

Sqoop

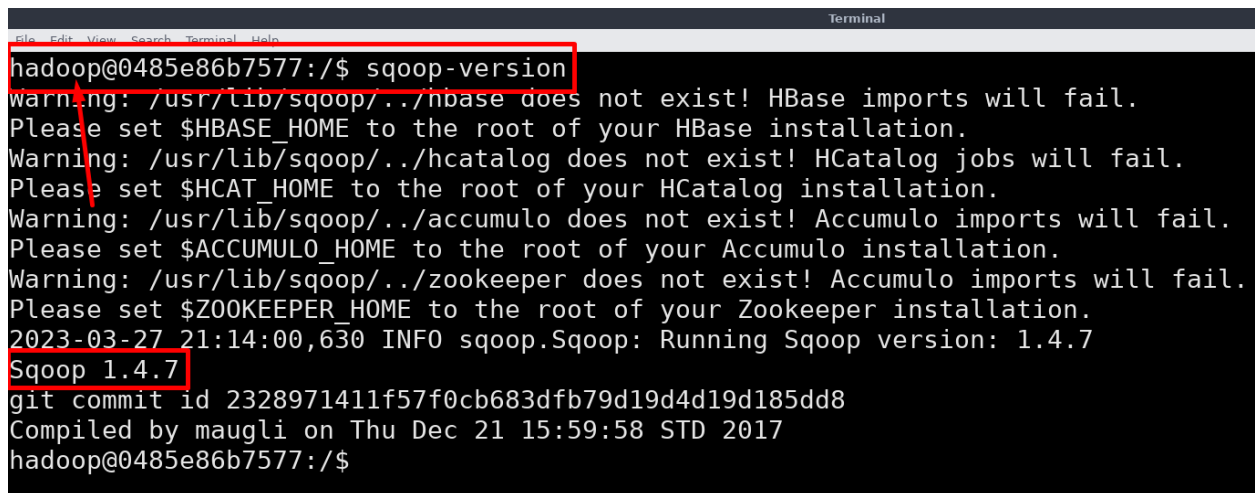
NOTA: por favor antes de continuar revisar la dirección IP y el puerto de Postgres, lo pueden hacer con el siguiente comando:

Docker inspect edvai_postgres

Para comenzar a utilizar sqoop debemos ingresar a la consola de Hadoop

Docker exec -it edvai_postgres bash

Verificar que estemos logueados con el usr hadoop y ya podemos comenzar a probar los siguientes comandos:

A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Help). The prompt is 'hadoop@0485e86b7577:/\$'. The command 'sqoop-version' is entered and highlighted with a red box. The output shows several warnings about missing HBase, HCatalog, Accumulo, and Zookeeper installation paths, followed by the version information: '2023-03-27 21:14:00,630 INFO sqoop.Sqoop: Running Sqoop version: 1.4.7'. The version '1.4.7' is also highlighted with a red box. The output continues with 'git commit id 2328971411f57f0cb683dfb79d19d4d19d185dd8', 'Compiled by maugli on Thu Dec 21 15:59:58 STD 2017', and the prompt 'hadoop@0485e86b7577:/\$'.

Verificar funcionamiento y versión:

- **Sqoop-version**

Listar databases:

**sqoop list-databases **

```
-connect jdbc:postgresql://172.17.0.3:5432/northwind \  
-username postgres -P
```

Listar tablas:

```
sqoop list-tables \  
-connect jdbc:postgresql://172.17.0.3:5432/northwind \  
-username postgres -P
```

Ejecutar Queries:

```
sqoop eval \  
-connect jdbc:postgresql://172.17.0.3:5432/northwind \  
-username postgres \  
-P \  
-query "select * from region limit 10"
```

Importar tablas:

```
sqoop import \  
-connect jdbc:postgresql://172.17.0.3:5432/northwind \  
-username postgres \  
-table region \  
-m 1 \  
-P \  
-target-dir /sqoop/ingest \  
-as-parquetfile \  
-delete-target-dir
```

Importar tablas con filtro:

```
sqoop import \
  --connect jdbc:postgresql://172.17.0.3:5432/northwind \
  --username postgres \
  --table region \
  --m 1 \
  --P \
  --target-dir /sqoop/ingest/southern \
  --as-parquetfile \
  --where "region_description = 'Southern'" \
  --delete-target-dir
```

