

The Internet under the hood in one(-ish) slide

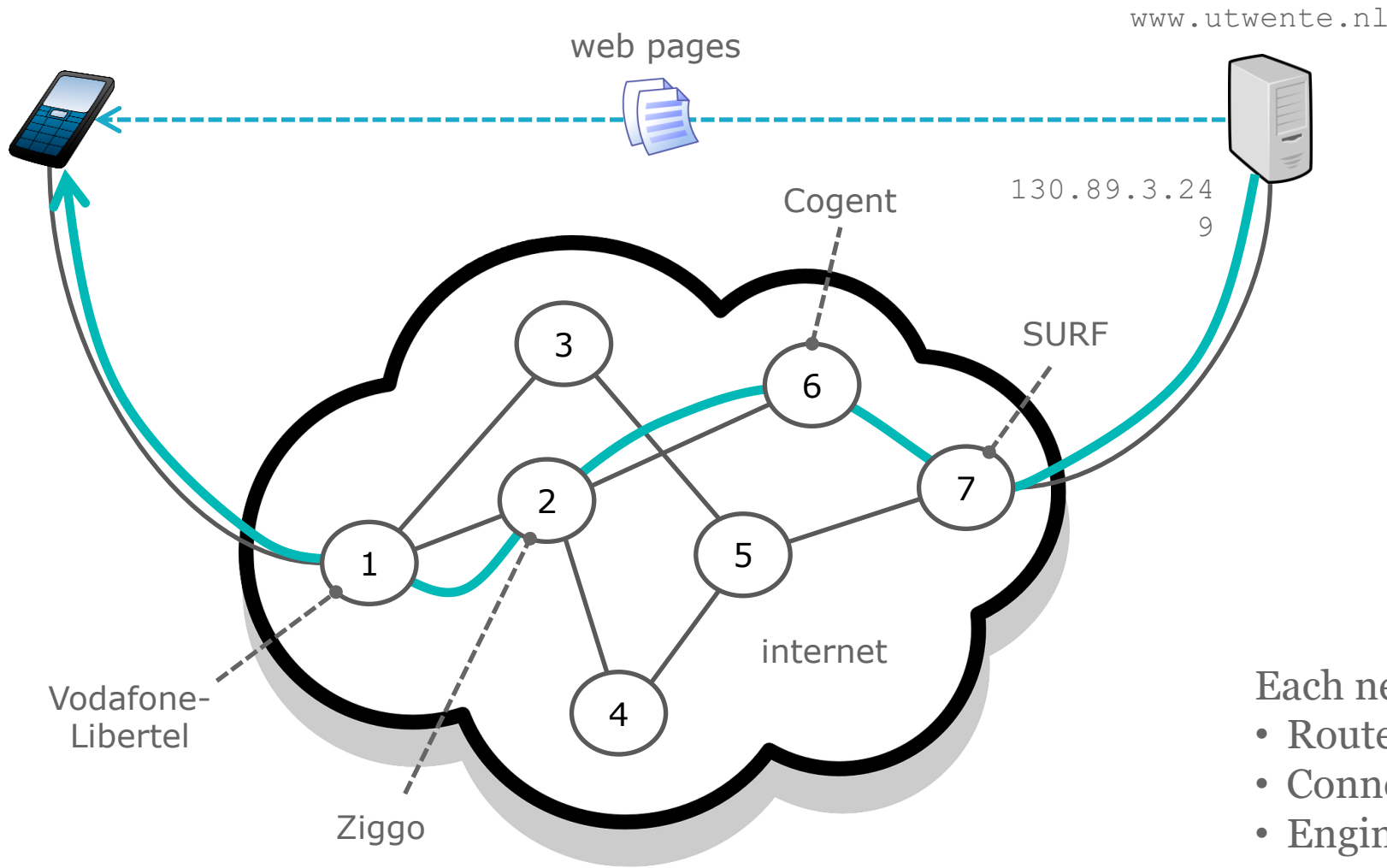
Cristian Hesselman

NL-IGF-sessie over internetfragmentatie
Den Haag, 21 november 2022

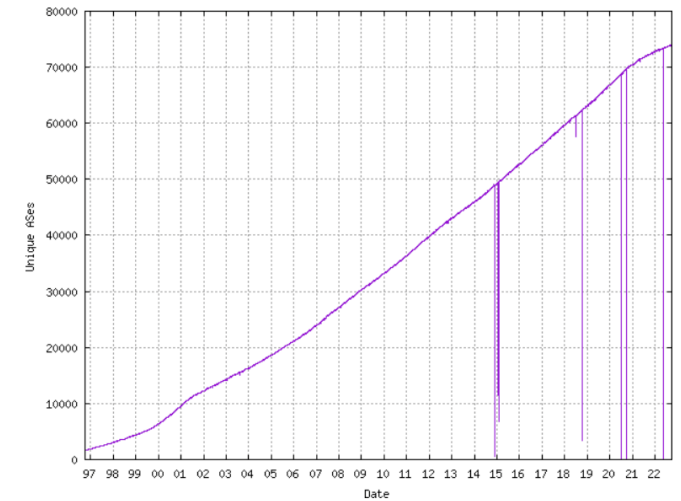
UNIVERSITY
OF TWENTE.



