

TA12

Introducing VMware Converter 4.0: What's New and Different

Pang Chen

Principal Consultant

VMware Technical Services

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This session may contain product features that are currently under development.

This session/overview of the new technology represents no commitment from VMware to deliver these features in any generally available product.

Features are subject to change, and must not be included in contracts, purchase orders, or sales agreements of any kind.

Technical feasibility and market demand will affect final delivery.

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VMware vCenter Converter Standalone 4.0: What's New and Different

- VMware vCenter Converter Overview
- New Features in VMware vCenter Converter Standalone 4.0
- Removed Features/Support
- Enhancements
- Architecture
- Requirements



VMware vCenter Converter Overview

VMware Converter

Converter Variants

Converter Roadmap

VMware Converter



■ What is VMware Converter?

- Utility to convert machines to VMs (P2V)
 - Powered-on machines (hot clone)
 - Powered-off machines (cold clone boot CD)
- Utility to convert VM formats and import other formats (VM Import)

■ Sources

- Physical, VMware VM, VCB, third-party (VM and backup), OVF (virtual appliance)

■ Destinations

- Managed (vCenter/ESX/ESXi), hosted (Workstation, Server, Fusion), OVF

Cloning Options

■ Disk-Based

- Take entire disk, as-is
- Block-level copy
- Available with cold clone boot CD or VM import only, not hot clone

■ Volume-Based

- Selectively choose volumes, option to resize
- Block-level or file-level copy
 - Block-level: default mode for Windows hot clone
 - File-level: used if shrinking volume size in destination (slower)
- Available with cold clone, hot clone, and VM import
- Available when disk file system can be understood

Converter Variants

vCenter Converter 3.0.3 Standalone

- Free standalone application
- Starter mode or enterprise licensed (vCenter licensed)
- Convert physical machines, VMware VMs, VCB, third-party formats (VMs, backup), OVF to hosted/managed destinations
- Linked clone option for hosted destination VMs
- Supports multiple tasks (queued if unlicensed)
- p2vtool CLI (experimental)
- Cold clone boot CD (vCenter licensed)

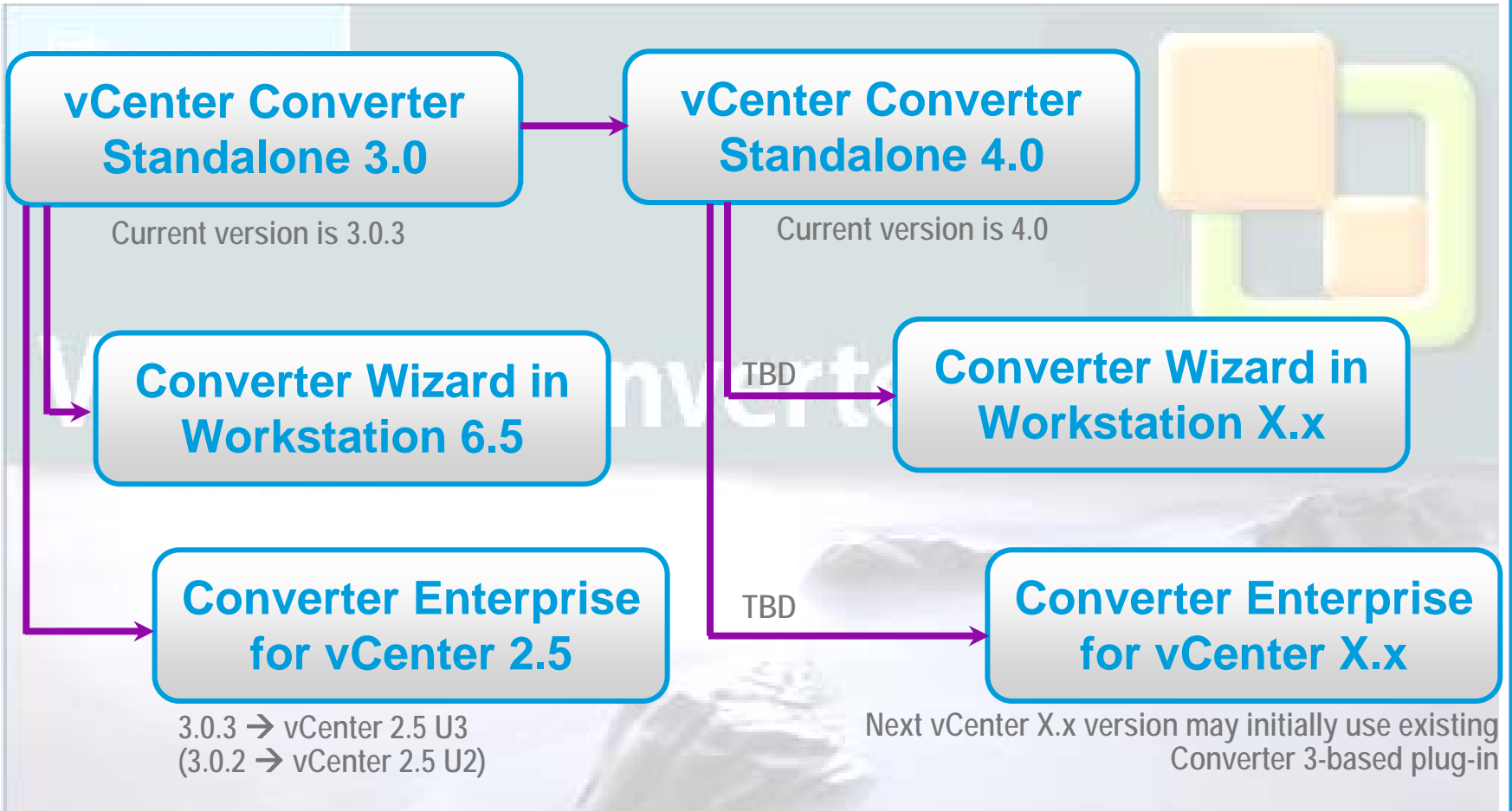
Converter Enterprise for vCenter 2.5 U3

- vCenter Server / VI Client plug-in
- No additional licensing
- Convert physical machines, VMware VMs, VCB, third-party formats (VMs, backup) to hosted/managed destinations
- OVF support via vCenter
- Supports multiple tasks
- Schedule future or recurring
- converter-tool CLI
- Cold clone boot CD

Converter embedded in Workstation 6.5

- Built-into Workstation 6.5
- No additional licensing
- Convert physical machines, VMware VMs, VCB, third-party formats (VMs, backup), OVF to hosted/managed destinations
- Linked clone option for hosted destination VMs
- One task at a time

Converter Roadmap



New Features in VMware vCenter Converter Standalone 4.0

Linux P2V

P2V Motion for Windows P2V

Windows Services Configuration

New Client/Server Architecture



Linux P2V



■ Supported Conversions

- Source: powered-on machine (hot clone only)
- Destination: managed destination only (vCenter/ESX/ESXi only)

■ Requirements and Limitations

- Remote SSH to source machine enabled
- Root or sudo login
- Volume-based file-level copy only
- GRUB only, no LILO
- File system types preserved: ext2, ext3, reiserfs, vfat (all else → ext3)
- LVM volumes can be read, but are not preserved in new VM
- If multi-boot system, only the current system is converted

P2V Motion for Windows P2V

■ Synchronize Changes

- Keeps track of changes after snapshot and applies changes in a post-clone synchronize step – minimizes lost transactions during hot clone
- Option to coordinate source shutdown and destination power-on
- Works in conjunction with Windows services

■ Requirements and Limitations

- Available only for live conversions of Windows XP and higher
- Volume-based block-level cloning only (no resizing of volumes)

— Synchronize source and destination —

Synchronize changes that occur to the source during cloning

Synchronization occurs after cloning. Before synchronization, key source services can be stopped so no data from these services is lost. Stop services through the services page. Select the options below to power off source and power on destination machine.

