

# **Project 2 – Packet Encapsulation**

## Final Report

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Class: ECE 312 Communication Networks

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# Initialization

```
Last login: Tue Oct 22 09:12:19 on ttys002
/Users/willwyq/Library/CloudStorage/OneDrive-Rose-HulmanInstituteofTechnology/Course/2024\ Fall/ECE\ 312\ Communication\
Networks/Project\ 2/RHPCClient ; exit;
willwyq@yueqiaos-mbp-5 ~ % /Users/willwyq/Library/CloudStorage/OneDrive-Rose-HulmanInstituteofTechnology/Course/2024\ Fal
1/ECE\ 312\ Communication\ Networks/Project\ 2/RHPCClient ; exit;
***** RHP UDP Client *****
Server IP address: 137.112.38.47
Port number: 2425

Connecting to server 137.112.38.47 on port 2425...
Connected

Enter the message type (0 for RHP Control, 1 for RHMP): █
```

# One RHP Control Message with the String “hi”

(Odd Length)

```
Enter the message type (0 for RHP Control, 1 for RHMP): 0
Enter the Control message you want to send: hi
```

```
***** Sending RHP Message *****
```

```
----- Sent RHP Message -----
Send Data Buffer: 0A BC 01 02 8B D8 68 69
```

```
RHP Packet Header Raw Fields:
```

```
  Version_Type: 0x0A
  Communication ID High: 0x01
  Communication ID Low: 0xBC
  Payload Length: 0x02
  Checksum High: 0xD8
  Checksum Low: 0x8B
  Buffer Byte: 0x00
```

```
RHP Packet Header Derived Fields:
```

```
  Version: 10
  Type: 0
  Communication ID: 48129
  Checksum: 55435
  Checksum in Hex: 0xD88B
```

```
RHP Packet Data:
```

```
  Checksum Pass: True
  Sum Of Data: 0xFFFF
  Is Buffered: False
  Payload: hi
```

```
***** Receiving RHP Message *****
```

```
----- RHP Packet Received -----
Version: 10
```

```
Type: 0
Communication ID: 444
Payload Length: 31 bytes
Buffered: Yes
Checksum: 0xA8A9
Payload: RHP message received - success
```

```
----- Processing Control Message -----
```

```
RHP Packet Header Raw Fields:
```

```
  Version_Type: 0x0A
  Communication ID High: 0x01
  Communication ID Low: 0xBC
  Payload Length: 0x1F
  Checksum High: 0xA8
  Checksum Low: 0xA9
  Buffer Byte: 0xFF
```

```
RHP Packet Header Derived Fields:
```

```
  Version: 10
  Type: 0
  Communication ID: 444
  Checksum: 43177
  Checksum in Hex: 0xA8A9
```

```
RHP Packet Data:
  Checksum Pass: True
  Sum Of Data: 0xFFFF
  Is Buffered: True
  Payload: RHP message received - success
```

```
Do you want to clear screen? (y/n): █
```

# One RHP Control Message with the String “hello”

(Even Length)

```
willwyq — RHPCClient — RHPCClient — 122x71
Do you want to quit? (y/n): n
Do you want to create new message? (y/n): y
Enter the message type (0 for RHP Control, 1 for RHMP): 0
Enter the Control message you want to send: hello
***** Sending RHP Message *****
----- Sent RHP Message -----
Send Data Buffer: 0A BC 01 05 22 FA FF 68 65 6C 6C 6F
RHP Packet Header Raw Fields:
    Version_Type: 0x0A
    Communication ID High: 0x01
    Communication ID Low: 0xBC
    Payload Length: 0x05
    Checksum High: 0xFA
    Checksum Low: 0x22
    Buffer Byte: 0xFF

RHP Packet Header Derived Fields:
    Version: 10
    Type: 0
    Communication ID: 48129
    Checksum: 64034
    Checksum in Hex: 0xFA22

RHP Packet Data:
    Checksum Pass: True
    Sum Of Data: 0xFFFF
    Is Buffered: True
    Payload: hello
-----
***** Receiving RHP Message *****
----- RHP Packet Received -----
Version: 10
Type: 0
Communication ID: 444
Payload Length: 31 bytes
Buffered: Yes
Checksum: 0xA8A9
Payload: RHP message received - success
-----
----- Processing Control Message -----
RHP Packet Header Raw Fields:
    Version_Type: 0x0A
    Communication ID High: 0x01
    Communication ID Low: 0xBC
    Payload Length: 0x1F
    Checksum High: 0xA8
    Checksum Low: 0xA9
    Buffer Byte: 0xFF

RHP Packet Header Derived Fields:
    Version: 10
    Type: 0
    Communication ID: 444
    Checksum: 43177
    Checksum in Hex: 0xA8A9

RHP Packet Data:
    Checksum Pass: True
    Sum Of Data: 0xFFFF
    Is Buffered: True
    Payload: RHP message received - success
-----
Do you want to clear screen? (y/n): █
```

