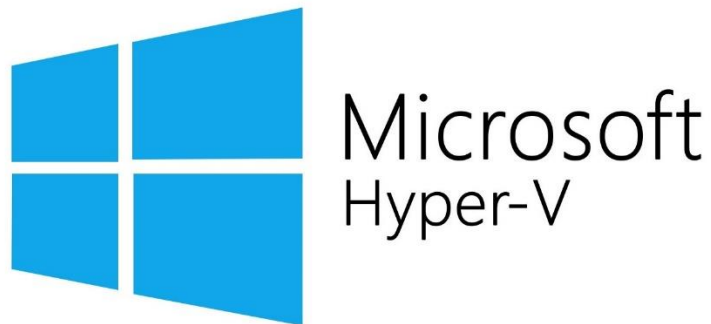


A guide to Hyper-V Virtualization for Microsoft Windows 10 Operating system

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Introduction



Microsoft Hyper-V, codenamed Viridian, and briefly known before its release as Windows Server Virtualization, is a native hypervisor; it can create virtual machines on x86-64 systems running Windows. Starting with Windows 8, Hyper-V superseded Windows Virtual PC as the hardware virtualization component of the client editions of Windows NT. A server computer running Hyper-V can be configured to expose individual virtual machines to one or more networks. Hyper-V was first released with Windows Server 2008 and has been available without additional charge since Windows Server 2012 and Windows 8.

Prerequisites

Microsoft Hyper-V Utilizes not only software components to enable a virtual guest OS (Operating System) but also direct to hardware code to take advantage of specialized virtualization instructions sets in a CPU. To facilitate Hyper-V your CPU will need the following technologies: NX bit, x86-64, Intel VT-x or AMD-V, and Second Level Address Translation.

Also, a Minimum of 4 GB memory. As virtual machines share memory with the Hyper-V host, you will need to provide enough memory to handle the expected virtual workload.

In your systems BIOS you will need to enable Virtualization Technology (may have a different label depending on motherboard manufacturer) as well as Hardware Enforced Data Execution Prevention.

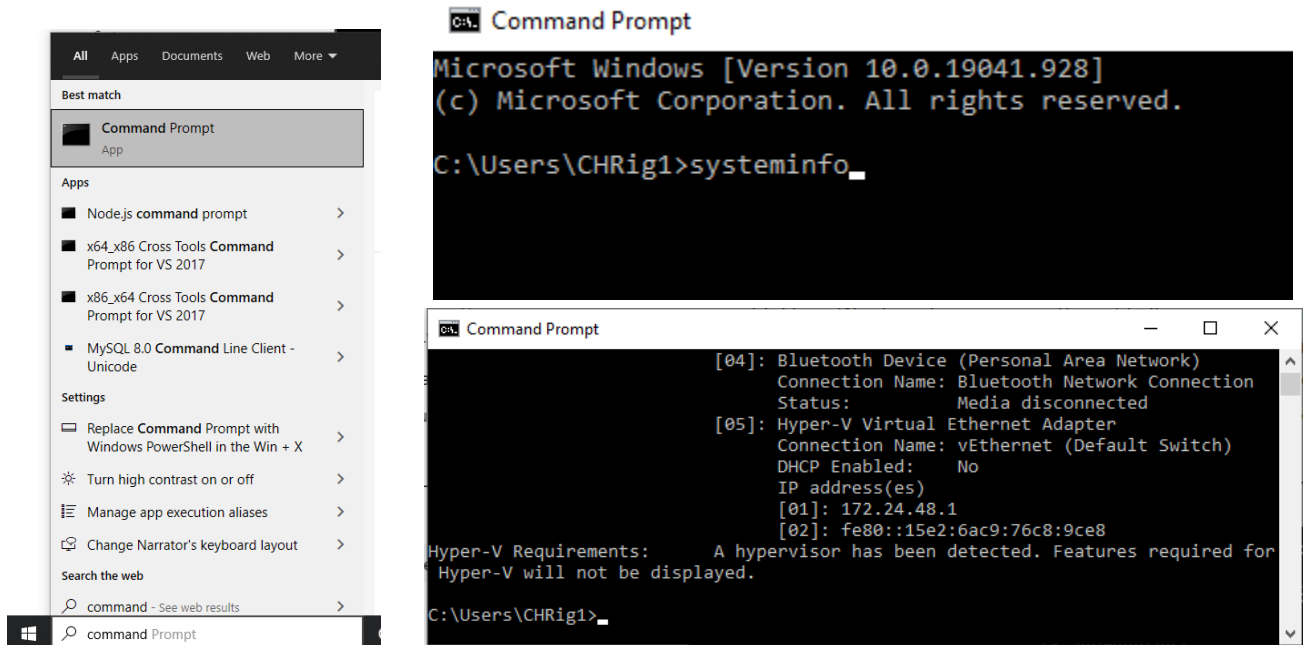
The Hyper-V role can be enabled on these versions of Windows 10:

- Windows 10 Enterprise
- Windows 10 Pro
- Windows 10 Education

The Hyper-V role **cannot** be installed on:

- Windows 10 Home
- Windows 10 Mobile
- Windows 10 Mobile Enterprise

You can view your systems information to make sure you are ready for virtualization by opening a command prompt window and typing in “systeminfo”



