

IT852: DeployStudio

Tips, Tricks, and Alternate Uses

Rusty Myers, Brandon Penglase

<http://tinyurl.com/it852>



Brandon Penglase

- Pennsylvania College of Technology
- Technical Support Analyst
- SSL OpenDirectory in “Magic Triangle”
- 300+ Macs
- DeployStudio, ARD



Rusty Myers

- Penn State University, College of Education
- Systems Administrator
- 400+ Macs
- DeployStudio, ARD, BigFix

What We're NOT Talking About...

- Setting up DeployStudio
- Making an Image
- Deploying an Image
- How to Create a Script/Package

We Will Talk About...

- Major Changes & New Features
- Tips & Tricks
- Alternate Uses
- Current Issues



We Assume...



- You Have Used DeployStudio, If Not...

DeployStudio Server, controlled by the GUI Admin, creates and deploys system images to computers.

Packages, scripts, and other tasks can be applied to the system. The software requires OS X to run.

More Information:

<http://www.deploystudio.com>

Major Changes & New Features



Major Changes

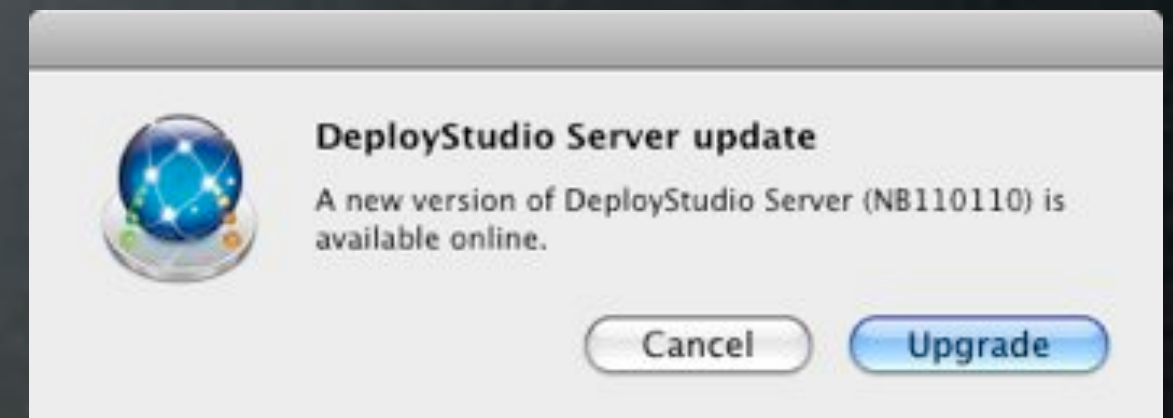


- 10.4 Server/Runtime Support Dropped (after rc20)
 - 10.4 Restores Supported
- Custom Repository Share Name
- Auto Update Local NetBoot Sets On Upgrades
 - Searches All Volumes

Major Changes



- Auto Update - DeployStudio Admin.app
 - Checks For Updates Automatically (If Enabled)
 - Incompatible Server - Admin Prompts To Update
- Binding, Package & Script Tasks Respect Workflow Order



Major Changes



- Auto Update - DeployStudio Admin.app
 - Checks For Updates Automatically (If Enabled)
 - Incompatible Server - Admin Prompts To Update
- Binding, Package & Script Tasks Respect Workflow Order



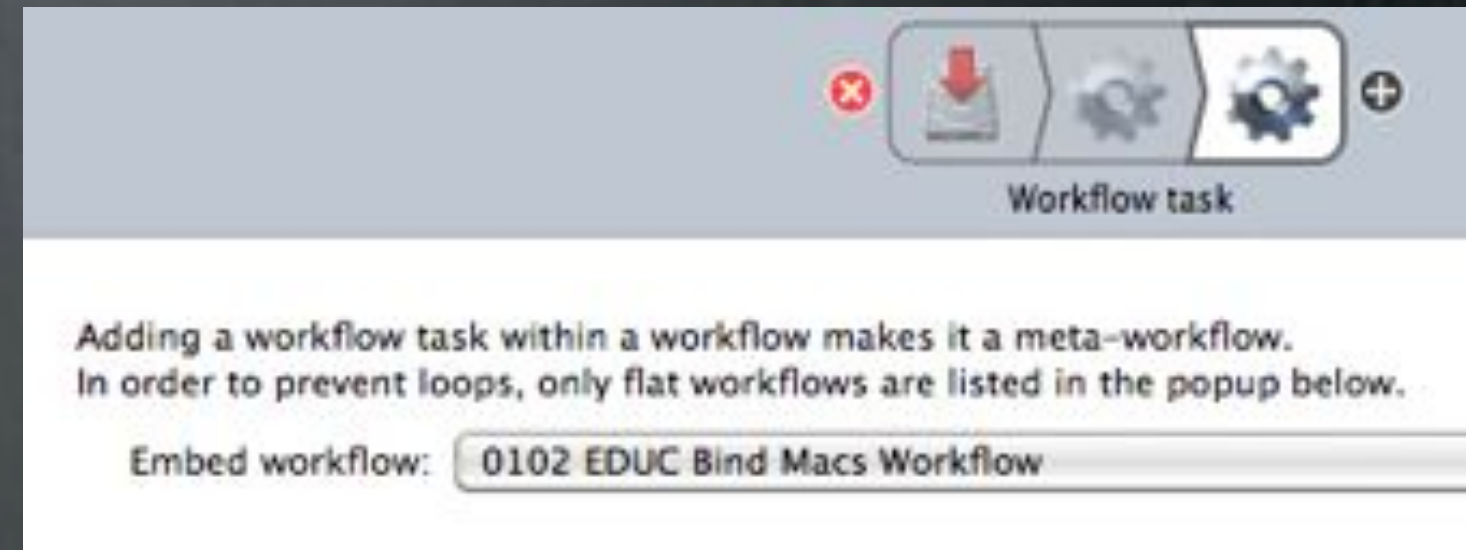
Major Changes - First Boot



- Originally: Run In Background, Behind Login Window
 - Post Processing Scripts Install To `/usr/local/bin`
- Then: Verbose Boot, Prevents GUI
- Now: Finalize.app Displays Finalize Script Log Above Login Window
 - Post Processing Scripts Install To `/etc/deploystudio`

New Features

- Master/Replica Servers
- Meta Workflows
 - Combine Multiple Tasks
 - Refine & Reuse
 - Easy to Update
 - Binding Passwords



New Tasks

- Software Update Task
 - Runs First
 - Immediately Reboots
- Copy File Task
- Time Configuration Task

Software Update Server base URL: (optional)

Run Apple Software Update client at first boot

File:

Path:

Create path if needed

Owner:

Group:

Others:

Network time server:

Time zone:

Updated Tasks



- Image Creation Process Steps
 - Image Creation Does Not Go Directly to the Repo
 - Image Gets Created/Scanned/Checksum Locally, then **Copied** Up to the Repo
- New Partitioning Task Layout
 - Secure Erase Options
 - Up To 6 Partitions

✓ single-pass zero-fill (~4 hours for 500GB)
single-pass random-fill (~4 hours for 500GB)
US DoD 7-pass (~30 hours for 500GB)
Gutmann 35-pass (~6 days for 500GB)

OS	Size
LINUX	10GB
SHARED	30%
WINDOWS	20%
MacOSX	20%
Server Test	15%
OS X Test	15%

Apply layout template: Custom [dropdown] Add partition

Updated Tasks

- Ignore Install Failures for Scripts & Packages
- Script Task
 - Can Run At First-Boot
- Configuration Task
 - Applies to Windows Sysprep
 - Add To Computer Group

Windows computer name: (Boot Camp only)

Client Management:

Updated Tasks

- AD Binding Task
 - Settings Applied First
 - Computer Password Expire time
- OD Binding Task
 - Add to OD Computer Group
 - Enable SSL



Enable trusted binding
 Apply computer's Client Management settings

Computer ID:

Directory admin: Pa

Enable SSL

Client Management:

Tips & Tricks



Database



Database

- Stores Computers & Computer Groups
 - Set Workflows Automation
 - Set Computer Network Settings
 - Set Hostname & Computer name
 - Set Computer Information Fields
 - From The Command Line...