# One RHMP Message of Type Message\_Request

(Checksum Failed)

```
willwyq — RHPClient — RHPClient — 138x83

Do you want to quit? (y/n): n
Do you want to create new message? (y/n): y

Enter the message type (0 for RHP Control, 1 for RHMP): 1

Enter the RHMP message type:
0 for Reserved;
1 for ID Request;
2 for Message Request;
4 for ID Response;
8 for Message Response
2

***** Sending RHP Message *****

----- Sent RHP Message -----
Send Data Buffer: 8A CE 0E 03 4C 1D FF C2 1B 4E
RHP Packet Header Raw Fields:
Version_Type: 0x8A
Communication ID High: 0x0E
Communication ID Low: 0xCE
Payload Length: 0x03
Checksum High: 0x1D
Checksum Low: 0x4C
Buffer Byte: 0xFF

RHP Packet Header Derived Fields:
Version: 10
Type: 1
Communication ID: 52750
Checksum: 7500
Checksum in Hex: 0x1D4C

RHP Packet Data:
Checksum Pass: True
Sum Of Data: 0xFFFF
Is Buffered: True
Payload: ?
RHM Buffer:
C2 1B 4E
RHMP Packet Header:
Byte 0: 0xC2
Byte 1: 0x1B
Byte 2: 0x4E
Byte 3: 0x00

RHMP Packet Derived Fields:
Type: 2
Source Port: 444
Destination Port: 312
Payload Length: Not Specified (Assumed 0 bytes)

RHMP Packet Data:
Payload:
-----

***** Receiving RHP Message *****
----- RHP Packet Received -----
Version: 10
Type: 1
Communication ID: 3790
Payload Length: 66 bytes
Buffered: No
Checksum: 0x1CFE
Payload: ?>You messed up, now I gotta mess you up. It's the law! -Mr. T
-----
Checksum verification failed for the received RHP_Packet.

| Checksum Failed. Automatically Retrying... |

***** Sending RHP Message *****

----- Sent RHP Message -----
Send Data Buffer: 8A CE 0E 03 4C 1D FF C2 1B 4E
RHP Packet Header Raw Fields:
Version_Type: 0x8A
Communication ID High: 0x0E
Communication ID Low: 0xCE
Payload Length: 0x03
Checksum High: 0x1D
Checksum Low: 0x4C
Buffer Byte: 0xFF
```

# Continous...

```
willwyq — RHPClient — RHPClient — 138x83

Payload Length: 66 bytes
Buffered: No
Checksum: 0x1CFE
Payload: ?>You messed up, now I gotta mess you up. It's the law! -Mr. T
-----
Checksum verification failed for the received RHP_Packet.

| Checksum Failed. Automatically Retrying... |

***** Sending RHP Message *****

----- Sent RHP Message -----
Send Data Buffer: 8A CE 0E 03 4C 1D FF C2 1B 4E
RHP Packet Header Raw Fields:
    Version_Type: 0x8A
    Communication_ID_High: 0x0E
    Communication_ID_Low: 0xCE
    Payload_Length: 0x03
    Checksum_High: 0x1D
    Checksum_Low: 0x4C
    Buffer_BytE: 0xFF

RHP Packet Header Derived Fields:
    Version: 10
    Type: 1
    Communication_ID: 52750
    Checksum: 7500
    Checksum_in_Hex: 0x1D4C

RHP Packet Data:
    Checksum_Pass: True
    Sum_Of_Data: 0xFFFF
    Is_Buffered: True
    Payload: ?
RHMP Buffer:
C2 1B 4E
RHMP Packet Header:
    Byte 0: 0xC2
    Byte 1: 0x1B
    Byte 2: 0x4E
    Byte 3: 0x00

RHMP Packet Derived Fields:
    Type: 2
    Source_Port: 444
    Destination_Port: 312
    Payload_Length: Not Specified (Assumed 0 bytes)

RHMP Packet Data:
    Payload:
-----

***** Receiving RHP Message *****
----- RHP Packet Received -----
Version: 10
Type: 1
Communication_ID: 3790
Payload_Length: 34 bytes
Buffered: No
Checksum: 0x8548
Payload: ?you have chosen . . . wisely.

----- Processing RHMP Message -----
RHMP Buffer:
88 13 6F 1E 59 6F 75 20 68 61 76 65 20 63 68 6F 73 65 6E 20 2E 20 2E 20 77 69 73 65 6C 79 2E 00
RHMP Packet Header:
    Byte 0: 0x88
    Byte 1: 0x13
    Byte 2: 0x6F
    Byte 3: 0x1E

RHMP Packet Derived Fields:
    Type: 8
    Source_Port: 312
    Destination_Port: 444
    Payload_Length: 30 bytes

RHMP Packet Data:
    Payload: You have chosen . . . wisely.
Received RHMP Message Response.

Do you want to clear screen? (y/n): █
```

