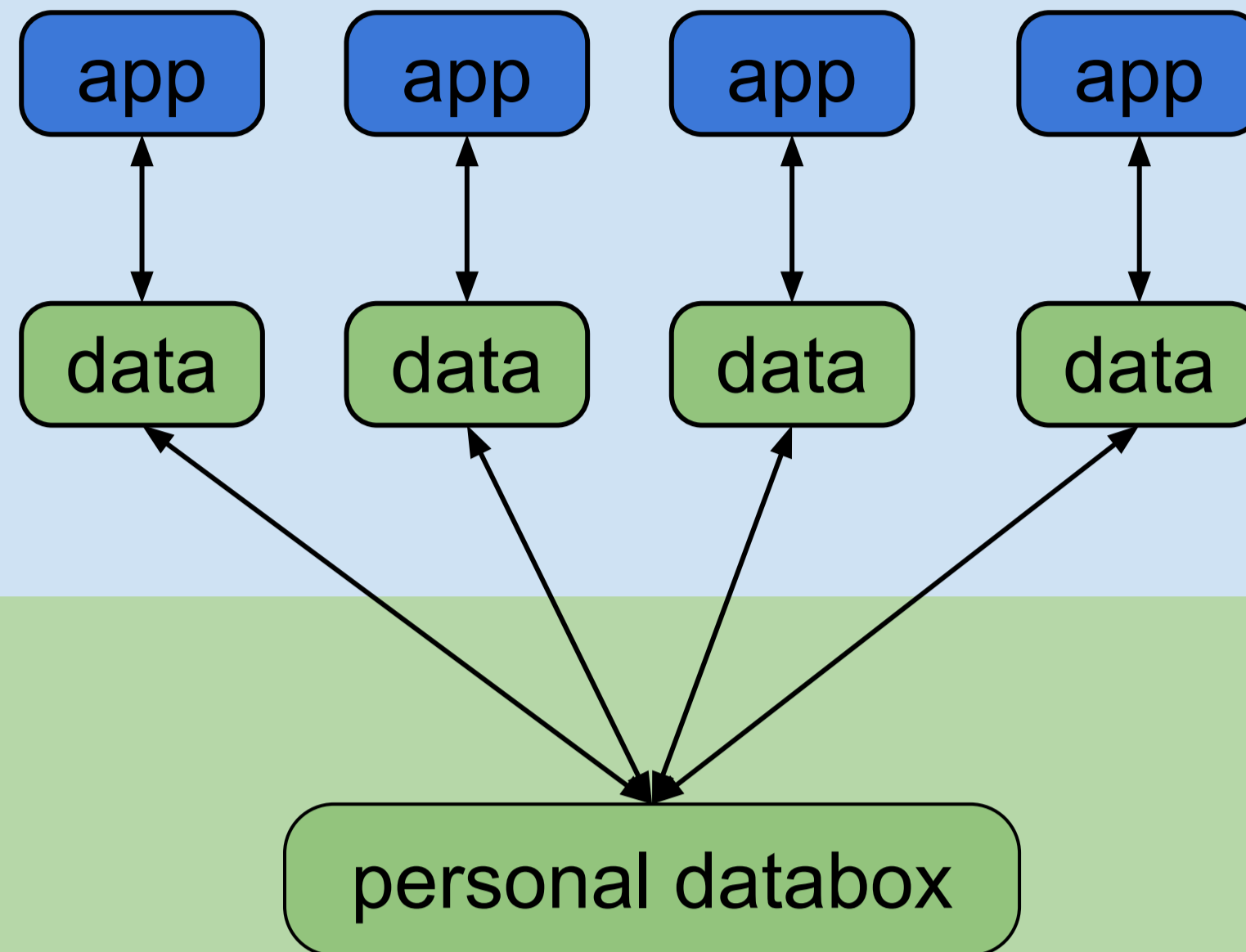# Life on the Edge:
New Abstractions for Edge Network Distributed Computing

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Application Layer

Aim
To provide a **viable alternative** to today's third party centralised services, by utilising existing devices on the **edge network**.

Motivation
Your digital life is out of control and out of your control.

- opaque terms of service
- mass surveillance
- government censorship
- data breaches
- content manipulation for profit
- targeted advertising
- no service guarantees

Databox

Problem
Users want to **take back control** of their personal data.

Solution
A self-hosted platform to enable users to engage with the **collection**, **management** and **consumption** of their personal data.

