

# Data Communication

## Assignment #2

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### 1. 각 가상머신의 MAC주소

```
pjh@pjh-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::2f48:a0e1:901c:13d3 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:6c:fd:3f txqueuelen 1000 (Ethernet)
    RX packets 55998 bytes 67223628 (67.2 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 18876 bytes 1729694 (1.7 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 4656 bytes 381394 (381.3 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 4656 bytes 381394 (381.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

pjh@pjh-VirtualBox:~$
```

```
pjh@pjh-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    ether 08:00:27:22:21:fb txqueuelen 1000 (Ethernet)
    RX packets 327 bytes 19892 (19.8 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 289 bytes 43612 (43.6 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 128 bytes 10994 (10.9 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 128 bytes 10994 (10.9 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

pjh@pjh-VirtualBox:~$
```

ifconfig 을 통해 살펴 본 결과, 가상머신1 (왼쪽)의 MAC 주소는 08:00:27:6c:fd:3f, 가상머신2 (오른쪽)의 MAC 주소는 08:00:27:22:21:fb 이었다.

### 2. 터미널에서의 실행 모습

```
Send ACK : GO
DATA has been received, Length : 9, Hello, 8
Send ACK : GO
DATA has been received, Length : 9, Hello, 9
Send ACK : STOP
ACK : GO has been received
Message has been transmitted. Wait ACK
ACK : GO has been received
Message has been transmitted. Wait ACK
ACK : STOP has been received
Change the STOP state to GO.
Send ACK : GO
DATA has been received, Length : 10, Hello, 10
Send ACK : GO
DATA has been received, Length : 10, Hello, 11
Send ACK : STOP
ACK : GO has been received
Message has been transmitted. Wait ACK
ACK : GO has been received
Message has been transmitted. Wait ACK
ACK : STOP has been received
Change the STOP state to GO.
Send ACK : GO
DATA has been received, Length : 10, Hello, 12
Send ACK : GO
DATA has been received, Length : 10, Hello, 13
Send ACK : STOP
```

```
ACK : STOP has been received
Change the STOP state to GO.
Send ACK : GO
DATA has been received, Length : 10, Hello, 12
Send ACK : GO
DATA has been received, Length : 10, Hello, 13
Send ACK : STOP
ACK : GO has been received
Message has been transmitted. Wait ACK
ACK : GO has been received
Message has been transmitted. Wait ACK
ACK : STOP has been received
Change the STOP state to GO.
Send ACK : GO
DATA has been received, Length : 10, Hello, 14
Send ACK : GO
DATA has been received, Length : 10, Hello, 15
Send ACK : STOP
ACK : GO has been received
Message has been transmitted. Wait ACK
ACK : GO has been received
Message has been transmitted. Wait ACK
ACK : STOP has been received
Change the STOP state to GO.
Send ACK : GO
ACK : GO has been received
```

우리의 의도대로 ACK STOP을 받을 시 전송 중지, ACK GO를 받을 시 전송 재개하는 모습을 확인할 수 있었다.

### 3. Wireshark 패킷 분석

우선, c 코드를 통해 각각의 type 의 뜻을 알아낼 수 있다.

