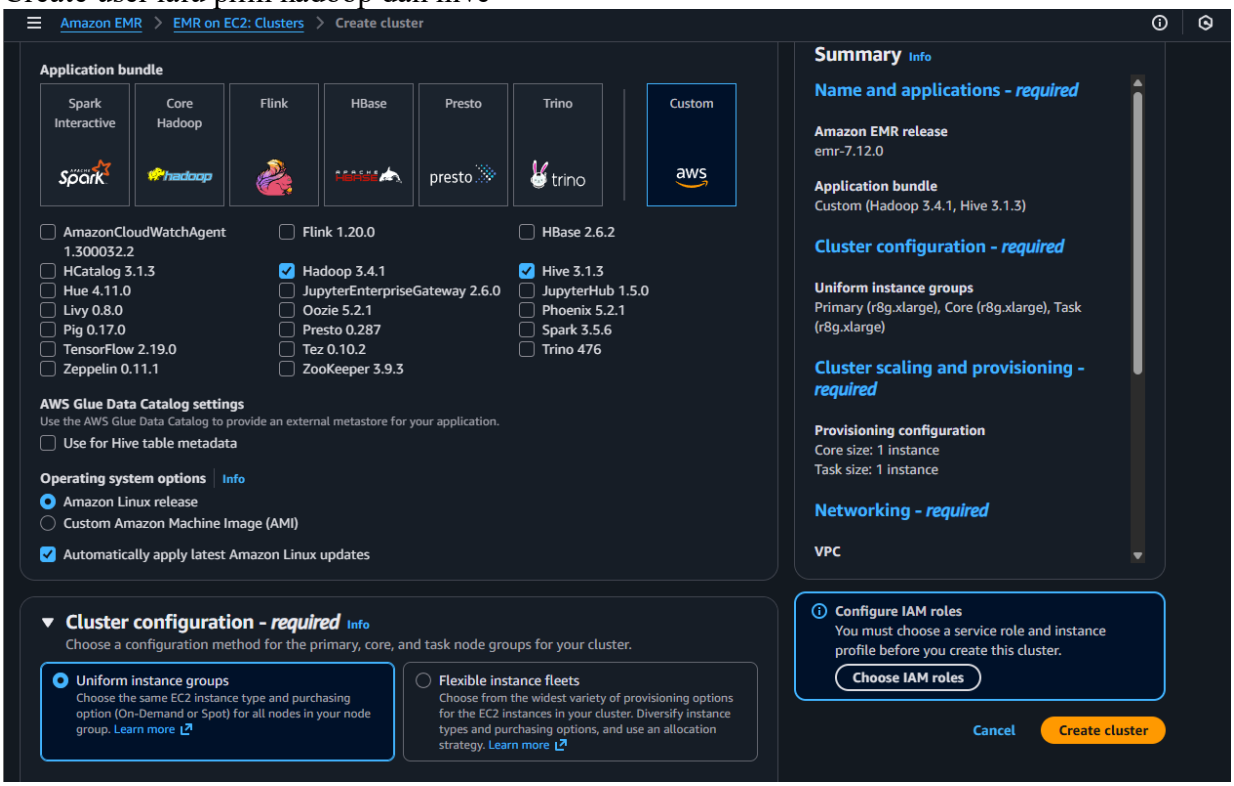
CARA BUAT CLUSTER UNTUK HADOOP

Masuk ke EMR

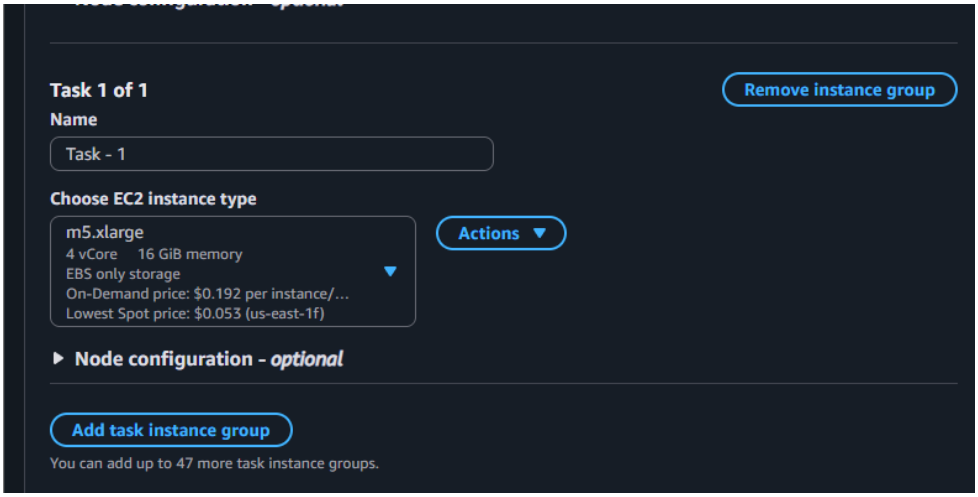
Create user lalu pilih hadoop dan hive