Supported Guest Operating Systems

Guest operating system	Maximum number of virtual processors	Notes
Windows 10	32	Enhanced Session Mode does not work on Windows 10 Home edition
Windows 8.1	32	
Windows 8	32	
Windows 7 with Service Pack 1 (SP 1)	4	Ultimate, Enterprise, and Professional editions (32-bit and 64-bit).
Windows 7	4	Ultimate, Enterprise, and Professional editions (32-bit and 64-bit).
Windows Vista with Service Pack 2 (SP2)	2	Business, Enterprise, and Ultimate, including N and KN editions.
-		
Windows Server Semi-Annual Channel	64	
Windows Server 2019	64	
Windows Server 2016	64	
Windows Server 2012 R2	64	
Windows Server 2012	64	
Windows Server 2008 R2 with Service Pack 1 (SP 1)	64	Datacenter, Enterprise, Standard and Web editions.
Windows Server 2008 with Service Pack 2 (SP 2)	4	Datacenter, Enterprise, Standard and Web editions (32-bit and 64-bit).
Windows Home Server 2011	4	
Windows Small Business Server 2011	Essentials edition - 2, Standard edition - 4	
Ubuntu 12.04–20.04	4	
Red Hat Compatible Kernel	4	

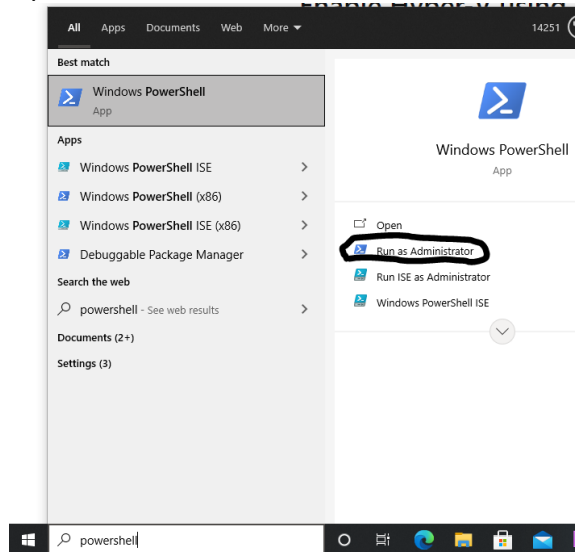
Windows 10 can run as a guest operating system on Windows 8.1 and Windows Server 2012 R2 Hyper-V hosts.

Initial Setup: Installation

There are a few ways that you can install the Hyper-V package on your windows machine. After you have confirmed that your system has met the requirements you can follow these steps to get it installed.

Enable Hyper-V using PowerShell

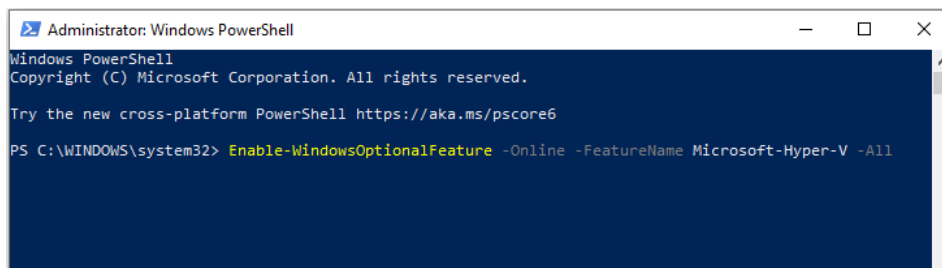
1. Open a PowerShell console as Administrator.



2. Run the following command:

PowerShell

```
Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Hyper-V -All
```



This will use the windows update tool to download the package called Microsoft-Hyper-V and all its dependent services.

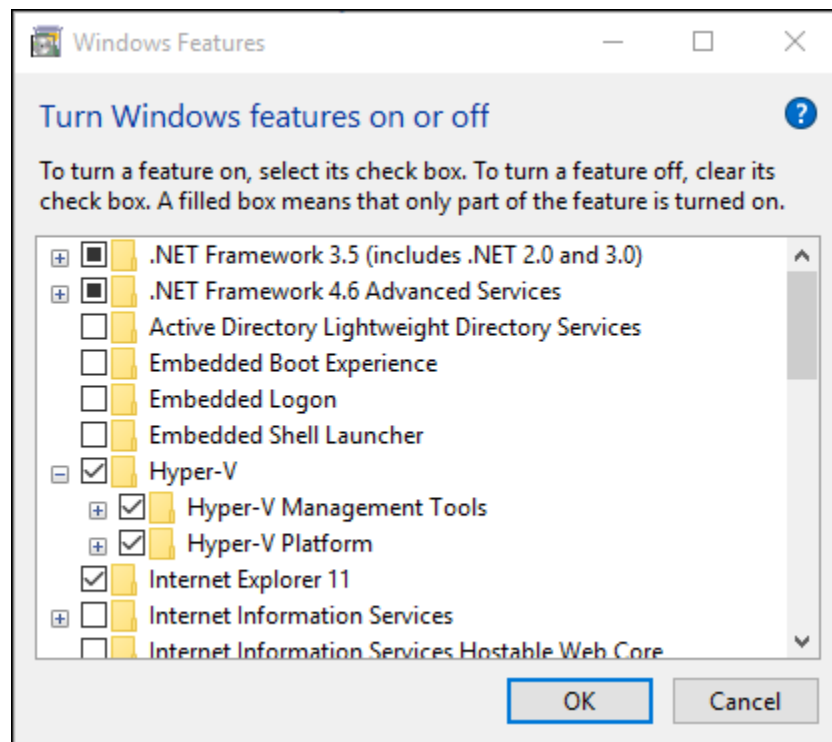
If the command could not be found, make sure you are running PowerShell as Administrator.

When the installation has completed, reboot.

Installation

Enable the Hyper-V role through Settings

1. Right click on the Windows button and select 'Apps and Features'.
2. Select **Programs and Features** on the right under related settings.
3. Select **Turn Windows Features on or off**.
4. Select **Hyper-V** and click **OK**.



