Peer-to-Peer Practical Exercise

Lab Work

TECHNISCHE UNIVERSITÄT DARMSTADT

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Problem 3.2, Task A

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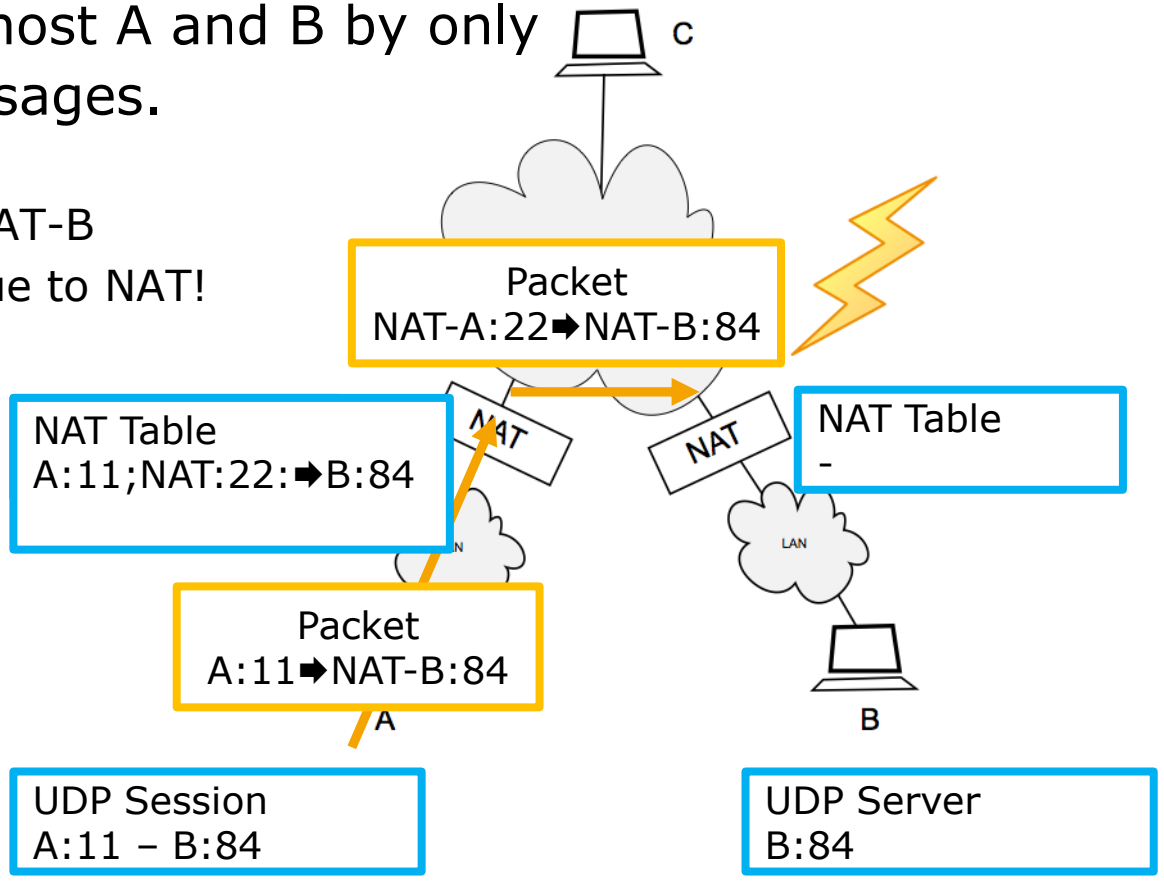
- Describe how you can set up a Peer-to-Peer connection between host A and B by only exchanging four messages.
  - What is the problem?
  - A sends message to NAT-B
  - Wrong port number due to NAT!