Turunkan instance type (biaya)

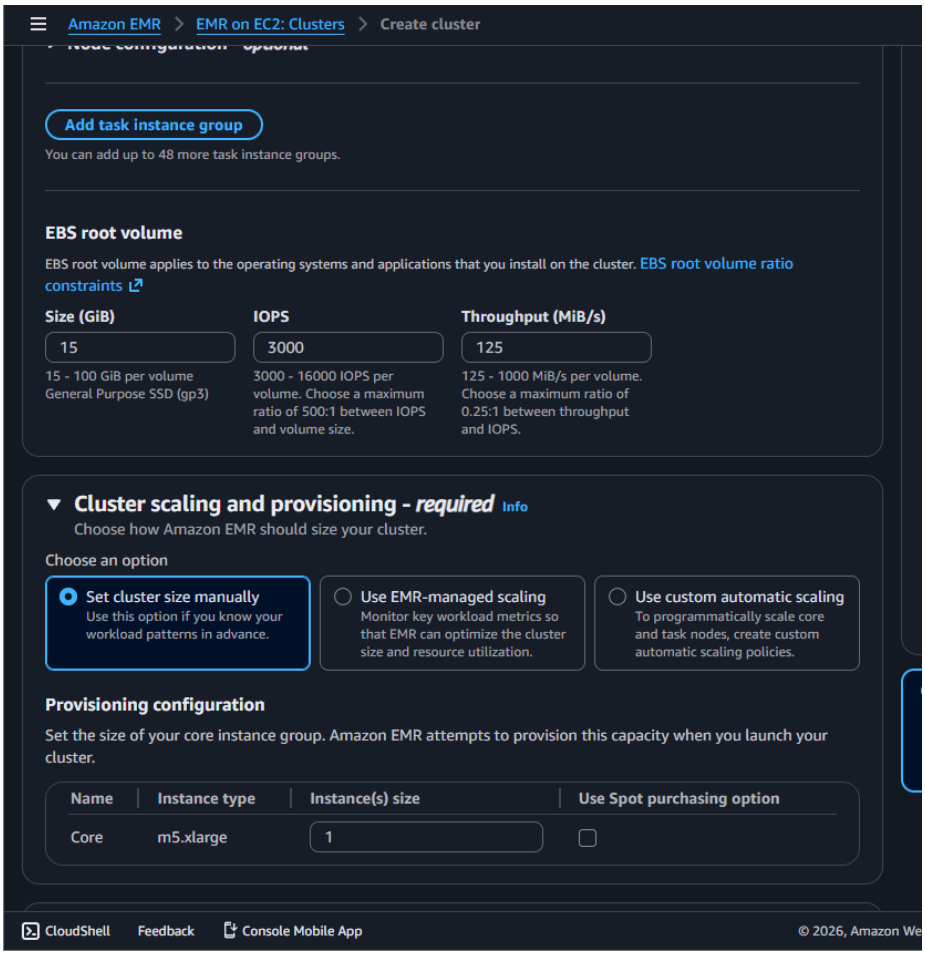
Di Cluster configuration (bagian bawah):
Primary / otak
❌ r8g.xlarge (INI MAHAL)
Ganti jadi
M5.large