Workflow

- Stop Server
- Create Plist & Make Changes
- Start Server
- or use the GUI



```
sudo launchctl unload /Library/LaunchDaemons/com.deploystudio.server.plist
```

```
sudo launchctl load /Library/LaunchDaemons/com.deploystudio.server.plist
```

Workflow

- Stop Server
- Create Plist & Make Changes
- Start Server
- or use the GUI



`sudo launchctl unload /Library/LaunchDaemons/com.deploystudio.server.plist`

`sudo launchctl load /Library/LaunchDaemons/com.deploystudio.server.plist`

Workflow

- Stop Server
- Create Plist & Make Changes
- Start Server
- or use the GUI

→ `sudo launchctl unload /Library/LaunchDaemons/com.deploystudio.server.plist`

→ `sudo launchctl load /Library/LaunchDaemons/com.deploystudio.server.plist`



Create plist



/<dsrepository>/Databases/ByHost

\$MAC = MAC address of computer to effect without colons

- Create the plist:

- `/usr/libexec/PlistBuddy -c \
"Add :dstudio-mac-addr string '00:00:00:00:00:01'" $MAC.plist`

- Add (or Set) to plist:

- `/usr/libexec/PlistBuddy -c \
"Add :architecture string i386" $MAC.plist`

Add Details



`/<dsrepository>/Databases/ByHost`

`$MAC` = MAC address of computer to effect without colons

- More Examples

- `/usr/libexec/PlistBuddy -c`

- “Add `:cn` string `COMPUTERNAME`”

- “Add `:dstudio-hostname` string `LocalHostname`” `$MAC.plist`

- “Add `:dstudio-bootcamp-windows-computer-name` string `Windows`”

Add Groups



`/<dsrepository>/Databases/ByHost`

`$MAC` = MAC address of computer to effect without colons

- Add Group

```
PlistBuddy -c "Add MACWORLD:dstudio-group-name string MACWORLD"  
group.settings.plist
```

- Add Computer to Group

```
PlistBuddy -c "Add :dstudio-group string MACWORLD" $MAC.plist
```

Find More...



`/<dsrepository>/Databases/ByHost`

`$MAC` = MAC address of computer to effect without colons

- Print Entire Plist

- `/usr/libexec/PlistBuddy -c "Print" $MAC.plist`

- Example plist

- <http://tinyurl.com/exampleplist>

Import/Export



- Import
 - Import Computers (csv)
Example: <http://tinyurl.com/dsimportcsv>
- Export
 - All Computers (plist)

Default Groups

- Don't Like Import Options?
 - Create Default Group
 - New Machines Get Auto-Added to Group

Default group

If checked, every new computer will be automatically added to this group on first time DeployStudio Runtime startup.

Tips



- Use `createUser.pkg` by Pete Akins
- Auto Add Computers to Default Group
 - On the Default Group, Enable the “Set Hostname In Database” Workflow as Automatic

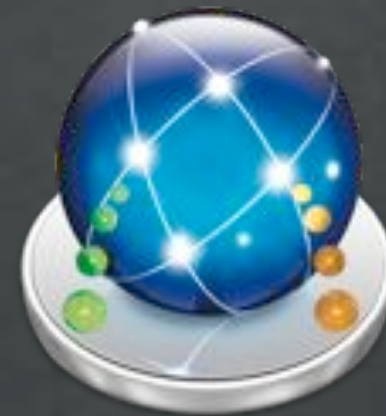
Do You Have Any?

Issues



- Exported plists don't Import
- Limited Import Options
- Passwords Stored In Reversible Cipher

Tasks



Install Task



- Installs During Workflow or at First Boot
- Workflow Precedence Respected
 - Package Inside Groups Install Alphabetically
- Drop in Most Packages

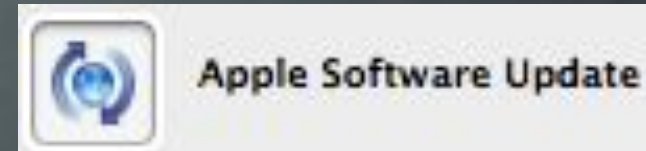
Script Task

- Runs During Workflow or at First Boot
- Workflow Precedence Respected
- Many Built-In Variables Available
 - Some Only Available After Imaging



Task Install Order

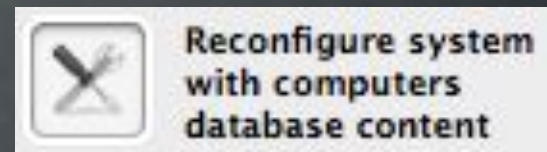
1. Software Update
- Reboots if needed



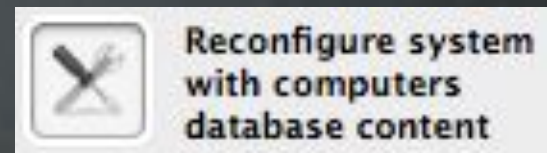
2. Time Set



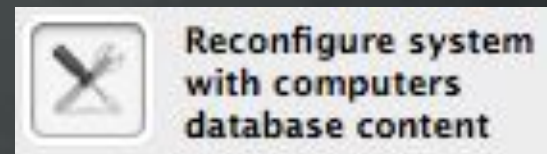
3. Rename Computer



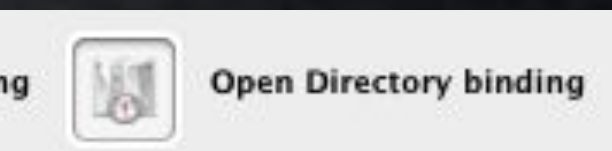
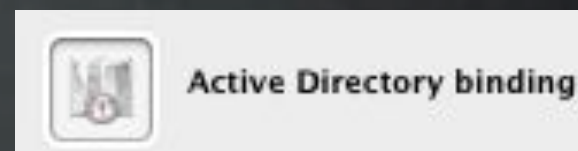
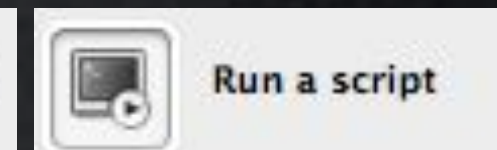
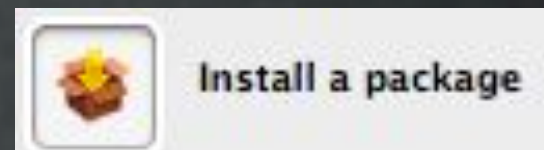
4. Create Users



5. Enable ARD



6. Packages, Scripts
& Binding



Packages & Scripts & Binding

- Install As Specified In Workflow
- Helper Scripts Written to /etc/deploystudio/bin
- Packages Write to /etc/deploystudio/ds_packages
- Scripts Write to /etc/deploystudio/ds_scripts



Tips



- Use Package Groups for Install Tasks
- Add Time Task **Before** Binding Task

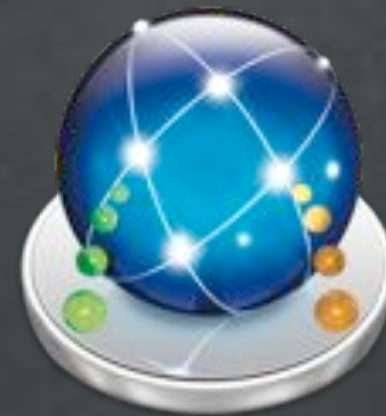
Do You Have Any?

Issues



- Install Task:
 - Some Installers Have Issues...Repackage
- Script Task:
 - No Dynamic Setting of Target Volume During Runtime
 - Only First Script Follows Workflow Order in rc124 (Fixed in Latest Nightly build)

Workflows



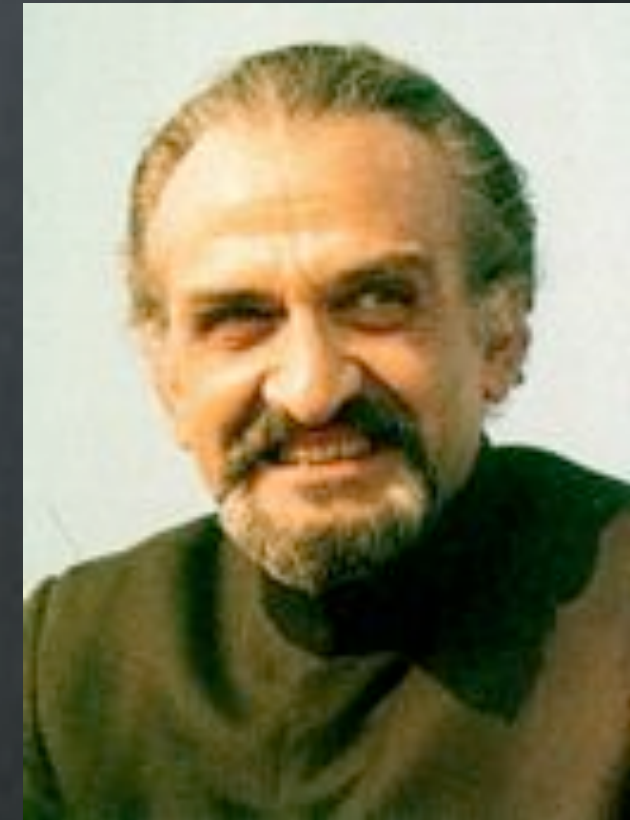
Functional Workflows

- Base Install Workflow
 - Packages & Scripts
- AD/OD Binding Workflow
- Database Configuration Workflow
- Restricted Software Install Workflow



