LAPORAN TUGAS INSTALASI APACHE SPARK

MATA KULIAH BIG DATA

Dosen Pengampu:

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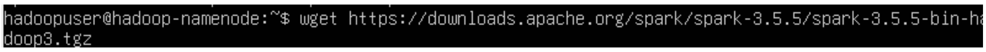
PROGRAM STUDI D4 TEKNIK INFORMATIKA
JURUSAN TEKNOLOGI INFORMASI
POLITEKNIK NEGERI MALANG
2025

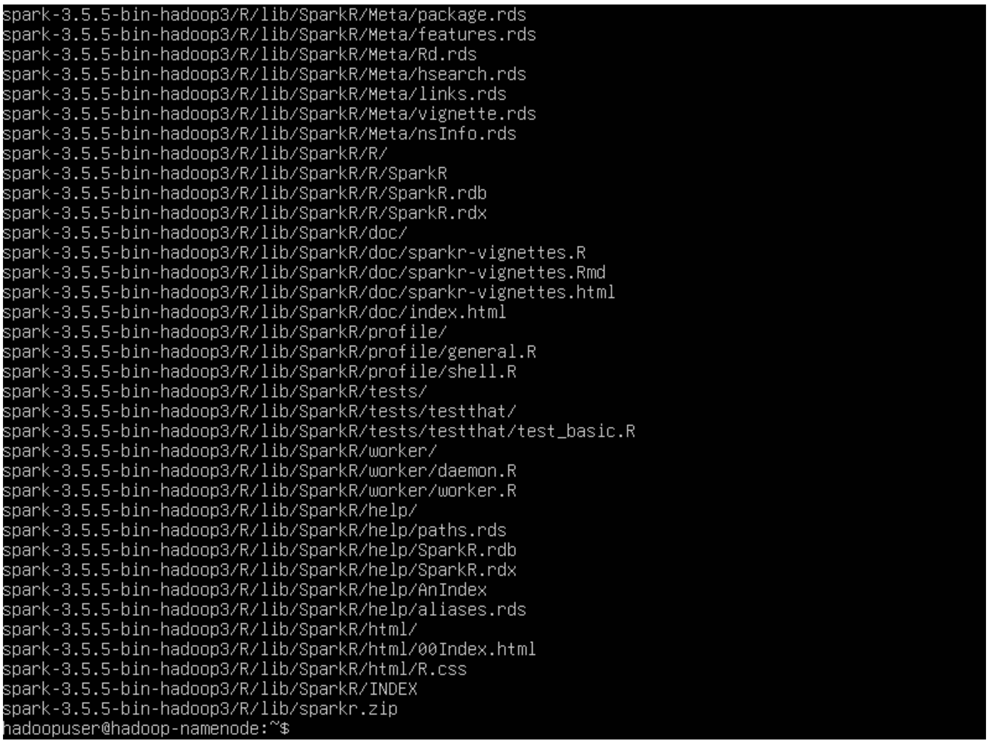
Bagian 1 : Instalasi Apache Spark

1. Unduh versi terbaru Spark dalam namenode vbox menggunakan wget

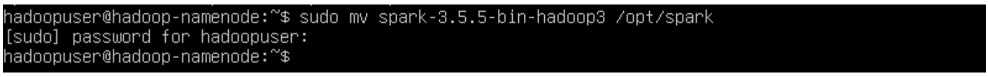


```
hadoopuser@hadoop-namenode:~$ wget https://downloads.apache.org/spark/spark-3.5.5/spark-3.5.5-bin-ha
doop3.tgz
```

