

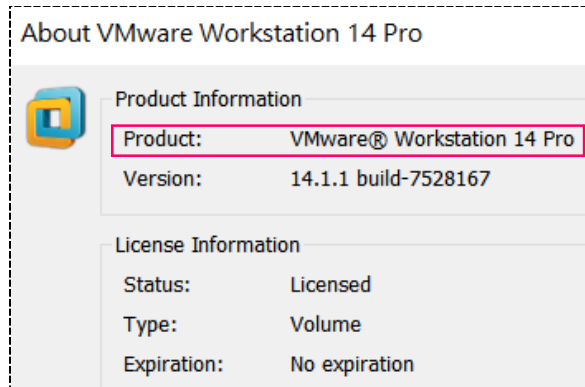
Ceph Installation Configuration and Administration Reference

prepared by Danny Lin

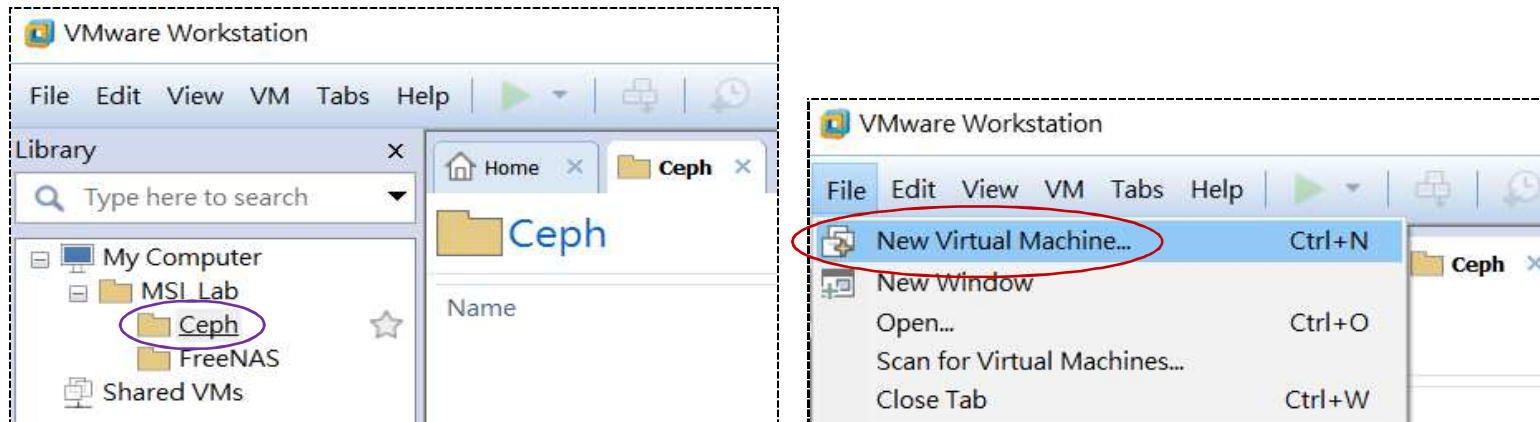
dl1963inet@outlook.com

Reference information		
Item	Description	URLs
1	<i>Welcome to Ceph</i>	http://docs.ceph.com/docs/mimic/
2	<i>Ceph Storage Cluster</i>	http://docs.ceph.com/docs/mimic/rados/
3	<i>Ceph Development</i>	http://docs.ceph.com/docs/mimic/rados/deployment/
4	<i>Product Documentation for Red Hat Ceph Storage</i>	https://access.redhat.com/documentation/en-us/red_hat_ceph_storage/
5	<i>How to build a Ceph Distributed Storage Cluster on CentOS 7</i>	https://www.howtoforge.com/tutorial/how-to-build-a-ceph-cluster-on-centos-7/
6	<i>Monitoring of a Ceph Cluster with Ceph-dash on CentOS 7</i>	https://www.howtoforge.com/tutorial/monitoring-of-a-ceph-cluster-with-ceph-dash/
7	<i>Ceph Releases</i>	http://docs.ceph.com/docs/master/releases/
8	<i>Pool, PG and CRUSH Config Reference</i>	http://docs.ceph.com/docs/master/rados/configuration/pool-pg-config-ref/

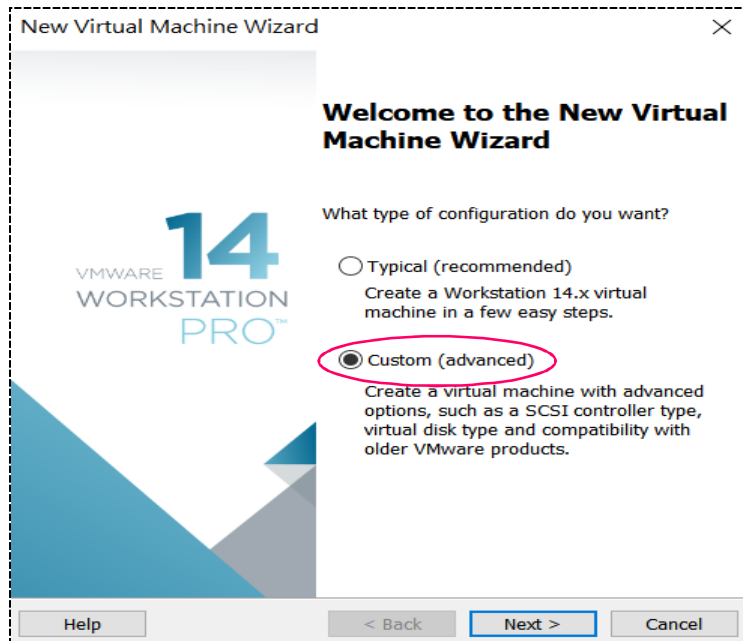
1. We use VMware Workstation Pro 14 to demo how to install, configure and administrate the Ceph storage:



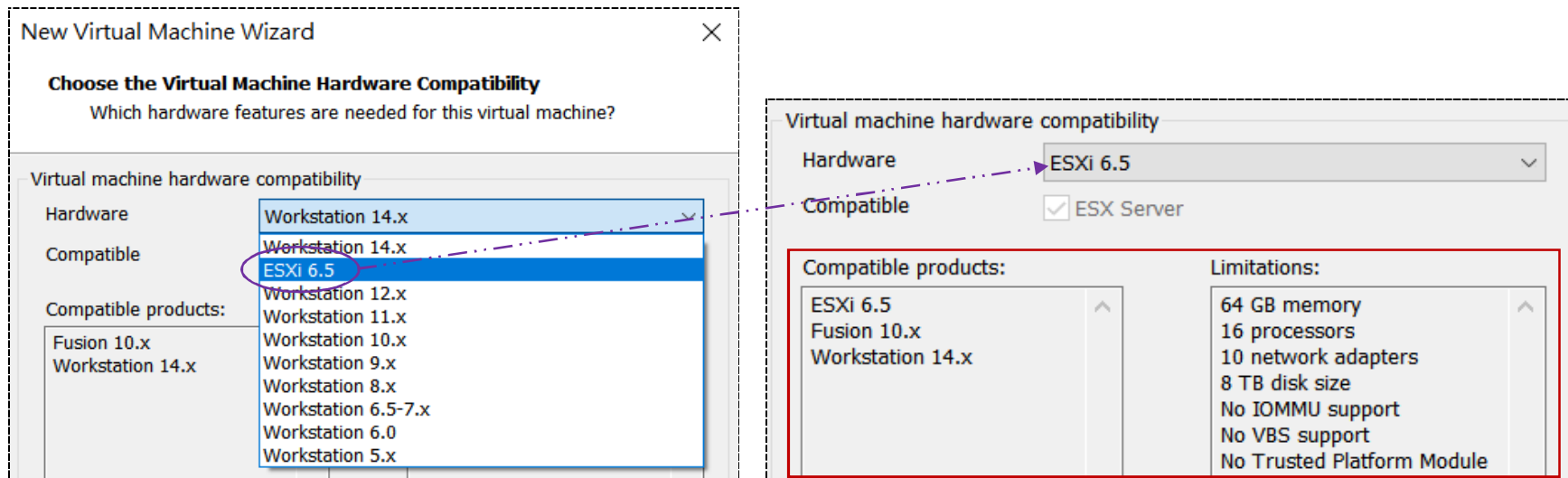
2. We create new VM for OS - CentOS 7.5 (1804) installation:



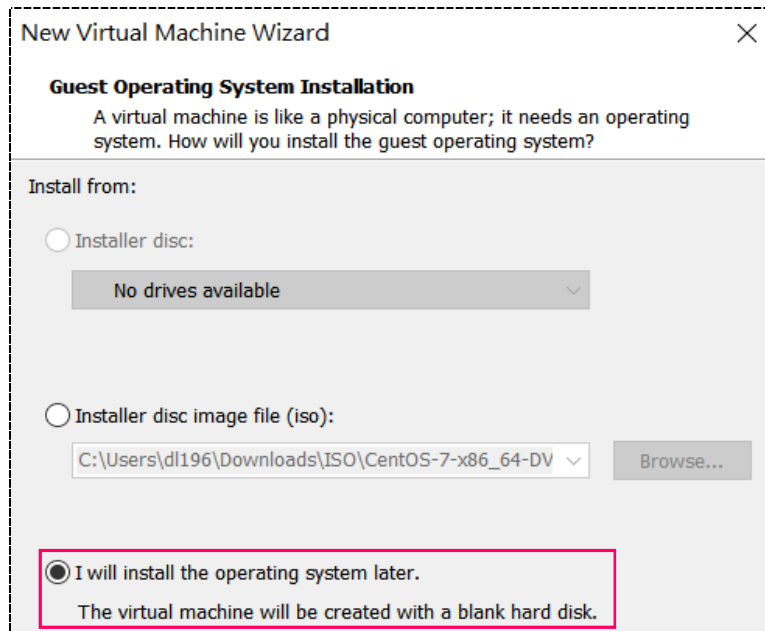
3. We choose “custom (advanced)” to configure more for VM:



4. We change from “WS 14.x” to “ESXi 6.5” for VM H/W compatibility, the limitations are as the listed:



5. We will install OS later, just want to create VM first, and select Linux, CentOS 7 64-bit, for guest OS:



New Virtual Machine Wizard

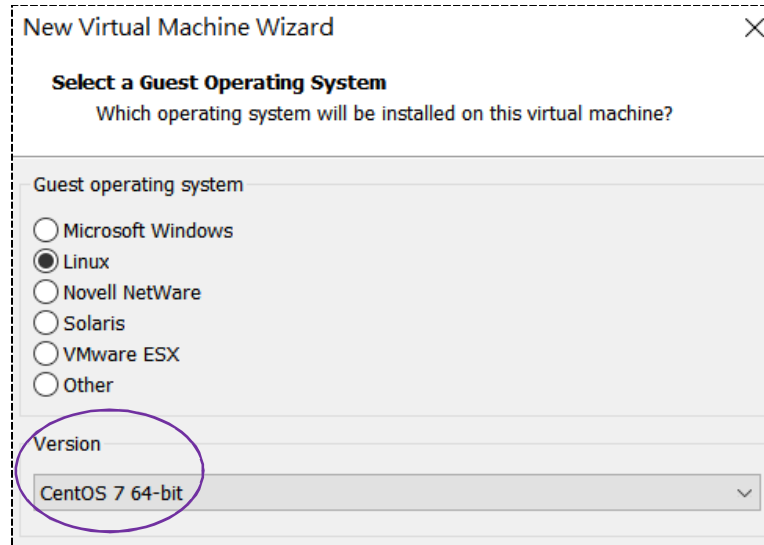
Guest Operating System Installation
A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?

Install from:

☐ Installer disc:
No drives available

☐ Installer disc image file (iso):
C:\Users\dl196\Downloads\ISO\CentOS-7-x86_64-DV Browse...

☒ I will install the operating system later.
The virtual machine will be created with a blank hard disk.



New Virtual Machine Wizard

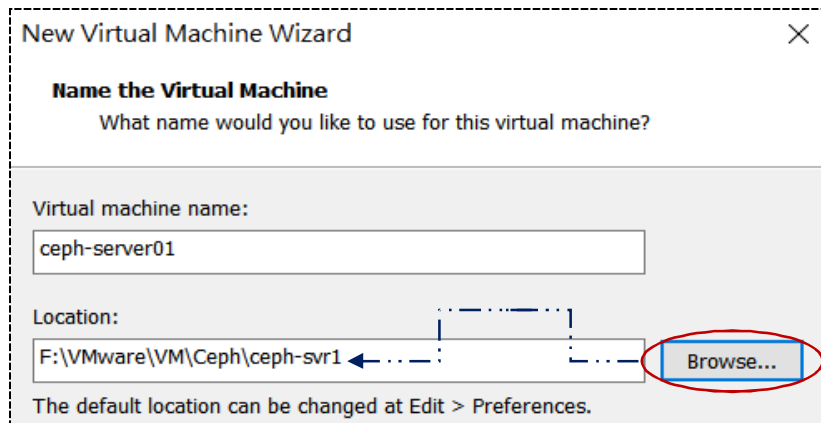
Select a Guest Operating System
Which operating system will be installed on this virtual machine?

Guest operating system

☐ Microsoft Windows
☒ Linux
☐ Novell NetWare
☐ Solaris
☐ VMware ESX
☐ Other

Version
CentOS 7 64-bit

6. We name the VM as ceph-server01, then browse the location to hold VM information:



New Virtual Machine Wizard

Name the Virtual Machine
What name would you like to use for this virtual machine?

Virtual machine name:
ceph-server01

Location:
F:\VMware\VM\Ceph\ceph-svr1 Browse...

The default location can be changed at Edit > Preferences.

7. We choose 2 processors, 2 cores per processor for CPU configuration and 8192 MB for memory:

The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Processor Configuration' step. The title bar says 'New Virtual Machine Wizard' with a close button. The main heading is 'Processor Configuration' with the instruction 'Specify the number of processors for this virtual machine.' Below this, there are three rows of configuration options, all of which are highlighted with a red rectangular box:

- Processors
- Number of processors: 2 (dropdown menu)
- Number of cores per processor: 2 (dropdown menu)
- Total processor cores: 4

The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Memory for the Virtual Machine' step. The title bar says 'New Virtual Machine Wizard' with a close button. The main heading is 'Memory for the Virtual Machine' with the instruction 'How much memory would you like to use for this virtual machine?'. Below this, there is a text box that says 'Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.' To the left of the memory input is a vertical slider with labels from 1 GB to 64 GB. The memory input field is highlighted with a red oval and contains the value '8192' followed by 'MB'. Below the input field, there is a checkbox labeled 'Maximum recommended memory: 27.9 GB' which is currently unchecked.

8. We choose NAT for network configuration and use LSI Logic for disk I/O SCSI controller:

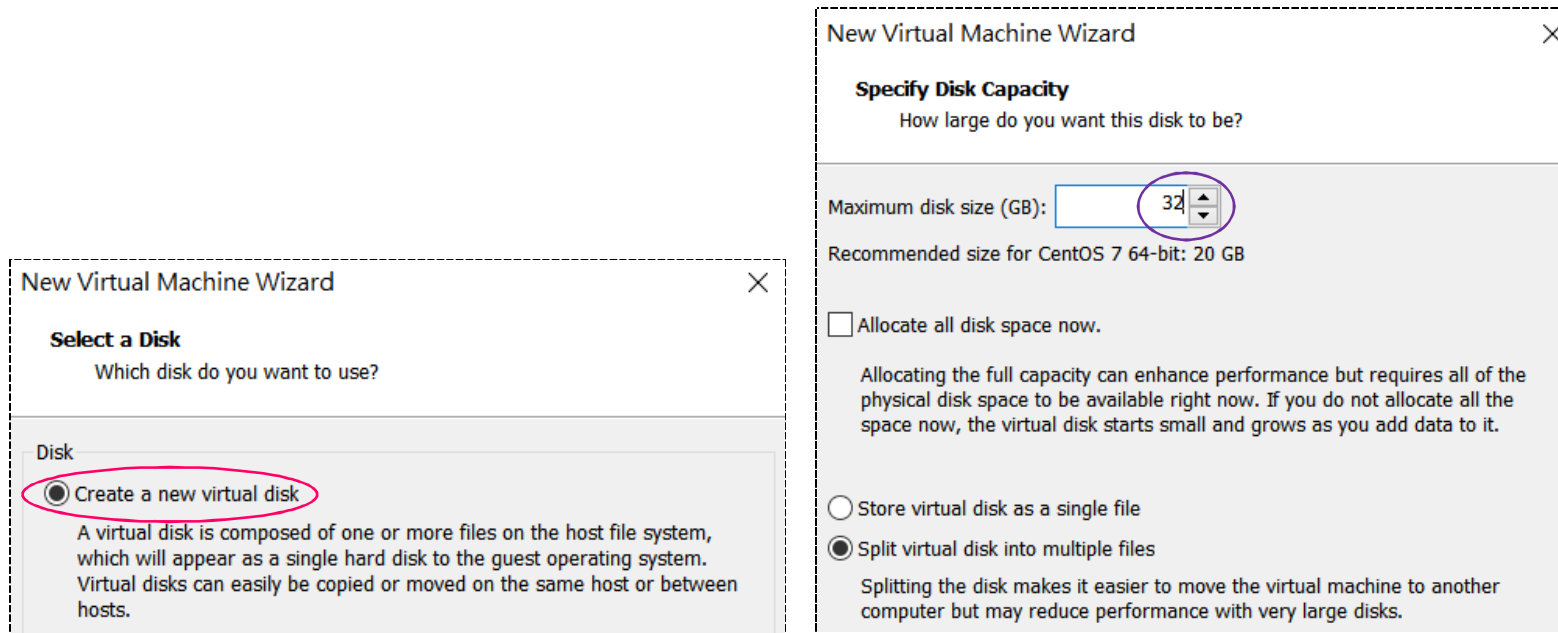
The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Network Type' step. The title bar says 'New Virtual Machine Wizard' with a close button. The main heading is 'Network Type' with the instruction 'What type of network do you want to add?'. Below this, there are three radio button options, all of which are highlighted with a red rectangular box:

- ☐ Use bridged networking
Give the guest operating system direct access to an external Ethernet network. The guest must have its own IP address on the external network.
- ☒ Use network address translation (NAT)
Give the guest operating system access to the host computer's dial-up or external Ethernet network connection using the host's IP address.
- ☐ Use host-only networking
Connect the guest operating system to a private virtual network on the host computer.

The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Select I/O Controller Types' step. The title bar says 'New Virtual Machine Wizard' with a close button. The main heading is 'Select I/O Controller Types' with the instruction 'Which SCSI controller type would you like to use?'. Below this, there is a section titled 'I/O controller types' with a sub-section 'SCSI Controller:'. There are three radio button options, all of which are highlighted with a red oval:

- ☐ BusLogic (Not available for 64-bit guests)
- ☒ LSI Logic (Recommended)
- ☐ LSI Logic SAS

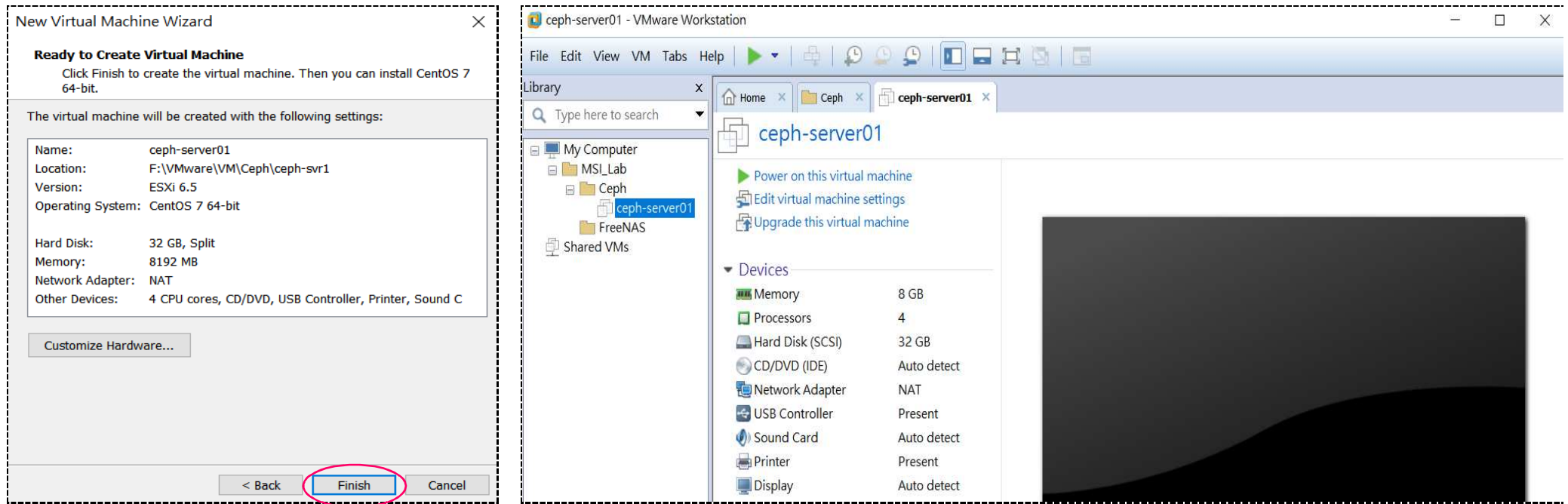
9. We create a new virtual disk and use 32 GB for disk size:



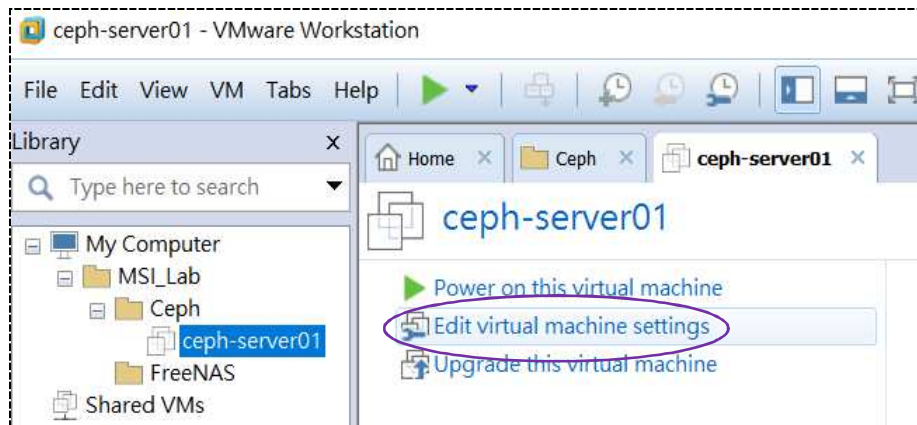
10. We browse the location to hold VM virtual disk:



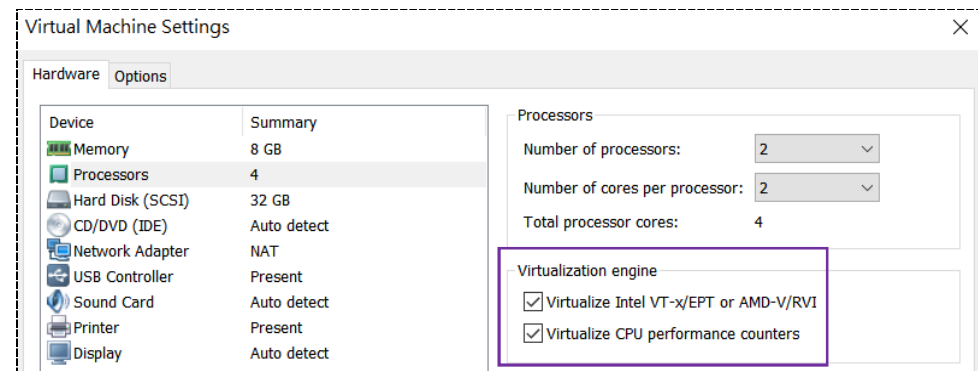
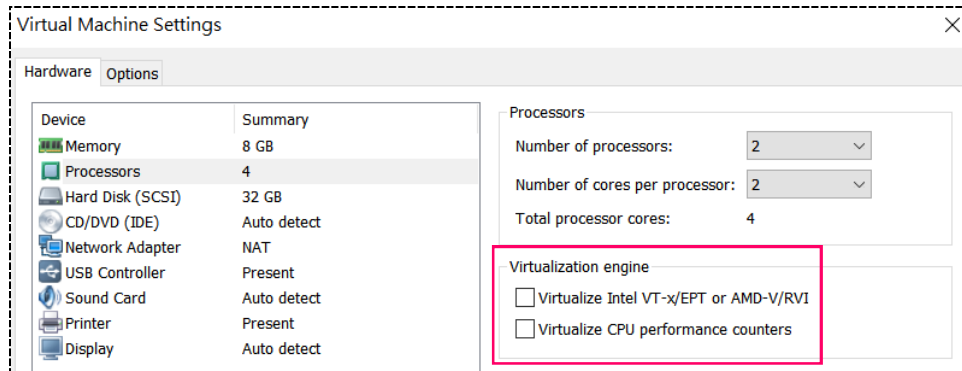
11. The VM has been created successfully:



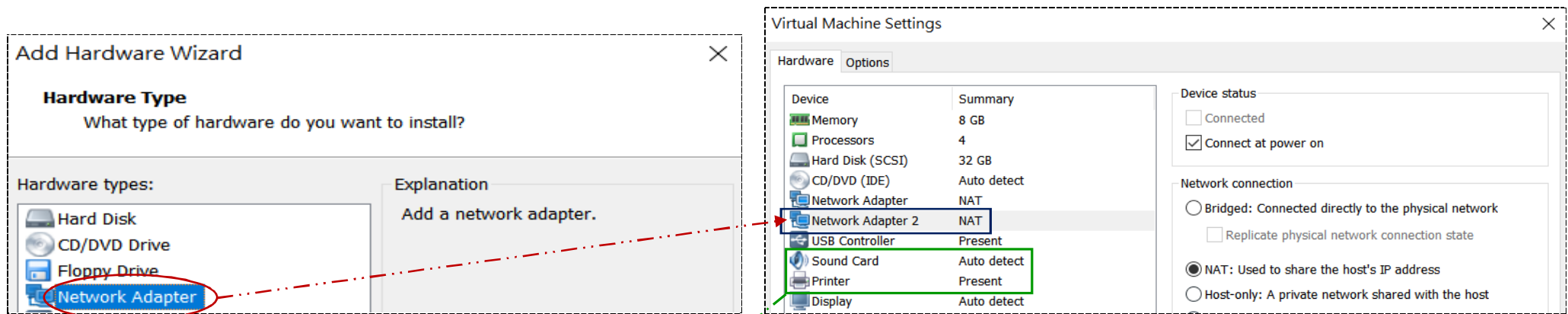
12. We edit virtual machine settings for more customization:



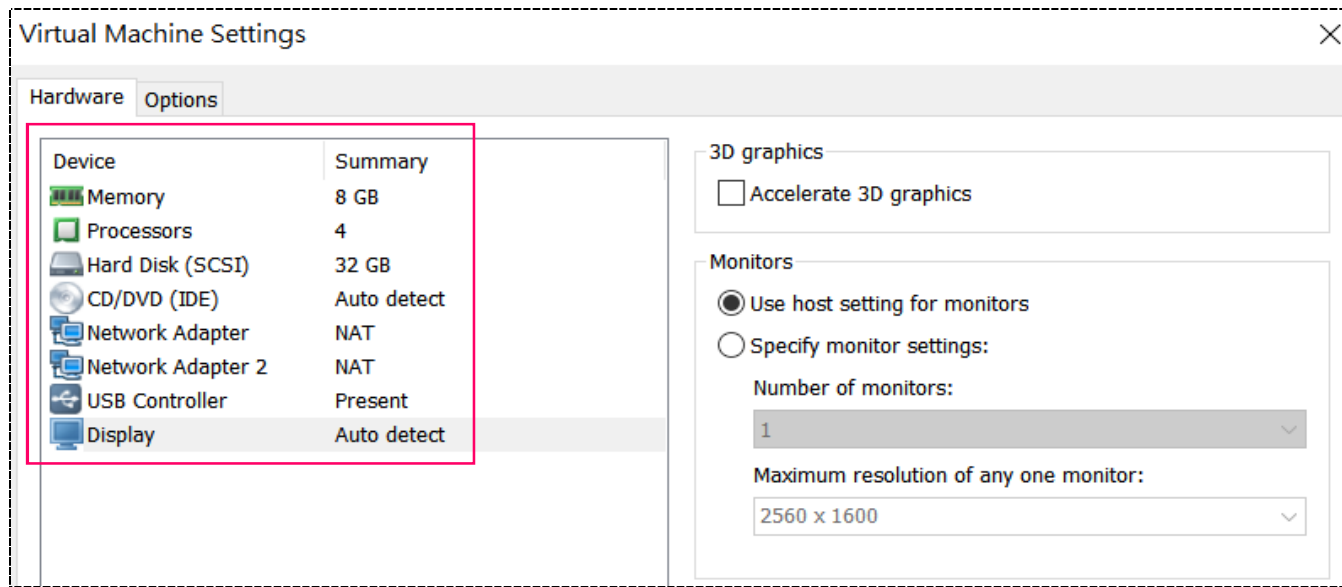
13. We enable H/W virtualization engine for CPUs:



