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Basics of PPPoE

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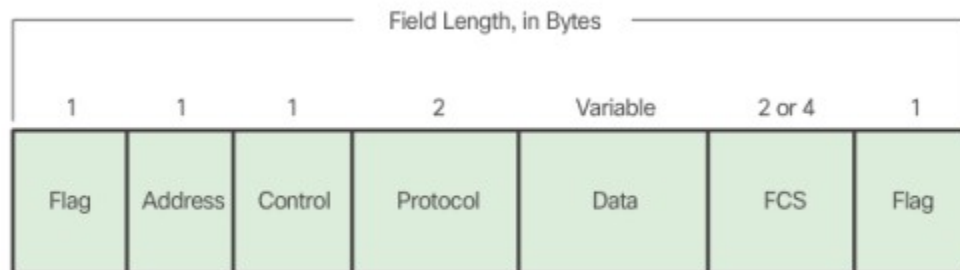
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What is PPP?

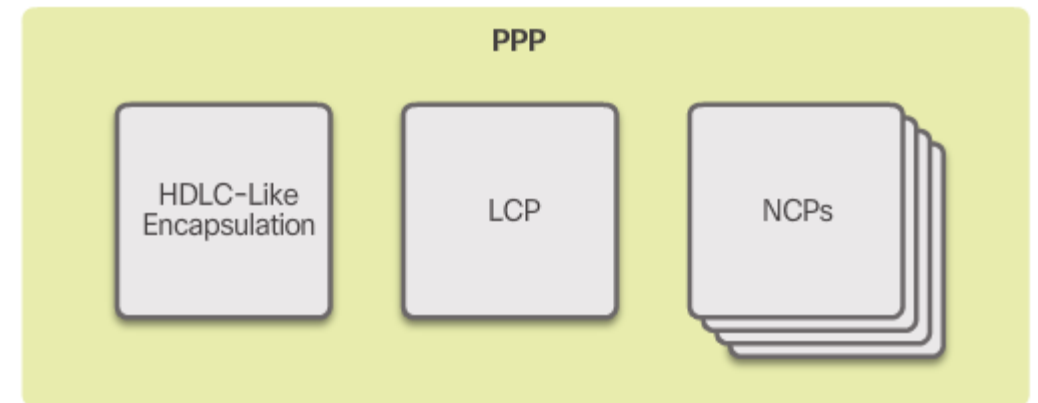
- HDLC-like framing for transporting multiprotocol packets over point-to-point links.
- Extensible Link Control Protocol (LCP) for establishing, configuring, and testing the data-link connection. Common service: **authentication**.
- Family of Network Control Protocols (NCPs) for establishing and configuring different network layer protocols, such as Internet Protocol (IPv4) Control Protocol. Common service: **IP address assignment**.



HDLC is the default encapsulation method on a serial link.



Use PPP encapsulation to connect a Cisco router to a non-Cisco router.



Basic PPP config

R1

```
username R2 password 0 R2pass
```

!

```
interface Serial0/0/0
```

```
ip address 10.0.0.1 255.0.0.0
```

```
encapsulation ppp
```

```
ppp authentication pap
```

```
ppp pap sent-username R1 password 0 R1pass
```

R2

```
username R1 password 0 R1pass
```

!

```
interface Serial0/0/0
```

```
ip address 10.0.0.2 255.0.0.0
```

```
encapsulation ppp
```

```
ppp authentication pap
```

```
ppp pap sent-username R2 password 0 R2pass
```



Supported on PT.

PPP config with address assignment

R1

```
username R2 password 0 R2pass
```

!

```
ip local pool PPP_Pool 10.0.0.10 10.0.0.20
```

!

```
interface Serial0/0
```

```
ip address 10.0.0.1 255.0.0.0
```

```
encapsulation ppp
```

```
peer default ip address pool PPP_Pool
```

```
ppp authentication pap
```

```
ppp pap sent-username R1 password 0 R1pass
```

R2

```
username R1 password 0 R1pass
```

!

```
interface Serial0/0
```

```
ip address negotiated
```

```
encapsulation ppp
```

```
ppp authentication pap
```

```
sent-username R2 password 0 R2pass
```

```
route default
```



What is PPPoE?

- Simple math: PPPoE = PPP + Ethernet 😊
- Use PPP services on your Ethernet network, such as authentication and IP address assignment.
- Typically used by ISPs for DSL connections.

