AUTOMATING BOOTCAMP INSTALLATION

Craig Richardson
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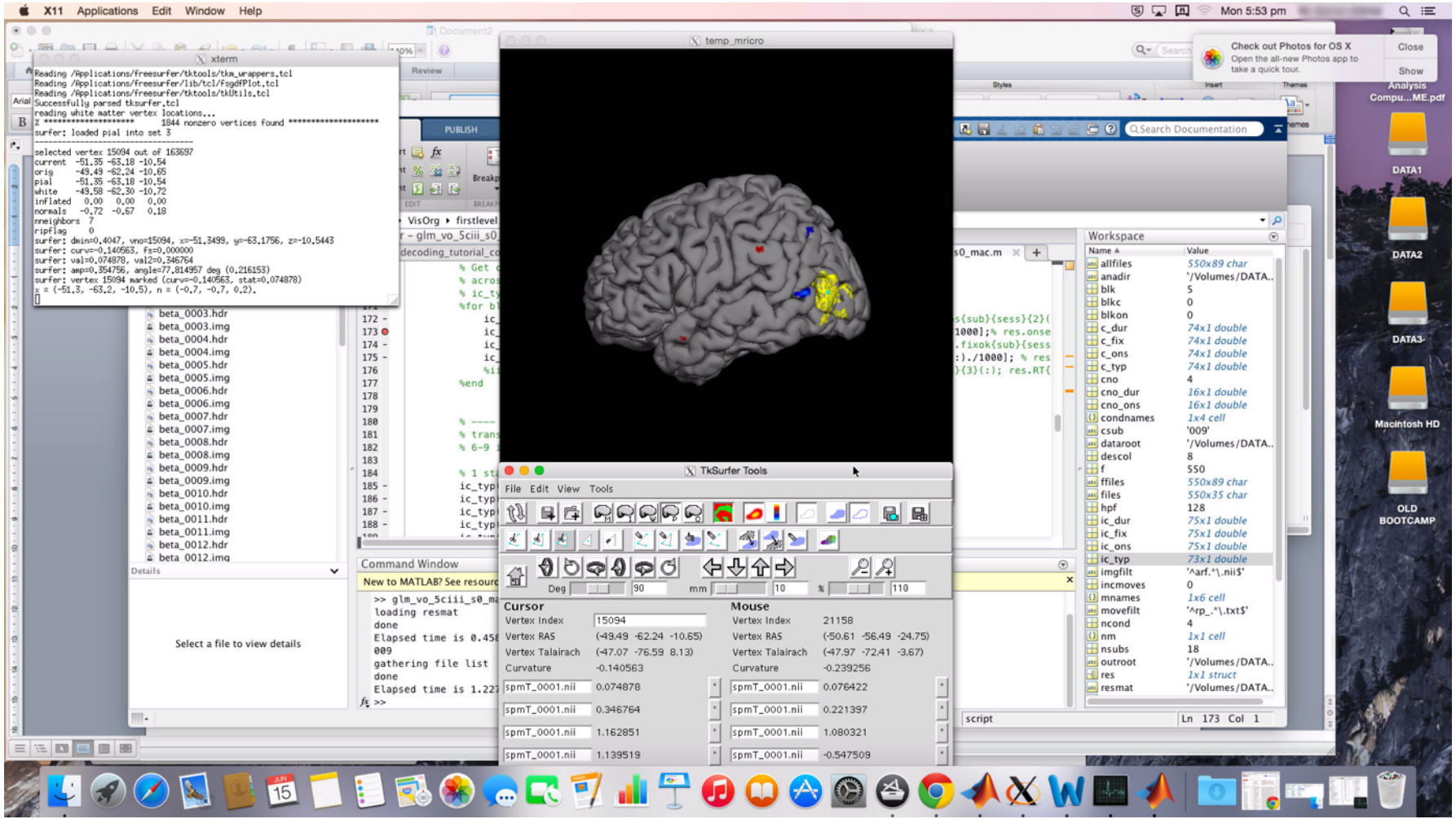
X11 Applications Edit Window Help
Mon 5:53 pm
xterm
Reading /Applications/freesurfer/tktools/tkm_wrappers.tcl
Reading /Applications/freesurfer/lib/tcl/FsgdfPlot.tcl
Reading /Applications/freesurfer/tktools/tkUtils.tcl
Successfully parsed tksurfer.tcl
reading white matter vertex locations...
Z ********** 1844 nonzero vertices found **********
surfer: loaded pial into set 3
selected vertex 15094 out of 163697
current -51.35 -63.18 -10.54
orig -49.49 -62.24 -10.65
pial -51.35 -63.18 -10.54
white -49.58 -62.30 -10.72
inflated 0.00 0.00 0.00
normals -0.72 -0.67 0.18
nneighbors 7
ripflag 0
surfer: dmin=0.4047, vno=15094, x=-51.3499, y=-63.1756, z=-10.5443
surfer: curv=-0.140563, fs=0.000000
surfer: val=0.074878, val2=0.346764
surfer: amp=0.354756, angle=77.814957 deg (0.216153)
surfer: vertex 15094 marked (curv=-0.140563, stat=0.074878)
x = (-51.3, -63.2, -10.5), n = (-0.7, -0.7, 0.2).
temp_mricro
TkSurfer Tools
File Edit View Tools
Cursor
Vertex Index 15094
Vertex RAS (-49.49 -62.24 -10.65)
Vertex Talairach (-47.07 -76.59 8.13)
Curvature -0.140563
Mouse
Vertex Index 21158
Vertex RAS (-50.61 -56.49 -24.75)
Vertex Talairach (-47.97 -72.41 -3.67)
Curvature -0.239256
spmT_0001.nii 0.074878
spmT_0001.nii 0.346764
spmT_0001.nii 1.162851
spmT_0001.nii 1.139519
spmT_0001.nii 0.076422
spmT_0001.nii 0.221397
spmT_0001.nii 1.080321
spmT_0001.nii -0.547509
Workspace
allfiles 550x89 char
anadir '/Volumes/DATA..
blk 5
blkc 0
blkon 0
c_dur 74x1 double
c_fix 74x1 double
c_ons 74x1 double
c_typ 74x1 double
cno 4
cno_dur 16x1 double
cno_ons 16x1 double
condnames 1x4 cell
csub '009'
dataroot '/Volumes/DATA..
descol 8
f 550
ffiles 550x89 char
files 550x35 char
hpf 128
ic_dur 75x1 double
ic_fix 75x1 double
ic_ons 75x1 double
ic_typ 73x1 double
imgfilt '^arf.*\.nii$'
incmoves 0
mnames 1x6 cell
movefilt '^rp_.*\.txt$'
ncond 4
nm 1x1 cell
nsubs 18
outroot '/Volumes/DATA..
res 1x1 struct
resmat '/Volumes/DATA..
Command Window
Select a file to view details
Check out Photos for OS X
Open the all-new Photos app to take a quick tour.
Close
Show
DATA1
DATA2
DATA3
Macintosh HD
OLD BOOTCAMP

Automating Boot Camp Installation

Why we standardised on Dual Boot Macs?

Pre 2000

Windows **or** Mac OS Desktop

- Unix Servers

2001 - 2006

Windows **and** Mac OS X

- Portable Unix
- Hardware costs rising

2006 - 2010

Intel Macs **with** Windows

- Fusion **or** Parallels **or** Boot Camp
- Support costs rising
- Still many Windows PCs

2010 - Present

Intel Macs with Windows as standard

- Boot Camp only
- Very few Windows PCs

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What is Boot Camp ?

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What Boot Camp is

- Running Windows natively on your Mac hardware (Dual Booting)
  - Apple's firmware customisations for booting Windows
  - Apple's Boot Camp Assistant for partitioning and creating install media
  - Apple's packaged set of Windows drivers for Mac hardware
  - Apple's Boot Camp Utility in Windows

What Boot Camp isn't

- Running Windows inside a virtual machine alongside OS X
- Other Windows software not related to booting Windows (iTunes, Quicktime etc)
- Magic

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Why not use Virtualisation, its great!

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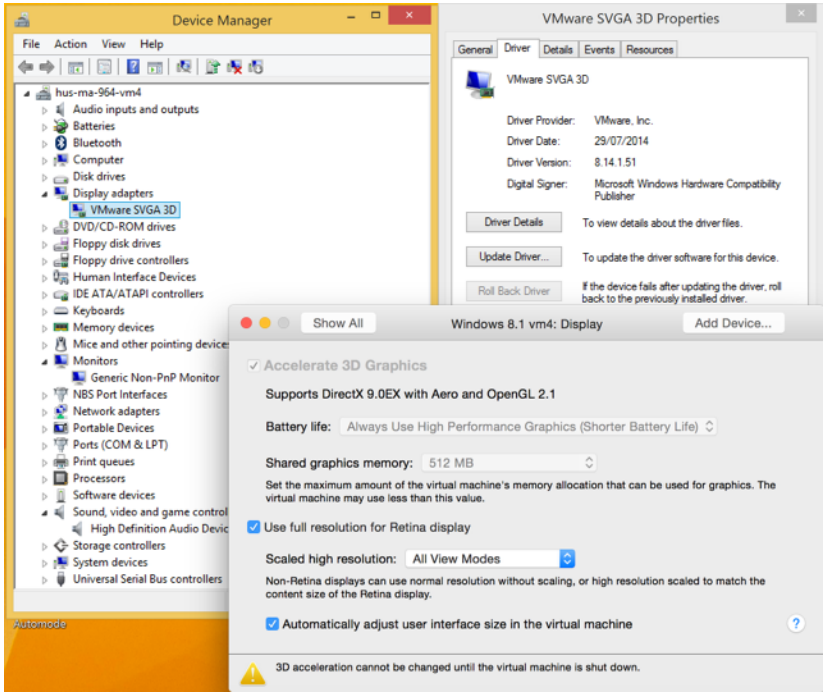
We care about milliseconds

- Virtual machines still emulate hardware.
- We measure reaction times based on presentation of visual and auditory stimuli.
- Must strive for millisecond accuracy.



