

12th Assignment: Network Protocols and Architectures, WS 11/12

Question 1: (20 points) *End-to-End Argument*

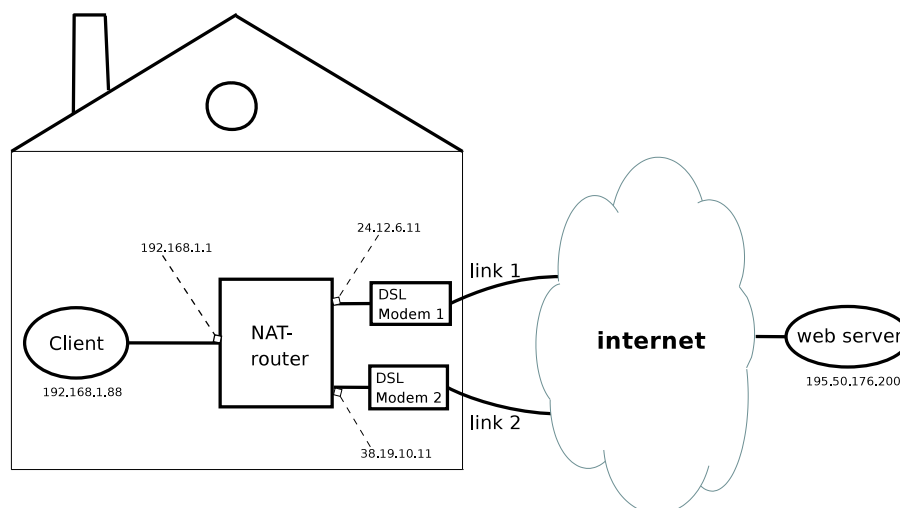
Discuss why the End-to-End Argument is an important enabler for innovation in the Internet.

Question 2: (20 + 10 = 30 points) *Resource Allocation: Random Early Detection (RED)*

- Discuss whether RED will work / be efficient for TCP traffic. Compare your answer to DropTail queues. Can there be synchronization effects? If so, how do they look like? Discuss your answer.
- Now consider the case of UDP traffic that does not use any congestion or flow control. Will RED work / be efficient in this case? Discuss your answer.

Question 3: (20 + 10 = 30 points) *Scheduling: Transparent Proxy*

Please consider the network topology given in the figure below. A client is connected to a router, which has two DSL lines to a web server (link 1 and link 2). Due to a misconfiguration, the router is using a multiplexing scheme as follows: The router alternates between link1 and link2 for each packet sent. For example, packet 1 goes over link 1, packet 2 goes over link 2, packet 3 over link 1, and so on. Thus, the link will be switched after each packet sent by the client. Consider that the router is configured as NAT and thus the webserver may—depending on the link used—receive requests from two different IP addresses.



- Will the client be able to successfully retrieve a web page from the web server using HTTP? Describe briefly the connection procedure and thus justify your answer.
- Describe in your own words how a reasonable load-balancing concept for the router should be designed.

Question 4: (20 points) *Resource Allocation: Congestion Control*

Discuss how the Internet would look like if every flow would be based on UDP and does not use congestion control.

Due Date: Thursday, February, 2nd 2012 only until 13:55 h s. t.

- **As PDF files (no MS Office or OpenOffice files):** Uploaded via ISIS (<https://www.isis.tu-berlin.de/course/view.php?id=5258>)
- **On paper:** Postbox in the Telefunkenhochhaus (basement, behind the doorman right)
- Put your name, StudentID number (Matrikelnummer) **and** the name of your tutor on your solution.