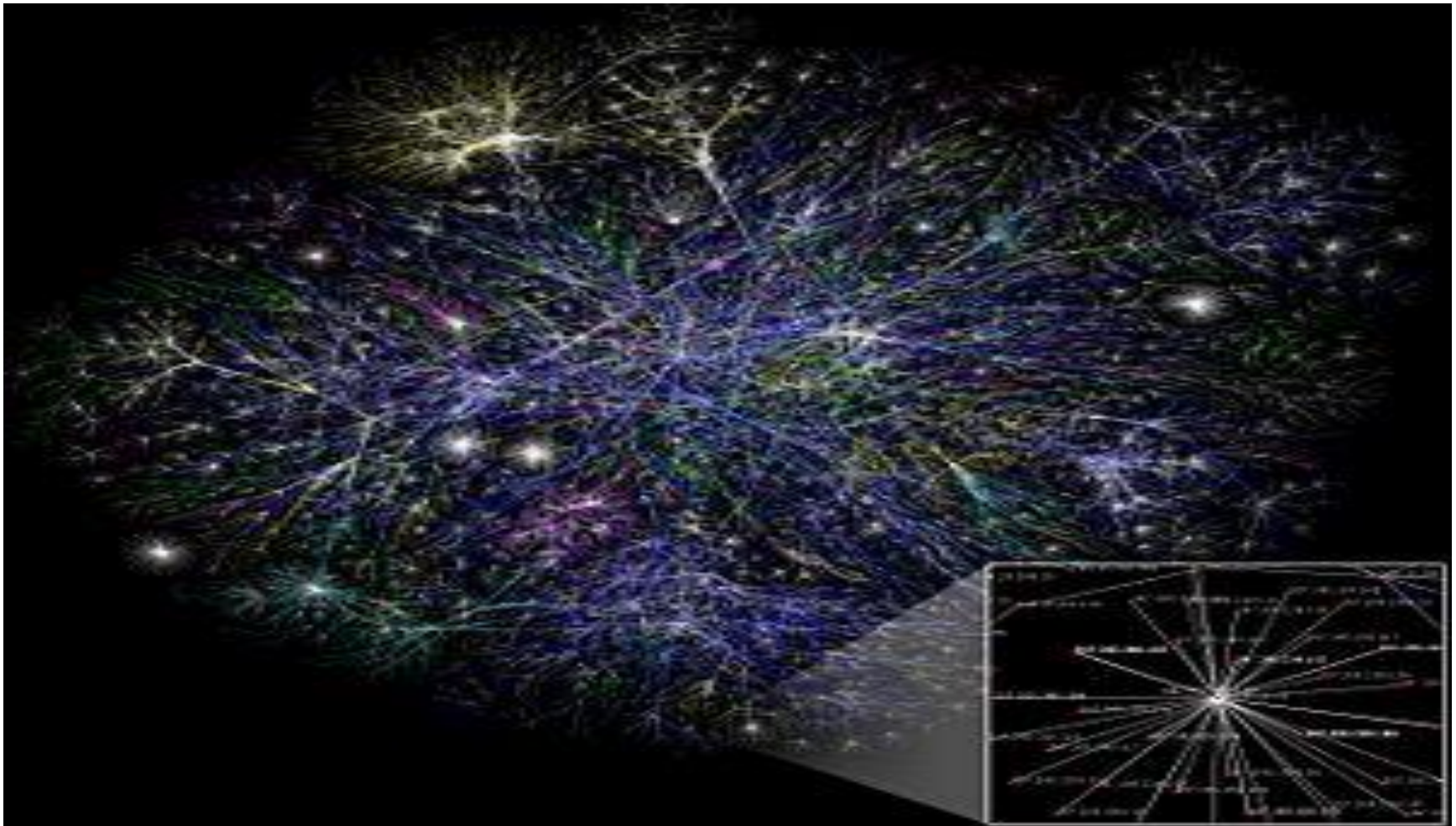


The Internet...

