Indian Institute of Information Technology, Nagpur

Course: Computer Networks (CSL 302, Core)

5th Semester

Topics Covered

- TCP/IP Model

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TCP/IP Model

- The TCP/IP model and the TCP/IP protocol stack make data communication possible between any two computers, anywhere in the world, at nearly the speed of light.
- The U.S. Department of Defense (DoD) created the TCP/IP reference model because it wanted a network that could survive any conditions.
- The TCP/IP model was developed prior to the OSI model.
- The TCP/IP is a hierarchical protocol made up of interactive modules, and each of them provides specific functionality.

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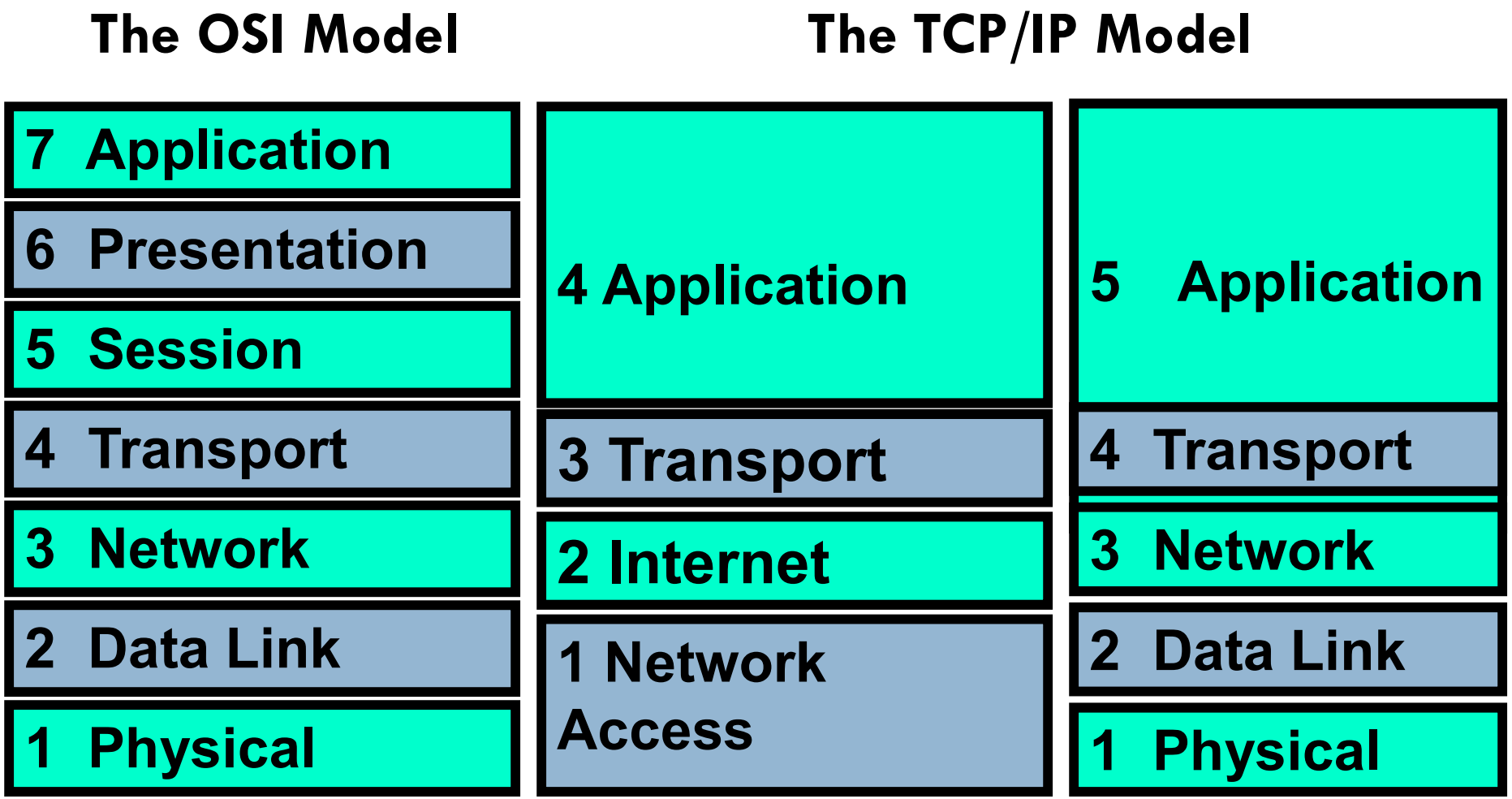
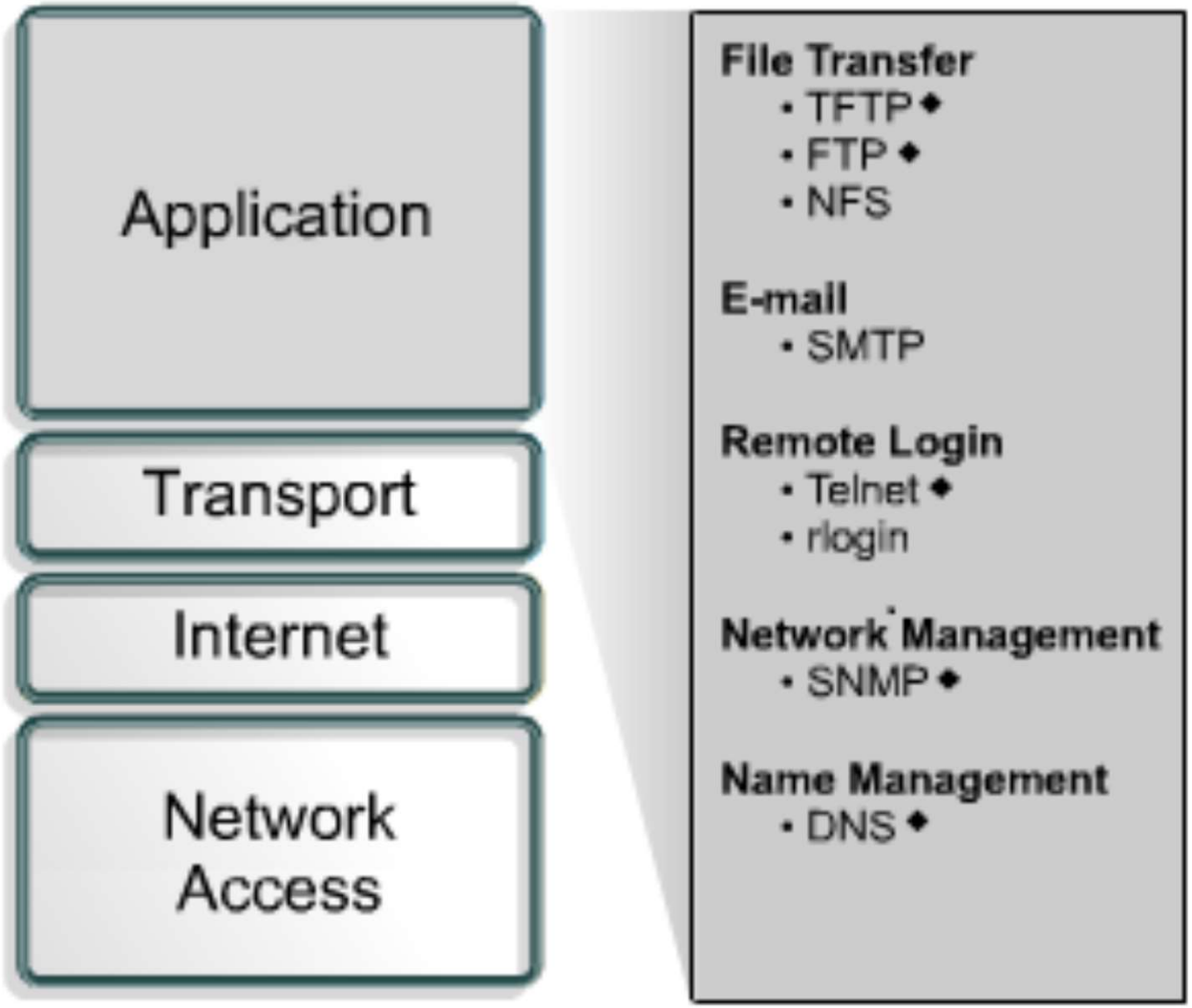