— Post-conversion power state —

Power off source machine

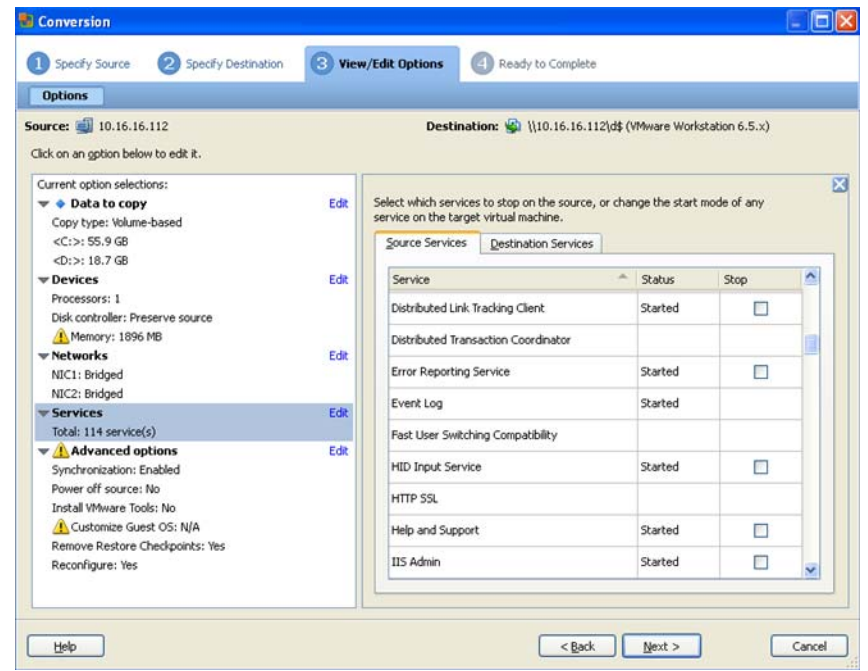
Windows Services Configuration

■ Optional Services Starting Mode Configuration

- Leave enabled/disabled or change per service
- Configure on source machine and/or destination VM
- During conversion, services on source disabled before P2V hot clone

■ Works with P2V Motion

- Services on source disabled before post-clone synchronize instead of before P2V hot clone



P2V Motion Example



Time	Step
08:00	Disable SQL Server service on source machine (no synchronize) and Take volume snapshot
08:01	Begin cloning snapshot to destination VM
11:23	Finish cloning snapshot to destination VM
11:24	Power off source machine and power on destination VM and start SQL Server service (no synchronize) <i>or</i> Disable SQL Server service on source machine
11:25	Begin synchronize changes since snapshot with VM
11:36	Finish synchronize changes since snapshot with VM
11:37	Power off source machine
11:37	Power on destination VM and start SQL Server service

Without P2V Motion

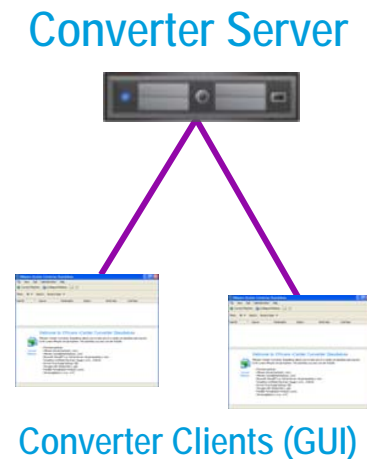
- Downtime = 3 hours 24 min
- Destination state = 08:00
- SQL Server service on source disabled at 08:00
- SQL Server service offline, but other transactions 08:00 to 11:24 not reflected in VM
- Destination VM powered on at 11:24 (no synchronize)

With P2V Motion

- Downtime = 13 min
- Destination state = 11:24
- SQL Server service on source disabled at 11:24
- Synchronize runs immediately after clone
- Transaction gap narrowed

New Client/Server Architecture

- Multi-User/Remote Support Client/Server
 - Servers can handle requests from multiple clients
 - Clients (GUI) can reside on same machine as server or remote machine
- Multi-Platform Support
 - Client and server now available in Linux as well as Windows
 - Same GUI look and feel
 - Can mix-and-match Linux/Windows client/server
 - Some VM Import features limited with Linux server
 - Converting Windows machines sources using Linux server experimental



Removed Features/Support from Converter

Windows NT 4.0 Support

Cold Clone

CLI

Removed Supported Destinations

Windows NT 4.0 Support

- Hot Clone P2V of Windows NT 4.0 Machines Not Supported with Converter 4.0
 - Alternative 1: Use previous vCenter Converter Standalone 3.0.3 or Converter Enterprise for vCenter 2.5 U3
 - Alternative 2: Take third-party system backup and use VM import
- VM Import of Windows NT 4.0 VMs and Backup Images Still Supported

Cold Clone and CLI

- No Cold Clone Boot CD Based on Converter 4.0
 - Use cold clone boot CD with previous vCenter Converter Standalone 3.0.3 or Converter Enterprise for vCenter 2.5 U3
 - Does not convert newer OSes supported by Converter 4.0
- No Command Line Interface (CLI) with Converter 4.0
 - Use CLI with previous vCenter Converter Standalone 3.0.3 or Converter Enterprise for vCenter 2.5 U3
 - p2vtool or converter-tool CLI cannot access Converter 4.0
- New Converter-4 Based Cold Clone Boot CD and CLI May Be Reintroduced in a Future Release

Removed Supported Destinations

- Hardware Gen 4 VM Format as Destination No Longer Offered
 - VMware Workstation 4.x
 - VMware ESX Server 2.x
 - VMware GSX Server 3.x
 - VMware ACE 1.x
- These Formats Still Supported as Sources for VM Import



Enhancements to Converter

New Supported OSes

New VM Sources/Destinations

New UI

New Behavior

Supported OSES in vCenter Converter Standalone 3.0.3 and Converter Enterprise for vCenter 2.5 U3

<i>Supported OS</i>	<i>vCenter Converter Standalone 3.0.3</i>	<i>Converter Enterprise for vCenter 2.5 U3</i>	<i>Hot Clone Source</i>	<i>Cold Clone or VM Import Source</i>
Windows NT 4.0 SP4 or higher	SP6 and IE 5 or higher		✓	✓
Windows 2000 Pro, Server, Adv Server	✓	SP4 and Update Rollup 1	✓	✓
Windows XP Home				✓
Windows XP Pro (32-bit/64-bit)	✓	SP2	✓	✓
Windows Server 2003 (32-bit/64-bit)	✓	SP1 or R2	✓	✓
Windows Vista (32-bit/64-bit)	✓		✓	✓

