



# Client Management - MCX

---

John DeTroye  
Senior Consulting Engineer  
Apple Education

**Session PSUMAC301**

# Defining Managed Client

# Managed Client is Usage Management

---

## Establish a consistent user experience

- Define the user workflow experience
- Enforce IT policy
- Distribute configuration preferences

Management by imaging is **NOT** Client Management

# MCX Frequency or Permanence

Manage:

Never

Once

Always

**Managed**

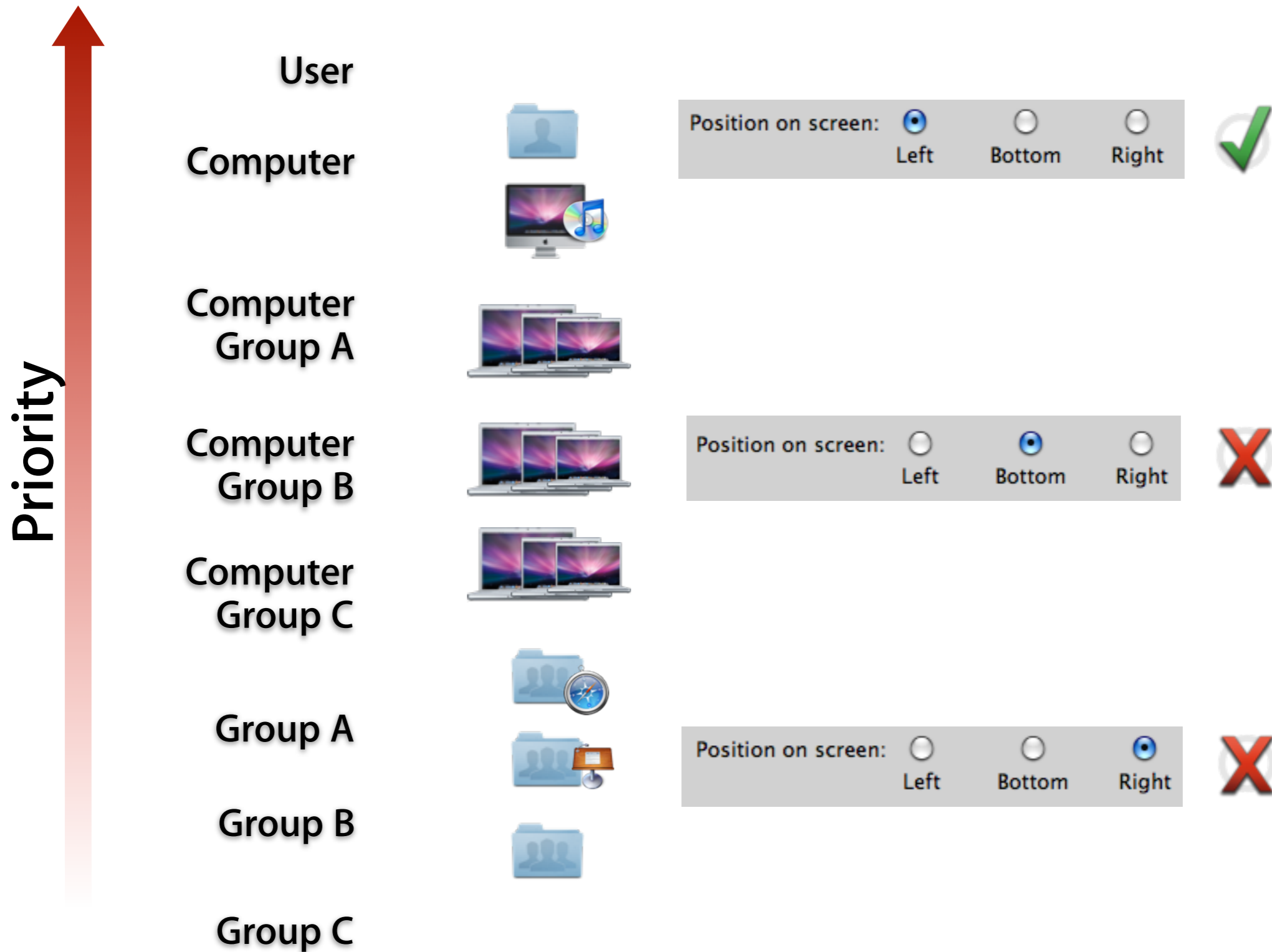
**User Control**

None, Never	unmanaged or never set	user has full control *
Once	preset with value from DS	user has full control *
Often **	reset with value from DS at each login	user has full control *, reset at logout
Always	forced from DS	user cannot control

\* Dependent on user permission under normal, unmanaged circumstances

\*\* Available in Details settings only




# MCX\_settings locations






# Hierarchical Groups

## Management via Computer Lists (pre-10.5 & AD)






-  Software Update—Server One
-  Login Window—List Login
-  Energy Saver—Allow Sleep



-  Software Update—Server One
-  Login Window—Type-in Login
-  Energy Saver—Allow Sleep



-  Software Update—Server One
-  Login Window—List Login
-  Energy Saver—Never Sleep

# Hierarchical Groups

## Management via Computer Groups (10.5+)

 Software Update—Server One

 Login Window—List Login

 Login Window—Type-in Login

 Energy Saver—Never Sleep



 Energy Saver—Allow Sleep



# Hierarchical Groups

Both Computer and User groups

 Application Launch Restrictions—No Dashboard

 Dock—Show Classroom Apps

 Dock—Show Pro Apps

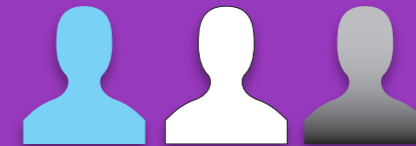


 Dock—Show Admin Apps



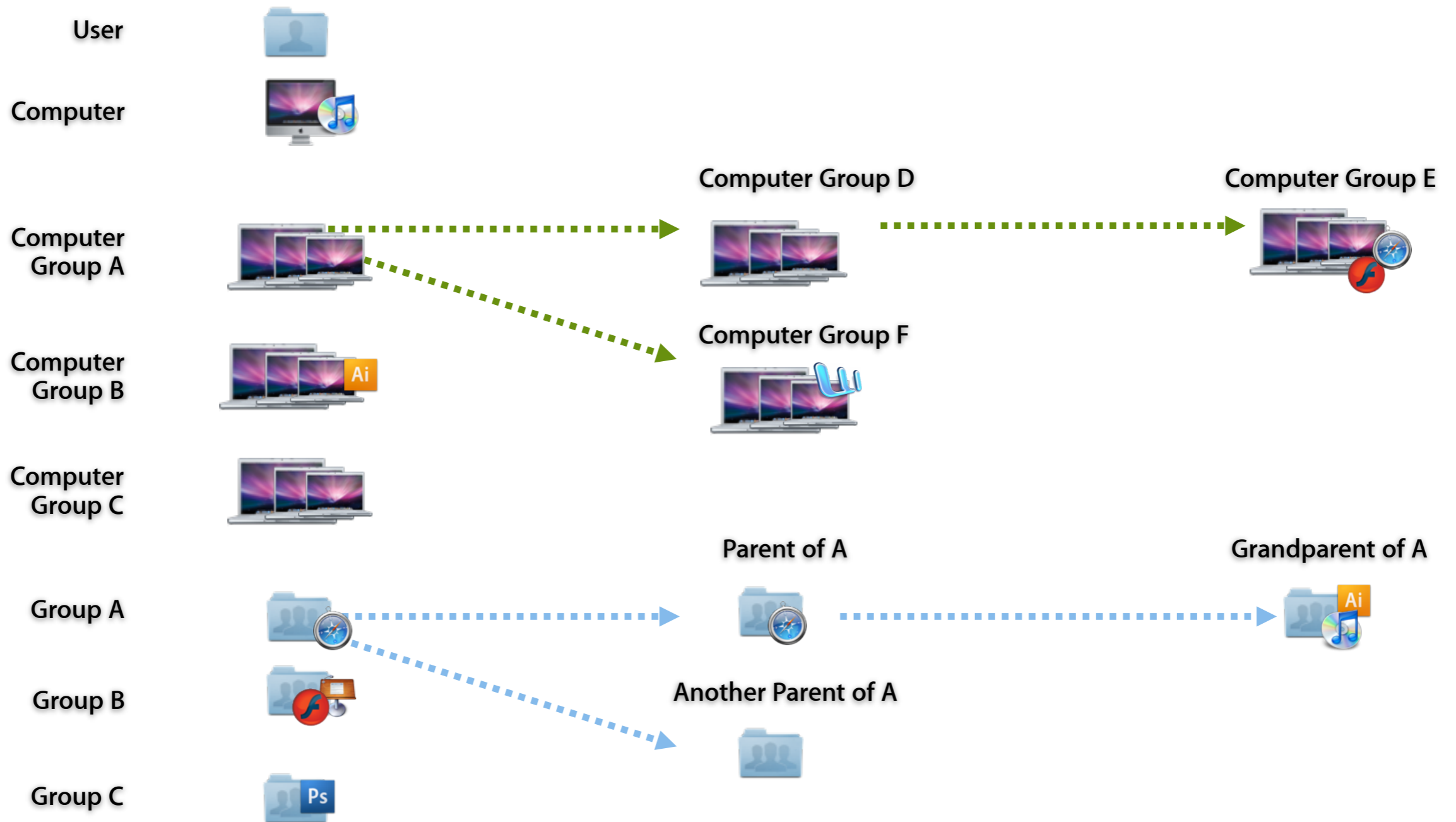
 Mobility—Create PHD

 Application Launch Restrictions—Allow Dashboard





# MCX Lists Will Be Concatenated



Combined Dock

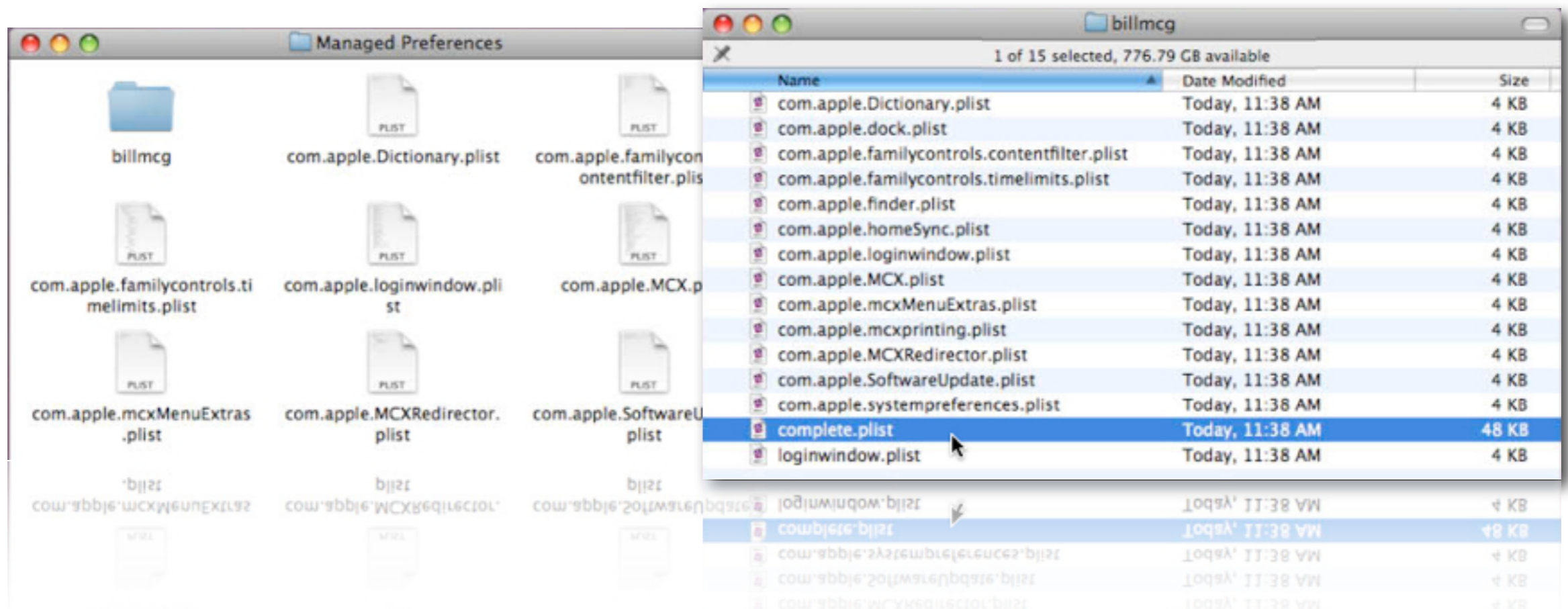
# Compositor - the core of mcx settings

## At the Login Window

- Settings affecting the computer are applied

## At login

- All settings for a user plus all workgroups are combined  
“composited”
- The composited plist is copied into /Library/Managed Preferences/  
<username>



# MCX cache control

---

## MCX cache is always tagged “dirty”

- Refreshed at boot to LoginWindow
- Refreshed at logout
- Refreshed at network transition

## To delete all cached info at client:

```
sudo dscl . -delete /Computers  
rm -rf /Library/Managed\ Preferences
```

## To remove mcx-settings for a specific user at a client:

```
sudo dscl . -delete /Users/username  
dsAttrTypeStandard:MCXSettings
```

# Debugging MCX Setting Conflicts

## System Profiler - Managed Client

The screenshot shows the System Profiler window for a managed client named 'lab-admin-kit'. The left sidebar lists various system components, with 'Managed Client' highlighted by a red arrow. The main pane displays a table of settings for the selected component.

