

StarWind[®] Ceph all-in-one Cluster

How to deploy Ceph all-in-one Cluster

JUNE 2017

TECHINICAL PAPER

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Introduction

This guidance will show you how to deploy a Ceph all-in-one cluster. The paper will walk you through the Ceph cluster configuration process and describe how to create a Ceph monitor and Ceph OSD.

Ceph is an open-source project, which provides unified software solution for storing blocks, files, and objects. The main idea of the project is to provide a high-performing distributed storage system which can provide an ability to perform a massive storage scale-out and will have no single points of failure. It has become one of the most popular Software-Defined Storage technologies.

Ceph becomes more attractive to the storage industry due to its openness, scalability, and reliability. Cloud computing and IaaS era requires a system which must be Software-Defined and ready for cloud technologies. Ceph injects here more than perfect, regardless the environment where it is going to be used (public, private, or hybrid cloud).

This guide is intended for experienced IT and Storage administrators and professionals who would like to deploy the Ceph all-in-one cluster to check out all the benefits of Ceph object storage.

A full set of up-to-date technical documentation can always be found [here](#), or by pressing the **Help** button in the StarWind Management Console.

For any technical inquiries please visit our [online community](#), [Frequently Asked Questions](#) page, or use the [support form](#) to contact our technical support department.

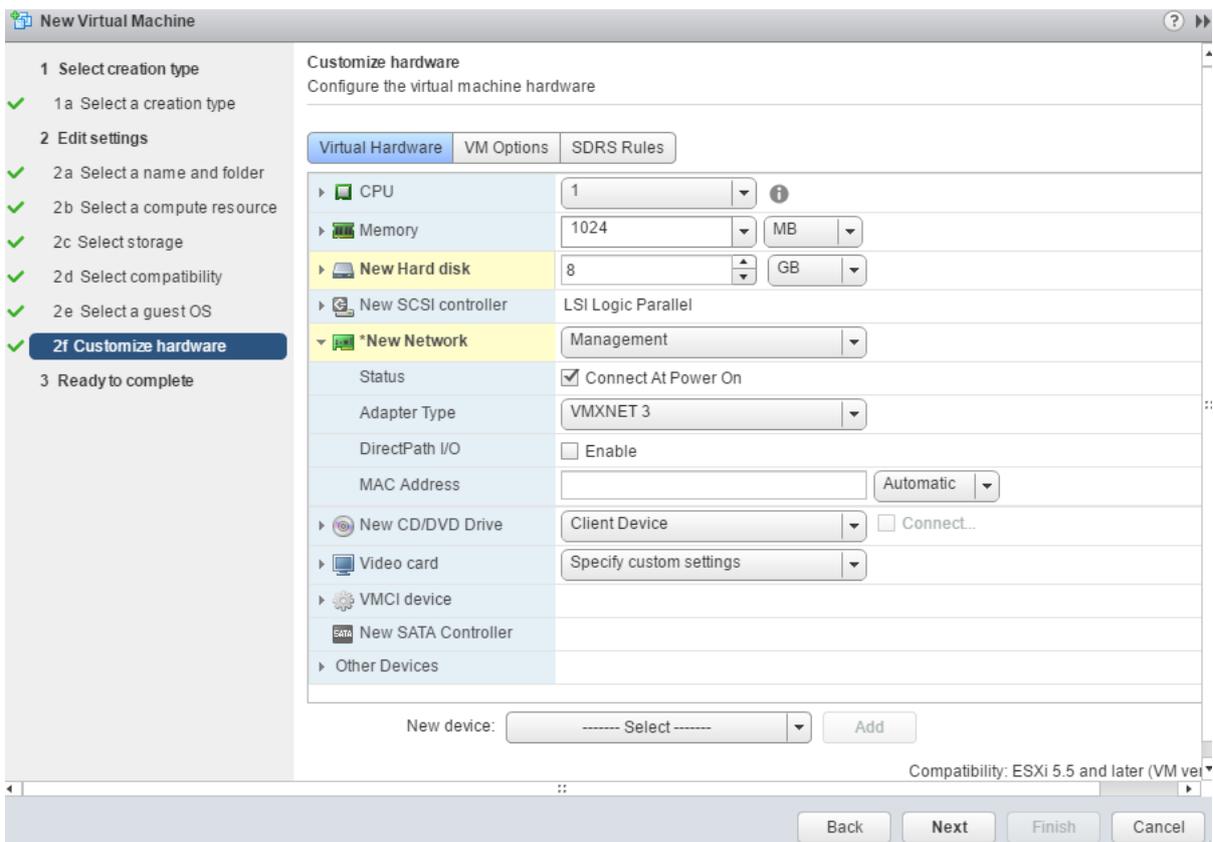
Before you begin

This guide describes the installation and configuration of the Ceph all-in-one cluster, which means that we are going to build the Ceph cluster using only one VM. We are going to deploy the ESXi VM and install Debian 8 on it.

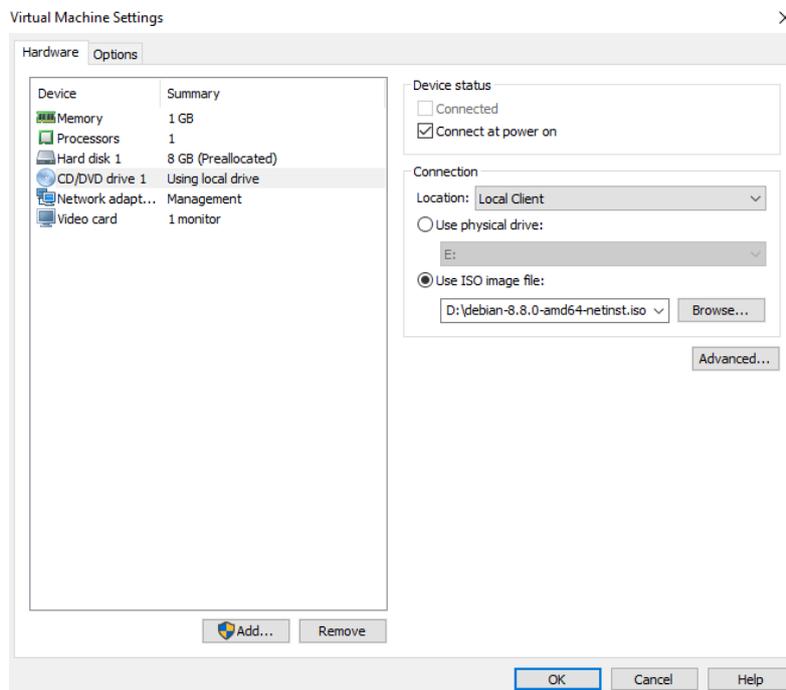
You can download our pre-deployed [OVF template](#) or follow these steps:

Virtual Machine Deployment and OS installation

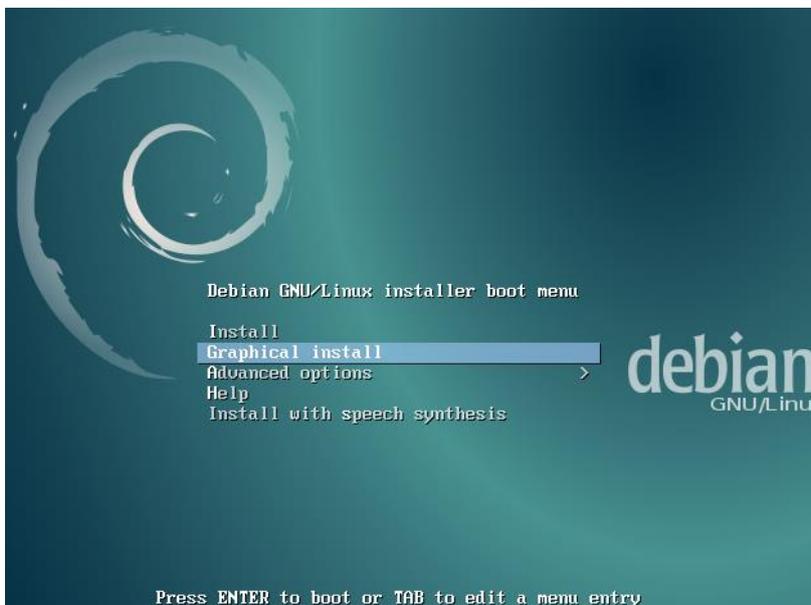
1. Download Debian 8 ISO for OS installation here:
<https://cdimage.debian.org/cdimage/archive/8.8.0/amd64/iso-cd/debian-8.8.0-amd64-netinst.iso>
2. Create the ESXi VM with following settings:



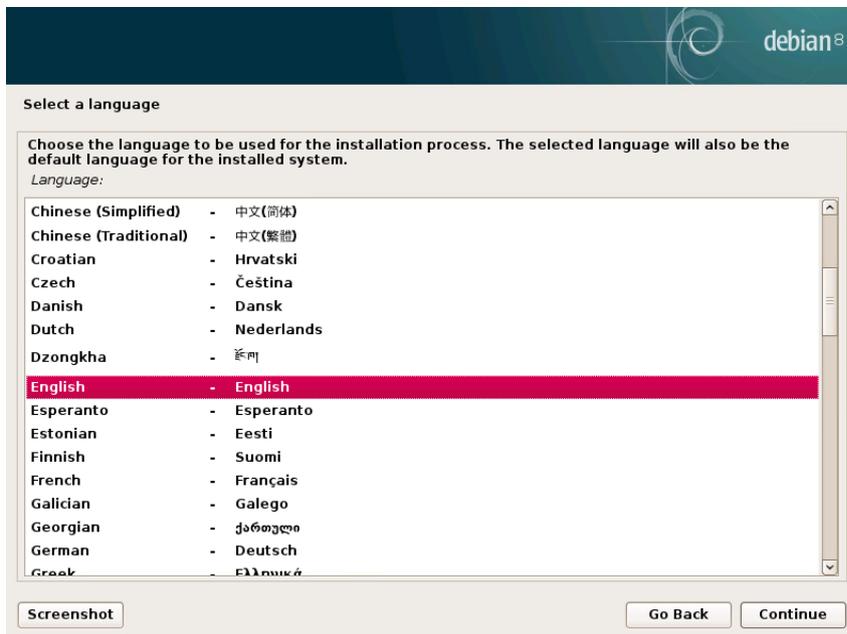
3. Mount the ISO image to the VM and boot from it.



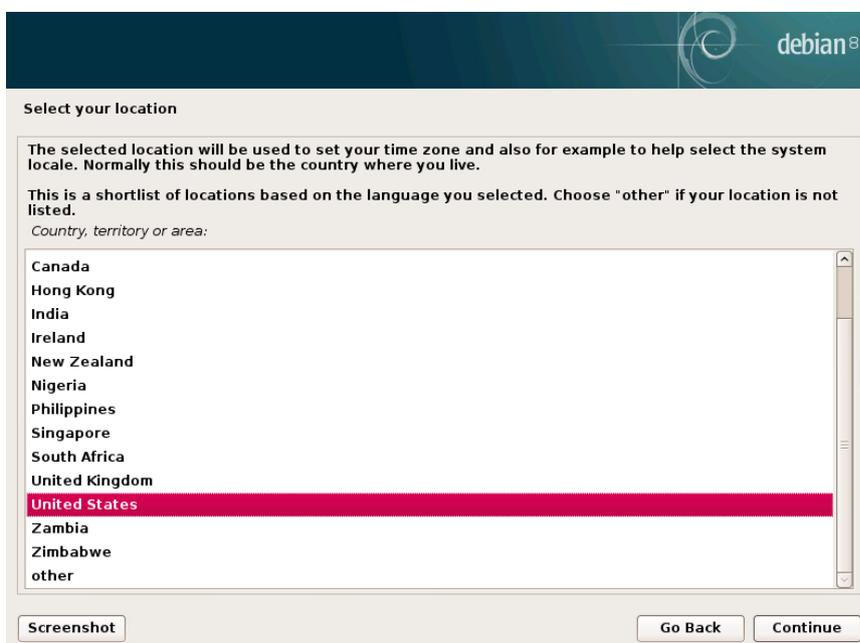
4. Choose **Graphical install option**



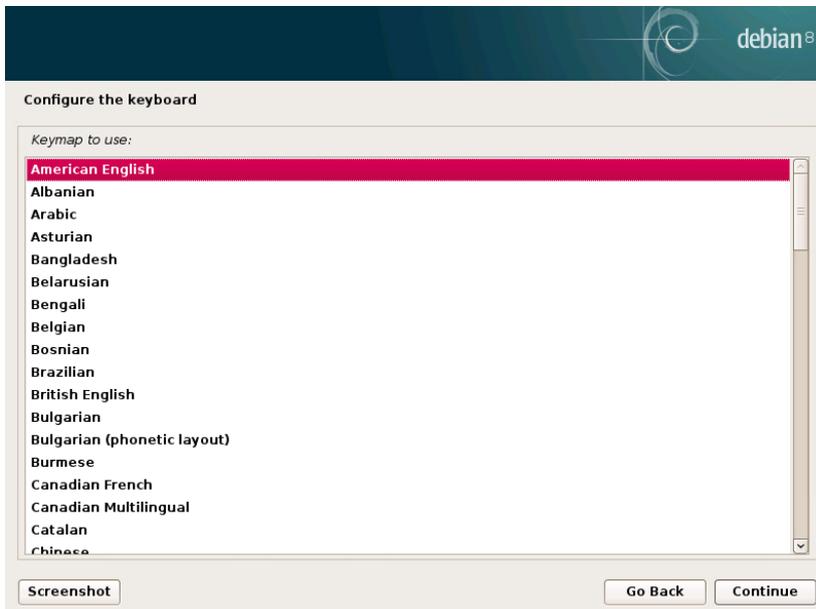
5. Choose an eligible language for the installation process



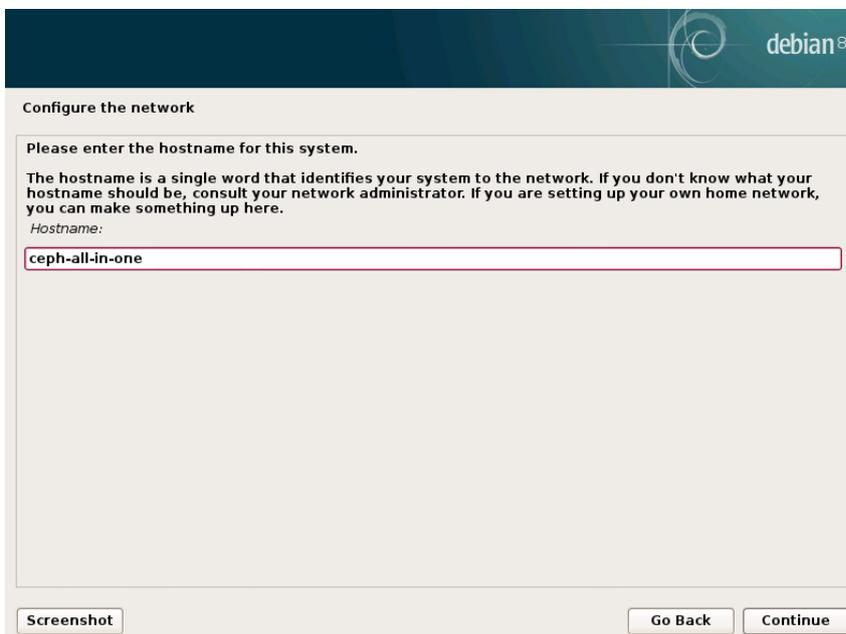
6. Select your location, which is going to be used to set your time zone.



