Deploying Windows

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Windows Vista Deployment

Preinstallation Phases Overview

- Phase 1 – Preinstallation Planning
- Phase 2 – Preinstallation Preparation
- Phase 3 – Preinstallation Customization
- Phase 4 – Image Deployment
- Phase 5 – Image Maintenance

Agenda

- Overview
  - Phase 3: customization
  - Phase 4: deployment
- Call to Action

Windows Vista Deployment

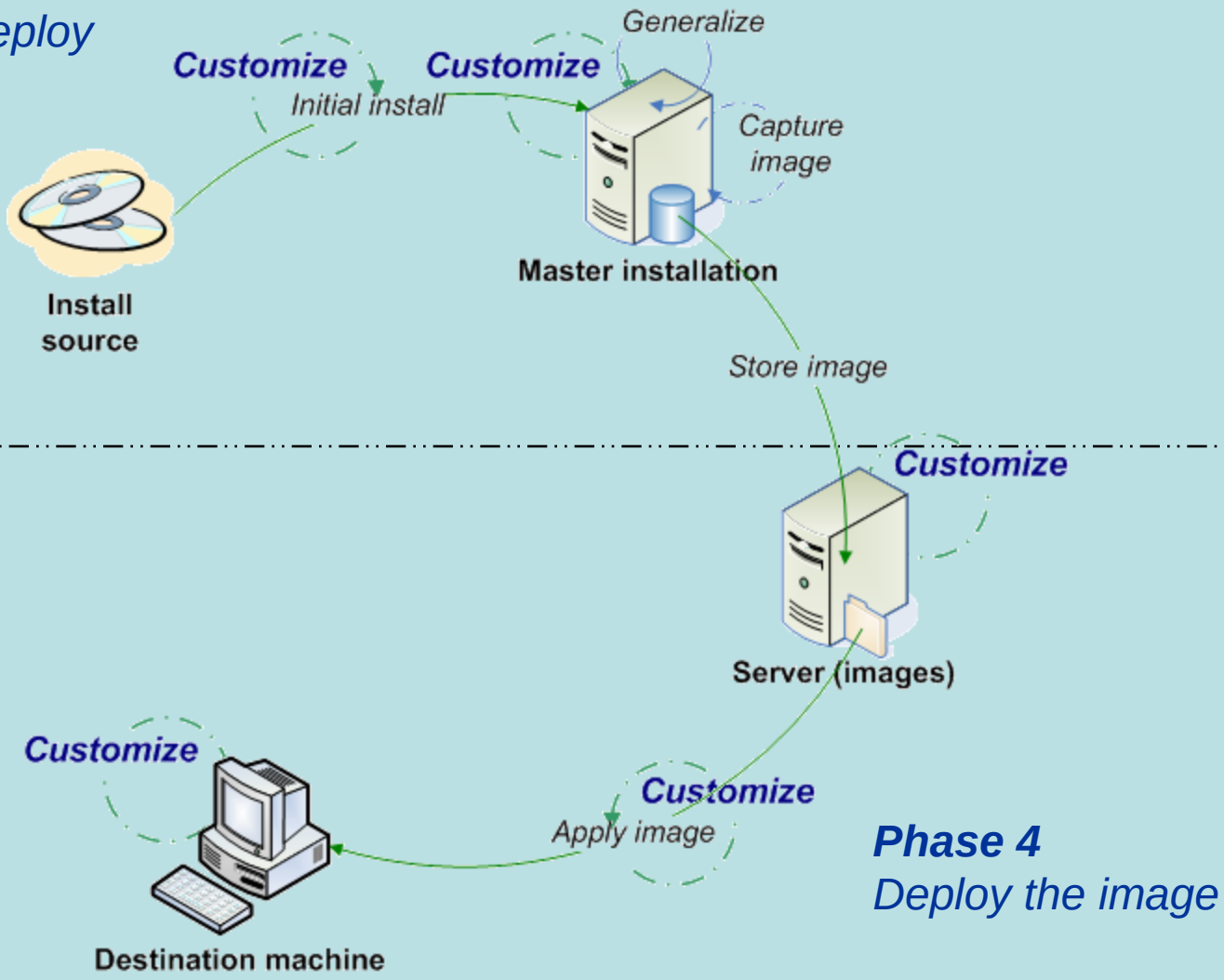
Phase 3

- Preinstallation Customization
  - Tools = Windows PE, Sysprep, ImageX

Deploying Windows

Phase 3

Prepare to deploy



Phase 4

Deploy the image

Background

Terms and Definitions

- Sysprep
  - Generalize
  - Specialize
- Imaging
  - Image
  - .WIM File
  - Capture / Apply
  - File-based / Sector-based

