

01-THREE WAYS TO RUN "UBUNTU LINUX" INSIDE A "WINDOWS 10" COMPUTER

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SUMMARY

There are three ways for you to run "Ubuntu Linux" inside a "Windows.." computer:

- Using the "VMware Player" hypervisor program
- Using the "VirtualBox" hypervisor program
- Using the "Hyper-V" hypervisor program

TOPICS

- Running Linux inside a "Windows.." computer
- Two Types of "Virtual Machine Programs" (= "Hypervisors")
- 3 "Hypervisor" options: "VMware Player", "VirtualBox", and "Hyper-V"
- "Enhanced Session" in "Hyper-V"
- Partial Implementation of "Enhanced Session" for "Ubuntu 18.03"

RUNNING "LINUX" INSIDE A "WINDOWS.." COMPUTER

- Since "Windows.." still has between 80 and 84 percent of "usage share" for all computers in use, you are probably running some version of "Windows.."
- However, with free "virtual machine programs" and free "Linux" operating systems, you can run "Linux" inside any "Windows.." computer ⁵

RUNNING "LINUX" INSIDE A "WINDOWS.." COMPUTER (continued)

- If you run "Linux" inside a "Windows.." computer, you can benefit from the speed and safety advantages that "Linux" has over the "Windows.." operating system: Linux is "lean and mean". Linux malware is almost non-existent.

RUNNING ..LINUX.. INSIDE A "WINDOWS.." COMPUTER (continued)

- Demonstration of Ubuntu Linux running inside a "Hyper-V" inside a "Windows 10 Pro" computer
- Demonstration of Ubuntu Linux running inside "VMware Workstation Viewer"
- Demonstration of Ubuntu Linux running inside "VirtualBox"

"AUDIO" SUPPORT FOR "VIRTUAL MACHINES"

- "Virtual machines" running inside "VMware Workstation Player" and "VirtualBox" have always had audio support:

Your headset or computer speakers and your headset or Webcam microphone would work when you were running the guest operating system inside a virtual machine

"AUDIO SUPPORT" FOR "VIRTUAL MACHINES" (continued)

- "Hyper-V" was only a "Windows Server" module from October 2008 until October 2014,
- During these early years, "Hyper-V" did not have "audio support" for speaker audio or microphone inputs.
- During these early years, "Hyper-V" did not have "USB support" or "drive support" for USB devices, even for your computer's hard drives or drive-like devices.

"ENHANCED SESSION" MODE FOR "WINDOWS.." VIRTUAL MACHINES

- In April 2014, Microsoft introduced "Enhanced Session" mode for Hyper-V virtual machines that run "Windows 8" or "Windows 10" as "guest operating systems: "Enhanced Session" provides "audio redirection" and "drive redirection" for "Windows.." running inside virtual machines.

"ENHANCED SESSION" MODE FOR "WINDOWS.." VIRTUAL MACHINES

(continued)

- According to <https://blogs.windows.com/windowsexperience/2013/12/05/overview-client-hyper-v-enhanced-session-mode-in-windows-8-1/#rYWDq5Ywb4bgURDu.97> :

"ENHANCED SESSION" MODE FOR "WINDOWS.." VIRTUAL MACHINES (continued)

- "Enhanced session" mode for "virtual machines" running "Windows.." as a "guest operating system" inside "Hyper-V" running in a "Windows 10 Pro" host computer consists of the following features for the "virtual machine":

"ENHANCED SESSION" MODE FOR "WINDOWS.." VIRTUAL MACHINES (continued)

Display Configuration

Audio redirection

Printer redirection

Full clipboard support (improved over limited
prior-generation clipboard support)

Smart Card support

USB Device redirection

Drive redirection

Redirection for supported Plug and Play devices

PARTIAL IMPLEMENTATION OF "ENHANCED SESSION" MODE FOR "UBUNTU" VIRTUAL MACHINES

(continued)

- In February 2018, Microsoft introduced partial "Enhanced Session" mode consisting of "disk redirection" for virtual machines running Ubuntu Linux.

At the present time (November 2018), no "audio redirection" is available yet for Ubuntu virtual machines.¹⁴

PARTIAL IMPLEMENTATION OF "ENHANCED SESSION" MODE FOR "UBUNTU" VIRTUAL MACHINES (continued)

Display Configuration **failed--window for Ubuntu cannot be re-sized. (Just have default sized screen or full screen.)**

Audio redirection **failed. A virtual machine inside Hyper-V that runs Ubuntu as a "guest operating system" has no speaker or microphone audio (as of November 2018).**

PARTIAL IMPLEMENTATION OF "ENHANCED SESSION" MODE FOR "UBUNTU" VIRTUAL MACHINES (continued)

Printer redirection **failed--"Printers" checkbox not available during startup of Ubuntu virtual machine**

Full clipboard support (improved over limited prior-generation clipboard support) **works--cut and paste from Ubuntu window to Windows desktop works fine. So does vice versa.**

PARTIAL IMPLEMENTATION OF "ENHANCED SESSION" MODE FOR "UBUNTU" VIRTUAL MACHINES (continued)

Smart Card support (not tested!)