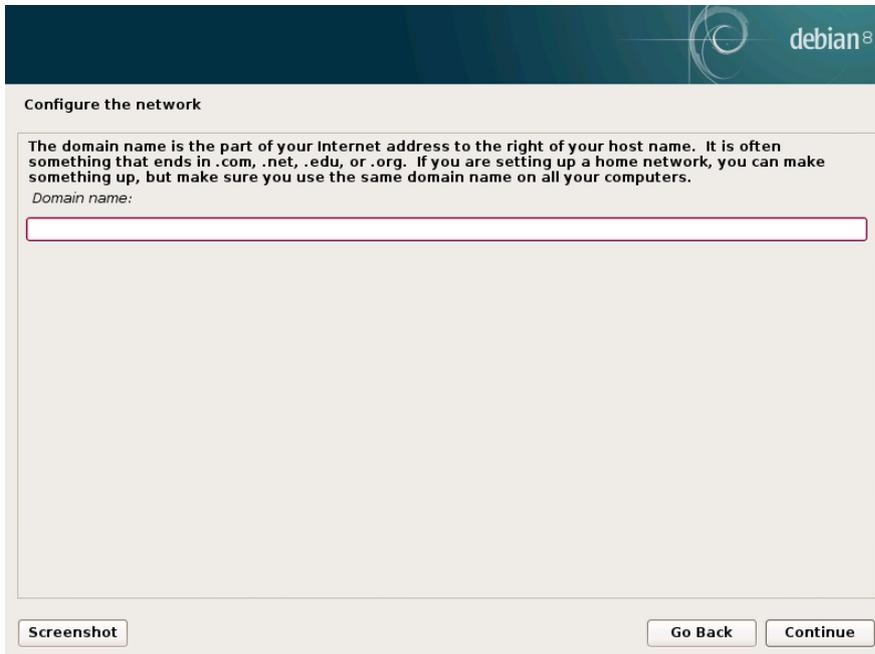
7. Configure the keyboard (choose **American English**)



8. Enter the hostname

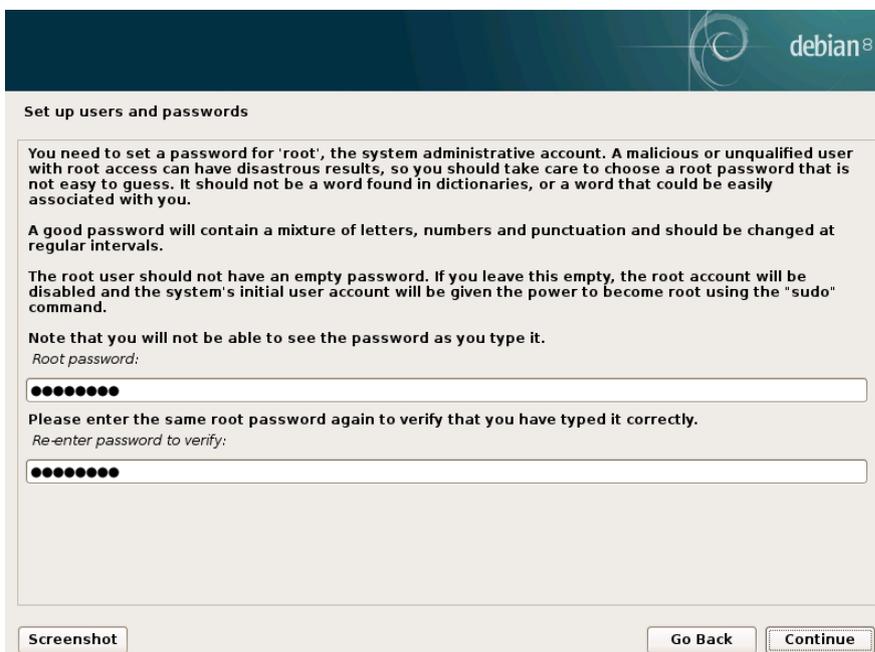


9. Configure your network.



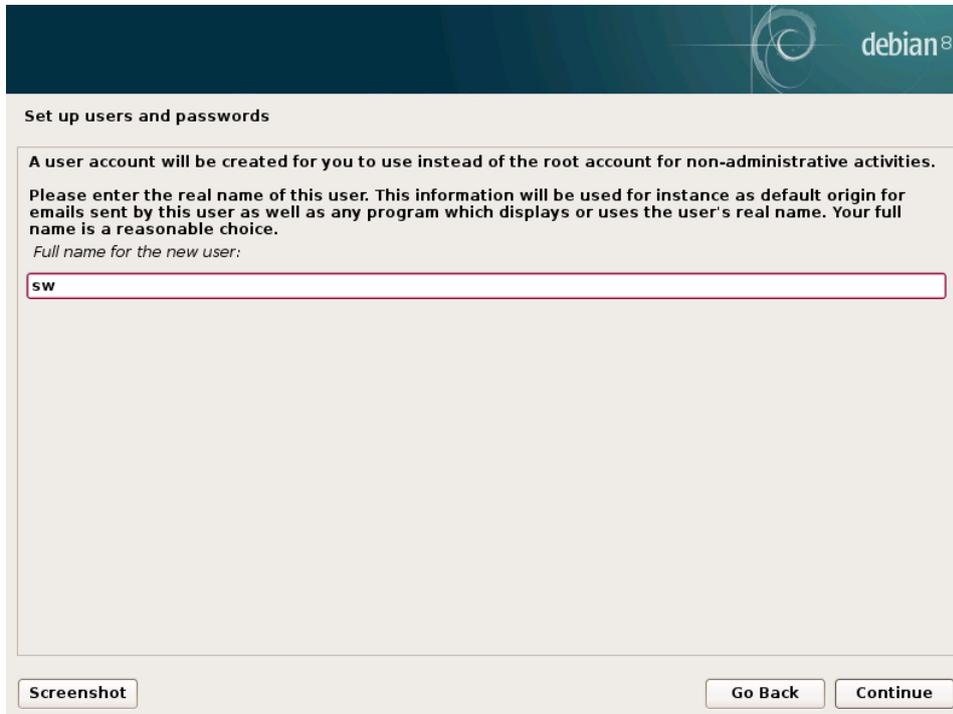
The screenshot shows the 'Configure the network' step in the Debian 8 installer. The window has a dark green header with the Debian logo and 'debian 8' text. Below the header, the title 'Configure the network' is displayed. A text box contains instructions: 'The domain name is the part of your Internet address to the right of your host name. It is often something that ends in .com, .net, .edu, or .org. If you are setting up a home network, you can make something up, but make sure you use the same domain name on all your computers.' Below this is a label 'Domain name:' followed by an empty text input field. At the bottom of the window, there are three buttons: 'Screenshot', 'Go Back', and 'Continue'.

10. Set up a password for 'root' account



The screenshot shows the 'Set up users and passwords' step in the Debian 8 installer. The window has a dark green header with the Debian logo and 'debian 8' text. Below the header, the title 'Set up users and passwords' is displayed. A text box contains instructions: 'You need to set a password for 'root', the system administrative account. A malicious or unqualified user with root access can have disastrous results, so you should take care to choose a root password that is not easy to guess. It should not be a word found in dictionaries, or a word that could be easily associated with you. A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals. The root user should not have an empty password. If you leave this empty, the root account will be disabled and the system's initial user account will be given the power to become root using the "sudo" command. Note that you will not be able to see the password as you type it.' Below this is a label 'Root password:' followed by a password input field with masked characters. Below that is the instruction 'Please enter the same root password again to verify that you have typed it correctly.' followed by a label 'Re-enter password to verify:' and another password input field with masked characters. At the bottom of the window, there are three buttons: 'Screenshot', 'Go Back', and 'Continue'.