Supported OSES in vCenter Converter Standalone 4.0 – Windows

<i>Supported OS</i>	<i>vCenter Converter 4.0 Client</i>	<i>vCenter Converter 4.0 Server</i>	<i>Hot Clone Source</i>	<i>VM Import Source</i>
Windows NT 4.0 SP6 Workstation or Server				✓
Windows 2000 Pro, Server, Adv Server	SP4	SP4	SP4	✓
Windows XP Home				✓
Windows XP Pro (32-bit/64-bit)	✓	✓	✓	✓
Windows Server 2003 (32-bit/64-bit)	✓	✓	✓	✓
Windows Vista (32-bit/64-bit)	✓	✓	✓	✓
Windows Server 2008 (32-bit/64-bit)	✓	✓	No Guest Customization	No Guest Customization

Supported OSes in vCenter Converter Standalone 4.0 – Linux

<i>Supported OS</i>	<i>vCenter Converter 4.0 Client</i>	<i>vCenter Converter 4.0 Server</i>	<i>Hot Clone Source</i>	<i>VM Import Source</i>
Red Hat Enter. Linux 2.1 (32-bit)			✓	✓
Red Hat Enter. Linux 3.0 (32/64-bit)		✓	✓	✓
Red Hat Enter. Linux 4.0 (32/64-bit)	✓	✓	✓	✓
Red Hat Enter. Linux 5.0 (32/64-bit)	✓	✓	✓	✓
Red Hat Linux AS 2.1 (32-bit)			✓	✓
SUSE Linux Enterprise 8 (32-bit)		✓	✓	✓
SUSE Linux Enterprise 9 (32/64-bit)		32-bit	✓	✓
SUSE Linux Enterprise 10 (32/64-bit)	✓	✓	✓	✓
Ubuntu 5.x (32-bit)		✓	✓	✓
Ubuntu 6.x (32-bit)	✓	✓	✓	✓
Ubuntu 7.x (32/64-bit)	✓	✓	✓	✓
Ubuntu 8.x (32-bit)				✓

Linux Conversion Source/Destination Limitations

■ Hot Clone

- If Converter Server on Windows, remote Linux source machines only
- If Converter Server on Linux, remote or local Linux source machines
 - Reference local Linux machine by IP address
- SSH over port 22 enabled
- Managed destinations only

■ VM Import

- Third-party system backups of Linux OSes not supported

■ Guest Customization of Linux Sources Not Supported

New VM Sources/Destinations

■ New VM Import Sources

- Parallels Desktop VM for Windows and Mac OS X 2.5, 3.0
- Additional versions of system backups – refer to documentation
 - Symantec Backup Exec System Recovery, Norton Ghost
 - Acronis True Image
 - Storage Craft ShadowProtect

■ New VM Destinations

- VMware Workstation 6.5.x
- VMware Server 2.x
- VMware Fusion 2.x

VM Import Limitations

■ Converter Server on Windows

- Windows guests
 - Reconfiguration and guest customization limited to Windows NT 4.0 and 2000 if Converter Server installed on Windows 2000
- Linux guests – VMware VMs only
 - Disk-based cloning only (no volume resizing)
 - No reconfiguration or guest customization
 - No VMware Tools installation

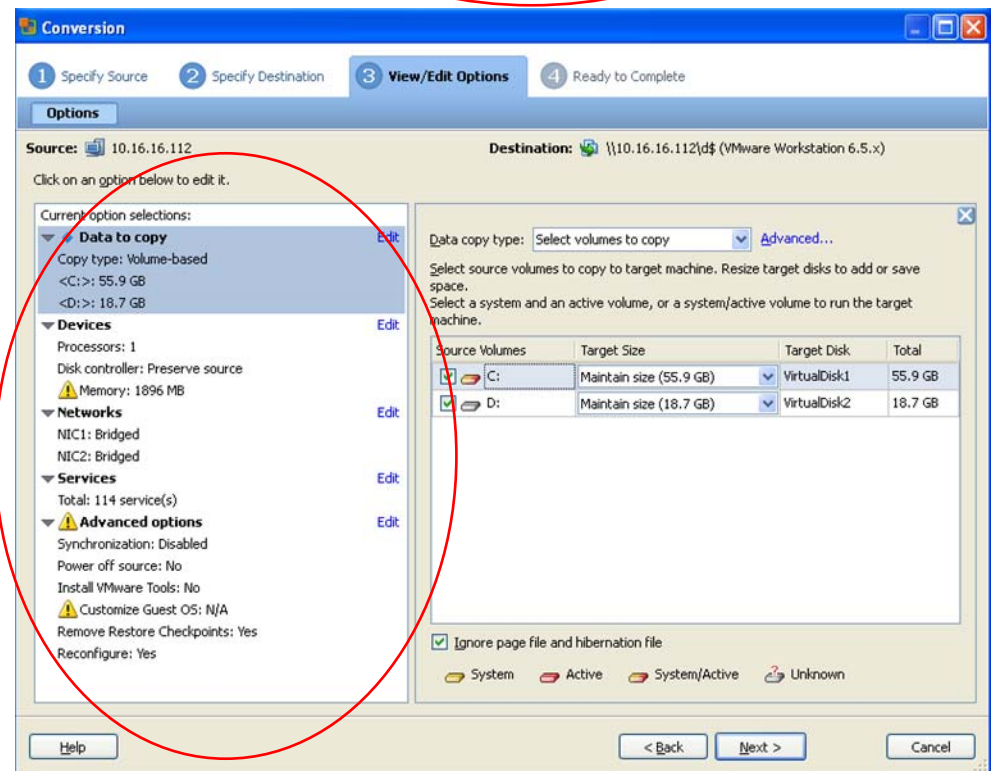
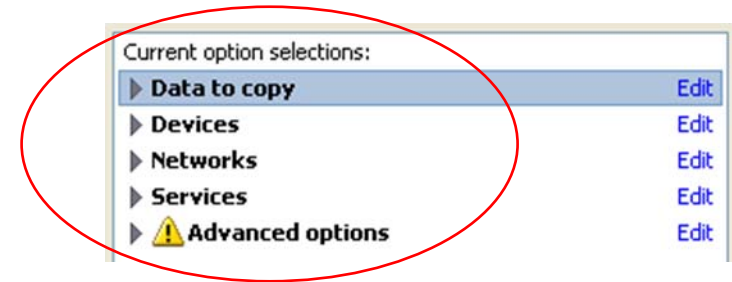
VM Import Limitations (continued)

■ Converter Server on Linux

- Windows guests
 - Disk-based cloning only (no volume resizing)
 - Reconfiguration not supported for Windows NT 4.0
 - Reconfiguration and guest customization requires NTFS-formatted boot and system volumes
 - Third-party system backup formats not supported
- Linux guests – VMware VMs only
 - Disk-based cloning only (no volume resizing)
 - No reconfiguration or guest customization
 - No VMware Tools installation
 - VCB and third-party system backup formats not supported

