Overlay Network and VXLAN

计算机网络 CS339

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An overlay network can be thought of as a computer network on top of another network.

VXLAN is often described as an overlay technology because it allows to stretch Layer 2 connections over an intervening Layer 3 network by encapsulating (tunneling) Ethernet frames in a VXLAN packet that includes IP addresses.

1 建立网络

先克隆虚拟机[1]，然后分别在 VM1 和 VM2 上分别运行下面的脚本，结果如图 1 所示：

Listing 1: vm1.sh

```
#!/bin/bash

sudo mn
h1 ifconfig h1-eth0 mtu 1450
h2 ifconfig h2-eth0 mtu 1450

# ======

sudo ifconfig s1 10.0.0.101/8 up
sudo ovs-vsctl add-br br1
sudo ifconfig ens33 0 up
sudo ovs-vsctl add-port br1 ens33
sudo ifconfig br1 192.168.4.131/24 up

sudo ovs-vsctl add-port s1 vxlan0 -- set interface vxlan0 type=vxlan options:
    remote_ip=192.168.4.132

sudo ifconfig vxlan_sys_4789 mtu 1450
sudo ifconfig s1-eth1 mtu 1450
sudo ifconfig s1-eth2 mtu 1450
```

Listing 2: vm2.sh

```
#!/bin/bash

sudo ovs-vsctl add-br s1
sudo ifconfig s1 10.0.0.102/8 up

sudo ovs-vsctl add-br br1
sudo ifconfig ens33 0 up
sudo ovs-vsctl add-port br1 ens33
sudo ifconfig br1 192.168.4.132/24 up

sudo ovs-vsctl add-port s1 vxlan0 -- set interface vxlan0 type=vxlan options:
    remote_ip=192.168.4.131

# ====clean====
# sudo ovs-vsctl del-br br1
```

[1]感谢 VMWare Workstation 的快照技术，如果重新启动虚拟机，网络配置将会让其无法上网，必须返回原点重新配置。

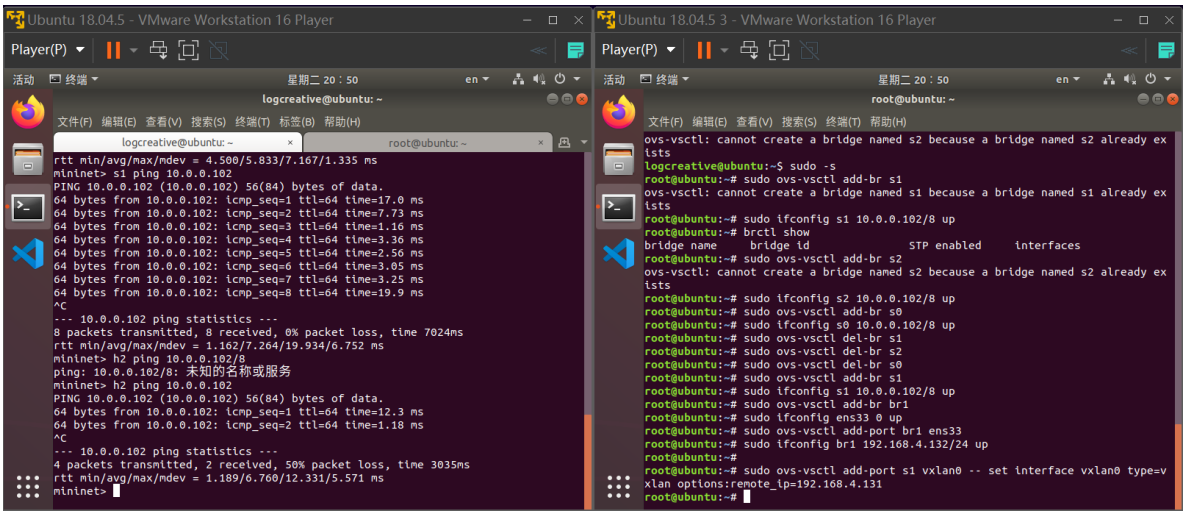

图 1: 配置环境

2 WIRESHARK 抓包

Use Wireshark to monitor the interfaces s1 and eth0, and describe your findings.

使用 Wireshark 抓取传输时数据，得到如图 2 所示的包。外层为 UDP 报文，显示的实际的 IP 地址；中间为 VXLAN 层；再内侧为 Overlay 的 ICMP 报文，显示的是 Overlay IP 地址。

