

**Ex No 4****Create UDF (User Defined Functions) in Apache Pig and execute it in MapReduce / HDFS mode****AIM:**

To create UDF in Apache Pig and execute it in MapReduce/HDFS mode.

**PROCEDURE:****1. Install Apache Pig****Download Pig:**

1. Download Pig from the Apache Pig download page:

Link: [Apache Pig 0.17.0 Download](#)

Extract the downloaded file (assuming you downloaded `pig-0.17.0.tar.gz`):

```
tar -xzf pig-0.17.0.tar.gz
```

Move the extracted folder to a directory, such as `/usr/local/`:

```
sudo mv pig-0.17.0 /usr/local/pig
```

**2. Set Up Environment Variables for Pig**

Edit your `~/.profile` or `~/.zshrc` to include Pig in the PATH.

```
nano ~/.zshrc
```

Add the following lines:

```
export PIG_HOME=/usr/local/pig
export PATH=$PIG_HOME/bin:$PATH
```

Apply the changes:

```
source ~/.zshrc
```

**3. Verify Pig Installation**

Run the following command to check if Pig is installed correctly:

```
pig -x local
```

You should see the Pig Grunt shell prompt:

```
grunt>
```

Type `quit` to exit the shell.

## 4. Start Hadoop Services

Make sure your Hadoop is up and running. Start the required services:

```
cd /usr/local/hadoop/sbin  
./start-dfs.sh  
./start-yarn.sh
```

## 5. Prepare Input Data (ex4.txt)

Create a sample text file for testing the UDF, named `ex4.txt`:

```
nano ex4.txt
```

Example content:

```
1, John  
2, Soniya  
3, Vijay  
4, Sonu
```

Upload the file to HDFS:

```
hdfs dfs -mkdir /UDF  
hdfs dfs -put ex4.txt /UDF/
```

## 6. Create UDF in Python

Now, you need to write your Python UDF.

Create a Python file `uppercase_udf.py`:

```
nano uppercase_udf.py
```

Add the following code to `uppercase_udf.py`:

```
#!/usr/bin/python3
def uppercase(text):
    return text.upper()

if __name__ == "__main__":
    import sys
    for line in sys.stdin:
        line = line.strip()
        result = uppercase(line)
        print(result)
```

Upload the Python UDF to HDFS:

```
hdfs dfs -mkdir /UDF/udfs
hdfs dfs -put uppercase_udf.py /UDF/udfs/
```

Make sure the file is in the correct HDFS directory by running:

```
hdfs dfs -ls /UDF/udfs
```

## 7. Write Pig Script (UDF.pig)

Create a Pig script to apply your UDF.

Create UDF.pig:

```
nano UDF.pig
```

Add the following Pig script to UDF.pig:

```
-- Register the UDF
REGISTER hdfs:///UDF/udfs/uppercase_udf.py USING jython AS myudfs;

-- Load the ex4.txt file from HDFS
data = LOAD 'hdfs:///UDF/ex4.txt' USING PigStorage(',') AS
(id:int,name:chararray);

-- Apply the UDF to each line
uppercase_data = FOREACH data GENERATE myudfs.uppercase(name) AS
upper_line;
```

```
-- Store the result in HDFS  
STORE uppercase_data INTO 'hdfs:///UDF/output' USING PigStorage(',');
```

Save the file and exit.

## 8. Run the Pig Script in MapReduce Mode

Now that everything is set up, execute the Pig script in MapReduce mode:

```
hdfs dfs -chmod 755 /UDF/udfs/uppercase_udf.py  
hdfs dfs -chmod 755 /UDF  
hdfs dfs -chmod 755 /UDF/ex4.txt
```

```
pig -x mapreduce UDF.pig
```

## 9. Check the Output

After the job finishes, you can view the output in HDFS.

List the output directory:

```
hdfs dfs -ls /UDF/output
```

You should see something like:

```
Found 1 items  
-rw-r--r--    3 user group    123 2024-09-11 12:00  
/UDF/output/part-m-00000
```

View the output file:

```
hdfs dfs -cat /UDF/output/part-m-00000
```

You should see the content in uppercase

**OUTPUT:**

```

Last login: Tue Sep 10 20:08:42 on ttys002
nativewit@Nativewits-MacBook-Air ~ %
cd /usr/local/Cellar/hadoop/3.4.0/libexec/sbin
nativewit@Nativewits-MacBook-Air sbin % ./start-dfs.sh
Starting namenodes on [localhost]
Starting datanodes
Starting secondary namenodes [Nativewits-MacBook-Air:local]
2024-09-10 20:36:29,894 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
nativewit@Nativewits-MacBook-Air sbin % ./start-yarn.sh
Starting resourcemanager
Starting nodemanagers
nativewit@Nativewits-MacBook-Air sbin % nano ex4.txt
nativewit@Nativewits-MacBook-Air sbin % hdfs dfs -mkdir /UDF
2024-09-10 20:36:25,288 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
nativewit@Nativewits-MacBook-Air sbin % hdfs dfs -put ex4.txt /UDF/
2024-09-10 20:36:31,300 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
nativewit@Nativewits-MacBook-Air sbin % nano uppercase_udf.py
nativewit@Nativewits-MacBook-Air sbin % hdfs dfs -mkdir /UDF/udfs
2024-09-10 20:37:00,810 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
nativewit@Nativewits-MacBook-Air sbin % hdfs dfs -put uppercase_udf.py /UDF/udfs/
2024-09-10 20:37:06,897 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
nativewit@Nativewits-MacBook-Air sbin % hdfs dfs -ls /UDF/udfs
2024-09-10 20:37:12,402 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Found 1 items
-rw-r--r-- 1 nativewit supergroup      219 2024-09-10 20:37 /UDF/udfs/uppercase_udf.py
nativewit@Nativewits-MacBook-Air sbin % nano UDF.pig
nativewit@Nativewits-MacBook-Air sbin % hdfs dfs -chmod 755 /UDF/udfs/uppercase_udf.py
2024-09-10 20:38:16,221 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
nativewit@Nativewits-MacBook-Air sbin % hdfs dfs -chmod 755 /UDF
2024-09-10 20:38:20,414 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
nativewit@Nativewits-MacBook-Air sbin % hdfs dfs -chmod 755 /UDF/ex4.txt
2024-09-10 20:38:25,425 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
nativewit@Nativewits-MacBook-Air sbin % pig -x mapreduce UDF.pig
2024-09-10 20:38:36,793 INFO pig.ExecTypeProvider: Trying ExecType : LOCAL
2024-09-10 20:38:36,795 INFO pig.ExecTypeProvider: Trying ExecType : MAPREDUCE
2024-09-10 20:38:36,795 INFO pig.ExecTypeProvider: Picked MAPREDUCE as the ExecType

```

**RESULT:**

Thus, UDF in Apache Pig has been created and executed in MapReduce/HDFS mode successfully.