

# *Virtual Private Networks*

*FEUP*

*MPR*

## Type of VPNs

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- ◆ Secure VPNs
  - » Built by customers
  - » Constructed using encryption
  - » PPP, PPTP, L2TP, IPSec
  
- ◆ Trusted VPNs
  - » Built by ISP, which provides and maintains the circuits integrity
  - » Layer 2 frames over MPLS, VLANs

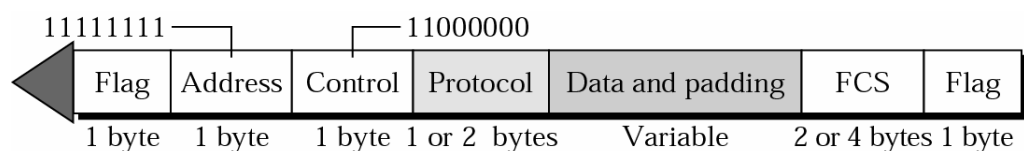
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# PPP – Point-to-Point Protocol

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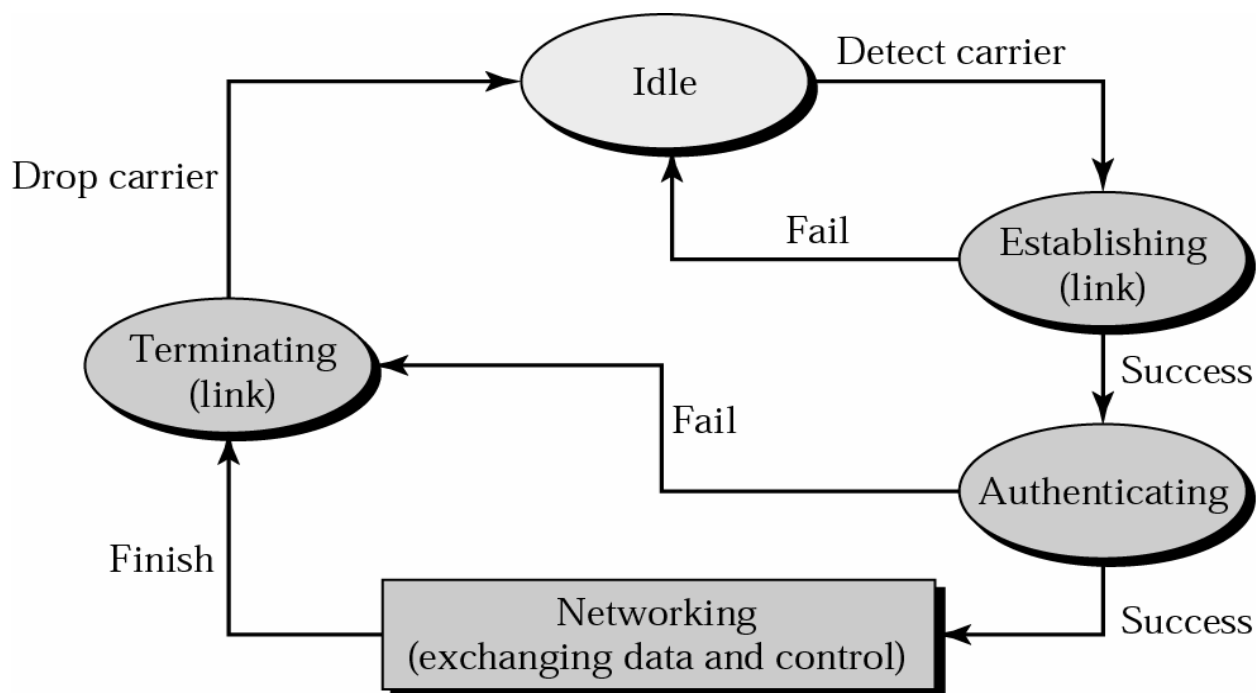
## *Point-to-Point Protocol*

