Plan

* Recitation Qs
* Recap: Big picture
* Raft: Common case
* Raft: Failures
* Scenarios

Logistics

* DB hands-on due tomorrow, May 5
* Design project due May 11
* Rest of 6.033 is about security
1. What does “understandability” mean in Raft context?

2. Did they succeed?

3. Why is understandability important?
   - Fewer bugs
   - No surprises
   - Simplicity
The Big Picture

Rast Cluster sometimes = set of servers

Admin

DENY(ami, 32)
ALLOW(henry, 32)

Allowed(ami, 32)!

Door

y/n

Door
Goal: Implement/Simulate a never-fail server w/ many sometimes-fail servers.
Normal operations in Raft

Fail-stop Failure

ALLOW(amiv, 32)

ok

Leader

ok
Why a majority of servers?

“Split brain”
How does Raft recover from Leader failure?

* When a follower doesn't hear from leader for a while, they run election.

* Note w/ most "up to date" log wins.

* Leader never deletes its log entries.

Note w/ most "up to date" log wins.
Rules to Remember (2019 Final)

* Server w/ most up-to-date log wins
* Ten increases w/ each election
* Majority to wins.
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Understandability

- Know what you're doing
- Apply concepts elsewhere
- Easier to understand → more useful
- Avoids bugs
Goal:
- Achieving Consensus on log from client
- Strong leader w/ election
- Majority of nodes w/ correct info
- Sustain node failures.

Goal: Implement a never-fail server on a cluster of sometimes-fail servers.

Fail-stop
Sailure
1. Client talks to leader
2. Leader sends append req to follows
3. When leader hears from majority (\(\geq 2\)):  
   - applies change to its “state machine”
   - replies to client
What happens when leader fails?

Leader vote for me?

Vote for me?

1 1 2 3 1
When a new leader gets elected...

- Its log is authoritative

- Committed entries stay committed (safety)

- Followers' logs may be inconsistent w/ leader's log — leader takes precedence.

- In election, majority up-to-date log wins
- Term # increases w/ each election
- Majority to win.
Example Scenarios (2017 Final)

S1

1 | 2 | 3

S2

1 | 2

S3

1

S4

1 | 4

S5

1 | 4 | 5