

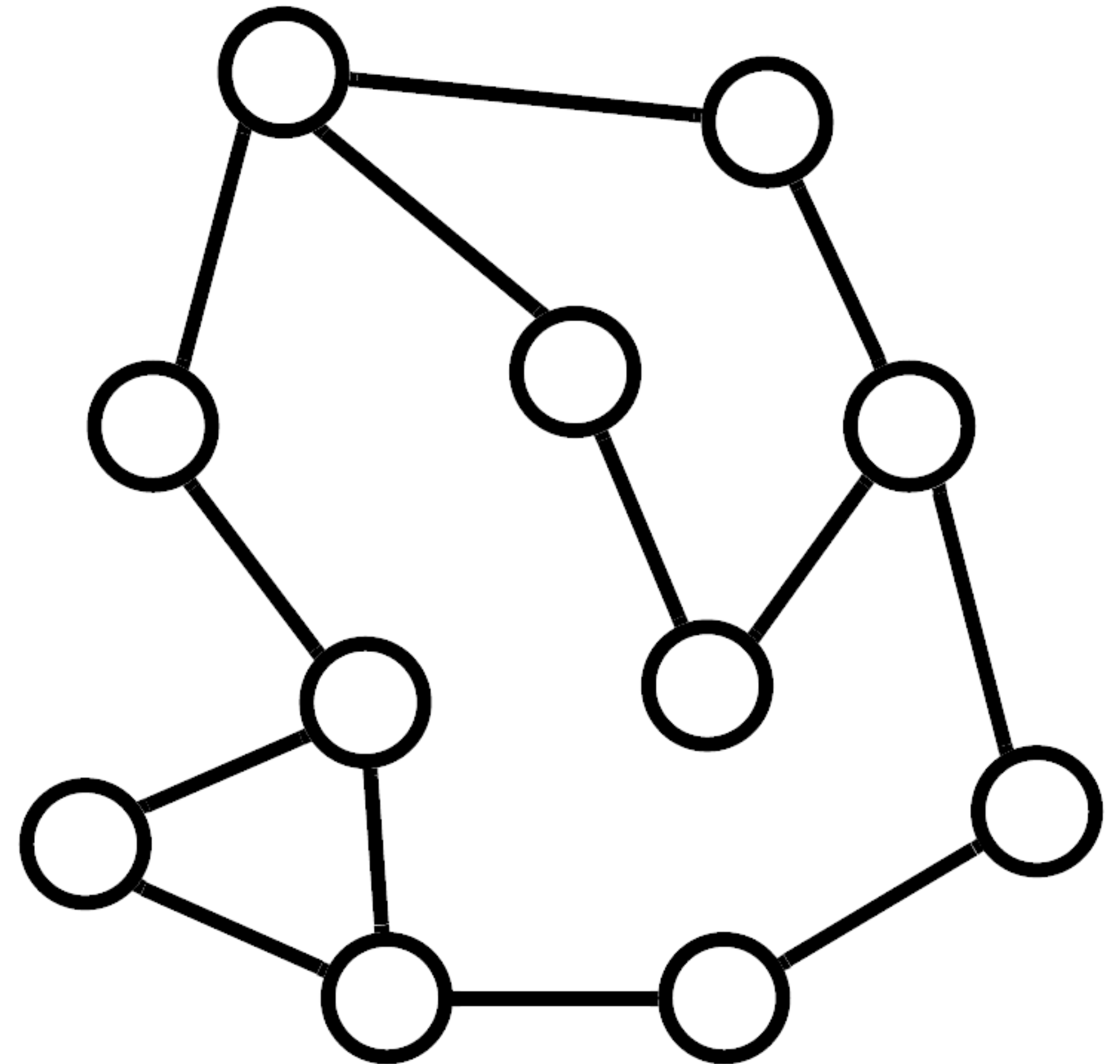
Paraweb

Networked Invisibility

The Modern Web: Tech Stack

High degree, high throughput, low latency

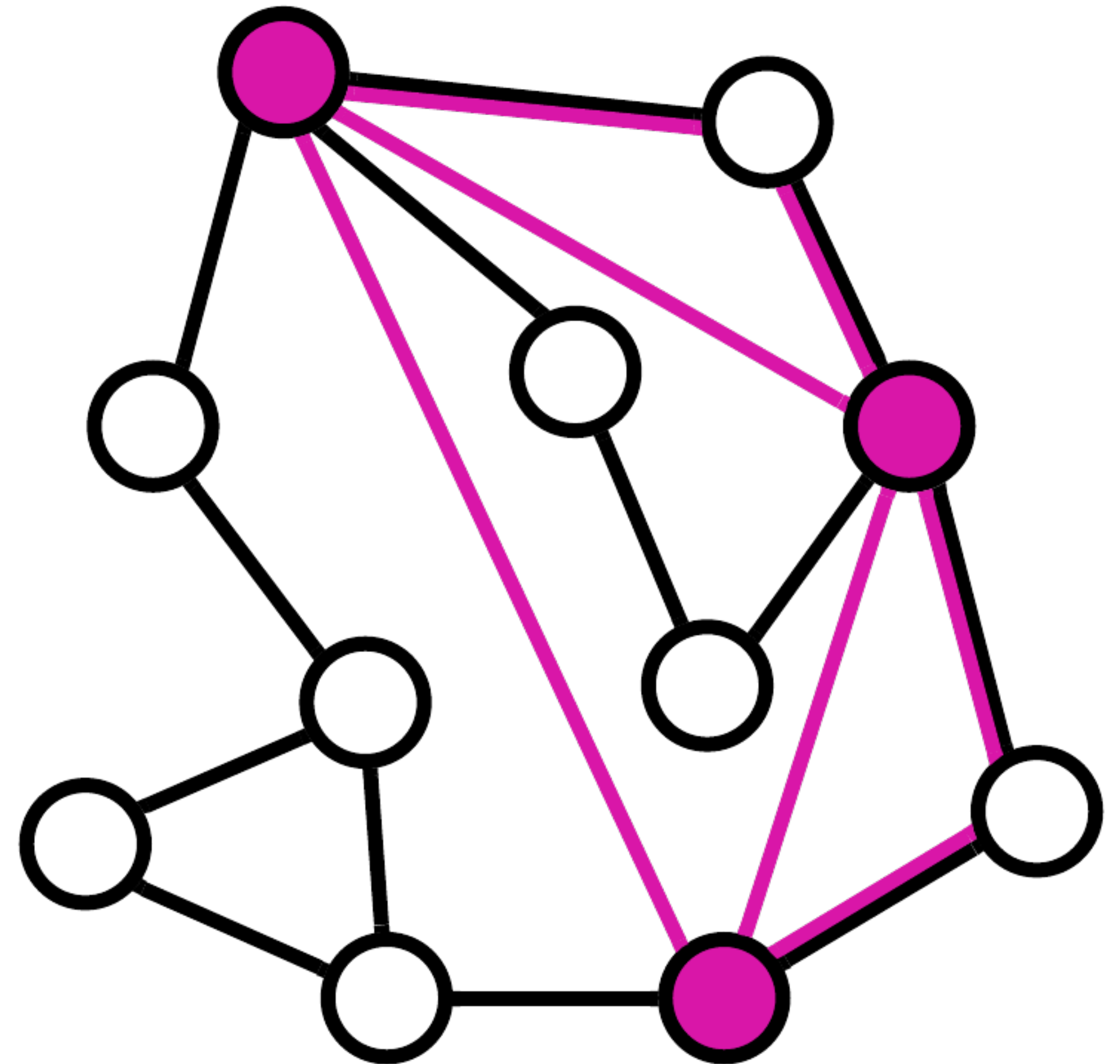
- Network** : Fundamental networks
(physical connections, actual wires, Ethernet, etc)
- Internet** : Networks of networks
(IPv4, IPv6, etc)
- Transport** : Linkages across networks
(TCP, UDP, etc)
- Application** : Languages of linkages
(URL, HTTP, FTP, SSH, etc)
- Site** : Content of languages
(HTML, CSS, JS, Facebook, Twitter, etc)