Lalu di core juga samakan
Untuk tasknya itu ibarat pekerja tambahan remove aja (pakai kalau kelas production)



Ebs root

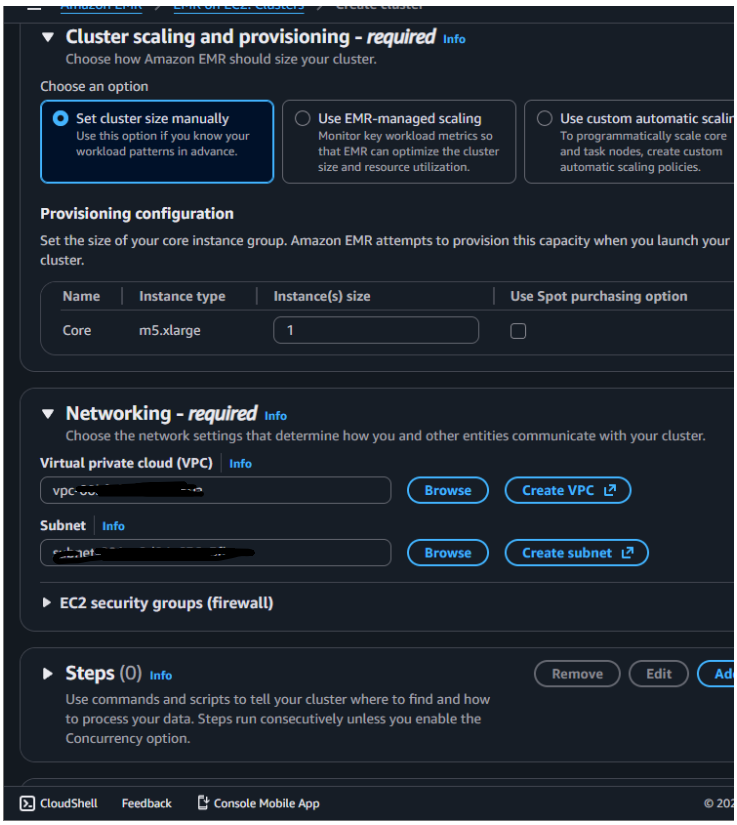
Untuk apa? OS, Hadoop binaries, Log, Temporary file



Setting yang benar

- Size (GiB):
👉 15 GB ✅
- IOPS:
👉 Biarkan default (3000)
- Throughput:
👉 Biarkan default (125)

Cluster Scalling and provisioning



- Kamu mengunci jumlah node
- EMR tidak auto nambah node
- Biaya terkontrol
- Cocok buat belajar

Networking

Vpc sudah terisi

Subnet sudah terisi

SSH / Amazon EC2 key pair for SSH to the cluster

Kunci untuk masuk (SSH) ke master node tanpa ini tidak bisa ssh, tidak bisa praktik hdfs, dfs, hive

