Denodo
QuickStart Virtual Machine

Installation and Configuration

Denodo Education
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Contents

Introduction

The **Denodo Training QuickStart Virtual Machine** (*DQVM* from now on) is a virtual machine based on CentOS 7 that helps students doing Denodo Training on demand courses. This virtual machine includes all the different data sources required for completing any on demand training course.

By using the virtual machine, students just need to run it and all the different data sources will be available for them in their machines, so they would just need to connect to them using the Denodo Platform.

Installation

The DQVM does not need to be installed. Students just need to launch it with the virtualization applications **Oracle VM Virtualbox 5.2.x, VMware vSphere v5.5 or Hyper-V Manager 10.0.18362.1.**

Hardware Requirements

The DQVM has the following hardware requirements:

Processor	**2 cores** or more.
Physical memory (RAM)	By default, the base RAM memory configured for the Virtual Machine is **4 GB**. The host Operating System should have that amount of RAM x2.
Disk space	By default, the initial size of the virtual machine is **600 MB** but it will need more space because it needs to download the docker images of the data sources (**around 6 GB**). **Note**: the VM can extend the internal storage up to **40 GB** max.

It is recommended to avoid memory overcommitment. That is, the amount of memory assigned to the virtual machine has to be backed by physical memory. Otherwise, the host operating system will have to swap to disk parts of the virtual machine. This will lead to a decrease in the performance of the Virtual Machine.

Note: if you are going to install Denodo Platform on the same machine, you also have to consider the **Denodo Platform requirements**.

Configuration Overview

Each version of the DQVM has the appropriate downloadable file. Please, you have to download the correct one for your virtualization application. Please, note that when the DQVM is running, it will use an internal IP address which could be different on your machine.

Oracle VirtualBox

This DQVM version is configured to use a specific network adapter and that adapter must be pre-configured to set the specific IP address that will be used in all Denodo Training on demand labs.
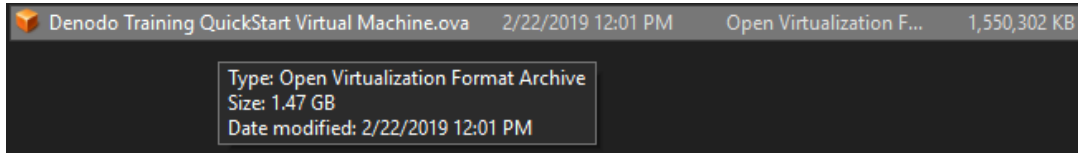
In the following sections, we will explain how to configure the Oracle VirtualBox network adapter and how to launch the DQVM.

Keep in mind that all Denodo Training on demand labs are based on this configuration, as all labs use the IP "**192.168.100.X**" (The IP assigned to this Virtual Machine by VirtualBox will be in the range 192.168.100.**3** - 192.168.100.**254**) or the name of the host "**data-server**" when connecting to a data source.

> **Note**: This document assumes that students already have installed Oracle VM VirtualBox (version 5.2.x or newer). If you need to install it, please visit: **www.virtualbox.org** or **Oracle VM VirtualBox**
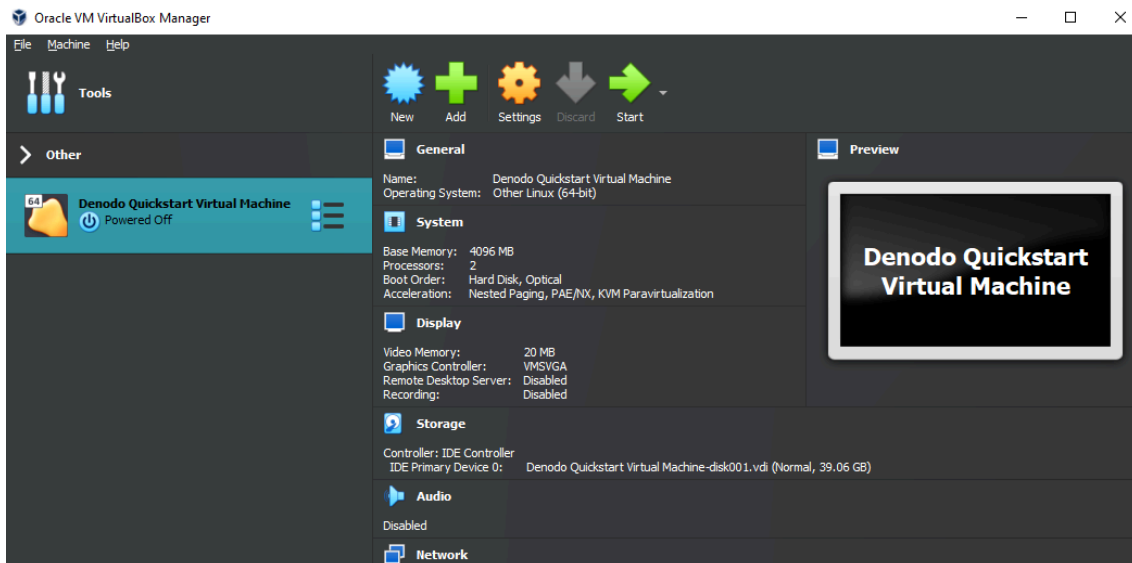
Importing the DQVM in Oracle VM VirtualBox

These are the steps for importing the DQVM:

1. You have two main options for importing the DQVM in Oracle VM VirtualBox:

    a. You can double-click over the "`Denodo Training QuickStart Virtual Machine.ova`" file (if .ova files are opened by default with Oracle VirtualBox in your system).

    b. You can right-click on the "`Denodo Training Virtual QuickStart Machine.ova`" file and select "`Open With > VirtualBox Manager`".

2. You will see a new window showing the details of the DQVM (set name as: **Denodo QuickStart Virtual Machine**):
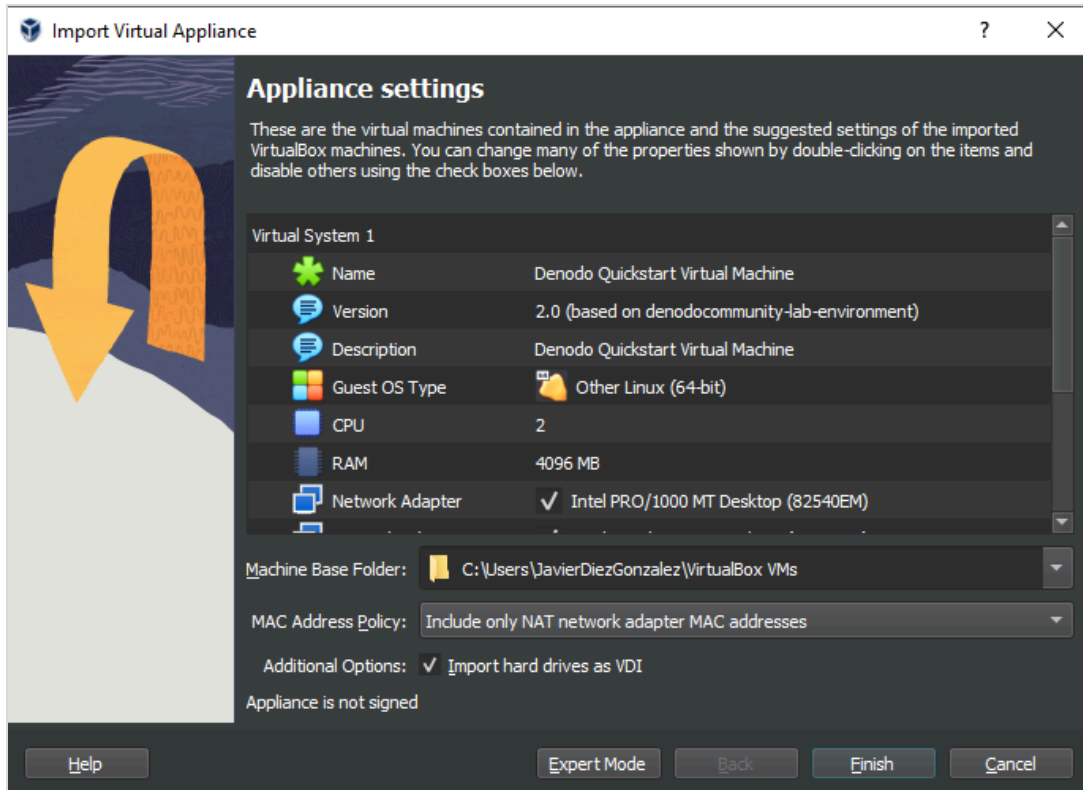
3. Click on "`Finish`" to import the Virtual Machine. When done, you will see it in the left panel with your other virtual machines.

Network Adapter configuration in Oracle VM VirtualBox

> **Note**: These steps are not mandatory for using the Virtual Machine but are recommended.

