

# Image Deployment Methodologies

Macworld SF 2007  
Session IT83 I



# About Us

**Justin Elliott**

Penn State University, ITS

Senior Research Programmer

MacEnterprise.org steering committee member

**Eric Fischer**

MTV Networks

Senior Macintosh Standards

New York/Secaucus, NJ Office

# Determine Your Requirements

- How often do you need to image?
- How quick do you need the restore process to be?
- How much data needs to be restored?

# Determine Your Resources

- How much time can you dedicate to setting up the image?
- Do you have fast (100 mb/switched) networks?
- Do you have DHCP on your networks?
- Do you have control over the networks?

# Step 1: Boot that Mac...

# Methods of Booting

- DVD
- USB Flash Drives
- FireWire Drives
- NetBoot
- NetInstall

# Bootable DVDs

- Pros:
  - They're Cheap!
  - Network is not required (but can be used)
  - Easy to create lots of them
  - If they get broken or lost, no big deal!

# Bootable DVDs

- Cons:
  - Slow to restore images directly from
  - Can be difficult to run 3rd party restore utilities from (Library Dependencies)
  - Limited in amount of data storage (8.5 GB)
  - Can be time consuming to update



# USB Flash Drives

- Pros:
  - Convenient - Easily fits in a shirt pocket
  - Re-writable, easier to update
  - Pretty fast booting
  - Cheaper than FireWire Drives
  - Can boot with full Mac OS X system capabilities

# USB Flash Drives

- Cons:
  - Only\* Intel Macs can boot with them
  - Limited data size (8 GB today)
  - You probably don't want to lose them ...

# USB Flash Drives

- Look for these things:
  - USB 2.0
  - Durable
  - Fast transfer speeds
  - Good USB port cap
- Recommended: Apacer Handy Steno HT203 200x, 4 GB USB Flash Drive (~ \$106.00 )



# FireWire Drives

- Pros:
  - Very fast for booting and restoring from
  - Large data storage size for large/multiple images
  - Can boot with full Mac OS X system capabilities

# FireWire Drives

- Cons:
  - Expensive
  - Fragile
  - Lots of cables to carry around
  - Not as convenient

# NetBoot

- Pros:
  - Very convenient - No media required!
  - Uses network for everything
  - Update one master image, all NetBooted clients see changes on reboot
  - Can boot with full Mac OS X system capabilities

# NetBoot

- Cons:
  - Slower than FireWire hard drives
  - Requires Mac OS X Server
  - Must have DHCP on the same segment
  - Difficult to NetBoot across segments
  - Really requires fast switched networks
  - If use “Diskless” mode, server will need space for temporary storage

# NetInstall

- Uses NetBoot with a special image
- Pros:
  - Very convenient - No media required!
  - Simple quick startup and restore process
  - Can pretty much be automated
  - Restore images or packages



# NetInstall

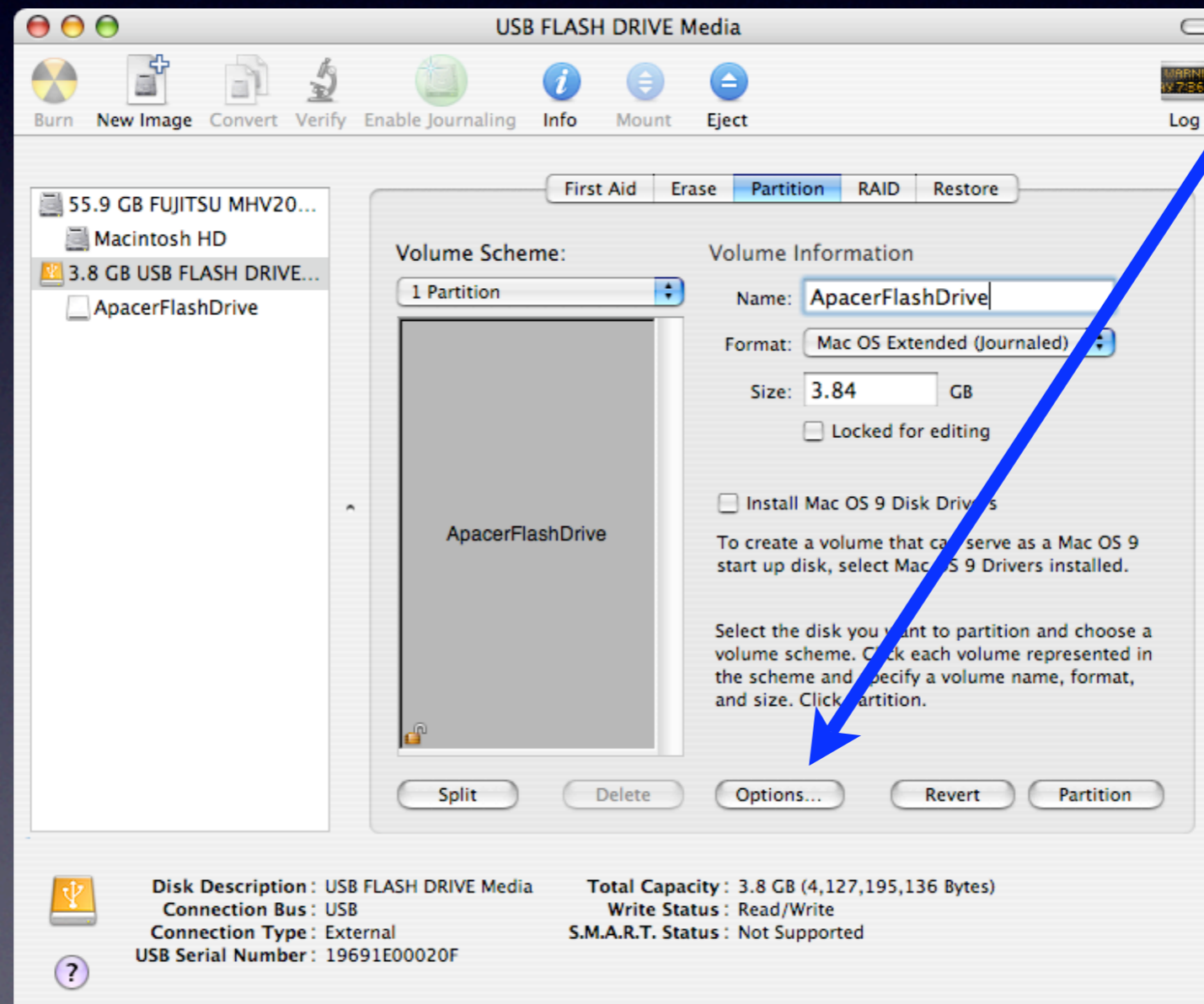
- Cons:
  - Difficult to run third party tools
  - Slower than FireWire hard drives
  - Must have DHCP on the same segment
  - Difficult to NetInstall across segments
  - Really requires fast switched networks

# Booting Tips

- Choose the correct partition scheme based on the type of Mac to boot:
  - PowerPC (G3, G4, G5)
    - Partition:Apple Partition Map
  - Intel (Core Duo, Core 2 Duo, Xeon)
    - Partition: GUID Partition Table

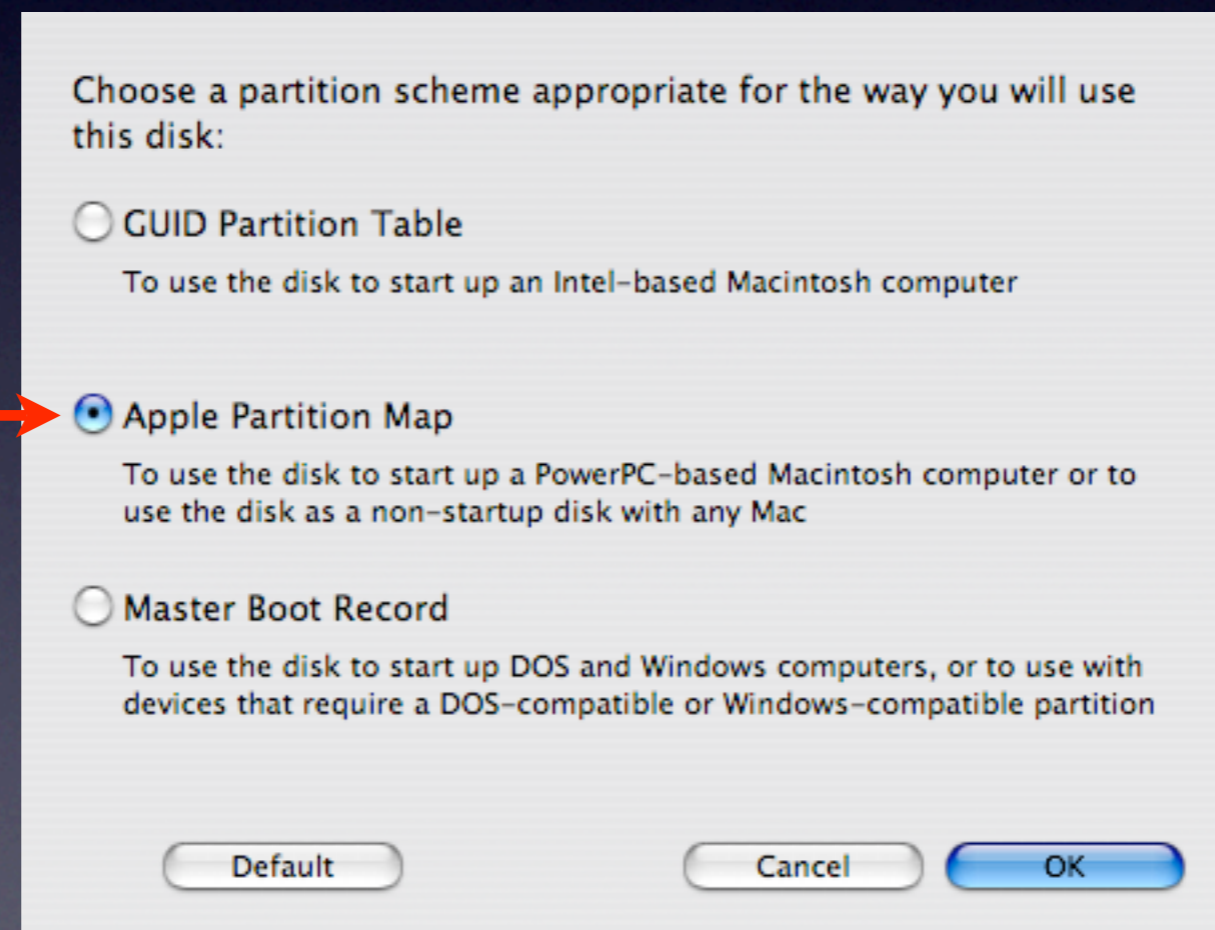
# Booting Tips

- Disk Utility's Partition tab, click 'Options...'



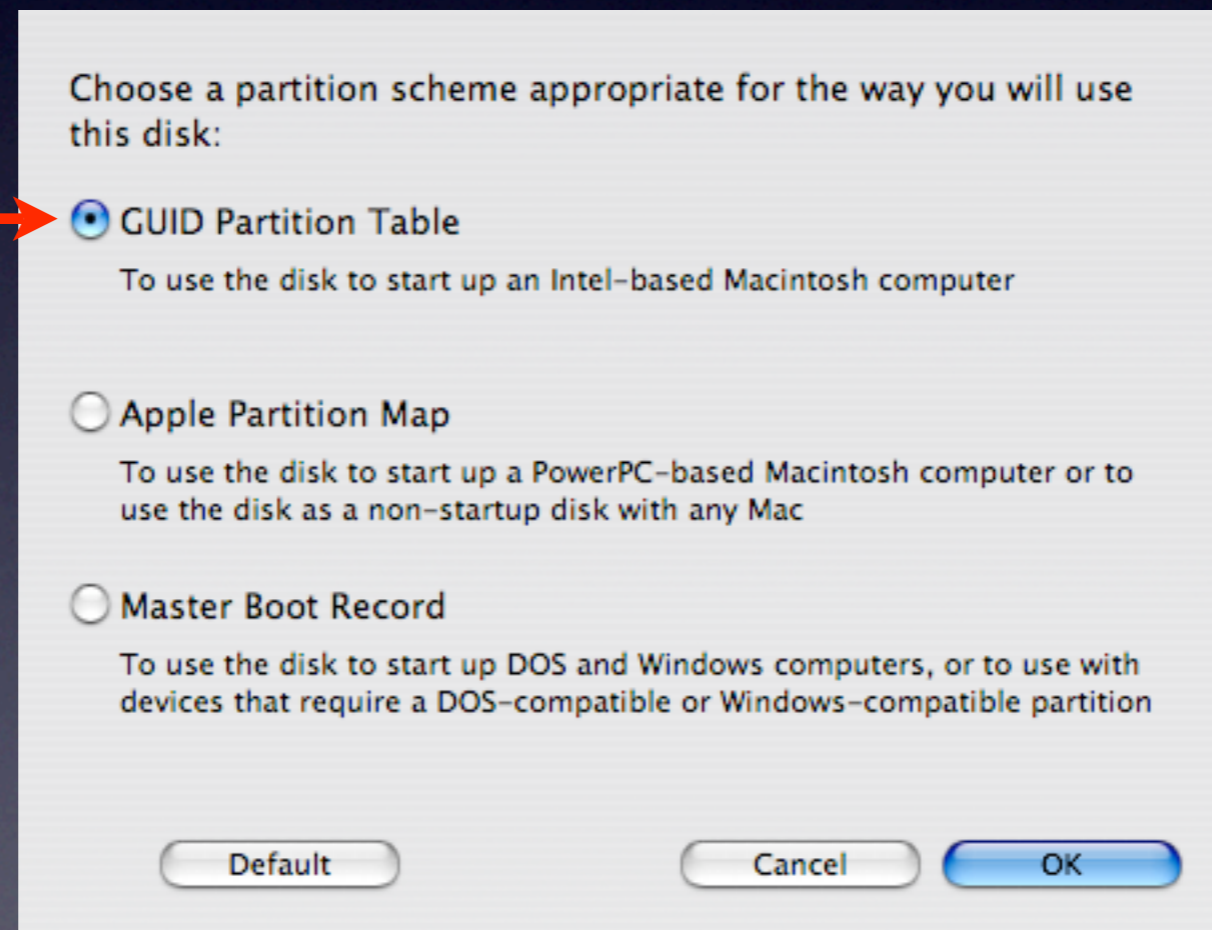
# Booting Tips

- Use 'Apple Partition Map' for PowerPC Macs



# Booting Tips

- Use 'GUID Partition Table' for Intel Macs



Step 2:  
Get the bits  
to the disk!

