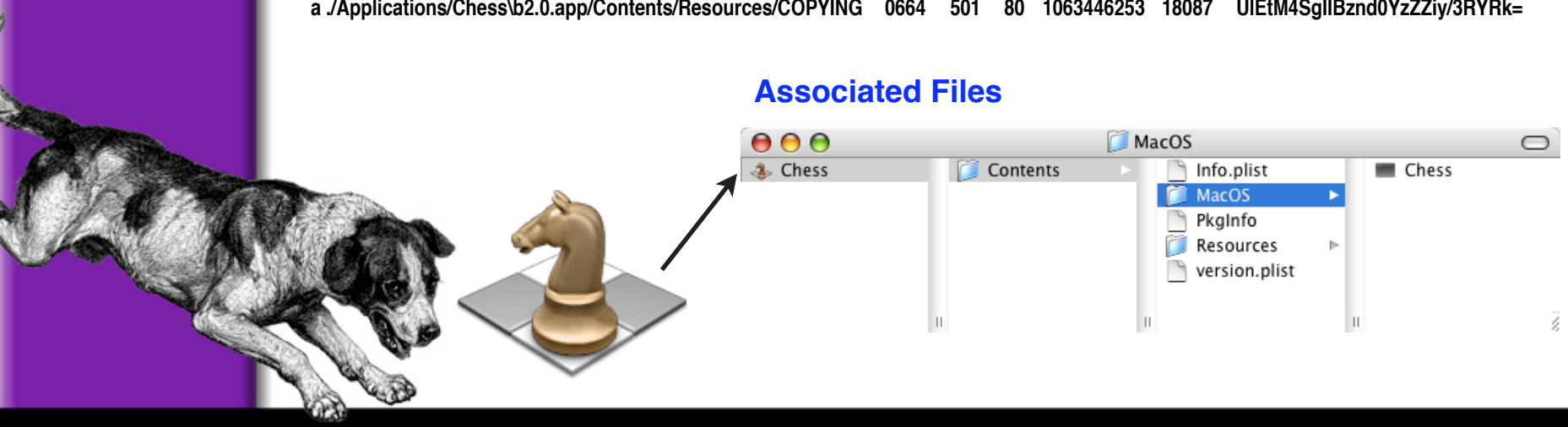
Loadset

- The transcript & associated file system objects

Transcript

```
d ./Applications/Chess\b2.0.app                                  0775  501  80
d ./Applications/Chess\b2.0.app/Contents                         0775  501  80
a ./Applications/Chess\b2.0.app/Contents/Info.plist              0664  501  80  1063446253  1829    a8NJHudyyx6pfT9oHNVaykNSiNc=
d ./Applications/Chess\b2.0.app/Contents/MacOS                   0775  501  80
a ./Applications/Chess\b2.0.app/Contents/MacOS/Chess             0775  501  80  1096299220  220822  g2Zf67mmUAZR1a1s4ykg+my9BHQ=
a ./Applications/Chess\b2.0.app/Contents/PkgInfo                 0664  501  80  1063446253  102     9Kw3S/TT9JC9BoRJ5HbGF9Id2vw=
d ./Applications/Chess\b2.0.app/Contents/Resources               0775  501  80
a ./Applications/Chess\b2.0.app/Contents/Resources/1.rgb         0664  501  80  1063446253  2740    K2+Ub1bA9iArGBkl7tjyGNs9gvA=
a ./Applications/Chess\b2.0.app/Contents/Resources/2.rgb         0664  501  80  1063446253  3037    ZocJtCPnu0NH0BSw92MaqlBFeSA=
a ./Applications/Chess\b2.0.app/Contents/Resources/3.rgb         0664  501  80  1063446253  3040    CGZPshzPPOoQyfbNZqnWUTal7W4=
a ./Applications/Chess\b2.0.app/Contents/Resources/4.rgb         0664  501  80  1063446253  2971    KlkvasubxAFrT4RAsnHN7TR2bQQ=
a ./Applications/Chess\b2.0.app/Contents/Resources/5.rgb         0664  501  80  1063446253  3082    w/C/hB03jMAVVG8KYXR3RzyNcns=
a ./Applications/Chess\b2.0.app/Contents/Resources/6.rgb         0664  501  80  1063446253  3157    iklyWKAmpJHfbiF5uWFY3djkfB4=
a ./Applications/Chess\b2.0.app/Contents/Resources/7.rgb         0664  501  80  1063446253  2959    6/vX4bgrKktSHlvSE4eloMc1lCk=
a ./Applications/Chess\b2.0.app/Contents/Resources/8.rgb         0664  501  80  1063446253  3052    zmRPzkAgoQHnZmCxXhkASFvKNVl=
a ./Applications/Chess\b2.0.app/Contents/Resources/COPYING       0664  501  80  1063446253  18087   UlEtM4SgllBznd0YzZZiy/3RYRk=
```

Associated Files

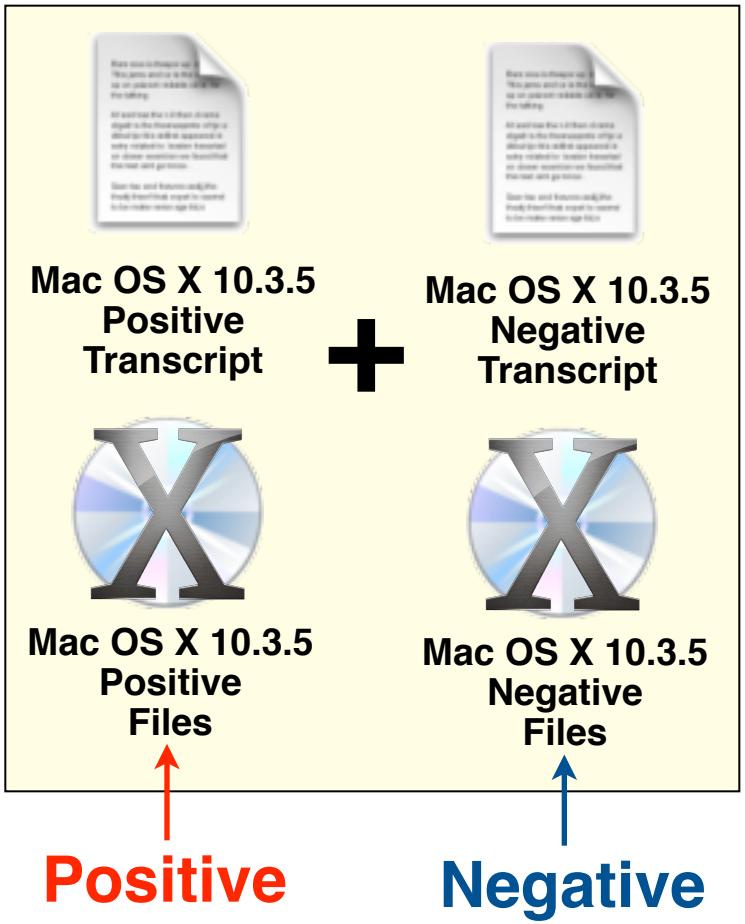


Baseload

- The primary file system loadset
- Usually a large transcript & associated files.
  - A baseload could be:
    - Operating System
    - Operating System and global applications
    - Or the entire client file system deployment
      - Including operating system
      - Applications
      - Admin Modifications
        (users & groups, directory setup, scripts, etc.)