Preparing to Deploy Windows

Phase 3 – Windows XP Experience

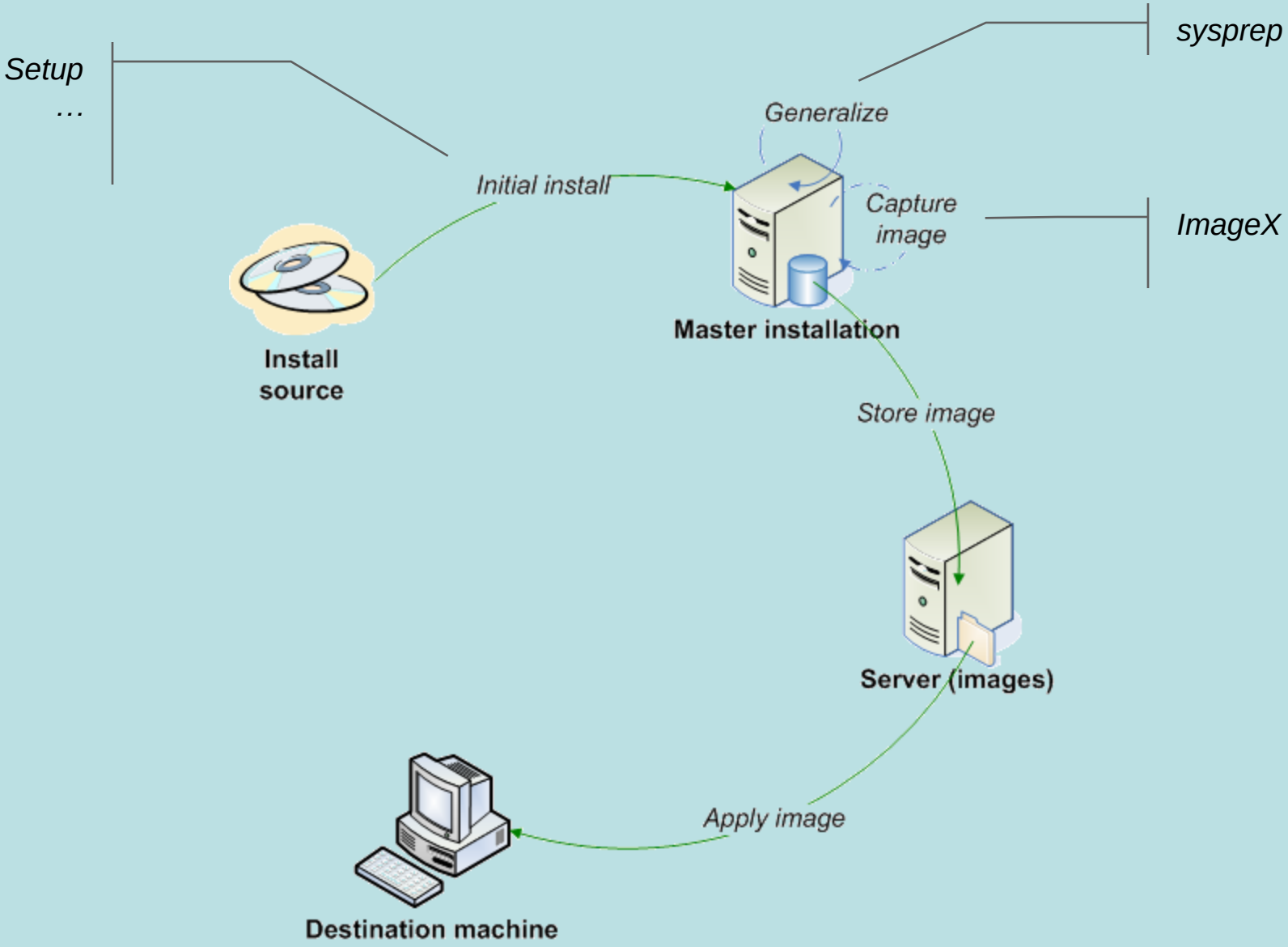
- Toolset
  - Winnt32.exe
  - Sysprep
  - Third-party imaging software
- Challenges
  - Fragile scripted installation
  - Added unnecessary time for mass deployments
  - New version of sysprep required every time components are updated
  - Sector-based imaging solutions
  - Hardware specific captures

