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Data Communication CS601 Lecture No 28

Lecture Prepared By

Muhammad Abid Ali

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CS601 Lecture No 28 Topic 161 to 165

HDLC frames

HDLC defines three **(VIP mcqs)** types of frames

- ✓ **information frames (I-frames)**

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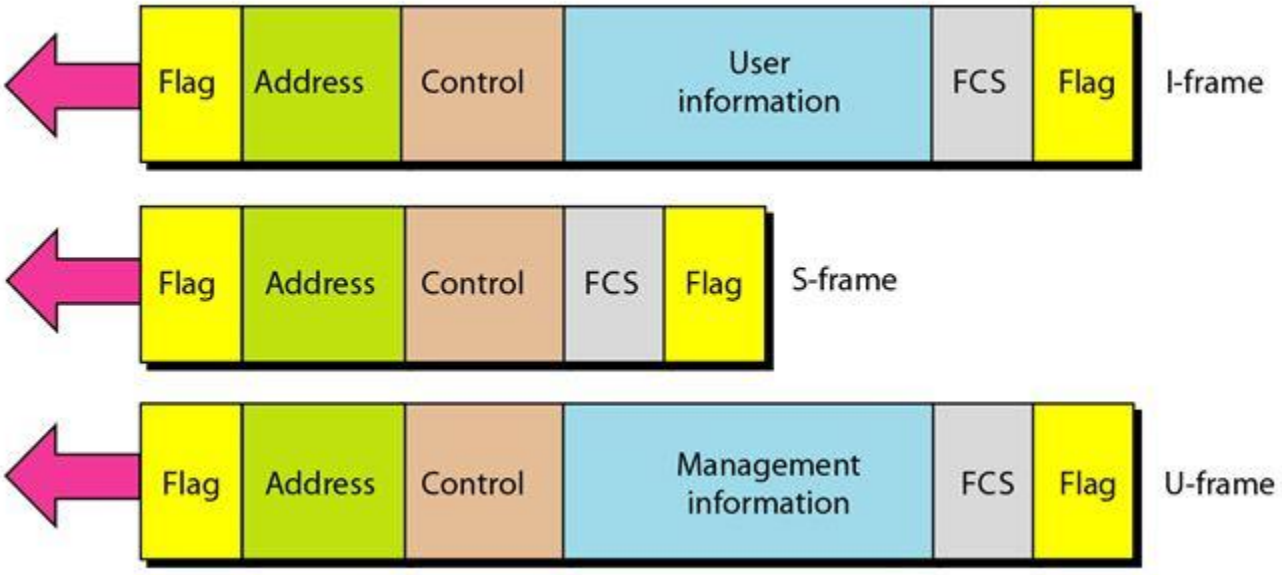
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- ✓ **Supervisory frames (S-frames)**
- ✓ **Unnumbered frames (U-frames)**

- ✓ **I-frame** – I-frames or Information frames carry user data from the network layer. They also include flow and error control information that is piggybacked on user data. The first bit of control field of I-frame is 0.

- ✓ **S-frame** – S-frames or Supervisory frames do not contain information field. They are used for flow and error control when piggybacking is not required. The first two bits of control field of S-frame is 10.

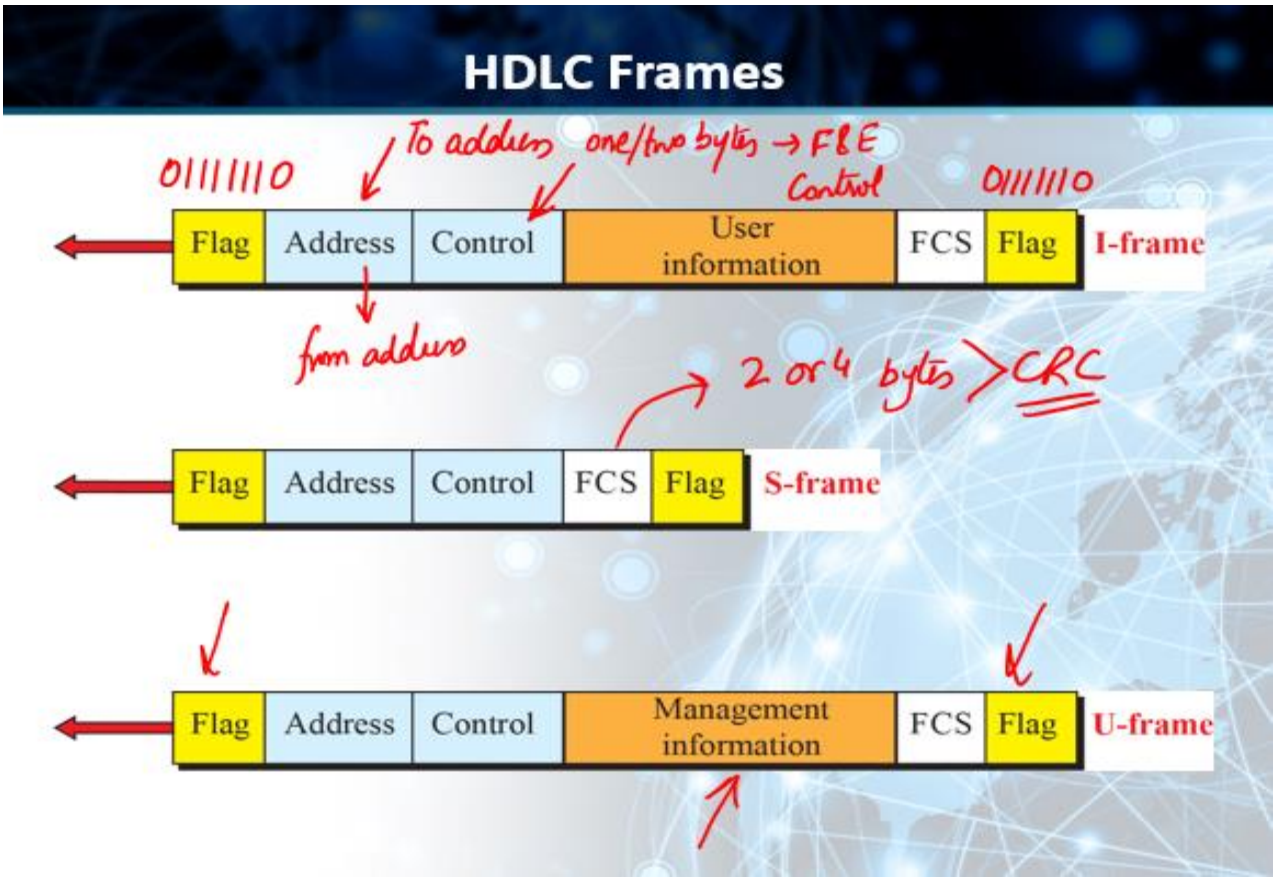
- ✓ **U-frame** – U-frames or Un-numbered frames are used for myriad miscellaneous functions, like link management. It may contain an information field, if required. The first two bits of control field of U-frame is 11.