11. Create a user account which is going to be used instead of the root account for non-administrative activities



debian⁸

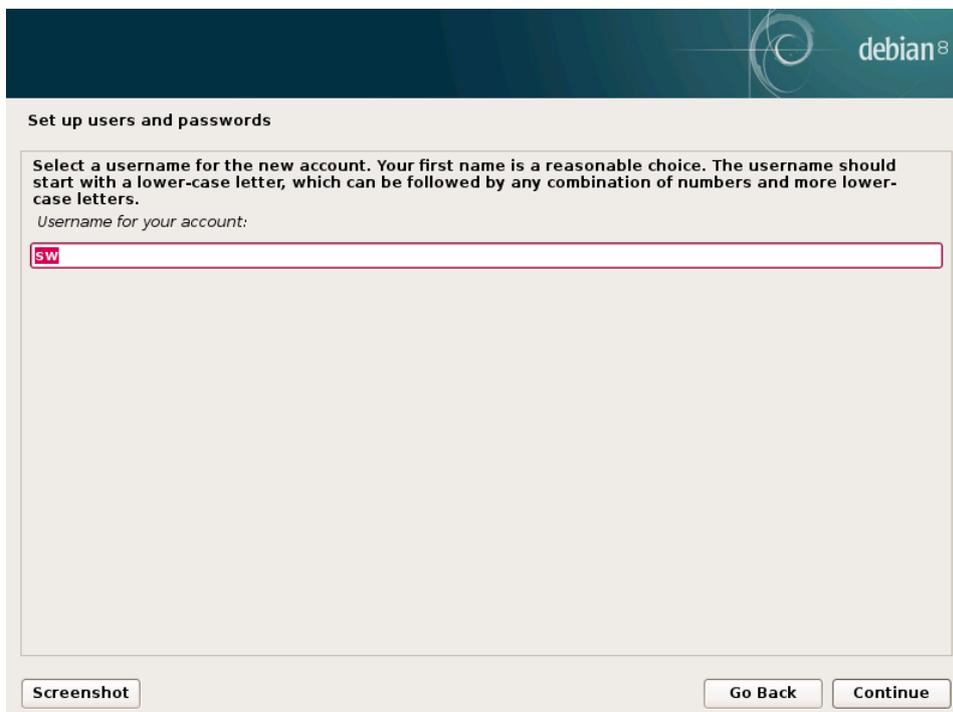
Set up users and passwords

A user account will be created for you to use instead of the root account for non-administrative activities.

Please enter the real name of this user. This information will be used for instance as default origin for emails sent by this user as well as any program which displays or uses the user's real name. Your full name is a reasonable choice.

Full name for the new user:

Screenshot Go Back Continue



debian⁸

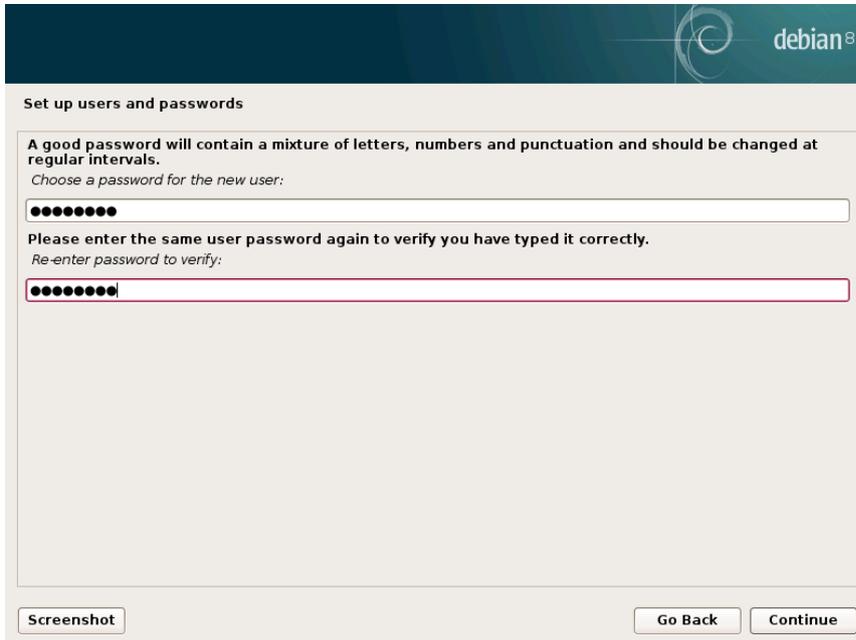
Set up users and passwords

Select a username for the new account. Your first name is a reasonable choice. The username should start with a lower-case letter, which can be followed by any combination of numbers and more lower-case letters.

Username for your account:

Screenshot Go Back Continue

12. Set up a password for the newly created account



debian 8

Set up users and passwords

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.
Choose a password for the new user:

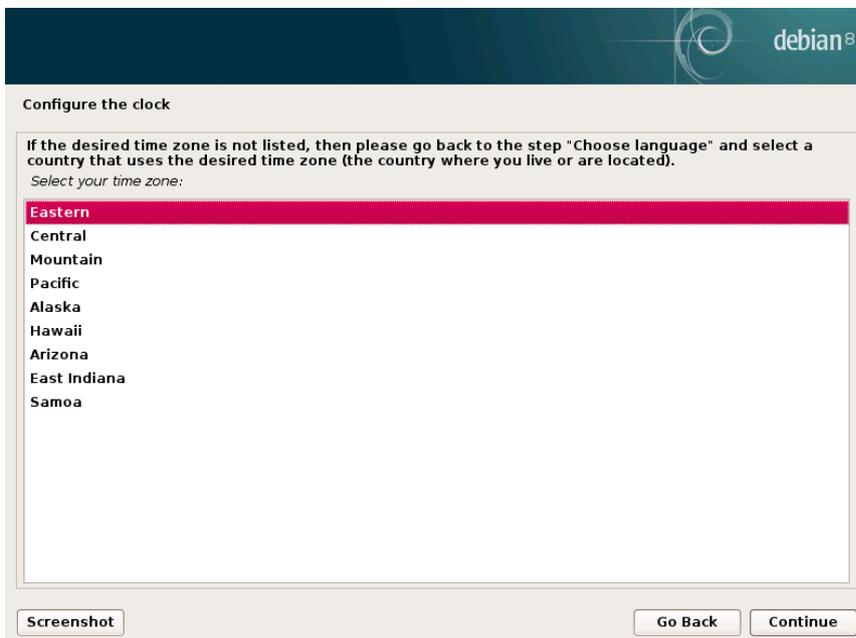
●●●●●●

Please enter the same user password again to verify you have typed it correctly.
Re-enter password to verify:

●●●●●●

Screenshot Go Back Continue

13. Select the desired time zone for you



debian 8

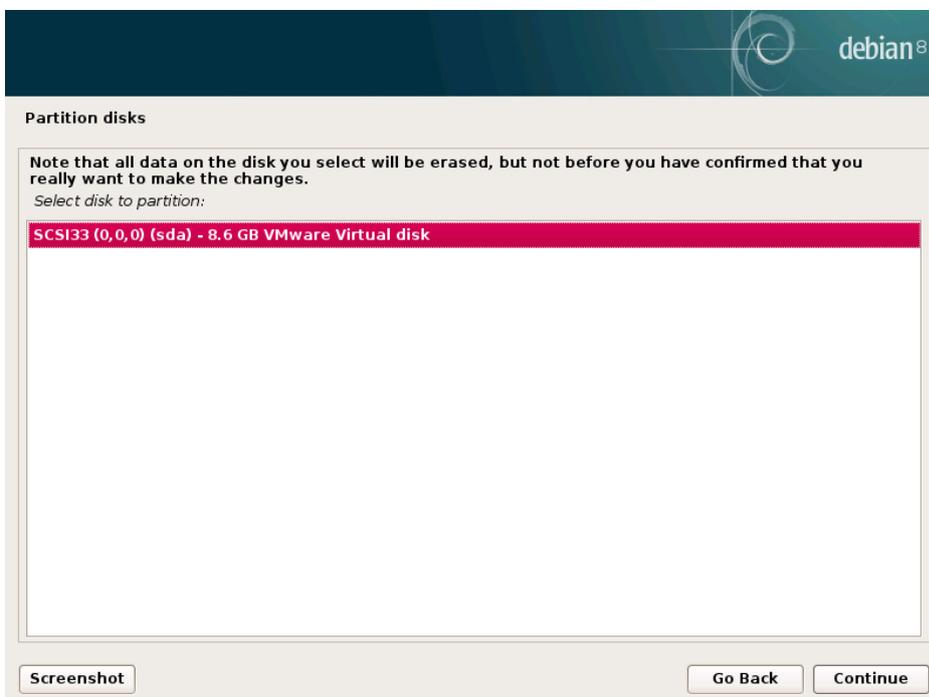
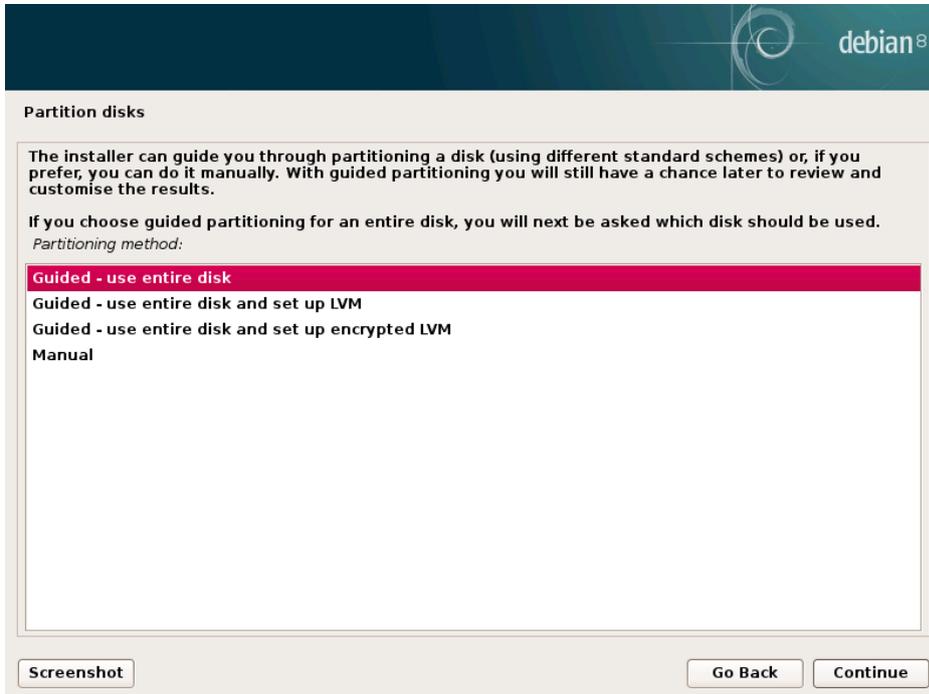
Configure the clock

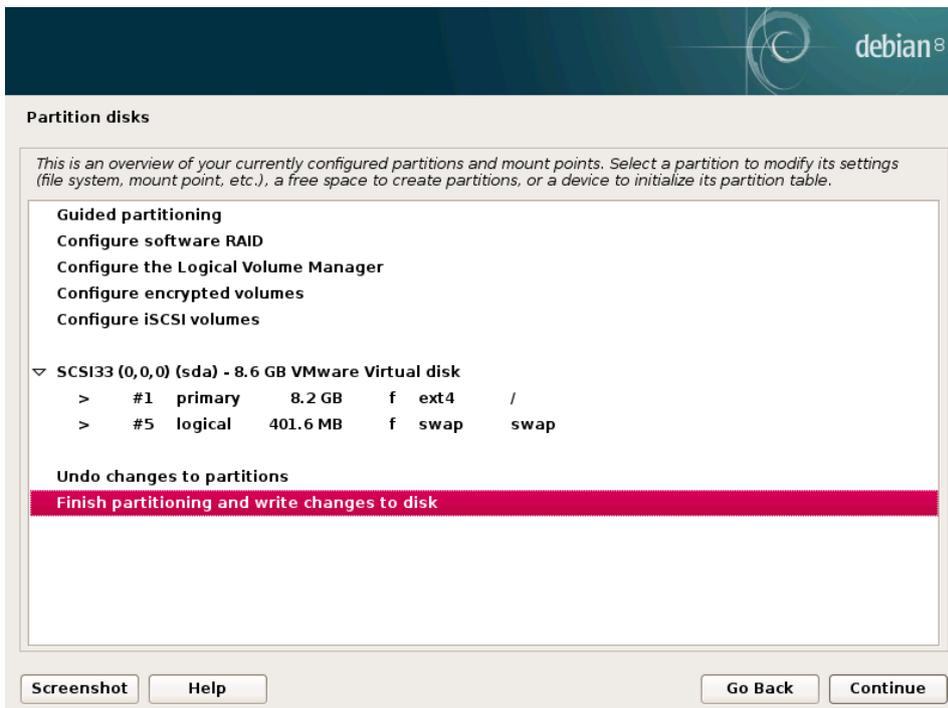
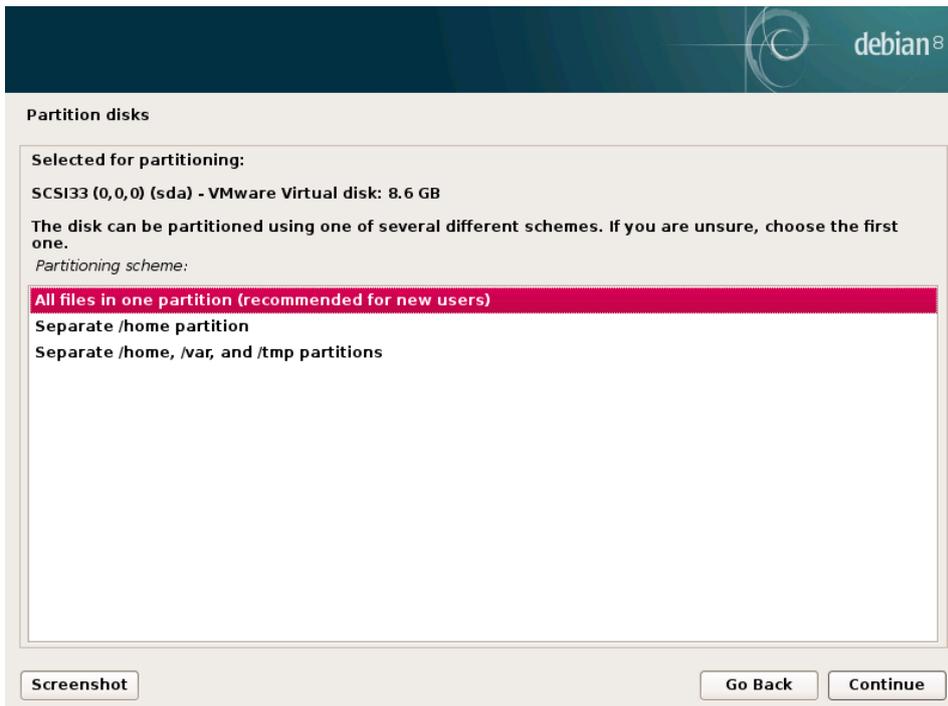
If the desired time zone is not listed, then please go back to the step "Choose language" and select a country that uses the desired time zone (the country where you live or are located).
Select your time zone:

Eastern
Central
Mountain
Pacific
Alaska
Hawaii
Arizona
East Indiana
Samoa

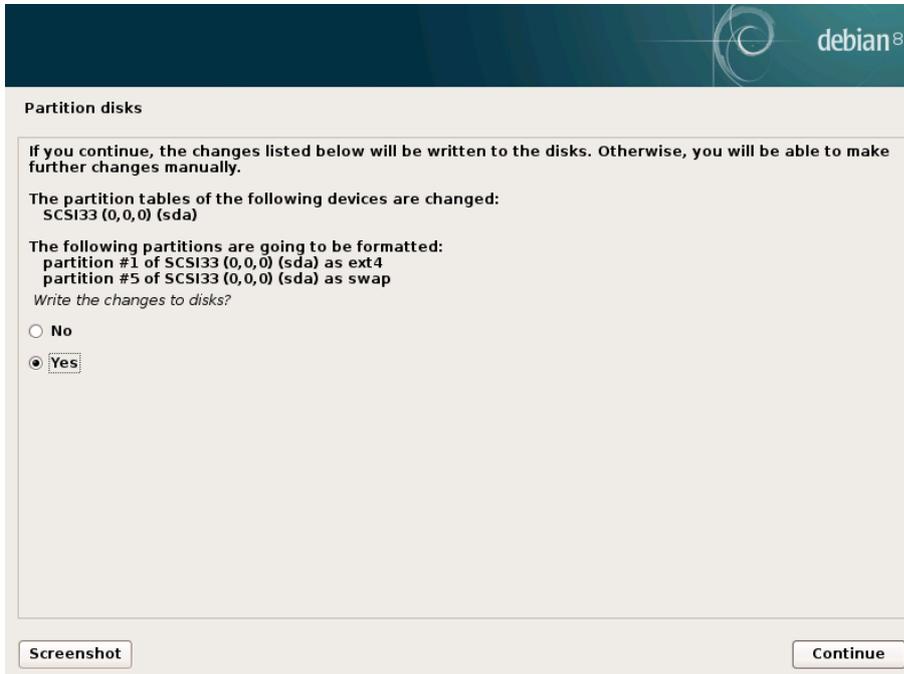
Screenshot Go Back Continue

14. Partition the disks

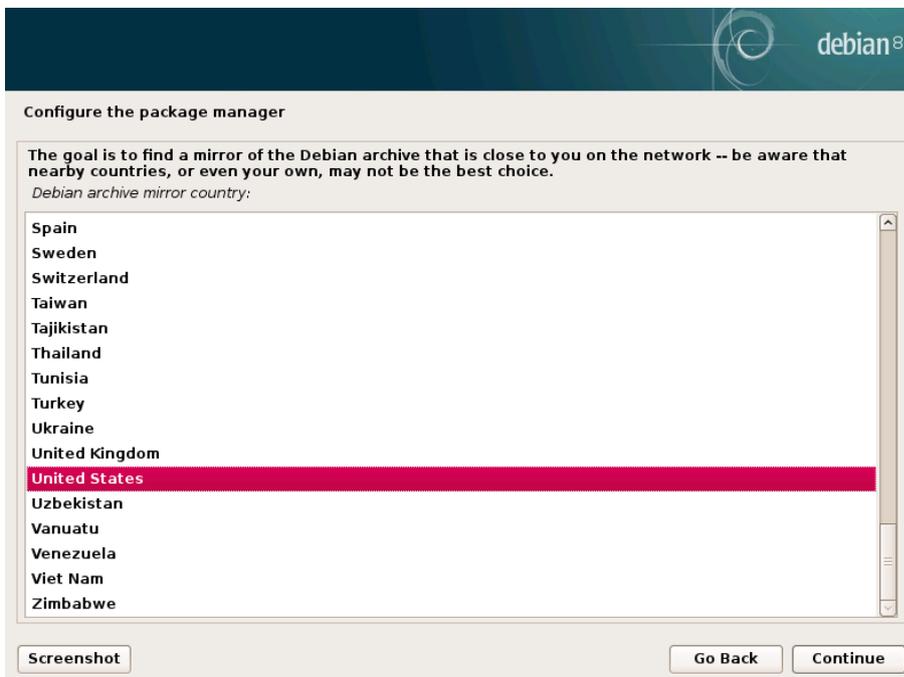




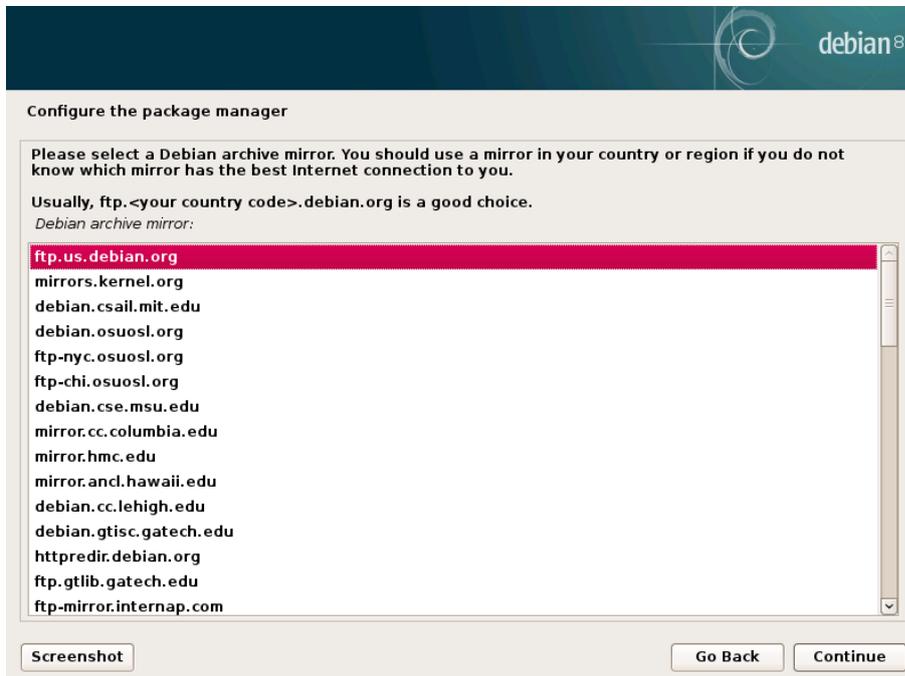
15. Write changes to the disks



