Apache Flink Getting Started

Experiment 10: Hourly Tips Processing

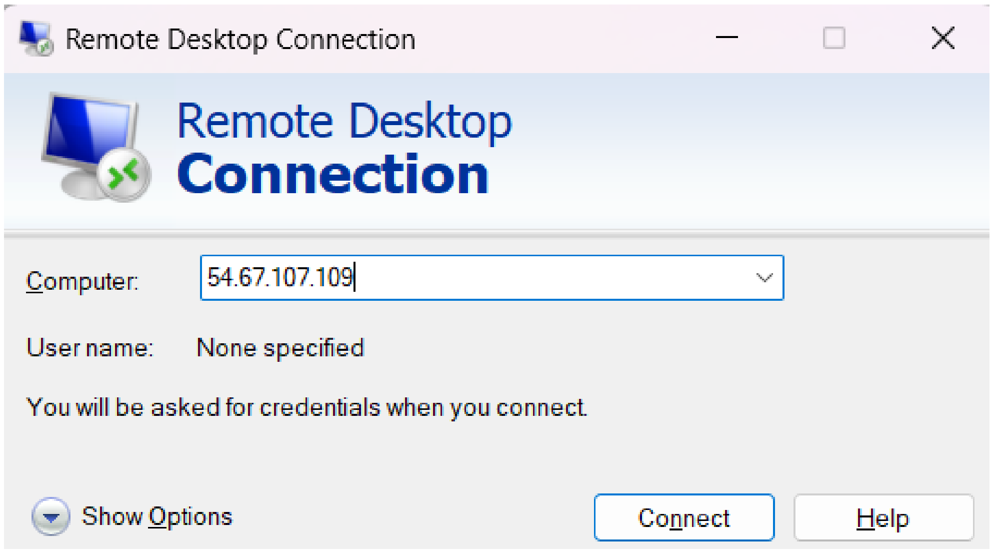
1.1 Steps to run your next Flink Program

1.1.1 Browse to the GitHub repo that you cloned. This should be cloned to your Windows Jump Box and the Flink Development Server
https://github.com/GeorgeNiece/flink-data-processing-2day

1.1.2 From a command prompt on your jumpbox machine SSH to the Unbuntu server
ssh -o ServerAliveInterval=180 -o ServerAliveCountMax=2 -i ansible.pem ubuntu@*ip_address_provided*

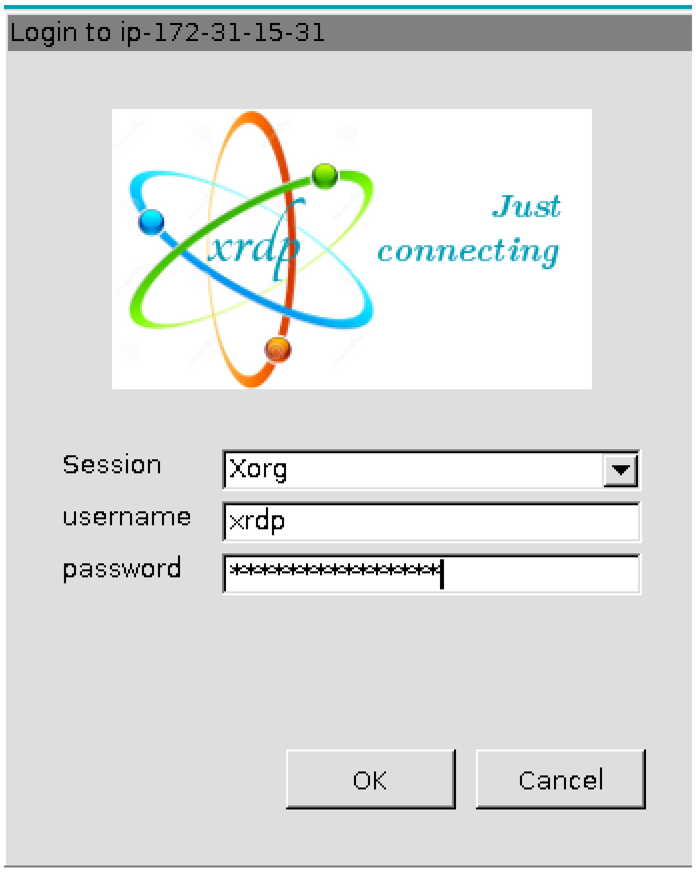
1.1.4 Change to the flink folder, verify Flink isn't started, start the Flink dev cluster, and verify that it started

```
ps -ef  | grep flink
cd ~/flink-2.0.0
./bin/start-cluster.sh
ps -ef | grep flink
```



