

Oracle VM VirtualBox

Release Notes for Release 7.0



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Contents

Preface

Audience	v
Related Documents	v
Conventions	v
Documentation Accessibility	v
Access to Oracle Support for Accessibility	v
Diversity and Inclusion	vi

1 New Features for Release 7.0

Using Cloud Virtual Machines with Oracle Cloud Infrastructure	1-1
Unattended Guest OS Installation Changes	1-1
VirtualBox Manager Changes	1-1
Full Encryption of Virtual Machines	1-2
Support for Windows 11	1-2
Improved Support for macOS Hosts	1-2
Copying and Pasting of Files	1-3
Networking Mode for Connections to a Cloud Service	1-3
Improved 3D Graphics Support	1-3
Improved Hyper-V Support	1-3
Default Type for Host Audio Driver	1-3
VBoxManage Command Line Changes	1-3

2 Accessibility Features of Oracle VM VirtualBox

Keyboard Shortcuts	2-1
Display Modes and Settings	2-1
Zoom Feature in Help Viewer	2-1

3 Change Log

Version 7.0.16 (2024-04-16)	3-1
Version 7.0.14 (2024-01-16)	3-1

Version 7.0.12(2023-10-17)	3-2
Version 7.0.10 (2023-07-18)	3-3
Version 7.0.8 (2023-04-18)	3-4
Version 7.0.6 (2023-01-17)	3-5
Version 7.0.4 (2022-11-18)	3-6
Version 7.0.2 (2022-10-20)	3-7
Version 7.0.0 (2022-10-10)	3-7
Change Logs for Legacy Versions	3-9

Preface

Provides a summary of new features and changes in this release of Oracle VM VirtualBox.

Audience

This document is intended for both new and existing users of Oracle VM VirtualBox. It is assumed that readers are familiar with Web technologies and have a general understanding of Windows and UNIX platforms.

Related Documents

The documentation for this product is available at:

<https://docs.oracle.com/en/virtualization/virtualbox/index.html>

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Access to Oracle Support for Accessibility

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit <https://www.oracle.com/corporate/accessibility/learning-support.html#support-tab>.

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

1

New Features for Release 7.0

This section describes the new features in release 7.0 of Oracle VM VirtualBox.

For a more detailed list of changes, see [Change Log](#).

Using Cloud Virtual Machines with Oracle Cloud Infrastructure

A cloud virtual machine (cloud VM) is a new type of VM that represents an Oracle Cloud Infrastructure instance.

Cloud VMs are shown in the VirtualBox Manager machine list, enabling you to create, manage, and control Oracle Cloud Infrastructure instances using Oracle VM VirtualBox.

Using cloud VMs, you can perform the following cloud operations in VirtualBox Manager:

- Create a new cloud instance.
- Add an existing cloud instance to VirtualBox Manager.
- Configure a cloud instance. Change settings, such as display name or shape.
- Control a cloud instance. Start, stop, and terminate the instance.
- Create instance console connections.

See [Using Cloud Virtual Machines](#) for more details.

Unattended Guest OS Installation Changes

Unattended guest OS installation can now be done when you create a new VM using the **Create Virtual Machine** wizard. An optional step in the wizard enables you to specify the required parameters for unattended guest OS installation.

You can also use the wizard to install the Oracle VM VirtualBox Guest Additions automatically, after the guest OS installation has completed.

See [Unattended Guest Installation](#).

VirtualBox Manager Changes

The following list shows the main improvements to the VirtualBox Manager user interface in this release:

- The user interface has a new look and uses embedded dialogs for VirtualBox Manager tools. Progress and warning messages are shown in a sliding panel called the **Notification Center**.
- Accessibility for the user interface has been improved.
- Wizard screens have been redesigned and improved.