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Emulated vs Real Video Hardware

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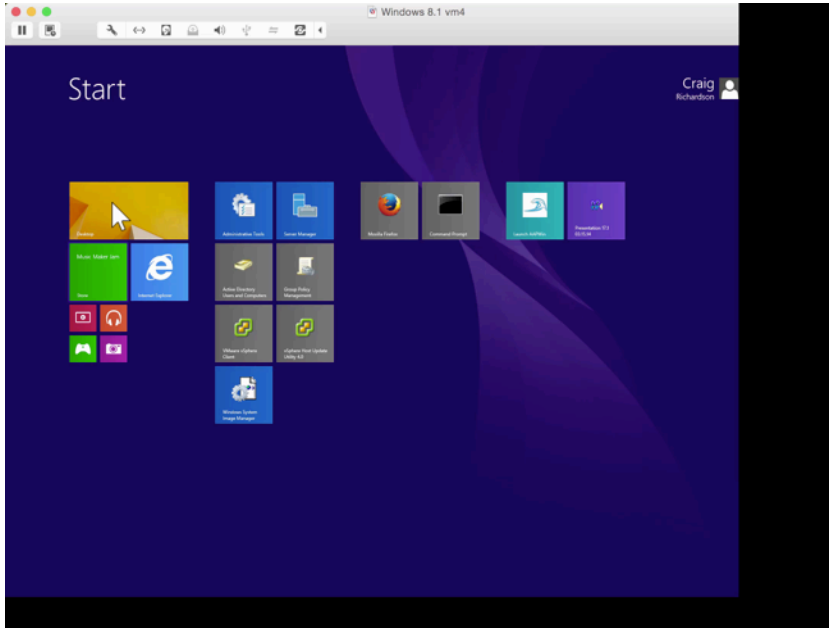
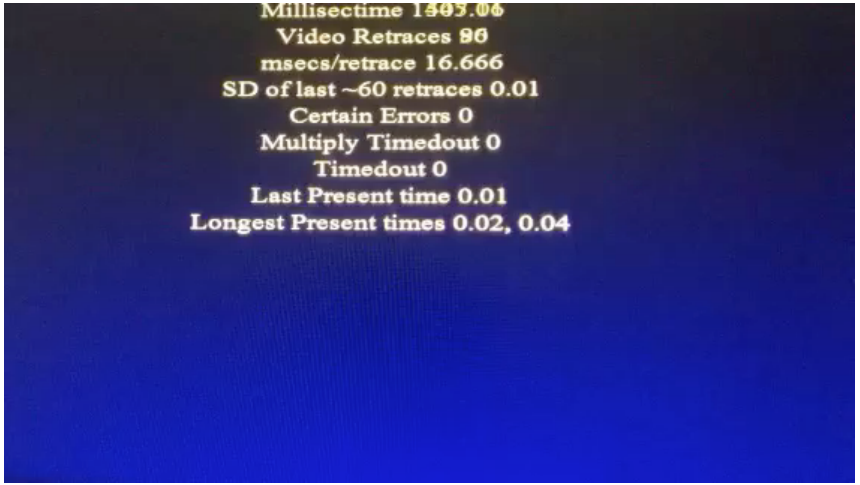
TimeDX - Emulated



TimeDX - Native



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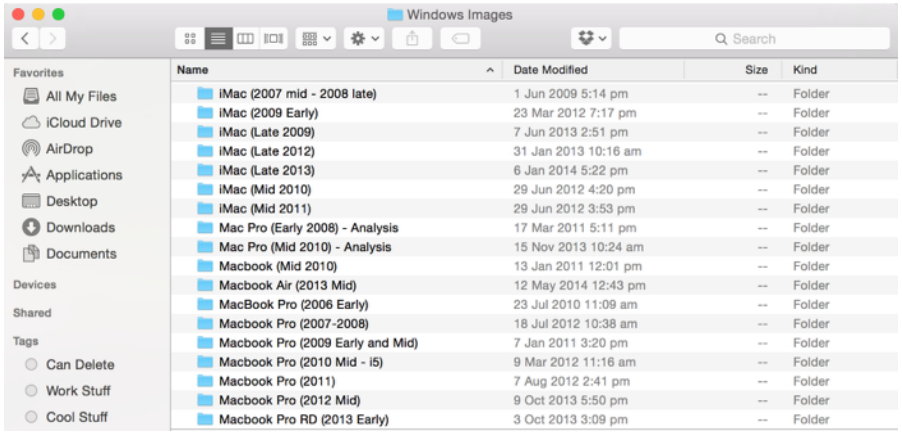
So Boot Camp is great, but ….

Too many images

- "Maintaining" far too many images.
- Older images no longer useful years later.
- Images made using different methods and tools.



Need to automate, receiving gripes about Boot Camp

- Requests for "Real" Windows
  - Deploying incorrect images leads to unhappy people.
  - Migration to Active Directory exposed Time Synchronisation issues.

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Goals for deploying Boot Camp

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Universal Image

Single system image that can be deployed to any compatible Mac.

Windows 8.1

Stop living in the past

Driverless Image

Windows should download and install driver set during first-boot.

Unattended Setup

Windows setup and configuration should be largely scripted.

Use existing tools for deployment

Ideally create something to be deployed many different ways.

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Inspirations - Brigadier

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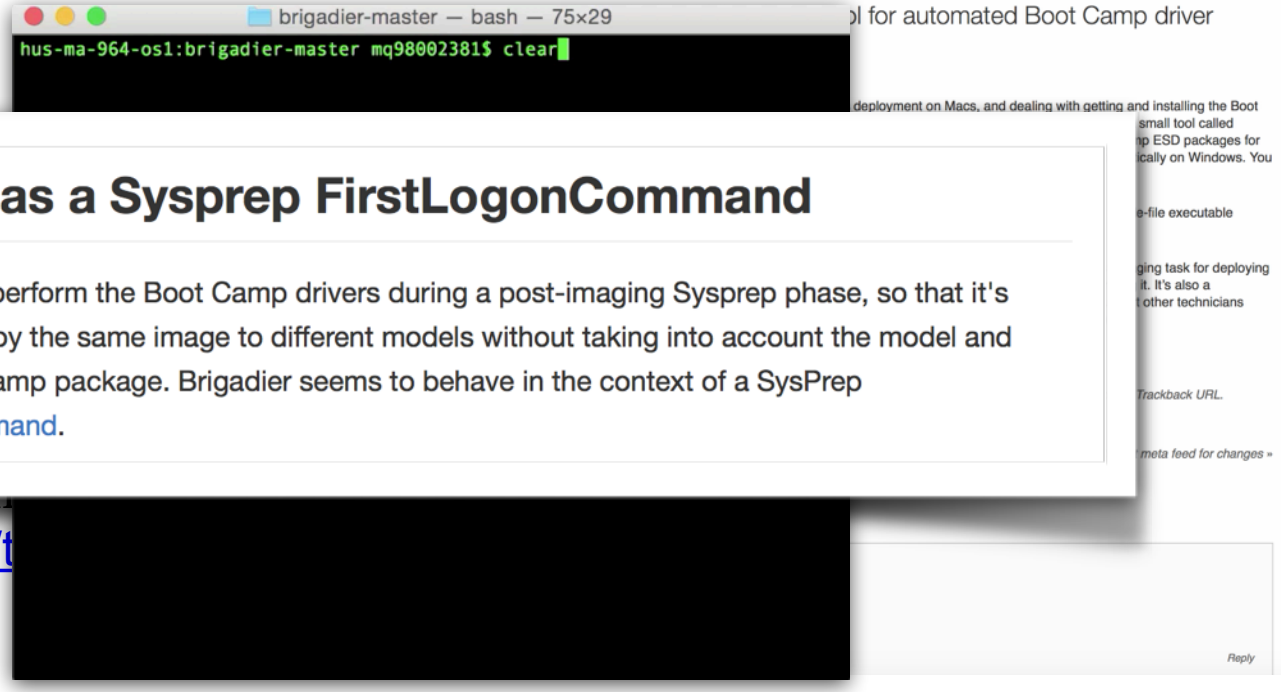
Brigadier

- Pytho
  Tim S
- Down
  for M
- Optio
  instal
- 64-bit
- https://github.com/t



http://macops.ca/introducing-brigadier-a-tool-for-automated-boot-camp-driver-download-and-installation/

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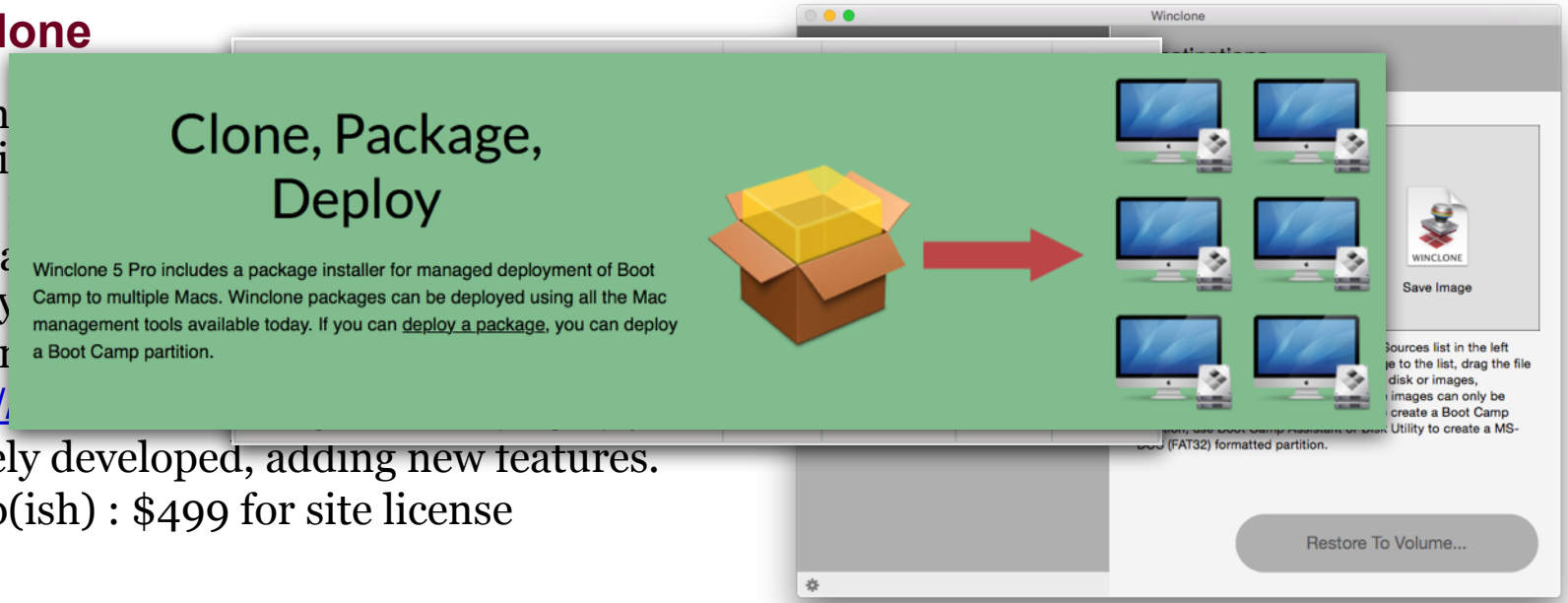
Inspirations - Winclone

Winclone

- Origin
  for usi
  NTFS
- Was sa
  a few y
- Relaun
- https:/
- Actively developed, adding new features.
- Cheap(ish) : $499 for site license



