Decentralized Internet: Back to the Future?

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EARLIER INTERNET

Advanced Research Projects Agency Network (ARPANET) 1969
UCLA and Stanford Research Establishment

The two PCs had the option to communicate something specific from one hub to the other creation it conceivable to set up a one of a kind transmission.

- Decentralized
- Secure since each node was independent
- Peer-to-Peer connectivity

The extra dependency of people on the internet paved the way for it to be commercialized when the tech companies realized that they could make money out of the venture

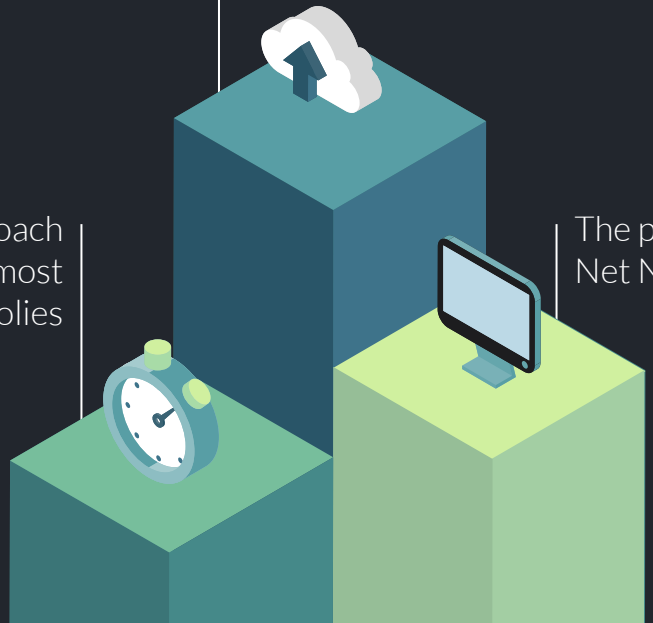
CENTRALIZED

Reasons why the web is centralized

Directing traffic to one network

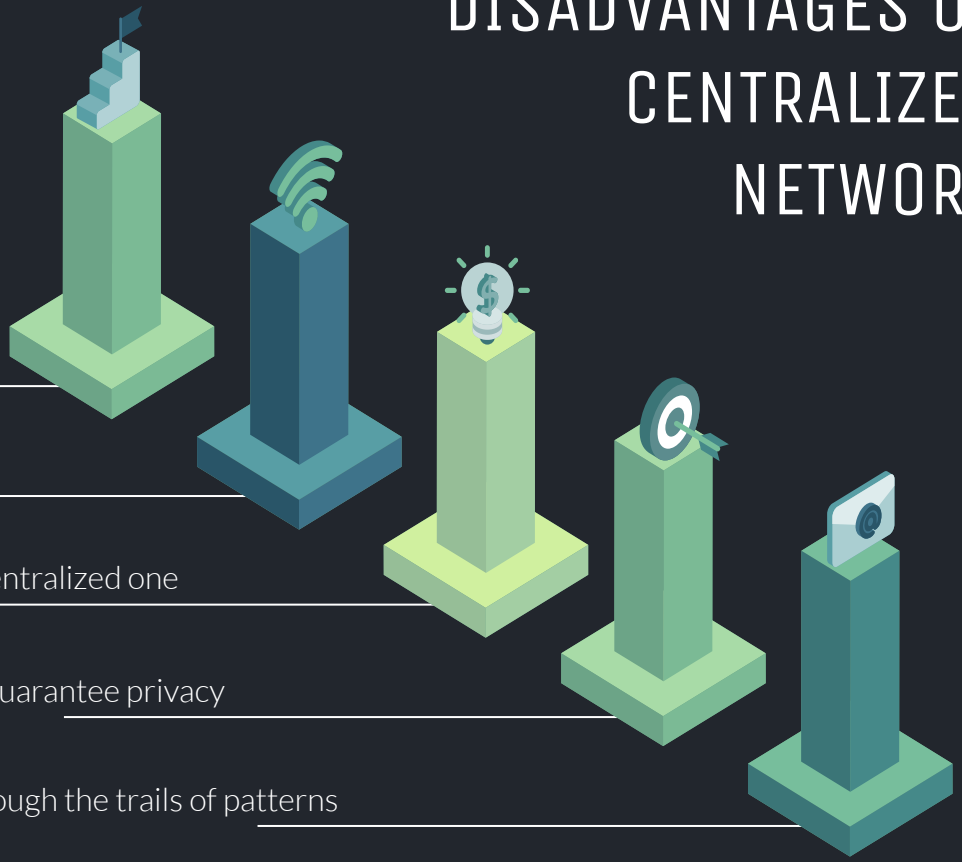
Marketing approach that is adopted by most monopolies

The principle concept of Net Neutrality



CENTRALIZED

DISADVANTAGES OF CENTRALIZED NETWORK



Failure in case the main servers are corrupted

Centralized network scheme relates to access

Centralized network is easier to attack compared to a decentralized one

Centralized network is not safe from a breach and do not guarantee privacy

Data mining, firms can predict behaviors of consumers through the trails of patterns

DECENTRALIZED

How is decentralization achieved?

