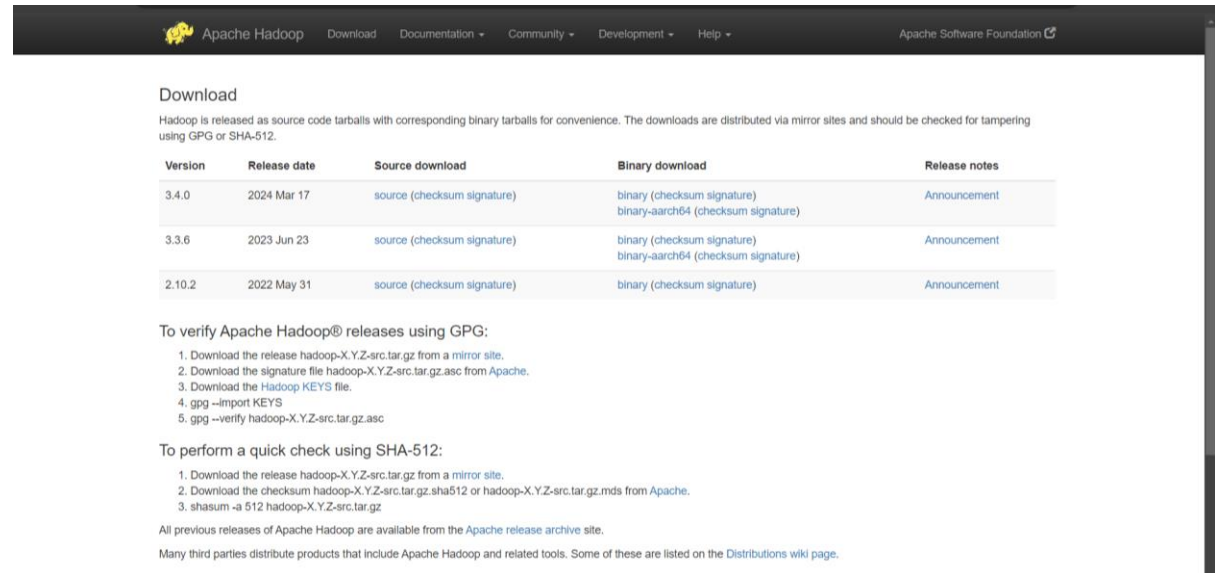


Exp. No : 1**Installation of Hadoop****1. Download Hadoop Binary file**


The screenshot shows the Apache Hadoop website's download page. At the top, there's a navigation bar with links for Download, Documentation, Community, Development, and Help. Below the navigation bar, the 'Download' section is highlighted. It states that Hadoop is released as source code tarballs with corresponding binary tarballs for convenience. A table lists the available versions: 3.4.0 (released 2024 Mar 17), 3.3.6 (released 2023 Jun 23), and 2.10.2 (released 2022 May 31). For each version, there are links for 'Source download' and 'Binary download'. The binary download links specify the architecture (e.g., 'binary-aarch64'). Release notes are also provided for each version. Below the table, instructions are given on how to verify the releases using GPG and how to perform a quick check using SHA-512. At the bottom, it mentions that all previous releases are available from the Apache release archive site and that many third parties distribute products that include Apache Hadoop and related tools.

Version	Release date	Source download	Binary download	Release notes
3.4.0	2024 Mar 17	source (checksum signature)	binary (checksum signature) binary-aarch64 (checksum signature)	Announcement
3.3.6	2023 Jun 23	source (checksum signature)	binary (checksum signature) binary-aarch64 (checksum signature)	Announcement
2.10.2	2022 May 31	source (checksum signature)	binary (checksum signature)	Announcement

To verify Apache Hadoop® releases using GPG:

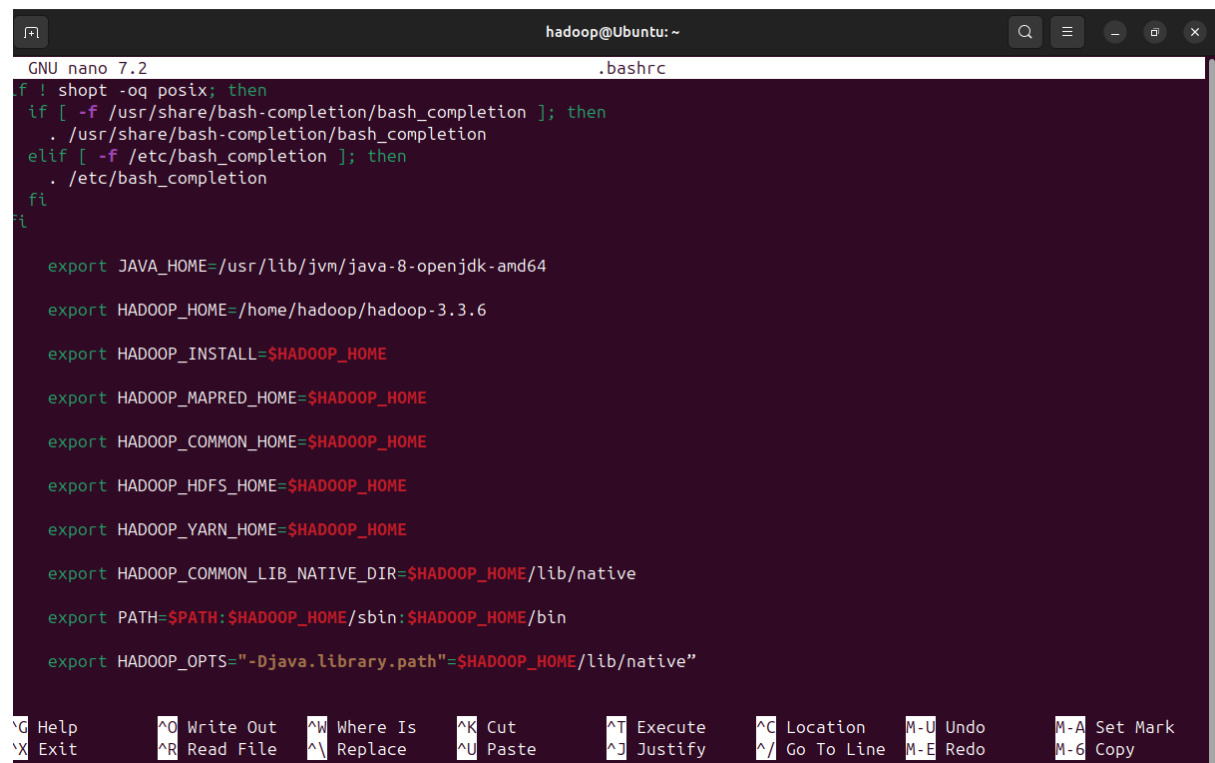
1. Download the release hadoop-X.Y.Z-src.tar.gz from a [mirror site](#).
2. Download the signature file hadoop-X.Y.Z-src.tar.gz.asc from Apache.
3. Download the [Hadoop KEYS](#) file.
4. `gpg --import KEYS`
5. `gpg --verify hadoop-X.Y.Z-src.tar.gz.asc`

To perform a quick check using SHA-512:

1. Download the release hadoop-X.Y.Z-src.tar.gz from a [mirror site](#).
2. Download the checksum hadoop-X.Y.Z-src.tar.gz.sha512 or hadoop-X.Y.Z-src.tar.gz.mds from Apache.
3. `shasum -a 512 hadoop-X.Y.Z-src.tar.gz`

All previous releases of Apache Hadoop are available from the [Apache release archive](#) site.

Many third parties distribute products that include Apache Hadoop and related tools. Some of these are listed on the [Distributions wiki](#) page.

