MP0 Report

Feb. 7, 2023

1. Instructions for Building & Running Code

Firstly, to connect VM to your local terminal, run

```
$ ssh [NetID]@sp23-cs425-50[ServerID].cs.illinois.edu
```

where you replace [NetID] with your net id and [ServerID] with the ID of assigned VMs.

Then, pull the repository on GitLab to VMs by running

```
$ git clone https://gitlab.engr.illinois.edu/qiyu6/group50-mp0.git
```

After pulling the repository, run the following command and select JDK 19 (or the latest version), to configure Java JDK version to JDK 19.

```
$ sudo update-alternatives --config 'java'
```

On the centralized logger, to get the IP address of the logger, run

```
$ ifconfig
```

For the centralized logger, run the following command to start listening on [port]

```
$ cd mp0/code
$ java ThreadedEchoServer [port]
```

For the client, run the following command to send out events to the logger

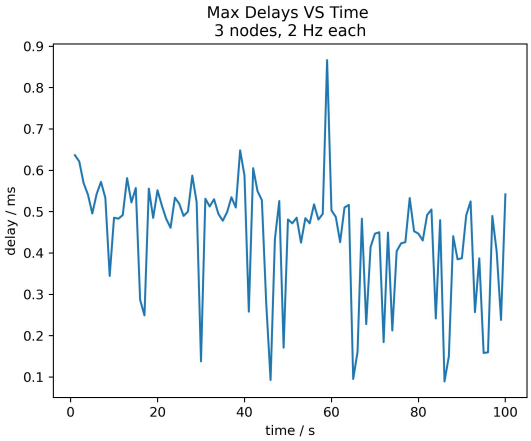
```
$ cd mp0/code
$ python3 -u ../generator.py [HZ] | java Client [nodeID] [loggerIP] [port]
```

where [HZ] represents the rate at which events occur, [loggerIP] represents the IP address of the logger, and [port] represents the connected port.

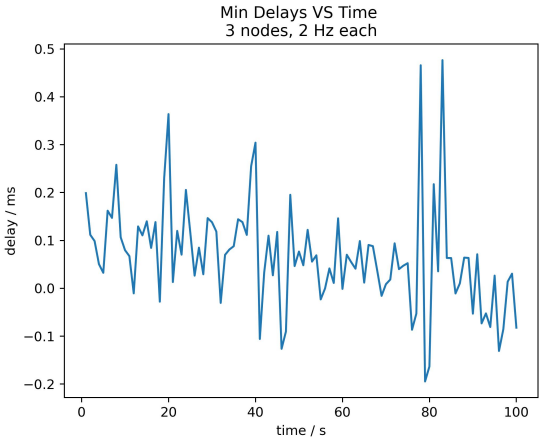
2. Evaluation Metrics

To calculate delays and bandwidth, we first intercept a 100-second period after the last node connects to and before the first node disconnects from the centralized logger. To calculate the delays, we compute the difference between the logger's timestamp after receiving the whole message from a client and the timestamp of the event itself. Since different VM instances are not strictly synchronized, it is possible to get a "negative" delay for an event. For events that have negative delays, we simply keep the negative number to avoid large bias when counting minimum and median delays. For bandwidth, we sum the length of all the messages within one second as the bandwidth of that second and plot our Bandwidth VS Time graph accordingly.