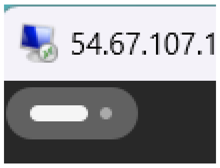
Computer: 54.67.107.109
User name: None specified
You will be asked for credentials when you connect.

1.1.5 Login to the ubuntu dev sandbox using Windows RDP with the xrdp user and the password that you set in Step 1.14

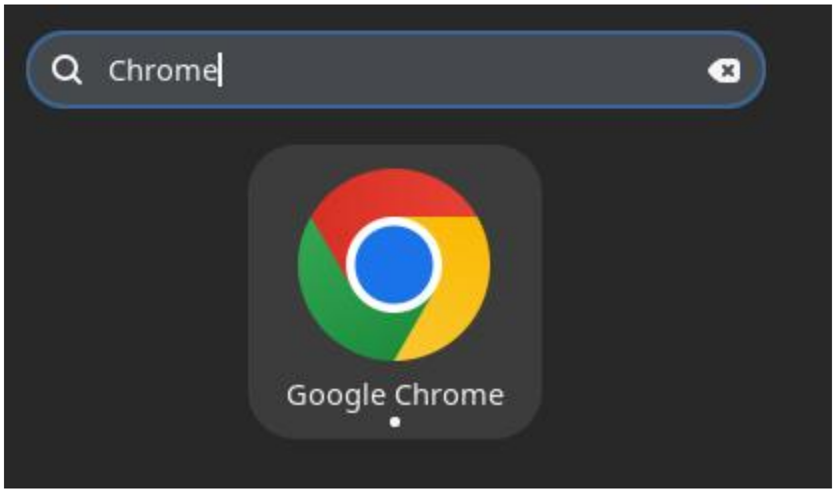

Login to ip-172-31-15-31

Session: Xorg
username: xrdp
password: ****************

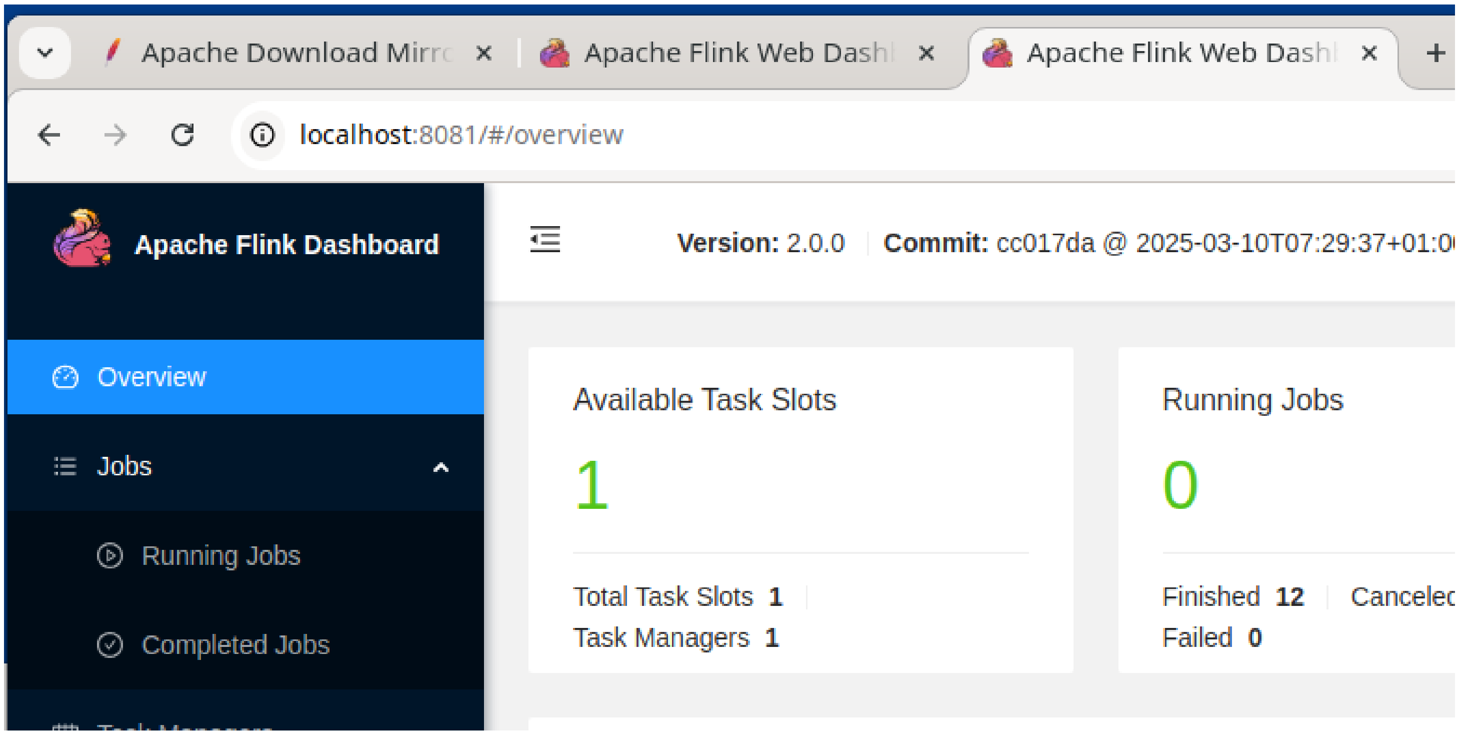
1.1.6 Click the Activities button in the top left corner of the Ubuntu Desktop



