

ODAM Installation Guide

This document describes how to install a virtual machine embedding the ODAAM software suite on Oracle VM VirtualBox

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INRA UMR 1332 BFP, Metabolomics Facility

France

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1- Virtual Machine (VM)

You can download the VM at the URL : <http://pmb-bordeaux.fr/odam/>

Characteristics of the ODAM Virtual Machine

- Distribution: CentOS 7.3 (Kernel 3.10)
- Memory: 2 Go (this parameter value can be modified in your virtualization software)
- 2 cores (this parameter value can be modified in your virtualization software)
- Thin provisioned system disk of 8 Go
- Network interface: NAT / Host-only Adapter
- Docker CE 17.03.1
- **Warning:** Keyboard is AZERTY by default
 - After logging, the '**loadkeys us/loadkeys fr**' commands allow you respectively to switch to a QWERTY/AZERTY keyboard
- Default '**root**' password: **tomtom** (to;to; if you have a QWERTY keyboard)

2- System requirements

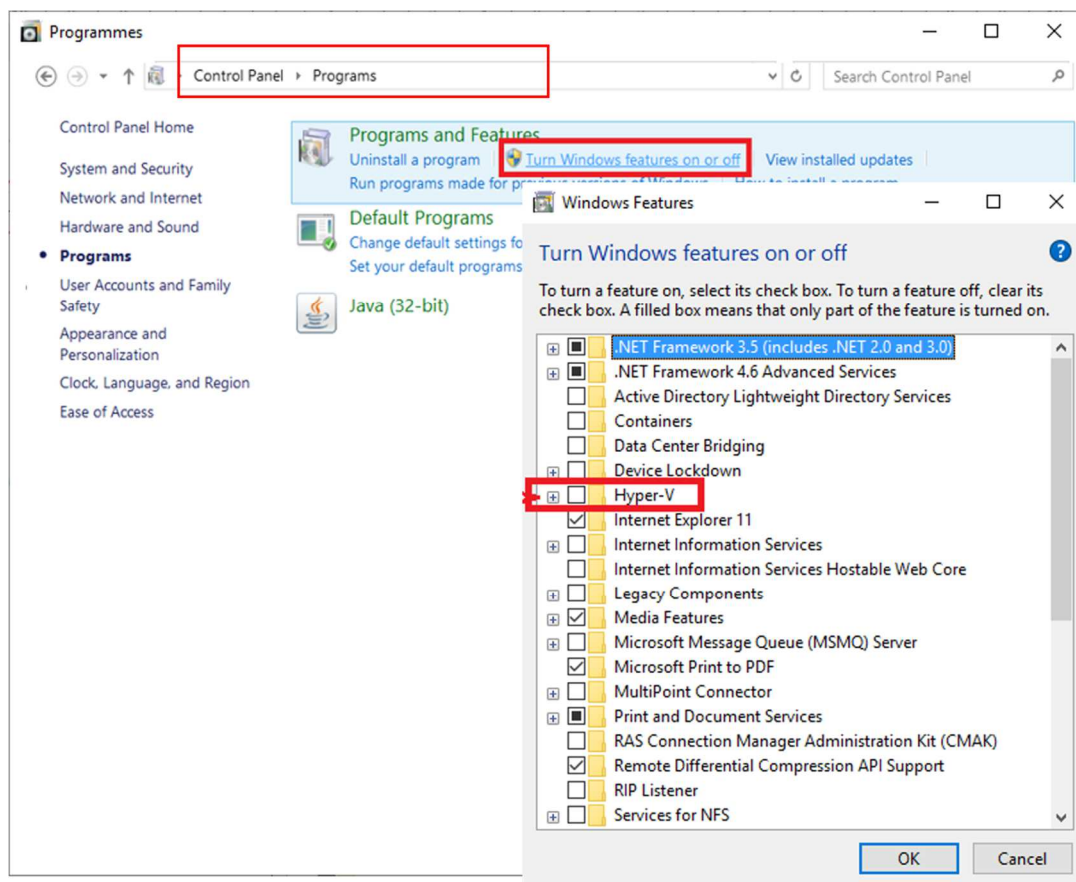
The installation and functionalities of the VM were successfully implemented based on the following items:

- Host machine under Windows 10 Proc (64bits)
- "Virtualization Technology" activated in the BIOS
(See <https://2nwiki.2n.cz/pages/viewpage.action?pageId=75202968>)
- Host machine with a minimum of 4 Go RAM
- Host machine with a minimum of 20 Go disk free space
- You need to have Administrator privileges on the host machine
- Oracle VM VirtualBox 6.1.22 (<https://www.virtualbox.org/>)

Other configurations may actually work well (i.e. with updated versions of the various elements or with Mac OS 10.11) but we cannot guarantee that the installation will run smoothly.

3- Disable the Hyper-V feature (Windows 10 Pro only)

On Windows 10 Pro, you have to disable the Hyper-V feature otherwise the virtual machine platforms do not work in 64-bit mode. Proceed as follow:



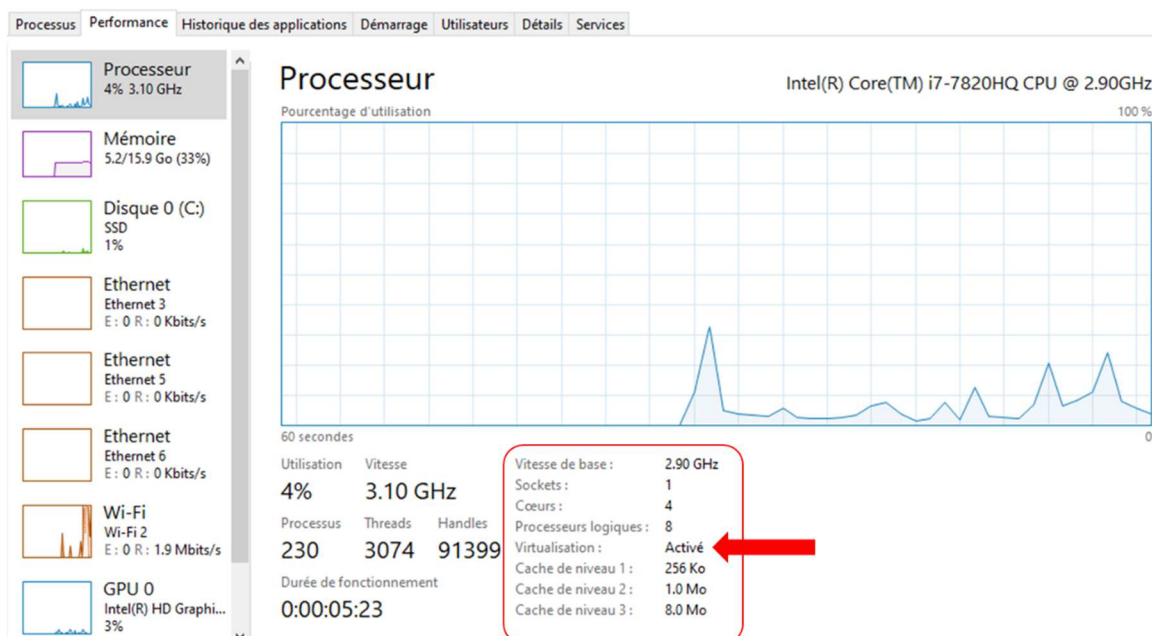
See

<https://ugetfix.com/ask/how-to-disable-hyper-v-in-windows-10/>

<https://www.poweronplatforms.com/enable-disable-hyper-v-windows-10-8/>

4- Virtualization enabled

You need to make sure that your PC supports virtualization. To do this, click on an area without an icon in the taskbar, and with the right mouse click, select "Task Manager".



