Redes de Computadores II

Universidade do Algarve

Semana 6

https://github.com/ncatanoc/redes_algarve

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UDP (User Datagram Protocol)

Goal:

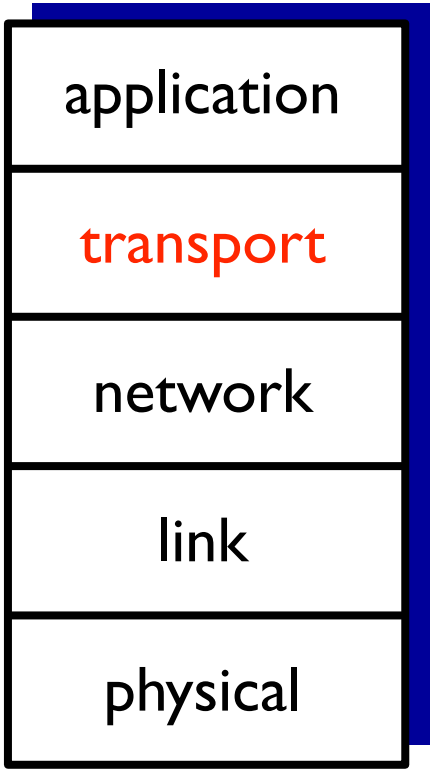
To understand the basic underpinnings of **UDP** and its role in data transfer

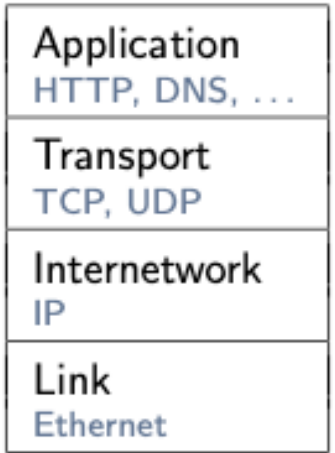
Roadmap

1. **UDP (User Datagram Protocol)**
2. UDP security

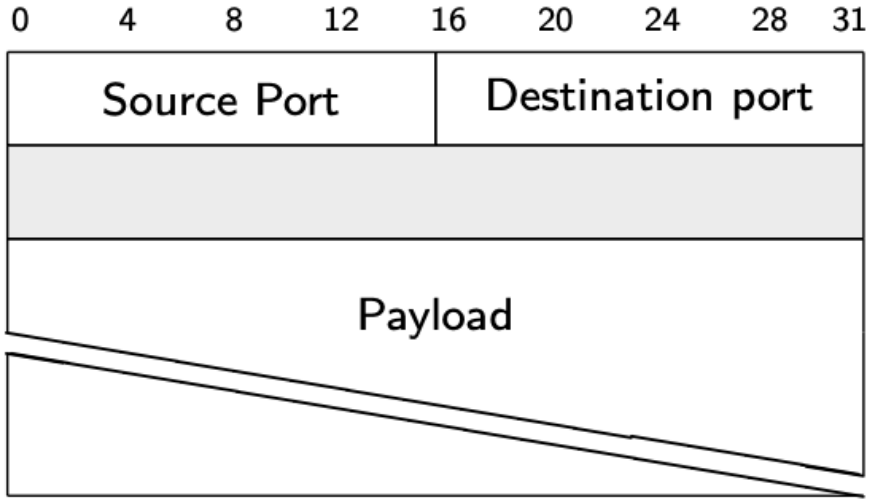
introduction to UDP

- UDP (User Datagram Protocol) is a transport layer protocol
- UDP passes data between the application layer and the network layer
- UDP is connectionless, it does not establish a connection between the Source and the Destination, e.g. through a handshake protocol (e.g. TLS)
- UDP's simplicity: ideal for audio streaming





