Unanimous

In Pursuit of Consensus at the Internet Edge

EuroSys Doctoral Workshop
20th April, Bordeaux
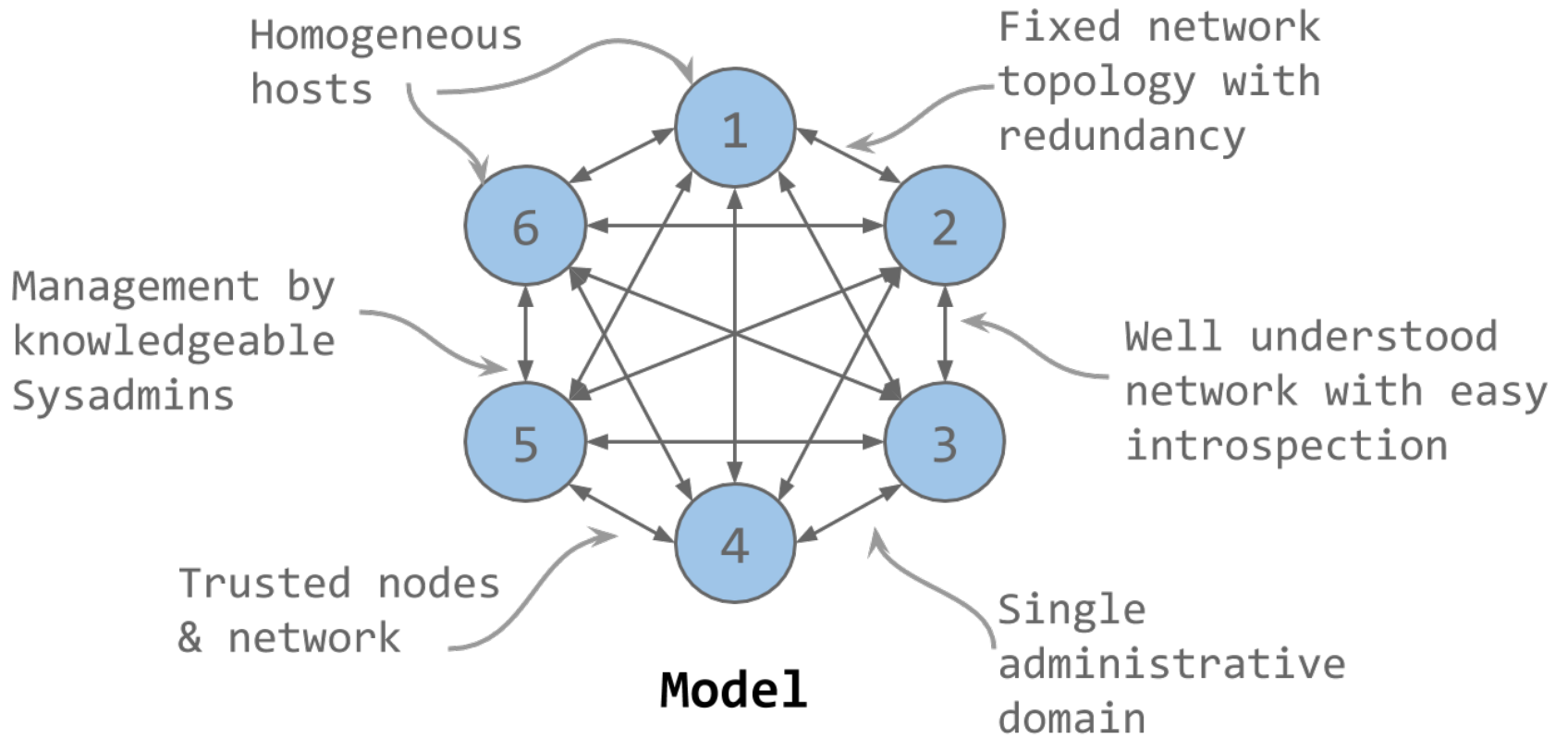
Heidi Howard
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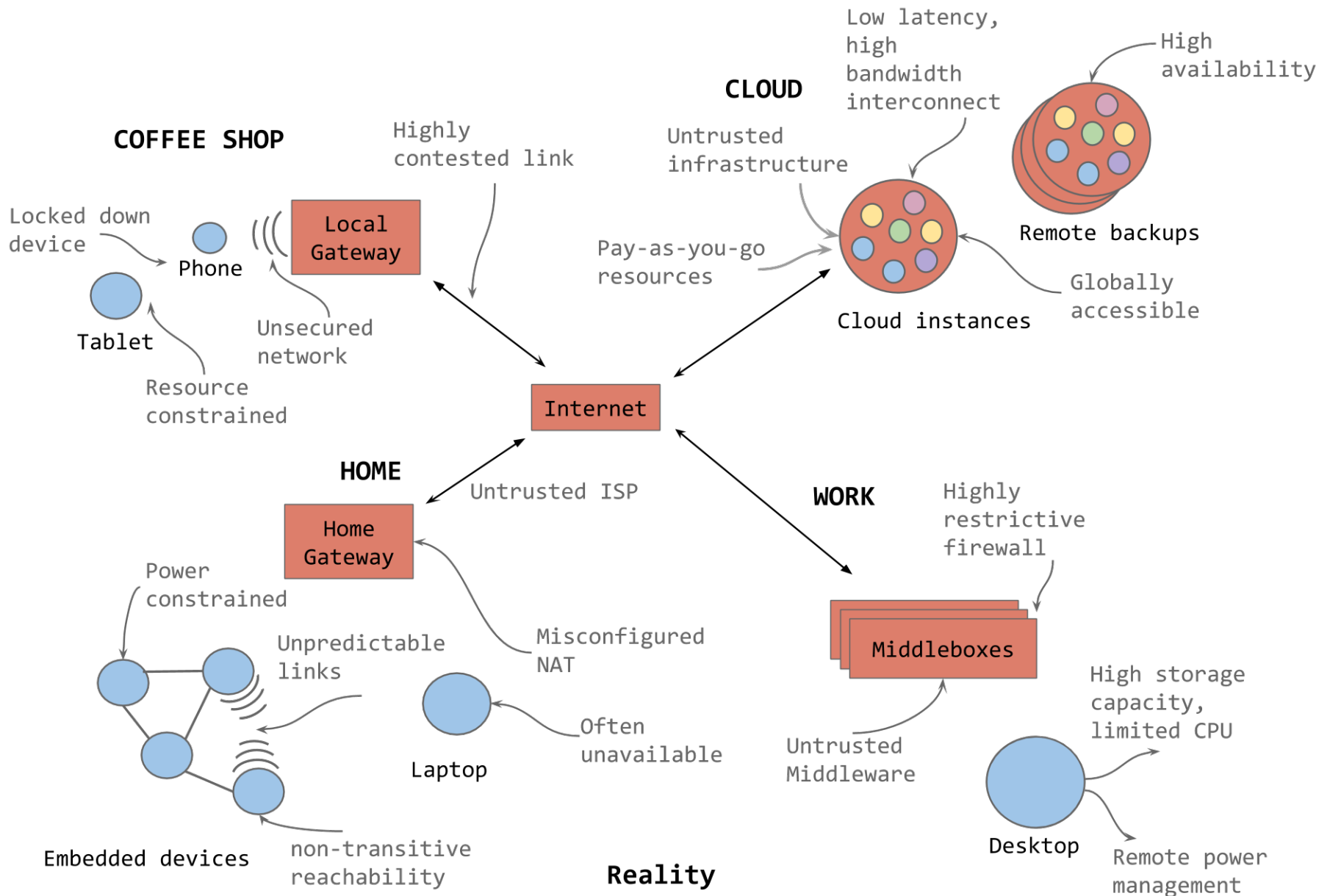