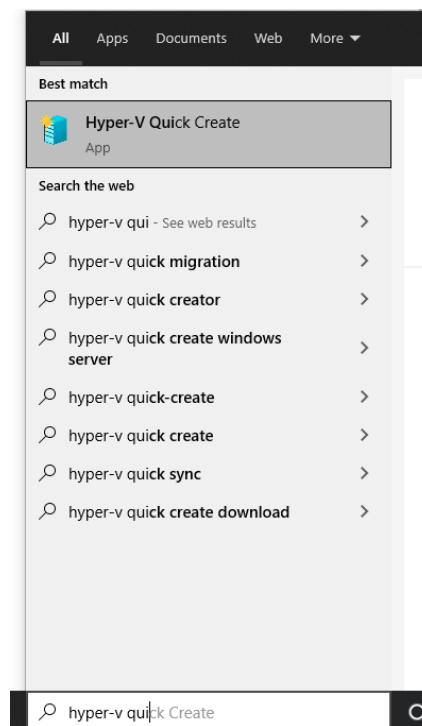
When the installation has completed you are prompted to **restart** your computer.

Creating a Virtual Machine with v1709 Host OS

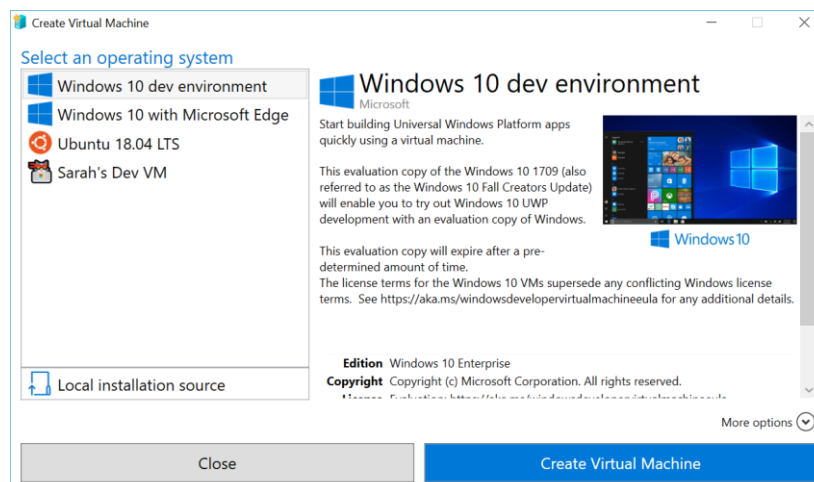
You can view Video instructions [here](#).

To create a new virtual machine in Fall Creators Update:

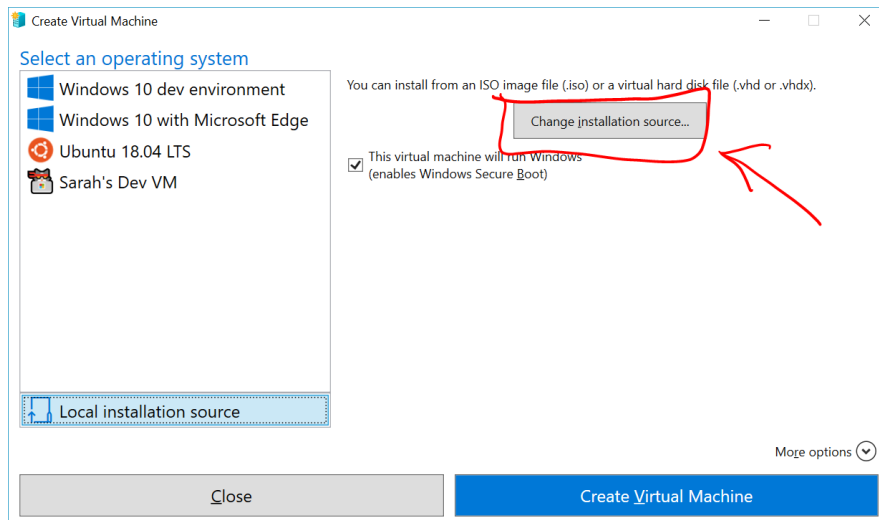
1. Open “Hyper-V Quick Create” from the start menu.



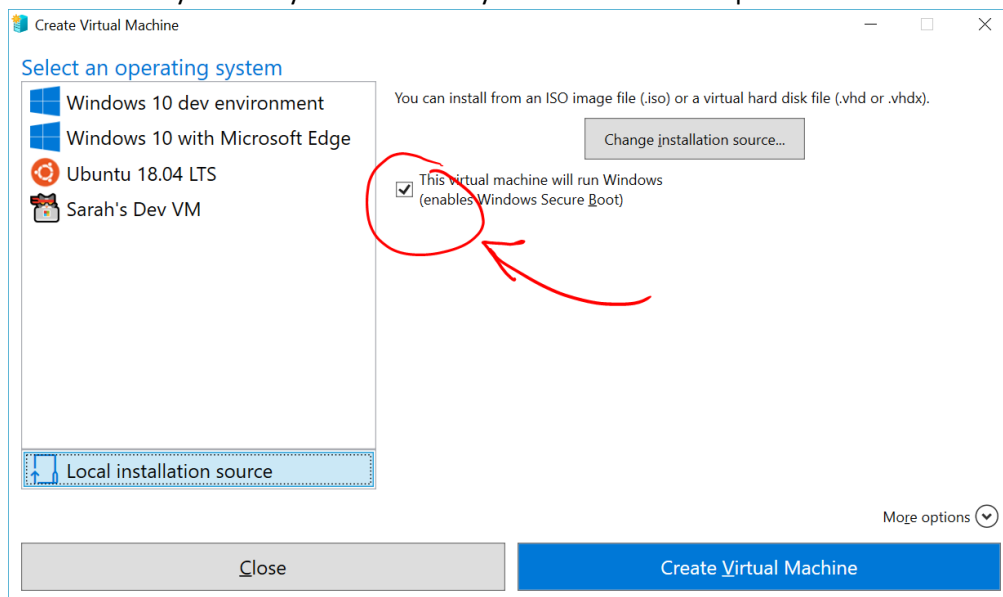
2. Select an operating system or choose your own by using a local installation source.