2. Modifying .bashrc file


The screenshot shows a terminal window with the nano text editor open, editing the .bashrc file. The editor's title bar says 'hadoop@Ubuntu: ~' and 'GNU nano 7.2 .bashrc'. The content of the file includes a conditional block for bash completion, followed by several export statements for environment variables. The variables being set are JAVA_HOME, HADOOP_HOME, HADOOP_INSTALL, HADOOP_MAPRED_HOME, HADOOP_COMMON_HOME, HADOOP_HDFS_HOME, HADOOP_YARN_HOME, HADOOP_COMMON_LIB_NATIVE_DIR, PATH, and HADOOP_OPTS. The PATH variable is updated to include the HADOOP_HOME/bin directory. The HADOOP_OPTS variable is set to include the HADOOP_HOME/lib/native directory. At the bottom of the terminal, there's a status bar with various keyboard shortcuts for nano, such as ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^U Undo, ^M Set Mark, ^X Exit, ^R Read File, ^_ Replace, ^U Paste, ^J Justify, ^_ Go To Line, ^E Redo, and ^6 Copy.

```

GNU nano 7.2 .bashrc
f ! shopt -oq posix; then
if [ -f /usr/share/bash-completion/bash_completion ]; then
. /usr/share/bash-completion/bash_completion
elif [ -f /etc/bash_completion ]; then
. /etc/bash_completion
fi
fi

export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64

export HADOOP_HOME=/home/hadoop/hadoop-3.3.6

export HADOOP_INSTALL=$HADOOP_HOME

export HADOOP_MAPRED_HOME=$HADOOP_HOME

export HADOOP_COMMON_HOME=$HADOOP_HOME

export HADOOP_HDFS_HOME=$HADOOP_HOME

export HADOOP_YARN_HOME=$HADOOP_HOME

export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native

export PATH=$PATH:$HADOOP_HOME/sbin:$HADOOP_HOME/bin

export HADOOP_OPTS="-Djava.library.path=$HADOOP_HOME/lib/native"

```

3. Updating JAVA_HOME in \$HADOOP_HOME/etc/hadoop/hadoop-env.sh

```

hadoop@Ubuntu: ~/hadoop-3.3.6/etc/hadoop
GNU nano 7.2 hadoop-env.sh
## {YARN_xyz|HDFS_xyz} > HADOOP_xyz > hard-coded defaults
##

# Many of the options here are built from the perspective that users
# may want to provide OVERWRITING values on the command line.
# For example:
#
export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64
#
# Therefore, the vast majority (BUT NOT ALL!) of these defaults
# are configured for substitution and not append. If append
# is preferable, modify this file accordingly.

###
# Generic settings for HADOOP
###

# Technically, the only required environment variable is JAVA_HOME.
# All others are optional. However, the defaults are probably not
# preferred. Many sites configure these options outside of Hadoop,
# such as in /etc/profile.d

# The java implementation to use. By default, this environment
# variable is REQUIRED on ALL platforms except OS X!
# export JAVA_HOME=

# Location of Hadoop. By default, Hadoop will attempt to determine
# this location based upon its execution path.

^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo      M-A Set Mark
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^/_ Go To Line  M-E Redo      M-6 Copy

```

4. Modifying \$HADOOP_HOME/etc/hadoop/core-site.xml

```

hadoop@Ubuntu: ~/hadoop-3.3.6/etc/hadoop
GNU nano 7.2 core-site.xml
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>
<!--
  Licensed under the Apache License, Version 2.0 (the "License");
  you may not use this file except in compliance with the License.
  You may obtain a copy of the License at

    http://www.apache.org/licenses/LICENSE-2.0

  Unless required by applicable law or agreed to in writing, software
  distributed under the License is distributed on an "AS IS" BASIS,
  WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
  See the License for the specific language governing permissions and
  limitations under the License. See accompanying LICENSE file.
-->

<!-- Put site-specific property overrides in this file. -->

  <configuration>

    <property>

      <name>fs.defaultFS</name>

      <value>hdfs://localhost:9000</value>

    </property>

  
```

5. Modifying \$HADOOP_HOME/etc/hadoop/hdfs-site.xml

```

hadoop@Ubuntu: ~/hadoop-3.3.6/etc/hadoop
GNU nano 7.2                                hdfs-site.xml
</configuration>
<configuration>
  <property>
    <name>dfs.replication</name>
    <value>1</value>
  </property>
  <property> <name>dfs.namenode.name.dir</name>
    <value>file:///home/hadoop/hadoopdata/hdfs/namenode</value>
  </property>
  <property>
    <name>dfs.datanode.data.dir</name>
    <value>file:///home/hadoop/hadoopdata/hdfs/datanode</value>
  </property>
</configuration>
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo      M-A Set Mark
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^/_ Go To Line M-E Redo      M-6 Copy