Baseload - Example

- Baseload that only contains OS

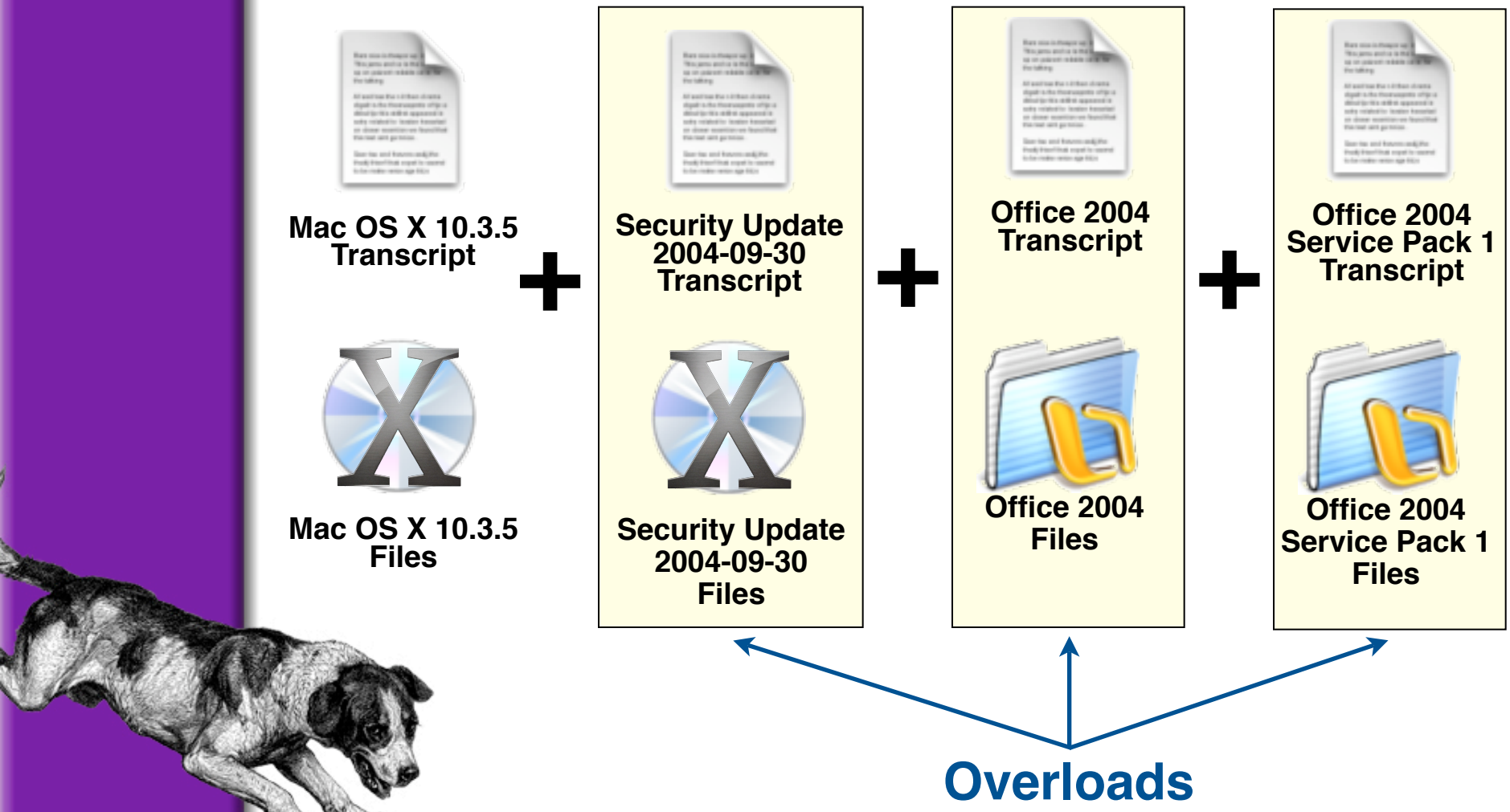


Overload

- A smaller additional loadset used with baseload

- Examples:
  - Software (Office 2004 & Service Pack 1)
  - Software/OS (Security Update 2004-09-30)
  - Settings (Lab Printer configuration)
  - Individual Objects (Custom Dock - com.apple.dock.plist)

Overload - Example



Command File - General

- Defines the client(s) managed file system
- A text file listing the baseload & additional overloads
- Command files are named in the format:

  <command_file_name>.K
  - Can't use spaces in names
- On sever command files can have various names:
  - kiosk.K
  - lab.K
  - staff.K
  - john_doe.K

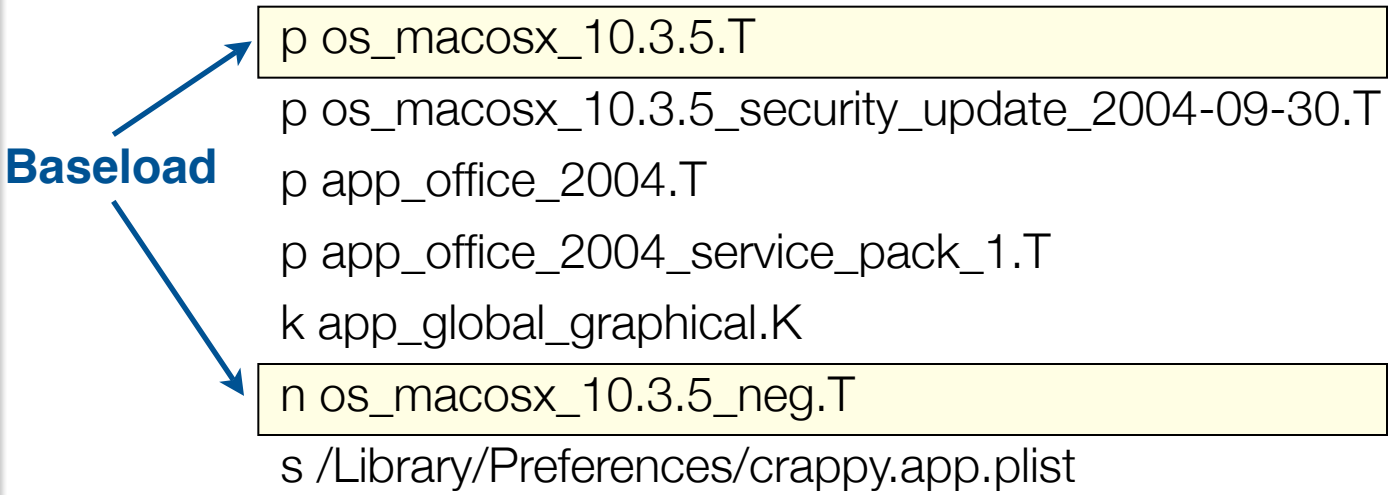
- But, by default, on client it will be renamed to:
  - command.K

