NETWORK PROTOCOLS & SECURITY
23EC2210 R/A/E

Topic:

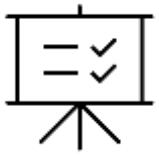
RIP, OSPF & BGP

Session - 22

AIM OF THE SESSION

To familiarize students with the basic concept of internet protocols and Interdomain and Intradomain Routing.

INSTRUCTIONAL OBJECTIVES



This Session is designed to:

1. List out the few routing protocols
2. Describe the routing protocols OSPF and BGP

LEARNING OUTCOMES

At the end of this session, you should be able to:

1. Demonstrate the OSPF routing protocol.
2. Demonstrate the BGP routing protocol.

PATH VECTOR ROUTING

Path vector routing is similar to distance vector routing. There is at least one node, called the speaker node, in each AS that creates a routing table and advertises it to speaker nodes in the neighboring ASs..

The topics discussed in this section include:

Initialization
Sharing
Updating

Figure *Initial routing tables in path vector routing*

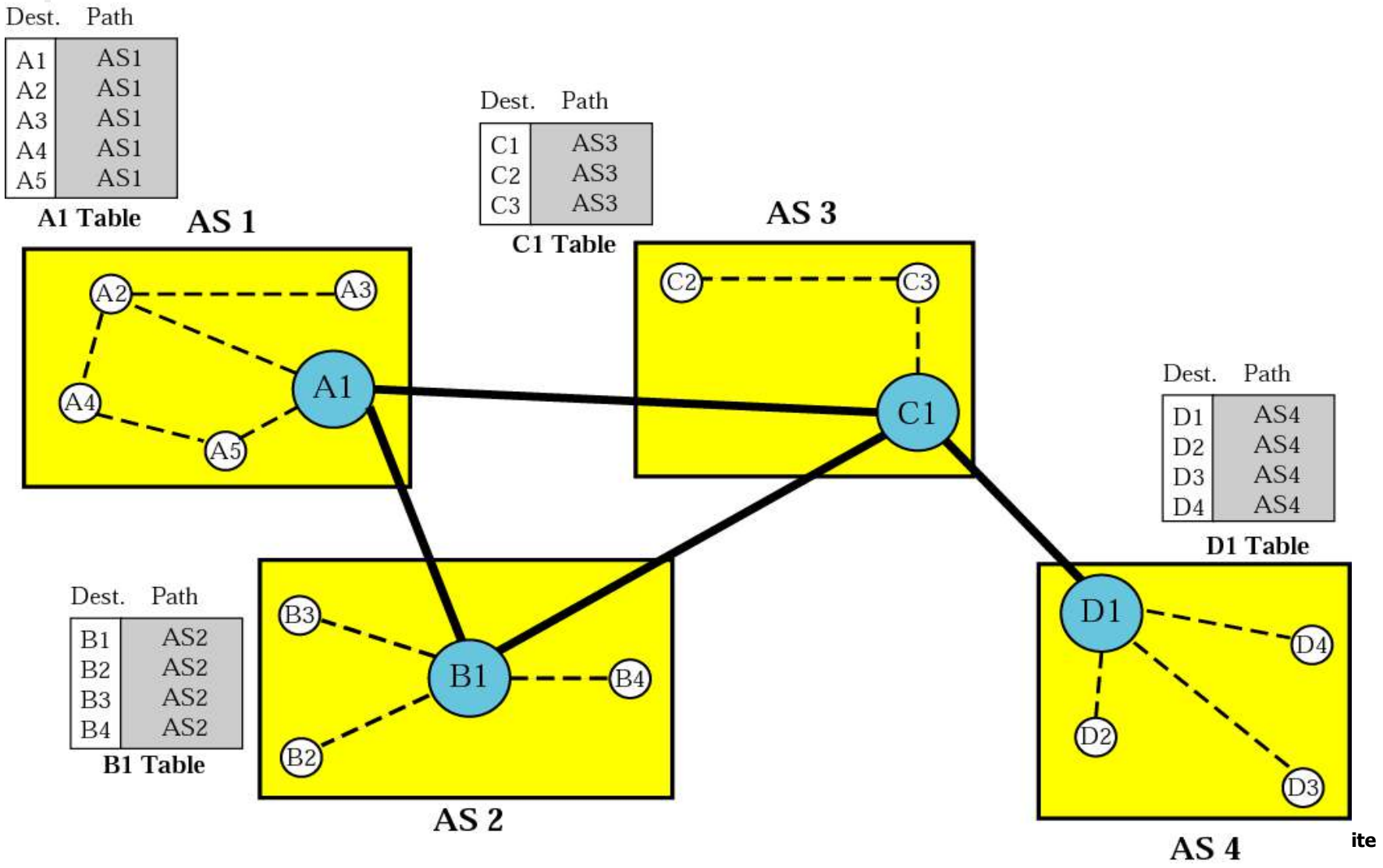