Name	Value
▶ .GlobalPreferences	
▶ com.apple.applicationaccess.new	
▶ com.apple.dashboard	
▶ com.apple.Dictionary	
▼ com.apple.dock	
persistent-others	()
MCXDockSpecialFolders	()
persistent-apps	( { "mcx_typehint" = 1; "tile-data" = ...
▶ com.apple.familycontrols.contentfilter	
▶ com.apple.familycontrols.timelimits	
▼ com.apple.finder	
ProhibitGoToiDisk	1
ShowRemovableMediaOnDesktop-immutable	1
WarnOnEmptyTrash-immutable	1
FinderSpawnWindow-immutable	1
ShowHardDrivesOnDesktop	1
OpenInColumnView-immutable	1
InterfaceLevel	Full
ProhibitGoToFolder	1
NewWindowTargetIsHome	1

Below the table, the details for the selected setting are shown:

```
com.apple.finder:  
  
ProhibitGoToiDisk:  
Value: 1  
State: always  
Source: labclients (Computer Group) {  
  
Source: labclients (Computer Group) {  
State: always  
Value: 1
```

# Managed Client design

# Local Preferences

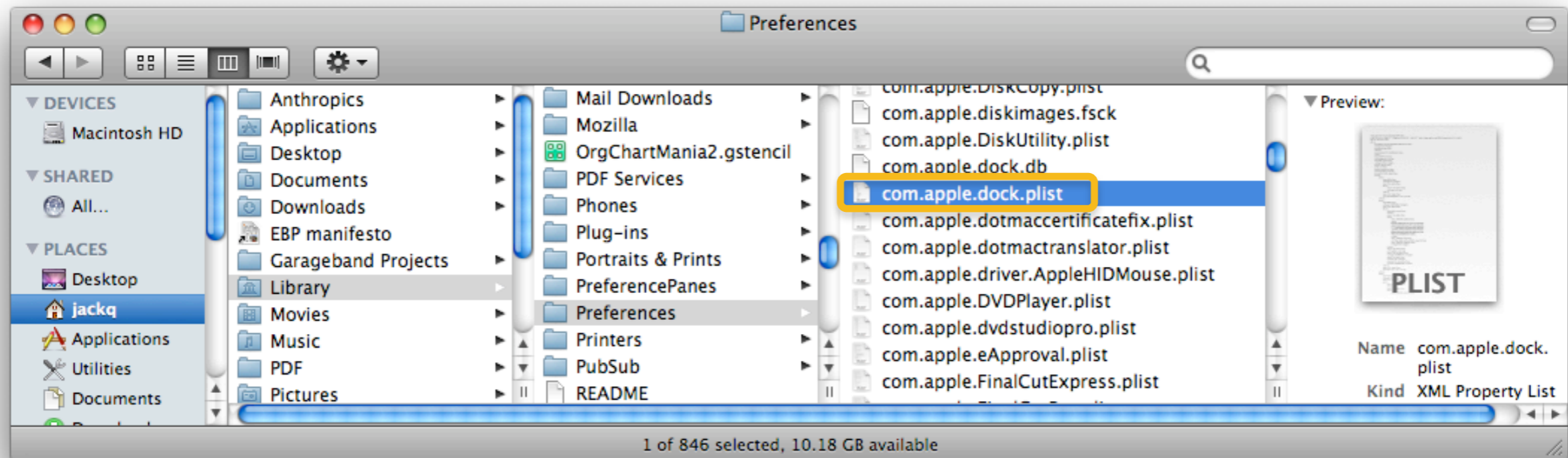
## Set in System Preferences



# Local Preferences

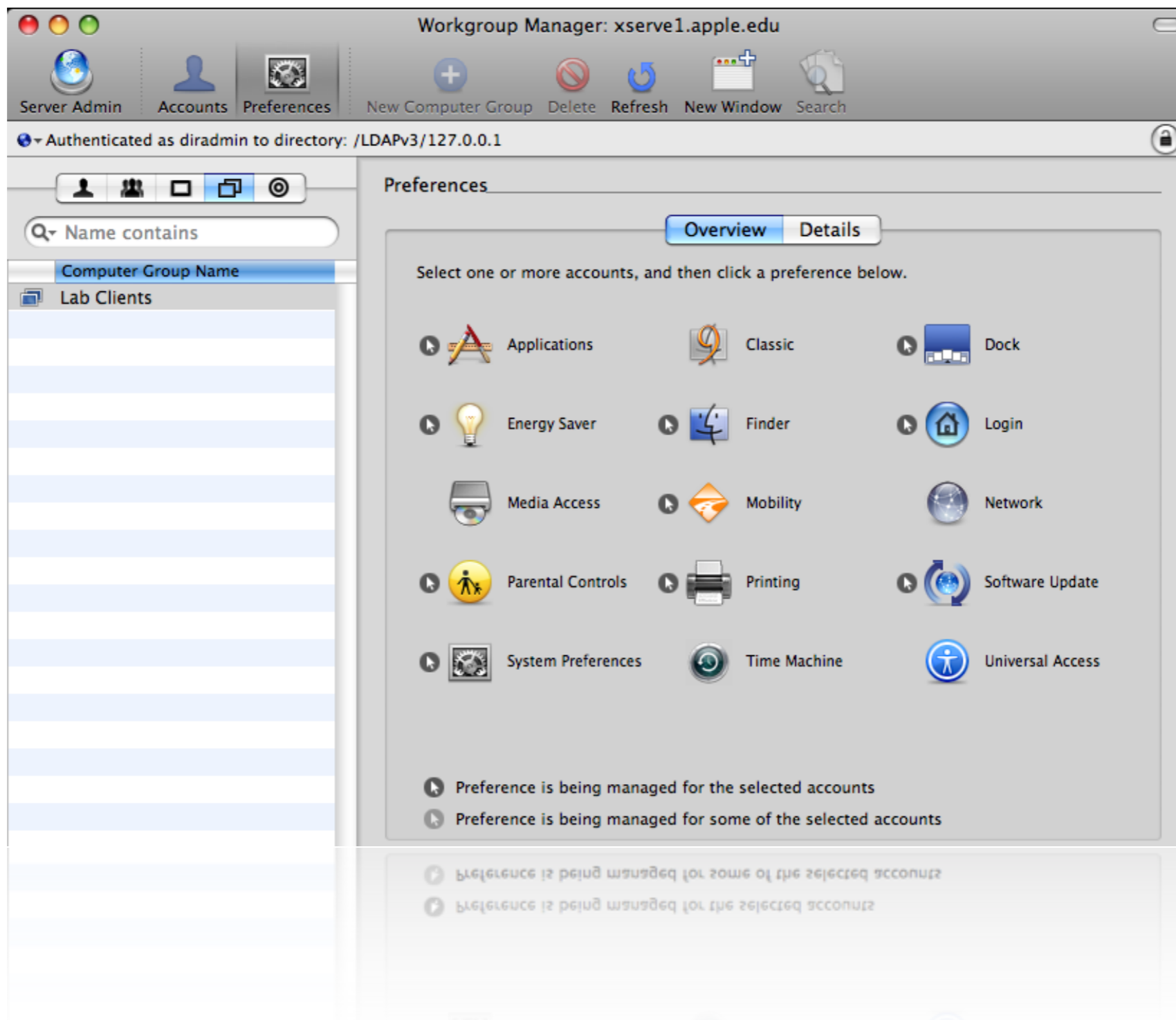
Live in `~/Library/Preferences/`

- Stored in plist format
- Reverse domain name notation
  - e.g. `com.apple.dock`



# Network managed preferences

## Workgroup Manager





# MCXSettings in network directory

Attribute Name: dsAttrTypeStandard:MCXSettings

Text:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>mcx_application_data</key>
  <dict>
    <key>com.apple.dock</key>
    <dict>
      <key>Forced</key>
      <array>
        <dict>
          <key>mcx_preference_settings</key>
          <dict>
            <key>autohide</key>
            <true/>
            <key>autohide-immutable</key>
            <true/>
            <key>largesize</key>
```

Hexadecimal:

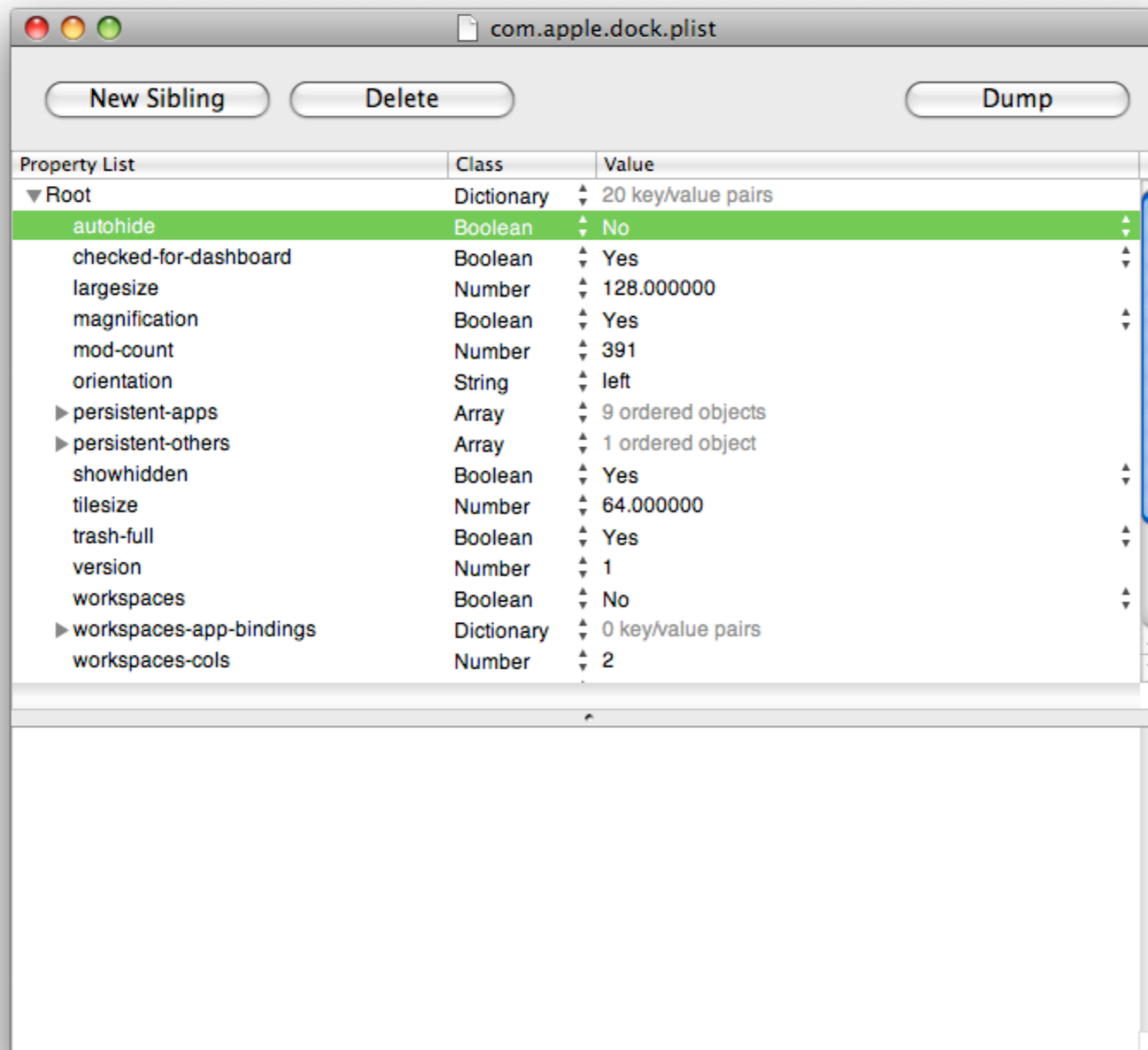
```
3c3f786d 6c207665 7273696f 6e3d2231 2e302220 656e636f 64696e67 3d225554 462d3822 3f3e0a3c
21444f43 54595045 20706c69 73742050 55424c49 4320222d 2f2f4170 706c652f 2f445444 20504c49
53542031 2e302f2f 454e2220 22687474 703a2f2f 7777772e 6170706c 652e636f 6d2f4454 44732f50
726f7065 7274704c 6073742d 312e302e 64746422 3e0a3c70 6c697374 20766572 73696f6e 3d22312e
```

Search in Text

# Anatomy of a Plist File

**Keyname** **Type** **Value**

autohide Boolean No



# Anatomy of a Plist

---

## It's just XML...

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://
www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>autohide</key>
  <false/>
```

## well, sort of

- Mac OS X plists are in binary format, convert before opening  
`plutil -convert xml1 com.apple.dock.plist; open -e !`

# Defaults CLI tool

---

## Direct access to property lists

```
defaults read com.apple.dock autohide
```

```
defaults write com.apple.dock autohide -bool true
```

	<i>App Domain</i>	<i>Keyname</i>	<i>Type</i>	<i>Value</i>
defaults write	com.apple.dock	autohide	-bool	true

Example: Time Machine - stop asking about drives

```
defaults write com.apple.TimeMachine  
DoNotOfferNewDisksForBackup -bool -true
```

```
defaults read com.apple.TimeMachine
```

```
{
```

```
    DoNotOfferNewDisksForBackup = 1;
```

```
}
```

# Managed Client settings via dscl

---

## Reading Values

```
dscl -mcxread /LDAPv3/127.0.0.1/ComputerGroups/clients
```

- Spews out a lot of XML

```
App domain: com.apple.dock  
Key: contents-immutable  
State: always  
Value: 1
```

```
App domain: com.apple.dock  
Key: static-only  
State: always  
Value: 1
```

```
App domain: com.apple.dock  
Key: AppItems-Raw  
State: always  
Value: (
```

```

    {
      "mcx_typehint" = 1;
      "tile-data" = {
        "file-data" = {
          "_CFURLString" = "/Applications/
Safari.app";
          "_CFURLStringType" = 0;
        };
        "file-label" = Safari;
      };
      "tile-type" = "file-tile";
    },
    {
      "mcx_typehint" = 1;
      "tile-data" = {
        "file-data" = {
          "_CFURLString" = "/Applications/
Preview.app";
          "_CFURLStringType" = 0;
        };
        "file-label" = Preview;
      };
      "tile-type" = "file-tile";
    },
    {
      "mcx_typehint" = 1;

```

```

        "tile-data" = {
            "file-data" = {
                "_CFURLString" = "/Applications/
iTunes.app";
                "_CFURLStringType" = 0;
            };
            "file-label" = iTunes;
        };
        "tile-type" = "file-tile";
    },
    {
        "mcx_typehint" = 1;
        "tile-data" = {
            "file-data" = {
                "_CFURLString" = "/Applications/Photo
Booth.app";
                "_CFURLStringType" = 0;
            };
            "file-label" = "Photo Booth";
        };
        "tile-type" = "file-tile";
    },
    {
        "mcx_typehint" = 1;
        "tile-data" = {

```

```

        "file-data" =
            {
                "_CFURLString" = "/Applications/
iPhoto.app";
                "_CFURLStringType" = 0;
            };
        "file-label" = iPhoto;
    };
    "tile-type" = "file-tile";
},
{
    "mcx_typehint" = 1;
    "tile-data" =
        {
            "file-data" =
                {
                    "_CFURLString" = "/Applications/
iMovie.app";
                    "_CFURLStringType" = 0;
                };
            "file-label" = iMovie;
        };
    "tile-type" = "file-tile";
},
{
    "mcx_typehint" = 1;
    "tile-data" =
        {
            "file-data" =
                {

```



**This could go on for another  
hundred slides or so...**

# Debugging MCX Setting Conflicts

---

## mcxquery

```
mcxquery -user <username> -group <groupname> -computer <comprname>
```

- Use “=” for current user/group/computer

```
mcxquery -user = -group = -computer =
```

```
com.apple.finder
```

```
    AppleShowAllExtensions-immutable labclients (Computer Group)  
always 1
```

```
    ComputerViewOptions_Arrangement labclients (Computer Group)  
once Name
```

```
    ComputerViewOptions_CalculateAllSizes labclients (Computer  
Group) once 0
```

```
    ComputerViewOptions_IconSize labclients (Computer Group) once  
48
```