Preparing to Deploy Windows

Phase 3 – Windows Vista Experience

- Windows Setup (setup.exe)
  - Image based
- Sysprep
- Imaging technologies
  - WIM format
  - ImageX /capture

Deploying Windows



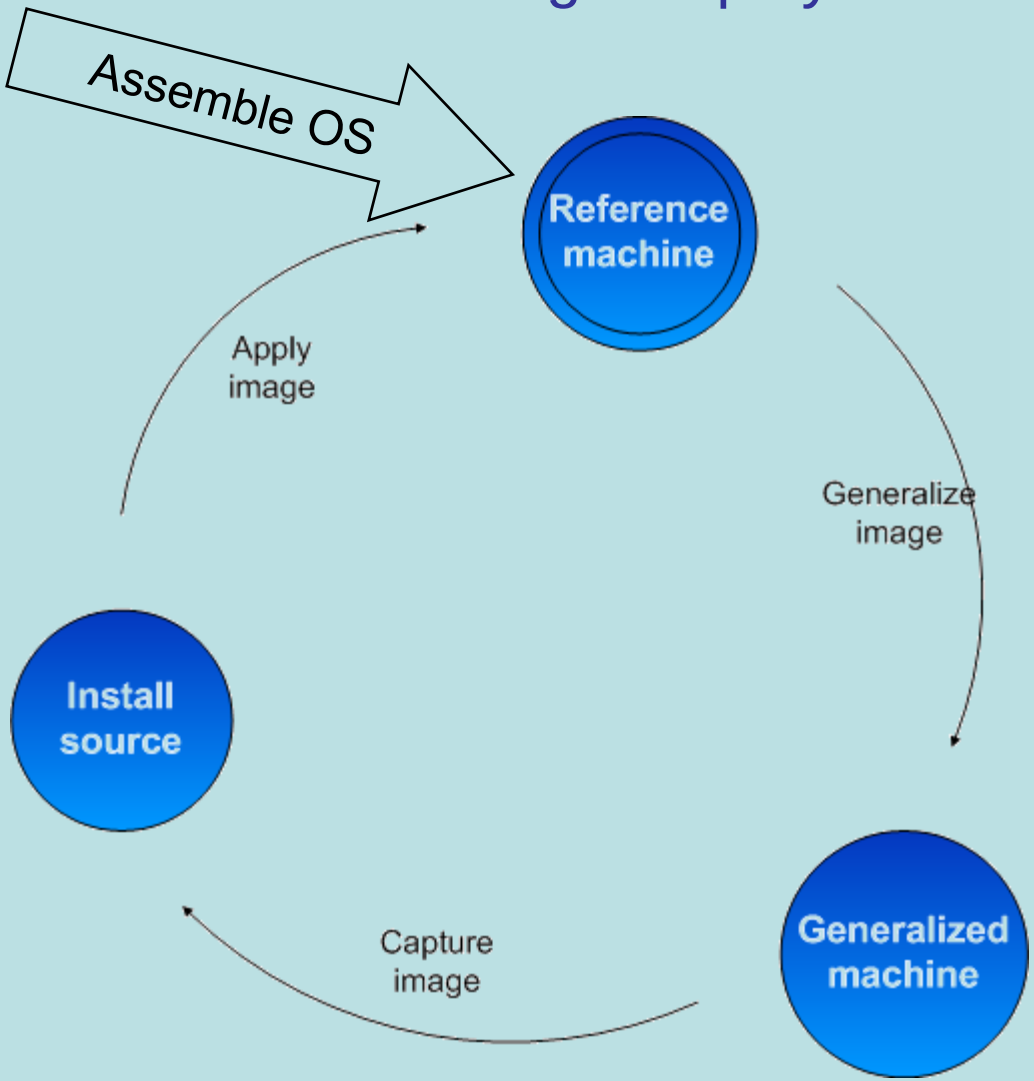
Preparing to Deploy Windows

Phase 3 – Windows Vista – Setup & Staged images

- Windows Vista
  - RTM image – *Provided as a sysprep'd image*
  - Setup – Re-architected to apply sysprep'd images
- Benefits
  - Reduction in space required to store images
  - Online and offline options for customizing image
  - Able to leverage same deployment method as retail installs