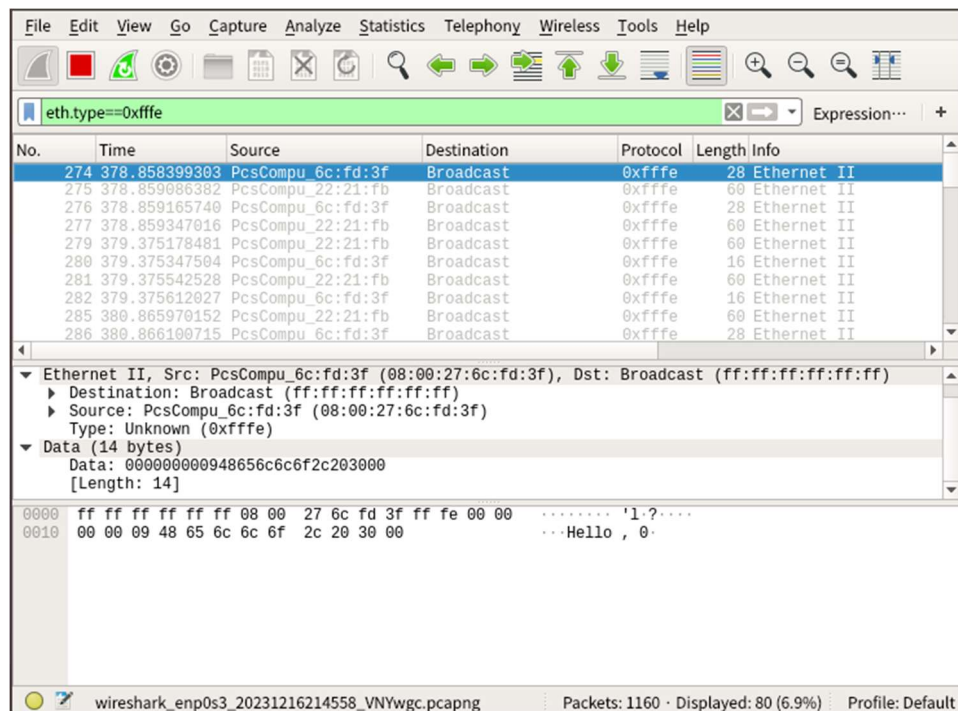
```
enum {  
    HEADER_TYPE_DATA,  
    HEADER_TYPE_ACK,  
};
```

위와 같이 정의되어 있으므로 Assignment#2 Type 이 '00'일 경우 DATA TYPE, '01'일 경우 ACK TYPE 이다. 또한,

```
enum {  
    ACK_TYPE_GO,  
    ACK_TYPE_STOP,  
    ACK_TYPE_NACK,  
};
```

위와 같이 정의되어 있으므로 ACK TYPE 이 '00'일 경우 ACK GO, '01'일 경우 ACK STOP 이다. 이 정보를 바탕으로 연속한 몇 개의 패킷을 분석한 과정은 다음과 같다. Wireshark 는 가상머신 1 에서 실행하였다.

-Packet #1



위 패킷은 Source 가 08:00:27:6c:fd:3f 이므로, 가상머신 1 에서 전송한 패킷이다. Assignment#2 Type 이 '00'이므로 DATA 타입이며, 'Hello, 0'이라는 데이터를 담고 있다.

File Edit View Go Capture Analyze Statistics Tools Help

Expression...

No.	Time	Source	Destination	Protocol	Length	Info
274	378.858399303	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
275	378.859086382	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
276	378.859165740	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
277	378.859347016	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
279	379.375178481	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
280	379.375347504	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
281	379.375542528	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
282	379.375612027	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
285	380.865970152	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
286	380.866100715	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II

▼ Ethernet II, Src: PcsCompu\_22:21:fb (08:00:27:22:21:fb), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

- Destination: Broadcast (ff:ff:ff:ff:ff:ff)
- Source: PcsCompu\_22:21:fb (08:00:27:22:21:fb)  
Type: Unknown (0xffff)

▼ Data (46 bytes)

Data: 01000000000000000000000000000000000000000000...  
[Length: 46]

```

0000 ff ff ff ff ff ff 08 00 27 22 21 fb ff fe 01 00 ..... '!.....
0010 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0020 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
    
```

wireshark enp0s3 20231216214558 VNYwec.pcapng Packets: 1546 · Displayed: 80 (5.2%) Profile: Default

-Packet #3

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

eth.type==0xffff

No.	Time	Source	Destination	Protocol	Length	Info
274	378.858399303	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
275	378.859086382	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
276	378.859165740	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
277	378.859347016	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
279	379.375178481	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
280	379.375347504	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
281	379.375542528	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
282	379.375612027	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
285	380.865970152	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
286	380.866100715	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II