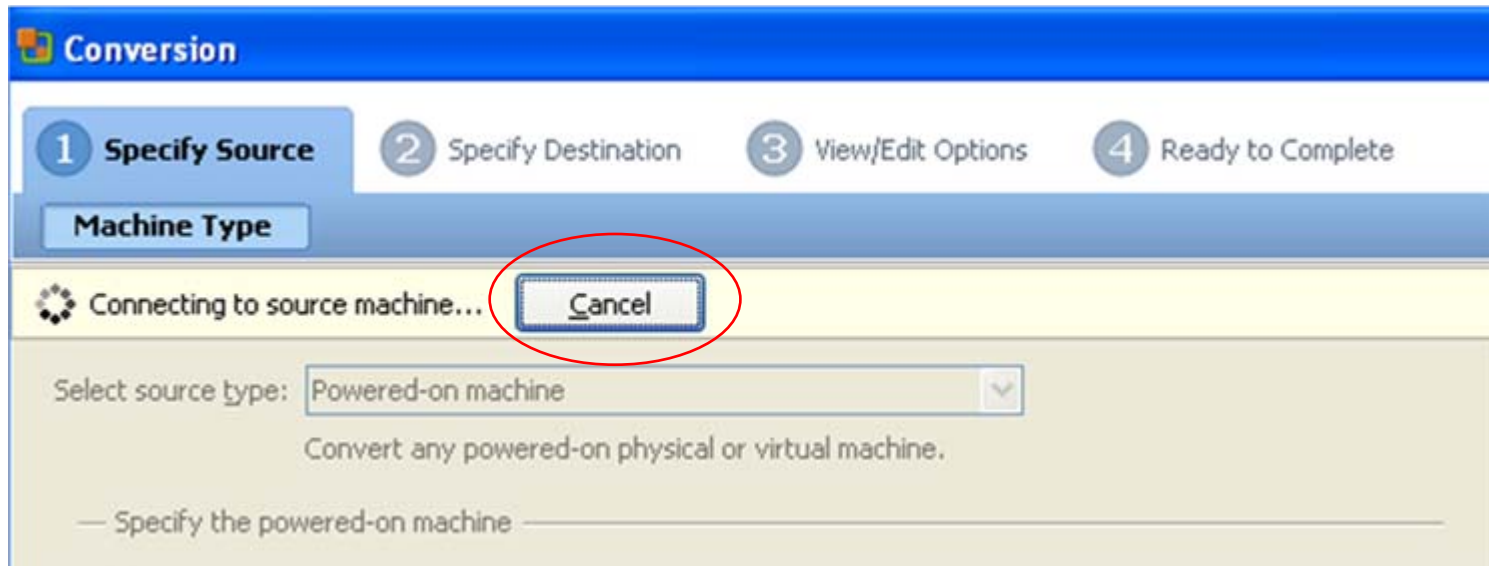
New UI – Streamlined

- Expandable Options
 - Defaults
 - Fewer steps for typical
- New View/Edit Options Summary
 - Review and change prior to conversion



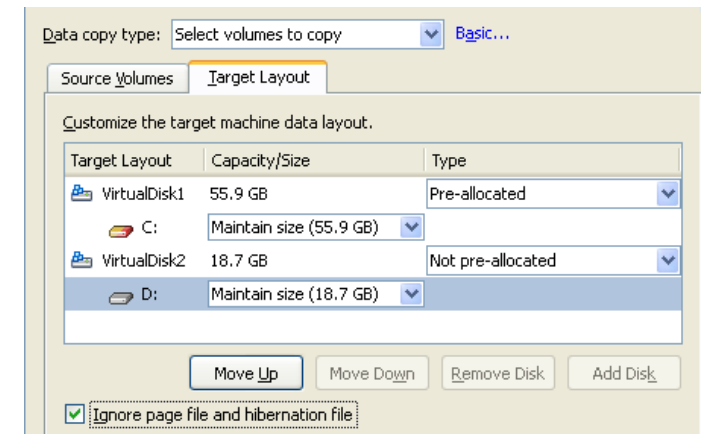
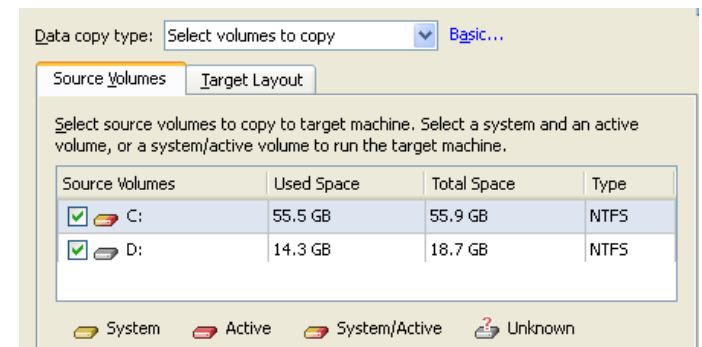
New UI – New “Cancel” Button

- Cancel Lengthy Processes



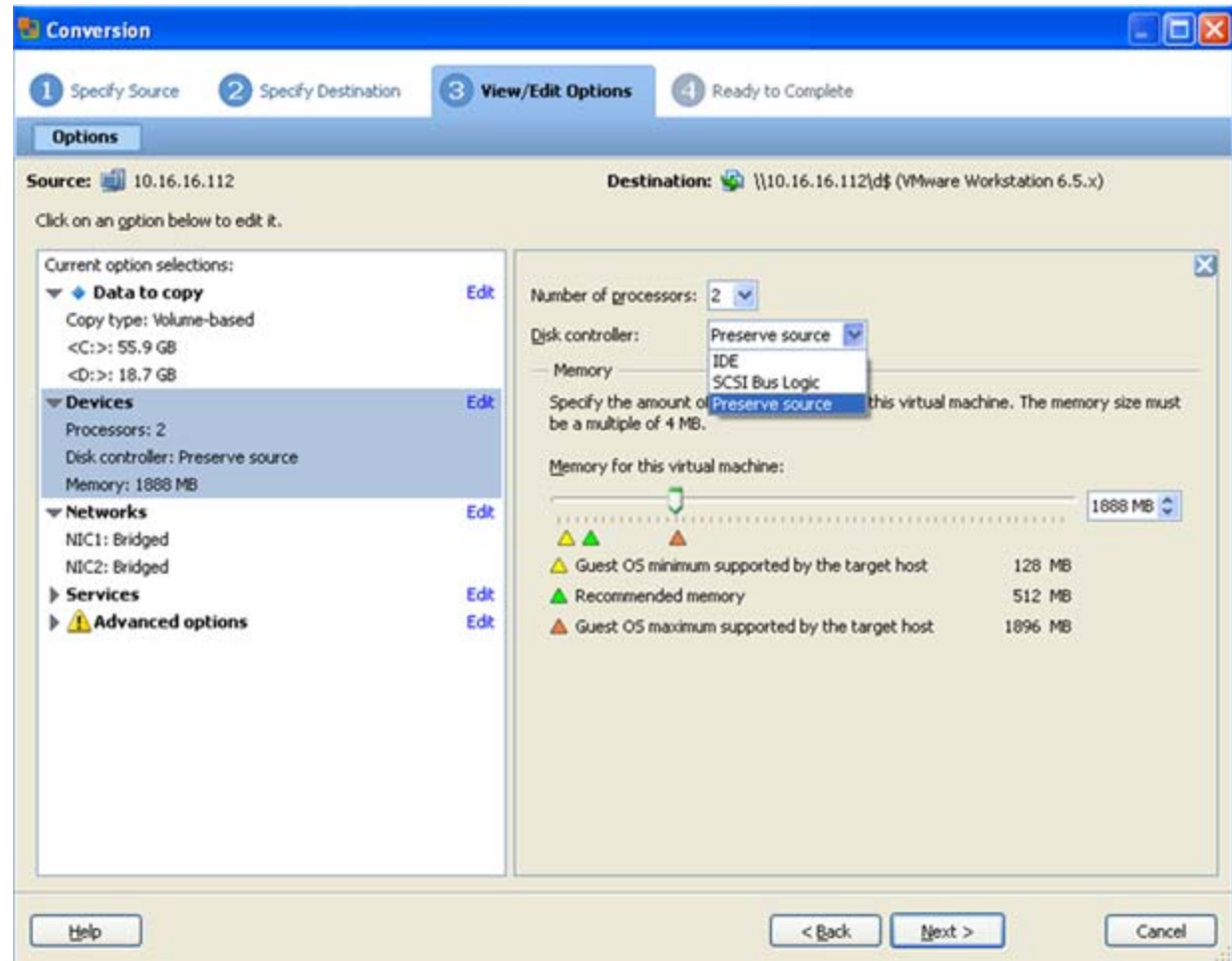
New UI – Disk Layout Options (Volume-Based Cloning)