Preparing to Deploy Windows

Phase 3 – Windows Vista – Image Deployment



Preparing to Deploy Windows

Phase 3 – Windows Vista Toolset – Sysprep

- Reseal to Windows Welcome (OOBE)
  - Build-to-Plan
  - Deploy same master image to multiple machines
- Reseal to Audit mode
  - Build-to-Order
  - Replacement for factory mode
  - Customize master image on target machine
    - Ready for installation of additional PnP drivers, applications, or other customizations

Preparing to Deploy Windows

Phase 3 – Windows Vista Toolset – Sysprep

- Sysprep is now part of core OS
  - No longer need to manually match the version of Sysprep from the OPK with the OS or SP
- Modular architecture
  - Any code required to modify component settings is part of the component itself; not dependent on Sysprep.exe
  - Not hard-coded as part of Sysprep

Preparing to Deploy Windows

Phase 3 – Windows Vista Toolset – Imaging

- Four major components
  - Windows Imaging Format (WIM)
  - Tools (ImageX)
  - APIs (WIMGAPI)
  - Enabling technologies (filters)

Preparing to Deploy Windows

Phase 3 – Windows Vista Toolset – Imaging

WIM is a file-based image format

- Non-destructive application of an OS image
- Single instance storage of file resources
- Multiple images / volumes in a single WIM container
- Application to variable size target drives

Preparing to Deploy Windows

Phase 3 – Windows Vista Toolset – Imaging

- ImageX
  - Command line tool
  - Basic operations include:
    - APPEND
    - APPLY
    - CAPTURE
    - DELETE
    - DIR
    - EXPORT
    - INFO
    - SPLIT
    - MOUNT(RW)
    - UNMOUNT

Preparing to Deploy Windows

Phase 3 – Windows Vista Toolset – Imaging

- Imaging APIs (WIMGAPI)
  - Exposes all imaging functionality
  - Enables custom imaging applications and solutions
  - For more information, see the OPK
- WIM File System Filter
  - Allows images to be mounted and modified

Preparing to Deploy Windows

Phase 3 – Windows Vista Toolset – Imaging

- ImageX does not support ‘hot’ captures
- Configuration Options
  - Compression type (FAST | MAX) is set per WIM file
  - Exclusions are specified through a config file
- Append Images
  - Use to improve capture times – hashing is much faster than compressing
  - Reduces number of WIM files to manage and redundant data

Preparing to Deploy Windows

Phase 3 – Review

- Installation
  - RTM image is sysprep'd and ready-to-use
  - Setup deploys sysprep'd images
- Sysprep
  - Ships with each OS
  - Settings live within OS components
- Imaging
  - MS-provided imaging solution
  - File-based images
  - Multiple images can be efficiently stored/appended to a single WIM

Windows Vista Deployment

Phase 4

- Image Deployment
  - Tools = Windows PE, ImageX, Windows Deployment Services

Deploying Windows

Phase 4 – Windows XP Experience

- Toolset
  - RIS
  - Windows PE / DOS
  - Third-party imaging tools

Deploying Windows

Phase 4 – Windows XP Experience – RIS Challenges

- RIS = original solution for remote OS deployment
  - First shipped with Windows 2000
  - Allowed remote deployment of Windows via PXE boot
- Problems and limitations
  - Lack of support for future direction of deployment
  - Existing management tools leave much to be desired
  - Minimal localization and accessibility story
  - PXE boot strategy fragmented

