XenServer 7.0: Release Notes

Welcome to XenServer 7.0. This document provides important information about the XenServer 7.0 release.

For frequently asked questions about XenServer, refer to the *XenServer 7.0 Technical FAQ*.

Documentation may be updated or changed after the initial release. Citrix suggests regularly visiting the XenServer 7.0 page on Citrix Product Documentation to learn about updates.

Customers can download the latest version of the XenServer 7.0.0 Base Installation ISO from the XenServer Product Download page.

Note: The XenServer 7.0.0 Base Installation ISO has been reissued on 6 July 2016 to include hotfix XS70E004. The reissued ISO also contains an updated version of the XenCenter Management Console (v7.0.1). This version of XenCenter is same as the version available to download on the XenServer 7.0 Download page and hotfix XS70E001.

New Features and Improvements in XenServer 7.0

XenServer 7.0 introduces enhanced features and functionality for application, desktop and server virtualization use cases. Major themes for this release are increased configuration limits, ease of maintenance improvements and features aimed at reducing the total cost of ownership.

Automated Windows VM Driver Updates Enterprise feature

Customers can now use the Windows Update mechanism to install the I/O drivers (PV drivers) that deliver enhanced storage and network performance.

In order to install I/O drivers using the Microsoft Windows Update mechanism, customers should:

- Ensure the host is correctly licensed
- Create a new Windows VM using the XenCenter issued with XenServer 7.0
- Enable Windows Update within the VM
- Ensure the VM has access to the Internet, or that it can connect to a WSUS proxy server

Customers also wishing to install the full Management Agent (required for VM lifecycle operations or performance monitoring within XenCenter) should install it from the XenServer Tools ISO, or deploy the management agent MSI file using an MSI installation tool. These files can be found on the XenServer Tools ISO. After installation, the Management Agent will keep itself up to date, if it has access to the Internet.

Health Check

Customers are now able to automate the process of uploading Server Status Reports to Citrix Insight Services and receive notifications in XenCenter regarding the health of their systems, based on CIS-generated reports.

Intel GVT-g virtual GPU for Windows ^{Enterprise feature}

We continue to collaborate with our partners and drive innovation in the virtualized-graphics domain. Within this release, we showcase Intel's virtual GPU; a graphics-acceleration solution that requires no additional hardware:

- Uses the Intel Iris Pro functionality on Broadwell processors equipped with the C226 chipset
- Utilizes a standard Intel GPU driver, installed within the VM

For additional information, see the *Configuring XenServer 7.0 for Graphics* guide.

Support for SMB Storage ^{Enterprise feature}

XenServer is now able to use SMB[1] storage as an SR type.

Customers with existing SMB storage (ubiquitous in many Microsoft environments) can now utilize SMB as their XenServer SR, and therefore may need no additional storage for their XenServer environment, enabling significant potential cost savings.

Direct Inspect APIs ^{Enterprise feature}

APIs integrated within the Xen hypervisor enable third-party security products to monitor and protect virtual infrastructures against malicious activity. Through use of memory introspection, IT admins can protect VMs without any security agents being installed inside the guests.

Bitdefender's GravityZone product is the first example of security vendors integrating with these APIs.

Improved Performance & Scale

We continue to deliver ever greater performance and scale, enabling customers to realize economies of scale and processing efficiencies. These include the following enhancements:

Increased Host Memory

Support for up to 5 TB of system memory, accommodating even the largest workloads

Support for up to 1.5 TB of Memory per VM

For memory-hungry VMs[2], such as those running databases, we now support up to 1.5 TB of memory

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[1] SMB is sometimes referred to as CIFS.
[2] The VM must operate in HVM mode, which includes Linux distributions such as CentOS or RHEL (version 7.0 or higher) or any Windows VM.

Improved Dom0 Responsiveness

The responsiveness of Dom0 has been significantly improved when subjected to heavy VM load

Support for 288 CPUs

Support for up to 288 logical CPU cores, accommodating even the most powerful servers

Support for 32 vCPUs per VM

Maximum number of virtual CPUs supported per VM has increased to 32

Increased number of VBDs

Maximum number of VBDs per VM has increased to 255

Increased number of VBDs

Maximum number of VBDs per host has increased to 4096

Increased number of VDIs per SR

Maximum number of VDIs per SR has increased to 20000 for file-based SRs (NFS, SMB, EXT) and 1000 for LVM-based SRs

Enhanced Active Directory Support

Delivering improvements for customers with very large numbers of objects within their Active Directory, including improved login times.

