Worldwide Sales Training & Communications

PSU Blast Image Config 2.0

May 24, 2004
Technical Problems

Click the Help button in the top-right corner of the player for technical support.

Or call (408) 203-7693
Mac OS X Labs Deployment Project

macosxvlabs.org
Welcome

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PSU Blast Image
Config 2.0

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May 24, 2004
Overview

• Part I
  - Intro to PSU Blast Image Config
  - New Features
  - Creating the Master Image
  - Demo Run
Overview

• Part II
  - Default/Autorun Preferences
  - Bootable DVD with Autorun Restore
  - Master Image Creation Tips and Tricks
  - PSU’s Lab Deployment with BIC
What is PSU Blast Image Config?

- A freeware tool originally for PSU only
- A complete software solution to quickly restore and configure a Macintosh back to a known state:
  - Configure and set the Open Firmware security, preventing unauthorized access
  - Set the date and time
  - Restore a master disk image quickly
  - Change the startup disk to the restored disk
What is PSU Blast Image Config?

• Configure the network settings on the restored disk (via ncutil):
  - IP Address: DHCP or Manual (Static)
  - Subnet Mask & Router
  - DNS Servers
  - Network Names (Computer and Local)

• Extensible through pre and post restore scripts and default/autorun preferences
Who can benefit from BIC?

• IT Support Staff
  – Faculty/Employee Desktop Support
  – Student Computing Labs
• Mac Repair Staff
  – Quickly restore a Mac, faster turn around time for rebuilds
• System Administrators
  – Keep master disk image of server ready for quick build
When would this be used?

• To build a Mac out of the box to be exactly like a default system configuration

• Erase a Mac, do a clean restore and reset the Open Firmware security, set date and time

• Doing a major OS X upgrade (ie, 10.2 to 10.3)
What’s new in 2.0?

• Support for Mac OS X 10.3
• Much faster restore times
• Support for international date and time Formats (ie, yyyy/mm/dd versus mm/dd/yyyy)
• Restore images over http
• Pre and post restore scripts
• Completely configurable Open Firmware settings
What’s new in 2.0?

- Autorun/default settings preferences support
- Specify Network Names (AppleTalk/Rendezvous)
- Specify DNS Servers
- No longer need network template settings file thanks to ncutil tool written by Jeff Frey:

  http://deaddog.duch.udel.edu/~frey/darwin/ncutil.php
Creating the Master Image...

• Read the asr (Apple Software Restore) man page: Open terminal.app and enter “man asr”

• Install Mac OS X on the master Mac and set it up the way you want it to work. I.e, Applications, printers, automated scripts, etc.

• Boot up from another partition or External FireWire Hard Disk with Mac OS X 10.3.x

• Login with an administrator account
Master Image: Enable Perms

• Enable Permissions on the Disk to Image:
  - Select “Macintosh HD”
  - File, Get Info
  - UN-check “Ignore ownership on this volume”
Master Image: Repair Master HD

- Launch Disk Utility
- Select the disk that will be imaged from
- Click the “Repair Disk” button
Master Image: Create the Image

• Images, New, Image From Folder...
  - Don’t select “Image From Macintosh HD...” or won’t be able to block restore to any volume larger than the master hard disk
Master Image: Create the Image

• Save the image as Read/Write as you’ll need to make changes to it later

• NOTE: “Image from Folder...” requires that the space to save the image is 2x larger as the source volume data size
Master Image: Cleanup

- Unmount the original master Volume HD FIRST
- Mount the read-write master image
- Open Terminal.app
Master Image: Cleanup

• In the terminal, become root and delete files:
  % sudo -s
  % rm /Volumes/<ImageVolName>/var/db/BootCache.playlist
  % rm /Volumes/<ImageVolName>/var/db/volinfo.database
  % rm -r /Volumes/<ImageVolName>/var/vm/swap*

• Quit terminal, unmount the master disk image
Master Image: Convert Image

• In Disk Utility:
  – Images, Convert...

  – Change the Image Format to Compressed
Master Image: Scan for Restore

• If you want to be able to verify the data restored, the image must be “Scanned for Restore” to add checksum data to the image

• In Disk Utility:
  – Images, Scan for Restore...
PSU BIC ‘RestoreImages’ folder

• Copy/Move the compressed and scanned image to the RestoreImages folder for easy access, or ....