The OSI Model
The TCP/IP Model
7 Application
6 Presentation
5 Session
4 Transport
3 Network
2 Data Link
1 Physical
4 Application
3 Transport
2 Internet
1 Network Access
5 Application
4 Transport
3 Network
2 Data Link
1 Physical

The Application Layer

The application layer of the TCP/IP model handles high-level protocols, issues of representation, encoding, and dialog control.



The Transport Layer

Transmission Control Protocol (TCP)
Connection-Oriented

User Datagram Protocol (UDP)
Connectionless

The transport layer provides transport services from the source host to the destination host. It constitutes a logical connection between these endpoints of the network.

Transport protocols segment and reassemble upper-layer applications into the same data stream between endpoints.

The transport layer data stream provides end-to-end transport services.

The Internet Layer

The purpose of the Internet layer is to select the best path through the network for packets to travel. The main protocol that functions at this layer is the Internet Protocol (IP). Best path determination and packet switching occur at this layer.

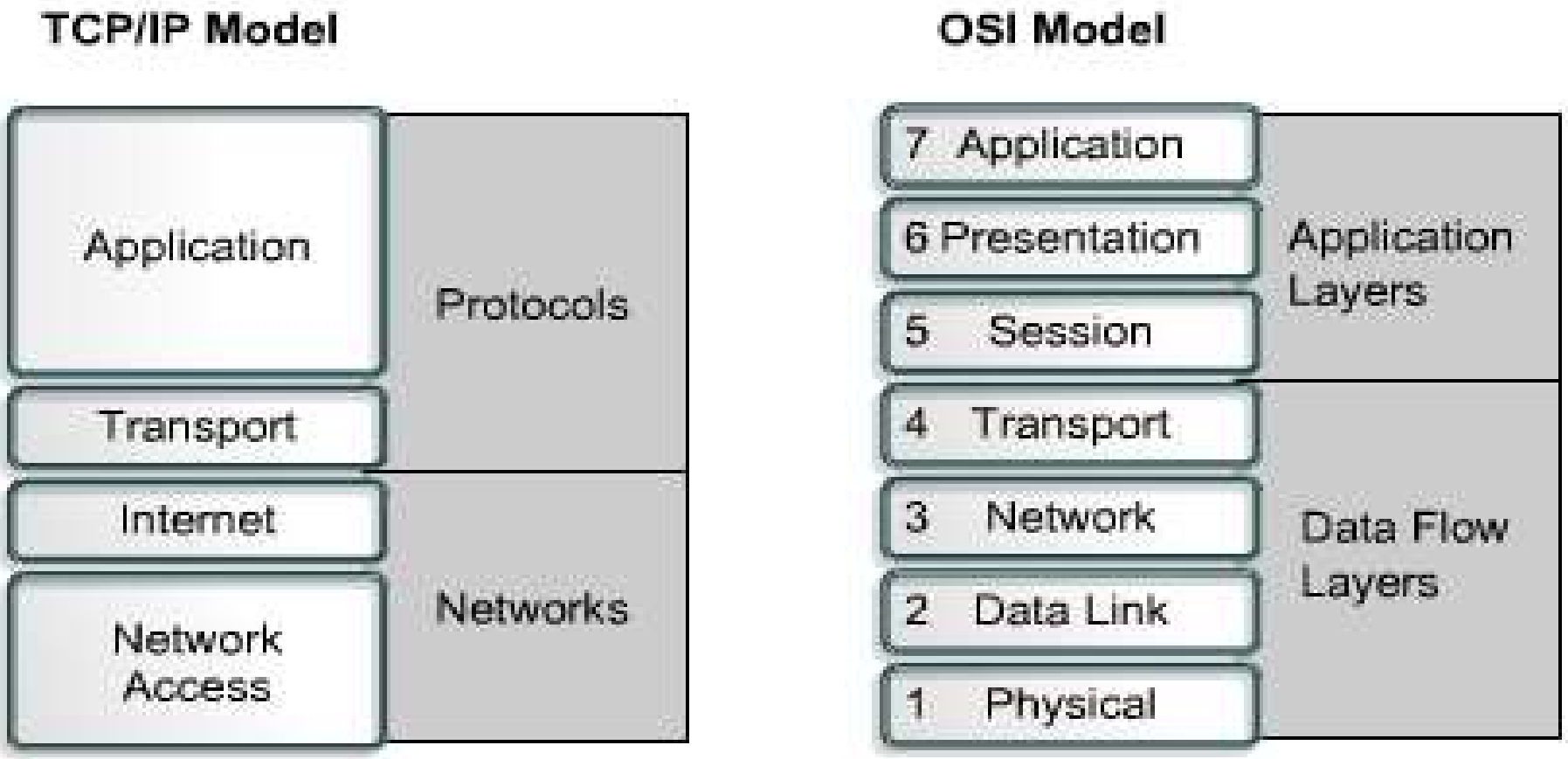
- Internet Protocol (IP)
- Internet Control Message Protocol (ICMP)
- Address Resolution Protocol (ARP)
- Reverse Address Resolution Protocol (RARP)