homepage: www.cl.cam.ac.uk/~hh360
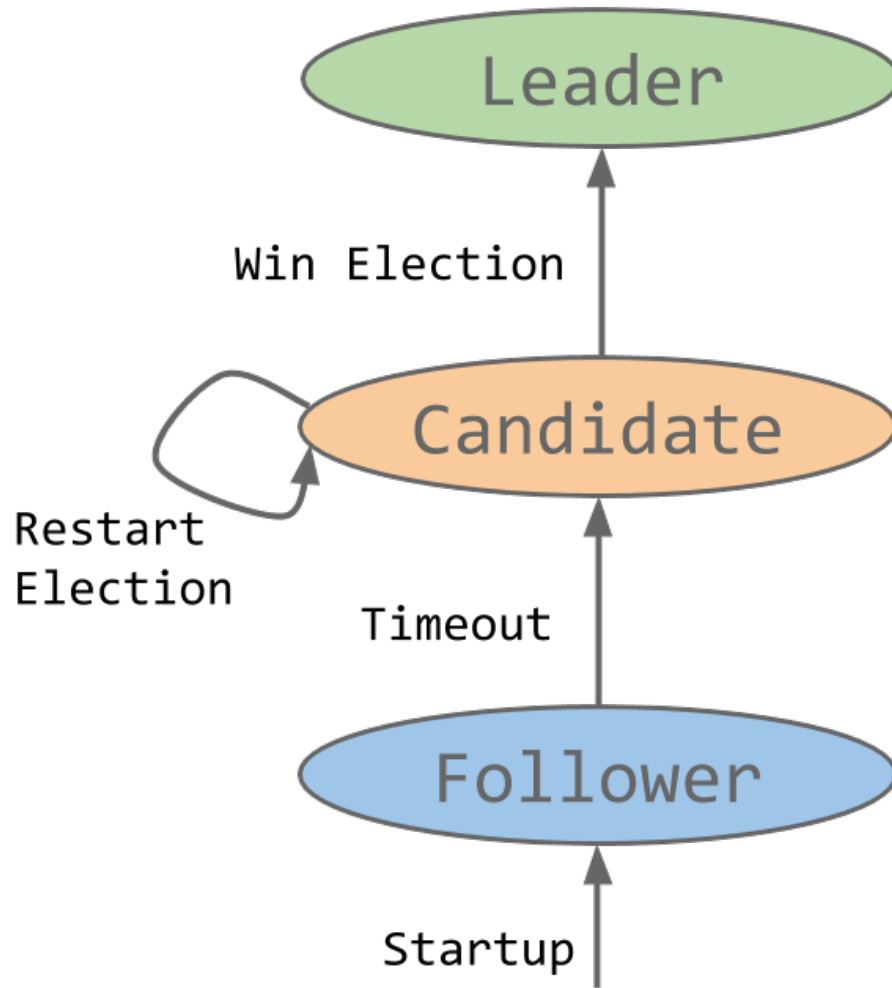twitter: @heidiann360