Increased Size of Dom0 Disk Partitions

By moving log files to a larger, separate partition, we enable more detailed logs to be held over a longer period of time, improving the ability to diagnose issues. Simultaneously, this alleviates demands on Dom0's root disk, and avoids potential space issues due to log file disk space consumption.

Networking and Storage IO

Significantly higher throughput for both Networking and Storage I/O

Simplified Heterogeneous Pool Support

Enables new hosts to be added to existing resource pools, irrespective of the underlying CPU type (as long as the CPU is from the same vendor family).

VMs can now freely migrate to a host within and across pools, provided that the destination host is compatible with the host the VM was booted on. These enhanced agilities are delivered without recourse to any command line expressions and do not require any hosts to be rebooted.

Support for Offline Storage Migration

Enables storage migrations to be undertaken with the VM in a stopped or suspended state, in addition to migrating the storage of a running VM.

Software-boot-from-iSCSI for Cisco UCS

- Enables XenServer to boot from SAN over iSCSI when using Cisco UCS, complementing the existing FC boot capabilities already supported in XenServer

- XenServer can be installed to, booted from and run from a LUN provided by an iSCSI target, which is specified in the iSCSI Boot Firmware Table (iBFT)

- This helps in reducing infrastructure costs by removing the need for expensive Fibre Channel HBAs

For additional information, see the *XenServer 7.0 Installation Guide*.

Support for Open-FCoE

Supports software FCoE, which can be configured easily using the XenServer installer. Software-based FCoE delivers the same benefits as hardware-based FCoE. It alleviates the need for using expensive HBAs by using less-expensive network adapters, in an entirely software-defined manner. For more information, see the *XenServer 7.0 Administrator's Guide*.

This release also supports boot-from-SAN from Open-FCoE and includes an updated installer to assist with the configuration of Open-FCoE. For additional information, see the *XenServer 7.0 Installation Guide*.

Support for NFSv4

Adds support for the current version of the NFS standard, in addition to the existing NFSv3 support.

XenCenter Improvements

- Customers are now able to initiate SSH console sessions direct from XenCenter
- The 'Install Update' wizard in XenCenter enables customers to download and extract updates (hotfixes) from the Citrix Support website and allows them to apply the update to multiple servers and pools simultaneously.

Platform Improvements

This release also incorporates the following platform improvements:

- Support for the latest Intel processors - Intel Broadwell-H, Broadwell-EX and Skylake-S
- Includes Xen hypervisor v4.6
- Dom0 now uses CentOS v7.2
- Support for booting hosts using UEFI

Support for New Guests

Introduction of the following new guests:

- Windows Server 2016 Technical Preview[3]
- SLED 11.3
- SLED 12, SLED 12 SP1
- RHEL, CentOS, Oracle Linux 7.2
- Debian Jessie 8
- Ubuntu 16.04

XSAVE CPU Instructions

Support for XSAVE AVX and AVX2 instruction set groups.

Advanced Vector Extensions (AVX and AVX2) provide 256-bit register support for the parallel execution of floating point and integer instructions respectively, the use of which can significantly

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[3] Windows Server 2016 Technical Preview has been tested with Microsoft's *Windows Server 2016 Technical Preview 5* build. Technical Preview guest operating systems receive limited testing, and must not be enabled on production systems.

improve the performance of certain arithmetic operations, especially those used in multimedia applications.

CPU Microcode Updates

CPU vendors issue updated microcode to fix issues in their silicon. XenServer now supports the application of CPU microcode updates at boot time, and the distribution of newer microcode through hotfixes.

XenServer Appliance Updates

XenServer 7.0 includes updates to the following XenServer appliances, which can be easily imported to your XenServer pool:

Workload Balancing Enterprise feature

- Introduces host disk Read/Write I/O recommendations for workload optimization to complement the existing CPU, memory and network load balancing capabilities.
- Workload Balancing VPX is now based on 64-bit CentOS 7.2.