2. Ekstrak dan pindahkan ke direktori /opt/spark



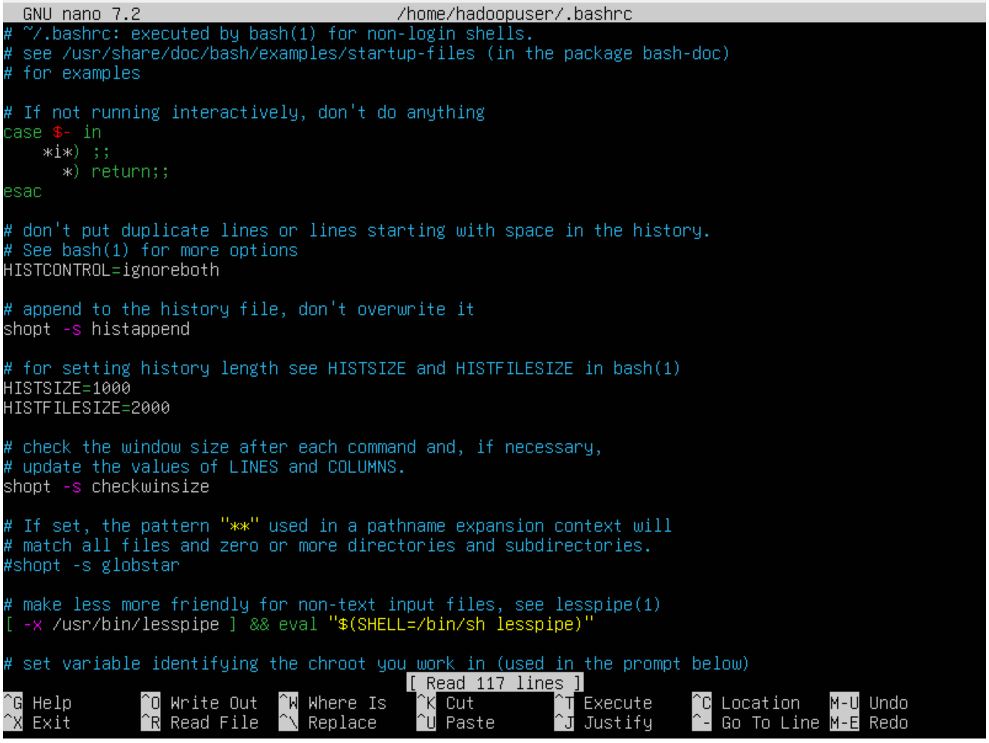
```
spark-3.5.5-bin-hadoop3/R/lib/SparkR/Meta/package.rds
spark-3.5.5-bin-hadoop3/R/lib/SparkR/Meta/features.rds
spark-3.5.5-bin-hadoop3/R/lib/SparkR/Meta/Rd.rds
spark-3.5.5-bin-hadoop3/R/lib/SparkR/Meta/hsearch.rds
spark-3.5.5-bin-hadoop3/R/lib/SparkR/Meta/links.rds
spark-3.5.5-bin-hadoop3/R/lib/SparkR/Meta/vignette.rds
spark-3.5.5-bin-hadoop3/R/lib/SparkR/Meta/nsInfo.rds
spark-3.5.5-bin-hadoop3/R/lib/SparkR/R/
spark-3.5.5-bin-hadoop3/R/lib/SparkR/R/SparkR
spark-3.5.5-bin-hadoop3/R/lib/SparkR/R/SparkR.rdb
spark-3.5.5-bin-hadoop3/R/lib/SparkR/R/SparkR.rdx
spark-3.5.5-bin-hadoop3/R/lib/SparkR/doc/
spark-3.5.5-bin-hadoop3/R/lib/SparkR/doc/sparkr-vignettes.R
spark-3.5.5-bin-hadoop3/R/lib/SparkR/doc/sparkr-vignettes.Rmd
spark-3.5.5-bin-hadoop3/R/lib/SparkR/doc/sparkr-vignettes.html
spark-3.5.5-bin-hadoop3/R/lib/SparkR/doc/index.html
spark-3.5.5-bin-hadoop3/R/lib/SparkR/profile/
spark-3.5.5-bin-hadoop3/R/lib/SparkR/profile/general.R
spark-3.5.5-bin-hadoop3/R/lib/SparkR/profile/shell.R
spark-3.5.5-bin-hadoop3/R/lib/SparkR/tests/
spark-3.5.5-bin-hadoop3/R/lib/SparkR/tests/testthat/
spark-3.5.5-bin-hadoop3/R/lib/SparkR/tests/testthat/test_basic.R
spark-3.5.5-bin-hadoop3/R/lib/SparkR/worker/
spark-3.5.5-bin-hadoop3/R/lib/SparkR/worker/daemon.R
spark-3.5.5-bin-hadoop3/R/lib/SparkR/worker/worker.R
spark-3.5.5-bin-hadoop3/R/lib/SparkR/help/
spark-3.5.5-bin-hadoop3/R/lib/SparkR/help/paths.rds
spark-3.5.5-bin-hadoop3/R/lib/SparkR/help/SparkR.rdb
spark-3.5.5-bin-hadoop3/R/lib/SparkR/help/SparkR.rdx
spark-3.5.5-bin-hadoop3/R/lib/SparkR/help/AnIndex
spark-3.5.5-bin-hadoop3/R/lib/SparkR/help/aliases.rds
spark-3.5.5-bin-hadoop3/R/lib/SparkR/html/
spark-3.5.5-bin-hadoop3/R/lib/SparkR/html/00Index.html
spark-3.5.5-bin-hadoop3/R/lib/SparkR/html/R.css
spark-3.5.5-bin-hadoop3/R/lib/SparkR/INDEX
spark-3.5.5-bin-hadoop3/R/lib/sparkr.zip
hadoopuser@hadoop-namenode:~$
```



```
hadoopuser@hadoop-namenode:~$ sudo mv spark-3.5.5-bin-hadoop3 /opt/spark
[sudo] password for hadoopuser:
hadoopuser@hadoop-namenode:~$
```