Automating Boot Camp Installation

Building a Reference Computer

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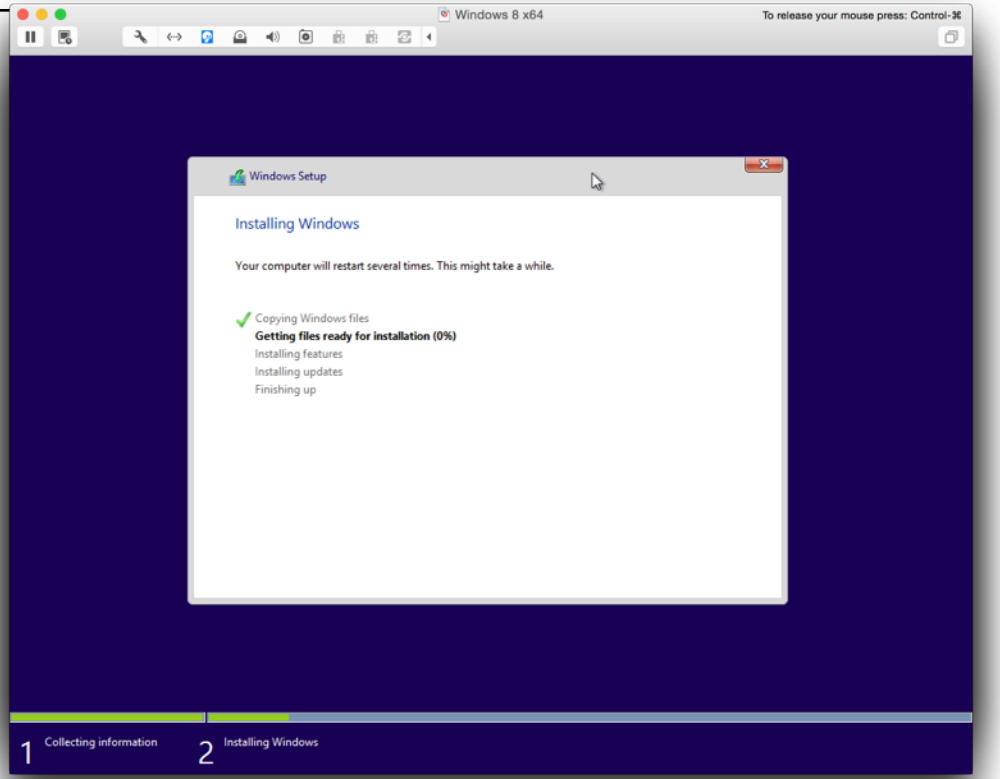
Get your newest Mac

- Boot Camp 5 required for Windows 8 drivers
- If possible use a model with Built-in ethernet
- In OSX start Boot Camp Assistant
- Create a USB installation media of Windows 8.1 and install
- Keep USB media, we'll use it later



Automating Boot Camp Installation

Audit Mode Customisations

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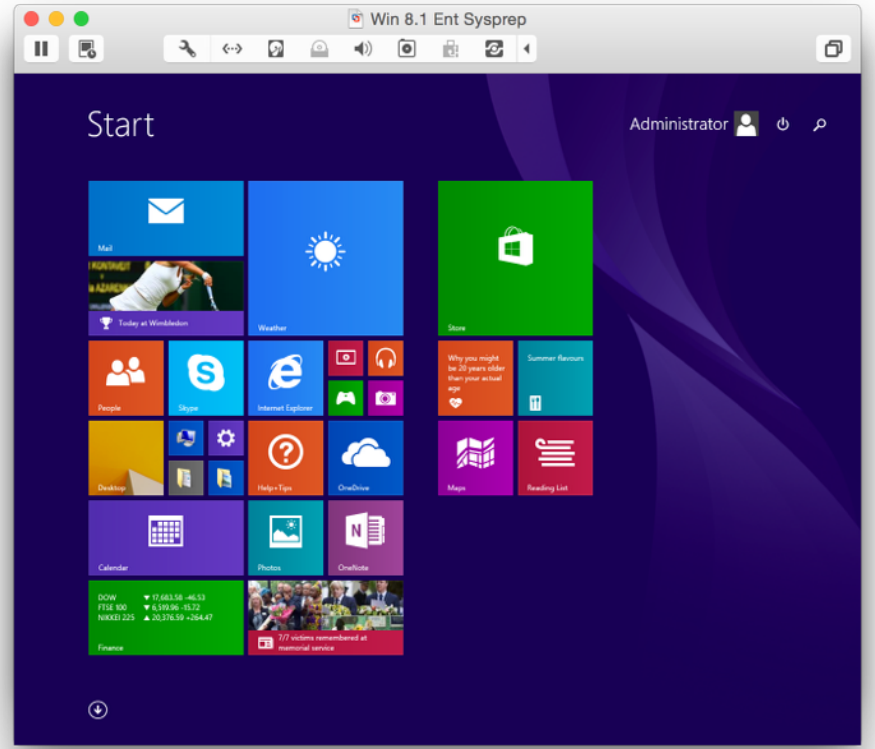
Pre-Imaging Configuration

Stopping OOBE

- After reboot Windows Installer starts the Out-of-Box-Experience (OOBE)
- Press CTRL-SHIFT-F3 to interrupt OOBE and boot to Audit Mode

Audit Mode

- Logs you into the inbuilt account ‘Administrator’
- Changes made will be applied to the Default User Template



Automating Boot Camp Installation

Audit Mode Customisations

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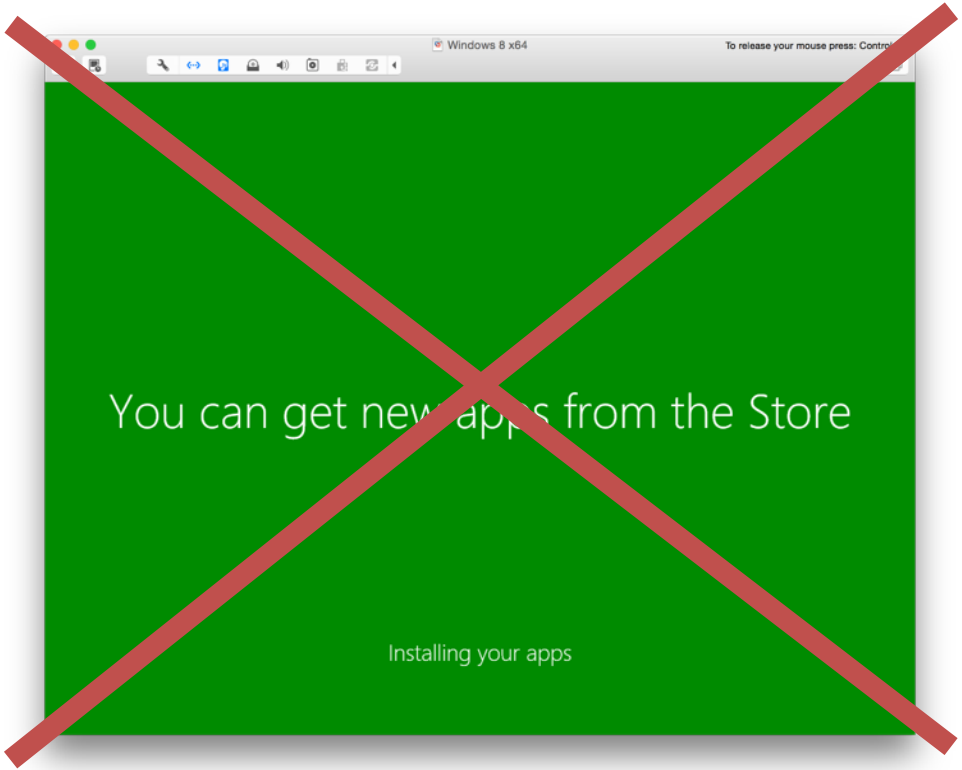
Get Online

- If reference Mac has no ethernet use a USB - Ethernet Dongle.
- Windows Drivers for it are on your USB install media
- Make copy to c:\AsixSetup64.exe

Local Group Policy

- Disable first sign-in animations
- Disable Getting Started Welcome Screen at logon
- Block signing in with Microsoft Account



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Audit Mode Customisations

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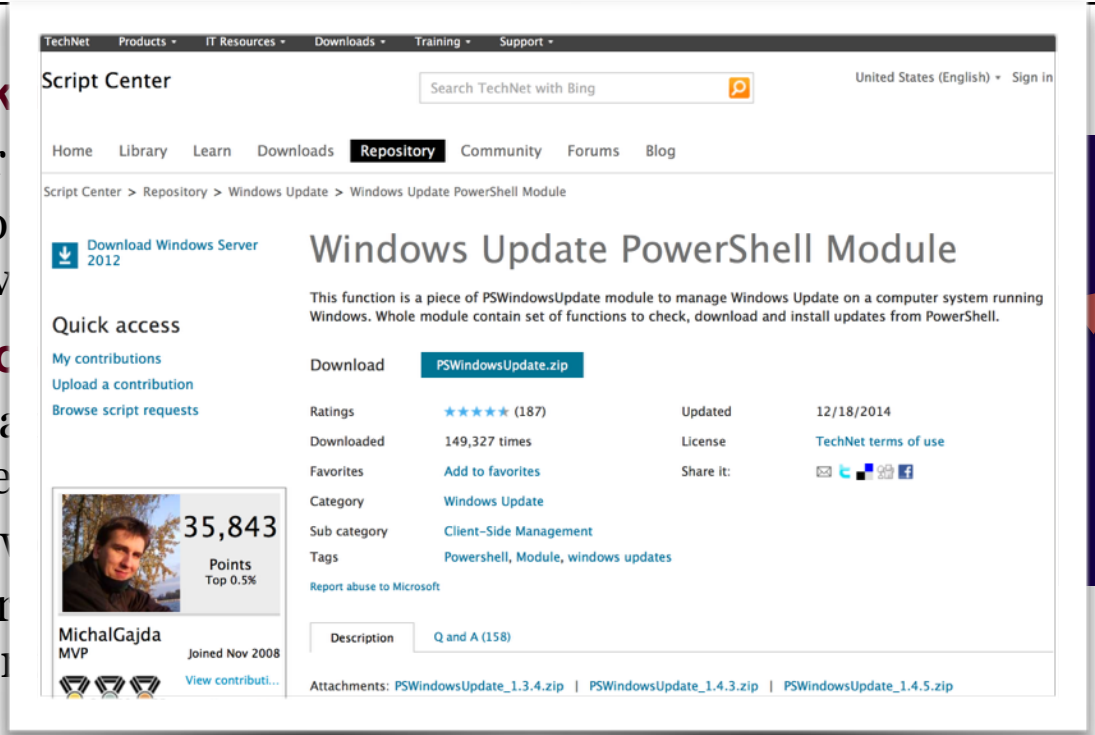
Install "Desk

- Install your
- Configure o
  (Adobe, Jav

Install Windo

- Win 8.1 disa
  Audit Mode
- Install a Pov
- Only bother
  to 8.1 that i



https://gallery.technet.microsoft.com/scriptcenter/2d191bcd-3308-4edd-9de2-88dff796b0bc

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Audit Mode Customisations

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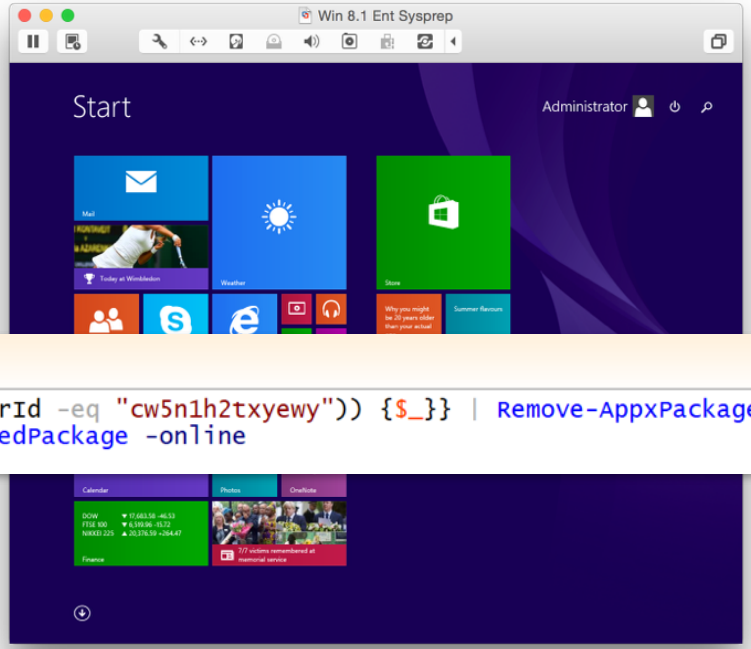
Configure Windows 8 Apps / Tiles

- Microsoft adds Live Tiles with dynamic content you cant predict
- They also hog a lot of screen real-estate that could be used for your own apps
- Delete them with Powershell commands



Remove Windows Apps.ps1

```
1   Get-AppxPackage | % {if (!($_.IsFramework -or $_.PublisherId -eq "cw5n1h2txyewy")) {$_}} | Remove-AppxPackage
2   Get-AppXProvisionedPackage -online | Remove-AppxProvisionedPackage -online
```

- Avoid installing new Windows 8 apps, will most likely break Sysprep
- https://support.microsoft.com/en-us/kb/2769827

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Audit Mode Customisations

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- Pin shortcuts to your applications
- Will reduce frustration with new Start Menu
- Make sure you are using Windows 8.1 Enterprise. Not Pro!