1.1.7 Wait for the Search Box at the top of the Ubuntu Desktop, and enter Chrome, click on the Launch Logo



1.1.8 Load the Flink Web UI at localhost:8081

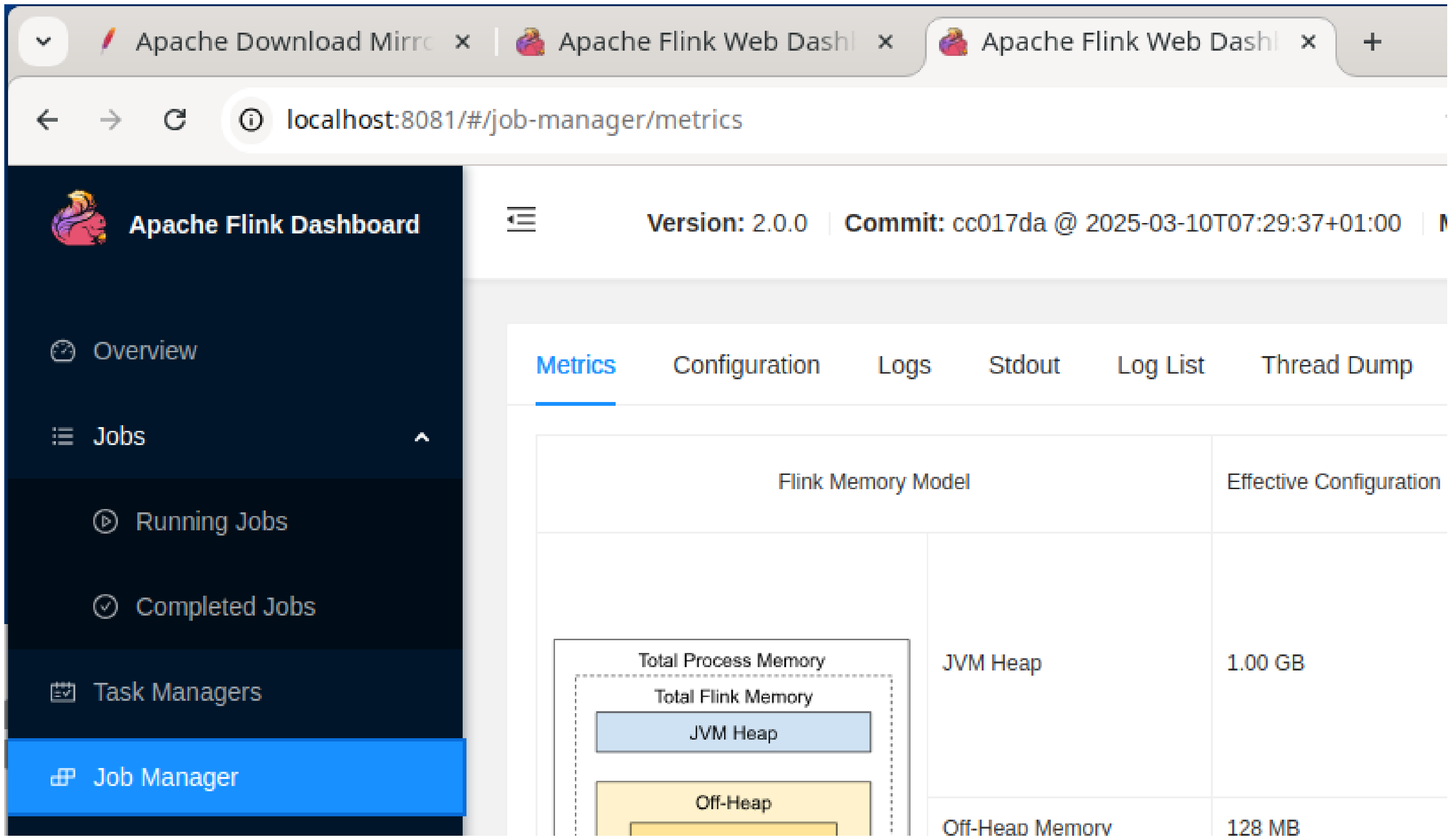


Version: 2.0.0 | Commit: cc017da @ 2025-03-10T07:29:37+01:0

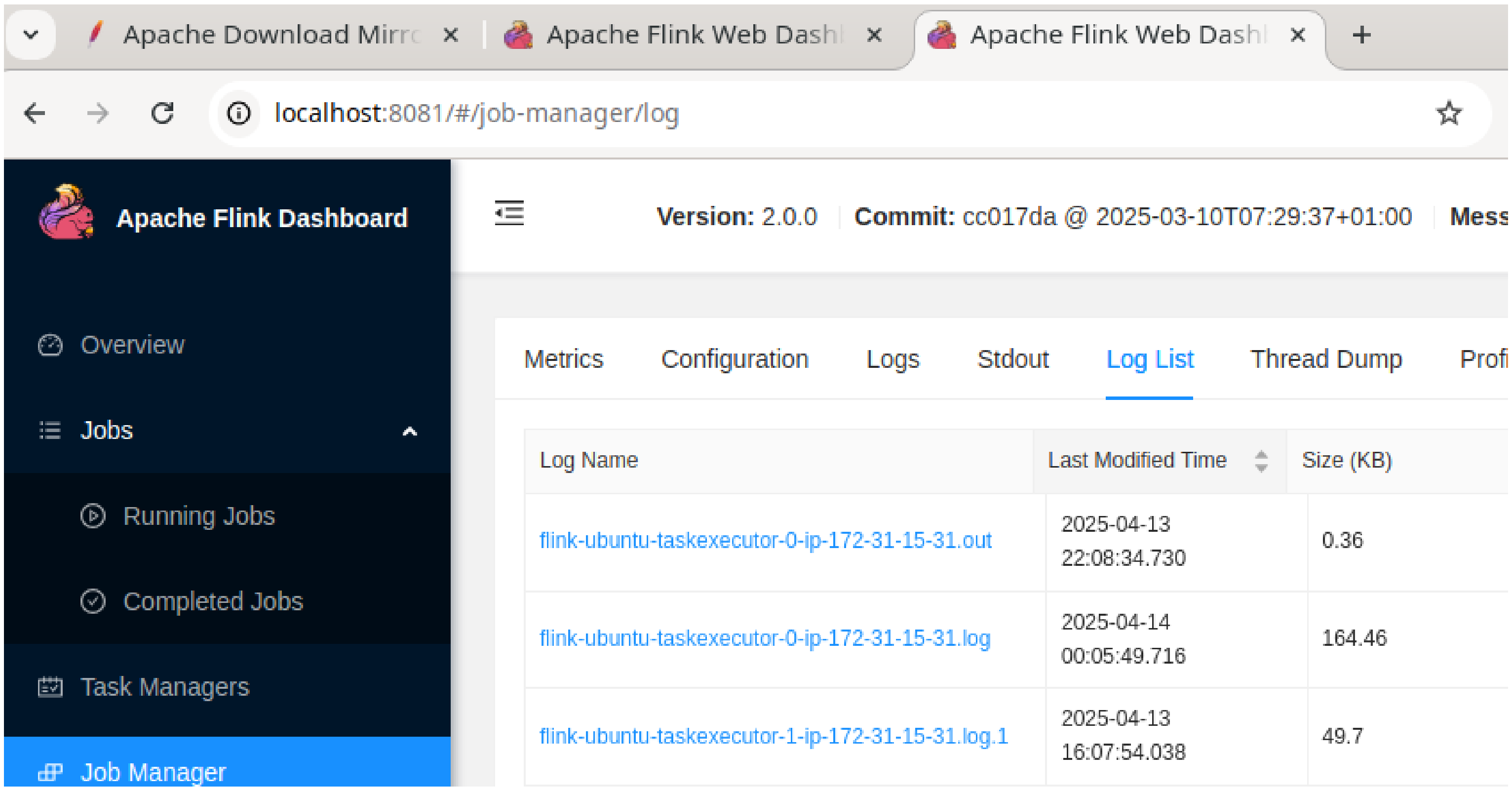
Available Task Slots
1
Total Task Slots 1
Task Managers 1

Running Jobs
0
Finished 12 | Cancelec
Failed 0

1.1.9 Click the Job Manager in the left hand navigation



1.1.10 Select Log List in the page navigation. These are the logs we'll monitor while we're running some of our experiments



Log Name	Last Modified Time	Size (KB)
flink-ubuntu-taskexecutor-0-ip-172-31-15-31.out	2025-04-13 22:08:34.730	0.36
flink-ubuntu-taskexecutor-0-ip-172-31-15-31.log	2025-04-14 00:05:49.716	164.46
flink-ubuntu-taskexecutor-1-ip-172-31-15-31.log.1	2025-04-13 16:07:54.038	49.7