PPPoE config

R1 (server)

```
---
username R2 password 0 R2pass
!
bba-group pppoe PPP_Group
 virtual-template 1
!
interface FastEthernet0/0
 pppoe enable group PPP_Group
!
interface Virtual-Template1
 mtu 1492
 ip address 10.0.0.1 255.0.0.0
 peer default ip address pool PPP_Pool
 ppp authentication pap callin
!
ip local pool PPP_Pool 10.0.0.10 10.0.0.20
```

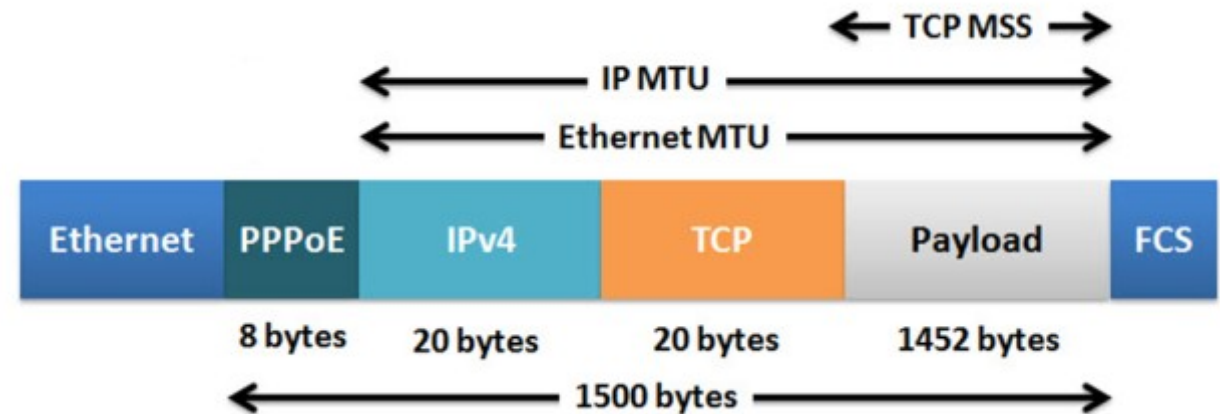
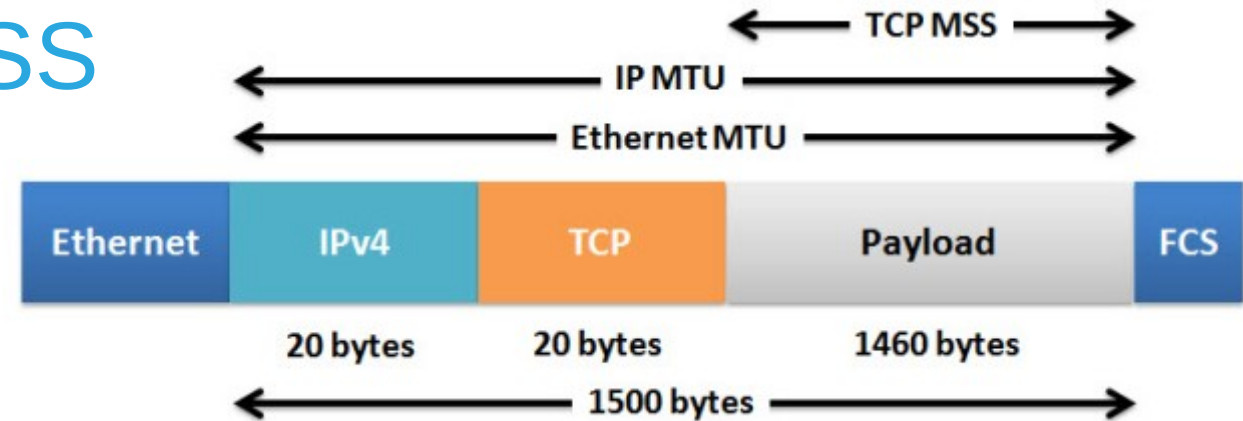


R2 (client)

```
---
interface FastEthernet0/0
 no ip address
 pppoe enable group global
 pppoe-client dial-pool-number 1
!
interface Dialer10
 mtu 1492
 ip address negotiated
 encapsulation ppp
 ip tcp adjust-mss 1452
 dialer pool 1
 ppp pap sent-username R2 password 0 R2pass
 ppp ipcp route default
```

Understanding MTU and MSS

- MSS: maximum segment size.
- MTU: maximum transmission unit.
- Keeping the MTU to 1500 will cause ...?
Fragmentation
- Keeping the MSS to 1460 will cause ...?
TCP retransmits



Common tshooting commands

- show ip interface brief
- show interfaces Dialer (client) / show interfaces Virtual-Access (server)
- show pppoe session
- debug ppp authentication
- debug pppoe events

Thank you.



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