```

6. Modifying \$HADOOP_HOME/etc/hadoop/mapred-site.xml

```

hadoop@Ubuntu: ~/hadoop-3.3.6/etc/hadoop
GNU nano 7.2                                mapred-site.xml
<configuration>
  <property>
    <name>yarn.app.mapreduce.am.env</name>
    <value>HADOOP_MAPRED_HOME=$HADOOP_HOME/home/hadoop/hadoop/bin/hadoop</value>
  </property>
  <property>
    <name>mapreduce.map.env</name>
    <value>HADOOP_MAPRED_HOME=$HADOOP_HOME/home/hadoop/hadoop/bin/hadoop</value>
  </property>
  <property>
    <name>mapreduce.reduce.env</name>
    <value>HADOOP_MAPRED_HOME=$HADOOP_HOME/home/hadoop/hadoop/bin/hadoop</value>
  </property>
</configuration>
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo      M-A Set Mark
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^/_ Go To Line M-E Redo      M-6 Copy

```

7. Modifying \$HADOOP_HOME/etc/hadoop/yarn-site.xml

```

hadoop@Ubuntu: ~/hadoop-3.3.6/etc/hadoop
GNU nano 7.2                                yarn-site.xml
<?xml version="1.0"?>
<!--
Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

    http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License. See accompanying LICENSE file.-->
<configuration>

  <property>

    <name>yarn.nodemanager.aux-services</name>

    <value>mapreduce_shuffle</value>

  </property>

</configuration>

[ Read 24 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo      M-A Set Mark
^X Exit      ^R Read File  ^_ Replace    ^U Paste      ^J Justify    ^_ Go To Line M-E Redo      M-6 Copy

```

8. Execute hdfs namenode -format

```

hadoop@Ubuntu: ~/hadoop-3.3.6/sbin
hadoop@Ubuntu:~/hadoop-3.3.6/sbin$ hdfs namenode -format
2024-08-15 16:44:36,005 INFO namenode.NameNode: STARTUP_MSG:
/*****
STARTUP_MSG: Starting NameNode
STARTUP_MSG:   host = Ubuntu/127.0.1.1
STARTUP_MSG:   args = [-format]
STARTUP_MSG:   version = 3.3.6
STARTUP_MSG:   classpath = /home/hadoop/hadoop-3.3.6/etc/hadoop:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/common
s-beanutils-1.9.4.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/kerby-asn1-1.0.1.jar:/home/hadoop/hadoop-3.3.6/s
hare/hadoop/common/lib/httpclient-4.5.13.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/netty-resolver-dns-native
-macos-4.1.89.Final-osx-x86_64.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/jsp-api-2.1.jar:/home/hadoop/hadoop
-3.3.6/share/hadoop/common/lib/zookeeper-jute-3.6.3.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/netty-transpor
t-sctp-4.1.89.Final.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/listenablefuture-9999.0-empty-to-avoid-conflic
t-with-guava.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/kerb-identity-1.0.1.jar:/home/hadoop/hadoop-3.3.6/sha
re/hadoop/common/lib/jetty-util-ajax-9.4.51.v20230217.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/netty-codec-
redis-4.1.89.Final.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/jaxb-impl-2.2.3-1.jar:/home/hadoop/hadoop-3.3.6
/share/hadoop/common/lib/jackson-core-2.12.7.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/netty-common-4.1.89.F
inal.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/checker-qual-2.5.2.jar:/home/hadoop/hadoop-3.3.6/share/hadoop
/common/lib/netty-all-4.1.89.Final.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/kerb-admin-1.0.1.jar:/home/hado
op/hadoop-3.3.6/share/hadoop/common/lib/jetty-servlet-9.4.51.v20230217.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common
/lib/netty-handler-4.1.89.Final.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/javax.servlet-api-3.1.0.jar:/home/
hadoop/hadoop-3.3.6/share/hadoop/common/lib/jackson-databind-2.12.7.1.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/
lib/jersey-json-1.20.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/token-provider-1.0.1.jar:/home/hadoop/hadoop-
3.3.6/share/hadoop/common/lib/stax2-api-4.2.1.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/curator-recipes-5.2.
0.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/animal-sniffer-annotations-1.17.jar:/home/hadoop/hadoop-3.3.6/sh
are/hadoop/common/lib/jettison-1.5.4.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/jackson-core-asl-1.9.13.jar:/
home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/netty-codec-memcache-4.1.89.Final.jar:/home/hadoop/hadoop-3.3.6/share/h
adoop/common/lib/metrics-core-3.2.4.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/hadoop-shaded-protobuf_3_7-1.1
.1.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/netty-handler-ssl-ocsp-4.1.89.Final.jar:/home/hadoop/hadoop-3.3
.6/share/hadoop/common/lib/netty-transport-rxtx-4.1.89.Final.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/kerb-
util-1.0.1.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/commons-compress-1.21.jar:/home/hadoop/hadoop-3.3.6/sha
re/hadoop/common/lib/netty-codec-4.1.89.Final.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/jetty-security-9.4.5
1.v20230217.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/common/lib/gson-2.9.0.jar:/home/hadoop/hadoop-3.3.6/share/hadoop/