Importar tablas desde una query:

```
sqoop import \
  --connect jdbc:postgresql://172.17.0.3:5432/northwind \
  --username postgres \
  --query "select * from region where region_id = 3 AND \$CONDITIONS" \
  --m 1 \
  --P \
  --target-dir /sqoop/ingest \
  --as-parquetfile \
  --delete-target-dir
```

Una vez que hayamos hecho el import nos quedará un archivo parquet en la siguiente ruta: **/sqoop/ingest**

Por lo que luego ya podemos ingresar a spark para comenzar a crear un dataframe en base a esa data.

Creamos un dataframe leyendo el parquet que acabamos de importar con sqoop

```
df = spark.read.parquet("/sqoop/ingest/*.parquet")
```

Luego podemos revisar el esquema

```
df.printSchema()
```

Podemos revisar si se encuentra datos dentro del dataframe:

```
>>> df.show(5)
```

```
+-----+-----+-----+-----+-----+
lorder_id|customer_id|ship_country|unit_price|quantity|
```

10248	VINET	France	14.0	12
10248	VINET	France	9.8	10
10248	VINET	France	34.8	5
10249	TOMSP	Germany	18.6	9
10249	TOMSP	Germany	42.4	40

only showing top 5 rows

APACHE nifi

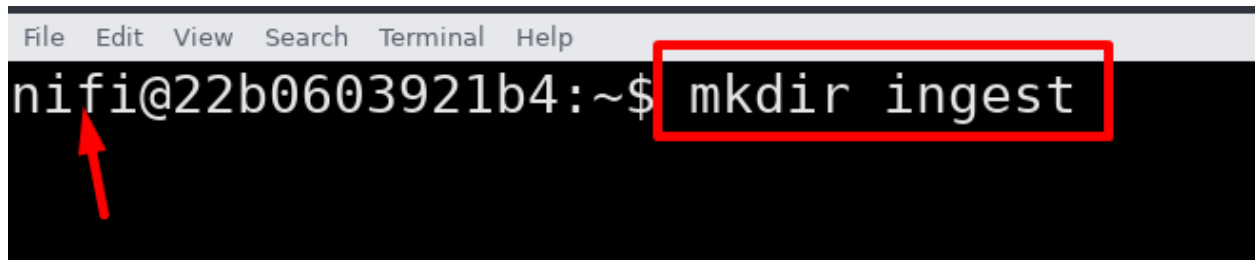
Para comenzar debemos ingresar a la consola nifi o ejecutar desde la ventana de terminal de la vm el siguiente comando:

Docker exec -it nifi bash

Una vez que ingresamos ir a la carpeta /home/nifi

Y creamos 3 carpetas:

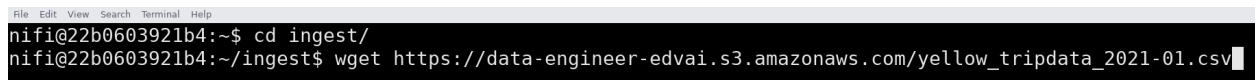
- Ingest
- Bucket
- hadoop



```
nifi@22b0603921b4:~$ mkdir ingest
```

Ingresamos a la carpeta ingest y bajamos el siguiente archivo con el siguiente comando:

`wget https://data-engineer-edvai.s3.amazonaws.com/yellow_tripdata_2021-01.csv`



```
nifi@22b0603921b4:~$ cd ingest/
nifi@22b0603921b4:~/ingest$ wget https://data-engineer-edvai.s3.amazonaws.com/yellow_tripdata_2021-01.csv
```

Luego vamos a la carpeta hadoop y creamos los siguientes archivos:

- core-site.xml
- hdfs-site.xml

De la siguiente manera:

Cat > core-site.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>
<!--
```

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-->

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

```
<configuration>
  <property>
    <name>fs.defaultFS</name>
    <value>hdfs://172.17.0.2:9000</value>
  </property>
</configuration>
```

Y luego Ctrl + D para finalizar la creación del archivo

Cat > hdfs-site.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>
<!--
```