# Deployment Methods

- Apple's Disk Utility
- Scripts - hook into 'asr'
- PSU Blast Image Config

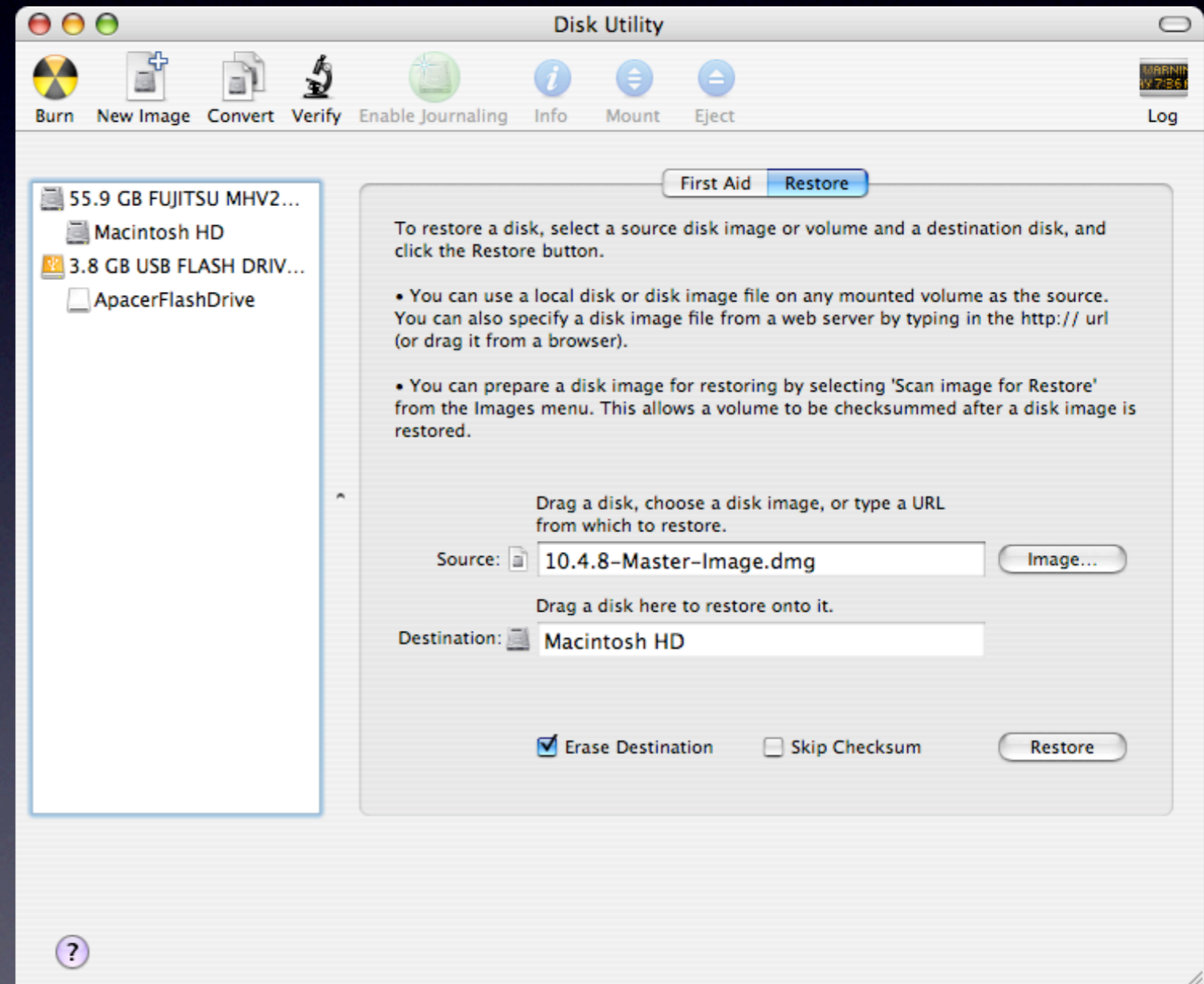


- NetRestore



# Apple's Disk Utility

- Select 'Macintosh HD' volume, click Restore tab
- Drag Image to Source field
- Drag 'Macintosh HD' volume to Destination
- Check 'Erase Destination' box
- Click 'Restore'





# Scripts

- AppleScript, Shell, Perl, Python, Ruby, etc.
- Script Apple's command line 'asr' utility
  - Specify image or volume to restore and volume to restore to:


```
#!/bin/sh
```

```
# Use asr to restore a system image 'image.dmg' to the  
# 'DiskToRestore' disk volume:
```

```
/usr/sbin/asr restore -source /path/to/image.dmg \  
-target /Volumes/DiskToRestore -erase
```

# Scripts

- Read the “man” page for asr!
- Open /Applications/Utilities/Terminal.app
- % man asr



```
Terminal — grotty — 80x25
ASR(8) BSD System Manager's Manual ASR(8)
NAME
  asr -- Apple Software Restore; copy volumes (e.g. from disk images)
SYNOPSIS
  asr verb [options]
  asr restore —source source —target target [options]
  asr server —source source —config configuration [options]
  asr restore —source asr://source —file file [options]
  asr imagescan —source [options] image
  asr help | version
DESCRIPTION
  asr efficiently copies disk images onto volumes, either directly or via a
  multicast network stream. asr can also accurately clone volumes without
  the use of an intermediate disk image.

  In its first form, asr copies source (usually a disk image, potentially
  on an HTTP server) to target. source can be specified using a path in
  the filesystem, or an http or https URL. It can also be an asr:// URL to
  indicate a multicast source. asr can also be invoked with its second
  form to act as a multicast server. In its third form, asr will restore a
  :
```

# PSU Blast Image Config



- Developed by Justin Elliott, PSU
- Used at Penn State University to image all 655 student lab and special purpose Macs
- Used by many system admins in industry and education
- Can be fully automated, pre/post restore scripts
- Can secure Open Firmware / EFI boot security
- Uses asr command line tool to restore images

Available here: <http://tinyurl.com/5xhrv>

# NetRestore



- Developed by Mike Bombich
- Used by many system admins in industry and education
- Can be fully automated, pre/post restore scripts
- Can secure Open Firmware / EFI boot security
- Uses asr command line tool to restore images

Available here: <http://www.bombich.com>

# Mix and Match!

- Boot with USB Flash drive, restore base image via asr over http, reboot, restore more data via Radmin, FileWave, or...
- Boot with FireWire hard disk, restore full image with PSU BIC, or ...
- Boot with DVD, restore via asr over http, or...
- Boot via NetBoot, restore image via network via NetRestore or PSU BIC, or ...
- Many options!

# Deployment at MTV

# Our Environment

- ~1500 Macs
- Multiple cities: New York, Nashville, Miami, Santa Monica, Burbank
- Many offsite productions
- NetRestore Helper used for initial imaging
- FileWave used for software pushes and pulls
- Timbuktu and ARD used for user management/troubleshooting

# Why don't we use NetBoot/NetInstall?

- It's our network, complex with the many regions.
- Doesn't help with the rental company or offsite productions.
- IT politics.



# What we did/do use.

- ASR with a local source on a bootable DVD.
- ASR with an http source using a bootable DVD.
- ASR with a local source on the bootable local FireWire drive.
- ASR with an http source using a bootable local FireWire drive.

# Bootable DVD Requirements

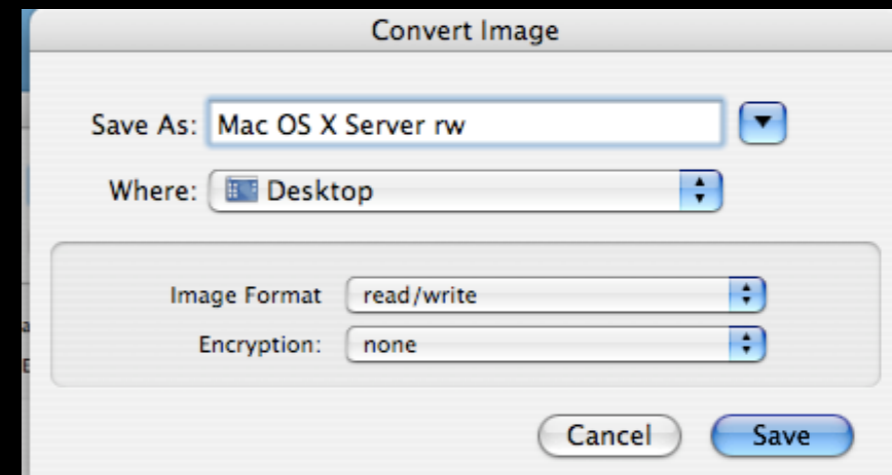
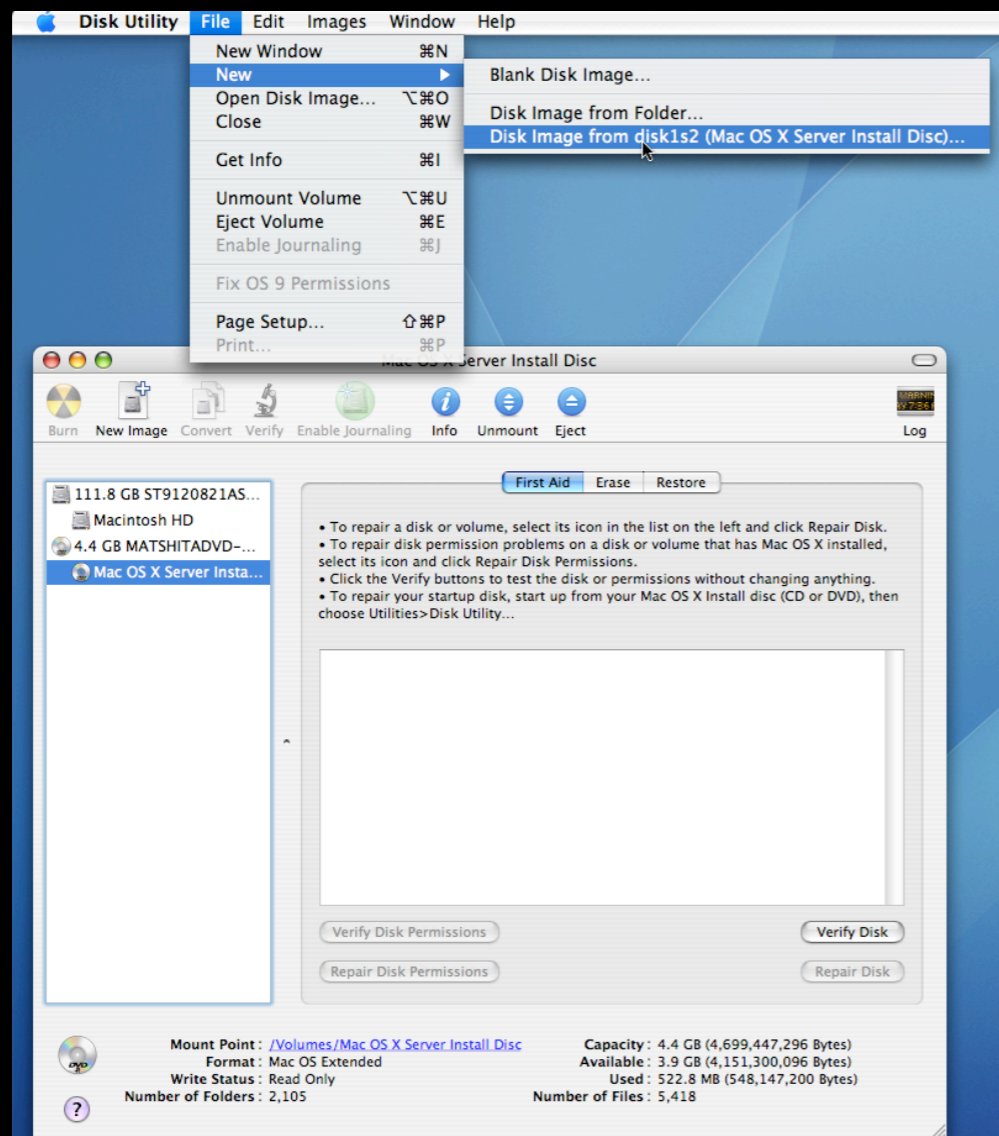
- Needs to boot in about 2 minutes.
- Needs to boot both PPC and Intel Macs.
- Needs to have the Terminal application on it.
- Needs to have network capabilities.

# The Solution

- Mac OS X Server 10.4.7 Universal DVD
- You can use the 10-user or unlimited user.

# Modifying the DVD

- Insert the DVD, launch Apple's Disk Utility, highlight the Mac OS X Server Install Disc in the left window, goto File-New-Disk Image from disk...(Mac OS X Server Install Disc), give the image a name, choose read/write as the Image Format, choose none for Encryption



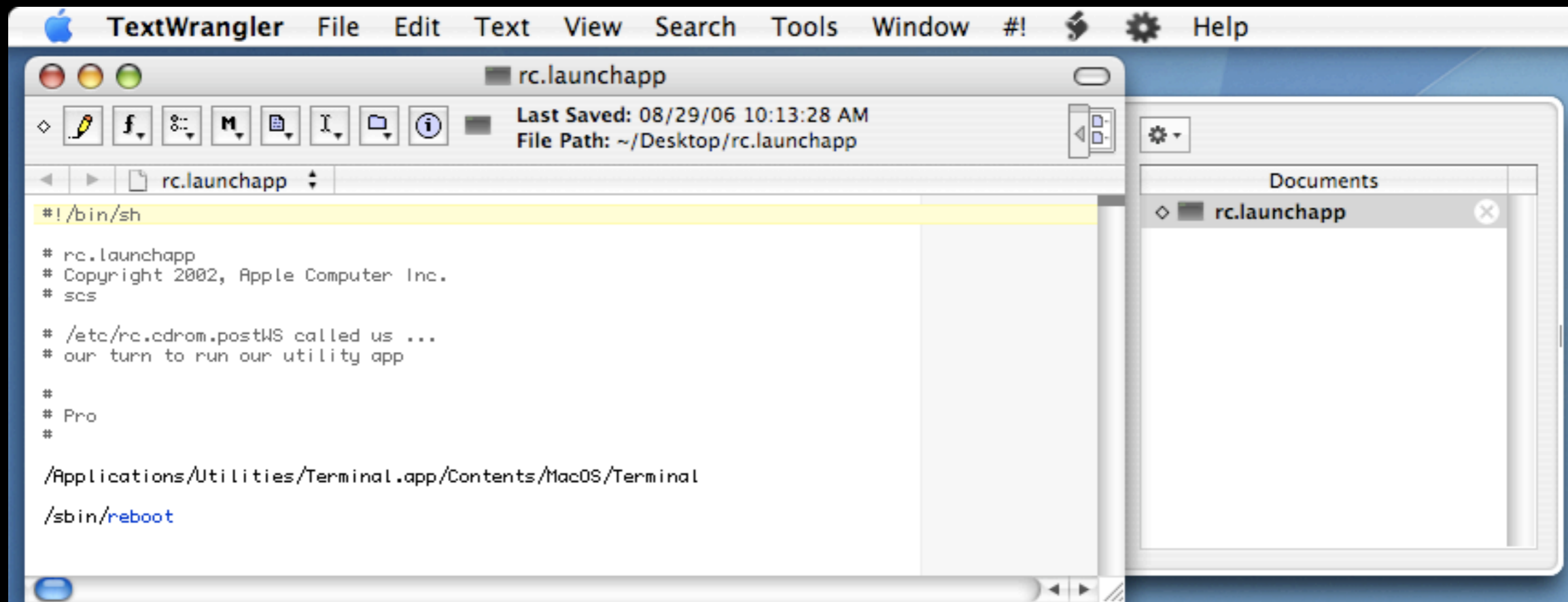
# Trim it up

- Mount the read/write image and delete the following:
  - /Documentation
  - /Other Installs
  - /Migration Tools
  - /System/Installation/CDIS
  - /System/Installation/Packages
- This will leave you with ~3.8 GB free.
- If your base Mac OS X image is less than this, you could create an Image folder and set your ASR script to restore your image from there.

```
asr -source /  
<path to your image on the DVD> -target /Volumes/Macintosh\  
HD/ -erase -noprompt
```