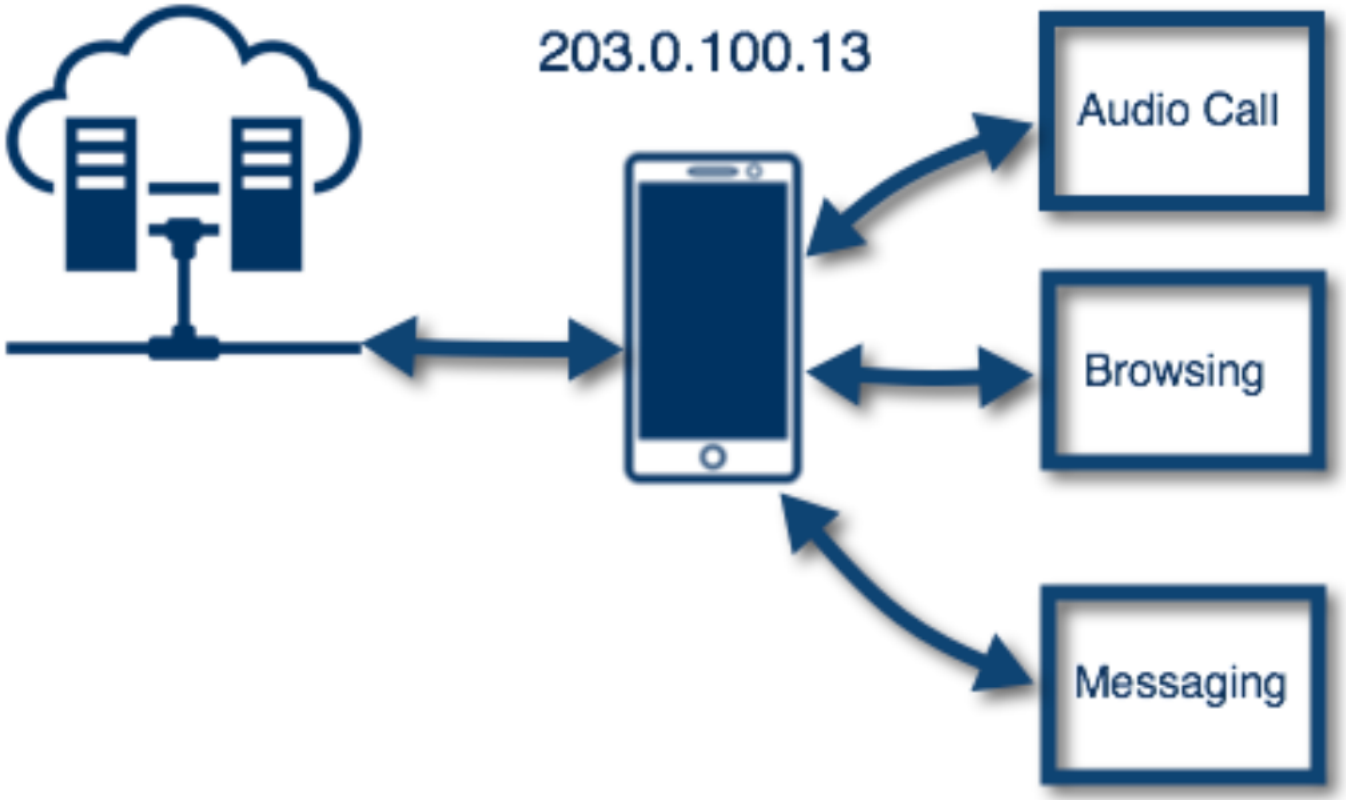
UDP packets



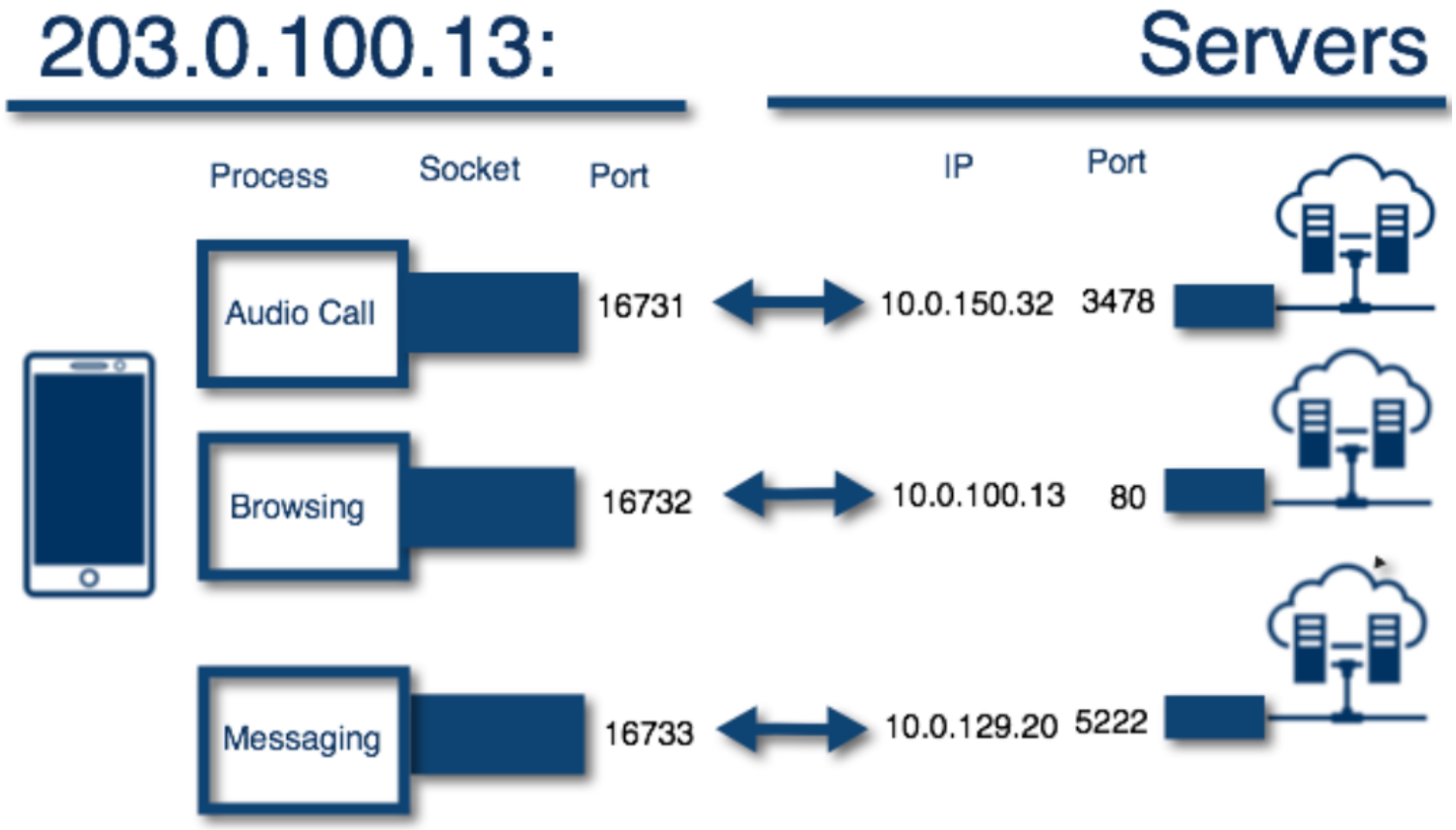
- Payload: Application Data
- Source Port: port message comes from
- Destination Port: arrival port

Connecting programs

How do we connect programs on your device to IP traffic from the network?



Connecting programs



A socket is an end-point in a two-way communication channel

Port numbers

- 16-bit numbers (range from 0 to 65535)
- Ports 0 to 1023 well-known ports by IANA
- Ephemeral ports
  - Range of ports that the IP Stack software can allocate automatically from
  - IANA suggests 49152 to 65535
  - In practice, range is OS-dependent

Internet Assigned Numbers Authority (**IANA**)

Quiz

What do we need a port for? Which statements are true or false?

- To uniquely identify a socket
- To uniquely identify a device
- To uniquely identify a program
- To dock your ships

Answer

What do we need a port for? Which statements are true or false?

