IP Tunnel Experiment

Future Internet Communication Technologies

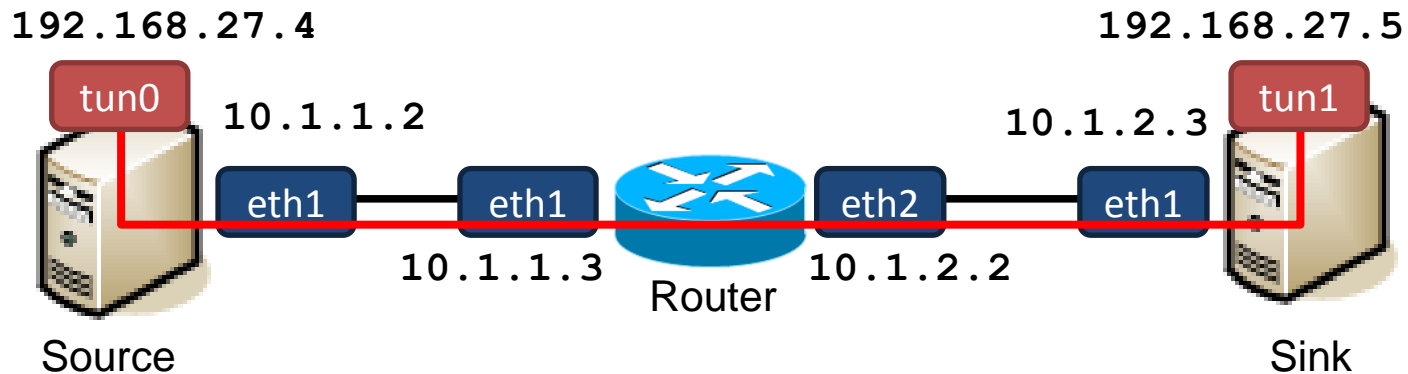# Physical Network Configuration

- Two subnetworks
  - 10.1.1.0/24 (Source and Router)
  - 10.1.2.0/24 (Sink and Router)

- Static routing configured at Router

```
             10.1.1.2                                    10.1.2.3
Source  [eth1]──────[eth1]  Router  [eth2]──────[eth1]  Sink
             10.1.1.3              10.1.2.2
```

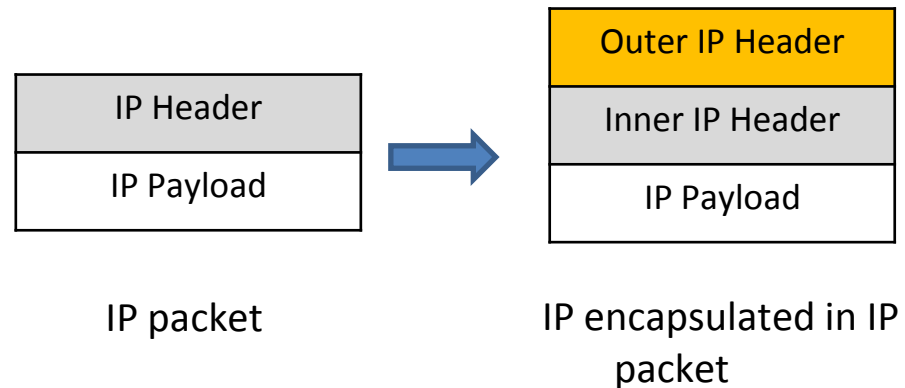- Virtual link between Source and Sink?

Physical Network Configuration
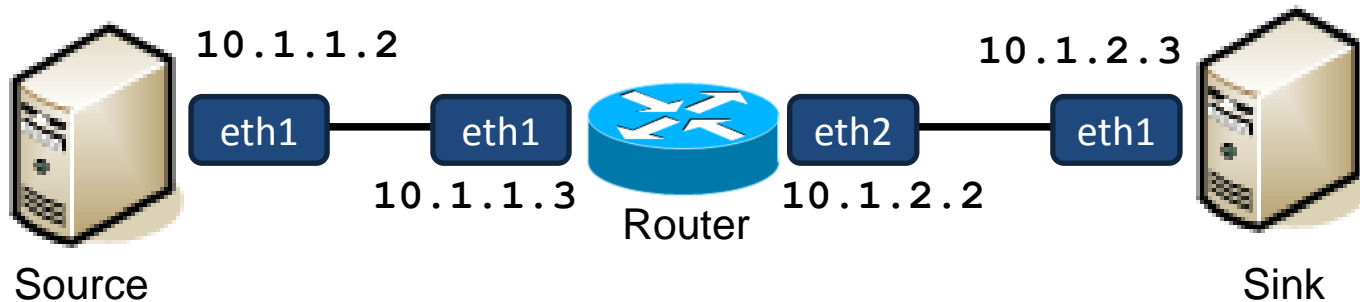
- Virtual link between Source and Sink
  - Point-to-Point connection
  - Tunnel interfaces tunX
  - Source: 192.168.27.4, Sink: 192.168.27.5