# One RHMP Message of Type Message\_Request

```
willwyq — RHPClient — RHPClient — 138x83
Enter the message type (0 for RHP Control, 1 for RHMP): 1
Enter the RHMP message type:
0 for Reserved;
1 for ID Request;
2 for Message Request;
4 for ID Response;
8 for Message Response
2
***** Sending RHP Message *****
----- Sent RHP Message -----
Send Data Buffer: 8A CE 0E 03 4C 1D FF C2 1B 4E
RHP Packet Header Raw Fields:
    Version_Type: 0x8A
    Communication ID High: 0x0E
    Communication ID Low: 0xCE
    Payload Length: 0x03
    Checksum High: 0x1D
    Checksum Low: 0x4C
    Buffer Byte: 0xFF

RHP Packet Header Derived Fields:
    Version: 10
    Type: 1
    Communication ID: 52750
    Checksum: 7500
    Checksum in Hex: 0x1D4C

RHP Packet Data:
    Checksum Pass: True
    Sum Of Data: 0xFFFF
    Is Buffered: True
    Payload: ?
RHPMP Buffer:
C2 1B 4E
RHPMP Packet Header:
    Byte 0: 0xC2
    Byte 1: 0x1B
    Byte 2: 0x4E
    Byte 3: 0x00

RHPMP Packet Derived Fields:
    Type: 2
    Source Port: 444
    Destination Port: 312
    Payload Length: Not Specified (Assumed 0 bytes)

RHPMP Packet Data:
    Payload:
-----
***** Receiving RHP Message *****
----- RHP Packet Received -----
Version: 10
Type: 1
Communication ID: 3790
Payload Length: 34 bytes
Buffered: No
Checksum: 0x8548
Payload: ?you have chosen . . . wisely.

----- Processing RHMP Message -----
RHPMP Buffer:
88 13 6F 1E 59 6F 75 20 68 61 76 65 20 63 68 6F 73 65 6E 20 2E 20 2E 20 2E 20 77 69 73 65 6C 79 2E 00
RHPMP Packet Header:
    Byte 0: 0x88
    Byte 1: 0x13
    Byte 2: 0x6F
    Byte 3: 0x1E

RHPMP Packet Derived Fields:
    Type: 8
    Source Port: 312
    Destination Port: 444
    Payload Length: 30 bytes

RHPMP Packet Data:
    Payload: You have chosen . . . wisely.
Received RHPMP Message Response.
-----
Do you want to clear screen? (y/n):
```

# One RHMP Message of Type *ID\_Request*

```
willwyq — RHPClient — RHPClient — 138x83

0 for Reserved;
1 for ID Request;
2 for Message Request;
4 for ID Response;
8 for Message Response
1

***** Sending RHP Message *****

----- Sent RHP Message -----
Send Data Buffer: 8A CE 0E 03 4C 1E FF C1 1B 4E
RHP Packet Header Raw Fields:
    Version_Type: 0x8A
    Communication ID_High: 0x0E
    Communication ID_Low: 0xCE
    Payload Length: 0x03
    Checksum High: 0x1E
    Checksum Low: 0x4C
    Buffer Byte: 0xFF

RHP Packet Header Derived Fields:
    Version: 10
    Type: 1
    Communication ID: 52750
    Checksum: 7756
    Checksum in Hex: 0x1E4C

RHP Packet Data:
    Checksum Pass: True
    Sum Of Data: 0xFFFF
    Is Buffered: True
    Payload: ?
RHMP Buffer:
C1 1B 4E
RHMP Packet Header:
    Byte 0: 0xC1
    Byte 1: 0x1B
    Byte 2: 0x4E
    Byte 3: 0x00

RHMP Packet Derived Fields:
    Type: 1
    Source Port: 444
    Destination Port: 312
    Payload Length: Not Specified (Assumed 0 bytes)

RHMP Packet Data:
    Payload:
-----

***** Receiving RHP Message *****
----- RHP Packet Received -----
Version: 10
Type: 1
Communication ID: 3790
Payload Length: 7 bytes
Buffered: Yes
Checksum: 0x8EE9
Payload: ?

----- Processing RHMP Message -----
RHMP Buffer:
84 13 6F 00 A2 6A 05
RHMP Packet Header:
    Byte 0: 0x84
    Byte 1: 0x13
    Byte 2: 0x6F
    Byte 3: 0x00

RHMP Packet Derived Fields:
    Type: 4
    Source Port: 312
    Destination Port: 444
    Payload Length: Not Specified (Assumed 0 bytes)

RHMP Packet Data:
    Payload:
Received RHMP ID Response.
Received ID:
    HEX: 0x00A26A05
    DEC: (10643973)
-----

Do you want to clear screen? (y/n): 
```