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Point-to-Point Protocol (PPP)

- **Most common protocol for point-to-point access**
- **Millions of Internet users who need to connect their home computers to the server of an Internet service provider use PPP (VIP mcqs)**
- **To control and manage the transfer of data, there is a need for a PPP(VIP mcqs) at the data-link layer**

Services provided by PPP

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The designers of PPP have included several services to make it suitable for a point-to-point protocol, but have ignored some traditional services to make it simple

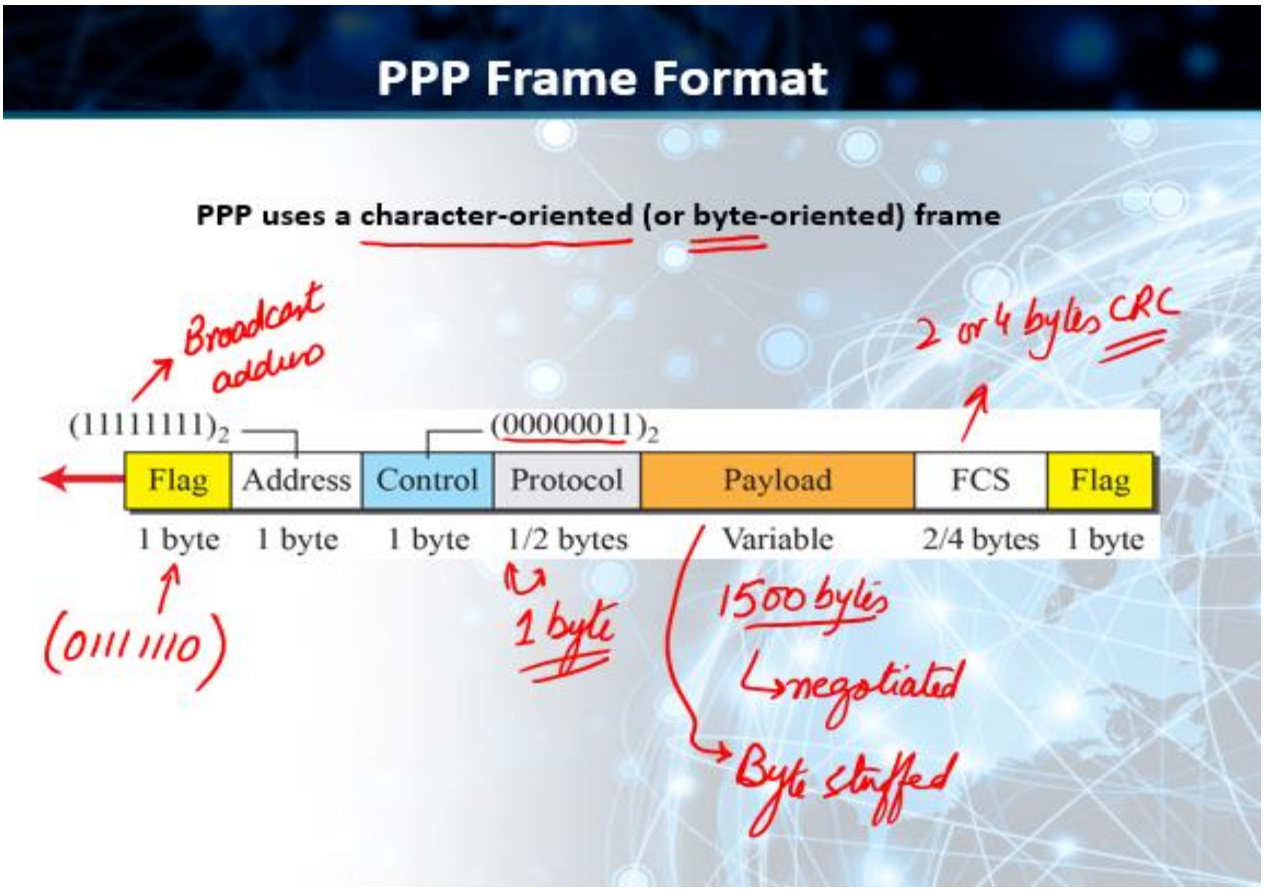
Services Included	Services Not Included
Framing	Flow Control
Link Establishment and Data Exchange	Error Correction (PPP has CRC detection only)
Authentication	No Sequence Numbering
Multilink PPP Address configuration	Absence of sophisticated Addressing Mechanism
Network Address configuration	