- Specify Layout of Source Volumes on Destination VM Disk(s)
 - Check desired source disk volumes
 - Move up/down (except system/active)
 - Specify order of volumes in destination
 - Move up/down
 - Specify which disk to place volume
 - Move up/down
 - Specify destination virtual disks
 - Add disk
 - Place on different datastores (managed VMs only)
 - Specify disk type (hosted VMs only)



New UI – VM Settings

- Processors
- Disk Controller
- Memory



New UI – Transfer Rate

- Reported on Running Tasks in KB/s
- Measures Rate of Data Written

The screenshot shows a task summary window with a dark blue header. The header contains 'Task ID 1: **Running**' and 'From: This local machine'. Below the header are two tabs: 'Summary' and 'Task Progress'. The 'Summary' tab is active, displaying a 'Conversion Status' section. This section lists various task details in a key-value format. The 'Transfer rate' is highlighted with a red oval and shows a value of 7030 KB/s.

Task ID 1: Running	From: This local machine
Summary	Task Progress
Conversion Status	
Type:	Convert physical machine to virtual machine
Created:	11/10/2008 3:20:48 PM by pbosky
Status:	Running - 6% Complete
Started:	11/10/2008 3:20:48 PM
Estimated time left:	1 hour(s) and 59 minute(s)
Estimated completion time:	11/10/2008 5:27:59 PM
Transfer rate:	7030 KB/s
Can be canceled:	Yes

New UI – New Per-Task Log Retrieval

■ Logging Now Per Task

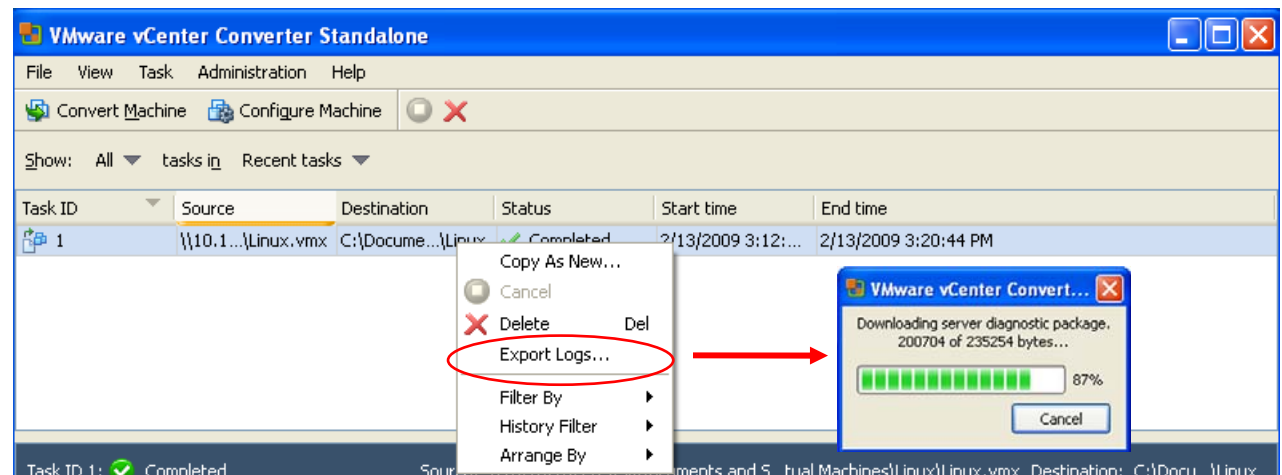
- Snapshot of all logs from all machines associated with a task

■ Export Logs – Now Available Per Task

- Collects all relevant logs for a task into a single zip file
- Fetches logs from remote machine if required

Task log bundles can help reconstruct events associated with a prior task for troubleshooting

Log bundles of successful tasks are kept only for a short period of time



New Behavior

- No License in vCenter Converter Standalone 4.0
 - No restrictions on destinations or number of sessions
 - Remains free
- Atomic Snapshots (Windows 2000 and Higher)
 - Multi-volume machines have snapshots taken at once, and then volume copy initiated
 - Converter 3.x serialized snapshot and copy per volume
- VSS-Aware Application Support (Windows XP and Higher)
 - Converter 4.0 now informs VSS-aware applications to quiesce application data prior to taking volume snapshot during live machine conversion