▼ Ethernet II, Src: PcsCompu\_6c:fd:3f (08:00:27:6c:fd:3f), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

- Destination: Broadcast (ff:ff:ff:ff:ff:ff)
- Source: PcsCompu\_6c:fd:3f (08:00:27:6c:fd:3f)
- Type: Unknown (0xffff)

▼ Data (14 bytes)

Data: 000000000948656c6c6f2c203100

[Length: 14]

```

0000  ff ff ff ff ff ff 00 00  27 6c fd 3f ff fe 00 00  ....'1?....
0010  00 00 09 48 65 6c 6f 2c  20 20 31 00             ...Hello, 1.
  
```

wireshark enp0s3 20231216214558 VNYwec.pcapng Packets: 1557 · Displayed: 80 (5.1%) Profile: Default

위 패킷은 가상머신 1 이 보낸 DATA 패킷이다. 위에서 예측했듯, DATA 패킷을 보내는 것을 멈추지 않았음을 확인할 수 있다. 전송 데이터 또한 'Hello, 1'로, 이전에 전송한 데이터 패킷보다 1 증가하였다.

File Edit View Go Capture Analyze Statistics Help

Expression...

No.	Time	Source	Destination	Protocol	Length	Info
274	378.858399303	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
275	378.859086382	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
276	378.859165740	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
277	378.859347016	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
279	379.375178481	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
280	379.375347504	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
281	379.375542528	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
282	379.375612027	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
285	380.865970152	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
286	380.866100715	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II

▼ Ethernet II, Src: PcsCompu\_22:21:fb (08:00:27:2d:21:fb), Dst: Broadcast (ff:ff:ff:ff:ff:ff)  
   ► Destination: Broadcast (ff:ff:ff:ff:ff:ff)  
   ► Source: PcsCompu\_22:21:fb (08:00:27:2d:21:fb)  
     Type: Unknown (0xffff)

▼ Data (46 bytes)  
   Data: 010100000000000000000000000000000000000000000000...  
   [Length: 46]

```

0000 ff ff ff ff ff ff 00 00 27 22 21 fb ff fe 01 01 ..... '!.....
0010 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0020 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0030 00 00 00 00 00 00 00 00 00 00 00 00 .....
  
```

wireshark enp0s3 20231216214558 VNYwec.pcapng     Packets: 1778 · Displayed: 80 (4.5%)     Profile: Default

-Packet #5

**File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help**

eth.type==0xffff Expression...

No.	Time	Source	Destination	Protocol	Length	Info
274	378.858399303	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
275	378.859086382	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
276	378.859165740	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
277	378.859347016	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
279	379.375178481	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
280	379.375347594	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
281	379.375542528	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
282	379.375612027	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
285	380.865970152	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
286	380.866100715	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II

▼ Ethernet II, Src: PcsCompu\_22:21:fb (08:00:27:22:21:fb), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

- Destination: Broadcast (ff:ff:ff:ff:ff:ff)
- Source: PcsCompu\_22:21:fb (08:00:27:22:21:fb)  
Type: Unknown (0xffff)
- ▼ Data (46 bytes)  
Data: 000000000948656c6c6f2c203000000000000000000000...  
[Length: 46]

```

0000 ff ff ff ff ff ff 08 00 27 22 21 fb ff fe 00 00 ..... ".....
0010 00 00 09 48 65 6c 6c 6f 2c 20 30 00 00 00 00 ...Hello , 0....
0020 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
    
```

wireshark eno0s3 20231216214558 VNYwec.pcapng Packets: 1848 · Displayed: 80 (4.3%) Profile: Default

가상머신 2 가 송신한 DATA 패킷이다. 가상머신 1 은 ACK STOP 을 아직 보내지 않았으므로 가상머신 2 는 DATA 패킷을 송신할 수 있다.