You should normally see the information about the virtualization, and whether or not it is enabled. If this is not the case, then you should check with your hardware vendor for information on how to enable virtualization at the BIOS level. If not, go and take a look at <https://2nwiki.2n.cz/pages/viewpage.action?pagelid=75202968>.

5- Installation procedures

There are two ways to proceed with the installation of the virtual machine containing ODAM software.

1. The first approach uses scripts, which further automates the installation.
2. The second approach is more manual, i.e. you have to perform the different steps yourself.

It is advisable to proceed according to the first approach. If something doesn't work properly, then you have to follow the second approach in order to see what went wrong with the first approach.

Before installation

Whichever approach you choose, you must first download the latest version of the virtual machine which can be retrieved at http://pmb-bordeaux.fr/odam/odam_vbox_vdi_x64.7z.

Download the zipped virtual disk file (VDI - 7z) then unzip it in your workspace. To unzip, install first the 7zip tool (<https://www.7-zip.org/download.html>).

After unzipping the 7z file, you should have 4 files as shown below:



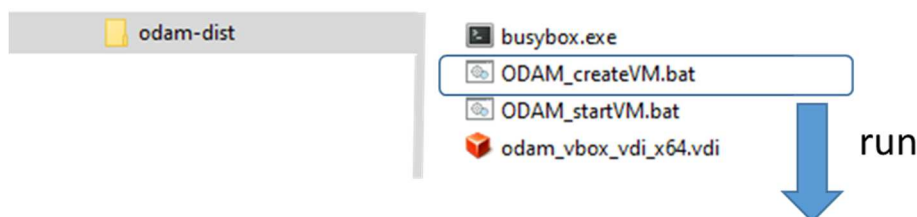
It is to be noted that these files should not be removed after the installation. So, you should take care to save it on a safe place on your disk.

Then proceed with the actual installation according to the chosen approach.

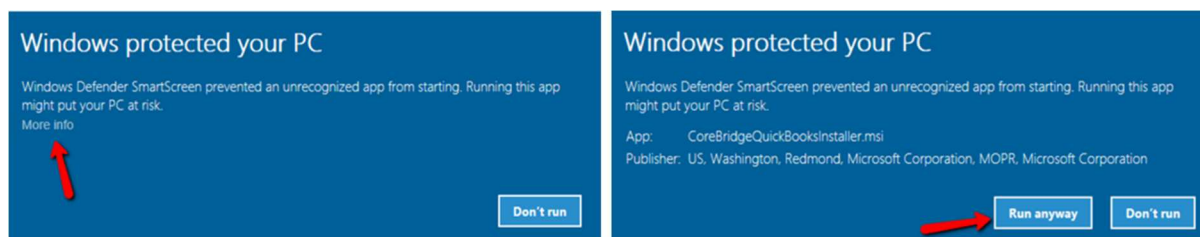
6- Automated installation

6.1- Creation of the Virtual Machine

To install the virtual machine, click on 'ODAM_createVM.bat'.



If 'Windows Defender' is active, you should normally see a screen telling you that the script in question may be dangerous. To run it anyway (that's the goal), you have to click on 'More info', then 'Run anyway' as shown below:



Then, a window will open.

```

C:\WINDOWS\system32\cmd.exe
:
: ODA - Full version running under VirtualBox
:
: a Network Adapter already exists
: "VirtualBox Host-Only Ethernet Adapter #2 : IP = 192.168.99.100"
: VM = odam-dist OK
:
: Root of your ODA Data directory [] :

```

For configuring the virtual machine, it is necessary to specify the root directory of the ODA data. You can specify it at this step or at the next step. In your example, the root directory of our ODA datasets is C:\Workdir\ODA\data.

```

C:\WINDOWS\system32\cmd.exe
:
: ODA - Full version running under VirtualBox
:
: a Network Adapter already exists
: "VirtualBox Host-Only Ethernet Adapter #2 : IP = 192.168.99.100"
: VM = odam-dist OK
:
: Root of your ODA Data directory [] : C:\Workdir\ODA\data
:
: VM = odam-dist
: VM PATH = C:/VirtualMach/odam-dist/odam_vbox_vdi_x64.vdi
: NETNAME = VirtualBox Host-Only Ethernet Adapter #2
: IP = 192.168.99.100
: Root of your ODA Data directory = C:\Workdir\ODA\data
:
Virtual machine 'odam-dist' is created and registered.
UUID: 8c31f74d-c45f-484f-baef-6eb0097b9b45
Settings file: 'C:\Users\djaco\VirtualBox VMs\odam-dist\odam-dist.vbox'
: Ended
Appuyez sur une touche pour continuer...

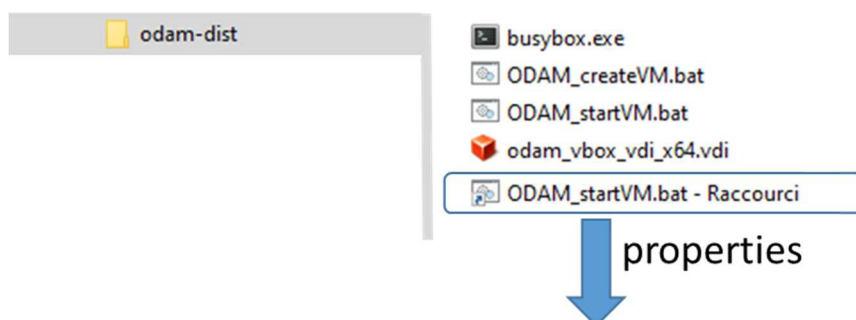
```

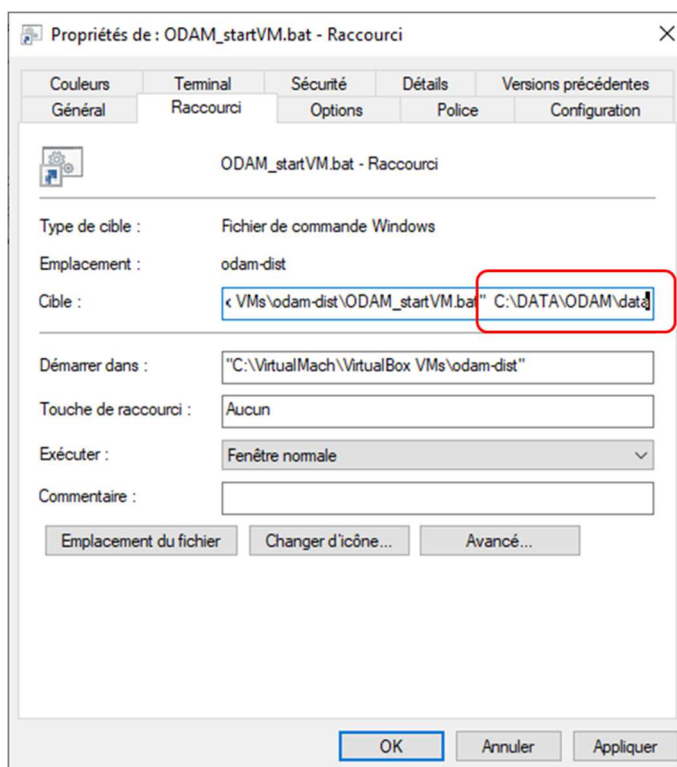
Then, the script will ask you to confirm the creation of the virtual network card. Of course, you will confirm it.

