Lab 3 - Session 2

Daniel Perdices

May 13, 2024

What are we going to do today?

Lab 3

Self-assessment

Material

SDN

Lab 3

IPv4

Last class, we talk about generic L3 functionality. Now, some particularities of IPv4

- ToS

- Fragmentation

- TTL

- Header integrity

ToS

ToS stands for Type of Service

Usage:

- Originally: Datagram priority (low latency, high throughput, high reliability)

- Nowadays, DiffServ: classes of traffic for best-effort routing (CS0=default, CS1=lowest, ..., CS4=highest, CS5=signaling, CS6=routing/control plane)

Fragmentation

If a datagram is larger than the MTU (Maximum Transmission Unit), it is splitted in two or more fragments:

All fragments but the last one - Flag MF $= 1$

- Fragment offset $=$ offset of 8B blocks

Last fragment: - Flag MF $= 0$

- Appropriate offset value

If Flag DF $= 1$, a ICMP message will be triggered if the IP datagram is too big.

Typically, fragmentation is disable for security reasons. Instead, we adjust the MSS (Maximum Segment Size) to fit the MTU.

TTL

TTL means Time to Live

- In IP, this is the number of L3 hops before the datagram is discarded.

- Each hop decreases the TTL in 1. When it reaches 0, an ICMP message is triggered.

- This is the working principle behind `traceroute`

Header integrity

To preserve the header integrity, a header checksum is performed:

- It does not include the payload, only the header.

- If a devices detects a wrong header checksum, datagram is discarded

Self-assessment

What you should have done by today

- Read the assignment.

- Read code for IP, ICMP, and UDP.

  - Identify functions that are yet to be implemented.

  - How functions call each other?

- Questions about IP.

- Questions about the assignment.

What you should have done by next week?

- Questions about the assignment

- Questions about UDP

- Questions about ICMP

- First implementation of ip.py

Material

Where are these slides?

dperdices.github.io/redes1-1391-2022/

github.com/dperdices/redes1-1391-2022

- Source code of this slides (in markdown)

- Slides in PDF

- Other resources

If you want a completed version or find any mistakes,

- Fork the repo

- Complete it / Fix it yourself

- Make a PR

- Wait for my approval (or comments)

SDN