RAFT

DNP lab 6
Innopolis University
Fall 2022

RAFT

- Consensus algorithm
  - Allows a collection of machines to work as a single group.
  - Continuous service even if some machines fail.

- Designed for **understability**

RAFT features

1. **Leader election**
   - Select one of the servers as the leader
   - Detect crash, choose new leader

2. **Normal operation (Log replication)**
   - Leader appends commands from clients to its log
   - Leader replicates its log to all other servers

3. **Safety**
   - Keep logs consistent
   - Only servers with up-to-date logs can become leader

RAFT features

1. **Leader election**
   - Select one of the servers as the leader
   - Detect crash, choose new leader

Your task for this lab

2. **Normal operation (Log replication)**
   - Leader appends commands from clients to its log
   - Leader replicates its log to all other servers

3. **Safety**
   - Keep logs consistent
   - Only servers with up-to-date logs can become leader

RAFT features

- **Three server states:**
  - Follower
  - Candidate
  - Leader

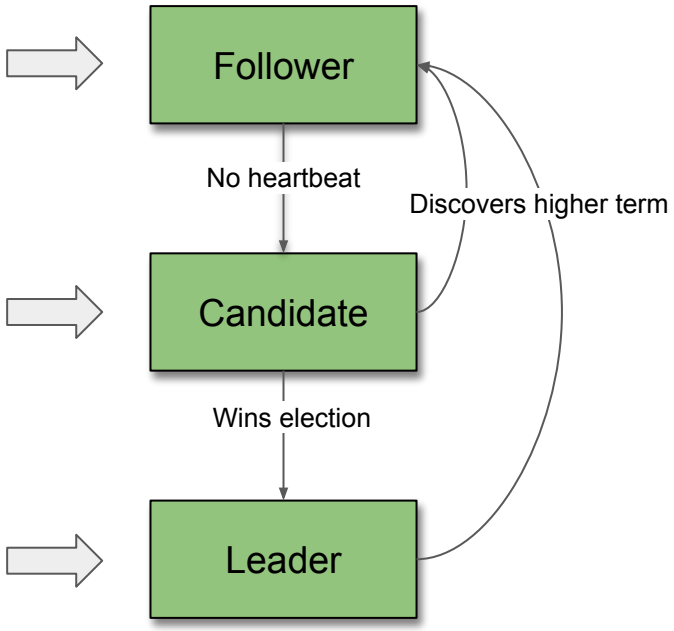
- **Terms** - the life cycle of the system is divided into terms

Server States

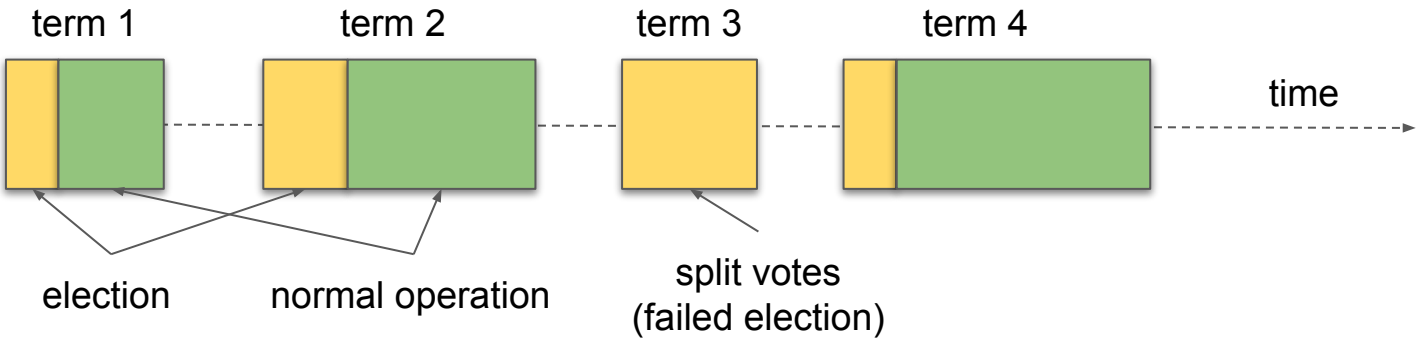
Follower - Initial state of the server. Just receives heartbeats

Candidate - sends out **RequestVote** to be chosen as leader

Leader - sends out **AppendEntries** as heartbeats and to replicate its logs

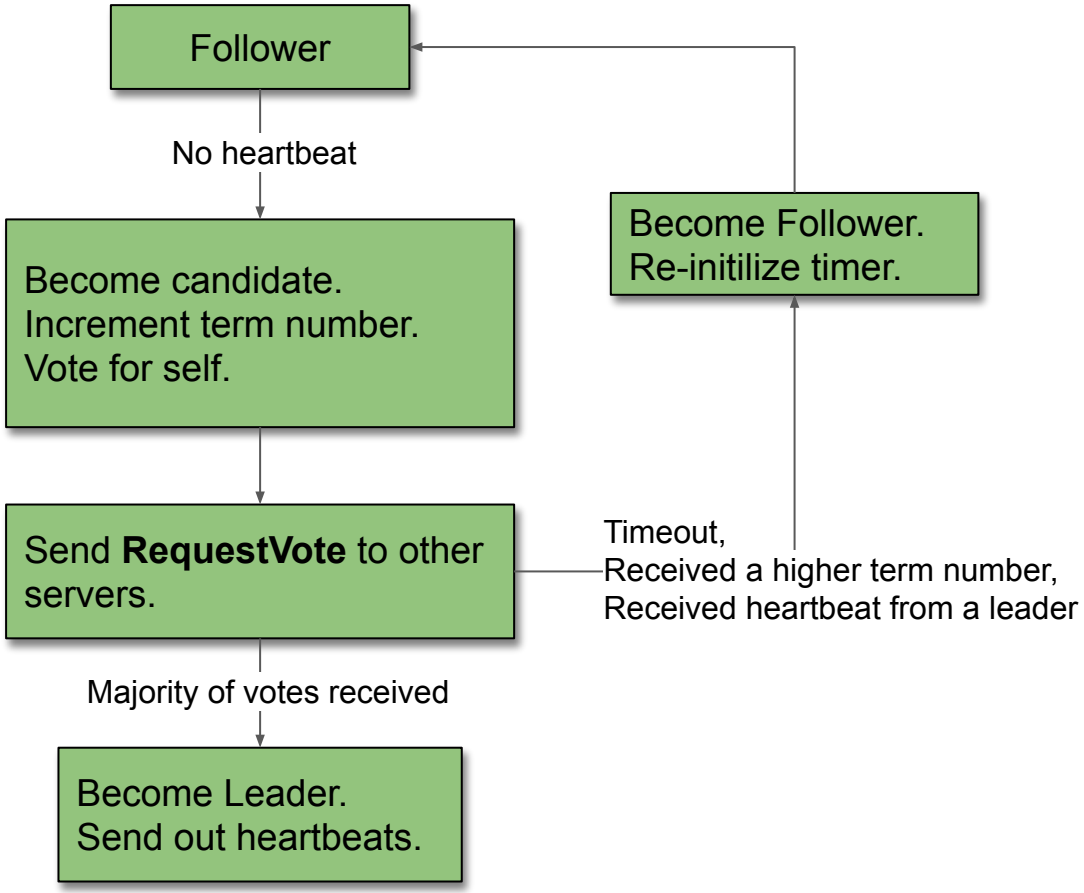


Terms



- At most one leader per term
  - May be no leader (failed election)
- Each server maintains its own **term number**
  - Received higher term? Update term number, become follower.
  - Received lower term? Answer with error.

Leader election



The end!