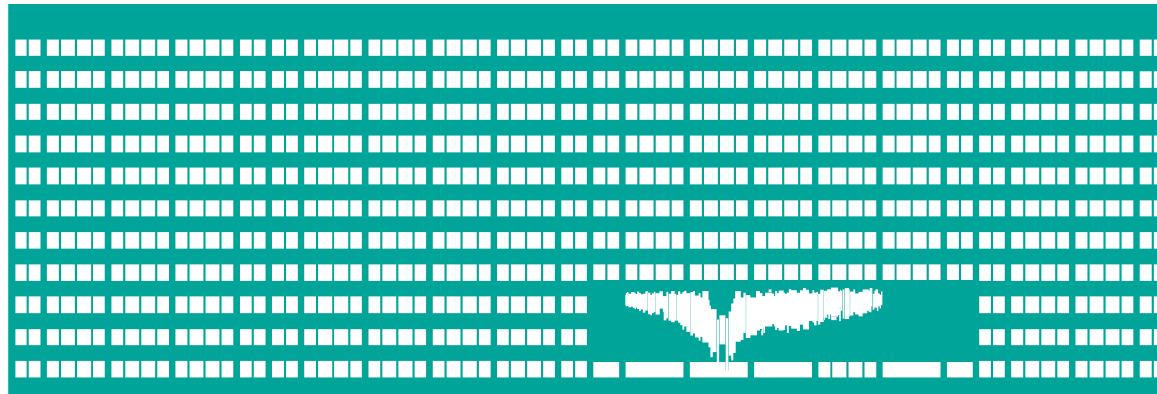


Application layer protocols, DHCP

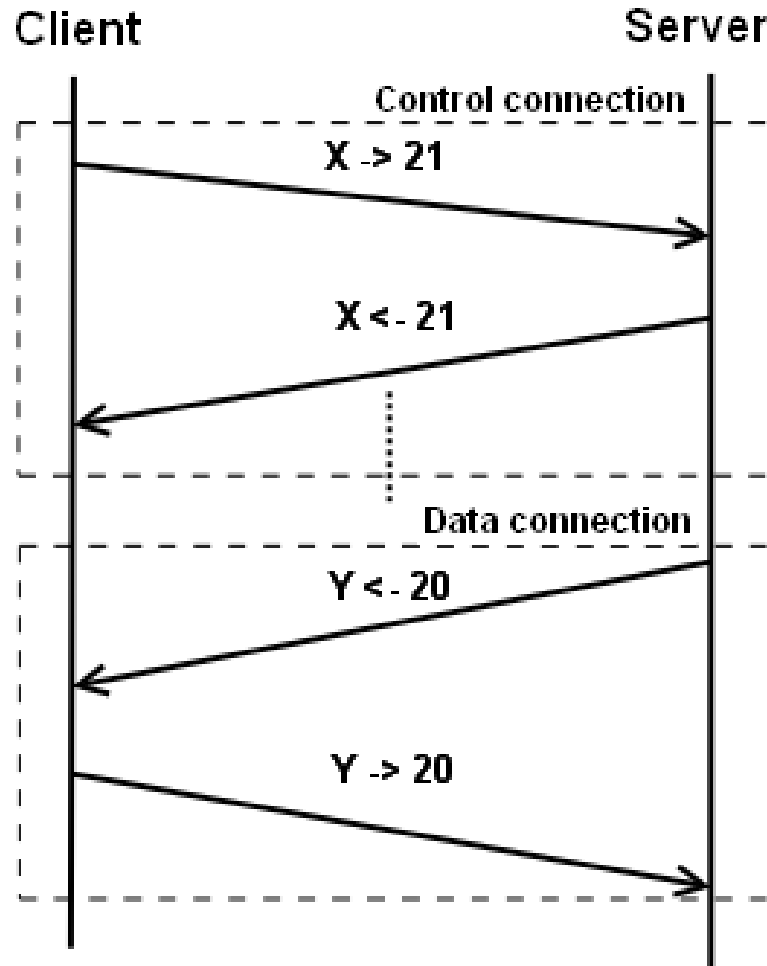


Computer Networks Seminar 10

Protocol examples

- FTP – TCP (20, 21)
- SSH – TCP (22)
- TELNET – TCP (23)
- SMTP – TCP (25)
- DNS – UDP, TCP (53)
- HTTP – TCP (80)
- POP – TCP (110)
-

FTP - establishing the connection



Application protocols demonstration

- How to connect to server
 - telnet <server> <port>
 - ex.: telnet 158.196.135.69 23
 - Putty in Windows (**Raw** for SMTP, POP3, HTTP)
- Analysis using program Wireshark:
 - **Analyze -> Follow TCP Stream** for TCP
 - Catching the passwords in packet outputs

Application protocols analysis

- Protocols for remote access
 - Telnet – to the teacher's computer (158.196.135.69)
 - SSH – to connect to homel or linux456
- Loading the page using browser – HTTP
- E-mail – SMTP for sending, POP3 for receiving

HTTP protocol communication

- Methods: GET, POST, PUT, HEAD, ...
- Protocol versions
 - HTTP/1.0 – 1 transfer for connection
 - HTTP/1.1 – URL instead of path, more transfers in 1 connection, ...
- Communication (www.cs.vsb.cz/PS/priklady/formulare.htm)
 - METHOD path[?p1=value1&p2=v2&p3&] protocol_version
Client headers
<CR><LF>
[data, being transmitted from client (PUT,POST)]
 - Protocol_version ANSWER_CODE answer
Server headers
<CR><LF>
[data, being transmitted in both directions (GET, POST, ...)]