# dscl > mcxhelp

- Complete CLI access to MCX

- -mcxread

- -mcxset

- -mcxedit

- mcximport

- plus ...

```
Terminal — ssh — 120x40
lab-imaac-intel-20:~ apple$ dscl
Entering interactive mode... (type "help" for commands)
> mcxhelp
MCX Extensions:
-mcxread    <record path> [optArgs] [<appDomain> [<keyName>]]
-mcxset     <record path> [optArgs] <appDomain> <keyName> [<mcxDomain> [<keyValue>]]
-mcxedit    <record path> [optArgs] <appDomain> <keyPath> [<keyValue>]
-mcxdelete  <record path> [optArgs] [<appDomain> [<keyName>]]
-mcxexport  <record path> [optArgs] [<appDomain> [<keyName>]]
-mcximport  <record path> [optArgs] <file path>
-mcxhelp

The <record path> specifies which record in the directory node is to be operated on (i.e. '/Users/mcx1'). This parameter is always required, but if you are in interactive mode, you can use '.' to mean 'current directory' (the directory that was last set using the 'cd' command).

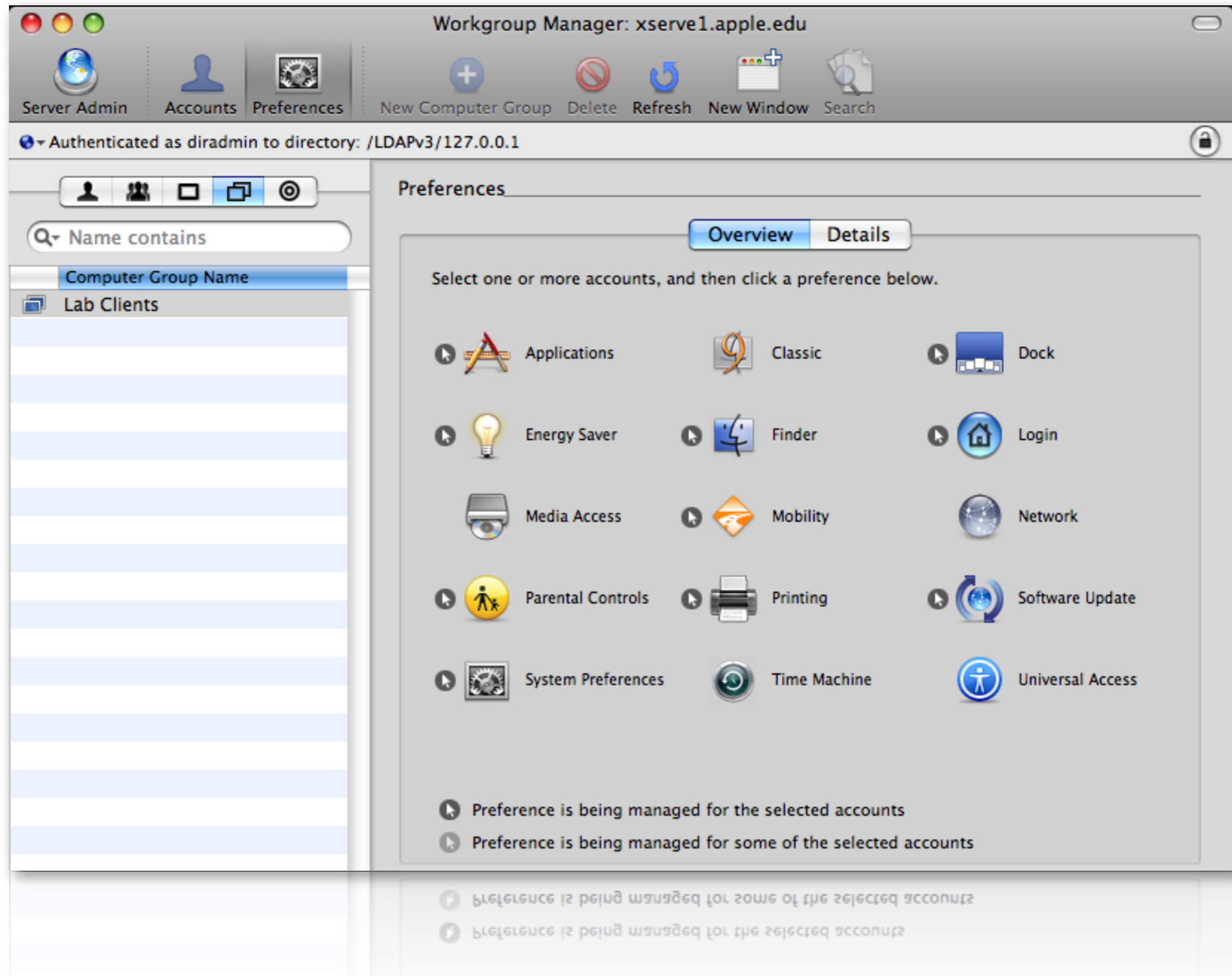
The <appDomain> parameter is something like 'com.apple.dock'

The <keyName> parameter is something like 'tilesize'

The <keyPath> parameter is a path to a sub-plist within an existing key value. For example 'mount-controls:dvd:1' means the 2nd element within the array with the key name 'dvd' within the key called 'mount-controls'

The <mcxDomain> is the type of management applied to the key. Legal values are:
'none'      (not managed)
'always'
'once'
'often'
'unset'
```

# Preferences in Workgroup Manager



# Preferences in WGM / Details

com.apple.dock

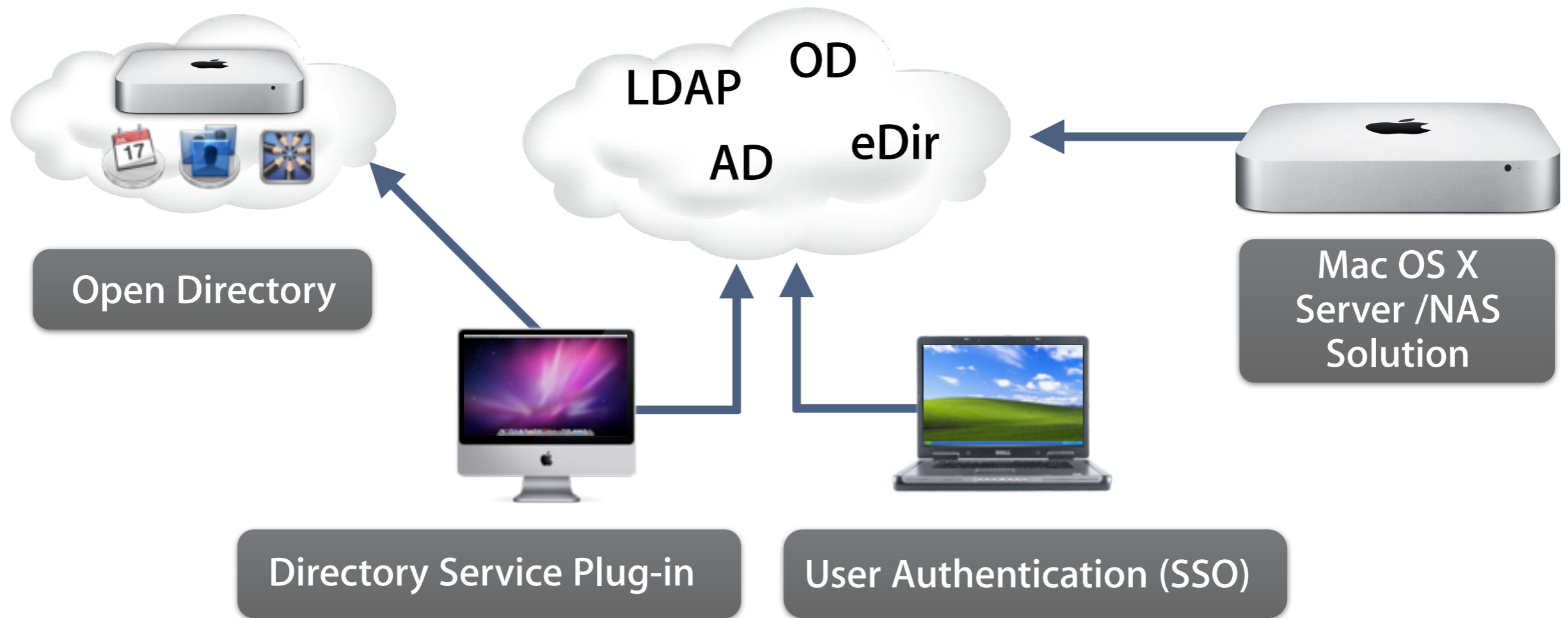
New Key Delete Set Default Delete Unmatched

Name	Type	Value
▶ Once	dictionary	empty
▶ Often <b>MCX Domain</b>	dictionary	empty
▼ Always	dictionary	14 items
autohide	boolean	true
autohide-immutable	boolean	true
largesize	real	128.000000
launchanim	boolean	true
launchanim-immutable	boolean	true
magnification	boolean	false
magnify-immutable	boolean	true
magsize-immutable	boolean	true
mineffect	string	genie
mineffect-immutable	boolean	true
orientation	string	bottom
position-immutable	boolean	true
size-immutable	boolean	true
tilesize	real	64.000000

Done Revert Apply Now

# Dual Directory Integration

## Authenticating Directory



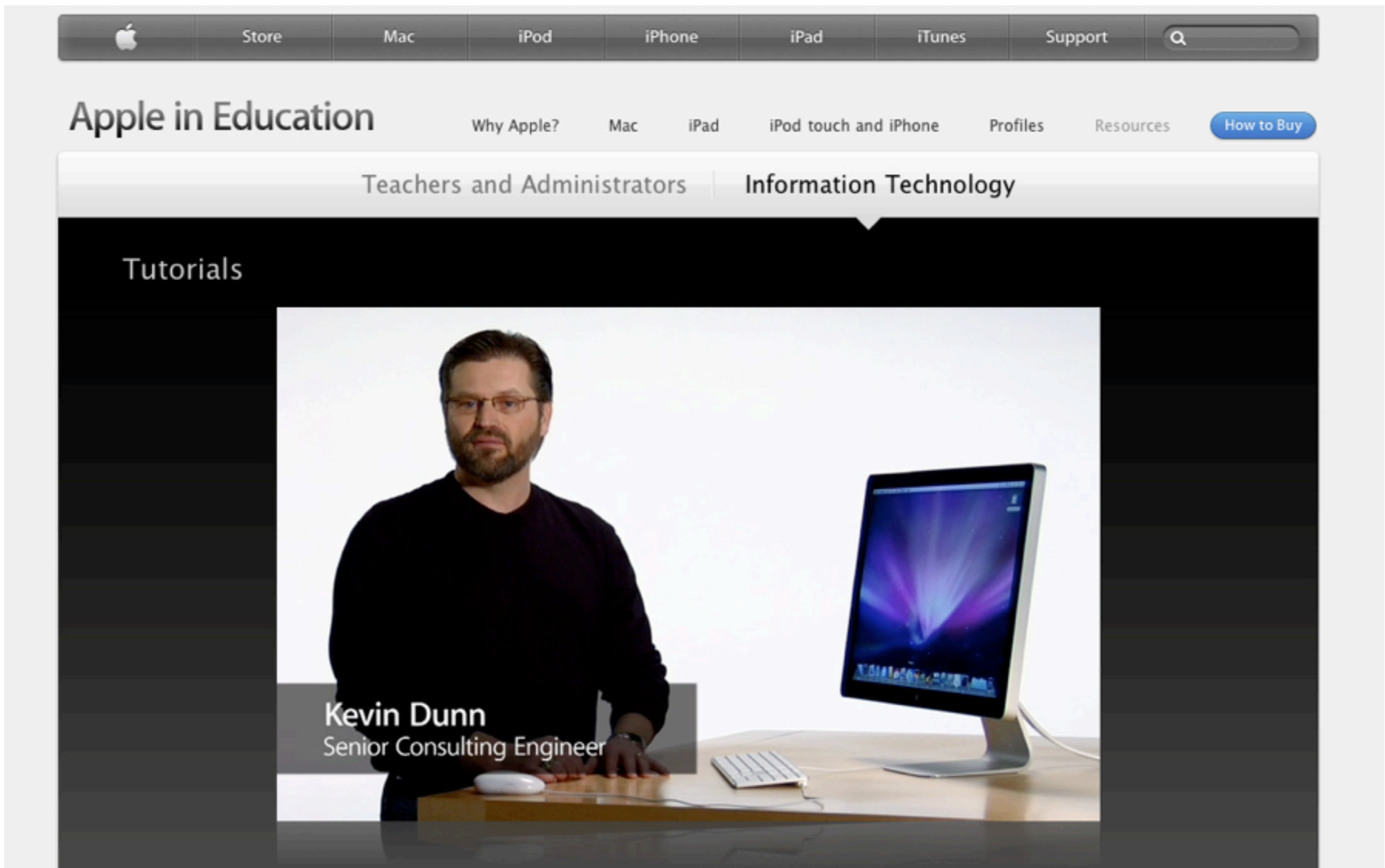
# Apple White Paper

---

## AD/OD Dual Directory Integration



[apple.com/business/resources](http://apple.com/business/resources)



<http://www.apple.com/education/resources/information-technology.html>



# Active Directory Schema Extensions

---

## Considerations

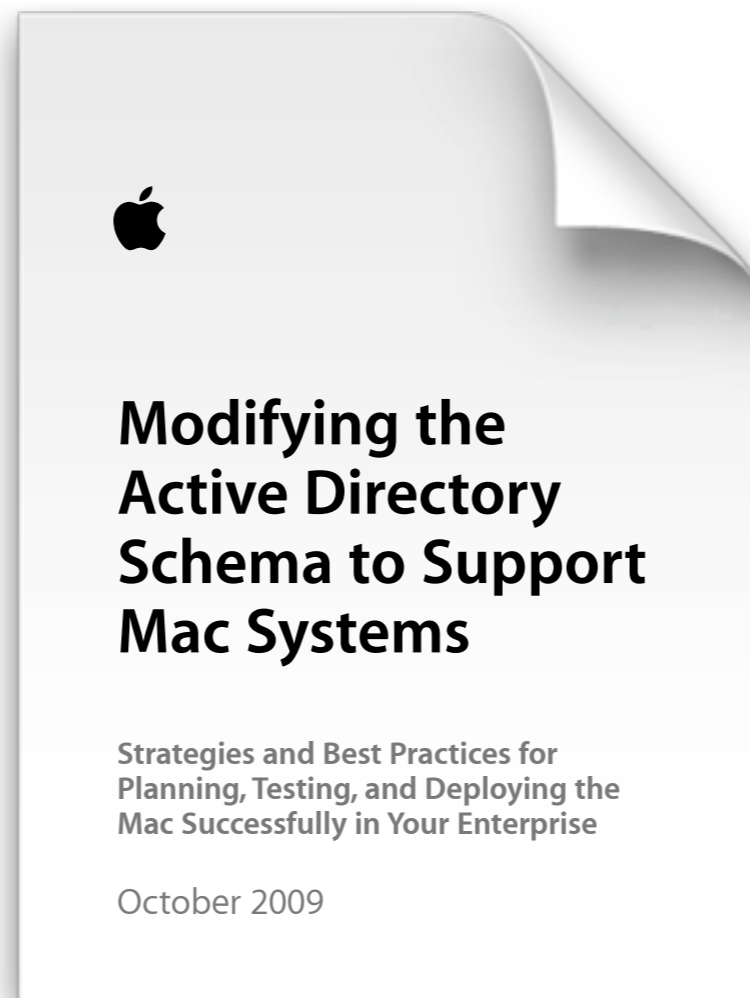
- Cost / Support
- Computer Lists vs. Computer Groups
- W2K3R2 - RFC 2307
- Active Directory Users and Computers/Group Policy Objects (Windows)
- Workgroup Manager (Mac OS X)
- Support
- Inability to revert changes



# Apple White Paper

---

## Active Directory Schema Extensions



[apple.com/business/resources](http://apple.com/business/resources)