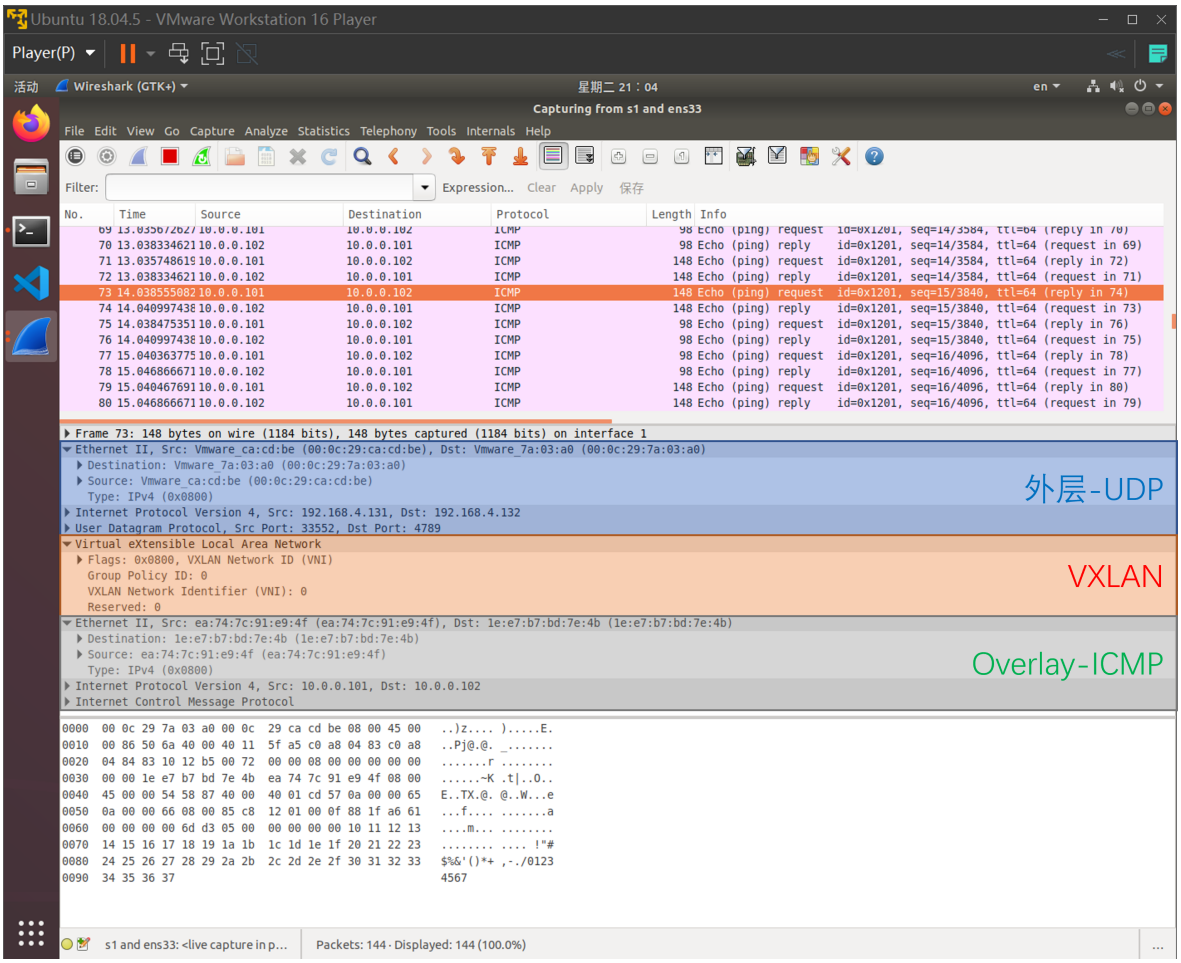

图 2: Wireshark 抓包

3 IPERF 测试

Use iperf to test the network bandwidth between the two virtual machines

- Test the bandwidth between 192.168.56.127 and 192.168.56.128
- Test the bandwidth between 10.0.0.1/10.0.0.2/10.0.0.101 and 10.0.0.102 (hint: you may need to specify a reasonable MTU size in order for your iperf to work in this case. Please also think about why.)

Compare the above results and explain the reason.

如果不调整 MTU 会导致从 h1 ping 出去的时候只有两个包被接收了，之后会提示“没有可

用的缓冲区空间”，如图 3 所示。

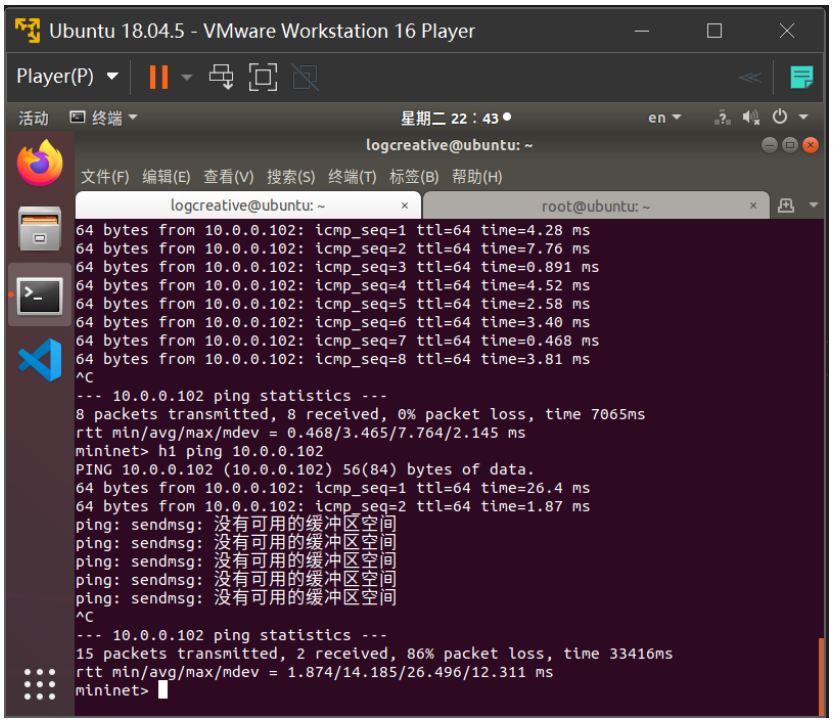

图 3: 没有可用的缓冲区空间

4 PING 测试

Similar to Q2, use ping to test the network latency and analyze your results.