- a) If you want to use your own image to create the virtual machine, select **Local Installation Source**.
- b) Select **Change Installation Source**.



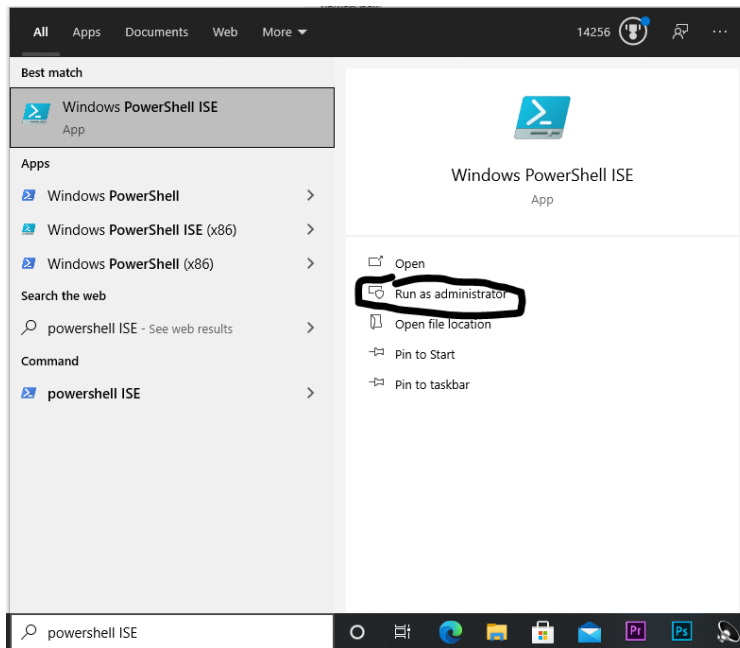
- c) Pick the .iso or .vhdx that you want to turn into a new virtual machine.
- d) If the image is a Linux image, deselect the Secure Boot option. To disable Windows launch security that may interfere with your Linux VM start up.



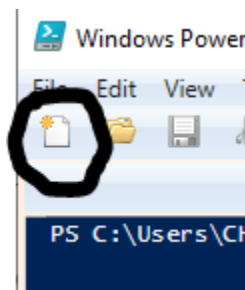
3. Select "**Create Virtual Machine**" Then Hyper-V Quick Create will take that ISO file build a virtual network adapter, assign it to the Virtual machine and launch the Machine for you.

CREATING A VIRTUAL MACHINE WITH V1607 AND EARLIER HOST OS

1. Open the **PowerShell ISE as Administrator.**



2. Select the New Script Button



3. Copy and paste the script below into the edit window.

```
# Set VM Name, Switch Name, and Installation Media Path.
$VMName = 'TESTVM'
$Switch = 'Default Switch'
$InstallMedia = 'C:\Users\Administrator\Desktop\en_windows_10_enterprise_x64_dvd_6851151.iso'

# Create New Virtual Machine
New-VM -Name $VMName -MemoryStartupBytes 2147483648 -Generation 2 -NewVHDPATH "D:\Virtual
Machines\$VMName\$VMName.vhdx" -NewVHDSIZEBytes 53687091200 -Path "D:\Virtual Machines\$VMName"
-SwitchName $Switch

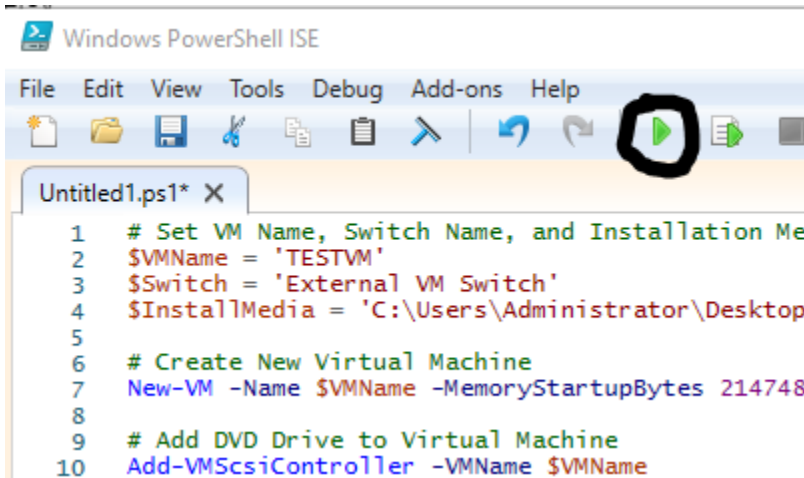
# Add DVD Drive to Virtual Machine
Add-VMScsiController -VMName $VMName
Add-VMdvdDrive -VMName $VMName -ControllerNumber 1 -ControllerLocation 0 -Path $InstallMedia

# Mount Installation Media
$DVDDrive = Get-VMdvdDrive -VMName $VMName

# Configure Virtual Machine to Boot from DVD
Set-VMFirmware -VMName $VMName -FirstBootDevice $DVDDrive
```

4. Modify Lines 4 and 7
 1. Set line 4 to the directory location of your iso file that houses your new guest OS that we are creating.
 2. Set the two directory locations on line 7 to a place on your machine where you would like to store the virtual hard drive for this guest OS.