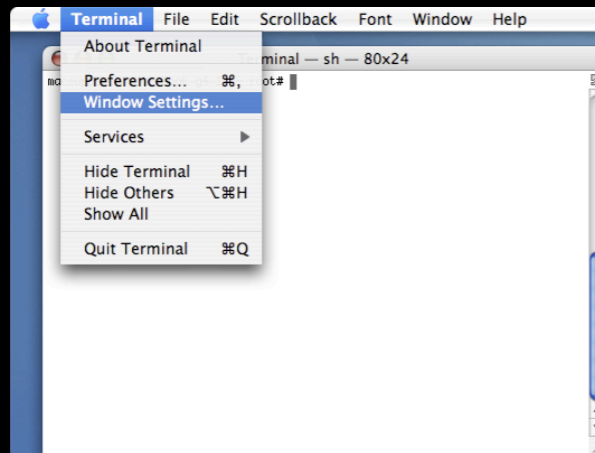
# The rc.launchapp File

- This file, when placed in the /etc folder on the DVD image, will launch Terminal as the frontmost application after the boot process.

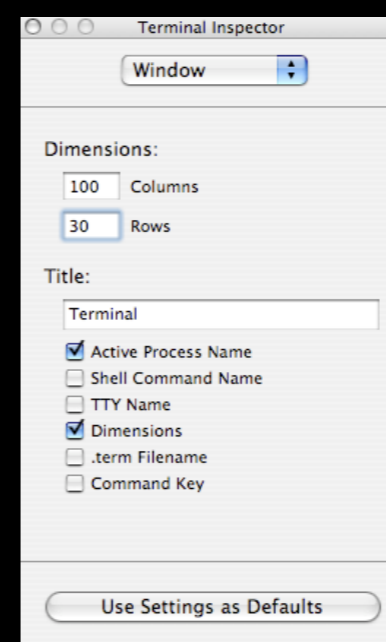
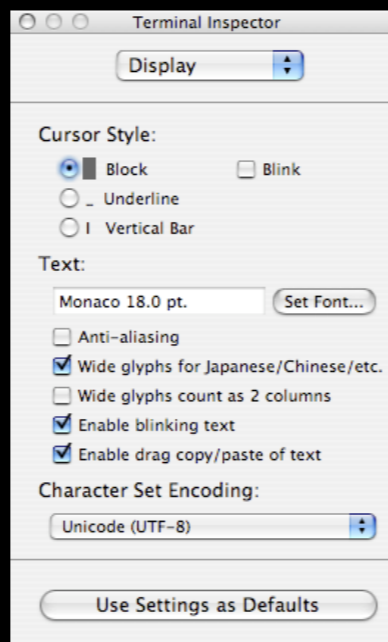
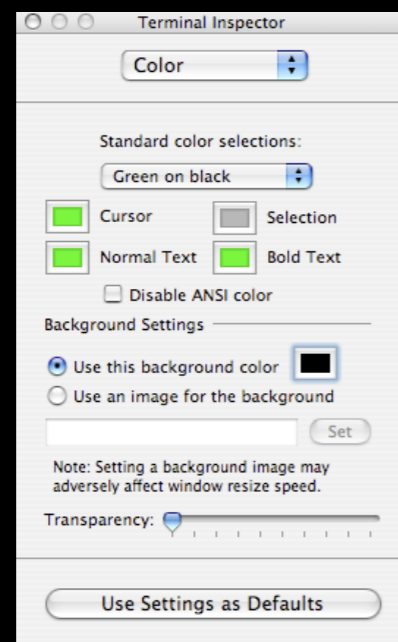


# Setting up the Terminal Window

- Launch the Terminal application on another Mac. Select Terminal-Window Settings.

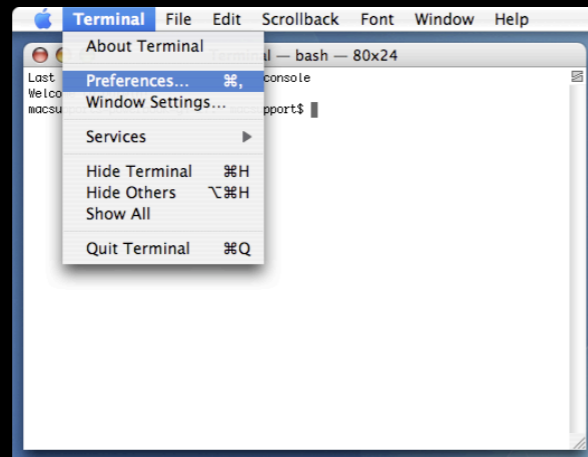


- Choose your settings and click the “Use Settings as Defaults” button when you are done.

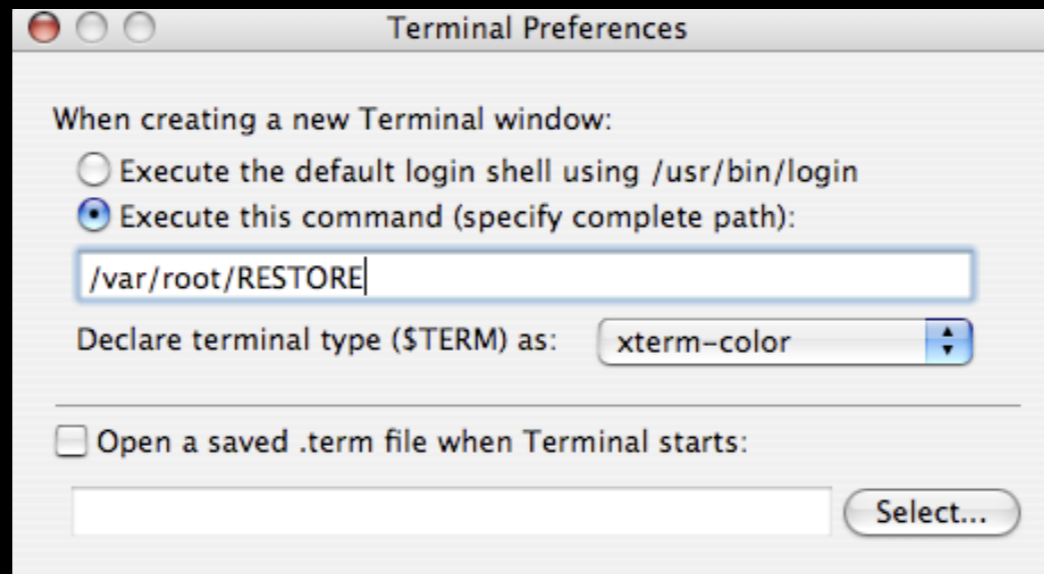


# Setting up the Terminal Window

- Select Terminal-Preferences



- Select the button for Execute this command (specify complete path) and enter the path to your shell script. This is the path where we will be placing the script on the DVD image.





# Setting up the Terminal Window

- On the Mac you created the Terminal preferences, go to ~/Library/Preferences and copy the “com.apple.Terminal.plist” file to the /var/root/Library/Preferences folder on the DVD image (create the folder if it does not exist).

# Tools to add

- Using a full Tiger OS, copy these items over to their corresponding places on the DVD image:

cut from `/usr/bin` to `/usr/bin`

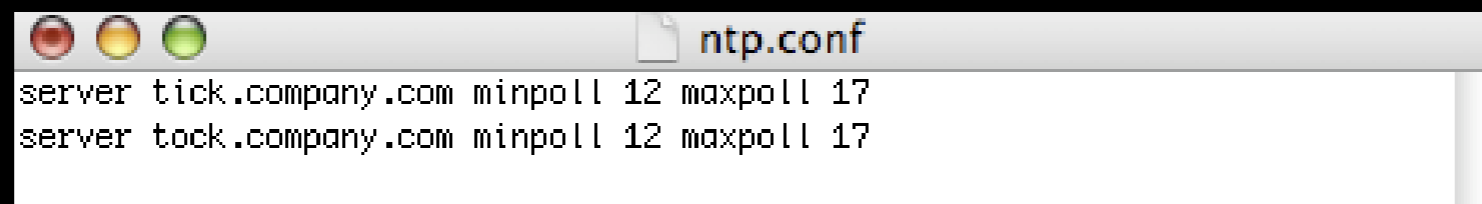
OFPW from `/NetRestore/Resources/Post-actions/bin` to `usr/bin`

byhost\_fix from `/NetRestore/Resources/Post-actions/bin` to `usr/bin`

ntptimeset from `/usr/sbin` to `/usr/sbin`

All items (countries) from `/usr/share/zoneinfo` to `/usr/share/zoneinfo`

ntp.conf, located in `/etc`, contains network time server info, edit it for your company, place it in `/etc`



```
ntp.conf
server tick.company.com minpoll 12 maxpoll 17
server tock.company.com minpoll 12 maxpoll 17
```

# Tools to add

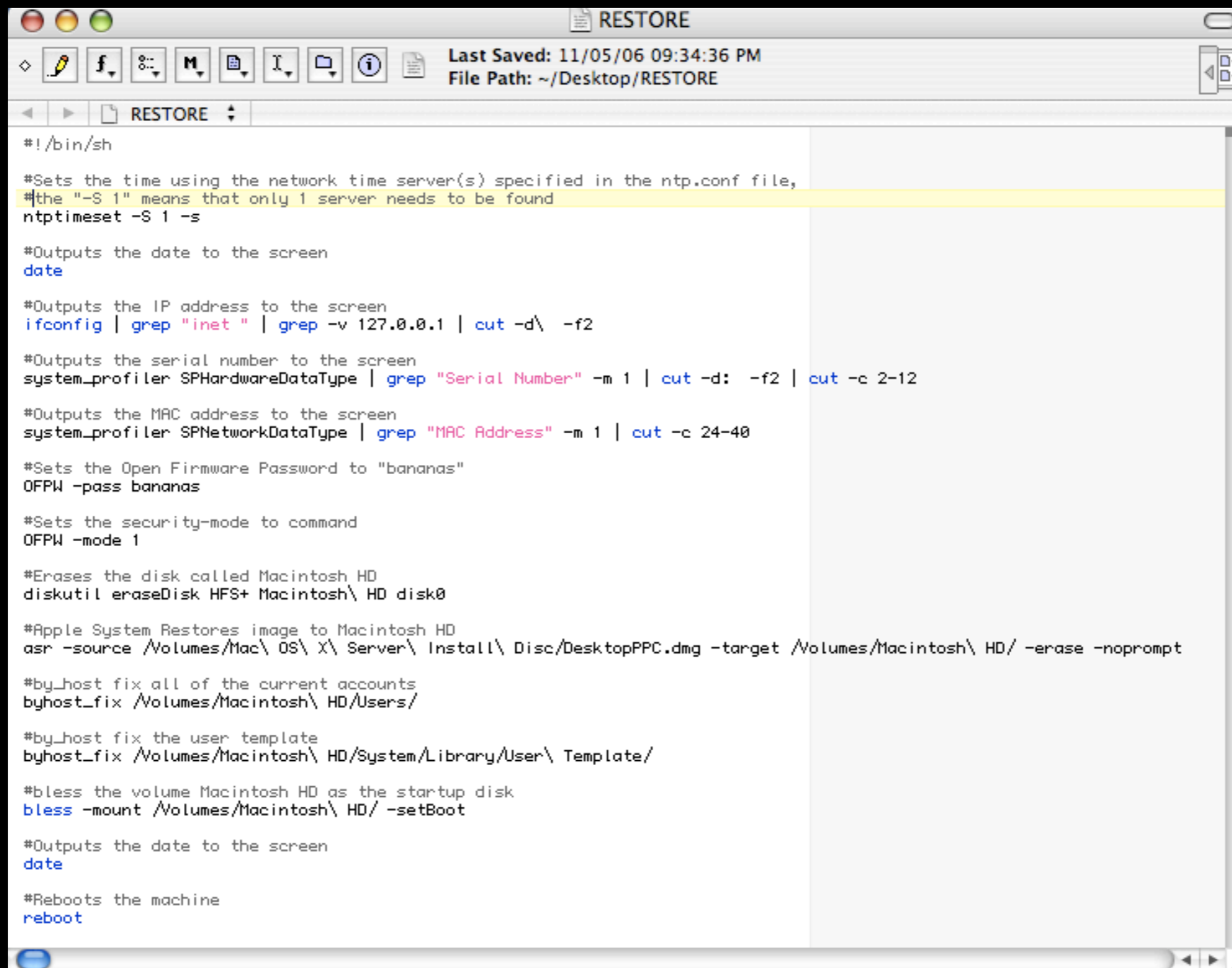
- Create a symbolic link for your location in the Terminal, example:

```
ln -s /usr/share/zoneinfo/America/New_York
```

- rename this file “localtime” and replace the current “localtime” file in /etc with it.