XenServer Conversion Manager Enterprise feature

- Enables a seamless conversion of VMware virtual machines from vSphere 5.0, 5.5, 5.5 U2 and 6.0 to XenServer 7.0
- Includes support for the latest Windows operating systems:
    - Windows 7
    - Windows 8
    - Windows Server 2012
    - Windows 10

Tech Preview

Windows Server Containers

Support for Windows Server Containers on Windows Server 2016 Technology Preview VMs

Windows Server 2016 Tech Preview

XenServer 7.0 provides a template that enables the creation of Windows Server 2016 Tech Preview VMs for non-production use.

Interoperability with Citrix Products

XenServer 7.0 has been extensively tested and is interoperable with Citrix XenDesktop 7.6, 7.7, 7.8 and 7.9.

Localization Support

The localized version of XenCenter (Simplified Chinese and Japanese) is also available in this release.

Installation & Upgrades

Before beginning installation, customers should review the installation procedure and system requirements detailed in the *XenServer 7.0 Installation Guide*.

Note: Upgrading from any of the XenServer Technical Preview releases to XenServer 7.0 is unsupported, and may result in a non-functional host.

Licensing

For information about XenServer 7.0 licensing, see the *XenServer 7.0 Licensing FAQ*.

Advisories and Known Issues

The following section details advisories and minor issues with this release and any workarounds that can be applied.

General

- If a pool's CPU feature set changes while a VM is running (for example, when a new host is added to an existing pool, or when the VM is migrated to a host in another pool), the VM will continue to use the feature set which was applied when it was started. To update the VM to use the pool's new feature set, the VM must be powered off and then started. Rebooting the VM, for example, by clicking 'Reboot' in XenCenter, does not update the VM's feature set.

- Customers should reboot the hosts when switching between Intel GPU pass-through (GVT-d) and Intel Virtual GPU (GVT-g).

- When the Intel GPU aperture size is set to a very small value in the BIOS (for example, 128MB), an error can prevent the XAPI toolstack from starting. If this issue is encountered when first installing XenServer, the workaround is to access the machine through BMC console and change the aperture size to a sufficiently large value. After installation of the hotfix XS70E033, the Intel GPU aperture size can be changed back to a small value.

- Before reinstalling Intel graphics drivers on a VM that already has a driver older than version 15.40.14.4454 installed, the existing driver should be uninstalled in Safe Mode. Failure to uninstall the existing driver in Safe Mode can cause the VM to crash.

- When using NVIDIA vGPU with a high resolution, the VNC console may fail to display the User Account Control (UAC) dialog box on Windows 7 and Windows Server 2008 R2 VMs. You can work around this issue by moving the mouse inside the console.

- If a virtual GPU enabled VM fails to start, some state may not be cleaned up properly and the VM may be reported as taking up space on a physical GPU. To work around this issue, delete and re-create the virtual GPU and then start the VM.

- After migrating Container Managed VMs between pools, the Container Management functionality stops working for the VMs. This is because Container Management is implemented using a pool-specific key. To work around this issue, the VM-specific preparation-step for "Container Management" needs to be repeated on the new pool. This means for CoreOS that the Cloud Config Drive needs to be updated by changing the Config Drive configuration in the VM preferences. For RHEL/CentOS/OL 7 and Ubuntu 14.04, it means that `xscontainer-prepare-vm` needs to be re-run. Note that even if the preparation-step is repeated, the old XenServer pool may keep access to the VMs.

- Renaming a container does not trigger the Container Management view to update. Additionally, on Ubuntu 14.04, the pause or unpause of a container from outside XenCenter does not trigger the view to update. This may mean that XenServer may not show the current (renamed/paused/unpaused) container-status. The underlying cause is that the view only gets refreshed following Docker event notifications. As a workaround, the refresh can be triggered manually by performing an action (i.e. start, stop) on an unrelated container that is running on the same VM.

- XenServer 7.0 does not include the off-host 32-bit xe CLI. Customers should instead use the 64-bit off-host xe CLI.

- The XenServer Measured Boot Supplemental Pack is not supported on hosts using UEFI boot mode.

- The XenServer Conversion Manager Console depends on the browser (for example: IE, Chrome, etc.) for proxy settings. If XenServer, ESXi and vCenter can only be reached through a proxy server, the details of the proxy server should be entered in the browser's proxy settings. If XenServer, ESXi and vCenter can be reached without a proxy server, and the user has set the browser's proxy to access the internet, then the addresses of XenServer, ESXi and vCenter should be added in the proxy exception of the browser's proxy settings

Internationalization

- Non-ASCII characters, such as characters with accents, cannot be used in the host console.