The Network Access Layer

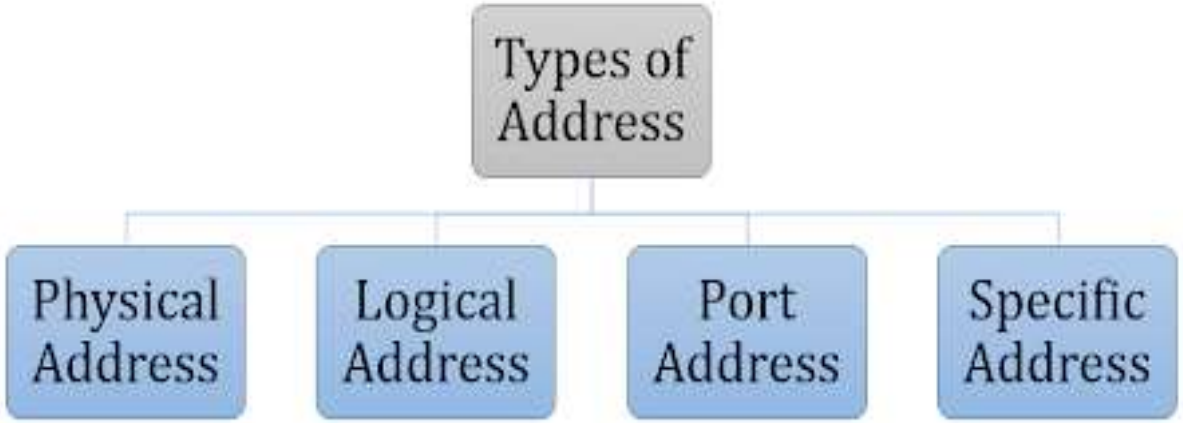
The network access layer is also called the host-to-network layer. It the layer that is concerned with all of the issues that an IP packet requires to actually make a physical link to the network media. It includes LAN and WAN details, and all the details contained in the OSI physical and data-link layers. NOTE: ARP & RARP work at both the Internet and Network Access Layers.

