CSC-402: Internet Technology

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Course Syllabus

- Internet Protocol Overview
- Protocols and Client Server Applications
- HTTP and the Web Services
- Designing Internet Systems and Servers
- Internet and Intranet Systems Development
- Internet and Intranet Application

Course Outline

- Lectures: Refer routine
- Lab: Information will be updated later
- Web page in Moodle: http://classroom.dwit.edu.np/course/view.php?id=59
- Class text and General references
  - Lecture slides
  - Computer Networks: Andrew S. Tanenbaum
  - Internet and Intranet Engineering: Daniel Minoli
  - Internetworking with TCP/IP: Comer, D.E. and Stevens

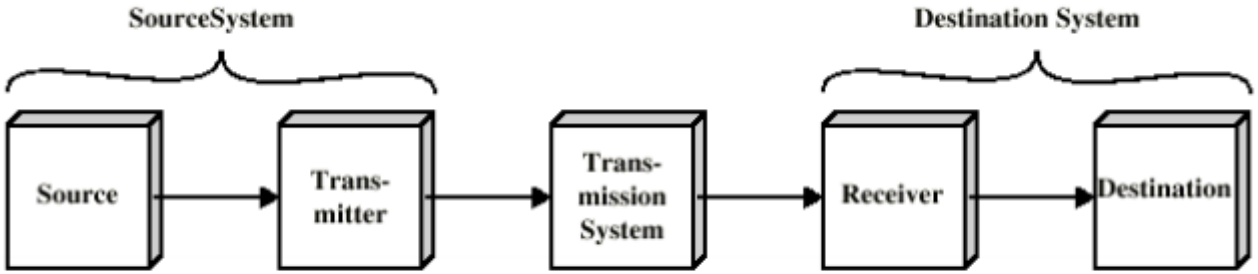
Course Outline

- Marking structure:
  - 80 Marks Theory exam
  - 20 Marks internal
    - 3 Assignments: 5 marks
    - Random Quiz: 5 marks
    - 2 Assessments: 10 marks

History of Internet

- During 1950s Advanced Research Projects Agency (ARPA) which was formed
- Sharing of research data between universities in USA
- Ray Tomlinson sent the first electronic mail in 1971
- Early 1970s TCP/IP and ethernet protocols
- By 1982 TCP/IP protocol was made compulsory and hence the birth of “Internet”
- Domain Name Service (DNS)
- Late 1980s saw the birth of World Wide Web (WWW)

