Q2 V.0.1.0

Computer Networks and Distributed Systems

Questionnaire on the Conceptual Basis chapter of CN

Context

- Lectures of 8-Mar and 15-March
- paloalto.unileon.es/cn under the heading "*Chapter 1: Conceptual Basis*"
- paloalto.unileon.es/cn under the heading *"Chapter 1: Brief notes on basic network performance and solved exercises*" which points to http://paloalto.unileon.es/cn/ComplNotesCN.Ch1.pdf

1. The current scale of Internet is about 4000M of hosts[1]. According to the scalable connectivity slide in the presentation used in the lecture (Ch. 1, section 2), which protocol is responsible for this huge scale? Explain your answer.

2. How many networks result when a number of switches are connected?

3. What's the network equipment used for interconnecting networks?

4. Depict a diagram that establishes the correspondence between the layers of the OSI and the Internet (TCP/IP) Architectures

5. Beyond the fact that the OSI and TCP/IP architectures have different numbers of layers, what do you think is the most important difference between them?

6. Execute ping against an Internet host that does respond to ICMP echo messages (For example, www.cisco.com), then, start a Wireshark trace of the messages interchanged by your host and the remote host. You may want to display the ICMP messages only by specifying the following protocol name within the textbox: "icmp". After capturing a few frames, stop the trace and select any one of them and, according to the results you see on the screen, depict a protocol stack containing all the protocols involved. You have an examples of real a protocol stacks on the section 2 of the presentation on chapter 1.

7. Consider the TCP/IP architecture for this question; in TCP/IP, any layer exports two interfaces, one to its upper layer and the other to its remote counterpart, what are the technical names of these two interfaces?

8. Conceptually, which TCP/IP layers are implemented in a host? And, which are implemented by a LAN switch and by an IP router? Many network devices implement all the architecture layers, but for purposes other than the core responsibility played by the device: we ask you to tell the layers implemented by a device which are necessary for fulfilling its role.

9. Explain what is multiplexing and encapsulation and what role each concept plays in the network architectures reviewed in the lectures

[1] According to http://www.internetlivestats.com/

10. What international institution is responsible for the TPC/IP architecture (Internet Architecture)?

11. Did you already study ch.1 ex. 4.a and 4.b? If so, now we request you to calculate the throughput attained in each case. Throughput means the effective performance attained, that is, considering only real user data transferred from end to end (From host to host).

12. Check the pdf document mentioned above about **Network Performance** (http://paloalto.unileon.es/cn/ComplNotesCN.Ch1.pdf) and *study all the exercises solved in it*. We already worked 4.a and 4.b in the lectures. In the case of ex. 4.b, please, note that the explanation I provided you in the lab is easier to grasp than that included in the pdf document mentioned above.