USB Device redirection (Just like for Windows.. virtual machines in Hyper-V, in Ubuntu virtual machines, it only works for USB hard drives, USB SSDs, and USB thumb drives. It does not work for USB keyboards, USB mice, USB audio controllers, or USB video controllers)

PARTIAL IMPLEMENTATION OF "ENHANCED SESSION" MODE FOR "UBUNTU" VIRTUAL MACHINES (continued)

Smart Card support (**not tested!**)

USB Device redirection (**Just like for Windows.. virtual machines in Hyper-V, in Ubuntu virtual machines, it only works for USB hard drives, USB SSDs, and USB thumb drives. It does not work for USB keyboards, USB mice, USB audio controllers, or USB video controllers**)

PARTIAL IMPLEMENTATION OF "ENHANCED SESSION" MODE FOR "UBUNTU" VIRTUAL MACHINES (continued)

Drive redirection (works well if it is selected during the startup of the Ubuntu virtual machine)

Redirection for supported Plug and Play devices (This item is redundant since the only supported Plug and Play devices are hard drives, SSDs, flash drives, and SD cards)

"HARD DRIVE SHARING" FOR THE THREE HYPERVISORS

- In "VMWare Workstation Player" and "VirtualBox", the sharing of real entire hard drives, SSDs, flash drives, and SD cards (that are connected to the host computer) virtual machines is slow and not reliable for hard drives greater than 1 Terabyte:

"HARD DRIVE SHARING" FOR THE THREE HYPERVISORS (continued)

- In "VMWare Workstation Player" and "VirtualBox", virtual machines have to connect to real drives and drive-like devices via virtual USB ports connected to USB enclosures, virtual SATA controllers connected to real SATA drives , or virtual SCSI adapters connected to real SCSI drives.

"HARD DRIVE SHARING" FOR THE THREE HYPERVISORS (continued)

- In "Hyper-V", virtual machines can access with great speed and super reliability the following devices:
real entire hard drives,
real SSDs,
real flash drives,
real SD cards, and
hard-drive-like devices such as USB-attached MP3 players and cell phones

"HARD DRIVE SHARING" FOR THE THREE HYPERVISORS (continued)

- In "Hyper-V", there are no size limitations to the real drives and real drive-like devices that a virtual machine can access.

We have successfully attached virtual machines to real hard drives that are up to 10 Terabytes in size in Hyper-V.

"HARD DRIVE SHARING" FOR THE THREE HYPERVISORS (continued)

- In "Hyper-V", virtual machines can access real hard drives and real drive-like devices with greater speed because:
 - ❑ proprietary "VMBus" for speeding up communications between the host operating system and virtual machines
 - ❑ speed advantage of a Type 1 hypervisor over a Type 2 hypervisor

"HARD DRIVE SHARING" FOR THE THREE HYPERVISORS (continued)

- In "Hyper-V", virtual machines can access real hard drives and real drive-like devices with "drive redirection" which is part of "Enhanced Session" mode which is a feature that is part of "Windows 8.1" guest operating systems, "Windows 10" guest operating systems, and some Linux operating systems such as Ubuntu 18.x

"DRIVE REDIRECTION" IS THE BIG FEATURE FOR "HYPER-V"

- When you run Ubuntu, Windows 8.1, or Windows 10 inside a virtual machine inside "Hyper-V" in "Enhanced session" mode, the "drive redirection" feature for accessing your real hard drives and real hard-drive-like devices is a feature that is not available in "VMware Workstation Player" or "VirtualBox".

"DRIVE REDIRECTION" IS THE BIG FEATURE FOR "HYPER-V" (continued)

- When you run Ubuntu inside a "Hyper-V" virtual machine and "Enhanced session" mode is turned on, then "drive redirection" looks like this:



shared-drives



Trash



shared-drives



Trash



Activities

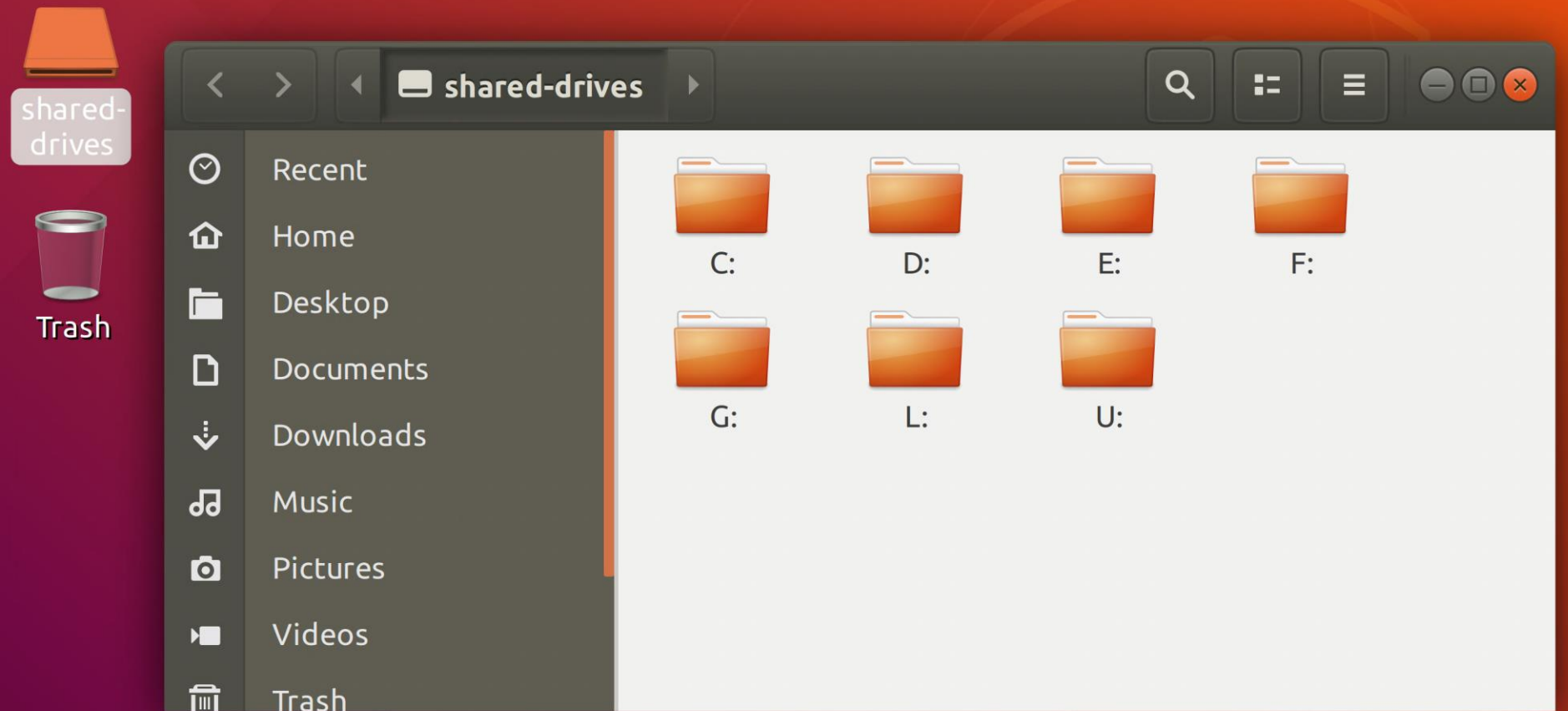


shared
drives



Trash





"DRIVE REDIRECTION" IS THE BIG FEATURE FOR "HYPER-V" (continued)

- When you run "Windows 10.." or "Windows 8.." inside a "Hyper-V" virtual machine and "Enhanced session" mode is turned on, then "drive redirection" looks like this:

This PC

File Computer View

← → ↕ ↑ This PC Search This PC

Quick access

- Desktop
- Downloads
- Documents
- Pictures
- Music
- Videos

OneDrive

This PC

Network

Homegroup

Folders (7)

- 3D Objects
- Desktop
- Documents
- Downloads
- Music
- Pictures
- Videos

Devices and drives (7)

- C on DESKTOP-32LSCSJ
- D on DESKTOP-32LSCSJ
- E on DESKTOP-32LSCSJ
- G on DESKTOP-32LSCSJ
- L on DESKTOP-32LSCSJ
- U on DESKTOP-32LSCSJ
- Local Disk (C:)
92.9 GB free of 126 GB

14 items

Devices and drives (7)



C on DESKTOP-32LSCSJ



D on DESKTOP-32LSCSJ



E on DESKTOP-32LSCSJ



G on DESKTOP-32LSCSJ



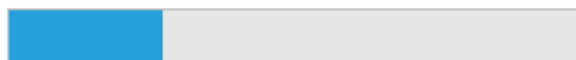
L on DESKTOP-32LSCSJ



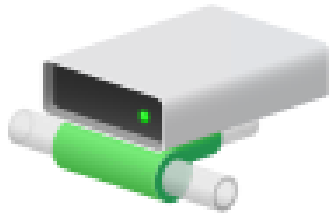
U on DESKTOP-32LSCSJ



Local Disk (C:)



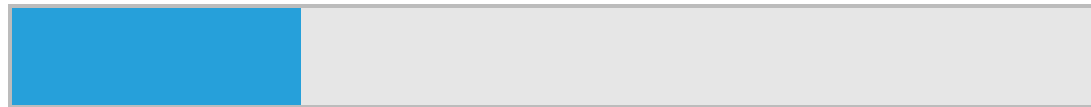
92.9 GB free of 126 GB



L on DESKTOP-32LSCSJ



Local Disk (C:)



92.2 GB free of 126 GB