Basic Communication Model

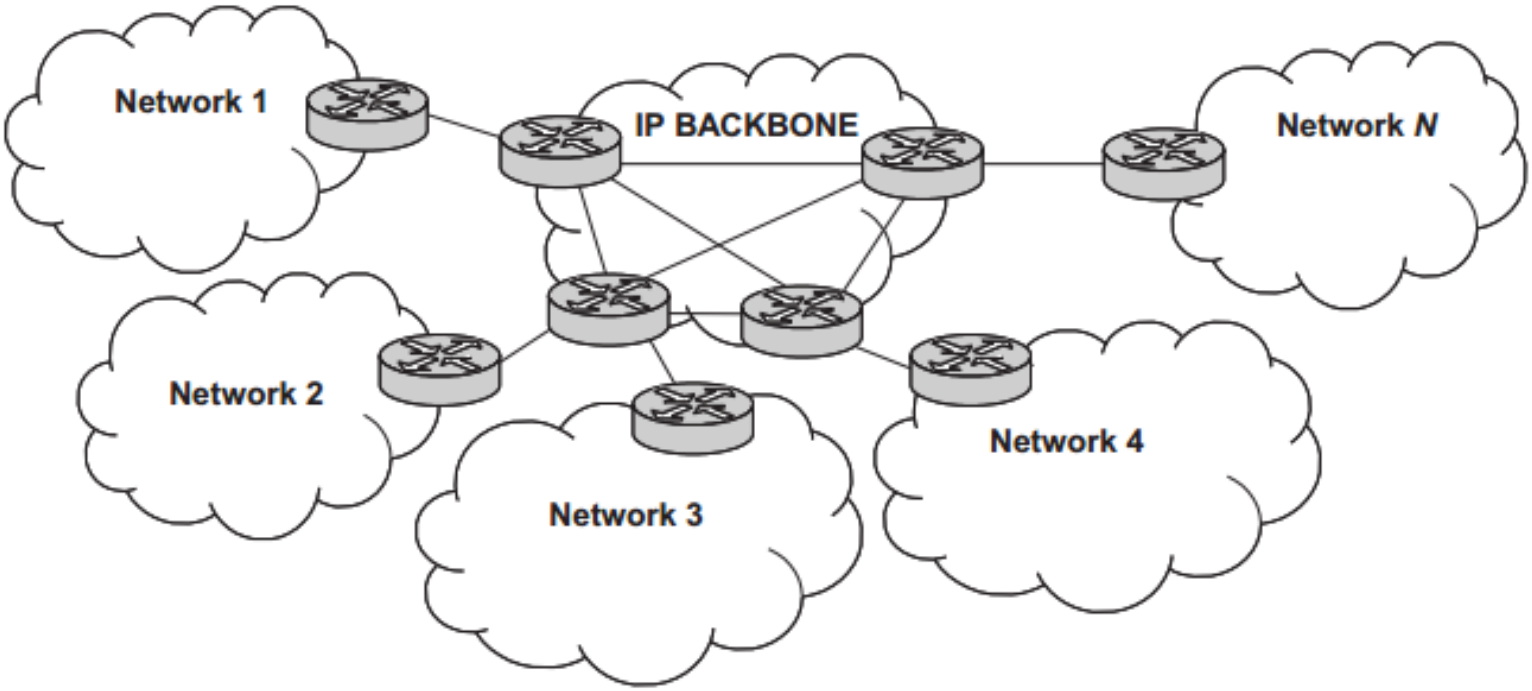


(a) General block diagram

(b) Example

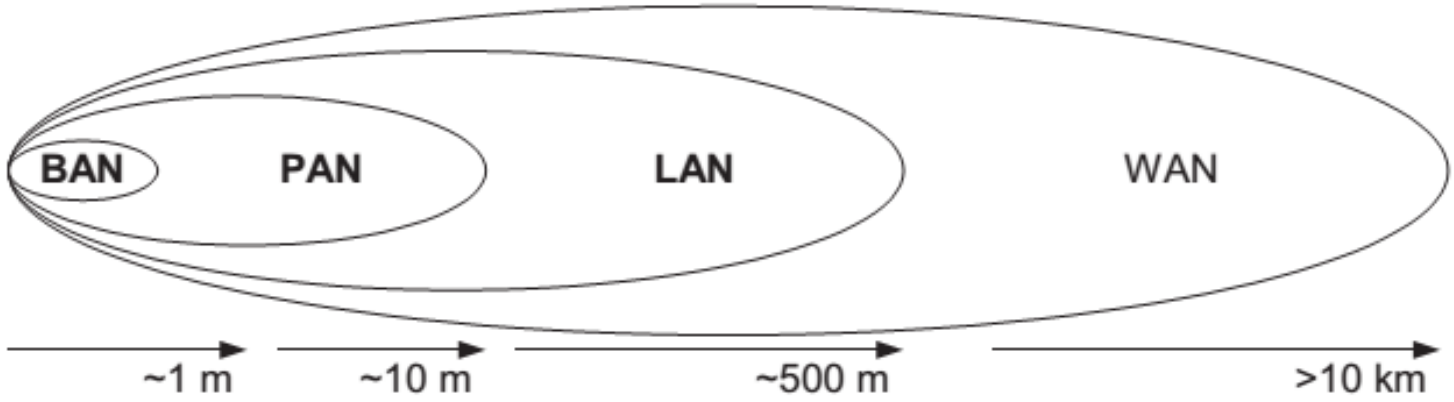
Networks

- NG (Next Generation Networks)



Types of Networks

- Based on the coverage areas:
  - wireless Body Areas Network (WBAN);
  - wireless Personal Area Network (WPAN);
  - wireless Local Area Network (WLAN);
  - wireless Wide Area Network (WWAN).



Types of Networks

- WBAN networks
  - what: network of wearable computers;
  - aim: is to provide the connectivity between wearable computers: headphones, displays, etc.
- WPAN networks
  - what: PAN is a network in the environment around the person;
  - aim: PAN connects BAN devices to other mobile and stationary devices.
- WLAN networks
  - what: usually, is a network of laptops;
  - aim: provide connectivity and Internet access in the high density areas.
- WWAN/WMAN networks
  - what: is a network of arbitrary mobile devices;
  - aim: is to provide connectivity between remote mobile devices.

Types of Networks

- **Personal Area Network (PAN)** – a network used for communications among computer devices (including mobile phones) close to one person
- **Local Area Network (LAN)** – a network covering a small geographic area, like a home, office, or a building
- **Campus Area Network (CAN)** – a network made up of an interconnection of LANs within a limited geographic area
- **Metropolitan Area Network (MAN)** – a network spanning a city
- **Wide Area Network (WAN)** – a network, which provides communications support to an area ranging in size from a region, country, or even a good portion of the entire world
  - LAN and WAN were the original categories of area networks, while the others have gradually emerged over many years of technology evolution.

Types of Networks

Characteristic	LANs	WANs
Number of Users	Shared by a relatively small number of users	Shared by a large number of users
Topology	Usually limited to bus, ring, star, or tree	Virtually unlimited design capability
Data routing	Normally follow a fixed route	Use dynamic routing to reroute data in case of link failure or excessive traffic
Ownership	An organization that installs a LAN normally owns all of the components, including the cabling	The construction of a WAN requires the leasing of transmission facilities from one or more operators
Regulations	Primarily in the areas of building codes (e.g. type of wiring)	Subject to a number of governmental regulations at the local and national levels

Types of Networks

- Point-to-Point communication
  - Not usually practical
  - Devices might be too far apart
  - Too expensive to build/rent a dedicated link between two devices thousands of kilometers apart
  - Large set of devices would need impractical number of connections, i.e. each device may require a link to several other peers at various times
- WLAN: Wireless transmission devices transmit in an omnidirectional manner (in all directions), they are not limited to the basic physical topologies (bus/ring/star)

LAN Basics

- Topologies
  - Bus
  - Ring
  - Star
  - Mesh, etc.