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Figure *Stabilized tables for four autonomous systems*

Dest.	Path
A1	AS1
...	
A5	AS1
B1	AS1-AS2
...	...
B4	AS1-AS2
C1	AS1-AS3
...	...
C3	AS1-AS3
D1	AS1-AS2-AS4
...	...
D4	AS1-AS2-AS4

A1 Table

Dest.	Path
A1	AS2-AS1
...	
A5	AS2-AS1
B1	AS2
...	...
B4	AS2
C1	AS2-AS3
...	...
C3	AS2-AS3
D1	AS2-AS3-AS4
...	...
D4	AS2-AS3-AS4

B1 Table

Dest.	Path
A1	AS3-AS1
...	
A5	AS3-AS1
B1	AS3-AS2
...	...
B4	AS3-AS2
C1	AS3
...	...
C3	AS3
D1	AS3-AS4
...	...
D4	AS3-AS4

C1 Table

Dest.	Path
A1	AS4-AS3-AS1
...	
A5	AS4-AS3-AS1
B1	AS4-AS3-AS2
...	...
B4	AS4-AS3-AS2
C1	AS4-AS3
...	...
C3	AS4-AS3
D1	AS4
...	...
D4	AS4

D1 Table

BGP

Border Gateway Protocol (BGP) is an interdomain routing protocol using path vector routing. It first appeared in 1989 and has gone through four versions.

The topics discussed in this section include:

Types of Autonomous Systems
Path Attributes
BGP Sessions
External and Internal BGP
Types of Packets
Packet Format
Encapsulation