The **Create Virtual Machine** wizard includes the following changes:

- An ISO installation medium can be selected for the new VM. Previously this step was done using the **First Start Wizard**, which has now been retired.
- Unattended installation settings can be configured for the new VM. See [Unattended Guest OS Installation Changes](#).
- More guest OS types are now supported, especially for Linux distributions. See [Creating Your First Virtual Machine](#).
- Extension pack installation and removal is now done using the **Extension Pack Manager** tool. Previously, the Preferences window was used.
- NAT networks are no longer configured using the Network tab in the Preferences window. This functionality has been moved to the **Network Manager** tool.
- New monitoring tools, **VM Activity Overview** and **Session Information**, enable monitoring of system resource usage by guest VMs and the host system. See [Monitoring of Virtual Machines](#).
- For VMs that do not start up correctly, a wizard is shown that prompts the user to boot from an install ISO.
- Tools such as the Guest Control File Manager and Log Viewer can now be accessed directly from VirtualBox Manager, on the machine tools menu for the guest VM.
- A context-sensitive help system is available for many wizards and dialogs. Click **Help** to display the corresponding help topic.

Full Encryption of Virtual Machines

Full encryption of virtual machines is now supported, by using the new `VBoxManage encryptvm` command.

Previous releases of Oracle VM VirtualBox only supported encryption of the disk images for a virtual machine. You can now also encrypt other data, such as VirtualBox configuration files, EFI boot data, and saved state information.

See [Encryption of VMs](#) for more details.

Support for Windows 11

Windows 11 is supported in this release, both as a host platform and as a guest operating system.

See [Supported Host Operating Systems](#).

Improved Support for macOS Hosts

For macOS hosts, this release includes support for the following features:

- macOS system extensions
- Apple M1 CPUs. An unsupported Technology Preview version is available for Apple silicon. See [Supported Host Operating Systems](#).

 **Note:**

Developer Preview is a public release for developers, which provides early access to unsupported software release and features.

Copying and Pasting of Files

Copy and paste of entire files between the guest and host systems is now supported, using the shared clipboard. This feature requires installation of the Oracle VM VirtualBox Guest Additions.

Networking Mode for Connections to a Cloud Service

This release introduces a new networking mode, called a *cloud network*. Using a cloud network enables a local VM to integrate with a virtual cloud network (VCN) on a remote Oracle Cloud Infrastructure service. See [Cloud Networks](#).

The Cloud Networks tab in Network Manager lists all cloud networks that are currently available.

Improved 3D Graphics Support

The VMSVGA graphics controller now includes improved 3D graphics rendering. This graphics controller supports standards such as Vulkan, OpenGL, and DirectX.

Improved Hyper-V Support

Performance improvements have been made for running Oracle VM VirtualBox on a Hyper-V Windows host, including support for nested VMs.

Default Type for Host Audio Driver

The **Default** type can now be specified as the **Host Audio Driver** for a VM. See [Audio Settings](#).

The **Default** option is enabled for all new VMs and selects the best audio driver automatically, depending on the host platform. This enables you to move VMs between different platforms without having to change the audio driver.

VBoxManage Command Line Changes

The following `VBoxManage` command changes have been introduced:

- `VBoxManage debugm`: The `guestsample` subcommand creates a report of the guest activity and can be used to diagnose issues with virtual machines.
- `VBoxManage encryptvm`: This new command enables encryption of virtual machine data. See [Full Encryption of Virtual Machines](#).

2

Accessibility Features of Oracle VM VirtualBox

This chapter describes the Oracle VM VirtualBox accessibility features.

Documentation is provided in HTML and PDF formats. The HTML format is accessible, but the PDF format is not accessible.

Keyboard Shortcuts

You can use keyboard shortcuts to perform tasks that are specific to Oracle VM VirtualBox. Configure the keyboard shortcuts by using the **Preferences, Input** dialog.

Display Modes and Settings

The Oracle VM VirtualBox product offers the following display modes and settings for VMs:

- **Global display settings for all VMs:** Use the **Preferences, Display** dialog.
- **Display modes and settings for individual VMs:** Use the **View** menu of the VM.