5. Run the following script by pressing the **green play button** in the ribbon.



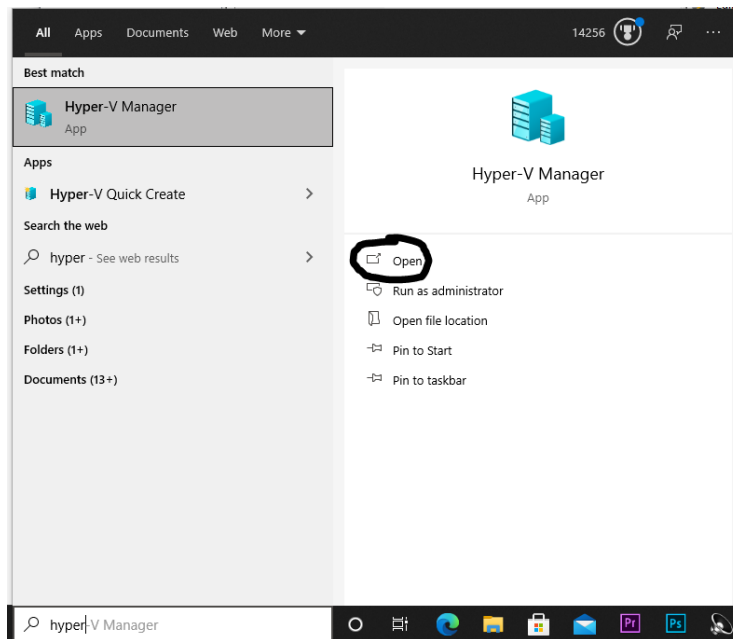
The screenshot shows the Windows PowerShell ISE interface. The ribbon at the top contains various icons, with the green play button (representing 'Run') circled in black. Below the ribbon, a script is displayed in a text area. The script is as follows:

```
1 # Set VM Name, Switch Name, and Installation Me
2 $VMName = 'TESTVM'
3 $Switch = 'External VM Switch'
4 $InstallMedia = 'C:\Users\Administrator\Desktop
5
6 # Create New Virtual Machine
7 New-VM -Name $VMName -MemoryStartupBytes 214748
8
9 # Add DVD Drive to Virtual Machine
10 Add-VMScsiController -VMName $VMName
```

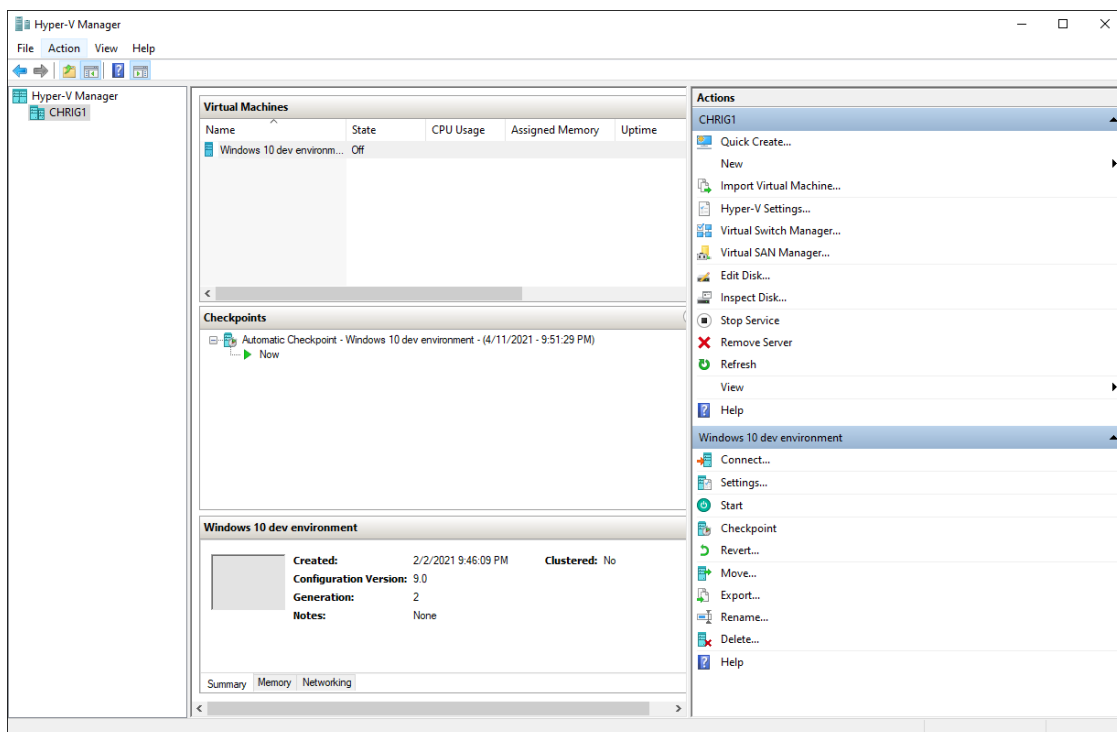
6. Once the Script is Completed and the Green Play button Appears again, you should have a new Virtual Machine created.

Managing the Virtual machine

To access the GUI management tool for Hyper-V Search for **“Hyper-V Manager”** in the start menu.

