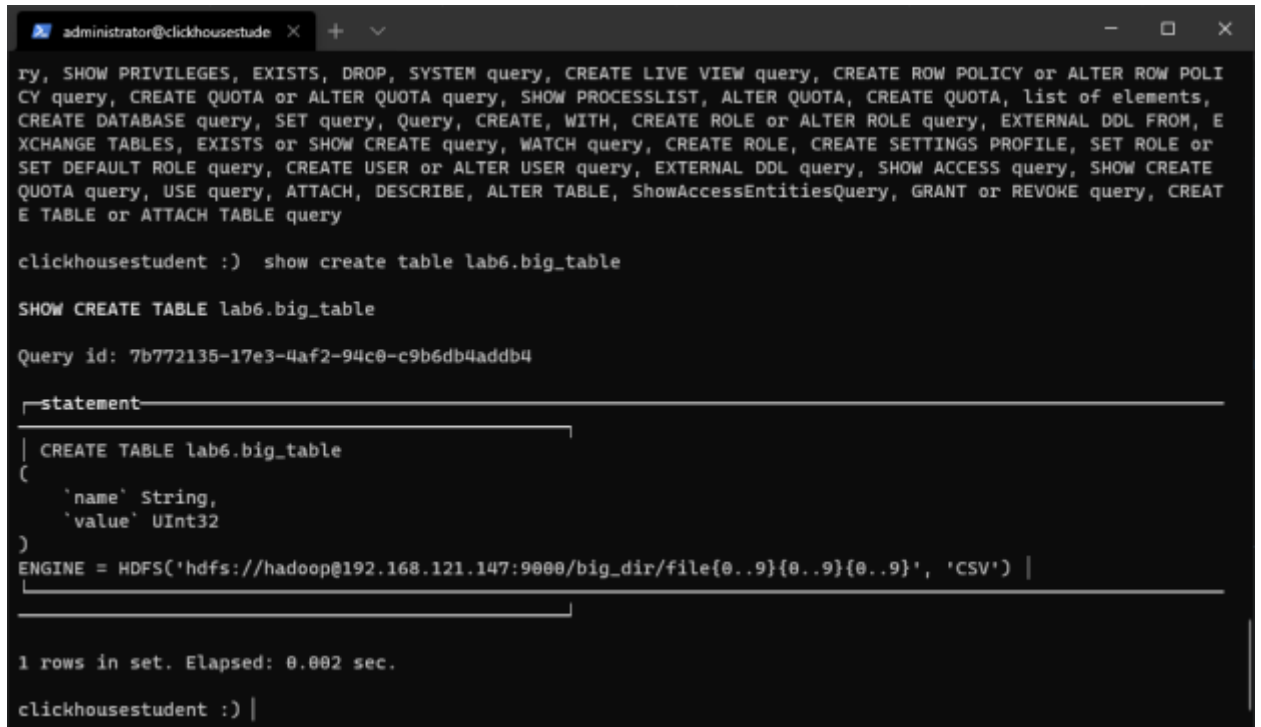


Подключимся к тестовой виртуальной машине по ssh:

```
ssh administrator@kgsu.demo.octonica.com -p 9999
```

Запустим clickhouse-client и выполним команду:

```
show create table lab6.big_table
```



```
administrator@clickhousestude x + v
ry, SHOW PRIVILEGES, EXISTS, DROP, SYSTEM query, CREATE LIVE VIEW query, CREATE ROW POLICY or ALTER ROW POLI
CY query, CREATE QUOTA or ALTER QUOTA query, SHOW PROCESSLIST, ALTER QUOTA, CREATE QUOTA, list of elements,
CREATE DATABASE query, SET query, Query, CREATE, WITH, CREATE ROLE or ALTER ROLE query, EXTERNAL DDL FROM, E
XCHANGE TABLES, EXISTS or SHOW CREATE query, WATCH query, CREATE ROLE, CREATE SETTINGS PROFILE, SET ROLE or
SET DEFAULT ROLE query, CREATE USER or ALTER USER query, EXTERNAL DDL query, SHOW ACCESS query, SHOW CREATE
QUOTA query, USE query, ATTACH, DESCRIBE, ALTER TABLE, ShowAccessEntitiesQuery, GRANT or REVOKE query, CREAT
E TABLE or ATTACH TABLE query

clickhousestudent :) show create table lab6.big_table

SHOW CREATE TABLE lab6.big_table

Query id: 7b772135-17e3-4af2-94c0-c9b6db4addb4

┌statement┐
├────────┤
| CREATE TABLE lab6.big_table
| (
|   'name' String,
|   'value' UInt32
| )
| ENGINE = HDFS('hdfs://hadoop@192.168.121.147:9000/big_dir/file{0..9}{0..9}{0..9}', 'CSV') |
└────────┘

1 rows in set. Elapsed: 0.002 sec.

clickhousestudent :) |
```

