

# One version of networking's future

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Note: Opinions expressed are solely those of the speaker



- For most people, Internet  $\equiv$  Web
- But when networking was created, data didn't live on computers:
  - ▶ Networking was for resource sharing.
  - ▶ Its communication model was a conversation between two machines.

# Conversational communication doesn't work for today's zettabytes of content

- Since we get content via machine-to-machine conversation, we end up equating what we want with where it is.
- Popular content requires a very fat pipe (disenfranchises creators, encourages distribution monopoly).
- Conversation data follows a single path from source to destination (creates gatekeepers, discourages access diversity, encourages carrier monopoly, spanning tree acts as a lens to magnify attacks).
- Discriminates against mobility (need an IP identity to supply or retrieve content).

## ... and leads to totally ineffective, unworkable security

- Since content is opaque to the network, 'security' consists of wrapping armor around a conversation — we secure the container, not the content.
- This doesn't work: Attackers get in at the seams and the attack surface increase exponentially as the system grows.
- Carriers (and an OS vendor) have sought to increase their monopoly on the (spurious) grounds that it decreases seams and, thus, attack surface.
- Consumers get marginalized and victimized: Trust decisions are delegated to a set of self-selected 'root authorities'; producer-to-consumer integrity is impossible to assess.

# Research landscape

- Today's communication architecture has its roots in history, not the laws of nature.
- Many 'point solutions' (virtualization, CDNs, p2p, cloud services) indicate that what is far more important today than where.
- Some current (mostly EU) research efforts are creating content-based communications architectures (PSIRP, 4Ward, Haggler, CCN).