# Last Year's Shell Script

- This script would automatically image the target Mac with the image file burned onto the Image DVD.



```
#!/bin/sh
#Sets the time using the network time server(s) specified in the ntp.conf file,
#the "-S 1" means that only 1 server needs to be found
ntpdate -S 1 -s

#Outputs the date to the screen
date

#Outputs the IP address to the screen
ifconfig | grep "inet " | grep -v 127.0.0.1 | cut -d\ -f2

#Outputs the serial number to the screen
system_profiler SPHardwareDataType | grep "Serial Number" -m 1 | cut -d: -f2 | cut -c 2-12

#Outputs the MAC address to the screen
system_profiler SPNetworkDataType | grep "MAC Address" -m 1 | cut -c 24-40

#Sets the Open Firmware Password to "bananas"
OFPW -pass bananas

#Sets the security-mode to command
OFPW -mode 1

#Erases the disk called Macintosh HD
diskutil eraseDisk HFS+ Macintosh\ HD disk0

#Apple System Restores image to Macintosh HD
asr -source /Volumes/Mac\ OS\ X\ Server\ Install\ Disc/DesktopPPC.dmg -target /Volumes/Macintosh\ HD/ -erase -noprompt

#by_host fix all of the current accounts
byhost_fix /Volumes/Macintosh\ HD/Users/

#by_host fix the user template
byhost_fix /Volumes/Macintosh\ HD/System/Library/User\ Template/

#bless the volume Macintosh HD as the startup disk
bless -mount /Volumes/Macintosh\ HD/ -setBoot

#Outputs the date to the screen
date

#Reboots the machine
reboot
```

# The Field Technicians Respond

- Not digging the automatic install, too many “accidents”.
- They wanted the choice to zero the drive.
- They wanted the user’s account automatically setup.
- They wanted the user’s Entourage automatically setup.
- They wanted the sharing name setup using Last Name, First Name, helpful when using Timbuktu for troubleshooting.
- Multiple images=Multiple DVDs. Can’t we have one disc to rule them all?
- Could we get machine specific data emailed to us when a new Mac gets setup?

# My Main Problem

- My Intel Mac images went over the magic ~3.8 GB limit.

# The ASR Script Modification

- When the script runs, it asks the tech for user specific information and if they want to zero the drive.
- The script then determines if the Mac is Intel or PPC, Desktop or Laptop and then starts the restore process with the appropriate image.
- A shell script contained within the image is modified with the technician's input and upon the first restart, the user's account is created.
- An Applescript contained within the image is modified with the technician's input and upon the first login to the user's account, it runs and Entourage opens with all of the user's info except the password.

# This Year's Script

```
#!/bin/sh
#Instructions and Warnings
echo This script will image your Mac over the network."
echo If you make a typo goto File New Shell to restart this script."
echo Please note that this script will erase the disk."
echo Please make sure the user data is backed up!"
#Checks to see if the network is available
if ping -c 1 webserver.company.com > /dev/null
then
echo READY!"
else
echo THE IMAGE SERVER CANNOT BE FOUND!" CHECK YOUR NETWORK CABLE PLUGGED INTO EN0!"
echo RESTART THE SCRIPT BY CHOOSING FILE">"NEW SHELL
exit
fi
#Optional network tuning
sysctl -w kern.ipc.maxsockbuf=8000000
sysctl -w net.inet.tcp.sendspace=4000000
sysctl -w net.inet.tcp.recvspace=4000000
#Prompts for user information
read -p "Enter the first name of the user (ex. John)> " firstname
read -p "Enter the last name of the user (ex. Smith)> " lastname
read -p "Enter the short name of the main user account (ex. smithj)> " username
read -p "Enter the password of the main user account (ex. newuser)> " pword
read -p "Enter the full email address (ex. john.smith@mtvstaff.com)> " email
read -p "Enter the domain (ex. mtvn viacom_corp)> " domain
read -p "Enter the location (ex. 1515;27-135 DO NOT USE COMMAS)> " location
read -p "Enter the phone number of the user (ex. 212-555-1234)> " phonenumber
read -p "Enter the FileWave username (ex. MTVCS-IMG5-12345T)> " fwname
read -p "Enter the technician's name> " techname
```



# This Year's Script

```
RESTORE

#Splits the email address. The @ symbol was problematic with the perl replace function

firsthalfemail=$(echo $email | cut -d @ -f 1)

lasthalfemail=$(echo $email | cut -d @ -f 2)

#Choice to zero the drive or not

echo Please choose if you want to Zero the drive"." Zeroing the drive will add time to the process"."

read -p "Enter a capital Y if you want to Zero a capital N if you do not> " zero

#Sets the variable "SN" to the serial number of the Mac

SN=$(system_profiler SPHardwareDataType | grep "Serial Number" -m 1 | cut -d: -f2 | cut -c 2-12)

#Sets the time using the network time server(s) specified in the ntp.conf file,
#the "-S 1" means that only 1 server needs to be found

ntptimeset -S 1 -s

#Outputs the date and time to the screen

date

#Outputs the IP address to the screen

ifconfig | grep "inet " | grep -v 127.0.0.1 | cut -d\ -f2

#Outputs the serial number to the screen

system_profiler SPHardwareDataType | grep "Serial Number" -m 1 | cut -d: -f2 | cut -c 2-12

#Outputs the MAC address to the screen

system_profiler SPNetworkDataType | grep "MAC Address" -m 1 | cut -c 24-40

#Sets the variable "MACADD" to the MAC address of the machine (taking out the : and capitalizing)

MACADD=$(system_profiler SPNetworkDataType | grep "MAC Address" -m 1 | cut -c 24-40 | cut -c
1-2,4-5,7-8,10-11,13-14,16-17 | sed 's/a/A/g' | sed 's/b/B/g' | sed 's/c/C/g' | sed 's/d/D/g' | sed 's/e/E/g' | sed
's/f/F/g')

#Sets the security-mode to command

OFPW -mode 1

#Sets the Open Firmware Password to "bananas"

OFPW -pass bananas
```

# This Year's Script

```
RESTORE

#Determines if the target machine is Intel.  If it is Intel, it runs the following
if system_profiler SPHardwareDataType | grep "Intel"
then
#If the tech choose "N", not to zero the drive, the following runs
  if [ "$zero" = "N" ]
  then
#Determines if the AC Charger is present, if so, insatll the Laptop image, if not, install the Desktop image
    if system_profiler SPPowerDataType | grep "AC Charger Information"
    then
      echo Installing Laptop Intel Image
      diskutil eraseDisk HFS+ Macintosh\ HD disk0
      asr -source http://webserver.company.com/LaptopIntel.dmg -target /Volumes/Macintosh\ HD/ -erase -noprompt
    else
      echo Installing Desktop Intel Image
      diskutil eraseDisk HFS+ Macintosh\ HD disk0
      asr -source http://webserver.company.com/DesktopIntel.dmg -target /Volumes/Macintosh\ HD/ -erase -noprompt
    fi
  fi
#If the tech choose "Y", to zero the drive, the following runs
  elif [ "$zero" = "Y" ]
  then
#Determines if the AC Charger is present, if so, insatll the Laptop image, if not, install the Desktop image
    if system_profiler SPPowerDataType | grep "AC Charger Information"
    then
      echo Installing Laptop Intel Image
      diskutil zeroDisk disk0
      diskutil eraseDisk HFS+ Macintosh\ HD disk0
      asr -source http://webserver.company.com/LaptopIntel.dmg -target /Volumes/Macintosh\ HD/ -erase -noprompt
    else
      echo Installing Desktop Intel Image
      diskutil zeroDisk disk0
      diskutil eraseDisk HFS+ Macintosh\ HD disk0
      asr -source http://webserver.company.com/DesktopIntel.dmg -target /Volumes/Macintosh\ HD/ -erase -noprompt
    fi
  else
#If the tech did not enter Y or N, output an error message
    echo You have made an invalid choice  Please restart the script by selecting File New Shell
    exit
  fi
fi
```

# This Year's Script

```
RESTORE

#If the (system_profiler SPHardwareDataType | grep "Intel") returns a false result, the PowerPC imaging process follows
else
#If the tech choose "N", not to zero the drive, the following runs
  if [ "$zero" = "N" ]
  then
#Determines if the AC Charger is present, if so, insatll the Laptop image, if not, install the Desktop image
  if system_profiler SPPowerDataType | grep "AC Charger Information"
  then
    echo Installing Laptop PPC Image
    diskutil eraseDisk HFS+ Macintosh\ HD disk0
    asr -source http://webserver.company.com/LaptopPPC.dmg -target /Volumes/Macintosh\ HD/ -erase -noprompt
  else
    echo Installing Desktop PPC Image
    diskutil eraseDisk HFS+ Macintosh\ HD disk0
    asr -source http://webserver.company.com/DesktopPPC.dmg -target /Volumes/Macintosh\ HD/ -erase -noprompt
  fi
#If the tech choose "Y", to zero the drive, the following runs
  elif [ "$zero" = "Y" ]
  then
#Determines if the AC Charger is present, if so, insatll the Laptop image, if not, install the Desktop image
  if system_profiler SPPowerDataType | grep "AC Charger Information"
  then
    echo Installing Laptop PPC Image
    diskutil zeroDisk disk0
    diskutil eraseDisk HFS+ Macintosh\ HD disk0
    asr -source http://webserver.company.com/LaptopPPC.dmg -target /Volumes/Macintosh\ HD/ -erase -noprompt
  else
    echo Installing Desktop PPC Image
    diskutil zeroDisk disk0
    diskutil eraseDisk HFS+ Macintosh\ HD disk0
    asr -source http://webserver.company.com/DesktopPPC.dmg -target /Volumes/Macintosh\ HD/ -erase -noprompt
  fi
  else
    echo You have made an invalid choice Please restart the script by selecting File New Shell
    exit
  fi
fi
```

# This Year's Script

```
RESTORE
#by_host fix all of the current accounts
byhost_fix /Volumes/Macintosh\ HD/Users/

#by_host fix the user template
byhost_fix /Volumes/Macintosh\ HD/System/Library/User\ Template/

#bless the volume Macintosh HD as the startup disk
bless -mount /Volumes/Macintosh\ HD/ -setBoot

perl -pi -e 's/ftpuser/'$username'/g' /Volumes/Macintosh\ HD//Users/macsupport/Desktop/newuser
perl -pi -e 's/FTP\ User/'$firstname\ $lastname'/g' /Volumes/Macintosh\ HD//Users/macsupport/Desktop/newuser
perl -pi -e 's/password/'$pwd'/g' /Volumes/Macintosh\ HD//Users/macsupport/Desktop/newuser

perl -pi -e 's/change-me/'$lastname-$firstname'/g' /Volumes/Macintosh\ HD//Library/Preferences/SystemConfiguration/preferences.plist
perl -pi -e 's/change\ me/'$lastname,\ $firstname'/g' /Volumes/Macintosh\ HD//Library/Preferences/SystemConfiguration/preferences.plist
perl -pi -e 's/smtp/'$email'/g' /Volumes/Macintosh\ HD/System/Library/User\ Template/English.lproj/Documents/EntourageSetup.applescript

perl -pi -e 's/primarydom/'$domain'/g' /Volumes/Macintosh\ HD/System/Library/User\ Template/English.lproj/Documents/EntourageSetup.applescript

perl -pi -e 's/fullname/'$firstname\ $lastname'/g' /Volumes/Macintosh\ HD/System/Library/User\ Template/English.lproj/Documents/EntourageSetup.applescript

perl -pi -e 's/username/'$username'/g' /Volumes/Macintosh\ HD/System/Library/User\ Template/English.lproj/Documents/EntourageSetup.applescript

perl -pi -e 's/firsthalfemail/'$firsthalfemail'/g' /Volumes/Macintosh\ HD/System/Library/User\ Template/English.lproj/Documents/EntourageSetup.applescript

perl -pi -e 's/lasthalfemail/'$lasthalfemail'/g' /Volumes/Macintosh\ HD/System/Library/User\ Template/English.lproj/Documents/EntourageSetup.applescript

echo $fwnam,$username,$firstname $lastname,$location,$phonenumber,$SN,$techname >> /Volumes/Macintosh\ HD/Users/macsupport/Desktop/"$username"."txt"

scp /Volumes/Macintosh\ HD/Users/macsupport/Desktop/"$username"."txt" macsupport@macimageny.viacom.com:~/Desktop/AddedUsers

diskutil enableJournal /Volumes/Macintosh\ HD

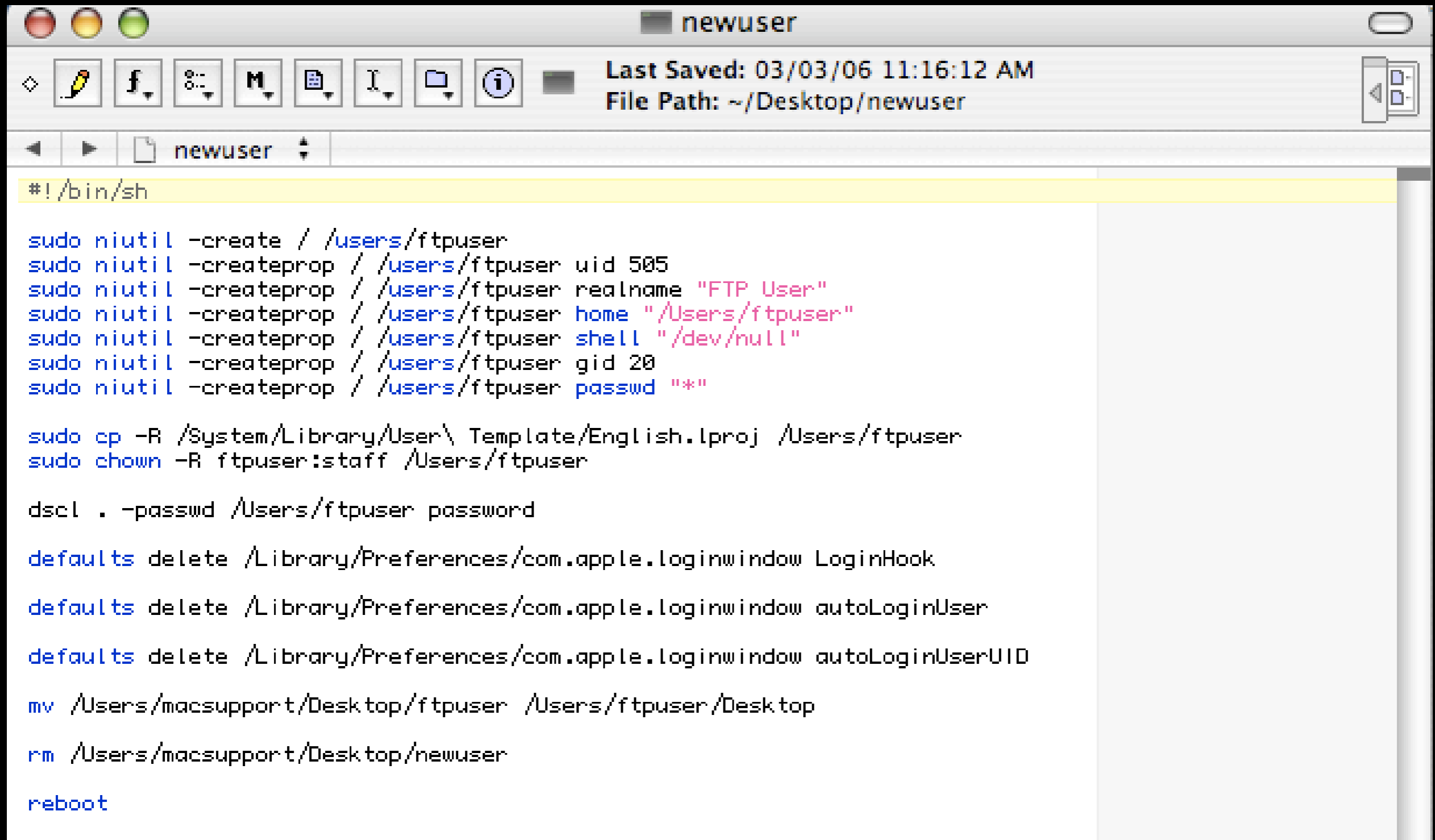
date

reboot
```