1.1.11 The first flink-ubuntu-taskexecutor*.out file will be the one we spend the most time looking at. Select that so that we can view there. We could open two browser tabs and watch the Jobs -> Running Jobs page while we run our first experiment.

1.1.12 Navigate back to the SSH terminal to the flink distribution folder

```
cd ~/flink-2.0.0
./bin/flink run ~/flink-data-processing-2day/experiments/built/HourlyTips.jar
```

This should show us with the Job submission, Program execution finished, JobID and the Job Runtime

View the **flink-ubuntu-taskexecutor*.out,** this time we'll just tail the file which shows us the following. For my sandbox environment that would be
~/flink-2.0.0:$ **tail log/flink-ubuntu-taskexecutor-0-ip-172-31-78-140.out**

We can view the logs to see the last written with the unix command `ls -alrt`

1.2 Steps to build your next Flink Program

1.2.1 We have the source for the Flink program in both the flink-project structure and the executable jar. **HourlyTips** Flink application identifies, for each hour, the driver earning the most tips. It's approached in two steps: first use hour-long windows that compute the total tips for each driver during the hour, and then from that stream of window results, find the driver with the maximum tip total for each hour. This experiment operates in event time. The input data of this experiment is a stream of TaxiFare events generated by the Taxi Fare Stream Generator. The TaxiFareGenerator annotates the generated DataStream<TaxiFare> with timestamps and watermarks. Hence, there is no need to provide a custom timestamp and watermark assigner in order to correctly use event time. The result of this experiment is a data stream of Tuple3<Long, Long, Float> records, one for each hour. Each hourly record contains the timestamp at the end of the hour, the driverId of the driver earning the most in tips during that hour, and the actual total of their tips. The resulting stream is printed to standard out.