Once the creation is finished, just press any key and the window will close.

6.2- Start of the Virtual Machine

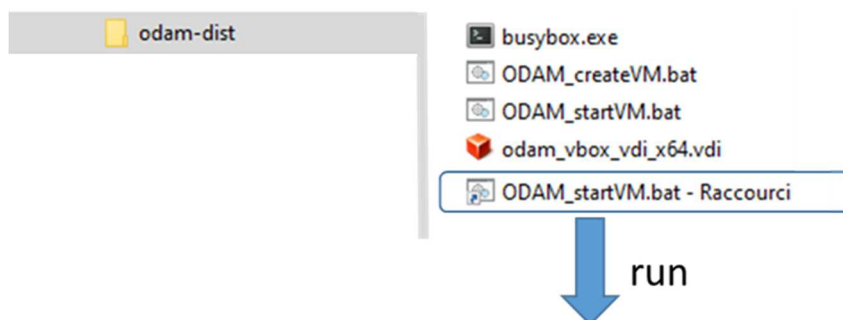
For starting the virtual machine, it is necessary to specify the root directory of the ODA data. If you don't specify it at the previous step, we suggest you **create a shortcut** to be able to specify the root directory of ODA data in the properties. This directory path must be added in the target box, after the batch file name (*i.e.* '**ODA_startVM.bat**'), as shown in the figure:





This shortcut can then be placed on the desktop for easier execution.

To start the virtual machine, just click the previously created shortcut. A window opens asking you to confirm the root directory of ODAM data (just click Enter) or to change it.



```
C:\WINDOWS\system32\cmd.exe
: ODA - Full version running under VirtualBox
: VM = odam-dist OK
: Root of your ODA Data directory [C:\Workdir\ODA\data] :
```

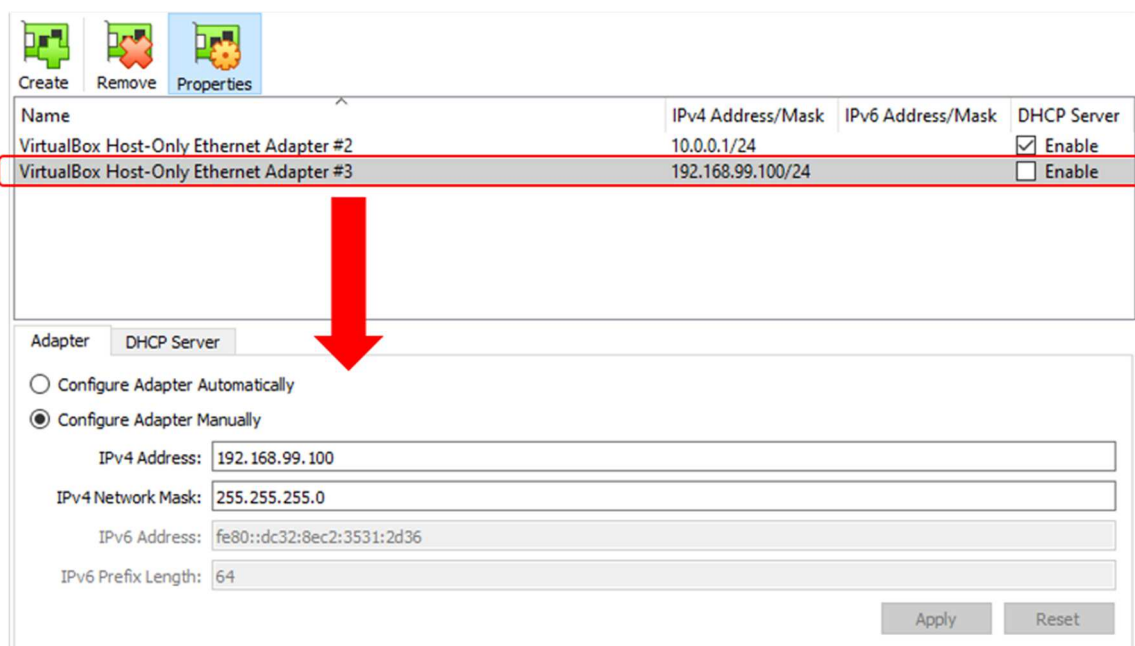
Then the virtual machine should start. Go to section “**Using ODAM**”.

Note: If the virtual machine does not start correctly or fails due to an error, you may be forced to restart your PC (Welcome to the MS Windows world), then after restarting, try again. It is very likely that the problem will be solved. See Troubleshooting section.

7- Manual installation

7.1- Before Creating a New Virtual Machine

First, launch Oracle VM VirtualBox. Then you have to create a new **host-only network** via Tools (Three Line Menu). After creating a new one with the help of the '**Creation**' button, click on this new adapter line and you will see its parameters at down on the window.



Name	IPv4 Address/Mask	IPv6 Address/Mask	DHCP Server
VirtualBox Host-Only Ethernet Adapter #2	10.0.0.1/24		☒ Enable
VirtualBox Host-Only Ethernet Adapter #3	192.168.99.100/24		☐ Enable

Adapter | DHCP Server

☐ Configure Adapter Automatically

☒ Configure Adapter Manually

IPv4 Address:

IPv4 Network Mask:

IPv6 Address:

IPv6 Prefix Length:

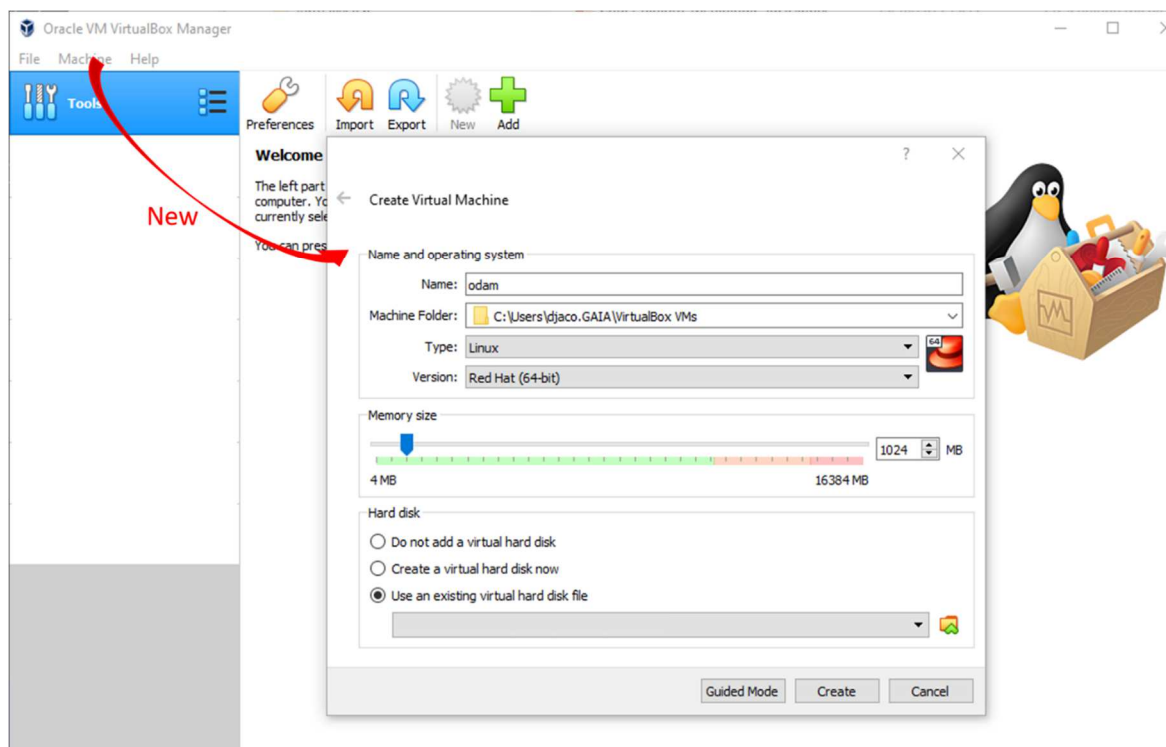
- In the '**DHCP Server**' tab, you have to check that the '**Enable Server**' is **unchecked**.
- In the '**Adapter**' tab, you have to choose '**Configure Adapter Manually**', then put '**192.168.99.100**' as IPv4 address and '**255.255.255.0**' as IPv4 Network Mask.
- Click on "**Apply**" to save your settings

7.2- Creation of the VM within Oracle VM VirtualBox

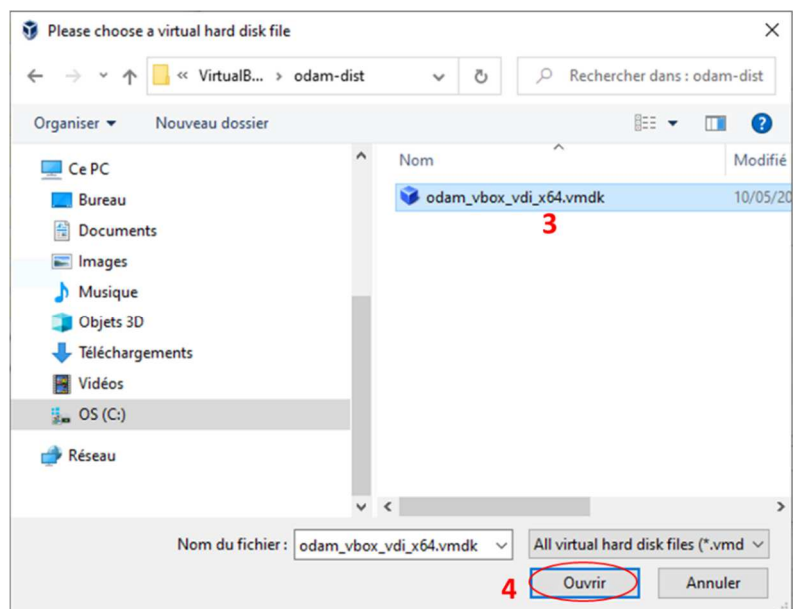
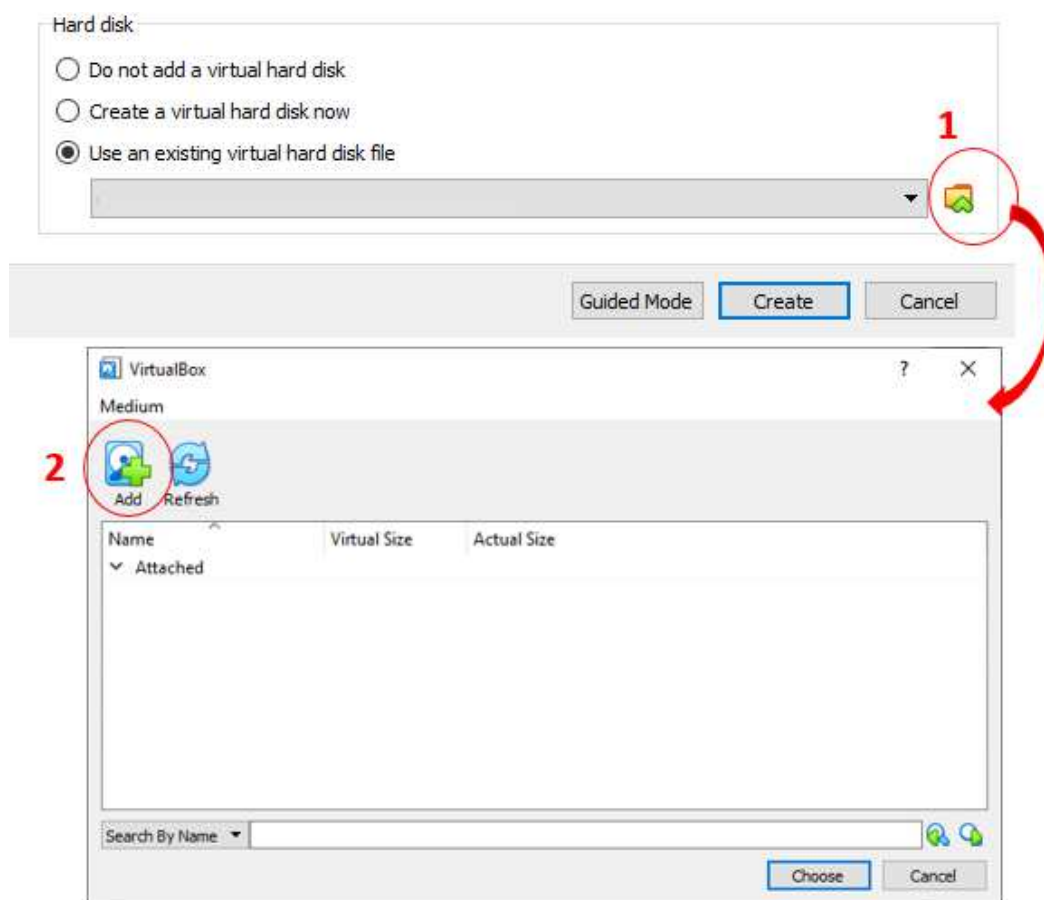
You need to create a virtual machine directly in Oracle VM VirtualBox, except the virtual disk. The latter, already created (i.e. included in the compressed archive that obviously you should to unzip), will have to be connected to the virtual machine newly created. Some parameters will have to be adjusted and then normally, everything should work well.