Klik create key pair

Beri nama misal emr-belajar-key

Type RSA

Format .pem

Amazon EMR service role

Piilh Create a service role

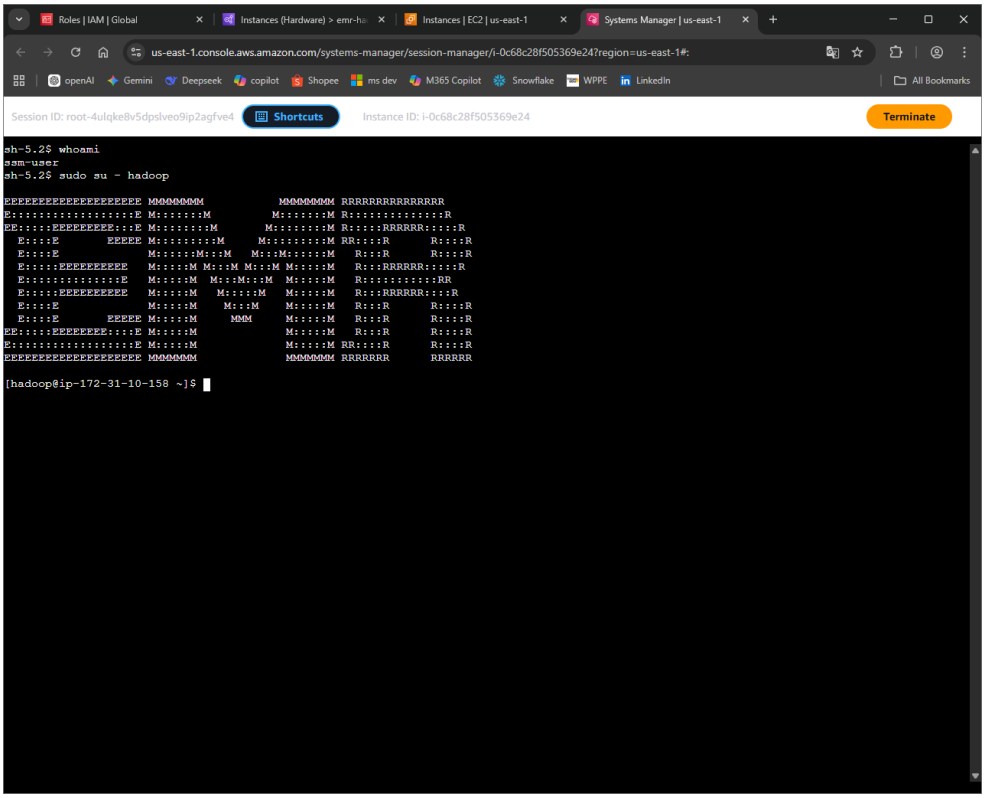
Ec2 instance profile for amazon emr

Itu isi create an instance profile

Kalo sudah klik create, tnuggu sampain status ke waiting

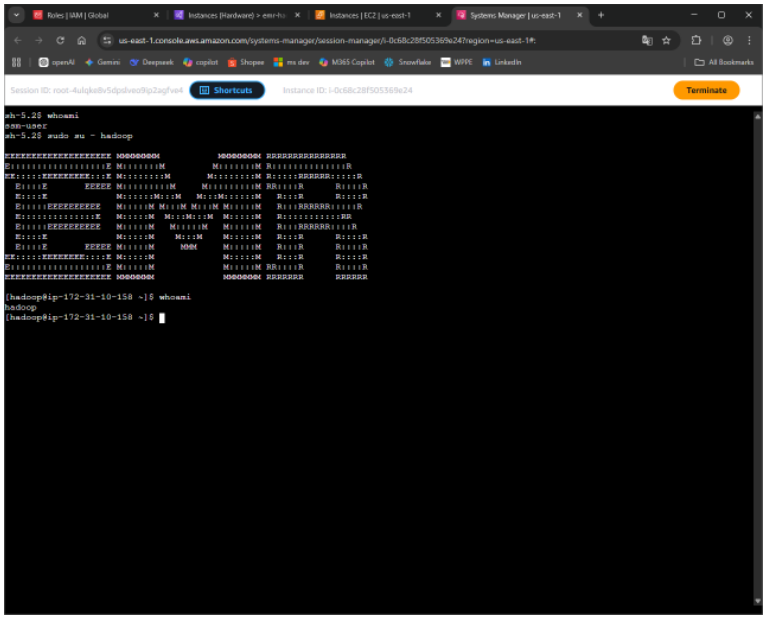
Setelah waiting selesai klik Connect to the Primary node using SSM