# In the Image

- Before imaging, the one admin account is set to auto-login via the Accounts Preference Pane.
- A shell script “newuser” is placed in this admin account. LoginWindow Manager is used to start this script upon the admin account login.
- The script creates the user’s account based on values modified by the install script, takes off the auto-login, deletes itself, and restarts the machine.
- An Applescript text document (EntourageSetup.applescript), a shell script (mailshell), an Applescript (Mail), and a backup of the loginwindow.plist are placed in the Documents folder within the User Template

# The “newuser” script



```
#!/bin/sh

sudo niutil -create / /users/ftpuser
sudo niutil -createprop / /users/ftpuser uid 505
sudo niutil -createprop / /users/ftpuser realname "FTP User"
sudo niutil -createprop / /users/ftpuser home "/Users/ftpuser"
sudo niutil -createprop / /users/ftpuser shell "/dev/null"
sudo niutil -createprop / /users/ftpuser gid 20
sudo niutil -createprop / /users/ftpuser passwd "*"

sudo cp -R /System/Library/User\ Template/English.lproj /Users/ftpuser
sudo chown -R ftpuser:staff /Users/ftpuser

dscl . -passwd /Users/ftpuser password

defaults delete /Library/Preferences/com.apple.loginwindow LoginHook
defaults delete /Library/Preferences/com.apple.loginwindow autoLoginUser
defaults delete /Library/Preferences/com.apple.loginwindow autoLoginUserID

mv /Users/macsupport/Desktop/ftpuser /Users/ftpuser/Desktop
rm /Users/macsupport/Desktop/newuser

reboot
```

# The Entourage Setup

- An account called “default” is created with Entourage in the user template with the settings that are common among all accounts: Exchange Server, LDAP Server.
- A copy of the loginwindow.plist is placed in the user template’s Documents folder. The Accounts Preference Pane is then used to add the applescript “mail” as a Login Item.
- The Applescript “mail” runs on login, which launches the shell script “mailshell”, which runs the EntourageSetup.applescript to configure Entourage, deletes the scripts, and moves the original loginwindow.plist back so that “mail” is no longer a Login Item.

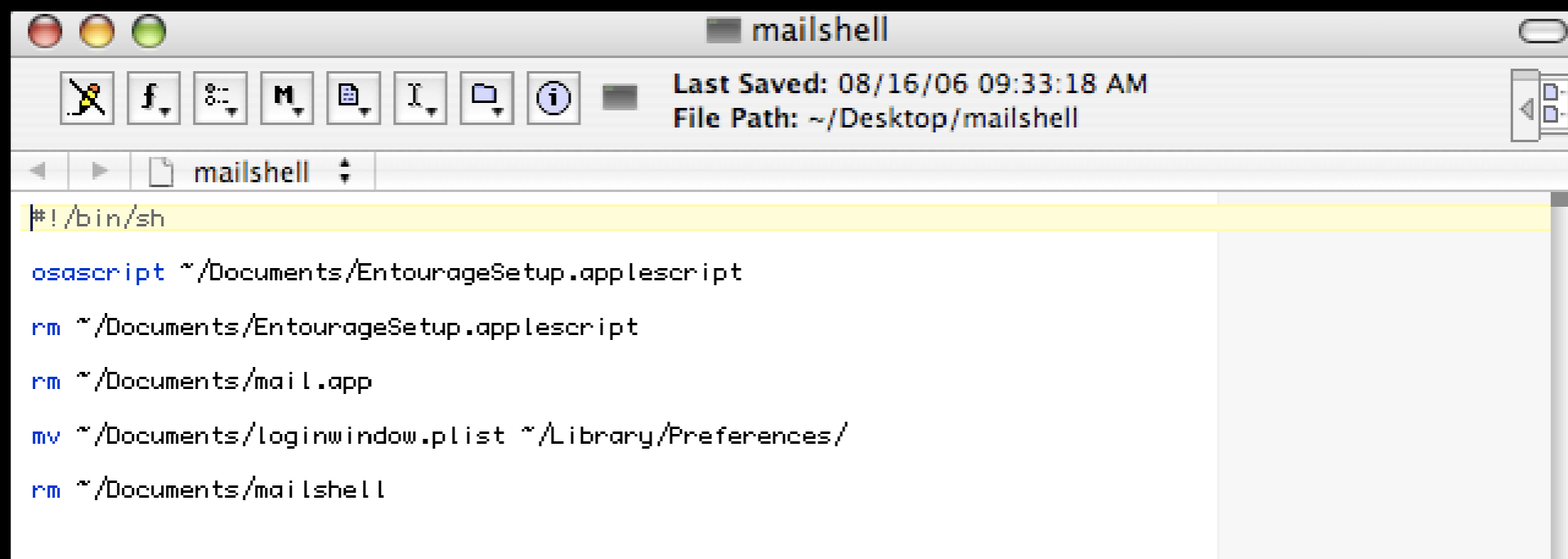
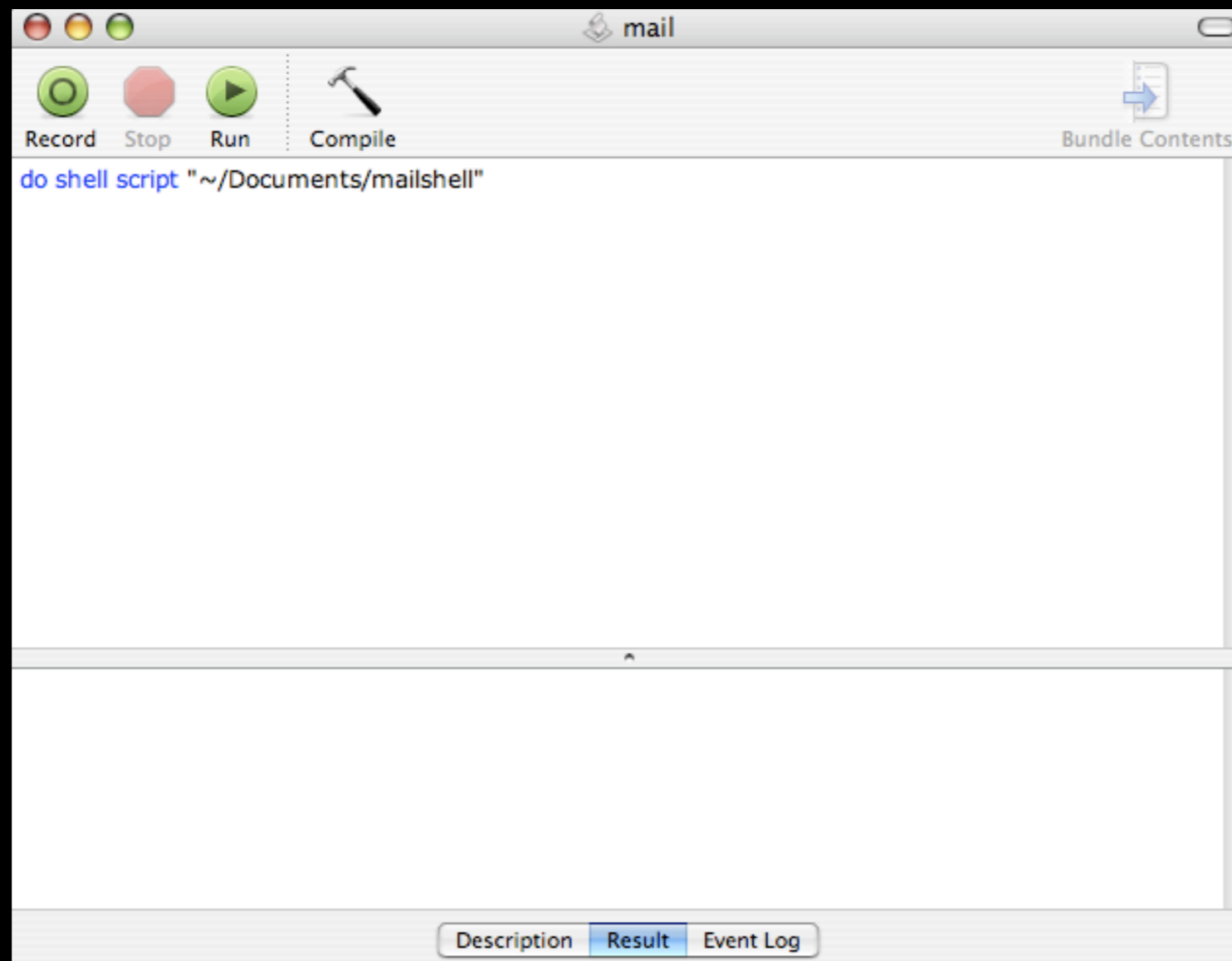
EntourageSetup.applescript

Record Stop Run Compile Bundle Contents

```
tell application "Microsoft Entourage"
  set working offline to true
  set the email address of Exchange account "default" to "firsthalfemail@lasthalfemail"
  set the domain of Exchange account "default" to "primarydom"
  set the full name of Exchange account "default" to "fullname"
  set the Exchange ID of Exchange account "default" to "username"
  set the name of Exchange account "default" to "firsthalfemail@lasthalfemail"
  set working offline to false
end tell
```

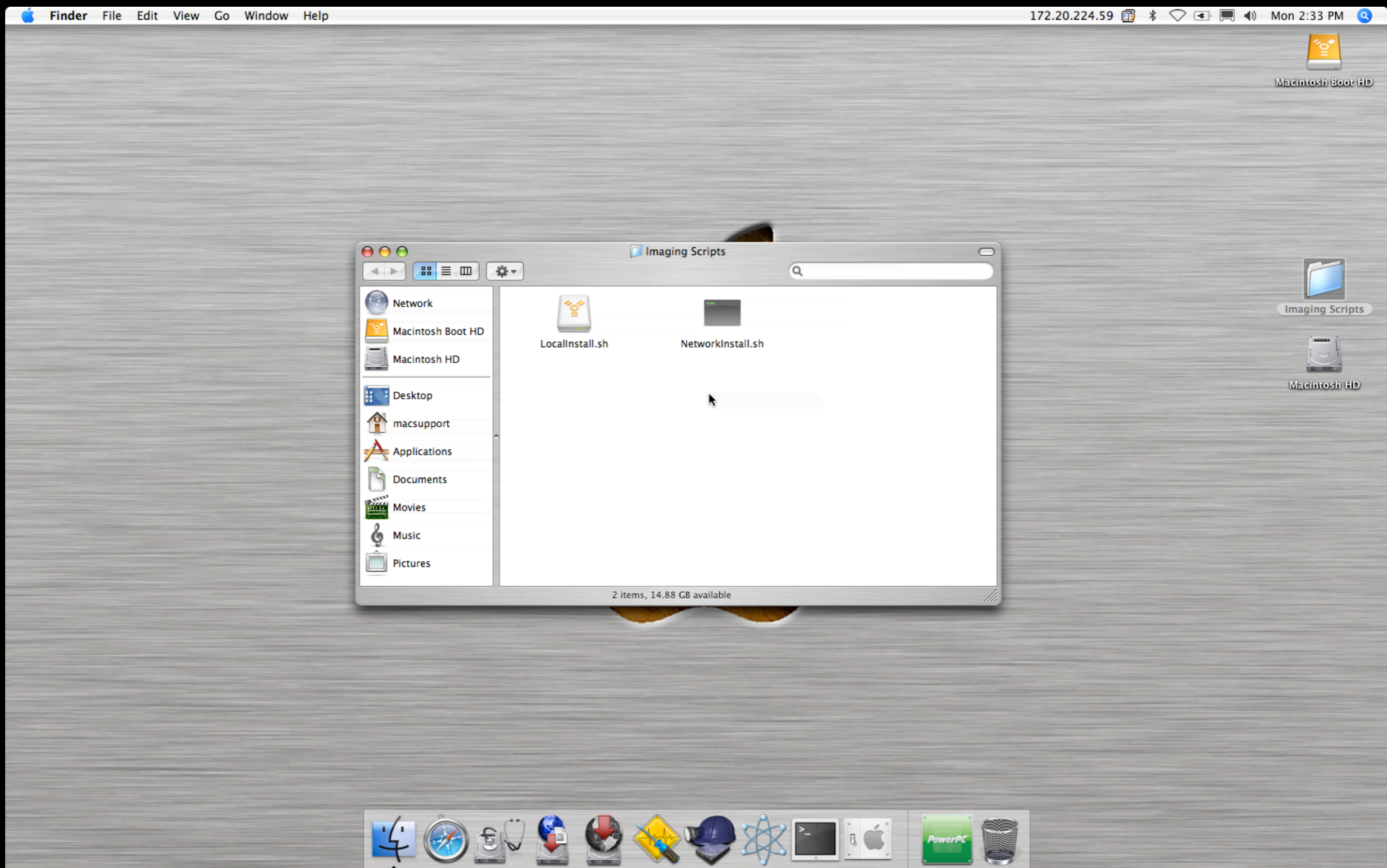
Description Result Event Log





# Let's Take a Look, Movie Time

# ASR http source install



# Creating an Apache Webserver

- Instructions modified from <http://www.phpmac.com/>
- Install Mac OS X client or server.
- Consider link aggregation with additional ethernet ports for increased bandwidth and failover.