- To uniquely identify a socket
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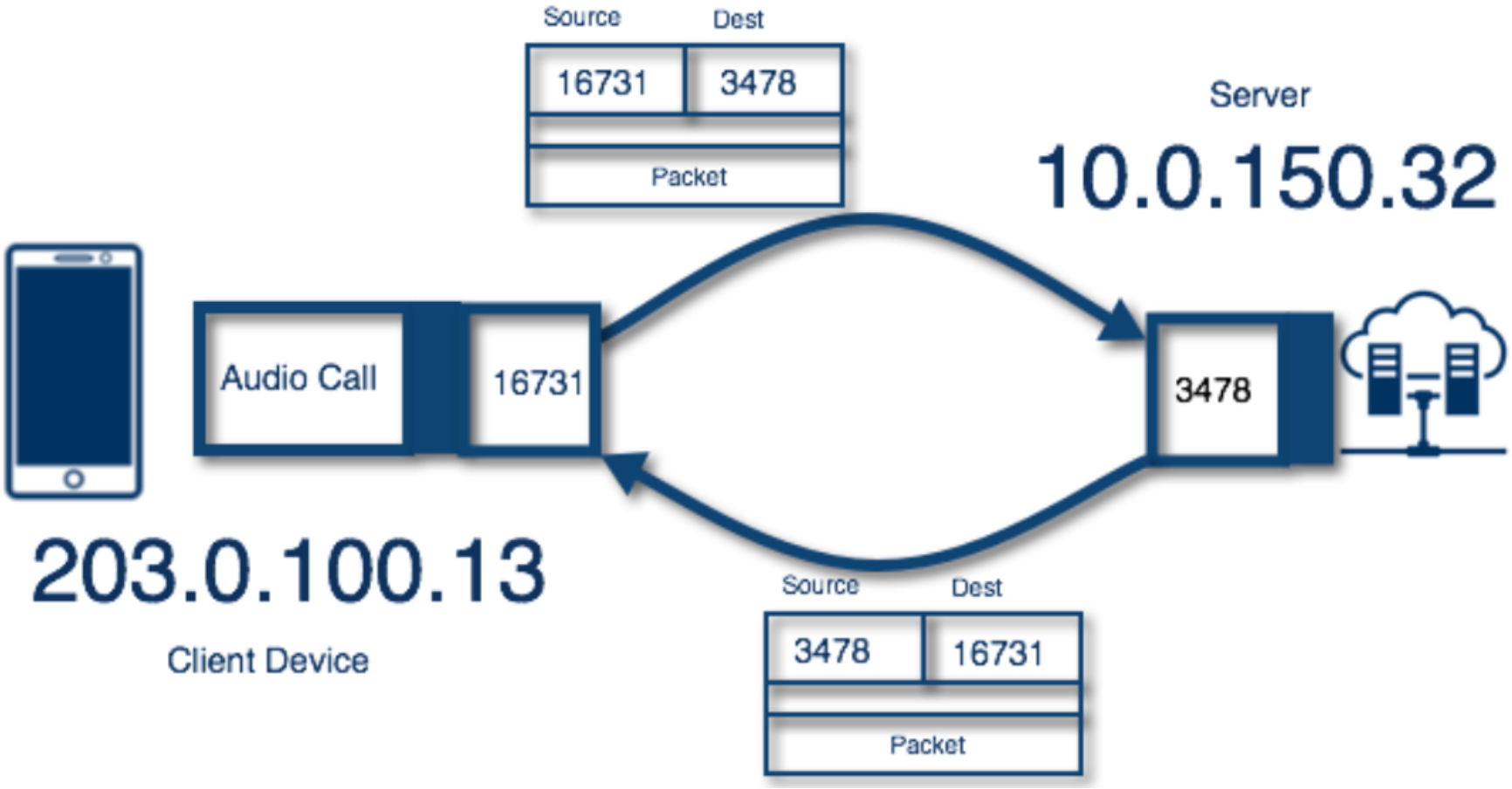
What are the attributes of UDP?

1. UPD is connectionless
    1. There is no handshake protocol between the Source and the Destination.
2. Port-to-Port
3. Process-to-Process communication
4. No ordering - No retry

How does UDP work?



What does UDP give you?

- Finer application level control over what data is sent, and when
- No handshake; it reduces delays
- No connection state; it can support more applications
- Small packet overhead

Quiz

What is UDP good for?

- Audio chat
- Video chat
- Real time systems
- Network Mangement (SNMP)
- Sending Email
- Downloading Web pages
- Watching Movies online

Answer

What is UDP good for?