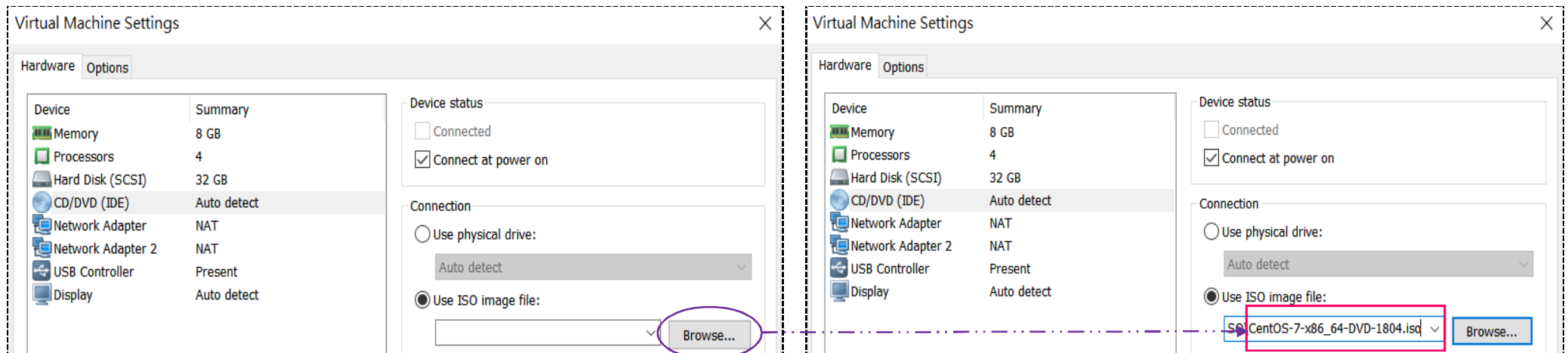
14. We add another network adapter:



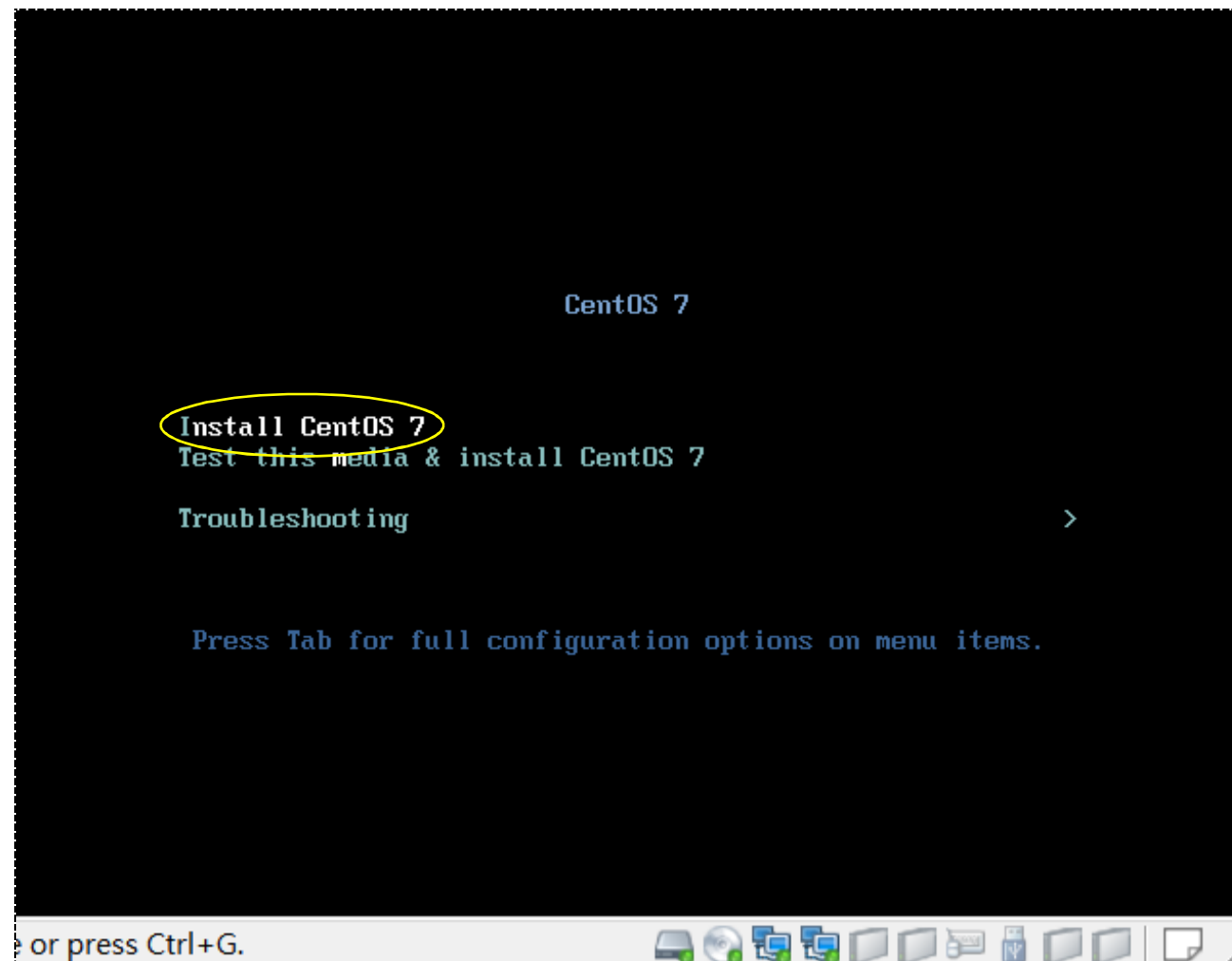
15. We remove unneeded H/W – sound card and printer:



16. We browse the CentOS 7.5 (1804) ISO image for guest OS installation:



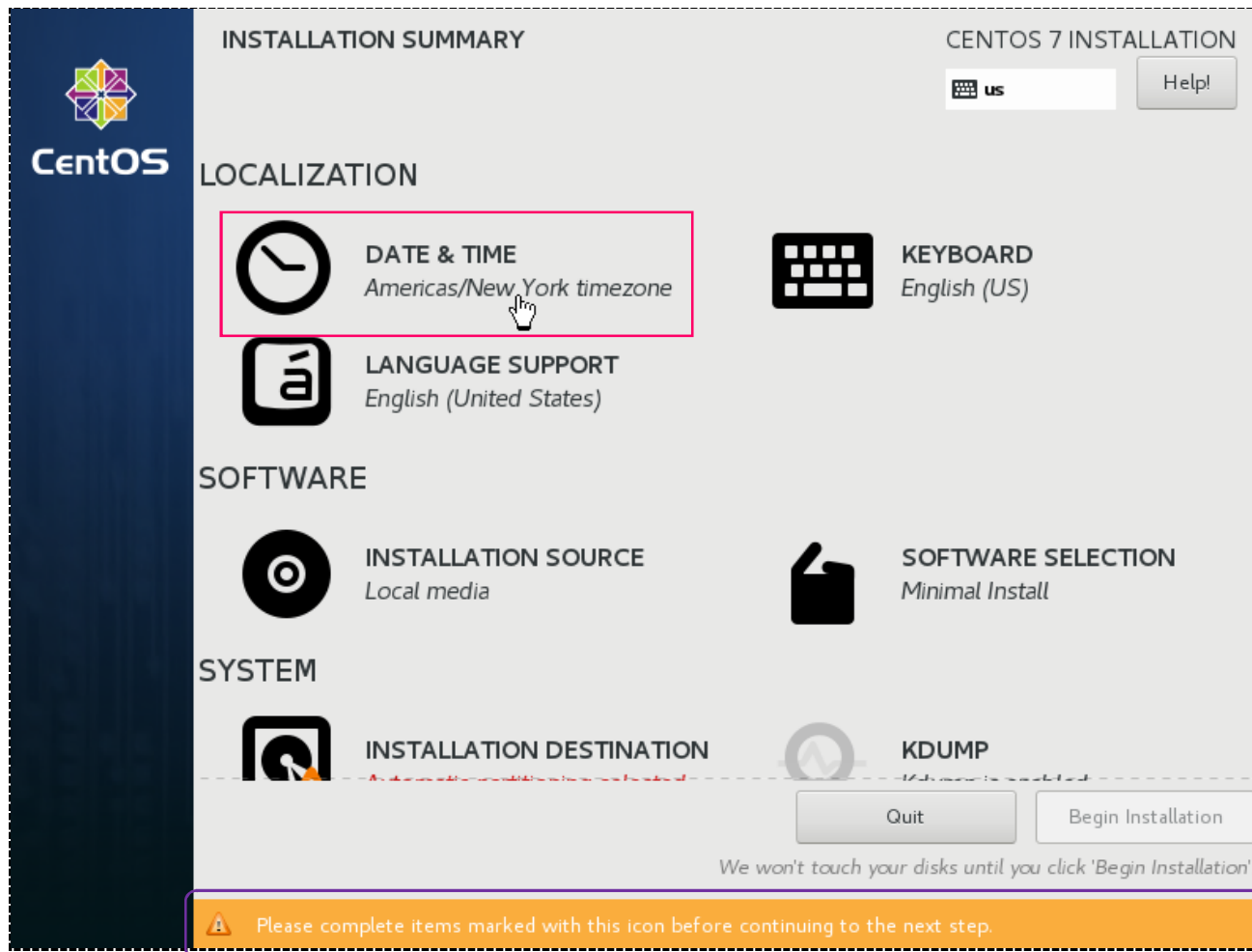
17. We power on the VM and start the guest OS installation:



18. We choose English as the language for installation process:

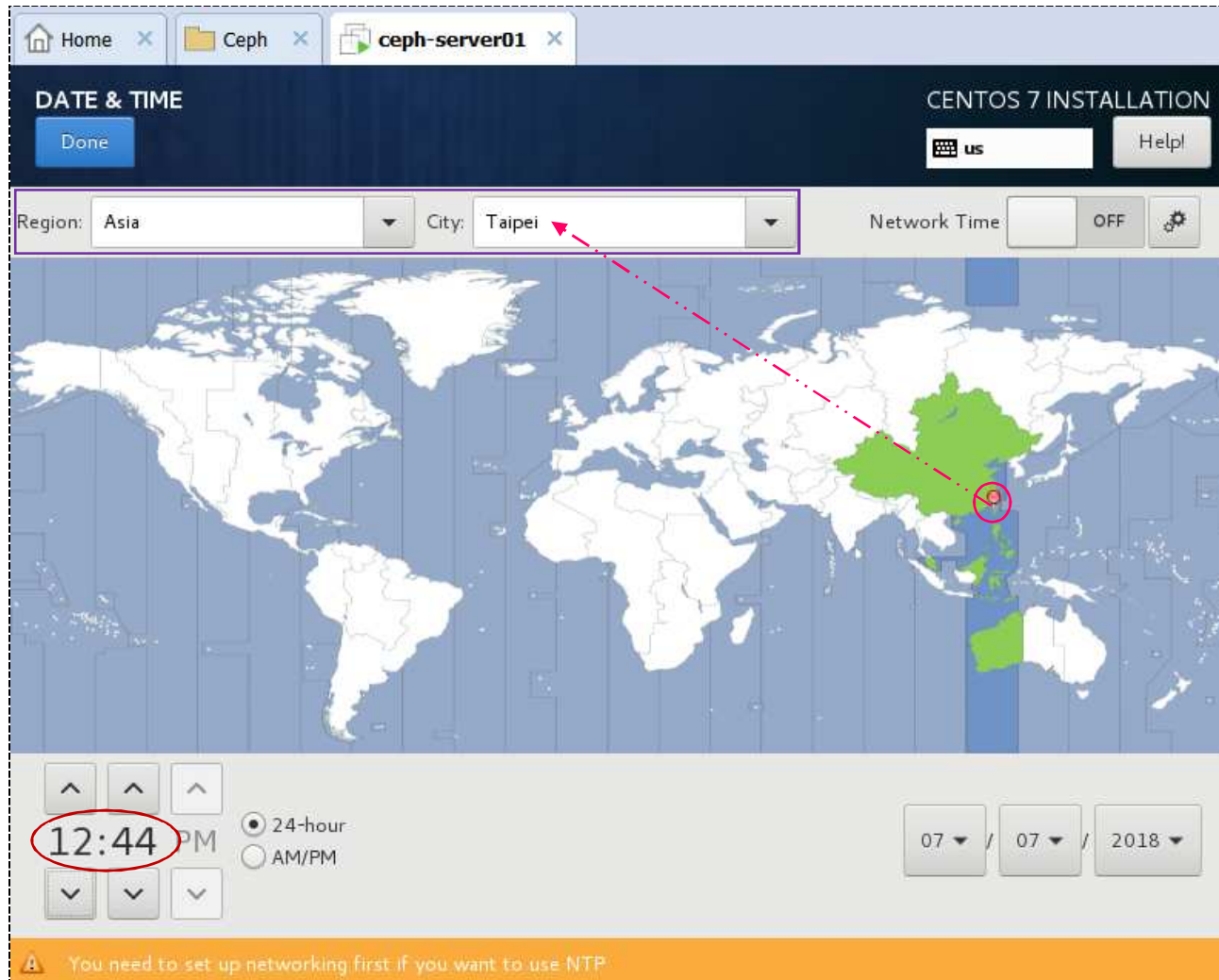


19. First of all, We will change the date & time setting from “Americas/New York” to “Asia/Taipei”:

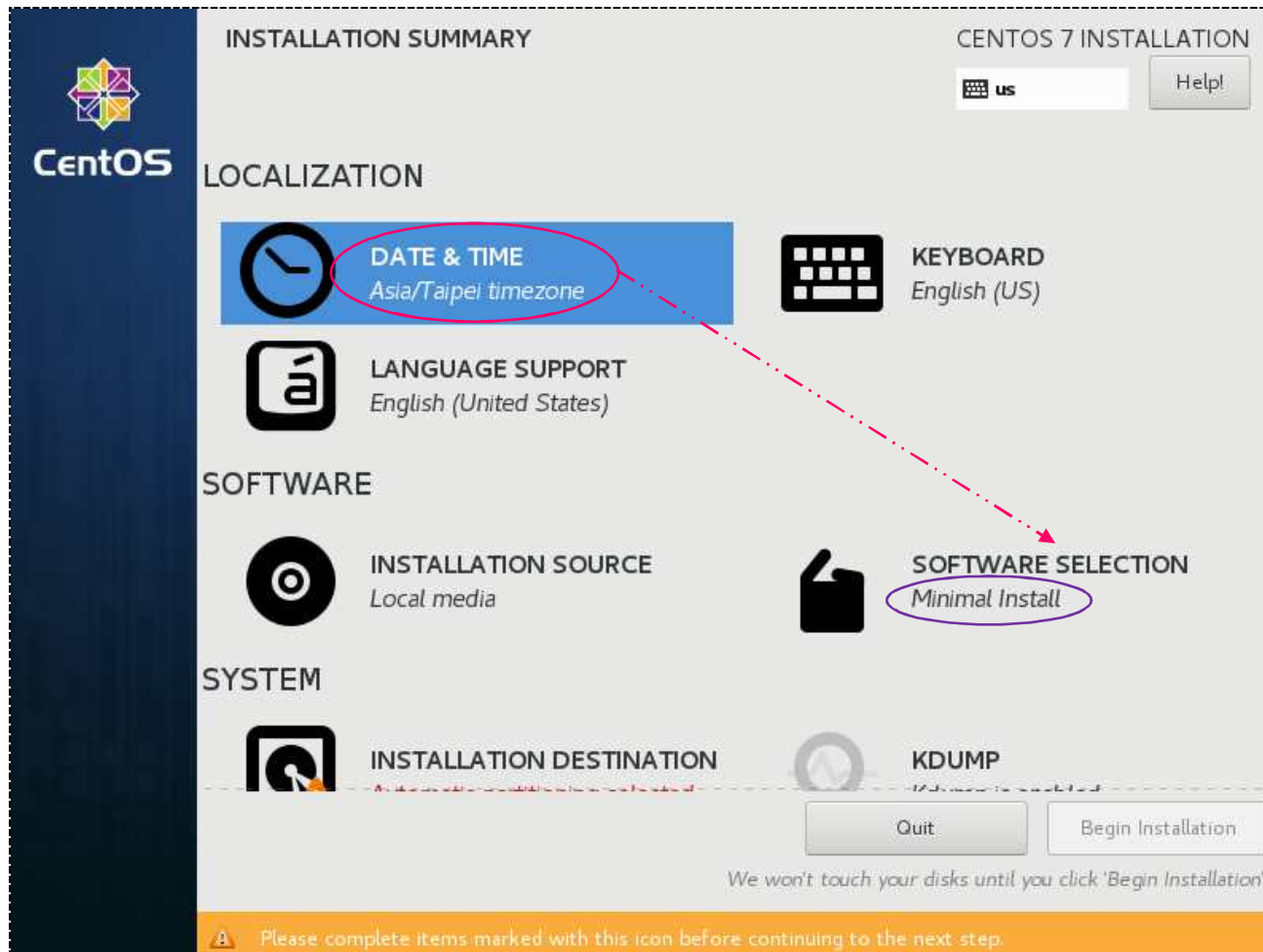


W

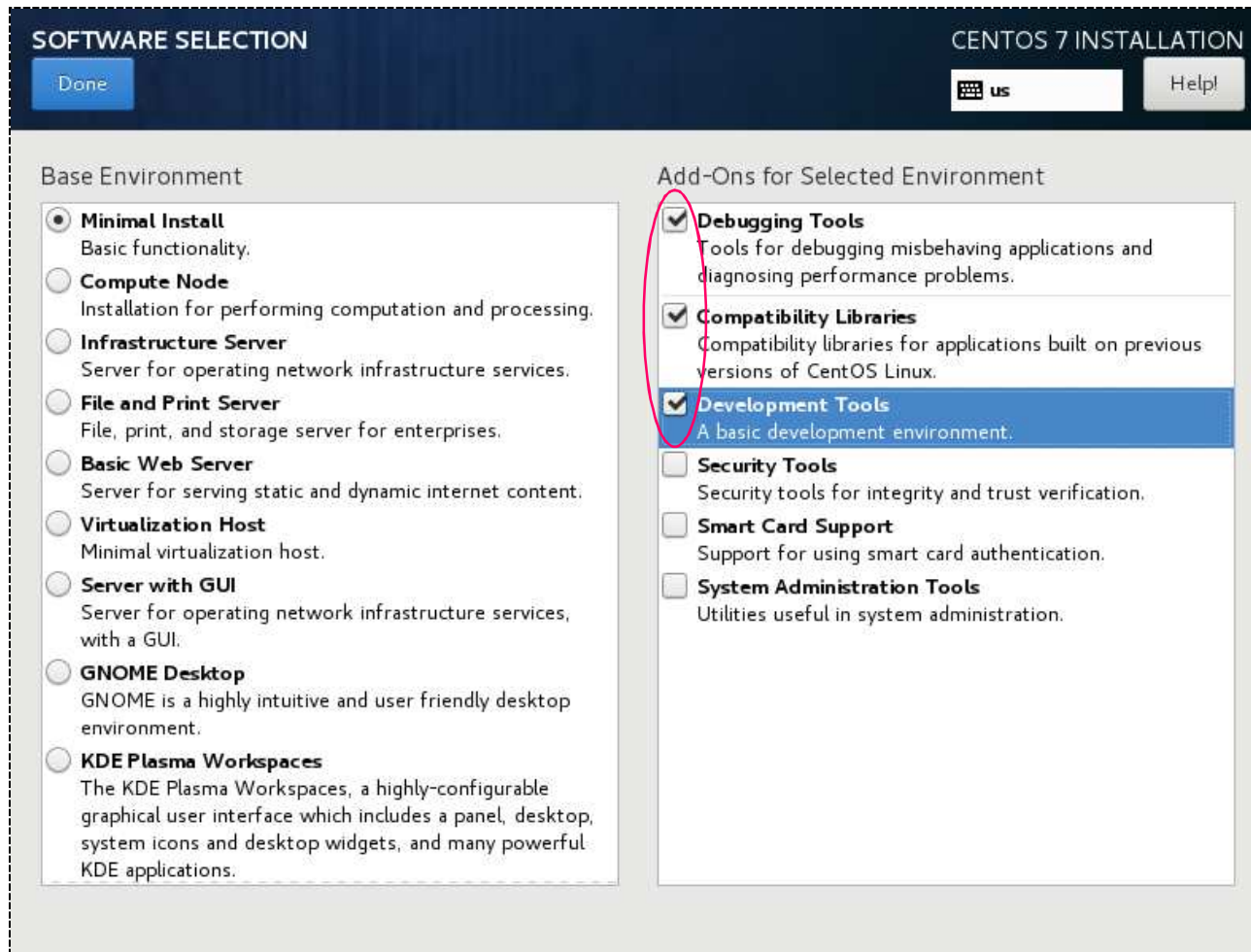
20. In addition to changing the timezone to “Asia/Taipei”, we update the time in the lower-left corner accordingly:



21. Then, we focus on the software selection for customization:



22. For minimal install, we add “debugging tools”, “compatibility libraries” and “development tools”:



The image shows the 'SOFTWARE SELECTION' window from the CentOS 7 installation process. The window has a dark blue header with the title 'SOFTWARE SELECTION' on the left and 'CENTOS 7 INSTALLATION' on the right. Below the header, there is a 'Done' button on the left, a keyboard layout selector showing 'us' in the center, and a 'Help' button on the right. The main content area is divided into two panels. The left panel, titled 'Base Environment', lists several installation options with radio buttons: 'Minimal Install' (selected), 'Compute Node', 'Infrastructure Server', 'File and Print Server', 'Basic Web Server', 'Virtualization Host', 'Server with GUI', 'GNOME Desktop', and 'KDE Plasma Workspaces'. The right panel, titled 'Add-Ons for Selected Environment', lists various add-ons with checkboxes. A red circle highlights the first three add-ons: 'Debugging Tools', 'Compatibility Libraries', and 'Development Tools', all of which are checked. The 'Development Tools' option is highlighted with a blue background. Other add-ons listed include 'Security Tools', 'Smart Card Support', and 'System Administration Tools', which are not checked.

SOFTWARE SELECTION **CENTOS 7 INSTALLATION**

Done us Help

Base Environment

- ☒ **Minimal Install**
Basic functionality.
- ☐ **Compute Node**
Installation for performing computation and processing.
- ☐ **Infrastructure Server**
Server for operating network infrastructure services.
- ☐ **File and Print Server**
File, print, and storage server for enterprises.
- ☐ **Basic Web Server**
Server for serving static and dynamic internet content.
- ☐ **Virtualization Host**
Minimal virtualization host.
- ☐ **Server with GUI**
Server for operating network infrastructure services, with a GUI.
- ☐ **GNOME Desktop**
GNOME is a highly intuitive and user friendly desktop environment.
- ☐ **KDE Plasma Workspaces**
The KDE Plasma Workspaces, a highly-configurable graphical user interface which includes a panel, desktop, system icons and desktop widgets, and many powerful KDE applications.

Add-Ons for Selected Environment

- ☒ **Debugging Tools**
Tools for debugging misbehaving applications and diagnosing performance problems.
- ☒ **Compatibility Libraries**
Compatibility libraries for applications built on previous versions of CentOS Linux.
- ☒ **Development Tools**
A basic development environment.
- ☐ **Security Tools**
Security tools for integrity and trust verification.
- ☐ **Smart Card Support**
Support for using smart card authentication.
- ☐ **System Administration Tools**
Utilities useful in system administration.

23. For server with GUI, we add “file and storage server”:

SOFTWARE SELECTION **CENTOS 7 INSTALLATION**

Done us Help!

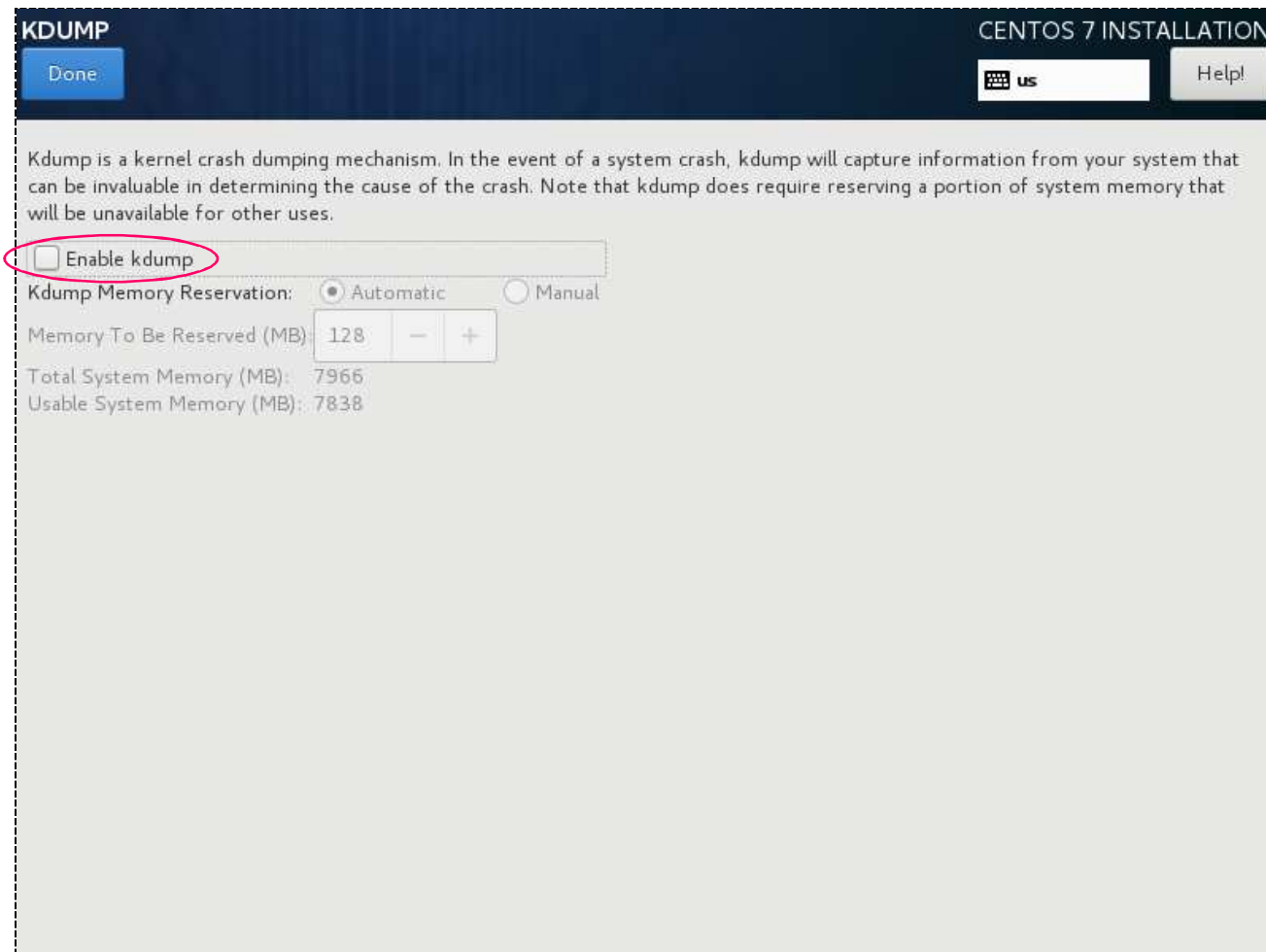
Base Environment

- ☐ **Minimal Install**
Basic functionality.
- ☐ **Compute Node**
Installation for performing computation and processing.
- ☐ **Infrastructure Server**
Server for operating network infrastructure services.
- ☐ **File and Print Server**
File, print, and storage server for enterprises.
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GNOME is a highly intuitive and user friendly desktop environment.
- ☐ **KDE Plasma Workspaces**
The KDE Plasma Workspaces, a highly-configurable graphical user interface which includes a panel, desktop, system icons and desktop widgets, and many powerful KDE applications.

Add-Ons for Selected Environment

- ☐ **Backup Server**
Software to centralize your infrastructure's backups.
- ☐ **DNS Name Server**
This package group allows you to run a DNS name server (BIND) on the system.
- ☐ **E-mail Server**
Allows the system to act as a SMTP and/or IMAP e-mail server.
- ☐ **FTP Server**
Allows the system to act as an FTP server.
- ☒ **File and Storage Server**
CIFS, SMB, NFS, iSCSI, iSER, and iSNS network storage server.
- ☐ **Hardware Monitoring Utilities**
A set of tools to monitor server hardware.
- ☐ **High Availability**
Infrastructure for highly available services and/or shared storage.
- ☐ **Identity Management Server**
Centralized management of users, servers and authentication policies.
- ☐ **Infiniband Support**
Software designed for supporting clustering and grid

24. At the same time, we disable kdump to reduce the reserved memory:



The image shows the 'KDUMP' configuration window during a 'CENTOS 7 INSTALLATION'. The window has a dark blue header with the title 'KDUMP' on the left and 'CENTOS 7 INSTALLATION' on the right. Below the header, there is a 'Done' button on the left and a 'Help!' button on the right. The main content area has a light gray background. It starts with a paragraph explaining that kdump is a kernel crash dumping mechanism and that it requires reserving system memory. Below this, there is a checkbox labeled 'Enable kdump' which is currently unchecked and is circled in red. Underneath the checkbox, there is a section for 'Kdump Memory Reservation' with two radio buttons: 'Automatic' (which is selected) and 'Manual'. Below the radio buttons, there is a 'Memory To Be Reserved (MB)' field with a numeric input set to '128' and minus/plus buttons. At the bottom, it displays 'Total System Memory (MB): 7966' and 'Usable System Memory (MB): 7838'.