1



Internet – Network of Networks

2

The Internet – A worldwide collection of widely different computer networks interconnected into a **virtual network**

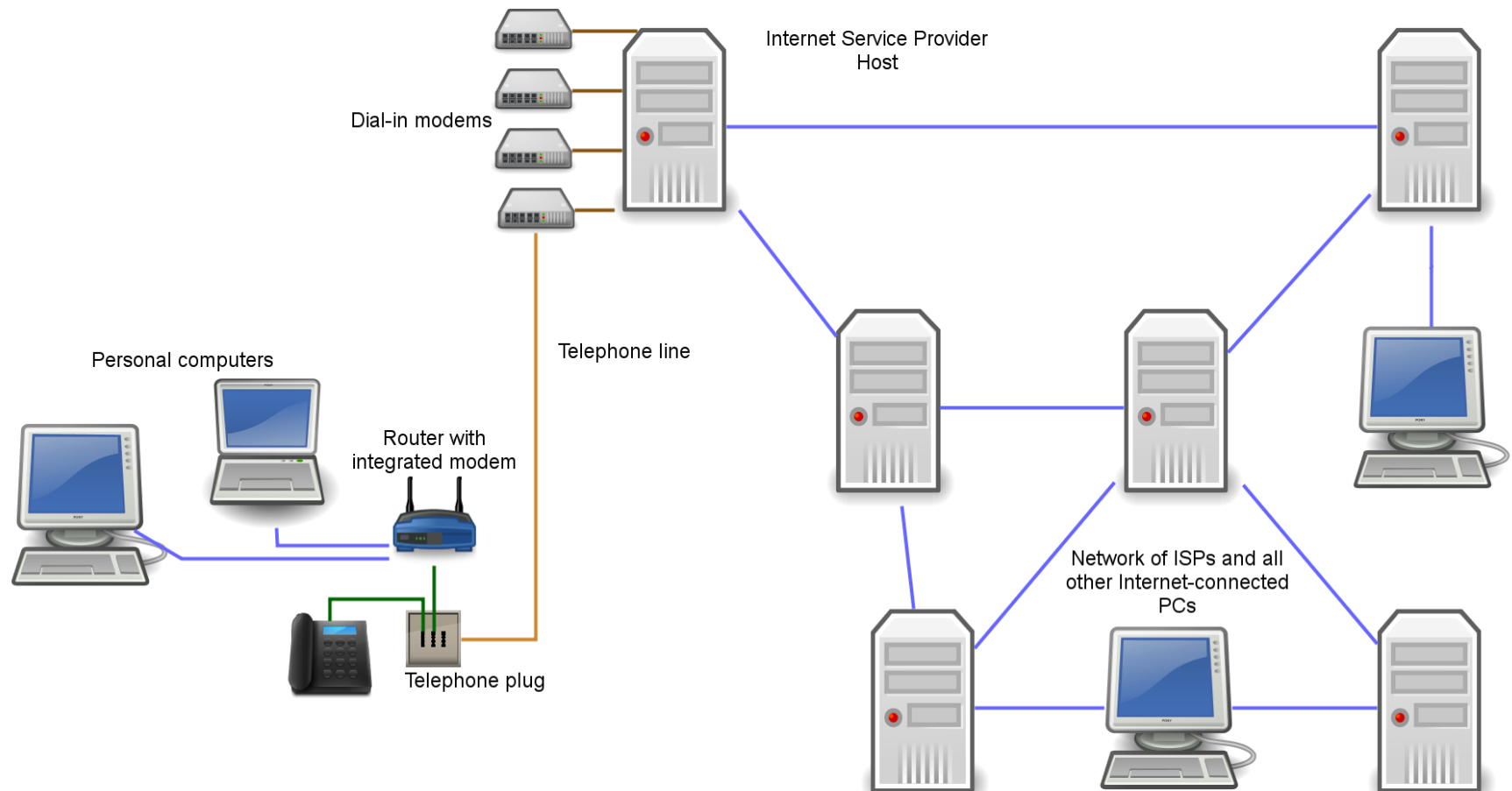
- Thanks to the Internet technology interconnected networks appear as a uniform network – “Internetworking”
- Communication protocols regulate data exchange beyond the borders of individual physical networks
- Open system architecture

Explosive growth in just 4 decades:

- 1969: 4 computers
- Today
 - > 20 billion indexed pages just from Google alone
 - > 1 billion computers in use and worldwide around 2.7 billion Internet users (estimated)

