Distributed Algorithms 347

Coursework 2

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Introduction

Setup

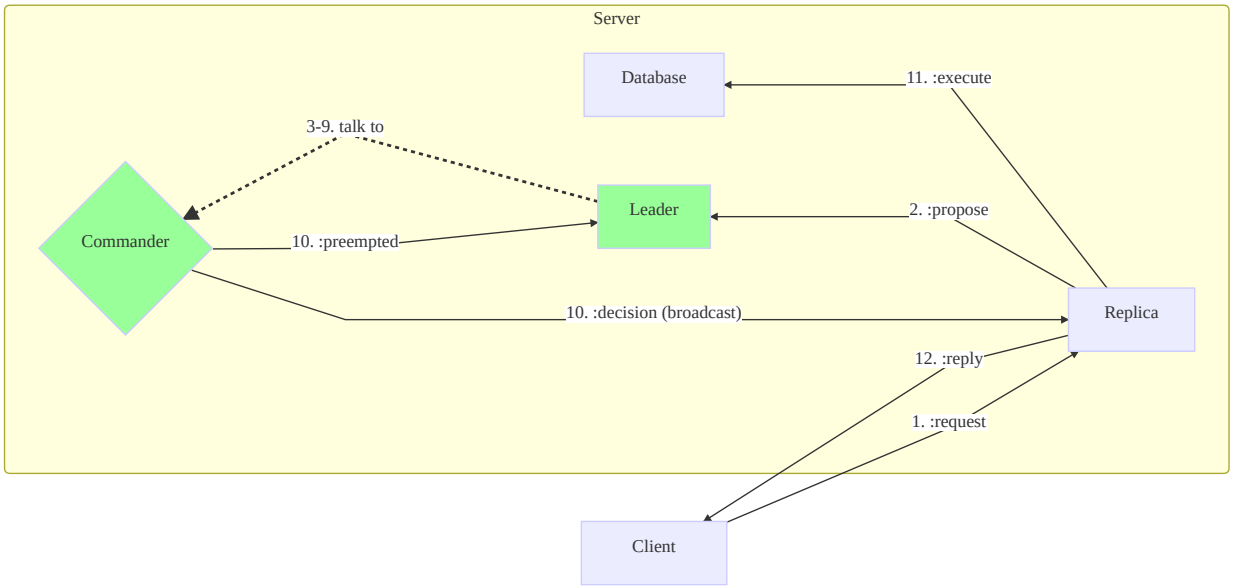
All code mentioned in the current paper were run with the following configuration

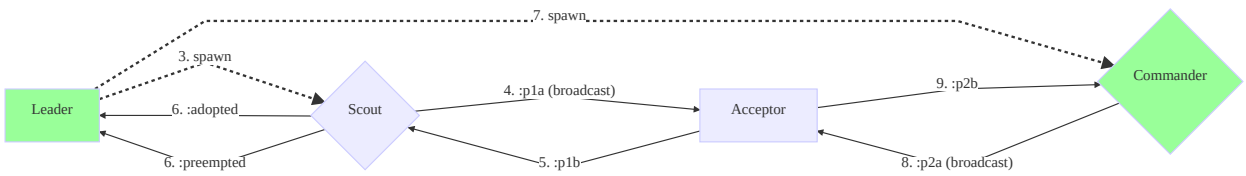
Computer	**Xiaomi Notebook Air**
Processor	Intel Core 2.3GHz x4
OS	Debian Buster64-bit
Memory	7.7 GiB
Elixir	1.3.3
Docker	17.12.0-ce
Docker-compose	1.17.1

