Centralized Architecture
The Barriers to Overthrowing Internet Feudalism

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ABSTRACT
Today’s Internet scarcely resembles the mythological image of it as a fundamentally democratic system. Instead, users are at the whims of a small number of providers who control nearly everything about users’ experiences on the Internet. In response, researchers and engineers have proposed, over the past decade, many systems to re-democratize the Internet, pushing control over data and systems back to the users. Yet nearly all such projects have failed. In this paper we explore why: what are the goals of such systems and what has caused them to run aground?

1 INTRODUCTION
Five years ago, Bruce Schneier noticed something curious
Peer-to-peer Architecture
Peer-to-peer Architecture

Issues:

- Slow
Peer-to-peer Architecture

Issues:

- Slow
- Data is not always available
Peer-to-peer Architecture

Issues:

- Slow
- Data is not always available
- Not easy to use
Peer-to-peer Architecture

Issues:

- Slow
- Data is not always available
- Not easy to use
- Not suited to mobile battery-powered devices
Issues:

- Slow
- Data is not always available
- Not easy to use
- Not suited to mobile battery-powered devices
- Privacy is hard
Federated Architecture
Federated Architecture

Issues:

- Privacy
Federated Architecture with End-to-end Encryption
Federated Architecture with End-to-end Encryption

Issues:

- Privacy
Federated Architecture with End-to-end Encryption

Issues:

- Privacy
- Not resilient to server downtime
Federated Architecture with End-to-end Encryption

Issues:

- Privacy
- Not resilient to server downtime
- Must trust the servers
Resilient Server-Assisted Architecture
How to do this:

- Decentralized identities with public key cryptography
- Decentralized content with CRDTs
- Safety with cooperative verification by users
- Efficiency with suitable Merkle data structures
  A. Auvolat, F. Taïani, *Merkle Search Trees: Efficient State-Based CRDTs in Open Networks*, SRDS 2019