Lalu connect



PRAKTEK HDFS

HDFS BASIC



Step 1

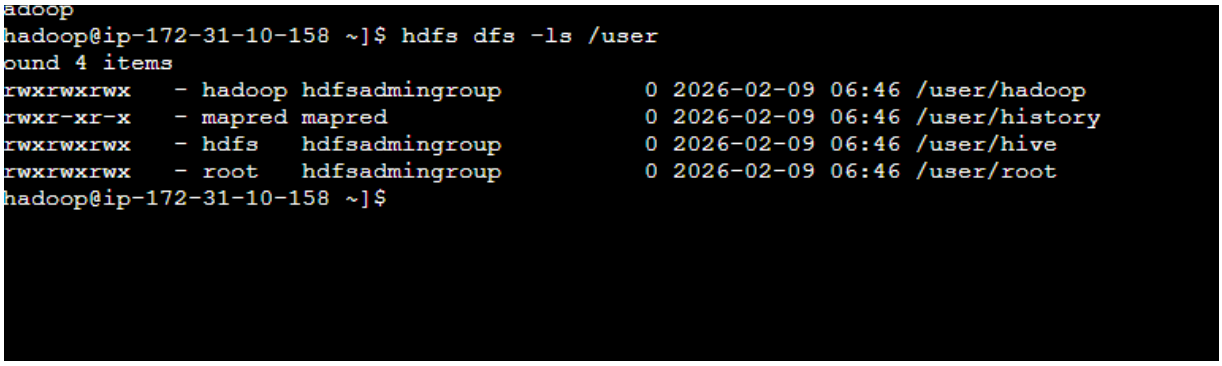
Pastikan login sebagai user hadoop ketik whoami target outputnya hadoop

Kalau mau ganti / masih root pindah aja sudo su – hadoop

Step 2 - Lihat “rumah” lo di HDFS

Di Hadoop, tiap user punya direktori sendiri di HDFS:

hdfs dfs -ls /user



Penjelasan

1. user/hadoop : owner : hadoop, ini direktori kerja utama saya di HDFS, Semua latihan HDFS & Hive nanti aman dilakukan di sini
2. /user/history : Dipakai Hadoop internal, buat job history, dipakai resource manager dan mapreduce
3. /user/hive : Dipakai Hive, Metadata & warehouse, Table Hive sering nyimpen data di bawah sini
4. user/root : Direktori untuk user root di HDFS

Praktik 1 bikin direktori sendiri di HDFS

Buat : hdfs dfs -mkdir /user/hadoop/input

Cek : hdfs dfs -ls /user/hadoop maka akan muncul

Knapa?

Hadoop SELALU kerja pakai folder

Hive & MapReduce hampir gak pernah baca file langsung di root

Pola standar:

/user/hadoop/input → data mentah

/user/hadoop/output → hasil proses

Praktik 2 – bikin file lokasl (linux)

Bikin file sementara

echo -e "1,andi,90\n2,budi,85\n3,citra,95" > nilai.csv

ls -l nilai.csv

cat nilai.csv

lalu enter maka file akan muncul

```
[hadoop@ip-172-31-10-158 ~]$ echo -e "1,andi,90\n2,budi,85\n3,citra,95" > nilai.csv
ls -l nilai.csv
cat nilai.csv
-rw-r--r--. 1 hadoop hadoop 31 Feb  9 07:28 nilai.csv
1,andi,90
2,budi,85
3,citra,95
[hadoop@ip-172-31-10-158 ~]$
```

Praktik 3 – Upload ke HDFS

Pindahkan file itu ke HDFS

hdfs dfs -put nilai.csv /user/hadoop/input/

lalu cek apakah ada di hdfs

hdfs dfs -ls /user/hadoop/input

hdfs dfs -cat /user/hadoop/input/nilai.csv

```
3,citra,95
[hadoop@ip-172-31-10-158 ~]$ hdfs dfs -put nilai.csv /user/hadoop/input/
[hadoop@ip-172-31-10-158 ~]$ hdfs dfs -ls /user/hadoop/input
Found 1 items
-rw-r--r--   1 hadoop hdfsadmingroup         31 2026-02-09 07:30 /user/hadoop/input/nilai.csv
[hadoop@ip-172-31-10-158 ~]$ hdfs dfs -cat /user/hadoop/input/nilai.csv
1,andi,90
2,budi,85
3,citra,95
[hadoop@ip-172-31-10-158 ~]$
```

Penjelasan singkat:

- rw-r--r-- → permission (kayak Linux)

- 1 → replication factor
- 31 → ukuran file (byte)

👉 Karena cluster lo cuma **1 DataNode**, replikasinya = **1**
Di cluster besar, biasanya = **3**

