



Best Practices for Deploying Hadoop Server on CentOS/RHEL 7 – Part 1

Mohan Sivam | Last Updated: February 17, 2021 | Read Time: 4 mins | [CentOS, Hadoop, RedHat](#) | [Leave a comment](#)

In this series of articles, we are going to cover the entire Cloudera Hadoop Cluster Building building with Vendor and Industrial recommended best practices.

Part 1: [Best Practices for Deploying Hadoop Server on CentOS/RHEL 7](#)

Part 2: [Setting Up Hadoop Pre-requisites and Security Hardening](#)

Part 3: [How to Install and Configure the Cloudera Manager on CentOS/RHEL 7](#)

Part 4: [How to Install CDH and Configure Service Placements on CentOS/RHEL 7](#)

Part 5: [How to Set Up High Availability for Namenode](#)

Part 6: [How to Set Up High Availability for Resource Manager](#)

Part 7: [How to Install and Configure Hive with High Availability](#)

Part 8: How to Install and Configure Sentry (Authorization Tool)

Part 9: How to Install Kerberos (Kerberising the Cluster) for Hadoop Authentication

Part 10: How to Tune Cluster (Yarn Tuning) on CentOS/RHEL 7

OS installation and doing OS level Pre-requisites are the first steps to build a Hadoop Cluster. Hadoop can run on the various flavor of Linux platform: CentOS, RedHat, Ubuntu, Debian, SUSE etc., In real-time production, most of the Hadoop Clusters are built on top of RHEL/CentOS, we will use CentOS 7 for demonstration in this series of tutorials.

In an Organization, OS installation can be done using kickstart. If it is a 3 to 4 node cluster, manual installation is possible but if we build a big cluster with more than 10 nodes, it's tedious to install OS one by one. In this scenario, the Kickstart method comes into the picture, we can proceed with the mass installation using kickstart.

Achieving good performance from a Hadoop Environment is depends on provisioning the correct Hardware & Software. So, building a production Hadoop cluster involves a lot of consideration regarding Hardware and Software.

In this article, we will go through various Benchmarks about OS installation and some best practices for deploying Cloudera Hadoop Cluster Server on CentOS/RHEL 7.

Important Consideration and Best Practices for Deploying Hadoop Server

The following are the best practices for setting up deploying Cloudera Hadoop Cluster Server on CentOS/RHEL 7.

- Hadoop servers do not require enterprise standard servers to build a cluster, it requires commodity hardware.

- In the production cluster, having 8 to 12 data disks are recommended. According to the nature of the workload, we need to decide on this. If the cluster is for compute-intensive applications, having 4 to 6 drives is best practice to avoid I/O issues.
- Data drives should be partitioned individually, for example – starting from /data01 to /data10.
- RAID configuration is not recommended for worker nodes, because Hadoop itself providing fault-tolerance on data by replicating the blocks into 3 by default. So JBOD is best for worker nodes.
- For Master Servers, RAID 1 is the best practice.
- The default filesystem on CentOS/RHEL 7.x is XFS. Hadoop supports XFS, ext3, and ext4. The recommended file-system is ext3 as it is tested for good performance.
- All the servers should be having the same OS version, at-least same minor release.
- It is best practice to have homogeneous hardware (all worker nodes should have the same hardware characteristics (RAM, disk space & Core etc).
- According to the cluster workload (Balanced Workload, Compute Intensive, I/O Intensive) and size, resource (RAM, CPU) planning per server will get differ.

Find the below Example for Disk Partitioning of the servers of 24TB storage.

Partition Information	OS Disks (2 x 1TB RAID 1)	Worker Node A)DataNode Disks (22 x 1TB JBOD)		Master Node B)NameNode Disks (22 x 1TB RAID 1 / JBOD)		Cloudera Manager C)CM Disk (22 x 1TB RAID 1)		Edge Node D)Edge Disk (22 x 1TB RAID 1)	
		Partition	Size	Partition	Size	Partition	Size	Partition	Size
swap	16GB	/data01	1TB	/nn (namenode)	8 TB (Useable: 4TB - RAID 1)	/	20 TB (Useable: 10TB)	/	22 TB (Useable: 11TB)
/boot	1GB	/data02	1TB	/zk (zookeeper)	2 TB JBOD	/sql_data (CM Metadata)	2 TB (Useable: 1TB)		
/home	50GB	/data03	1TB	/jn (journal node)	2 TB JBOD				
/opt	100GB	/data04	1TB	/	Remaining				
/tmp	100GB	/data05	1TB						
/usr	50GB	/data06	1TB						
/var	100GB	/data07	1TB						
/var/log	100GB	/data08	1TB						
/var/log/audit	100GB	/data09	1TB						
/	All Remaining/data22	1TB						