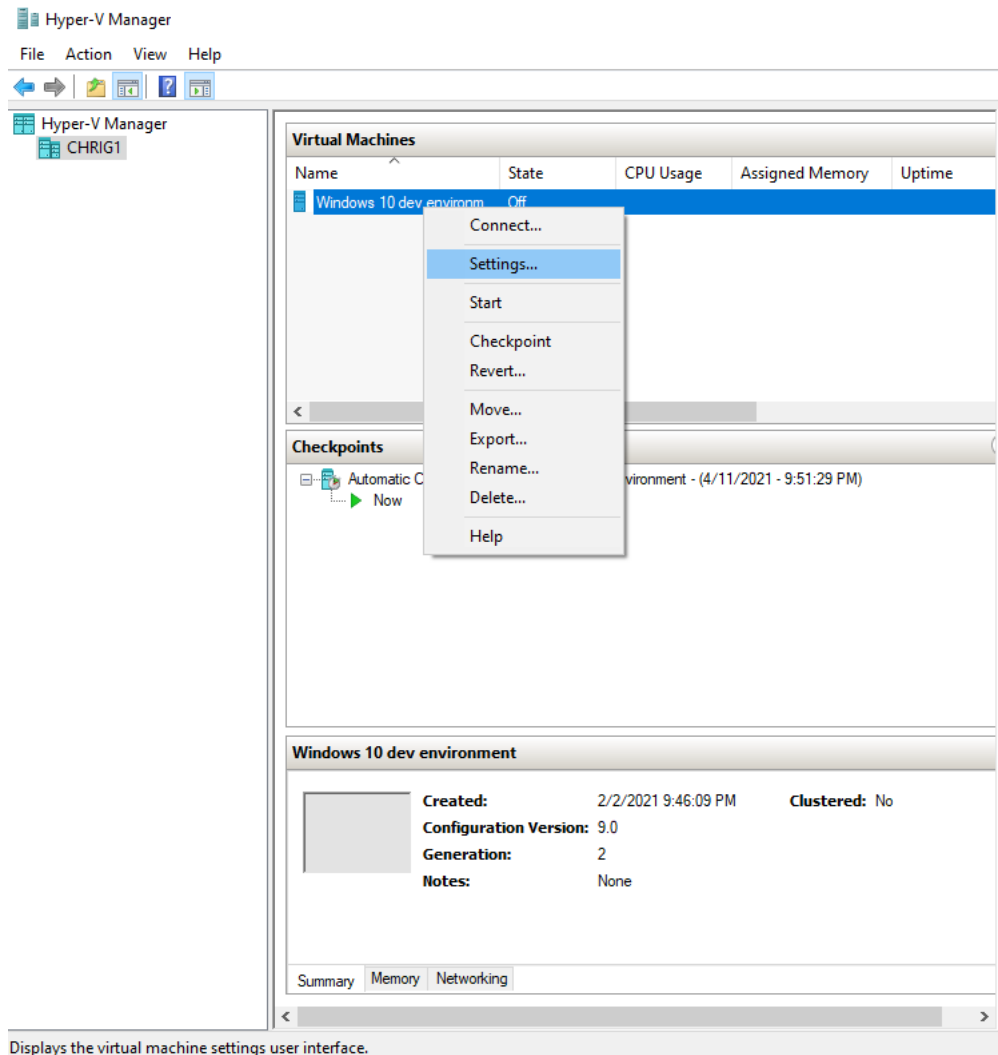


In Hyper-V Manager you can manage the virtual machines that we created above. This Tool can also connect to remote servers and desktops and allow you to administer changes and connect to virtual sessions from a different machine as well.



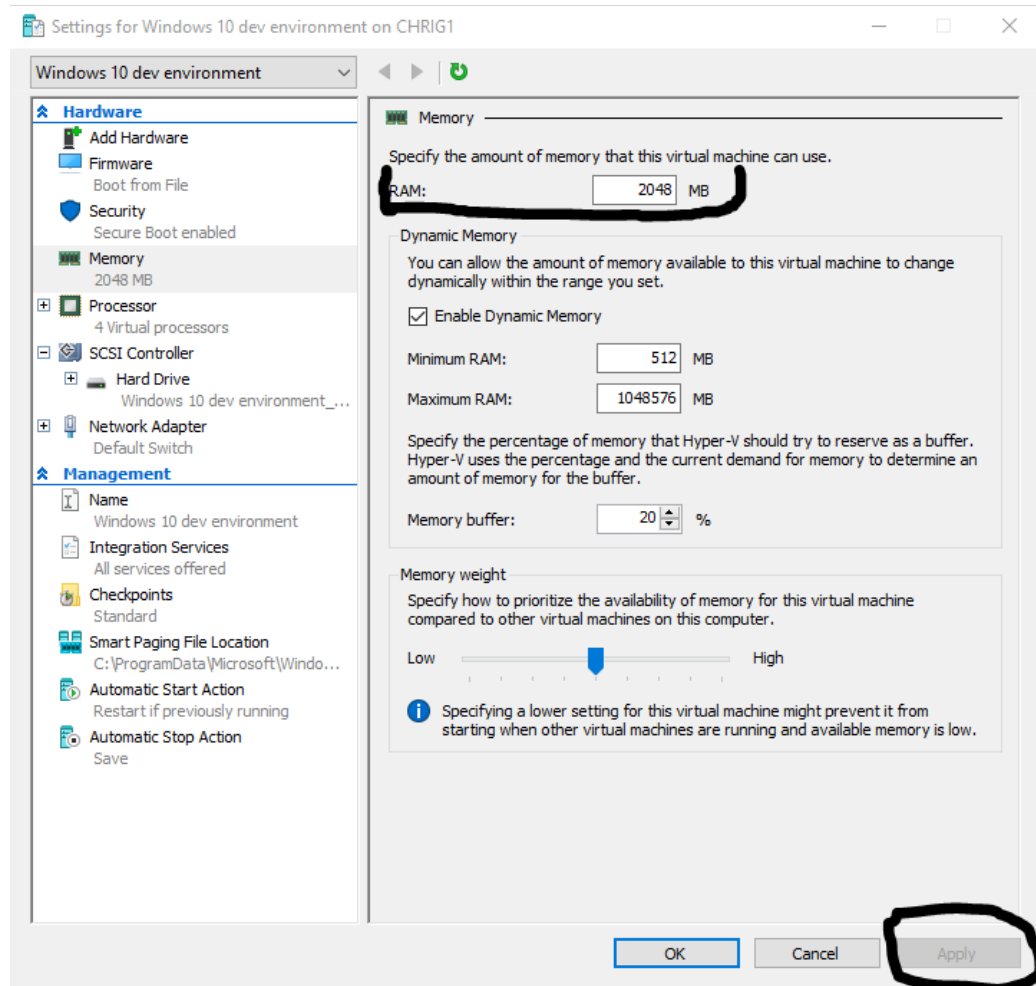
Adjusting Ram Allocation for a guest VM

1. In Hyper-V Manager **right click on the VM** you wish to modify from the list of virtual machines. Then **select Settings...**



Displays the virtual machine settings user interface.

2. In the Settings menu Select the **Memory** section. Enter the amount of RAM you wish to allocate in the first Field.
3. Then select **Apply**.