Figure *Internal and external BGP sessions*

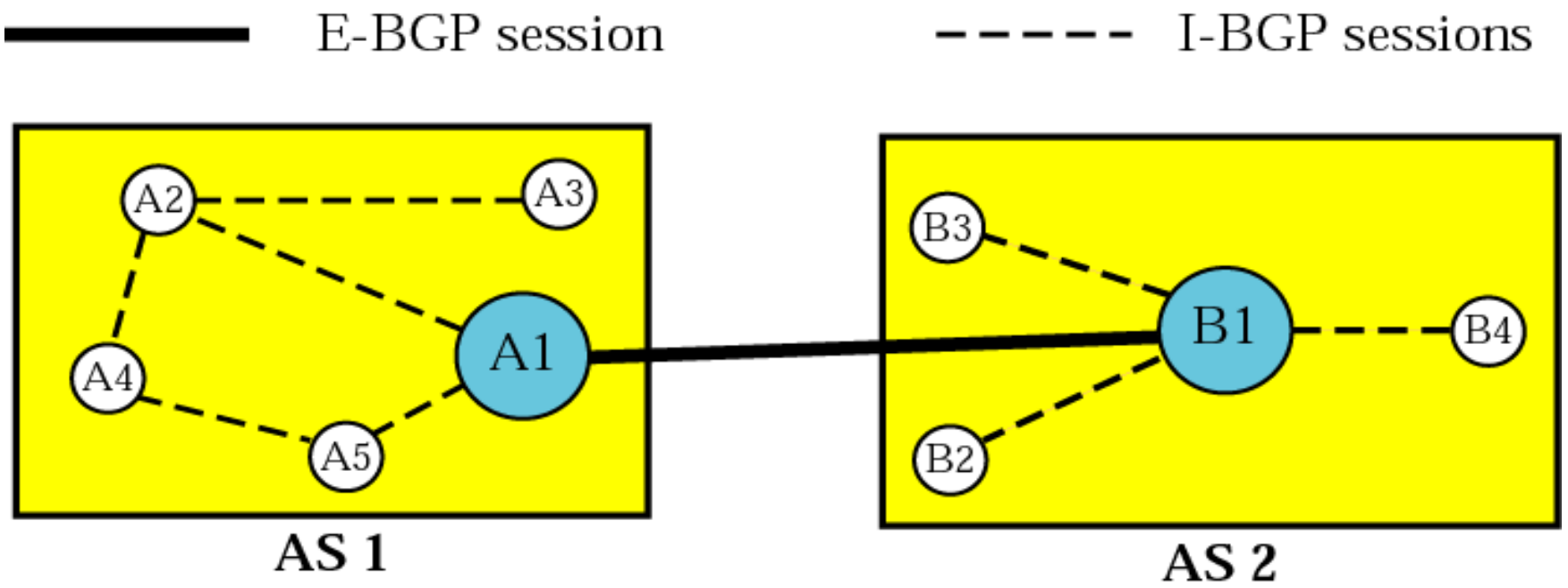