Disk Partitioning

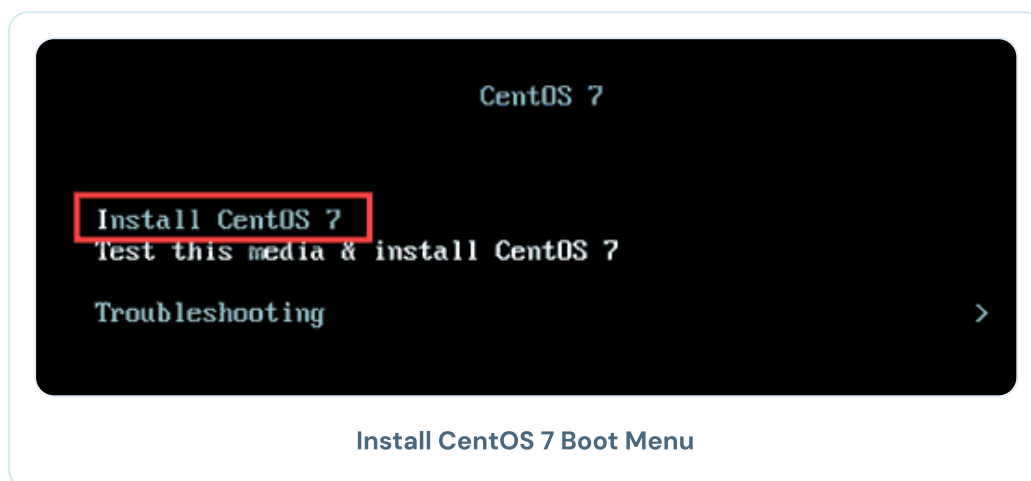
Installing CentOS 7 for Hadoop Server Deployment

Things you need to know before installing CentOS 7 server for Hadoop Server.

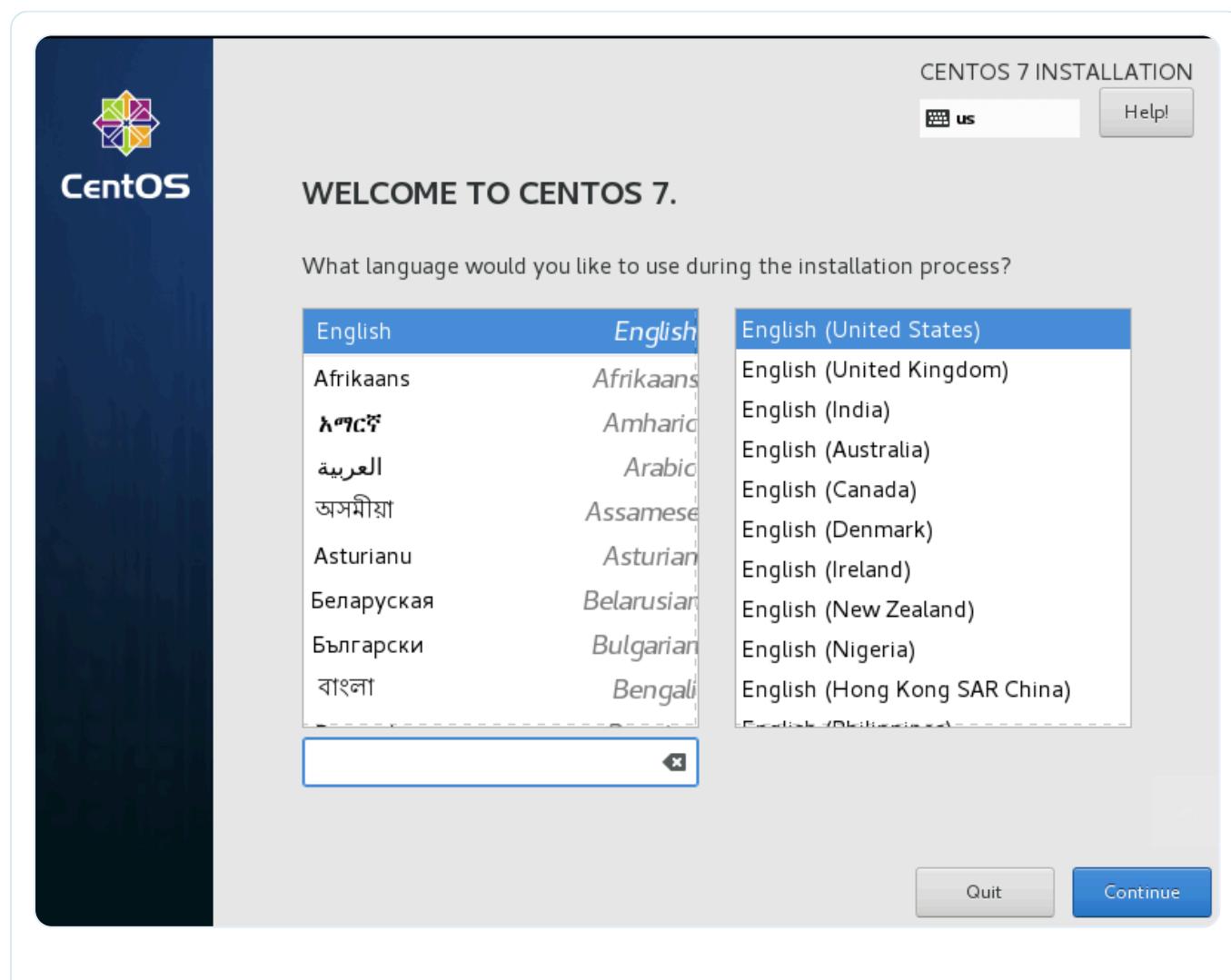
- Minimal installation is enough for Hadoop Servers (worker nodes), in some cases, GUI can be installed only for Master servers or Management servers where we can use browsers for Web UIs of Management tools.
- Configuring networks, hostname, and other OS-related settings can be done after OS installation.
- In real-time, server vendors will be having their own console to interact and manage the servers, for example – Dell servers are having iDRAC which is a device, embedded with servers. Using that iDRAC interface we can install OS with having an OS image in our local system.

