CS332
Progress Presentation

Team Blue

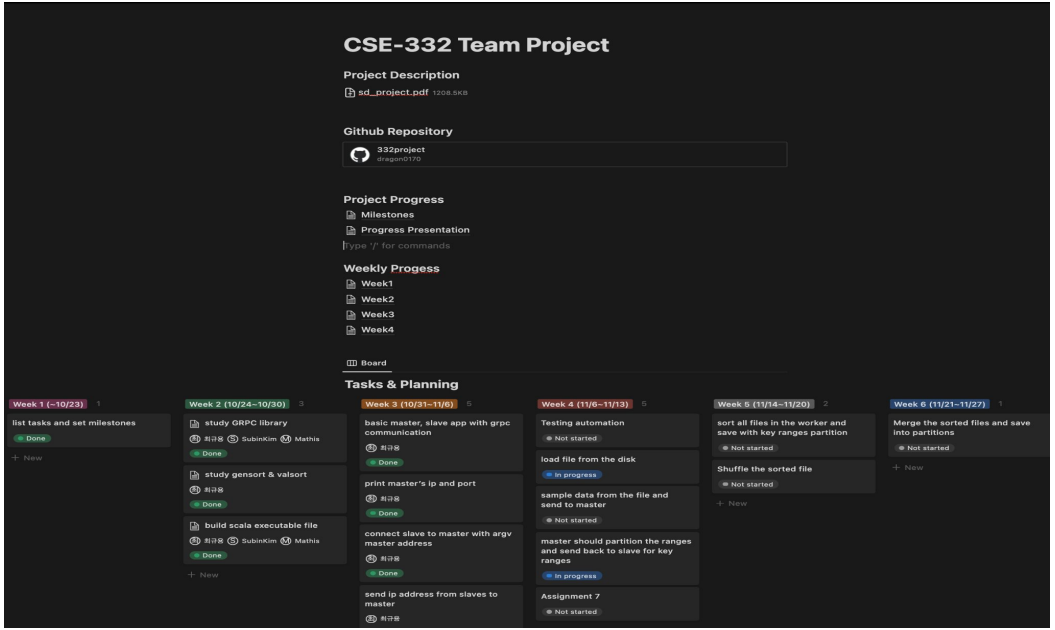
Review of weekly progress(week 1)

What we do

- Kick-off team meeting
- Planning for the project

Review

- First time to meet each other
- Set up the project



Review of weekly progress(week 2)

What we do

- learn how to use grpc in Scala
  - grpc-java, scalapb
- build executable file with Scala application

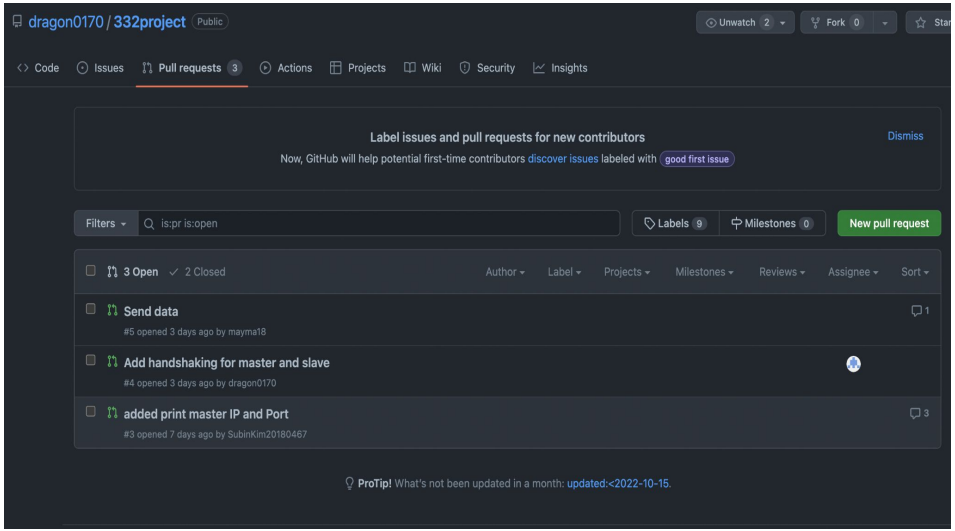
Review

- Warm up for the project

Review of weekly progress(week 3-4)

What we do

- Set up the basic scala project with master and slave application(sbt, grpc)
- Implement handshaking feature
  - master prints ip:port, slave connects to master and send ip to master, master waits and prints ip lists
- Open a file from the disk and send file data as string with grpc request



Review

- Something is going wrong
- **We need a change**

Member Role(Before)

- Self-directed, Democratic
- 최규용, 김수빈, Mathis
  - All members divide the tasks for a week with discussion.
  - Do the task during a week.
  - Review each other’s task.