INFRASTRUCTURE

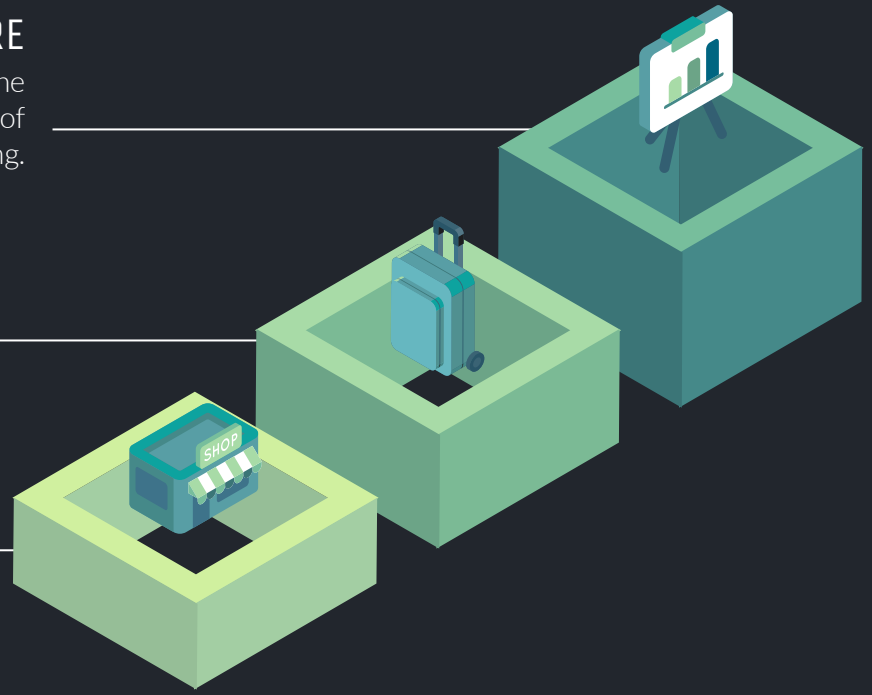
The distribution of tasks needed for maintaining a service within the system. The provisioning of infrastructure impacts the design in terms of trust and message routing.

NETWORK TOPOLOGY

In decentralized system, there are two distinct topologies.
1) network topology : connections between nodes to route traffic.
2)authority topology : power relations between the nodes.

AUTHORITY

Relation among nodes in terms of authority and describe mechanisms which potentially effects of power disparity that could harm the security and privacy of users.



How is decentralization achieved?

INFRASTRUCTURE

1) User-based Infrastructure
2) User-independent Infrastructure
3) Hybrid Systems

NETWORK TOPOLOGY

1) Network topology
2) Authority topology
3) Mesh
4) Distributed Hash Tables (DHT)
5) Super-nodes
6)Stratified

AUTHORITY

1) Ad-hoc: Nodes Interact Directly
2) P2P: Nodes Assist Other Nodes
3) Social-based: Nodes Assist Friends
4) Federated: Providers Assist Users

How does decentralization support privacy?

Confidentiality from Third Parties

Confidentiality from Peers

Anonymity

Deniability

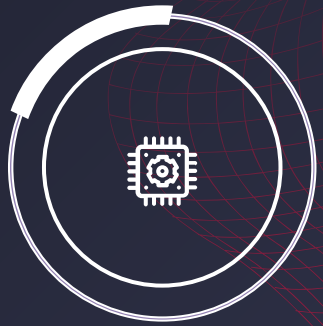
Covertness

THE ADVANTAGES OF DECENTRALIZATION

Flexible Trust Models

1) Distributed Trust
2) No Natural Central Authority
3) Leveraging Existing Trust Networks

Distributed Allocation of Resources Assists with Ease of Deployment



Resilience Against Formidable Adversaries

1) Location Diversity
2) Survivability
3) Separation of Development from Operations
4) Publicly Verifiable Integrity

Analysis of Decentralized Internet Systems

Social Networking System

InterPlanetary File System (IPFS)

Secure Scuttle-Butt(SSB)