<http://www.small-tree.com>

[http://docs.info.apple.com/article.html?  
path=ServerAdmin/10.4/en/c3ha3.html](http://docs.info.apple.com/article.html?path=ServerAdmin/10.4/en/c3ha3.html)

- Install the latest Xcode 2.4
- Open the Terminal application and enter the following:

```
curl -O http://apache.mirrors.esat.net/httpd/  
httpd-2.2.3.tar.gz (downloads the source code for  
Apache)
```

```
guntar -xzf httpd-2.2.3.tar.gz
```

```
cd httpd-2.2.3  
sudo ./configure \  
--prefix=/apache2 \  
--enable-module=most \  
--enable-shared=max  
sudo make  
sudo make install
```

```
curl -O http://apache.mirrors.esat.net/httpd/  
httpd-2.2.3.tar.gz (downloads the source code for  
Apache)
```

```
gnutar -xzf httpd-2.2.3.tar.gz
```

```
cd httpd-2.2.3  
sudo ./configure \  
--prefix=/apache2 \  
--enable-module=most \  
--enable-shared=max  
sudo make  
sudo make install
```

```
curl -O http://apache.mirrors.esat.net/httpd/  
httpd-2.2.3.tar.gz (downloads the source code for  
Apache)
```

```
guntar -xzf httpd-2.2.3.tar.gz
```

```
cd httpd-2.2.3
```

```
sudo ./configure \  
--prefix=/apache2 \  
--enable-module=most \  
--enable-shared=max  
sudo make  
sudo make install
```

```
curl -O http://apache.mirrors.esat.net/httpd/  
httpd-2.2.3.tar.gz (downloads the source code for  
Apache)
```

```
gunzip httpd-2.2.3.tar.gz
```

```
cd httpd-2.2.3
```

```
sudo ./configure \  
--prefix=/apache2 \  
--enable-module=most \  
--enable-shared=max
```

```
sudo make
```

```
sudo make install
```



```
curl -O http://apache.mirrors.esat.net/httpd/  
httpd-2.2.3.tar.gz (downloads the source code for  
Apache)
```

```
gunzip httpd-2.2.3.tar.gz
```

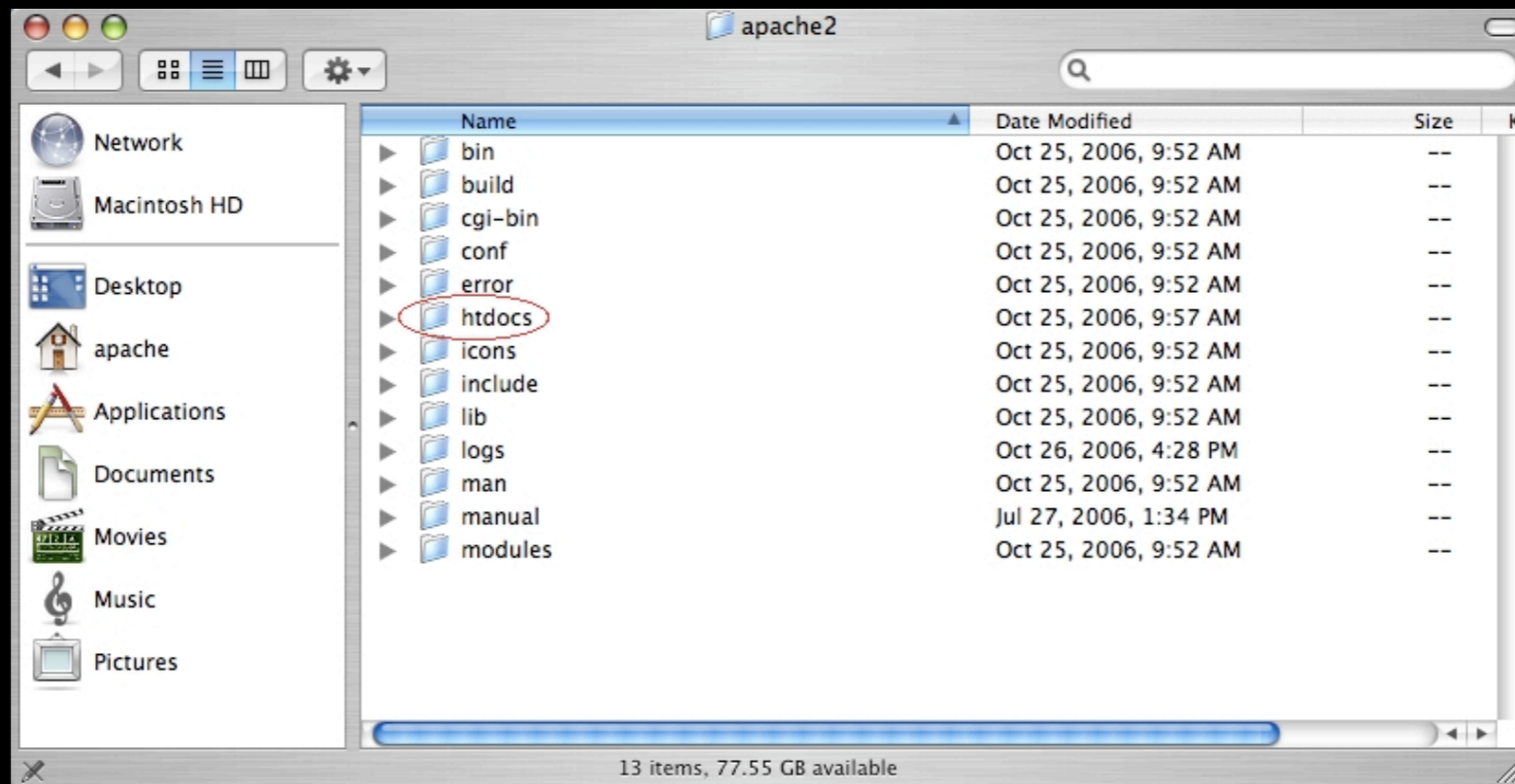
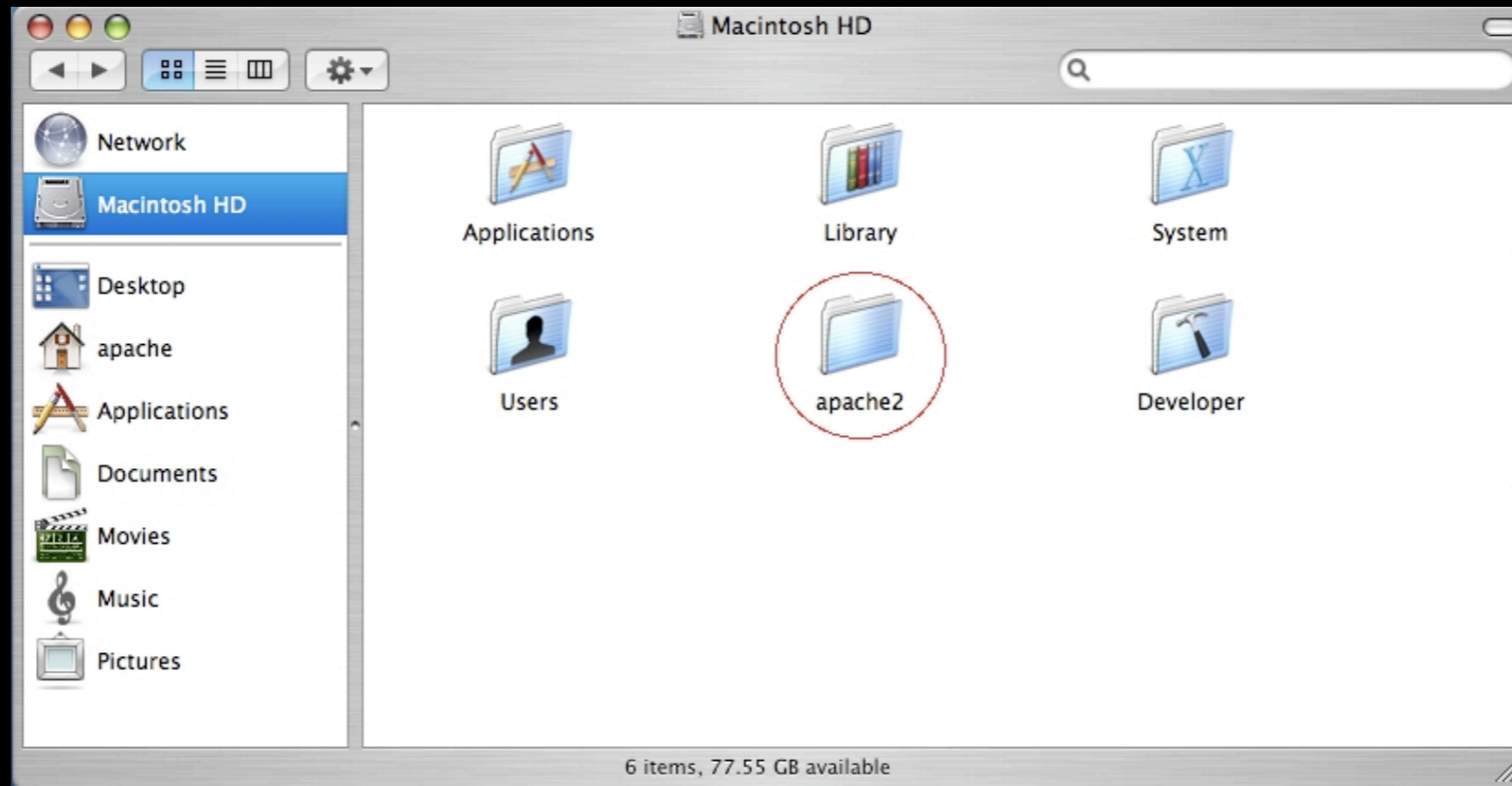
```
cd httpd-2.2.3  
sudo ./configure \  
--prefix=/apache2 \  
--enable-module=most \  
--enable-shared=max  
sudo make  
sudo make install
```

```
curl -O http://apache.mirrors.esat.net/httpd/  
httpd-2.2.3.tar.gz (downloads the source code for  
Apache)
```

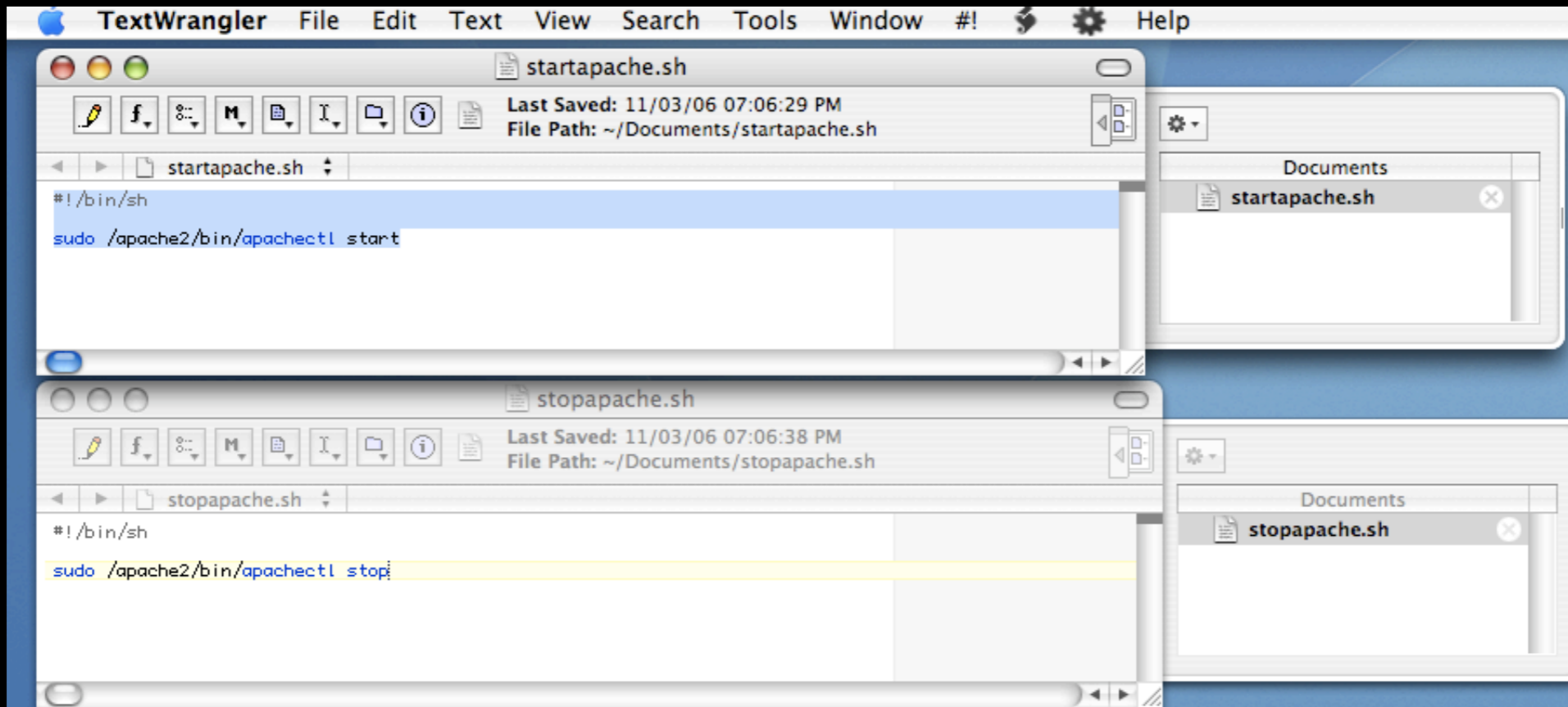
```
guntar -xzf httpd-2.2.3.tar.gz
```

```
cd httpd-2.2.3  
sudo ./configure \  
--prefix=/apache2 \  
--enable-module=most \  
--enable-shared=max  
sudo make  
sudo make install
```

# Results



- Use your favorite text editor to create two scripts:

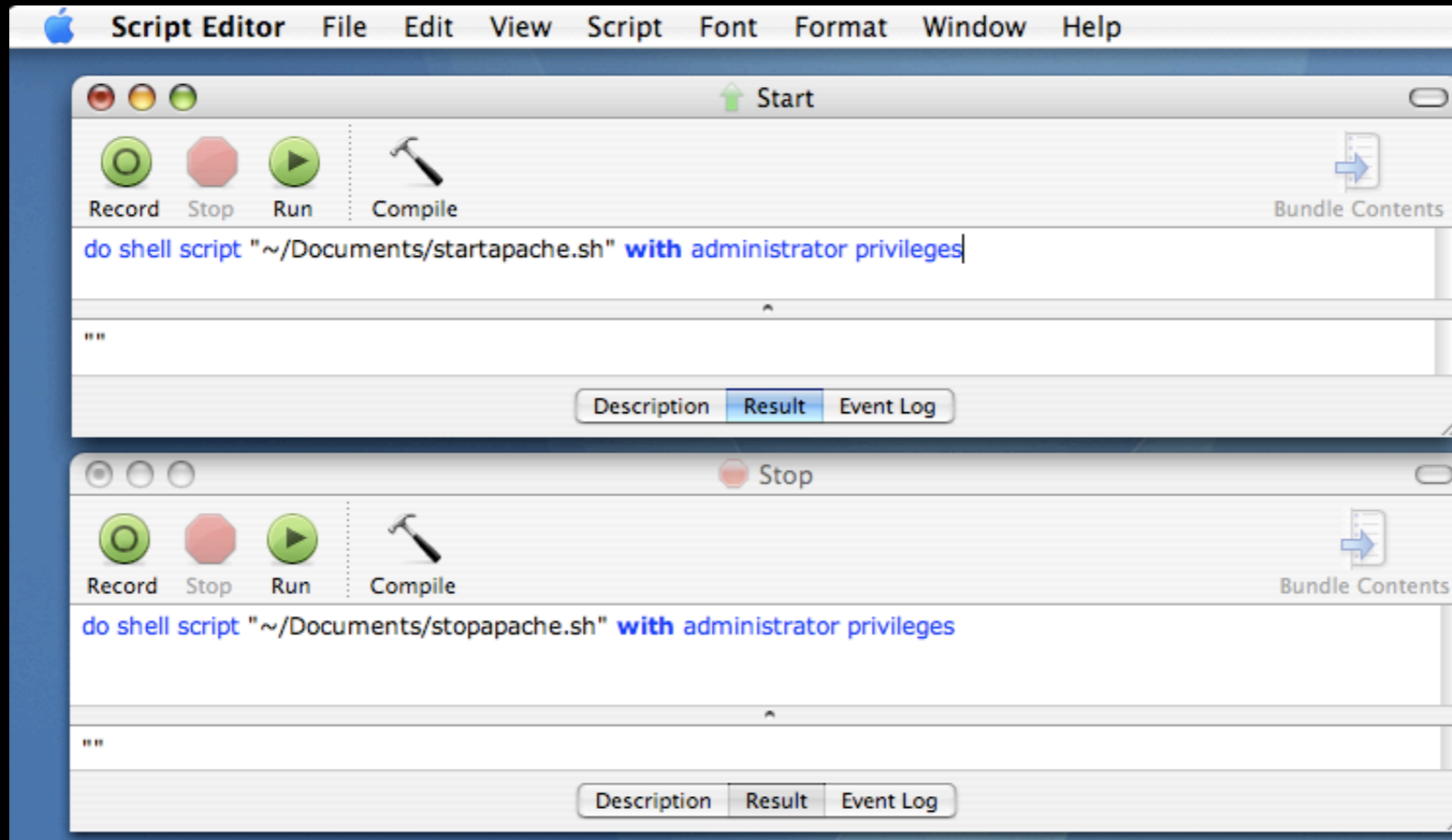


- Use the Terminal to make the scripts executable:

```
chmod +x ~/Documents/startapache.sh
```

```
chmod +x ~/Documents/stopapache.sh
```

- Open Script Editor. Create two scripts to launch the shell scripts with admin privileges.



- File-Save As-choose Application. Give them some pretty looking icons.

# Apache Server Setup

- Copy your image(s) to the htdocs folder.
- Run the Start Apache Applescript.
- Test
- Maintain



Macintosh HD



DesktopIntel.dmg



LaptopIntel.dmg



DesktopPPC.dmg



LaptopPPC.dmg



# Testing

- Open a browser on another machine.
- Enter `http://<IP or DNS address of the server>/image.dmg`



**Movies. Now playing on an iPod near you.**



**iPod nano**  
Completely remastered.



**Aperture**  
Version 1.5  
Everything you need for after the shoot. Now with more than 20 new features.

**iTunes 7**  
Free Download

**Music**  
Over 3.5 million songs. 99¢ each.

**Movies**  
New and classic films from \$9.99

**TV shows**  
200+ shows at \$1.99 an episode.

**Audiobooks**  
More than 20,000 titles.

**Podcasts**  
65,000 and counting. 100% free.

**iPod Games**  
\$4.99 each. Countless hours of fun.

**The new iMacs.**  
Faster. Bigger. Brighter.



- Keeping the Steins**  
Movie Just Added
- iTunes Top Songs**
1. My Love (Single Version)  
Justin Timberlake featuring T.I.
  2. Smack That  
Akon
  3. Fergalicious  
Fergie
  4. How to Save a Life  
The Fray
  5. Lips of an Angel  
Hinder

**Top Stories**  
XML [Subscribe to Hot News RSS](#) November 04, 2006 02:50 PM PST

**November 03, 2006**

**iPod shuffle: "a perfect stocking stuffer"**  
"The second-generation iPod shuffle is impressively small," writes Mike Kobrin for PC Magazine, "and the built-in clip makes it ideal for working out, running, or just casual listening."

**Apple Announces New 8GB Model of iPod nano (PRODUCT) RED Special Edition**  
In response to outstanding customer demand, Apple today announced a new 8GB model of the iPod nano (PRODUCT) RED Special Edition. The new model holds up to 2,000 songs and is available for \$249, joining the 4GB model priced at \$199. Apple will contribute \$10 from the sale of each iPod nano (PRODUCT) RED to the Global Fund to help fight HIV/AIDS in Africa.

**Roger O'Donnell: One Man, One Instrument**  
As keyboardist for The Psychedelic Furs, The Thompson Twins, and The Cure, Roger O'Donnell helped define the sound of the '80s. And now with his first solo effort, his creative floodgates have truly opened.

**.Mac**  
Get a 60-day free trial

Internet Essentials for your Mac   
[Learn More](#)

Your personal hard disk on the Internet

- Events**
- [Photo Plus Expo — New York City](#)  
Nov 2-4
  - [Data Retention & Recovery Seminar](#)  
Nov 5- Dec 7
  - [InterBEE — Makuhari, JP](#)  
Nov 15-17
  - [Aperture Test Drive Seminar](#)



# Maintenance

- Updated images created and uploaded to the server.
- Run the Stop Apache server Applescript.
- Replace the image file in the htdocs folder.
- Run the Start Apache server Applescript.



Macintosh HD



DesktopIntel.dmg



# Contact Info

[keepfirewirealive@gmail.com](mailto:keepfirewirealive@gmail.com)

So how does  
Penn State University  
deploy their images?

Hint: It starts with “PSU”...

# Penn State's Environment

- ~655 Managed Macs
- Many different network segments
- No DHCP services on segments - by design
- All PowerPC Macs in labs for Fall 2006/Spring 2007 semesters
- Testing Intel Macs for Summer 2007 rollout

# Booting the Macs ...

- Use external FireWire disks
- Install Mac OS X 10.4.8
- Create admin accounts with different images to restore
- Install ncutil 3.1.1
- Install PSU Blast Image Config, add to startup items, configure autorun prefs

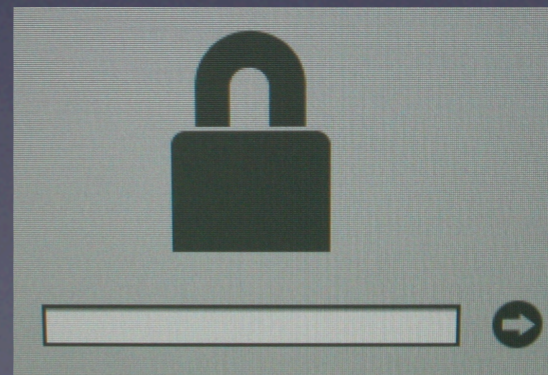


# Password Protection

- Power up the Mac, hold the 'Option' key down to bring up the boot picker
- If security is enabled, the password dialog will appear (PowerPC):



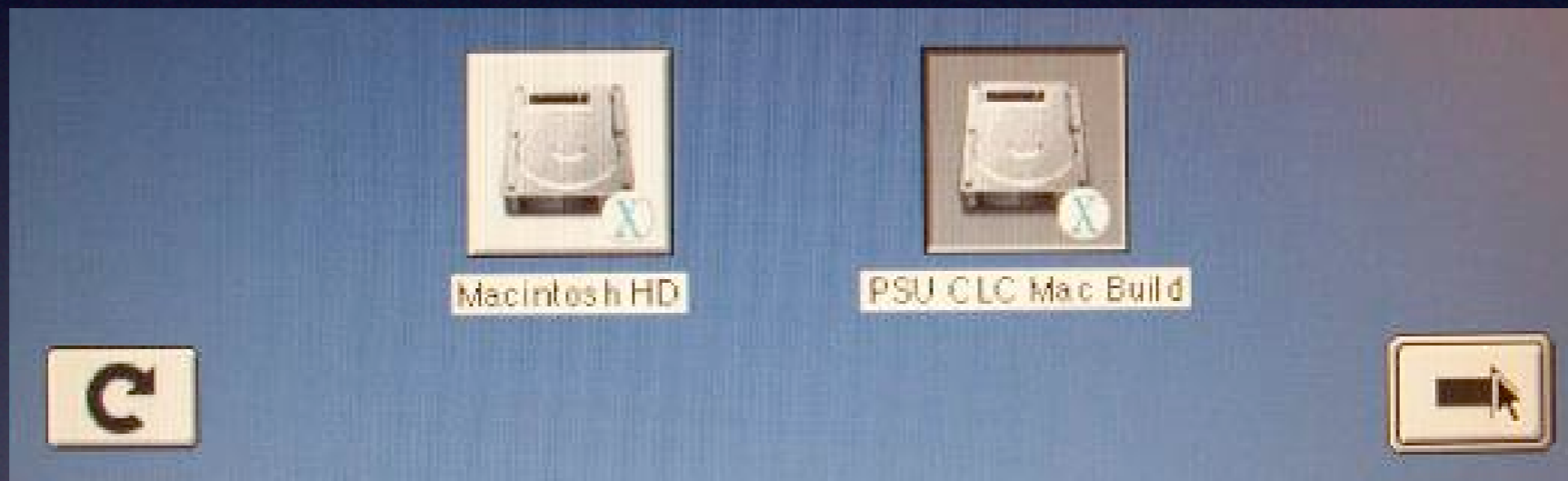
- Intel:





# Boot Picker

- After entering the security password select the volume to boot with (PowerPC):



- Intel:



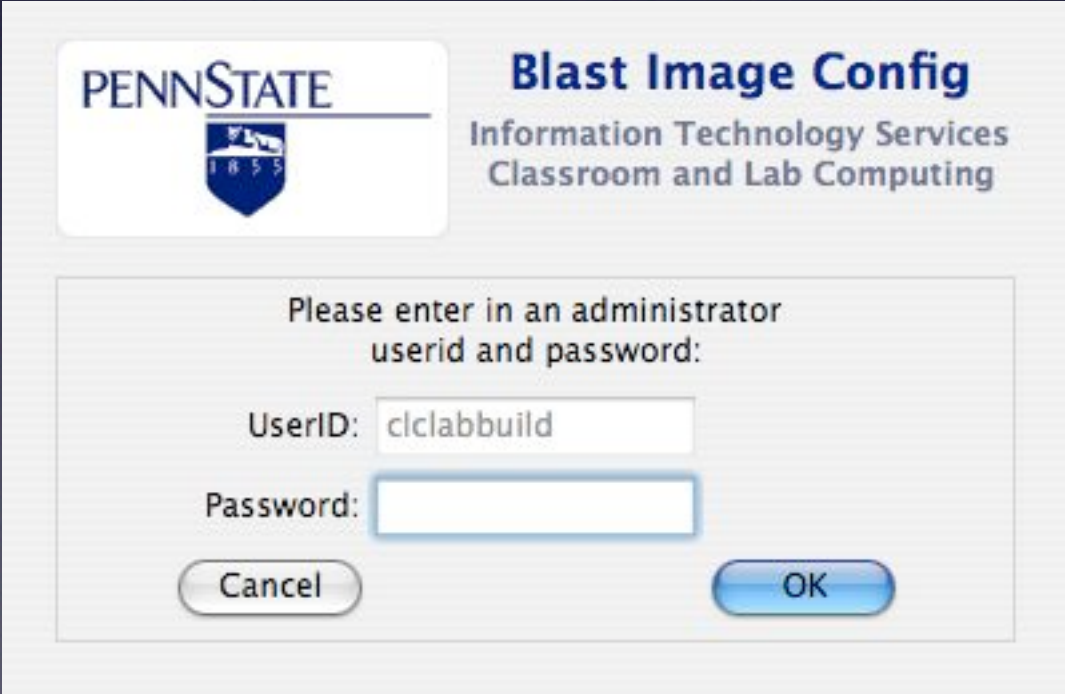
# Login

- Login as the 'CLC Lab Build' admin user



# PSU Blast Image Config Starts up...

- PSU Blast Image Config set as the startup item for the 'CLC Lab Build' admin user
- Enter in password for CLC Lab Build user



The screenshot shows a login dialog box for 'Blast Image Config'. In the top left corner is the Penn State logo with the text 'PENNSTATE' and '1855'. To the right of the logo, the title 'Blast Image Config' is displayed in a bold blue font, with the subtitle 'Information Technology Services Classroom and Lab Computing' below it. The main area of the dialog contains the instruction 'Please enter in an administrator userid and password:'. Below this instruction are two input fields: 'UserID:' with the text 'clclabbuild' entered, and 'Password:' with an empty field. At the bottom of the dialog are two buttons: 'Cancel' on the left and 'OK' on the right.

# Configure Firmware Security

- Configure the Firmware security to prevent booting from other volumes at startup without a password (Intel/EFI):

**Extended Firmware Interface Security Options**

Mode

None (Disabled)

Command (Recommended)

Password Firmware Version: EFI

Use Admin Password

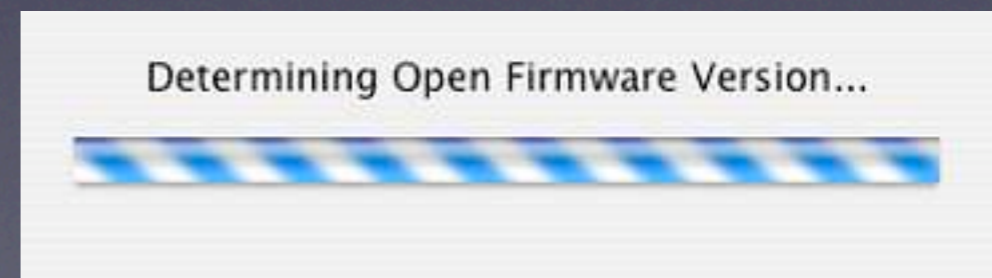
Specify Different Password:

Password:

Confirm:

Cancel Apply Skip

- Autorun (PowerPC):



# Date and Time

- Enter in the date and time

**Configure Date and Time**

**Date Set**

Current System Date:  
8/24/04

Month Day Year  
08 / 24 / 2004

**Time Set**

Current System Time:  
12:49:02 PM

Time Format: 12  
 AM  PM

Hour Minute  
12 : 49

Date and time updated.

Quit Apply Continue

# Network Settings

- Select Network Config on restored disk

How do you want the network settings configured on the restored disk?