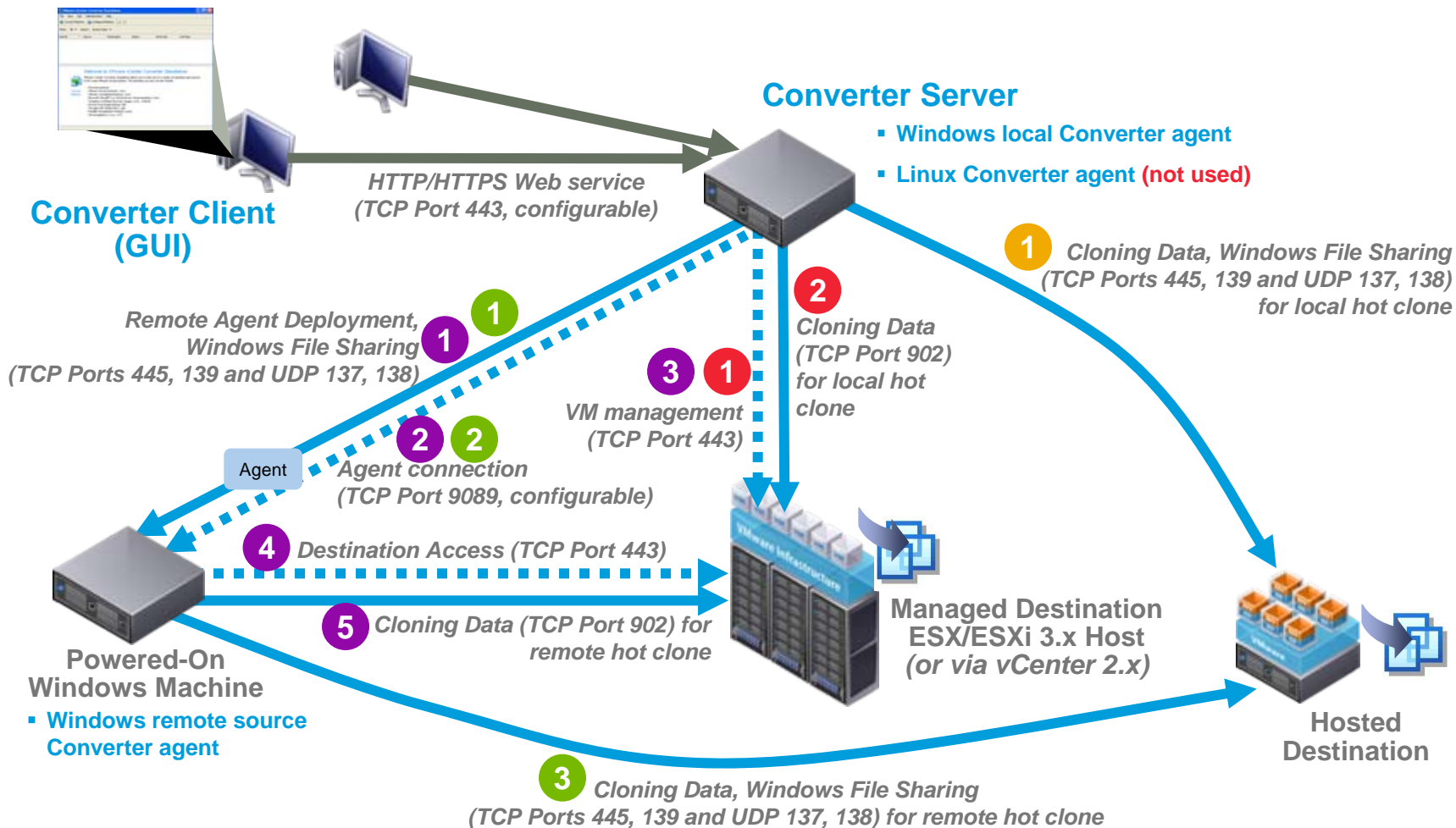
Converter 4.0 Architecture

vCenter Converter Standalone 4.0 Architecture

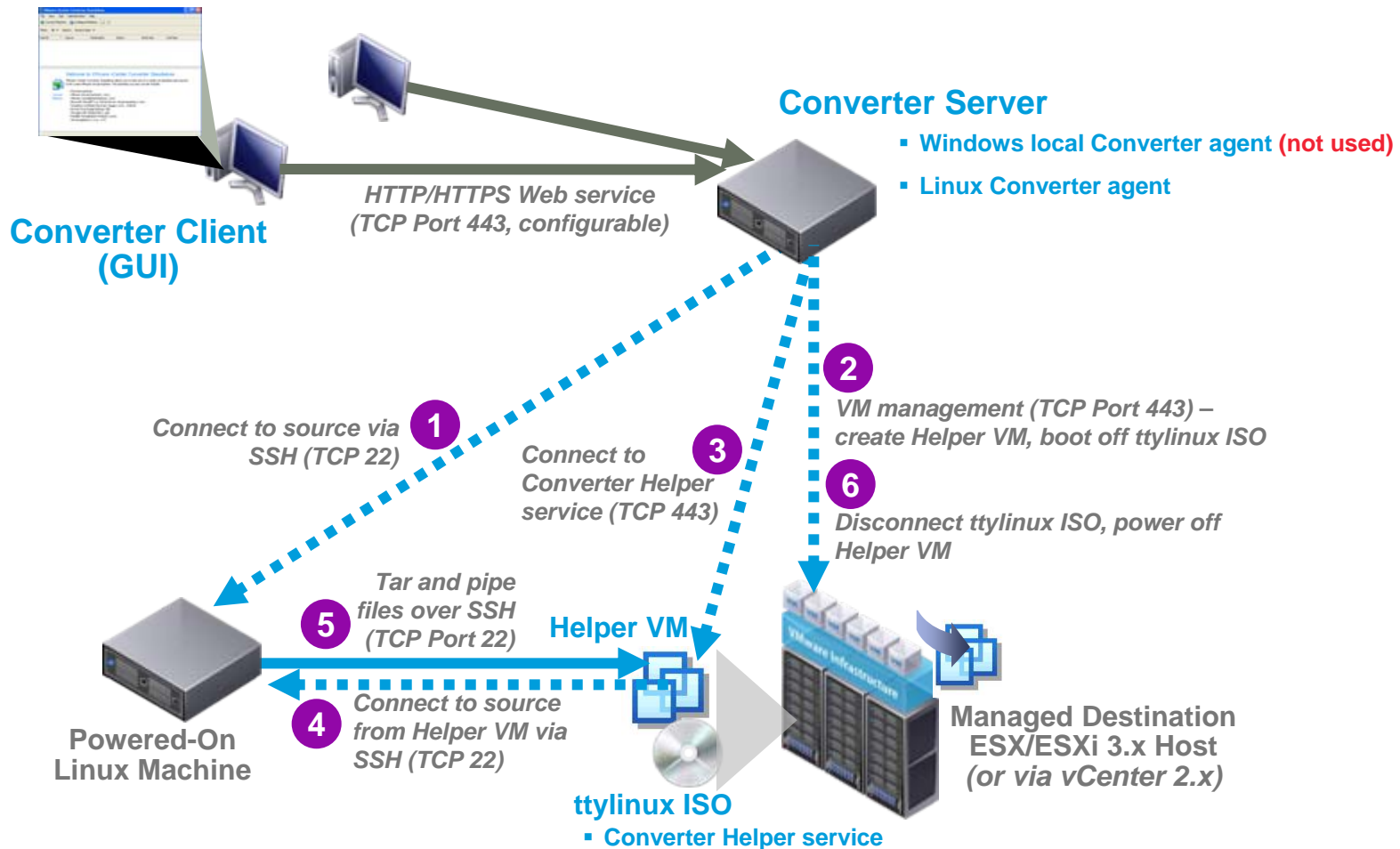
vCenter Converter Standalone 4.0 Components