In this article, we have installed OS (CentOS 7) in VMware virtual machine. Here, we will not be having multiple disks to perform partitions. CentOS is similar to RHEL (same functionality), so we will see the steps to install CentOS.

1. Begin by [downloading the CentOS 7.x ISO image](#) in your local windows system and select it while booting the virtual machine. Select 'Install CentOS 7' as shown.

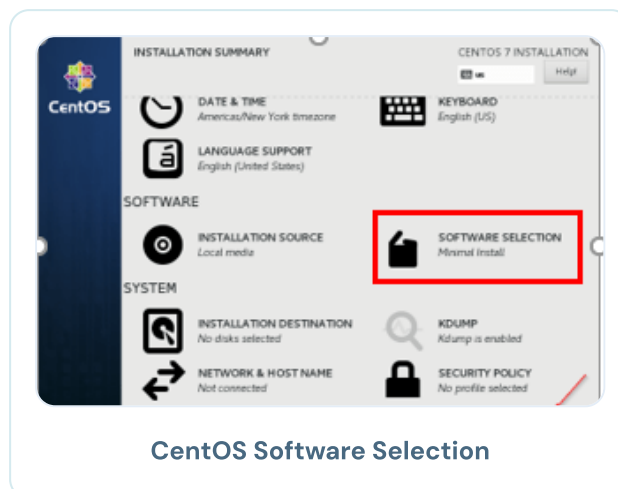


2. Select the Language, default will be English, and click continue.

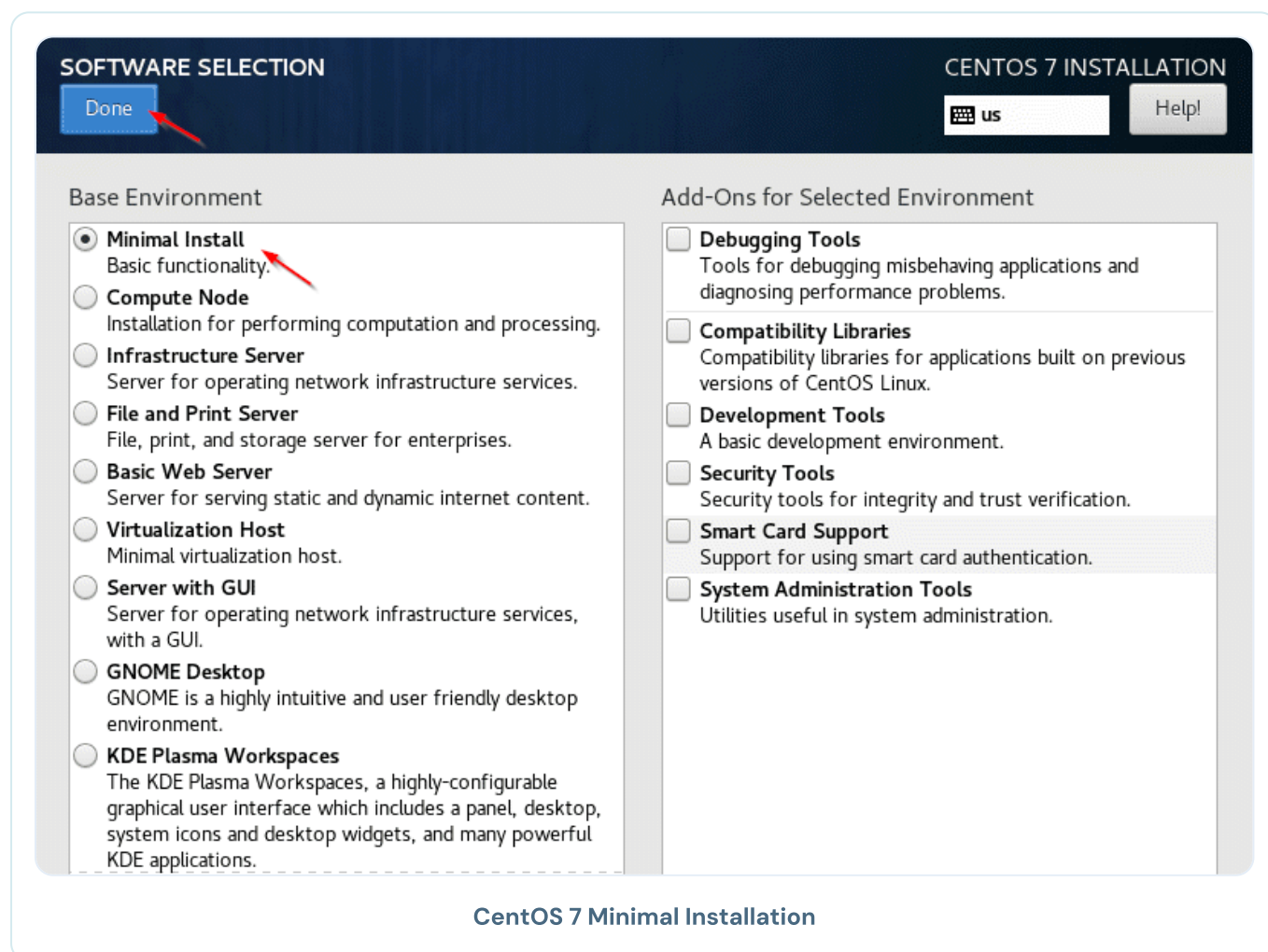


Select CentOS 7 Language

3. Software Selection – Select the 'Minimal Installation' and click 'Done'.




CentOS Software Selection



CentOS 7 Minimal Installation


4. Set the root password as it will prompt us to set.

ROOT PASSWORD CENTOS 7 INSTALLATION

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