- Once finished with Audit Mode shutdown computer

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Automating OOBE with Sysprep

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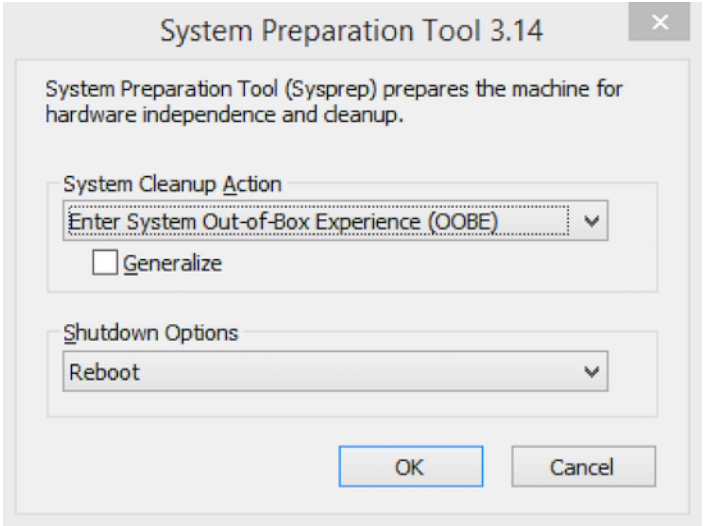
Post-Imaging Configuration

System Preparation Tool (Sysprep)

- Generalises Windows on your Reference computer so it can be used with different hardware
  - Drivers
  - Security Identifier (SIDs)
  - Computer Name
- c:\Windows\System32\Sysprep\Sysprep.exe
- Optionally provide settings for OOBE and additional post install steps provided via XML “Answer File”



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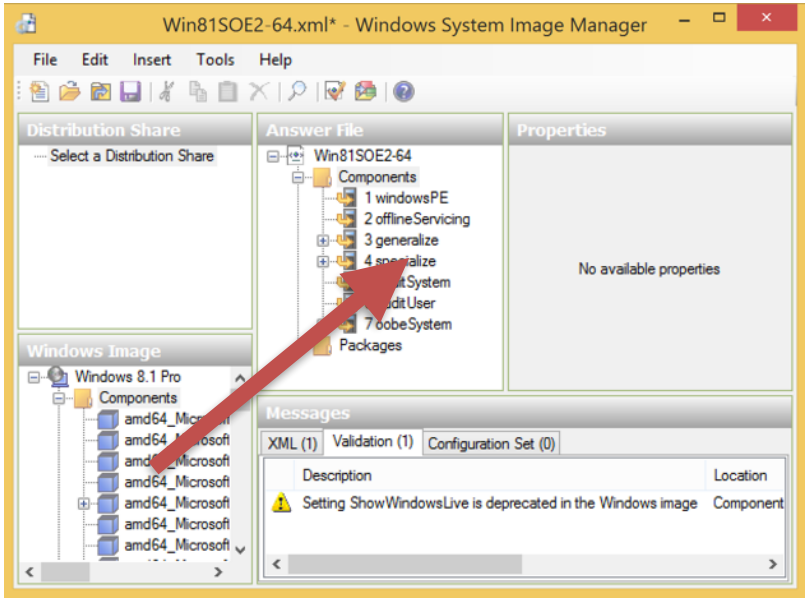
Sysprep Answer File Creation

- Download Windows Assessment and Deployment Kit (ADK)

- Install on your own computer, not the reference computer you are preparing
- Run Windows System Image Manager
- Creates a catalog of components (options) from the sources/install.wim file on your USB install media
- Drag components from the image to the Answer File section to configure



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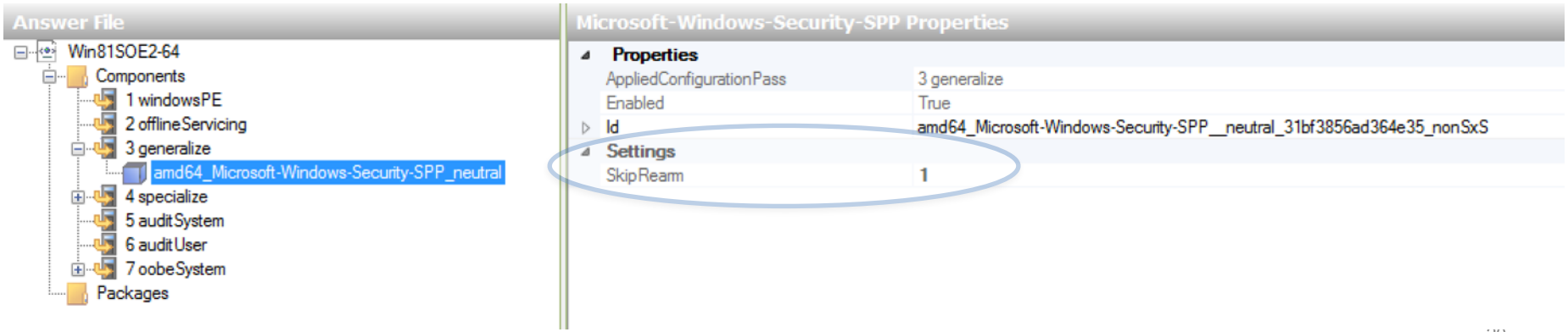
SkipRearm

- Sysprep is limited to being run three times before Windows will start to reject licensing.
- This setting is supposed to enable unlimited rearms.
- Not reliable, take backup image of your Reference computer before executing Sysprep



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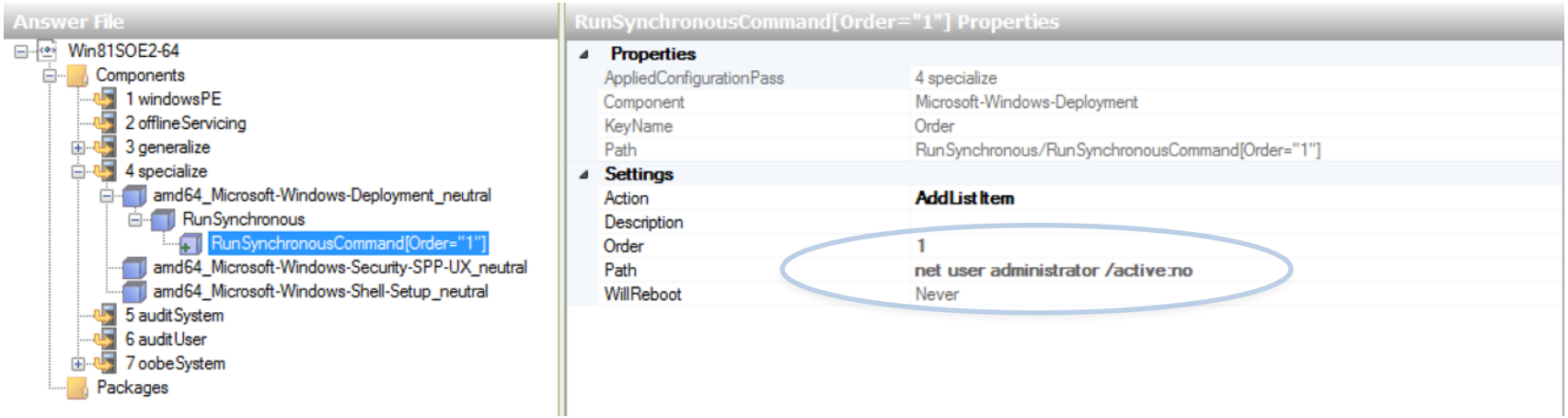
Disable Administrator Account

- We'll create a new local administrator account to use instead.



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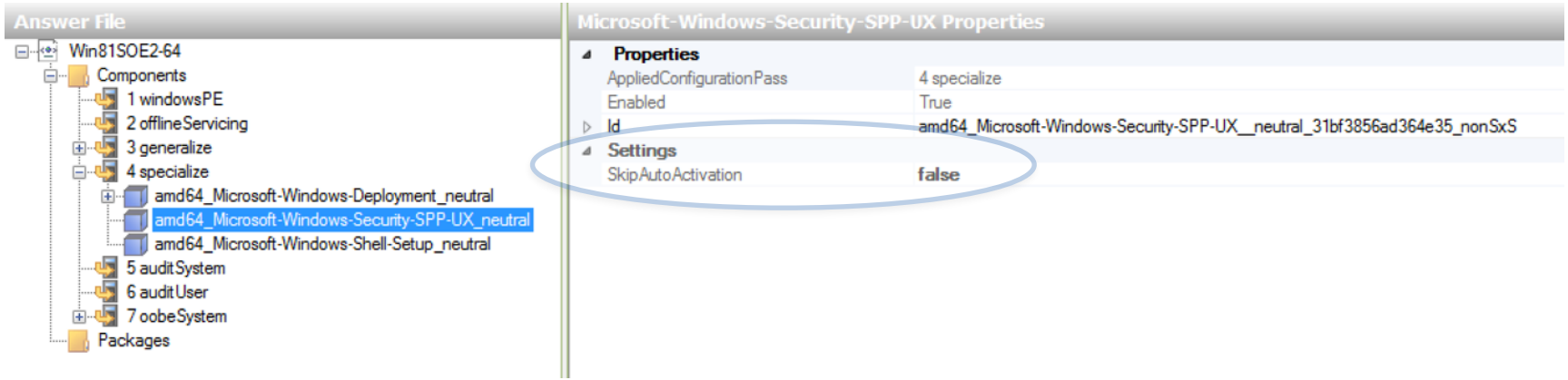
Skip Automatic Activation