Problem 3.2, Task A
Symmetric NAT

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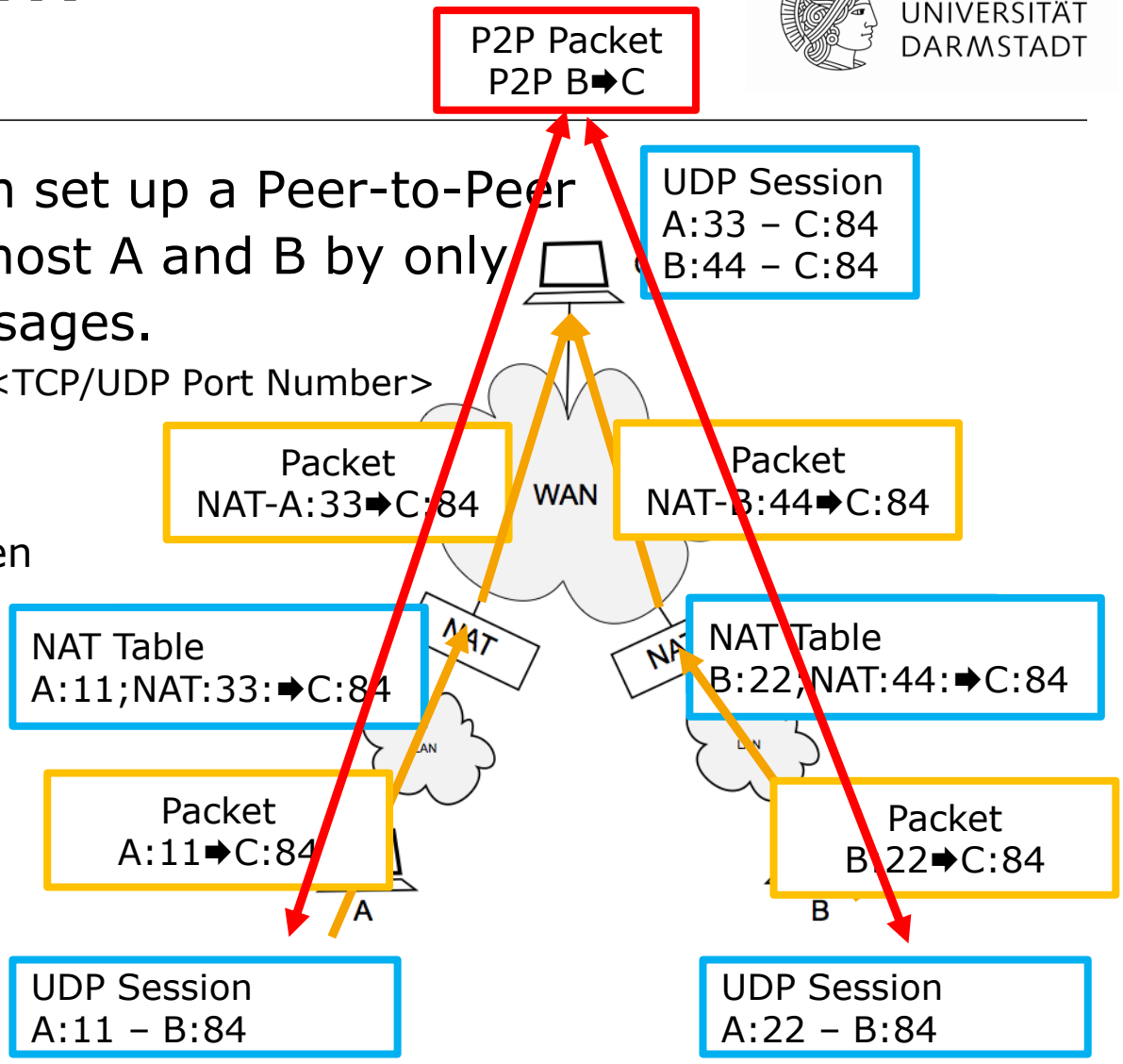
- Describe how you can set up a Peer-to-Peer connection between host A and B by only exchanging four messages.
  - Notation: <IP Address>:<TCP/UDP Port Number>
  - A➡C, C➡B
  - B➡C, C➡A
  - The connection between A and B is established by relaying packets through C