Member Role(After)

- Surgical, Aristocracy
- 최규용
  - Main leader, surgeon
  - Overall design
  - Specify and distribute tasks
  - Do the assigned tasks
  - Review code and documentation
- 김수빈, Mathis
  - Do the assigned tasks
  - Review code and documentation

Logistics

- **In English**
- Communication
  - main communication - Kakao Talk
  - code review and discussion - Github Pull Request
  - **(NEW)weekly meeting for progress review at every sunday afternoon - Online video call**
- Documentation
  - project & task management, general documentation - Notion
  - requirements, how to build, install - Github README.md
  - diagram, slides, spreadsheets, etc. - Google Docs, Draw.io

Logistics

README.md

332project

Requirements

- JDK v1.8.0
- Scala v2.13.10
- sbt v1.7.3

Build

This command compiles protobuf file to scala class.

```
sbt compile
```

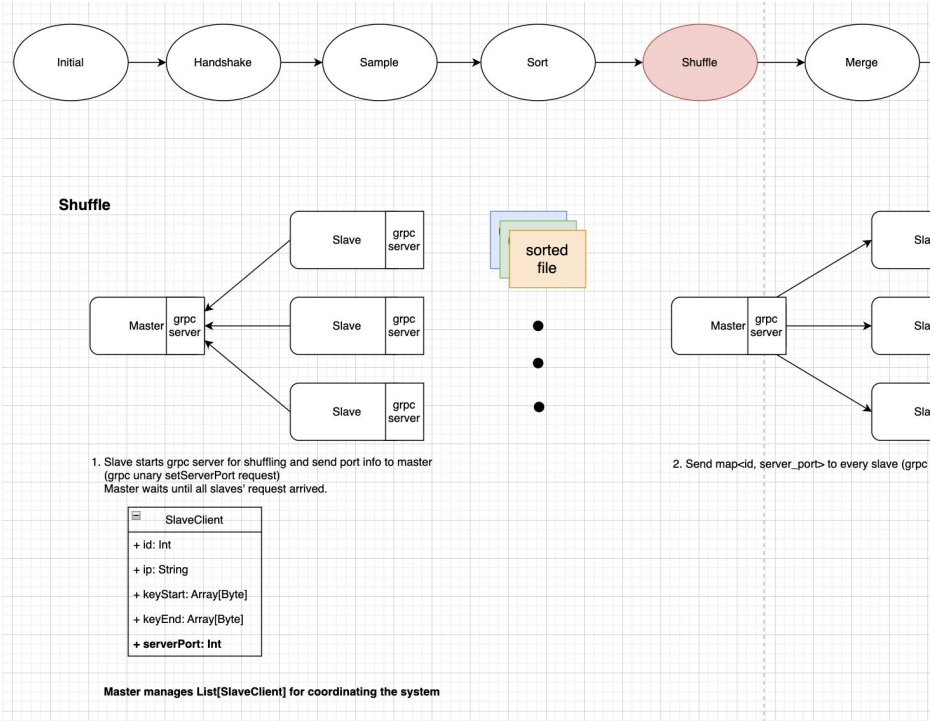
Installation

```
sbt stage
```

Milestones

#1(~11/7)

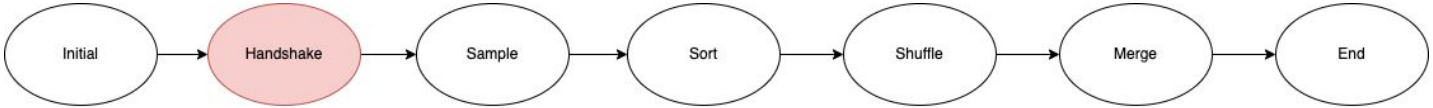
- Generate unsorted data files
- Learn grpc
- Slave connects to Master with grpc



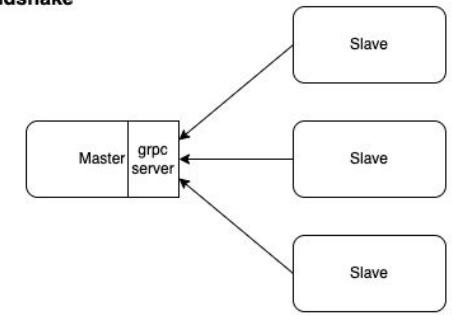
Details

- Programming Environments
  - OS
    - Local
      - macOS 12.6
      - Ubuntu 22.04.1
    - Test(work in progress)
      - Ubuntu by Docker(TBD)
  - **JDK v1.8.0_352**
  - sbt v1.7.3
  - **scala v2.13.10**
  - protobuf v3.19.2
  - gensort v1.5
- Libraries
  - grpc-java v1.46.0
  - scalapb v0.11.11
- Logging
  - log4j v2.19.0

