**Lab Assignment #2 – No\_SQL & Sharding**

Due Date: Friday, Week 4

**Purpose:**

The purpose of this Lab assignment is to:

1. To get hands-on experience of setting up Sharding for a NoSQL database (mongoDb)
2. To populated data into the Sharded database.
3. To retrieve data from the shards.
4. Research NoSQL stores

**General Instructions:**

Be sure to read the following general instructions carefully:

1. This assignment must be completed individually by all the students.
2. Only provide the requested screenshots and make sure to have a complete screenshot, partial screenshots will not earn any marks.
3. You will have to provide a **demonstration video for your solution (only exercise #1)** and upload the video together with the solution on **eCentennial** through the assignment link. See the **video recording instructions** at the end of this document.
4. In your 5-minute demonstration video you should explain your setup clearly and demo inserting and retrieving data from the collection. Any submission without an accompanying video will lose 70% of the grade.
5. Any submission without an accompanying video will lose 70% of the grade.
6. Any submission without an accompanying analysis report will lose 20% of the grade.

Assignment Pre-requisites Instructions:

1. Watch the lab tutorial video in Module #3
2. Go through the instructions posted under lab tutorial module #3
3. Setup the environment by downloading the image of the virtual machine on your laptop, in order to carry out the assignment. The image will have the Linux/ centos 7 and mongodb installed on the first machine, so you don’t need to start from scratch and we will be using the same environment to run the lab demos for future exercises and labs.

Assignment Requirements (Instructions):

Exercise #1 80%

 Replicate the exercise demonstrated in the lab tutorial with the following amendments:

1. For this assignment run everything on machine#1 and use the centos user with the password the same as the userid
2. For the data directory (folder) name it “data\_firstname” where firstname is your first\_name. Create this directory(folder) under root using mkdir or using the centos GUI feature.
3. For Shard0 change the port# from localhost:37015 to localhost:370XX where XX are the last two digits of your student ID. Similarly increase by one the port numbers for each node within the shard0.

For example, if your student Id ends with 56 the ports would be:

37056

37057

37058

1. Repeat the same port numbering for Shard 1.
2. Keep the port numbers for the mongos demon and the config servers the same.
3. Once your configuration is setup correctly take a screenshot showing all the processes and name it “screenshot #1XX” where XX are the last two digits of your student id. (Hint: ps aux | mongod) add the screen shot to your analysis report.
4. Create a database and name it “CollegeXX”, where XX are the last two digits of your student id.
5. Create a collection and name it “students”.
6. Insert ten records of data similar to the example mentioned in the lab tutorial instruction, for the data insert records related to you and your colleagues.
7. Retrieve all the inserted data and take a screenshot name it “screenshot #2XX”, where XX are the last two digits of your student id. (hint: use the find method) add the screen shot to your analysis report.
8. Check the Sharding status that illustrates the distribution of data; and take a screenshot name it “screenshot #3XX”, where XX are the last two digits of your student id. add the screen shot to your analysis report.
9. Please insert all the linux/Mongodb instructions you used, into your analysis report.
10. In your 5-minute demonstration video you should explain your setup clearly and demo inserting and retrieving data from the Shards.

Exercise #2 20%

1. In this exercise you will research and investigate a NOSQL stores. If your first name starts with a letter between A – M you are assigned to investigate Redis datastore, if your first name starts with a letter between N – Z you are to investigate ClickHouse datastore.
2. In your research please make sure to touch on key features, type(s) of the datastore, how it distributes data (partitioning, sharding…etc.) , how the store supports fault tolerance and name some companies that use the store.
3. In total one page and make sure to cite your references.

**Evaluation:**

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| --- | --- |
| **Infrastructure:**   * Correct implementation of required sharded structure port numbers. Covered in demo. * Correct setup and use of demons and shard key. Covered in demo. | 30%     30% |
| **Data population and retrieval**   * Correct insertion of data. * Correct retrieval of data. * Covered in demo. | 10%  10% |
| **Analysis report** | 20% |
| **Total** | 100% |

**Naming and Submission Rules:**

1. You must name your submission according to the following rule:

**YourFullname\_COMP251\_assignmentnumber.zip**.Example: **AdamPerjouski\_COMP51\_assignment1** .**zip**

1. Upload the submission file on e-Centennial using the Assignment link(s).
2. In total you should submit one zipped file named as above containing the following:
   1. One demonstration video (Exercise #1)
   2. One analysis report covering the two exercises

**Demonstration Video Recording**

Please record a short video (max 4-5 minutes) to explain/demonstrate your assignment solution. You may **use the Windows 10 Game bar** to do the recording:

1. Press the Windows key + G at the same time to open the Game Bar dialog.

2. Check the "Yes, this is a game" checkbox to load the Game Bar.

3. Click on the Start Recording button (or Win + Alt + R) to begin capturing the video.

4. Stop the recording by clicking on the red recording bar that will be on the top right of the program window.

(If it disappears on you, press Win + G again to bring the Game Bar back.)

You'll find your recorded video (MP4 file), under the Videos folder in a subfolder called Captures. Submit the video together with your solution.

Alternatively you can use any other freely available software. One option is screencast-O-matic free version at:<https://screencast-o-matic.com/>