PPP Frame Format

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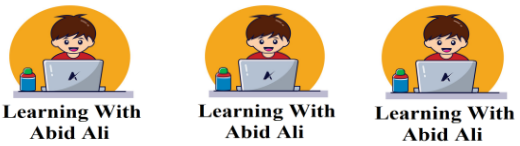
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Multiplexing in PPP

- **Although PPP is a link-layer protocol, it uses another set of protocols to establish the link, authenticate and carry the network-layer data**
- **Three sets of protocols are:**
  - **Link Control Protocol (LCP)**
  - **Two Authentication Protocols (APs)**
  - **Several Network Control Protocols (NCPs)**

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Legend

LCP : Link control protocol
AP : Authentication protocol
NCP: Network control protocol

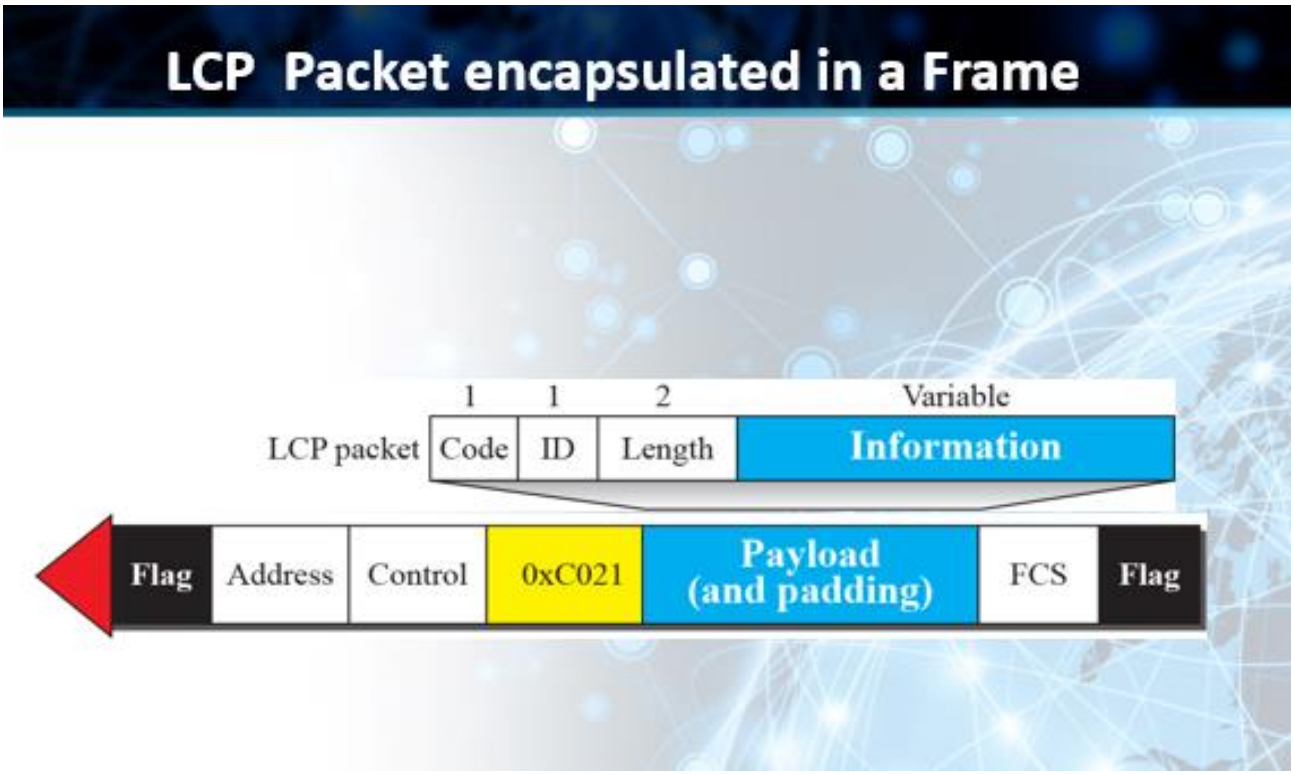
Protocol values:

LCP : 0xC021
AP : 0xC023 and 0xC223
NCP: 0x8021 and ....
Data: 0x0021 and ....