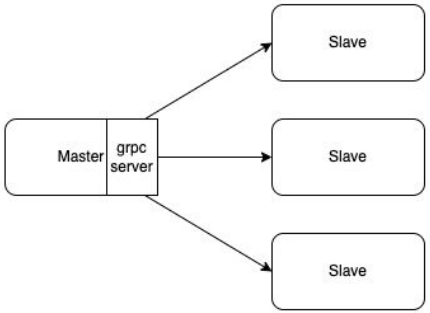
Design



Handshake



1. Send slave's IP to master (grpc unary handshake request)
   Master waits until all slaves' request arrived.

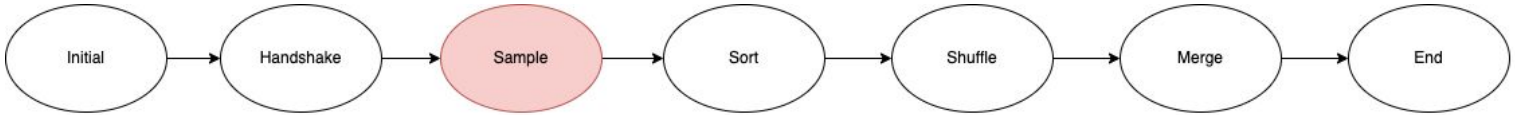


2. Send slave id to each slave (grpc unary handshake response)
   From now, slave will send all grpc requests with its own id

SlaveClient
+ id: Int
+ ip: String
+ keyStart: Array[Byte]
+ keyEnd: Array[Byte]
+ serverPort: Int

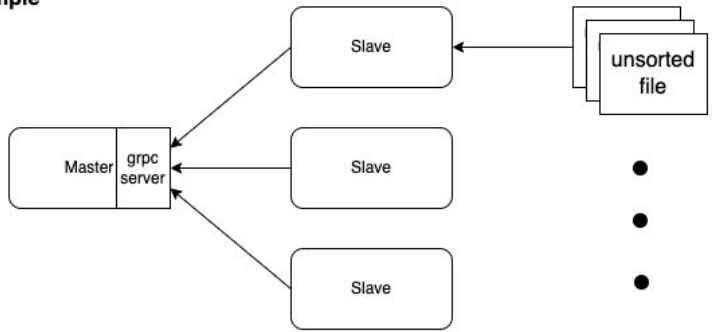
Master manages List[SlaveClient] for coordinating the system

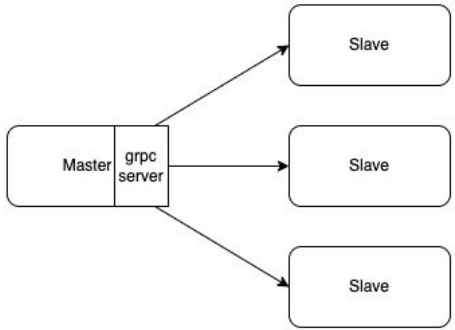
Design



Sample

1. Open and sample 1MB data from each file and concatenate them





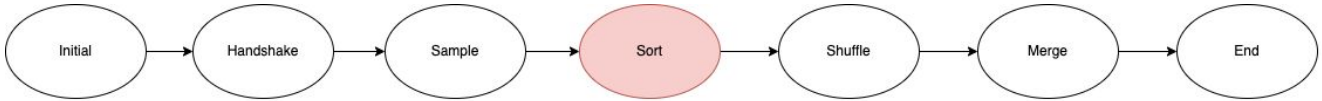
2. Send sampled data to master (grpc unary sendSampleData request)
   Master waits until all slaves' request arrived.
   Master analyze collected sample data and save key ranges(start, end) for each slave

3. Send map<id, key_ranges> to every slave (grpc unary sendSampleData response)
   Slave saves the mapping data in the application.