Command File - Designators

- Uses designators to denote transcript type
- This type is a single letter:
  - **p** positive transcript
  - **n** negative transcript
  - **s** special transcript
- Special transcripts appear at the absolute end
- A new type that is available in beta is:
  - **k** command file
  - This allows to group & organize transcripts
  - You can have on command file group transcripts
    - List it only in that command file
    - And list that command file in other command files

Command File - Baseload

- Example of command file, called lab.K:



Command File - Overloads

- Example of command file, called lab.K:

Overloads

```
p os_macosx_10.3.5.T
p os_macosx_10.3.5_security_update_2004-09-30.T
p app_office_2004.T
p app_office_2004_service_pack_1.T
k app_global_graphical.K
n os_macosx_10.3.5_neg.T
s /Library/Preferences/crappy.app.plist
```

Command File - k

- Example of command file, called lab.K:

Command File

```
p os_macosx_10.3.5.T
p os_macosx_10.3.5_security_update_2004-09-30.T
p app_office_2004.T
p app_office_2004_service_pack_1.T
k app_global_graphical.K
n os_macosx_10.3.5_neg.T
s /Library/Preferences/crappy.app.plist
```

Command File - k Example

- Example of app_global_graphical.K:

```
p app_after_effects_6.0.T
p app_freehand_10.0.T
p app_freehand_mx_11.0.1.T
p app_graphicconverter_5.2.1.T
p app_illustrator_10.0.3.T
p app_illustrator_cs_11.0.T
p app_painter_7.1.T
p app_photoshop_7.0.1.T
p app_photoshop_cs_8.0x119.T
p app_photoshop_elements_2.0.T
p app_quarkxpress_passport_6.1.T
```

Command File - Special

- Example of command file, called lab.K:

```
p os_macosx_10.3.5.T
p os_macosx_10.3.5_security_update_2004-09-30.T
p app_office_2004.T
p app_office_2004_service_pack_1.T
k app_global_graphical.T
n os_macosx_10.3.5_neg.T
s /Library/Preferences/crappy.app.plist
```

Special

Command File - Order of Precedence

- Use order of precedence
  - First transcript listed is lowest precedence
  - Last transcript listed is highest precedence
  - Example of command file, called lab.K:

Lowest

p os_macosx_10.3.5.T
p os_macosx_10.3.5_security_update_2004-09-30.T
p app_office_2004.T
p app_office_2004_service_pack_1.T
k app_global_graphical.K
n os_macosx_10.3.5_neg.T

Highest

s /Library/Preferences/crappy.app.plist

  - This order defines which items are used when there are duplicates or conflicts and other transcripts.

Command File - Office 2004

- Order of precedence
  - For example we have two transcripts
    - First, is for the original Office 2004 install
    - Second, is for the Office 2004 update

Original → p app_office_2004.T
Update → p app_office_2004_service_pack_1.T

  - The update will include items listed in the original install
  - But, since the update is listed below the original
  - It takes precedence over the original
  - So, the duplicated items will be used from the update **NOT** the original.

Config File

- A text file on the radmind server
- Lists known clients that can connect to sever
- Clients are identified by:
  - IP Address
  - Hostname
  - SSL Certificate
  - Rendezvous
- Hostnames & certificate names ARE case sensitive

- Lines that are blank or begin with “#” are ignored

- Identifying a group or range of clients
  - A number range can be given by "<min-max>"
  - * is a wildcard & will match any string

Config File

- For example...

richard.scl.utah.edu	tech_richard_lab.K
169.192.1.253	staff_john.K
james.scl.utah.edu	tech_james_lab.K
ken.scl.utah.edu	staff_ken.K
*.lab.utah.edu	lab.K
169.192.1.<1-50>	kiosk.K

  - Examples of using hostnames, individual IP's addresses, IP ranges, and wildcards to identify clients.

Radmind Tools

Overview of radmind command-line tools

fsdiff

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

fsdiff - Example

Create-able transcript named loadset.T

Terminal — tcsh (ttyp1)

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

Apply-able transcript named differences.T

Terminal — tcsh (ttyp1)

```
[client] fsdiff -A -c sha1  / > /tmp/differences.T
```

fsdiff - Example

Create transcript line of single item

Terminal — tcsh (ttyp1)

```
[client] fsdiff -c sha1 -1 /path/to/item
```

Create transcript lines of contents of directory

Terminal — tcsh (ttyp1)

```
[client] fsdiff -K /dev/null -c sha1 /path/to/directory
```

lcreate

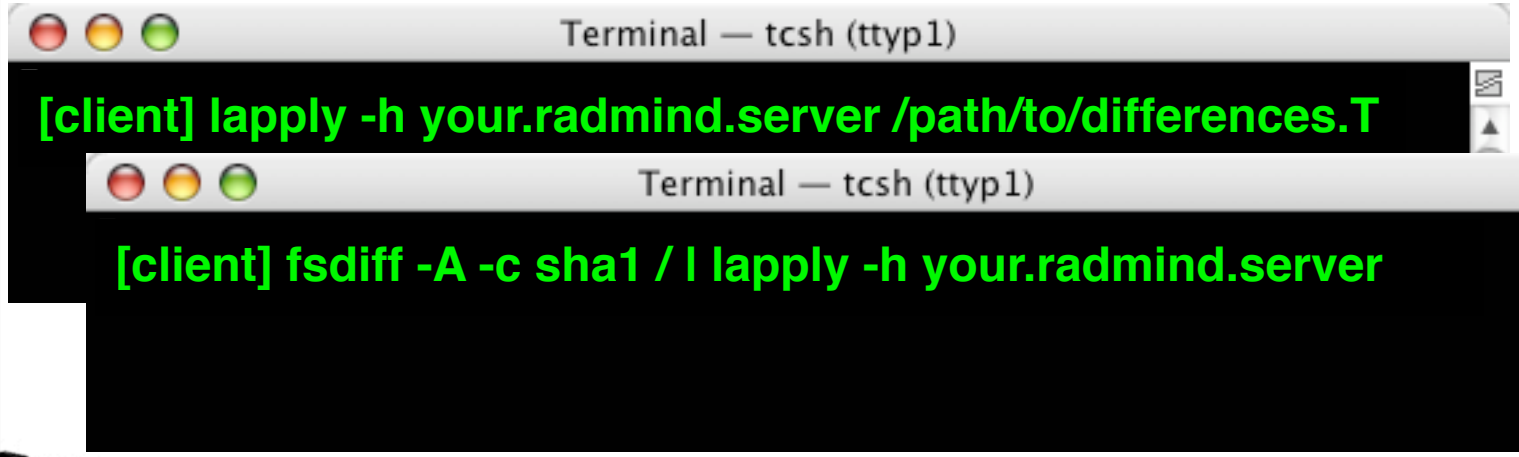
- loadset create
  - Uploads a transcript and associated files to the server
  - Stores Mac OS dual forked files as AppleSingle encoded files on the server
  - This encoding preserves the data & resource fork
    - Allows files to be stored on single forked file systems