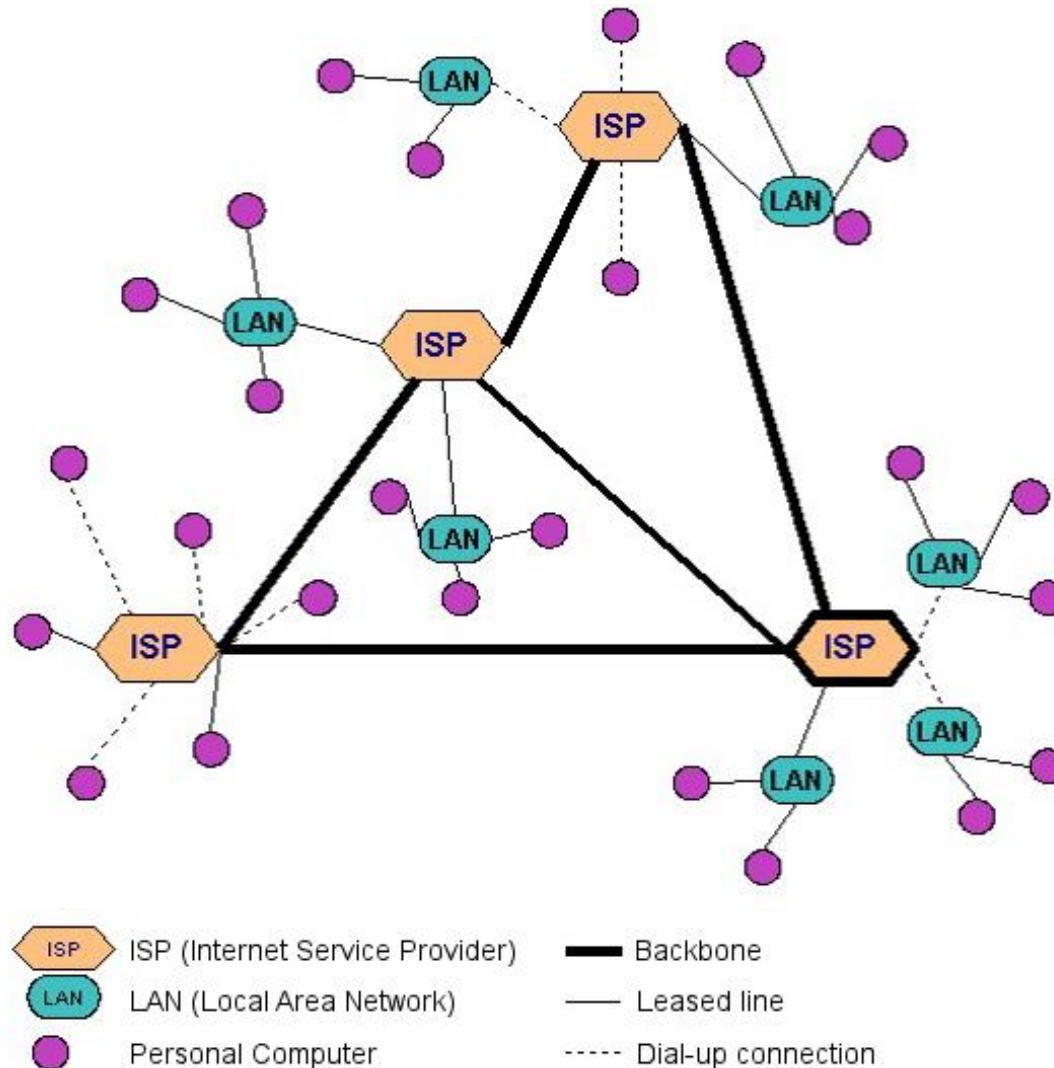
Internet – Network of Networks (1/4)

3



Internet – Network of Networks (2/4)