Network Ports Used

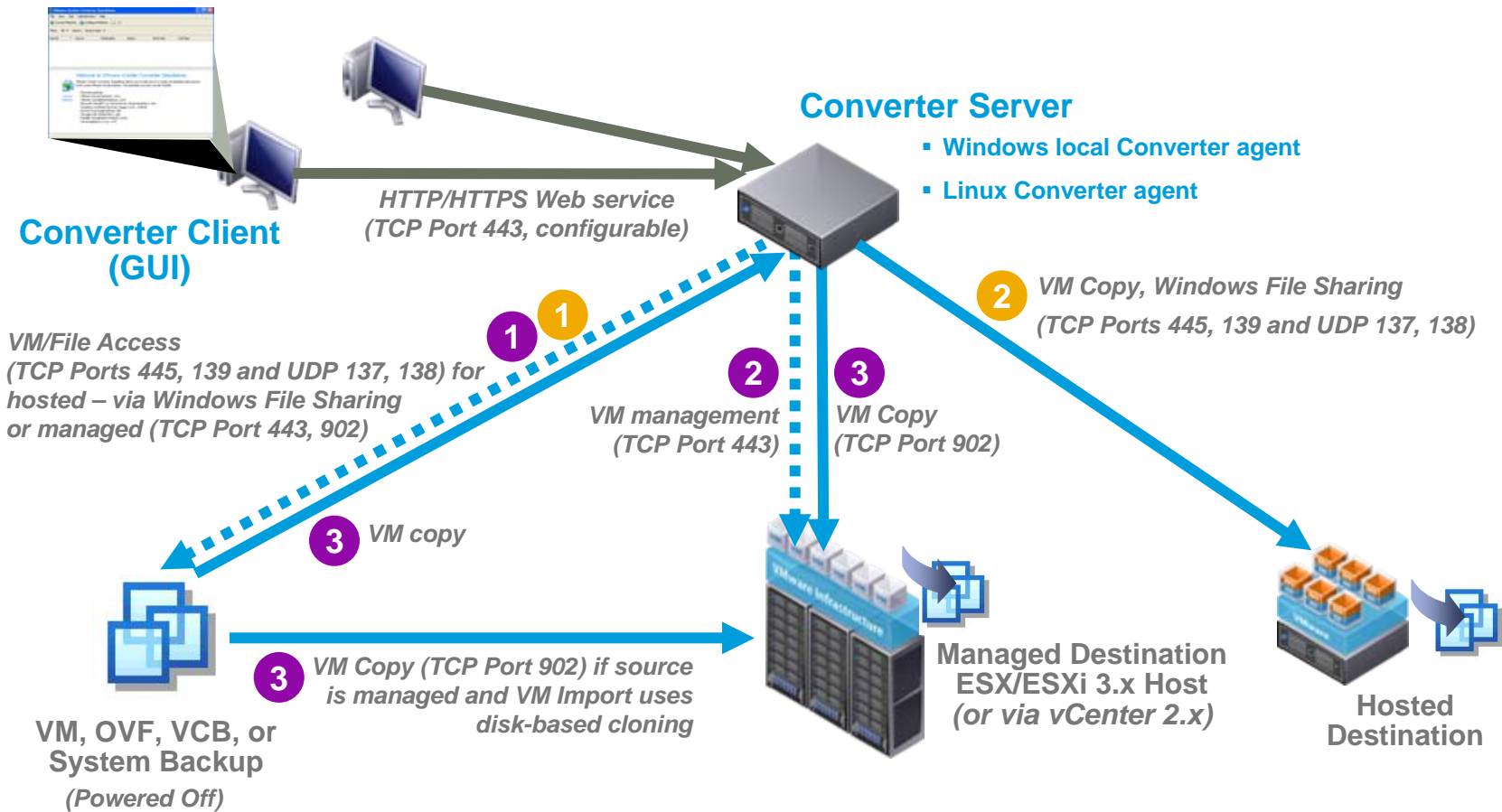
vCenter Converter Standalone 4.0 Architecture: Live Windows



vCenter Converter Standalone 4.0 Architecture: Live Linux



vCenter Converter Standalone 4.0 Architecture: VM Import



Converter Sources

■ Powered-on Machine

- Windows
- Linux

Can be powered-on VM

(e.g. Hyper-V, XenServer, Virtual Iron VMs)

■ VMware Infrastructure VM

■ VMware Workstation or other VMware VM

■ Third-Party VM or Backup Image

■ Virtual Appliance



Powered-On
Machine



VM, OVF, VCB, or
System Backup
(Powered Off)

Converter Destinations

■ Managed (VMware Infrastructure)

- ESX/ESXi 3.x host
- via vCenter 2.x Server



■ Hosted (VMware Workstation or other VMware VM)

- VM files placed onto directory accessible by UNC path



■ Virtual Appliance

Converter Server and Client

■ Converter Server

- Windows service or Linux daemon
- Maintains task database
- Accepts requests from Converter clients
- Installed with Converter agent
 - Windows local Converter agent
 - Linux Converter agent
- Delegates most of work to Converter agent

Converter Server



- Windows local Converter agent
- Linux Converter agent

■ Converter Client (GUI)

- Interface for submitting tasks
- Runs on Windows or Linux



Converter Client
(GUI)

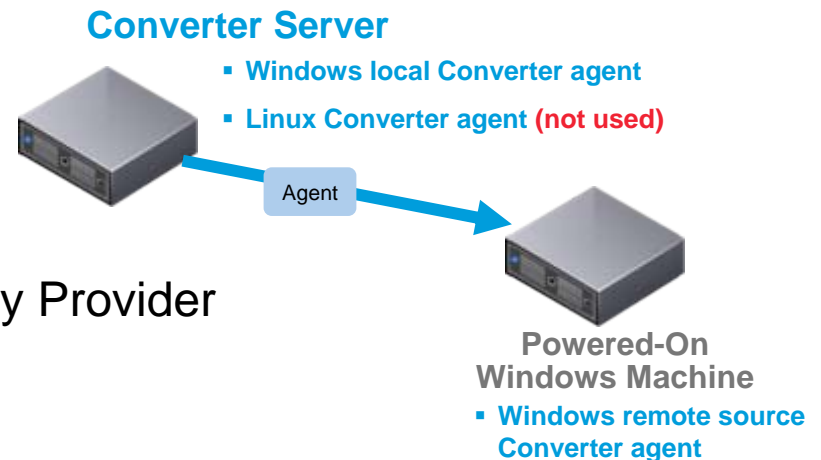
Converter Agent – Windows

■ Types

- Local (installed with Converter)
- Remote (installed during live conversion)

■ Works in Conjunction with Windows Services

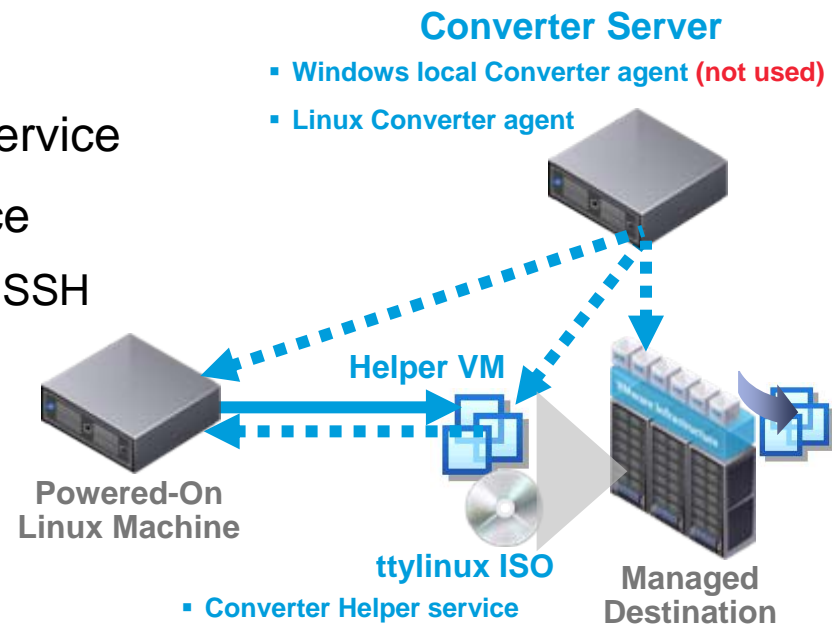
- Workstation
- Server
- TCP/IP NetBIOS Helper
- Volume Shadow Copy
- Microsoft Software Shadow Copy Provider



