Reliable Queueing System

Project for the Distributed Systems course AY 2024-2025

Petenzi Roberto and Visconti Alberto

POLITECNICO
MILANO 1863

Goal

Create a **reliable and fault tolerant** system where **brokers collaborate** to offer queues to clients.

POLITECNICO
MILANO 1863

Requirements and assumptions

Requirements:

- Queues are append only, FIFO and need to be replicated by some brokers.
- Clients need to be able to create new queues, append values or read from the queues.
- Brokers automatically track which value each client is supposed to read.

Assumptions:

- Broker’s storage is reliable.
- No network partitions, crash failures for brokers.

Our solution

- **Java** using **TCP sockets**
- **Brokers** divided into leader and followers:
  - Leader handles client requests.
  - Followers get updates from the leader and respond to the clients.
  - If leader fails the follower with the most entries in its queue storage becomes leader.
  - Update when a new peer connects mid-execution the leader brings him up to date
- Clients discard multiple message using the UUID of the message itself.

Add

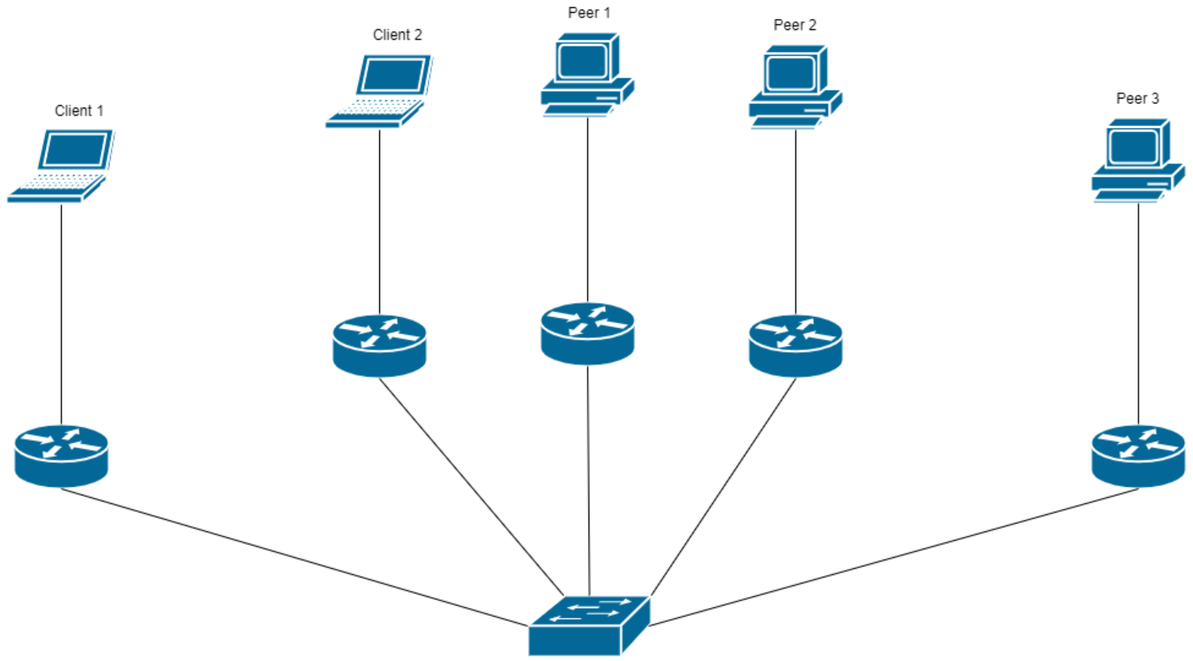
- Client sends message leader
- Leader broadcasts it to other peers
- Probability of a failure: $err\_rate^{(1+(n-1)(1-err\_rate))}$

Read

- Client sends read request, leader broadcasts it to other peers
- All peers respond and client discards duplicate messages via their id
- Client receive messages as long as one peer is up and available

Testing

- Mini-net to simulate real system
- Possible to change link latency and error rate
- We tested a system with two clients and three brokers



POLITECNICO
MILANO 1863

Thank you for your attention

Roberto Petenzi and Alberto Visconti

POLITECNICO
MILANO 1863