• Images can be on another hard disk, server, or via http too!
BIC 2.0 System Requirements

- Mac OS X 10.2.2 or higher, including 10.3
- Administrator Account
- If Open Firmware security is desired, the Mac must be capable of supporting it
- If you need to configure the network settings on the restored disk, `ncutil` must be installed
- Various Unix command line tools
  - `asr`, `disktool`, `find`, `bless`, `ioreg`, `hdiutil`, etc.
BIC 2.0 Application Folder

• Blast Image Config 2.0 disk image download:
Demo Run: Login

- Can run BIC 2.0 from any mounted volume
- Must be launched as an admin or root user
Demo Run: Open Firmware Security

• To prevent booting from other devices and entering single user mode, enable Open Firmware Security

![Open Firmware Security Options](image_url)
Demo Run: Open Firmware Security

• Things to be aware of:
  – Some older Macs do NOT support OF Security, check Apple for firmware updaters
  – If forget password, will need to change RAM configuration and reset the PRAM 3 times
  – Do NOT use a capital “U” in the Open Firmware password:
    http://docs.info.apple.com/article.html?artnum=107666
Demo Run: Pre Restore Script(s)

• Run shell/perl scripts, displays STDOUT and exit value:
Demo Run: Set the Date & Time

- Different date formats supported, 12/24 hour time:
Demo Run: Configure Network

- Before restore, can specify how to configure the network settings on the restored disk
- Remember: `ncutil must` be installed to configure network settings

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

- Don’t Modify
- DHCP
- Static IP
Demo Run: Config IP Settings...

- Static IP Configuration
  - Specify IP address
  - Subnet Mask
  - Router (Aka, Gateway)

Enter Network Settings:

- IP Address: 192.168.1.50
- Subnet Mask: 255.255.255.0
- Router: 192.168.1.1

Save Network Settings
Demo Run: DNS Servers...

- Can specify up to 3 DNS Servers
- Can read in default servers from an autorun/Defaults preferences file

### 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

[Save DNS Settings]
Demo Run: Network Names

- Specify the Computer (AppleTalk) Name
- Specify the Local (Rendezvous) Host Name
- Can use variable substitution in the autorun/defaults prefs

**Enter Network Names:**

- **Computer Name:**
  - Mac.192.168.001.050

- **Local (Rendezvous) Host Name:**
  - Mac-192-168-001-050

**Save Network Names**
Demo Run: Restore the Disk

- Select Restore Image,
- Or specify Other Source,
- Select Disk to be Restored,
- Click Restore
Demo Run: Other Image Source

- Can specify network based images in the `NetworkImagesList` file
- File contains http: url's to images, ie:
  
  http://myserver.edu/Master10.3-Image.dmg
Demo Run: Other Image Source

- Via the Other Image Source button, can specify other file or network location for restore image
Demo Run: Other Image Source

- Local and other image sources added to the Disk Image popup menu:
Demo Run: Restore Complete

• Restore status shows elapsed time and percentage done of the restore and verify
• AFTER restore, verifies restored volume file system and attempts to repair it if required
• Old and new volume name is reported at end of restore
Demo Run: Apply Network Settings

- After restore is complete, the network settings on the restored disk are configured as specified before starting the restore (Don’t Modify or DHCP or Static)
Demo Run: Set the Boot Disk...

- Via the bless command, sets the startup/boot disk to the restored disk
- Uses the newest version of the bootx file from the booted drive or the restored disk
Demo Run: Post Restore Scripts

• Post restore scripts receive the path to the restored volume

```
ExampleScript1.pl

Post-Restore-Scripts Output:
Path of disk restored: /Volumes/Macintosh HD
Exit value of script: 0
```

Run Script

Continue
Demo Run: Restore Complete

• Can Quit, Restart, or Shutdown when complete
• Can specify which button is the default with the autorun/Default preferences
Default/Autorun Preferences

• If the `edu.psu.clc.blastimageconfig` file is installed in `~/Library/Preferences/`, BIC 2.0 will read it for the default and/or autorun settings

• Useful for quick and simple installs

• Can have default settings without autorunning turned on, but must have defaults set to autorun

• Useful for system admins to force the person doing the restore to use certain defaults
Default/Autorun Preferences

• Example keys and values in the `edu.psu.clc.blastimageconfig` file:

  AUTO_RUN=YES
  PROMPT_TO_AUTORUN=YES
  LOCK_OF_SETTINGS=YES
  PRE_RESTORE_SCRIPT=testScript.pl
  NETWORK_CONFIG=SET_IP
Default/Autorun Preferences