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

Root Password:


 **Weak**



Confirm:


Set Root Password

5. Installation Destination – This is the important step to be cautious. We need to select the disk where the OS has to be installed, dedicated disk should be selected for OS. Click the 'Installation Destination' and select the Disk, in real-time multiple disks will be there, we need to select, preferable 'sda'.



INSTALLATION SUMMARY CENTOS 7 INSTALLATION

  **us** [Help!](#)



 **Americas/New York timezone**  **English (US)**


 **LANGUAGE SUPPORT**
English (United States)

SOFTWARE

 **INSTALLATION SOURCE**
Local media  **SOFTWARE SELECTION**
Minimal Install


SYSTEM

 **INSTALLATION DESTINATION**
Automatic partitioning selected  **KDUMP**
Kdump is enabled

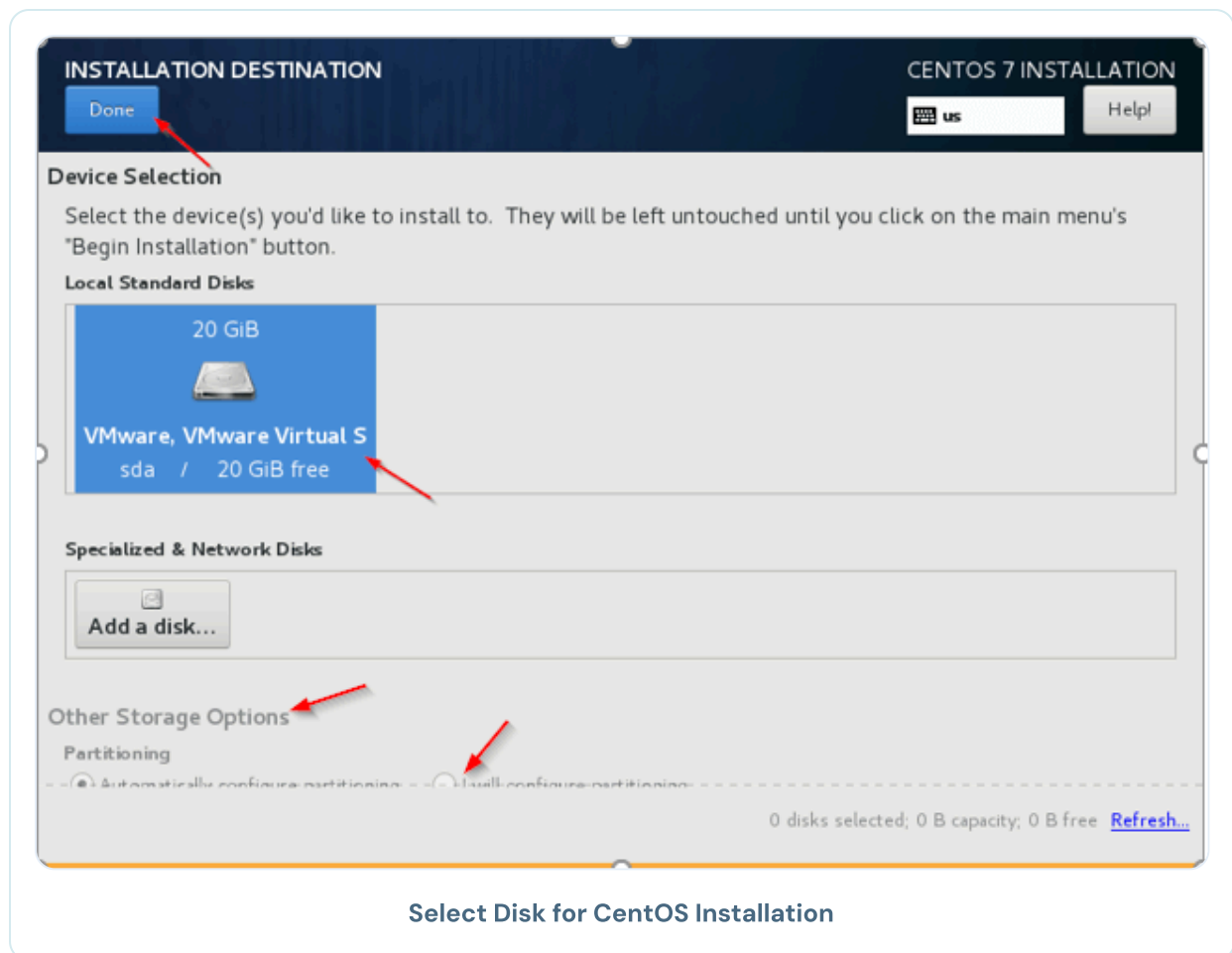
 **NETWORK & HOST NAME**
Not connected  **SECURITY POLICY**
No profile selected