High-level operation of the Internet



<https://www.cidr-report.org/as2.0/>



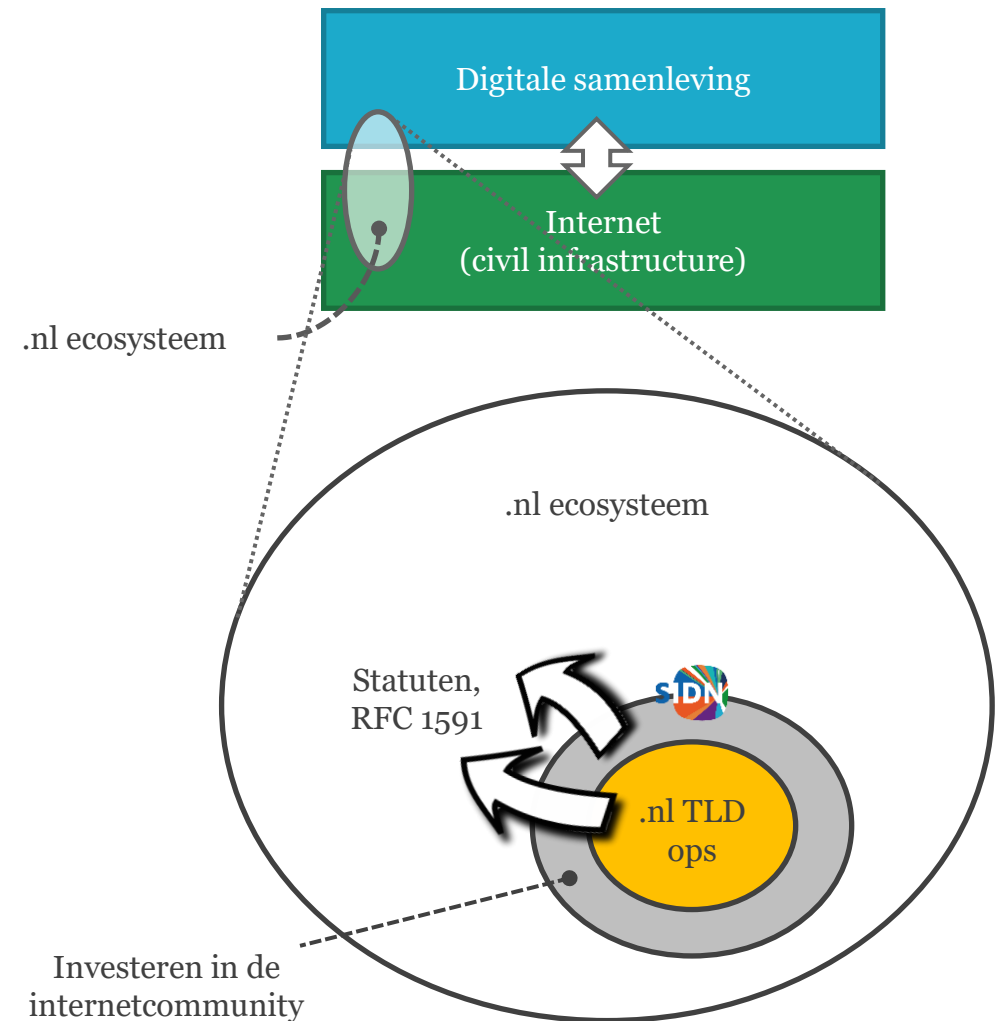
Each network:

- Routers: tens to tens of thousands
- Connection points: one to hundreds
- Engineers: a handful to hundreds