- **Creation of the new virtual machine:**

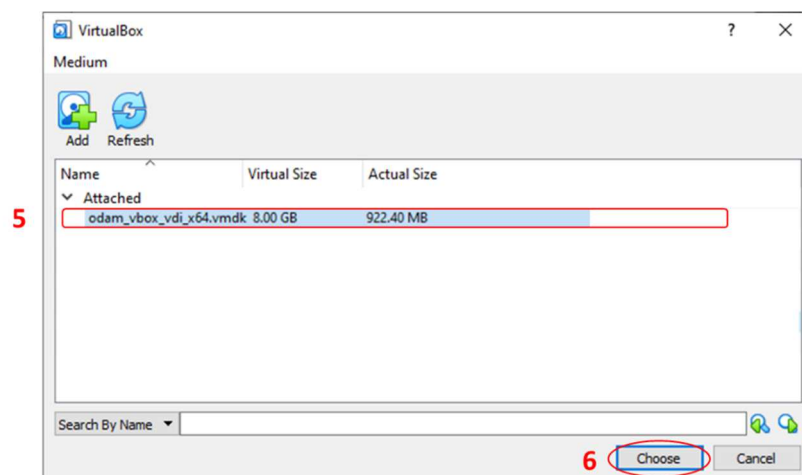
For Mac OS users, see <https://blogs.oracle.com/oswald/importing-a-vdi-in-virtualbox>



- Choose a **name** for the VM; 'odam' for instance.
- Choose '**Linux**' as Type, and '**Red Hat (64-bit)**' as Version. Of course, your computer has to be a 64-bit OS.
- Choose at least **1024Mo**; but **2048Mo** is better.
- Instead of creating a new virtual disk, it is at this step that we have to connect the virtual disk embedded in the ZIP file (or 7z). So choose the option '**Use an existing virtual hard disk file**'.



- Browse your file tree on your disk looking for where you've unpacked the virtual disk (i.e. the downloaded file).

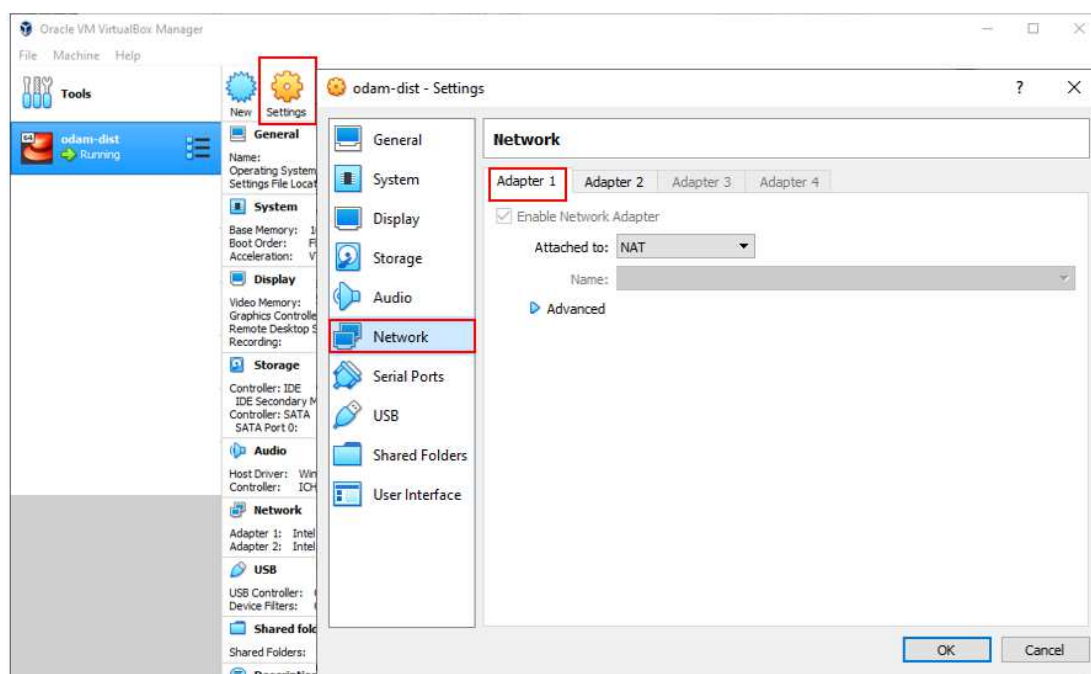


Then, click to the '**Create**' button.

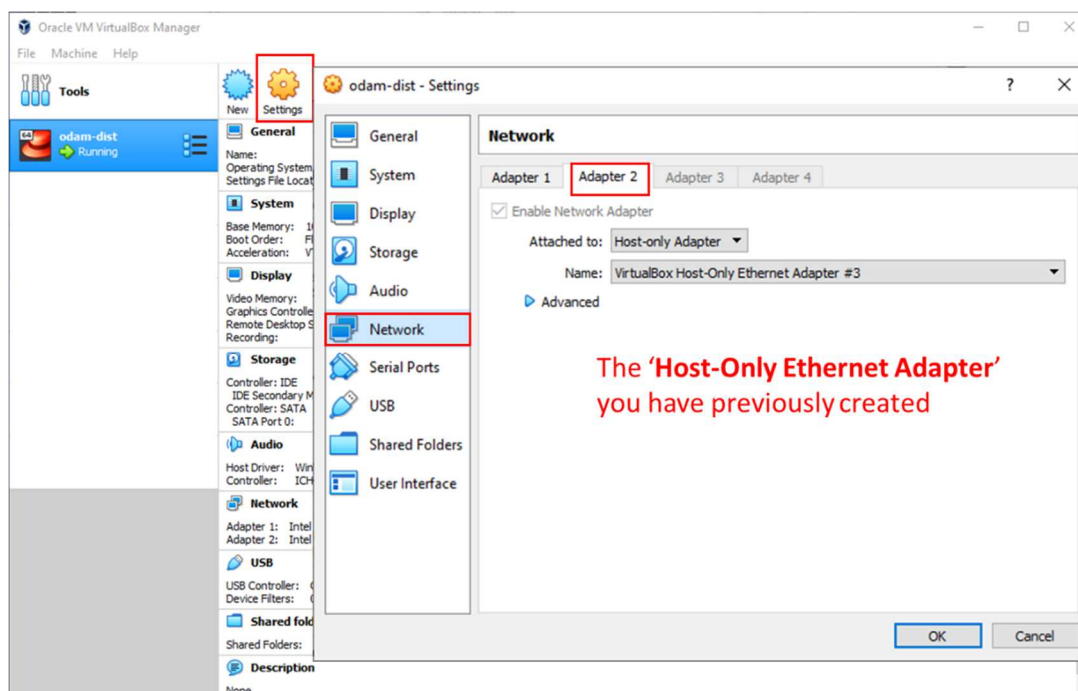
7.3- Configuration of the VM Network

Once the VM is created, we have to adjust some parameters concerning the network configuration.

In the instance's **Settings... Network**, make sure the **Adapter 1** is attached to **NAT**. This will provide the Internet access to the virtual machine.