[Quit](#) [Begin Installation](#)

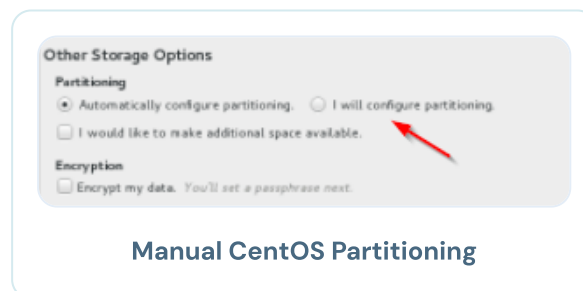
We won't touch your disks until you click 'Begin Installation'.

 Please complete items marked with this icon before continuing to the next step.

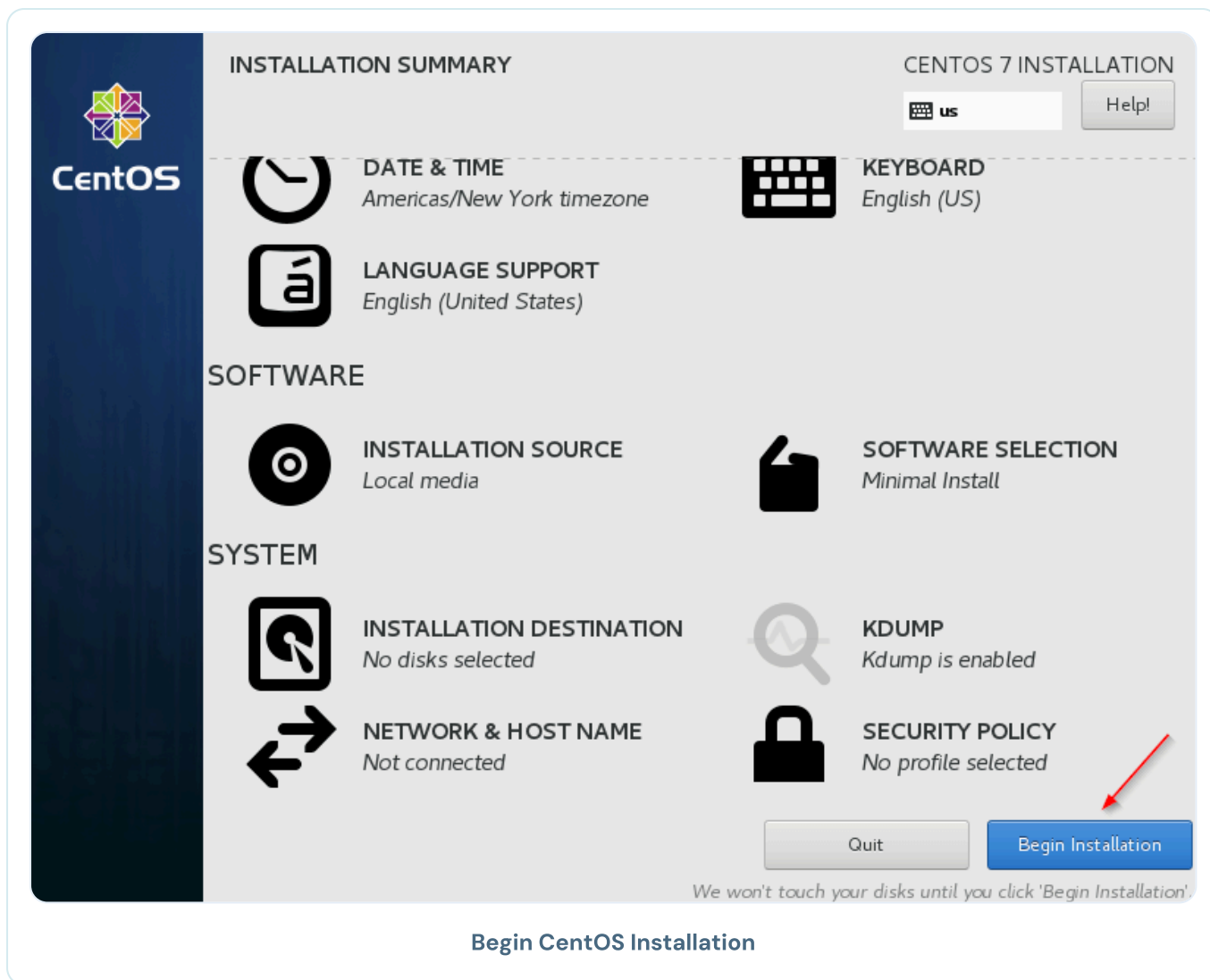