Sending e-mail - SMTP

Server: **smtp.vsb.cz**, port **25**

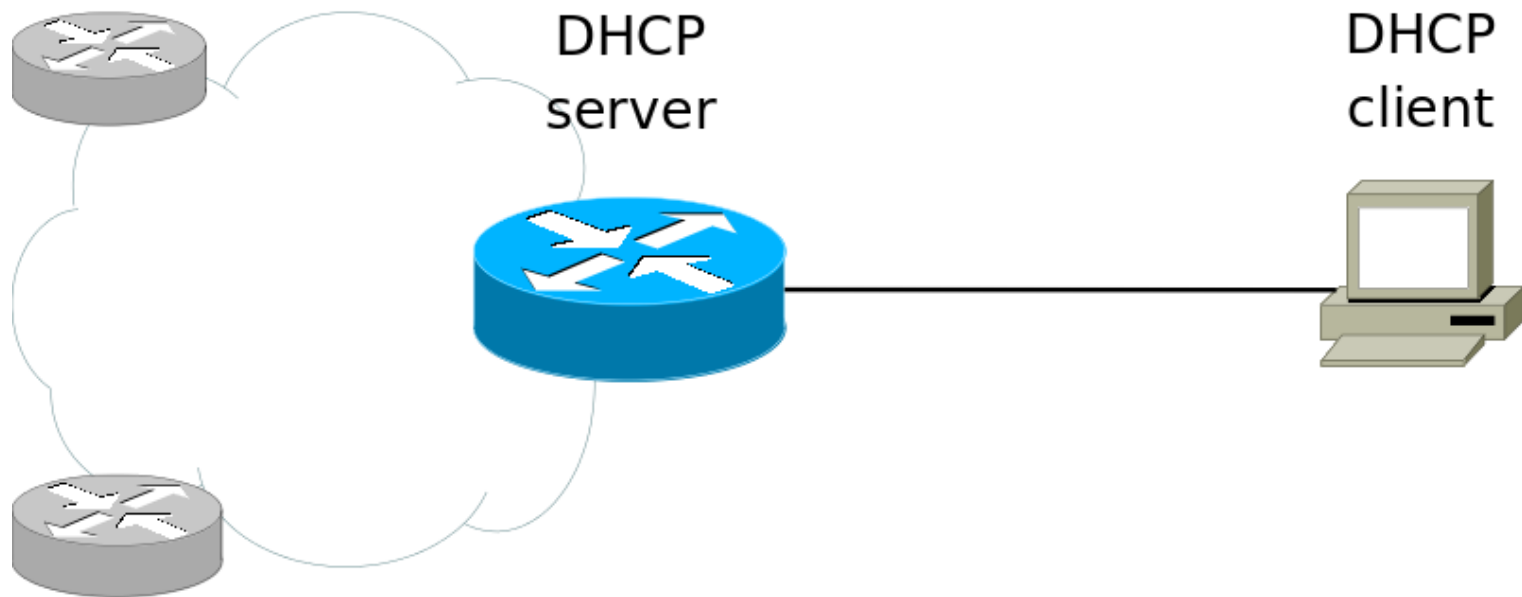
- **HELO** PC_identification (or **EHLO** PC_identification)
MAIL FROM: sender@server.domain.cz
RCPT TO: recipient@server2.domain2.cz
DATA (begins the message)
- Message headers in format - Header: value
(From, Date, Subject, To, Reply-To, Content-Type, ...)
(CR+LF)
Message body
.
(ends the message)
- **QUIT**

Receiving e-mail - POP3

- Initialization
 - **pop3.seznam.cz:110** (posttest:cviceni)
 - **pop3.centrum.cz:110** (posttest:cviceni)
 - **USER** *user_name*
 - **PASS** *password* (WARNING: is visible!)
- Commands for handling the messages
 - **STAT** - list the count of all messages and their total size
 - **LIST** - shows numbered list of messages with their size
 - **UIDL** - message identifiers which are not changed between sessions
 - **TOP** *x n* - gets first *n* lines of message *x*
 - **RETR** *x* - downloads message *x* from server
 - **DELE** *x* - deletes message *x*
 - **RSET** *x* - cancels marking that message is deleted of the message *x*
 - **QUIT** - ends the session

Practical assignment

- Configuration and observing the behaviour of DHCP server on local network



DHCP server configuration - Cisco

- **(config)# ip dhcp pool <name>**
 - **(dhcp-config)# network <network> <mask>**
 - network address, address mask
 - **(dhcp-config)# default-router <address>**
 - default gateway address
 - **(dhcp-config)# dns-server <address>**
 - DNS server address
 - **(dhcp-config)# domain <domain>**
 - default domain (e.g. vsb.cz)
 - **(dhcp-config)# lease {<d> [<h> [<m>]] | infinite}** – duration of address lease
- **(config)# ip dhcp excluded-addr <from> <to>**

Assignment - DHCP server

- Connect computer to the router
- Configure DHCP server on router
- Draw down time harmonogram of DHCP message exchange between server and computer
 - **# debug ip dhcp server packet**
– on router
 - Wireshark – on station