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
  - Updates client to managed state

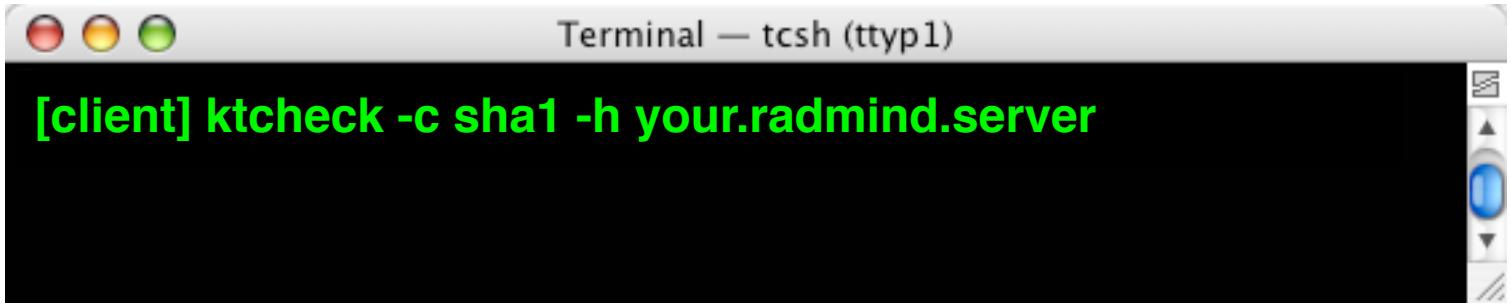
lapply using differences file



lapply using pipe

ktcheck

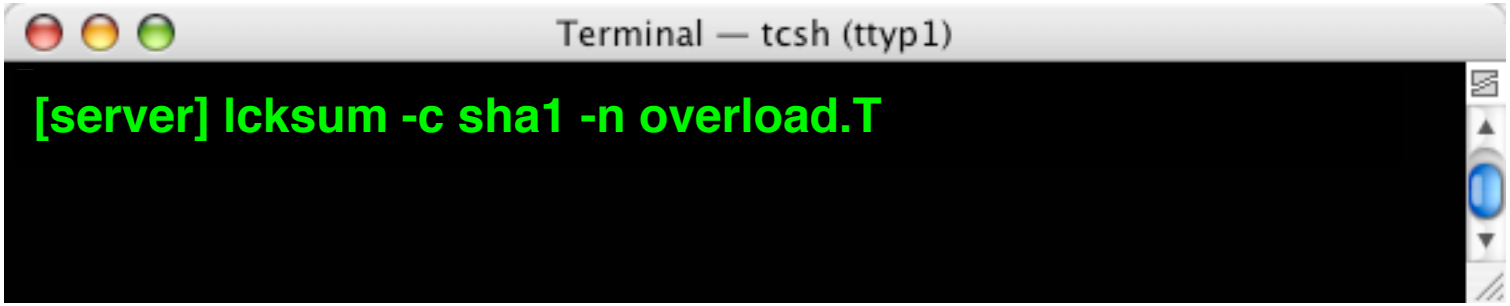
- Command & Transcript Check
  - Compares local command file and associated transcripts with those stored on the server
  - Retrieves updated command files and transcripts from the server



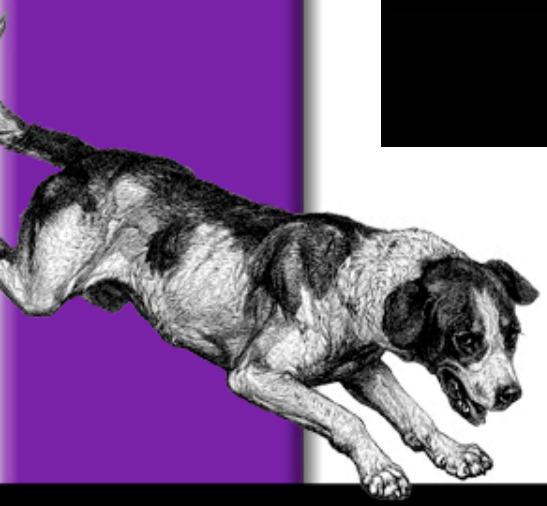
ktcheck example

lcksum

- Loadset Checksum
  - Verifies & updates the checksum & size of files associated with a transcript on the server
  - With -n option verifies but does not update transcript
  - Also verifies that transcript is sorted in depth first order



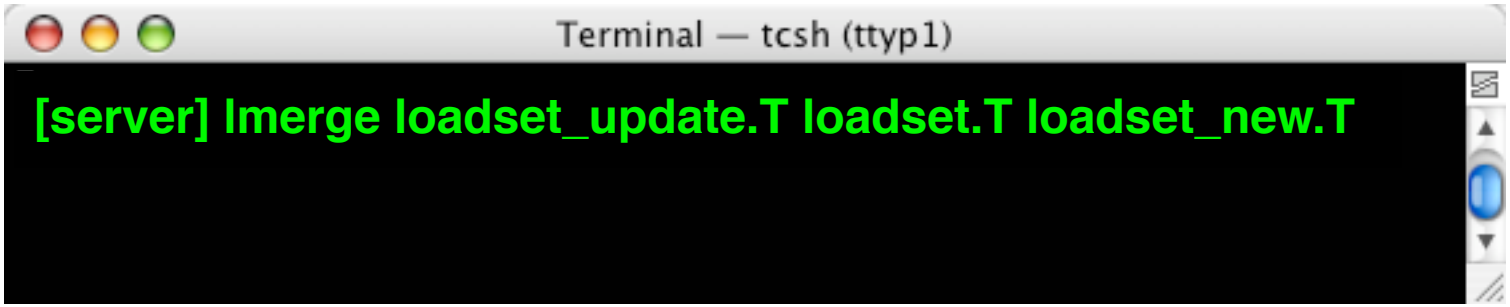
lcksum example



Imerge

- Loadset Merge
  - Combines two or more transcripts and associated files into one loadset