- XenServer root passwords must not contain non-ASCII characters.

Hardware Compatibility

Note: Customers should refer to the XenServer [Hardware Compatibility List (HCL)](#) for the most recent additions and advice for all hardware compatibility questions.

- XenServer cannot power control hosts running on Dell hardware using the Dell Remote Access Controller (DRAC).

- Customers who use Broadcom Limited's lpfc driver with XenServer 7.0 should use Broadcom Limited's certified optics with the card.

  Starting with XenServer 7.0, Emulex LPE31000, LPE32000 HBAs and all variant HBAs of this architecture will:

  - Detect and enable Broadcom Limited, Avago and Emulex-certified SFP and QSFP optics.
  - For firmware rev 11.0.243.0 and higher, unqualified optics will be disabled, the link will be down and an error message will be written to the log file.
  - The lpfc driver 11.0.0.12 will display the following message and the link will not be displayed: `"3176 Port Name [wwpn] Unqualified optics – Replace with Avago optics for Warranty and Technical support"`.

Storage

- XenServer displays incorrect performance metrics for VM and host disk read/write activities. The root cause of this issue has been identified and a fix will be made available as soon as possible in an upcoming hotfix.

- Cancelling the import of a VM does not delete the VM or VDIs created. To work around this issue, restart XAPI, unplug any dom0 VBDs connected to the new VDI and then manually delete the unwanted VM and the VDI.

- When creating a checkpoint (snapshot with memory), if a user cancels the checkpoint creation operation which is in progress, the created checkpoint may not be deleted and the VM may end up in a suspended state. To work around this issue, manually delete the unwanted checkpoint and then resume the VM.

- When a VM has a checkpoint with its memory image (suspend VDI) located on a non-shared SR that cannot be attached to the host on which the VM is running, attempts to migrate the VM to another pool using Storage XenMotion can fail. To work around this issue, migrate the VM to a host on which all of the memory image VDIs can be attached.

- It is not possible to attach storage provided by Microsoft iSCSI Software Target versions 3.2 or 3.3. However, attempts to attach storage provided by iSCSI Target Server included in Windows Server 2012 and Windows Server 2012 R2 will succeed.

- When adding HBA SRs to a pool of XenServer hosts, before running the New SR wizard, customers should ensure that each LUN is mapped to all hosts in the pool.

Networking

- Disabling a static IPv6 address on a Windows VM through XenServer will not take effect until the VM is rebooted.

- When using Fibre Channel over Ethernet (FCoE), attempts to create a VLAN network with the same tag as the VLAN used by FCoE can fail stating an unknown error occurred.

- XenServer does not prevent users from unplugging a NIC used by an FCoE SR.

- Attempts to create a Cross-Server Private Network that spans two subnets, where at least one of the subnets is not the default gateway on a host, can fail. We recommend that you use the same IP subnet on all hosts to create a Cross-Server Private Network.

- When a static IPv6 address is reset, the new IPv6 address will not be displayed on the IPv6 properties for the network interface. However, the network interface will be configured with the new IPv6 address, in addition to the old address.

XenCenter

- On machines configured with an Intel GPU as the primary display device, the VM Properties dialog of a virtual GPU assigned VM incorrectly reports the GPU type as 'None' in XenCenter, even when a virtual GPU is assigned to the VM. If you click 'OK' at this stage, XenCenter accepts the GPU type value to be 'None'. As a result, the virtual GPU will be unassigned and the VM will not have access to the virtual GPU.

   Note: This issue occurs only on the original copy of XenCenter (v7.0.0) included on the *XenServer 7.0 Base Installation ISO*. Installing XenCenter v7.0.1, available to download from the XenServer 7.0 Product Download page, resolves this issue.

- XenCenter displays graphs for GPU Pass-through even when performance data is unavailable.

- Modifying the font size or DPI on the computer on which XenCenter is running can result in the user interface displaying incorrectly. The default font size is 96 DPI; Windows 7 refers to this as 100%.

Guests

- When customers uninstall and then reinstall the Management Agent into a VM, they may not be prompted for a VM reboot. Note that a VM reboot may be required to get the VM to an optimized state.

- After running 'setup.exe' to install XenServer Tools on a newly created Windows 8.1 or Windows 10 VM, the initial VM restart operation may take over an hour to complete.