# Apple Online Seminar

---

## Active Directory Schema Extensions

**Modifying Active Directory Schema  
to Support Mac Computers**

— A deep-dive into the necessary tools and processes

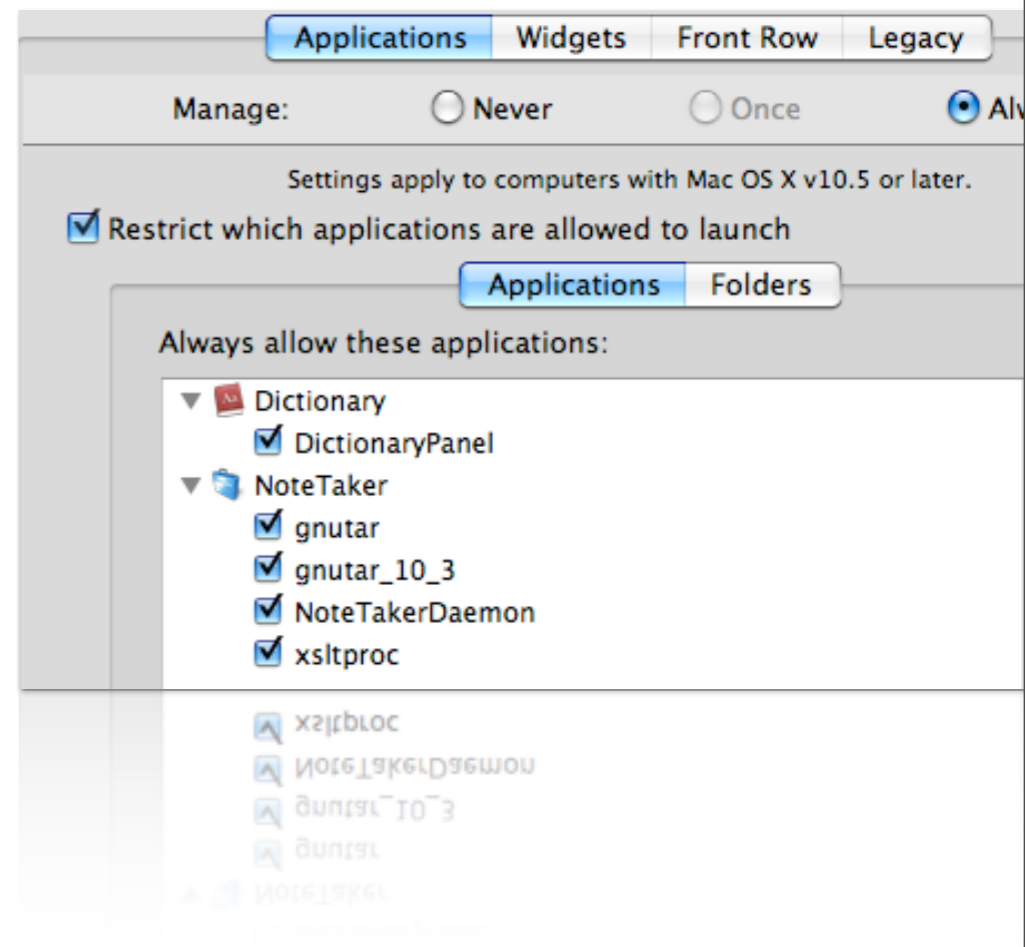


<http://seminars.apple.com/seminaronline/modifying/apple>

# Key Managed client settings

# Application management

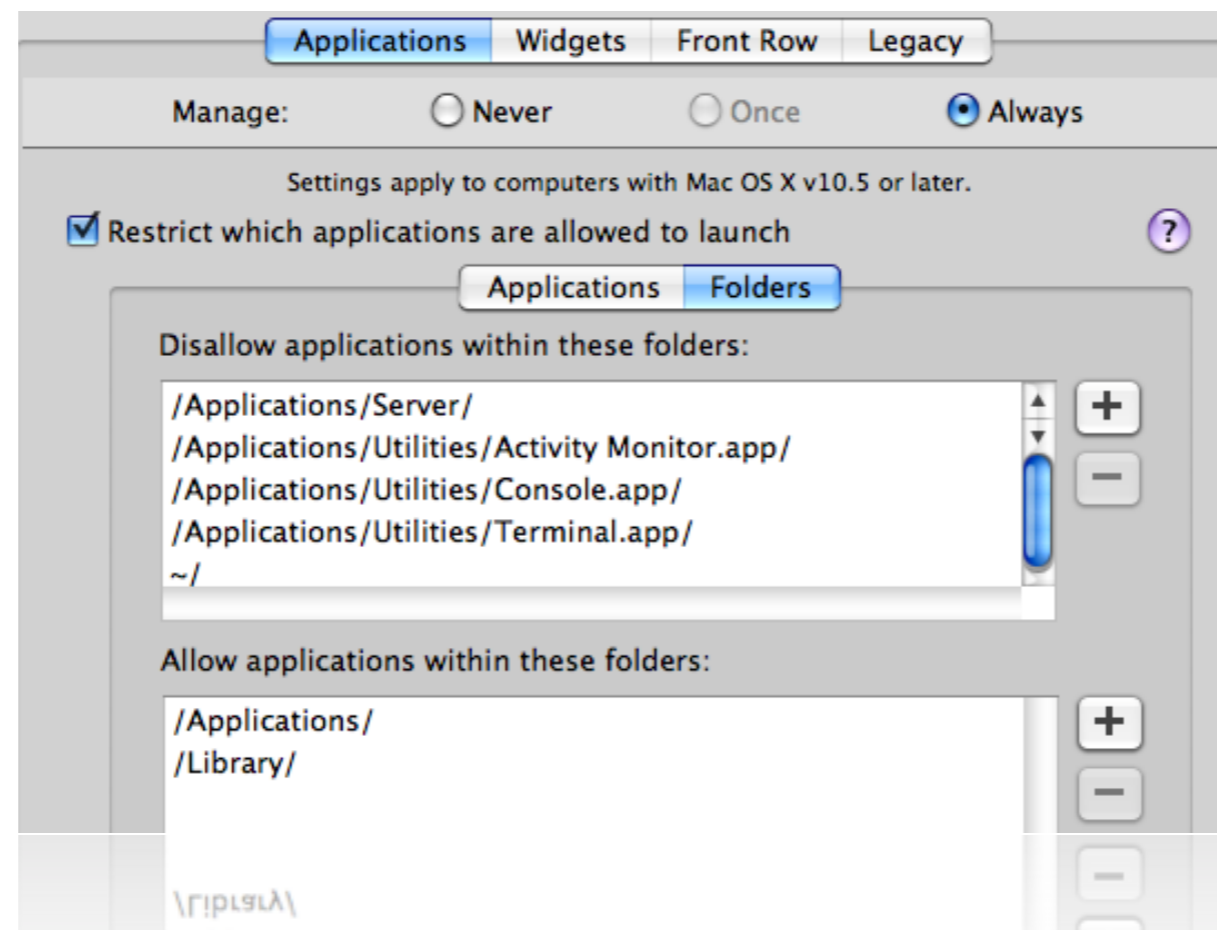
- Who Gets to Run What?
  - Applications are digitally signed
  - Third Party Apps will be signed by WGM
  - Updates need to be re-signed and re-deployed
  - Any modification to Application Bundle will invalidate signature and revoke launch permission
  - White List can be complex to set up
    - Everything else is blacklisted



# Application management

## Launch Restrictions by Folder

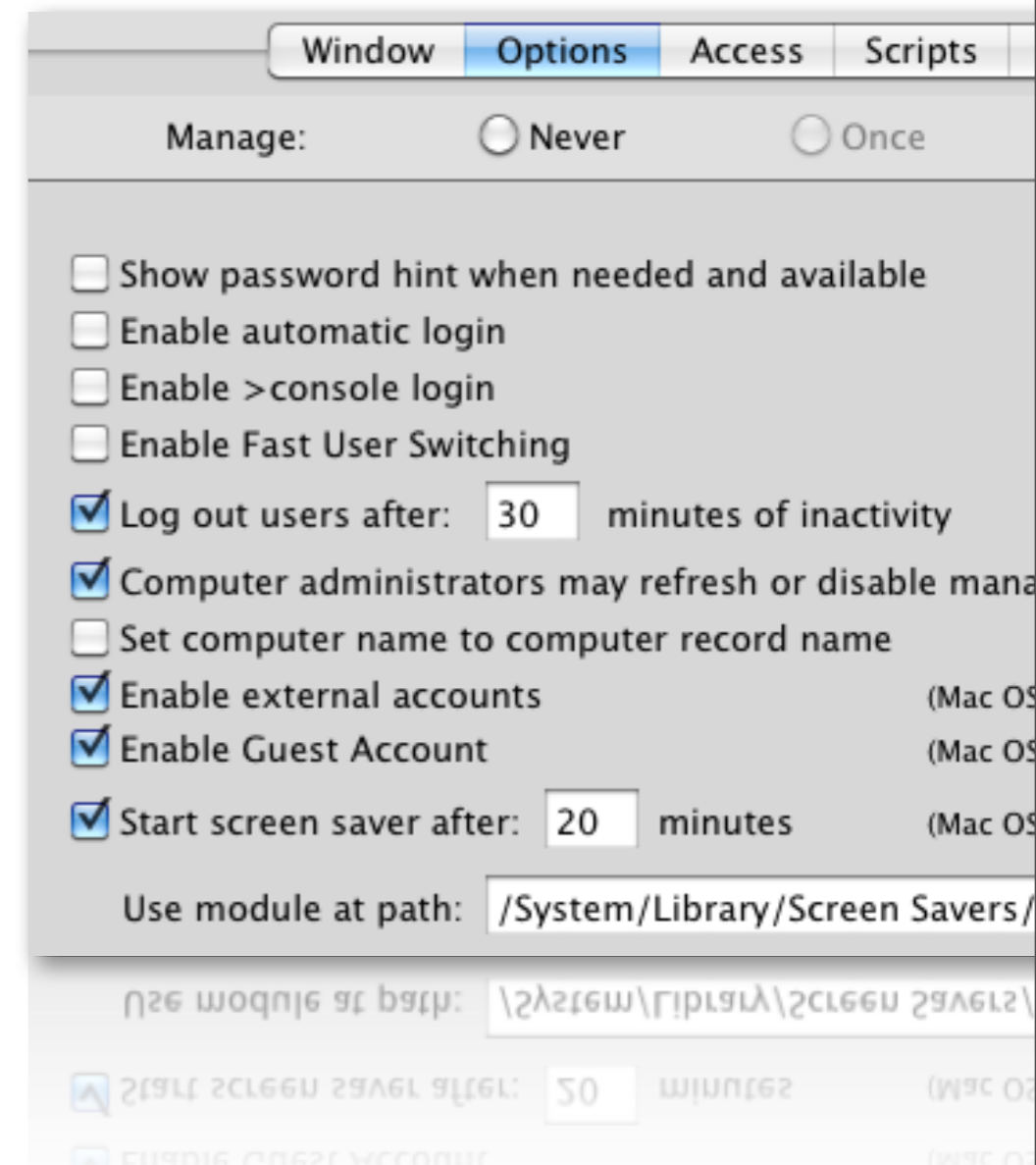
- If “Disallow” is set, at least one “allow” folder must be set
- Top down resolution, deny wins
- Allowed signed apps can always be launched



# Login

## Setting options

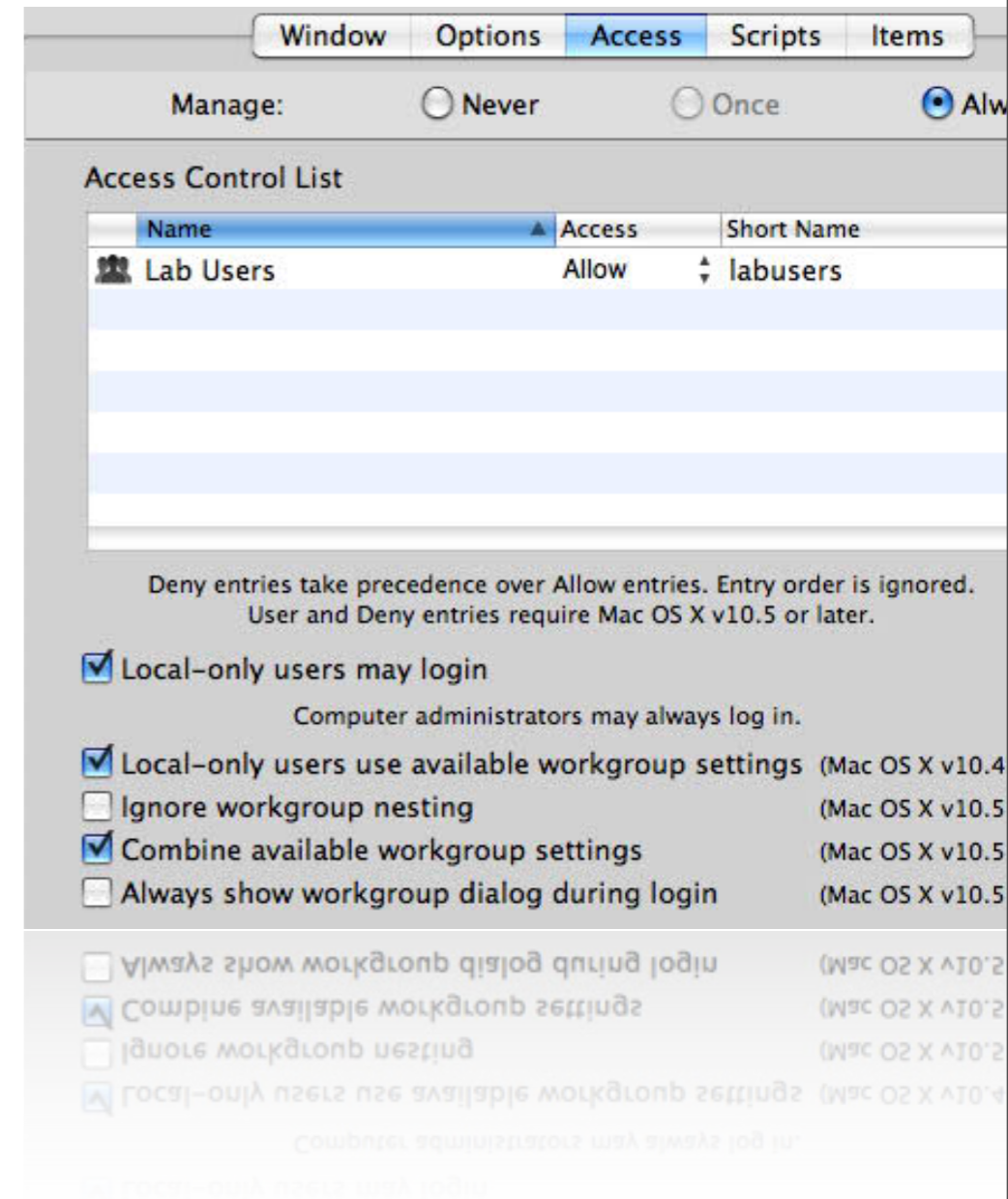
- Control login type
- Set auto logout
- Manage local admins (or not)
- Enable special mobile account
  - External - covered later on
- Enable Guest account globally



# Login

## Access Control List (ACL)

- Specify access by group or user
- Set workgroup combining
  - All groups with preferences are combined into a single user experience at login
  - Avoids the “Which group do I use again?”
- If a group is not listed, it's MCX settings will not apply at login





# Network

## Setting basic network access

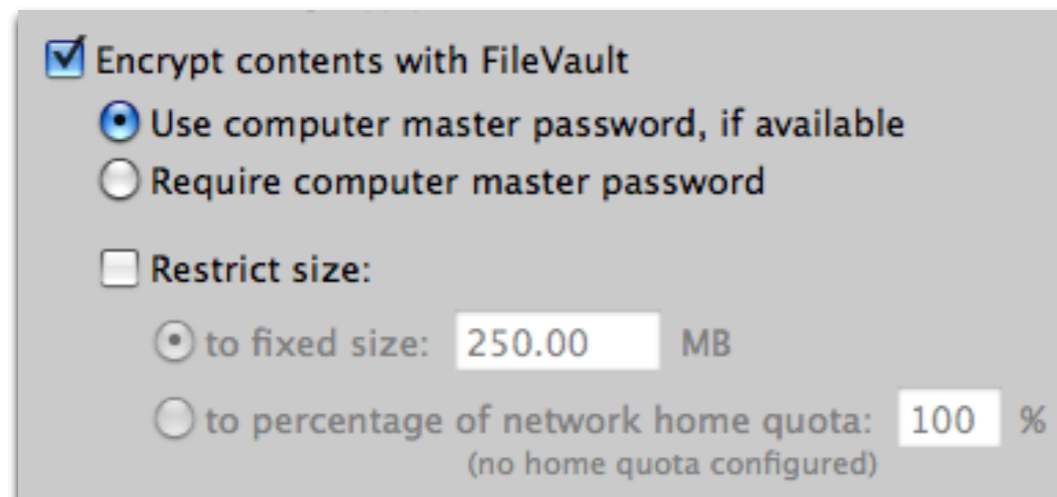
- Establish global proxies
- Disable Internet Sharing
- Allow / deny Bluetooth
- Be careful with the 'Airport' setting...