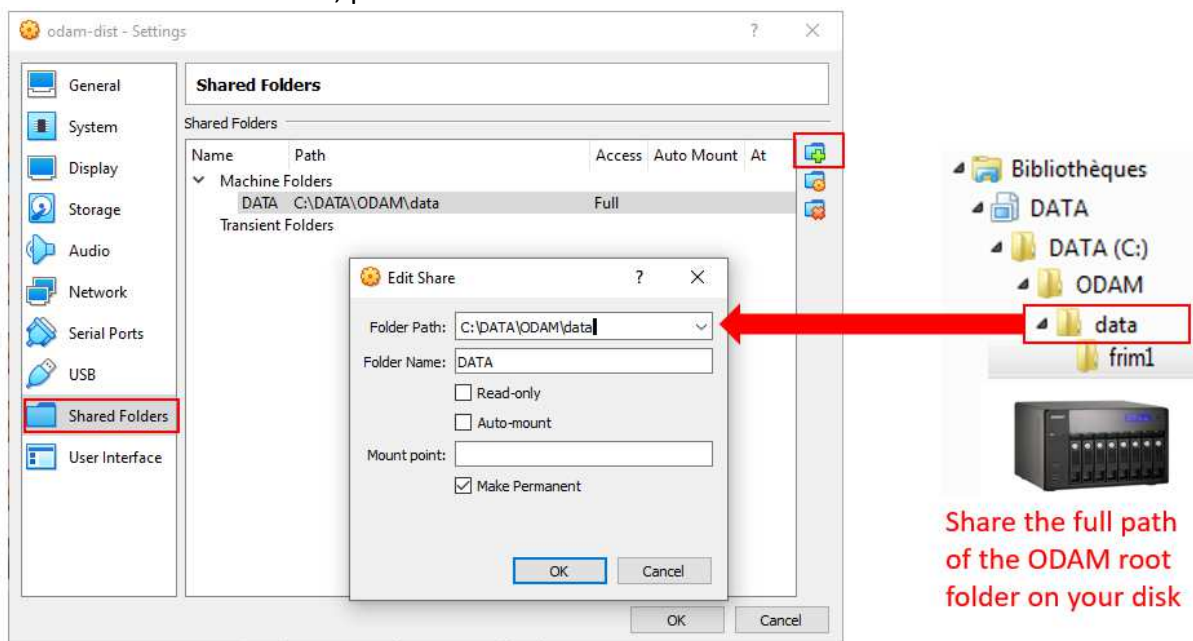
Also enable the **Adapter 2** and attach it to the **Host-only Adapter** you have previously created.



7.4 - Share your ODA folder of datasets

You have to share your ODA folder of datasets. So in the instance's **Settings... Shared Folders**, create a new entry and the edit it.

- In the '**Folder Path**' , field, put the **full path of the ODA root folder on your disk**
- In the '**Folder Name**' , put '**DATA**'

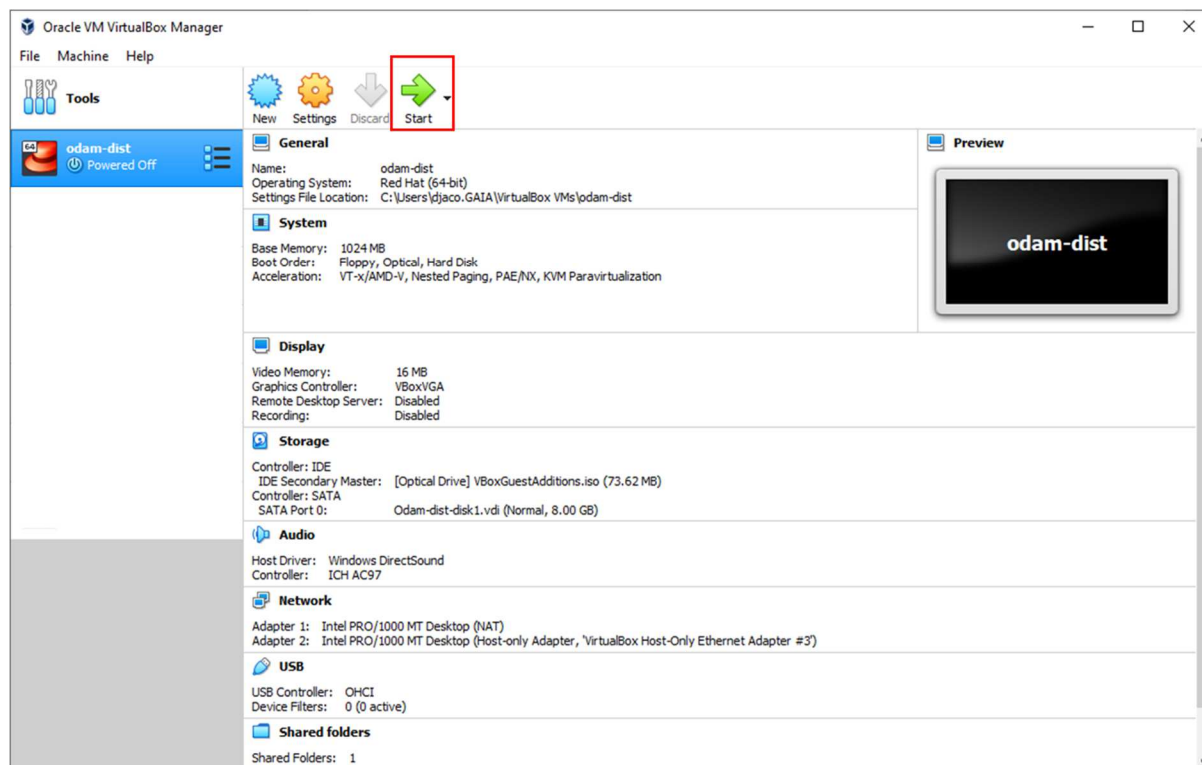


In addition, make sure that the '**Auto mount**' option is **not checked**.

Click on “OK” to save your settings

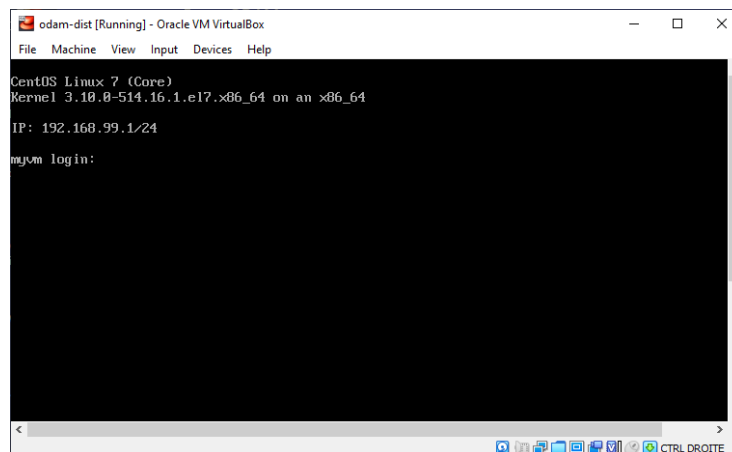
7.5 - Start your machine

To start the virtual machine, simply click on the ‘Start’ button as shown below:



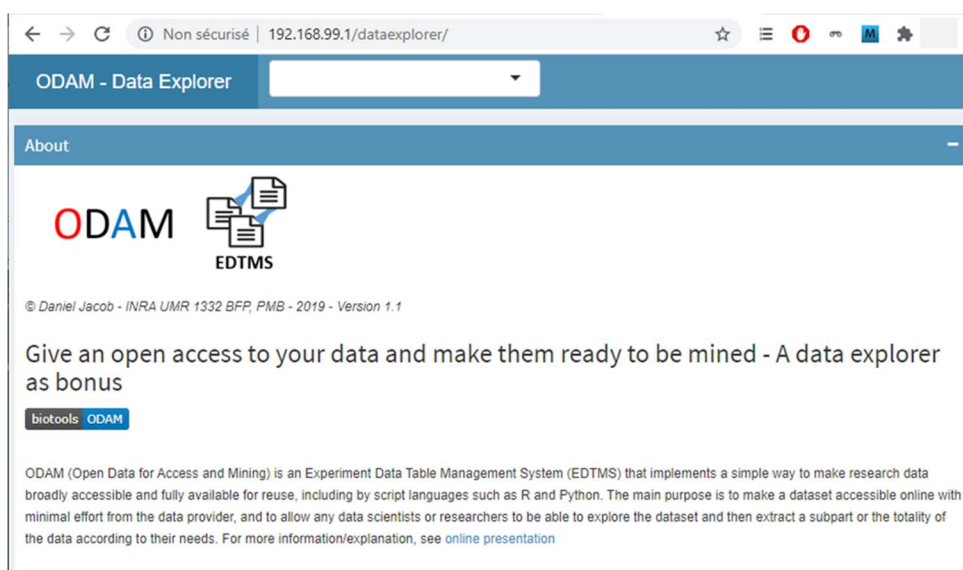
8- Using ODA

Once the VM is started, the VM console will appear as shown below:



You do not need to log in through this window. You can reduce it to an icon.

- **Note 1:** After starting, you should always wait for the login to appear in the console so that the various processes have time to start.
- **Note 2:** To switch between the VirtualBox Linux console and the Windows environment, press the right [Ctrl] key.
- Start your web browser to access the **ODAM data explorer** with the following URL (*JavaScript* functionalities must be enabled within your web browser).
 - <http://192.168.99.1/dataexplorer/>
- You will see the ODA data explorer started:



9- Test ODAV with the FRIM1 dataset

First, go to the Dataverse page for the FRIM1 dataset, and then **download the frim1.zip**

 **Dataverse** <https://data.inra.fr/dataset.xhtml?persistentId=doi:10.15454/95JUTK>

 **FRIM - Fruit Integrative Modelling** Version 2.0

Bénard, Camille; Bernillon, Stéphane; Biais, Benoit; Maucourt, Mickael; Ballias, Patricia; Deborde, Catherine; Colombié, Sophie; Cabasson, Cécile; Jacob, Daniel; Gibon, Yves; Moing, Annick. 2018, "FRIM - Fruit Integrative Modelling", <https://doi.org/10.15454/95JUTK>, Portail Data Inra, V2

 Learn about Data Citation Standards.

Description The project aimed to build a virtual tomato fruit that enables the prediction of metabolite levels given genetic and environmental inputs, by an iterative process between laboratories which combine expertise in fruit biology, ecophysiology, theoretical and experimental biochemistry, and biotechnology.

Subject Computer science; Information management; Omics; Plant Health and Pathology

Related Publication Bénard C., Bernillon S., Biais B., Osorio S., Maucourt M., Ballias P., Deborde C., Colombié S., Cabasson C., Jacob D., Vercambre G., Gautier H., Rolin D., Génard M., Fernie A., Gibon Y., Moing A. 2015 Metabolomic profiling in tomato reveals diet compositional changes in fruit affected by source-sink relationships. Journal of Experimental Botany Vol. 66, No. 11 pp. 3391–3404 doi: 10.1093/jxb/erv151

Alternative URL <https://pmb-bordeaux.fr/dataexplorer/?ds=frim1>

Files Metadata Terms Versions

1 File

 **frim1.zip**
ZIP Archive - 106.8 KB - Apr 4, 2019 - 8 Downloads
MD5: 92bcc35acf57ea61eb78fd3f47582ded
ODAM Frim1 data files



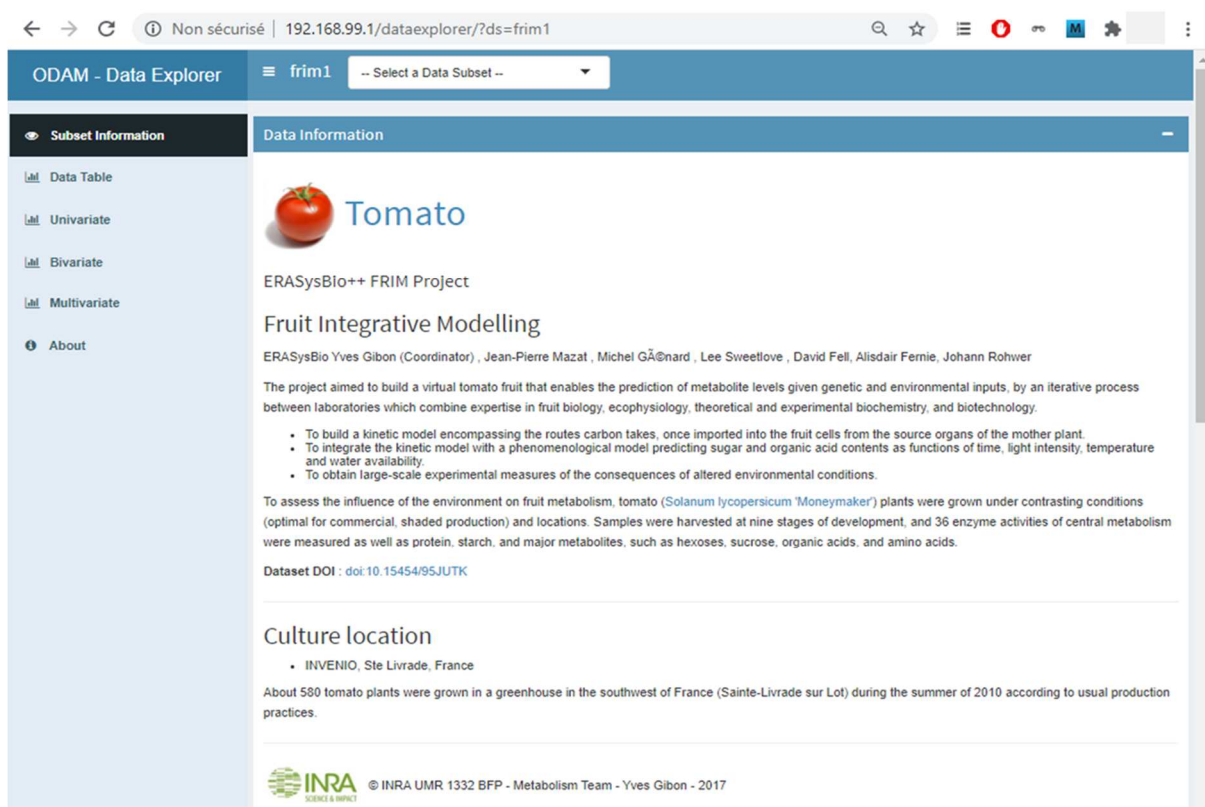
Second, unzip the download file under the folder you chose to share through the Virtual Machine you have created.

So, you should have something like that:



Start your web browser to access the **ODAM dataexplorer** in order to explore the FRIM1 datasets, with the following URL (*JavaScript* functionalities must be enabled within your web browser).