1.2.2 To compile from command line with Java you would need to reference the flink distribution jar files in your classpath, either directly as noted here or in a build tool like Maven or Gradle. A sample POM file is included in our course GitHub repo in the flink-project

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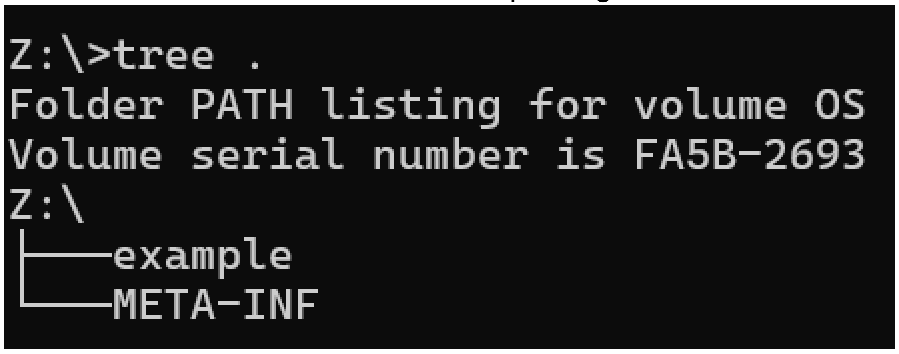
```
javac -classpath C:\lib-2.0\flink-cep-2.0.0.jar;C:\lib-2.0\flink-
connector-files-2.0.0.jar;C:\lib-2.0\flink-csv-2.0.0.jar;C:\lib-
2.0\flink-dist-2.0.0.jar;C:\lib-2.0\flink-json-2.0.0.jar;C:\lib-
2.0\flink-scala_2.12-2.0.0.jar;C:\lib-2.0\flink-table-api-java-
uber-2.0.0.jar;C:\lib-2.0\flink-table-planner-loader-
2.0.0.jar;C:\lib-2.0\flink-table-runtime-2.0.0.jar;C:\lib-
2.0\log4j-1.2-api-2.24.1.jar;C:\lib-2.0\log4j-api-
2.24.1.jar;C:\lib-2.0\log4j-core-2.24.1.jar;C:\lib-2.0\log4j-
slf4j-impl-2.24.1.jar;C:\lib-2.0\flink-streaming-java-
1.20.1.jar;C:\lib-2.0\flink-runtime-2.0.0.jar;
example/HourlyTips.java
```

1.2.4 To package the executable jar for the Flink program we create a MANIFEST.MF that we'll use in the packaging, notice that the

```
Manifest-Version: 1.0
Implementation-Title: Flink : Examples : Simple Stream
Implementation-Version: 2.0.0
Archiver-Version: Plexus Archiver
Built-By: geoniece
Specification-Vendor: Innovation in Software
Specification-Title: Flink : Examples : Simple Stream
Implementation-Vendor-Id: com.innovationinsoftware
program-class: example.HourlyTips
Implementation-Vendor: Innovation in Software
```

```
Created-By: Apache Maven 3.8.6
Build-Jdk: 1.11.0_312
Specification-Version: 2.0.0
```

1.2.5 We have a folder structure with our package



```
Z:\>tree .
Folder PATH listing for volume OS
Volume serial number is FA5B-2693
Z:\
├───example
└───META-INF
```

1.2.6 To package the executable jar for our Flink program we do the following

Ubuntu-@ip-172.15.50.23:~$ **`jar --manifest=META-INF/MANIFEST.MF --create --file c:\users\Geo\HourlyTips.jar example/*`**

1.2.7 **Congratulations, time to celebrate** you ran another Flink program in our session