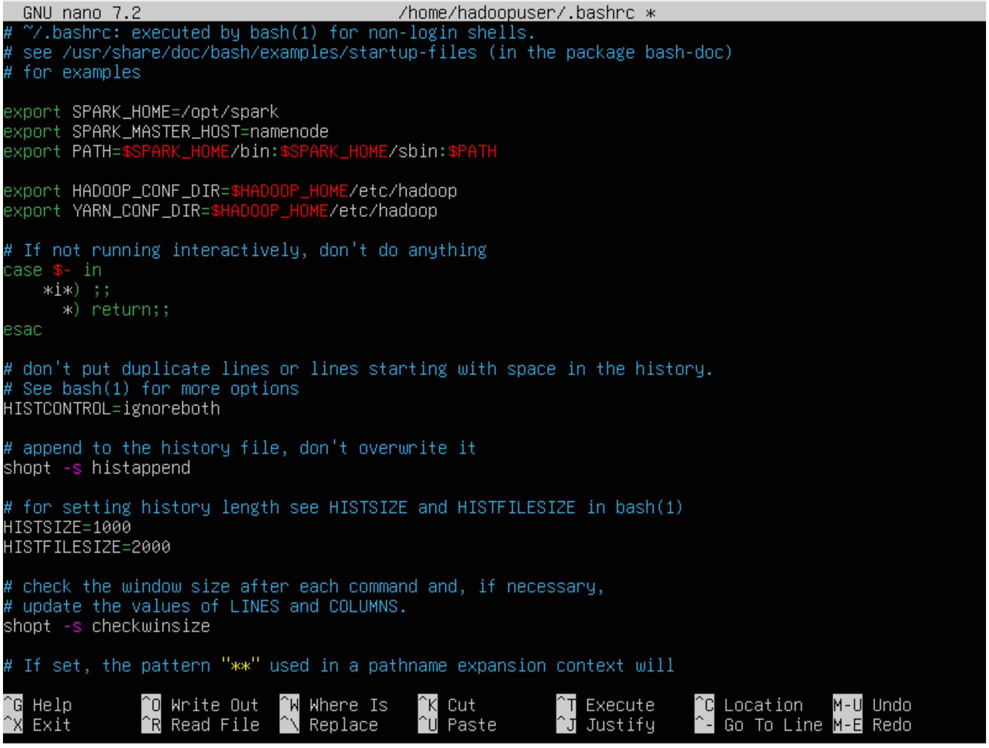
Bagian 2 : Konfigurasi Apache Spark

1. Konfigurasi environment variables. Edit .bashrc atau .profile :



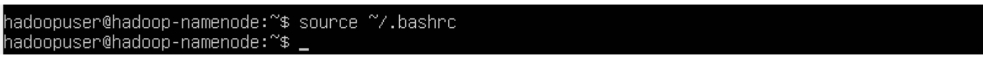
```
# ~/.bashrc: executed by bash(1) for non-login shells.
# see /usr/share/doc/bash/examples/startup-files (in the package bash-doc)
# for examples

# If not running interactively, don't do anything
case $- in
    *i*) ;;
      *) return;;
esac

# don't put duplicate lines or lines starting with space in the history.
# See bash(1) for more options
HISTCONTROL=ignoreboth

# append to the history file, don't overwrite it
shopt -s histappend

# for setting history length see HISTSIZE and HISTFILESIZE in bash(1)
HISTSIZE=1000
HISTFILESIZE=2000

# check the window size after each command and, if necessary,
# update the values of LINES and COLUMNS.
shopt -s checkwinsize

# If set, the pattern "**" used in a pathname expansion context will
# match all files and zero or more directories and subdirectories.
#shopt -s globstar

# make less more friendly for non-text input files, see lesspipe(1)
[ -x /usr/bin/lesspipe ] && eval "$(SHELL=/bin/sh lesspipe)"

# set variable identifying the chroot you work in (used in the prompt below)
                                        [ Read 117 lines ]