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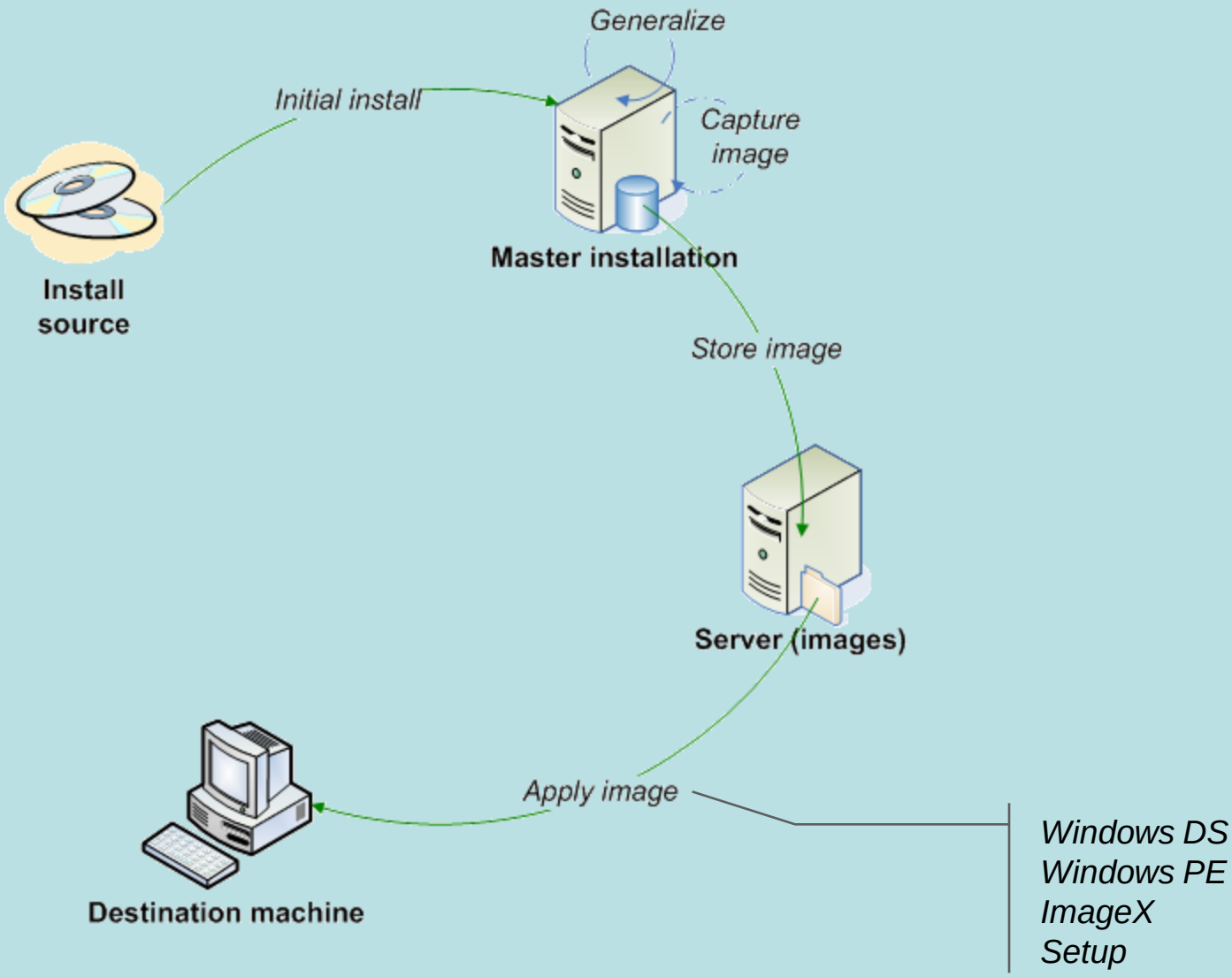
Phase 4 – Windows Vista Experience

- Windows PE
  - Parity with Windows PE 1.6 (from Windows Server 2003 SP1/Windows XP Professional x64 Edition)
  - Additional features
- Windows DS
  - Replacement for RIS

Deploying Windows



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Phase 4 – Windows Vista Toolset – Windows PE

- Boot configurations
  - HD, USB, CD, DVD, network (PXE)
- Boot formats
  - Flat image – media-based
  - Compressed WIM into RAMDisk (recommended)
- Configuring Windows PE
  - wpeinit replaces factory.exe -winpe
  - Settings from Winbom.ini moved to unified Unattend.xml

Deploying Windows

Phase 4 – Windows Vista Toolset – Windows PE

32 MB RAM (Writable Scratch Space)

- Temporary space that exists in RAM
- May be used by applications for temp storage
- Different from mounting a separate RAMDisk

PnP support

- “Hot” (online) Plug n Play support
- Offline / online driver injection

Deploying Windows

Phase 4 – Windows Vista Toolset – Windows PE

Build Tools

- Working Windows PE images are provided
- Tools to customize Windows PE at par with Windows Vista tools
  - Optional components may be added or removed
  - Offline servicing of Windows PE images supported
  - Windows Vista Windows PE language packs may be added
  - New customization tool (peimg.exe)

Deploying Windows

Phase 4 – Windows Vista Toolset

- peimg.exe
  - Offline servicing of Windows PE images
  - Uses same APIs as pkgmgr.exe
- pkgmgr.exe
  - Offline servicing of Windows Vista images
  - Uses Component-Based Servicing APIs
- imagex.exe
  - Capture / Apply images with WIM files
  - Mount images
  - Set and provide metadata information on images in WIM files