- **Good cases for UDP**
  - Audio chat
  - Video chat
  - Real time systems
  - Network Mangement (SNMP)
- **UDP not as good of a fit**
  - Sending Email
  - Downloading Web pages
  - Watching Movies online

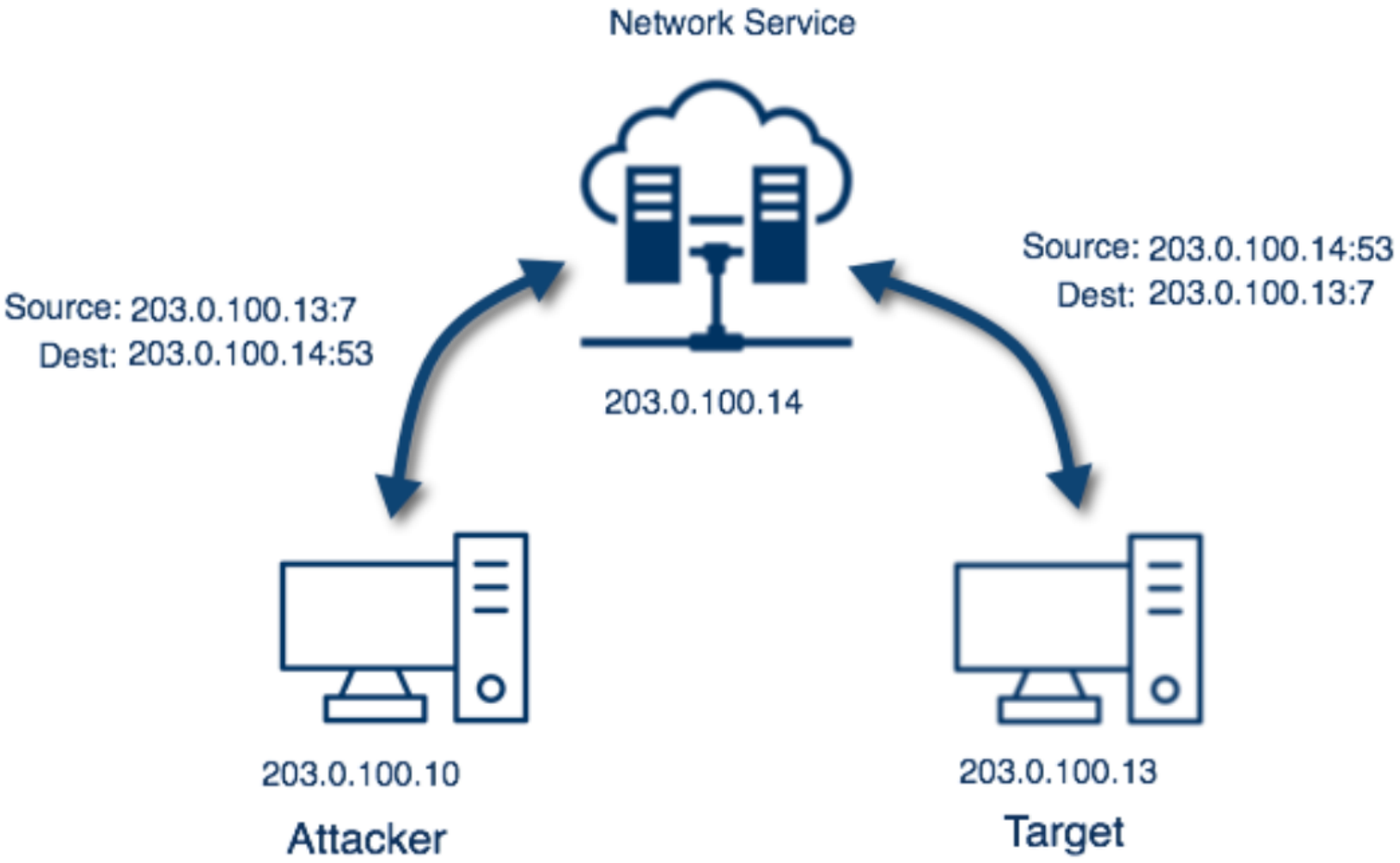
Roadmap

1. UDP (User Datagram Protocol)
2. **UDP security**

UDP security

- IP spoofing
  - Injecting a false Source IP address
- Reflection attacks
  - Response to a target machine
- Traffic amplification
  - Denial of service attack to a target machine

Reflection attack



Quiz

Who is the intended target of a reflection attack?

- ☐ The device that the attacker is sending the request to.
- ☐ The device that is mentioned in the source IP field.
- ☐ The device that the attacker is using to send packets.

Answer

Who is the intended target of a reflection attack?