```

2. Tambahkan baris berikut:



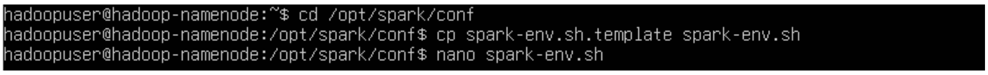
```
# ~/.bashrc: executed by bash(1) for non-login shells.
# see /usr/share/doc/bash/examples/startup-files (in the package bash-doc)
# for examples

export SPARK_HOME=/opt/spark
export SPARK_MASTER_HOST=namenode
export PATH=$SPARK_HOME/bin:$SPARK_HOME/sbin:$PATH

export HADOOP_CONF_DIR=$HADOOP_HOME/etc/hadoop
export YARN_CONF_DIR=$HADOOP_HOME/etc/hadoop

# If not running interactively, don't do anything
case $- in
    *i*) ;;
      *) return;;
esac

# don't put duplicate lines or lines starting with space in the history.
# See bash(1) for more options
HISTCONTROL=ignoreboth

# append to the history file, don't overwrite it
shopt -s histappend

# for setting history length see HISTSIZE and HISTFILESIZE in bash(1)
HISTSIZE=1000
HISTFILESIZE=2000

# check the window size after each command and, if necessary,
# update the values of LINES and COLUMNS.
shopt -s checkwinsize

# If set, the pattern "**" used in a pathname expansion context will
```

3. Kemudian jalankan:

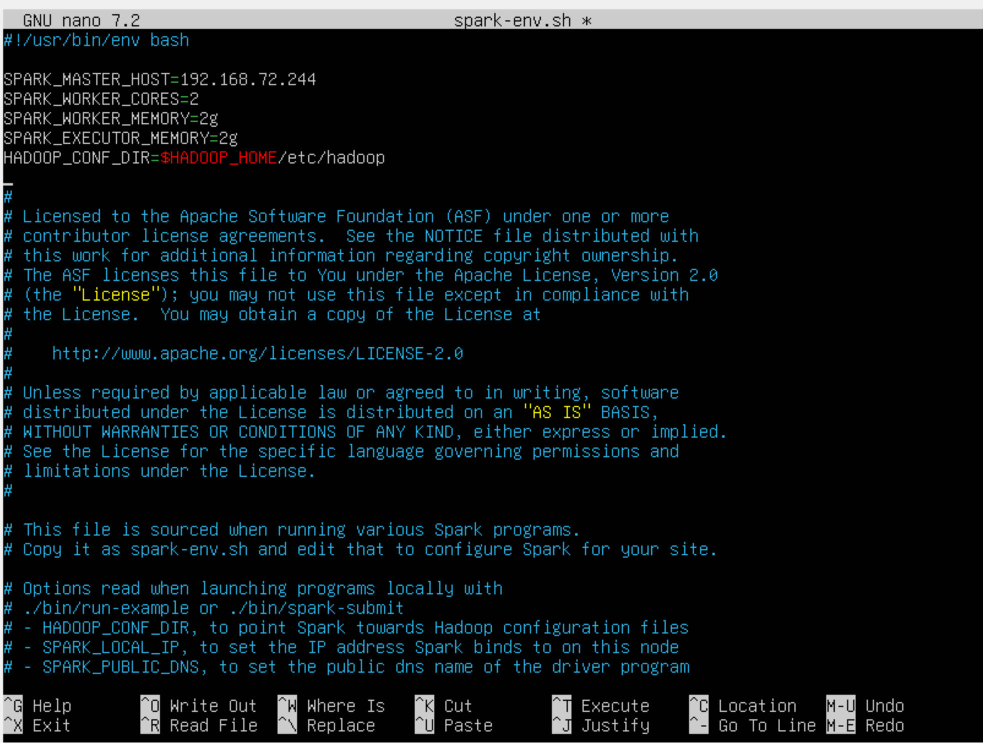


```
hadoopuser@hadoop-namenode:~$ source ~/.bashrc
hadoopuser@hadoop-namenode:~$ _
```

