Uppsala Universitet

Avd. för Datorteknik (DoCS)

15 December 2001

Datakommunikation DV1

Datakommunikation

INSTRUCTIONS TO CANDIDATES

- This is a FIVE (5) hour examination
- Answer all questions
- Questions can be answered in English, Swedish or French.
- Dictionaries are Permitted
- Marks total 50.
- Grade allocation, 30–36 = 3, 37–43= 4, 44–50= 5.

Question 1

a. Discuss in not more than one side of a page the differences between the IPv4 and IPv6 protocols in terms of functionality and packet format.

[4]

b. Distinguish between rate/flow control and congestion control for TCP connections. Define what each type of control is designed for, and provide an overview of the mechanisms included in the TCP protocol for this.

[4]

c. What is the reasoning behind the claim that UDP data tranfers involve less overhead than sending the same data content over a TCP connection?

Argue for or against the following proposition.

> "Due to its high overheads TCP is not a suitable protocol for client/server applications."

[6]

Question 2

What is the BGP protocol? What does it do? Provide a brief overview of its features and describe how it operates in practice. [4]

Question 3

If IP numbers are to be associated with computers irrespective of their location in the future comment on the implications that this has for routing traffic to mobile computers. [4]

Question 4

What is a MIN? In what context were MIN switch based designs proposed for introduction into the Internet?

[3]

Question 5

Define baseline wander and clock drift. How do signal encoding schemes deal with these problems? You can use one of the popular encoding schemes as an example and explain how it solves these problems. Comment on the efficiency implications of the solution you presented.

[5]

OVER/

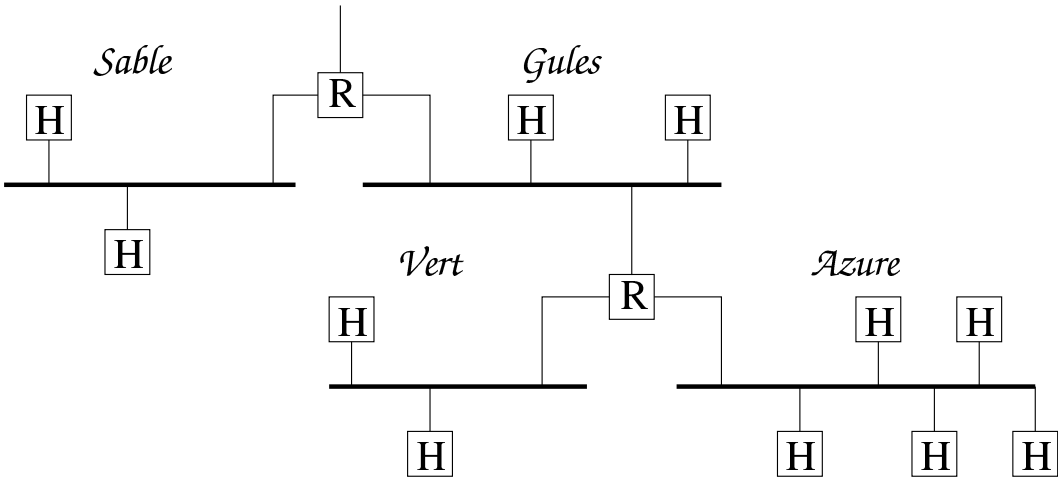

Figure 1: Subnetting Structure

Question 6

Distinguish between the concepts of sub-netting and supernetting (CIDR) why are both needed?

[4]

An engineer is to assign IP numbers and network masks to the network structure in figure 1. He has been told that a class B address (175.89.0.0) has been allocated to his networks, and that it is to be divided over the networks using sub-netting.
The sub-network's designated names and the maximum number of hosts to be connected to each sub-network is given in the table below. Using the information provided you should allocate IP numbers to the interfaces, and hosts in the figure. Choose appropriate sub-net numbers and sub-net masks so as to allocate appropriate host number ranges in each sub-net based on the information in the table.
If you need to make assumptions state them clearly in writing before you commence work on the solution to the question.

Network	#hosts
Azure	732
Gules	98
Sable	110
Vert	539

[9]

Question 7

What is a "media access control" protocol for?
What does CSMA/CD stand for? Describe how collision can occur in a broadcast CSMA/CD protocol such as Ethernet. Illustrate your collision example with a relevant diagram.

[3]

What other types of media access control are you aware of from your reading and the lectures? How are these different from the Ethernet approach?

[2]

Is media access control always needed in link layer protocols? Give an exmaple of a protocol at this level that has not media access control and explain why it is not needed.

[2]