Figure *Types of BGP messages*

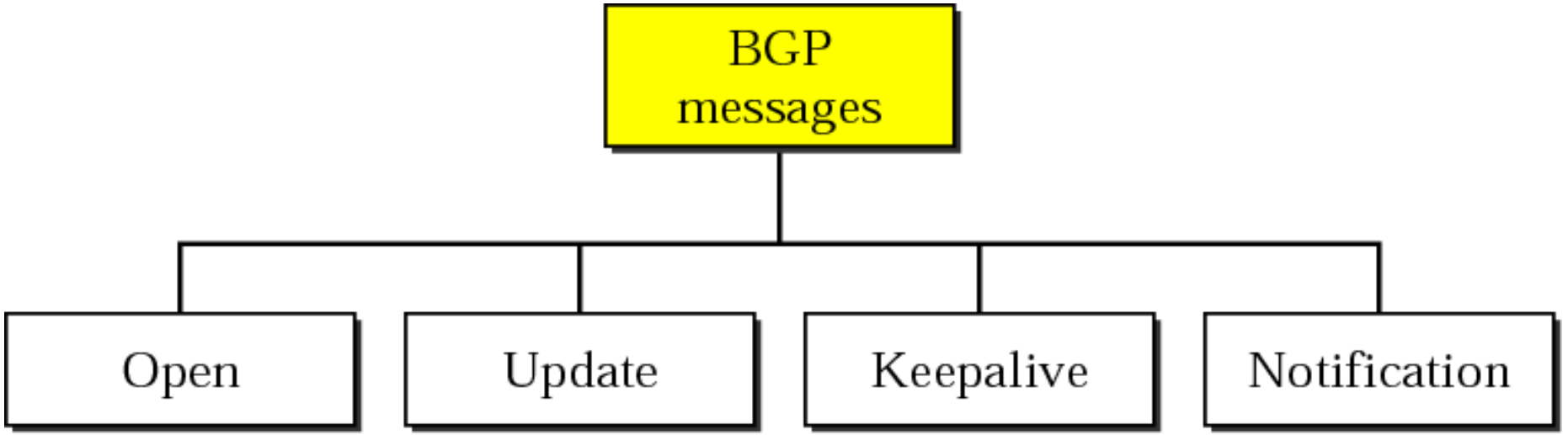