# Mobility preferences

## Mobile Account settings

- Synced or non-synced
- External / Filevault / Expiration

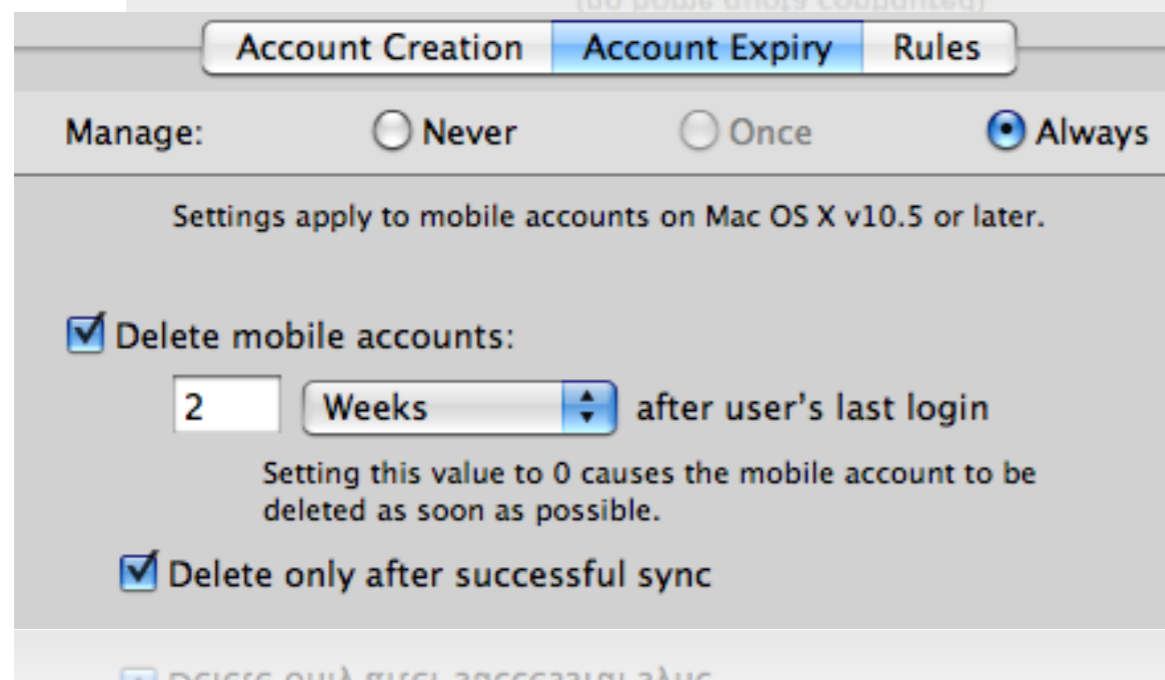


Encrypt contents with FileVault

- Use computer master password, if available
- Require computer master password

Restrict size:

- to fixed size:  MB
- to percentage of network home quota:  %  
(no home quota configured)



Account Creation | **Account Expiry** | Rules

Manage:  Never  Once  Always

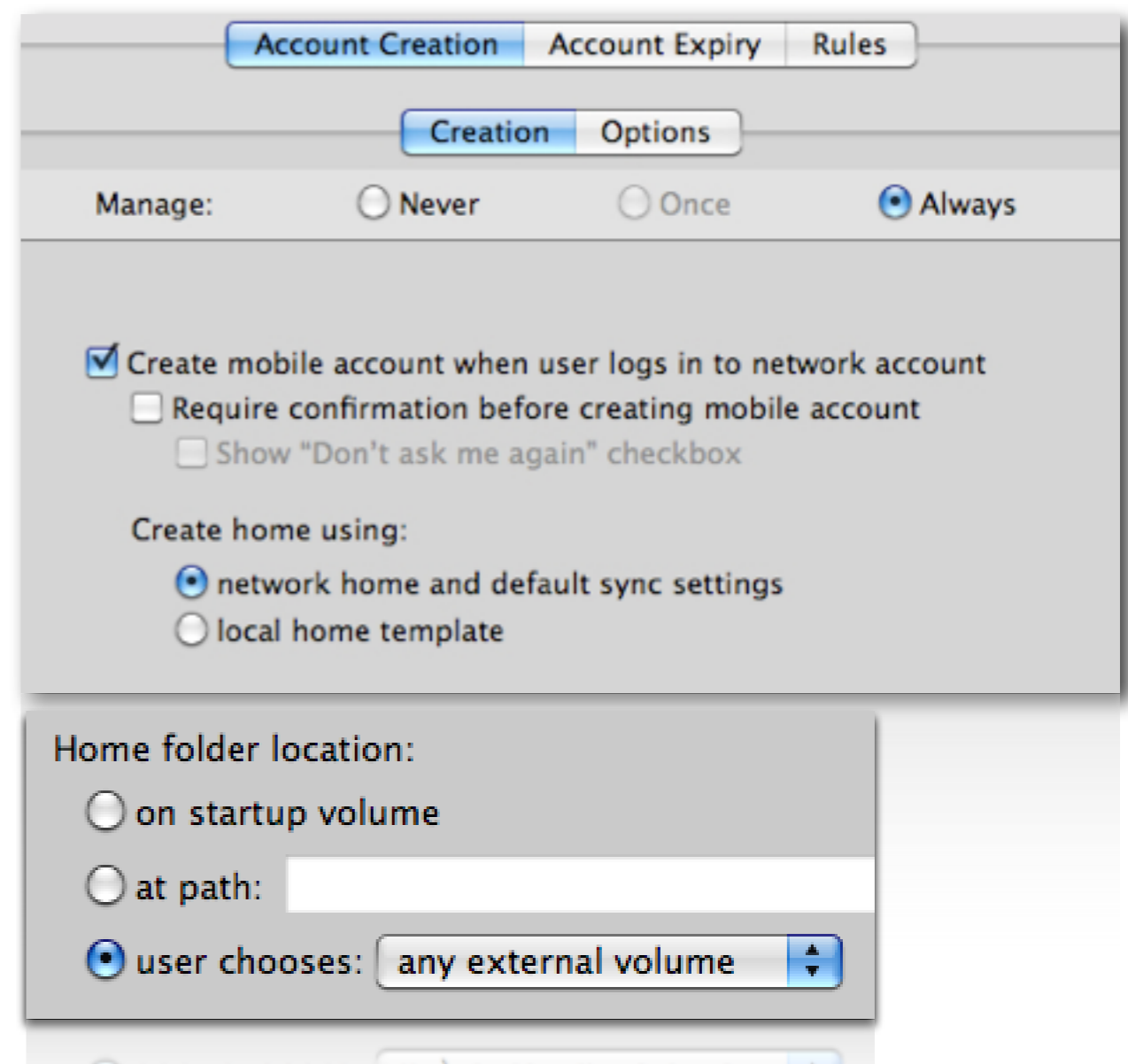
Settings apply to mobile accounts on Mac OS X v10.5 or later.

Delete mobile accounts:

after user's last login

Setting this value to 0 causes the mobile account to be deleted as soon as possible.

Delete only after successful sync



Account Creation | Account Expiry | Rules

**Creation** | Options

Manage:  Never  Once  Always

Create mobile account when user logs in to network account

- Require confirmation before creating mobile account
  - Show "Don't ask me again" checkbox

Create home using:

- network home and default sync settings
- local home template

Home folder location:

- on startup volume
- at path:
- user chooses:

# K.I.S.S. rules in setting up MCX

---

Use computer groups for wider reach in settings

Set “Once” to allow user’s a little leeway where possible

- Dock placement

Use “Always” to set items that must be permanent

- Application restrictions

For labs, use “Often” to allow a ‘controlled leeway’

- More on this in the Details section

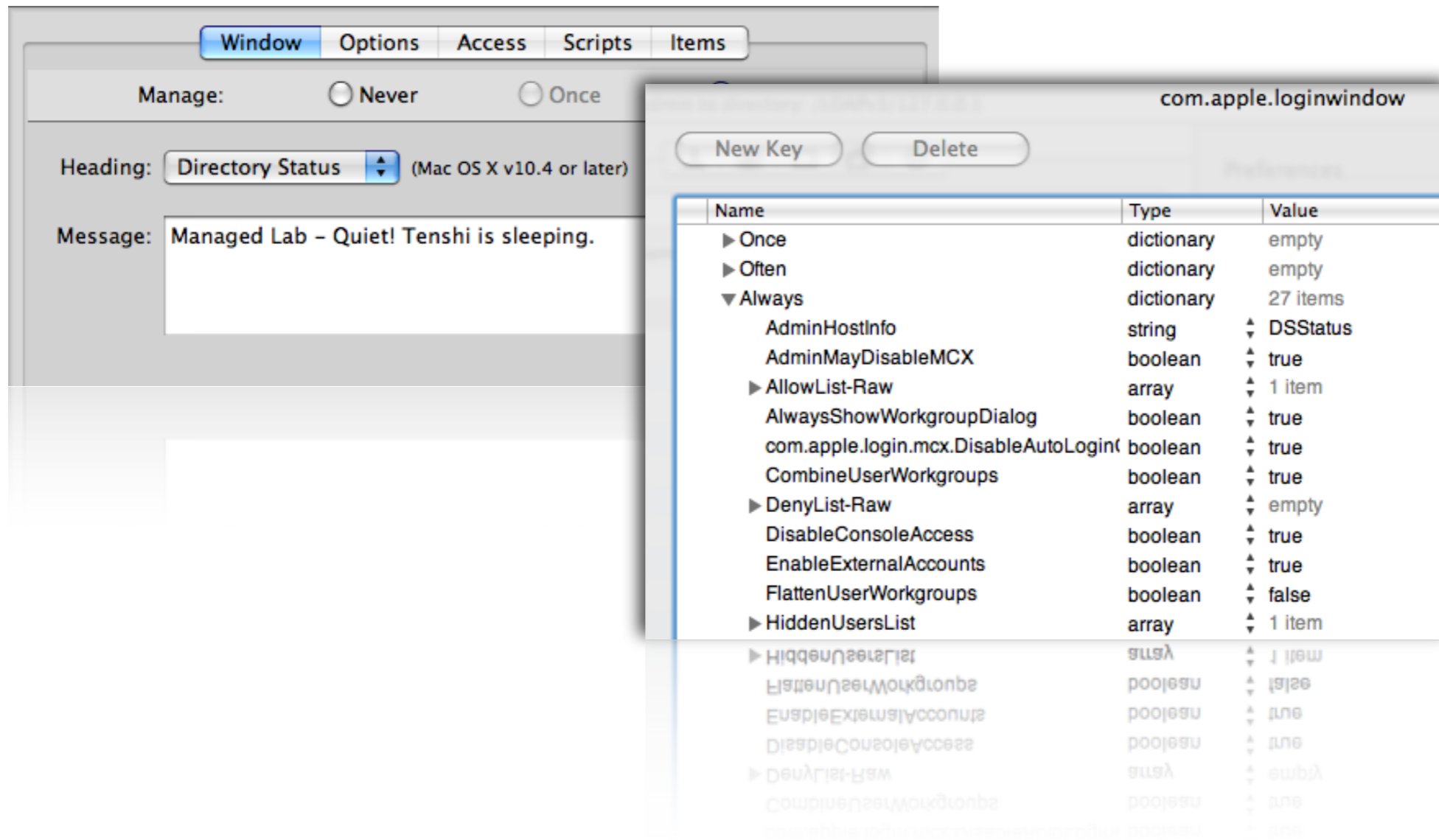
# Advanced MCX - Details

# Detailed view of GUI settings plus more

Granular access to MCX settings

A way to review settings made at the GUI

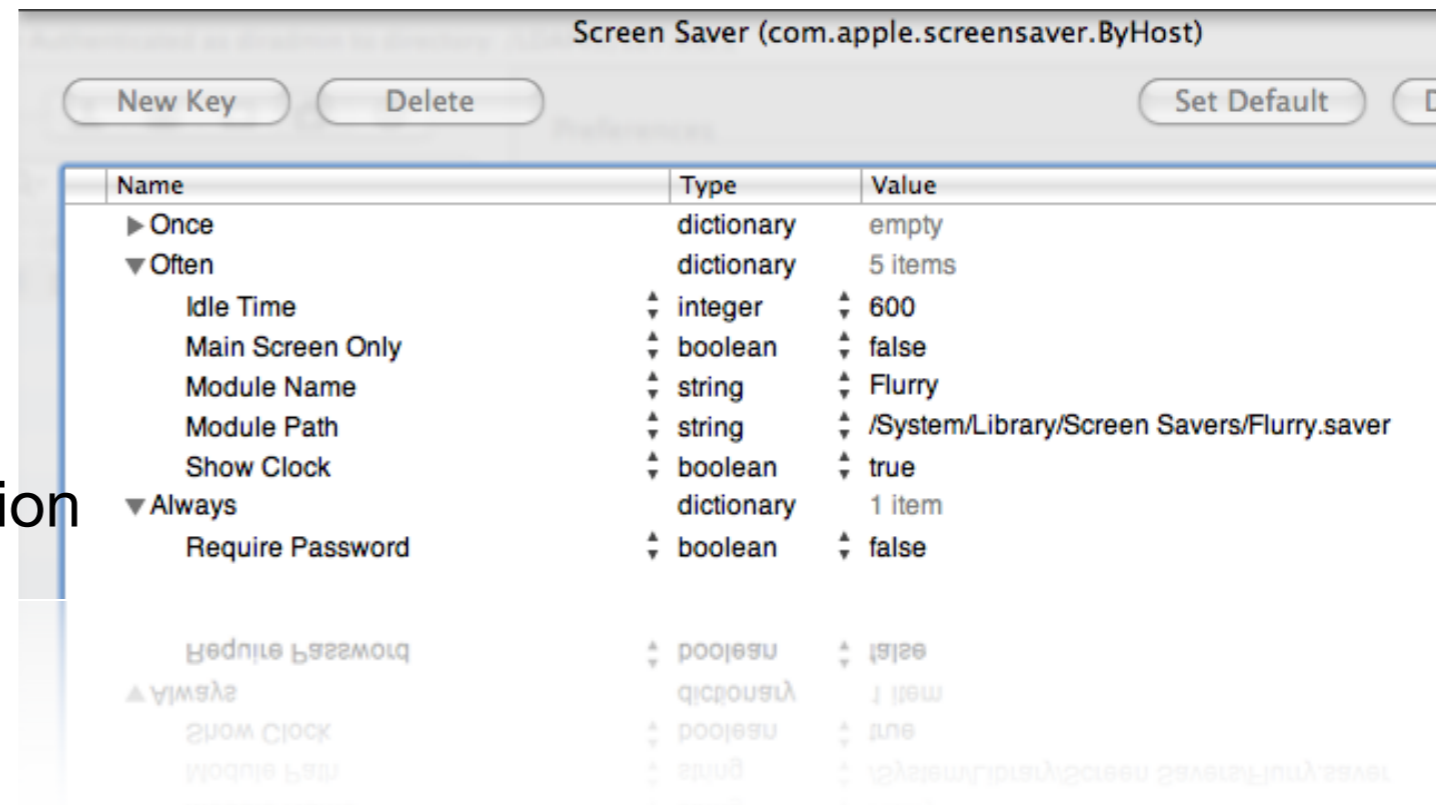
plus add and modify settings that won't see a checkbox