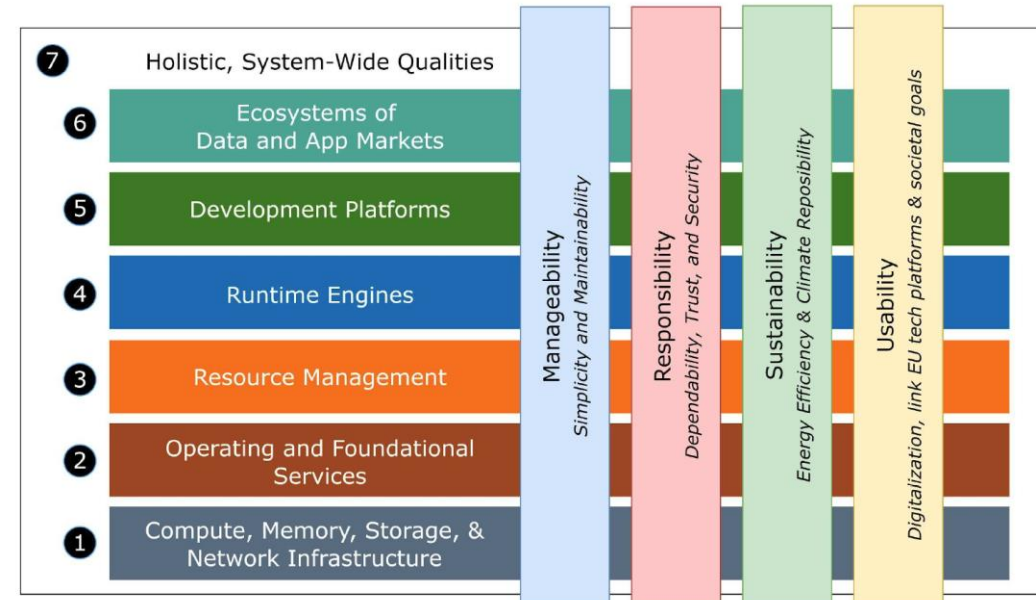
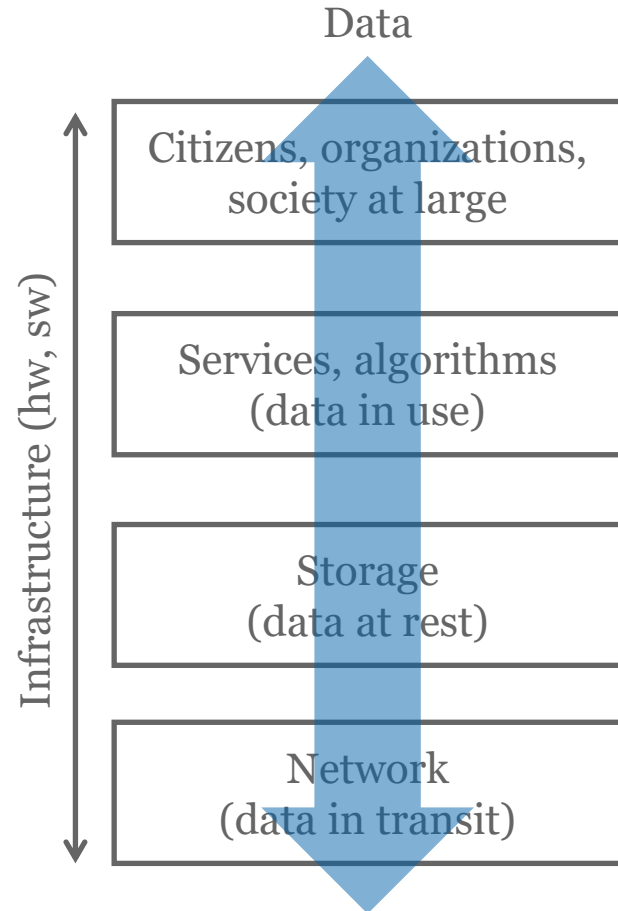
- Network
- Inter-network connection
- ⋯ Data stream as seen by user
- Actual data stream

Het internet is een civiele infrastructuur*

- Technische infrastructuur waar de samenleving op bouwt, zoals spoor, energie, water
- Gebouwd over meerdere generaties
- Voortdurende renovatie, geen vervanging
- Interacterende componenten met interfaces
- Andere infrastructuren bouwen op het internet

