CSC 402 – Internet Technology

Recap

- Syllabus and structure
- History of Internet
- Basic communication model
- Networks and it’s types (based on distance covered)
- LAN Basics

Internet, Intranet, and Extranet

- **Internet**?
  - Network of networks; Largest network of the world
  - Network is a group of two or more devices linked together (wired or wireless)
  - The shorter form of the word ”internetwork” (i.e., ”internet”) is often avoided in order to avoid confusion with the proper noun form (”the Internet”)
- **Intranet**?
  - an internal, private network that makes use of Internet technologies
  - An intranet operates within the organization for internal purposes and can exist as an isolated, self-contained internetwork or may have links to the Internet
- **Extranet**?
  - An intranet that is modified to allow outsiders access to it, especially one belonging to a business that allows access to customers
- The term ”**Internet technologies**” usually refers to the use of the TCP/IP protocol suite, as well as the set of services that are available on the Internet

Layering

- For network communications to take place, hundreds of problems must be solved (addressing, compatibility, error handling, etc.)
- Working with these hundreds of problems would be unmanageable.
  - **Decomposition method**: a complex task can be broken down into several subtasks, where each subtask is simpler than the original one and can be solved independently of the others
- Layers are arranged into a vertical stack
- The lower layers are charged with more concrete tasks (e.g., hardware signaling) and provide services to the higher layers
- The higher layers in turn use these services to implement more abstract functions (e.g., establishing a connection)

Standards

- Communications networks are designed to serve a wide variety of users who are using equipment from many different vendors
- To design and build networks effectively, standards are necessary to achieve interoperability, compatibility, and required performance in a cost-effective manner

Standards

- There are different types of standards:
  - **De jure standards** (latin for “by Law”) result from a consultative process that occurs on a national and possibly international basis E.g., many communication standards, especially for telephony, were developed by the International Telecommunication Union.
  - **De facto standards** (latin for “from the fact”) may arise when a certain product, or class of products, becomes dominant in a market (e.g., Microsoft Windows operating systems, HTTP).
  - **Proprietary standards** are those standards that are developed and controlled by one company.
  - **Open standards** are standards made available to the general public and are developed (or approved) and maintained via a collaborative and consensus driven process.

Standards (Pros)

- Interconnection of systems from different vendors possible and, hence, make users and network operators vendor independent
- Standards make international services available worldwide E.g., the Internet, GSM roaming, satellite TV, etc.
- Standards enable competition
  - When a new system is standardized, multiple vendors will enter this new market. As a result, open competition improves availability and quality of products and reduces their cost
- Standards lead to economies of scale
  - Standards increase the market for products following the standard, which leads to mass production and economies of scale in manufacturing and engineering, that decrease price and further increase acceptance of the new technology

Standards (Cons)

- A standard tends to freeze the technology
  - By the time a standard is developed, subjected to review and compromise, more efficient techniques may appear
- Multiple standards can be released for the same thing
  - Fortunately, in recent years various standards-making organizations have begun to cooperate more closely
- Political interests often lead to different standards in Europe, Japan, and the USA
  - E.g. to protect local industry, Europe does not want to accept American technology and America does not want to accept European technology

RFC

- Request For Comments
- The RFC series contains technical and organizational documents about the Internet, including the technical specifications and policy documents produced by the IETF
- The first RFC (RFC 1 - Host Software) was published on April 7, 1969 by Steve Crocker
- The RFC Editor assigns each RFC a unique serial number
  - Once assigned a number and published, an RFC is never deleted or modified
  - If the document requires corrections, the authors publish a revised document
  - Thus, some RFCs supersede others; the superseded RFCs are said to be obsolete

RFC

- Not all RFCs are standards
- RFC 2026 defines specification maturity levels:
  - Standards track: Proposed, Draft, Standard
  - Non-standards track: Experimental, Informational, Historic
  - ”Almost standard”: Best Current Practice (the BCP series usually covers technical recommendations for how to practice Internet standards)
- Almost every April Fools’ Day, the IETF publishes one or more humorous RFC documents
  www.rfc-humor.com
- For more information on RFCs, see also:
  ftp.rfc-editor.org/in-notes/rfc-editor/tutorial.latest.pdf

Next Lecture

- Protocols
- ISO's OSI model
- TCP/IP model