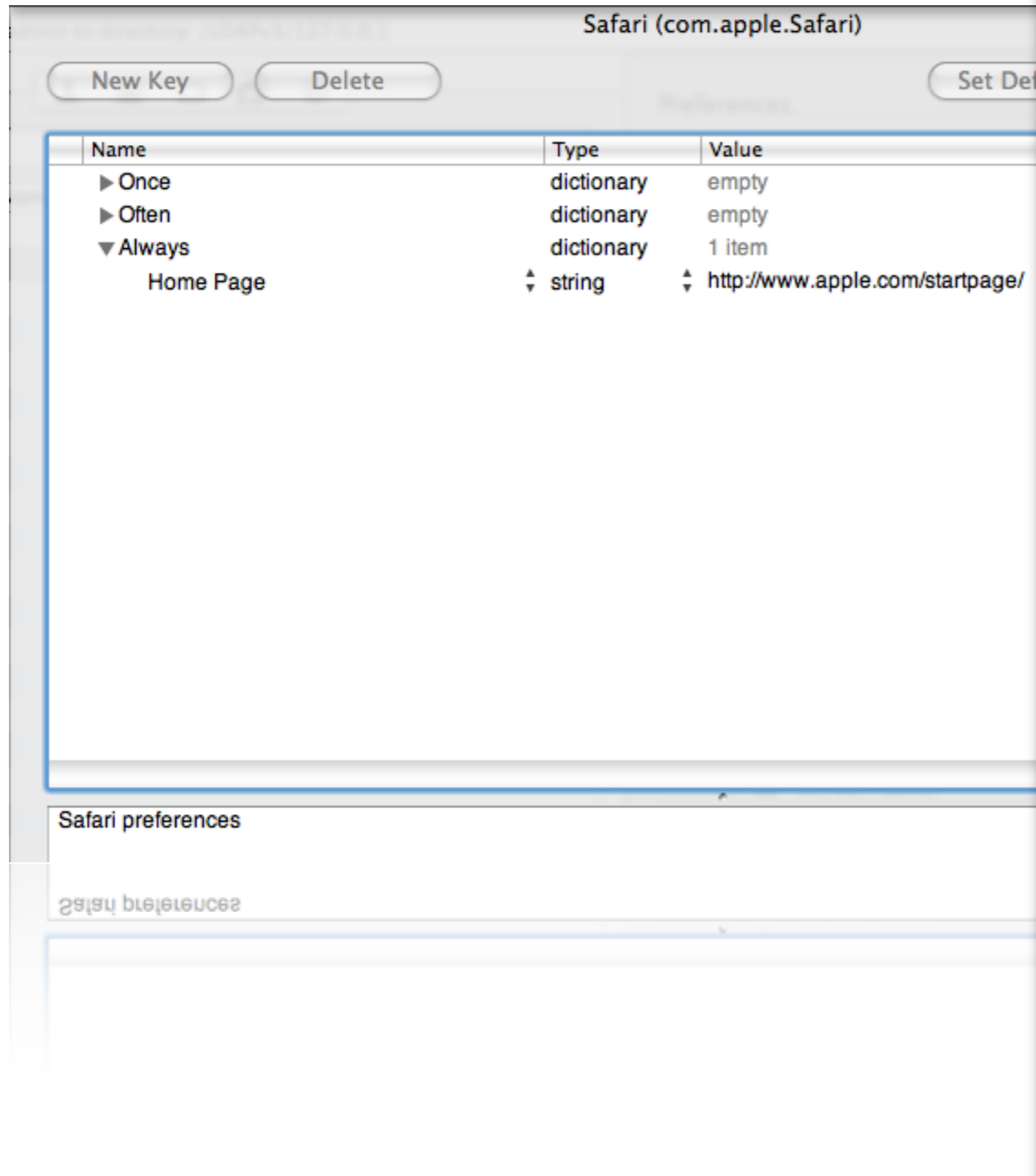
# Inside the Managed Client

## Keys to the castle @ /System/Library/CoreServices/Managed Client

- Preloaded manifests for many preferences:
  - Desktop Picture
  - Folder Redirection
  - iCal, iChat, and Mail preloading
  - iTunes
  - Menu Extras
  - Mobile Account extras
  - Quicktime Pro registration
  - Safari keys
  - and more...

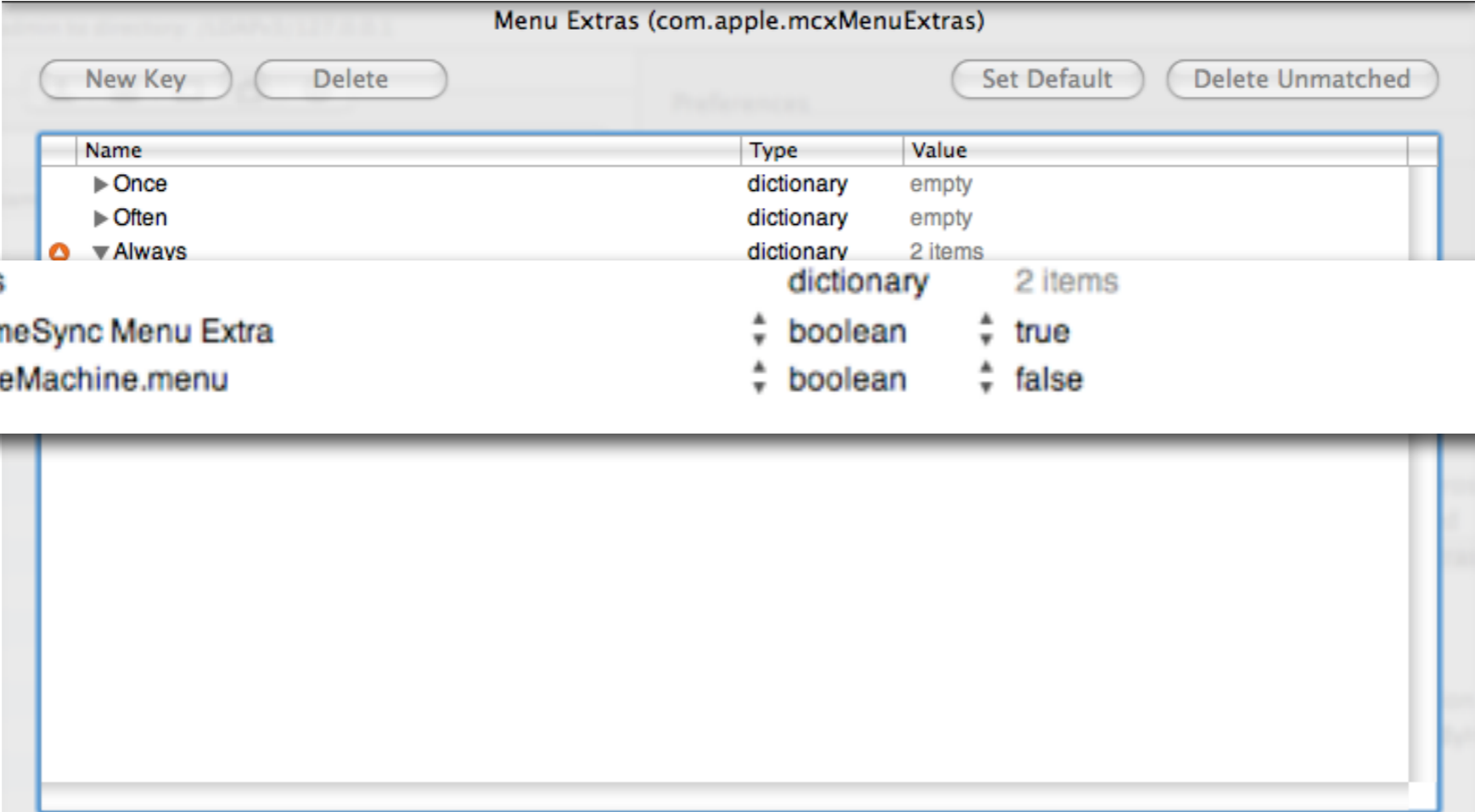


# Some apps contain preference manifests



- Contents of New Windows
  - History Age Limit
  - Downloads Location
  - Downloads Clearing Policy
  - Open Safe Downloads Automatically
  - Open External Links in Existing Window
  - Default Font
  - Default Fixed-width Font
  - Default Fixed-width Font Size
  - Display Images
  - Default Text Encoding
  - Bookmarks Bar Includes Address Book
  - Bookmarks Bar Includes Bonjour
  - Bookmarks Menu Includes Bookmarks Bar
  - Bookmarks Menu Includes Address Book
  - Bookmarks Menu Includes Bonjour
  - Bookmarks Collections Include Address Book
  - Bookmarks Collections Include Bonjour
  - Command-Click Makes Tabs
  - New Tabs are Selected
  - Confirm Closing Multiple Pages
  - AutoFill From Address Book
  - AutoFill Passwords
  - AutoFill Miscellaneous Forms
  - Plug-ins Enabled
  - Java Enabled
  - JavaScript Enabled
  - Allow JavaScript to Open Windows Automatically
  - Ask Before Submitting Insecure Forms**
  - Minimum Font Size
  - Tab to Links
  - Enable User Style Sheet
  - User Style Sheet Location
  - Include Develop Menu
  - Private Browsing
  - Print Backgrounds
  - Print Headers and Footers
- ✓ New Item

# Controlling Menu Bar Icons



The screenshot shows the 'Menu Extras (com.apple.mcxMenuExtras)' preference pane. At the top, there are buttons for 'New Key', 'Delete', 'Set Default', and 'Delete Unmatched'. Below these is a table with columns for 'Name', 'Type', and 'Value'. The table is organized into a tree structure with expandable sections: 'Once', 'Often', and 'Always'. The 'Always' section is expanded, showing two items: 'HomeSync Menu Extra' and 'TimeMachine.menu'. The 'HomeSync Menu Extra' has a type of 'boolean' and a value of 'true'. The 'TimeMachine.menu' has a type of 'boolean' and a value of 'false'. A magnifying glass effect highlights the 'Always' section and its contents.

Name	Type	Value
▶ Once	dictionary	empty
▶ Often	dictionary	empty
▶ Always	dictionary	2 items
HomeSync Menu Extra	boolean	true
TimeMachine.menu	boolean	false

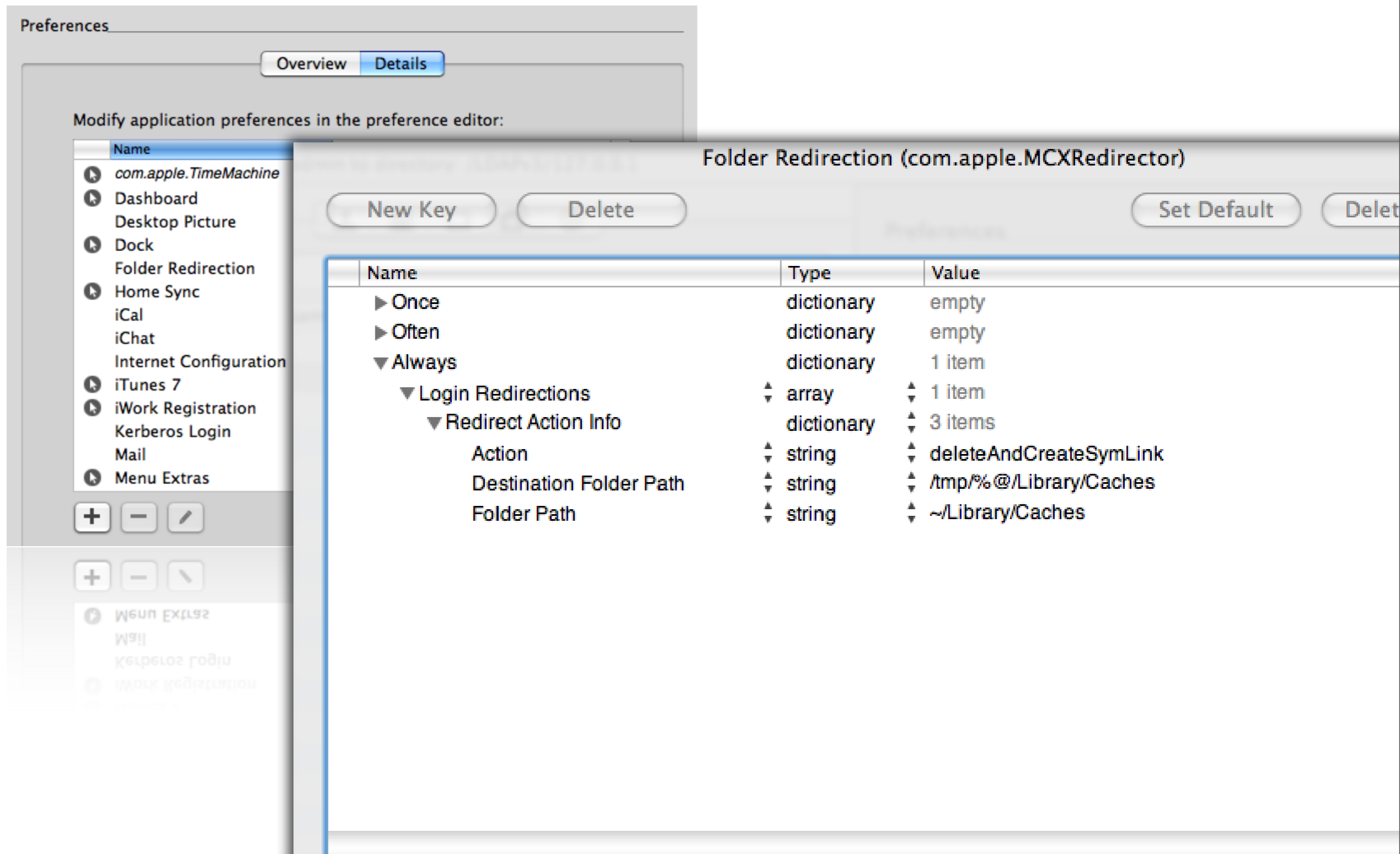
Managed menu extras. Specified menu extras will be added or removed from the menu bar after user login. Standard menu extra may be specified by file name. Non-standard menu extras are specified by full path. Some menu extras will only appear if appropriate for the target computer's hardware or software configuration.

