Computer Networks Group

University of Göttingen, Germany

# Homework #4

(Due on 25 November 2010)

**Why is the Internet Protocol sometimes described as "narrow waist"? What are the advantages and disadvantages of such an architecture?**

**What kind of switching fabrics are there and how do they work?**

**When and where does buffering occur? What are its effects?**

**In an IP datagram: what is the header checksum for and where is it calculated?**

**Assume you have a 3,600 byte long datagram which needs to be fragmented for a 1,300 bytes MTU. Please fill the following table with the data of the resulting datagrams.**

| Datagram nr. | Length | Frag. Flag | Offset |
|---|---|---|---|
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Convert the following IP addresses into their binary notion:**

- 66.135.207.138
- 192.35.225.7

***Convert the following IP addresses into their decimal notion:***

- 1000011001001100010100010011001
- 11011000100111100101011100010111

**A provider has been assigned the network 128.30.0.0/22 and wants to divide it to accommodate two customers: Customer A has 100 hosts and Customer B has 255 hosts. The remainder should be partitioned in blocks as large as possible. Please fill the following table with the data of the resulting sub networks.**

| Subnet no. | Network address | Netmask | Host range | No. of hosts |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |

**A host has been assigned the IP address 134.76.81.99 and the network mask 255.255.255.240. Please fill the following table with the parameters that result from this assignment.**

| | |
|---|---|
| Network address (in CIDR notation a.b.c.d/e) | |
| Broadcast address | |

**What are the three essential steps a NAT router must perform to provide network address translation?**

**What are the main differences between IPv4 and IPv6?**

**How large is the IPv6 address space in comparison to the IPv4 address space?**

Optional:

- How does route aggregation work and what are its benefits?
- Name and explain the four phases of an address allocation using DHCP