Master Workflows

- Combine Functional Workflows
- Quick Construction
- Reuse Function Workflows
- Error Resistant



Automate Workflows



- Tasks Automate on Last Restored Volume
- If Not Restoring a Volume -
 - Tasks Require Manually Selecting Target Volume
- Work Around-
 - Use Script to Rename Internal Drive to “VolumeName”
 - Manually Set Tasks Target to “VolumeName”

Workflow Access

- Setup Groups in WGM
 - Use Nested Groups
 - Use AD Accounts/Groups
- Configure in DeployStudio Assistant



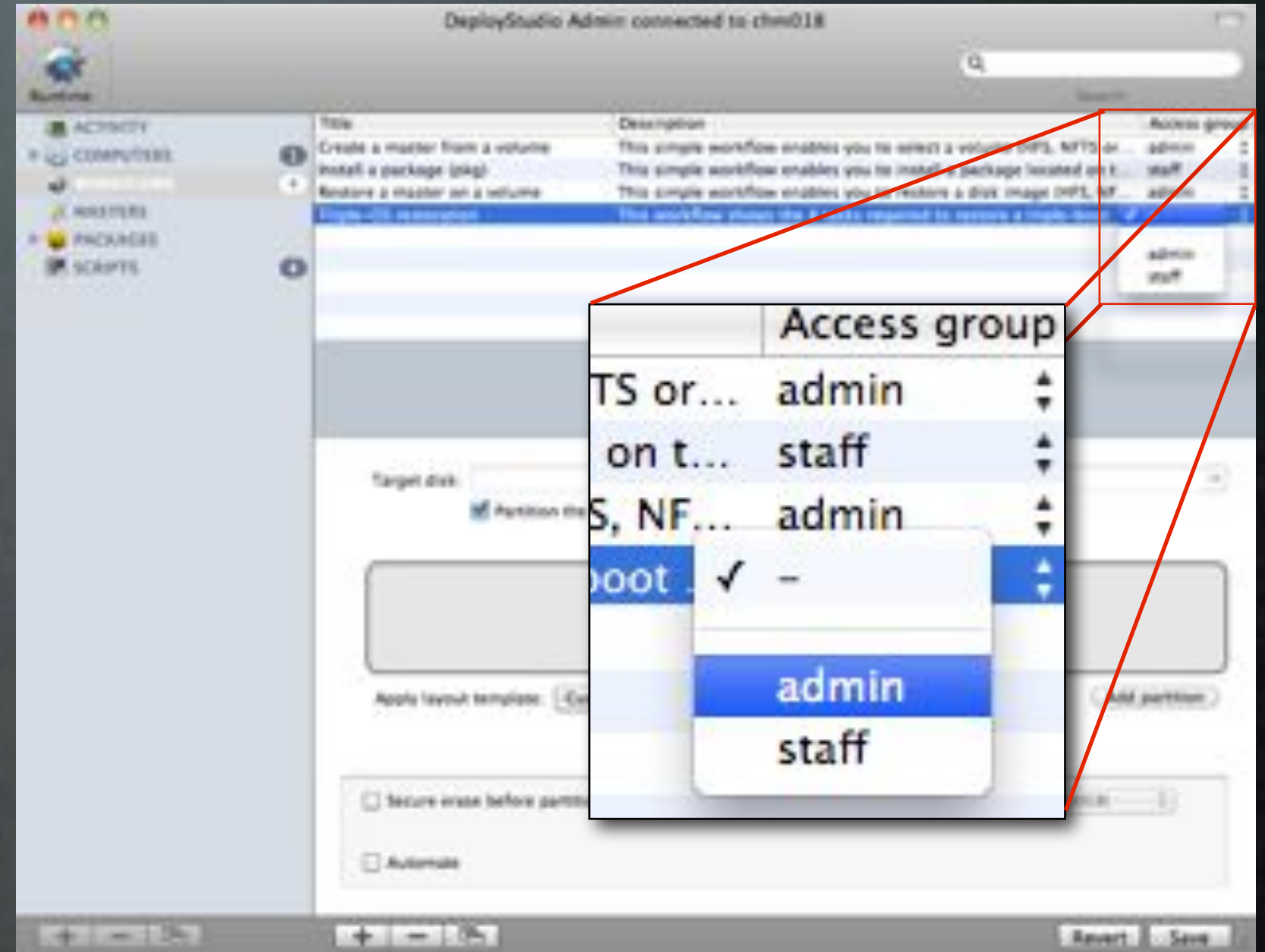
DeployStudio Assistant

- DS Assistant Setup
 - Configure the Server
- DS Admin Access
 - Configure Workflows
- DS Runtime Access
 - Workflow Access



DeployStudio Admin

- Set Access for Groups
- Use “-” for Open Access
- Restrict
 - Workflows
 - Images
 - Packages



Tips



- Leave Empty Workflow at Top
- Organize Workflows with 0001...0002...0003

- Group By:
 - Function
 - Access

Title	Description	Access group
1 ____ LEAVE BLANK ____	Always leave this workflow blank	-
1000 #--- Academic Workflows	1000 Are Academic Workflows	dscsrunti...
1000 - ATHS\E235 Automated Flow MM	E235 Multiple Machine	dscsrunti...
1000 - ATHS\E235 Automated Flow SM	E235 Single Machine	dscsrunti...
1000 - LIB\203 Automated Flow (MM)	LIB Multiple Machine	dscsrunti...
1000 - LIB\203 Automated Flow (SM)	LIB Single Machine	dscsrunti...
2000 #--- Administrative Workflows	2000 Are Administrative Workflows	dscsrunti...
2000 - IS Workflow	Integrated Studies Workflow	dsruntime
2000 - Leopard - Donation Restore	Leopard Initial Setup for Donations	dsruntime

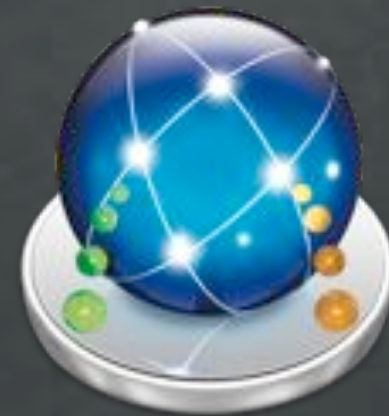
Do You Have Any?

Issues



- Automated Workflows
 - Not Flexible When Failing
 - Can Overwrite Data
 - Can Choose Wrong Drive or Partition
 - Can't Stop Workflow - Unless You Force Shutdown!
- Non-Automated Workflows
 - Tasks Can Be Skipped
 - Needs Run Manual

Scripts



Script Languages

- System or Image Native
- Netboot Sets Only Include
 - Bash
 - Perl (Basic)
 - Python (Optional)
 - Ruby (Optional)



Script Variables



- First Boot Scripts:
/ - Standard Root Path
- Post Imaging:
/Volumes/\$DS_LAST_RESTORED_VOLUME
- Pre Imaging:
`system_profiler SPSerialATADataType | awk -F: ' /Mount Point/ { print $2}' | head -n1`

OD SSL Binding



- Checks to See if ca-bundle.crt Exists, if Not, it Downloads it from a Web Server
- Checks to See if ldap.conf Has Been Modified, if Not, it Modifies it to Reference CAFile to ca-bundle.crt
- Modifies the DS OD Binding Script

<http://tinyurl.com/odsslcert>

edu.mit.Kerberos modification

- Use Sed!