appropriate for the target computer's hardware or software configuration.  
may be specified by file name. Non-standard menu extras are specified by full path. Some menu extras will only appear if  
managed menu extras. Specified menu extras will be added or removed from the menu bar after user login. Standard menu extra



# Folder Redirection

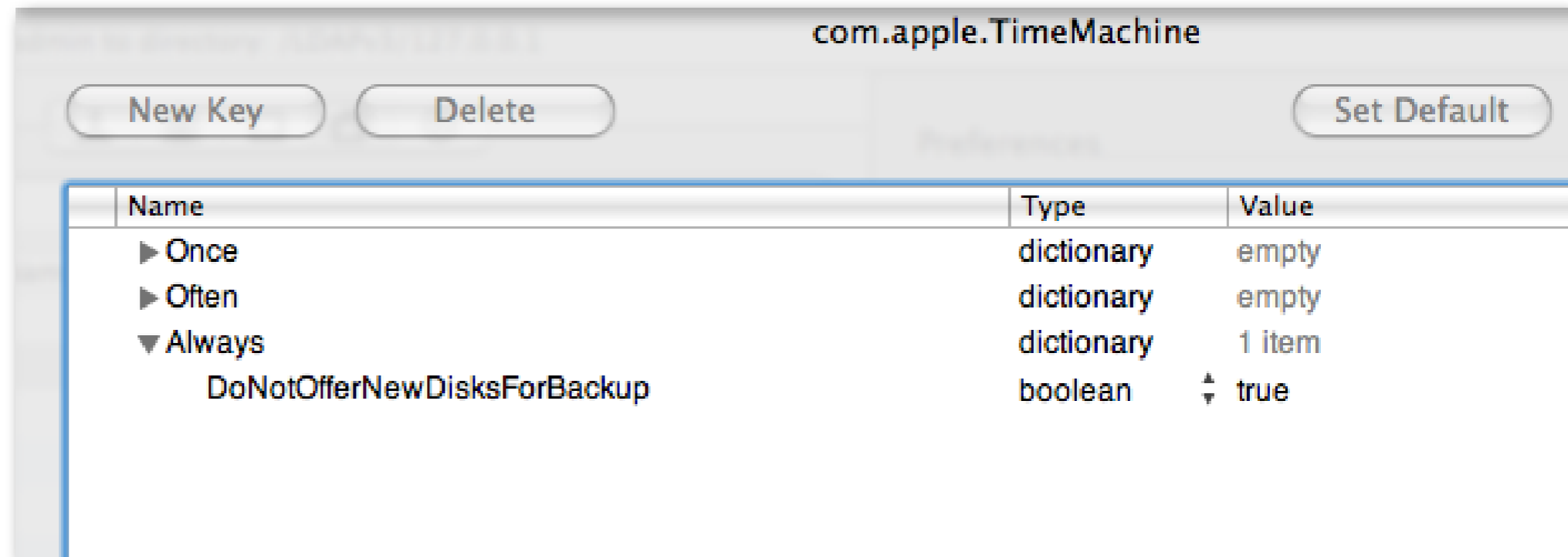
## Help for network home users



# Time Machine

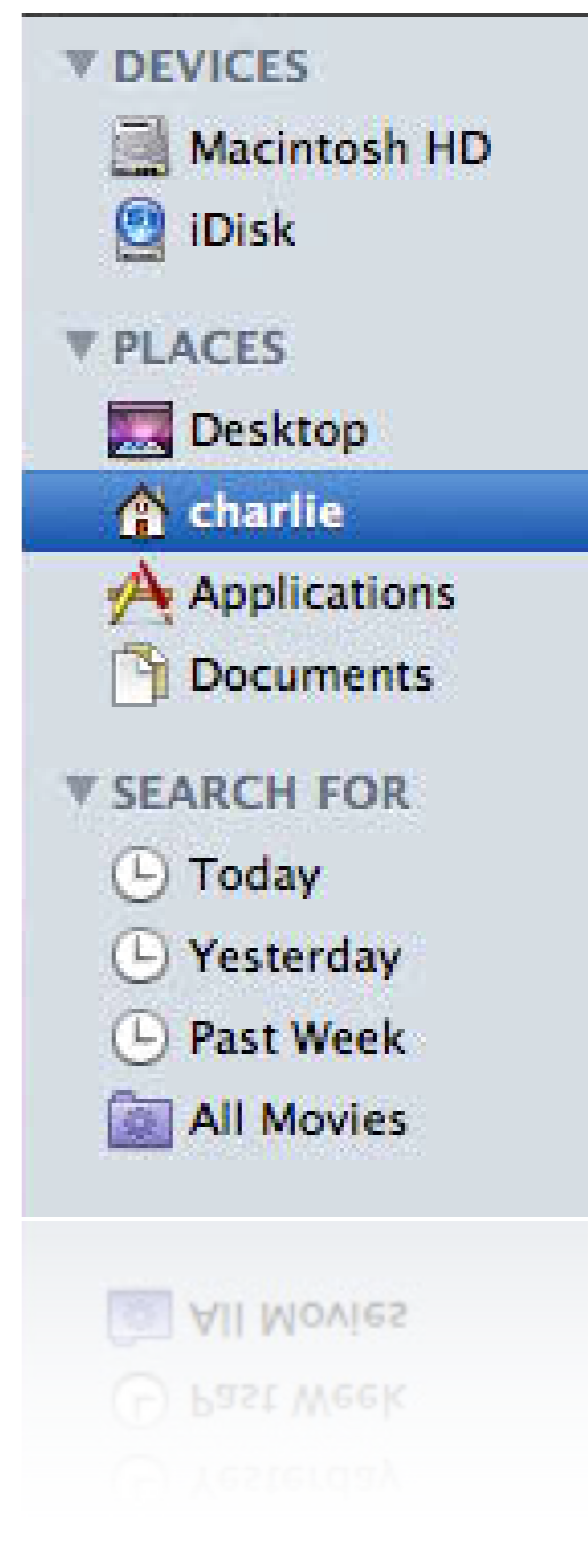
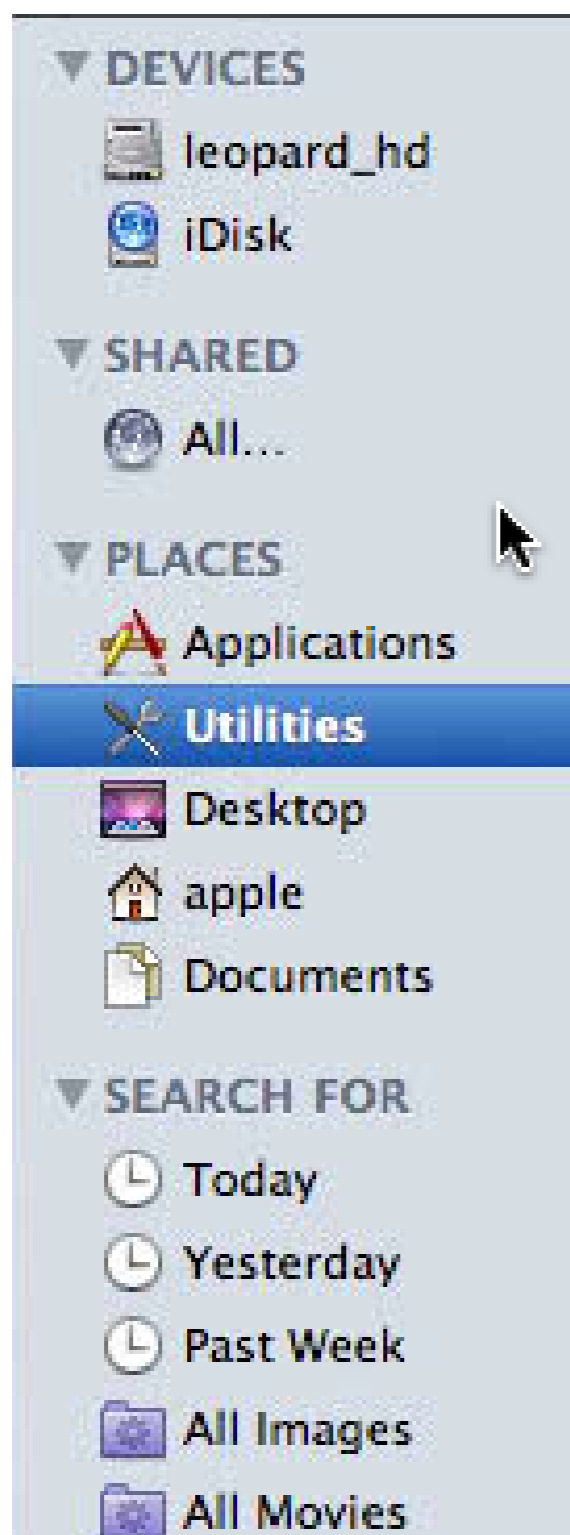
```
defaults write com.apple.TimeMachine  
DoNotOfferNewDisksForBackup -bool  
YES
```

or ...



# Importing preferences

## Example - Sidebar



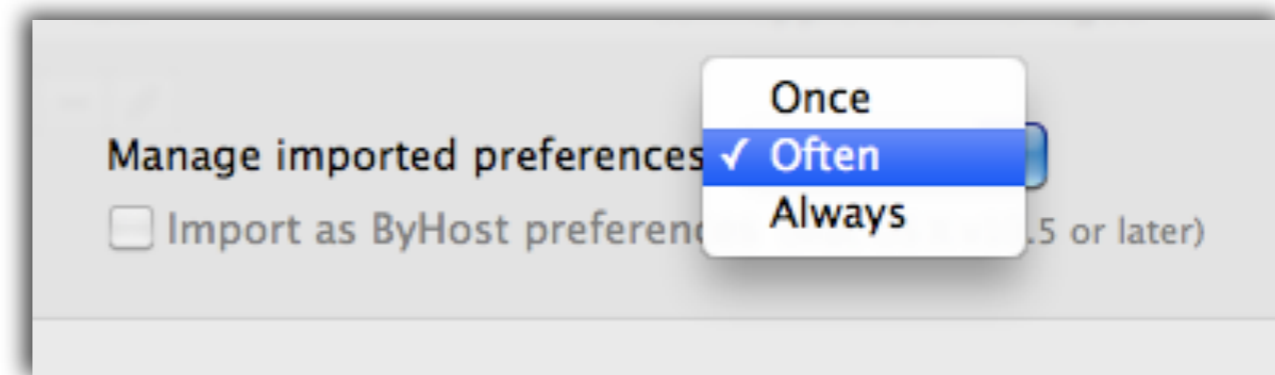
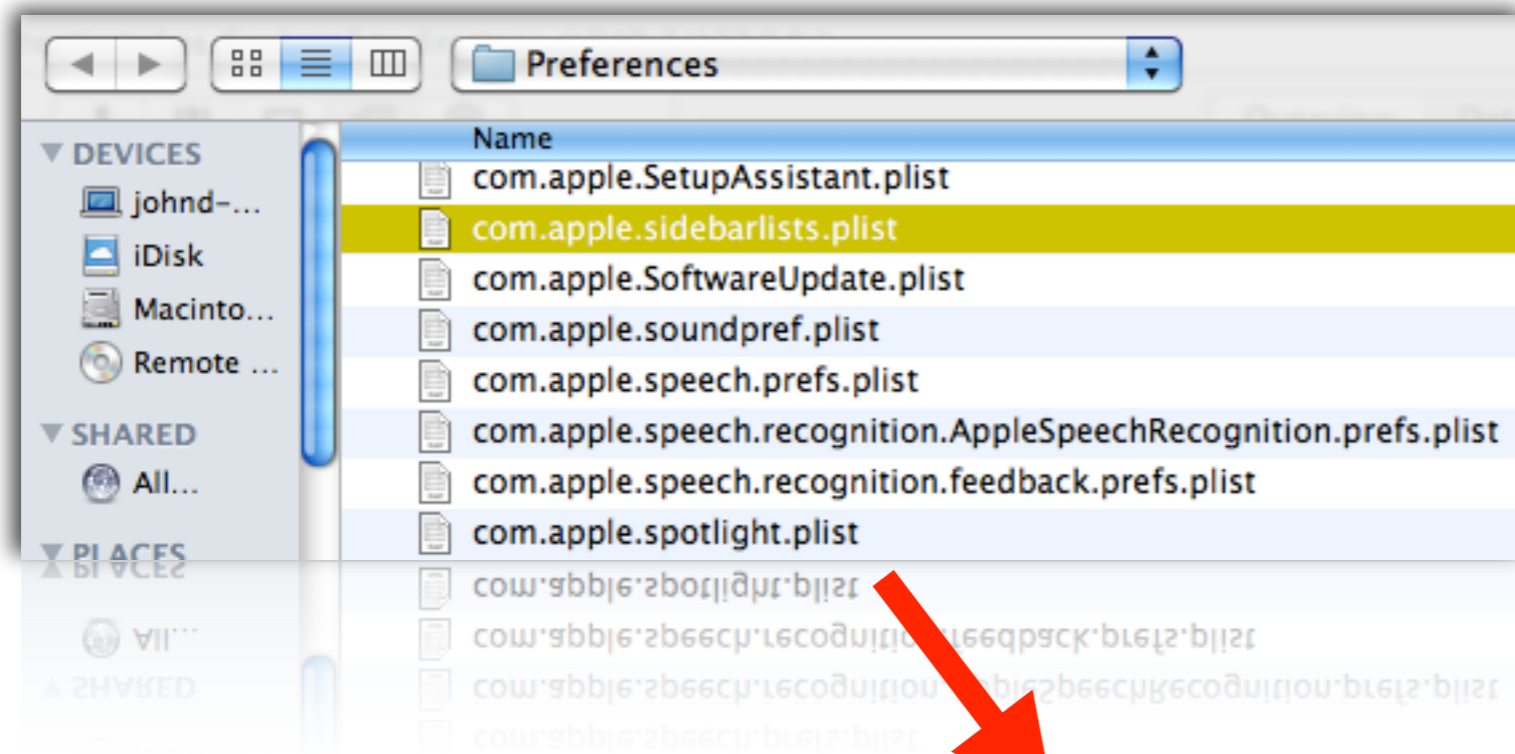
# Set up master properly