Select Installation Destination

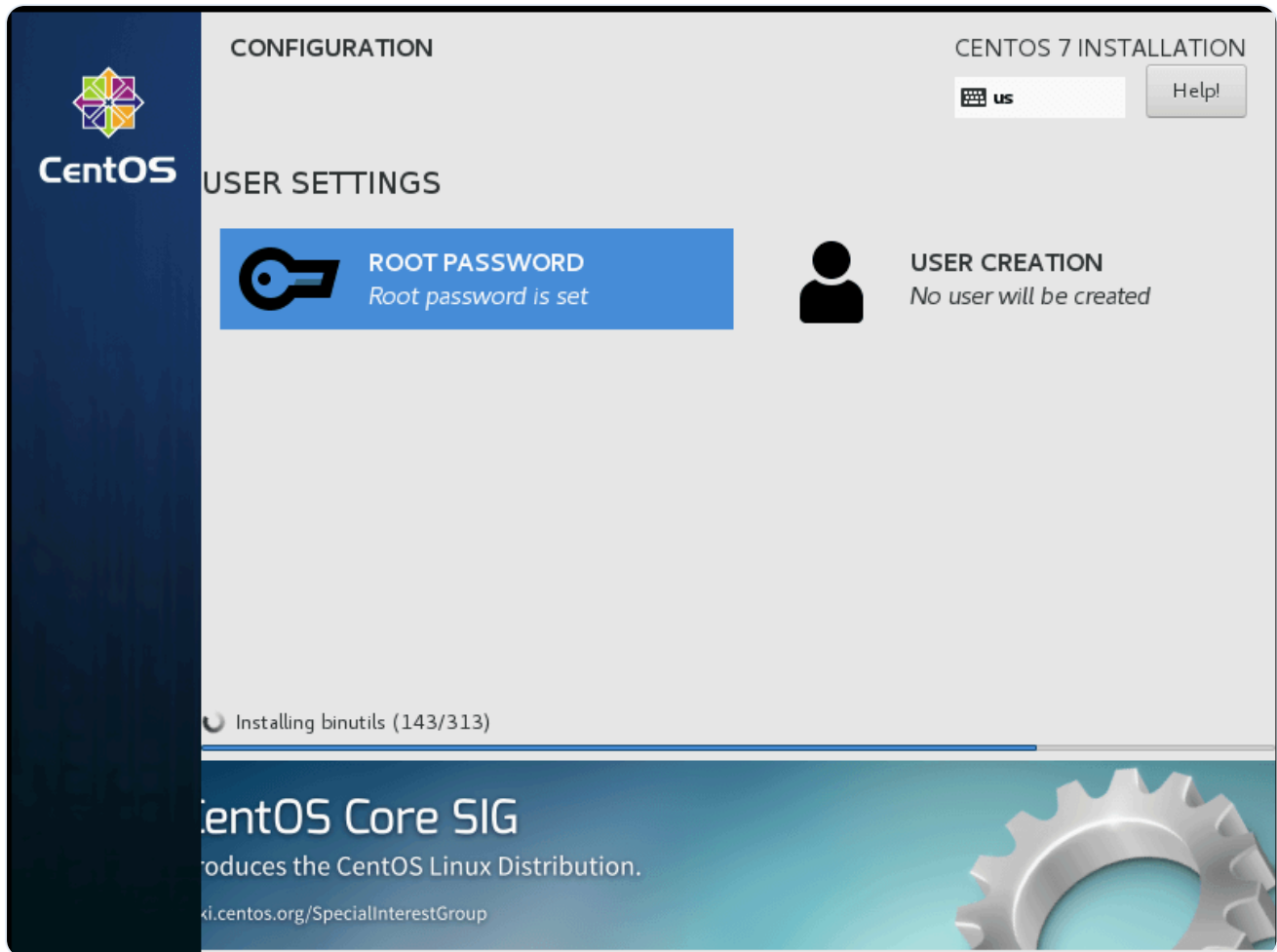


6. Other Storage Options – Choose the second option (I will configure partitioning) to configure OS related partitioning like /var, /var/log, /home, /tmp, /opt, /swap.



