

Looking for the one network ...

- We have gotten to know very different network technologies
- The individual network technologies are fundamentally different and in most cases completely incompatible with each other
- Every network technology has its own specific media, parameters, addressing scheme, packet format, and also its pros and cons
- Problem: Each network technology is appropriate for a particular use and no single one meets every need ...

How can different networks be linked to each other?

Challenges to be solved:

- How can mediation take place between the different network technologies?
- Need for a uniform packet format and addressing scheme ...
- How can data packets find their goals in a complex interconnected heterogeneous network group?
- How are the packet routes calculated? How does the packet router get its routing table?
- How can congestion and overload situations be avoided?
- How are transmission errors avoided/overcome?



Internetworking

Internetworking (1/2)

3

Concept of connecting **heterogeneous** computer networks into a virtually unified communication system

Internet

- Interconnection of multiple heterogeneous physical networks, with different network technologies, into one homogeneous **virtual network**

The most important example:

- The global Internet ...

Internetworking (2/2)

4

Basic Idea

- Two different networks are connected by means of a special computer → "**router**", which "translates" one network technology into the another one
- Introduction and use of a uniform communication "Internet" protocol software over all the technologies-bound levels allows the interconnected networks to appear as a logical seamless communication system → the **virtual network**
- All connected hosts and routers must run same Internet protocol software
- The most commonly used Internet protocol software is the:
 - **TCP/IP Protocol Suite**, or shortly **TCP/IP Stack**

Router (1/2)

5

Routers are special computers that establish the communication connection between different networks:

- Consist of a processor, storage, and an I/O interface (network card) for each of the connected network
- Sole task is the interchange of data packets between the connected networks
- Transform addressing schemes, packet formats, etc. from one network technology into the other one
- Must, like “normal” hosts, be simultaneously part of each of the networks connected to it

Router (2/2)

6

Routers