Zoom Feature in Help Viewer

Help Viewer, the online help system for VirtualBox Manager, has a zoom feature. This enables the size of text in help topics to be adjusted as required.

3

Change Log

This section summarizes the changes between Oracle VM VirtualBox versions. Note that this change log is not exhaustive and not all changes are listed.

Oracle VM VirtualBox version numbers consist of three numbers separated by dots where the first and second number represent the major version and the third number the minor version. Minor version numbers of official releases are always even. An odd minor version number represents an internal development or test build. In addition, each build contains a revision number.

Version 7.0.16 (2024-04-16)

This is a maintenance release. The following items were fixed and/or added:

- VMM: Fixed a guru meditation executing nested-guests using the KVM hypervisor in the guest on Intel hosts (bug #21805)
- VMM: Fixed Linux VM crash on some recent AMD models
- USB: Fixed issue when EHCI controller was mishandling short packets (bug #20726)
- Audio: Introduced general improvements
- VBoxManage and vboximg-mount: Updated usage information and documentation (bugs #21895, #21992 and #21993)
- Guest Control: Fixed starting Windows guest processes in the correct Windows session (7.0 regression)
- Linux Host: Fixed issue when VBox.sh was deleting wrong VBoxSVC IPC socket when VM was started using sudo (bug #20928)
- Linux Host: Fixed kernel modules build failure when using GCC 13.2
- macOS Host: Fixed issue when App Nap was affecting VM performance (bug #18678)
- Linux Host and Guest: Added fixes related to UBSAN warnings discovered on recent Linux distributions (bug #21877)
- Linux Host and Guest: Added possibility to prevent kernel module from automatic loading during system boot by adding mod_name.disabled=1 into kernel command line
- Linux Host and Guest: Added initial support for kernel 6.9 (bug #22033)
- Linux Host and Guest: Fixed mk_pte warning introduced in kernel 6.6 (bug #21898)
- Linux Guest Additions: Added initial support for kernel 6.8
- Windows Guest Additions: Introduced general improvements in graphics area

Version 7.0.14 (2024-01-16)

This is a maintenance release. The following items were fixed and/or added:

- Audio: Added more fixes for switching host audio devices on Windows hosts using the WAS backend
- 3D: Added general improvements
- OCI: Fixed wrong guest RAM unit usage in VirtualSystemDescription, memory is provided in bytes, "Byte" is the base unit
- Main: OVF Import/Export: Added support for importing and exporting VMs containing NVMe storage controllers (bug #19320)
- Main: OVF Import/Export: Added support for exporting a VM which contains a medium inserted into a virtual CD/DVD drive which is attached to a Virtio-SCSI controller
- Devices: Fixed a problem where Windows guests "forget" in-progress touch events when the user holds down a finger without moving it for a period of time
- macOS Host USB: Added support for newer storage devices
- macOS Host: Fixed memory Leak in the VBoxIntNetSwitch process when VM was configured to use 'Internal Networking' (bug #21752)
- Linux Host and Guest: Added initial support for RHEL 9.4 kernel
- Linux Guest Additions: Fixed kernel panic on RHEL 8.9 kernel caused by vboxvideo (bugs #10381 and #21911)
- Solaris Guest Additions: Added support for the Additions to be installed into an alternate root path ('pkgadd -R')
- Solaris Guest Additions: Removed requirement to reboot VM after uninstalling GAs
- RDP: Fix possible crash when connecting with the Apple Silicon variant of the Microsoft Remote Desktop application (bug #21820)
- BIOS: Fixed handle number used for DMI OEM table (bug #19781)

Version 7.0.12(2023-10-17)

This is a maintenance release. The following items were fixed and/or added:

- VMM: Fixed using a debugger inside the guest under certain circumstances (bugs #21413 and #21546)
- VMM: Fixed detection of VT-x being used by other hypervisors (bug #21867)
- VMM: Introduced additional improvements in Split Lock Detection feature of recent Intel CPUs on Linux hosts (bug #20180)
- GUI: Fixed issue when the nested hardware virtualization setting was not displayed in the VM details panel (bug #21707)
- GUI: Introduced NLS update for Croatian, Indonesian, Italian, Japanese, Korean, Dutch and Turkish languages as well as added general look-and-feel improvements
- Devices: Fixed black screen in Windows guests with multiple guest screens when 3D is disabled (7.0.10 regression)
- Devices: Fixed PCI device identifiers for the VirtIO network interface (bug #21516)
- Devices: Fixed VLAN support for the VirtIO network interface (bug #21778)

- Devices: Fixed loading saved states when a TPM is configured (7.0.10 regression, bug #21773)
- Networking: Fixed memory leaks in the VBoxIntNetSwitch process on macOS (bug #21752)
- Networking: Fixed TCP connections with IP addresses ending on .2 when the NAT network attachment is used (bug #21513)
- Audio: Fixed switching host audio devices on Windows hosts using the WAS backend (bugs #20431, #21517, #20630 and #20723)
- VRDP: Added general improvements
- VBoxManage: Added improvements for "list usbfilters" command
- Unattended: Added kick start file support for Oracle Linux 8 and Oracle Linux 9
- Main: Added more Linux OS subtypes
- Host Services: Fixed Guest Properties service crash under rare circumstance
- Linux Host and Guest: Fixed few "field-spanning write" kernel warnings (bugs #21410 and #21862)
- Linux Guest Additions: Added more fixes for RHEL 8.9 and 9.3 kernel
- Linux Guest Additions: Added more fixes for kernel 6.4
- Linux Guest Additions: Added initial support for OpenSUSE 15.5 kernel
- Linux Guest Additions: Added initial support for kernels 6.5 and 6.6
- Linux Guest Additions: Added version reporting for "rcvboxadd status-kernel" and "rcvboxadd status-user" commands
- BIOS: Restored support for ISA SCSI HBAs in the BIOS (bug #21736)

Version 7.0.10 (2023-07-18)

This is a maintenance release. The following items were fixed and/or added:

- OCI: Introduced general improvements
- VMM: Fixed sluggish performance starting with macOS Ventura 13.3 (bug #21563, bug#21596)
- VMM: Fixed a bug while walking page tables while executing nested VMs causing flooding of the release log as a consequence (Intel hosts only, bug #21551)
- GUI: Added general improvements
- TPM: Fixed a crash when a VM has a TPM version 1.2 configured (bug #21622)
- 3D: Initial support for OpenGL 4.1
- 3D: Fixed various graphics issues with Windows 11 guests (bugs #21136, #21515)
- Guest Control/VBoxManage: Fixed parameter "--ignore-orphaned-processes"
- Guest Control/VBoxManage: Fixed behavior of how handling argument 0 for a started guest process works: One can now explicitly specify it with the newly added option "--arg0". This will effectively restore the behavior of former VirtualBox versions
- Audio: Also use the PulseAudio backend when pipewire-pulse is running instead of falling back to ALSA (bug #21575)

- NAT: Adjusted UDP proxy timeout from 18-21 to 21-24 range to respect intended 20 second timeout (bug #21560)
- Linux Host: Added initial support for Indirect Branch Tracking (bug #21435)
- Linux Host: Added initial support for kernel 6.5 (NOTE: Guest Additions do not support kernel 6.5 yet)
- Solaris Host: Introduced general improvements in the installer area
- Linux Host and Guest: Improved condition check when kernel modules need to be signed
- Linux Host and Guest: Added initial support for RHEL 8.8 (bug #21692), 8.9 (bug #21690) and 9.3 (bugs #21598 and #21671) kernels
- MacOS Host and Guest: Introduced general improvements in the installer area
- Windows Host and Guest: Introduced ECDSA support (bug #21621)
- Linux Guest Additions: Fixed issue when kernel modules were rebuilt on each boot when guest system has no X11 installed
- Linux Guest Additions: Added initial support for kernel 6.4
- Linux Guest Additions: Fixed issue when vboxvideo module reloading caused kernel panic in some guests (bug #21740)
- Linux Guest Additions: Introduced general improvements in the installer area
- Windows Guest Additions: Introduced general improvements in graphics drivers area