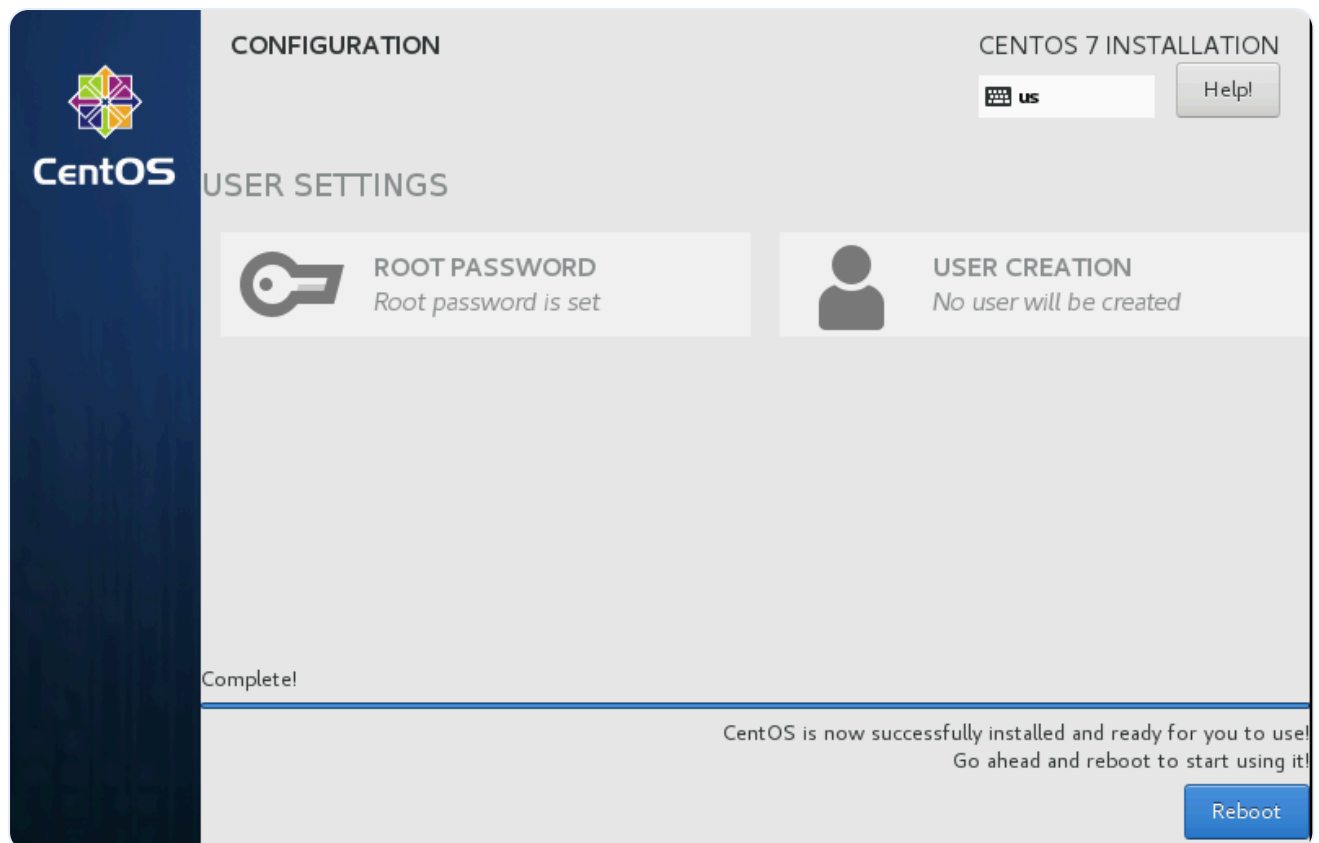
7. Once done, begin the installation.





CentOS 7 Installation

8. Once the Installation completed, reboot the server.



CentOS 7 Installation Complete

9. Login into the server and set the hostname.

```
# hostnamectl status
# hostnamectl set-hostname tecmint
# hostnamectl status
```

```
[root@localhost ~]# hostnamectl set-hostname tecmint
[root@localhost ~]# hostnamectl status
  Static hostname: tecmint
          Icon name: computer-vm
          Chassis: vm
    Machine ID: c1c2749f59df4898b5133d600864d405
       Boot ID: 3c8b84966e964f7eb1428b947d7b737a
  Virtualization: vmware
  Operating System: CentOS Linux 7 (Core)
    CPE OS Name: cpe:/o:centos:centos:7
         Kernel: Linux 3.10.0-862.el7.x86_64
  Architecture: x86_64
[root@localhost ~]# hostname
tecmint
[root@localhost ~]# _
```

Set Hostname on CentOS

Summary

In this article, we have gone through OS installation steps and best practices for filesystem partitioning. These are all general guideline, according to the nature of the workload, we may need to concentrate on more nuances to achieve the best performance of the cluster. Cluster planning is art for the Hadoop administrator. We will have deep dive into [OS level pre-requisites and security Hardening](#) in the next article.

◆ [CentOS Tips, Hadoop Tips, RHEL Tips](#)