Unanimous

Problem
Distributed algorithms are **designed for the datacenter**. They assume a fixed network topology with redundancy and well understood link characteristics, homogeneous hosts and management by knowledgeable sysadmins.
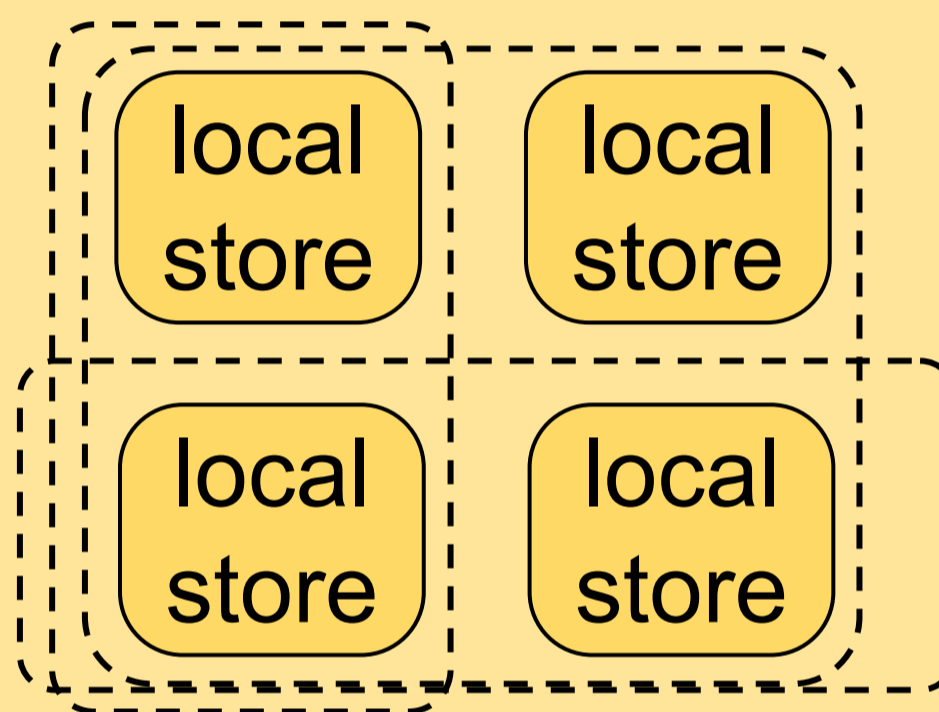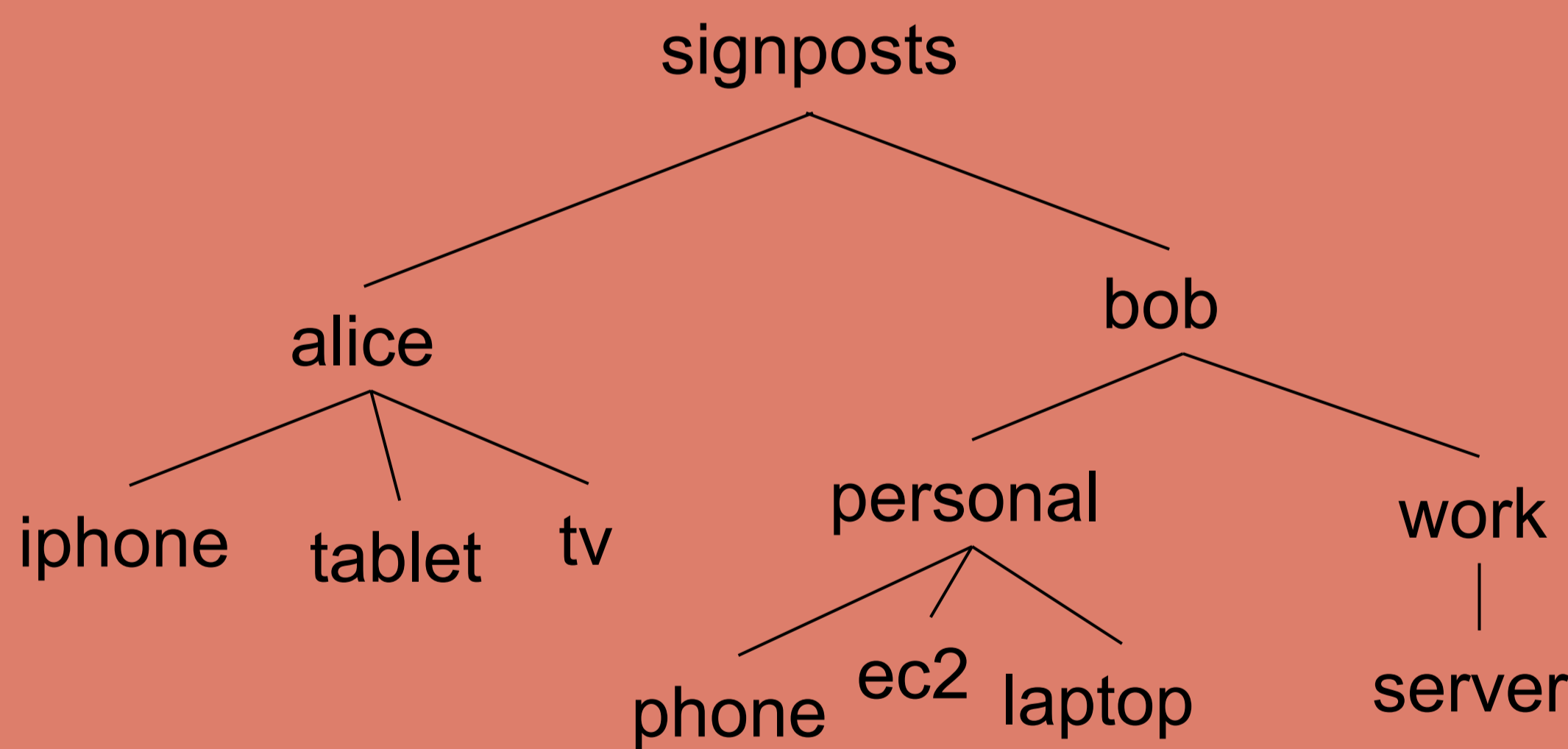