- After upgrading a XenServer host from a previous version to XenServer 7.0, Windows VMs with XenServer Tools installed may incorrectly report as not having the XenServer Tools installed, or display some of the functionalities as unavailable. To work around this issue, install XenServer Tools issued with XenServer 7.0.

- VM templates for Windows XP and Windows Server 2003 do not exist in XenServer 7.0, as support for these guests has been retired by Microsoft. Customers who wish to create a Windows XP or a Windows Server 2003 VM should use the 'other install media' template.

- After repairing the Management Agent on a VM that has XenServer Tools installed, attempts to reboot or shut down the VM using XenCenter can fail with the error `VM didn't acknowledge the need to shutdown.` To work around this issue, restart the xenlite Windows service.

- Customers who install the XenServer Tools or the Management Agent through RDP may not see the restart prompt as it only appears on the Windows console session. To ensure that you restart the VM (if required) and to get your VM to an optimized state, we recommend that you run `setup.exe` with the `/forcerestart` option applied in RDP, or restart the VM manually after installation. Note that the force restart option will restart the VM only if it is required to get the VM to an optimized state.

- After performing a migration or suspend operation, RHEL, CentOS, Oracle Linux, and Scientific Linux 7.x VMs may freeze during resume. For more information, see Red Hat [Bugzilla 1141249](#).

- The console screen on HVM Linux guests can go blank after a period (typically ten minutes) of inactivity. You can work around this issue by adding `consoleblank=0` to the kernel boot parameters of the guest. Consult your guest OS documentation for information about updating the kernel boot parameters.

- After using XenMotion (Live Migration) to move a Windows VM, the memory usage reported for the VM may be incorrect.

- CPU pinning information does not persist when VMs are migrated.

Security

With this release, XenServer will accept connections using the TLS 1.2 security protocol. If required, you can mandate that XenServer *only* accepts connections using TLS 1.2, and not allow earlier versions.

Customers can mandate the use of TLS 1.2 and disable earlier versions by doing one of the following:

1. In XenCenter, in the Pool Properties dialog, go to **Security**, and select the checkbox **TLS 1.2 only**
2. On the xe command line enter: `xe pool-disable-ssl-legacy`

Note: Before switching the security protocol to accept communication over TLS 1.2 only, you **MUST** ensure that any appliances (including third-party appliances) that communicate with the XenServer pool are compatible with TLS 1.2.

If you are writing a client program that communicates to XenServer using an SDK, or updating an existing client program to communicate with XenServer 7.0, and would like to use TLS 1.2, you may need certain minimum versions of your libraries, or insert extra lines in your program.

C#

C# requires at least .NET v4.5 and Visual Studio 2013. By default, .NET 4.5 will **not** connect using TLS 1.2; to use TLS 1.2 you will need to add the following line at the start of your program:

To restrict connections to hosts using TLS 1.2:
```
ServicePointManager.SecurityProtocol = SecurityProtocolType.Tls12;
```

Or, to connect to hosts using any version of TLS:

```
ServicePointManager.SecurityProtocol = SecurityProtocolType.Tls |
SecurityProtocolType.Tls12;
```

PowerShell

PowerShell requires at least .NET 4.5 and PowerShell 4. To use TLS 1.2 you will need to add the following line at the start of your program:
To restrict connections to hosts using TLS 1.2:

```
[Net.ServicePointManager]::SecurityProtocol='tls12'
```


Or, to connect to hosts using any version of TLS:

```
[Net.ServicePointManager]:: SecurityProtocol='tls,tls11,tls12'
```

Java

In order to use TLS v1.2 by default, you will need to use Java 8.

C and Python

C and Python require OpenSSL v1.0.1 or higher.

About Citrix

Citrix (NASDAQ:CTXS) is leading the transition to software-defining the workplace, uniting virtualization, mobility management, networking and SaaS solutions to enable new ways for businesses and people to work better. Citrix solutions power business mobility through secure, mobile workspaces that provide people with instant access to apps, desktops, data and communications on any device, over any network and cloud. With annual revenue in 2015 of $3.28 billion, Citrix solutions are in use at more than 400,000 organizations and by over 100 million users globally. Learn more at www.citrix.com.

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Enterprise features are available for XenServer Enterprise edition customers, or those who have access to XenServer through their XenApp/XenDesktop entitlement. To learn more about XenServer editions, and to find out how to upgrade, visit the Citrix website.