KDUMP **CENTOS 7 INSTALLATION**

Done Help!

Kdump is a kernel crash dumping mechanism. In the event of a system crash, kdump will capture information from your system that can be invaluable in determining the cause of the crash. Note that kdump does require reserving a portion of system memory that will be unavailable for other uses.

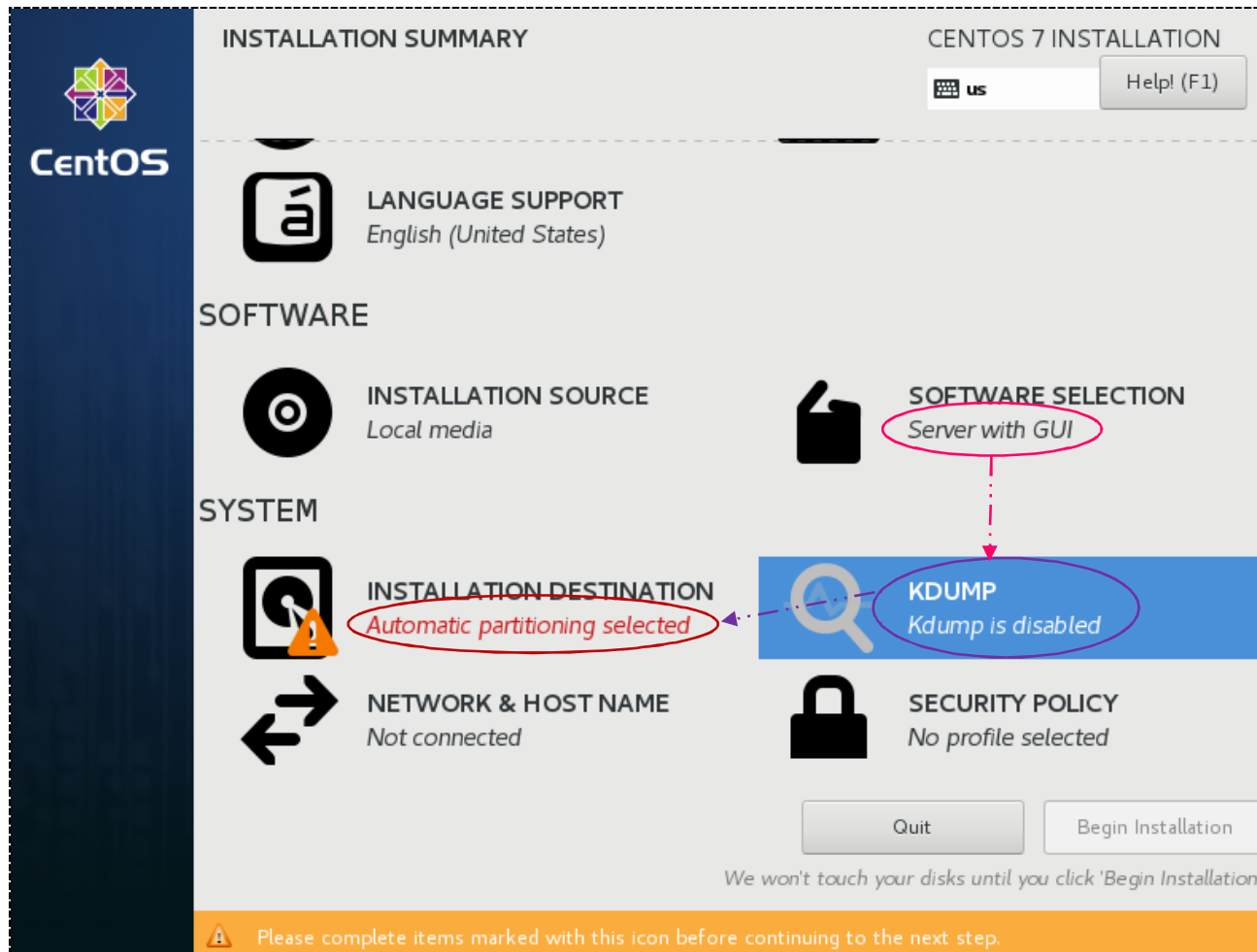
☐ Enable kdump

Kdump Memory Reservation: ☒ Automatic ☐ Manual

Memory To Be Reserved (MB) - +

Total System Memory (MB): 7966
Usable System Memory (MB): 7838

25. Now, we customize the disk partitions:



INSTALLATION DESTINATION

CENTOS 7 INSTALLATION

[Done](#) **us**[Help! \(F1\)](#)

Device Selection

Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.

Local Standard Disks

32 GiB



VMware, VMware Virtual S

sda / 32 GiB free

Disks left unselected here will not be touched.

Specialized & Network Disks



Add a disk...

Disks left unselected here will not be touched.

Other Storage Options

Partitioning

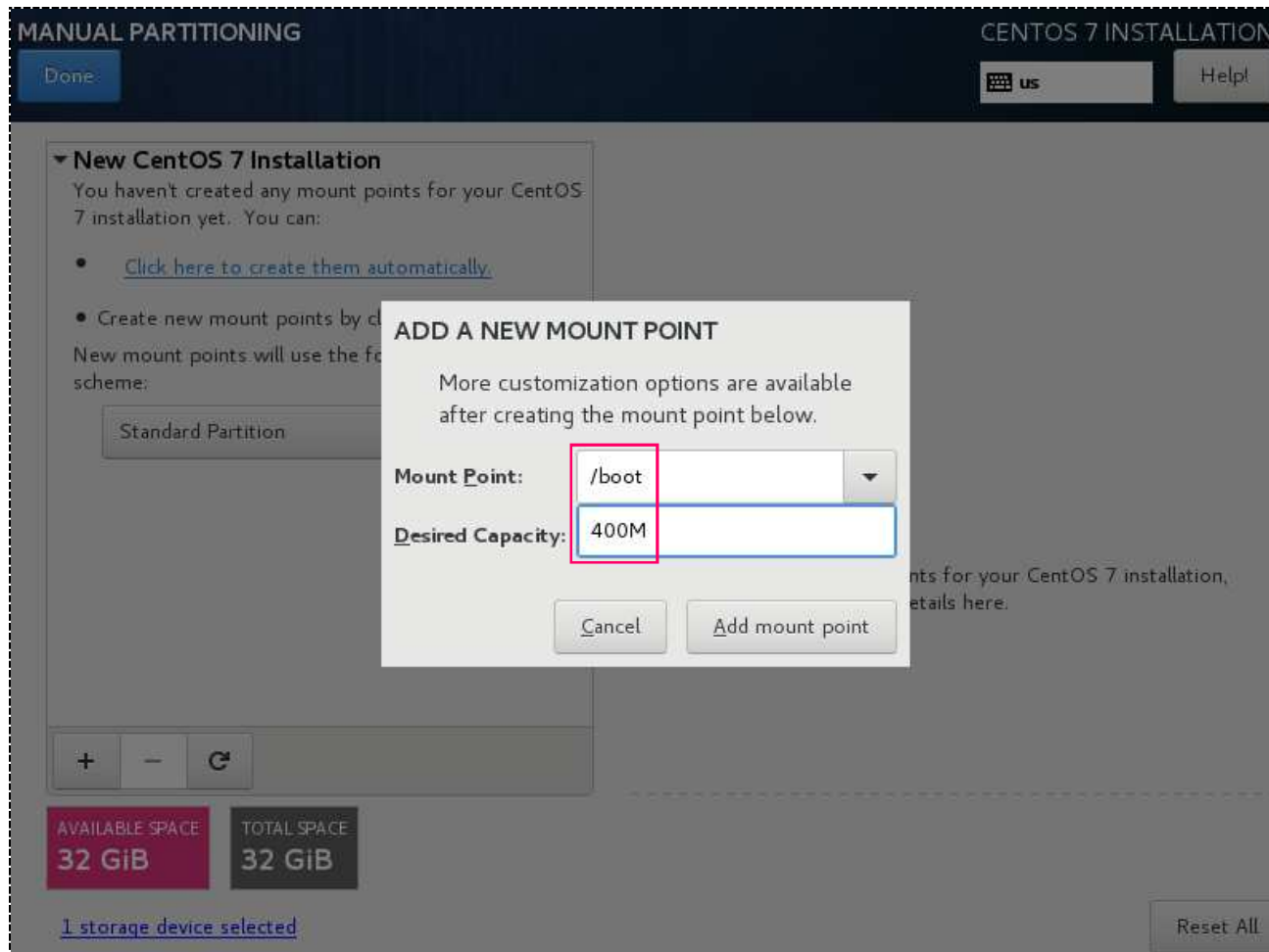
☐ Automatically configure partitioning. ☒ I will configure partitioning.

☐ I would like to make additional space available.

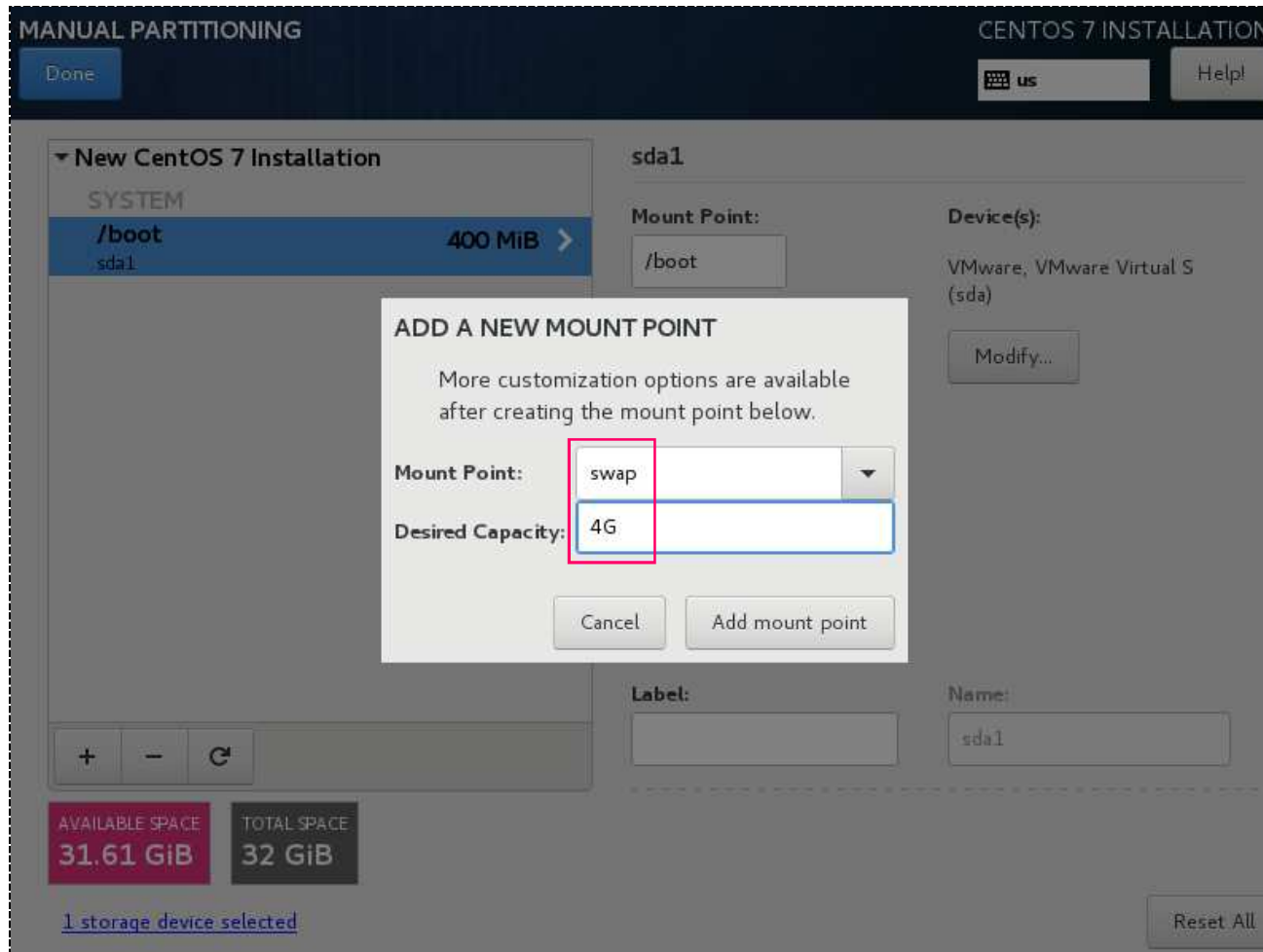
[Full disk summary and boot loader...](#)

1 disk selected; 32 GiB capacity; 32 GiB free [Refresh...](#)

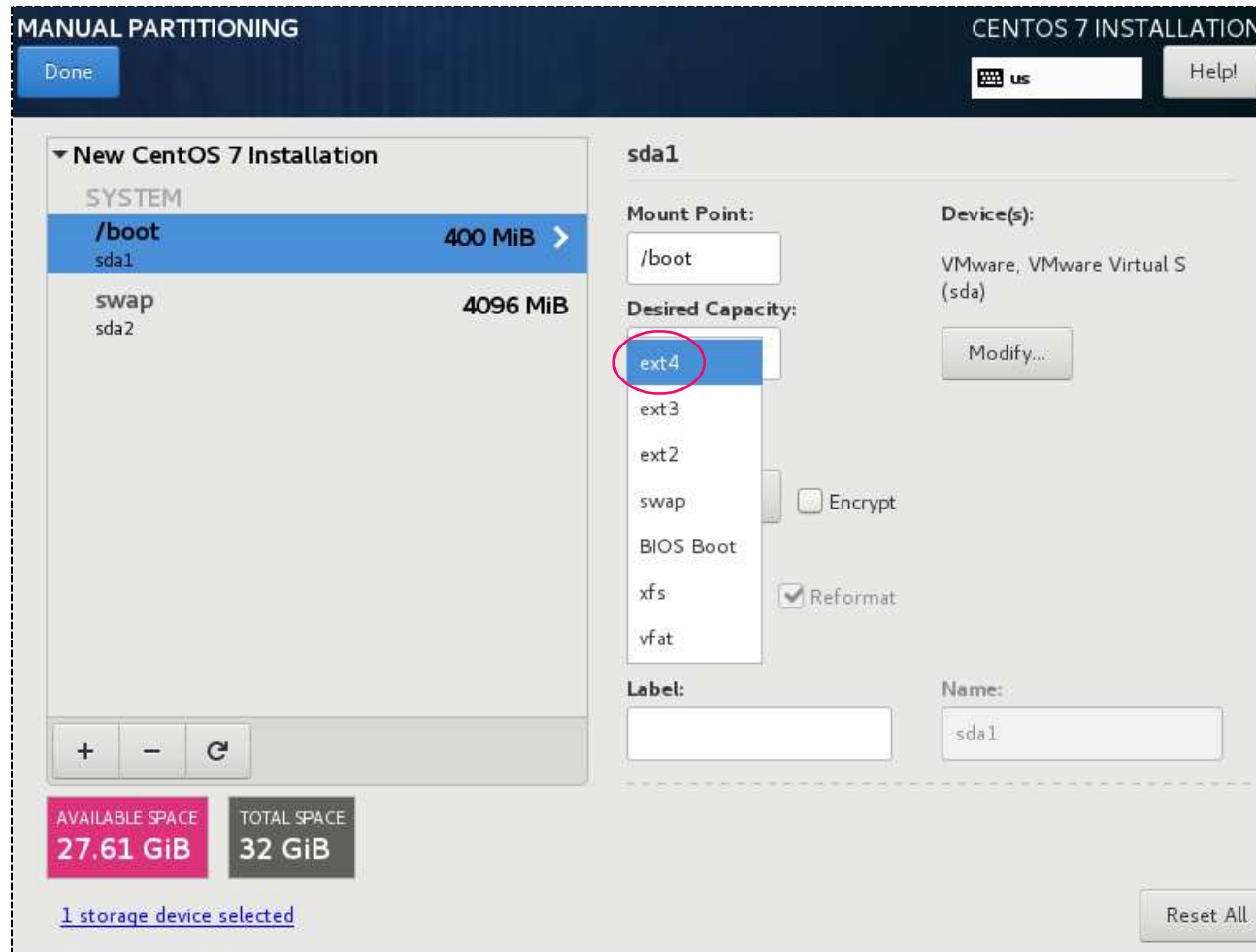
26. We create boot partition with size of 400 MB and mount it on /boot:



27. We create swap partition with size of 4 GB and use it as swap space:



28. For /boot file system, we use ext4 format instead of xfs and label it as boot:



29. Please remember to click “update settings” to let changes take effect immediately:

MANUAL PARTITIONING **CENTOS 7 INSTALLATION**

Done us Help!

▼ New CentOS 7 Installation

SYSTEM

/boot sda1	400 MiB >
swap sda2	4096 MiB

400 MiB Modify...

Device Type:
Standard... ☐ Encrypt

File System:
ext4 ☒ Reformat

Label: boot **Name:** sda1

+ - ↺

AVAILABLE SPACE
27.61 GiB

TOTAL SPACE
32 GiB

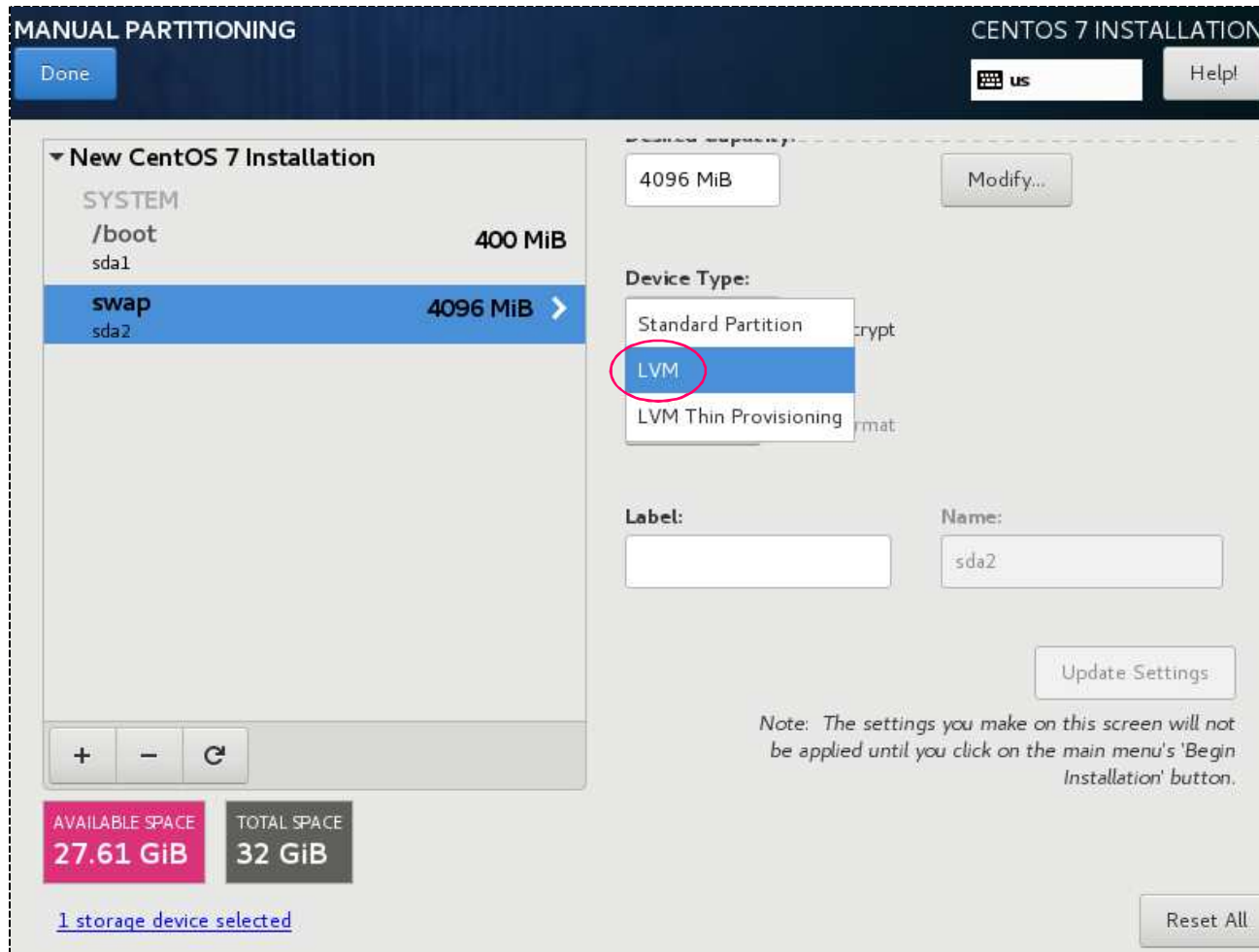
[1 storage device selected](#)

Update Settings

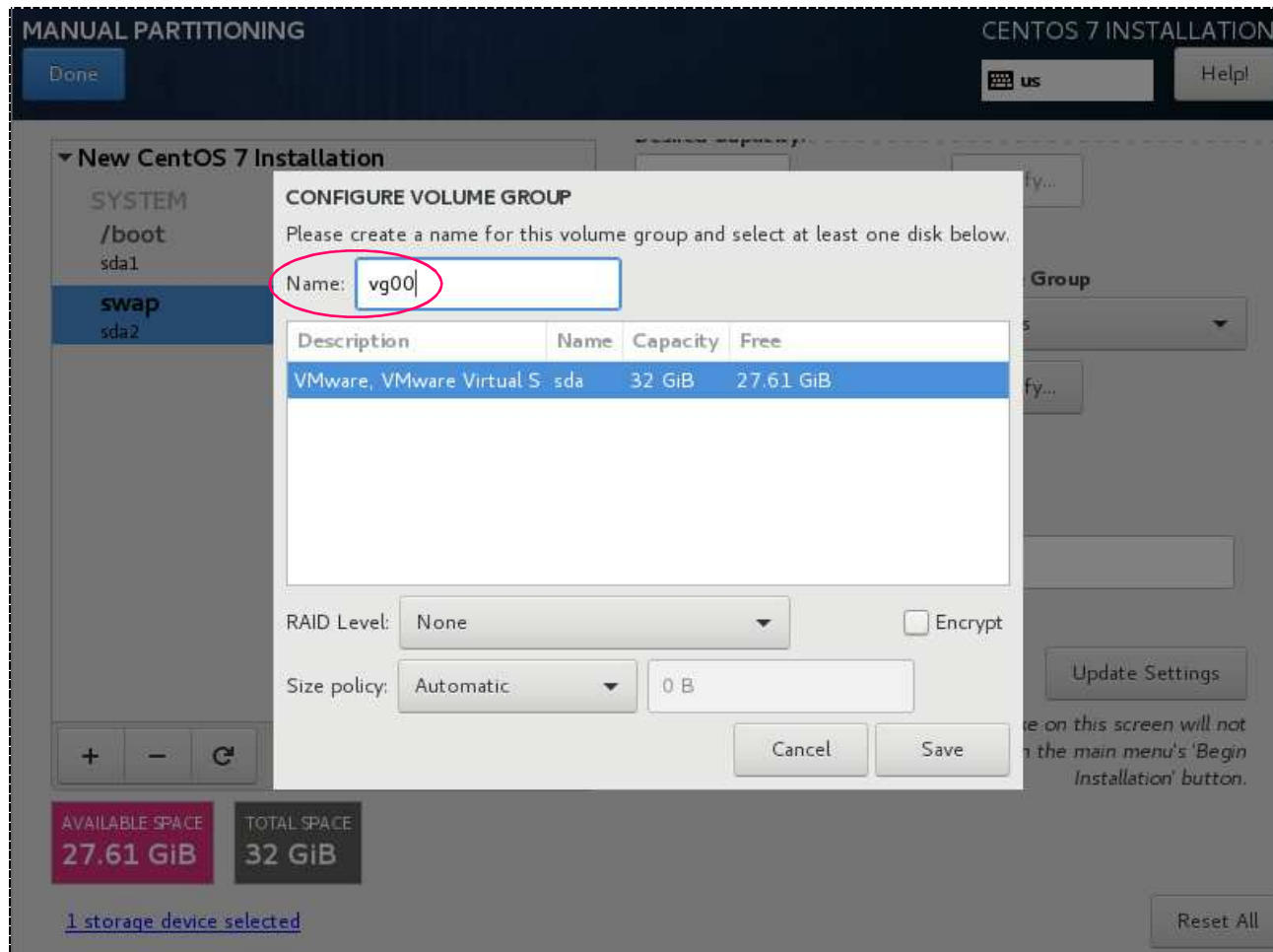
Note: The settings you make on this screen will not be applied until you click on the main menu's 'Begin Installation' button.

Reset All

30. For swap partition, we use LVM instead of standard partition:



31. We name the volume group as vg00 for LVM:



32. Please remember to click “update settings” to let changes take effect immediately:

MANUAL PARTITIONING **CENTOS 7 INSTALLATION**

Done us Help! (F1)

▼ **New CentOS 7 Installation**

SYSTEM

/boot 400 MiB
sda1

swap 4096 MiB >
vg00-swap

+ - ↺

Device Type: LVM ☐ Encrypt **Volume Group:** vg00 (0 B free)

File System: swap ☒ Reformat Modify...

Label: swap **Name:** swap

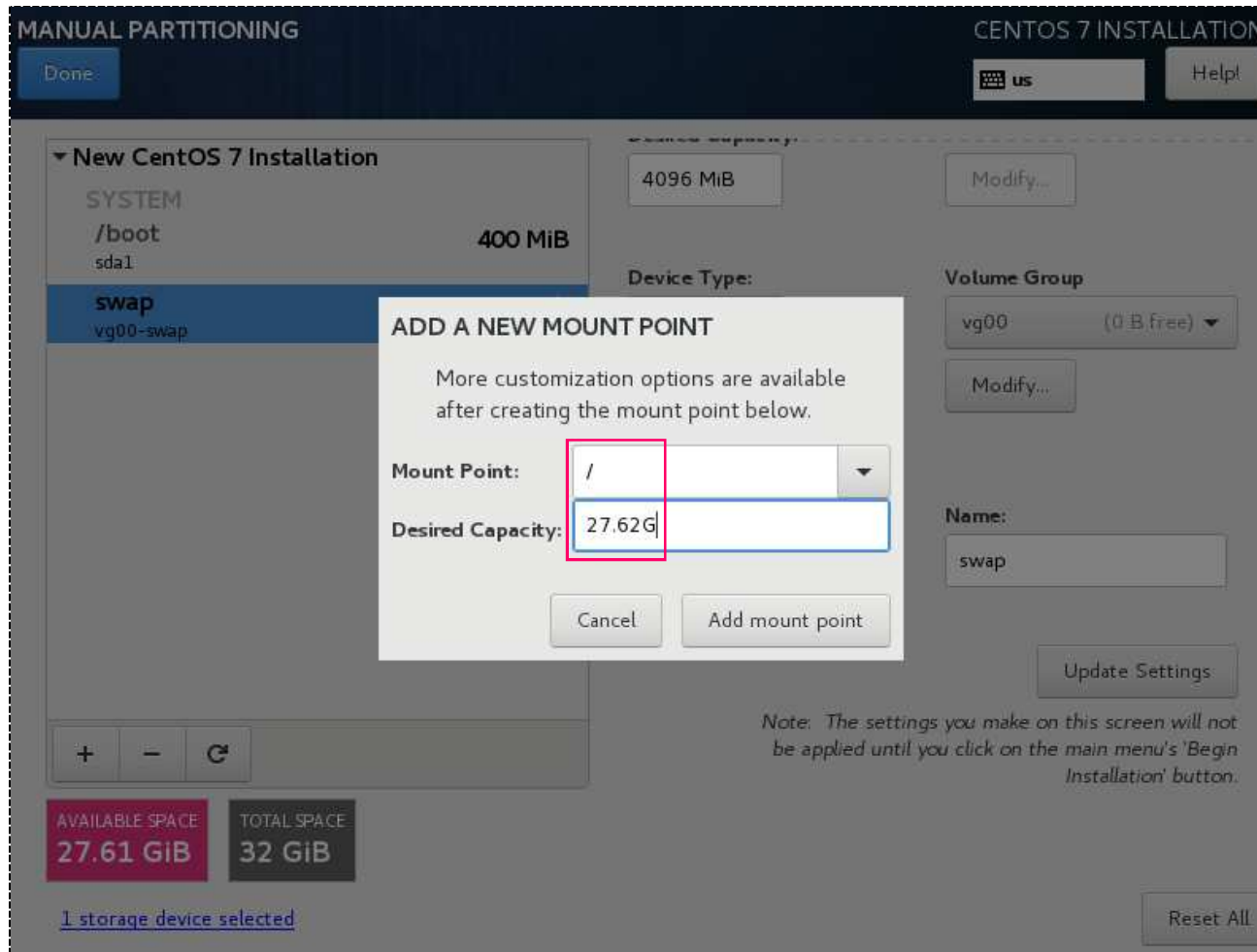
Update Settings

Note: The settings you make on this screen will not be applied until you click on the main menu's 'Begin Installation' button.