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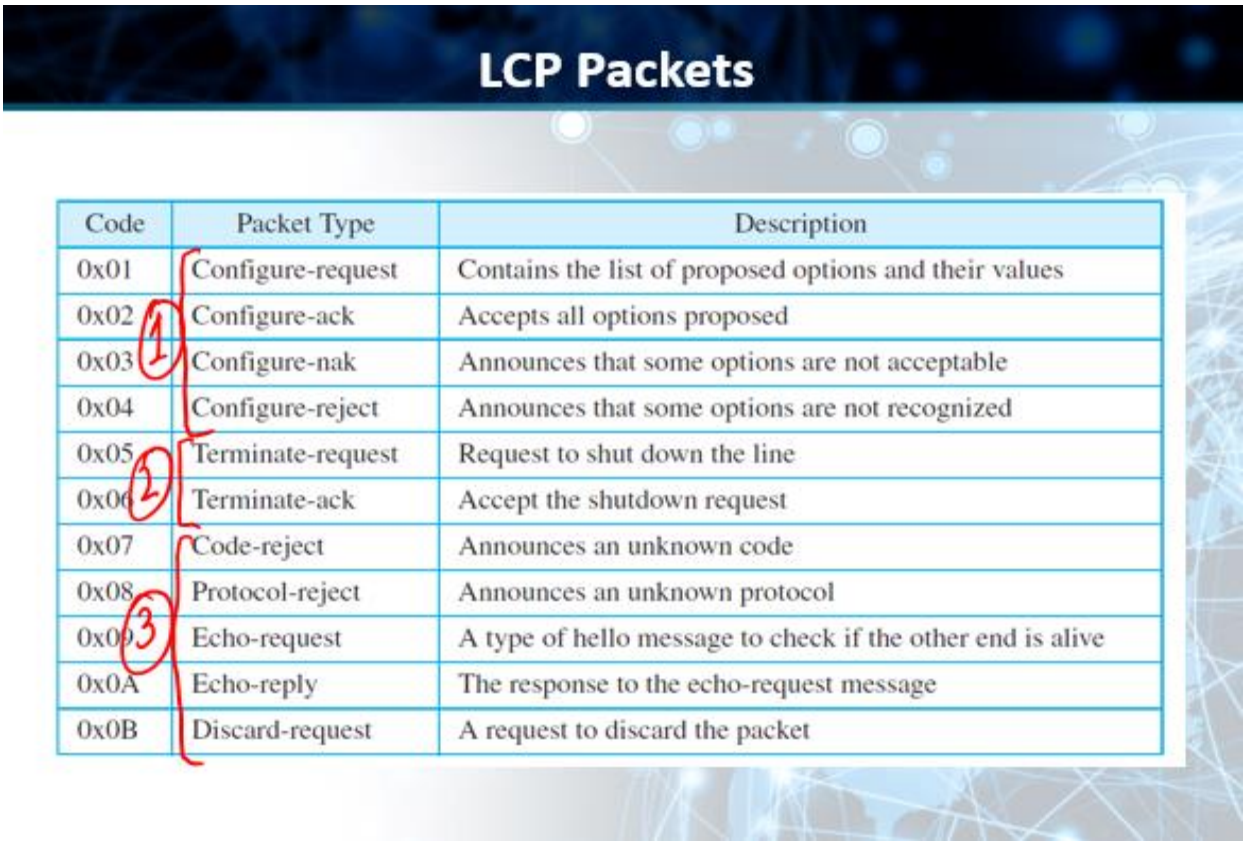
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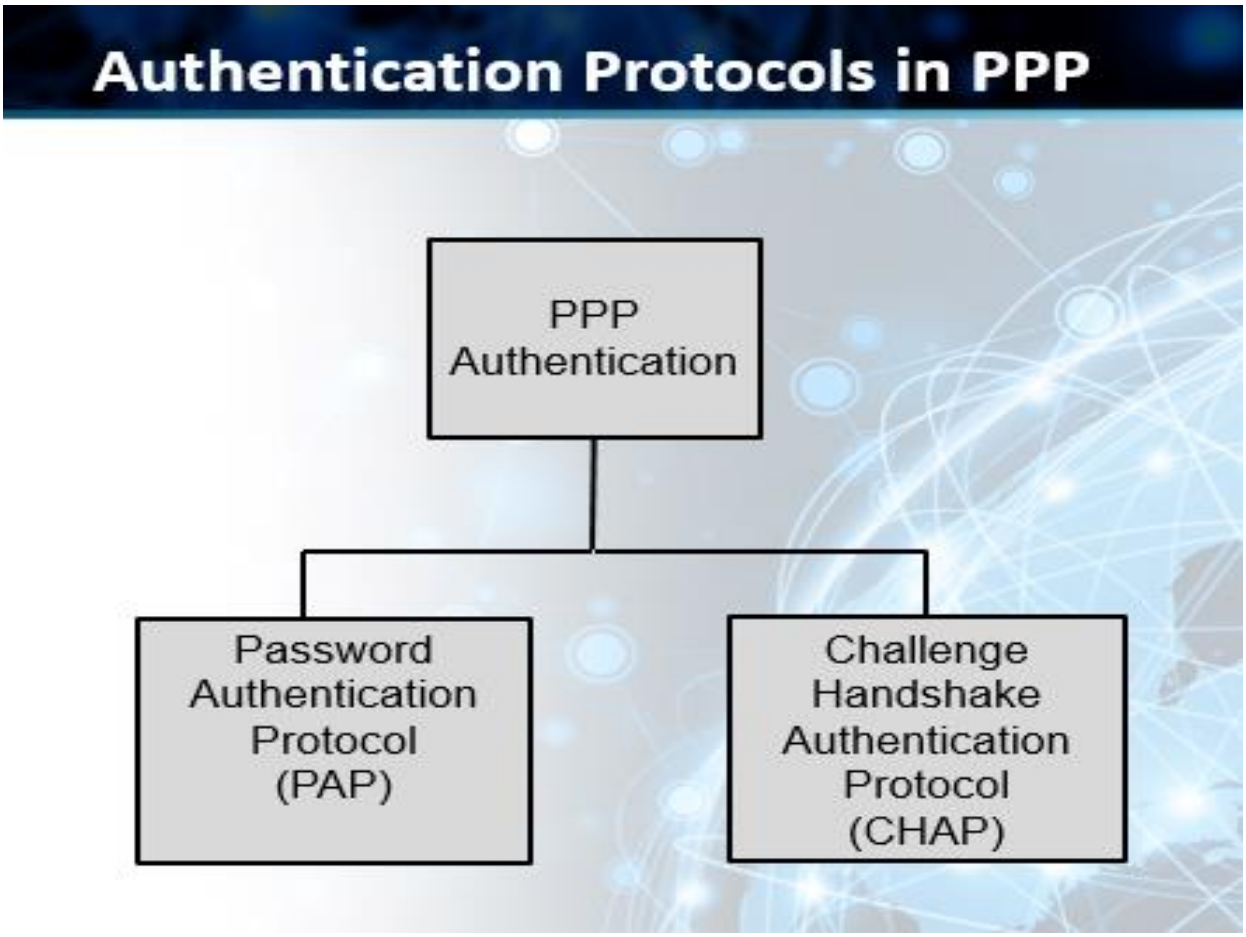
Authentication Protocols in PPP