Find below the steps required for students using Oracle VM VirtualBox to configure the IP address of the DQVM:

4. Configure the network for your VirtualBox administrator tool by accessing the "Tools" option (navigating to "`File > Host Network Manager`" in older versions of VirtualBox).
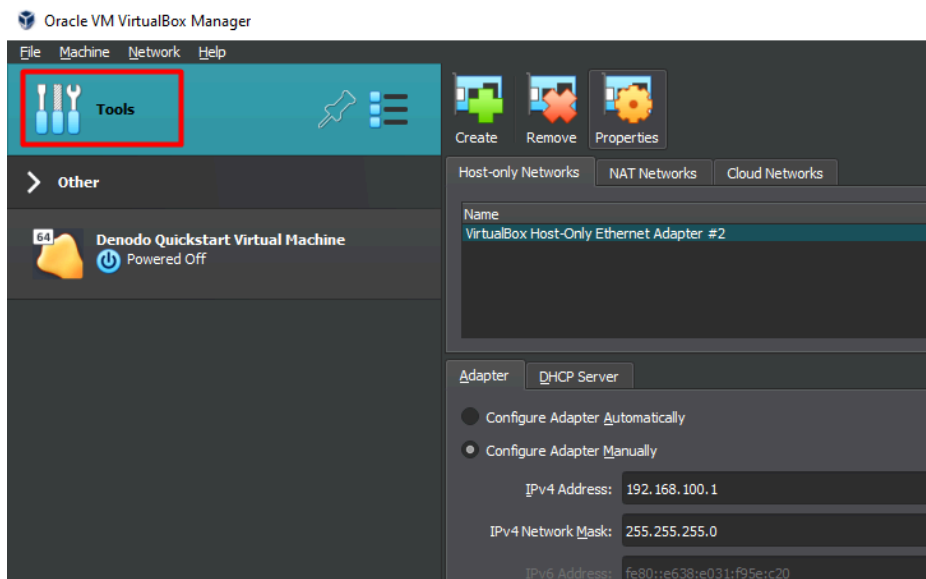

5. Click on the button "*Create*" to create a new VirtualBox **Host-Only** Network.

    a. After you click on this button you will see a new "*VirtualBox Host-Only Ethernet Adapter*" listed in this panel.

6. Configure the new adapter just by clicking over it and selecting the "*Properties*" option:

    a. Select the option "*Configure Adapter Manually*" and add the following information:

        • **IPv4 Address**: `192.168.100.1`

- **IPv4 Network Mask**: `255.255.255.0`
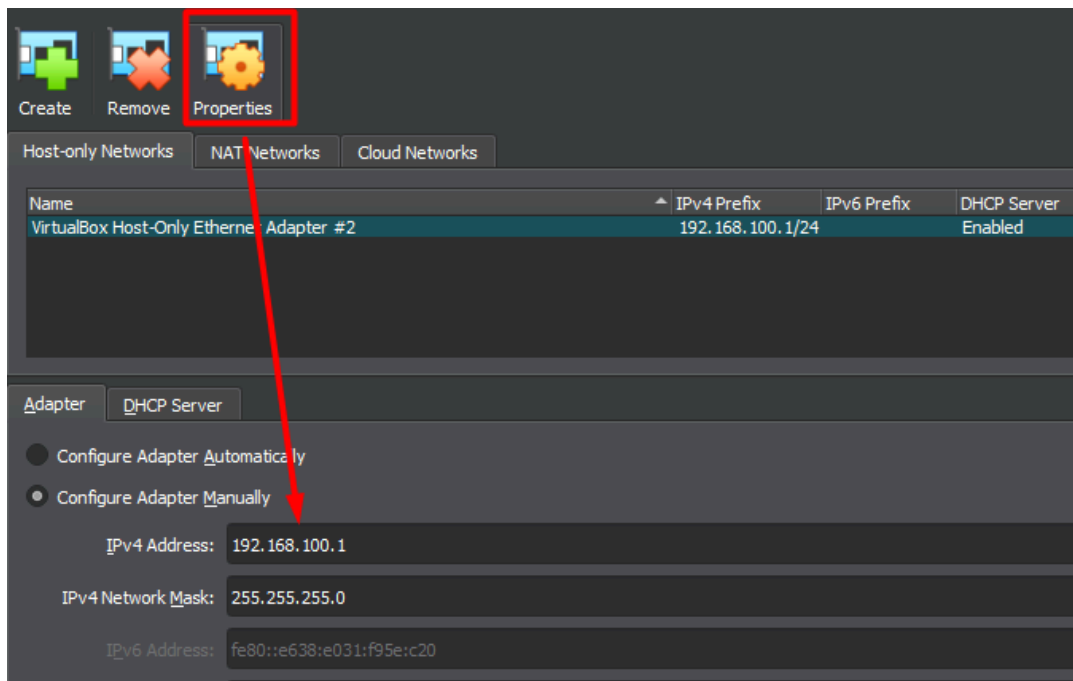
b. Inside the configuration of the adapter, open the "*DHCP Server*" tab and configure the following:

- Select **Enable Server**

- **Server Address**: `192.168.100.2`

- **Server Mask**: `255.255.255.0`

- **Lower Address Bound**: `192.168.100.3`

- **Upper Address Bound**: `192.168.100.254`
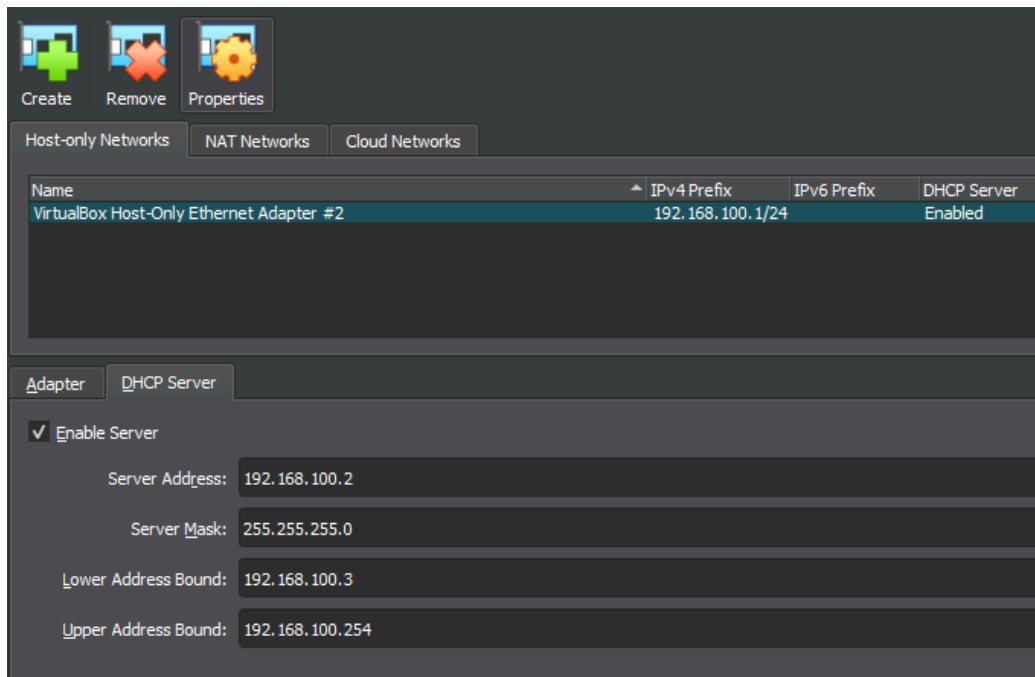
     c. After all the changes have been applied, click on "**Apply**" and then close this panel.

7. Return to the list of virtual machines, select the DQVM, right-click over it, and click on "*Settings*". Then open the "**Network**" tab:

     a. Open the "*Adapter 2*" and be sure that is using the following configuration:

- **Attached to**: `Host-only Adapter`

- **Name**: (Here you should select the name of the ethernet adapter you configured at step 2).
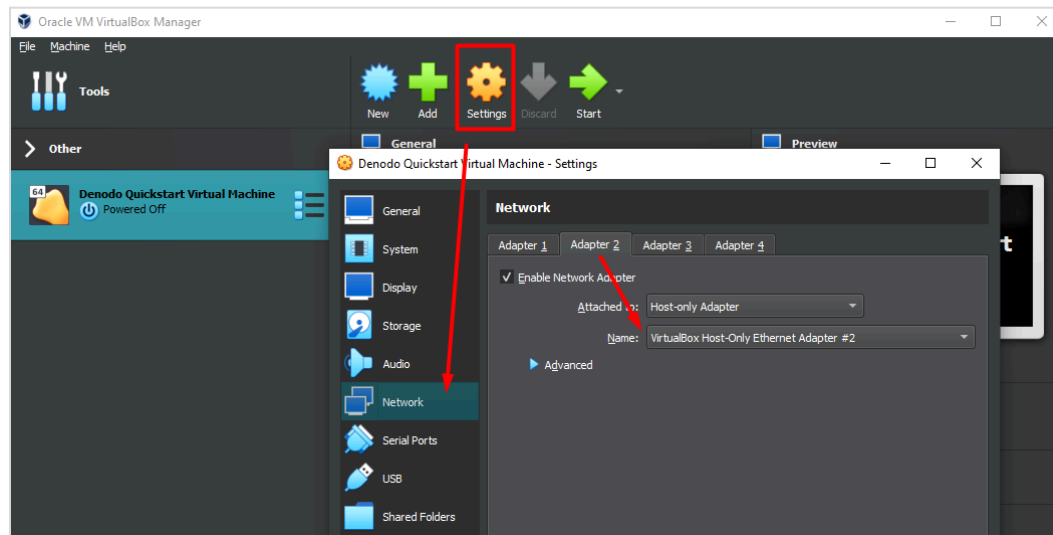
b. Then Click on "**Ok**" to save the changes.

