# OpenNebula Sunstone: How it works

OpenNebula Sunstone was the HPC for creating and adjusting the VMs during this project. This was monitored by SurfSara.

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## The dashboard

The total overview of all VMs their status and if they are available will be shown in the dashboard. The number of resources, like CPU hours and memory, are visualized by graphs. These graphs are simple monitoring options for the user.

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*Figure 1: The Dashboard overview*

By pressing the “Blue\_button(1)”, the Instances: VM menu will pop up. If you press the “green\_button(2)” it will show the VM creation menu. These can both be used for quicker navigation through the menu.

## Instances

The instances menu is used for activating your VM and if pressed shows detailed information about how it is operating.

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*Figure 2: The Instances overview:*

1. *Create VM*
2. *Refresh overview*
3. *Save current VM changes*
4. *Start your VM*
5. *Suspend/Stop VM, is used when you want to keep it running but pause its recourses*
6. *Power Off/Suspend, for turning off your server*
7. *Reboot*
8. *Hold/Release*
9. *Tags/Labels*

*Terminate,****only used when VM has status “FAILURE”****Pressing on one of your VMs (in this case Isengard\_ansible), will bring up the VM specific menu.*

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*Figure 3: VM specific overview*

The first you will see is the information(1) and permissions that are specific to your VM. Important variables here are the “State”, “LCM-State” and the user privileges. The State variables show if the VM is running, deployed, or possibly failed. When booting up your VM it is important to check on these as it can still spend valuable recourses if not handled correctly. The same counts for whom you permit to use and manage the VM. The “owner” will by default be able to manage and use the VM. Group-users need to be added by the owner and can be set to whatever the owner wants it to. By clicking on the “Capacity(2)”, you will see the overview of VM specific recourses used. Unlike the dashboard graph, you will be able to see the Real used recourses and the maximum available resources. Keep this in mind as a VM can still cross the maximum and possibly end up in a failure. Resizing is a valuable option once your VM needs more resources.

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*Figure 4: The capacity overview of a VM*

The storage icon shows, of course, the amount of data stored in your VM and possible data disk. It is still more trustworthy to use the ‘df -h’ option in the command line of your VM, but this can be used for a quick overview if not connected to the VM. Use the green button “Attach disk” to attach the created data-disk, do not forget to mount it in the command line!

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*Figure 5: The storage overview of a VM*

The network overview shows the IP and current network details of the VM. By using the ‘ssh <serverdetails@IP-adress>’ command you can connect to the VM as long as your own PC/Mac Sra SSh key is added in the interface of OpenNebula Sunstone. If desired you can attach a new network but it is not advised to do so as it can interrupt your current VMs operations.

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*Figure 6: The network overview of a VM*

## Templates

Before you can create a virtual machine, you’ll first have to add a template for it. This can be done with the “green\_button(1)” and will show your new templates settings. The blue buttons: Update, Instantiate, and Clone, is only available when a VM-template is selected. The rest of the buttons are similar to the Instances menu.

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*Figure 7: The create template overview*

How do you create a VM template? Start by pressing “green\_button(1)” which will bring up the following menu:

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*Figure 8: Creating a VM template*

All options that are visible on the menu need to be specified. Start by choosing a name for your VM-template. Make sure you can remember its name and the specifications you gave it as it is possible to have many templates! A quick description of what it will be used. More important however is the amount of resources that you will assign to this template. Keep in mind that memory is in RAM, not storage. A basic RAM is set on 4-8 GB. This can be personalized further by selecting the amount of CPU. A value of 0.5 CPU will assign half of a CPU to the VM, most of the time however you will use at least 1 CPU. This amount may be lacking when a server is in its production state and thus can be adjusted in the Instances menu. VCPU stands for virtual CPU and is not often used but can help visualize the real CPU time that is spent. The default spent vCPU is set to 1. Cost is only necessary if you wish to add more value tot he memory, CPU, and amount of storage spent. All other specifications like adding a logo and such are not obligatory and don’t have to be specified. The one thing left to do is to add either an OS-image or a Volitedisk, you add this by going to the storage area and choosing your pre-created OS-image or specify the Volitedisk resources.

## Storage

The storage overview has five different menus: Datastores, Images, Files, MarketPlaces, and Apps. The most important ones for a user are the Datastores and Images menu. The datastores menu oversees the total capacity that is available and in which cluster. The images menu is used to create images that are necessary for your data storage. Like creating a VM and a template, press that green button again and simply gives your disk a name and make it persistent if necessary. You may also choose to create a data disk by adjusting the type to “Generic data block” which can later be mounted to your virtual machines.

