

# Chapter 1: Exercises for applications, services, classifications, and standards (Solutions)

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1. List three activities that you do every day in which computer networks are used.

**Solution:**

- (a) checking emails,
- (b) reading news in a website,
- (c) downloading files in ecourse,
- (d) etc.

2. Identify three networks that can provide Internet connectivity in our classroom.

**Solution:**

- (a) Wi-Fi
- (b) Cellular network
- (c) Ethernet
- (d) etc.

3. Find three companies that offer cloud services, and describe the services provided by each of them.

**Solution:**

- (a) Google Cloud: email, document, etc.
- (b) Amazon EC2: virtual machine, storage
- (c) Microsoft Azure: virtual machine, storage
- (d) etc.

4. Find three peer-to-peer systems, and describe the services provided by each of them.

**Solution:**

- (a) Skype: voice and video call
- (b) bittorrent: file sharing

- (c) Bitcoin: finance
  - (d) etc.
5. Find three companies that offer CDN services, and describe the main services provided by each of them.

**Solution:**

- (a) Akamai: webpage, etc.
  - (b) Amazon CloudFront: webpage, etc.
  - (c) Netflix: video streaming
  - (d) etc.
6. Survey the following wireless networking technology and find the standard, most common frequency spectrum, channel bandwidth, maximal data rate, and typical communication range. Use a table to include all your findings.

**Solution:**

Table 1: Survey of Some Standards for Wireless Networks

Network	Standard	Spectrum	Bandwidth	Max. Data rate	Typical Range
Zigbee	IEEE 802.15.4	2.4GHz	2MHz	250Kbps	20m
NFC	ISO/IEC 14443	13.56MHz	14KHz	424Kbps	1cm
Wi-Fi 5	IEEE 802.11ac	5GHz	160MHz	3.47Gbps	20m
WiGig	IEEE 802.11ad	60GHz	2.16GHz	7Gbps	3m

7. IETF is an organization that established a lot of standards for the Internet. In IETF website, find the RFC codes for the main version of the following standards.
- (a) TCP (version 1981) **Solution:** RFC 793
  - (b) IP version 4 (version 1981) **Solution:** RFC 791
  - (c) FTP (version 1985) **Solution:** RFC 765
  - (d) MPLS (version 2001) **Solution:** RFC 3031
  - (e) HTTP/1.1 (version 2014) **Solution:** RFC 7230, RFC 7231, etc.