Launching DQVM

Once all the configuration steps are done, you can launch the DQVM just simply selecting the Virtual Machine in the left panel and clicking on "**Start**" (green arrow).
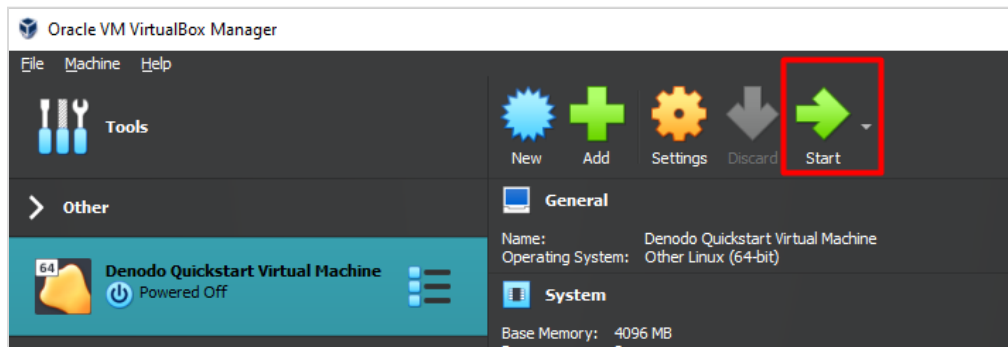
Microsoft Hyper-V

In the following sections, we will explain how to configure the Hyper-V Manager and how to launch the DQVM.

> **Note**: This document assumes that students already have Hyper-V activated on your Windows installation. If you need to install it, please visit:
> **https://docs.microsoft.com/virtualization/hyper-v-on-windows/quick-start/enable-hyper-v**

Importing the DQVM in Hyper-V

These are the steps for importing the DQVM:

1. For importing the DQVM in Hyper-V, you can click on the button "Import Virtual Machine..." located on the menu "Action".
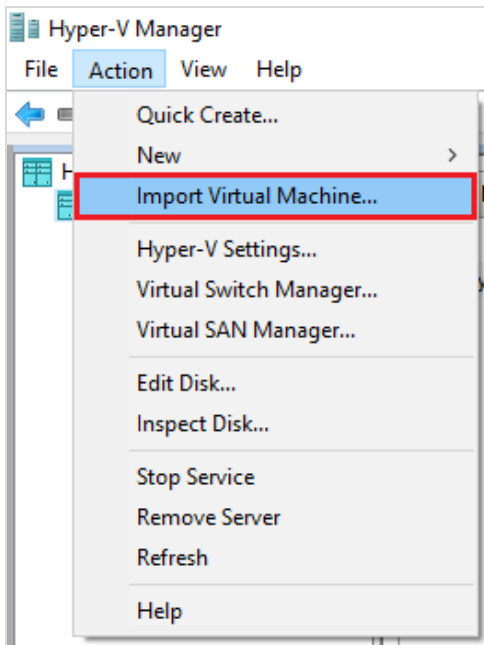
**2.** In the "Before you begin" page, you can check the content and click on "Next >":
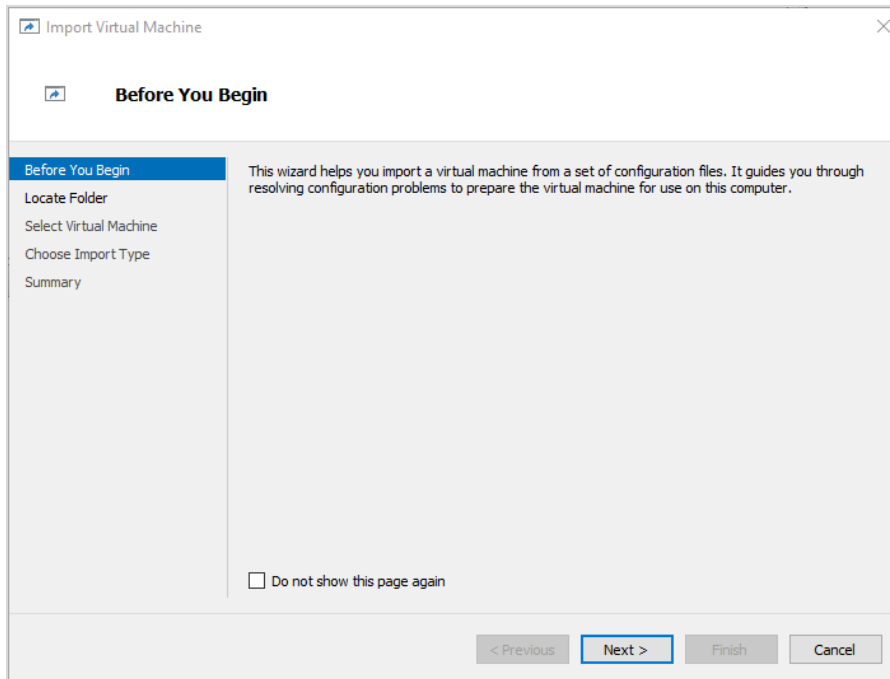
3. On the new page, you have to locate where you have the DQVM files for the Hyper-V. Please, be sure that you have selected the root path where you have unzipped the zip file that contains the DQVM.
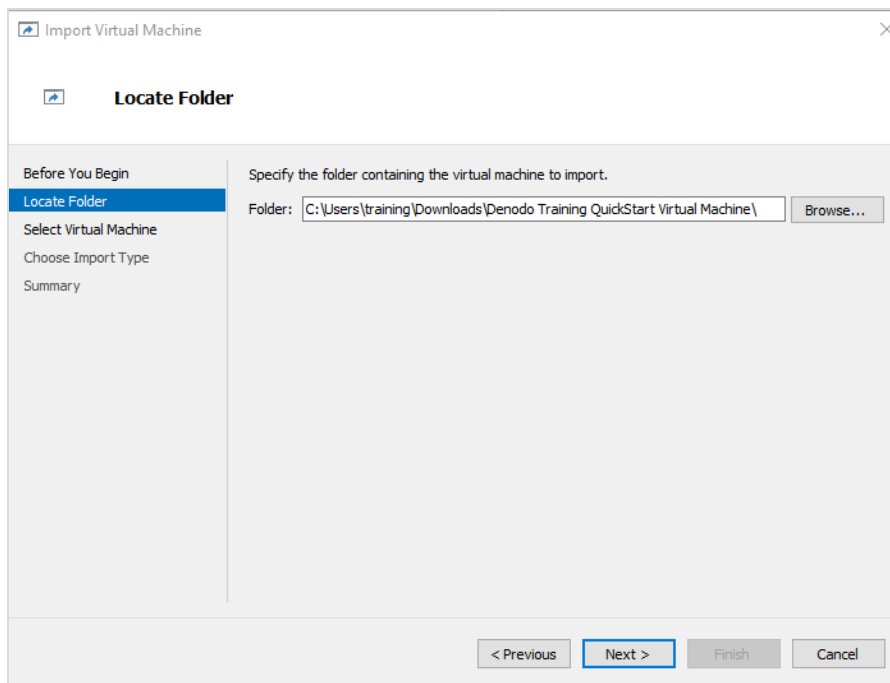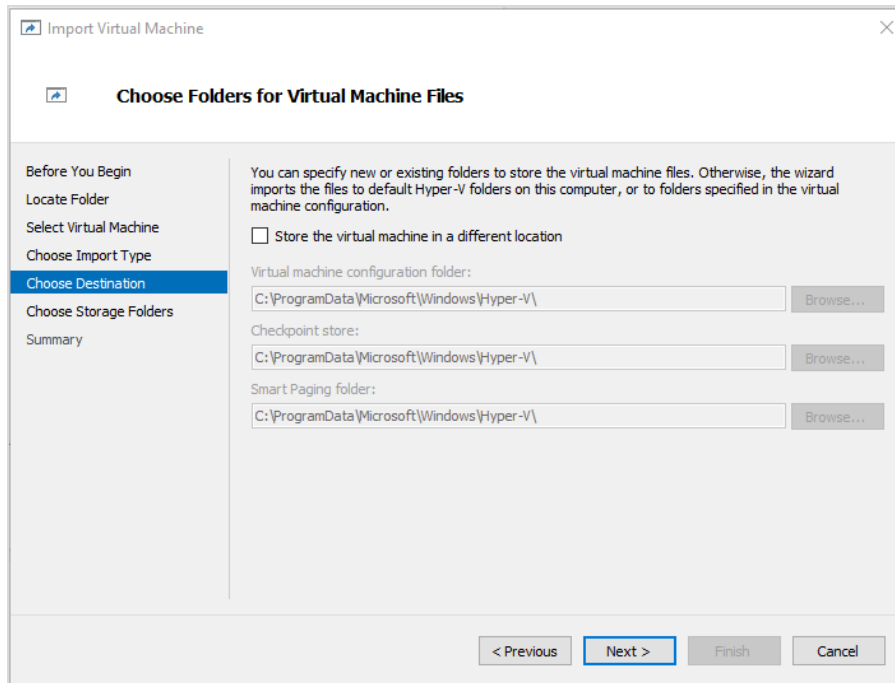
**4.** Select the DQVM to start the process of importing the Virtual Machine
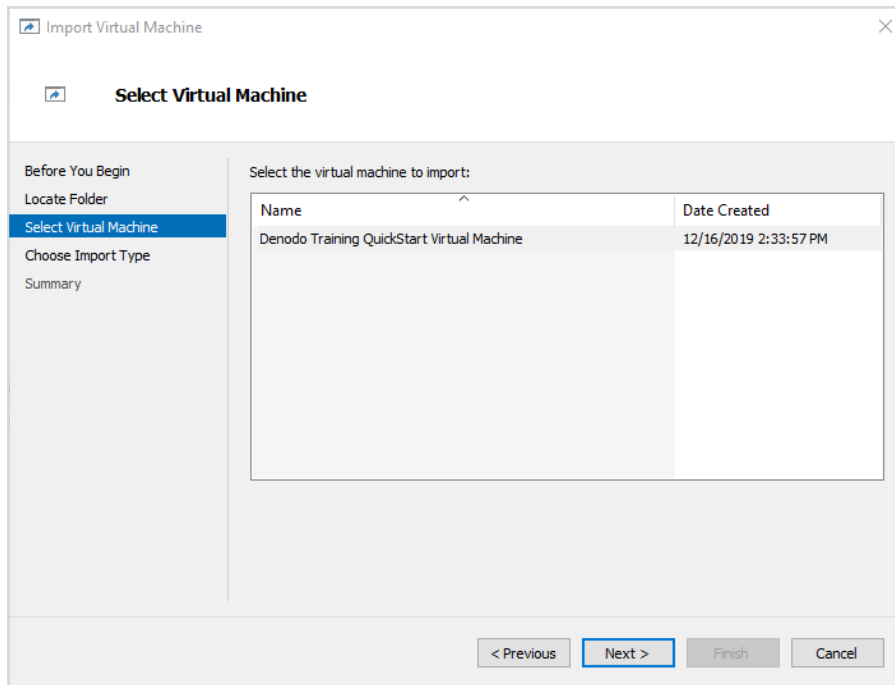
5. Select how you want to import the VM. In these steps, we are going to select "Restore". The import process will copy the VM to a new path and will maintain the unique ID.
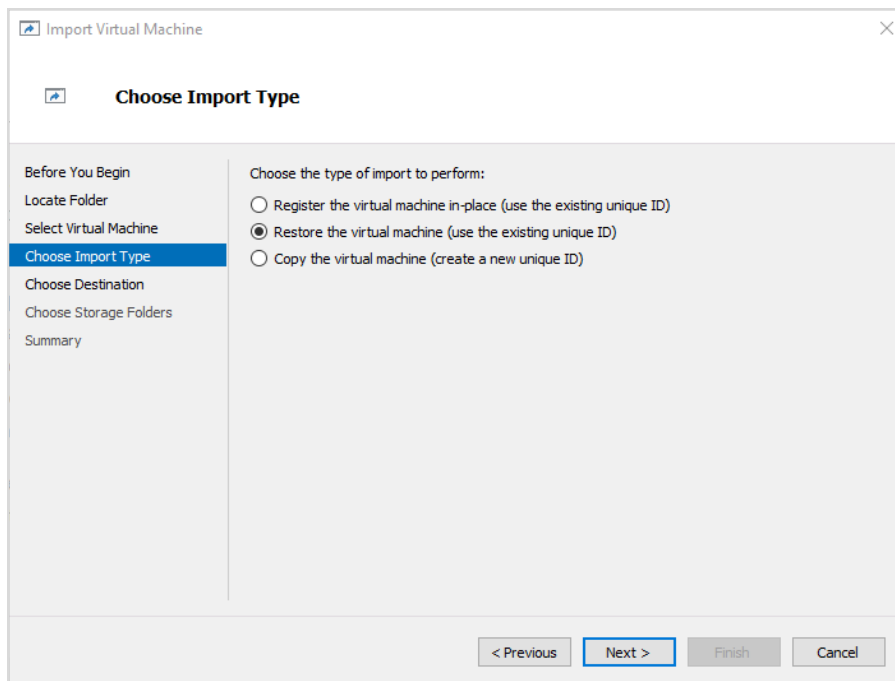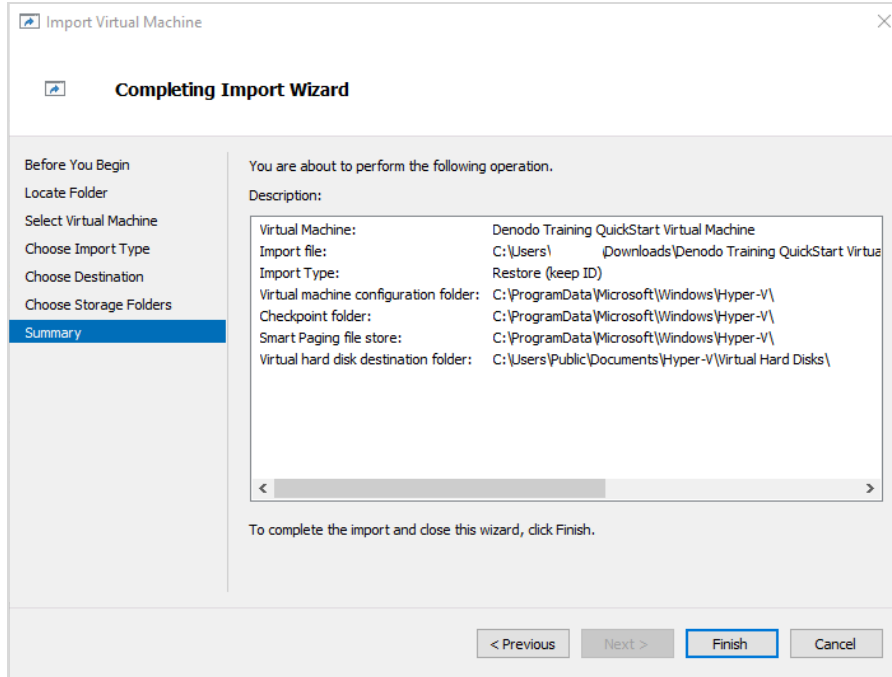
6. In the "Choose Folders for Virtual Machine Files", you can leave the default paths. Or, if you prefer, you can choose other ones.

7. Also, you can use the default path where the hard disk will be imported, or choose a new one.
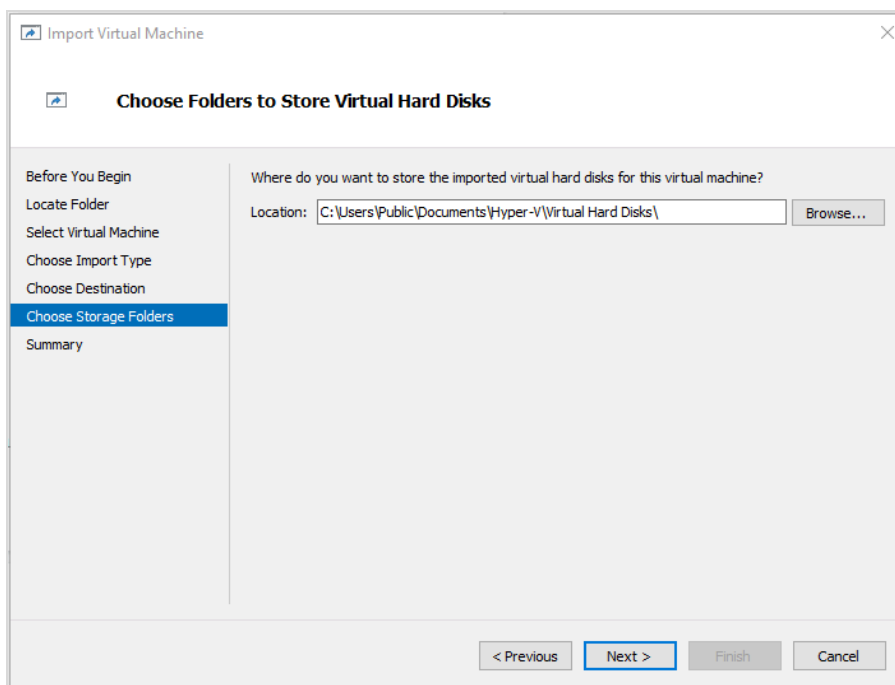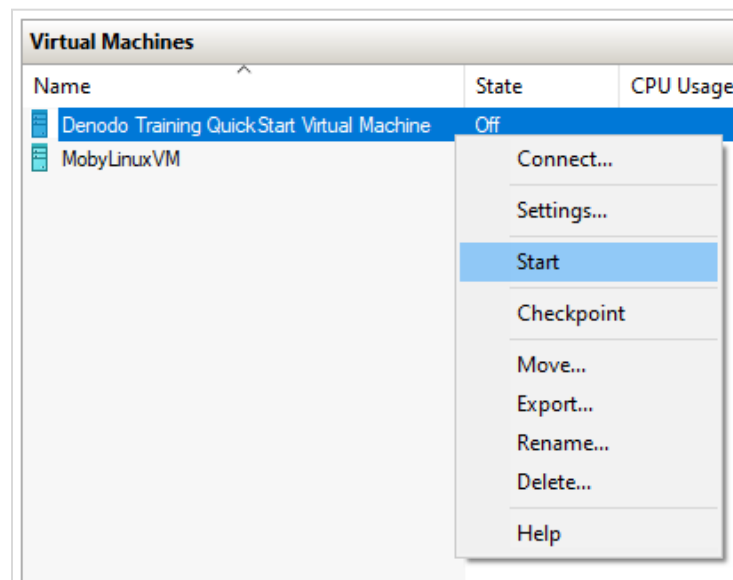
8. In the last step, you can review all the options before the import begins.