Deploying Windows

Phase 4 – Windows Vista Toolset – Windows Deployment Services

PXE Boot of Windows PE

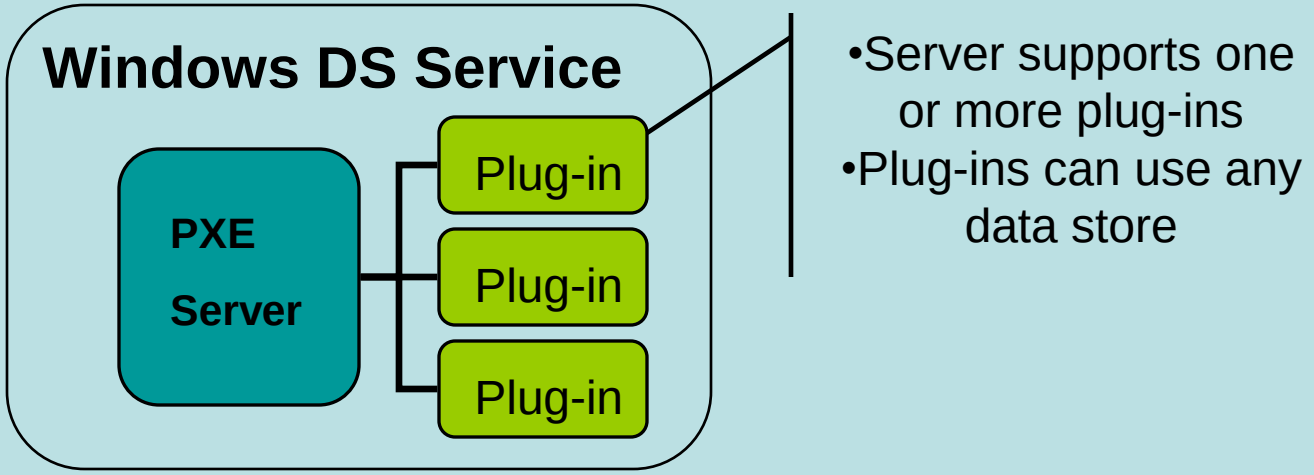
- Common Windows PE uses
  - Deployment pre-OS
  - Boot environment for updating BIOS / firmware
- RAMDISK boot support for Windows PE 2.0
- Improved download speeds
  - Adjustable TFTP block size
  - WIM format provides compression and single instancing
- Simplified management tasks for adding / removing images

Deploying Windows

Phase 4 – Windows Vista Toolset – Windows Deployment Services

Network Boot Support

- Scalable PXE server built on unified architecture
  - Replaceable plug-ins
  - Published APIs
  - Does not require Active Directory
  - Scenario: write plug-in that talks to SQL database