4. Konfigurasi spark-env.sh. Salin template dan edit serta tambahkan



```
hadoopuser@hadoop-namenode:~$ cd /opt/spark/conf
hadoopuser@hadoop-namenode:/opt/spark/conf$ cp spark-env.sh.template spark-env.sh
hadoopuser@hadoop-namenode:/opt/spark/conf$ nano spark-env.sh
```



```
#!/usr/bin/env bash

SPARK_MASTER_HOST=192.168.72.244
SPARK_WORKER_CORES=2
SPARK_WORKER_MEMORY=2g
SPARK_EXECUTOR_MEMORY=2g
HADOOP_CONF_DIR=$HADOOP_HOME/etc/hadoop
_
#
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# this work for additional information regarding copyright ownership.
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#
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# 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.
#

# This file is sourced when running various Spark programs.
# Copy it as spark-env.sh and edit that to configure Spark for your site.

# Options read when launching programs locally with
# ./bin/run-example or ./bin/spark-submit
# - HADOOP_CONF_DIR, to point Spark towards Hadoop configuration files
# - SPARK_LOCAL_IP, to set the IP address Spark binds to on this node
# - SPARK_PUBLIC_DNS, to set the public dns name of the driver program
```
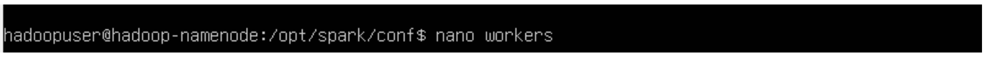
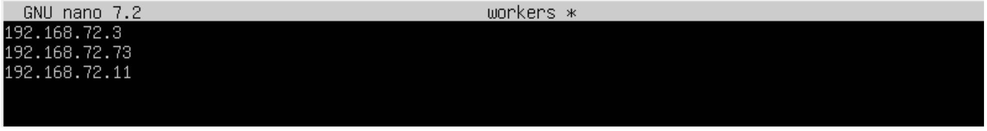

5. Buat daftar worker



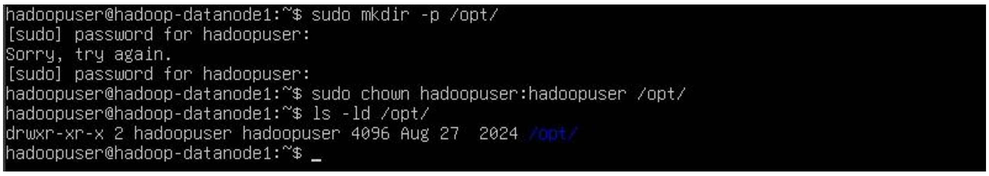
```
hadoopuser@hadoop-namenode:/opt/spark/conf$ nano workers
```



```
192.168.72.3
192.168.72.73
192.168.72.11
```

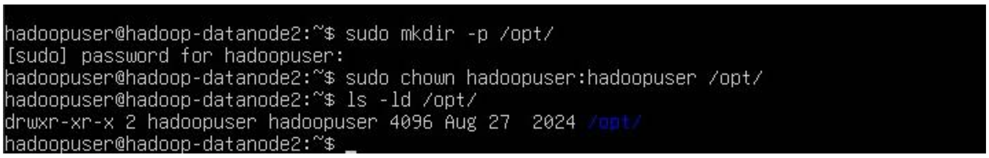
6. Buat direktori /opt/ di setiap datanode

Datanode 1:



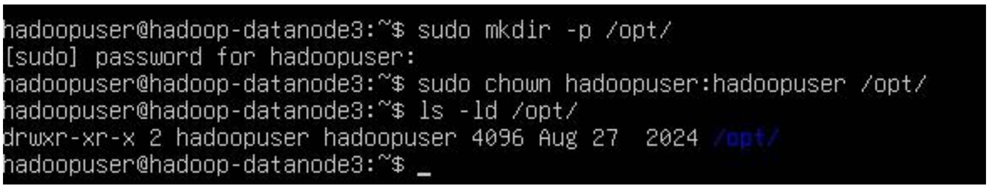
```
hadoopuser@hadoop-datanode1:~$ sudo mkdir -p /opt/
[sudo] password for hadoopuser:
Sorry, try again.
[sudo] password for hadoopuser:
hadoopuser@hadoop-datanode1:~$ sudo chown hadoopuser:hadoopuser /opt/
hadoopuser@hadoop-datanode1:~$ ls -ld /opt/
drwxr-xr-x 2 hadoopuser hadoopuser 4096 Aug 27  2024 /opt/
hadoopuser@hadoop-datanode1:~$ _
```

Datanode 2:



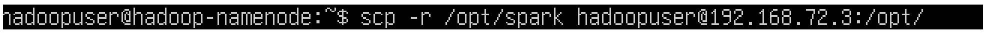
```
hadoopuser@hadoop-datanode2:~$ sudo mkdir -p /opt/
[sudo] password for hadoopuser:
hadoopuser@hadoop-datanode2:~$ sudo chown hadoopuser:hadoopuser /opt/
hadoopuser@hadoop-datanode2:~$ ls -ld /opt/
drwxr-xr-x 2 hadoopuser hadoopuser 4096 Aug 27  2024 /opt/
hadoopuser@hadoop-datanode2:~$ _
```

Datanode 3:

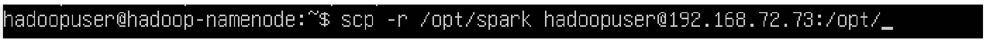


```
hadoopuser@hadoop-datanode3:~$ sudo mkdir -p /opt/
[sudo] password for hadoopuser:
hadoopuser@hadoop-datanode3:~$ sudo chown hadoopuser:hadoopuser /opt/
hadoopuser@hadoop-datanode3:~$ ls -ld /opt/
drwxr-xr-x 2 hadoopuser hadoopuser 4096 Aug 27  2024 /opt/
hadoopuser@hadoop-datanode3:~$ _
```

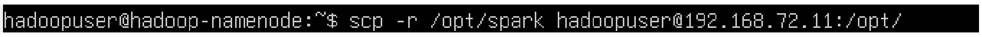
Namenode:



```
hadoopuser@hadoop-namenode:~$ scp -r /opt/spark hadoopuser@192.168.72.3:/opt/
```



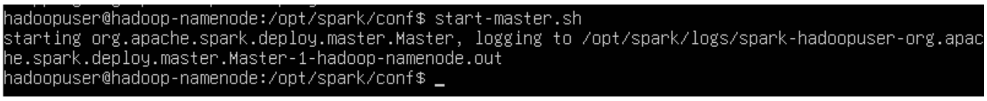
```
hadoopuser@hadoop-namenode:~$ scp -r /opt/spark hadoopuser@192.168.72.73:/opt/_
```



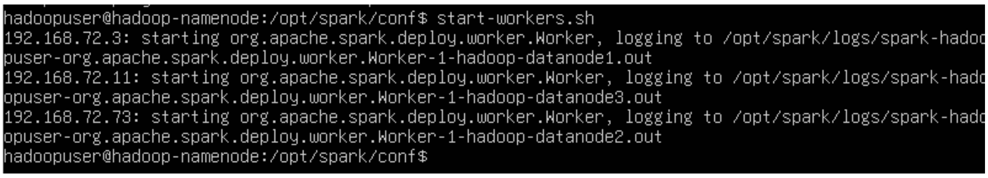
```
hadoopuser@hadoop-namenode:~$ scp -r /opt/spark hadoopuser@192.168.72.11:/opt/
```