Launching DQVM

Once all the configuration steps are done, you can launch the DQVM just simply selecting the Virtual Machine in the left panel and select "**Start**" after doing a right-click over the VM.

Network Adapter configuration in Hyper-V

> **Note**: These steps only are necessary if your Hyper-V DQVM does not have configured an Ip address after it starts.

Find below the steps required for students using Hyper-V to configure the IP address of the DQVM. First of all, you have to create a network switch that can access your network. To that, please, follow these steps:

1. Launch your "Hyper-V Manager". Locate the option "Virtual Switch Manager..." under the menu Action.
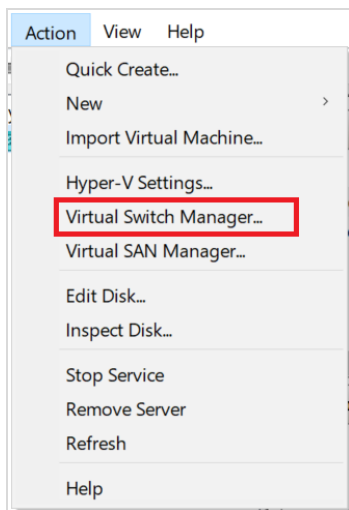
2. In the "Virtual Switch Manager" window:

    a. Click on "New virtual network switch".

    b. Select "External" as the type of the new virtual switch to create.

   c. Finally, click on "Create Virtual Switch" to create it.
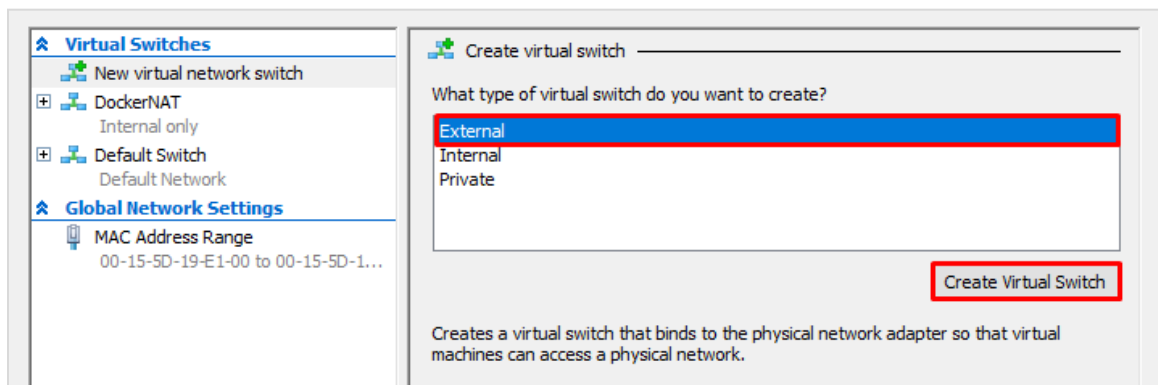
3. In the configuration window of the new virtual switch:

   a. Give a name to this new virtual switch. In this example, we are going to name it "External Switch".

   b. Select "External network" as the "Connection type", and select the network used by your computer to access the network.
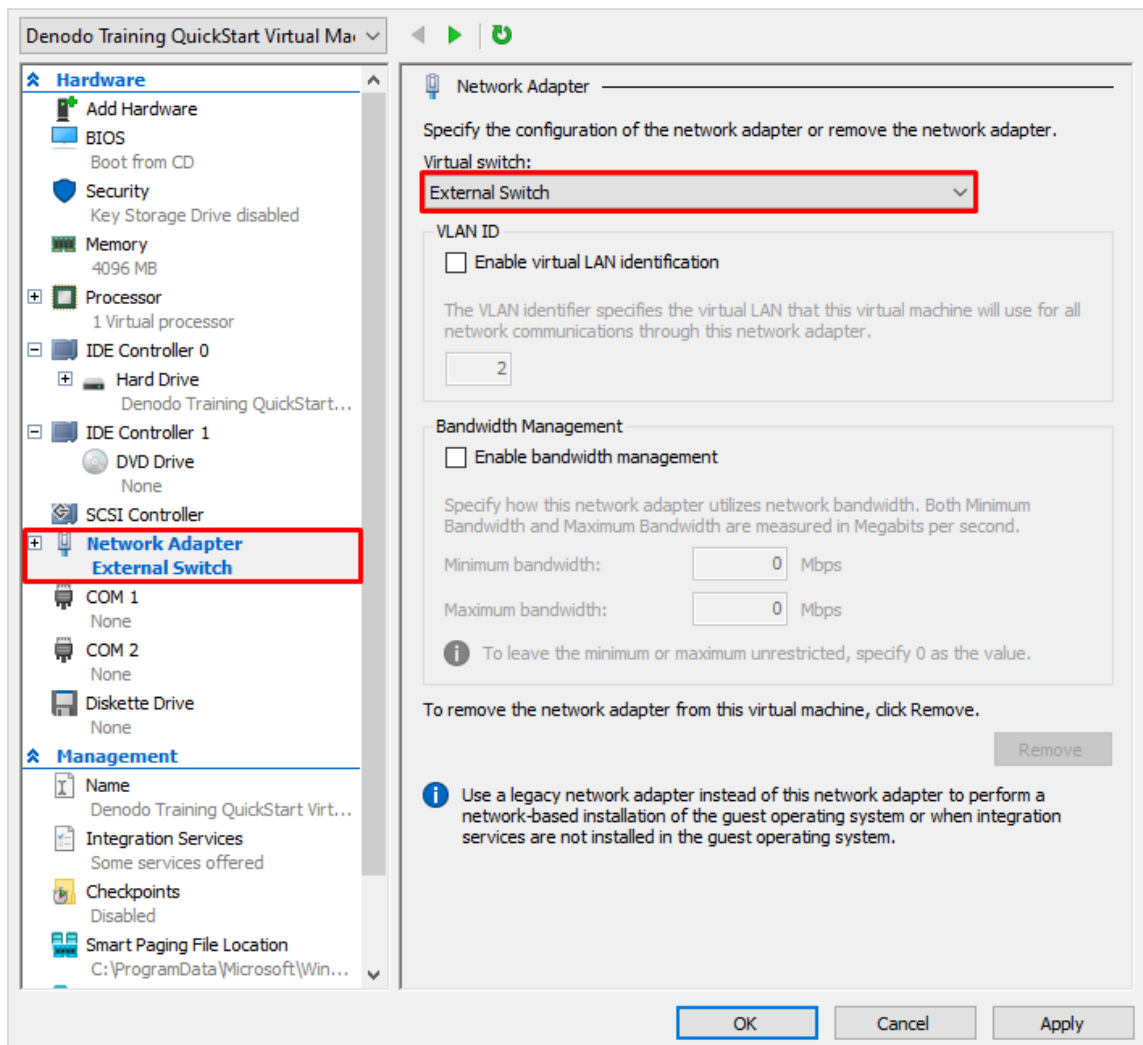
   c. When done, click on "Ok" to save the changes.
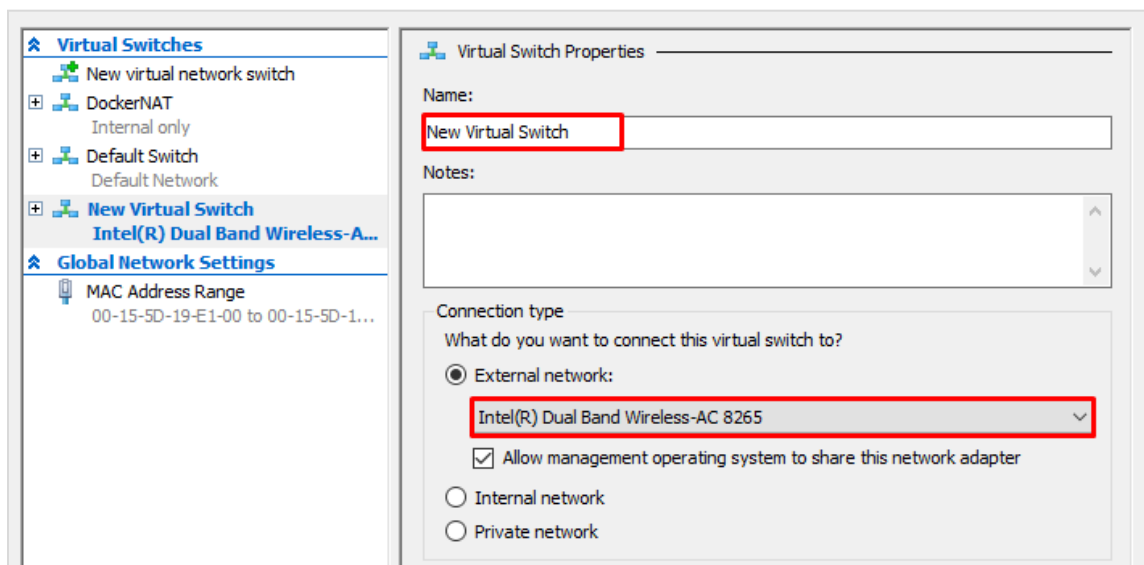
When done, you must configure your DQVM to use your new virtual switch. To do that, please, follow these steps:

1. Right click on the DQVM and select the option "Settings...":
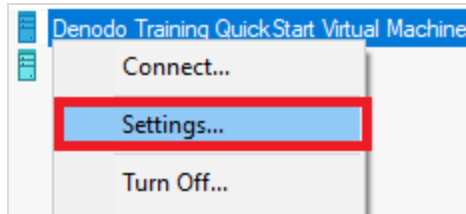
2. Click on the "Network Adapter" section, and select the new virtual Switch created previously ("External Switch" in this example). Click on "Ok" to save the changes.
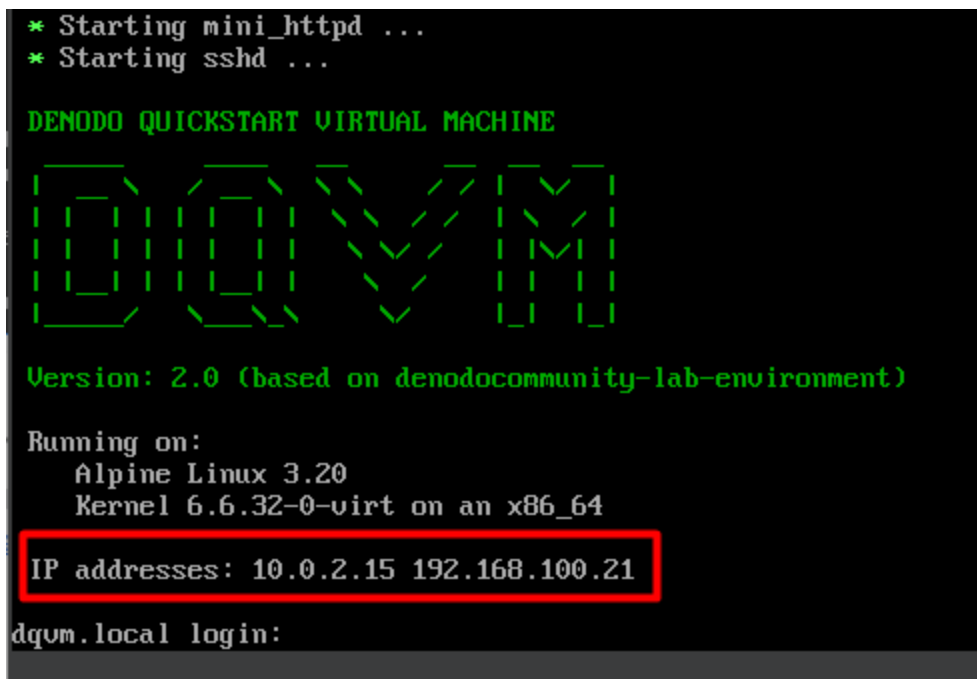
Post-configuration tasks

In this section, some recommended configurations are explained. They are not needed for running the DQVM, but you can follow them to simplify the access to the virtual machine.

Getting the IP of the Virtual Machine

Let's see how you can obtain the **IP address** of the virtual machine.

1. When the DQVM is launched a new window is opened. In that window, you can see the startup progress.

2. At some point, you will be asked for login credentials. You can see the IP address in this window.

3. Please, note that the recommended IP Address to communicate with the VM is 192.168.100.X. If you see only one IP, please, use that to access the VM.

Note: If the field "IP Addresses" is empty after the DQVM startup, please, follow the steps listed in the section [Getting the IP from the command line](#) to get the IP manually.

IP without pre-configuration in Oracle VirtualBox

Although the recommendation for using the DQVM is to configure the network adapter to use the IP address `192.168.100.X`, you can also use this virtual machine even without configuring the network adapter.

If you are not going to configure the network adapter, you need to change the network settings of the DQVM by removing the second adapter:

1. Open the **Settings** of the Virtual Machine.

2. Select the **Network** settings.

3. Remove or disable **Adapter 2**
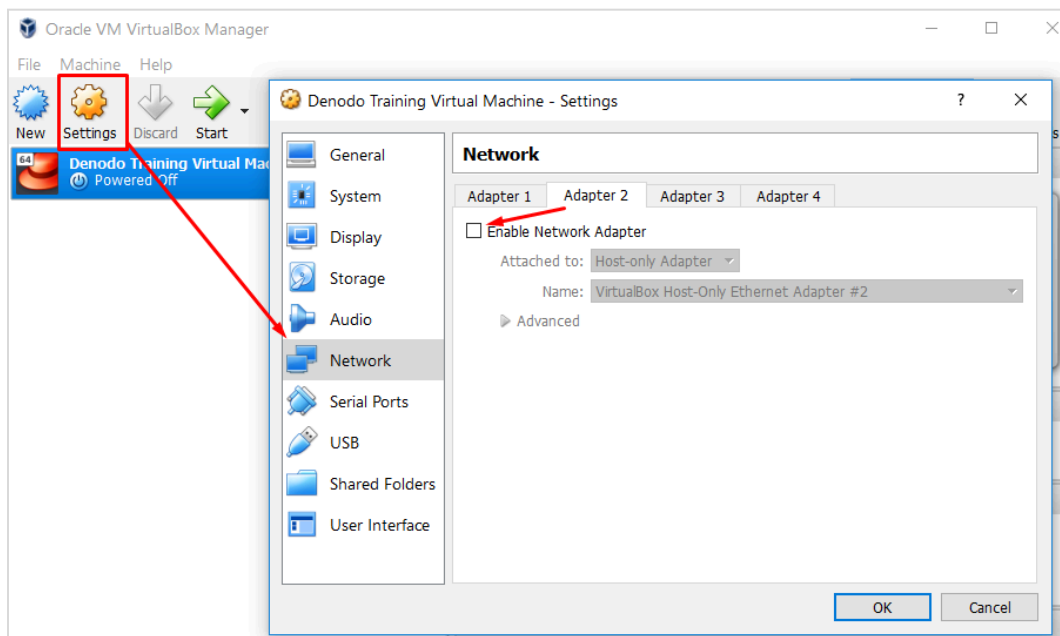
4. Click OK to save the changes.

Getting the IP addresses from the command line

After logged in, you can launch the following command to get the IP of the machine:

- `ip addr`

After executing that command, you will get the IP address that you can use for connecting to the data sources for the different training labs. You will get something like the following screenshot, in which you can see the IP (marked in red) you have to use for the labs:

```
dqvm:~$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 08:00:27:73:30:c3 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe73:30c3/64 scope link
       valid_lft forever preferred_lft forever
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 08:00:27:00:4c:45 brd ff:ff:ff:ff:ff:ff
    inet 192.168.100.21/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe00:4c45/64 scope link
       valid_lft forever preferred_lft forever
4: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN
    link/ether 02:42:40:52:ca:0c brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
```