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-->

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

```
<configuration>
```

```
<property>
  <name>dfs.replication</name>
  <value>1</value>
</property>

<property>
  <name>dfs.name.dir</name>
  <value>file:///home/hadoop/hadoopdata/hdfs/namenode</value>
</property>

<property>
  <name>dfs.data.dir</name>
  <value>file:///home/hadoop/hadoopdata/hdfs/datanode</value>
</property>
</configuration>
```

Y luego Ctrl + D para finalizar la creación del archivo

Luego ingresamos a la UI de nifi desde el ícono nifi o ingresamos a firefox e ingresamos la siguiente dirección:

<https://localhost:8443/nifi/>

El usr y la pass son las siguientes:

Generated Username [d30eb1a2-3bfe-4c85-9ea4-9562915a70e6]

Generated Password [NvxFSKesWliU1K4XL1AQJwovv9z7TW4h]

En caso de no funcionar ir a la terminal de la vm y ejecutar el siguiente comando

Linux/Mac

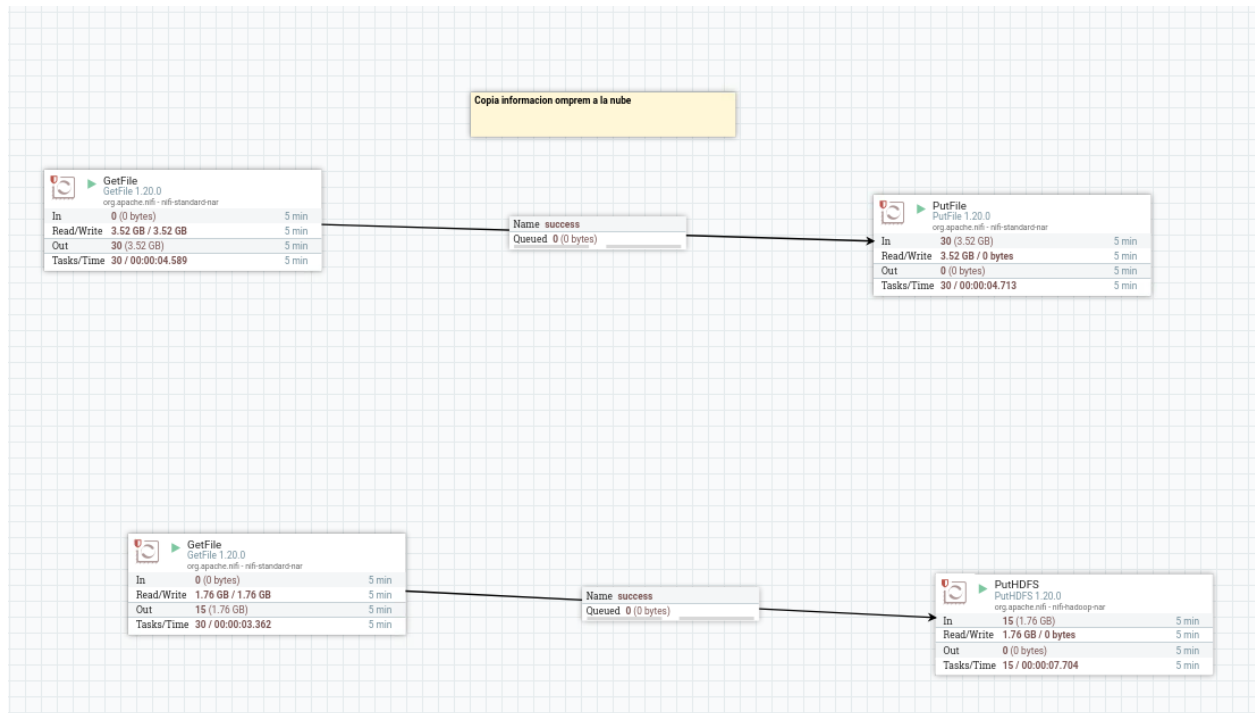
docker logs nifi | grep Generated

windows

docker logs nifi | findstr Generated

Una vez que ingresamos vamos a generar 4 procesadores:

- 2 GetFile
- 1 Putfile
- 1 PutHDFS



El primer proceso va a tomar datos desde /ingest y lo va a copiar a /bucket de la siguiente manera:

GETFILE

input directory: /home/nifi/ingest

File filter: yellow_tripdata_2021-01.csv (o dejar por default que no pone ningún filtro)

Scheduling: 10 seg

Processor Details

▶ Running

⚙ STOP & CONFIGURE

SETTINGS

SCHEDULING

PROPERTIES

RELATIONSHIPS

COMMENTS

Required field

Property		Value	
Input Directory	?	/home/nifi/ingest	
File Filter	?	yellow_tripdata_2021-01.csv	
Path Filter	?	No value set	
Batch Size	?	10	
Keep Source File	?	true	
Recurse Subdirectories	?	true	
Polling Interval	?	0 sec	
Ignore Hidden Files	?	true	
Minimum File Age	?	0 sec	
Maximum File Age	?	No value set	
Minimum File Size	?	0 B	
Maximum File Size	?	No value set	

OK

PutFile

Directory: home/nifi/bucket

Relationships:

- Failure: retry and terminate
- Success: terminate

Processor Details

▶ Running

⚙ STOP & CONFIGURE

SETTINGS

SCHEDULING

PROPERTIES

RELATIONSHIPS

COMMENTS

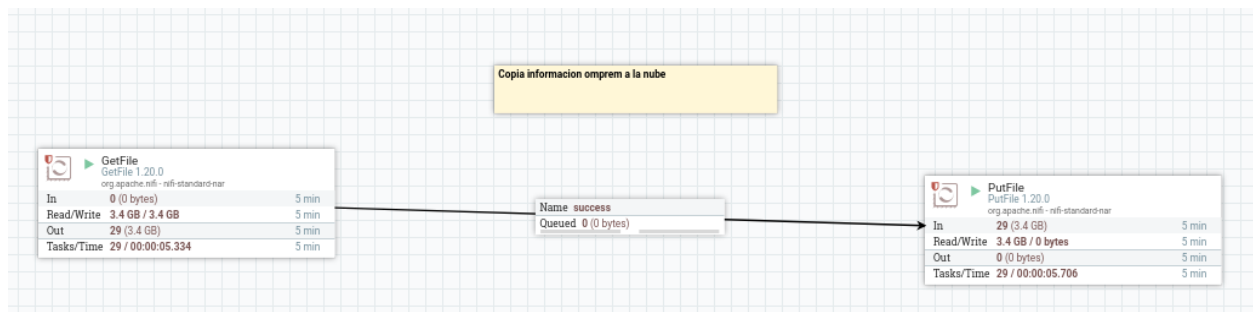
Required field

Property	Value
Directory	🔍 /home/nifi/bucket
Conflict Resolution Strategy	🔍 replace
Create Missing Directories	🔍 true
Maximum File Count	🔍 No value set
Last Modified Time	🔍 No value set
Permissions	🔍 No value set
Owner	🔍 No value set
Group	🔍 No value set

OK

Lo linkeamos con el put file a través de la flecha

Luego ya lo podemos hacer correr, para verificar que funcionó OK debemos revisar la carpeta /home/nifi/bucket y ver si se encuentra el archivo yellow_tripdata_2021-01.csv



Ahora nos queda copiar el archivo /home/nifi/bucket/yellow_tripdata_2021-01.csv a la carpeta /nifi de HDFS

Getfile

Input directory: /home/nifi/bucket

File filter: dejarlo por default para que no filtre ningún archivo

Scheduling: 10 seg

Processor Details

Running

STOP & CONFIGURE

SETTINGS

SCHEDULING

PROPERTIES

RELATIONSHIPS

COMMENTS

Required field

Property	Value
Input Directory	<div>?</div> /home/nifi/bucket
File Filter	<div>?</div> [\.\]*
Path Filter	<div>?</div> No value set
Batch Size	<div>?</div> 10
Keep Source File	<div>?</div> false
Recurse Subdirectories	<div>?</div> true
Polling Interval	<div>?</div> 0 sec
Ignore Hidden Files	<div>?</div> true
Minimum File Age	<div>?</div> 0 sec
Maximum File Age	<div>?</div> No value set
Minimum File Size	<div>?</div> 0 B
Maximum File Size	<div>?</div> No value set