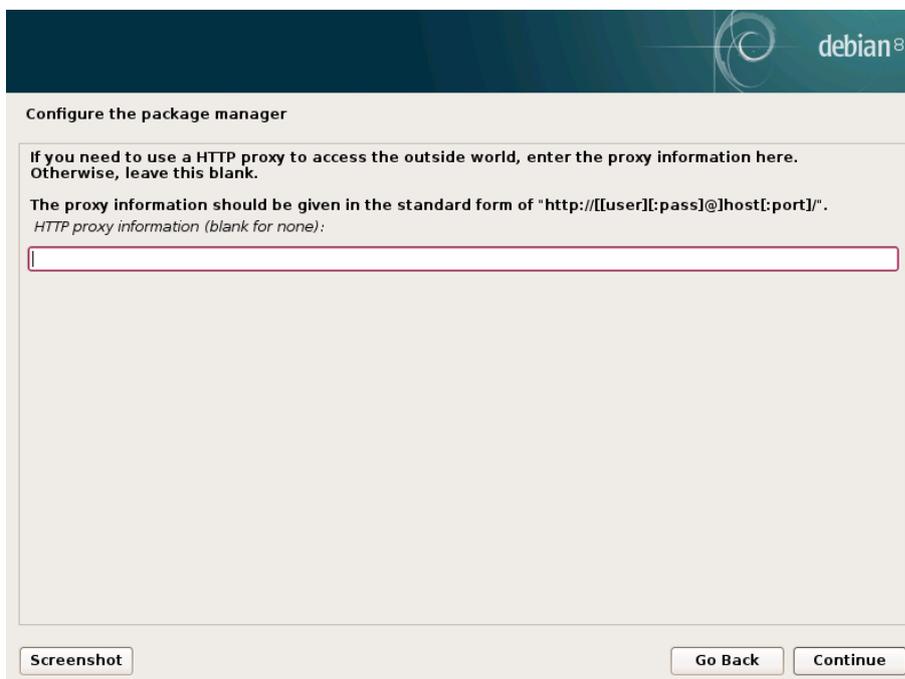
16. Configure the package manager



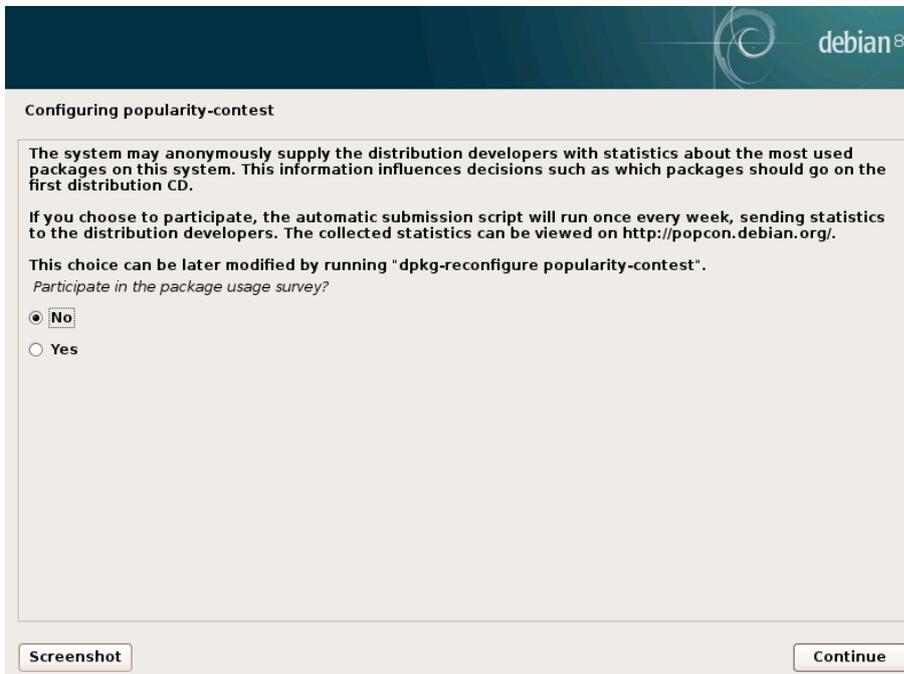
17. Select a Debian Archive mirror



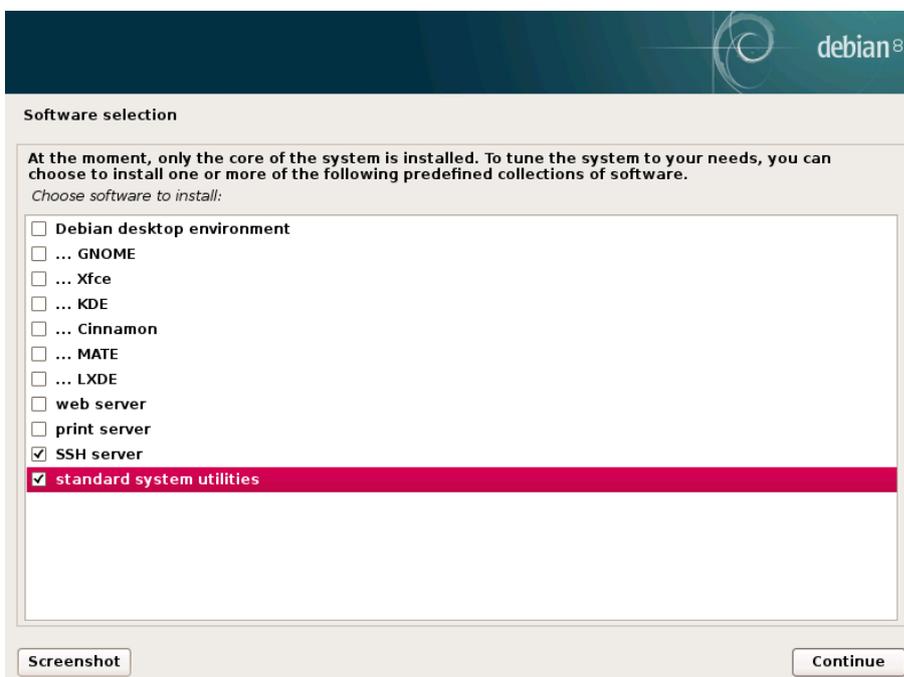
18. Enter proxy information if you need to use HTTP proxy.