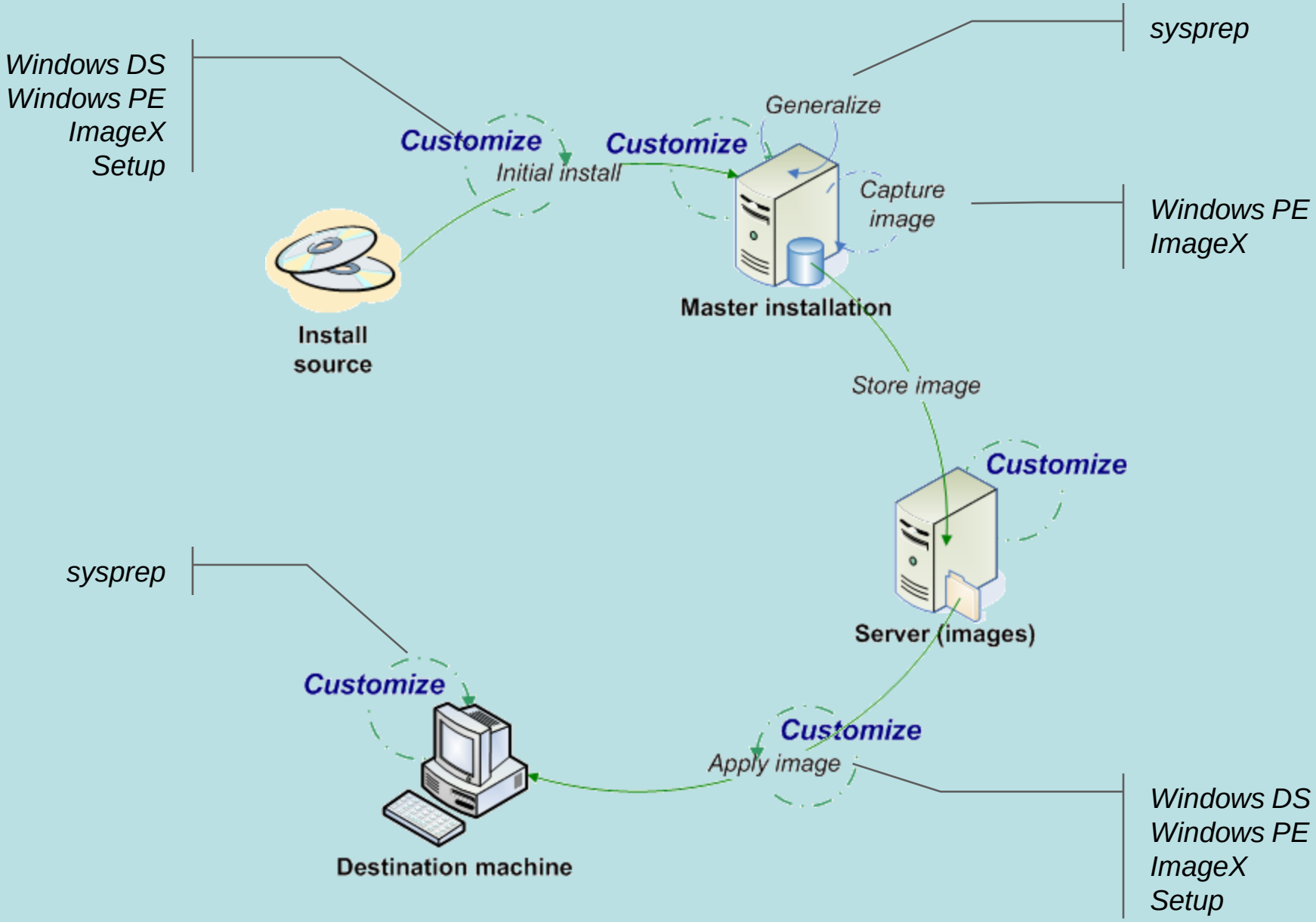
- Windows PE PXE boot
  - Scenario: network boot into Windows PE and run custom installation

Deploying Windows

Phase 4 – Windows Vista Toolset – Benefits

- Windows PE
  - Windows PE image provided
  - Scratch space available
  - Ability to inject drivers online and offline
  - Improved management tools
- Windows Deployment Services
  - Extensible platform
  - Improved management tools
  - Consolidating image format
  - Windows DS and Setup share image format

Deploying Windows Vista



Call to Action

- Try the labs
  - Walk-through demos covered in this session
  - Customize your labs
  - Complete your evaluation.