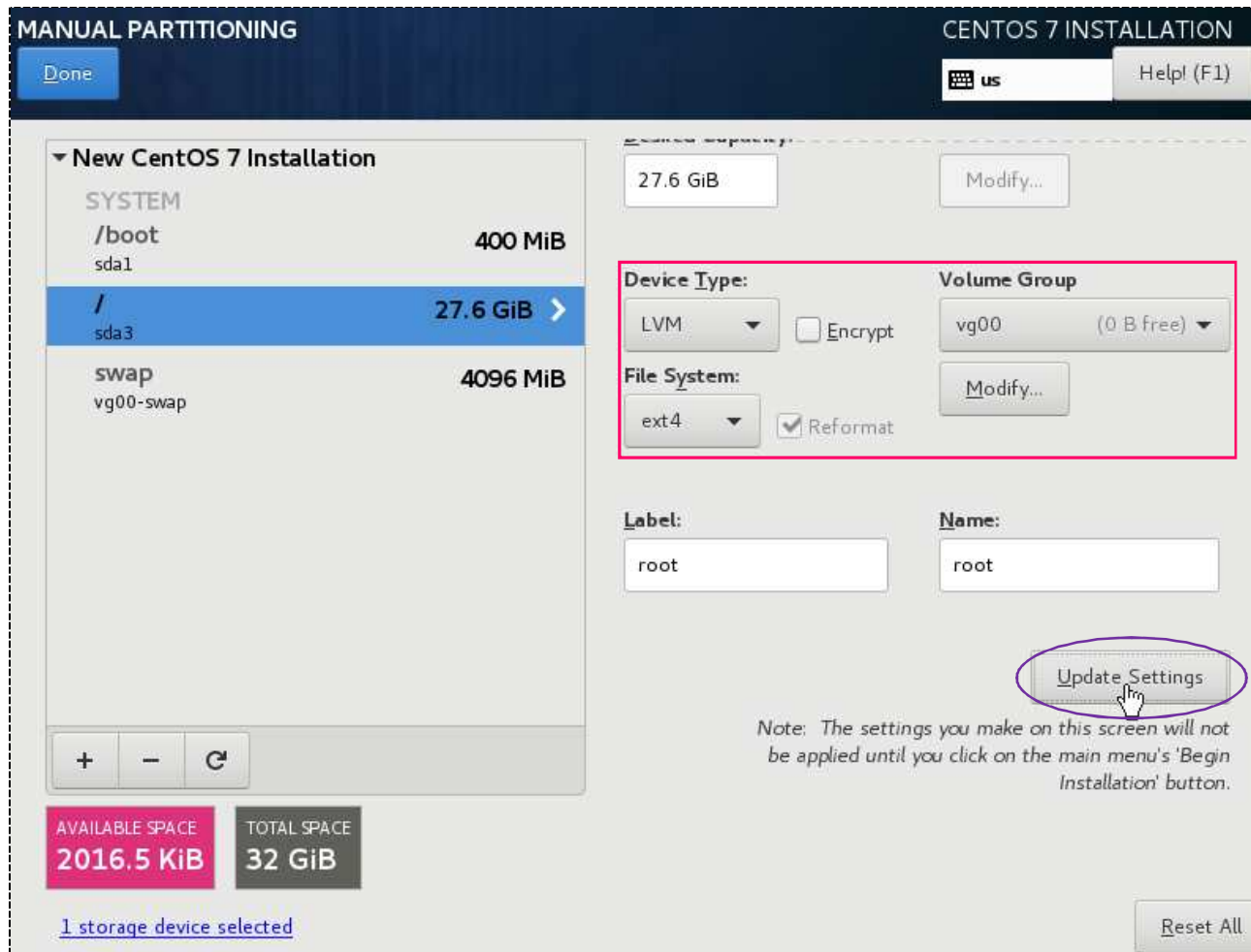
AVAILABLE SPACE 27.61 GiB **TOTAL SPACE** 32 GiB

[1 storage device selected](#) Reset All

33. We create root partition with size of 27.62 GB (with size for a little more than available space) and mount it on /:



34. For root partition, we use LVM instead of standard partition, ext4 format instead of xfs and label it as root; remember to click “update settings” to let changes take effect immediately:



The image shows the 'MANUAL PARTITIONING' screen in the CentOS 7 installer. The interface is divided into several sections. On the left, under 'New CentOS 7 Installation', there is a list of partitions: /boot (400 MiB, sda1), / (27.6 GiB, sda3), and swap (4096 MiB, vg00-swap). The / partition is selected. Below this list are buttons for adding (+), removing (-), and refreshing (circular arrow). At the bottom left, two boxes show 'AVAILABLE SPACE 2016.5 KiB' and 'TOTAL SPACE 32 GiB'. A link at the bottom left says '1 storage device selected'. On the right, the '27.6 GiB' partition is being configured. A 'Modify...' button is next to the size. A red box highlights the configuration options: 'Device Type' is set to 'LVM', 'Volume Group' is 'vg00 (0 B free)', 'File System' is 'ext4', and 'Reformat' is checked. Below these, 'Label' and 'Name' are both set to 'root'. A purple circle highlights the 'Update Settings' button. A note states: 'Note: The settings you make on this screen will not be applied until you click on the main menu's 'Begin Installation' button.' A 'Reset All' button is at the bottom right. The top bar includes a 'Done' button, a keyboard icon with 'us', and a 'Help! (F1)' button.

MANUAL PARTITIONING

CENTOS 7 INSTALLATION

Done

us Help! (F1)

▼ New CentOS 7 Installation

SYSTEM

/boot 400 MiB
sda1

/ 27.6 GiB >
sda3

swap 4096 MiB
vg00-swap

+ - ↻

AVAILABLE SPACE 2016.5 KiB

TOTAL SPACE 32 GiB

1 storage device selected

27.6 GiB Modify...

Device Type: LVM ☐ Encrypt

Volume Group: vg00 (0 B free)

File System: ext4 ☒ Reformat

Label: root

Name: root

Update Settings

Note: The settings you make on this screen will not be applied until you click on the main menu's 'Begin Installation' button.

Reset All

35. This is our final partition table for guest OS installation:

MANUAL PARTITIONING

CENTOS 7 INSTALLATION

Done

us

Help! (F1)

▼ New CentOS 7 Installation

SYSTEM

/boot
sda1
400 MiB

/

vg00-root
27.6 GiB >

swap

vg00-swap
4096 MiB

+ - ↺

AVAILABLE SPACE
992.5 KiB

TOTAL SPACE
32 GiB

[1 storage device selected](#)

27.6 GiB

Modify...

Device Type:
LVM

☐ Encrypt

Volume Group
vg00 (0 B free)

File System:
ext4

☒ Reformat

Modify...

Label:
root

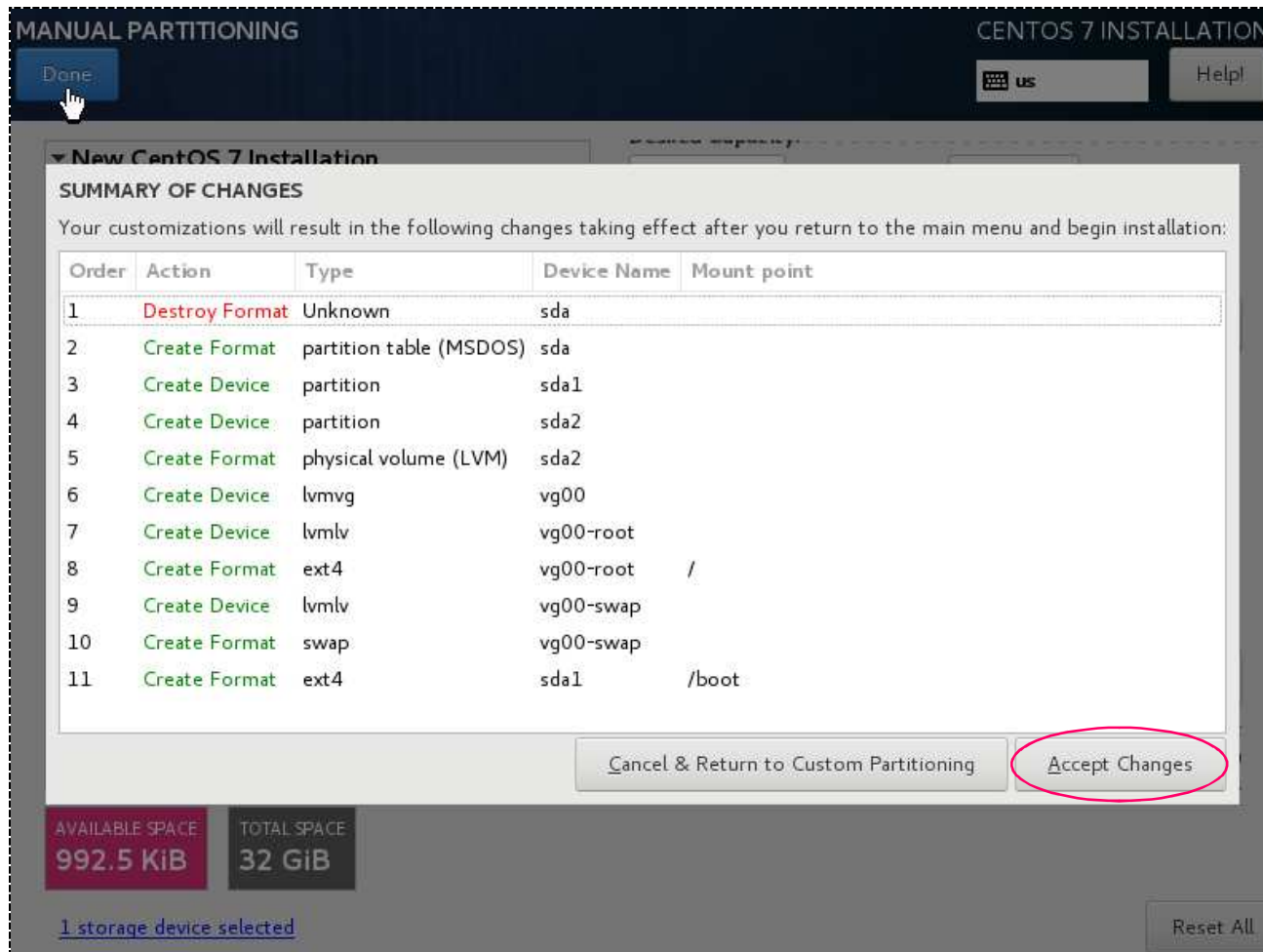
Name:
root

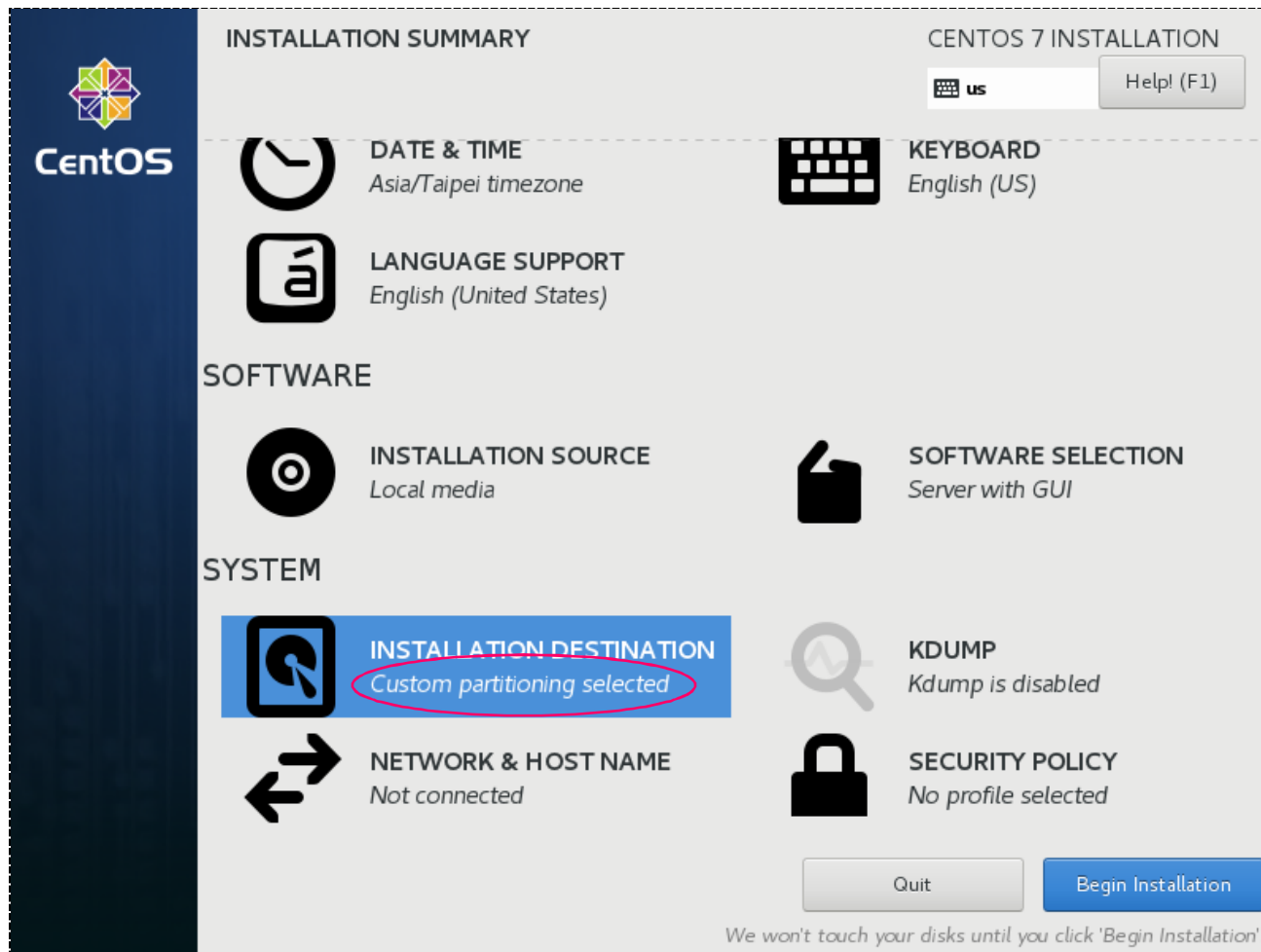
Update Settings

Note: The settings you make on this screen will not be applied until you click on the main menu's 'Begin Installation' button.

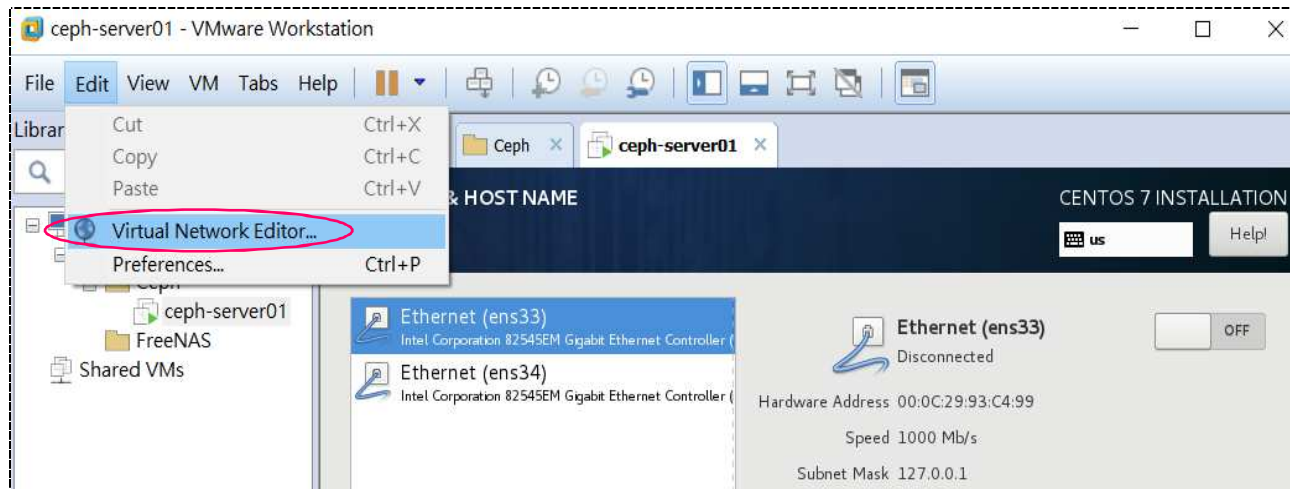
Reset All

36. We accept changes for final partition table:

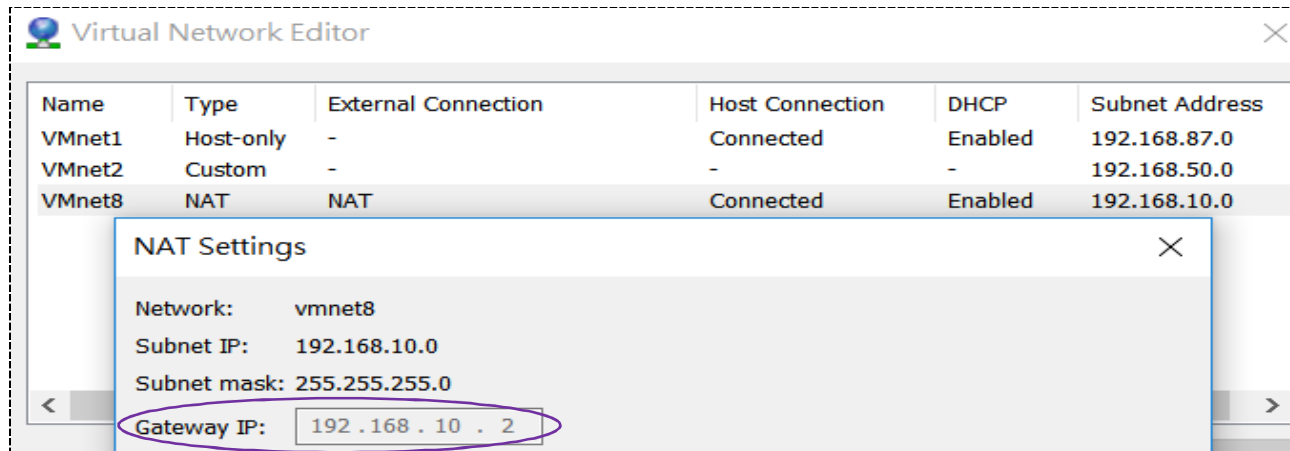




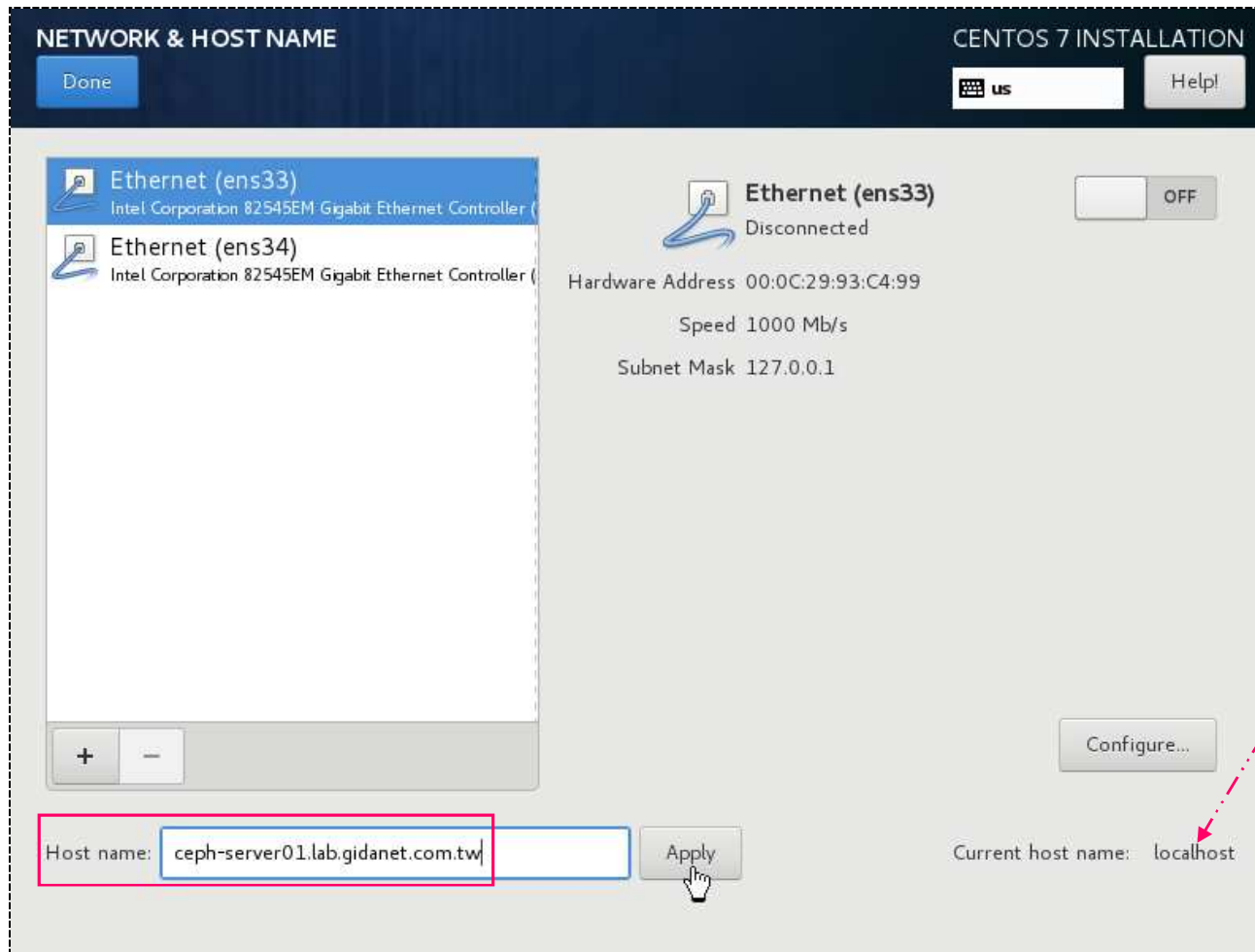
37. Before configuring network, we check the VMware Workstation virtual network settings, especially, for NAT, so we can assign static IP addresses and default gateway for Ceph servers:



38. The default gateway is 192.168.10.2 and IP subnet address is 192.168.10.0/24:



39. For network, we configure hostname first, remember to click “apply”, the current hostname will be updated immediately:



40. The network interface, ens33, is configured to automatically connect to network, assigned a static IP, default gateway and DNS servers; please remember to click “save” to save the configuration information:

NETWORK & HOST NAME CENTOS 7 INSTALLATION

Editing ens33

Connection name:

General | Ethernet | 802.1X Security | DCB | Proxy | IPv4 Settings | IPv6 Settings

☒ Automatically connect to this network when it is available

Connection priority for auto-activation: - +

☒ All users may connect to this network

☐ Automatically connect to VPN when using this connection

NETWORK & HOST NAME CENTOS 7 INSTALLATION

Editing ens33

Connection name:

General | Ethernet | 802.1X Security | DCB | Proxy | **IPv4 Settings** | IPv6 Settings

Method:

Addresses

Address	Netmask	Gateway
192.168.10.241	24	192.168.10.2

Add
Delete

DNS servers:

Search domains:

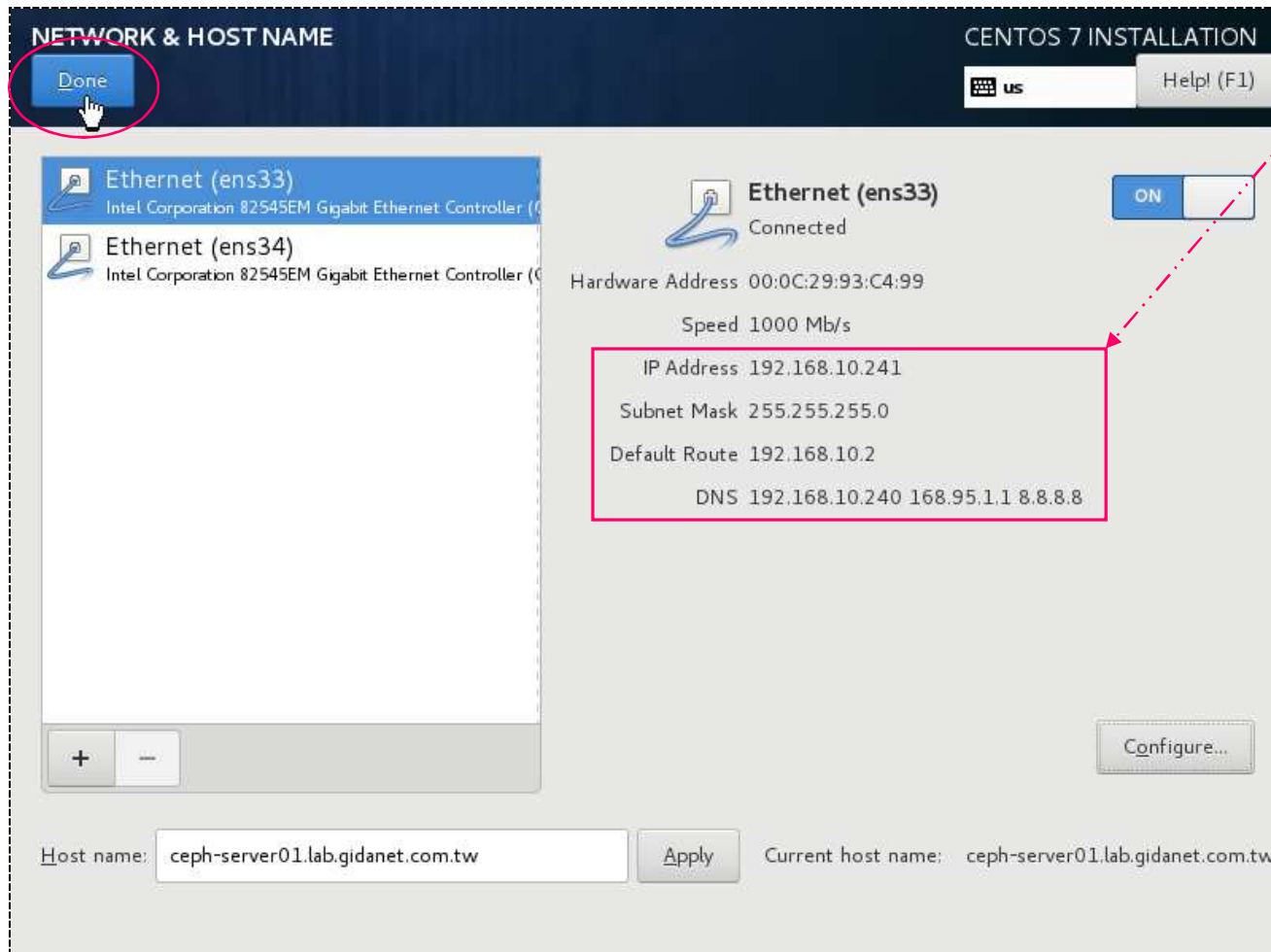
DHCP client ID:

☐ Require IPv4 addressing for this connection to complete

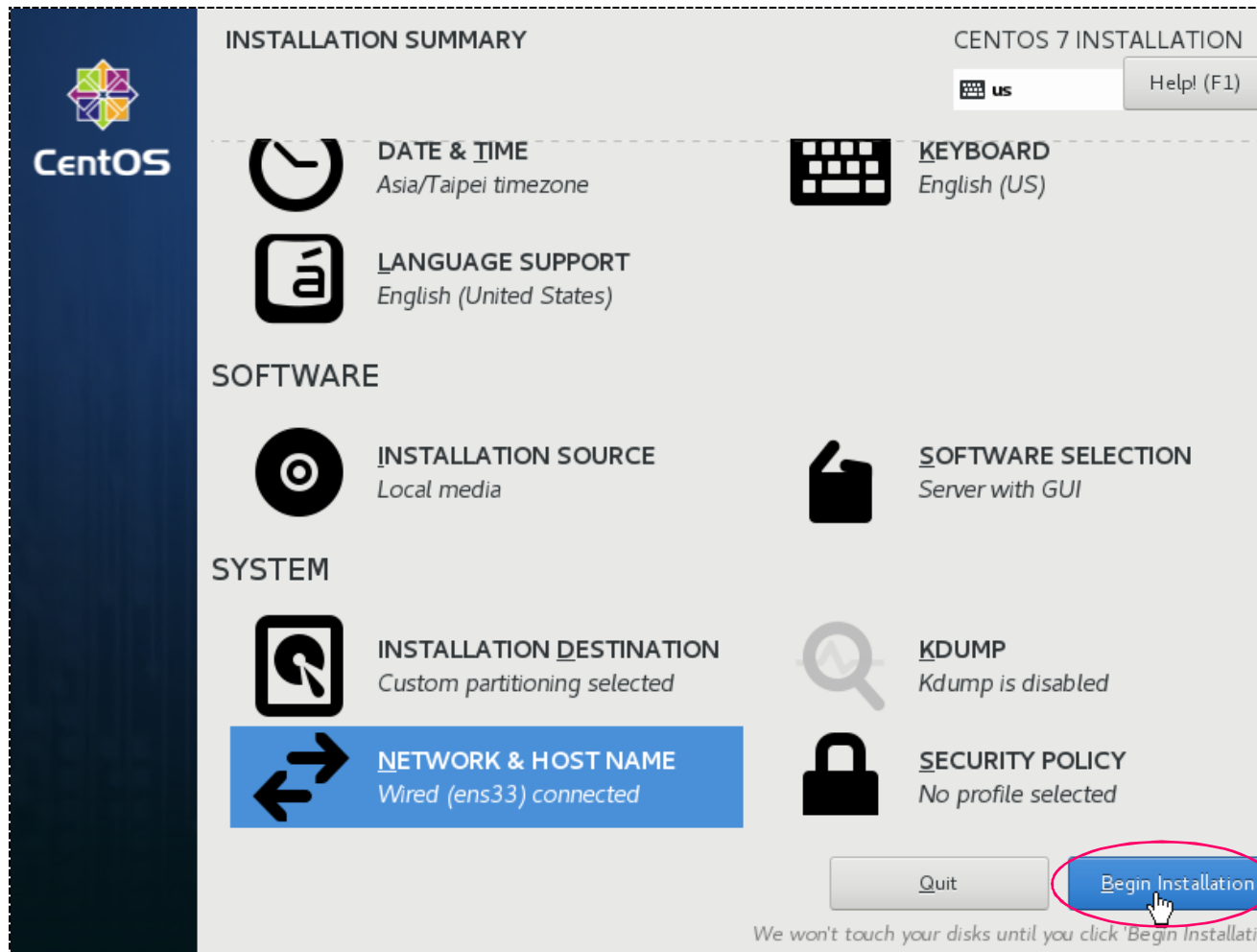
Routes...