- [ ] The device that the attacker is sending the request to.
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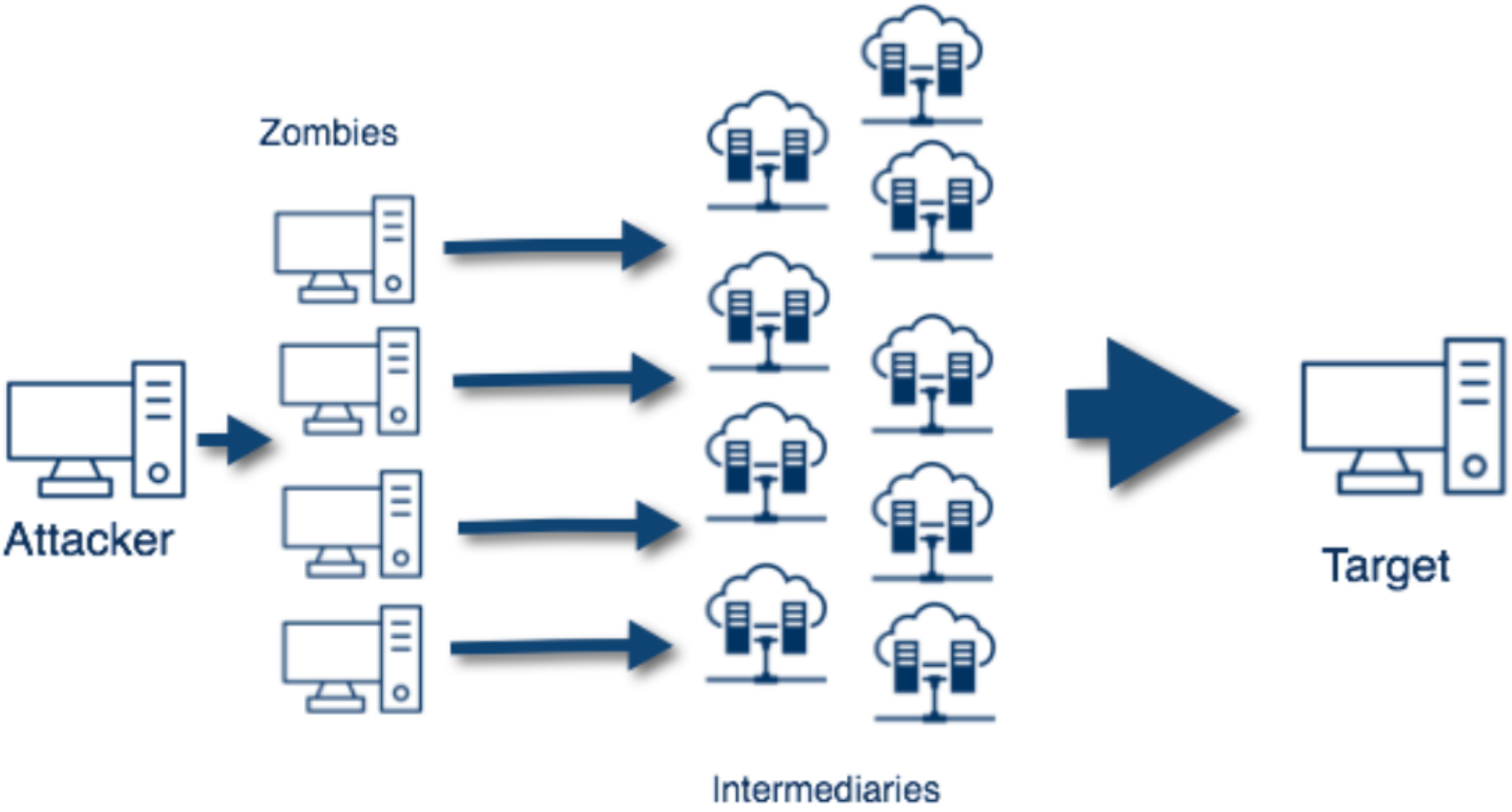
Amplification attack



Quiz

What attributes of UDP contribute to it being used for amplification attacks?

- Connectionless
- Spoofable
- Guaranteed Delivery

Answer

What attributes of UDP contribute to it being used for amplification attacks?

- **Connectionless**
- **Spoofable**
- Guaranteed Delivery

UDP summary

- Lightweight protocol that allows for greater control over delivery and timing of the content.
- Does not keep track of the ordering
- Less overhead makes it preferable for streaming.
- The lack of guarantees makes it less preferable for applications that would suffer from missing data, like Web pages