Version 7.0.8 (2023-04-18)

This is a maintenance release. The following items were fixed and/or added:

- VMM: Fixed EFLAGS.TF handling for CPUID instructions when Hyper-V is used (bug #17961)
- VMM: Fixed MONITOR/MWAIT crash with Solaris guests when Hyper-V is used on Windows 11
- VMM: Introduced general improvements in nested visualization area
- VMM: Fixed triple fault related guru meditations for UEFI guests starting with macOS Ventura 13.3 (bug #21563)
- GUI: Brought back Restore current snapshot checkbox of Close VM dialog (bugs #21189, #21491)
- GUI: Fixes and validation for VM settings USB filters editor, filter port value is now properly saved/restored
- GUI: Fixes for VM name and OS type embedded editors of Details pane
- GUI: Cloud related wizards should now propose enabled profiles before disabled
- Oracle VM VirtualBox Extension Pack: Fixed shipping the cryptographic support module for full VM encryption
- E1000: Fixed possible guru meditation when changing network attachments (bug #21488)
- virtio-net: Follow up fixes for FreeBSD 12.3 and pfSense 2.6.0 (bug #21201)

- 3D: Fixed various graphics issues with Windows 7 guests (bugs #21129, #21196, #21208, #21521)
- Main/UefiVariableStore: Added API to add signatures to the MOK list (Machine Owner Key)
- VBoxManage: Introduced `modifynvram enrollmok` sub-command to enroll Machine Owner Key into NVRAM, so Linux guest kernel can pick it up in order to verify signature of modules signed with this key
- Guest Control/Main: Fixed deleting files via built-in toolbox
- Linux host: Added possibility to bypass kernel modules signature verification once `VBOX_BYPASS_MODULES_SIGNATURE_CHECK="1"` is specified in `/etc/vbox/vbox.cfg`, useful in case if Linux distribution does not provide necessary tools to verify kernel module signature
- Linux Guest Additions and host Installer: Improved detection if system is running `systemd` as the init process
- Linux Guest Additions and host drivers: Introduce initial support for kernel 6.3
- Linux Guest Additions: Added possibility to bypass kernel modules signature verification once `VBOX_BYPASS_MODULES_SIGNATURE_CHECK="1"` is specified in `/etc/virtualbox-guest-additions.conf`, useful in case if Linux distribution does not provide necessary tools to verify kernel module signature
- Linux Guest Additions: Added experimental support for kernel modules and user services reloading in the end of installation process, thus guest system reboot after Guest Additions (7.0.8 and newer) upgrade is no longer required in general case
- Linux Guest Additions: Fixed `vboxvideo` build issue with RHEL 8.7, 9.1 and 9.2 kernels (bugs #21446 and #21450)

Version 7.0.6 (2023-01-17)

This is a maintenance release. The following items were fixed and/or added:

- VMM: Fixed guru running the FreeBSD loader on older Intel CPUs without unrestricted guest support (bug #21332)
- GUI: Fixed virtual machines grouping when VM was created or modified in command line (bugs #11500, #20933)
- GUI: Introduced generic changes in settings dialogs
- VirtioNet: Fixed broken network after loading saved state (bug #21172)
- Storage: Added support for increasing the size of the following VMDK image variants: `monolithicFlat`, `monolithicSparse`, `twoGbMaxExtentSparse`, `twoGbMaxExtentFlat`
- VBoxManage: Added missing `--directory` switch for `guestcontrol mktemp` command
- Mouse Integration: Guest was provided with extended host mouse state (bug #21139)
- DnD: Introduced generic improvements
- Guest Control: Fixed handling creation mode for temporary directories (bug #21394)
- Linux Host and Guest: Added initial support for building UEK7 kernel on Oracle Linux 8
- Linux Host and Guest: Added initial support for RHEL 9.1 kernel
- Windows Host: Fixed support for VM autostart (bug#21349)