Cancel

41. The network interface has been configured successfully, we can find the information here:



42. After completing all customization and configuration, the installation is beginning:



43. During the installation, we can set root password and add one user account:



44. The root password is set with one strong password: (ChimaKaimen)

ROOT PASSWORD

Done

CENTOS 7 INSTALLATION

The root account is used for administering the system. Enter a password for the root user.

Root Password: [masked]

Confirm: [masked]

Strong

us Help

45. The user account is added with one strong password: (01DLin!qaz)

CREATE USER

Done

CENTOS 7 INSTALLATION

Full name: Danny Lin

User name: dlin01

Tip: Keep your user name shorter than 32 characters and do not use spaces.

☒ Make this user administrator

☒ Require a password to use this account

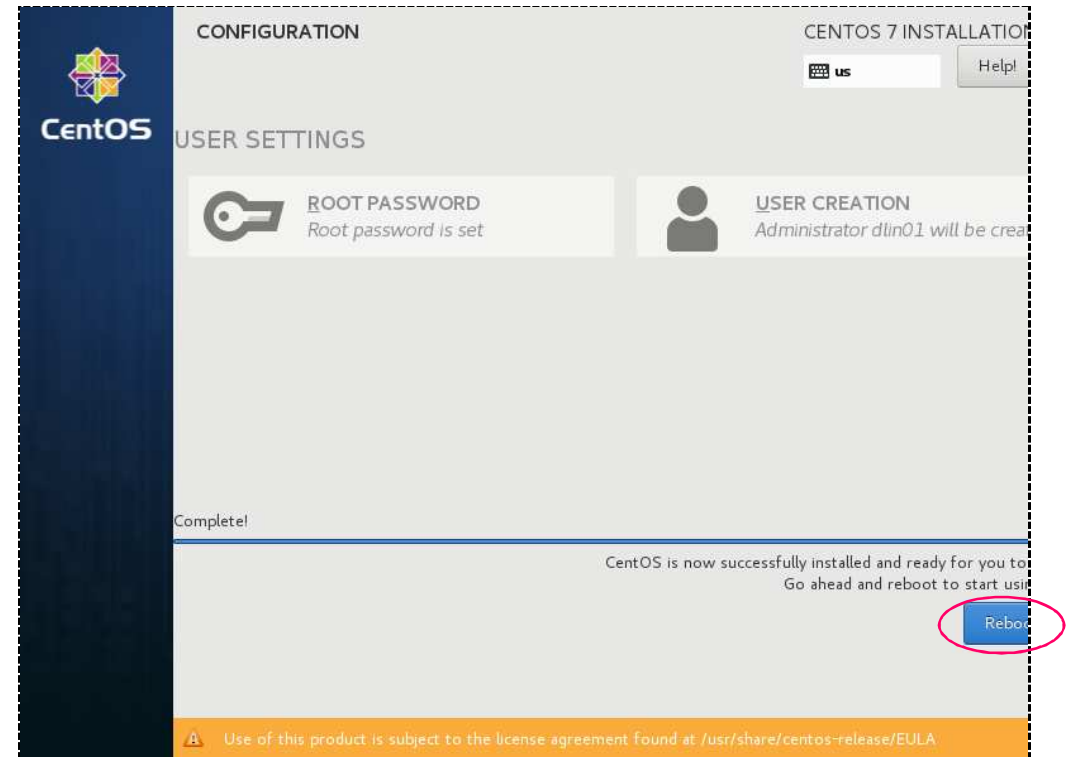
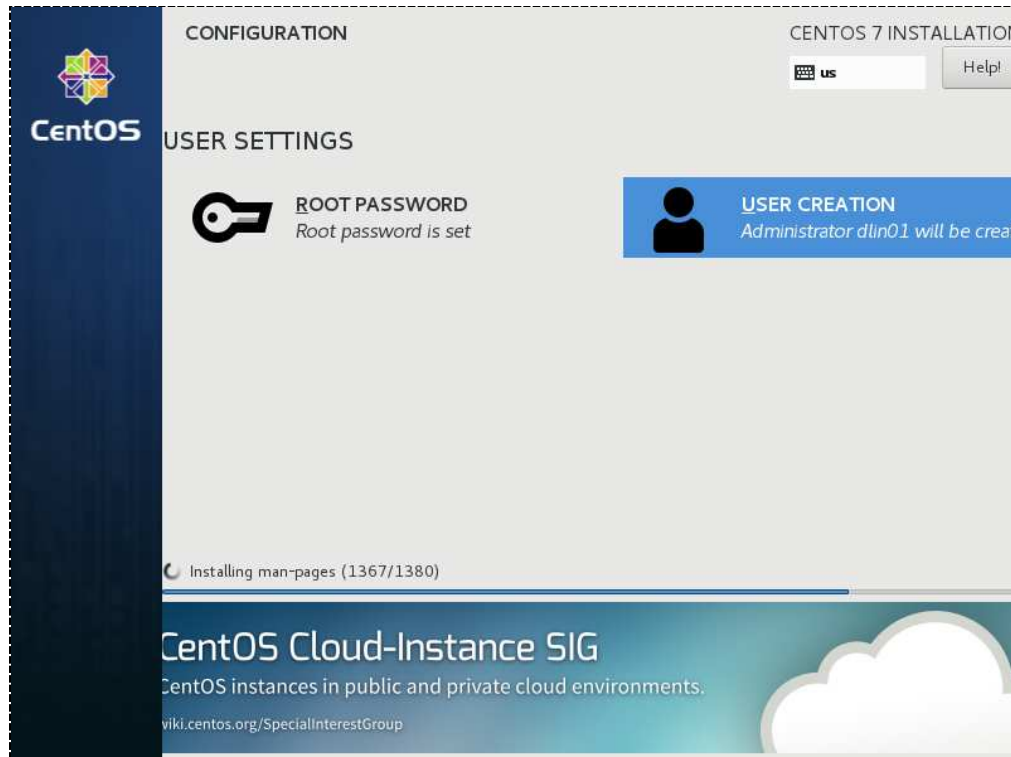
Password: [masked]

Confirm password: [masked]

Strong

us Help

46. Finally, we click reboot to complete the installation:



Sat 14:09



Danny Lin

Not listed?



Applications Places Terminal

Sat 14:33

Welcome

Next

root@ceph-server01:~

File Edit View Search Terminal Tabs Help

root@ceph-server01:~ x root@ceph-server01:~ x root@ceph-server01:~ x root@ceph-server01:~ x

```
[root@ceph-server01 ~]# df -kP
Filesystem                1024-blocks    Used Available Capacity Mounted on
/dev/mapper/vg00-root      28360764 3815736 23081324      15% /
devtmpfs                   4061572      0  4061572      0% /dev
tmpfs                      4078604      0  4078604      0% /dev/shm
tmpfs                      4078604    12844  4065760      1% /run
tmpfs                      4078604      0  4078604      0% /sys/fs/cgroup
/dev/sda1                  388462    129155   234731     36% /boot
tmpfs                      815724      8   815716      1% /run/user/42
tmpfs                      815724     48   815676      1% /run/user/0

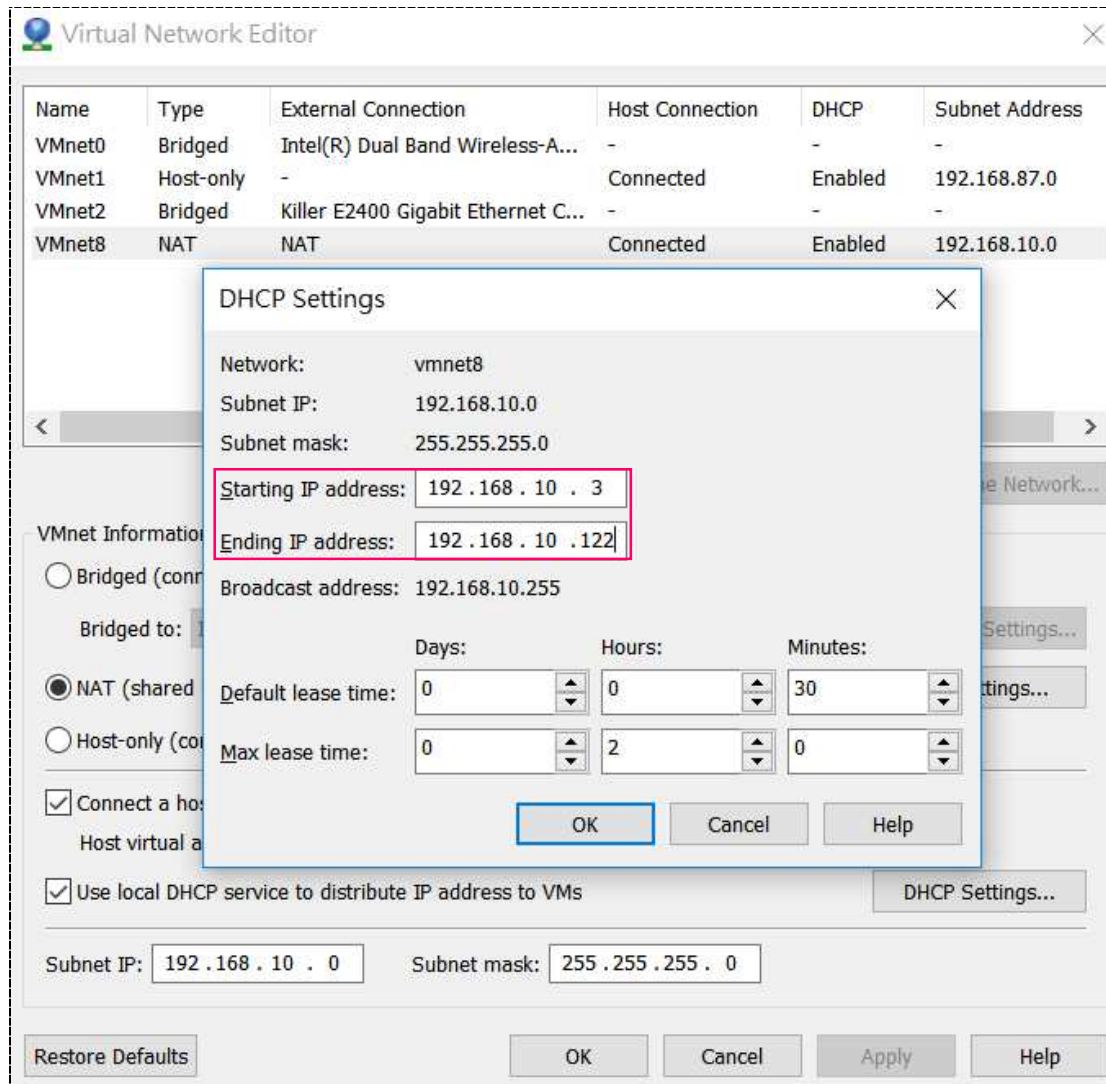
[root@ceph-server01 ~]# pvscan
PV /dev/sda2   VG vg00           lvm2 [<31.61 GiB / 0   free]
Total: 1 [<31.61 GiB] / in use: 1 [<31.61 GiB] / in no VG: 0 [0   ]

[root@ceph-server01 ~]# vgscan
Reading volume groups from cache.
Found volume group "vg00" using metadata type lvm2

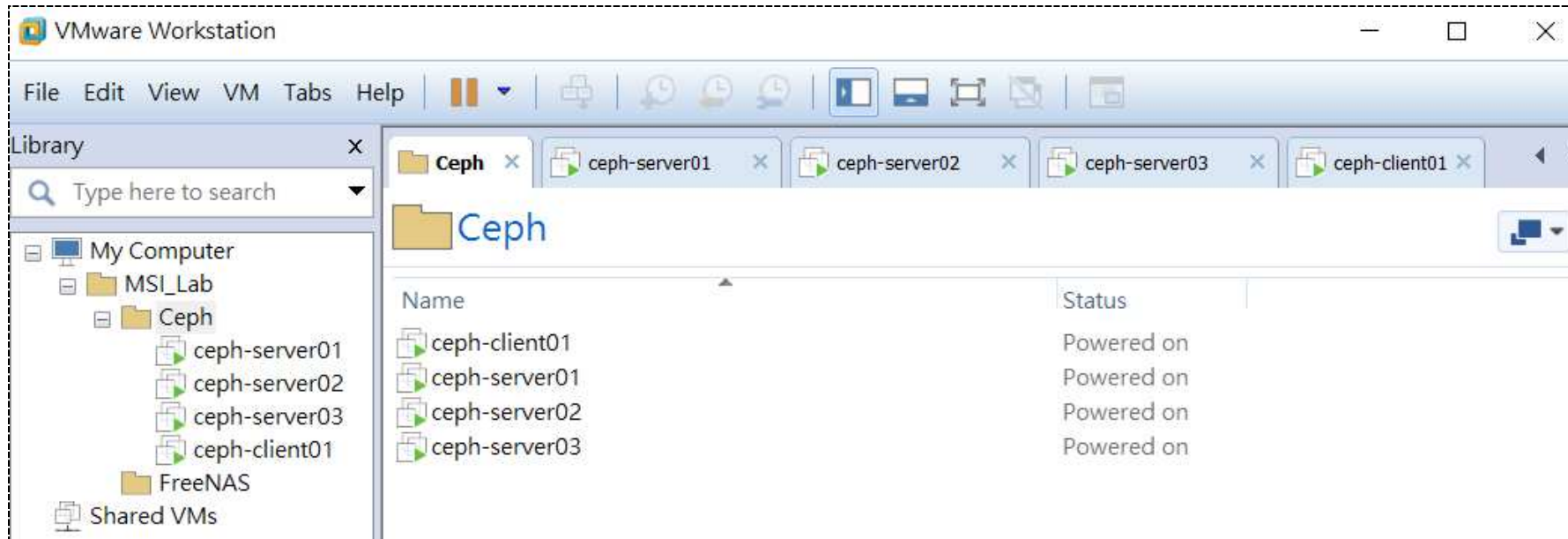
[root@ceph-server01 ~]# lvscan
ACTIVE          '/dev/vg00/swap' [4.00 GiB] inherit
ACTIVE          '/dev/vg00/root'  [<27.61 GiB] inherit

[root@ceph-server01 ~]# ip addr list
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default 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
```

47. For the static IP addresses used by us for Ceph servers, we change the NAT DHCP range from 192.168.10.128 ~ 192.168.10.254 to 192.168.10.3 to 192.168.10.122:



48. Finally, we create and install three Ceph storage server nodes and one client node:



49. Before configuring the bond network interface, we disable and stop the NetworkManager service: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# systemctl status NetworkManager | grep Active
```

```
Active: active (running) since Sat 2018-07-07 14:06:00 CST; 40min ago
```

```
[root@ceph-server01 ~]# systemctl disable NetworkManager; systemctl stop NetworkManager; systemctl status NetworkManager
```

```
Removed symlink /etc/systemd/system/multi-user.target.wants/NetworkManager.service.
```

```
Removed symlink /etc/systemd/system/dbus-org.freedesktop.NetworkManager.service.
```

```
Removed symlink /etc/systemd/system/dbus-org.freedesktop.nm-dispatcher.service.
```

- NetworkManager.service - Network Manager

```
Loaded: loaded (/usr/lib/systemd/system/NetworkManager.service; disabled; vendor preset: enabled)
```

```
Active: inactive (dead) since Sat 2018-07-07 14:47:13 CST; 9ms ago
```

Docs: man:NetworkManager(8)

Process: 878 ExecStart=/usr/sbin/NetworkManager --no-daemon (code=exited, status=0/SUCCESS)

Main PID: 878 (code=exited, status=0/SUCCESS)

```
Jul 07 14:06:09 ceph-server01.lab.gidanet.com.tw NetworkManager[878]: <info> [1530943569.4101] devic... )
Jul 07 14:06:09 ceph-server01.lab.gidanet.com.tw NetworkManager[878]: <info> [1530943569.4127] devic....
Jul 07 14:06:09 ceph-server01.lab.gidanet.com.tw NetworkManager[878]: <info> [1530943569.4860] devic... )
Jul 07 14:06:09 ceph-server01.lab.gidanet.com.tw NetworkManager[878]: <info> [1530943569.4863] devic...d
Jul 07 14:06:09 ceph-server01.lab.gidanet.com.tw NetworkManager[878]: <info> [1530943569.4863] devic...0
Jul 07 14:47:13 ceph-server01.lab.gidanet.com.tw systemd[1]: Stopping Network Manager...
Jul 07 14:47:13 ceph-server01.lab.gidanet.com.tw NetworkManager[878]: <info> [1530946033.7579] caught...
Jul 07 14:47:13 ceph-server01.lab.gidanet.com.tw NetworkManager[878]: <info> [1530946033.7617] devic...0
Jul 07 14:47:13 ceph-server01.lab.gidanet.com.tw NetworkManager[878]: <info> [1530946033.7651] exiti... )
Jul 07 14:47:13 ceph-server01.lab.gidanet.com.tw systemd[1]: Stopped Network Manager.
```

Hint: Some lines were ellipsized, use -l to show in full.

50. We check (list) and probe bonding kernel module to load it: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# lsmod | grep bonding
```

```
[root@ceph-server01 ~]# modprobe bonding; lsmod | grep bonding
```

```
bonding                149864  0
```

51. We edit and create the bond0 (virtual) network interface configuration: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# vi /etc/sysconfig/network-scripts/ifcfg-bond0
```

```
DEVICE=bond0
```

```
NAME=bond0
```

```
TYPE=Bond
```

```
BOOTPROTO=none
ONBOOT=yes
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=no
IPADDR=192.168.10.241
PREFIX=24
GATEWAY=192.168.10.2
DNS1=192.168.10.240
DNS2=168.95.1.1
DNS3=8.8.8.8
BONDING_MASTER=yes
BONDING_OPTS="mode=active-backup miimon=100 primary=ens33"
```

52. We edit and update the physical network interface configuration to match the bonding requirement: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# vi /etc/sysconfig/network-scripts/ifcfg-ens33 /etc/sysconfig/network-scripts/ifcfg-ens34
```

```
DEVICE=ens33
TYPE=Ethernet
BOOTPROTO=none
ONBOOT=yes
MASTER=bond0
SLAVE=yes
```

```
DEVICE=ens34
TYPE=Ethernet
BOOTPROTO=none
```

ONBOOT=yes

MASTER=bond0

SLAVE=yes

53. After editing the network interface configuration, we restart and check the status of network service: (executed on all Ceph storage server/client nodes)

[root@ceph-server01 ~]# systemctl restart network; systemctl status network

- network.service - LSB: Bring up/down networking
Loaded: loaded (/etc/rc.d/init.d/network; bad; vendor preset: disabled)
Active: **active (running)** since Sat 2018-07-07 15:11:25 CST; 13ms ago
Docs: man:systemd-sysv-generator(8)
Process: 4574 ExecStop=/etc/rc.d/init.d/network stop (code=exited, status=0/SUCCESS)
Process: 4793 ExecStart=/etc/rc.d/init.d/network start (code=exited, status=0/SUCCESS)
Tasks: 2
CGroup: /system.slice/network.service
├─4999 /bin/bash /etc/sysconfig/network-scripts/ifup-eth ifcfg-bond0 boot
└─5001 sleep 2

Jul 07 15:11:20 ceph-server01.lab.gidanet.com.tw systemd[1]: Starting LSB: Bring up/down networking...

Jul 07 15:11:20 ceph-server01.lab.gidanet.com.tw network[4793]: Bringing up loopback interface: [OK]

Jul 07 15:11:25 ceph-server01.lab.gidanet.com.tw network[4793]: Bringing up interface bond0: [OK]

Jul 07 15:11:25 ceph-server01.lab.gidanet.com.tw systemd[1]: Started LSB: Bring up/down networking.

Hint: Some lines were ellipsized, use -l to show in full.

54. We use command to check the NIC information - ens33, ens34 and bond0: (executed on all Ceph storage server/client nodes)

[root@ceph-server01 ~]# ip addr list

1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default 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: ens33: <BROADCAST,MULTICAST,SLAVE,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast master bond0 state UP group default qlen 1000
    link/ether 00:0c:29:93:c4:99 brd ff:ff:ff:ff:ff:ff
3: ens34: <BROADCAST,MULTICAST,SLAVE,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast master bond0 state UP group default qlen 1000
    link/ether 00:0c:29:93:c4:99 brd ff:ff:ff:ff:ff:ff
4: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:f4:1e:9f brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
        valid_lft forever preferred_lft forever
5: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN group default qlen 1000
    link/ether 52:54:00:f4:1e:9f brd ff:ff:ff:ff:ff:ff
6: bond0: <BROADCAST,MULTICAST,MASTER,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 00:0c:29:93:c4:99 brd ff:ff:ff:ff:ff:ff
    inet 192.168.10.241/24 brd 192.168.10.255 scope global bond0
        valid_lft forever preferred_lft forever
    inet6 fe80::20c:29ff:fe93:c499/64 scope link
        valid_lft forever preferred_lft forever

```

[root@ceph-server01 ~]# ip route list

```

default via 192.168.10.2 dev bond0
169.254.0.0/16 dev bond0 scope link metric 1006
192.168.10.0/24 dev bond0 proto kernel scope link src 192.168.10.241
192.168.122.0/24 dev virbr0 proto kernel scope link src 192.168.122.1

```

55. We use command to check the bond0 information to make sure the settings configured as what we want them to be: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# cat /proc/net/bonding/bond0
```

Ethernet Channel Bonding Driver: v3.7.1 (April 27, 2011)

Bonding Mode: fault-tolerance (active-backup)

Primary Slave: ens33 (primary_reselect always)

Currently Active Slave: ens33

MII Status: up

MII Polling Interval (ms): 100

Up Delay (ms): 0

Down Delay (ms): 0

Slave Interface: ens33

MII Status: up

Speed: 1000 Mbps

Duplex: full

Link Failure Count: 0

Permanent HW addr: 00:0c:29:93:c4:99

Slave queue ID: 0

Slave Interface: ens34

MII Status: up

Speed: 1000 Mbps

Duplex: full

Link Failure Count: 0

Permanent HW addr: 00:0c:29:93:c4:a3

Slave queue ID: 0

56. We create a Ceph user - cephuser, set password and configure sudo for “cephuser”: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# useradd -d /home/cephuser -m cephuser
```

```
[root@ceph-server01 ~]# passwd cephuser (01Ceph!qaz)
```

```
[root@ceph-server01 ~]# echo "cephuser ALL = (root) NOPASSWD:ALL" | tee /etc/sudoers.d/cephuser
```

```
cephuser ALL = (root) NOPASSWD:ALL
```

```
[root@ceph-server01 ~]# chmod 0440 /etc/sudoers.d/cephuser
```

57. We install NTP for time synchronization between Ceph servers and Ceph clients: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# yum install -y ntp ntpdate ntp-doc
```

```
:::~::~:
```

Installed:

ntp.x86_64 0:4.2.6p5-28.el7.centos

ntp-doc.noarch 0:4.2.6p5-28.el7.centos

Dependency Installed:

autogen-libopts.x86_64 0:5.18-5.el7

Complete!

58. We execute ntpdate command to set a date/time via NTP protocol from local NTP server (Taiwan): (executed on all Ceph

storage server/client nodes)

```
[root@ceph-server01 ~]# ntpdate 0.tw.pool.ntp.org
```

```
8 Jul 21:55:23 ntpdate[4578]: step time server 103.18.128.60 offset -2.117082 sec
```

59. We set the hardware clock (RTC) to the current system time: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# hwclock --systohc
```

60. We enable, start and check the status of ntpd service: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# systemctl enable ntpd; systemctl start ntpd; systemctl status ntpd
```

Created symlink from /etc/systemd/system/multi-user.target.wants/ntpd.service to /usr/lib/systemd/system/ntpd.service.

● ntpd.service - Network Time Service

Loaded: loaded (/usr/lib/systemd/system/ntpd.service; **enabled**; vendor preset: disabled)

Active: **active (running)** since Sun 2018-07-08 21:58:02 CST; 8ms ago

Process: 4641 ExecStart=/usr/sbin/ntpd -u ntp:ntp \$OPTIONS (code=exited, status=0/SUCCESS)

Main PID: 4642 (ntpd)

Tasks: 1

CGroup: /system.slice/ntpd.service

└─4642 /usr/sbin/ntpd -u ntp:ntp -g

```
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw ntpd[4642]: ntp_io: estimated max descriptors: 1024...16
```

```
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw ntpd[4642]: Listen and drop on 0 v4wildcard 0.0.0.0...23
```

```
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw ntpd[4642]: Listen and drop on 1 v6wildcard :: UDP 123
```

```
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw ntpd[4642]: Listen normally on 2 lo 127.0.0.1 UDP 123
```

```
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw ntpd[4642]: Listen normally on 3 bond0 192.168.10.2...23
```

```
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw ntpd[4642]: Listen normally on 4 virbr0 192.168.122...23
```

```
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw ntpd[4642]: Listen normally on 5 lo ::1 UDP 123
```

```
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw ntpd[4642]: Listen normally on 6 bond0 fe80::20c:29...23
```

```
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw ntpd[4642]: Listening on routing socket on fd #23 f...es
Jul 08 21:58:02 ceph-server01.lab.gidanet.com.tw systemd[1]: Started Network Time Service.
Hint: Some lines were ellipsized, use -l to show in full.
```

61. We install/update the open virtual machine tools for virtual machines hosted on VMware: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# yum install -y open-vm-tools
```

```
:::::::::::
```

```
Updated:
```

```
open-vm-tools.x86_64 0:10.1.10-3.el7_5.1
```

```
Dependency Updated:
```

```
open-vm-tools-desktop.x86_64 0:10.1.10-3.el7_5.1
```

```
Complete!
```

62. We disable security-enhanced linux: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# sed -i 's/SELINUX=enforcing/SELINUX=disabled/g' /etc/selinux/config
```

63. After rebooting, we use command to check and make sure the security-enhanced linux is disabled: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# getenforce
```

```
Disabled
```

64. We configure /etc/hosts for easy access to Ceph servers and Ceph clients by means of hostname: (executed on all Ceph storage server/client nodes)

```
[root@ceph-server01 ~]# vi /etc/hosts
```

```
127.0.0.1    localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
```

```
192.168.10.241 ceph-server01.lab.gidanet.com.tw ceph-server01
192.168.10.242 ceph-server02.lab.gidanet.com.tw ceph-server02
192.168.10.243 ceph-server03.lab.gidanet.com.tw ceph-server03

192.168.10.231 ceph-client01.lab.gidanet.com.tw ceph-client01
```

65. We configure ssh server so password-less ssh access for “cephuser”: (executed on the first Ceph storage server node)

```
[root@ceph-server01 ~]# su - cephuser
```

```
[cephuser@ceph-server01 ~]$ ssh-keygen
```

Generating public/private rsa key pair.

Enter file in which to save the key (/home/cephuser/.ssh/id_rsa):

Created directory '/home/cephuser/.ssh'.

Enter passphrase (empty for no passphrase):

Enter same passphrase again:

Your identification has been saved in /home/cephuser/.ssh/id_rsa.

Your public key has been saved in /home/cephuser/.ssh/id_rsa.pub.

The key fingerprint is:

SHA256:Np29+z3CaIyOMHCIGsH8sMWK2U413j03Xm1B8egp0As cephuser@ceph-server01.lab.gidanet.com.tw

The key's randomart image is:

```
+---[RSA 2048]-----+
|           .         |
|o . . . +          |
|.+.o. E . o .       |
```

```
|o=B+.  o = +      |
|=++++.. S * .      |
|.o  o+ o + . .      |
|  .  o. . = +      |
|      .o..o + + o |
|      ..... ..o o|
+----[SHA256]-----+
```

```
[cephuser@ceph-server01 ~]$ vi ~/.ssh/config
```

```
Host ceph-server01
    Hostname ceph-server01
    User cephuser
```

```
Host ceph-server02
    Hostname ceph-server02
    User cephuser
```

```
Host ceph-server03
    Hostname ceph-server03
    User cephuser
```

```
Host ceph-client01
    Hostname ceph-client01
    User cephuser
```

```
[cephuser@ceph-server01 ~]$ chmod 644 ~/.ssh/config; ls -l ~/.ssh/config
```

```
-rw-r--r--. 1 cephuser cephuser 294 Jul  8 22:14 /home/cephuser/.ssh/config
```

```
[cephuser@ceph-server01 ~]$ ssh-keyscan ceph-server02 ceph-server03 ceph-client01 >> ~/.ssh/known_hosts
```

```
# ceph-server02:22 SSH-2.0-OpenSSH_7.4  
# ceph-server02:22 SSH-2.0-OpenSSH_7.4  
# ceph-server02:22 SSH-2.0-OpenSSH_7.4  
# ceph-server03:22 SSH-2.0-OpenSSH_7.4  
# ceph-server03:22 SSH-2.0-OpenSSH_7.4  
# ceph-server03:22 SSH-2.0-OpenSSH_7.4  
# ceph-client01:22 SSH-2.0-OpenSSH_7.4  
# ceph-client01:22 SSH-2.0-OpenSSH_7.4  
# ceph-client01:22 SSH-2.0-OpenSSH_7.4
```

```
[cephuser@ceph-server01 ~]$ ssh-copy-id ceph-server02
```

```
/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/cephuser/.ssh/id_rsa.pub"
```

```
/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
```

```
/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
```

```
cephuser@ceph-server02's password:
```

```
Number of key(s) added: 1
```

Now try logging into the machine, with: "ssh 'ceph-server02'"

and check to make sure that only the key(s) you wanted were added.