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*Figure 9: Creating an image*

## Network

The network tab is important for admin users. Keep in mind that both Virtual Networks as the Network Topology cannot be adjusted by group users. Only owners and admins can specialize in network settings.

## Settings

The settings section is where you set your own public SSH-key in the format: “ssh-sra <SSH-key>”. If this is not done, you cannot link to the VM from your personal device. Be sure to keep your ssh-key secret however as it can be used to get into your device from the cloud as well as getting into your VM. This section also provides the payment and quota info for the platform.

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*Figure 10: Settings interface*

Step by step: creating an image, template and, VM

1. Open OpenNebula Sunstone, log in and go to “Settings”.
2. If not yet done, put your SSH-key in your account. It will save automatically.
3. Go to “Storage”.
4. Press “images”.
5. Select the green “Plus” button.
6. Give your image a name and select Type: “Operating System image”. Select the image as persistent.
7. Select “Datastore” number “106”.
8. Use path : “/var/tmp”
9. Press the green “Create” button to save your new image.
10. Check your new image by clicking it.
11. Go to Templates > VMs
12. Select the green “Plus” button.
13. Name your template
14. Set base memory to 4 as a base (can be adjusted later)
15. Set base CPU to 1 as a base (can be adjusted later)
16. Inside the create template menu > storage
17. Choose your pre-created OS-image
18. Press the green “Create” button to save your new template.
19. Check your new template by clicking it and check the resources you assigned to it!
20. Go to Instances > VMs
21. Select the green “Plus” button.
22. Choose your pre-created template
23. Instantiate as persistent > SWITCH ON
24. Name the VM
25. Press the green “Create” button to save your new VM.

# It is possible that your VM will automatically run from this point, you can adjust this by pressing the “Start on hold” function whilst creating the VM #

1. Check your fresh VM:
   1. Check the capacity > does it have the memory and CPU assigned?
   2. Check the Storage > is the current size lower than the max size?
   3. Check the network > is your VM connected to the network?
2. If all checks out, press the “|>|” button to start running the VM!
3. Check out your resources again and try connecting to the VM using:

‘ssh ubuntu@<ip-adress>’

1. Congratulations! You just created a new VM for you to work with
2. Make sure that if other users need to work on this VM that their SSH-keys are placed inside of their accounts settings and that they are allowed to use it by checking on the “group” and “manage” filters in the info section of your VM.
3. Tip: if working in your VM always check the resources and size. It is possible that the current size is higher than the maximum. If this happens with either the CPU or the size than the status would probably end up in a failure as the VM cannot store any more data on its image. You will have to start over and contact the helpdesk if this occurs.

## Step by step: Resizing your image

1. You will need to have completed step 1 to 8 from: “creating an image”
2. Now go to the VM templates section and select your image.
3. Check that your newly created image is either attached or attach it as image to the template. (see figure 11) Afbeelding met schermafbeelding, laptop, computer, scherm

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*Figure 11: Attaching an image to your template*

1. Initiate your instance and check its capacity and resources
2. Now go to activated instances to see if your instance runs. (If not, run it)
3. Your OS-image is probably a “desktop” ubuntu machine, this means that you will have to connect to its VNC if you wish to resize it (see figure 12).



*Figure 12: The “VNC” button in the menu-bar*

1. When you press it you will see a desktop of the ubuntu instance. Use the “right mouse key” and choose the terminal option.
2. Type “sudo apt-get install gparted” and enter. (see figure 13) Afbeelding met schermafbeelding, computer

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*Figure 13: Commands in the terminal of ubuntu-VNC*

1. Press the GParted app inside of the desktop menu.
2. You will see the following overview ( see figure 14)

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*Figure 14: The result of GParted install*

1. Press the “file+” button to choose your adjustments fort he unallocated storage. Afbeelding met schermafbeelding

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*Figure 15: Creating a new partition*

1. Create a new partition as displayed in figure 15. Press add when done.
2. It might take a while, but if you succeeded then the following tekst will show, see figure 16.

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*Figure 16: Success! You’re partition is created.*

1. Close the interface of the ubuntu machine by pressing the red cross, do not worry as it saves automatically.
2. Use the “Power off” option to stop the VM.
3. Go towards storage
4. Behind the OS-image there is now an action available, Choose “Save as”.
5. Now change the “saved as” image to persistent and data type to OS.
6. Congratulations, you resized your image! If you wish to increase or decrease its resources you can change this in the partition menu of the unallocated data. Simply check the free space and, disk size. Do be carefull as you might have reached a maximum of resources already, in this case you might have to disposse some unused images.