Движок HDFS:

ENGINE =

HDFS('hdfs://hadoop@192.168.121.147:9000/big_dir/file{0..9}{0..9}{0..9}',
'CSV')

Данные хранятся в папке big_dir;

В папке лежат данные формата CSV;

{0..9} означает счетчик файлов, состоящий из 3 цифр, максимальное число
файлов – 999, все они идут последовательно.

Выполним команду:

```
select * from lab6.big_table order by value
```

```
administrator@clickhousestude x + v

1 rows in set. Elapsed: 0.002 sec.

clickhousestudent :) select * from lab6.big_table order by value

SELECT *
FROM lab6.big_table
ORDER BY value ASC

Query id: e8c7ebe3-dd9b-4b03-8c65-da2257e61120

name value
----
one    1
two    2
three  3
five   5
seven  7

name value
----
ten    10
eleven 11

8 rows in set. Elapsed: 0.036 sec.

clickhousestudent :) |
```

Просмотрим папку big_dir:

`hdfs dfs -ls hdfs://hadoop@192.168.121.147:9000/big_dir/`

```
administrator@clickhousestude x + v

seven 7

name value
----
ten    10
eleven 11

8 rows in set. Elapsed: 0.036 sec.

clickhousestudent :) exit
Bye.
administrator@clickhousestude:~$ hdfs dfs -ls hdfs://hadoop@192.168.121.147:9000/big_dir/
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.apache.hadoop.security.authentication.util.KerberosUtil (file:/home/administrator/
hadoop-2.8.5/share/hadoop/common/lib/hadoop-auth-2.8.5.jar) to method sun.security.krb5.Config.getInstance()
WARNING: Please consider reporting this to the maintainers of org.apache.hadoop.security.authentication.util.KerberosUtil
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
Found 3 items
-rw-r--r-- 1 hadoop supergroup 26 2020-12-22 20:44 hdfs://hadoop@192.168.121.147:9000/big_dir/file001
-rw-r--r-- 1 hadoop supergroup 24 2020-12-22 20:46 hdfs://hadoop@192.168.121.147:9000/big_dir/file002
-rw-r--r-- 3 hadoop supergroup 21 2020-12-23 09:58 hdfs://hadoop@192.168.121.147:9000/big_dir/file003
administrator@clickhousestude:~$ |
```

В папке находится 3 файла, посмотрим их через `-cat`:

```
administrator@clickhousestude X + v
"ten",10
"eleven",11
administrator@clickhousestude:~$ hdfs dfs -cat hdfs://hadoop@192.168.121.147:9000/big_dir/file001
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.apache.hadoop.security.authentication.util.KerberosUtil (file:/home/administrator/
hadoop-2.8.5/share/hadoop/common/lib/hadoop-auth-2.8.5.jar) to method sun.security.krb5.Config.getInstance()
WARNING: Please consider reporting this to the maintainers of org.apache.hadoop.security.authentication.util.KerberosUtil
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
"one",1
"two",2
"three",3
administrator@clickhousestude:~$ hdfs dfs -cat hdfs://hadoop@192.168.121.147:9000/big_dir/file002
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.apache.hadoop.security.authentication.util.KerberosUtil (file:/home/administrator/
hadoop-2.8.5/share/hadoop/common/lib/hadoop-auth-2.8.5.jar) to method sun.security.krb5.Config.getInstance()
WARNING: Please consider reporting this to the maintainers of org.apache.hadoop.security.authentication.util.KerberosUtil
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
"five",5
"",0
"seven",7
administrator@clickhousestude:~$ hdfs dfs -cat hdfs://hadoop@192.168.121.147:9000/big_dir/file003
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.apache.hadoop.security.authentication.util.KerberosUtil (file:/home/administrator/
hadoop-2.8.5/share/hadoop/common/lib/hadoop-auth-2.8.5.jar) to method sun.security.krb5.Config.getInstance()
WARNING: Please consider reporting this to the maintainers of org.apache.hadoop.security.authentication.util.KerberosUtil
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
"ten",10
"eleven",11
administrator@clickhousestude:~$ |
```