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

```
echo "pct_kerberos_settings.sh - v0.1 ("`date`")"
```

```
# Start Here
```

```
sed -i old -e '1,4 d' -e 's/dns_fallback\ =\ no/dns_fallback\ =\ no\
```

```
forwardable = yes/' /Library/Preferences/edu.mit.Kerberos
```

```
echo "pct_kerberos_settings.sh - end"
```

```
exit 0
```

<http://tinyurl.com/dsmodkerb>

Add Details to Database



- Run In Workflow
- Save Computer Specific Data
 - Add Serial Number to Database
- `SerialNum=`system_profiler SPHardwareDataType | grep Serial | awk '{print $4}'``
- `/usr/libexec/PlistBuddy -c \
"Add :dstudio-host-ard-field-1 string $SerialNum" \
/tmp/DSNetworkRepository/Databases/ByHost/$MAC.plist`

DS Server needs to be restarted to view changes

BackupRestore

Over AFP via DeployStudio Repository

- Backups Local Accounts
 - Saves Password
 - Skips Mobile Accounts
- Backups All Home Folders

- Restores Local Accounts
 - Restores Password
 - Restores All Home Folders



<http://tinyurl.com/DSBackupRestore>

BackupRestore

Over AFP via DeployStudio Repository

- Backups Local Accounts
 - Saves Password
 - Skips Mobile Accounts
- Backups All Home Folders



- Restores Local Accounts
 - Restores Password
 - Restores All Home Folders



<http://tinyurl.com/DSBackupRestore>

BackupRestore

Over AFP via DeployStudio Repository

- Backups Local Accounts
 - Saves Password
 - Skips Mobile Accounts
- Backups All Home Folders
- Restores Local Accounts
 - Restores Password
 - Restores All Home Folders

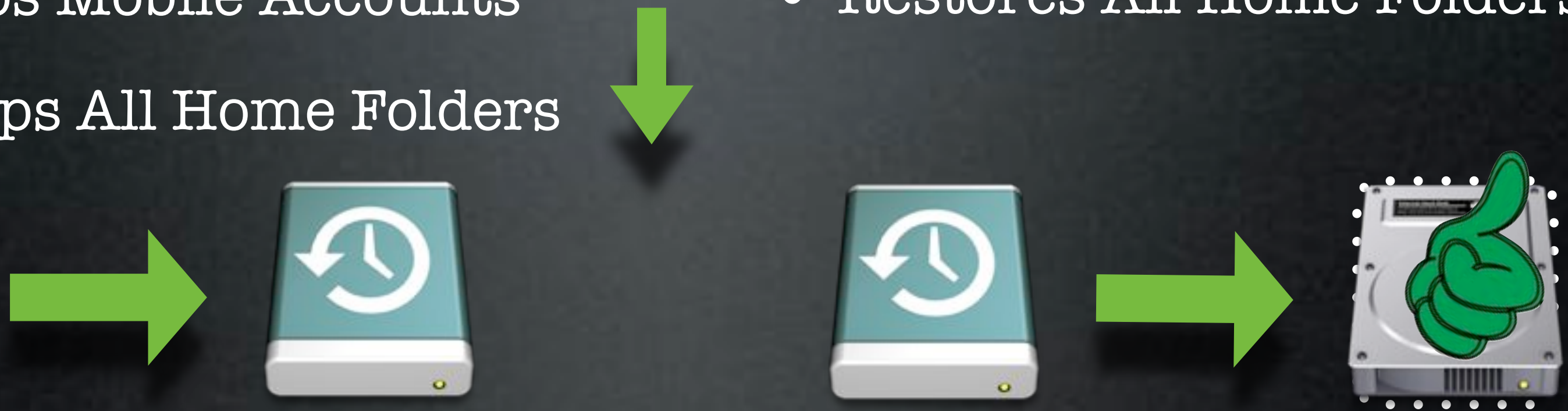


<http://tinyurl.com/DSBackupRestore>

BackupRestore

Over AFP via DeployStudio Repository

- Backups Local Accounts
 - Saves Password
 - Skips Mobile Accounts
- Backups All Home Folders
- Restores Local Accounts
 - Restores Password
 - Restores All Home Folders



<http://tinyurl.com/DSBackupRestore>

Tips



- Use Scripts to Make Modifications Post-Imaging
- Scripts Can Make Life Even More Automated
- Use Full Path for Tools
- Can be Used to Make ByHost Changes with new Hosts
 - Turn off bluetooth, mute volume, etc

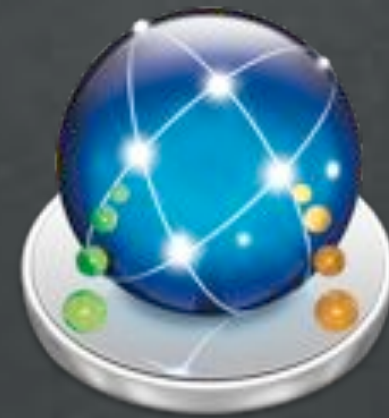
Do You Have Any?

Issues



- Typos Can Really Mess Up Your System(s)
- Not Very Helpful if You're Not Versed with Scripting Languages

Replicas



Replicas

- Basic Master/Replica Topology
- Scalability/Redundancy
- User Needs to be a DeployStudio Admin
- Sync Specific Sections



Replicas

- Basic Master/Replica Topology
- Scalability/Redundancy
- User Needs to be a DeployStudio Admin
- Sync Specific Sections



Replicas

- Basic Master/Replica Topology
- Scalability/Redundancy
- User Needs to be a DeployStudio Admin
- Sync Specific Sections



Replicas

- Basic Master/Replica Topology
- Scalability/Redundancy
- User Needs to be a DeployStudio Admin
- Sync Specific Sections



Replicas

- Basic Master/Replica Topology
- Scalability/Redundancy
- User Needs to be a DeployStudio Admin
- Sync Specific Sections




Replicas

- Basic Master/Replica Topology
- Scalability/Redundancy
- User Needs to be a DeployStudio Admin
- Sync Specific Sections



Syncing

- `950.deploystudio.replica.sync.sh`
`/etc/periodic/daily`
- `com.apple.periodic-daily.plist`
`/System/Library/LaunchDaemons`
- Daily at 3:15am

Last sync:  Master: `deploystudio.server.com`
Date: `14/12/2010 at 03:15`
Elapsed time: `23s`

Tips



- Using Directory Services?
 - Replicate OD For Consistency of Users & Groups
 - At Least - Bind All DS Servers to Directory
- Use Custom LaunchD to Change Sync Time
- Use Custom rsync to Sync Repositories

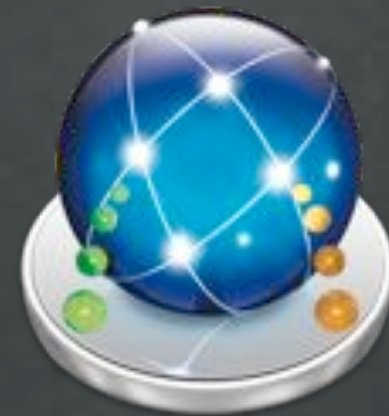
Do You Have Any?

Issues



- Single Direction Sync - Master to Replica

Multi-Imaging



Multi-Imaging



- SysPrep Windows Images
- Use DeployStudio to Capture/Restore Images
- Reconfigure Task Modifies Unattended XML For Machine Name

Tips



- Image Windows First, OS X Last
 - Tasks Target Last Restored Volume
- Partition Order Must be Mac First

Do You Have Any?

Issues



- Cannot (currently) bind Windows to Active Directory
- No DeployStudio Tasks Work