Don't Modify  DHCP  Static IP

- Static IP:

Enter Network Settings:

IP Address:  
192 . 168 . 1 . 50

Subnet Mask:  
255 . 255 . 255 . 0

Router:  
192 . 168 . 1 . 1

# Configure DNS

- Enter in DNS Servers (Can be automated)

**Enter DNS Server Settings:**

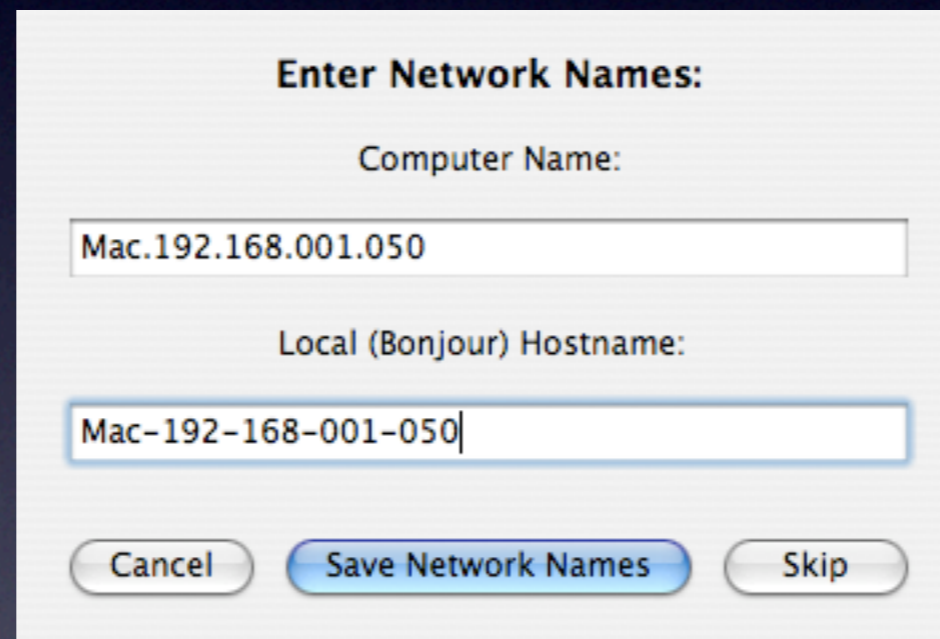
Primary DNS Server:  
192 . 168 . 1 . 200 ✓

Second DNS Server:  
192 . 168 . 1 . 201 ✓

Third DNS Server:  
192 . 168 . 1 . 202 ✓

# Configure Network Names

- Enter in Network Names (Can be automated)



**Enter Network Names:**

Computer Name:  
Mac.192.168.001.050

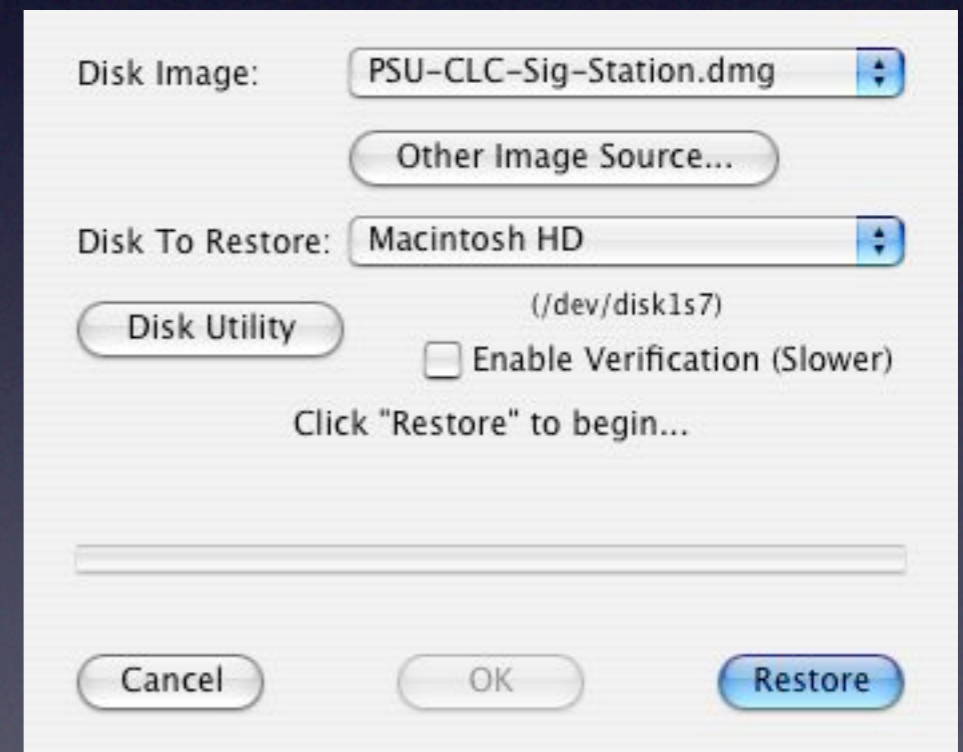
Local (Bonjour) Hostname:  
Mac-192-168-001-050

Cancel Save Network Names Skip



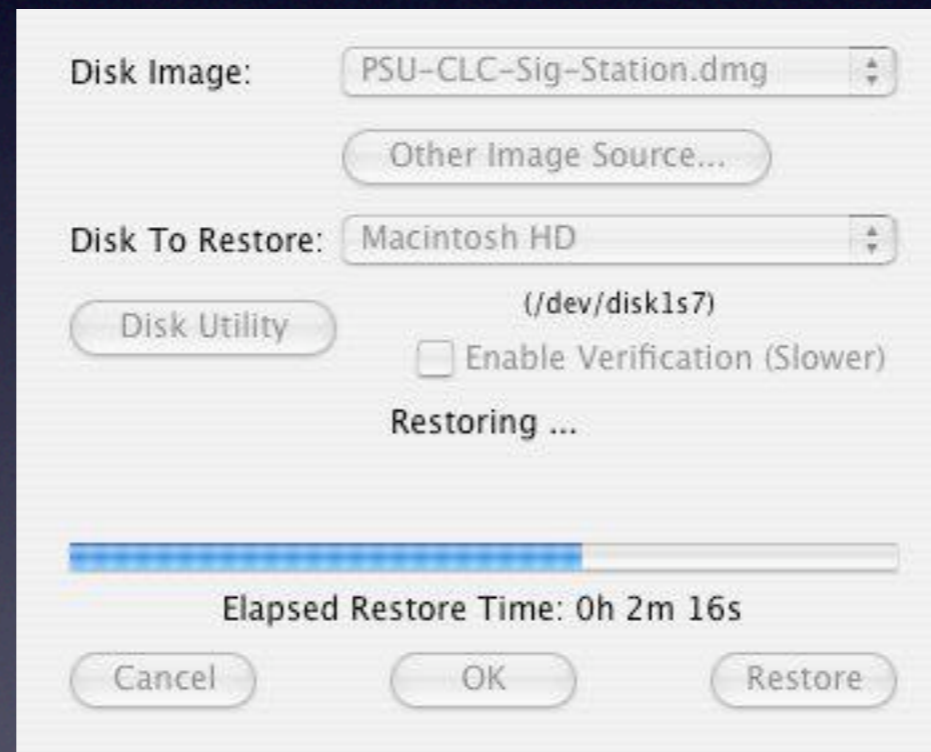
# Restore Dialog

- Select 'Disk Image' to restore
  - Image can be on local disk, or mounted server, or specified via http
- Select 'Disk to Restore' to
- 'Enable Verification' if the image was scanned
- Can be automated



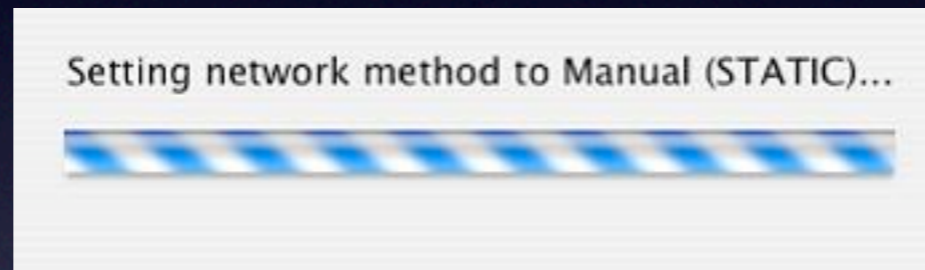
# Restore in Process...

- Elapsed Timer during restore process



# Apply Network Settings

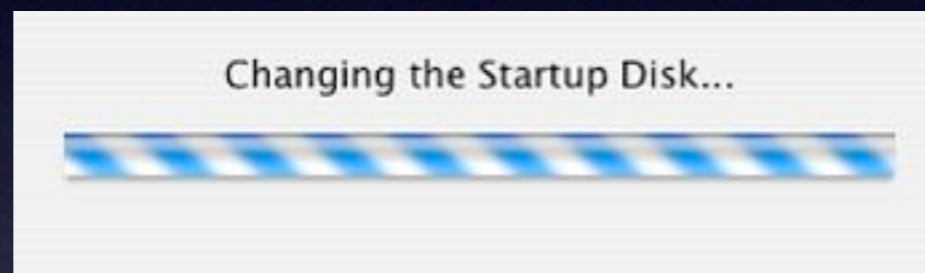
- Network settings specified before restore started are applied to the restored disk via ncutil



- ncutil can do some things better than Apple's networksetup and scutil commands
- ncutil download here:
  - <http://deaddog.duch.udel.edu/ncutil/>

# Change the Startup Disk

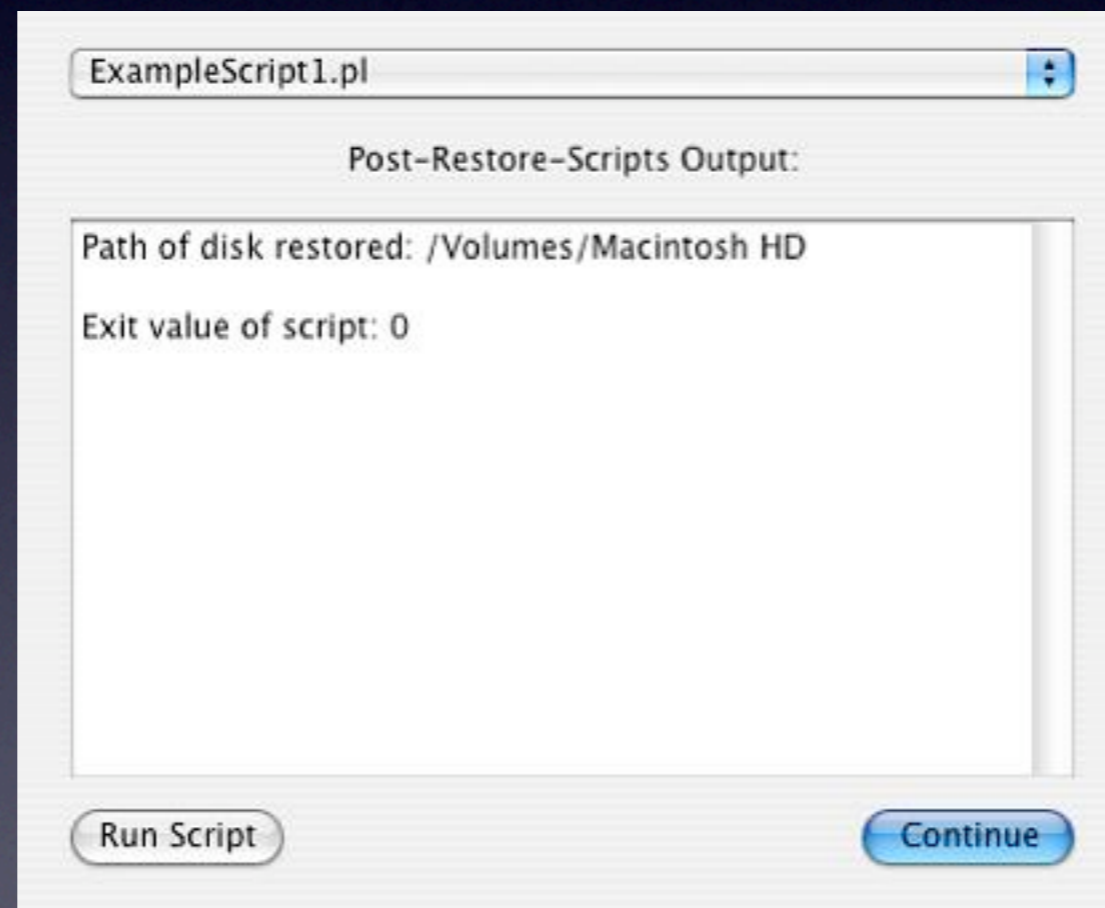
- The startup disk setting is then changed to the restored disk



- Uses the 'bless' command and does the appropriate settings based on PowerPC or Intel Mac

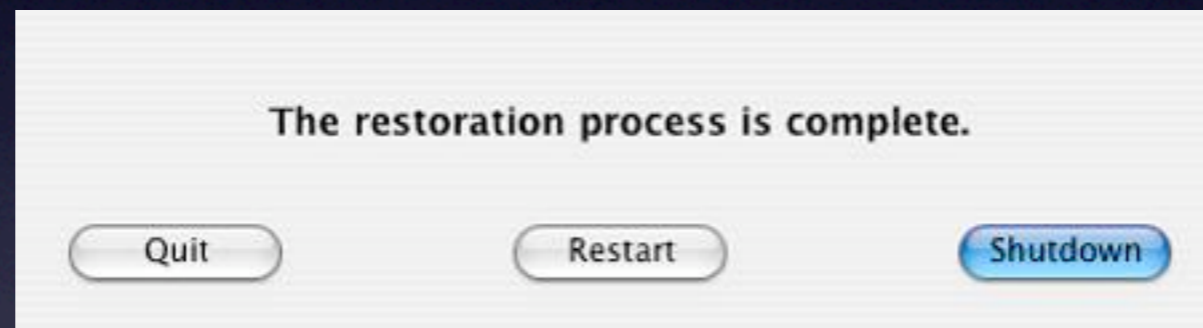
# Run Post Restore Script

- Post restore scripts can be executed (shell, perl, command line)



# Completion Options

- Once everything is done, do you want to Quit, Restart, or Shutdown?



- All steps that do not require entering in text can be automated via autorun preferences.
- Date and time can be skipped if desired.

# Contact Info

Justin Elliott

[jelliott@psu.edu](mailto:jelliott@psu.edu)

# Q&A / Discussion



# Continue the learning ...

- ***IT841: Maintaining Order - Effective Image Maintenance Techniques***
  - Thursday @ 3:30 pm - 5:00 pm
- ***IT851: Client Management Fundamentals***
  - Friday @ 9:00 pm - 10:30 pm