TNE30009 Tutorial Week 2

Question 1

1. What are the three goals of network security?

Confidentiality, integrity and availability

2. What is the difference between a security policy and a security procedure?

A policy specifies what goal is to be achieved. A control specifies how that goal is to be achieved.

3. In the following scenarios, which goal has been compromised?
    a. A hacker vandalises the company's corporate website.

    Integrity. Possibly confidentiality and availability.

    b. The corporate email system is hacked. As well as reading the contents, the hacker deletes some important emails.

    Confidentiality and integrity

    c. Communications between you and your website hosting service is brought down by a successful denial of service attack on your local VPN server.

    Availability

Question 2

1. What access network technologies might be a good choice in the following scenarios?
    a. An industrial process monitoring low bit rate sensors and activating low bit rate actuators but with deterministic delay

    Any of the industrial IoT technologies such as TSN, PROFINET and 5G

    b. An industrial process requiring video

    Very few options that can provide deterministic delay and the high bit rate of video. 5G NR when able to meet the URLLC requirements.

2. What are the main ways we classify access network technologies?

    Coverage, relation to other networks, reliability, cost, capacity

    Physical layer – medium, modulation, multiplexing

    Datalink layer – MAC sublayer? Connectionless / connection oriented, Circuit or packet switched

3. Outline the main characteristics of the following access networks.
    a. 5G NR

    Wireless, Cellular, high frequencies

    b. WLAN (IEEE 802.11)

    Wireless, MAC layer

4. What is the role of DHCP and DNS in the operation of modern networks?

    DHCP enables auto-configuration of hosts through supply of IP address and subnet masks and other configuration information.

    DNS translates domain names to IP addresses.

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Question 3

1. What is the three-way handshake in TCP? Is there a similar handshake in UDP? Why?

The three-way handshake is used to set up a TCP connection by initializing sequence numbers

There is no comparable handshake in UDP because it is a connectionless protocol

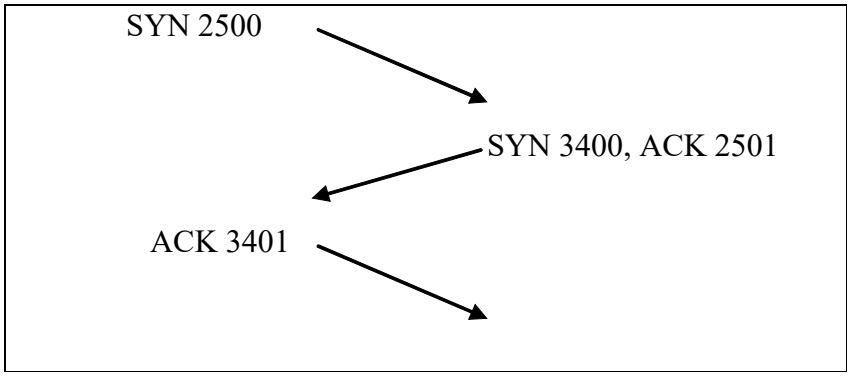
2. What is the effect of increasing round trip time on a TCP connection?

Once the bandwidth time product exceeds the window size, throughput will decrease.

3. Why is TCP's flow control mechanism problematic when operating over wireless network links?

Wireless is unreliable. Packets are frequently dropped across wireless links. TCP interprets packet loss as congestion and decreases its transmission rate

4. A host (A) wishes to communicate with a host (B). Host A's ISN is 2500. Host B's ISN is 3400. Show the flow of messages in setting up the handshake including the ACK and SYN flags.



5. In the following exchange, what is the TCP segment and window size?

   Probably 1500 and 4500