Figure *BGP packet header*

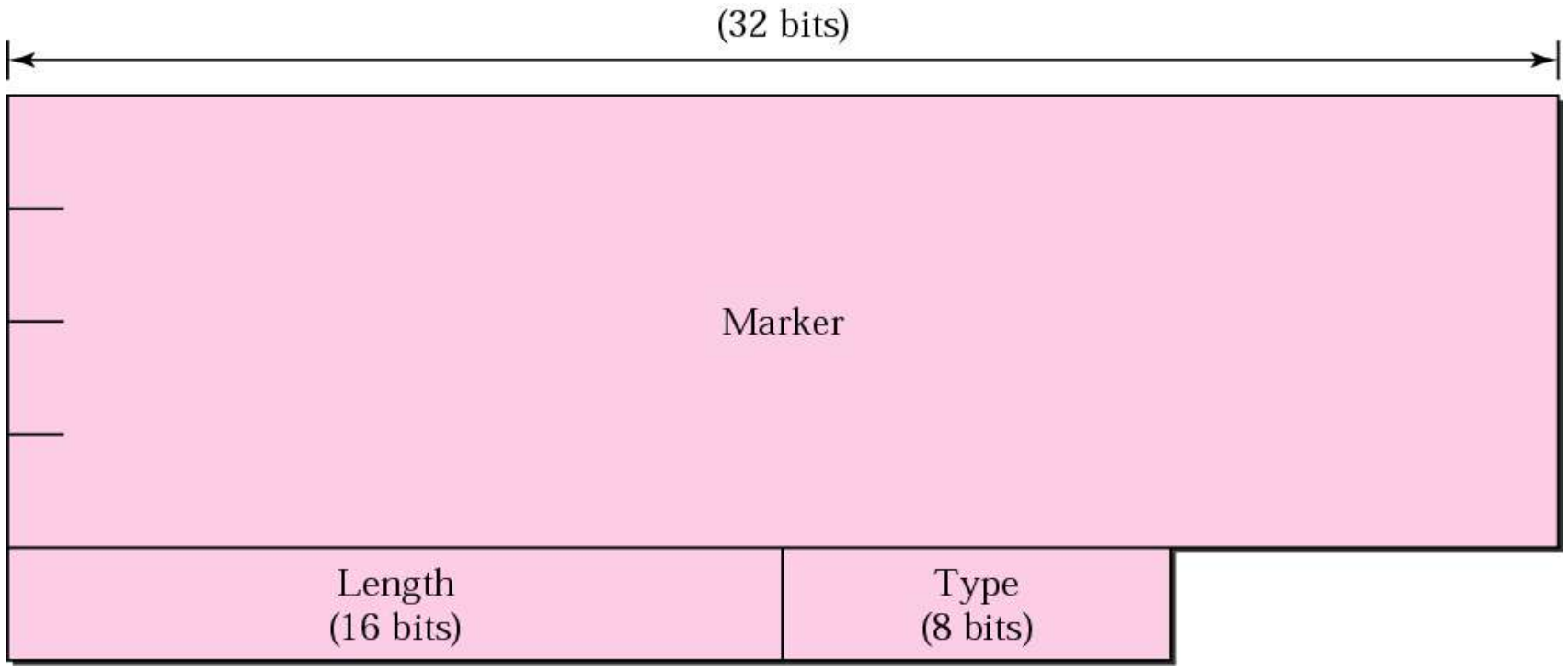


Figure *Open message*