Homogeneous
hosts

Fixed network
topology with
redundancy

Management by
knowledgeable
Sysadmins

Well understood
network with easy
introspection

Trusted nodes
& network

Single
administrative
domain

Model

Problem
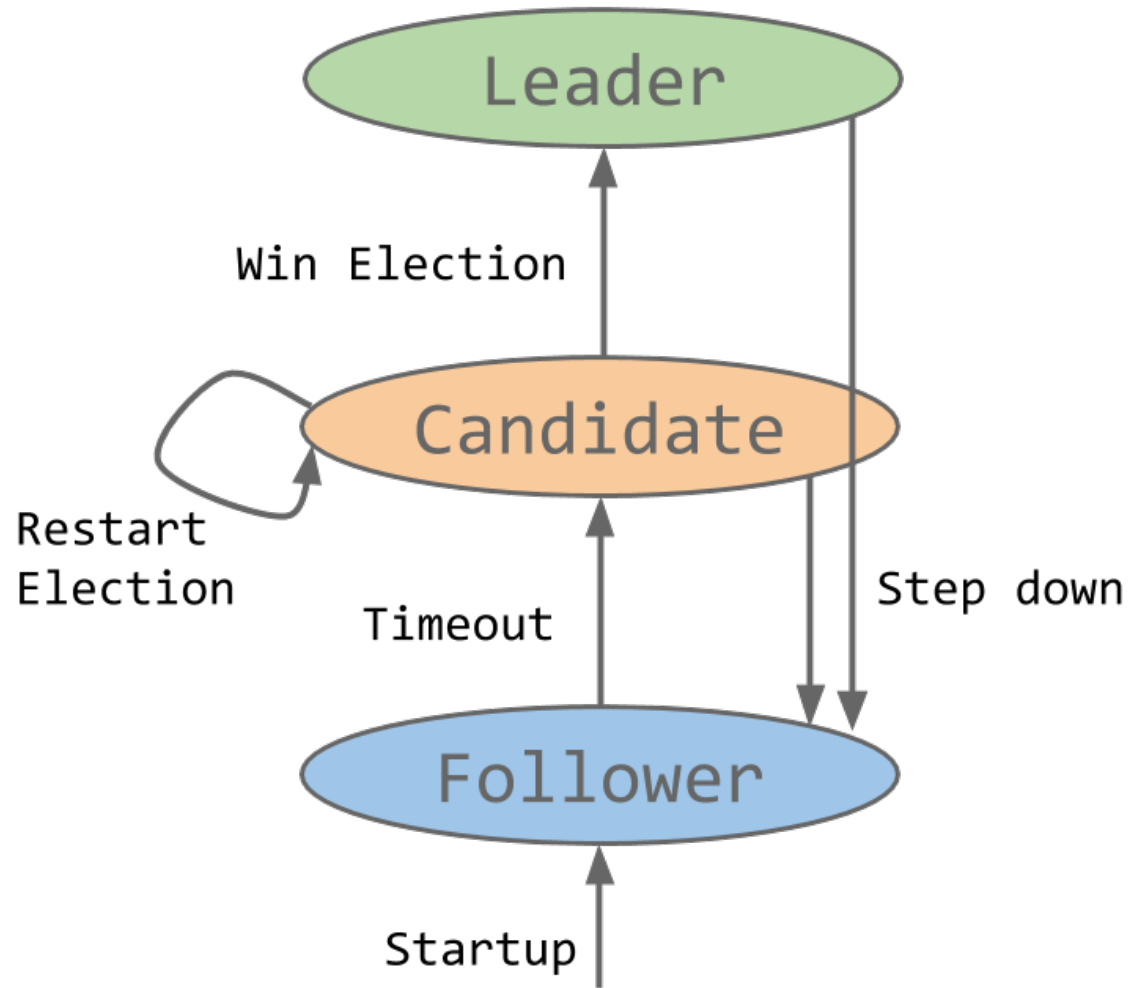
Developing fault-tolerant applications for the Internet edge is hard.

COFFEE SHOP

Locked down device

Phone

Tablet

Resource constrained

Unsecured network

Highly contested link

Local Gateway

CLOUD

Low latency, high bandwidth interconnect

High availability

Untrusted infrastructure

Pay-as-you-go resources

Remote backups

Globally accessible

Cloud instances

Internet

Untrusted ISP

HOME

Home Gateway

Power constrained

Unpredictable links

Misconfigured NAT

Laptop

Often unavailable

Embedded devices

non-transitive reachability

WORK

Highly restrictive firewall

Middleboxes

Untrusted Middleware

High storage capacity, limited CPU

Desktop

Remote power management

Reality

Quick Intro to Raft

Quick Intro to Raft

Example:
Asymmetric Reachability in Raft
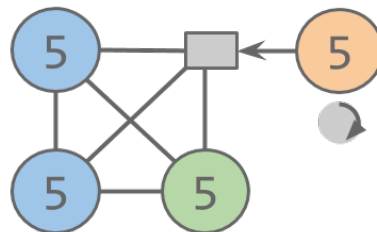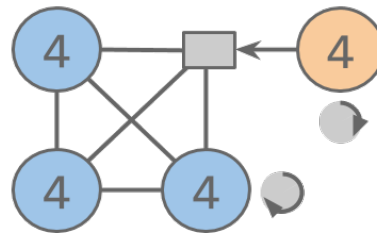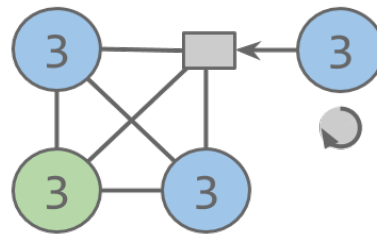
Approach

1. designed for developer usability and performance.

2. based on the reality of the modern internet.

3. conservative leader election with smart failure detectors.

4. various degrees of passive participation.

Comments & Questions

"In my experience, all distributed consensus algorithms are either:
  1: Paxos,
  2: Paxos with extra unnecessary cruft, or
  3: broken." - Mike Burrows

let's continue the discussion:

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