Bagian 3 : Menjalankan Apache Spark di Cluster Hadoop

1. Jalankan Spark Master dan Workers di namenode (Master Node)

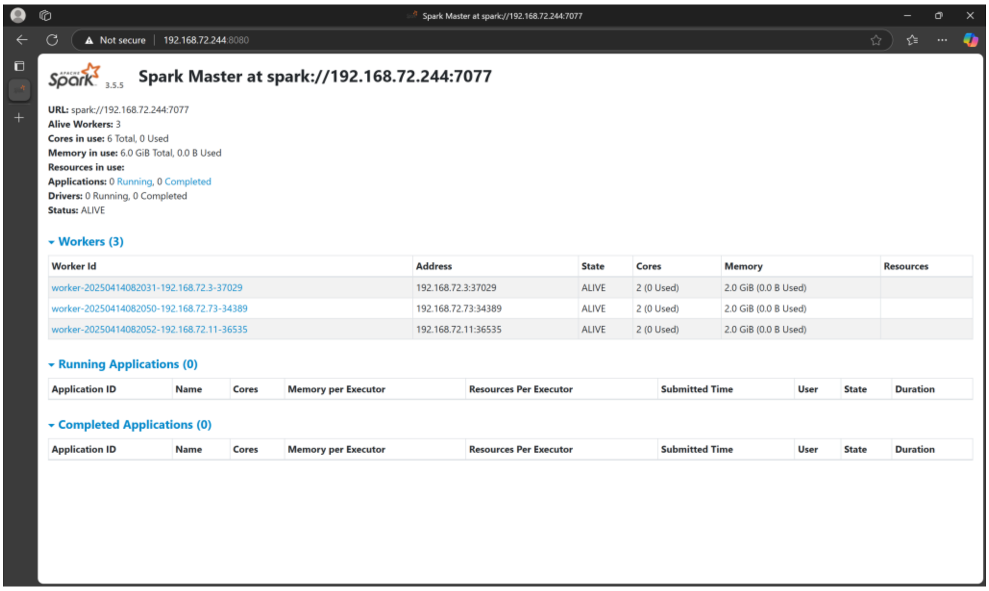


```
hadoopuser@hadoop-namenode:/opt/spark/conf$ start-master.sh
starting org.apache.spark.deploy.master.Master, logging to /opt/spark/logs/spark-hadoopuser-org.apac
he.spark.deploy.master.Master-1-hadoop-namenode.out
hadoopuser@hadoop-namenode:/opt/spark/conf$ _
```



```
hadoopuser@hadoop-namenode:/opt/spark/conf$ start-workers.sh
192.168.72.3: starting org.apache.spark.deploy.worker.Worker, logging to /opt/spark/logs/spark-hadoo
puser-org.apache.spark.deploy.worker.Worker-1-hadoop-datanode1.out
192.168.72.11: starting org.apache.spark.deploy.worker.Worker, logging to /opt/spark/logs/spark-hado
opuser-org.apache.spark.deploy.worker.Worker-1-hadoop-datanode3.out
192.168.72.73: starting org.apache.spark.deploy.worker.Worker, logging to /opt/spark/logs/spark-hado
opuser-org.apache.spark.deploy.worker.Worker-1-hadoop-datanode2.out
hadoopuser@hadoop-namenode:/opt/spark/conf$
```

2. Buka di browser: http://192.168.72.244:8080



Spark Master at spark://192.168.72.244:7077

URL: spark://192.168.72.244:7077
Alive Workers: 3
Cores in use: 6 Total, 0 Used
Memory in use: 6.0 GiB Total, 0.0 B Used
Resources in use:
Applications: 0 Running, 0 Completed
Drivers: 0 Running, 0 Completed
Status: ALIVE

Workers (3)

Worker Id	Address	State	Cores	Memory	Resources
worker-20250414082031-192.168.72.3-37029	192.168.72.3:37029	ALIVE	2 (0 Used)	2.0 GiB (0.0 B Used)	
worker-20250414082050-192.168.72.73-34389	192.168.72.73:34389	ALIVE	2 (0 Used)	2.0 GiB (0.0 B Used)	
worker-20250414082052-192.168.72.11-36535	192.168.72.11:36535	ALIVE	2 (0 Used)	2.0 GiB (0.0 B Used)	

Running Applications (0)

Application ID	Name	Cores	Memory per Executor	Resources Per Executor	Submitted Time	User	State	Duration

Completed Applications (0)

Application ID	Name	Cores	Memory per Executor	Resources Per Executor	Submitted Time	User	State	Duration