The PPP authentication protocols are Password Authentication Protocol (PAP) and Challenge-Handshake Authentication Protocol (CHAP). Each protocol uses a secrets database that contains identification information, or security credentials, for each caller that is permitted to link to the local machine.

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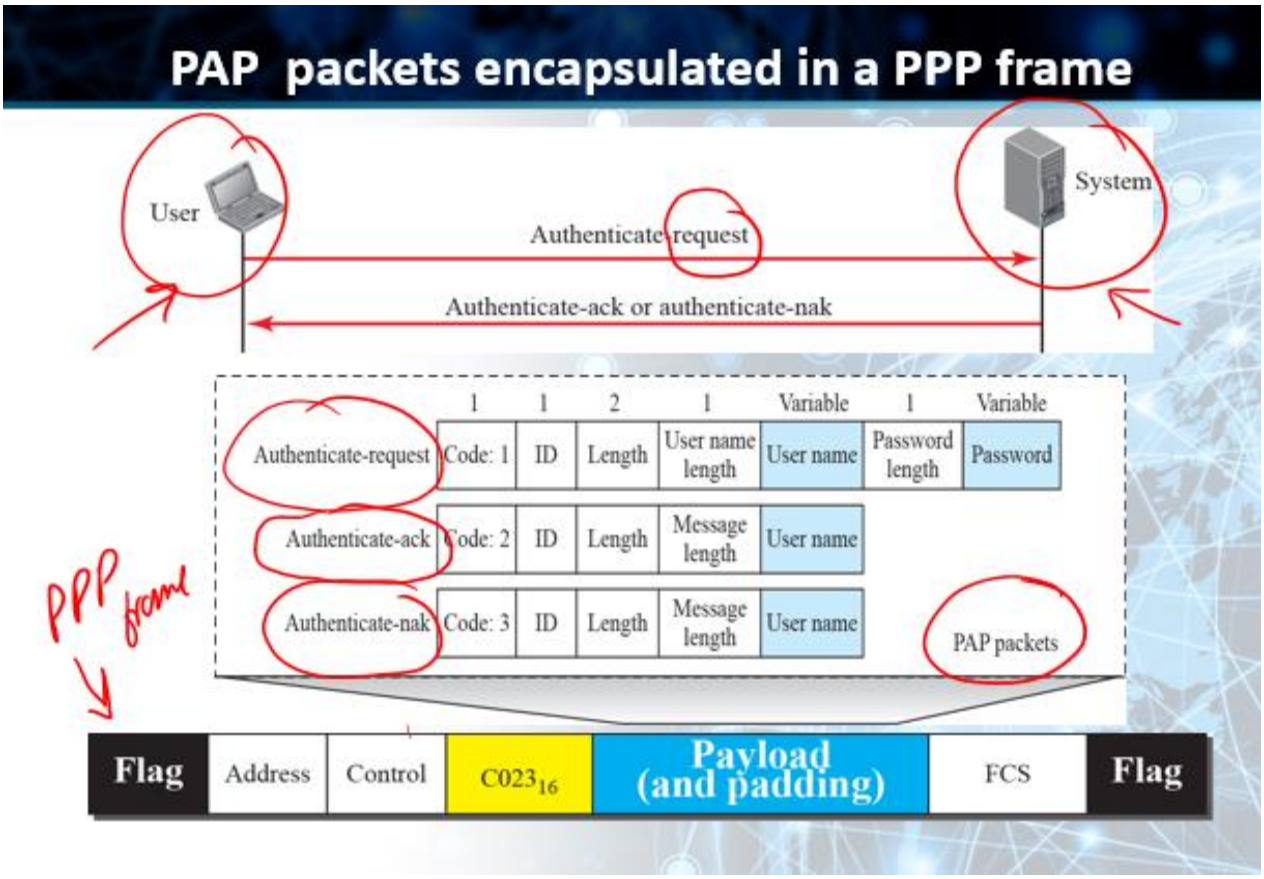
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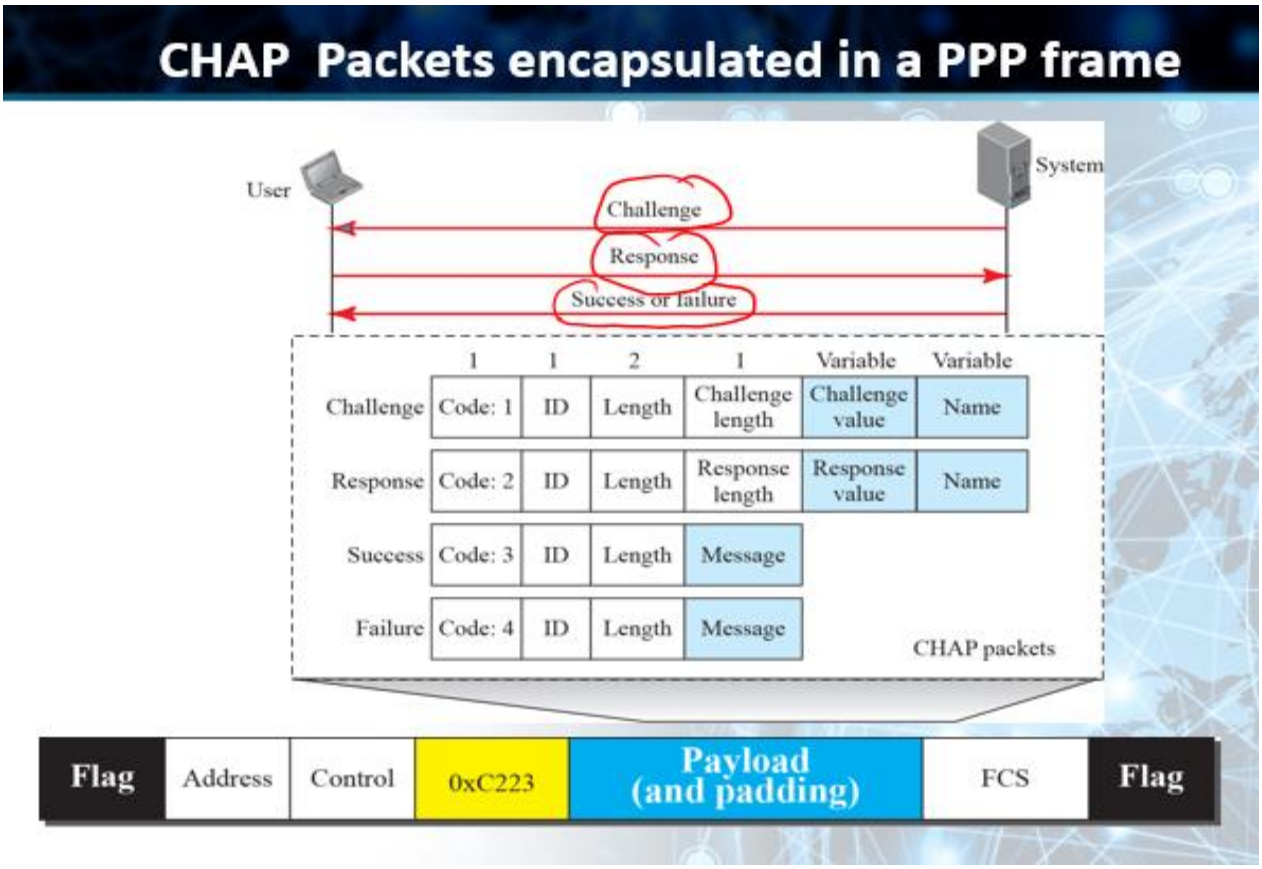
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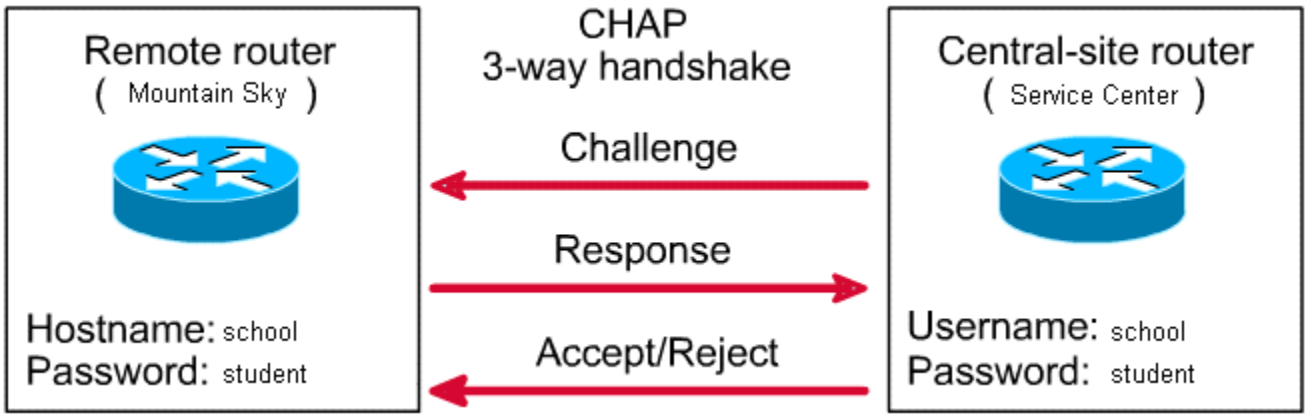