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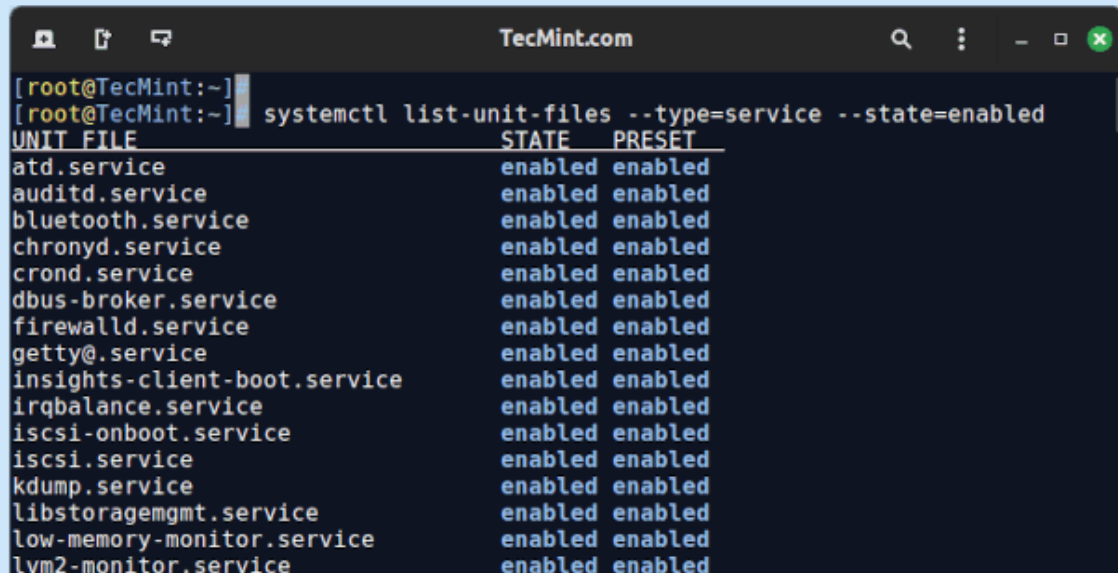
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```
[root@TecMint:~]# systemctl list-unit-files --type=service --state=enabled
UNIT FILE                                STATE    PRESET
atd.service                             enabled  enabled
auditd.service                           enabled  enabled
bluetooth.service                       enabled  enabled
chronyd.service                         enabled  enabled
crond.service                           enabled  enabled
dbus-broker.service                     enabled  enabled
firewalld.service                       enabled  enabled
getty@.service                           enabled  enabled
insights-client-boot.service             enabled  enabled
irqbalance.service                     enabled  enabled
iscsi-onboot.service                    enabled  enabled
iscsi.service                           enabled  enabled
kdump.service                           enabled  enabled
libstoragemgmt.service                  enabled  enabled
low-memory-monitor.service              enabled  enabled
lvm2-monitor.service                    enabled  enabled
```

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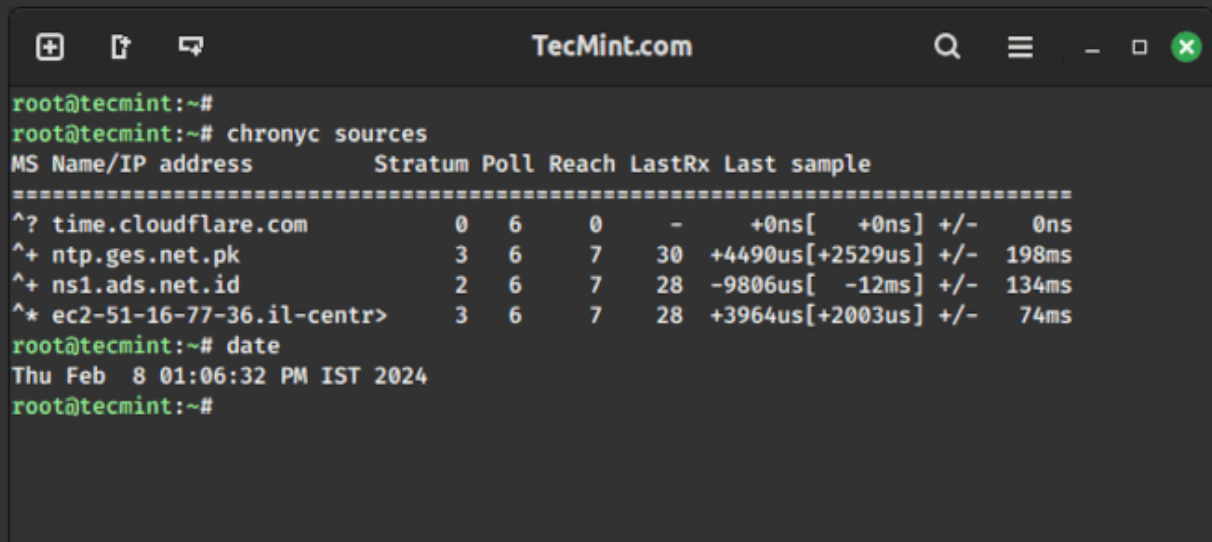
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A terminal window titled 'TecMint.com' showing the output of the 'chronyc sources' command. The output lists several NTP sources with their status, poll times, reach, and last sample times. The sources include time.cloudflare.com, ntp.ges.net.pk, ns1.ads.net.id, and ec2-51-16-77-36.il-centr>. The terminal also shows the date as 'Thu Feb 8 01:06:32 PM IST 2024'.

```
root@tecmint:~#  
root@tecmint:~# chronyc sources  
MS Name/IP address          Stratum Poll Reach LastRx Last sample  
=====
```

MS Name/IP address	Stratum	Poll	Reach	LastRx	Last sample
^? time.cloudflare.com	0	6	0	-	+0ns[+0ns] +/- 0ns
^+ ntp.ges.net.pk	3	6	7	30	+4490us[+2529us] +/- 198ms
^+ ns1.ads.net.id	2	6	7	28	-9806us[-12ms] +/- 134ms
^* ec2-51-16-77-36.il-centr>	3	6	7	28	+3964us[+2003us] +/- 74ms

```
root@tecmint:~# date  
Thu Feb 8 01:06:32 PM IST 2024  
root@tecmint:~#
```

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