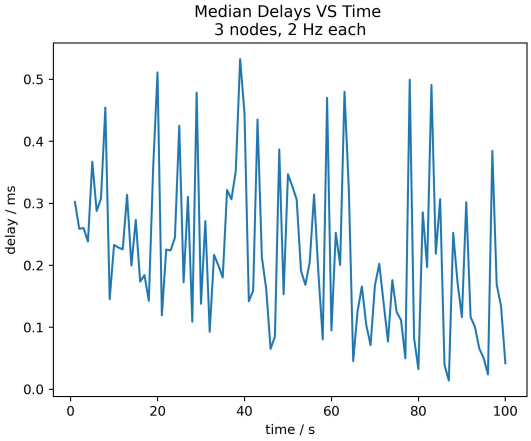
3. Graphs



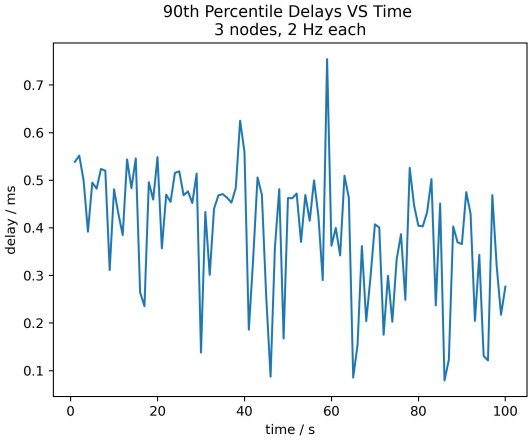
(a) Maximum Delays VS Time



(b) Minimum Delays VS Time



(c) Median Delays VS Time



(d) 90 percentile Delays VS Time

Figure 1: Delays VS Time for 3 nodes, 2HZ each

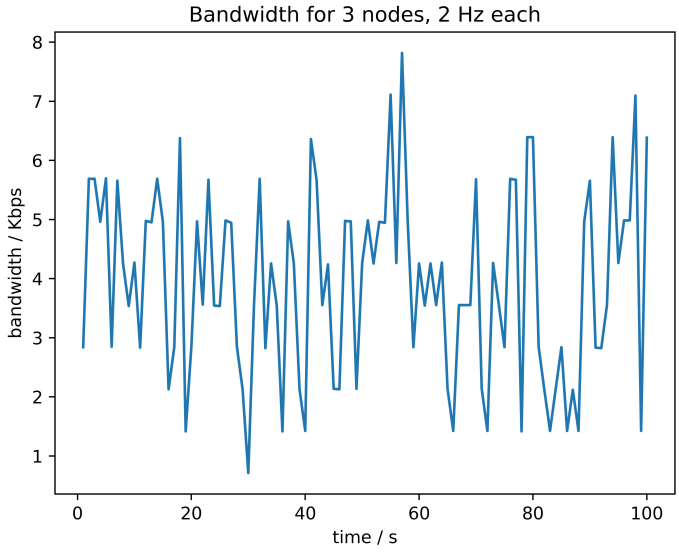
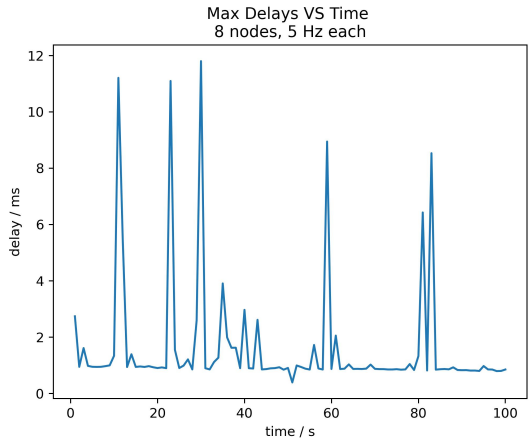
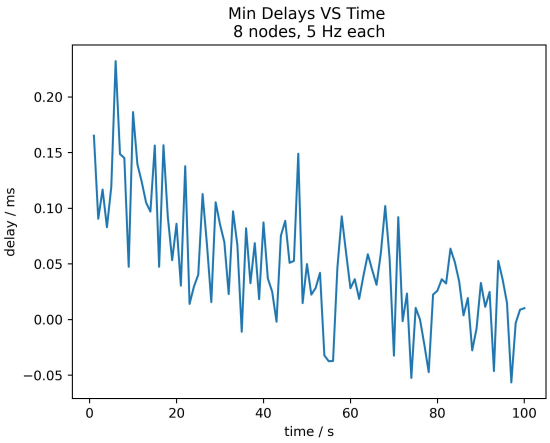


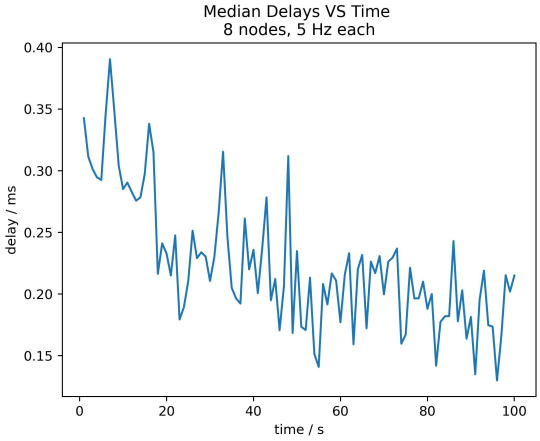
Figure 2: Bandwidth VS Time for 3 nodes, 2HZ each



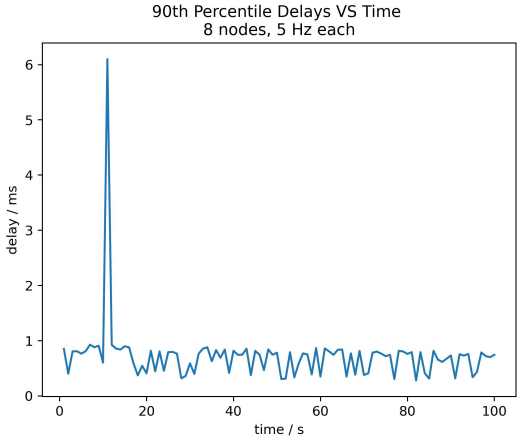
(a) Maximum Delays VS Time



(b) Minimum Delays VS Time



(c) Median Delays VS Time



(d) 90 percentile Delays VS Time

Figure 3: Delays VS Time for 8 nodes, 5HZ each

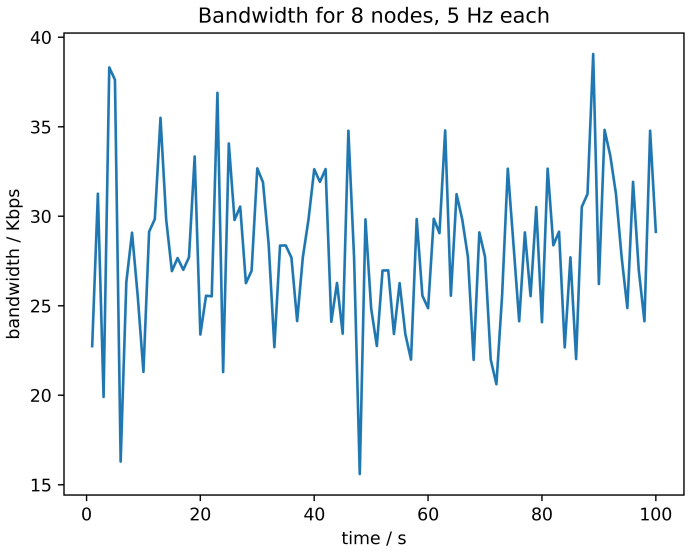


Figure 4: Bandwidth VS Time for 8 nodes, 5HZ each