Praktik 4 - Hapus File Lokal

rm nilai.csv

ls nilai.csv

yang terjadi itu hapus file lokal (linux) bukan hdfs

Praktik 5 Cara Hapus file HDFS

hdfs dfs -rm /user/hadoop/input/nilai.csv

kalau sukses otuptunya

Deleted /user/hadoop/input/nilai.csv

Praktik 6 Melihat Metadata

hdfs dfs -stat "%n | size=%b | repl=%r | block=%o" /user/hadoop/input/nilai.csv

output

nilai.csv | size=31 | repl=1 | block=134217728

Artinya:

- size → ukuran file asli (31 byte)
- repl → replication factor (1)
- block → block size HDFS (128 MB)

👉 Walaupun file cuma 31 byte, HDFS tetap alokasikan 1 block.

Lihat block ID & lokasi DataNode

hdfs fsck /user/hadoop/input/nilai.csv -files -blocks -locations

```
/user/hadoop/input/nilai.csv 31 bytes, replicated: replication=1, 1 block(s):  OK
0. BP-1260015907-172.31.10.158-1770619602913:blk_1073741826_1002 len=31 Live_repl=1
bd4-43a2-93e2-5deed20e222d,DISK]]


Status: HEALTHY
 Number of data-nodes:  1
 Number of racks:               1
 Total dirs:                    0
 Total symlinks:                0

Replicated Blocks:
 Total size:    31 B
 Total files:   1
 Total blocks (validated):      1 (avg. block size 31 B)
 Minimally replicated blocks:   1 (100.0 %)
 Over-replicated blocks:        0 (0.0 %)
 Under-replicated blocks:       0 (0.0 %)
 Mis-replicated blocks:         0 (0.0 %)
 Default replication factor:    1
 Average block replication:     1.0
 Missing blocks:                0
 Corrupt blocks:                0
 Missing replicas:              0 (0.0 %)
 Blocks queued for replication: 0

Erasure Coded Block Groups:
 Total size:    0 B
 Total files:   0
 Total block groups (validated):        0
 Minimally erasure-coded block groups:  0
 Over-erasure-coded block groups:       0
 Under-erasure-coded block groups:      0
 Unsatisfactory placement block groups: 0
 Average block group size:      0.0
 Missing block groups:          0
 Corrupt block groups:          0
 Missing internal blocks:       0
 Blocks queued for replication: 0
FSCK ended at Mon Feb 09 07:43:36 UTC 2026 in 13 milliseconds
```

Artinya:

- File = 31 byte
- Replikasi = 1
- Jumlah block = 1
- Status = SEHAT

👉 Walaupun kecil, HDFS tetap treat ini sebagai 1 block.

Block

blk_1073741826_1002 len=31

blk itu block ID

len 31 itu isi blok = 31byte

Datanode

DatanodeInfoWithStorage[172.31.9.11:9866, ... , DISK]

Block ini disimpan di Core node

IP: 172.31.9.11

Storage type: DISK

Itu mesin EC2 lain, bukan primary node

HIVE BASIC

Hive adalah SQL diatas HDFS

Data sudah ada tadi diatas disini

/user/hadoop/input/nilai.csv

Rencananya mau kueri pakai sql

Beeline No conection

Kalau no conection berarti dia belum nyambung ke hive service, ibarat buka mysql client tapi blm connect ke database

Cara memperbaiki

!connect jdbc:hive2://localhost:10000/default

Kalau diminta username masukan aja hadoop lalu pasword langsung enter aja

Step 1 masuk ke hive (beeline)

Diterminal yang sama jalankan beeline

Buat database

CREATE DATABASE IF NOT EXISTS belajar;