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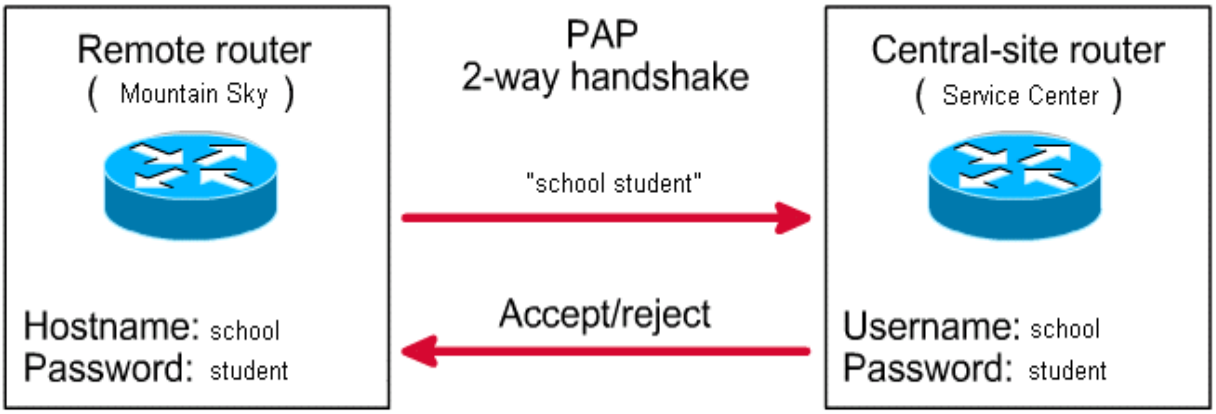


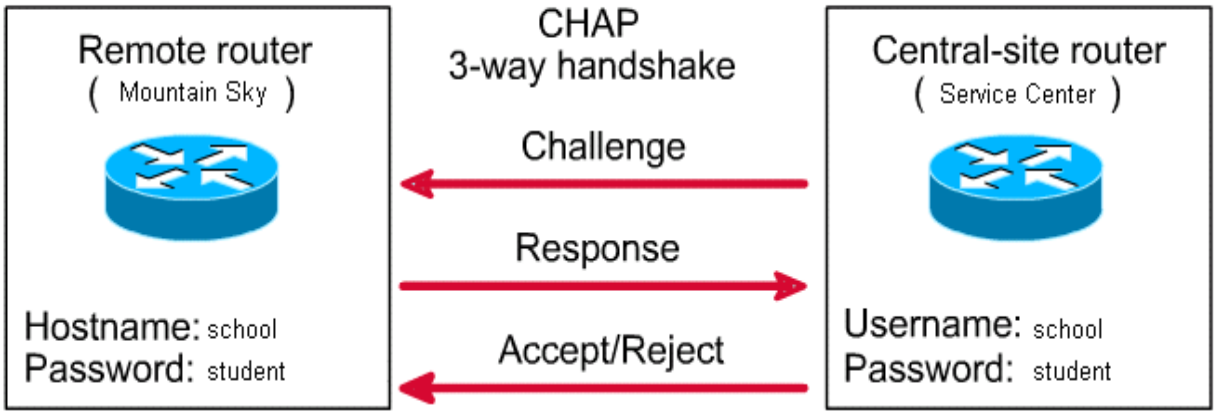


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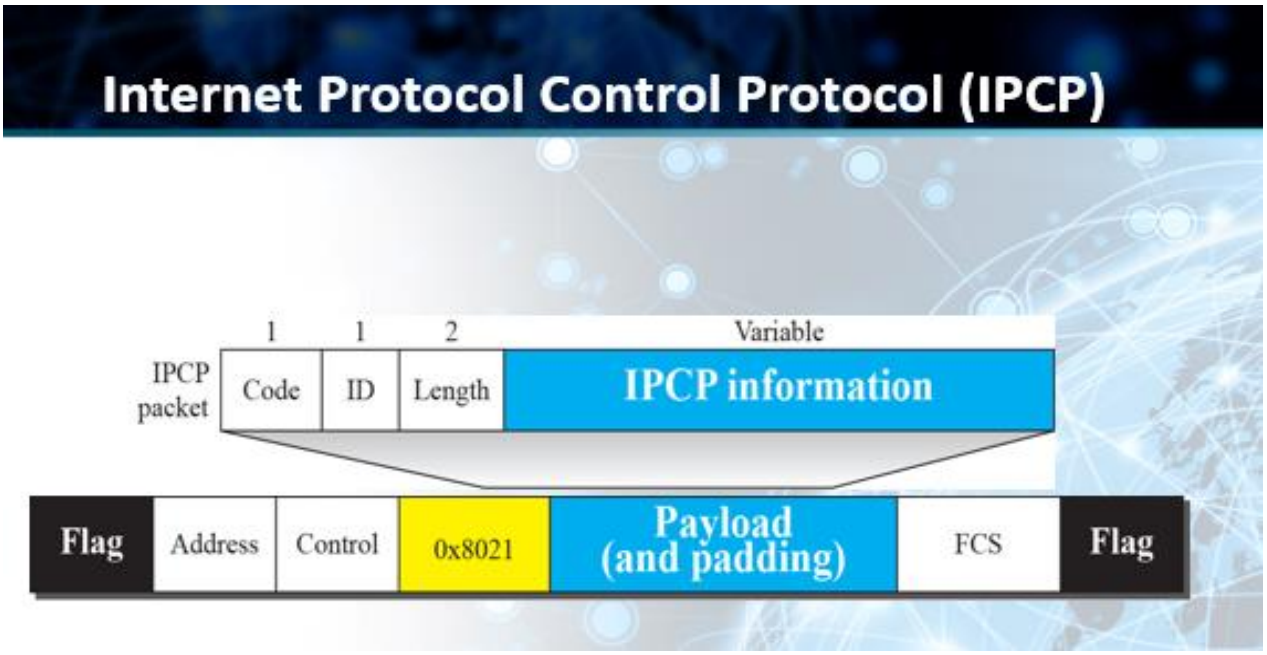