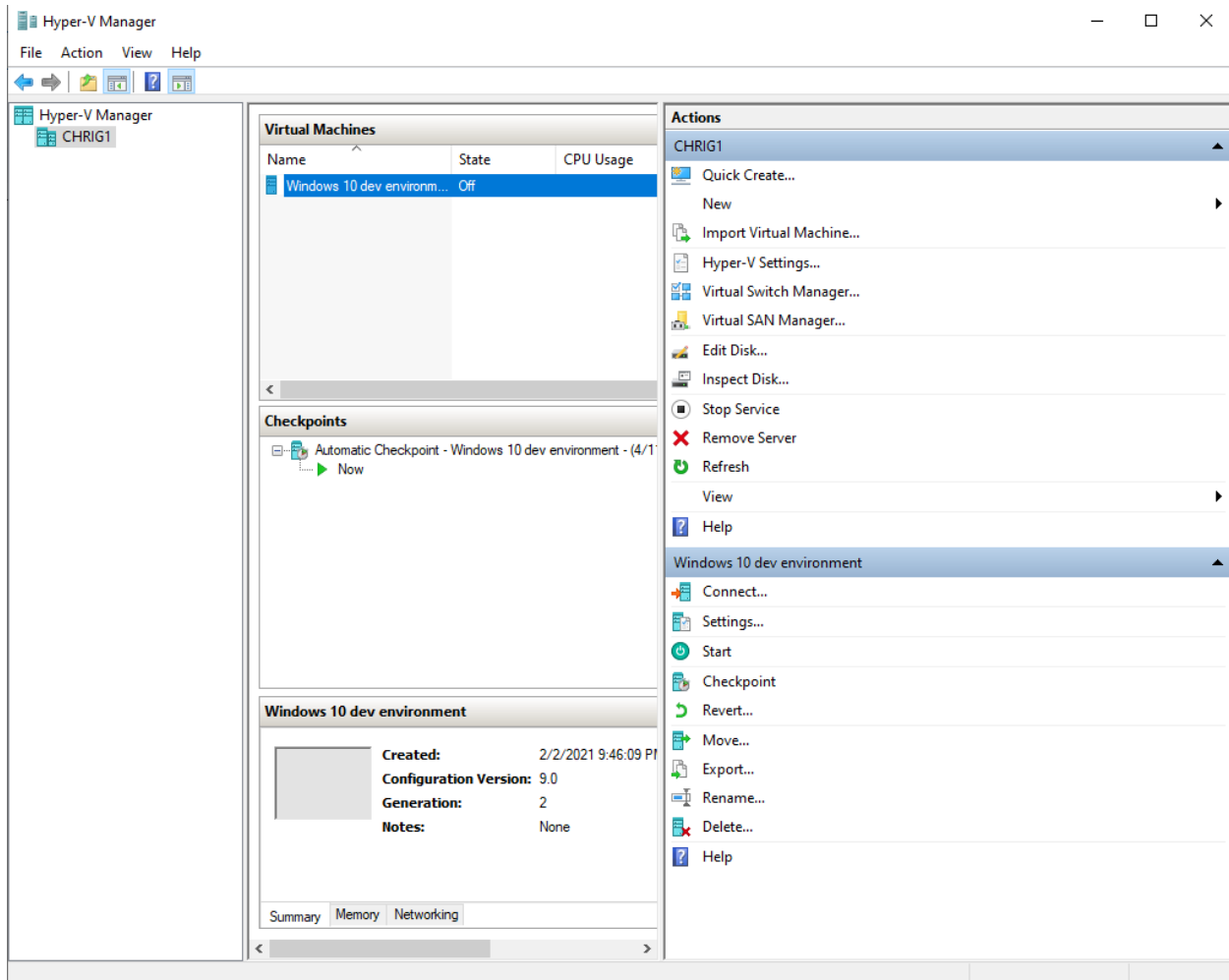


Here you can establish how much RAM you want to allow the VM to have allocated. This RAM is allocated from the RAM that is available inside the physical Host computer. When selecting a new value, you want to make sure that you leave enough RAM for the host OS' processes to function correctly and the same for the guest OS.

Hyper-V also has the ability to allocate memory on the fly with Dynamic memory allocation. This allows the Host OS to retain some of the Guest OS' RAM until the Guest OS is in demand for more. This can be set in the **Dynamic Memory** Subsection.

Creating a Rollback Checkpoint

1. In Hyper-V Manager **left click on the VM** to select the instance you wish to capture from the list of virtual machines.



- Then on the right pane under the instance name (“Windows 10 dev environment” for me) subsection Select **checkpoint**.

The screenshot shows the Hyper-V Manager interface. The main pane displays a table of virtual machines with the following data:

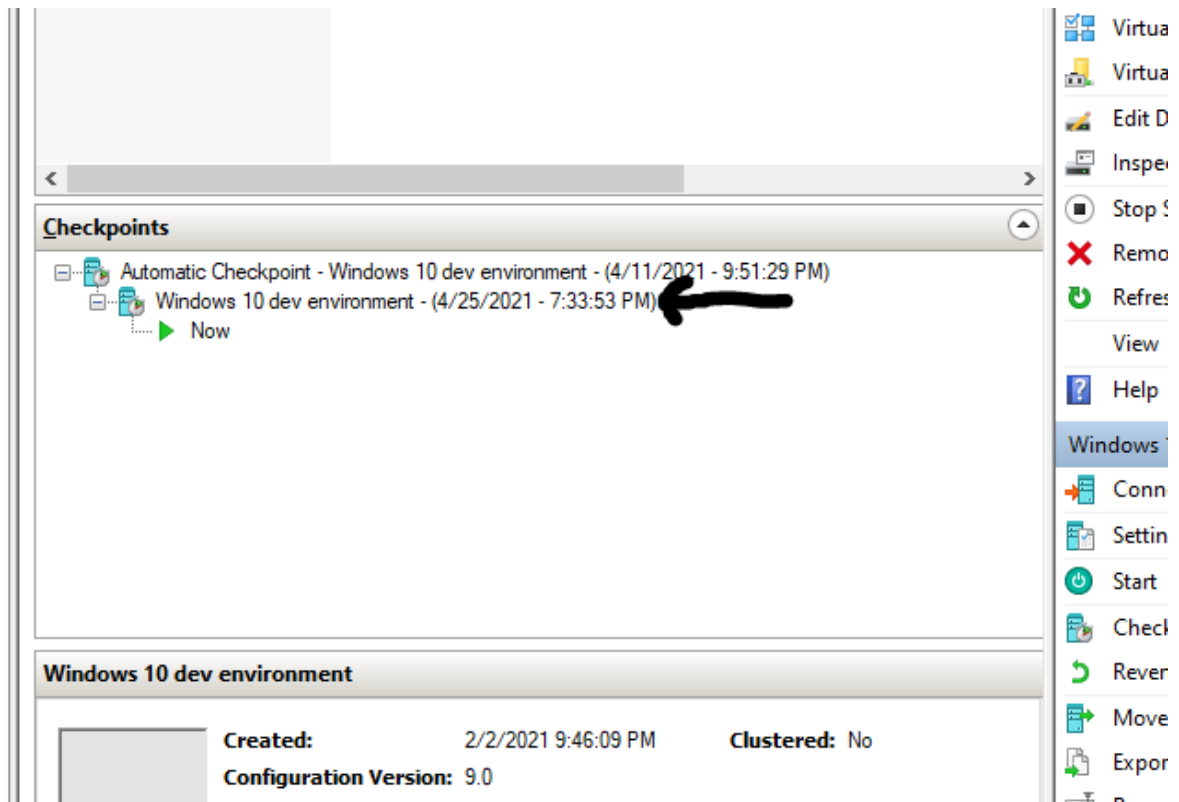
Name	State	CPU Usage	Assigned Memory	Uptime
Windows 10 dev environ...	Off			

Below the table, the 'Checkpoints' section shows an 'Automatic Checkpoint - Windows 10 dev environment - (4/11/2021 - 9:51:29 PM)' with a 'Now' indicator.

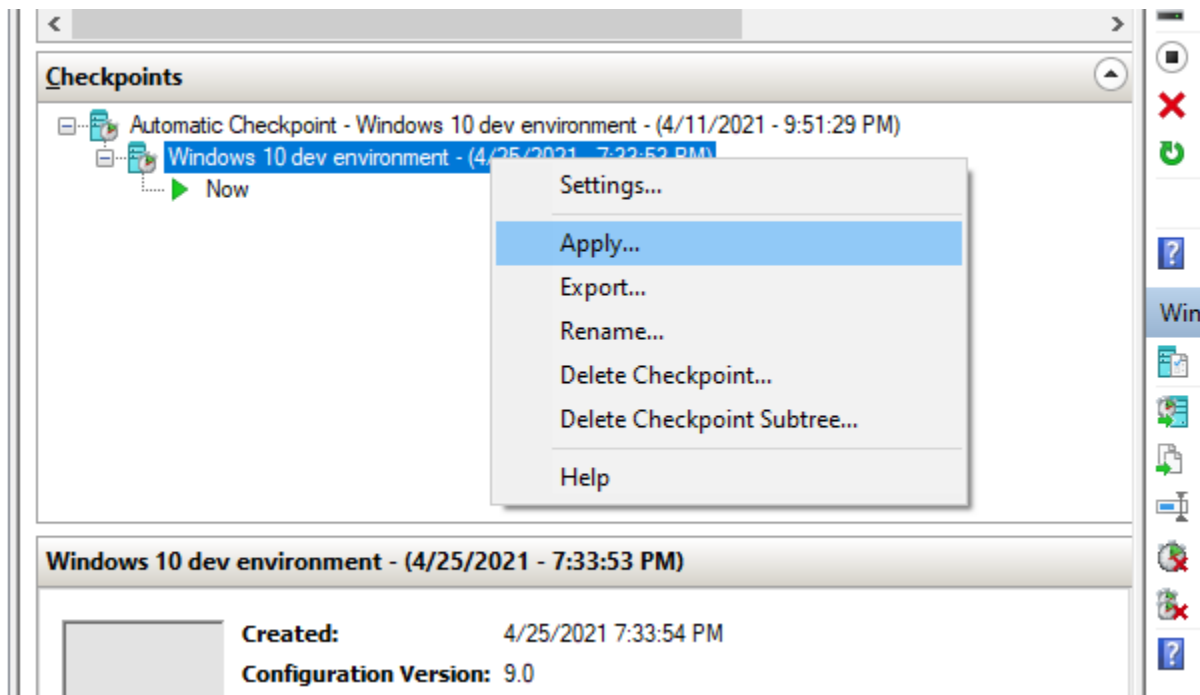
The 'Actions' pane on the right is expanded for the selected virtual machine, 'Windows 10 dev environment'. The 'Checkpoint' option is highlighted with a red circle and arrow.

At the bottom of the window, a status bar indicates: 'CHRIG1: 1 virtual machine selected.'

- Then you can View or act on the checkpoint from the **checkpoints pane** in the middle of the manager.



- You can open the submenu by right clicking on the checkpoint you created.



In this submenu you can

- View the **Settings** that were in effect when this checkpoint was taken.
- You can **Apply** the checkpoint and rollback to the point in time the checkpoint was taken Data and settings.
- You can **Export** the checkpoint configuration for migrating to a new machine as a file.
- You can **Rename** the checkpoint.
- You can **Delete** the Checkpoint or the checkpoint and every checkpoint below it.

Credits

- Microsoft Documents <https://docs.microsoft.com/en-us/virtualization/hyper-v-on-windows/about/>