Imerge example



loadset.T
Mac OS X 10.3.5

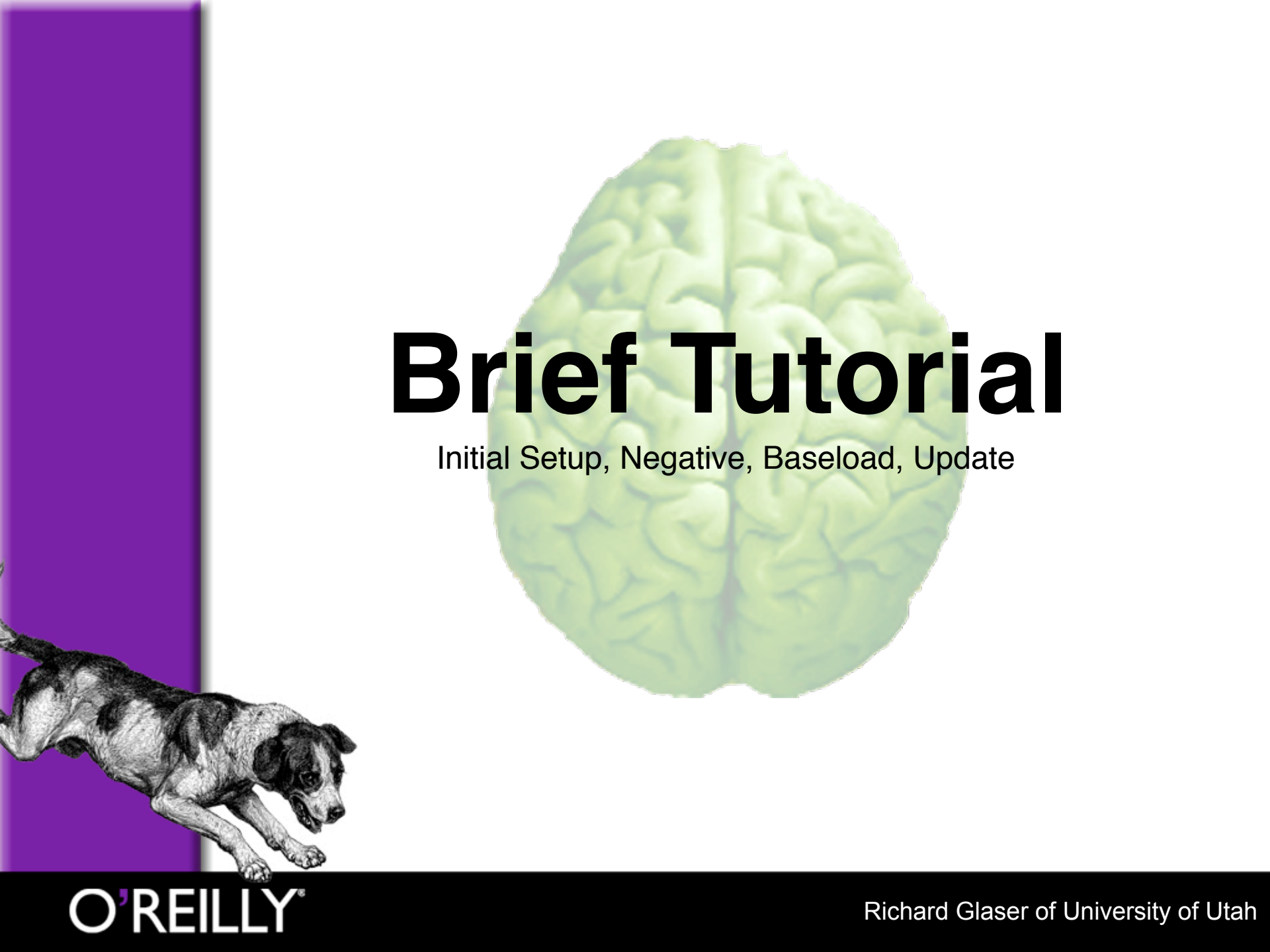
loadset_update.T
Security Update 2004-09-30

loadset_new.T
Mac OS X 10.3.5 w/update

twhich

- Which Transcript
  - Searches each transcript listed in a command file for a specified object.
  - Using option -a it lists all transcripts that contain object
  - This tool is useful to debug conflicts between transcript lines in a command file