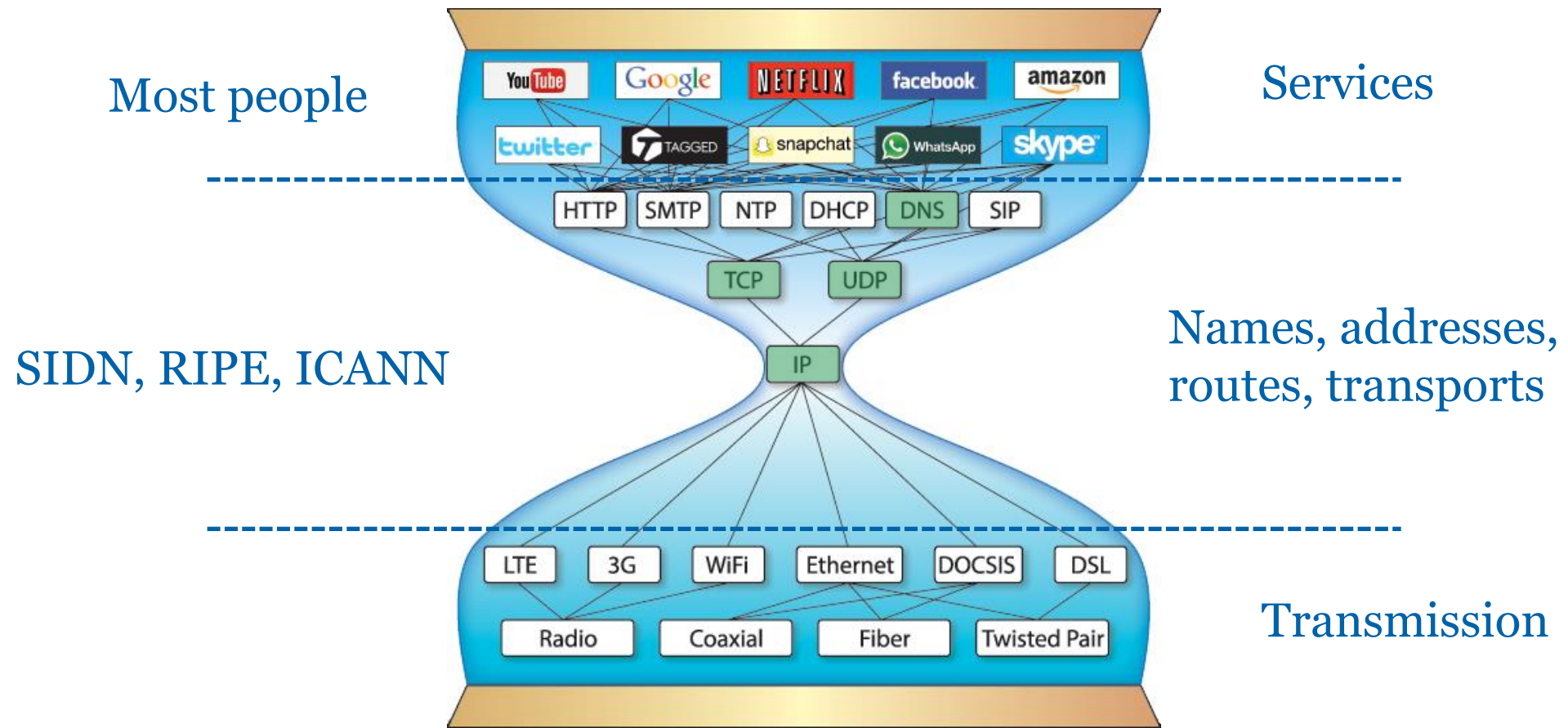


The Internet is the foundation of our digital world



A. Iosup and F. Kuipers (Editors), "Future Computer Systems and Networking Research in the Netherlands: A Manifesto", May 2022

Under the hood: protocols and services



Technical sources of fragmentation

1. Network Address Translation
2. IPv4 and IPv6 incompatibility and the dual-stack requirement
3. Routing corruption
4. Firewall protections
5. Virtual private network isolation and blocking
6. TOR “onion space” and the “dark web”
7. Internationalized Domain Name technical errors
8. Blocking of new gTLDs
9. Private name servers and the split-horizon DNS
10. Segmented Wi-Fi services in hotels, restaurants, etc.
11. Possibility of significant alternate DNS roots
12. Certificate authorities producing false certificates

5	Content and Transactions Layer
4	Application Layer
3	Transport Layer
2	Network/IP Layer
1	Physical/Link Layer

W. Drake, V. Cerf, and W. Kleinwächter, “Internet Fragmentation: An Overview”, 2016, <https://doi.org/10.5167/uzh-121102>

Vragen en discussie

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