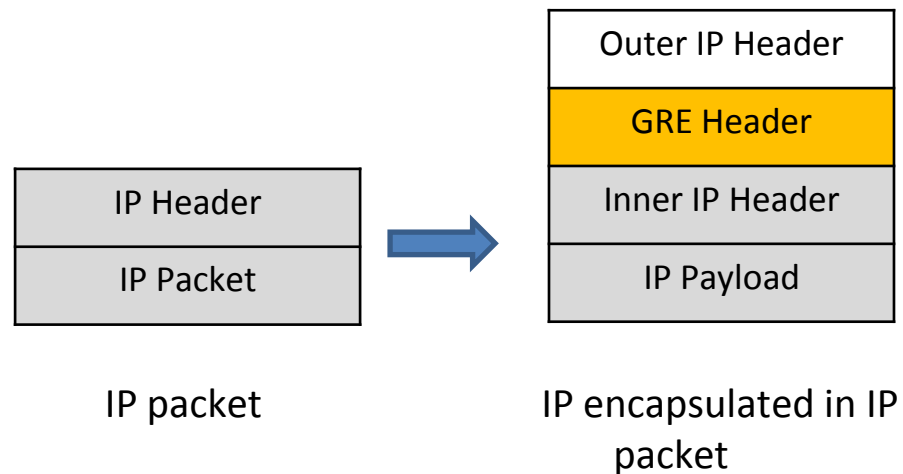**192.168.27.4**   **192.168.27.5**

tun0   **10.1.1.2**   **10.1.2.3**   tun1

eth1   eth1   eth2   eth1

10.1.1.3   Router   **10.1.2.2**

Source   Sink

Link Virtualization Technologies

- **IP-in-IP**

| IP Header |
| IP Payload |

IP packet

→

| Outer IP Header |
| Inner IP Header |
| IP Payload |

IP encapsulated in IP packet

- **Generic Routing Encapsulation (GRE)**
  - IPv4

| IP Header |
| IP Packet |

IP packet

→

| Outer IP Header |
| GRE Header |
| Inner IP Header |
| IP Payload |

IP encapsulated in IP packet

Experiment

- Login to the experimental nodes

ssh [-X] student @[src|router|sink].srs[1|2|3|4].filab.filab.uni-hannover.de

- Configure tunnel between source and sink
  - Tools *ip [tunnel]* and *ifconfig*

- Load IP-in-IP and GRE kernel modules

sudo modprobe [ipip|ip_gre]

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Experiment

- ## Create tunnel
  - tun0, tun1, … is the corresponding interface name

sudo ip tunnel add tun[0|1|...] mode [ipip|gre] local [host_ip_local] remote [host_ip_remote]

<u>Example:</u> *sudo ip tunnel add tun0 mode ipip local 10.1.1.2 remote 10.1.2.3*

- ## Configure tunnel interfaces

sudo ifconfig tun[0|1|...] [tunnel_ip_local] netmask [tunnel_ip_netmask] pointopoint [tunnel_ip_remote]

<u>Example:</u> *sudo ifconfig tun0 192.168.27.4 netmask 255.255.255.0 pointopoint 192.168.27.5*

- Setting tunnel link up (if required)

sudo ip link set tun[0|1|…] up

- If you need to check the current tunnels

ip tunnel

- To remove a tunnel interface

sudo ip tunnel del tun[0|1|…]

Wireshark

ping 10.1.1.2 –c 1
ping 192.168.27.5 –c 1