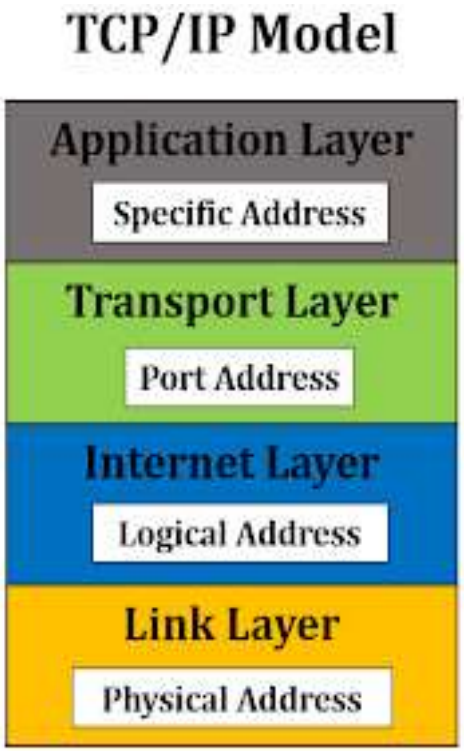
- Ethernet
- Fast Ethernet
- SLIP & PPP
- FDDI
- ATM, Frame Relay & SMDS

Comparing TCP/IP & OSI Model



Addressing in TCP/IP





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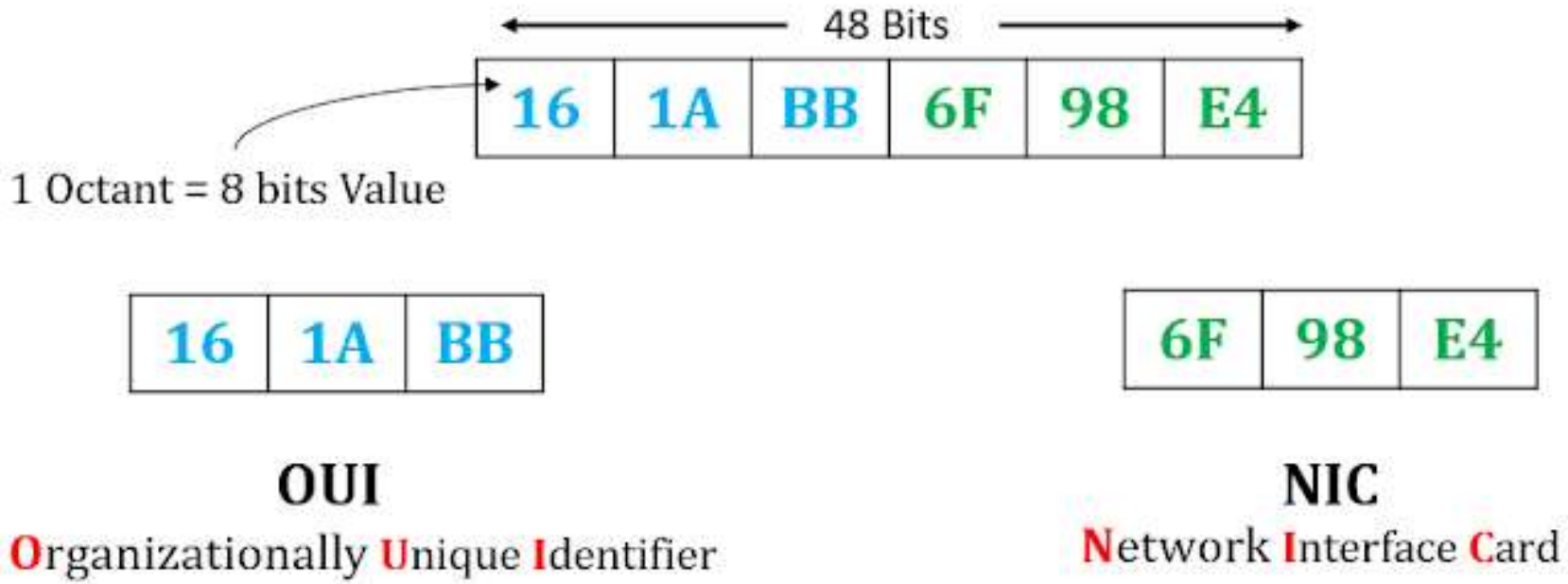
- Physical Address (MAC Address)