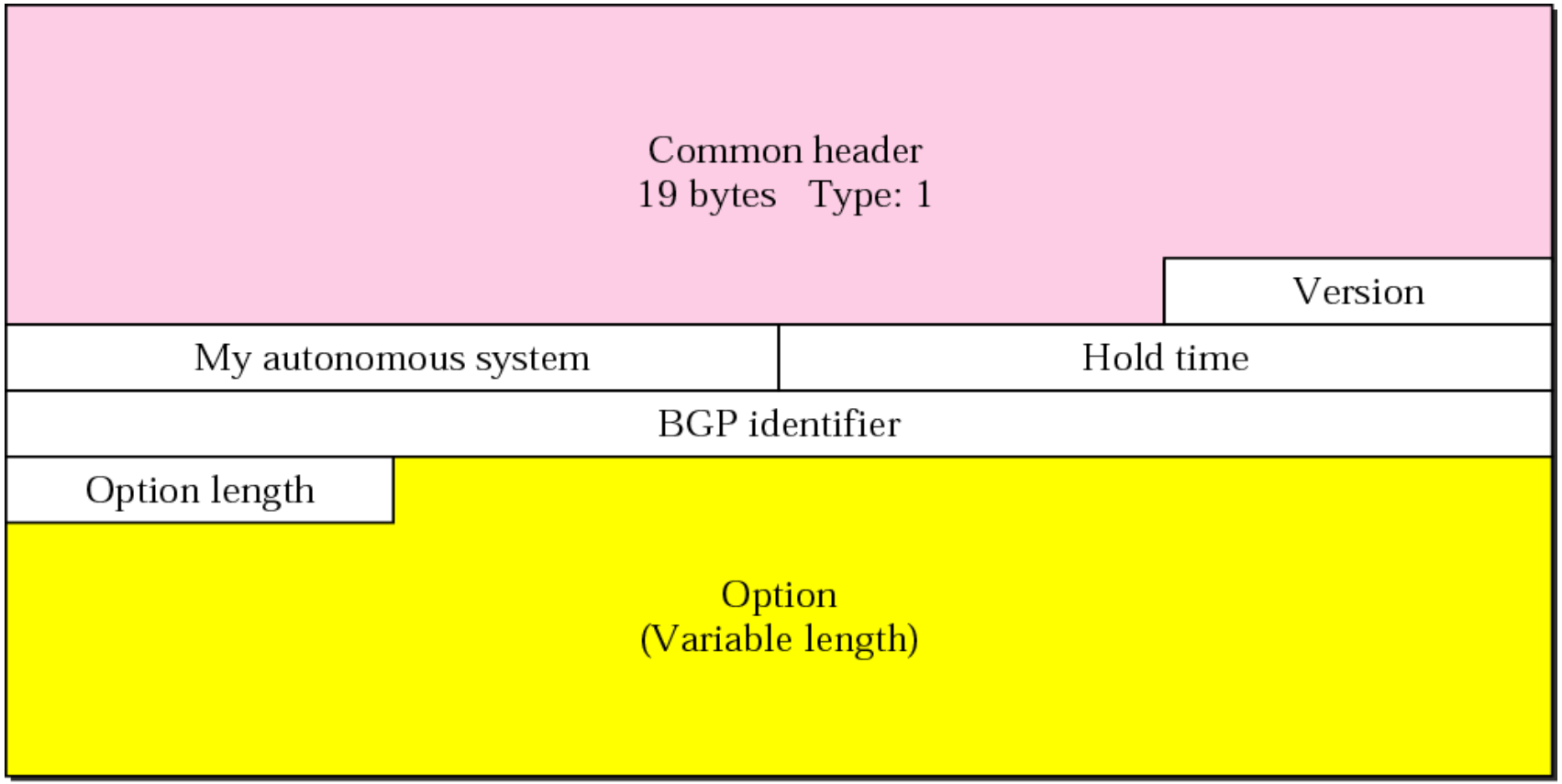
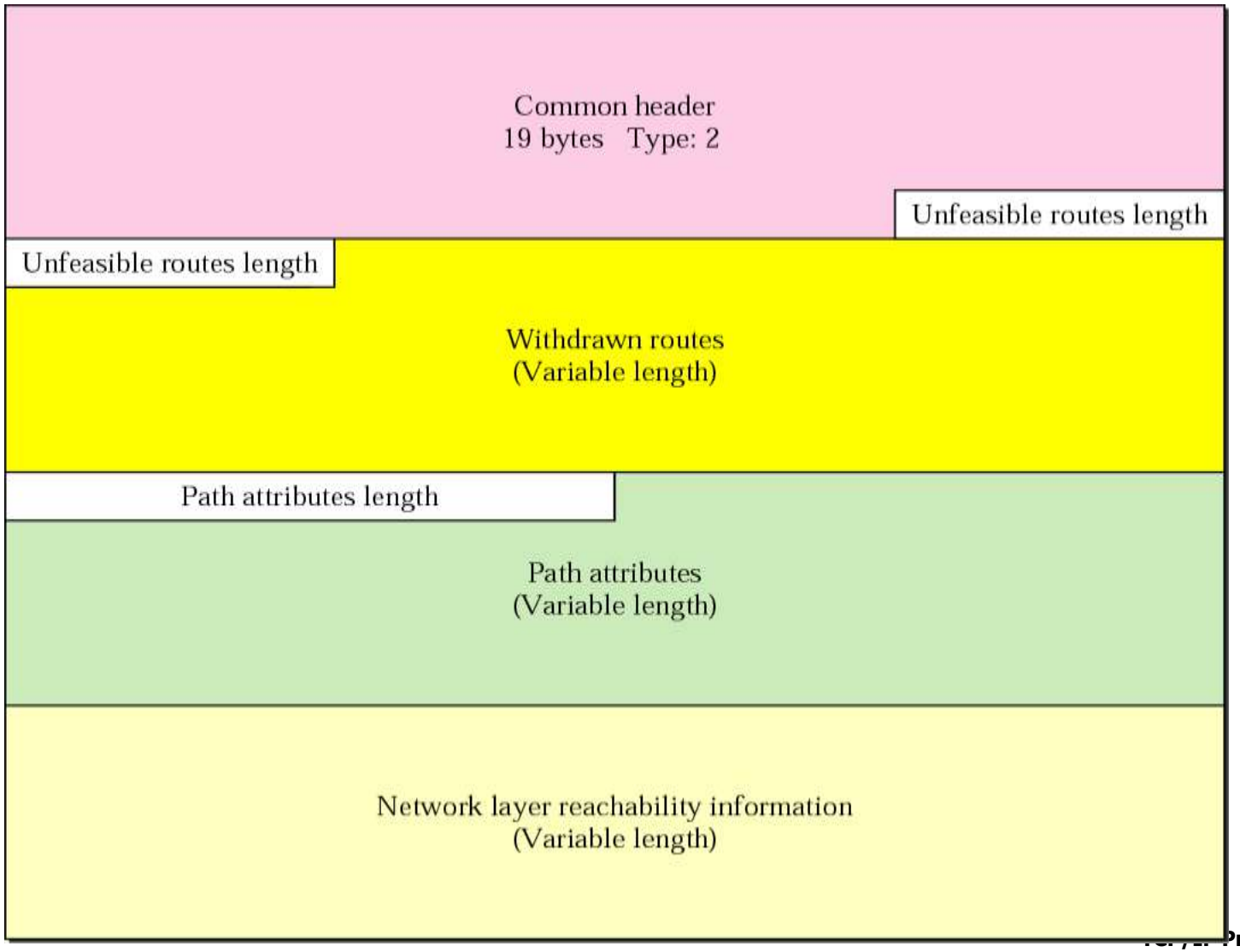