Alternate Uses



Delegation



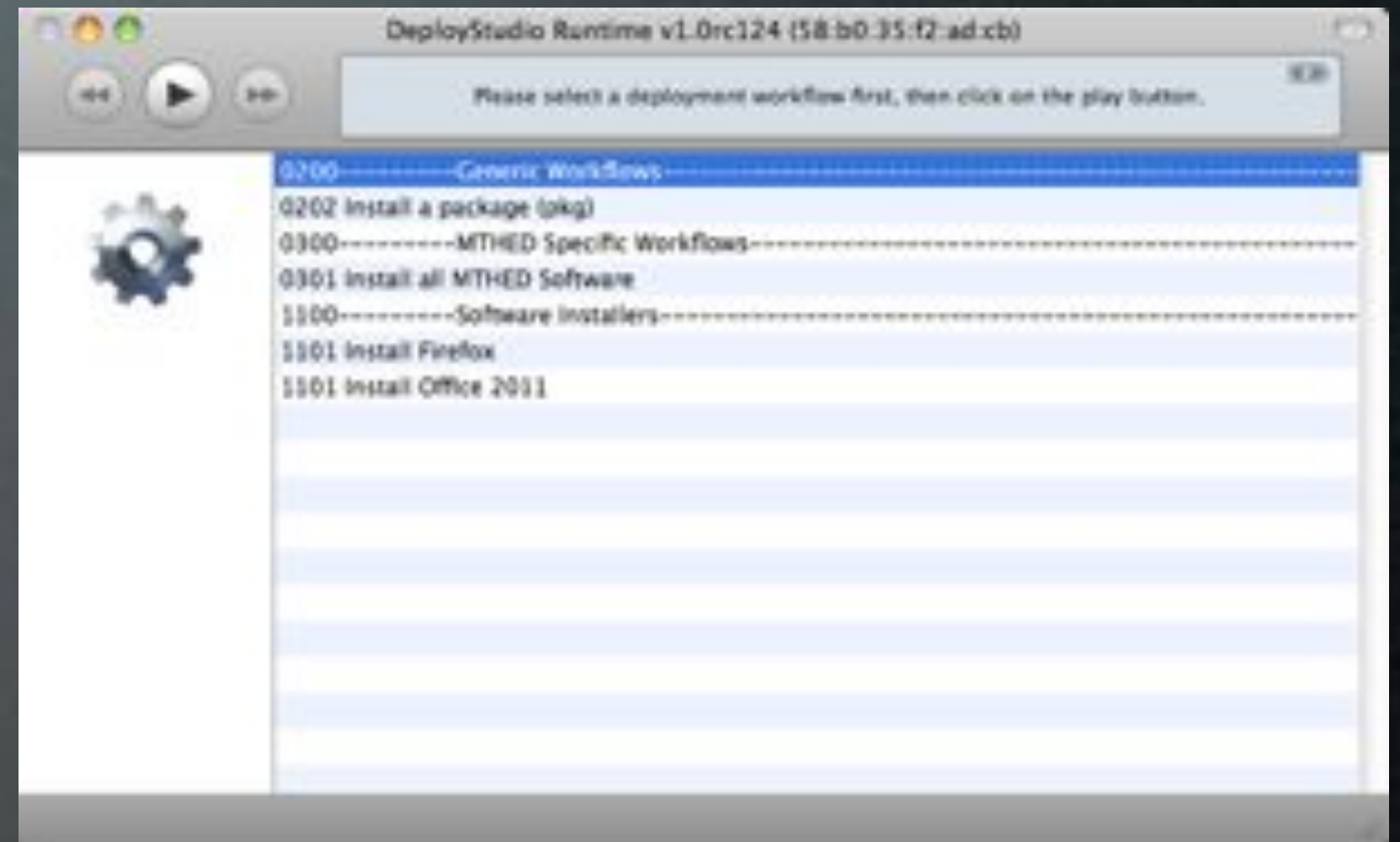
Train Your Ninjas

- Easy to Understand Workflows
- Easily Repeatable
- Maintain Control & Standards



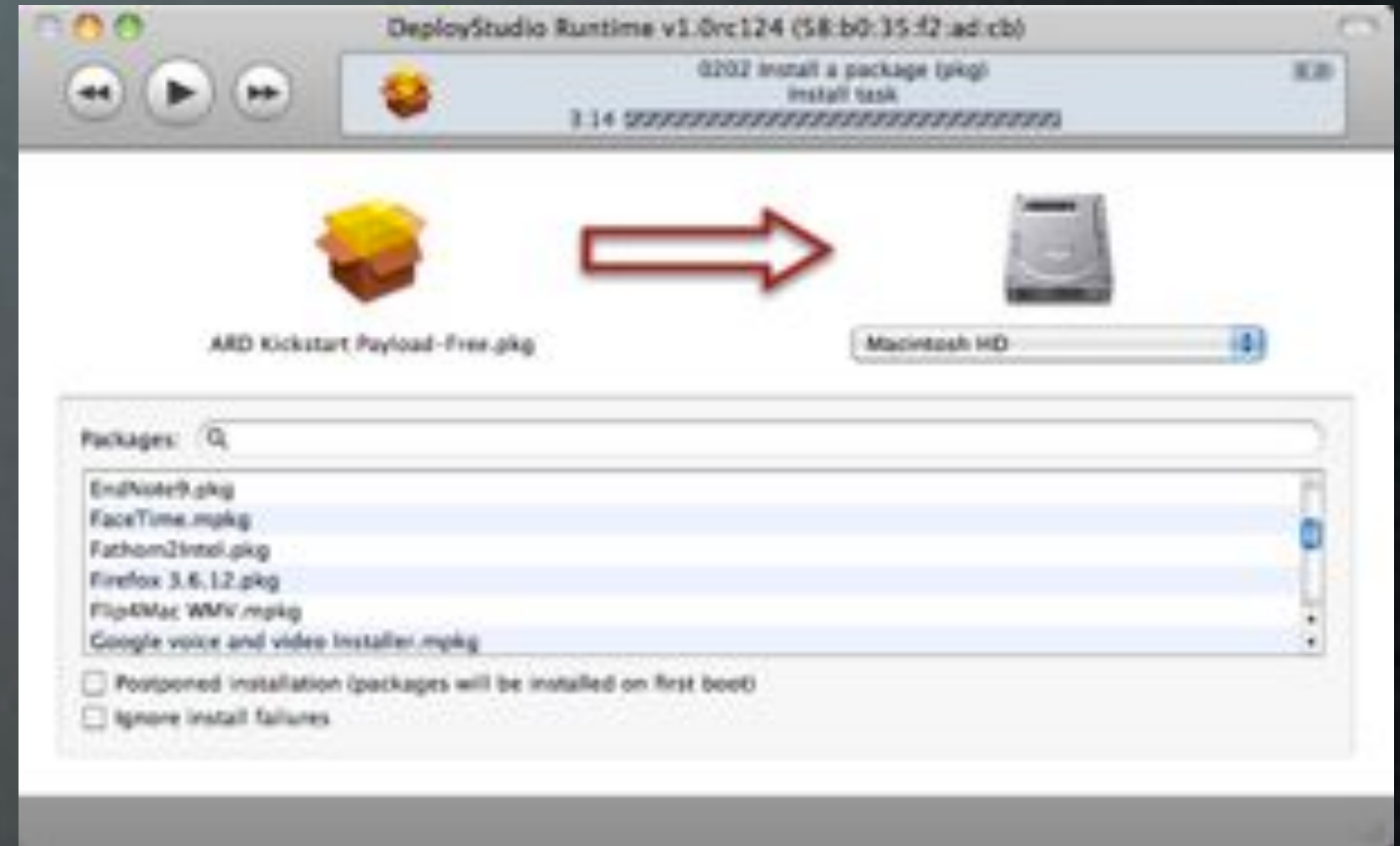
Let Others Play

- Staff “Play” the Workflow
- Number Workflows for Ease
- Restrict Access with Groups



Let Others Play

- Staff “Play” the Workflow
- Number Workflows for Ease
- Restrict Access with Groups



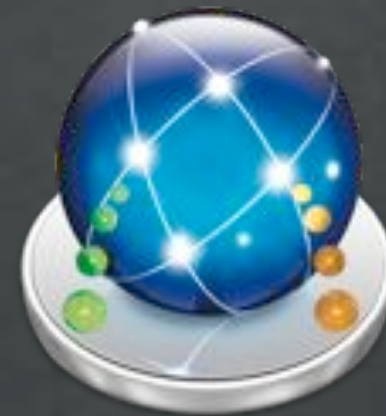
Tips



- Numbered Workflows are Easier to Communicate
- Provide Very Limited Rights First

Do You Have Any?

Thin Imaging



Thin Imaging

- Use Custom and Retail Scripts & Packages
- Install On Top of OS X Base
- Easy to Configure
- Quick to Change



Target

- Existing Systems or Images
 - Use InstaDMG
 - Disk Utility
 - DeployStudio
 - Existing System
 - Out of Box



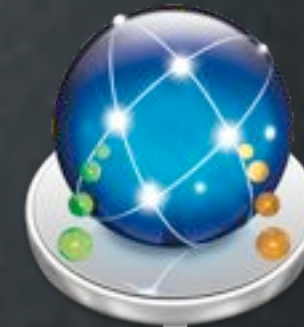
Workflow Example

- Remove Computer from Box
- Run DeployStudio Workflow
 - Install Packages/Scripts
 - Create Users
 - Bind to AD/OD
- Deploy!



Workflow Example

- Remove Computer from Box
- Run DeployStudio Workflow
 - Install Packages/Scripts
 - Create Users
 - Bind to AD/OD
- Deploy!