- ◆ PPP - The Point-to-Point Protocol
  - RFC 1661, RFC 2153
- ◆ Method for transporting datagrams over point-to-point links
- ◆ 3 main components
  - » method for encapsulating multi-protocol datagrams
  - » LCP - Link Control Protocol
    - establishing, configuring, testing the data-link connection
  - » Family of NCP - Network Control Protocols
    - establishing, configuring different network-layer protocols

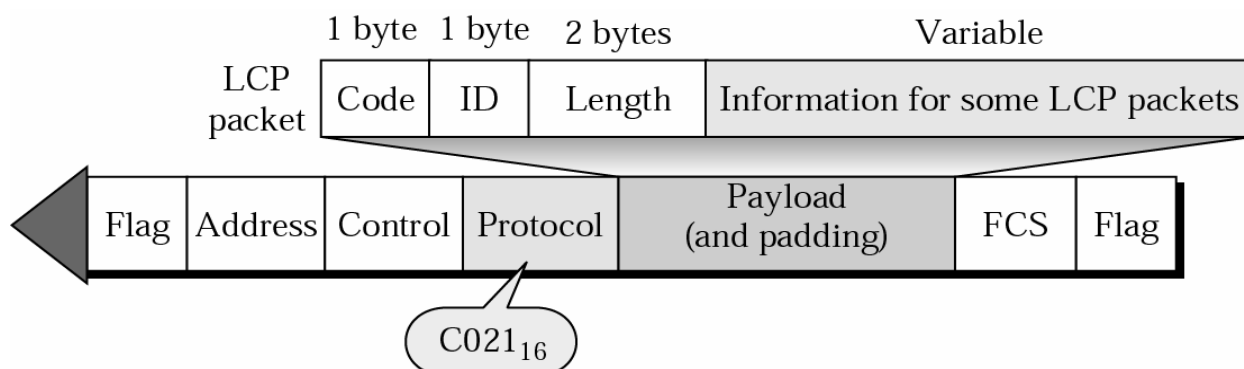


**Flag:** start/end of frame (01111110); **Address:** broadcast address; **Protocol:** protocol encapsulated

# Transition States



# LCP Packet in a Frame



# LCP Packet and Codes

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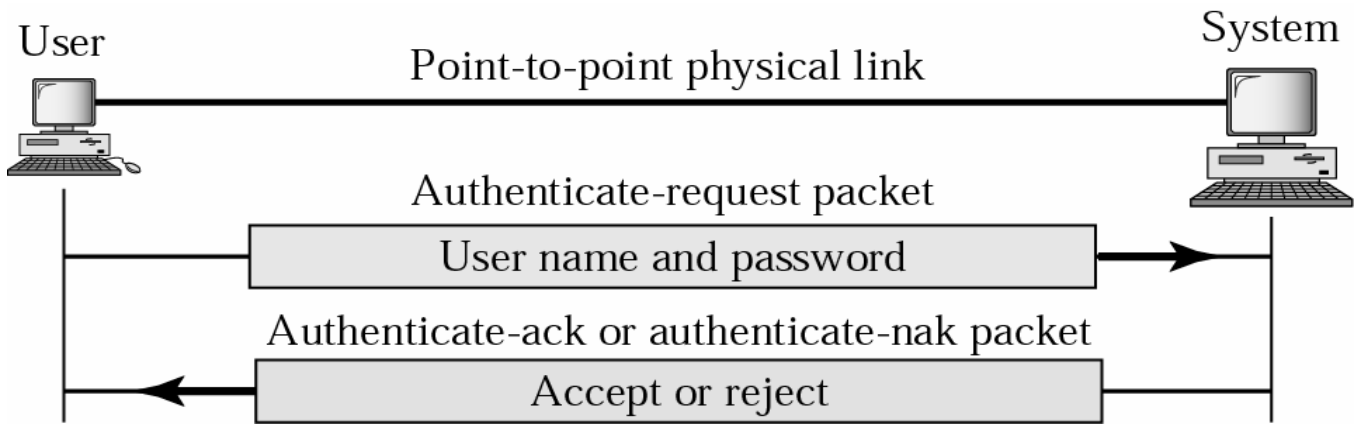
Code 0x	Packet Type	Description
01	Configure-request	Contains the list of proposed options and their values
02	Configure-ack	Accepts all options proposed
03	Configure-nak	Announces that some options are not acceptable
04	Configure-reject	Announces that some options are not recognized
05	Terminate-request	Requests to shut down the line
06	Terminate-ack	Accepts the shut down request
07	Code-reject	Announces an unknown code
08	Protocol-reject	Announces an unknown protocol
09	Echo-request	A type of hello message to check if the other end is alive
0A	Echo-reply	The response to the echo-request message
0B	Discard-request	A request to discard the packet