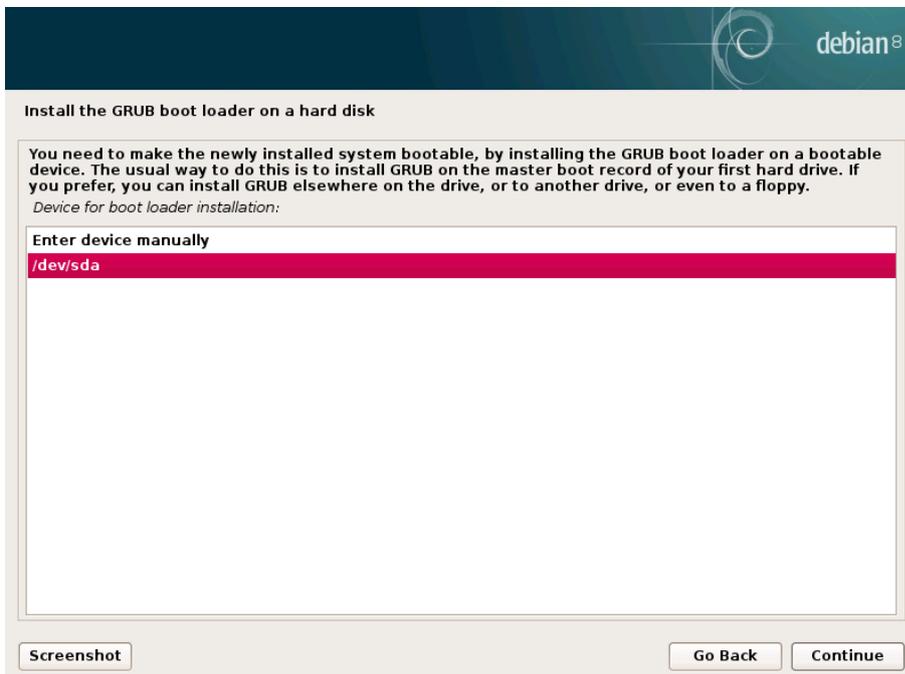
19. Configure popularity contest



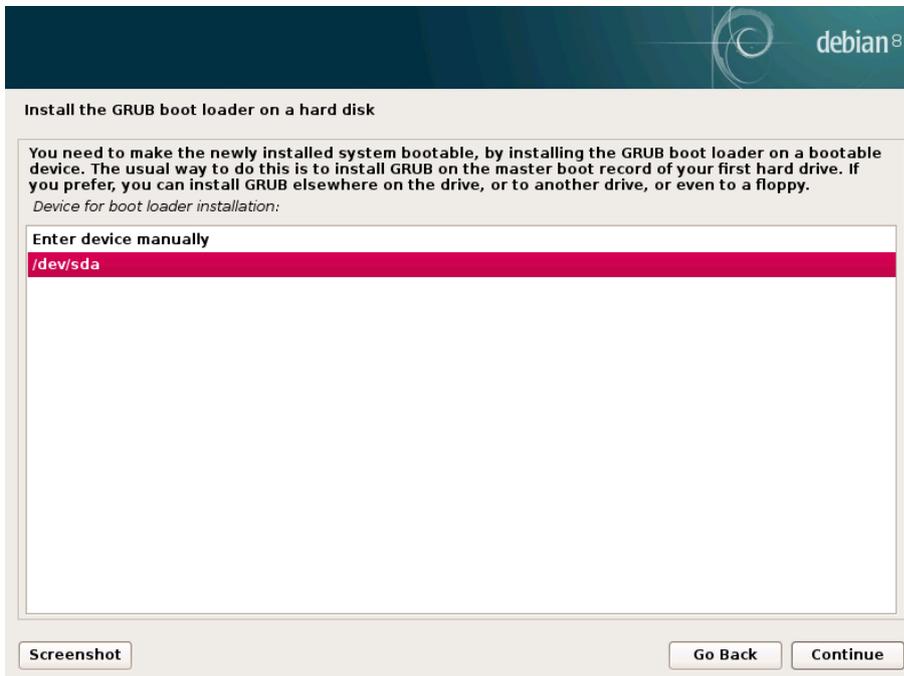
20. Select software needed



21. Install the GRUB boot loader

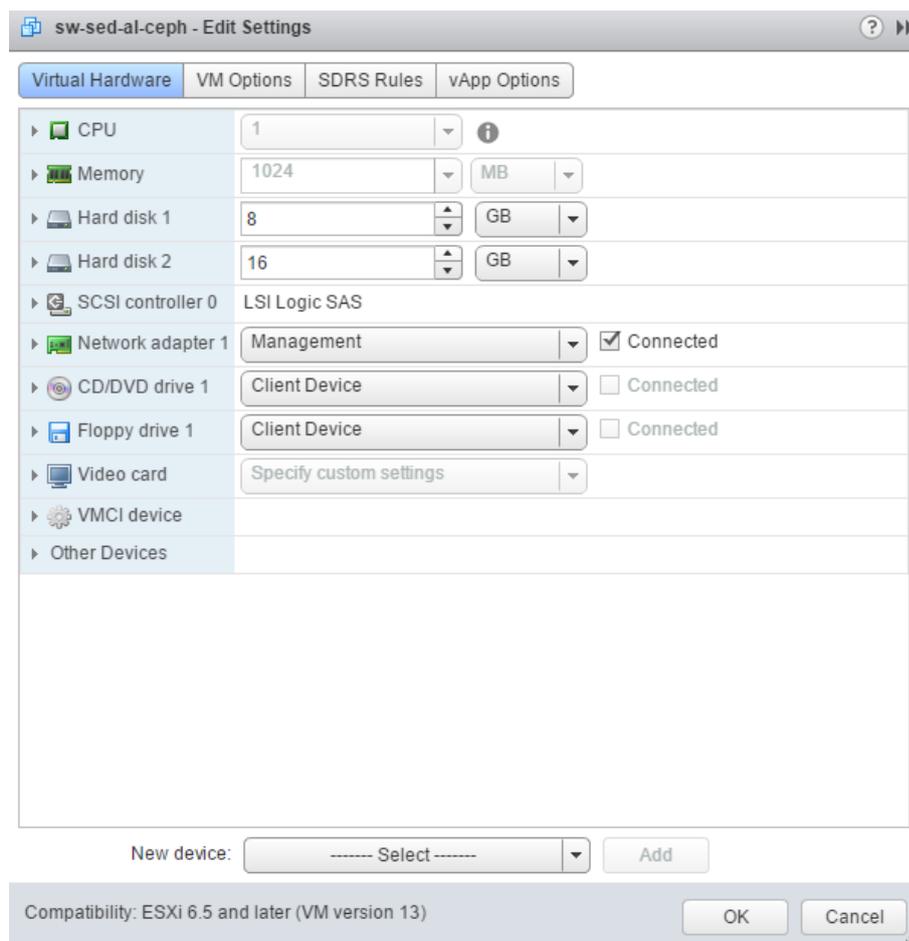


22. Finish the installation



Virtual Machine configuration

23. Add a Virtual Disk with a desirable size to the VM. This Virtual Disk will be used by OSD Daemon.



24. Boot the VM into the recently installed OS and log in to it using the root account. Update Debian using the following command: **apt-get -y update**

25. Install packages and configure NTP.
apt-get install -y sudo python python-pip ntp;
systemctl enable ntp;
systemctl start ntp;

26. Add user you have created to sudoers (where %USERNAME% is the user account you have created during OS installation):
usermod -aG sudo %USERNAME%;
echo "%USERNAME% ALL = (root) NOPASSWD:ALL" | sudo tee
/etc/sudoers.d/%USERNAME%;
chmod 0440 /etc/sudoers.d/%USERNAME%;

27. Connect to the VM via SSH and log in using your user account.

28. Configure SSH:
Generate the ssh keys for %USERNAME% user:
ssh-keygen
Leave passphrase as blank/empty.
Edit file id_rsa.pub and remove "%USERNAME%@host" (name of your user) at the end of the string
nano /home/%USERNAME%/.ssh/id_rsa.pub
cp /home/%USERNAME%/.ssh/id_rsa.pub
/home/%USERNAME%/.ssh/authorized_key

29. Add to /etc/hosts host ip (eth0) and a hostname

```

GNU nano 2.2.6                               File: /etc/hosts
127.0.0.1    localhost
127.0.1.1    ceph-all-in-one
192.168.0.69 ceph-all-in-one

# The following lines are desirable for IPv6 capable hosts
::1        localhost ip6-localhost ip6-loopback
ff02::1    ip6-allnodes
ff02::2    ip6-allrouters

```

Ceph Deployment

30. Deploy Ceph "all-in-one":

- Create directory "Ceph-all-in-one":
mkdir ~/Ceph-all-in-one;
cd ~/Ceph-all-in-one;
- Install Ceph-deploy:
sudo pip install Ceph-deploy
- Create new config:
sCeph-deploy new Ceph-all-in-one;
echo "[osd]" >> /home/%USERNAME%/Ceph-all-in-one/Ceph.conf;
echo "osd pool default size = 1" >> /home/sw/Ceph-all-in-one/Ceph.conf;
echo "osd crush chooseleaf type = 0" >> /home/%USERNAME%/Ceph-all-in-one/Ceph.conf;

31. Install Ceph and add mon role to node

Ceph-deploy install Ceph-all-in-one; ("Ceph-all-in-one" our hostname)
Ceph-deploy mon create-initial;
Ceph-deploy osd create Ceph-all-in-one:sdb; ("Ceph-all-in-one" our hostname, sdb name of the disk we have added in the Virtual Machine configuration section)

32. Change Ceph rbd pool size:

sudo Ceph osd pool set rbd size 1

```
sw@sw-sed-al-ceph:~/ceph-all-in-one$ sudo ceph osd pool set rbd size 1
set pool 0 size to 1
sw@sw-sed-al-ceph:~/ceph-all-in-one$ █
```

33. After deployment:
Check cluster status: **sudo Ceph -s**

```
sw@sw-sed-al-ceph:~/ceph-all-in-one$ sudo ceph -s
cluster cbb947f6-5998-4c0e-97f8-f157a935fe2a
health HEALTH_OK
monmap el: 1 mons at {sw-sed-al-ceph=192.168.0.69:6789/0}
election epoch 4, quorum 0 sw-sed-al-ceph
osdmap ell: 1 osds: 1 up, 1 in
flags sortbitwise,require_jewel_osds
pgmap v24: 64 pgs, 1 pools, 370 bytes data, 4 objects
34748 kB used, 11219 MB / 11252 MB avail
64 active+clean
sw@sw-sed-al-ceph:~/ceph-all-in-one$ █
```

NOTE: Please keep in mind that we have deployed Ceph cluster without the replication. It is not recommended to use this scenario in production.

Conclusion

By following these instructions, you have deployed Debian VM and configured it for creating Ceph all-in-one cluster. We have configured the VM as a Ceph monitor and created an OSD and Ceph pool. As a result, you can create RBD device, format it and mount to store your data.

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