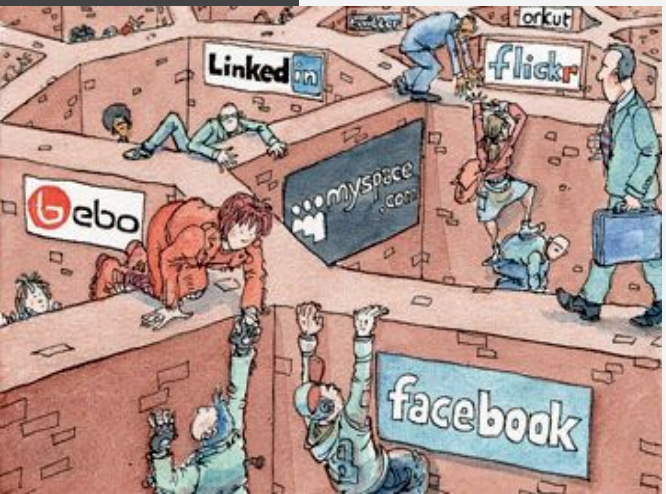
Dat/Hypercore/Beaker

Internet of Things

BitTorrent

SOCIAL NETWORKING SYSTEM

- Users do not have to be bounded by a particular social networking service
- Can provide the same or even higher level of user interaction
- Based on open technologies such as Linked Data, Semantic Web ontologies, open single-signon identity systems, and access control.



- URIs as identifiers throughout allows the decentralized framework to be distributedtion

INTERPLANETARY FILE SYSTEM (IPFS)

IPFS is to create a decentralized file-sharing system.

Storing records on those files so that they are never lost.

Combination of Git, BitTorrent, and Hash Tables.

SECURE SCUTTLE-BUTT(SSB)

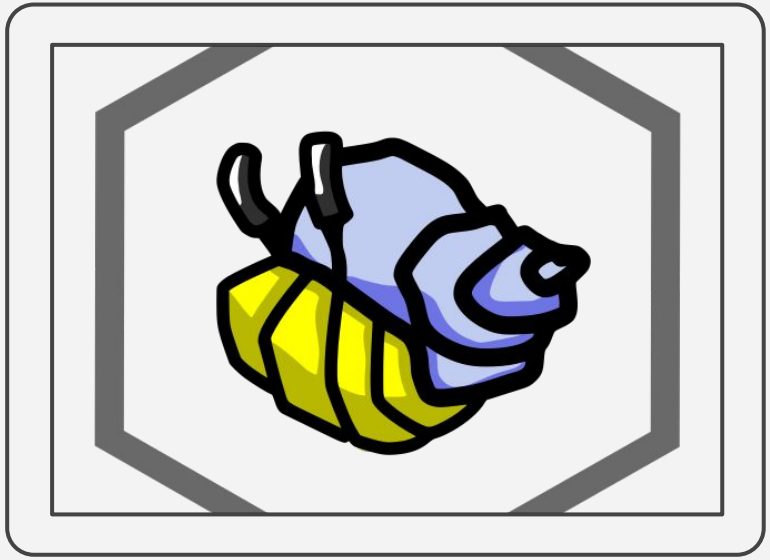
Distributed social network that is responsible for replicating messages

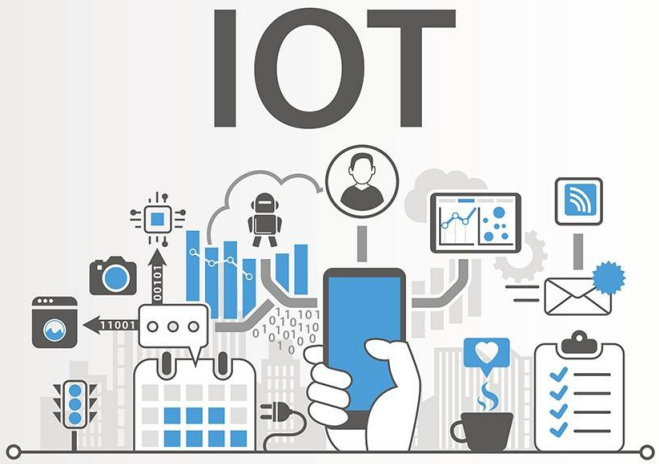
Each node is referred to as a Scuttleverse

Fascinating idea behind SSB is that it can function offline

SSB also uses similar techniques such as Git (DIstributed Version Control System)

It allows users to discover each other over the local network





INTERNET OF THINGS

IoTeX is a blockchain solution that connects the Internet of Things in a network environment

The aim is to integrate Internet of Trusted Things and privacy within the blockchain, which happens to be the most trusted crypto company

Mainnet implements Root Chain on which new Layer 2 chains, tokens, Apps, and businesses will be launched

BITTORRENT

Protocol that supports peer-to-peer file sharing to distribute large amounts of data.

Transferring data files from one massive server to every user over an extremely robust network and splits it up to multiple normal PCS and multiple smaller networks.

Not like the client-server approach where users depend solely on the file's original distributor.

Form of decentralized network that allows adequate mirroring.

CONCLUSIÓN

Our analysis points to some fundamental trade-off between availability, privacy, and integrity in decentralized systems: A good design for one is an unsafe design pattern for another. Systems use a wide variety of infrastructure, network topology, and authority relation choices

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thanks

Does anyone have any questions?

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