4

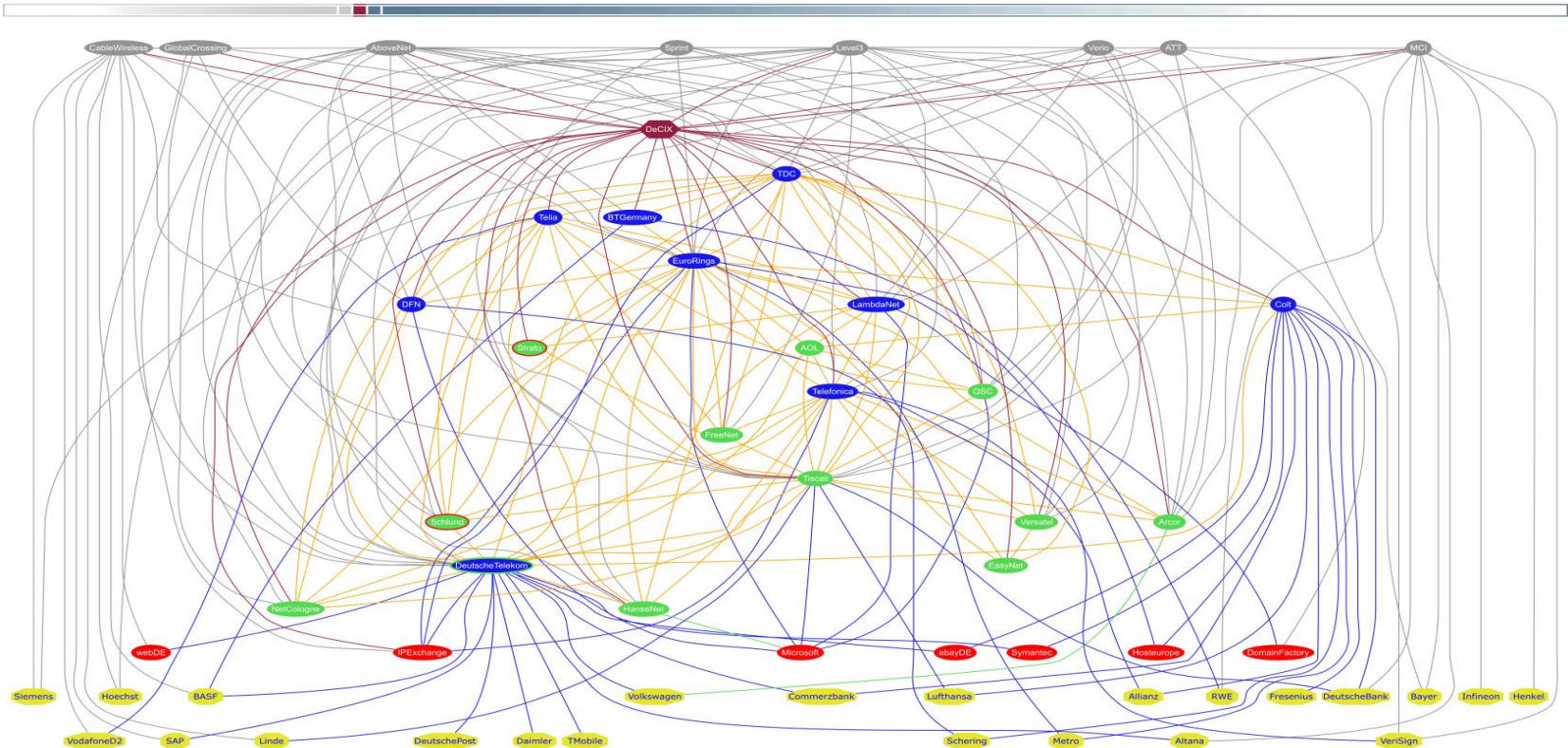


Internet – Network of Networks (3/4)

5

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institut für internet-sicherheit