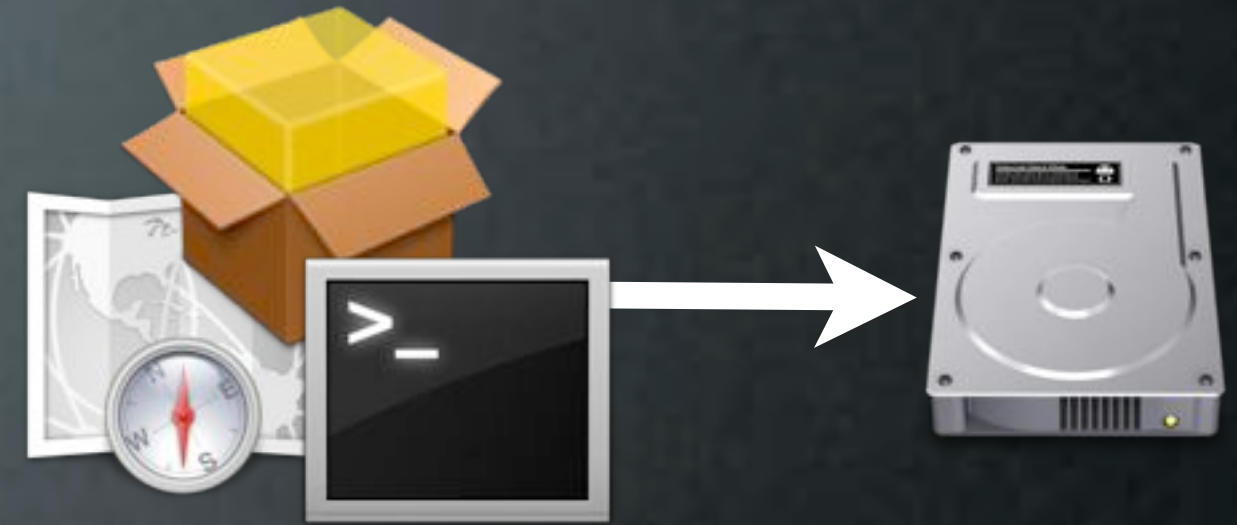
Workflow Example

- Remove Computer from Box
- Run DeployStudio Workflow
 - Install Packages/Scripts
 - Create Users
 - Bind to AD/OD
- Deploy!



Task Target

- No Last Restored Volume -
 - Tasks Need Target
- Overcome Task Limitations by
 - Renaming Volume
 - Manually Setting Target for Tasks



Tips



- Great for Trickle-In-Machines
- Test Any Changes, Test a Lot!

Do You Have Any?

Issues



- Slower Than Single Image
- More Error Prone

Self Service



Power to the People

- Stand Alone DeployStudio Runtime
 - Easy DIY Software Installs
 - Maintenance Scripts
 - Group Restrictions
 - More Access Over Time



Runtime Privileges

- Runtime Does Not Require Admin Rights
- Does Require Login to Runtime
- Only Workflows With Proper Access Show
- Modified /etc/sudoers



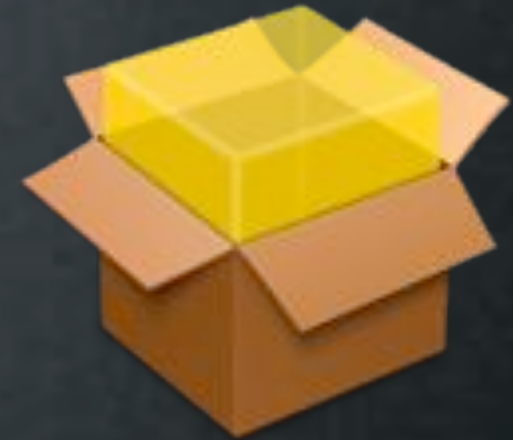
```
%everyone ALL=NOPASSWD: /Applications/Utilities/DeployStudio\ Runtime.app/Contents/MacOS/Runtime.bin
```

Running Runtime



- Open From Script & Terminal
- Create .app With Platypus
- Open With Apple Remote Desktop

Distribute



- Package DeployStudio Admin.app
- Use Parts Of DS Admin Installer Postflight To
 - Link DS Runtime In Utilities
 - Allow Installs With /etc/sudoers
- Deploy Easier Method To Open Runtime - Platypus App

Issues



- Self Service Needs Rebuilt When Servers Are Updated
- Has To Mount Entire Repository
- Slow From Outside Internal Network

Auto Update



Automatic Updates

- Run Updates or Maintenance
 - Daily/Weekly/Monthly
 - NetBoot to DeployStudio
 - Use Secondary NetBoot Set with AutoLogin



Automatic Software Updates

Generic task

Description:

Error message:

Command: `educ_rename_computer.sh`

Parameters:

Postponed execution (command will be launched on first boot)

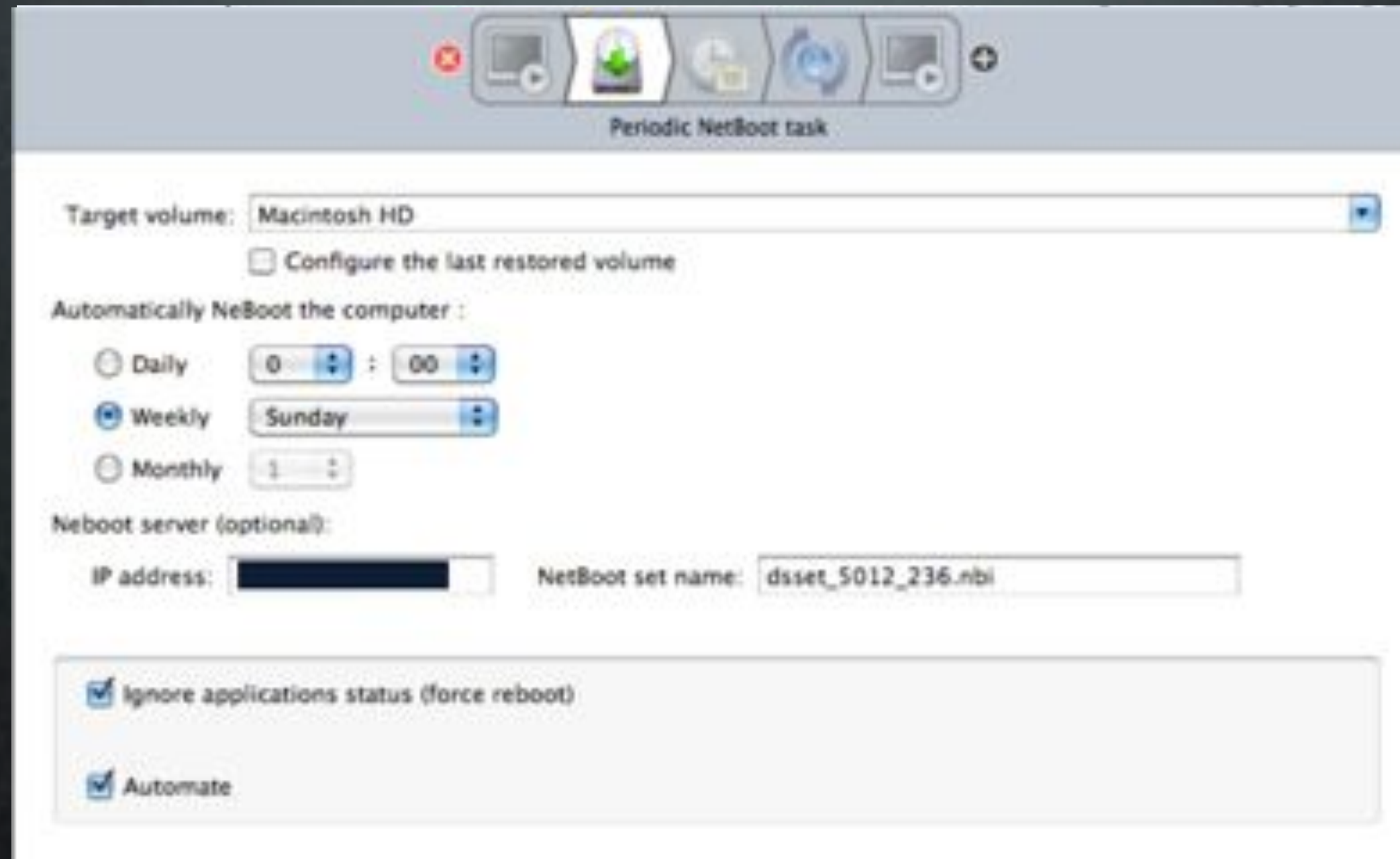
Target volume:

Install on the last restored volume

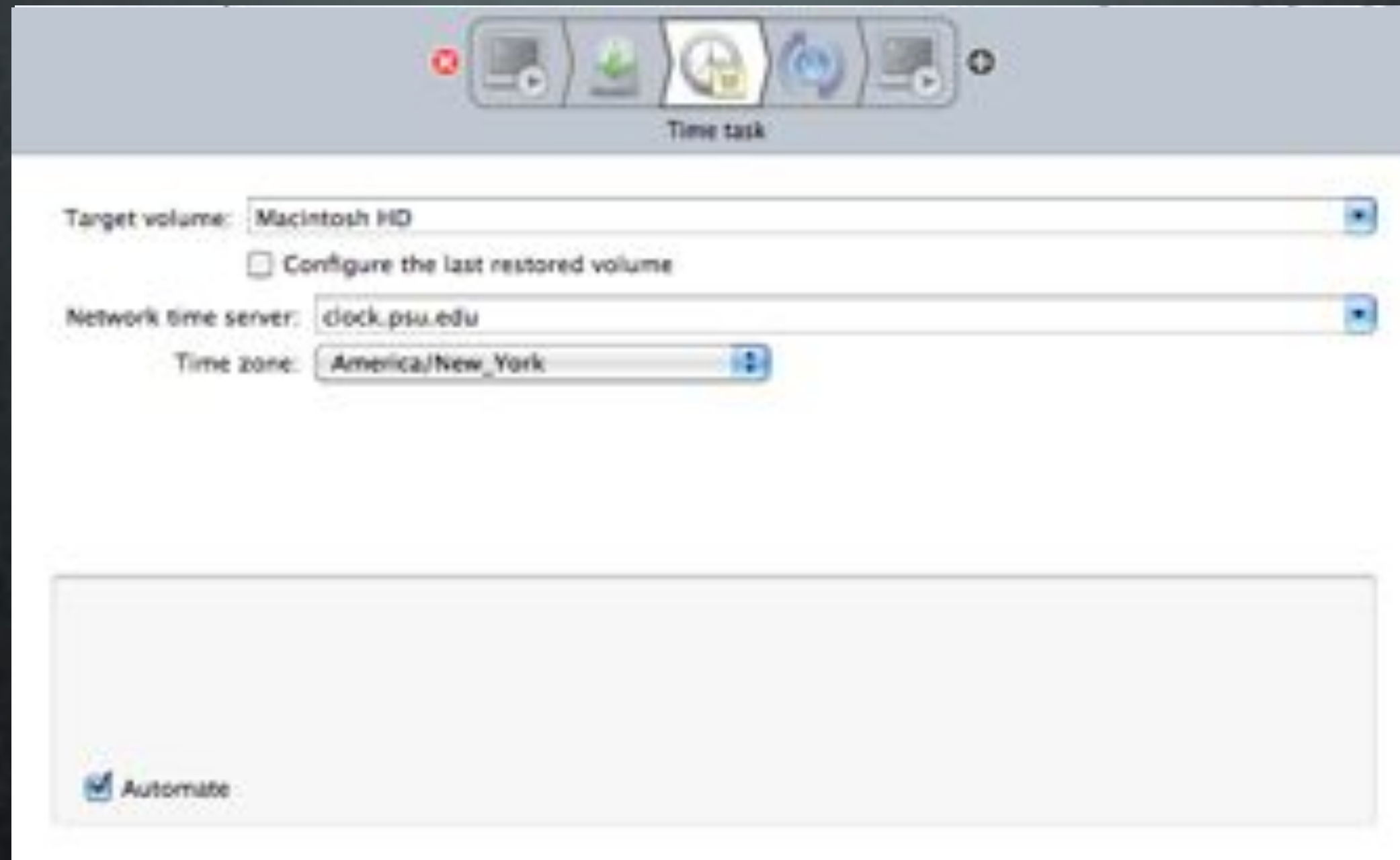
Ignore failures

Automate

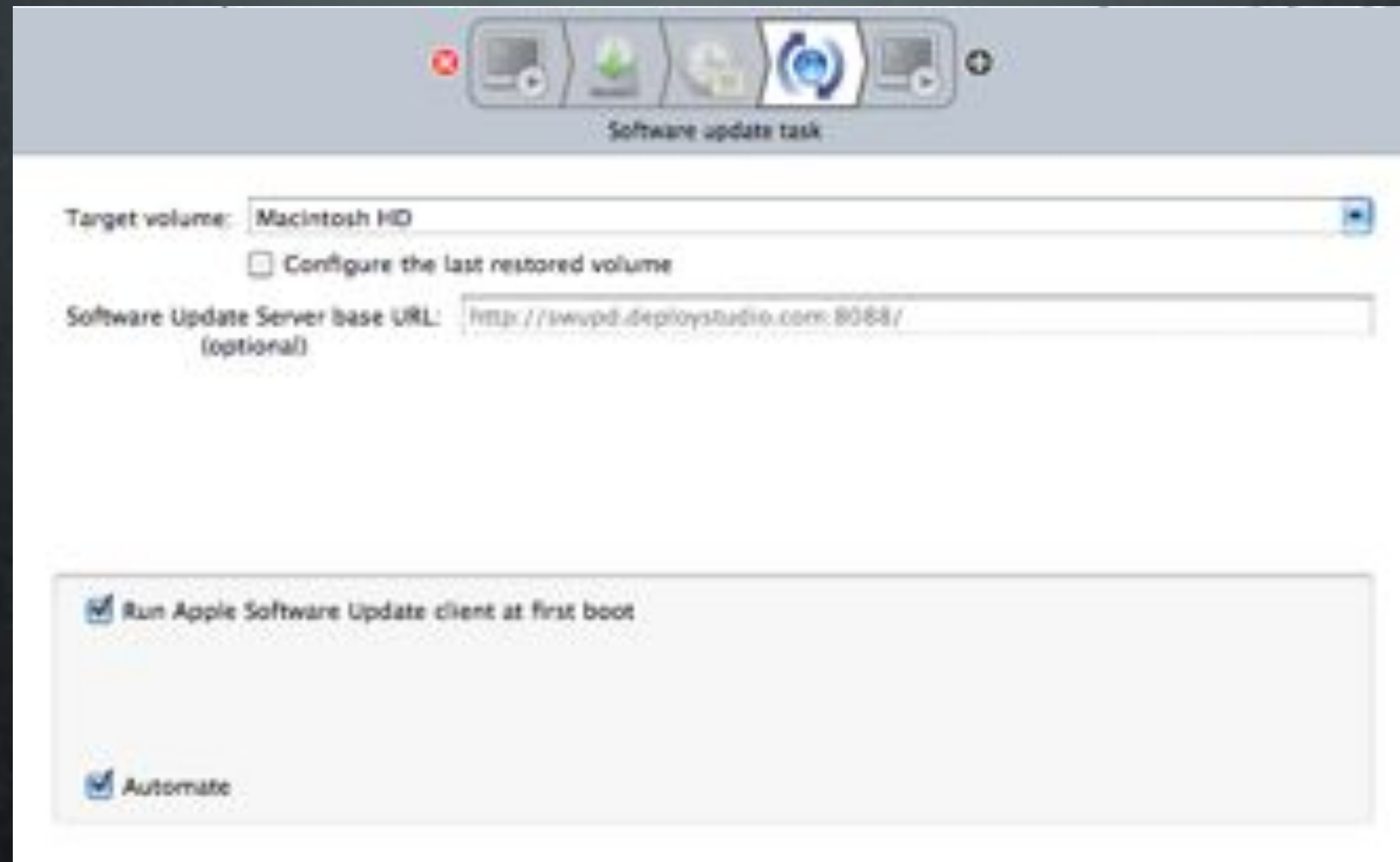
Automatic Software Updates



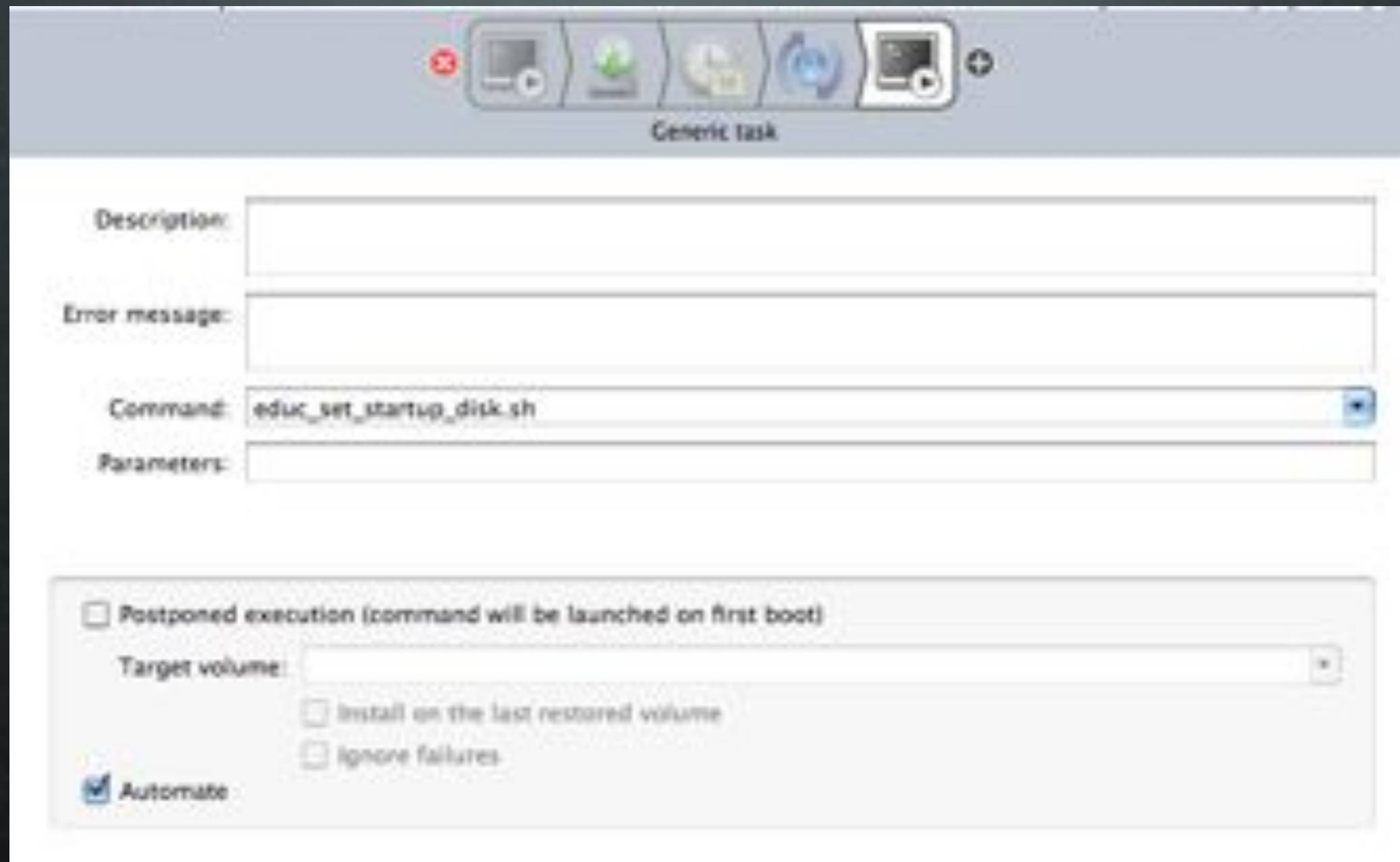
Automatic Software Updates



Automatic Software Updates



Automatic Software Updates



The image shows a screenshot of the Windows Task Scheduler interface for configuring a 'Generic task'. The window title bar includes a toolbar with icons for deleting, creating, refreshing, and running tasks, along with a plus sign for additional options. The main configuration area contains the following fields and options:

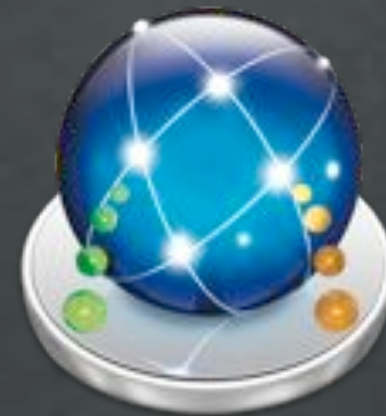
- Description:** An empty text box.
- Error message:** An empty text box.
- Command:** A text box containing the command `educ_set_startup_disk.sh`.
- Parameters:** An empty text box.
- Postponed execution (command will be launched on first boot):** An unchecked checkbox.
- Target volume:** A dropdown menu.
- Install on the last restored volume:** An unchecked checkbox.
- Ignore failures:** An unchecked checkbox.
- Automate:** A checked checkbox.

Issues



- Machines Must be On
- Could Cause Data Loss During Force Reboot

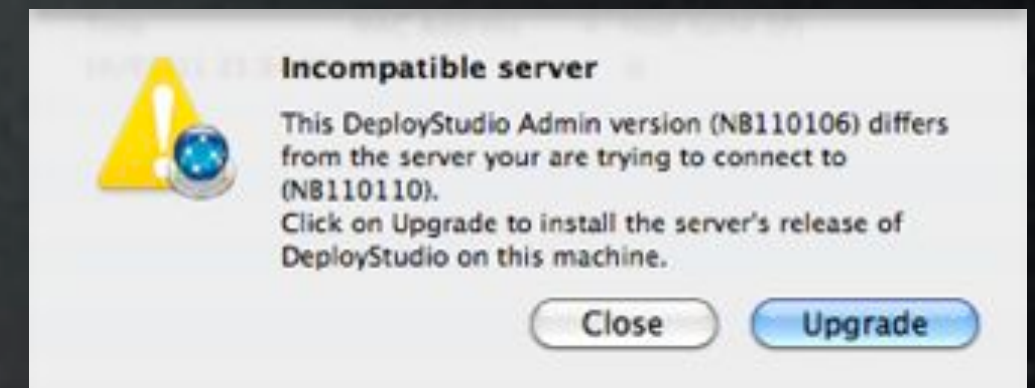
