

## 11th Assignment: Network Protocols and Architectures, WS 13/14

### Modified deadline!

Please note that this worksheet consists of 50 points only and thus has half the workload of an average worksheet. We therefore shifted the deadline to **Sunday 11:55 p. m.**! The next worksheet will consist of 150 points and will be issued on Monday morning.

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

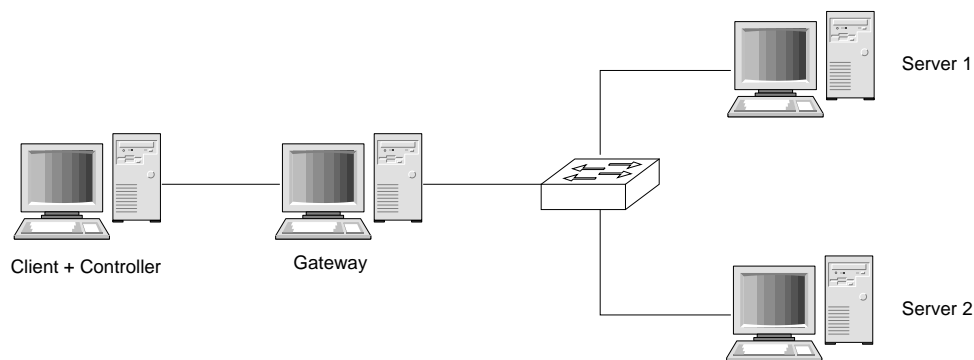


Figure 1: Experimental Setup

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.<sup>1</sup> 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 client + 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 client is sending data to server 1 or server 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 server could respond to queries by the client. A direct communication between the client and any server is not possible. The communication protocol used between client and server 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 12.

**Remark:** Specific implementation and protocol details will be provided in assignment 12. Thus, do not yet implement the protocol!

- (a) 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.

<sup>1</sup>For real-world applications see UPnP and Port Triggering as motivation.

- (b) Design the *soft-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.

**Due Date: Sunday, January, 19th 2014 only until 11:55 p. m. s. t.**

- **As PDF files (no MS Office or OpenOffice files):** Uploaded via ISIS (<https://www.isis.tu-berlin.de/2.0/course/view.php?id=349>)
- Put your name, StudentID number (Matrikelnummer) **and** the name of your tutor on your solution.