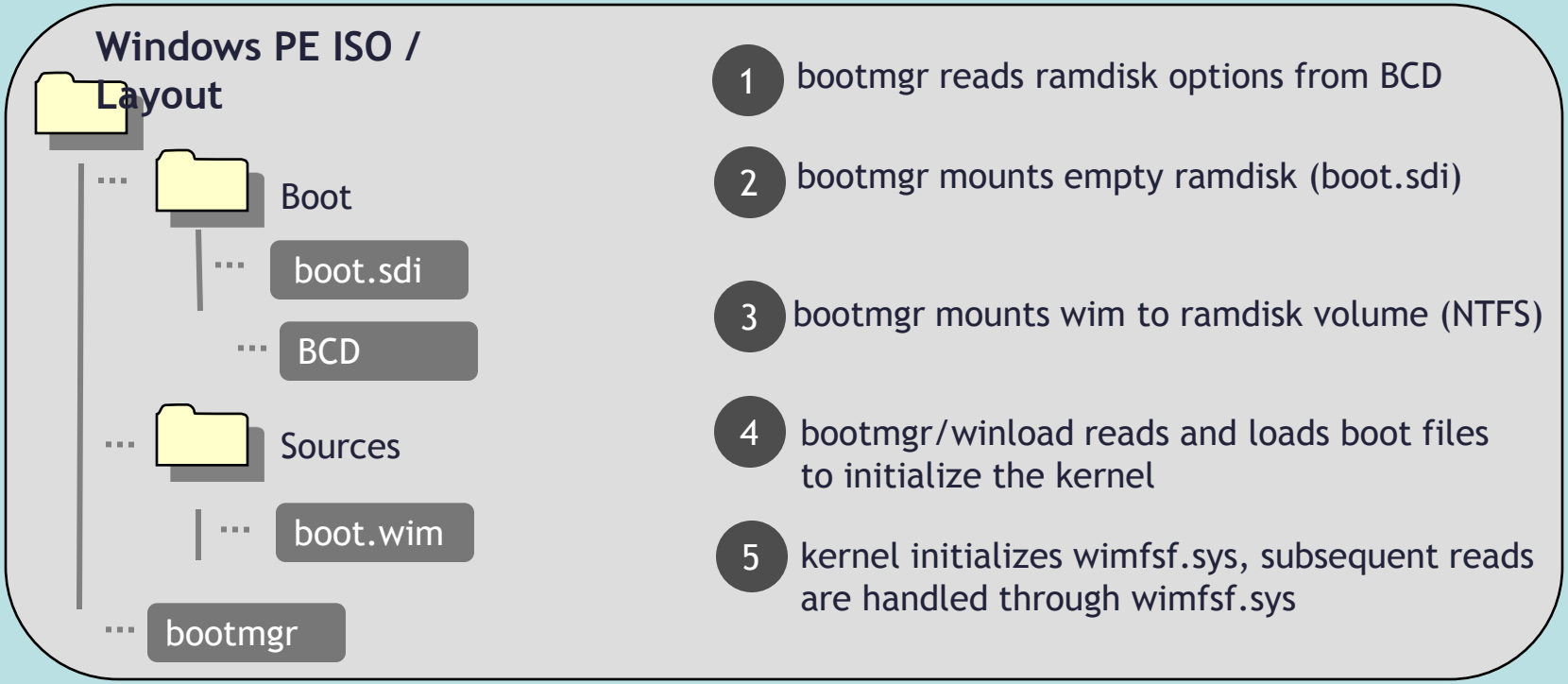
Appendix & Technical Reference

Deploying Windows

Windows Vista Toolset: Imaging

Boot from WIM

- Boot option supported for Windows Vista Windows PE images only
- Enabled through file system mini-filter (wimfsf.sys) and OS loader functionality
- WIM boot filter does not support writes



Deploying Windows

Windows Vista Toolset: Imaging

APIs and Extensibility

- WIMGAPI provides programmatic access to all Windows Imaging functions
  - Available to third parties and ISVs
  - Distributed and documented as part of the OPK and Windows Automated Installation Kit (corporate users)
- Basic Imaging Functions
  - WIMCreateFile – create a new WIM file or open an existing WIM
  - WIMLoadImage – load an image from a WIM
  - WIMCaptureImage – captures a specified path
  - WIMGetAttributes – returns WIM_INFO structure
  - WIMApplyImage – applies an image to a path
  - WIMDeleteImage – removes an image from a WIM
  - WIMMountImage – mounts an image to a specified path
  - WIMUnmountImage – unmounts a specified image

Deploying Windows

Windows Vista Toolset: Imaging

APIs and Extensibility

- Additional Imaging Functions
  - WIMSetBootImage – marks a specified image as bootable
  - WIMSplitFile – split a WIM into smaller parts
  - WIMSetReferenceFile – set an alternate WIM as the source for file resources
  - WIMExportImage – copies an image to a target WIM
  - WIMCopyFile – Similar to CopyFile, offer WIM file verification during copy
- Message Callbacks
  - WIMRegisterMessageCallback offered for registration
  - WIM_MSG_PROGRESS – indicates progress for apply
  - WIM_MSG_PROCESS – prevent a file / dir from being processed
  - WIM_MSG_COMPRESS – prevent a file from being compressed
  - WIM_MSG_SPLIT – change size of WIM part for split
  - Other messages include: ERROR, ALIGNMENT, SCANNING, SETRANGE, SETPOS

Deploying Windows

Windows Vista Toolset: Imaging

- Capture syntax

  IMAGEX [FLAGS] /CAPTURE [source] [image file] “IMAGE NAME” "IMAGE DESCRIPTION"

- Append syntax

  IMAGEX [FLAGS] /APPEND [source] [image file] “IMAGE NAME” "IMAGE DESCRIPTION"

- Exclusions are specified through a config file

```
[ExclusionList]
$ntfs.log
hiberfil.sys
pagefile.sys
"System Volume Information"
RECYCLER
Bootsect.dat
Windows.OLD
…
```

Deploying Windows

Phase 4 – Windows XP Experience Windows PE Challenges

- Set of tools that strip a bootable subset of binaries from a Windows image
- No writeable space
- Windows PE image needed to be customized with drivers, etc. before it could be booted
  - PnP driver detection only at boot time
  - Windows PE did not allow online injection of drivers