```
[cephuser@ceph-server01 ~]$ ssh-copy-id ceph-server03
```

```
.....
```

```
[cephuser@ceph-server01 ~]$ ssh-copy-id ceph-client01
```

.....

66. We test password-less ssh access for “cephuser”: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 ~]$ date; ssh ceph-server02 date
```

```
Tue Jul 10 21:41:53 CST 2018
```

```
Tue Jul 10 21:41:53 CST 2018
```

```
[cephuser@ceph-server01 ~]$ date; ssh ceph-server03 date
```

```
Tue Jul 10 21:42:18 CST 2018
```

```
Tue Jul 10 21:42:18 CST 2018
```

```
[cephuser@ceph-server01 ~]$ date; ssh ceph-client01 date
```

```
Tue Jul 10 21:42:26 CST 2018
```

```
Tue Jul 10 21:42:26 CST 2018
```

67. We check the status of firewalld service, if it is not running, we enable and start it: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# systemctl status firewalld
```

- firewalld.service - firewalld - dynamic firewall daemon
Loaded: loaded (/usr/lib/systemd/system/firewalld.service; **enabled**; vendor preset: enabled)
Active: **active (running)** since Mon 2018-07-09 17:40:04 CST; 3h 9min ago
Docs: man:firewalld(1)
Main PID: 792 (firewalld)
Tasks: 2
CGroup: /system.slice/firewalld.service
└─792 /usr/bin/python -Es /usr/sbin/firewalld --nofork --nopid

Jul 09 17:39:43 ceph-server01.lab.gidanet.com.tw systemd[1]: Starting firewalld - dynamic firewall d....
Jul 09 17:40:04 ceph-server01.lab.gidanet.com.tw systemd[1]: Started firewalld - dynamic firewall daemon.
Hint: Some lines were ellipsized, use -l to show in full.

68. We open the following ports needed by Ceph administration, Ceph monitor and Ceph OSD: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# firewall-cmd --zone=public --add-port=80/tcp --permanent  
success
```

```
[root@ceph-server01 ~]# firewall-cmd --zone=public --add-port=2003/tcp --permanent  
success
```

```
[root@ceph-server01 ~]# firewall-cmd --zone=public --add-port=4505-4506/tcp --permanent  
success
```

These ports are for Ceph administration.

```
[root@ceph-server01 ~]# firewall-cmd --zone=public --add-port=6789/tcp --permanent  
success
```

This port is for Ceph monitor.

```
[root@ceph-server01 ~]# firewall-cmd --zone=public --add-port=6800-7300/tcp --permanent  
success
```

These ports are for Ceph OSD.

```
[root@ceph-server01 ~]# firewall-cmd --reload  
success
```

```
[root@ceph-server01 ~]# iptables -L IN_public_allow
```

Chain IN_public_allow (1 references)

target	prot	opt	source	destination
--------	------	-----	--------	-------------

ACCEPT	tcp	--	anywhere	anywhere	tcp dpt:ssh ctstate NEW
ACCEPT	tcp	--	anywhere	anywhere	tcp dpt:http ctstate NEW
ACCEPT	tcp	--	anywhere	anywhere	tcp dpt:cfinger ctstate NEW
ACCEPT	tcp	--	anywhere	anywhere	tcp dpts:4505:4506 ctstate NEW
ACCEPT	tcp	--	anywhere	anywhere	tcp dpt:smc-https ctstate NEW
ACCEPT	tcp	--	anywhere	anywhere	tcp dpts:6800:7300 ctstate NEW

69. We add the Ceph repository and install the Ceph deployment tool “ceph-deploy” with the yum command: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# rpm -Uvh http://download.ceph.com/rpm-jewel/el7/noarch/ceph-release-1-1.el7.noarch.rpm
```

```
::::::::::
```

```
Updating / installing...
```

```
1:ceph-release-1-1.el7 ##### [100%]
```

```
[root@ceph-server01 ~]# rpm -qa --last | grep -e librados2 -e librbd1
```

```
librbd1-0.94.5-2.el7.x86_64 Tue 10 Jul 2018 09:57:54 AM CST
```

```
librados2-0.94.5-2.el7.x86_64 Tue 10 Jul 2018 09:57:54 AM CST
```

```
[root@ceph-server01 ~]# cat >> /etc/yum.repos.d/ceph.repo
```

```
[Ceph]
```

```
name=Ceph packages for $basearch
```

```
baseurl=http://download.ceph.com/rpm-jewel/el7/$basearch
```

```
enabled=1
```

```
gpgcheck=1
```

```
type=rpm-md
```

```
gpgkey=https://download.ceph.com/keys/release.asc
```

```
priority=1
```

```
[Ceph-noarch]
name=Ceph noarch packages
baseurl=http://download.ceph.com/rpm-jewel/el7/noarch
enabled=1
gpgcheck=1
type=rpm-md
gpgkey=https://download.ceph.com/keys/release.asc
priority=1
```

```
[ceph-source]
name=Ceph source packages
baseurl=http://download.ceph.com/rpm-jewel/el7/SRPMS
enabled=1
gpgcheck=1
type=rpm-md
gpgkey=https://download.ceph.com/keys/release.asc
priority=1
```

70. We download two rpms, then install them to solve the rpm dependency issue before installing ceph-deploy: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# wget -c ftp://ftp.pbone.net/mirror/ftp.centos.org/7.5.1804/storage/x86_64/ceph-jewel/litng-ust-2.4.1-1.el7.1.x86_64.rpm
```

```
[root@ceph-server01 ~]# wget -c ftp://ftp.pbone.net/mirror/ftp.centos.org/7.5.1804/storage/x86_64/ceph-jewel/userspace-rcu-0.7.16-1.el7.x86_64.rpm
```

```
[root@ceph-server01 ~]# yum -y install lttng-ust-2.4.1-1.el7.1.x86_64.rpm userspace-rcu-0.7.16-1.el7.x86_64.rpm
```

```
.....
```

```
Installed:
```

```
lttng-ust.x86_64 0:2.4.1-1.el7.1          userspace-rcu.x86_64 0:0.7.16-1.el7
```

```
Complete!
```

71. We update all currently installed packages then install ceph-deploy: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# yum -y update && yum -y install ceph-deploy
```

```
.....
```

```
.....
```

```
sudo.x86_64 0:1.8.19p2-14.el7_5
systemtap.x86_64 0:3.2-8.el7_5
systemtap-client.x86_64 0:3.2-8.el7_5
systemtap-devel.x86_64 0:3.2-8.el7_5
systemtap-runtime.x86_64 0:3.2-8.el7_5
targetcli.noarch 0:2.1.fb46-6.el7_5
tzdata.noarch 0:2018e-3.el7
tzdata-java.noarch 0:2018e-3.el7
vdo.x86_64 0:6.1.0.168-18
xorg-x11-drv-wacom.x86_64 0:0.34.2-5.el7
```

```
Complete!
```

```
.....
```

```
.....
```

```
Installed:
```

```
ceph-deploy.noarch 0:1.5.39-0
```

Complete!

72. We change user to cephuser for creating and configuring Ceph cluster:

```
[root@ceph-server01 ~]# su - cephuser
```

73. We create cluster directory to hold cluster related configuration files: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 ~]$ mkdir cluster
```

```
[cephuser@ceph-server01 ~]$ cd cluster
```

```
[cephuser@ceph-server01 cluster]$ ceph-deploy --help
```

```
usage: ceph-deploy [-h] [-v | -q] [--version] [--username USERNAME]
                  [--overwrite-conf] [--ceph-conf CEPH_CONF]
                  COMMAND ...
```

Easy Ceph deployment

```
  ^-
 /   \
|0 o|  ceph-deploy v2.0.0
).-.(
' /|||\ '
| ' | ' |
' | ' |
```

Full documentation can be found at: <http://ceph.com/ceph-deploy/docs>

optional arguments:

-h, --help	show this help message and exit
-v, --verbose	be more verbose
-q, --quiet	be less verbose
--version	the current installed version of ceph-deploy
--username USERNAME	the username to connect to the remote host
--overwrite-conf	overwrite an existing conf file on remote host (if present)
--ceph-conf CEPH_CONF	use (or reuse) a given ceph.conf file

commands:

COMMAND	description
new	Start deploying a new cluster, and write a CLUSTER.conf and keyring for it.
install	Install Ceph packages on remote hosts.
rgw	Ceph RGW daemon management
mgr	Ceph MGR daemon management
mds	Ceph MDS daemon management
mon	Ceph MON Daemon management
gatherkeys	Gather authentication keys for provisioning new nodes.
disk	Manage disks on a remote host.
osd	Prepare a data disk on remote host.
repo	Repo definition management
admin	Push configuration and client.admin key to a remote host.

config	Copy ceph.conf to/from remote host(s)
uninstall	Remove Ceph packages from remote hosts.
purgedata	Purge (delete, destroy, discard, shred) any Ceph data from /var/lib/ceph
purge	Remove Ceph packages from remote hosts and purge all data.
forgetkeys	Remove authentication keys from the local directory.
pkg	Manage packages on remote hosts.
calamari	Install and configure Calamari nodes. Assumes that a repository with Calamari packages is already configured. Refer to the docs for examples (http://ceph.com/ceph-deploy/docs/conf.html)

74. We create a new cluster configuration with ceph-deploy command: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ ceph-deploy new ceph-server01
```

```
[ceph_deploy.conf][DEBUG ] found configuration file at: /home/cephuser/.cephdeploy.conf
[ceph_deploy.cli][INFO ] Invoked (1.5.39): /bin/ceph-deploy new ceph-server01
[ceph_deploy.cli][INFO ] ceph-deploy options:
[ceph_deploy.cli][INFO ] username                : None
[ceph_deploy.cli][INFO ] func                : <function new at 0x7f1ebd1b4aa0>
[ceph_deploy.cli][INFO ] verbose              : False
[ceph_deploy.cli][INFO ] overwrite_conf       : False
[ceph_deploy.cli][INFO ] quiet                : False
[ceph_deploy.cli][INFO ] cd_conf              : <ceph_deploy.conf.cephdeploy.Conf instance at 0x7f1ebc930050>
[ceph_deploy.cli][INFO ] cluster              : ceph
[ceph_deploy.cli][INFO ] ssh_copykey          : True
[ceph_deploy.cli][INFO ] mon                  : ['ceph-server01']
```

```

[ceph_deploy.cli][INFO ] public_network          : None
[ceph_deploy.cli][INFO ] ceph_conf              : None
[ceph_deploy.cli][INFO ] cluster_network       : None
[ceph_deploy.cli][INFO ] default_release       : False
[ceph_deploy.cli][INFO ] fsid                  : None
[ceph_deploy.new][DEBUG ] Creating new cluster named ceph
[ceph_deploy.new][INFO ] making sure passwordless SSH succeeds
[ceph-server01][DEBUG ] connection detected need for sudo
[ceph-server01][DEBUG ] connected to host: ceph-server01
[ceph-server01][DEBUG ] detect platform information from remote host
[ceph-server01][DEBUG ] detect machine type
[ceph-server01][DEBUG ] find the location of an executable
[ceph-server01][INFO ] Running command: sudo /usr/sbin/ip link show
[ceph-server01][INFO ] Running command: sudo /usr/sbin/ip addr show
[ceph-server01][DEBUG ] IP addresses found: [u'192.168.10.241', u'192.168.122.1' ]
[ceph_deploy.new][DEBUG ] Resolving host ceph-server01
[ceph_deploy.new][DEBUG ] Monitor ceph-server01 at 192.168.10.241
[ceph_deploy.new][DEBUG ] Monitor initial members are ['ceph-server01' ]
[ceph_deploy.new][DEBUG ] Monitor addrs are ['192.168.10.241' ]
[ceph_deploy.new][DEBUG ] Creating a random mon key...
[ceph_deploy.new][DEBUG ] Writing monitor keyring to ceph.mon.keyring...
[ceph_deploy.new][DEBUG ] Writing initial config to ceph.conf...

```

75. We check the cluster configuration: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ cat ceph.conf
```

```
[global]
```

```
fsid = 4d00630f-ff91-4bf0-b7e1-fe9f616753ea
```

```
mon_initial_members = ceph-server01
mon_host = 192.168.10.241
auth_cluster_required = cephx
auth_service_required = cephx
auth_client_required = cephx
```

```
[cephuser@ceph-server01 cluster]$ cp -p ceph.conf ceph.conf.Orig
```

76. We update the cluster configuration by adding network definition: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ vi ceph.conf
```

```
:::~::~:
```

```
# Your network address
```

```
public network = 192.168.10.0/24
```

```
osd pool default size = 2
```

77. We install Ceph on all Ceph storage nodes: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ ceph-deploy install ceph-server01 ceph-server02 ceph-server03
```

```
[ceph_deploy.cli][INFO ] Invoked (1.5.39): /bin/ceph-deploy install ceph-server01 ceph-server02 ceph-server03
```

```
[ceph_deploy.cli][INFO ] ceph-deploy options:
```

```
[ceph_deploy.cli][INFO ] verbose : False
```

```
[ceph_deploy.cli][INFO ] testing : None
```

```
[ceph_deploy.cli][INFO ] cd_conf : <ceph_deploy.conf.cephdeploy.Conf instance at 0x7ff6eca862d8>
```

```
[ceph_deploy.cli][INFO ] cluster : ceph
```

```
[ceph_deploy.cli][INFO ] dev_commit : None
```

```
[ceph_deploy.cli][INFO ] install_mds : False
```

```
[ceph_deploy.cli][INFO ] stable : None
```



```

[ceph_deploy.cli][INFO ] default_release      : False
[ceph_deploy.cli][INFO ] username        : None
[ceph_deploy.cli][INFO ] adjust_repos    : True
[ceph_deploy.cli][INFO ] func            : <function install at 0x7ff6ed9562a8>
[ceph_deploy.cli][INFO ] install_mgr     : False
[ceph_deploy.cli][INFO ] install_all     : False
[ceph_deploy.cli][INFO ] repo            : False
[ceph_deploy.cli][INFO ] host            : ['ceph-server01', 'ceph-server02', 'ceph-server03']
[ceph_deploy.cli][INFO ] install_rgw     : False
[ceph_deploy.cli][INFO ] install_tests   : False
[ceph_deploy.cli][INFO ] repo_url        : None
[ceph_deploy.cli][INFO ] ceph_conf       : None
[ceph_deploy.cli][INFO ] install_osd     : False
[ceph_deploy.cli][INFO ] version_kind    : stable
[ceph_deploy.cli][INFO ] install_common  : False
[ceph_deploy.cli][INFO ] overwrite_conf  : False
[ceph_deploy.cli][INFO ] quiet           : False
[ceph_deploy.cli][INFO ] dev             : master
[ceph_deploy.cli][INFO ] nogpgcheck      : False
[ceph_deploy.cli][INFO ] local_mirror    : None
[ceph_deploy.cli][INFO ] release         : None
[ceph_deploy.cli][INFO ] install_mon     : False
[ceph_deploy.cli][INFO ] gpg_url         : None
[ceph_deploy.install][DEBUG ] Installing stable version jewel on cluster ceph hosts ceph-server01 ceph-server02 ceph-server03
[ceph_deploy.install][DEBUG ] Detecting platform for host ceph-server01 ...
[ceph-server01][DEBUG ] connection detected need for sudo
[ceph-server01][DEBUG ] connected to host: ceph-server01

```

```

[ceph-server01][DEBUG ] detect platform information from remote host
[ceph-server01][DEBUG ] detect machine type
[ceph_deploy.install][INFO  ] Distro info: CentOS Linux 7.5.1804 Core
[ceph-server01][INFO  ] installing Ceph on ceph-server01
[ceph-server01][INFO  ] Running command: sudo yum clean all
[ceph-server01][DEBUG ] Loaded plugins: fastestmirror, langpacks
[ceph-server01][DEBUG ] Cleaning repos: Ceph Ceph-noarch base ceph-source extras updates
[ceph-server01][DEBUG ] Cleaning up everything
[ceph-server01][DEBUG ] Maybe you want: rm -rf /var/cache/yum, to also free up space taken by orphaned data from disabled or removed repos
[ceph-server01][DEBUG ] Cleaning up list of fastest mirrors
[ceph-server01][INFO  ] Running command: sudo yum -y install epel-release
[ceph-server01][DEBUG ] Loaded plugins: fastestmirror, langpacks
[ceph-server01][DEBUG ] Determining fastest mirrors
:::~::~
:::~::~
[ceph-server03][DEBUG ] Dependencies Resolved
[ceph-server03][DEBUG ]
[ceph-server03][DEBUG ] =====
[ceph-server03][DEBUG ] Package                Arch          Version           Repository        Size
[ceph-server03][DEBUG ] =====
[ceph-server03][DEBUG ] Installing:
[ceph-server03][DEBUG ] ceph                   x86_64        2:10.2.11-0.el7   Ceph              3.0 k
[ceph-server03][DEBUG ] ceph-radosgw           x86_64        2:10.2.11-0.el7   Ceph              267 k
[ceph-server03][DEBUG ] Installing for dependencies:
[ceph-server03][DEBUG ] boost-program-options  x86_64        1.53.0-27.el7     base              156 k
[ceph-server03][DEBUG ] boost-regex            x86_64        1.53.0-27.el7     base              300 k
[ceph-server03][DEBUG ] ceph-base              x86_64        2:10.2.11-0.el7   Ceph              4.2 M

```

[ceph-server03][DEBUG]	ceph-common	x86_64	2:10.2.11-0.e17	Ceph	17 M
[ceph-server03][DEBUG]	ceph-mds	x86_64	2:10.2.11-0.e17	Ceph	2.8 M
[ceph-server03][DEBUG]	ceph-mon	x86_64	2:10.2.11-0.e17	Ceph	3.1 M
[ceph-server03][DEBUG]	ceph-osd	x86_64	2:10.2.11-0.e17	Ceph	9.5 M
[ceph-server03][DEBUG]	ceph-selinux	x86_64	2:10.2.11-0.e17	Ceph	20 k
[ceph-server03][DEBUG]	fcgi	x86_64	2.4.0-25.e17	epel	47 k
[ceph-server03][DEBUG]	hdparm	x86_64	9.43-5.e17	base	83 k
[ceph-server03][DEBUG]	leveldb	x86_64	1.12.0-11.e17	epel	161 k
[ceph-server03][DEBUG]	libbabeltrace	x86_64	1.2.4-3.e17	epel	147 k
[ceph-server03][DEBUG]	libcephfs1	x86_64	2:10.2.11-0.e17	Ceph	1.9 M
[ceph-server03][DEBUG]	libradosstriper1	x86_64	2:10.2.11-0.e17	Ceph	1.8 M
[ceph-server03][DEBUG]	librgw2	x86_64	2:10.2.11-0.e17	Ceph	3.0 M
[ceph-server03][DEBUG]	mailcap	noarch	2.1.41-2.e17	base	31 k
[ceph-server03][DEBUG]	python-babel	noarch	0.9.6-8.e17	base	1.4 M
[ceph-server03][DEBUG]	python-cephfs	x86_64	2:10.2.11-0.e17	Ceph	78 k
[ceph-server03][DEBUG]	python-flask	noarch	1:0.10.1-4.e17	extras	204 k
[ceph-server03][DEBUG]	python-itsdangerous	noarch	0.23-2.e17	extras	24 k
[ceph-server03][DEBUG]	python-jinja2	noarch	2.7.2-2.e17	base	515 k
[ceph-server03][DEBUG]	python-markupsafe	x86_64	0.11-10.e17	base	25 k
[ceph-server03][DEBUG]	python-rados	x86_64	2:10.2.11-0.e17	Ceph	149 k
[ceph-server03][DEBUG]	python-rbd	x86_64	2:10.2.11-0.e17	Ceph	79 k
[ceph-server03][DEBUG]	python-requests	noarch	2.6.0-1.e17_1	base	94 k
[ceph-server03][DEBUG]	python-urllib3	noarch	1.10.2-5.e17	base	102 k
[ceph-server03][DEBUG]	python-werkzeug	noarch	0.9.1-2.e17	extras	562 k
[ceph-server03][DEBUG]					
[ceph-server03][DEBUG]	Transaction Summary				
[ceph-server03][DEBUG]	=====				

```

[ceph-server03][DEBUG ] Install 2 Packages (+27 Dependent packages)
[ceph-server03][DEBUG ]
[ceph-server03][DEBUG ] Total download size: 47 M
[ceph-server03][DEBUG ] Installed size: 178 M
:::
:::
[ceph-server03][DEBUG ] Installed:
[ceph-server03][DEBUG ]   ceph.x86_64 2:10.2.11-0.el7          ceph-radosgw.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]
[ceph-server03][DEBUG ] Dependency Installed:
[ceph-server03][DEBUG ]   boost-program-options.x86_64 0:1.53.0-27.el7
[ceph-server03][DEBUG ]   boost-regex.x86_64 0:1.53.0-27.el7
[ceph-server03][DEBUG ]   ceph-base.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]   ceph-common.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]   ceph-mds.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]   ceph-mon.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]   ceph-osd.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]   ceph-selinux.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]   fcgi.x86_64 0:2.4.0-25.el7
[ceph-server03][DEBUG ]   hdparm.x86_64 0:9.43-5.el7
[ceph-server03][DEBUG ]   leveldb.x86_64 0:1.12.0-11.el7
[ceph-server03][DEBUG ]   libbabeltrace.x86_64 0:1.2.4-3.el7
[ceph-server03][DEBUG ]   libcephfs1.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]   libradosstriper1.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]   librgw2.x86_64 2:10.2.11-0.el7
[ceph-server03][DEBUG ]   mailcap.noarch 0:2.1.41-2.el7
[ceph-server03][DEBUG ]   python-babel.noarch 0:0.9.6-8.el7

```

```

[ceph-server03][DEBUG ] python-cephfs.x86_64 2:10.2.11-0.e17
[ceph-server03][DEBUG ] python-flask.noarch 1:0.10.1-4.e17
[ceph-server03][DEBUG ] python-itsdangerous.noarch 0:0.23-2.e17
[ceph-server03][DEBUG ] python-jinja2.noarch 0:2.7.2-2.e17
[ceph-server03][DEBUG ] python-markupsafe.x86_64 0:0.11-10.e17
[ceph-server03][DEBUG ] python-rados.x86_64 2:10.2.11-0.e17
[ceph-server03][DEBUG ] python-rbd.x86_64 2:10.2.11-0.e17
[ceph-server03][DEBUG ] python-requests.noarch 0:2.6.0-1.e17_1
[ceph-server03][DEBUG ] python-urllib3.noarch 0:1.10.2-5.e17
[ceph-server03][DEBUG ] python-werkzeug.noarch 0:0.9.1-2.e17
[ceph-server03][DEBUG ]
[ceph-server03][DEBUG ] Complete!
[ceph-server03][INFO ] Running command: sudo ceph --version
[ceph-server03][DEBUG ] ceph version 10.2.11 (e4b061b47f07f583c92a050d9e84b1813a35671e)

```

[cephuser@ceph-server01 cluster]# rpm -qa --last | grep -e " Wed 11 Jul 2018 04:3"

```

mailcap-2.1.41-2.e17.noarch           Wed 11 Jul 2018 04:37:10 PM CST
ceph-radosgw-10.2.11-0.e17.x86_64    Wed 11 Jul 2018 04:37:10 PM CST
ceph-mon-10.2.11-0.e17.x86_64        Wed 11 Jul 2018 04:37:10 PM CST
ceph-mds-10.2.11-0.e17.x86_64        Wed 11 Jul 2018 04:37:10 PM CST
ceph-10.2.11-0.e17.x86_64            Wed 11 Jul 2018 04:37:10 PM CST
ceph-osd-10.2.11-0.e17.x86_64        Wed 11 Jul 2018 04:37:09 PM CST
ceph-selinux-10.2.11-0.e17.x86_64    Wed 11 Jul 2018 04:36:54 PM CST
ceph-base-10.2.11-0.e17.x86_64       Wed 11 Jul 2018 04:36:54 PM CST
ceph-common-10.2.11-0.e17.x86_64     Wed 11 Jul 2018 04:36:53 PM CST
libbabeltrace-1.2.4-3.e17.x86_64     Wed 11 Jul 2018 04:36:51 PM CST
hdparm-9.43-5.e17.x86_64             Wed 11 Jul 2018 04:36:51 PM CST

```

boost-regex-1.53.0-27.el7.x86_64	Wed 11 Jul 2018 04:36:51 PM CST
python-urllib3-1.10.2-5.el7.noarch	Wed 11 Jul 2018 04:36:50 PM CST
python-requests-2.6.0-1.el7_1.noarch	Wed 11 Jul 2018 04:36:50 PM CST
python-markupsafe-0.11-10.el7.x86_64	Wed 11 Jul 2018 04:36:50 PM CST
python-jinja2-2.7.2-2.el7.noarch	Wed 11 Jul 2018 04:36:50 PM CST
python-itsdangerous-0.23-2.el7.noarch	Wed 11 Jul 2018 04:36:50 PM CST
python-flask-0.10.1-4.el7.noarch	Wed 11 Jul 2018 04:36:50 PM CST
libradosstriper1-10.2.11-0.el7.x86_64	Wed 11 Jul 2018 04:36:50 PM CST
python-werkzeug-0.9.1-2.el7.noarch	Wed 11 Jul 2018 04:36:49 PM CST
python-rbd-10.2.11-0.el7.x86_64	Wed 11 Jul 2018 04:36:49 PM CST
python-cephfs-10.2.11-0.el7.x86_64	Wed 11 Jul 2018 04:36:49 PM CST
python-babel-0.9.6-8.el7.noarch	Wed 11 Jul 2018 04:36:49 PM CST
librgw2-10.2.11-0.el7.x86_64	Wed 11 Jul 2018 04:36:49 PM CST
leveldb-1.12.0-11.el7.x86_64	Wed 11 Jul 2018 04:36:49 PM CST
boost-program-options-1.53.0-27.el7.x86_64	Wed 11 Jul 2018 04:36:49 PM CST
python-rados-10.2.11-0.el7.x86_64	Wed 11 Jul 2018 04:36:48 PM CST
libcephfs1-10.2.11-0.el7.x86_64	Wed 11 Jul 2018 04:36:48 PM CST
fcgi-2.4.0-25.el7.x86_64	Wed 11 Jul 2018 04:36:48 PM CST
gpg-pubkey-352c64e5-52ae6884	Wed 11 Jul 2018 04:33:15 PM CST
ceph-release-1-1.el7.noarch	Wed 11 Jul 2018 04:32:50 PM CST
yum-plugin-priorities-1.1.31-45.el7.noarch	Wed 11 Jul 2018 04:32:28 PM CST
epel-release-7-11.noarch	Wed 11 Jul 2018 04:31:35 PM CST

78. Based on timestamp, we check how many Ceph related rpms installed: (executed on all Ceph storage server nodes)

```
[cephuser@ceph-server01 cluster]$ rpm -qa --last | grep -e " Wed 11 Jul 2018 04:3" | wc -L
```

33

```
[cephuser@ceph-server02 ~]$ rpm -qa --last | grep -e " Wed 11 Jul 2018 04:[34]" | wc -L
```