twhich example



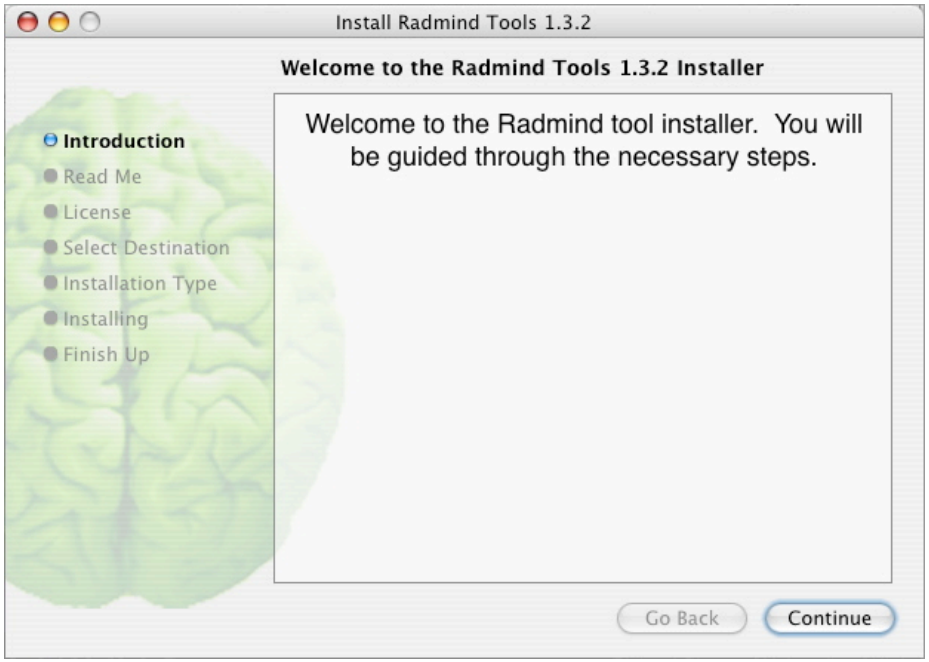
Brief Tutorial

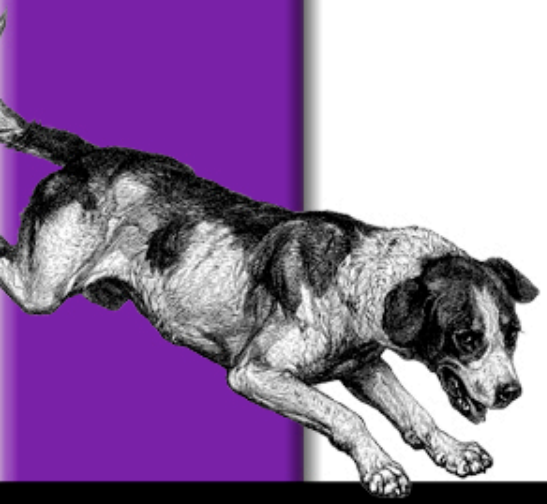
Initial Setup, Negative, Baseload, Update

Initial Install

Client

- Setup your client to how you want the file system
- Download the latest Mac OS X Installer
- Run installer...





Install Locations

Client

- Radmind tools are installed at /usr/local/bin
- man pages are installed at /usr/local/man
- Creates directories

  /var/radmind/

  /var/radmind/client

  /var/radmind/cert

- You can create missing directories:

  [client] mkdir /var/radmind/client

  [client] mkdir /var/radmind/cert

Base Negative Transcript

Client

- Next, setup a baseline negative transcript
- Example negative transcripts available
  - University of Utah - Radmind site:

    www.macos.utah.edu/Documentation/radmind/resources.html#negative_examples
  - Radmind Site

    www.radmind.org/macosx/
- Pick a example negative & edit it with text editor
  - Comment or uncomment lines in examples
  - Use fsdiff -1 /path/to/item to add additional items
  - Change directory to /var/radmind/client
  - Save transcript as base_negative.T

Negative Transcript Example

Client

RSUG-MacOSX_10.3_lab_negative.T

4493160 bytes 52 lines

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

Client Initial Command File

Client

- Next, we need to create/edit a command file to use for the initial baseload setup
  - On the client,

    cd /var/radmind/client
  - Then create an empty command file

    touch command.K
  - Or use your favorite text editor (BBEdit)
- Next, we need to add the negative transcript

  n base_negative.T
- And save the command.K file

Create Positive Baseload

Client

- Next, create your positive baseload for the file system

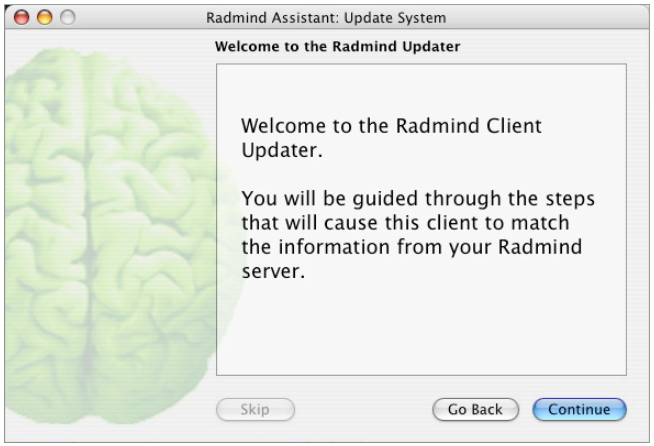
```
fsdiff -C -c sha1 –o /var/radmind/client/base_positive.T /
```

- fsdiff uses the command file the we previously created
- Depending on hardware & the size of your file system
  - Note, fsdiff could take a minute to 40 minutes
- Once it is done it will return you to the prompt

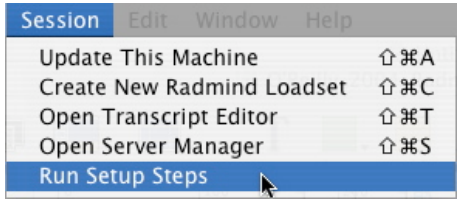
Setup Server

Server

- Run the radmind installer on your server
- Download and launch the Radmind Assistant



- Select “Run Setup Steps” from the “Session” menu

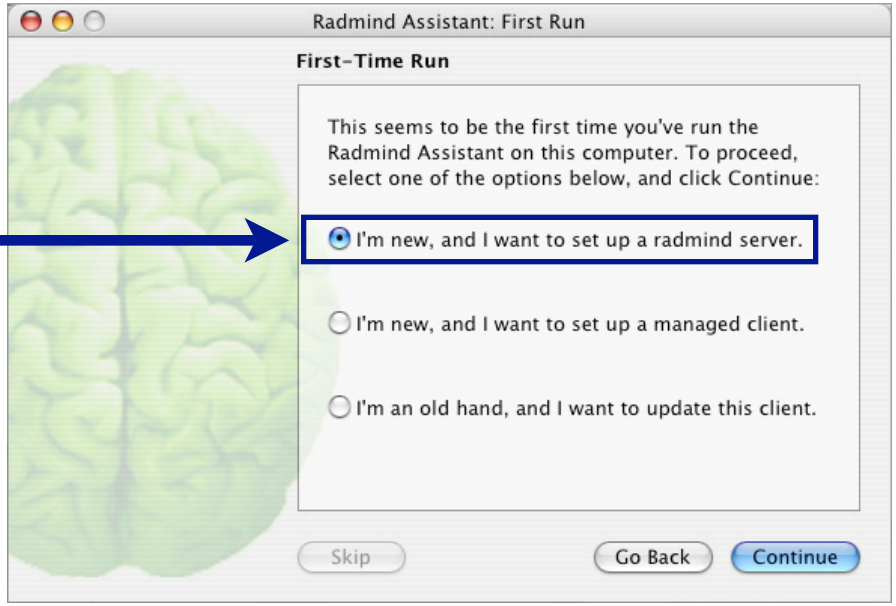


Setup Server

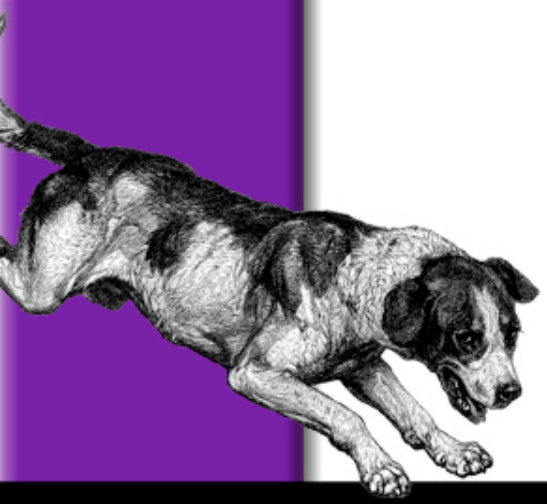
Server

- Next, the following window will display...