Solution
A new distributed consensus algorithm, designed specifically to **tolerate edge network failures** and whose configuration parameters reflect application needs such as caching, consistency and dynamic membership.

Signposts

Problem
Establishing **authenticated identities** and **secure channels** between edge network devices.


Solution
Give **every device** a user friendly domain name. Channels between devices are created as **a side effect of DNS resolution** and devices appears as if local thus supporting legacy devices & applications.

Edge Network

Challenges

- **heterogeneous & often resource constrained hosts**
- asymmetric and nontransitive reachability
- diverse & unpredictable link characteristics
- mobile hosts and networks
- layer violations by poorly understood middleboxes
- network externalities and high switching costs
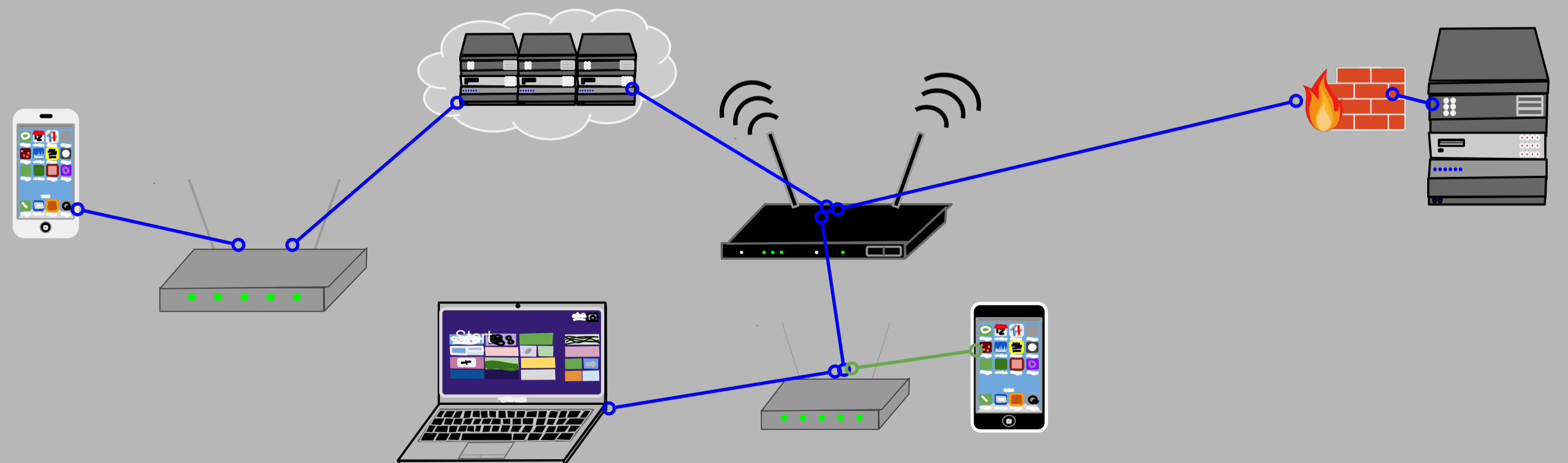
Read more

Hamed Haddadi, Heidi Howard, Amir Chaudhry, Jon Crowcroft, Anil Madhavapeddy and Richard Mortier. Personal Data: Thinking Inside the Box. preprint arXiv:1501.04737 [cs.CY]

Heidi Howard, Malte Schwarzkopf, Anil Madhavapeddy and Jon Crowcroft. Raft Refloated: Do We Have Consensus? SIGOPS Operating Systems Review

Charalampos Rotsos, Heidi Howard, David Sheets, Richard Mortier, Anil Madhavapeddy, Amir Chaudhry, and Jon Crowcroft. Lost in the Edge: Finding Your Way with DNSSEC Signposts. 3rd USENIX Workshop on Free and Open Communications on the Internet

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