Lalu use database belajar

Lalu show databases buat cek apakah udah dibuat atau blm

Step 2 buat tabel

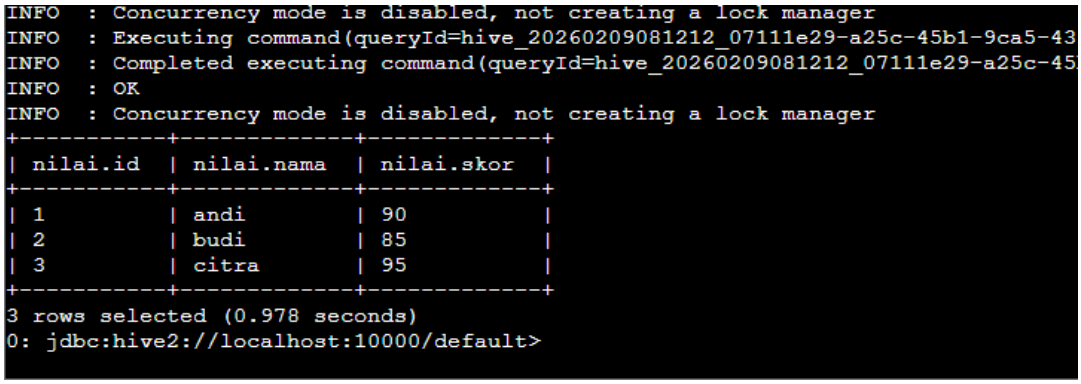
```
CREATE TABLE nilai (
  id INT,
  nama STRING,
  skor INT
)
ROW FORMAT DELIMITED
FIELDS TERMINATED BY ','
STORED AS TEXTFILE;
```

Lalu load datanya

```
LOAD DATA INPATH '/user/hadoop/input/nilai.csv'
INTO TABLE nilai;
```

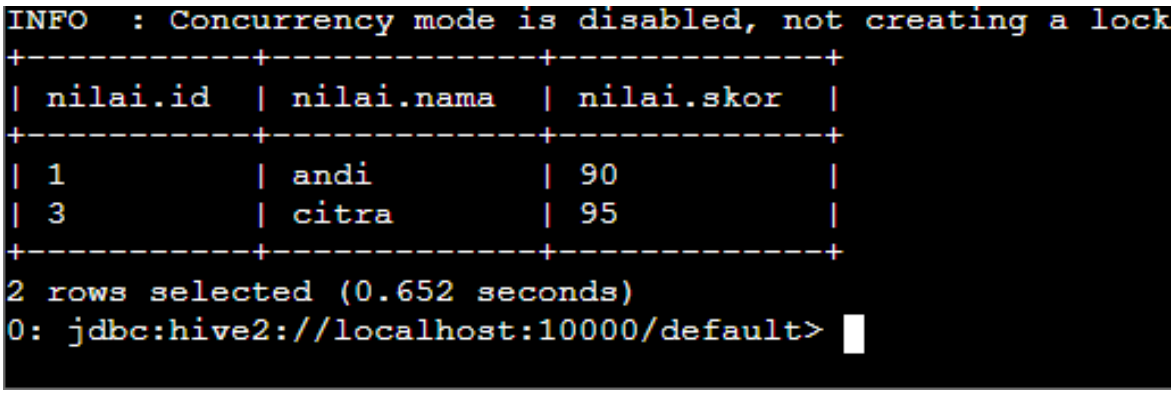
Query

```
SELECT * FROM nilai;
```



```
INFO  : Concurrency mode is disabled, not creating a lock manager
INFO  : Executing command(queryId=hive_20260209081212_07111e29-a25c-45b1-9ca5-43
INFO  : Completed executing command(queryId=hive_20260209081212_07111e29-a25c-45
INFO  : OK
INFO  : Concurrency mode is disabled, not creating a lock manager
+-----------+-------------+-------------+
| nilai.id  | nilai.nama  | nilai.skor  |
+-----------+-------------+-------------+
| 1         | andi        | 90          |
| 2         | budi        | 85          |
| 3         | citra       | 95          |
+-----------+-------------+-------------+
3 rows selected (0.978 seconds)
0: jdbc:hive2://localhost:10000/default>
```

```
SELECT *
FROM nilai
WHERE skor >= 90;
```


INFO : Concurrency mode is disabled, not creating a lock
nilai.id	nilai.nama	nilai.skor
1	andi	90
3	citra	95
2 rows selected (0.652 seconds)
0: jdbc:hive2://localhost:10000/default>