- We’re going to provide a Volume License later on



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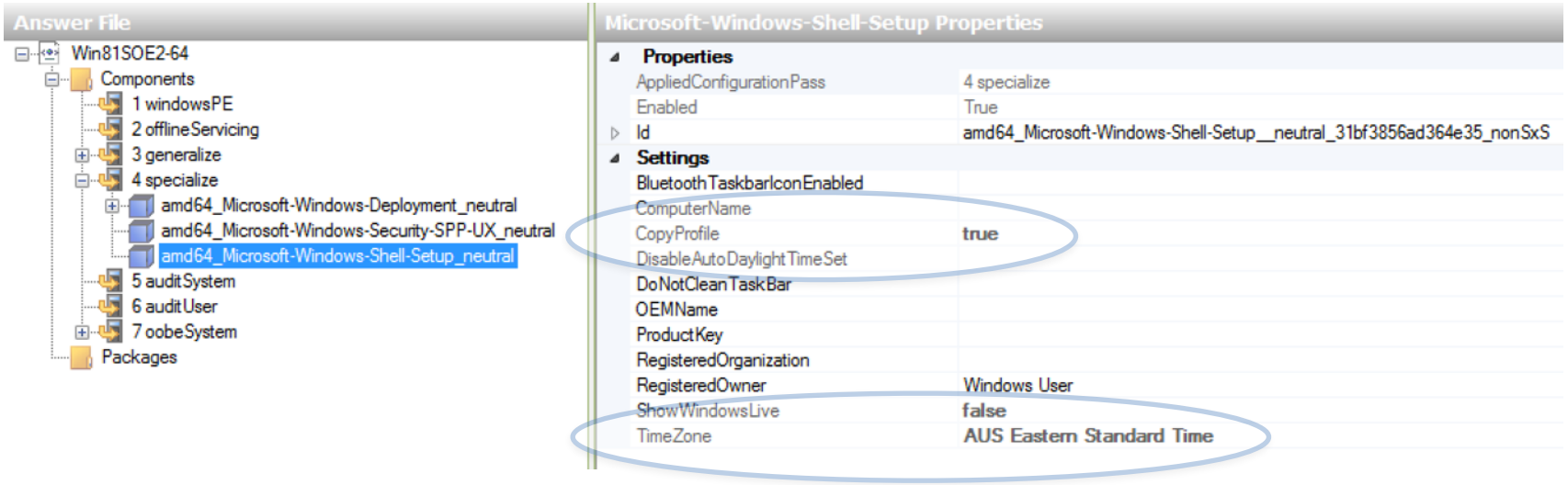
CopyProfile

- This tells Sysprep to make the Administrator account the Default User Template
- https://technet.microsoft.com/en-us/library/cc749073(WS.10).aspx



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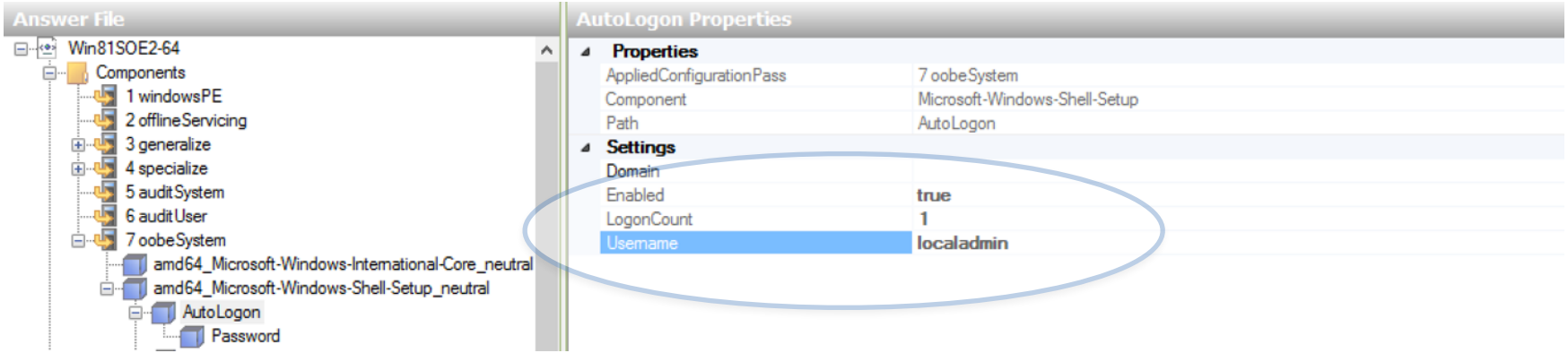
First Login Settings

- Give account details for the account to login as automatically after its first boot.



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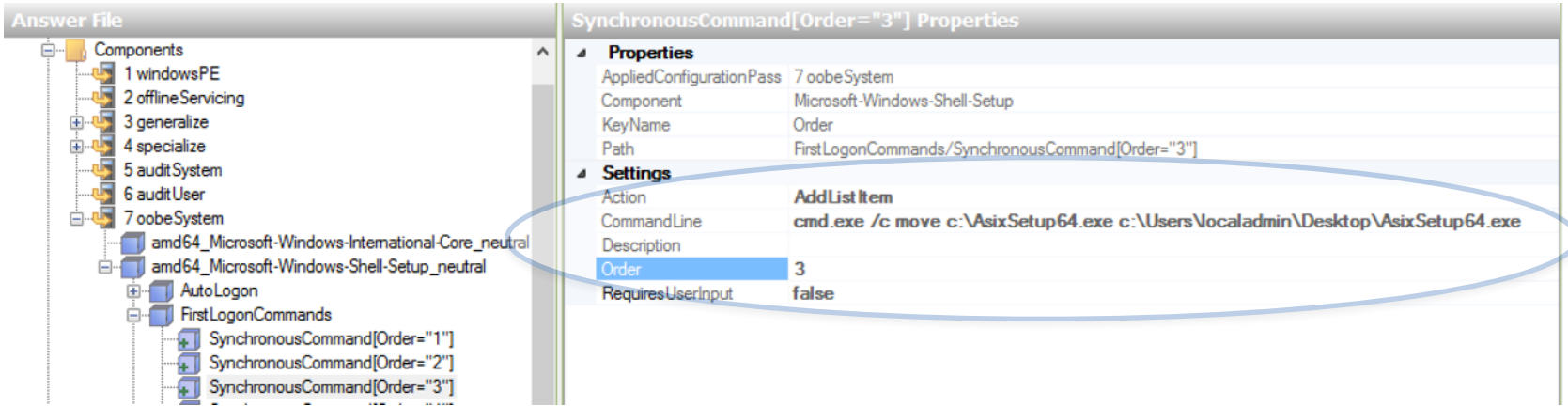
Copy resources to final locations

- Move Brigadier.exe, Anti-Virus Installer and USB Ethernet Driver from c:\ to new Local Administrators Desktop



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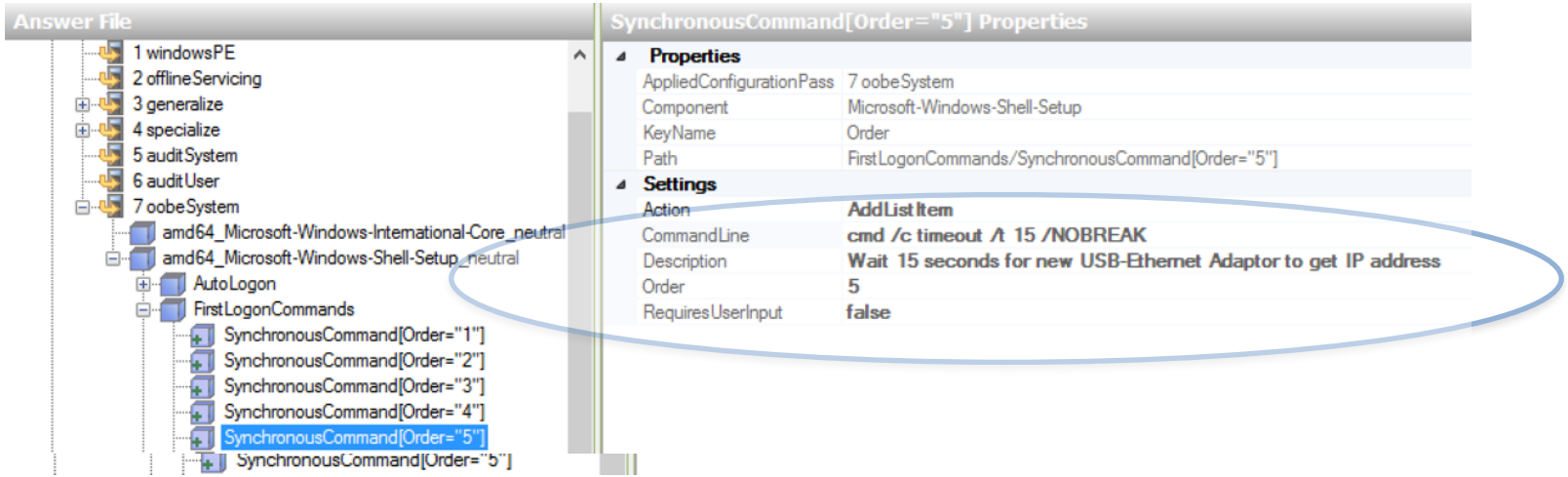
Install USB Ethernet Drivers

- Incase the Mac we are restoring to has no onboard Ethernet
- Give the drivers 15 seconds to activate and obtain IP address from DHCP



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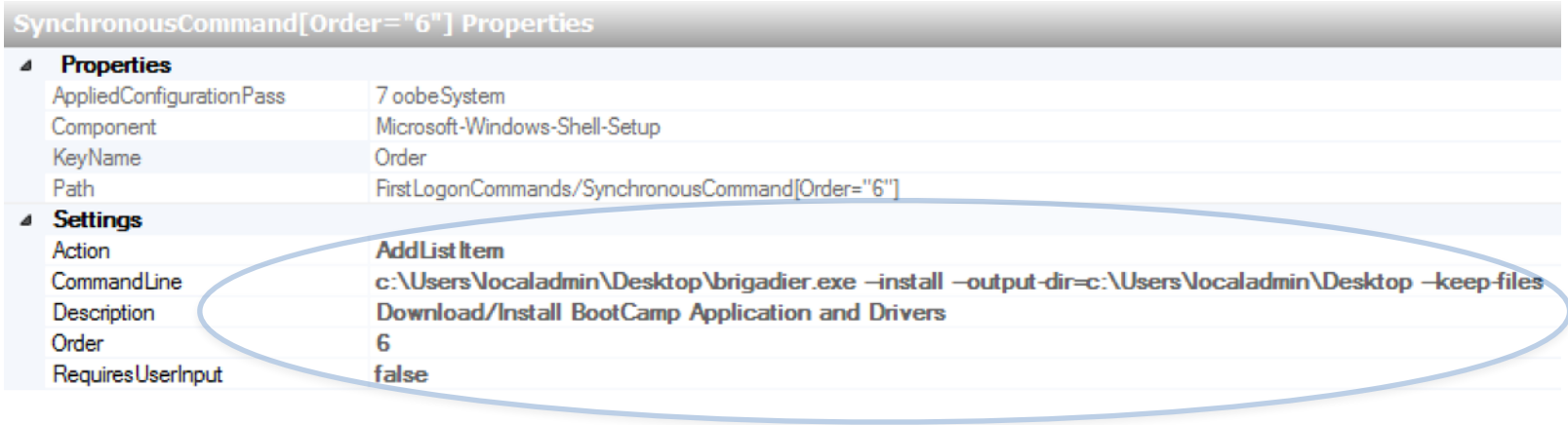
Download and install Drivers with Brigadier