Figure. *Update message*



BGP supports classless addressing and CIDR.

Figure. *Keepalive message*

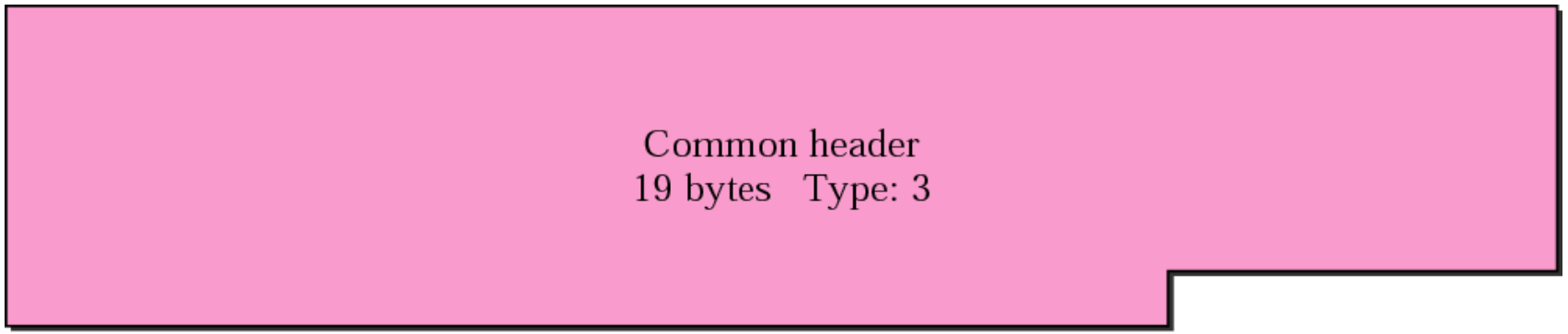


Figure. *Notification message*

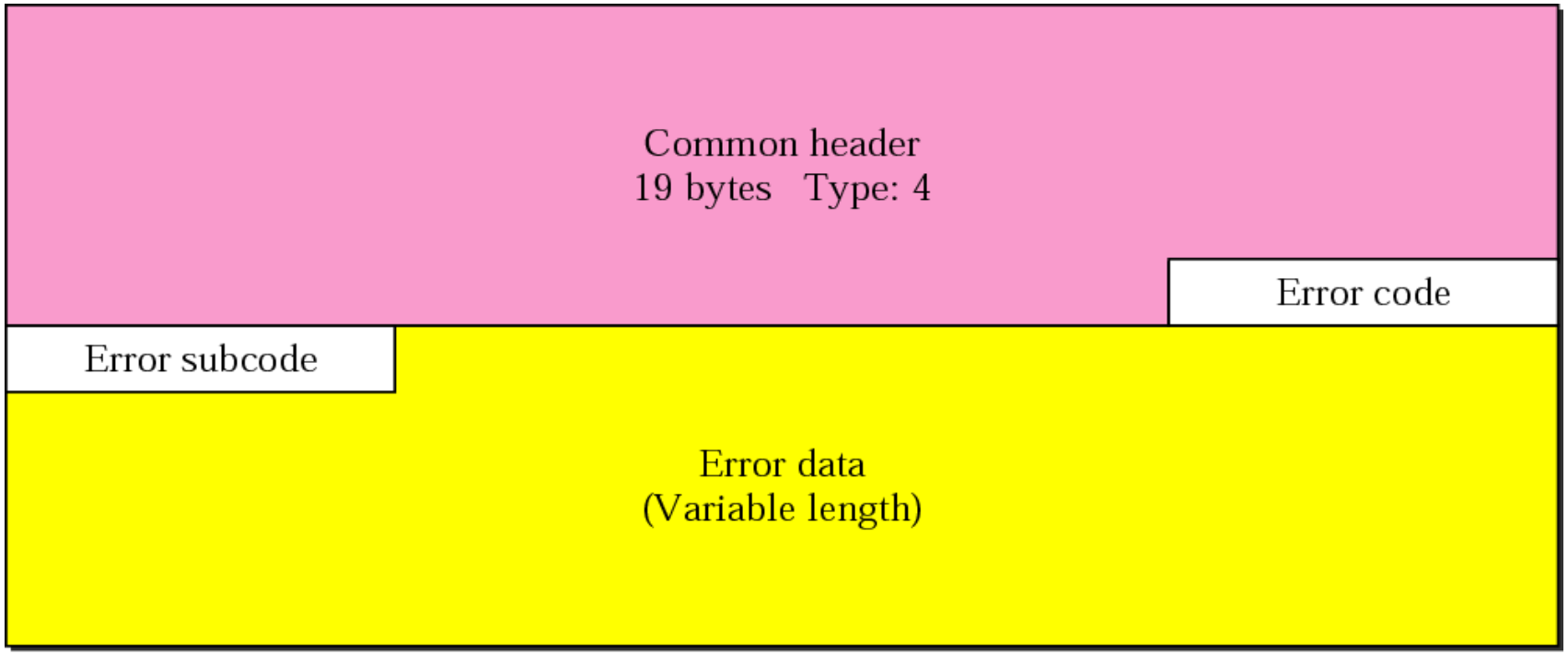


Table Error codes

Error Code	Error Code Description	Error Subcode Description
1	Message header error	Three different subcodes are defined for this type of error: synchronization problem (1), bad message length (2), and bad message type (3).
2	Open message error	Six different subcodes are defined for this type of error: unsupported version number (1), bad peer AS (2), bad BGP identifier (3), unsupported optional parameter (4), authentication failure (5), and unacceptable hold time (6).
3	Update message error	Eleven different subcodes are defined for this type of error: malformed attribute list (1), unrecognized well-known attribute (2), missing well-known attribute (3), attribute flag error (4), attribute length error (5), invalid origin attribute (6), AS routing loop (7), invalid next hop attribute (8), optional attribute error (9), invalid network field (10), malformed AS_PATH (11).
4	Hold timer expired	No subcode defined.
5	Finite state machine error	This defines the procedural error. No subcode defined.
6	Cease	No subcode defined.

BGP uses the services of TCP on port 179.

THANK YOU

Team –Network Protocols and Security