- Linux Guest Additions: Added initial support for kernel 6.2 for vboxvideo
- Audio: The "--audio" option in VBoxManage is now marked as deprecated; please use "--audio-driver" and "--audio-enabled" instead. This will allow more flexibility when changing the driver and/or controlling the audio functionality

Version 7.0.4 (2022-11-18)

This is a maintenance release. The following items were fixed and/or added:

- VMM: Added nested paging support for nested virtualization (Intel hosts only)
- VMM: Fixed rare guru meditations with certain guests on macOS 10.15 (Catalina) (bug #21237)
- VMM: Fixed possible VM process crash on Windows hosts when Hyper-V is used with certain guests (bug #21174)
- VMM: Fixed Windows XP guest hang or BSOD on AMD CPUs under certain circumstances (bug #21256)
- GUI: Various bugfixes for the Guest Control file manager
- GUI: Added more informative file operations in the Guest Control file manager
- GUI: Added an option to the global settings (the display page) to resize user interface font
- GUI: Fixed a regression in new vm wizard. Selected virtual disks are no longer deleted when the wizard is cancelled (bug #21244)
- GUI: Added a new menu item to the devices menu to optionally upgrade the guest additions
- VirtioSCSI: Fixed recognition of the virtio SCSI controller by the EFI firmware (bug #21200)
- VirtioSCSI: Fixed hang when shutting down the VM if the virtio SCSI controller is used (bug #21144)
- virtio-net: Workaround a bug in the virtio-net driver included in FreeBSD version up to 12.3 which renders the device non functional (bug #21201)
- Storage: Fixed I/O errors with the VirtioSCSI controller when the host I/O cache is enabled (bug #19717)
- VBoxManage: Fixed regression when 'createmedium disk --variant RawDisk' command resulted in invalid .vmdk file (bug #21125)
- Main: Restored input pointing device behavior in multi-monitor VM configuration (bug #21137)
- Main: Fixed progress indication during automatic Linux Guest Additions installation
- Guest Control: Fixed path handling issues (bug #21095)
- 3D: Fixed VM process crash on macOS with 3D enabled (bug #21232)
- Linux Host and Guest: General improvements in startup scripts
- Linux Guest Additions: Introduced initial support for RHEL 8.7 and 9.2 kernels (bug #21272, #21258)
- Linux Guest Additions: Introduced initial support for SLES 15.4 kernels
- Linux Guest Additions: Fixed kernel modules rebuild behavior on system shutdown

Version 7.0.2 (2022-10-20)

This is a maintenance release. The following items were fixed and/or added:

- Known issue: VMs having more than one vCPU configured will not work properly on macOS Catalina due to an unknown memory corruption issue. Either lower the number of vCPUs to 1 or upgrade to BigSur or later where the issue does not occur
- Main: Fixed issue when VBoxSVC could become unresponsive if Extension Pack was not installed (bug #21167)
- macOS hosts: Added workaround for a bug in the Hypervisor framework on Catalina causing VERR_NEM_MAP_PAGES_FAILED errors when starting a VM. (bug #21128)
- macOS hosts: Re-introduced support for internal networking, this is considered a bit experimental still
- macOS hosts: Fixed VM crash when the guest tries to access a microphone or webcam
- Windows host: Shared Clipboard: Fixed issue when only 4Kb of host clipboard buffer was accessible to guest (bug #21149)
- Linux Guest Additions: Introduced initial support for kernel 6.1
- Linux Guest Additions: Fixed issue when VBoxClient seamless service caused a crash of some X11 applications (bug #21132)
- Windows hosts: GUI: Fixed missing Qt libraries for vista style and sql driver (bug #21155)
- GUI: Fixed a glitch in the log viewer which was causing wrong log file to be saved (bug #21156)

