HY559
Infrastructure Technologies for Large-Scale Service-Oriented Systems

Kostas Magoutis
magoutis@ics.forth.gr
http://www.ics.forth.gr/~magoutis
Paxos

• Asynchronous consensus
  – Network can delay, reorder, lose (but not corrupt) packets

• Can guarantee safety
  – Replicas will agree on a single value

• Need additional assumptions to ensure progress
Paxos setup

- Be able to agree in the presence of up to $f$ failures
  - $2f+1$ nodes
  - Agreement when majority $(f +1)$ agrees on a value

Lecture #17 – Chubby
Need to try to get a majority to accept

Lecture #17 – Chubby
Paxos – phase 1

[Diagram showing the Paxos protocol with phases and roles such as proposer, acceptor, learner, and client, with steps involving prepare requests, proposal acceptance, and value write to stable store.]
Paxos – phase 2

Lecture #17 – Chubby
Paxos – communicate agreement

Lecture #17 – Chubby
Paxos – majority learns outcome

Lecture #17 – Chubby
Paxos – learning chosen value

Lecture #17 – Chubby
Paxos – propagate chosen value

Lecture #17 – Chubby
Paxos – everyone learns outcome

Lecture #17 – Chubby
Example

Lecture #17 – Chubby
Example (contd.)

Lecture #17 – Chubby