File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

eth.type==0xffff

No.	Time	Source	Destination	Protocol	Length	Info
274	378.858399303	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
275	378.859086382	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
276	378.859165740	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
277	378.859347016	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
279	379.375178481	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
280	379.375347504	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
281	379.375422528	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
282	379.375612027	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
285	380.865970152	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
286	380.866100715	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II

▼ Ethernet II, Src: PcsCompu\_6c:fd:3f (08:00:27:6c:fd:3f), Dst: Broadcast (ff:ff:ff:ff:ff:ff)  
 ► Destination: Broadcast (ff:ff:ff:ff:ff:ff)  
 ► Source: PcsCompu\_6c:fd:3f (08:00:27:6c:fd:3f)  
 Type: Unknown (0xffff)  
 ▼ Data (2 bytes)  
 Data: 0100  
 [Length: 2]

0000 ff ff ff ff ff ff 00 27 6c fd 3f ff fe 01 00 ..... '1'?...

wireshark\_enp0s3\_20231216214558\_VNYWg.pcapng      Packets: 1879 · Displayed: 80 (4.3%)      Profile: Default

-Packet #7

Wireshark interface showing a packet capture. The packet list displays a packet from 192.168.1.10 to 192.168.1.1. The packet details show the Ethernet II header and the ARP request structure. The packet bytes show the raw data in hexadecimal and ASCII.

No.	Time	Source	Destination	Protocol	Length	Info
274	378.858399303	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
275	378.859886382	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
276	378.859165740	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
277	378.859347616	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
279	379.375378481	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
280	379.375347584	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
281	379.375542528	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
282	379.375612027	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
285	380.8595970152	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
286	380.866100715	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II

Packet 281 details:

- Ethernet II, Src: PcsCompu\_22:21:fb (08:00:27:22:21:fb), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  - Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  - Source: PcsCompu\_22:21:fb (08:00:27:22:21:fb)
  - Type: Unknown (0xffff)
- Data (46 bytes)
  - Data: 000000000948656c6c6f2c203100000000000000000000...
  - [Length: 46]

Packet 281 bytes:

```

0000  ff ff ff ff ff ff ff ff 27 22 21 fb ff fe 00 00  .....!.....
0010  00 00 09 48 65 6c 6c 6f 2c 20 31 00 00 00 00 00  ...Hello, .....
0020  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  .....
0030  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  .....
  
```

가상머신 2 가 보낸 DATA 패킷이다. 이전 DATA 패킷보다 Hello 뒤의 숫자가 1 증가했음을 확인할 수 있다.

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

eth.type=0xffff Expression...

No.	Time	Source	Destination	Protocol	Length	Info
274	378.858399303	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
275	378.859086382	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
276	378.859165740	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
277	378.859347016	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
279	379.375178481	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
280	379.375347504	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
281	379.375542528	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
282	379.375612027	PcsCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
285	380.865970152	PcsCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
286	380.866100715	PcsCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II

▼ Ethernet II, Src: PcsCompu\_6c:fd:3f (08:00:27:6c:fd:3f), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

- Destination: Broadcast (ff:ff:ff:ff:ff:ff)
- Source: PcsCompu\_6c:fd:3f (08:00:27:6c:fd:3f)
- Type: Unknown (0xffff)

▼ Data (2 bytes)

Data: 0101

[Length: 2]

0000 ff ff ff ff ff ff 08 00 27 6c fd 3f ff fe 01 01 ..... '1?....

wireshark\_enp0s3\_20231216214558\_VNYwgc.pcapng Packets: 1987 · Displayed: 80 (4.0%) Profile: Default

-Packet #9

**File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help**

[Icons]

eth.type==0xffff [X] Expression...