Problem 3.2, Task A
Full-cone NAT

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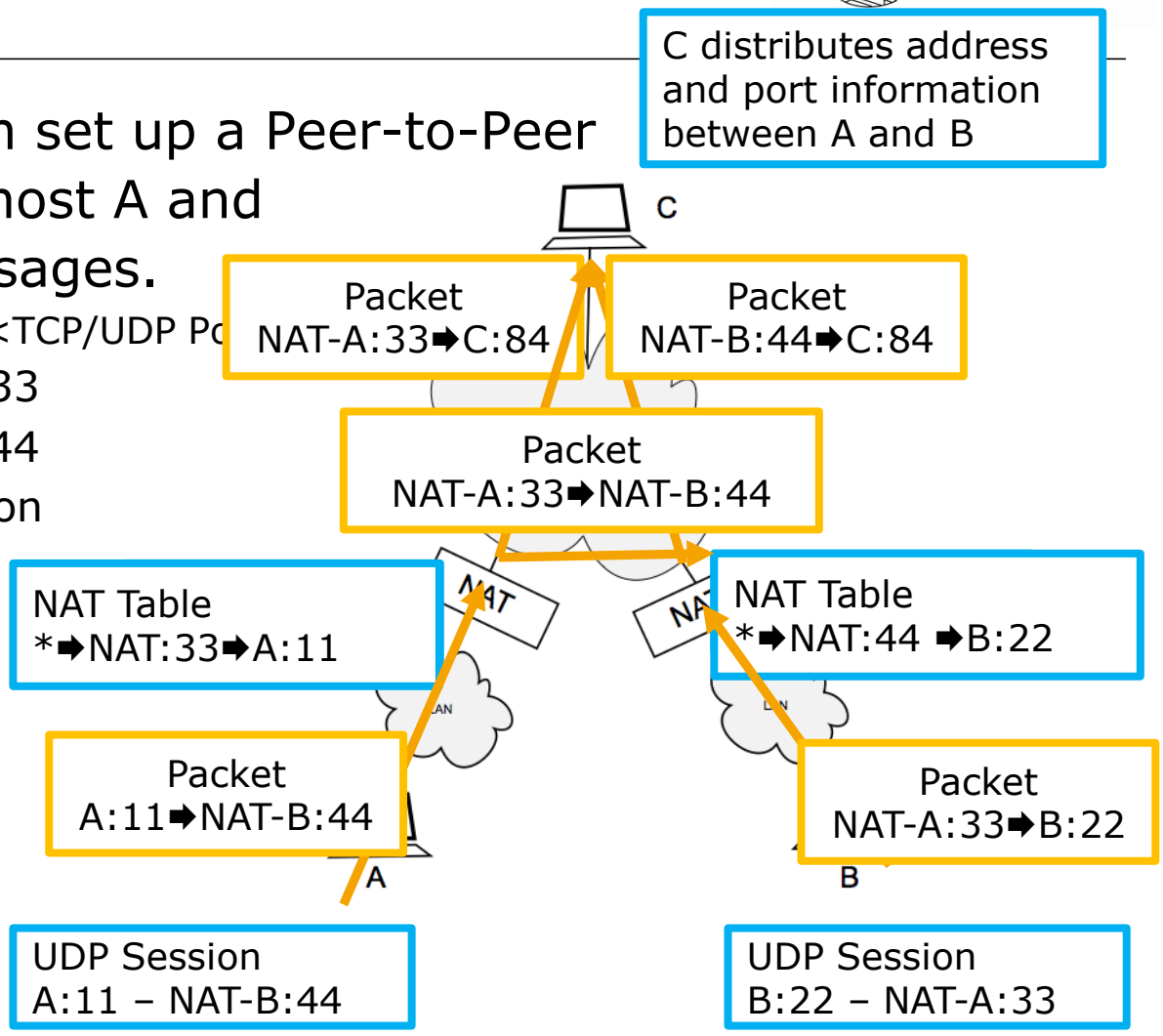
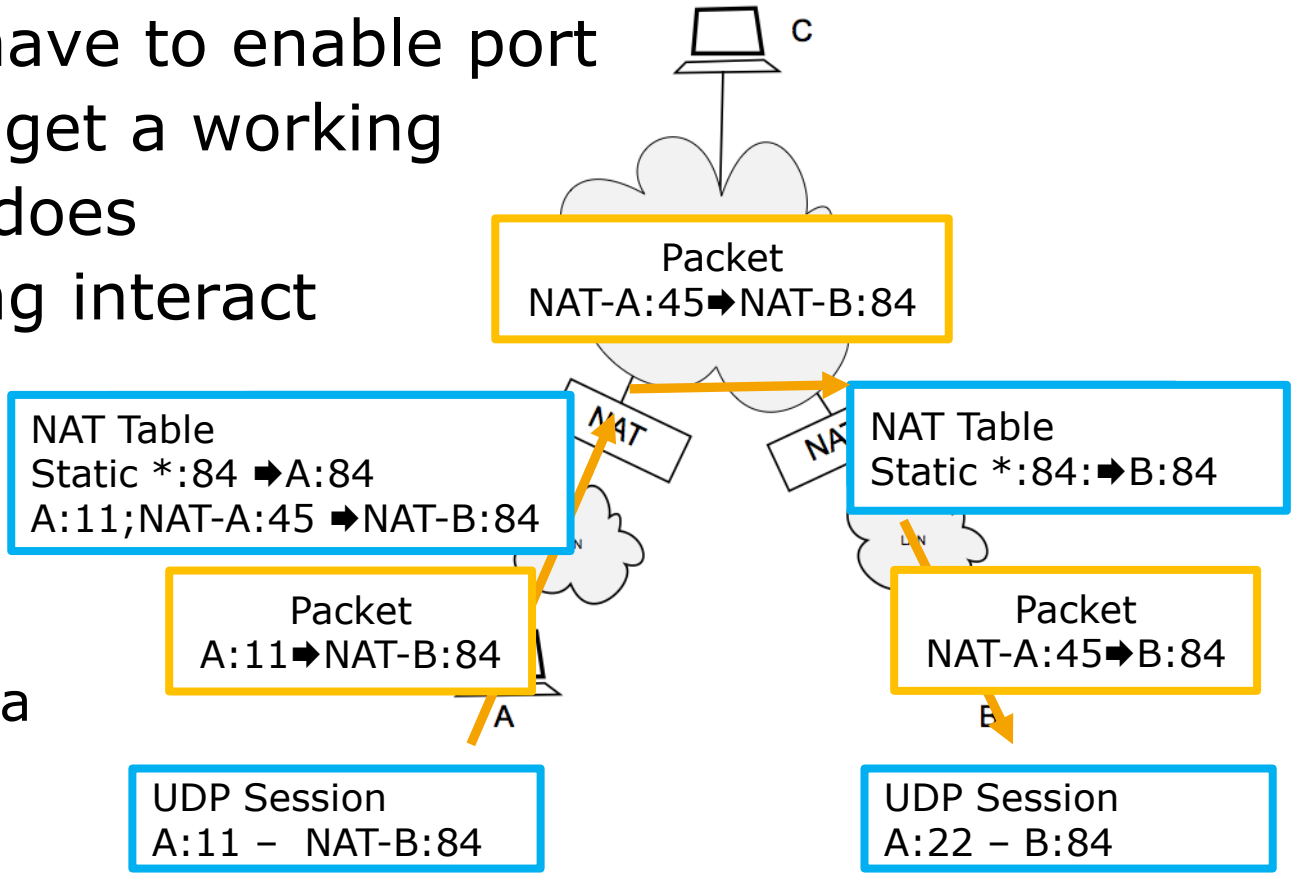
- Describe how you can set up a Peer-to-Peer connection between host A and exchanging four messages.
  - Notation: <IP Address>:<TCP/UDP Po
  - A➡C, C stores NAT-A:33
  - B➡C, C stores NAT-B:44
  - C distributes information
    - C➡B NAT-A:33
    - C➡A NAT-B:44
  - The connection between A and B is established.



