TD NET1 : Intro

Goal :

This workshop aims to ease understanding of OSI and TCP/IP model, as well as to understand the principle of encapsulation.

1. Which layer of the OSI model is responsible for data encryption and decryption?
    a. Physical Layer
    b. Data Link Layer
    c. Network Layer
    d. Presentation Layer
2. What is the primary function of the Transport Layer in the OSI model?
    a. Routing packets to their destinations
    b. Establishing, maintaining, and terminating connections
    c. Converting data into packets for transmission
    d. Defining physical network characteristics
3. What is the primary function of the Data Link Layer?
    a. Packet forwarding and routing
    b. End-to-end communication
    c. Framing, addressing, and error detection
    d. Flow control and congestion management
4. What does the Application Layer in the OSI model provide to application programs?
    a. Encryption and decryption services
    b. Network addressing and routing
    c. Interface for accessing the network services
    d. Physical network connectivity
5. Which transport layer protocol provides connection-oriented and reliable data transfer?
    a. UDP
    b. ICMP
    c. TCP
    d. IP
6. Which protocol is commonly used for dynamically assigning IP addresses to devices on a network?
    a. HTTP
    b. DNS
    c. DHCP
    d. FTP
7. What is the IETF ? goal ?
8. What is a protocol?
9. What is the name given to the PDUs of the layers 1, 2, 3, 4?

10. What is the model used in Internet? describe it!
11. What are the differences between switching and routing?
12. What are the differences between an end-to-end and point-to-point protocol?
13. What are the differences between a connection-oriented protocol and a non-connection-oriented one?

14. Data encapsulation ?

```
0000  d2 dd b7 c1 46 17 38 14 28 b1 e1 e5 08 00 45 00
0010  00 4c 1f 54 00 00 80 11 00 00 c0 a8 65 88 c0 a8
0020  65 fe f3 ce 00 35 00 38 4d 21
```

Champs	Description en HEX	Description Décimal
Adresse MAC source		
Adresse MAC Destination		
Protocole transport		
Adresse Source		
Adresse Destination		
Numéro du port		

a) Quels sont les différents protocoles encapsulés ?

15. Analyse de protocole avancé

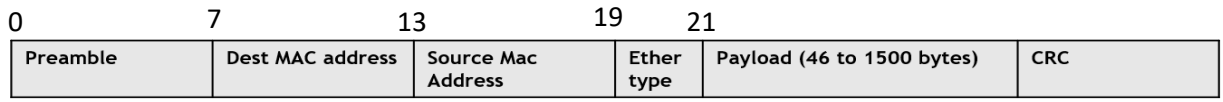
```
0000  ff ff ff ff ff ff 04 56 e5 26 42 1f 08 06 00 01
0010  08 00 06 04 00 01 04 56 e5 26 42 1f c0 a8 69 bd
0020  00 00 00 00 00 00 c0 a8 69 fe

0000  04 56 e5 26 42 1f d2 dd b7 c1 46 17 08 06 00 01
0010  08 00 06 04 00 02 d2 dd b7 c1 46 17 c0 a8 69 fe
0020  04 56 e5 26 42 1f c0 a8 69 bd 00 00 00 00 00 00
0030  00 00 00 00 00 00 00 00 00 00 00 00
```

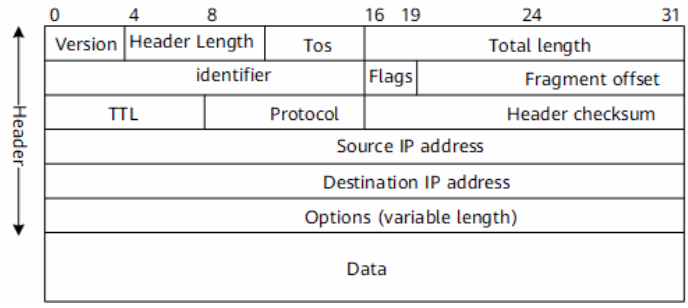
Champs	Description en HEX	Description Décimal
Adresse MAC source		
Adresse MAC Destination		
Protocole Réseau		
Requête		
Réponse		

Annexe

Trames Ethernet



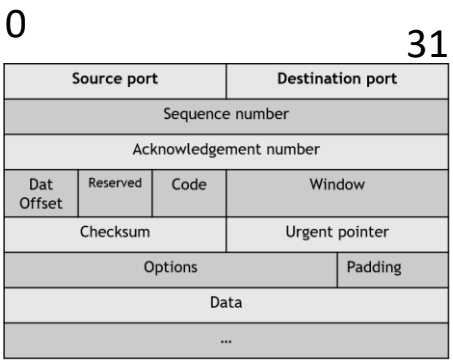
Paquet IP

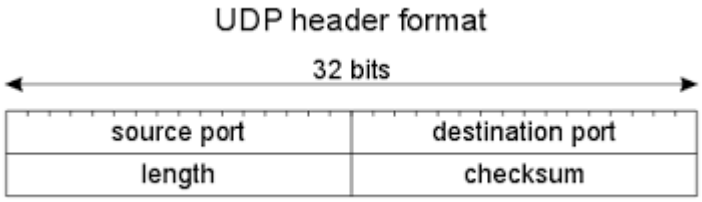


Protocol list

Hex	Protocol number	Keyword
0x01	1	ICMP
0x06	6	TCP
0x11	17	UDP
0x1B	27	RDP
….		

Segment TCP





Port -> to application

Hex	Decimal	Protocol
0x14	20	FTP
0x19	25	SMTP
0x43, 0x44	67, 68	DHCP
0x35	53	DNS

Format (RFC826) des trames ARP, dans l'ordre (et en Hexa)

- HRD=HW type (16bits) : 1=Ethernet
- PRO=Protocol type (16bits) : 0800=IP
- HLN=HW address Length (8 bits) : 6 (Ethernet)
- PLN=Protocole address Length (8 bits) : 4 (IPv4)
- OP=Operation (16 bits) : 1=request, 2=reply
- SHA=Sender HW address (depend de HLN) : en pratique : 48 bits
- SPA=Sender Protocol address (depend de PLN) : en pratique : 32 bits
- THA=Target HW address (depend de HLN) : en pratique : 48 bits
- TPA=Target Protocol address (depend de PLN) : en pratique : 32 bits

Totalisant, en pratique, 28 octets