```

```

hadoop@Ubuntu: ~/hadoop-3.3.6/sbin
2024-08-15 16:44:40,084 INFO metrics.TopMetrics: NNTop conf: dfs.namenode.top.num.users = 10
2024-08-15 16:44:40,084 INFO metrics.TopMetrics: NNTop conf: dfs.namenode.top.windows.minutes = 1,5,25
2024-08-15 16:44:40,121 INFO namenode.FSNamesystem: Retry cache on namenode is enabled
2024-08-15 16:44:40,121 INFO namenode.FSNamesystem: Retry cache will use 0.03 of total heap and retry cache entry expiry
time is 600000 millis
2024-08-15 16:44:40,146 INFO util.GSet: Computing capacity for map NameNodeRetryCache
2024-08-15 16:44:40,150 INFO util.GSet: VM type = 64-bit
2024-08-15 16:44:40,153 INFO util.GSet: 0.029999999329447746% max memory 871.5 MB = 267.7 KB
2024-08-15 16:44:40,153 INFO util.GSet: capacity = 2^15 = 32768 entries
2024-08-15 16:44:40,153 INFO util.GSet: capacity = 2^15 = 32768 entries
2024-08-15 16:44:43,736 INFO namenode.FSImage: Allocated new BlockPoolId: BP-1847114295-127.0.1.1-1723720483718
2024-08-15 16:44:43,736 INFO common.Storage: Will remove files: [/home/hadoop/hadoopdata/hdfs/namenode/current/edits_inp
rogress_00000000000000000002, /home/hadoop/hadoopdata/hdfs/namenode/current/fsimage_00000000000000000001.md5, /home/hadoop
/hadoopdata/hdfs/namenode/current/fsimage_00000000000000000000.md5, /home/hadoop/hadoopdata/hdfs/namenode/current/VERSION
, /home/hadoop/hadoopdata/hdfs/namenode/current/fsimage_00000000000000000001, /home/hadoop/hadoopdata/hdfs/namenode/curre
nt/seen_txid, /home/hadoop/hadoopdata/hdfs/namenode/current/fsimage_00000000000000000000, /home/hadoop/hadoopdata/hdfs/na
menode/current/edits_00000000000000000001-00000000000000000001]
2024-08-15 16:44:43,917 INFO common.Storage: Storage directory /home/hadoop/hadoopdata/hdfs/namenode has been successfu
ly formatted.
2024-08-15 16:44:44,225 INFO namenode.FSImageFormatProtobuf: Saving image file /home/hadoop/hadoopdata/hdfs/namenode/cu
rent/fsimage.ckpt_00000000000000000000 using no compression
2024-08-15 16:44:44,577 INFO namenode.FSImageFormatProtobuf: Image file /home/hadoop/hadoopdata/hdfs/namenode/current/fs
image.ckpt_00000000000000000000 of size 401 bytes saved in 0 seconds .
2024-08-15 16:44:44,630 INFO namenode.NNStorageRetentionManager: Going to retain 1 images with txid >= 0
2024-08-15 16:44:44,661 INFO namenode.FSNamesystem: Stopping services started for active state
2024-08-15 16:44:44,661 INFO namenode.FSNamesystem: Stopping services started for standby state
2024-08-15 16:44:44,675 INFO namenode.FSImage: FSImageSaver clean checkpoint: txid=0 when meet shutdown.
2024-08-15 16:44:44,685 INFO namenode.NameNode: SHUTDOWN_MSG:
/*****
SHUTDOWN_MSG: Shutting down NameNode at Ubuntu/127.0.1.1
*****/
hadoop@Ubuntu: ~/hadoop-3.3.6/sbin$