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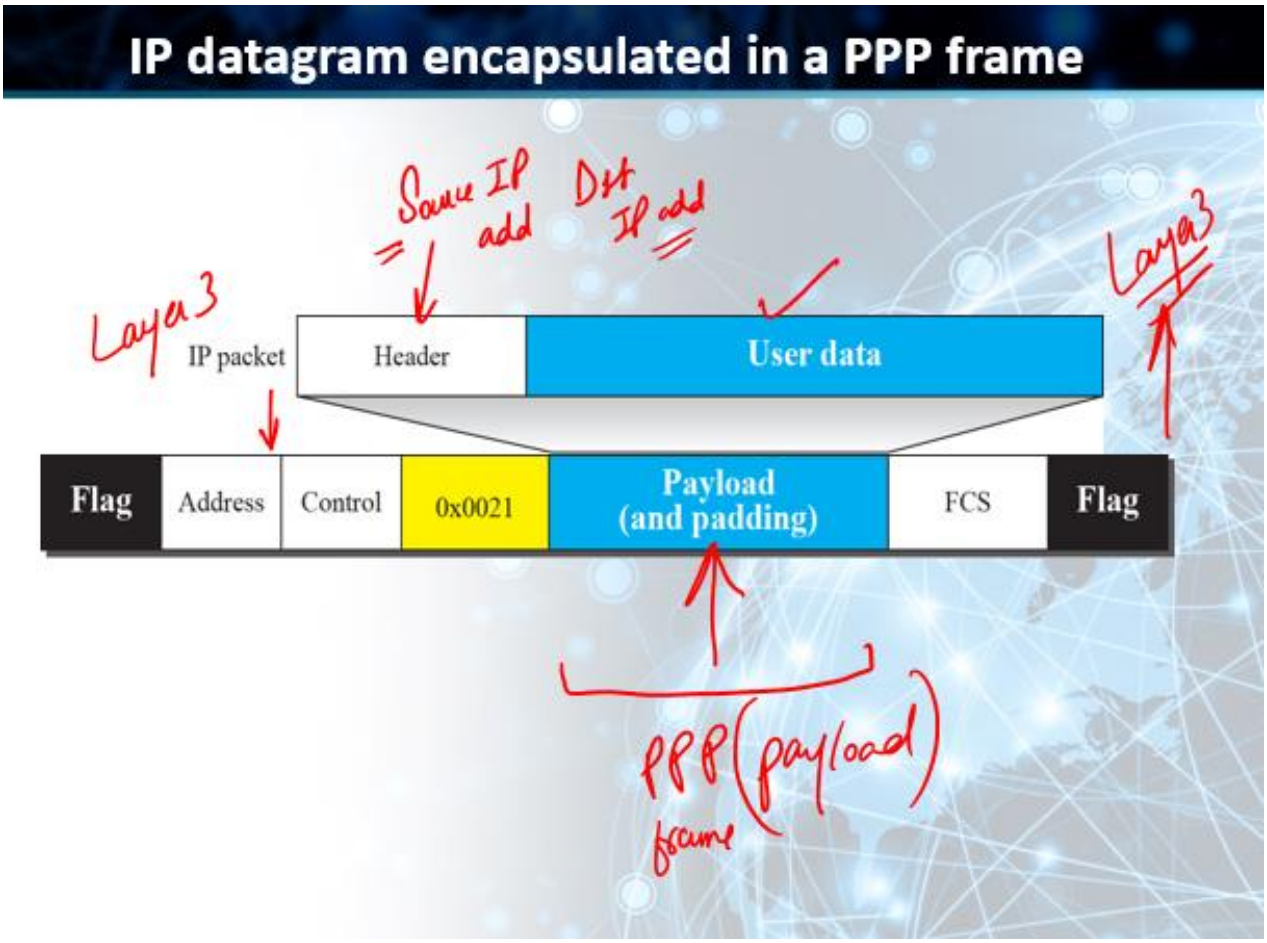
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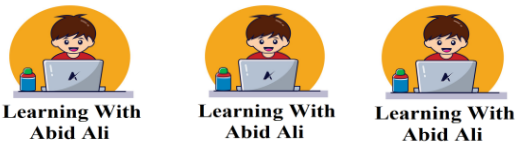
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Code values for IPCP Packets

Code	*IPCP Packet*
0x01	Configure-request
0x02	Configure-ack
0x03	Configure-nak
0x04	Configure-reject
0x05	Terminate-request
0x06	Terminate-ack
0x07	Code-reject