- <http://192.168.99.1/dataexplorer/?ds=frim1>



The screenshot shows the ODA Explorer web application interface. The browser address bar indicates the URL is 192.168.99.1/dataexplorer/?ds=frim1. The application header shows 'ODAM - Data Explorer' and a dropdown menu for 'frim1'. The left sidebar contains navigation links: 'Subset Information', 'Data Table', 'Univariate', 'Bivariate', 'Multivariate', and 'About'. The main content area displays 'Data Information' for the 'Tomato' dataset. It includes a tomato icon, the title 'Tomato', and the project name 'ERASysBio++ FRIM Project'. The project description states: 'Fruit Integrative Modelling'. The project aims to build a virtual tomato fruit that enables the prediction of metabolite levels given genetic and environmental inputs, by an iterative process between laboratories which combine expertise in fruit biology, ecophysiology, theoretical and experimental biochemistry, and biotechnology. The project goals are listed as:

- To build a kinetic model encompassing the routes carbon takes, once imported into the fruit cells from the source organs of the mother plant.
- To integrate the kinetic model with a phenomenological model predicting sugar and organic acid contents as functions of time, light intensity, temperature and water availability.
- To obtain large-scale experimental measures of the consequences of altered environmental conditions.

 The text further explains that to assess the influence of the environment on fruit metabolism, tomato (*Solanum lycopersicum* 'Moneymaker') plants were grown under contrasting conditions (optimal for commercial, shaded production) and locations. Samples were harvested at nine stages of development, and 36 enzyme activities of central metabolism were measured as well as protein, starch, and major metabolites, such as hexoses, sucrose, organic acids, and amino acids. The dataset DOI is provided as doi:10.15454/95JUTK. The 'Culture location' section mentions 'INVENIO, Ste Livrade, France' and states that about 580 tomato plants were grown in a greenhouse in the southwest of France (Sainte-Livrade sur Lot) during the summer of 2010 according to usual production practices. The footer of the page shows the INRA logo and copyright information: © INRA UMR 1332 BFP - Metabolism Team - Yves Gibon - 2017.

You can also test the ODA API with the Swagger application embedded in the VM:

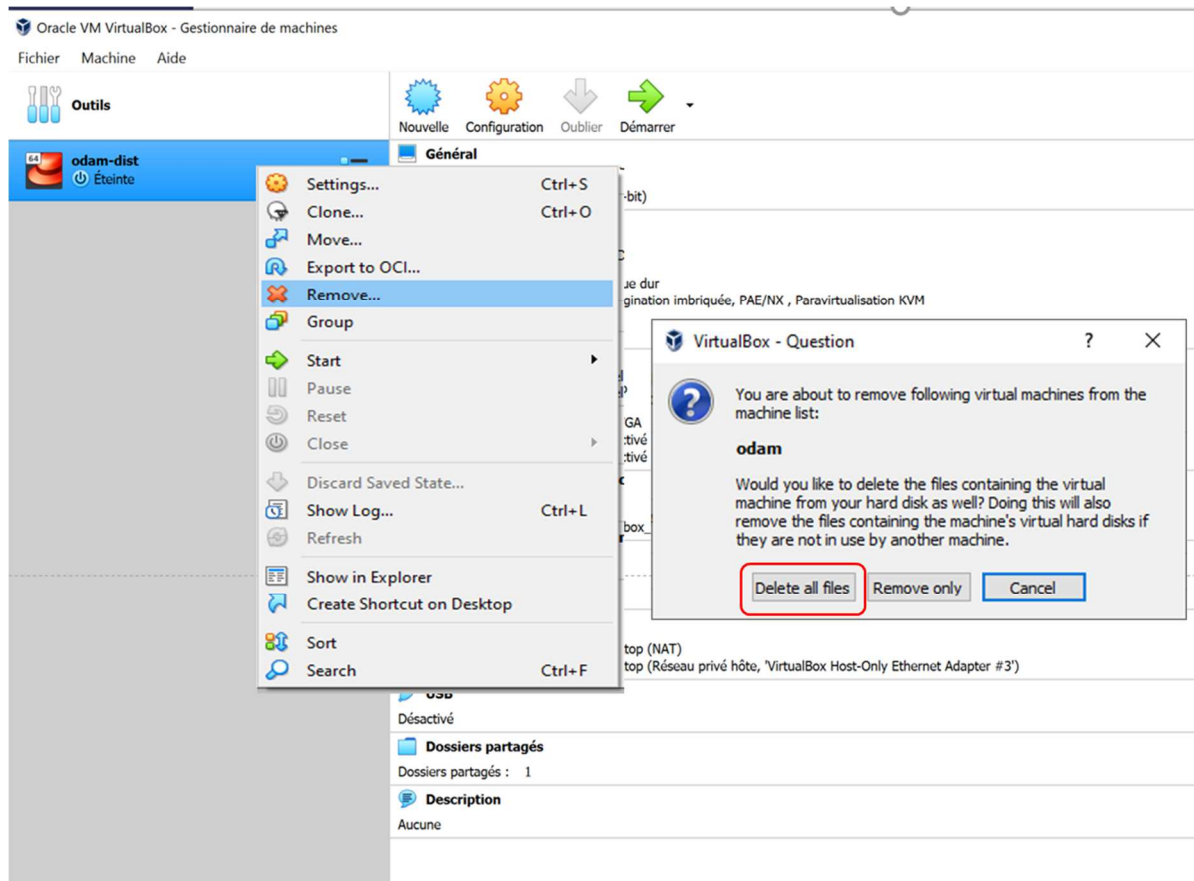
- <http://192.168.99.1/odamsw>

For more details on how to use ODA, please refer to its online documentation.

ODAM -Deployment and User's Guide : <https://inrae.github.io/ODAM/>

10- Update ODAV

To update, you first have to suppress the Virtual Machine into VirtualBox, as shown below:



Think to delete also the scripts *.bat because it could be have changed. Then, go to the step “Installation procedures”.

11- Note for Mac OS X 10.x/11.x

- We have proceeded ourselves no installation tests on Mac OS X 10.x/11.x but several users have successfully installed ODA^M using Oracle VM VirtualBox 5.1.10 or higher. Many online helps exist, and we have selected the following:
- Installing Oracle VM VirtualBox and extension packs
<https://www.virtualbox.org/manual/ch01.html#intro-installing>
- Importing a VDI in Oracle VM VirtualBox
<https://blogs.oracle.com/oswald/importing-a-vdi-in-virtualbox>
- How to Setup Nat Network and Port Forwarding Virtualbox
<https://www.youtube.com/watch?v=nxFfaXVcEMc>
- Download 7zX for Mac OS (<https://www.opensourcemacssoftware.org/utilitaire-mac/7zip-mac-7zx.html>) otherwise The Unarchiver (<https://theunarchiver.com/>) works well.

12- Troubleshooting

First, start your VM into VirtualBox (as shown in the 7.5 section) rather than the batch script.

The main issue that could occur is that the VM could not start. One of the recurring problems is due to the network adapter that cannot be properly connected to the network card.

Typically, if you get an error as shown below:



you have to force your PC to restart (Welcome to the MS Windows world), then after restarting, try again. It is very likely that the problem will be solved.