```

9. Execute start-dfs.sh

```

hadoop@Ubuntu: ~/hadoop-3.3.6/sbin$ start-dfs.sh
Starting namenodes on [localhost]
Starting datanodes
Starting secondary namenodes [Ubuntu]
2024-08-15 16:47:24,236 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using buil
tin-java classes where applicable

```

10. Execute start-yarn.sh

```

hadoop@Ubuntu: ~/hadoop-3.3.6/sbin$ start-yarn.sh
Starting resourcemanager
Starting nodemanagers
hadoop@Ubuntu: ~/hadoop-3.3.6/sbin$

```

11. Execute jps command

```

hadoop@Ubuntu: ~/hadoop-3.3.6/sbin$ jps
4758 NodeManager
4390 SecondaryNameNode
5111 Jps
4632 ResourceManager
4015 NameNode

```

12. Open <http://localhost:9870>

Namenode information

localhost:9870/dfshealth.html#tab-overview

HadoopOverviewDatanodesDatanode Volume FailuresSnapshotStartup ProgressUtilities

Overview 'localhost:9000' (active)

Started:	Thu Aug 15 16:47:15 +0530 2024
Version:	3.3.6, r1be78238728da9266a4f88195058f08fd012bf9c
Compiled:	Sun Jun 18 13:52:00 +0530 2023 by ubuntu from (HEAD detached at release-3.3.6-RC1)
Cluster ID:	CID-4797107d-bd90-4038-afed-e5c495ecd59b
Block Pool ID:	BP-1847114295-127.0.1.1-1723720483718

Summary

Security is off.
Safemode is off.

1 files and directories, 0 blocks (0 replicated blocks, 0 erasure coded block groups) = 1 total filesystem object(s).

Heap Memory used 79.95 MB of 261 MB Heap Memory. Max Heap Memory is 871.5 MB.


Non Heap Memory used 47.19 MB of 48.65 MB Committed Non Heap Memory. Max Non Heap Memory is <unbounded>.

Configured Capacity:	0 B
----------------------	-----

13. Open <http://localhost:8088>

All Applications

localhost:8088/cluster



Cluster

AboutNodesNode LabelsApplicationsNEWNEW_SAVINGSUBMITTEDACCEPTEDRUNNINGFINISHEDFAILEDKILLED

Scheduler

Tools

Cluster Metrics

Apps Submitted	Apps Pending	Apps Running	Apps Completed	Containers Running
0	0	0	0	0

Cluster Nodes Metrics

Active Nodes	Decommissioning Nodes	Decommissioned Nodes
1	0	0

Scheduler Metrics

Scheduler Type	Scheduling Resource Type	Minimum Allocation
Capacity Scheduler	[memory-mb (unit=Mi), vcores]	<memory:1024, vCores:1>


Show 20 entries

ID	User	Name	Application Type	Application Tags	Queue	Application Priority	StartTime	LaunchTime	FinishTime
Showing 0 to 0 of 0 entries									

14. Open <http://localhost:8042>

NodeManager information

localhost:8042/node



ResourceManager

NodeManager

- Node Information
- List of Applications
- List of Containers

Tools

NodeManager information

Total Vmem allocated for Containers	16.80 GB
Vmem enforcement enabled	true
Total Pmem allocated for Container	8 GB
Pmem enforcement enabled	true
Total VCores allocated for Containers	8
Resource types	memory-mb (unit=Mj), vcores
NodeHealthyStatus	true
LastNodeHealthTime	Thu Aug 15 16:52:37 IST 2024
NodeHealthReport	
NodeManager started on	Thu Aug 15 16:48:34 IST 2024
NodeManager Version:	3.3.6 from 1be78238728da9266a4f88195058f08fd012bf9c by ubuntu source checksum d42eb795a5eadb0febf5e44a7f87a9 on 2023-06-18T08:31Z
Hadoop Version:	3.3.6 from 1be78238728da9266a4f88195058f08fd012bf9c by ubuntu source checksum 5652179ad55f76cb287d9c633bb53bbd on 2023-06-18T08:22Z