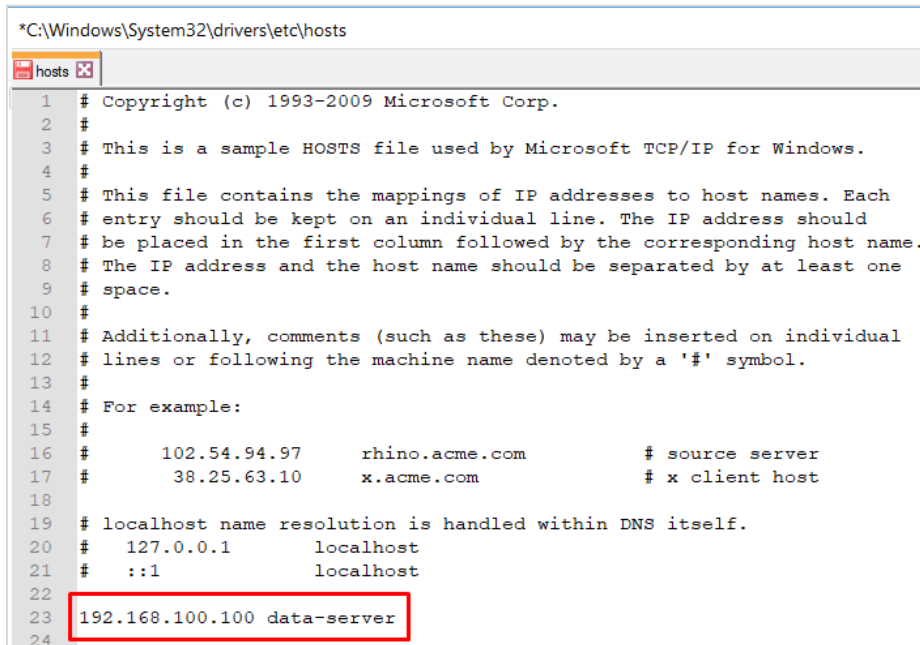# Editing your local hosts file for using data-server as hostname

You can edit the `hosts` file of your Operating System for mapping the IP address of the DQVM to "`data-server`" host name. By doing that, it will be easy for you to do the on demand labs, as you will just need to enter "`data-server`" for any data source connection instead of the whole IP address.

> **Note**: The lab descriptions assume that you have the containers of the data sources running in localhost. When using the DQVM you have to use **data-server** or the **IP address** of the Virtual Machine instead of localhost.

For configuring that, you have to locate the hosts file in your system. Find below the instructions for Windows:
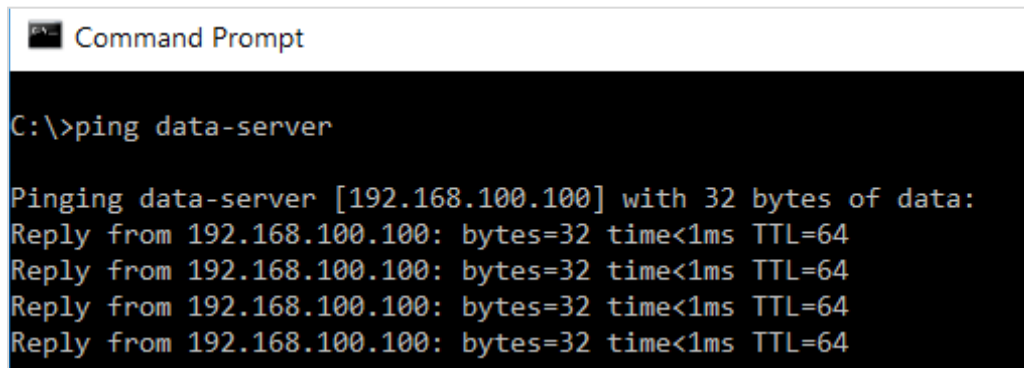
- The hosts file is located at `C:\Windows\System32\drivers\etc`

    a. Open the file "**hosts**" (you can use any text editor, just keep in mind you would need admin privileges for editing this file).

    b. Add a new line at the bottom of this file with the following (change 192.168.100.100 with the actual IP address of your DQVM):

```
192.168.100.100 data-server
```


c. Save the file.

d. You can confirm that this modification in the hosts file has been done by opening a command-line window and just doing a ping to "data-server".

Accessing the Virtual Machine

You can access this virtual Machine using this user:

- **Login**: denodo

- **Password**: denodo

Please, note that the default "denodo" user is included in the sudoers users, so for executing commands as root you can use `sudo` …

Accessing as "root"

You can access the DQVM by using the "root" user, for example if you need to restart a service or update any configuration. To access "root", please, follow these steps:

1. When the DQVM is launched a new window is opened. In that window you can see the startup progress.

2. At some point you will be asked for login credentials. Use the "root" user:

   a. **Login**: root

   b. **Password**: denodo

Changing your keyboard layout

By default, the DQVM is configured for the **US keyboard**. To change the keyboard layout of the DQVM, access to the Virtual Machine and execute the following:

- `sudo setup-keymap`

A list of keyboard layouts will be shown. You can select the most appropriate for your system. For example, to change the layout to spanish, you can select:

- Select keyboard layout: `es`

- Select variant: `es`

Accessing through a Web Interface

The DQVM includes a web-based system administration tool called **Webmin**. Webmin is a web-based server management control panel for Unix-like systems allowing users to configure the virtual machine internals, such as users, services, etc.

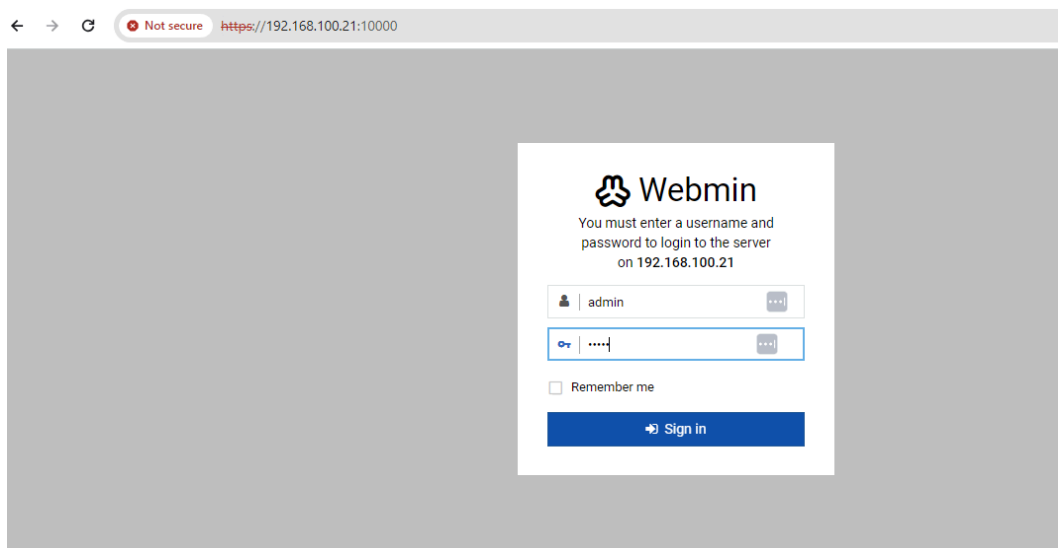The Webmin web console can be started executing the following command:

- `sudo service webmin start`

Once it is started, you can access the console from:
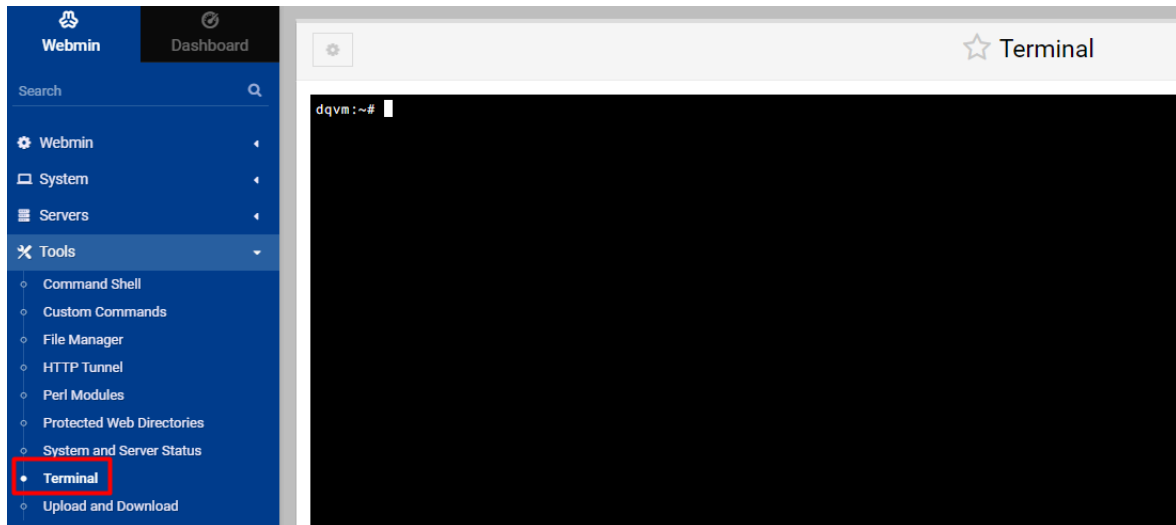
- **https://<IP address of VM or data-server>:10000**

Once the Webmin web console is launched you need to enter the username and password as **admin/admin**

Once the login is successful, you can find a list of useful options available under the "Tools" menu such as:

1. **Terminal** - This module allows you to enter shell commands. Please note this shell uses the user root!