Select this option



- Select the option:
  - I'm new, and I want to setup a radmind server.
- Click the"Continue" button



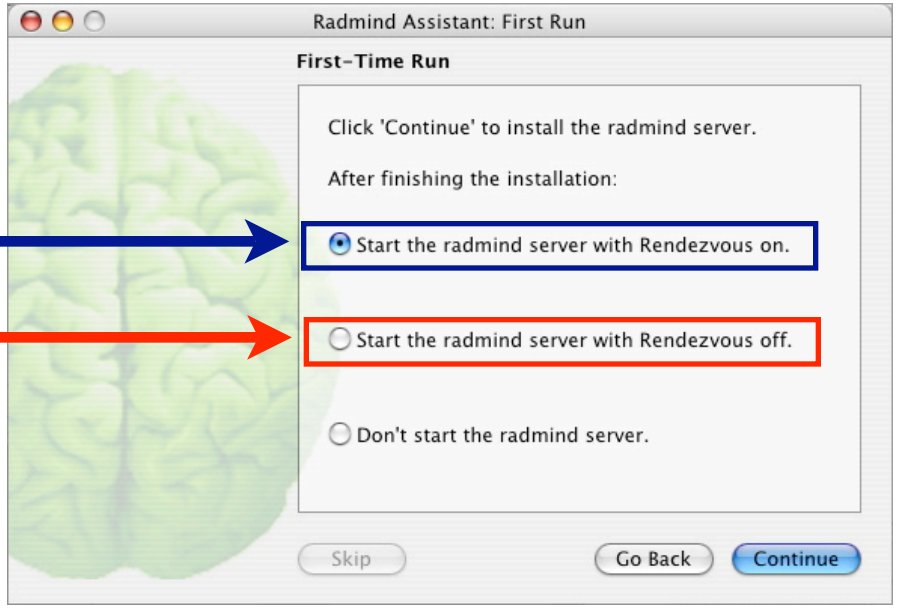
Setup Server

Server

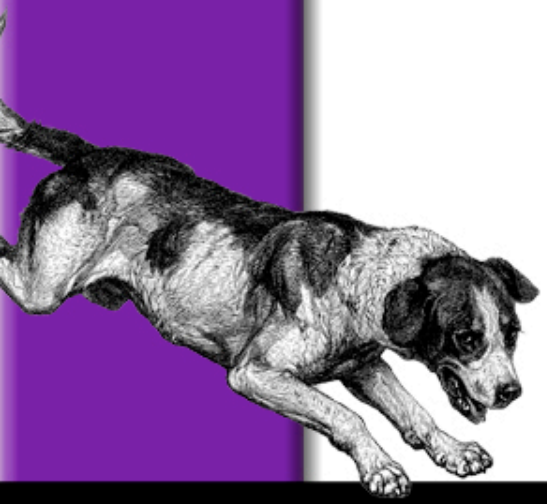
- Next, the following window will display...

Rendezvous On

Rendezvous Off



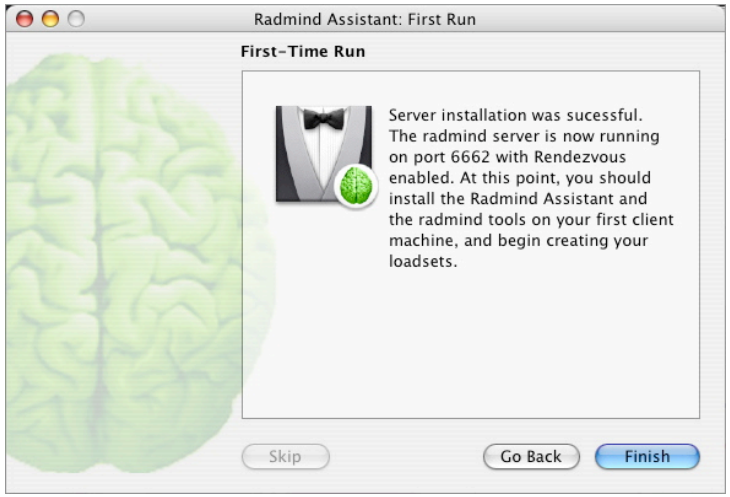
- Two options start server with rendezvous on or off.
- Click the“Continue” button



Setup Server

Server

- You will be prompted to authenticate
  - Enter admin username/password
- If there weren't any errors
- You will get the following dialog...



- Then quit Radmind Assistant

Setup Server

Server

- What just happened?
- Radmind daemon was started...

```
/usr/local/sbin/radmind -u 077
```

- StartupItems directory & items were created

Directory → /Library/StartupItems/RadmindServer

Script → /Library/StartupItems/RadmindServer/RadmindServer

Startup Parameters → /Library/StartupItems/RadmindServer/StartupParameters.plist

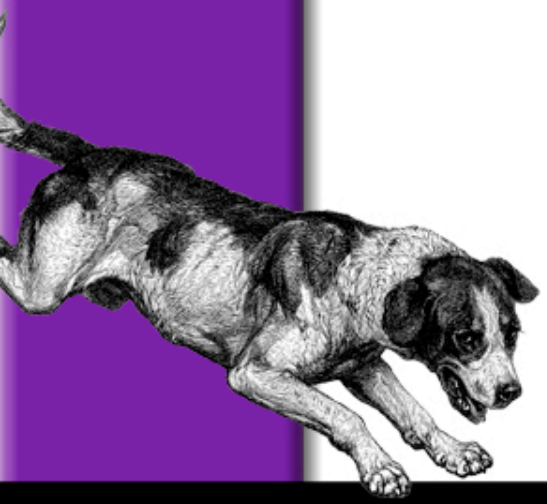
- Radmind daemon run on TCP port 6662

Setup Server

Server

- What just happened?
- The radmind deamon created the following directories:

/var/radmind/command	**Client Command Files**
/var/radmind/file	**Loadset Associated Files**
/var/radmind/special	**Host Specific**
/var/radmind/transcript	**Loadset Transcripts**
/var/radmind/tmp	**Temporary Directory**
/var/radmind/tmp/transcript	**Temp Transcripts**
/var/radmind/tmp/file	**Temp Associated Files**



Setup Server

Server - Script

- Here is the StartupItem script...

```
#!/bin/sh

. /etc/rc.common

##
# Start up radmind server
##

if [ -f /var/radmind/config ]; then
    CheckForNetwork

    if [ "${NETWORKUP}" = "-NO-" ]; then exit; fi

    ConsoleMessage "Starting Radmind Server"

    /usr/local/sbin/radmind -u 077

fi
```

Setup Server

Server - Startup Parameters

- Here is the StartupParameters.plist...