Problem 3.2, Task B

- Students deploying an RB-HORST access point have to enable port forwarding to get a working system. How does port forwarding interact with the NAT table?
  - A manually enabled port forwarding is a static entry in the NAT table



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Wireshark

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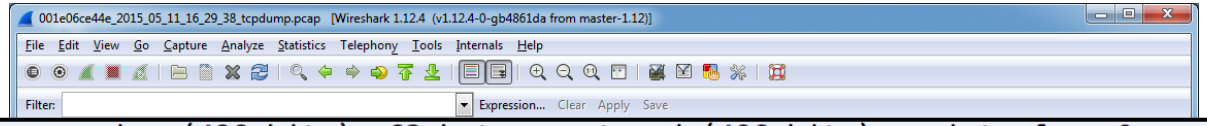
- Packet capturing
  - Capture and store all frames received or transmitted through a given network interface
  - Wireshark does packet capturing using libpcap
  - Wireshark provides a nice GUI for investigating and analyzing the captured data
- Installation
  - Windows & Mac OS:
    - https://www.wireshark.org/download.html
  - Linux:
    - Use your favorite package manager
    - E.g. for Ubuntu:
      - aptitude install wireshark

Using Wireshark

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▶ Frame 269: 62 bytes on wire (496 bits), 62 bytes captured (496 bits) on interface 0
▼ Ethernet II, Src: Dell_51:72:22 (f0:1f:af:51:72:22), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  ▶ Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  ▶ Source: Dell_51:72:22 (f0:1f:af:51:72:22)
    Type: IP (0x0800)
▼ Internet Protocol Version 4, Src: 130.83.139.58 (130.83.139.58), Dst: 130.83.139.255 (130.83.139.255)
    Version: 4
    Header Length: 20 bytes
  ▶ Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00: Not-ECT (Not ECN-Capable Transport))
    Total Length: 48
    Identification: 0x6fed (28653)
  ▶ Flags: 0x00
    Fragment offset: 0
    Time to live: 128
    Protocol: UDP (17)
  ▶ Header checksum: 0xaeef [validation disabled]
    Source: 130.83.139.58 (130.83.139.58)
    Destination: 130.83.139.255 (130.83.139.255)
    [Source GeoIP: Unknown]
    [Destination GeoIP: Unknown]
▼ User Datagram Protocol, Src Port: 2007 (2007), Dst Port: 2007 (2007)
```