• More keys and values:
  
  DNS_SERVER1=192.168.1.200
  COMPUTER_NAME=Mac.{$IP}
  DEFAULT_DISK_IMAGE=10.3-Master.dmg
  ENDING_TASK=RESTART

• Many more not shown, more being added
Bootable DVD Autorun Restore

• BIC 2.0 can run from a bootable DVD created with bootCD from:

   http://www.charlessoft.com/

• Must add additional command line tools and frameworks to support BIC 2.0 from a DVD Boot

• G5’s : Find a 10.2.8 G5 System Install CD/DVD
Bootable DVD image creation

• On a Mac running 10.2.8:
  - Configure the network settings as you’d want them to be on the bootable DVD
  - Enable root user login
    - /Applications/Utilities/NetInfo Manager
    - Security menu, Authenticate,
    - Enable Root User, enter new password
  - Login as root
Bootable DVD image creation

• as Root, copy BIC 2.0 folder to /Applications
• as Root, Add the BIC 2.0 app as a startup item
• Add the edu.psu.clc.blastimageconfig autorun prefs to /var/root/Library/Preferences/
• Install ncutil from http://deaddog.duch.udel.edu/ncutil-install.tgz
• Download & launch BootCD from http://www.charlessof.com
Bootable DVD image creation

• In the Boot CD Image Creator dialog, do this:
Bootable DVD image creation

- BootCD will run for a while creating the image...
- Click **OK** on the “Choose Applications” dialog,
- Click **Cancel** on the “Choose Applications to include on CD” (do NOT add BIC 2.0 now)
- BootCD will finalize the bootable DVD image - wait for the “Image Complete” dialog, click the **Great!** button
- Quit out of BootCD
Bootable DVD image creation

- Mount the bootable DVD image
- Via the Finder, copy the PSU BIC 2.0 folder to the “Applications” folder on the root of the mounted image
- Copy your master image to the RestoreImages folder in the PSU BIC 2.0 folder on the image
Bootable DVD image creation

• Open /Applications/Utilities/Terminal.app

• Run `psuPrepareBootDVD.pl` to copy the necessary command line tools and frameworks to the image to support BIC 2.0:

```
psuPrepareBootDVD.pl /Volumes/Bootable\ DVD
```
Bootable DVD image creation

• Unmount the image and burn it to a DVD-R with Disk Copy under 10.2 or Disk Utility under 10.3

• Boot a Mac with the DVD, watch BIC 2.0 autorun and restore

• Note: Sometimes the Mac’s built-in hard disk doesn’t mount when booted with a bootCD created DVD, use Disk Utility to erase it or mount it on the Desktop

• Everyone goes home happy.
Image Creation Tips and Tricks

• During testing, can restore a read-write image, but with “enable verification” un-checked (off)

• Compressed images will restore faster even with time spent on decompressing data

• If Disk Utility’s “Scan for Restore” doesn’t work, open terminal.app and try:

  sudo asr -imagescan /path/to/Imagefile.dmg
PSU’s Lab Deployment with BIC

• Staff dedicated to installing, building and moving lab computers
• Primarily use bus-powered, external FireWire Disks to build Macs
• Use bootable DVD’s when need to build many Macs out of the box
• Images on the firewire disks are pretty large, updated every 2 months or so
• No DHCP on networks, static IP only (can’t netboot across segments)
Download and Documentation

• Blast Image Config 2.0 main web page:
  http://clc.its.psu.edu/Labs/Mac/Resources/blastimageconfig/default.aspx

• ncutil download:
  http://deaddog.duch.udel.edu/~frey/darwin/ncutil.php
Q&A
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BIC at School of Visual Arts, Penn State

Daniel Ritter
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BIC in the SVA

• In the Labs
  – Create Master Image, image labs, fast rollout
  – Digital Photo and Graphic Design Labs
• In the Field
  – Wide variation in Hardware and locations
• Pitfalls
  – Machine requirements, hardware issues
• My Process
  – Prepare image, user prep, clone, post clean
BIC In the Labs

• Identical machines / software loads

• Easy per-semester rollout

• Rapid recovery on-the-fly
BIC in the Field

- Mixed machines
- ‘Base’ image
- Per-user details
Pitfalls

- Machines lacking firewire support
- Blue-and-White G3s
- Manual imaging
- Root user; documentation
- Hardware failures
My Process

- Tools preparation
- User Preparation
- Blasting peeps
- Post-process
- User-specific details
Q&A