

Guiding Principles

Effects on Internet & Web Architecture

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Is there an Internet
"architecture"?

Some principles

From RFC 1958 (1996), *Architectural Principles of the Internet*

- Goal of global connectivity, through a single network-of-networks
- End-to-end functions should be performed by the end-systems
- There is no centralized control of the Internet
- Modularity is good

The end-to-end principle

Workshop questions

End-to-end functions can best be realized by end-to-end protocols, instead of intelligence hidden in the network

- *How do different solutions place requirements on end devices, vs. network or intermediary elements?*

Reusing building blocks

Workshop questions

Internet and web protocols are most successful when they leverage and create reusable building blocks

- *Are solutions able to leverage existing protocol building blocks?*
- *How will any new mechanisms for solutions be used in the future to solve other problems?
What do we anticipate about those?*

Extensibility & evolution

(RFC 9170)

- Protocol "ossification" is a major challenge with Internet protocols
 - Implementations end up locked into old versions due to the ecosystem being intolerant of updates
- Protocols need to plan to be updatable and maintainable
 - Actively using extension points is best
 - Minimize the number of extension points, and use them more

Extensibility & evolution

Workshop questions

- *How will solutions adapt to future requirements and technologies?*
 - *New categories of content*
 - *New cryptographic algorithms*

Avoiding centralization

(RFC 9518)

- Centralization is when a small number of vendors/operators/entities can control a function of the Internet
- The Internet is designed to be inherently decentralized
 - However, many pressures have led to centralization in some areas
- Centralization can create chokepoints, reduce innovation, lead to widespread outages, etc.
- Centralization can also have positive aspects, such as simplified discovery, consistency, and improving economies of scale

Avoiding centralization

Workshop questions

- *How would different solutions lead towards centralization?*
 - *Are solutions calling for central entities to perform functions for whole populations?*
- *Can solutions be accomplished in decentralized ways?*

Avoiding fragmentation

- The Internet is a single, global, interoperable network-of-networks
 - Protocols over IP and the Web are designed to work from anywhere
- Fragmentation occurs when a subset of users can access only a subset of the Internet
 - This can lead to "walled gardens", and reduce global access
 - Requiring specific hardware or software versions to access content is a form of fragmentation

See <https://www.internetsociety.org/resources/internet-fragmentation/>

Avoiding fragmentation

Workshop questions

- *How could different solutions lead to Internet and Web fragmentation?*
- *Do solutions imply requirements that cannot be met by some hardware or software?*
- *How will solutions behave for different users in different jurisdictions or regions?*