- Download location is to new local administrators desktop
- Pre install 7-Zip during Audit Mode customisations



SynchronousCommand[Order="6"] Properties

Properties	
AppliedConfigurationPass	7 oobeSystem
Component	Microsoft-Windows-Shell-Setup
KeyName	Order
Path	FirstLogonCommands/SynchronousCommand[Order="6"]
Settings	
Action	AddListItem
CommandLine	c:\Users\localadmin\Desktop\brigadier.exe –install –output-dir=c:\Users\localadmin\Desktop –keep-files
Description	Download/Install BootCamp Application and Drivers
Order	6
RequiresUserInput	false

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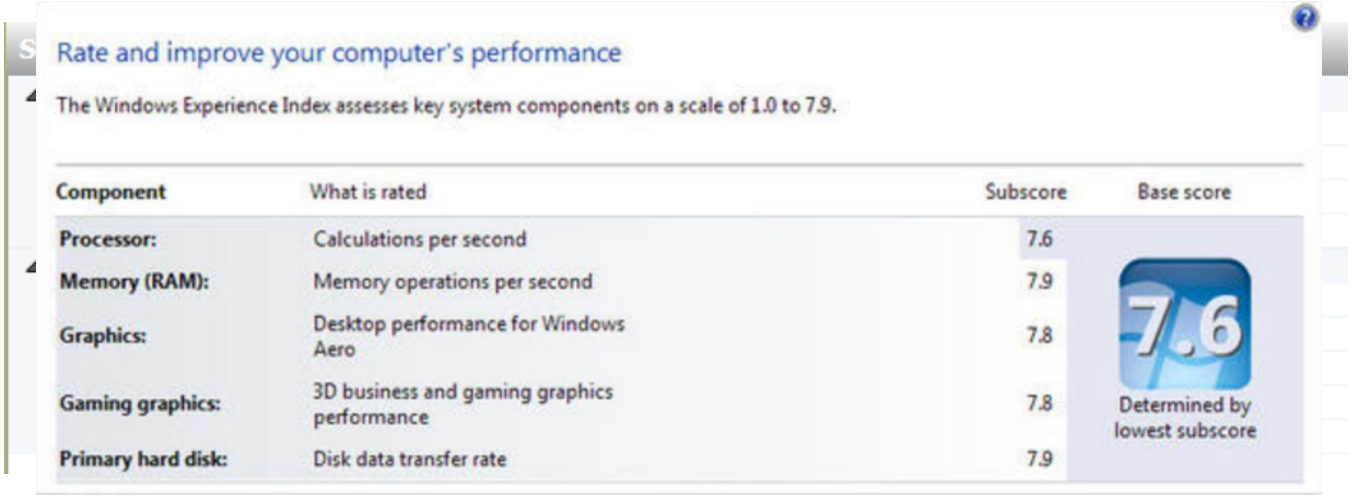
Run Windows System Assessment Tool

- WinSAT was never run during install.
- GUI for Windows System Assessment is deprecated in Windows 8.1



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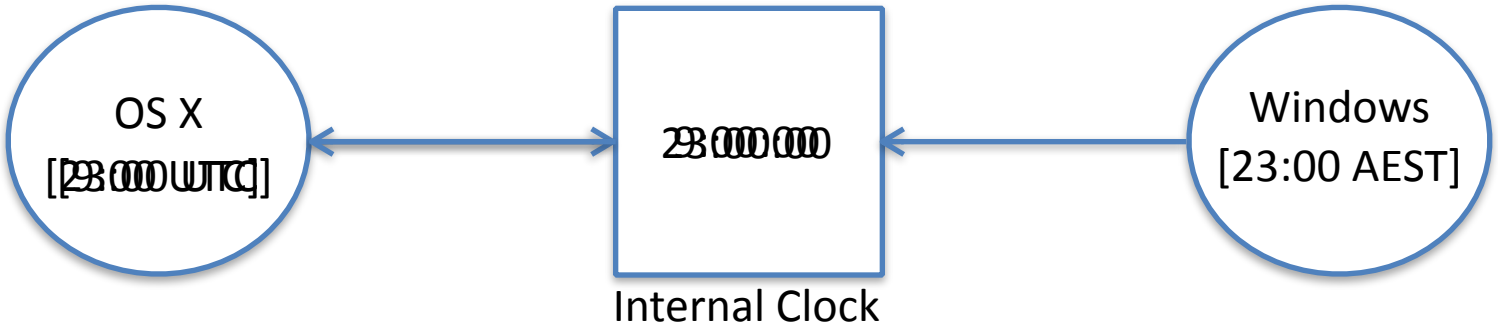
Time Synchronisation

- OS X assumes system clock is always in UTC
- Windows writes time to system clock using configured offset (AEST)
- OS X boots up and reads time incorrectly
- Kerberos based SSO is time sensitive and will reject logins from OS X



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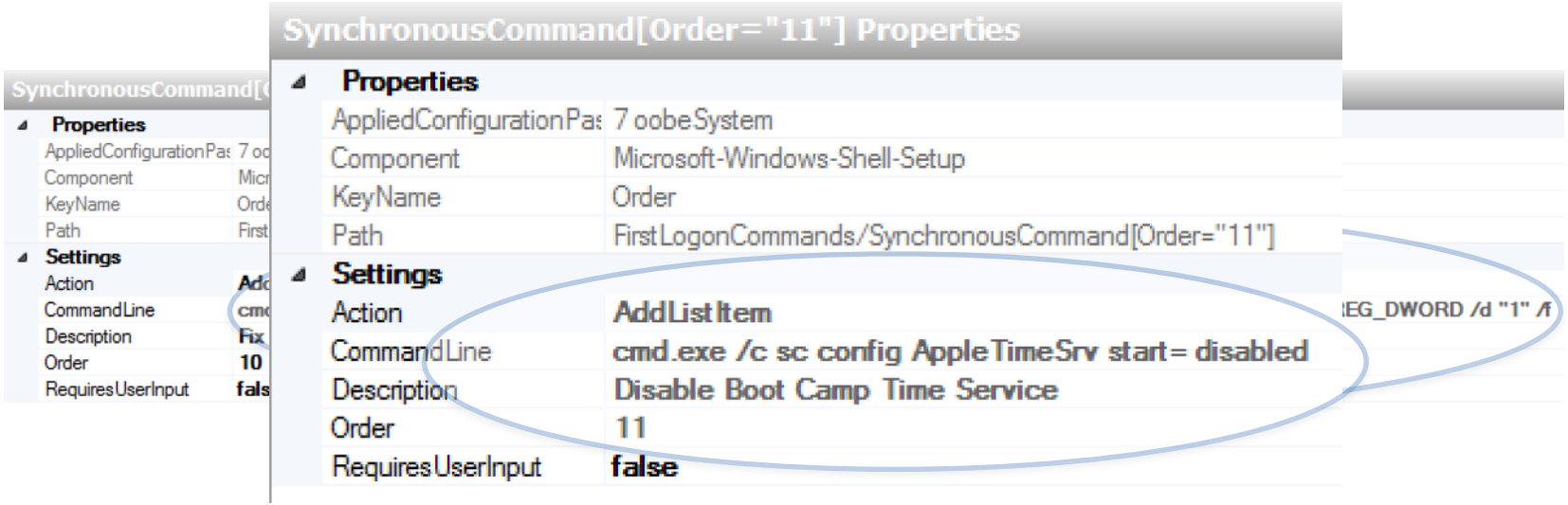
Fixing Time Syncronisation

- Registry modification to always assume internal clock is UTC
- Disable Apple Time Service, it doesn't seem to ever do its job.



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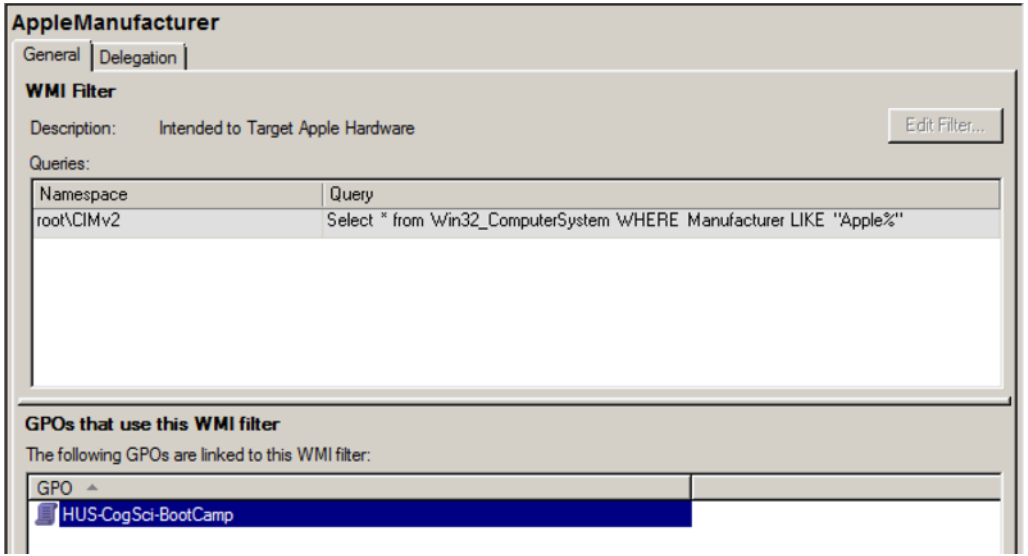
Fixing Time Syncronisation (Group Policy Option)

- Can also fix via Group Policy for any Boot Camp computers you have previously deployed.
- Use a WMI filter to stop it applying to Non-Apple Windows PCs



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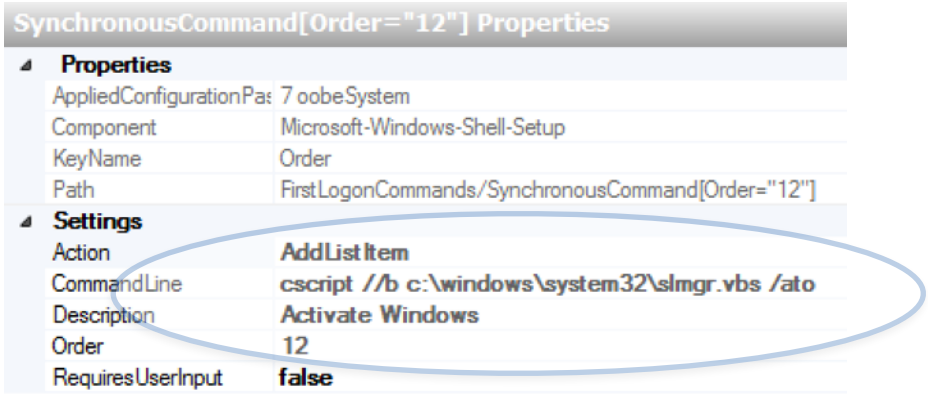
Activate Windows