Version 7.0.0 (2022-10-10)

This is a major update. The following major new features were added:

- Virtual machines can be fully encrypted now, including the VM config logs and saved states (CLI only for now)
- OCI: Cloud virtual machines can be added to Virtual Machine Manager and controlled as local VMs
- OCI: Cloud networks can now be configured via Network Manager tool same way as it is done for Host-only and NAT networks
- GUI: Added a new utility similar to "top" or "resource monitor" which lists performance statistics (CPU usage, RAM usage, disk I/O rate, etc.) of running guests
- GUI: Reworked the new vm wizard to integrate the unattended guest OS installation and to have a more streamlined work flow
- GUI: Added a new help viewer widget which enables the user manual to be navigated and searched
- GUI: Adding new notification center unifying most of running progresses and error reporting around the GUI
- GUI: Improved theme support on all platforms. Linux and macOS use native engine while for Windows host it is separately implemented
- GUI: Large icon update

- Audio recording: Now using Vorbis as the default audio format for WebM containers. Opus is no longer being used
- Audio: Added "default" host driver type to make it possible to move VMs (appliances) between different platforms without the need of changing the audio driver explicitly. When the "default" driver is selected, the best audio backend option for a platform will be used. This is the default for newly created VMs
- Guest Control: Implemented initial support for automatic updating of Guest Additions for Linux guests
- Guest Control: Implemented ability to wait for and/or reboot the guest when updating Guest Additions via VBoxManage
- VBoxManage: Added Guest Control "waitrunlevel" sub-command to make it possible to wait for a guest to reach a certain run level
- Windows hosts: Added experimental support of running autostarted VMs in session 0, to allow running VMS even when a usser is not being logged in (disabled by default, please consult the manual)
- macOS host: Dropped all kernel extensions. VirtualBox relies fully on the hypervisor and vmnet frameworks provided by Apple now. At the moment the implementation lacks "Internal Networking" functionality. This will be provided at a later date
- macOS host: Providing a Developer Preview package for systems with an Apple silicon CPU. This is unsupported work in progress, and is known to have very modest performance
- Linux Guest Additions: Reworked guest screen re-size functionality, added basic integration with some of guest Desktop Environments
- Devices: Implemented new 3D support based on DirectX 11 (and DXVK on non Windows hosts)
- Devices: Added virtual IOMMU devices (Intel and AMD variant)
- Devices: Added virtual TPM 1.2 and 2.0 devices
- Devices: The EHCI and XHCI USB controller devices are now part of the open source base package
- EFI: Added support for Secure Boot
- Debugging: Added experimental support for guest debugging through GDB and highly experimental support for guest debugging through KD/WinDbg

In addition, the following items were fixed and/or added:

- OCI: Cloud networking functionality is enhanced for local VMs, now local VMs could be connected to cloud networking
- GUI: Improved behavior of the virtual machine list and various VM related tools in case multiple items are selected
- GUI: On available platforms, added a new option to disable the host's screensaver
- GUI: Reworked global preferences, machine settings and the wizards to improve stability and usability
- GUI: Improving mouse handling in multi-monitor case on X11 platform
- GUI: Medium enumeration engine was reworked to improve performance

- GUI: NAT Network stuff was moved from global preferences to global Network Manager tool
- GUI: Extension Pack Manager was moved from global preferences to global tools
- GUI: Improved overall accessibility
- GUI: Migrating to recent Qt versions

Change Logs for Legacy Versions

To view the change log for a legacy version of VirtualBox see the documentation for the relevant Oracle VM VirtualBox release.

Change logs are also available at:

<https://www.virtualbox.org/wiki/Changelog>.