2. **File Manager** - It allows you to view and manipulate files on the DQVM through an HTML interface. You can upload files to the DQVM (or download files to your system) using this tool.
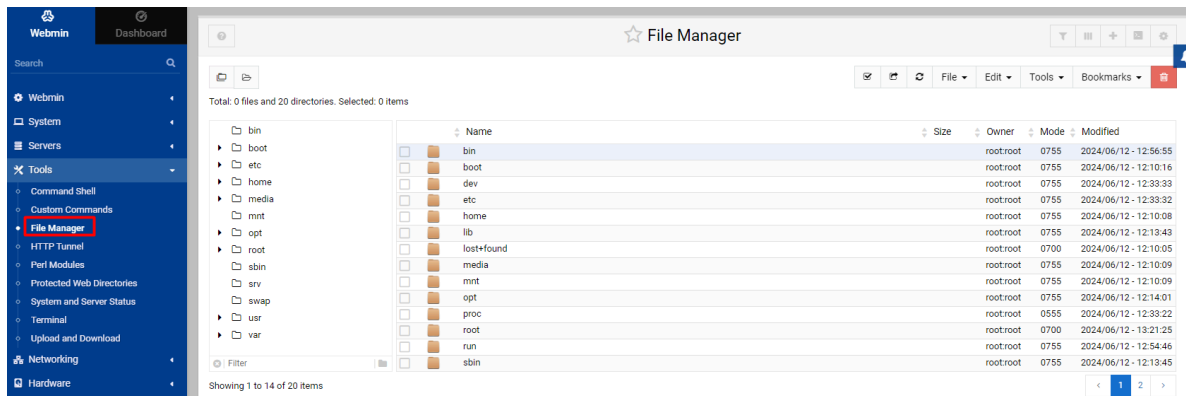
Launching the Training Data Sources

The Denodo Community Lab Environment is a docker-compose script that comprises different environment variables that can be modified based on the requirement.

Once you are connected to the Virtual Machine, you only have to run the following commands:

```
cd /home/denodo/denodocommunity-lab-environment/lab-environment-containers/build/
docker compose -p training --profile ds up
```

where:

- **-p training** refers to the docker project name. This parameter is optional. If you use it, you can use any label here. This is useful if you want to have multiple versions of the same lab environment. For example, one for training and another one for creating a personal project. For the rest of examples used here we are going to omit this parameter but it is strongly recommended to use it.

- **--profile ds** refers to the profile name. The profiles help you to selectively start services. This is achieved by assigning each service to one or more profiles.

- **up** refers to the command for building, creating and starting containers for the services configured. It aggregates the output of each container (logs), if you want to avoid that, simply add **--detach** or **-d** to start the containers in the background.

The first time you execute this command, it will download all the required containers from dockerhub:

That step is only done once. When completed, it will start all the containers of the data sources (you can see the output in the console):

List of Data Sources Included in the Virtual Machine

Please check the Denodo Community Lab Environment documentation to see the list of supported data sources:
https://github.com/denodo/denodocommunity-lab-environment/tree/master/lab-environment-containers#list-of-denodo-common-lab-environment-containers

Connecting from Denodo to the Training Data Sources

Once the Denodo Community Lab Environment is running in the DQVM, you will be able to access them using the **IP address of the DQVM** (or using data-server, if you have configured your system to use that hostname).
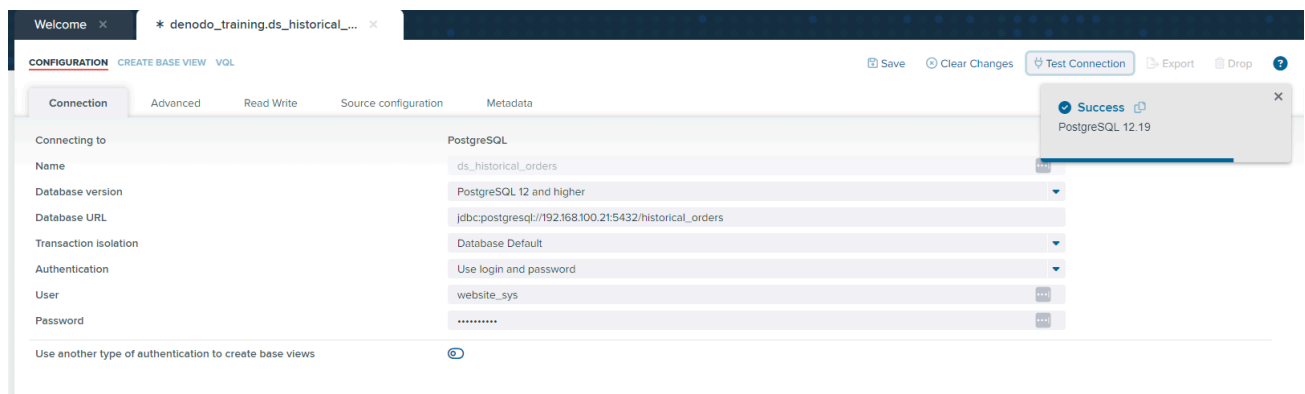
You can find the exact steps for creating the data sources in the lab description of the on-demand training courses or tutorials.

Appendix: Common Issues

The message "VT-x is not available (VERR_VMX_NO_VMX)" is shown when trying to start the DQVM in VirtualBox.

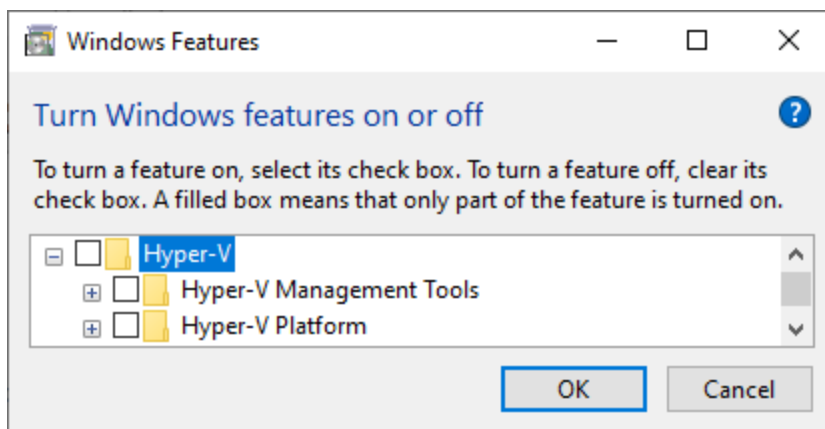Please, note that you have to enable the Virtualization option in your local machine BIOS. Check the manuals of your BIOS vendor, because this option can have different names based on the BIOS vendor.

If you have enabled the Virtualization option in your local machine BIOS, please, check if you have disabled the "Hyper-V" option. To check that, you can:

- Check it in the Windows Features (Windows button + r, type "OptionalFeatures.exe" and click Ok). Be sure that the Hyper-V options are disabled.

- Or you can open an administrator command console and execute the following command:

  - ```
    bcdedit /set hypervisorlaunchtype off
    ```

Please, note that you have to restart the machine to apply this change. If you have enabled the Hyper-V options, note that you can use the "Microsoft Hyper-V" version of the DQVM.

The message "This kernel requires an x86-64 cpu but only detected an i686 cpu." is shown when I try to start the DQVM in VirtualBox.

In VirtualBox, ensure that you have selected "Red Hat (64-bit)" as the version of the DQVM. To do that:

1. In VirtualBox, select the DQVM and click on "Settings''.

2. Navigate to the "General Settings" window > "Basic" tab.

3. Ensure that the "Version" is "Red Hat (64-bit)".

The message "Failed to load R0 module C:\Program Files\Oracle\VirtualBox/VMMR0.r0: SUP_IOCTL_LDR_OPEN failed (VERR_LDR_GENERAL_FAILURE)." is shown when I try to start the DQVM in VirtualBox.

Your VirtualBox installation is affected by the bug [#20627](). The Windows Hypervisor-enforced Code Integrity (HVCI) feature rejects the VirtualBox component VMMR0.r0 (*).

Ensure to use the latest version of VirtualBox or one of the tested versions of VirtualBox.

A workaround is to disable HVCI aka Memory integrity as follows:
1. On your Windows host, go to Start > Settings > Update & security > Windows Security > Device security > Core isolation details.
2. Turn "off" Memory integrity.
3. Reboot the Windows host.

Thank you again for your continued trust in Denodo, and we look forward to providing you with the industry's best products and services over the coming year. Should you have any feedback or questions, please let us know.

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Denodo Training QuickStart Virtual Machine