Problems?



Tips



- Previous NTFS Restore Failures Fixed
- Don't "Upgrade" Admin - Check For Updates!



Do You Have Any?

Issues



- Not Open Source - Future Unknown
- Back Button Doesn't Reverse Actions
- Repository Access - Permission Issues
- Some Images Are Not Hardware Independent

Issues



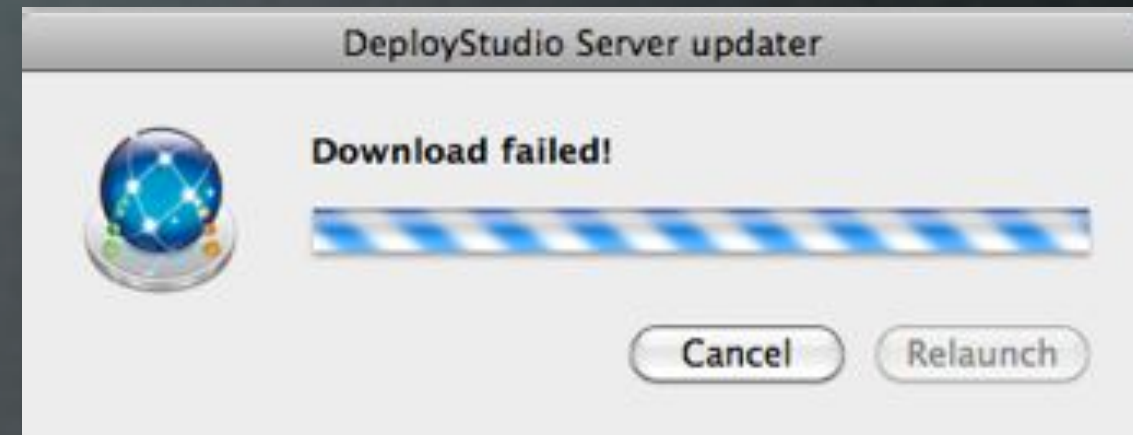
- Admin.app Fails to Upgrade



Issues



- Admin.app Fails to Upgrade



Issues



- Reversed Network Interfaces
 - Common on iMac Model Identifier 8,1
- Abort Workflow Command Fails
- Automated Workflows Can Blow Away Data
- 10.6.6 Netboot Sets Do Not Work
(Fixed in NR110110)

Guides



- Server Setup Video
<http://tinyurl.com/deploystudio101>
- Imaging Workflows
<http://tinyurl.com/DSimagingworkflows>
- Server Guide
<http://tinyurl.com/DSServerGuide>

Thanks!

<http://www.macenterprise.org/mailling-list>

www.deploystudio.com/forums

http://osxdeployment.info/wiki/Main_Page

<http://deploystudio.wikispaces.com/>

[irc.freenode.net](irc://freenode.net) - ##osx-server

Thanks!

<http://www.macenterprise.org/mailling-list>

www.deploystudio.com/forums

http://osxdeployment.info/wiki/Main_Page

<http://deploystudio.wikispaces.com/>

[#osx-server](irc://freenode.net)

Check Out the Scripts!