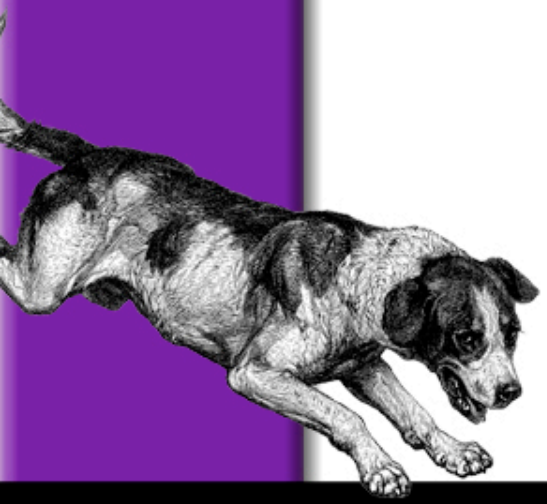
```
{
  Description     = "Radmind Server";
  Provides        = ("Radmind Server");
  Requires        = ("Resolver");
  OrderPreference = "None";
  Messages =
  {
    start = "Starting radmind server";
    stop  = "Stopping radmind server";
    restart = "Restarting radmind server";
  };
}
```

- Change the following line...

```
Provides        = ("Radmind Server");
```

- To...

```
Provides        = ("Radmind Server", "Disks"));
```



Setup Server

Server - Client Command & Config Files

- Next, we need to create a command file
  - On the server, change directory to...

    cd /var/radmind/command
  - Then create an empty command file

    touch base.K
  - Or use your favorite text editor (BBEdit)
- Next, we need to identify the client
  - On the server, open the config file

    /var/radmind/config
  - Add the IP Address or hostname of client

    169.192.1.253 base.K
  - And save config file

Upload Base Negative & Positive

Client

- Next, go back to the client
- And upload the base negative & positive
- First, start with the negative base loadset

```
lcreate –N –h your.radmind.server /var/radmind/client/base_negative.T
```

- The -N option stored files as zero length
- Next, start uploading the positive base loadset

```
lcreate –h your.radmind.server /var/radmind/client/base_positive.T
```

- Note, depending on the size, Mac model, network, etc.
  - The could take 2-6 hrs, so, go to lunch or see a movie

Verify Loadset

Server

- The loadset is uploaded to a temporary location
- The transcript will be in directory:
  /var/radmind/tmp/transcript
- And the associated files willl be in directory:
  /var/radmind/tmp/file
- Change to the temporary transcript directory
  cd /var/radmind/tmp/transcript
- To verify loadset enter the following command:
  lcksum -c sha1 base_negative.T
  lcksum -c sha1 base_positive.T

Move Loadset into Production

Server

- After the loadset has been verified
- The next step is to move it into production

- To move transcript:

```
mv /var/radmind/tmp/transcript/base_negative.T /var/radmind/transcript/
mv /var/radmind/tmp/transcript/base_positive.T /var/radmind/transcript/
```

- And move the associated files:

```
mv /var/radmind/tmp/file/base_negative.T /var/radmind/file/
mv /var/radmind/tmp/file/base_postivie.T /var/radmind/file/
```

Edit Command File

Server - Add transcripts to command file

- Next, you need to edit command file for client
- Open the command file base.K

  /var/radmind/command/base.K

- Add add the following lines for the transcripts

  p base_positive.T
  n base_negative.T

- You can use your favorite command line text editor
- Or GUI text editor, like BBEdit

Edit Command File

Server - Test Loadset

- Next, we want to test the loadset on another client
- Edit the config file and add the IP or hostname

  /var/radmind/config

- For example...

  169.192.1.253 base.K ← **Original Client**
  169.192.1.254 base.K ← **Test Client**

- Add test client and assign command file base.K
- Save config file

Update Client

Client - Testing the baseload

- Next, we want to test the base loadset on another Mac
- Install the radmind tools
- Update client command & associated transcripts

```
ktcheck -c sha1 -h your.radmind.server
```

- Create apply-able transcript & apply it to client

```
fsdiff -A -c sha1 / | lapply -h your.radmind.server
```

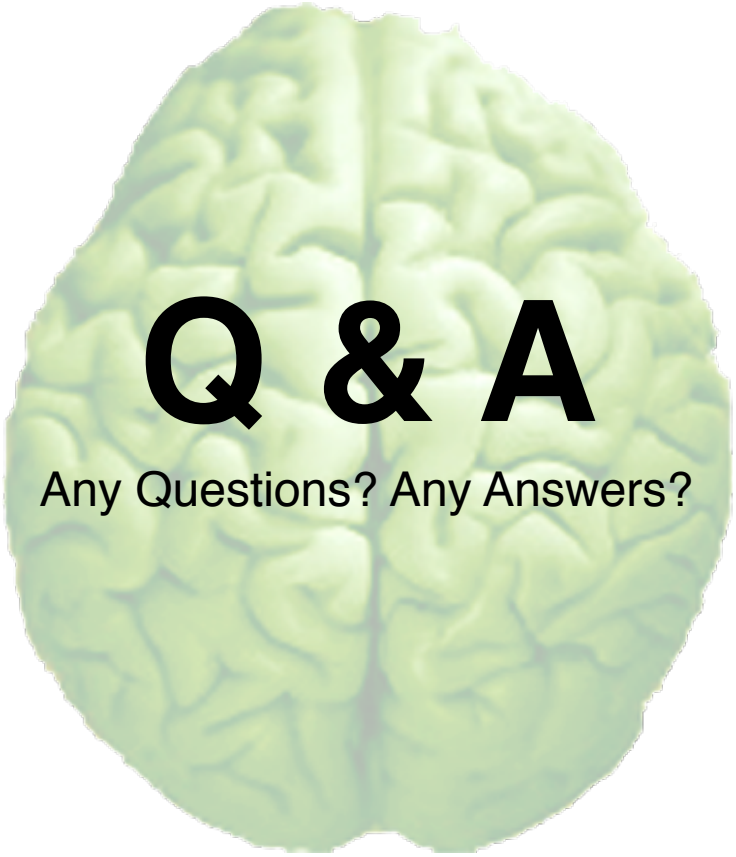
- Once it is done, reboot and test client

Related Sessions

Related Sessions

- **Automating Computer Management**
  Wed, 11:25 AM - 12:20 PM

  Will covering a suite of scripts, tools, graphics used to managed labs at the University of Utah.



Q & A

Any Questions? Any Answers?

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Richard Glaser of University of Utah