Lab 8. Report

Student Information

Anna Boronina (@whoorma)

[github repository with the source code](#)

Exercise 1.2

Q1: What is a stratum in terms of NTP?

A1: Stratum is a measure of synchronization distance from the primary time source. It helps to find the most accurate time sources and to prevent time loops. There are 3 levels of stratum: 0, 1, and 2. **Stratum 0** is the most accurate one (atomic clock), but they cannot be connected to over the network. **Stratum 1** is the most accurate source of time for NTP that is available via network. Stratum 1 usually uses stratum 0 for synchronization. The next level is **stratum 2** - they are least accurate because they are synchronized with stratum 1 therefore they bring some overhead and are the least accurate. There are next levels, as I understood. The further from 0, the worse the accuracy. Also, stratum *N+1* uses stratum *N*.

Exercise 1.3

Q2: Provide the output of `ntpq -p` command from the client and describe the meaning of the following fields: `remote`, `refid`, `st`, `t`, `when`, `poll`, `reach`, `delay`, `offset`, and `jitter`.

A2:

```
[whoorma@tk ~]$ ntpq -p
     remote           refid      st t when poll reach   delay   offset  jitter
==============================================================================
 ec2-18-222-136- 96.126.122.39    3 u    1   64    1  151.834   -0.750   0.000
```

`remote` : NTP server we are connected to

`refid` : an opaque 32 bit identifier for the selected upstream peer of the peer - refers to the NTP servers that the remote servers are connected to

`st` : stratum level

`t` : the type that the server is using: unicast, multicast, broadcast, manycast. It is unicast in our case

`when` : how long ago since the last time the server was polled

`poll` : how often the server is polled (usually it's set to 64 seconds)

`reach` : result of the most recent 8 NTP updates (set to *377* (octal system) if all 8 were successful - not the case for us - i honestly don't know why it shows *1*)

`delay` : delay in reaching the server

`offset` : difference between the local clock and the server's clock

`jitter` : network latency

Exercise 2

Q3: What are the lacks of using the Lamport's algorithm?

A3: The algorithm has a few disadvantages:

- Failure of one process may bring the progress down - vectors that interacted with a failed process will not be properly updated
- If we have N processes, then the algorithm's complexity is 3(N-1)* messages per event, since we have 3 types of messages: *request* (send a message), *reply* (receive a message) and *release* (imitate event).

Assignment

You can see the output of the program below and compare it to the picture.


```
[whoorma@tk lab8]$ python main.py
A to B: i dont wanna drink anymore :c
A to B: dude you hear me?
* A ordered more cider *
B to A: yeah i hear you. i'm done too
* A ordered more cider *
* A ordered more cider *
C to B: i wanna get one more cider and then we can go
* B ordered more cider *
B to A: hey, we should stop drinking
B to C: A got shitfaced, let's go pls
* C ordered more cider *
B to C: duude you should stop, let's go

A's final vector: [5, 3, 1]
B's final vector: [2, 5, 1]
C's final vector: [2, 5, 2]
[whoorma@tk lab8]$
```

Figure 2. Three processes, each with its own vector logical clock