AUTOMATING BOOTCAMP INSTALLATION

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Automating Boot Camp Installation
Why we standardised on Dual Boot Macs?

Pre 2000
Windows or Mac OS Desktop
• Unix Servers

2006 - 2010
Intel Macs with Windows
• Fusion or Parallels or Boot Camp
• Support costs rising
• Still many Windows PCs

2001 - 2006
Windows and Mac OS X
• Portable Unix
• Hardware costs rising

2010 - Present
Intel Macs with Windows as standard
• Boot Camp only
• Very few Windows PCs
Automating Boot Camp Installation

What is Boot Camp?

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!

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

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

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

Brigadier

- Python script created and maintained by Tim Sutton.
- Downloads correct Boot Camp package for Mac it is run on.
- Optionally executes the Boot Camp installer.
- 64-bit Windows only.
- [https://github.com/timsutton/brigadier](https://github.com/timsutton/brigadier)

Running as a Sysprep FirstLogonCommand

It’s common to perform the Boot Camp drivers during a post-imaging Sysprep phase, so that it’s possible to deploy the same image to different models without taking into account the model and required Boot Camp package. Brigadier seems to behave in the context of a SysPrep FirstLogonCommand.

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Inspirations - Winclone

Winclone

- Originally freeware tool, graphical interface for using NTFSProgs to create disk images of NTFS partitions.
- Was sadly discontinued and unsupported for a few years.
- Relaunched as commercial software.
- https://twocanoes.com/winclone
- Actively developed, adding new features.
- Cheap(ish) : $499 for site license
Automating Boot Camp Installation
Building a Reference Computer

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


Keep USB media, we’ll use it later
Automating Boot Camp Installation
Audit Mode Customisations

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

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

Install "Desktop" Software
• Install your required packages (Adobe, Java etc)

Install Windows Updates
• Win 8.1 disables Windows Update in Audit Mode
• Install a Powershell Module
• Only bothered as we wanted the update to 8.1 that introduced the Power Button

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

Configure Windows 8 Apps / Tiles
• Microsoft adds Live Tiles with dynamic content you can’t predict
• They also hog a lot of screen real-estate that could be used for your own apps
• Delete them with Powershell commands

```powershell
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](https://support.microsoft.com/en-us/kb/2769827)
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Audit Mode Customisations

- 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

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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Automating OOBE with Sysprep

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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Automating OOBEx with Sysprep

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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Automating OOBE with Sysprep

Disable Administrator Account

- We’ll create a new local administrator account to use instead.
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Automating OOBE with Sysprep

Skip Automatic Activation
• We’re going to provide a Volume License later on
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Automating OOBE with Sysprep

**CopyProfile**
- Names the Sysprep to Microsoft Audit Mode Admin account the Default User Template
First Login Settings

• Give account details for the account to login as automatically after its first boot.
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Automating OOBE with Sysprep

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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Automating OOBE with Sysprep

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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Automating OOBE with Sysprep

Download and install Drivers with Brigadier

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

![SynchronousCommand properties screenshot]
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Automating OOBE with Sysprep

Run Windows System Assessment Tool

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

![Windows System Assessment Tool](image-url)
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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Automating OOBE with Sysprep

Fixing Time Synchronization

- Registry modification to always assume internal clock is UTC
- Disable Apple Time Service, it doesn't seem to ever do its job.
Fixing Time Synchronization (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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Automating OOBE with Sysprep

Activate Windows

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

```bash
• cscript //b c:\windows\system32\slmgr.vbs /ipk XXXXX-XXXXX-XXXXX
```
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Automating OOBE with Sysprep

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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**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
Create new local administrator

• Provide a username / password for the local administrator account to create on our deployed PCs.
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Automating OOBE with Sysprep

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.
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Automating OOBE with Sysprep

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.
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Creating Images with Winclone

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

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
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Restoring Images with Winclone

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.
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Winclone Disk Operations

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
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Deploying Winclone PKG via Apple Remote Desktop

- 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

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
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FACULTY OF HUMAN SCIENCES  I  DEPARTMENT
OF COGNITIVE SCIENCE

Demonstration of First Boot Post Imaging
Automating Boot Camp Installation
Demonstration of First Boot Post Imaging

Thankyou for listening!