No.	Time	Source	Destination	Protocol	Length Info
274	378.858399363	PcsCompu_6c:fd:3f	Broadcast	0xffff	28 Ethernet II
275	378.859086382	PcsCompu_22:21:fb	Broadcast	0xffff	60 Ethernet II
276	378.859165740	PcsCompu_6c:fd:3f	Broadcast	0xffff	28 Ethernet II
277	378.859347016	PcsCompu_22:21:fb	Broadcast	0xffff	60 Ethernet II
279	379.375178481	PcsCompu_22:21:fb	Broadcast	0xffff	60 Ethernet II
280	379.375347504	PcsCompu_6c:fd:3f	Broadcast	0xffff	16 Ethernet II
281	379.375542528	PcsCompu_22:21:fb	Broadcast	0xffff	60 Ethernet II
282	379.375612827	PcsCompu_6c:fd:3f	Broadcast	0xffff	16 Ethernet II
285	380.865970152	PcsCompu_22:21:fb	Broadcast	0xffff	60 Ethernet II
286	380.866169715	PcsCompu_6c:fd:3f	Broadcast	0xffff	28 Ethernet II

- Ethernet II, Src: PcsCompu\_22:21:fb (08:00:27:22:21:fb), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  - Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  - Source: PcsCompu\_22:21:fb (08:00:27:22:21:fb)
  - Type: Unknown (0xffff)
  - Data (46 bytes)
 

Data: 0100000000000000000000000000000000000000000000000000000000000000...  
[Length: 46]

```

0000 ff ff ff ff ff ff 08 00 27 22 21 fb ff fe 01 00 .....[].....
0010 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0020 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
          
```

wireshark\_encps3\_20231216214558\_VNYwgc.pcapng      Packets: 2106 · Displayed: 80 (3.8%)    Profile: Default

가상머신 2 가 ACK STOP 을 보내고 나서 2000ms 가 지나 ACK GO 를 전송했다. 이제 가상머신 1 은 다시 DATA 패킷을 전송할 수 있게 되었다. 따라서 다음 패킷은 가상머신 1 의 DATA 패킷일 것이라 예측할 수 있다.

-Packet #10

No.	Time	Source	Destination	Protocol	Length	Info
274	378.858399303	PcCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
275	378.859086382	PcCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
276	378.859165740	PcCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II
277	378.859347016	PcCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
279	379.375178481	PcCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
280	379.375347504	PcCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
281	379.375542528	PcCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
282	379.375612027	PcCompu_6c:fd:3f	Broadcast	0xffff	16	Ethernet II
285	380.865970152	PcCompu_22:21:fb	Broadcast	0xffff	60	Ethernet II
286	380.866100715	PcCompu_6c:fd:3f	Broadcast	0xffff	28	Ethernet II

▼ Ethernet II, Src: PcCompu\_6c:fd:3f (08:00:27:6c:fd:3f), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

- Destination: Broadcast (ff:ff:ff:ff:ff:ff)
- Source: PcCompu\_6c:fd:3f (08:00:27:6c:fd:3f)
- Type: Unknown (0xffff)
- ▼ Data (14 bytes)
- Data: 000000000948656c6c6f2c203200
- [Length: 14]

0000 ff ff ff ff ff 08 00 27 6c fd 3f ff fe 00 00 ..... '1'?....  
 0010 00 00 09 48 65 6c 6c 6f 2c 20 32 00 ...Hello , 2

wireshark\_enp0s3\_20231216214558\_VNYwgc.pcapng      Packets: 2130 · Displayed: 80 (3.8%)      Profile: Default

위에서 예측한대로, 가상머신 1 이 다시 DATA 패킷을 전송하기 시작했다. 전송한 데이터의 값은 이전에 마지막으로 보낸 데이터인 'Hello, 1'에서 1 증가한 값을 확인할 수 있다.

#### 4. 결론

분석 결과를 통해, 두 가상머신 사이의 통신은 의도한 대로 이루어졌음을 알 수 있다. 특히, ACK STOP 을 받을 시 다음 ACK GO 까지 데이터 패킷 전송을 중단하는 기능은 위 패킷 분석의 Packet #4 ~ Packet #10 을 통해 정상적으로 작동함을 확인할 수 있었다.