OK

PutHDFS

Luego creamos el procesador PutHDFS de la siguiente manera:

Hadoop configuration resources (archivos de configuración de hadoop):

/home/nifi/hadoop/core-site.xml, /home/nifi/hadoop/hdfs-site.xml

Directory: /nifi

Conflict resolution strategy: replace

Relationships:

- Failure: retry and terminate
- Success: terminate

Processor Details

Running

STOP & CONFIGURE

SETTINGS

SCHEDULING

PROPERTIES

RELATIONSHIPS

COMMENTS

Required field

Property	Value
Hadoop Configuration Resources	/home/nifi/hadoop/core-site.xml, /home/nifi/hadoop/hdf...
Kerberos Credentials Service	No value set
Kerberos User Service	No value set
Kerberos Principal	No value set
Kerberos Keytab	No value set
Kerberos Password	No value set
Kerberos Relogin Period	4 hours
Additional Classpath Resources	No value set
Directory	/nifi
Conflict Resolution Strategy	replace
Writing Strategy	Write and rename
Block Size	No value set

OK

Luego tenemos que revisar que nifi pueda escribir en el directorio /nifi
Para esto ingresamos en la consola hadoop

Y escribimos en la consola `hdfs dfs -ls /`

Ahí revisamos que otros usuarios no pueden escribir en esa carpeta, por lo que vamos a modificar los permisos

```
hadoop@0485e86b7577:/$ hdfs dfs -ls /
Found 7 items
drwxr-xr-x  - hadoop supergroup    0 2023-03-21 09:02 /ingest
drwxr-xr-x  - hadoop supergroup    0 2022-04-26 19:51 /inputs
drwxr-xr-x  - hadoop supergroup    0 2022-01-22 21:35 /logs
drwxr-xr-x  - hadoop supergroup    0 2023-03-27 20:47 /nifi
drwxr-xr-x  - hadoop supergroup    0 2023-03-27 19:47 /sqoop
drwxrwxr-x  - hadoop supergroup    0 2022-05-02 20:46 /tmp
drwxr-xr-x  - hadoop supergroup    0 2022-01-23 13:15 /user
```

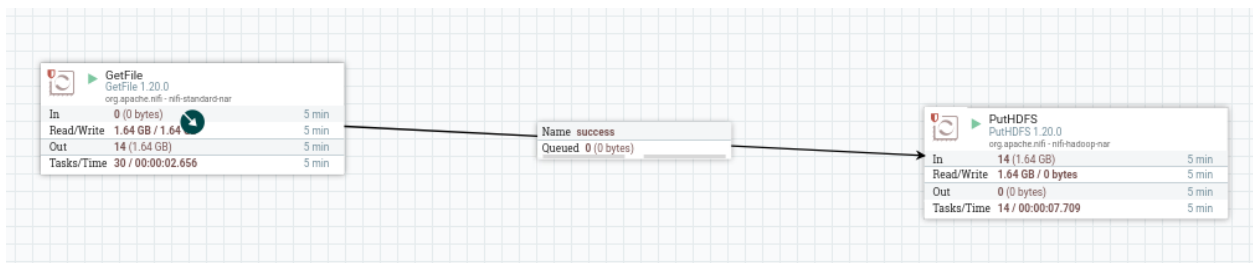
Modificamos los permisos con el siguiente comando:

```
Hdfs dfs -chmod 777 /nifi
```

Luego verificamos que afectivamente el directorio /nifi tengan permisos para escribir otros usuarios

```
hadoop@0485e86b7577:/$ hdfs dfs -chmod 777 /nifi
hadoop@0485e86b7577:/$ hdfs dfs -ls /
Found 7 items
drwxr-xr-x  - hadoop supergroup      0 2023-03-21 09:02 /ingest
drwxr-xr-x  - hadoop supergroup      0 2022-04-26 19:51 /inputs
drwxr-xr-x  - hadoop supergroup      0 2022-01-22 21:35 /loads
drwxrwxrwx  - hadoop supergroup      0 2023-03-27 20:47 /nifi
drwxr-xr-x  - hadoop supergroup      0 2023-03-27 19:47 /sqoop
drwxrwxr-x  - hadoop supergroup      0 2022-05-02 20:46 /tmp
drwxr-xr-x  - hadoop supergroup      0 2022-01-23 13:15 /user
```