## Finder Preferences - Sidebar



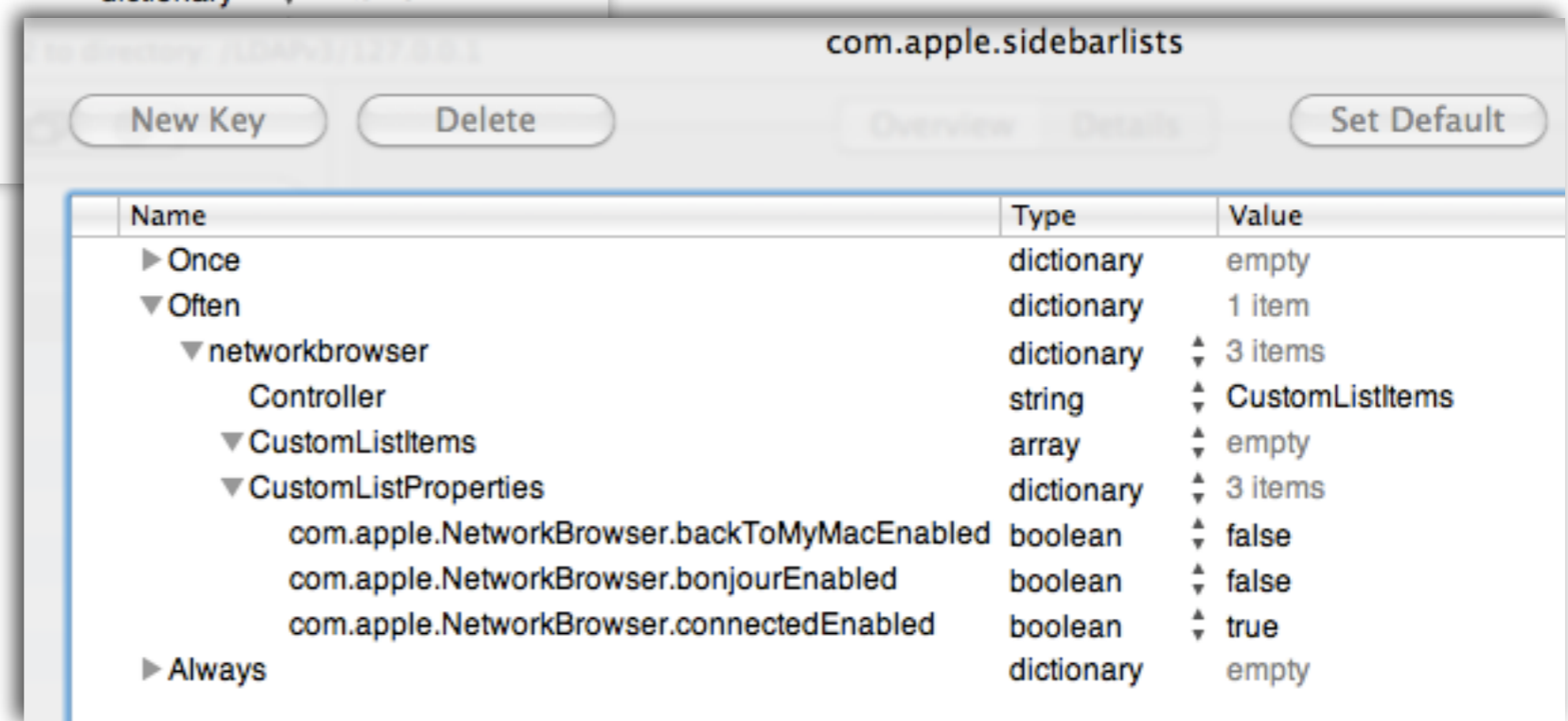
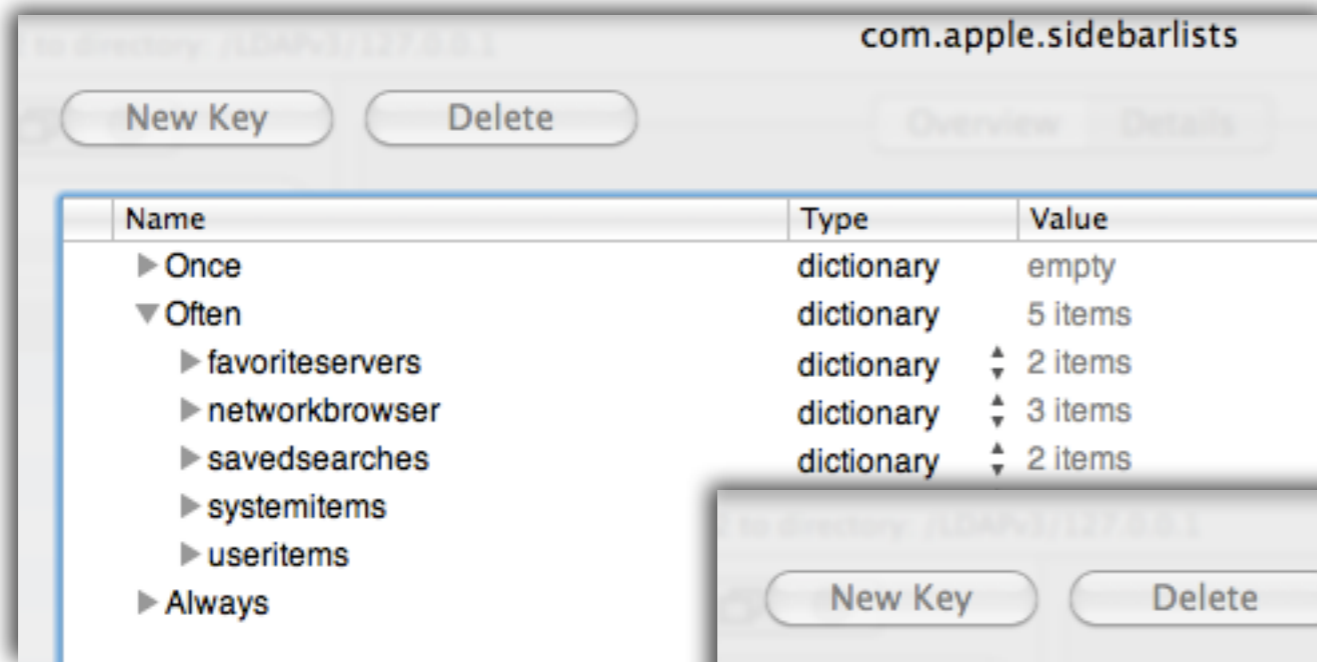
# Locate altered plist from WGM

~/Library/Preferences/com.apple.sidebarlists



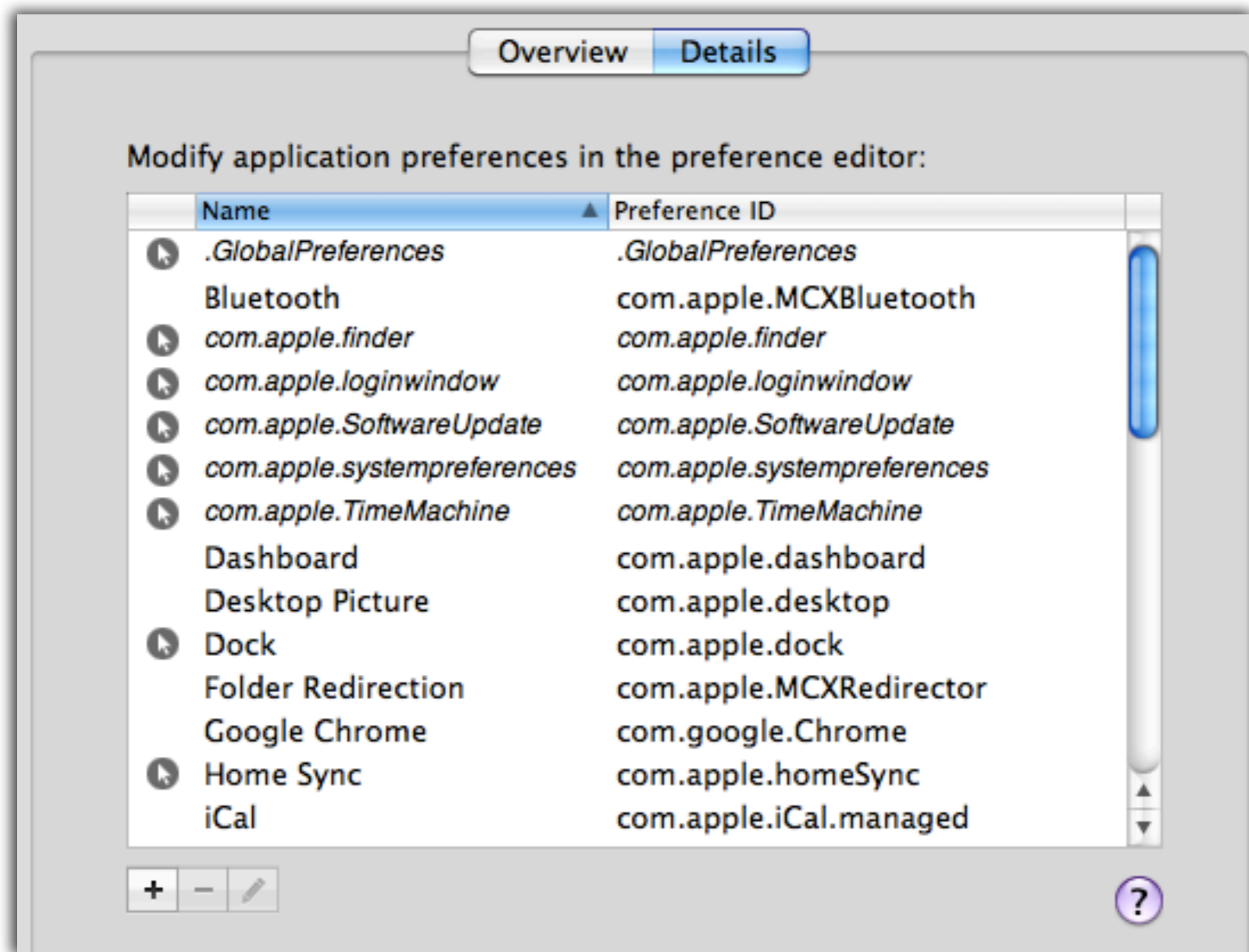
# Clean up settings

## Remove unneeded keys



# Details - all settings are visible

Imported settings are in italics



# Open Source list of manifests

<http://code.google.com/p/manifestdestiny/>

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>pfm_version</key>
  <real>1.0</real>
  <key>pfm_domain</key>
  <string>com.apple.TimeMachine</string>
  <key>pfm_description</key>
  <string>Settings for Apple Time Machine</string>
  <key>pfm_title</key>
  <string>Apple Time Machine</string>
  <key>pfm_subkeys</key>
  <array>
    <dict>
      <key>pfm_description</key>
      <string>This value will control the option to prompt to use attached driv
Time Machine.</string>
      <key>pfm_name</key>
      <string>DoNotOfferNewDisksForBackup</string>
      <key>pfm_title</key>
      <string>Do Not Offer New Disks for Backup</string>
      <key>pfm_type</key>
      <string>boolean</string>
      <key>pfm_targets</key>
```



# Control as Little as Possible...

---

## More control means more work

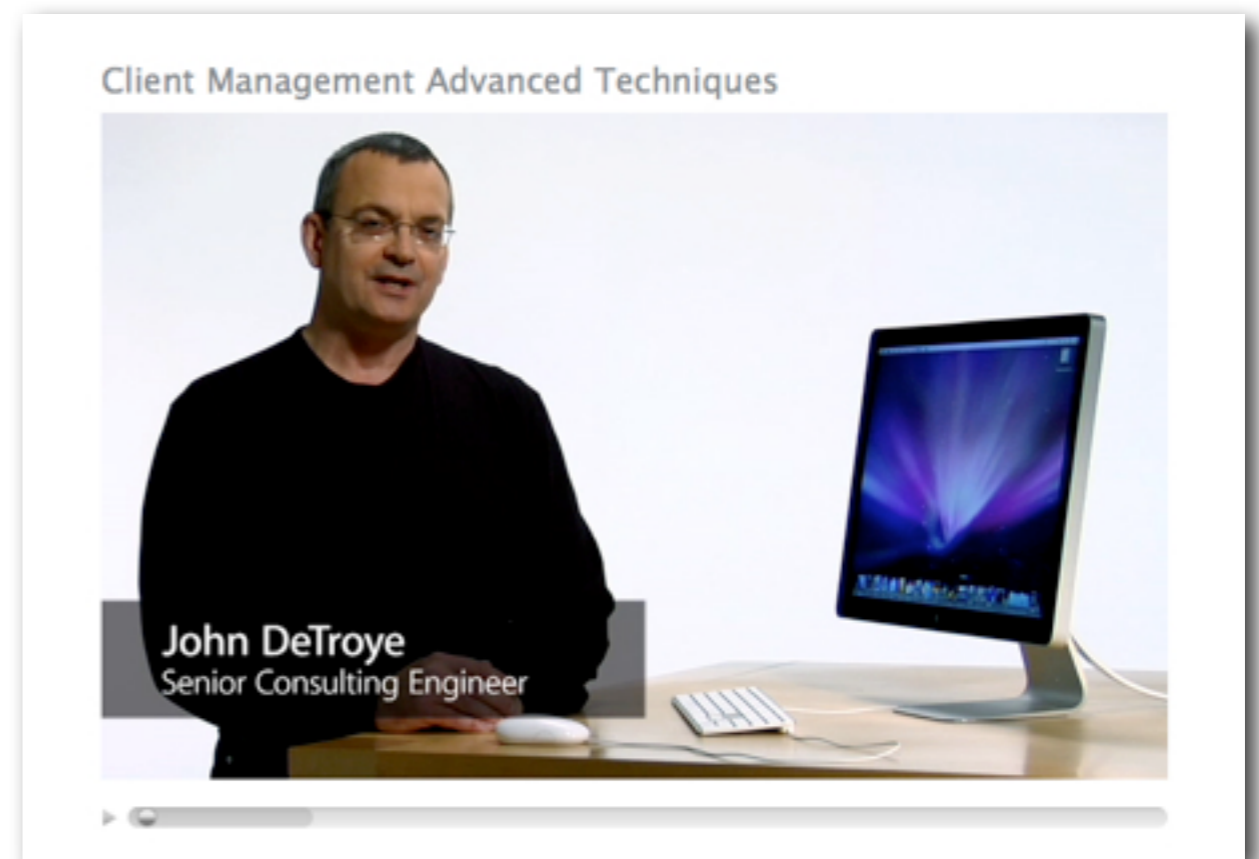
- Controls should support and guide users, not hinder them
- Provide a consistent environment
- Maintaining more controls = more conflicts = more debugging
- Don't use technology as a solution for a social problem
- Deploy and enforce Acceptable Use Policies

# Useful URL's

---

## Official server docs / Education IT Resources

- <http://www.apple.com/server/documentation>
- <http://www.apple.com/education/resources/information-technology.html>
- or iTunes - search "Apple Education" in Podcasts



# Q&A