# Some Options and Their Values

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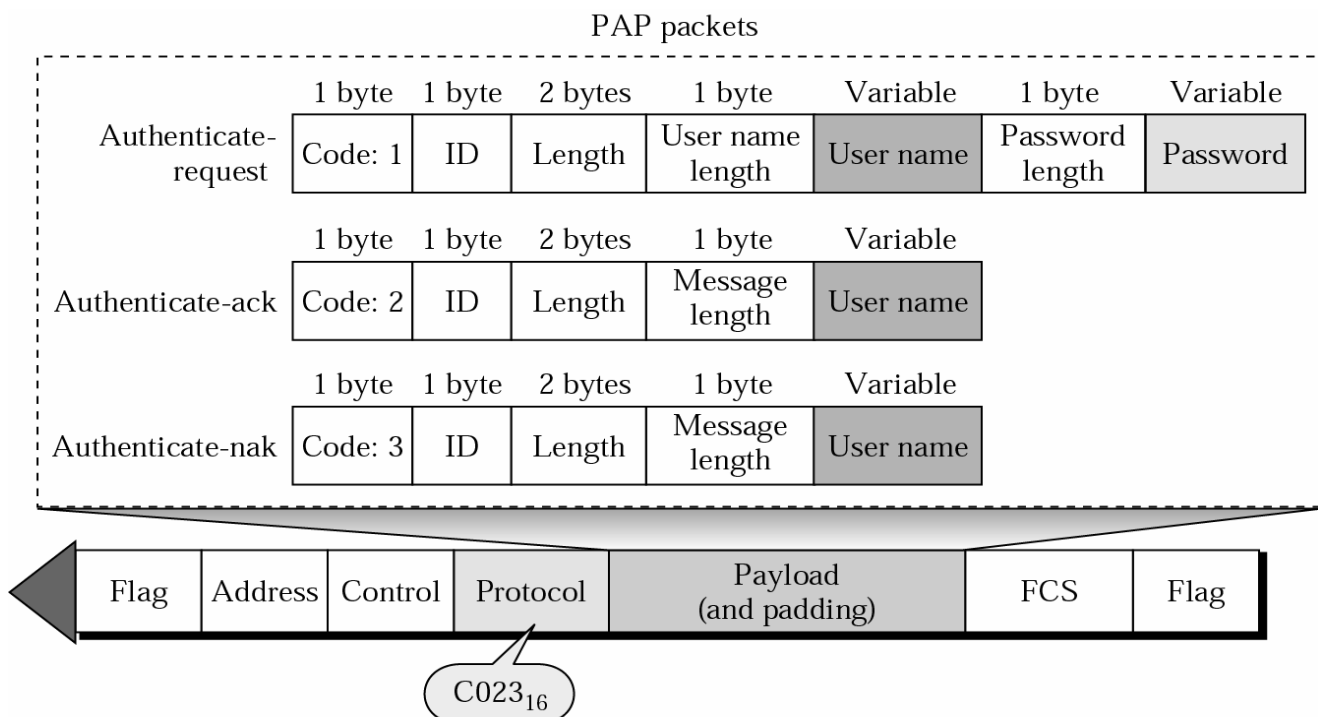
Option	Example Values
Maximum receive unit	1500
Authentication protocol	None, PAP, CHAP

# PAP – Password Authentication Protocol



Poor Security: Usernames and Passwords sent in the clear

## PAP Packets



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