Ahora si podemos darle start a la segunda parte del proces que me va a permitir copiar el archivo yellow_tripdata_2021-01.csv desde la carpeta /nifi/bucket al directorio /nifi



Para verificar que efectivamente copio el archivo lo podemos hacer desde la UI hadoop

Browse Directory

The screenshot shows the Hadoop Browse Directory interface. At the top, the path '/nifi' is entered in the address bar and highlighted with a red box. Below the address bar, there are icons for file operations and a search bar. A table lists the contents of the directory, with columns for Permission, Owner, Group, Size, Last Modified, Replication, Block Size, and Name. The file 'yellow_tripdata_2021-01.csv' is listed and its name is highlighted with a red box. The interface also shows 'Showing 1 to 1 of 1 entries' and navigation buttons for Previous, 1, and Next.

Permission	Owner	Group	Size	Last Modified	Replication	Block Size	Name
-rw-r--r--	nifi	supergroup	120.15 MB	Mar 27 20:56	1	128 MB	yellow_tripdata_2021-01.csv

O desde la consola hadoop con el siguiente comando:

```
hadoop@0485e86b7577:/$ hdfs dfs -ls /nifi
Found 1 items
-rw-r--r-- 1 nifi supergroup 125981363 2023-03-27 21:50 /nifi/yellow_tripdata_2021-01.csv
hadoop@0485e86b7577:/$
```

Por lo que luego ya podemos ingresar a spark para comenzar a crear un dataframe en base a esa data.

Creamos un dataframe leyendo el parquet que acabamos de importar con sqoop
df = spark.read.option("header", "true").csv("/nifi/*.csv")

Luego podemos revisar el esquema

```
>>> df.printSchema()
```

root

```
|- VendorID: string (nullable = true)
|- tpep_pickup_datetime: string (nullable = true)
|- tpep_dropoff_datetime: string (nullable = true)
|- passenger_count: string (nullable = true)
|- trip_distance: string (nullable = true)
|- RatecodeID: string (nullable = true)
|- store_and_fwd_flag: string (nullable = true)
|- PULocationID: string (nullable = true)
|- DOLocationID: string (nullable = true)
|- payment_type: string (nullable = true)
|- fare_amount: string (nullable = true)
```

```

|- extra: string (nullable = true)
|- mta_tax: string (nullable = true)
|- tip_amount: string (nullable = true)
|- tolls_amount: string (nullable = true)
|- improvement_surcharge: string (nullable = true)
|- total_amount: string (nullable = true)
|- congestion_surcharge: string (nullable = true)

```

Podemos revisar si se encuentra datos dentro del dataframe:

```
>> df.show(3)
```

```

+-----+-----+-----+-----+-----+-----+-----+-----+
---+-----+-----+-----+-----+-----+-----+-----+-----+
-----+
|VendorID|tpep_pickup_datetime|tpep_dropoff_datetime|passenger_count|trip_distance|
RatecodeID|store_and_fwd_flag|PULocationID|DOLocationID|payment_type|fare_amount|
extra|mta_tax|tip_amount|tolls_amount|improvement_surcharge|total_amount|congestio
n_surcharge|
+-----+-----+-----+-----+-----+-----+-----+-----+
---+-----+-----+-----+-----+-----+-----+-----+-----+
-----+
|    1| 2021-01-01 00:30:10| 2021-01-01 00:36:12|          1|      2.10|          1|          N|
142|      43|          2|          8|  3|  0.5|          0|          0|          0.3|      11.8|
2.5|
|    1| 2021-01-01 00:51:20| 2021-01-01 00:52:19|          1|      .20|          1|          N|
238|     151|          2|          3| 0.5|  0.5|          0|          0|          0.3|      4.3|
0|
|    1| 2021-01-01 00:43:30| 2021-01-01 01:11:06|          1|     14.70|          1|          N|
132|     165|          1|         42| 0.5|  0.5|      8.65|          0|          0.3|     51.95|
0|
+-----+-----+-----+-----+-----+-----+-----+-----+
---+-----+-----+-----+-----+-----+-----+-----+-----+
-----+

```

only showing top 3 rows