Данные совпадают с командой `select * from lab6.big_table order by value` , только без сортировки во втором файле.

Создадим текстовый файл в формате CSV, содержащий следующие значения файла 3 и сохраним его под именем file004:

```
GNU nano 2.9.3 file004
"twelve",12
"thirteen",13

[ Wrote 2 lines ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos ^U Undo
^X Exit ^R Read File ^_ Replace ^U Uncut Text ^T To Spell ^_ Go To Line ^E Redo
```

С помощью переменной окружения зададим имя пользователя из которого будем обращаться к Hadoop:

`export HADOOP_USER_NAME=hadoop`

С помощью `-put` запишем файл в папку `big_dir`:

hdfs dfs -put file004 hdfs://hadoop@192.168.121.147:9000/big_dir

```
administrator@clickhousestude x + v
WARNING: Illegal reflective access by org.apache.hadoop.security.authentication.util.KerberosUtil (file:/home/administrator/hadoop-2.8.5/share/hadoop/common/lib/hadoop-auth-2.8.5.jar) to method sun.security.krb5.Config.getInstance()
WARNING: Please consider reporting this to the maintainers of org.apache.hadoop.security.authentication.util.KerberosUtil
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
administrator@clickhousestudent:~/50916kek$ hdfs dfs -ls hdfs://hadoop@192.168.121.147:9000/big_dir/
WARNING: An illegal reflective access operation has occurred
WARNING: Illegal reflective access by org.apache.hadoop.security.authentication.util.KerberosUtil (file:/home/administrator/hadoop-2.8.5/share/hadoop/common/lib/hadoop-auth-2.8.5.jar) to method sun.security.krb5.Config.getInstance()
WARNING: Please consider reporting this to the maintainers of org.apache.hadoop.security.authentication.util.KerberosUtil
WARNING: Use --illegal-access=warn to enable warnings of further illegal reflective access operations
WARNING: All illegal access operations will be denied in a future release
Found 4 items
-rw-r--r-- 1 hadoop supergroup 26 2020-12-22 20:44 hdfs://hadoop@192.168.121.147:9000/big_dir/file001
-rw-r--r-- 1 hadoop supergroup 24 2020-12-22 20:46 hdfs://hadoop@192.168.121.147:9000/big_dir/file002
-rw-r--r-- 3 hadoop supergroup 21 2020-12-23 09:58 hdfs://hadoop@192.168.121.147:9000/big_dir/file003
-rw-r--r-- 3 hadoop supergroup 26 2020-12-25 19:00 hdfs://hadoop@192.168.121.147:9000/big_dir/file004
administrator@clickhousestudent:~/50916kek$ |
```

Выполним повторный запрос `select * from lab6.big_table order by value`

```
administrator@clickhousestude x + v
SELECT *
FROM lab6.big_table
ORDER BY value ASC
Query id: a60c6c39-43c5-40fa-b0ed-287dfcb8587e

name  value
----  -
one   1
two   2
three 3
five  5
seven  7

name  value
----  -
ten   10
eleven 11

name  value
----  -
twelve 12
thirteen 13

10 rows in set. Elapsed: 0.044 sec.
clickhousestudent :) |
```

Как видно на рисунке, новые значения были добавлены в таблицу.