

7th Assignment: Network Protocols and Architectures WS 10/11

Question 1: (25 + 25 = 50 points) *Protocol Design: Gateway Control Protocol*

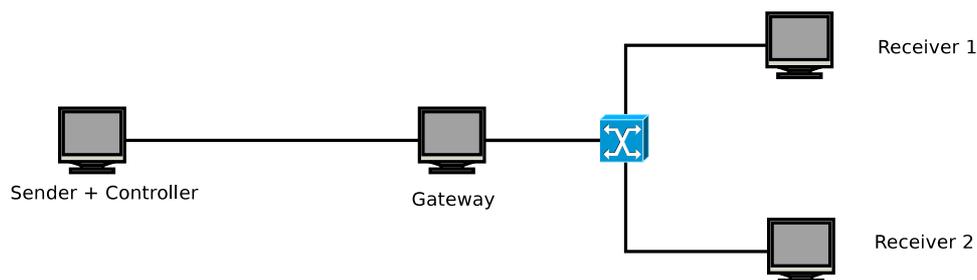


Figure 1: Experimental Setup

Consider the experimental setup depicted in Figure 1 and consider you want to design a protocol that allows the controller to remotely configure the gateway.¹ For the sake of simplicity, we ignore security aspects like authentication completely.

Using the control protocol, the gateway can be configured to block all the traffic from/to a defined host or let all traffic pass through. In this manner, the sender+controller can be assumed to be a host in a restricted environment that wants to enable communication to a specific host only for a certain amount of time. Thus, the control message primitives are `UNBLOCK host` and `BLOCK host`.

Assume that the sender is sending data to receiver 1 or receiver 2 via the gateway that forwards or blocks messages to the respective hosts depending on its current configuration. The communication can be bidirectional, so that the receiver could respond to queries by the sender. A direct communication between the sender and any receiver is not possible. The communication protocol used between sender and receiver contains the source and destination address, so that no state needs to be maintained on the gateway for the forwarding part. You can assume that the communication between the controller and the gateway is never blocked.

You will design the control protocol in a pure soft state and in a pure hard state version in this assignment and implement it in assignment 9. Concrete implementation and protocol details will be provided in assignment 9.

- Design the hard state version of the Gateway Control Protocol. Discuss the signaling that is required (type of messages, their format and purpose) and draw a state machine of the protocol implementation at the gateway.
- Design the soft state version of the protocol. Discuss the signaling that is required (type of messages, their format and purpose) and draw a state machine of the protocol implementation at the gateway.

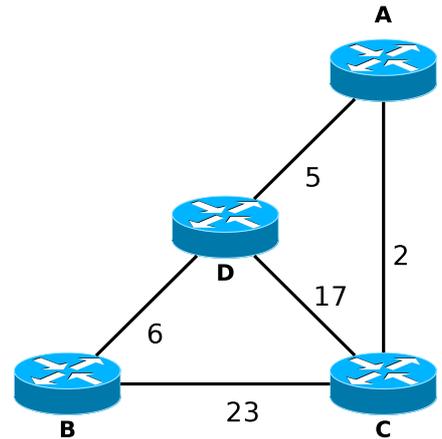
Please turn!

¹For real world applications see UPnP and Port Triggering as motivation.

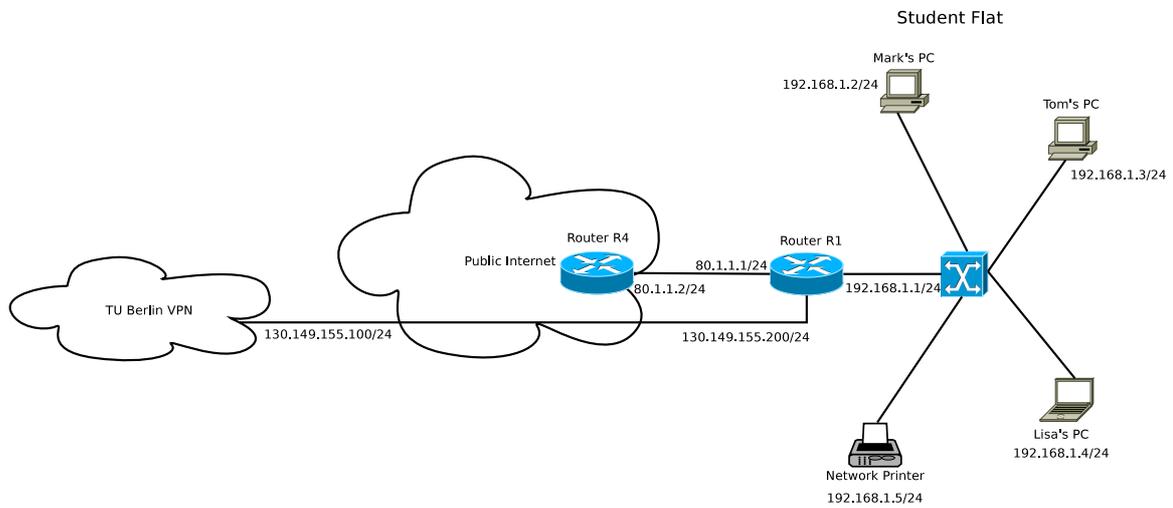
Question 2: (40 points) *Distance Vector Routing*

Consider the network given, and assume that each node initially knows the costs (the labels at the links) to each of its neighbors. Assume that all routers start at the same time and send their routing update messages synchronously. Consider the distance vector algorithm and show the distance table entries at node D over time until the routing is stable.

Use the Tables shown in slide 16 in the slideset “01d: Routing” (we will not accept other table formats!). For A, B and C it is sufficient to remember the best path to the destination.



Question 3: (10 points) *Repetition: Forwarding Table*



Considering the given topology, provide the forwarding table of router R1.

Due Date: Thursday, December, 16th 2010 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=3584>)
- **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.