- We're using a Key Distribution Server with Volume License



- cscript //b c:\windows\system32\slmgr.vbs /ipk XXXXX-XXXXX-XXXXX

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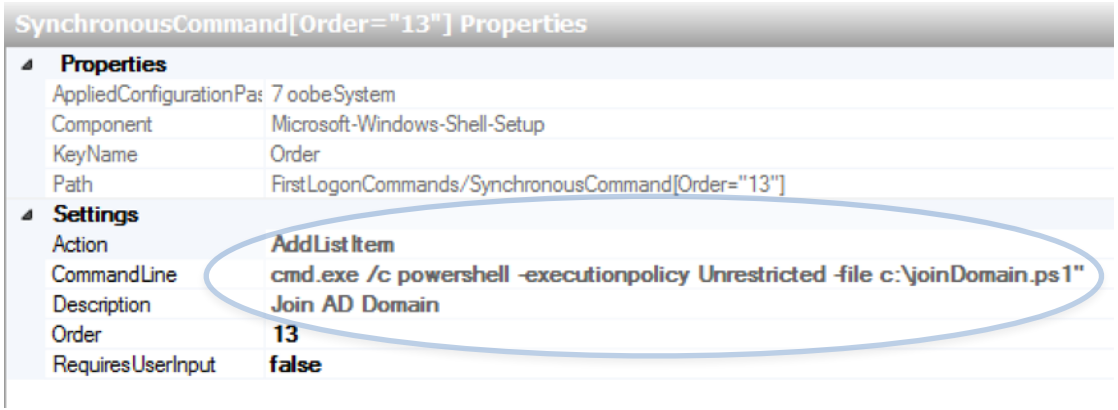
Join Active Directory Domain

- Run your bind script



- We'll script the deletion of the Powershell script later (it has passwords in it)

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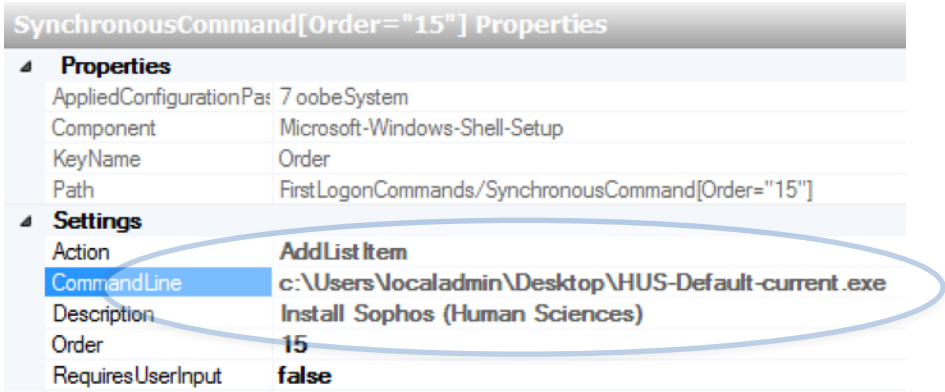
Install Extra Packages

- Sophos Anti-Virus



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Automating OOBE with Sysprep

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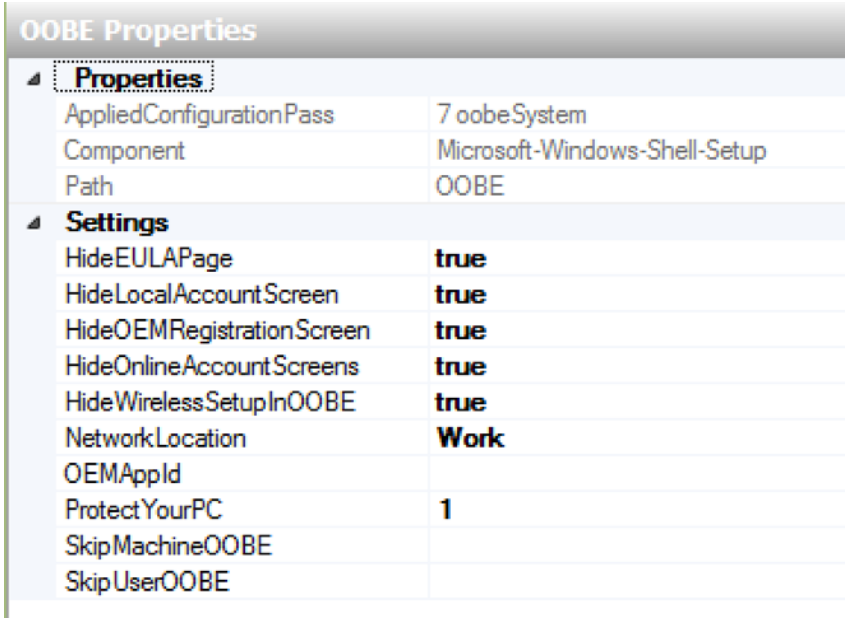
OOBE User Screens

- Hides user input screens in OOBE those that we do not need to configure (eg Wi-Fi)
- Set Network Location to be “Work”
- Windows Updates
  - 1 = Recommended
  - 2 = Windows Updates Only
  - 3 = Disabled



Automating Boot Camp Installation

Automating OOBE with Sysprep

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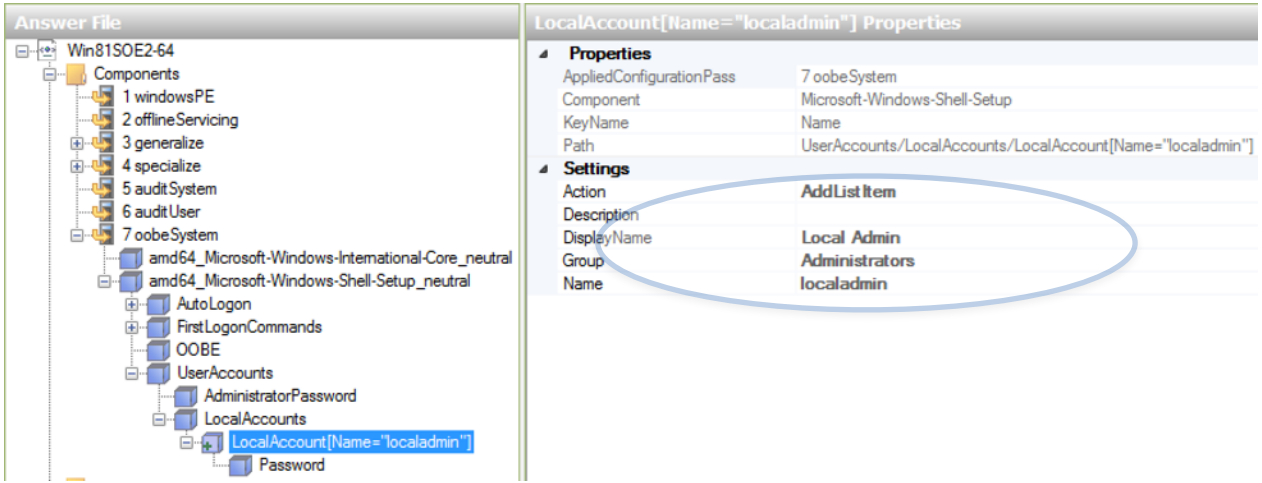
Create new local administrator

- Provide a username / password for the local administrator account to create on our deployed PCs.



Automating Boot Camp Installation

Automating OOBE with Sysprep

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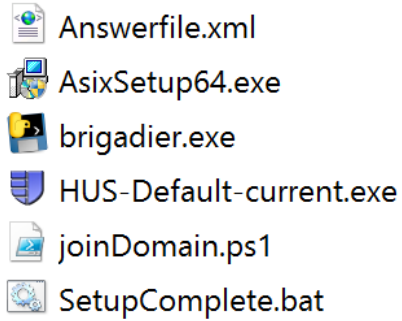
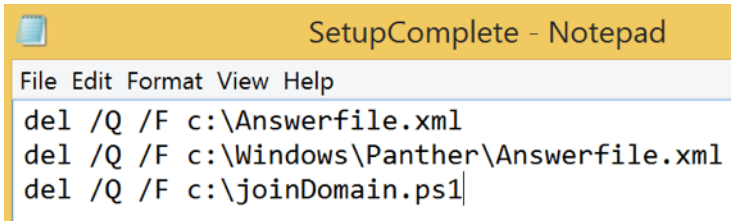
Save Answer File

- Move Answer File and other resources to Reference computer.
- Place them in root of the c drive (C:\)



- SetupComplete.bat
- c:\Windows\Setup\Scripts\
- This will be executed after Sysprep has finished performing its configuration.



Automating Boot Camp Installation

Automating OOBE with Sysprep

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Run Sysprep in preparation for imaging

- With everything in place on the reference computer run Sysprep while still in Audit Mode
- c:\Windows\System32\Sysprep\

- sysprep.exe /generalize /oobe /shutdown /unattend:”c:\Answerfile.xml"

- The reference computer will shutdown. Restart it in OS X in preparation for creating the disk image of your work.

Automating Boot Camp Installation

Creating Images with Winclone

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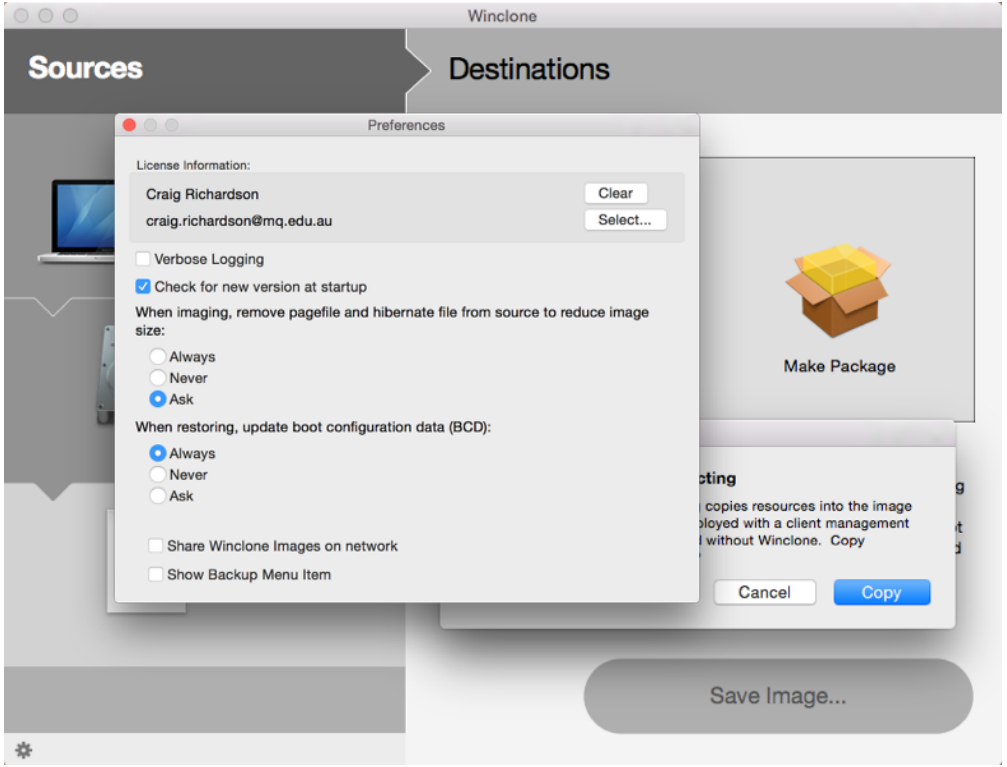
Creating Winclone images