33

```
[cephuser@ceph-server03 ~]$ rpm -qa --last | grep -e " Wed 11 Jul 2018 04:[34]" | wc -L
```

33

79. We deploy ceph-mon on the first node:

```
[cephuser@ceph-server01 cluster]$ ceph-deploy mon create-initial
```

```
[ceph_deploy.conf][DEBUG ] found configuration file at: /home/cephuser/.cephdeploy.conf
```

```
[ceph_deploy.cli][INFO ] Invoked (1.5.39): /bin/ceph-deploy mon create-initial
```

```
[ceph_deploy.cli][INFO ] ceph-deploy options:
```

```
[ceph_deploy.cli][INFO ] username : None
```

```
[ceph_deploy.cli][INFO ] verbose : False
```

```
[ceph_deploy.cli][INFO ] overwrite_conf : False
```

```
[ceph_deploy.cli][INFO ] subcommand : create-initial
```

```
[ceph_deploy.cli][INFO ] quiet : False
```

```
[ceph_deploy.cli][INFO ] cd_conf : <ceph_deploy.conf.cephdeploy.Conf instance at 0x7f75c9de7368>
```

```
[ceph_deploy.cli][INFO ] cluster : ceph
```

```
[ceph_deploy.cli][INFO ] func : <function mon at 0x7f75c9e31b90>
```

```
[ceph_deploy.cli][INFO ] ceph_conf : None
```

```
[ceph_deploy.cli][INFO ] default_release : False
```

```
[ceph_deploy.cli][INFO ] keyrings : None
```

```
[ceph_deploy.mon][DEBUG ] Deploying mon, cluster ceph hosts ceph-server01
```

```
[ceph_deploy.mon][DEBUG ] detecting platform for host ceph-server01 ...
```

```
[ceph-server01][DEBUG ] connection detected need for sudo
```

```
[ceph-server01][DEBUG ] connected to host: ceph-server01
```

```
[ceph-server01][DEBUG ] detect platform information from remote host
```

```
[ceph-server01][DEBUG ] detect machine type
[ceph-server01][DEBUG ] find the location of an executable
[ceph_deploy.mon][INFO  ] distro info: CentOS Linux 7.5.1804 Core
[ceph-server01][DEBUG ] determining if provided host has same hostname in remote
[ceph-server01][DEBUG ] get remote short hostname
[ceph-server01][DEBUG ] deploying mon to ceph-server01
[ceph-server01][DEBUG ] get remote short hostname
[ceph-server01][DEBUG ] remote hostname: ceph-server01
[ceph-server01][DEBUG ] write cluster configuration to /etc/ceph/{cluster}.conf
[ceph-server01][DEBUG ] create the mon path if it does not exist
[ceph-server01][DEBUG ] checking for done path: /var/lib/ceph/mon/ceph-ceph-server01/done
[ceph-server01][DEBUG ] done path does not exist: /var/lib/ceph/mon/ceph-ceph-server01/done
[ceph-server01][INFO  ] creating keyring file: /var/lib/ceph/tmp/ceph-ceph-server01.mon.keyring
[ceph-server01][DEBUG ] create the monitor keyring file
[ceph-server01][INFO  ] Running command: sudo ceph-mon --cluster ceph --mkfs -i ceph-server01 --keyring /var/lib/ceph/tmp/ceph-ceph-server01.mon.keyring --setuser 167 --setgroup 167
[ceph-server01][DEBUG ] ceph-mon: renaming mon.noname-a 192.168.10.241:6789/0 to mon.ceph-server01
[ceph-server01][DEBUG ] ceph-mon: set fsid to 4d00630f-ff91-4bf0-b7e1-fe9f616753ea
[ceph-server01][DEBUG ] ceph-mon: created monfs at /var/lib/ceph/mon/ceph-ceph-server01 for mon.ceph-server01
[ceph-server01][INFO  ] unlinking keyring file /var/lib/ceph/tmp/ceph-ceph-server01.mon.keyring
[ceph-server01][DEBUG ] create a done file to avoid re-doing the mon deployment
[ceph-server01][DEBUG ] create the init path if it does not exist
[ceph-server01][INFO  ] Running command: sudo systemctl enable ceph.target
[ceph-server01][INFO  ] Running command: sudo systemctl enable ceph-mon@ceph-server01
[ceph-server01][WARNIN] Created symlink from /etc/systemd/system/ceph-mon.target.wants/ceph-mon@ceph-server01.service to /usr/lib/systemd/system/ceph-mon@.service.
[ceph-server01][INFO  ] Running command: sudo systemctl start ceph-mon@ceph-server01
```



```

[ceph-server01][INFO ] Running command: sudo ceph --cluster=ceph --admin-daemon /var/run/ceph/ceph-mon.ceph-server01.asok mon_status
[ceph-server01][DEBUG ] *****
[ceph-server01][DEBUG ] status for monitor: mon.ceph-server01
[ceph-server01][DEBUG ] {
[ceph-server01][DEBUG ]   "election_epoch": 3,
[ceph-server01][DEBUG ]   "extra_probe_peers": [],
[ceph-server01][DEBUG ]   "monmap": {
[ceph-server01][DEBUG ]     "created": "2018-07-11 17:12:15.929639",
[ceph-server01][DEBUG ]     "epoch": 1,
[ceph-server01][DEBUG ]     "fsid": "4d00630f-ff91-4bf0-b7e1-fe9f616753ea",
[ceph-server01][DEBUG ]     "modified": "2018-07-11 17:12:15.929639",
[ceph-server01][DEBUG ]     "mons": [
[ceph-server01][DEBUG ]       {
[ceph-server01][DEBUG ]         "addr": "192.168.10.241:6789/0",
[ceph-server01][DEBUG ]         "name": "ceph-server01",
[ceph-server01][DEBUG ]         "rank": 0
[ceph-server01][DEBUG ]       }
[ceph-server01][DEBUG ]     ]
[ceph-server01][DEBUG ]   },
[ceph-server01][DEBUG ]   "name": "ceph-server01",
[ceph-server01][DEBUG ]   "outside_quorum": [],
[ceph-server01][DEBUG ]   "quorum": [
[ceph-server01][DEBUG ]     0
[ceph-server01][DEBUG ]   ],
[ceph-server01][DEBUG ]   "rank": 0,
[ceph-server01][DEBUG ]   "state": "leader",
[ceph-server01][DEBUG ]   "sync_provider": []

```

```

[ceph-server01][DEBUG ] }
[ceph-server01][DEBUG ] *****
[ceph-server01][INFO  ] monitor: mon.ceph-server01 is running
[ceph-server01][INFO  ] Running command: sudo ceph --cluster=ceph --admin-daemon /var/run/ceph/ceph-mon.ceph-server01.asok mon_status
[ceph_deploy.mon][INFO  ] processing monitor mon.ceph-server01
[ceph-server01][DEBUG ] connection detected need for sudo
[ceph-server01][DEBUG ] connected to host: ceph-server01
[ceph-server01][DEBUG ] detect platform information from remote host
[ceph-server01][DEBUG ] detect machine type
[ceph-server01][DEBUG ] find the location of an executable
[ceph-server01][INFO  ] Running command: sudo ceph --cluster=ceph --admin-daemon /var/run/ceph/ceph-mon.ceph-server01.asok mon_status
[ceph_deploy.mon][INFO  ] mon.ceph-server01 monitor has reached quorum!
[ceph_deploy.mon][INFO  ] all initial monitors are running and have formed quorum
[ceph_deploy.mon][INFO  ] Running gatherkeys...
[ceph_deploy.gatherkeys][INFO  ] Storing keys in temp directory /tmp/tmpHsaQGC
[ceph-server01][DEBUG ] connection detected need for sudo
[ceph-server01][DEBUG ] connected to host: ceph-server01
[ceph-server01][DEBUG ] detect platform information from remote host
[ceph-server01][DEBUG ] detect machine type
[ceph-server01][DEBUG ] get remote short hostname
[ceph-server01][DEBUG ] fetch remote file
[ceph-server01][INFO  ] Running command: sudo /usr/bin/ceph --connect-timeout=25 --cluster=ceph --admin-daemon=/var/run/ceph/ceph-mon.ceph-server01.asok mon_status
[ceph-server01][INFO  ] Running command: sudo /usr/bin/ceph --connect-timeout=25 --cluster=ceph --name mon. --keyring=/var/lib/ceph/mon/ceph-ceph-server01/keyring auth get client.admin
[ceph-server01][INFO  ] Running command: sudo /usr/bin/ceph --connect-timeout=25 --cluster=ceph --name mon. --keyring=/var/lib/ceph/mon/ceph-ceph-server01/keyring auth get client.bootstrap-mds

```

```

[ceph-server01][INFO ] Running command: sudo /usr/bin/ceph --connect-timeout=25 --cluster=ceph --name mon. --
keyring=/var/lib/ceph/mon/ceph-ceph-server01/keyring auth get client.bootstrap-mgr
[ceph-server01][INFO ] Running command: sudo /usr/bin/ceph --connect-timeout=25 --cluster=ceph --name mon. --
keyring=/var/lib/ceph/mon/ceph-ceph-server01/keyring auth get-or-create client.bootstrap-mgr mon allow profile bootstrap-mgr
[ceph-server01][INFO ] Running command: sudo /usr/bin/ceph --connect-timeout=25 --cluster=ceph --name mon. --
keyring=/var/lib/ceph/mon/ceph-ceph-server01/keyring auth get client.bootstrap-osd
[ceph-server01][INFO ] Running command: sudo /usr/bin/ceph --connect-timeout=25 --cluster=ceph --name mon. --
keyring=/var/lib/ceph/mon/ceph-ceph-server01/keyring auth get client.bootstrap-rgw
[ceph_deploy.gatherkeys][INFO ] Storing ceph.client.admin.keyring
[ceph_deploy.gatherkeys][INFO ] Storing ceph.bootstrap-mds.keyring
[ceph_deploy.gatherkeys][INFO ] Storing ceph.bootstrap-mgr.keyring
[ceph_deploy.gatherkeys][INFO ] keyring 'ceph.mon.keyring' already exists
[ceph_deploy.gatherkeys][INFO ] Storing ceph.bootstrap-osd.keyring
[ceph_deploy.gatherkeys][INFO ] Storing ceph.bootstrap-rgw.keyring
[ceph_deploy.gatherkeys][INFO ] Destroy temp directory /tmp/tmpsaQGC

```

80. We deploy (create more monitors - a single monitor per node) ceph-mon on the other nodes:

[cephuser@ceph-server01 cluster]\$ ceph-deploy mon create ceph-server02 ceph-server03

.....

.....

```

[ceph-server03][DEBUG ] *****
[ceph-server03][DEBUG ] status for monitor: mon.ceph-server03
[ceph-server03][DEBUG ] {
[ceph-server03][DEBUG ]   "election_epoch": 0,
[ceph-server03][DEBUG ]   "extra_probe_peers": [
[ceph-server03][DEBUG ]     "192.168.10.241:6789/0"
[ceph-server03][DEBUG ]   ],

```

```

[ceph-server03][DEBUG ] "monmap": {
[ceph-server03][DEBUG ]   "created": "2018-07-11 17:12:15.929639",
[ceph-server03][DEBUG ]   "epoch": 2,
[ceph-server03][DEBUG ]   "fsid": "4d00630f-ff91-4bf0-b7e1-fe9f616753ea",
[ceph-server03][DEBUG ]   "modified": "2018-07-11 17:15:12.105763",
[ceph-server03][DEBUG ]   "mons": [
[ceph-server03][DEBUG ]     {
[ceph-server03][DEBUG ]       "addr": "192.168.10.241:6789/0",
[ceph-server03][DEBUG ]       "name": "ceph-server01",
[ceph-server03][DEBUG ]       "rank": 0
[ceph-server03][DEBUG ]     },
[ceph-server03][DEBUG ]     {
[ceph-server03][DEBUG ]       "addr": "192.168.10.242:6789/0",
[ceph-server03][DEBUG ]       "name": "ceph-server02",
[ceph-server03][DEBUG ]       "rank": 1
[ceph-server03][DEBUG ]     }
[ceph-server03][DEBUG ]   ]
[ceph-server03][DEBUG ] },
[ceph-server03][DEBUG ] "name": "ceph-server03",
[ceph-server03][DEBUG ] "outside_quorum": [
[ceph-server03][DEBUG ]   "ceph-server01",
[ceph-server03][DEBUG ]   "ceph-server02"
[ceph-server03][DEBUG ] ],
[ceph-server03][DEBUG ] "quorum": [],
[ceph-server03][DEBUG ] "rank": -1,
[ceph-server03][DEBUG ] "state": "probing",
[ceph-server03][DEBUG ] "sync_provider": []

```

```
[ceph-server03][DEBUG ] }
[ceph-server03][DEBUG ] *****
[ceph-server03][INFO  ] monitor: mon.ceph-server03 is currently at the state of probing
[ceph-server03][INFO  ] Running command: sudo ceph --cluster=ceph --admin-daemon /var/run/ceph/ceph-mon.ceph-server03.asok mon_status
[ceph-server03][WARNIN] ceph-server03 is not defined in 'mon initial members'
[ceph-server03][WARNIN] monitor ceph-server03 does not exist in monmap
```

81. We use command to check the relationship of ceph-mon on all Ceph server nodes:

```
[cephuser@ceph-server01 cluster]$ sudo netstat -antlp | grep mon
```

```
tcp        0      0 192.168.10.241:6789    0.0.0.0:*               LISTEN      75654/ceph-mon
tcp        0      0 192.168.10.241:6789    192.168.10.243:53366    ESTABLISHED 75654/ceph-mon
tcp        0      0 192.168.10.241:6789    192.168.10.242:47806    ESTABLISHED 75654/ceph-mon
```

```
[cephuser@ceph-server02 ~]$ sudo netstat -antlp | grep mon
```

```
tcp        0      0 192.168.10.242:6789    0.0.0.0:*               LISTEN      76131/ceph-mon
tcp        0      0 192.168.10.242:6789    192.168.10.243:34014    ESTABLISHED 76131/ceph-mon
tcp        0      0 192.168.10.242:47806    192.168.10.241:6789    ESTABLISHED 76131/ceph-mon
```

```
[cephuser@ceph-server03 ~]$ sudo netstat -antlp | grep mon
```

```
tcp        0      0 192.168.10.243:6789    0.0.0.0:*               LISTEN      76236/ceph-mon
tcp        0      0 192.168.10.243:53366    192.168.10.241:6789    ESTABLISHED 76236/ceph-mon
tcp        0      0 192.168.10.243:34014    192.168.10.242:6789    ESTABLISHED 76236/ceph-mon
```

82. We list keyring files: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ ls -alt
```

```
total 200
-rw-rw-r-- 1 cephuser cephuser 157316 Jul 11 17:19 ceph-deploy-ceph.log
```

```

drwxrwxr-x  2 cephuser cephuser 4096 Jul 11 17:12 .
-rw-----  1 cephuser cephuser  113 Jul 11 17:12 ceph.bootstrap-rgw.keyring
-rw-----  1 cephuser cephuser  113 Jul 11 17:12 ceph.bootstrap-osd.keyring
-rw-----  1 cephuser cephuser   71 Jul 11 17:12 ceph.bootstrap-mgr.keyring
-rw-----  1 cephuser cephuser  113 Jul 11 17:12 ceph.bootstrap-mds.keyring
-rw-----  1 cephuser cephuser  129 Jul 11 17:12 ceph.client.admin.keyring
drwx-----. 7 cephuser cephuser 4096 Jul 11 16:29 ..
-rw-rw-r--  1 cephuser cephuser  287 Jul 11 16:29 ceph.conf
-rw-rw-r--  1 cephuser cephuser  205 Jul 11 16:27 ceph.conf.Orig
-rw-----  1 cephuser cephuser   73 Jul 11 16:27 ceph.mon.keyring

```

83. We install jq package for JSON output processing: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# yum -y install jq
```

```
.....
```

Installed:

```
jq.x86_64 0:1.5-1.el7
```

Dependency Installed:

```
oniguruma.x86_64 0:5.9.5-3.el7
```

Complete!

84. We check Ceph cluster status: (executed on any Ceph storage server node)

```
[root@ceph-server01 ~]# ceph --cluster ceph quorum_status | jq
```

```
{
  "election_epoch": 20,
  "quorum": [
```

```
0,
1,
2
],
"quorum_names": [
  "ceph-server01",
  "ceph-server02",
  "ceph-server03"
],
"quorum_leader_name": "ceph-server01",
"monmap": {
  "epoch": 3,
  "fsid": "4d00630f-ff91-4bf0-b7e1-fe9f616753ea",
  "modified": "2018-07-11 17:15:19.056801",
  "created": "2018-07-11 17:12:15.929639",
  "mons": [
    {
      "rank": 0,
      "name": "ceph-server01",
      "addr": "192.168.10.241:6789/0"
    },
    {
      "rank": 1,
      "name": "ceph-server02",
      "addr": "192.168.10.242:6789/0"
    },
    {
```

```

    "rank": 2,
    "name": "ceph-server03",
    "addr": "192.168.10.243:6789/0"
  }
]
}
}

```

[root@ceph-server01 ~]# ceph quorum_status --format json-pretty

```

{
  "election_epoch": 28,
  "quorum": [
    0,
    1,
    2
  ],
  "quorum_names": [
    "ceph-server01",
    "ceph-server02",
    "ceph-server03"
  ],
  "quorum_leader_name": "ceph-server01",
  "monmap": {
    "epoch": 3,
    "fsid": "4d00630f-ff91-4bf0-b7e1-fe9f616753ea",
    "modified": "2018-07-11 17:15:19.056801",

```



```

"created": "2018-07-11 17:12:15.929639",
"mons": [
  {
    "rank": 0,
    "name": "ceph-server01",
    "addr": "192.168.10.241:6789\0"
  },
  {
    "rank": 1,
    "name": "ceph-server02",
    "addr": "192.168.10.242:6789\0"
  },
  {
    "rank": 2,
    "name": "ceph-server03",
    "addr": "192.168.10.243:6789\0"
  }
]
}

```

85. We use command to scan newly added SCSI disks without rebooting server: (executed on all Ceph storage server nodes)

```

[root@ceph-server01 ~]# grep mpt /sys/class/scsi_host/host?/proc_name
/sys/class/scsi_host/host0/proc_name:mptspi

```

```

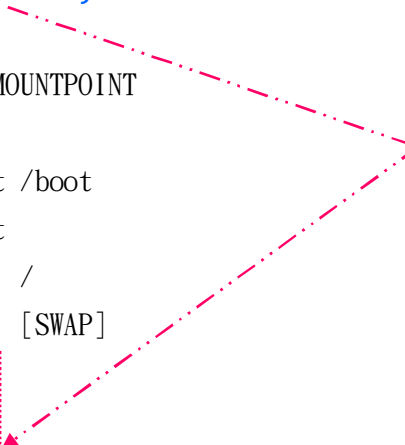
[root@ceph-server01 ~]# echo "- - -" > /sys/class/scsi_host/host0/scan

```

86. After scanning newly added SCSI disks, we use command to list them: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# lsblk
```

NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINT
sda	8:0	0	32G	0	disk	
└─sda1	8:1	0	400M	0	part	/boot
└─sda2	8:2	0	31.6G	0	part	
└─vg00-root	253:0	0	27.6G	0	lvm	/
└─vg00-swap	253:1	0	4G	0	lvm	[SWAP]
sdb	8:16	0	180G	0	disk	
sdc	8:32	0	180G	0	disk	
sdd	8:48	0	180G	0	disk	
sde	8:64	0	180G	0	disk	
sr0	11:0	1	4.2G	0	rom	



87. We change user to cephuser again to check and add OSDs to cluster: (executed on the first Ceph storage server node)

```
[root@ceph-server01 ~]# su - cephuser
```

```
[cephuser@ceph-server01 ~]$ cd cluster
```

```
[cephuser@ceph-server01 cluster]$ ceph-deploy disk list ceph-server01 ceph-server02 ceph-server03 2>&1 | grep unknown
```

```
[ceph-server01][DEBUG ] /dev/sdb other, unknown
[ceph-server01][DEBUG ] /dev/sdc other, unknown
[ceph-server01][DEBUG ] /dev/sdd other, unknown
[ceph-server01][DEBUG ] /dev/sde other, unknown
[ceph-server02][DEBUG ] /dev/sdb other, unknown
[ceph-server02][DEBUG ] /dev/sdc other, unknown
[ceph-server02][DEBUG ] /dev/sdd other, unknown
```

```
[ceph-server02][DEBUG ] /dev/sde other, unknown
[ceph-server03][DEBUG ] /dev/sdb other, unknown
[ceph-server03][DEBUG ] /dev/sdc other, unknown
[ceph-server03][DEBUG ] /dev/sdd other, unknown
[ceph-server03][DEBUG ] /dev/sde other, unknown
```

88. We use a simple command pipeline to compose command line option used by ceph-deploy command to prepare OSDs: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ ceph-deploy disk list ceph-server01 ceph-server02 ceph-server03 2>&1 | grep unknown | awk -F\]
 '{ print $1 $3 }' | cut -c 2- | awk '{ printf( "%s:%s\n", $1, $2 ) }'
```

```
ceph-server01:/dev/sdb
ceph-server01:/dev/sdc
ceph-server01:/dev/sdd
ceph-server01:/dev/sde
ceph-server02:/dev/sdb
ceph-server02:/dev/sdc
ceph-server02:/dev/sdd
ceph-server02:/dev/sde
ceph-server03:/dev/sdb
ceph-server03:/dev/sdc
ceph-server03:/dev/sdd
ceph-server03:/dev/sde
```

89. We use “ceph-deploy disk zap” command to erase a device's partition table and contents: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ for SERVER_DISKS in `ceph-deploy disk list ceph-server01 ceph-server02 ceph-server03 2>&1 | grep
unknown | awk -F\] '{ print $1 $3 }' | cut -c 2- | awk '{ printf( "%s:%s\n", $1, $2 ) }'`
```

```

> do
>     ceph-deploy disk zap ${SERVER_DISKS}
> done
:::
:::
[ceph_deploy.conf][DEBUG ] found configuration file at: /home/cephuser/.cephdeploy.conf
[ceph_deploy.cli][INFO  ] Invoked (1.5.39): /bin/ceph-deploy disk zap ceph-server03:/dev/sde
[ceph_deploy.cli][INFO  ] ceph-deploy options:
[ceph_deploy.cli][INFO  ] username                : None
[ceph_deploy.cli][INFO  ] verbose                : False
[ceph_deploy.cli][INFO  ] overwrite_conf         : False
[ceph_deploy.cli][INFO  ] subcommand             : zap
[ceph_deploy.cli][INFO  ] quiet                  : False
[ceph_deploy.cli][INFO  ] cd_conf                : <ceph_deploy.conf.cephdeploy.Conf instance at 0x7fa0ee6ad680>
[ceph_deploy.cli][INFO  ] cluster                : ceph
[ceph_deploy.cli][INFO  ] func                   : <function disk at 0x7fa0ee6fc500>
[ceph_deploy.cli][INFO  ] ceph_conf              : None
[ceph_deploy.cli][INFO  ] default_release        : False
[ceph_deploy.cli][INFO  ] disk                   : [('ceph-server03', '/dev/sde', None)]
[ceph_deploy.osd][DEBUG ] zapping /dev/sde on ceph-server03
[ceph-server03][DEBUG ] connection detected need for sudo
[ceph-server03][DEBUG ] connected to host: ceph-server03
[ceph-server03][DEBUG ] detect platform information from remote host
[ceph-server03][DEBUG ] detect machine type
[ceph-server03][DEBUG ] find the location of an executable
[ceph_deploy.osd][INFO  ] Distro info: CentOS Linux 7.5.1804 Core
[ceph-server03][DEBUG ] zeroing last few blocks of device

```

```
[ceph-server03][DEBUG ] find the location of an executable
[ceph-server03][INFO  ] Running command: sudo /usr/sbin/ceph-disk zap /dev/sde
[ceph-server03][DEBUG ] Creating new GPT entries.
[ceph-server03][DEBUG ] GPT data structures destroyed! You may now partition the disk using fdisk or
[ceph-server03][DEBUG ] other utilities.
[ceph-server03][DEBUG ] Creating new GPT entries.
[ceph-server03][DEBUG ] The operation has completed successfully.
```

90. We use “ceph-deploy osd prepare” command to prepare disks for Ceph OSDs: (executed on the first Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ for SERVER_DISKS in `ceph-deploy disk list ceph-server01 ceph-server02 ceph-server03 2>&1 | grep
unknown | awk -F\] '{ print $1 $3 }' | cut -c 2- | awk '{ printf( "%s:%s\n", $1, $2 ) }'`
> do
>     ceph-deploy osd prepare ${SERVER_DISKS}
> done
:::
:::
[ceph_deploy.conf][DEBUG ] found configuration file at: /home/cephuser/.cephdeploy.conf
[ceph_deploy.cli][INFO  ] Invoked (1.5.39): /bin/ceph-deploy osd prepare ceph-server03:/dev/sde
[ceph_deploy.cli][INFO  ] ceph-deploy options:
[ceph_deploy.cli][INFO  ] username                : None
[ceph_deploy.cli][INFO  ] block_db                : None
[ceph_deploy.cli][INFO  ] disk                    : [('ceph-server03', '/dev/sde', None)]
[ceph_deploy.cli][INFO  ] dmccrypt                 : False
[ceph_deploy.cli][INFO  ] verbose                  : False
[ceph_deploy.cli][INFO  ] bluestore                : None
[ceph_deploy.cli][INFO  ] block_wal                : None
[ceph_deploy.cli][INFO  ] overwrite_conf           : False
```

```

[ceph_deploy.cli][INFO ] subcommand           : prepare
[ceph_deploy.cli][INFO ] dmccrypt_key_dir       : /etc/ceph/dmccrypt-keys
[ceph_deploy.cli][INFO ] quiet                  : False
[ceph_deploy.cli][INFO ] cd_conf                 : <ceph_deploy.conf.cephdeploy.Conf instance at 0x7fe51c1802d8>
[ceph_deploy.cli][INFO ] cluster                 : ceph
[ceph_deploy.cli][INFO ] fs_type                 : xfs
[ceph_deploy.cli][INFO ] filestore               : None
[ceph_deploy.cli][INFO ] func                    : <function osd at 0x7fe51c1c2488>
[ceph_deploy.cli][INFO ] ceph_conf               : None
[ceph_deploy.cli][INFO ] default_release         : False
[ceph_deploy.cli][INFO ] zap_disk                : False
[ceph_deploy.osd][DEBUG ] Preparing cluster ceph disks ceph-server03:/dev/sde:
[ceph-server03][DEBUG ] connection detected need for sudo
[ceph-server03][DEBUG ] connected to host: ceph-server03
[ceph-server03][DEBUG ] detect platform information from remote host
[ceph-server03][DEBUG ] detect machine type
[ceph-server03][DEBUG ] find the location of an executable
[ceph_deploy.osd][INFO ] Distro info: CentOS Linux 7.5.1804 Core
[ceph_deploy.osd][DEBUG ] Deploying osd to ceph-server03
[ceph-server03][DEBUG ] write cluster configuration to /etc/ceph/{cluster}.conf
[ceph_deploy.osd][DEBUG ] Preparing host ceph-server03 disk /dev/sde journal None activate False
[ceph-server03][DEBUG ] find the location of an executable
[ceph-server03][INFO ] Running command: sudo /usr/sbin/ceph-disk -v prepare --cluster ceph --fs-type xfs -- /dev/sde
[ceph-server03][WARNIN] command: Running command: /usr/bin/ceph-osd --cluster=ceph --show-config-value=fsid
[ceph-server03][WARNIN] command: Running command: /usr/bin/ceph-osd --check-allows-journal -i 0 --log-file $run_dir/$cluster-osd-check.log -
-cluster ceph --setuser ceph --setgroup ceph
[ceph-server03][WARNIN] command: Running command: /usr/bin/ceph-osd --check-wants-journal -i 0 --log-file $run_dir/$cluster-osd-check.log --

```

```

cluster ceph --setuser ceph --setgroup ceph
[ceph-server03][WARNIN] command: Running command: /usr/bin/ceph-osd --check-needs-journal -i 0 --log-file $run_dir/$cluster-osd-check.log --
cluster ceph --setuser ceph --setgroup ceph
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] set_type: Will colocate journal with data on /dev/sde
[ceph-server03][WARNIN] command: Running command: /usr/bin/ceph-osd --cluster=ceph --show-config-value=osd_journal_size
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] command: Running command: /usr/bin/ceph-conf --cluster=ceph --name=osd. --lookup osd_mkfs_options_xfs
[ceph-server03][WARNIN] command: Running command: /usr/bin/ceph-conf --cluster=ceph --name=osd. --lookup osd_fs_mkfs_options_xfs
[ceph-server03][WARNIN] command: Running command: /usr/bin/ceph-conf --cluster=ceph --name=osd. --lookup osd_mount_options_xfs
[ceph-server03][WARNIN] command: Running command: /usr/bin/ceph-conf --cluster=ceph --name=osd. --lookup osd_fs_mount_options_xfs
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] ptype_tobe_for_name: name = journal
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] create_partition: Creating journal partition num 2 size 5120 on /dev/sde
[ceph-server03][WARNIN] command_check_call: Running command: /sbin/sfdisk --new=2:0:+5120M --change-name=2:ceph journal --partition-
guid=2:564443ce-a09f-4ad4-a745-d44accd7d96e --typecode=2:45b0969e-9b03-4f30-b4c6-b4b80ceff106 --mbrtogpt -- /dev/sde
[ceph-server03][DEBUG ] The operation has completed successfully.
[ceph-server03][WARNIN] update_partition: Calling partprobe on created device /dev/sde
[ceph-server03][WARNIN] command_check_call: Running command: /usr/bin/udevadm settle --timeout=600
[ceph-server03][WARNIN] command: Running command: /usr/bin/flock -s /dev/sde /sbin/partprobe /dev/sde
[ceph-server03][WARNIN] command_check_call: Running command: /usr/bin/udevadm settle --timeout=600
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid

```

```

[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde2 uuid path is /sys/dev/block/8:66/dm/uuid
[ceph-server03][WARNIN] prepare_device: Journal is GPT partition /dev/disk/by-partuuid/564443ce-a09f-4ad4-a745-d44accd7d96e
[ceph-server03][WARNIN] prepare_device: Journal is GPT partition /dev/disk/by-partuuid/564443ce-a09f-4ad4-a745-d44accd7d96e
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] set_data_partition: Creating osd partition on /dev/sde
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] ptype_tobe_for_name: name = data
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] create_partition: Creating data partition num 1 size 0 on /dev/sde
[ceph-server03][WARNIN] command_check_call: Running command: /sbin/sgdisk --largest-new=1 --change-name=1:ceph data --partition-
guid=1:51efd095-73d1-46ee-b8ed-23492fadf339 --typecode=1:89c57f98-2fe5-4dc0-89c1-f3ad0ceff2be --mbrtogpt -- /dev/sde
[ceph-server03][DEBUG ] The operation has completed successfully.
[ceph-server03][WARNIN] update_partition: Calling partprobe on created device /dev/sde
[ceph-server03][WARNIN] command_check_call: Running command: /usr/bin/udevadm settle --timeout=600
[ceph-server03][WARNIN] command: Running command: /usr/bin/flock -s /dev/sde /sbin/partprobe /dev/sde
[ceph-server03][WARNIN] command_check_call: Running command: /usr/bin/udevadm settle --timeout=600
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde1 uuid path is /sys/dev/block/8:65/dm/uuid
[ceph-server03][WARNIN] populate_data_path_device: Creating xfs fs on /dev/sde1
[ceph-server03][WARNIN] command_check_call: Running command: /sbin/mkfs -t xfs -f -i size=2048 -- /dev/sde1
[ceph-server03][DEBUG ] meta-data=/dev/sde1          isize=2048   agcount=4, agsize=11468735 blks
[ceph-server03][DEBUG ]                        =          sectsz=512   attr=2, projid32bit=1
[ceph-server03][DEBUG ]                        =          crc=1       finobt=0, sparse=0
[ceph-server03][DEBUG ] data          =          bsize=4096   blocks=45874939, imaxpct=25
[ceph-server03][DEBUG ]                        =          sunit=0      swidth=0 blks
[ceph-server03][DEBUG ] naming       =version 2        bsize=4096   ascii-ci=0 ftype=1

```



```

[ceph-server03][DEBUG ] log      =internal log      bsize=4096  blocks=22399, version=2
[ceph-server03][DEBUG ]          =                  sectsz=512   sunit=0 blks, lazy-count=1
[ceph-server03][DEBUG ] realtime =none              extsz=4096  blocks=0, rtextents=0
[ceph-server03][WARNIN] mount: Mounting /dev/sdel on /var/lib/ceph/tmp/mnt.ClKHfP with options noatime,inode64
[ceph-server03][WARNIN] command_check_call: Running command: /usr/bin/mount -t xfs -o noatime,inode64 -- /dev/sdel
/var/lib/ceph/tmp/mnt.ClKHfP
[ceph-server03][WARNIN] command: Running command: /sbin/restorecon /var/lib/ceph/tmp/mnt.ClKHfP
[ceph-server03][WARNIN] populate_data_path: Preparing osd data dir /var/lib/ceph/tmp/mnt.ClKHfP
[ceph-server03][WARNIN] command: Running command: /sbin/restorecon -R /var/lib/ceph/tmp/mnt.ClKHfP/ceph_fsid.6783.tmp
[ceph-server03][WARNIN] command: Running command: /usr/bin/chown -R ceph:ceph /var/lib/ceph/tmp/mnt.ClKHfP/ceph_fsid.6783.tmp
[ceph-server03][WARNIN] command: Running command: /sbin/restorecon -R /var/lib/ceph/tmp/mnt.ClKHfP/fsid.6783.tmp
[ceph-server03][WARNIN] command: Running command: /usr/bin/chown -R ceph:ceph /var/lib/ceph/tmp/mnt.ClKHfP/fsid.6783.tmp
[ceph-server03][WARNIN] command: Running command: /sbin/restorecon -R /var/lib/ceph/tmp/mnt.ClKHfP/magic.6783.tmp
[ceph-server03][WARNIN] command: Running command: /usr/bin/chown -R ceph:ceph /var/lib/ceph/tmp/mnt.ClKHfP/magic.6783.tmp
[ceph-server03][WARNIN] command: Running command: /sbin/restorecon -R /var/lib/ceph/tmp/mnt.ClKHfP/journal_uuid.6783.tmp
[ceph-server03][WARNIN] command: Running command: /usr/bin/chown -R ceph:ceph /var/lib/ceph/tmp/mnt.ClKHfP/journal_uuid.6783.tmp
[ceph-server03][WARNIN] adjust_symlink: Creating symlink /var/lib/ceph/tmp/mnt.ClKHfP/journal -> /dev/disk/by-partuuid/564443ce-a09f-4ad4-
a745-d44accd7d96e
[ceph-server03][WARNIN] command: Running command: /sbin/restorecon -R /var/lib/ceph/tmp/mnt.ClKHfP
[ceph-server03][WARNIN] command: Running command: /usr/bin/chown -R ceph:ceph /var/lib/ceph/tmp/mnt.ClKHfP
[ceph-server03][WARNIN] unmount: Unmounting /var/lib/ceph/tmp/mnt.ClKHfP
[ceph-server03][WARNIN] command_check_call: Running command: /bin/umount -- /var/lib/ceph/tmp/mnt.ClKHfP
[ceph-server03][WARNIN] get_dm_uuid: get_dm_uuid /dev/sde uuid path is /sys/dev/block/8:64/dm/uuid
[ceph-server03][WARNIN] command_check_call: Running command: /sbin/sfdisk --typecode=1:4fbd7e29-9d25-41b8-afd0-062c0ceff05d -- /dev/sde
[ceph-server03][DEBUG ] Warning: The kernel is still using the old partition table.
[ceph-server03][DEBUG ] The new table will be used at the next reboot.
[ceph-server03][DEBUG ] The operation has completed successfully.

```

```
[ceph-server03][WARNIN] update_partition: Calling partprobe on prepared device /dev/sde
[ceph-server03][WARNIN] command_check_call: Running command: /usr/bin/udevadm settle --timeout=600
[ceph-server03][WARNIN] command: Running command: /usr/bin/flock -s /dev/sde /sbin/partprobe /dev/sde
[ceph-server03][WARNIN] command_check_call: Running command: /usr/bin/udevadm settle --timeout=600
[ceph-server03][WARNIN] command_check_call: Running command: /usr/bin/udevadm trigger --action=add --sysname-match sdel
[ceph-server03][INFO  ] checking OSD status...
[ceph-server03][DEBUG ] find the location of an executable
[ceph-server03][INFO  ] Running command: sudo /bin/ceph --cluster=ceph osd stat --format=json
[ceph_deploy.osd][DEBUG ] Host ceph-server03 is now ready for osd use.
```

91. We show Ceph cluster status: (executed on any Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ ceph status
```

```
cluster 4d00630f-ff91-4bf0-b7e1-fe9f616753ea
health HEALTH_WARN
    too few PGs per OSD (10 < min 30)
monmap e3: 3 mons at {ceph-server01=192.168.10.241:6789/0,ceph-server02=192.168.10.242:6789/0,ceph-server03=192.168.10.243:6789/0}
    election epoch 36, quorum 0,1,2 ceph-server01,ceph-server02,ceph-server03
osdmap e69: 12 osds: 12 up, 12 in
    flags sortbitwise,require_jewel_osds
pgmap v142: 64 pgs, 1 pools, 0 bytes data, 0 objects
    1299 MB used, 2106 GB / 2107 GB avail
    64 active+clean
```

92. We show utilization statistics, including disk usage (bytes) and object counts, over the entire system and broken down by pool: (executed on any Ceph storage server node)

```
[cephuser@ceph-server01 cluster]$ rados df
```

pool name	KB	objects	clones	degraded	unfound	rd	rd KB	wr	wr KB
-----------	----	---------	--------	----------	---------	----	-------	----	-------

rbid	0	0	0	0	0	0	0	0	0
total used	1330912	0							
total avail	2209023584								
total space	2210354496								

[cephuser@ceph-server01 cluster]\$ ceph-deploy disk list ceph-server01 ceph-server02 ceph-server03 2>&1 | grep 'ceph [dj]' (executed on the first Ceph storage server node)

```
[ceph-server01][DEBUG ] /dev/sdb2 ceph journal, for /dev/sdb1
[ceph-server01][DEBUG ] /dev/sdb1 ceph data, active, cluster ceph, osd.0, journal /dev/sdb2
[ceph-server01][DEBUG ] /dev/sdc2 ceph journal, for /dev/sdc1
[ceph-server01][DEBUG ] /dev/sdc1 ceph data, active, cluster ceph, osd.1, journal /dev/sdc2
[ceph-server01][DEBUG ] /dev/sdd2 ceph journal, for /dev/sdd1
[ceph-server01][DEBUG ] /dev/sdd1 ceph data, active, cluster ceph, osd.2, journal /dev/sdd2
[ceph-server01][DEBUG ] /dev/sde2 ceph journal, for /dev/sde1
[ceph-server01][DEBUG ] /dev/sde1 ceph data, active, cluster ceph, osd.3, journal /dev/sde2
[ceph-server02][DEBUG ] /dev/sdb2 ceph journal, for /dev/sdb1
[ceph-server02][DEBUG ] /dev/sdb1 ceph data, active, cluster ceph, osd.4, journal /dev/sdb2
[ceph-server02][DEBUG ] /dev/sdc2 ceph journal, for /dev/sdc1
[ceph-server02][DEBUG ] /dev/sdc1 ceph data, active, cluster ceph, osd.5, journal /dev/sdc2
[ceph-server02][DEBUG ] /dev/sdd2 ceph journal, for /dev/sdd1
[ceph-server02][DEBUG ] /dev/sdd1 ceph data, active, cluster ceph, osd.6, journal /dev/sdd2
[ceph-server02][DEBUG ] /dev/sde2 ceph journal, for /dev/sde1
[ceph-server02][DEBUG ] /dev/sde1 ceph data, active, cluster ceph, osd.7, journal /dev/sde2
[ceph-server03][DEBUG ] /dev/sdb2 ceph journal, for /dev/sdb1
[ceph-server03][DEBUG ] /dev/sdb1 ceph data, active, cluster ceph, osd.8, journal /dev/sdb2
[ceph-server03][DEBUG ] /dev/sdc2 ceph journal, for /dev/sdc1
[ceph-server03][DEBUG ] /dev/sdc1 ceph data, active, cluster ceph, osd.9, journal /dev/sdc2
```

```
[ceph-server03][DEBUG ] /dev/sdd2 ceph journal, for /dev/sdd1
[ceph-server03][DEBUG ] /dev/sdd1 ceph data, active, cluster ceph, osd.10, journal /dev/sdd2
[ceph-server03][DEBUG ] /dev/sde2 ceph journal, for /dev/sde1
[ceph-server03][DEBUG ] /dev/sde1 ceph data, active, cluster ceph, osd.11, journal /dev/sde2
```

[cephuser@ceph-server01 cluster]\$ lsblk (executed on any Ceph storage server node)

```
NAME          MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda            8:0    0   32G  0 disk
├─sda1         8:1    0  400M  0 part /boot
└─sda2         8:2    0  31.6G  0 part
   └─vg00-root 253:0    0  27.6G  0 lvm  /
      └─vg00-swap 253:1    0    4G  0 lvm  [SWAP]
sdb            8:16    0  180G  0 disk
├─sdb1         8:17    0  175G  0 part /var/lib/ceph/osd/ceph-0
└─sdb2         8:18    0    5G  0 part
sdc            8:32    0  180G  0 disk
├─sdc1         8:33    0  175G  0 part /var/lib/ceph/osd/ceph-1
└─sdc2         8:34    0    5G  0 part
sdd            8:48    0  180G  0 disk
├─sdd1         8:49    0  175G  0 part /var/lib/ceph/osd/ceph-2
└─sdd2         8:50    0    5G  0 part
sde            8:64    0  180G  0 disk
├─sde1         8:65    0  175G  0 part /var/lib/ceph/osd/ceph-3
└─sde2         8:66    0    5G  0 part
sr0           11:0    1   4.2G  0 rom
```

[cephuser@ceph-server01 cluster]\$ scp -pr . ceph-server02:~/cluster/ (executed on the first Ceph storage server node)

ceph.bootstrap-osd.keyring	100%	113	4.6KB/s	00:00
ceph.conf.Orig	100%	205	11.4KB/s	00:00
ceph.bootstrap-mgr.keyring	100%	71	43.1KB/s	00:00
ceph.client.admin.keyring	100%	129	71.6KB/s	00:00
ceph.bootstrap-rgw.keyring	100%	113	74.6KB/s	00:00
ceph.bootstrap-mds.keyring	100%	113	71.6KB/s	00:00
ceph-deploy-ceph.log	100%	429KB	1.4MB/s	00:00
ceph.conf	100%	287	121.7KB/s	00:00
ceph.mon.keyring	100%	73	41.8KB/s	00:00

[cephuser@ceph-server01 cluster]\$ scp -pr . ceph-server03:~/cluster/ (executed on the first Ceph storage server node)
 ::::::::::

93. We deploy the management key to all Ceph storage nodes: (executed on the first Ceph storage server node)

[cephuser@ceph-server01 cluster]\$ ceph-deploy admin ceph-server01 ceph-server02 ceph-server03

```
[ceph_deploy.conf][DEBUG ] found configuration file at: /home/cephuser/.cephdeploy.conf
[ceph_deploy.cli][INFO ] Invoked (1.5.39): /bin/ceph-deploy admin ceph-server01 ceph-server02 ceph-server03
[ceph_deploy.cli][INFO ] ceph-deploy options:
[ceph_deploy.cli][INFO ] username                : None
[ceph_deploy.cli][INFO ] verbose                : False
[ceph_deploy.cli][INFO ] overwrite_conf         : False
[ceph_deploy.cli][INFO ] quiet                  : False
[ceph_deploy.cli][INFO ] cd_conf                 : <ceph_deploy.conf.cephdeploy.Conf instance at 0x7efe02c723b0>
[ceph_deploy.cli][INFO ] cluster                 : ceph
[ceph_deploy.cli][INFO ] client                  : ['ceph-server01', 'ceph-server02', 'ceph-server03']
[ceph_deploy.cli][INFO ] func                    : <function admin at 0x7efe03d90e60>
[ceph_deploy.cli][INFO ] ceph_conf                : None
```

```

[ceph_deploy.cli][INFO ] default_release : False
[ceph_deploy.admin][DEBUG ] Pushing admin keys and conf to ceph-server01
[ceph-server01][DEBUG ] connection detected need for sudo
[ceph-server01][DEBUG ] connected to host: ceph-server01
[ceph-server01][DEBUG ] detect platform information from remote host
[ceph-server01][DEBUG ] detect machine type
[ceph-server01][DEBUG ] write cluster configuration to /etc/ceph/{cluster}.conf
[ceph_deploy.admin][DEBUG ] Pushing admin keys and conf to ceph-server02
[ceph-server02][DEBUG ] connection detected need for sudo
[ceph-server02][DEBUG ] connected to host: ceph-server02
[ceph-server02][DEBUG ] detect platform information from remote host
[ceph-server02][DEBUG ] detect machine type
[ceph-server02][DEBUG ] write cluster configuration to /etc/ceph/{cluster}.conf
[ceph_deploy.admin][DEBUG ] Pushing admin keys and conf to ceph-server03
[ceph-server03][DEBUG ] connection detected need for sudo
[ceph-server03][DEBUG ] connected to host: ceph-server03
[ceph-server03][DEBUG ] detect platform information from remote host
[ceph-server03][DEBUG ] detect machine type
[ceph-server03][DEBUG ] write cluster configuration to /etc/ceph/{cluster}.conf

```

94. We change permission so the management key can be read by non-root user: (executed on all Ceph storage server nodes)

```
[cephuser@ceph-server01 cluster]$ sudo chmod +r /etc/ceph/ceph.client.admin.keyring
```

95. We install some rpms for building up Ceph Dashboard – Web admin: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# yum -y install httpd mod_wsgi mod_ssl git
```

```
.....
```

```
Installed:
```

httpd.x86_64 0:2.4.6-80.el7.centos.1 mod_ssl.x86_64 1:2.4.6-80.el7.centos.1 mod_wsgi.x86_64 0:3.4-12.el7_0

Dependency Installed:

httpd-tools.x86_64 0:2.4.6-80.el7.centos.1

Complete!

96. We enable, start and check the status of httpd service: (executed on all Ceph storage server nodes)

[root@ceph-server01 ~]# systemctl enable httpd; systemctl start httpd; systemctl status httpd

Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service to /usr/lib/systemd/system/httpd.service.

● httpd.service - The Apache HTTP Server

Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)

Active: active (running) since Thu 2018-07-12 22:03:21 CST; 4ms ago

Docs: man:httpd(8)

man:apachectl(8)

Main PID: 3945 (httpd)

Status: "Processing requests..."

Tasks: 3

CGroup: /system.slice/httpd.service

├─3945 /usr/sbin/httpd -DFOREGROUND

├─3948 /usr/sbin/httpd -DFOREGROUND

├─3949 /usr/sbin/httpd -DFOREGROUND

└─3951 /usr/sbin/httpd -DFOREGROUND

Jul 12 22:03:21 ceph-server01.lab.gidanet.com.tw systemd[1]: Starting The Apache HTTP Server...

Jul 12 22:03:21 ceph-server01.lab.gidanet.com.tw systemd[1]: Started The Apache HTTP Server.

97. We use git command to clone (download) Ceph Dashboard: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# cd /var/www/html
```

```
[root@ceph-server01 html]# git clone https://github.com/Crapworks/ceph-dash.git
```

Cloning into 'ceph-dash'...

remote: Counting objects: 1004, done.

remote: Total 1004 (delta 0), reused 0 (delta 0), pack-reused 1004

Receiving objects: 100% (1004/1004), 4.66 MiB | 991.00 KiB/s, done.

Resolving deltas: 100% (482/482), done.

```
[root@ceph-server01 html]# chown -R apache ceph-dash
```

98. We copy template and edit configuration file for Ceph Dashboard: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 html]# cd ceph-dash
```

```
[root@ceph-server01 ceph-dash]# cp -p contrib/apache/cephdash /etc/httpd/conf.d/cephdash.conf
```

```
[root@ceph-server01 ceph-dash]# vi /etc/httpd/conf.d/cephdash.conf
```

```
<VirtualHost *:80>
```

```
    ServerName ceph-server01.lab.gidanet.com.tw
```

```
    RewriteEngine On
```

```
    RewriteCond %{REQUEST_URI} !^/server-status
```

```
    RewriteRule ^/?(.*) https://%{HTTP_HOST}/$1 [R,L]
```

```
</VirtualHost>
```

```
<VirtualHost *:443>
```


ServerName **ceph-server01.lab.gidanet.com.tw**

WSGIDaemonProcess cephdash user=**apache** group=**apache** processes=1 threads=5

WSGIScriptAlias / /var/www/html/ceph-dash/contrib/wsgi/cephdash.wsgi

WSGIPassAuthorization On

SSLEngine on

SSLCertificateFile **/etc/httpd/ssl/ssl.crt**

SSLCertificateKeyFile **/etc/httpd/ssl/ssl.key**

<Directory /var/www/html/ceph-dash>

WSGIProcessGroup cephdash

WSGIApplicationGroup %{GLOBAL}

Order deny,allow

Allow from all

AuthType Basic

AuthName "Restricted Content"

AuthUserFile **/etc/httpd/.htpasswd**

Require valid-user

</Directory>

</VirtualHost>

99. We edit the default httpd configuration file: (executed on all Ceph storage server nodes)

[root@ceph-server01 ceph-dash]# vi /etc/httpd/conf/httpd.conf

[root@ceph-server01 ceph-dash]# grep -e ceph -e 192.168 /etc/httpd/conf/httpd.conf

```
Listen 192.168.10.241:80
ServerAdmin root@ceph-server01.lab.gidanet.com.tw
ServerName ceph-server01.lab.gidanet.com.tw:80
```

```
[root@ceph-server01 ceph-dash]# mkdir -p /etc/httpd/ssl/
```

100. Based on configuration, we generate two SSL files - ssl.key and ssl.crt: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ceph-dash]# openssl req -x509 -nodes -days 365 -newkey rsa:2048 \
> -keyout /etc/httpd/ssl/ssl.key -out /etc/httpd/ssl/ssl.crt
```

Generating a 2048 bit RSA private key

.....+++

.....+++

writing new private key to '/etc/httpd/ssl/ssl.key'

You are about to be asked to enter information that will be incorporated
into your certificate request.

What you are about to enter is what is called a Distinguished Name or a DN.

There are quite a few fields but you can leave some blank

For some fields there will be a default value,

If you enter '.', the field will be left blank.

Country Name (2 letter code) [XX]:TW

State or Province Name (full name) []:Taiwan

Locality Name (eg, city) [Default City]:Taipei

Organization Name (eg, company) [Default Company Ltd]:Gidanet

Organizational Unit Name (eg, section) []:Lab

Common Name (eg, your name or your server's hostname) []:ceph-server01.lab.gidanet.com.tw

Email Address []:dl1963inet@outlook.com

101. We change permission for the SSL files, read/write by root only: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ceph-dash]# chmod 600 /etc/httpd/ssl/*
```

102. We create .htpasswd for basic authentication to access Ceph Dashboard: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ceph-dash]# htpasswd -c /etc/httpd/.htpasswd cephdashbd
```

New password: (01Ceph!qaz)

Re-type new password:

Adding password for user cephdashbd

103. We test configuration, restart and check the status of httpd service: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ceph-dash]# apachectl configtest
```

Syntax OK

```
[root@ceph-server01 ceph-dash]# systemctl restart httpd; systemctl status httpd
```

100. httpd.service - The Apache HTTP Server

Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)

Active: active (running) since Thu 2018-07-12 22:39:02 CST; 11ms ago

Docs: man:httpd(8)

man:apachectl(8)

Process: 4354 ExecStop=/bin/kill -WINCH \${MAINPID} (code=exited, status=0/SUCCESS)

Main PID: 4361 (httpd)

Status: "Processing requests..."

Tasks: 14

CGroup: /system.slice/httpd.service

└─4361 /usr/sbin/httpd -DFOREGROUND

```
|—4362 /usr/sbin/httpd -DFOREGROUND
|—4363 /usr/sbin/httpd -DFOREGROUND
|—4364 /usr/sbin/httpd -DFOREGROUND
|—4365 /usr/sbin/httpd -DFOREGROUND
|—4367 /usr/sbin/httpd -DFOREGROUND
|—4368 /usr/sbin/httpd -DFOREGROUND
```

Jul 12 22:39:02 ceph-server01.lab.gidanet.com.tw systemd[1]: Starting The Apache HTTP Server...

Jul 12 22:39:02 ceph-server01.lab.gidanet.com.tw systemd[1]: Started The Apache HTTP Server.

104. We open the https port for Ceph Dashboard access: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ceph-dash]# firewall-cmd --zone=public --add-port=443/tcp --permanent
```

success

```
[root@ceph-server01 ceph-dash]# firewall-cmd --reload
```

success

105. We add two lines as below so more logging generated for trouble-shooting: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# vi /var/www/html/ceph-dash/contrib/wsgi/cephdash.wsgi
```

```
.....
```

```
import logging
```

```
logging.basicConfig(stream=sys.stderr)
```

```
.....
```

106. We change permission so WSGI script can be executed and keyring file can be read by apache: (executed on all Ceph storage server nodes)

```
[root@ceph-server01 ~]# chmod +x /var/www/html/ceph-dash/contrib/wsgi/cephdash.wsgi
```

```
[root@ceph-server01 ~]# chmod +r /etc/ceph/ceph.client.admin.keyring
```



https://ceph-server01.lab.gidanet.com.tw

Ceph Dashboard

4d00630f-ff91-4bf0-b7e1-fe9f616753ea

Ceph Cluster Overall Status

⚡ Cluster Status:HEALTH_WARN

⚡ too few PGs per OSD (10 < min 30)

Ceph Cluster Monitor Status

✓ Monitor CEPH-SERVER01: HEALTH_OK

✓ Monitor CEPH-SERVER02: HEALTH_OK

✓ Monitor CEPH-SERVER03: HEALTH_OK

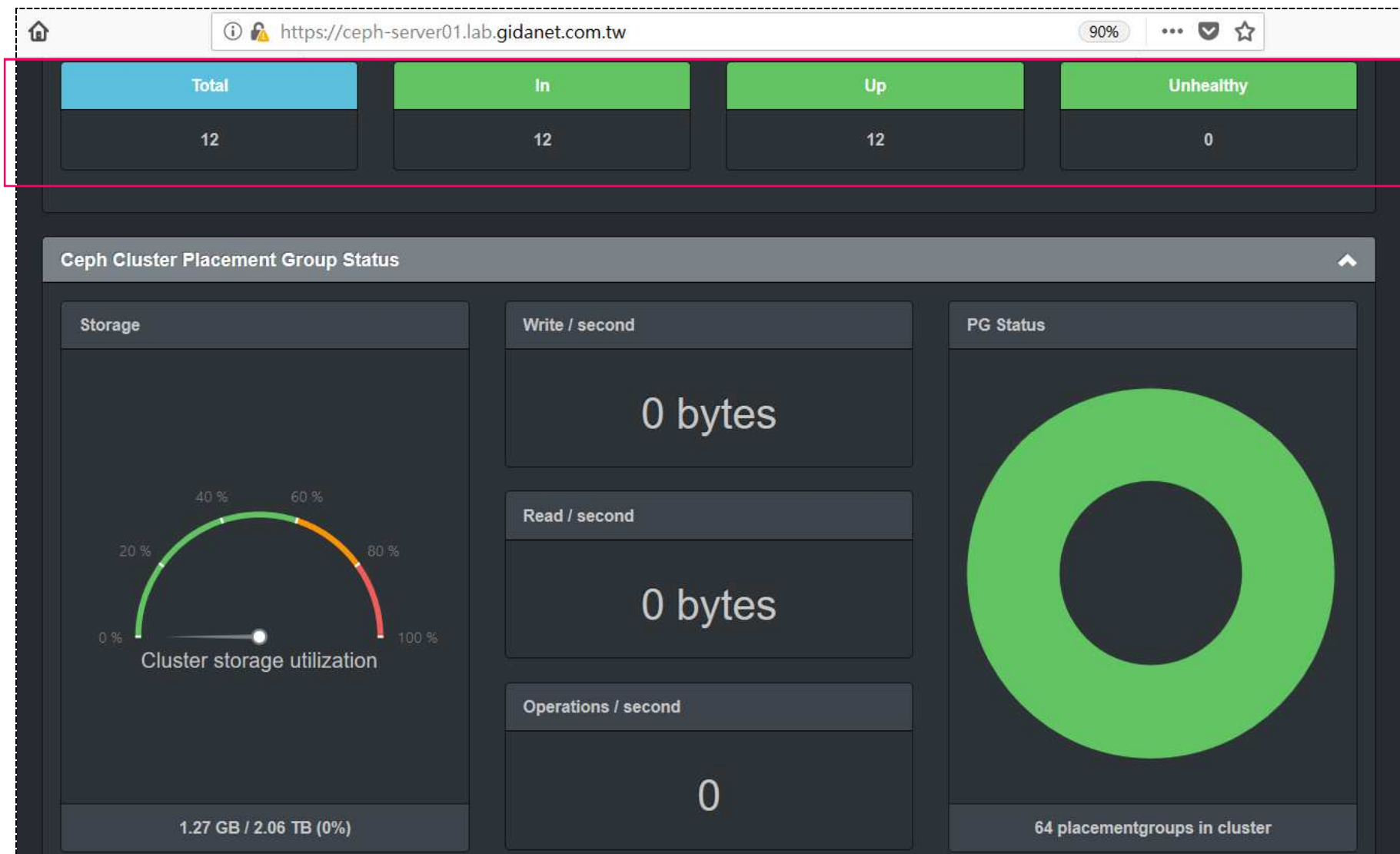
Ceph Cluster OSD Status

Total

In

Up

Unhealthy



```
[root@ceph-server01 ~]# curl -u cephdashbd:01Ceph\!qaz -k --basic https://ceph-server01.lab.gidanet.com.tw/
```