Converter Agent – Linux

■ Agent Functions

- Connects to source machine via SSH to obtain source details
- Creates new Helper VM and disks on ESX/ESXi host
- Bootstraps Helper VM using ttylinux ISO
 - Runs Converter Helper service
- Connects to Converter Helper service
- Invokes Converter Helper service
 - Connect to source machine via SSH
 - Copy files
- Powers off VM
- Disconnects ttylinux ISO



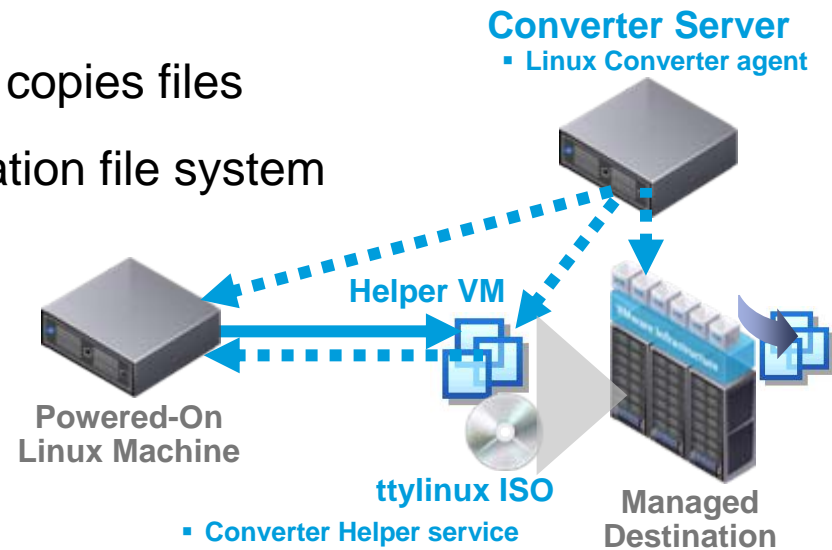
Helper VM and Converter Helper Service – Linux

■ Helper VM

- Destination VM created by Converter, initially booted off ttylinux ISO

■ Converter Helper Service

- Partitions/formats disks on destination VM (Helper VM) and mounts volumes
- Connects to Linux machine and copies files
- Un-tars source files onto destination file system
- Performs reconfiguration



Network Ports Used

<i>Network Path</i>	<i>TCP Ports</i>
Converter Client (GUI) to Converter Server	443 (configurable)
Converter Server to Remote Windows Powered-On Machine	Remote Agent deployment/ Windows File Sharing: 445 and 139 (and UDP 137, 138) Agent connection: 9089 (configurable)
Converter Server/Linux Agent to Remote Linux Powered-On Machine	22
Converter Server/Agent to Managed Destination – VM Creation/Management (includes VM Helper Creation/Management)	443
Windows Powered-On Machine to Managed Destination – Hot Clone	Access: 443 (vCenter/ESX/ESXi) and Copy: 902 (ESX/ESXi)
Windows Powered-On Machine to Hosted Destination – Hot Clone	Windows File Sharing: 445 and 139 (and UDP 137, 138)
Helper VM to Linux Powered-On Machine – Hot Clone	22
Converter Server/Agent to Managed Source/Destination – VM Import (Traffic from ESX/ESXi to ESX/ESXi Direct for Disk-Based Cloning Only)	Access: 443 (vCenter/ESX/ESXi) and Copy: 902 (ESX/ESXi)
Converter Server/Agent to Hosted Source/Destination – VM Import	Windows File Sharing: 445 and 139 (and UDP 137, 138)

VMware vCenter Converter Requirements

Installation

Usage

VMware Infrastructure Permissions

Guest Customization (Sysprep Configuration)

Installation – Windows

■ Installing

- Requires MSI 3.0 or higher
- Server and agent must be installed and run as Administrator
- Client (GUI) can be installed and run as non-Administrator
- Default directory: \Program Files%\VMware\VMware vCenter Converter Standalone
- Services installed: vmware-converter-server, vmware-converter-agent, vstor2-mntapi10

■ Space Requirements

- Client (GUI): 25MB; Server and agent: 360MB
- Temporary (installation file and decompress): 200MB

Installation – Linux

■ Installing

- Server and agent must be installed and run as root
- Client (GUI) must be installed and run as root
- Default executables directory: /usr/bin
- Default library directory: /usr/lib/vmware-vcenter-converter-standalone
- Services installed: /etc/init.d/vmware-converter (agent not registered)

■ Space Requirements

- Client (GUI): 130MB; Server and agent: 450MB
- Temporary (installation file and decompress): 630MB

Usage

■ Windows Machine Live Conversion

- Requires at least MSI 2.0 to install Converter agent (remote conversions only)
- At least 200MB free space for volume snapshot to convert machine
- At least one NTFS volume (Windows Server 2008: no FAT/FAT32)
- Windows 2000 requires a reboot

■ Linux Machine Live Conversion

- Requires SSH and port 22 open for communication by Converter
- Managed destinations only
- VM network vSwitch on ESX/ESXi host by Helper VM that is created


■ VM Import – Remember Limitations based on Converter Server OS

VMware Infrastructure Permissions

- Grant VMware Infrastructure User Datacenter-Level Permissions:
 - Datastore.Browse Datastore
 - Datastore.Allocate Space
 - Virtual Machine.Inventory
 - Virtual Machine.Configuration
 - Virtual Machine.Interaction.Power On (if Converter to power on VM)
 - Virtual Machine.Provisioning.Allow Disk Access
 - Resource.Assign Virtual Machine To Resource Pool
 - Network.Assign To VM

Guest Customization (Sysprep Configuration)

- Windows-Based Converter Server
 - %ALLUSERSPROFILE%\Application Data\VMware\VMware vCenter Converter Standalone\sysprep\
- Linux-Based Converter Server
 - /usr/lib/vmware-vcenter-converter-standalone/sysprep/
- Install in Appropriate Subfolder
 - 2k, svr2003, svr2003-64, xp, xp-64
- Exceptions
 - Windows Vista (no files required)
 - Windows Server 2008 (customization not supported in Converter 4.0)



Virtually anything
is possible.

Virtually anything
is possible.

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Use pencil or black or blue ink and fill the appropriate boxes in like this:

1. This session was... (pick one)
 directly applicable to my job
 indirectly applicable to my job
 personally interesting, but not applicable to my job

2. Did this session provide information that can help you do your job better?
 Yes
 Slightly
 No

3. This session was... (pick one)
 Too technical
 Just right
 Not technical enough

4. What is your technical experience level?
 Not technical
 Novice
 Intermediate
 Full-armed

5. Based on what you learned in this session, what is your likelihood to...
 implement what you heard in your environment
 Request more information
 Upgrade or purchase the product/service presented

Please rate your satisfaction with the session or lab on each of the following factors:

6. How satisfied are you...
 Very Satisfied
 Somewhat Satisfied
 Neutral
 Somewhat Dissatisfied
 Very Dissatisfied

A. OVERALL SATISFACTION
 B. With the relevance of the material for your needs
 C. That the session matched the session description (BREAKOUT SESSION ONLY)
 D. With the amount of time allocated for the session
 E. With the speaker's presentation skills
 F. With the speaker's knowledge of the subject
 G. That the speaker effectively answered questions
 LAB ONLY
 H. Ease of following lab manual

What, if anything, was the value of the session or how could it be improved?

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