SlaveClient
+ id: Int
+ ip: String
+ keyStart: Array[Byte]
+ keyEnd: Array[Byte]
+ serverPort: Int

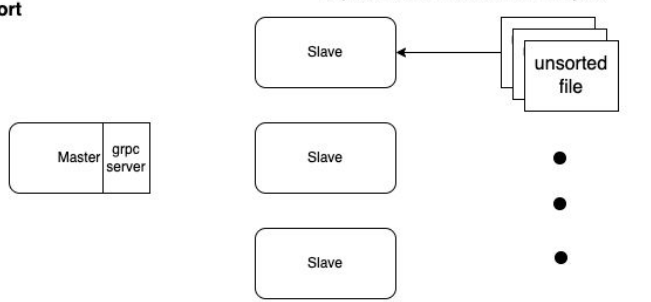
Master manages List[SlaveClient] for coordinating the system

Design

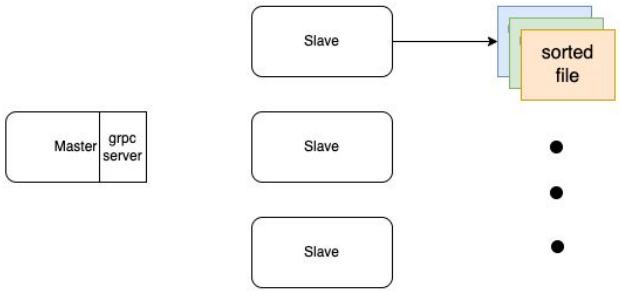


Sort

1. Open file and sort data in the file one by one



2. Partition sorted data using the mapping data of map<id, key_ranges>

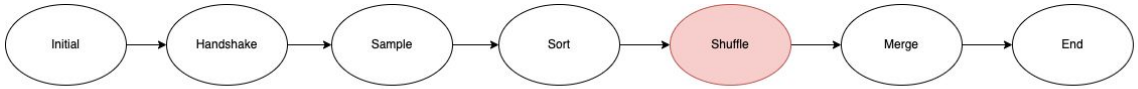


3. Save partitioned data into files with name of slave id labeling. (ex. sorted_num_targetSlaveId)
Iterate all files in the directory.

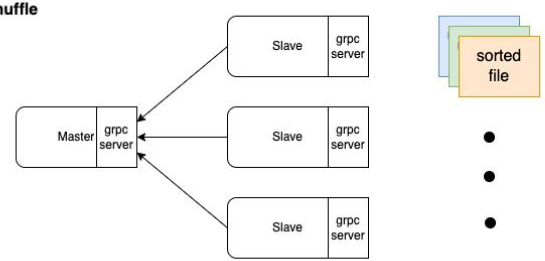
SlaveClient
+ id: Int
+ ip: String
+ keyStart: Array[Byte]
+ keyEnd: Array[Byte]
+ serverPort: Int

Master manages List[SlaveClient] for coordinating the system

Design



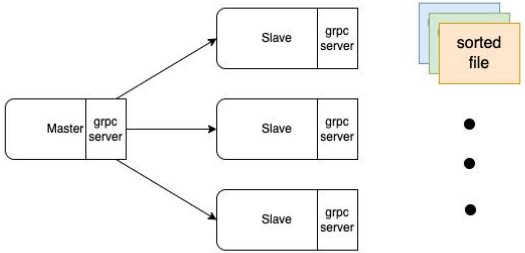
Shuffle



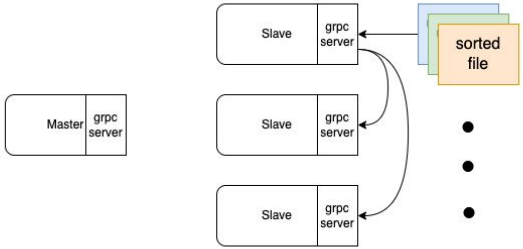
1. Slave starts grpc server for shuffling and send port info to master (grpc unary setServerPort request)
   Master waits until all slaves' request arrived.

SlaveClient
+ id: Int
+ ip: String
+ keyStart: Array[Byte]
+ keyEnd: Array[Byte]
+ serverPort: Int