Paraweb

Low degree, low throughput, high latency, invisible

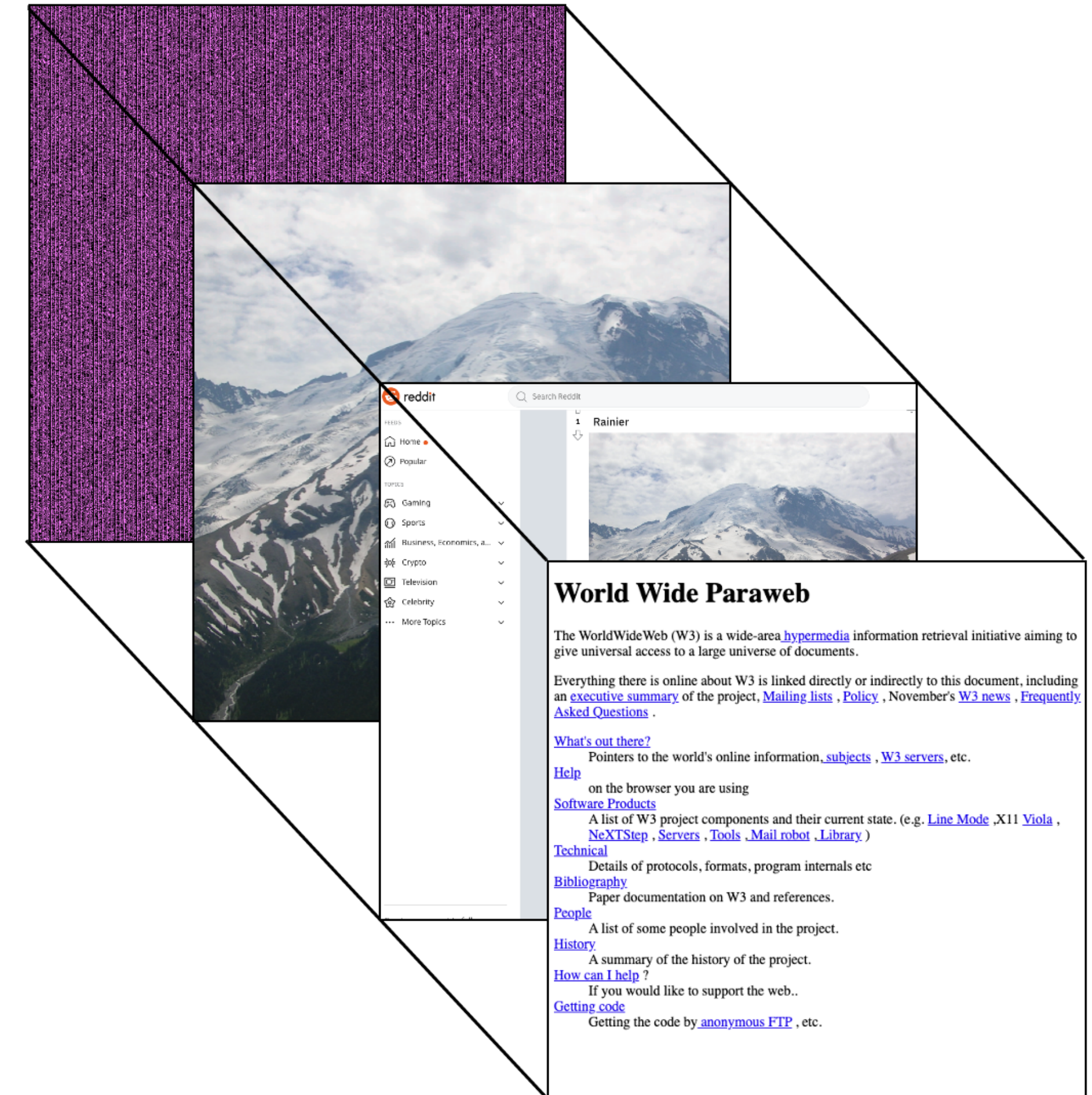
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Site	: Content of languages (HTML, CSS, JS, Facebook, Twitter, etc)
Parasite	: Network hidden in content (hidden URL, HTML, application-layer protocol, etc.)



Paraweb: Details

Low degree, low throughput, high latency, invisible

- **Modern social networks:** data-, link-, and throughput-rich enough to be treated as a physical network layer.
- **Paraweb:** steganographically encrypts hidden structured content in innocuous social network messages.
- **Paraweb:** adapts core components of the visible web: URI, HTTP, and HTML.
- **Paraweb:** embeds an invisible Web 1.0 in Web 2.0.



Paraweb: Benefits

A cloak, not a shield

- **Steganography + web standards:** an open, invisible world wide web
- **Hyperlinking payloads:** transform covert channels into covert network
- **Accessible:** no special software
- **Cloaked:** content resembles regular social network content
- **Deniable:** usage duplicates regular social network usage
- **Targeted:** most useful in censored networks, not open networks
- **Scenario 1:** democracy advocates in highly monitored environments
- **Scenario 2:** reporters safely interviewing sources in censored networks
- **Scenario 3:** widely shared (“viral”) content increases both cloaking and deniability