System Structure

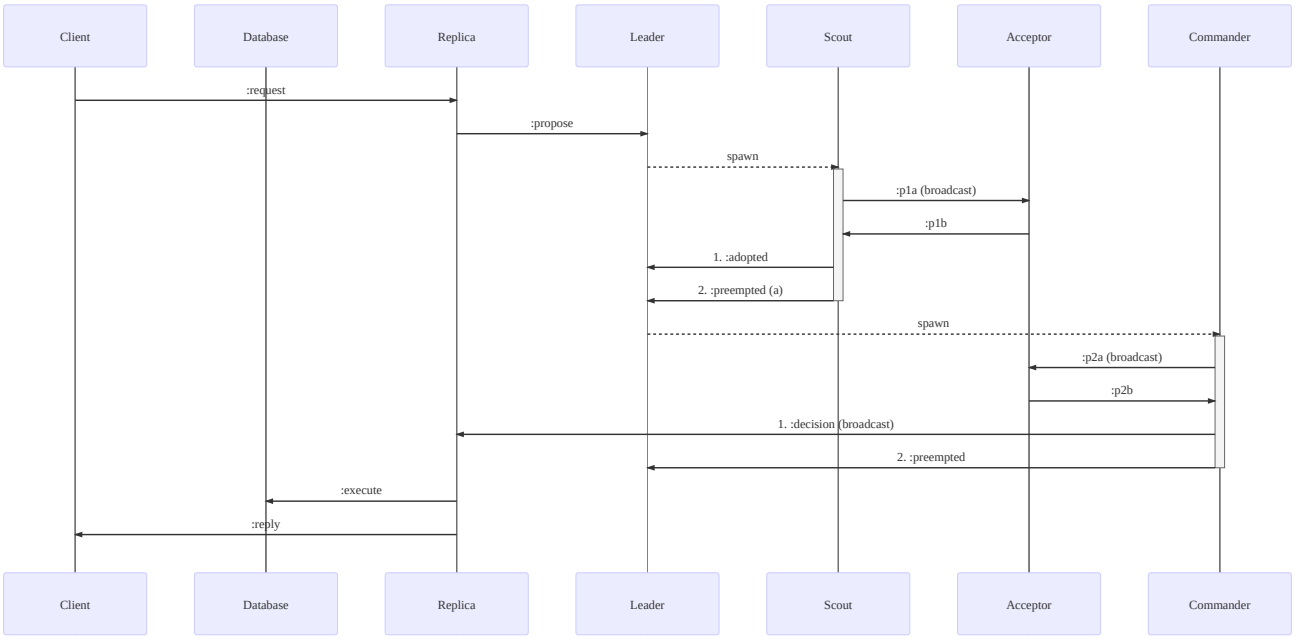
Flowchart

The flowchart is divided in two distinct ones for the sake of clarity.





Sequence diagram



Implementation and evaluation

Tests

- Number of requests $$
- Number of Clients C
- Number of Servers S
- Size of the Window W

- Sending Rate (ms) R

We look at the response time (ms) T

$N = ?, C = 2, S = 3, W = 5, R = 5$

N	T
100	1000
1000	614000
2000	$2701000 \approx 45\text{min}$

The system is slow. It is because in the Paxos paper, a `Leader` should spawn $O(\#\text{proposals})$ `Commander`. Then to perform 500 requests, the algorithm spawns about 250000 `Commander`. After the commander is not needed, I kill but it would be better to reuse it.

$N = 500, C = ?, S = 3, W = 5, R = 5$

C	T
2	44000
10	45000
100	32000

Surprisingly, the number of client has a positive impact on the response time. The more client there is the faster the response time. It may be due to a

$N = 500, C = 2, S = ?, W = 5, R = 5$

S	T
1	2000
3	44000
10	$1873000 \approx 30\text{min}$

The more server there is the more difficult it is for them to synchronise them.

$N = 500, C = 2, S = 3, W = ?, R = 5$

W	T

1	**429000**
5	**44000**
100	**4000**

Window size has a massive impact on the performance of the algorithm. It is because it allows to perform more operation in parallel.

$N = 500, C = 2, S = 3, W = 5, R = ?$

R	T
50	Never performed ($N = 389$)
500	Never perform ($N = 37$)
5000	Never performed ($N = 1$)

Client doesn't have time to perform all of its 250 requests if the sleeps. This sleep time may be random, then it reflects that the infrastructure the client is running on should be reliable.