Master manages List[SlaveClient] for coordinating the system

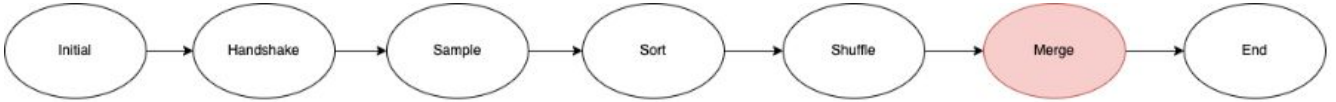


2. Send map<id, server_port> to every slave (grpc unary setServerPort response)

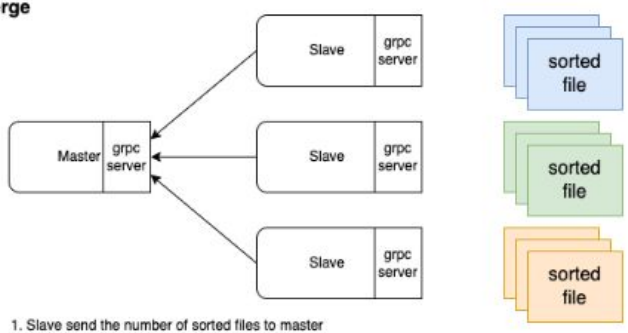


3. Send each sorted file to the appropriate slave's grpc server (grpc client-streaming sendSortedFiles request)
   Each slave waits until receiving files from all slaves.

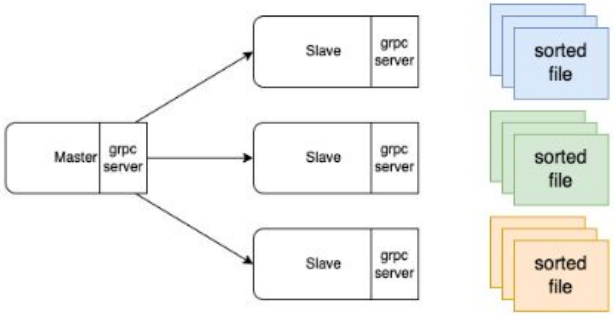
Design



Merge



1. Slave send the number of sorted files to master
   (grpc unary sendNumFile request)
   Master waits until all slaves' request arrived.

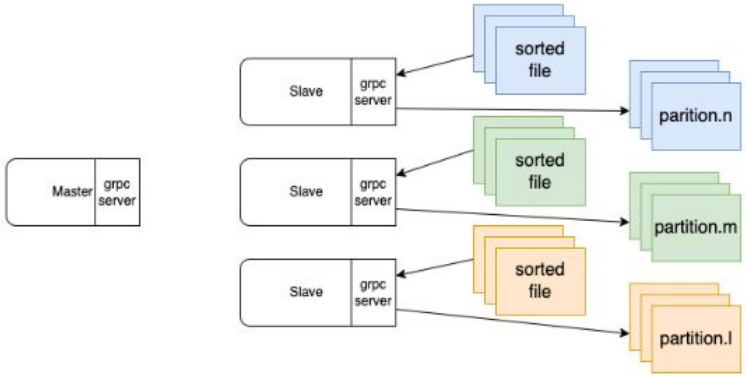


2. Send start index of partitioned file to every slave (grpc unary sendNumFile response)

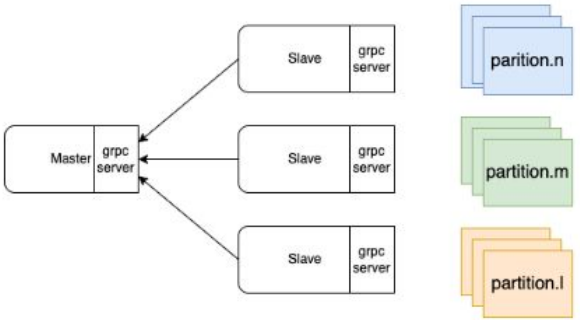
SlaveClient
+ id: Int
+ ip: String
+ keyStart: Array[Byte]
+ keyEnd: Array[Byte]
+ serverPort: Int

Master manages List[SlaveClient] for coordinating the system

Design



3. Each slave runs k-way merge algorithm for sorted files and save the final partition files.



4. Slave send message for completion of merging to master (grpc unary notifyMergingCompleted request)
Now, slave can shutdown the application.
Master waits until all slaves' request arrived and shutdown the application after that.

Progress

- We set 4 big milestones at the beginning.
  a. Be familiar with **gensort/valsort, grpc, protobuf**. Master can connects to Slave with grpc and **sends ip address and prints the ip address list**. (~11/7)
  b. **Sample data** from the file in each worker. Master **determines and broadcasts sorting key ranges for each slaves**. (~11/13)
  c. **Sort input files** in each slave and **save the sorted results into partitioned files** with appropriate key ranges. (~11/20)
  d. **Shuffle the sorted files** with each other between slaves. **Merge all sorted files** in each slave and **save into partitioned files** with appropriate size. (~12/4)
- Completed milestones
  - First milestone

Progress

- Modules implemented so far
  - Handshaking
    - connects and send ip address from slave to master
    - master waits until all slaves are connected and prints ip list
- Modules that are not working yet
  - Sampling(In progress)
  - Sorting
  - Shuffling
  - Merging