- Winclone Image
- Make Self Extracting
- Apple Package Installers

Remove Temporary Files

- Can remove Pagefile and Hibernation files when imaging.
- Configure in Preferences
- Saves disk space in image
- Recreated on first boot



Automating Boot Camp Installation

Creating Images with Winclone

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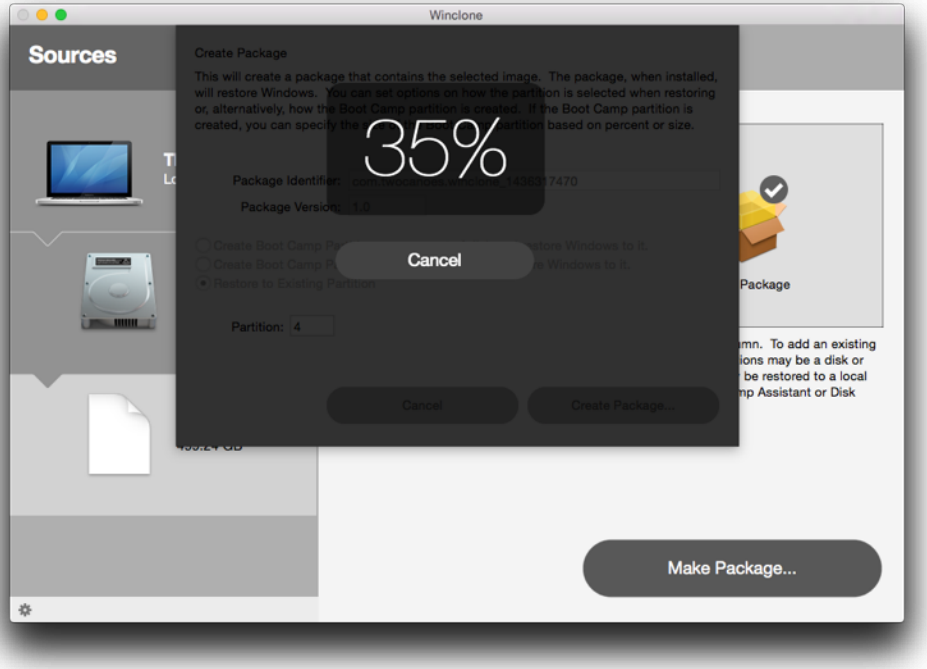
Creating Install Packages

- Wraps your image with scripts in a Package Installer
- Easy to create
- Set package identifier for install receipts
- Package installer will partition disk for you.
- Fast package creation from an existing Winclone image



Automating Boot Camp Installation

Restoring Images with Winclone

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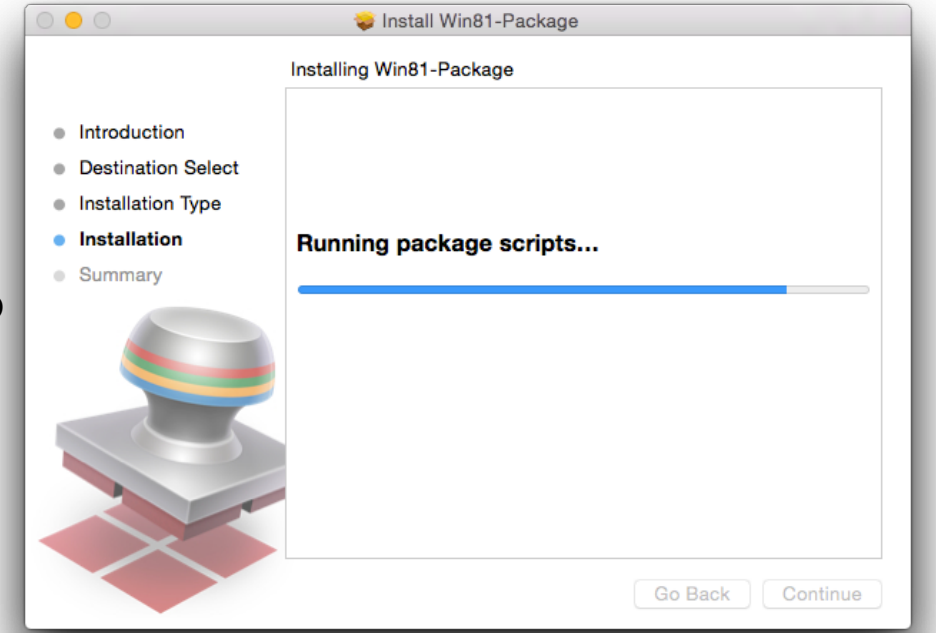
Restoring Winclone images

- Can install Winclone and move image to target Mac. Select your partition and click Restore.
- Transfer self-extracting package to client and run it.
- Transfer Apple Package Installer to target and run.



Automating Boot Camp Installation

Winclone Disk Operations

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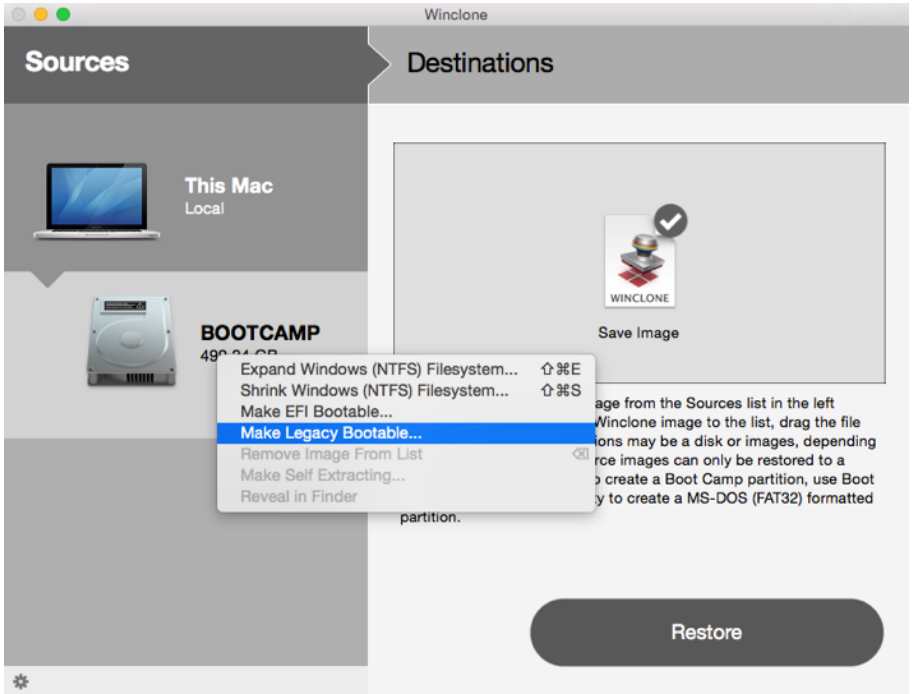
Resizing Partitions

- Shrink NTFS partition to smallest possible size
- Expand NTFS partition to fill free space

Configure Boot Loader

- Configure EFI Booting
- Configure MBR/BIOS Booting



Automating Boot Camp Installation

Deploying Winclone PKG via Apple Remote Desktop

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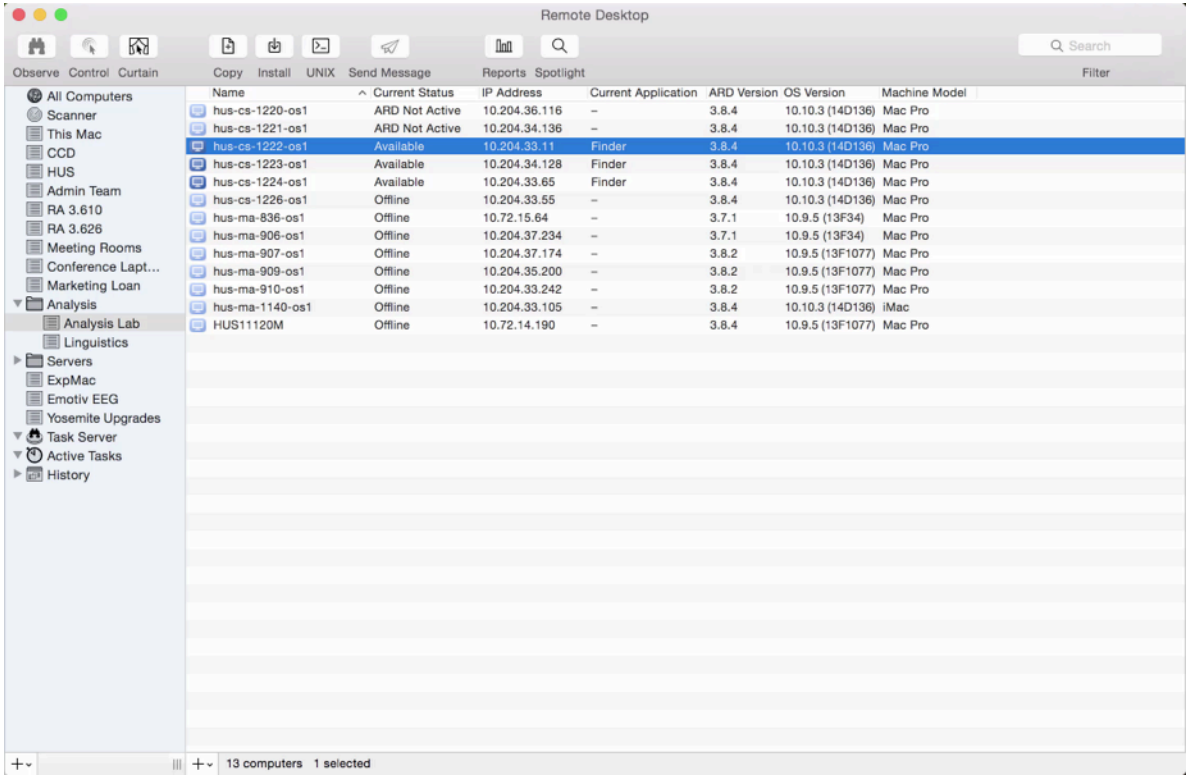
- Should work via any mechanism that can deploy PKG installers
- DeployStudio, Casper, ARD, Munki etc etc etc
- In ARD must select “Use untrusted certificates”



Automating Boot Camp Installation

Creating Images with Winclone

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Core Storage

- WinClone 5 lists support for Core Storage Volumes
  - Yosemite started using CoreStorage Volumes by default.
  - Fusion Drive Macs all use Core Storage
  - Our Package Installers created in Winclone 5 do not partition correctly
  - Partition Core Storage Volume manually to restore to Fusion Drive

```
/dev/disk0
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      GUID_partition_scheme                        *500.3 GB   disk0
   1:                        EFI EFI                     209.7 MB   disk0s1
   2:          Apple_CoreStorage                        499.4 GB   disk0s2
   3:                 Apple_Boot Recovery HD            650.0 MB   disk0s3
/dev/disk1
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:                  Apple_HFS Macintosh HD           *499.1 GB   disk1
                                 Logical Volume on disk0s2
                                 4C5E0438-BD66-4648-AE9E-FFACA42B38E1
                                 Unencrypted
/dev/disk2
```

Automating Boot Camp Installation

Demonstration of First Boot Post Imaging

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Thankyou for listening!