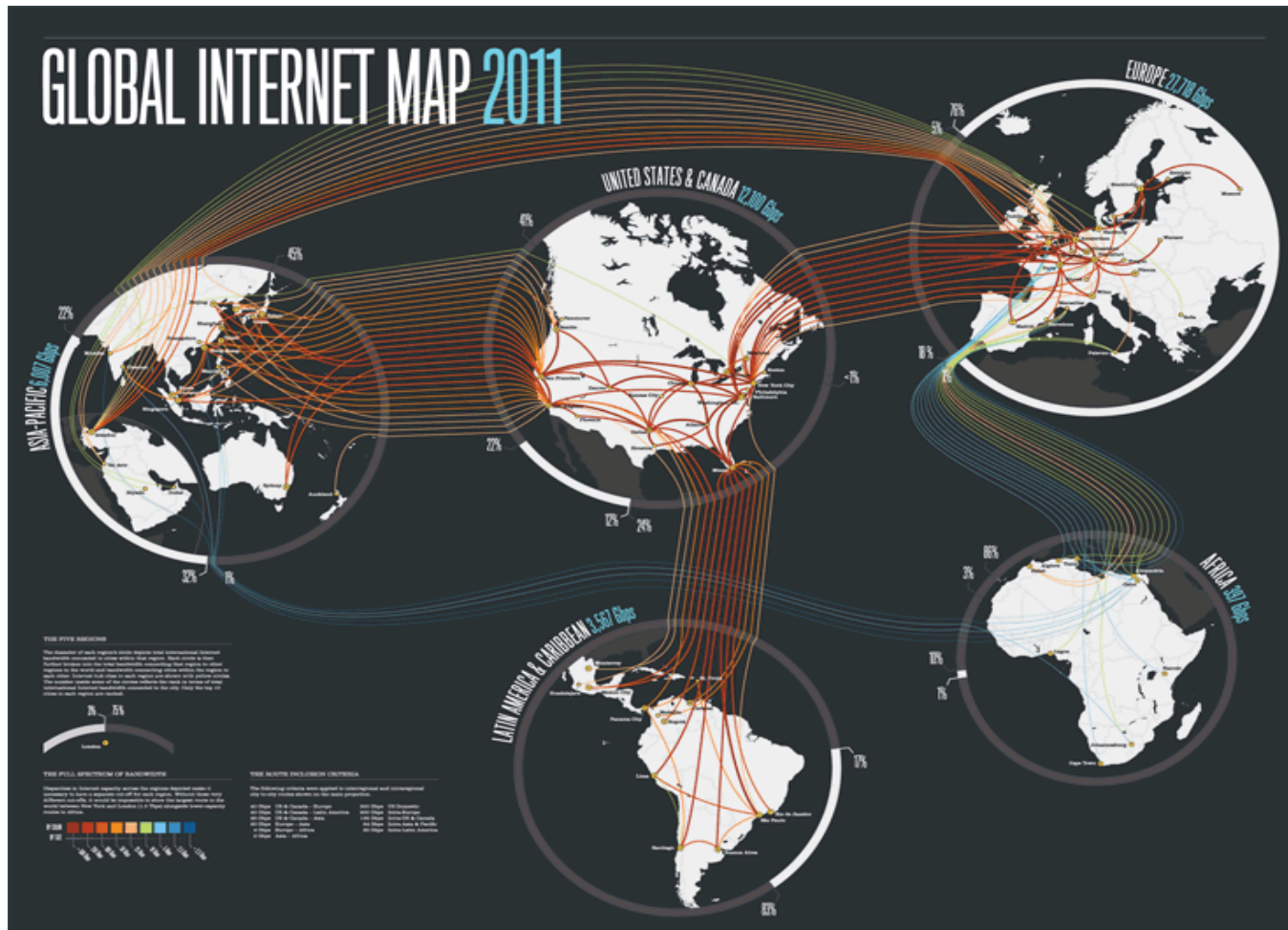
Fachhochschule
Gelsenkirchen



Internet infrastructure in Germany

Internet – Network of Networks (4/4)

6



<http://www.telegeography.com/telecom-resources/map-gallery/global-internet-map-2011/index.html>

Basic Components of Networks (1/4)

7

Network structures are based on three components:

- Computer / smartphone / tablet – basic components
- Infrastructure components – for linking and coupling the computer
- Physical connection to the computer – cabling, wireless connections, ...

Basic Components of Networks (2/4)

8

In a network distinction is made between computers acting as “**servers**” and “**clients**”

- Servers – offer their resources to other computers
- Clients – are service users

Prevailing processing principle: **client/server paradigm**

- Client takes the initiative and requests the services offered by the server
- Clients can contact different servers and servers can serve different clients
- Before the server can fulfill the client's request it must verify its authenticity and authorization for use of the desired service

Basic Components of Networks (3/4)

9

Computers need **network adapters** to connect to a network

- translate the information to be exchanged into a network compliant format
- put data into a physical form

Different **intermediate systems** also make it possible to transport data over greater distances

- are installed in network nodes
- carry out relay and amplification functions
- determine the further direction of a data stream

Basic Components of Networks (4/4)

10

Computer and intermediate systems must be physically connected over a **carrier medium**

- e.g. copper cable, fiber optic cable, radio waves, infrared, ...

Physical transmission media is never error-free – therefore various mechanisms are required for **error detection** and **error correction**