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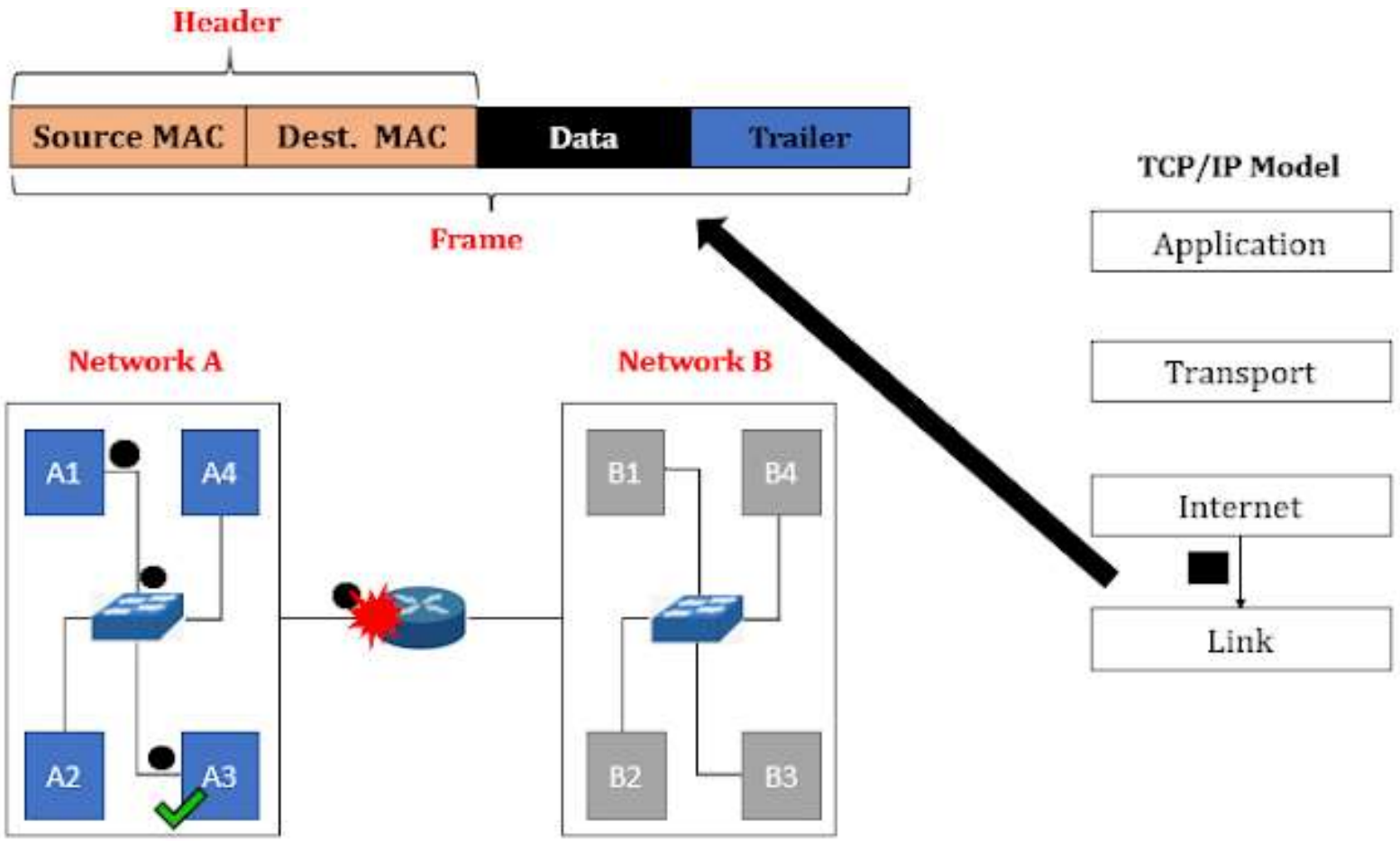
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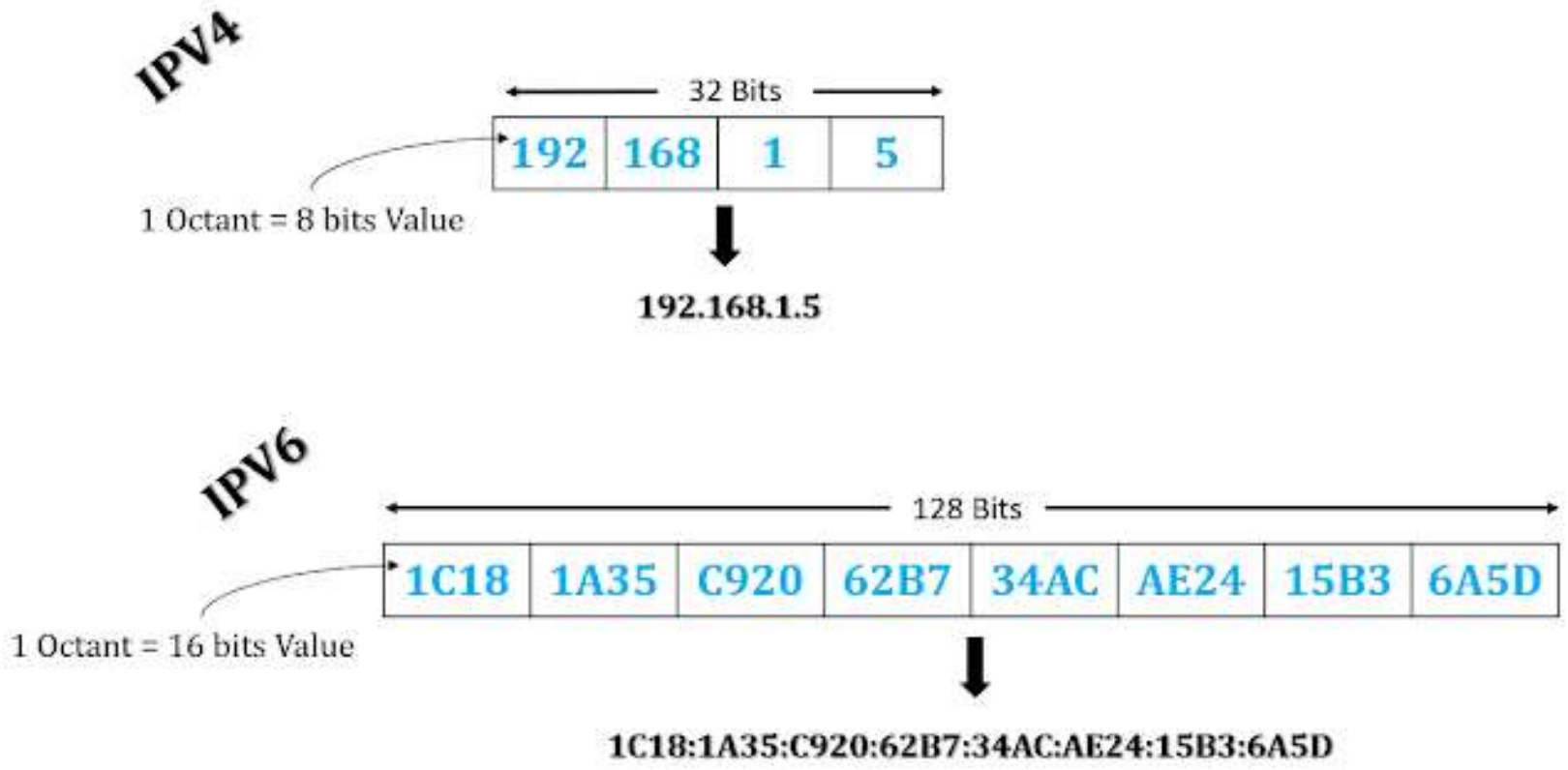
Source MAC
Dest. MAC
Data
Trailer
Frame
TCP/IP Model
Application
Transport
Internet
Link
Network A
Network B
A1
A4
A2
A3
B1
B4
B2
B3

Cont…

- Logical Address (IP Address)



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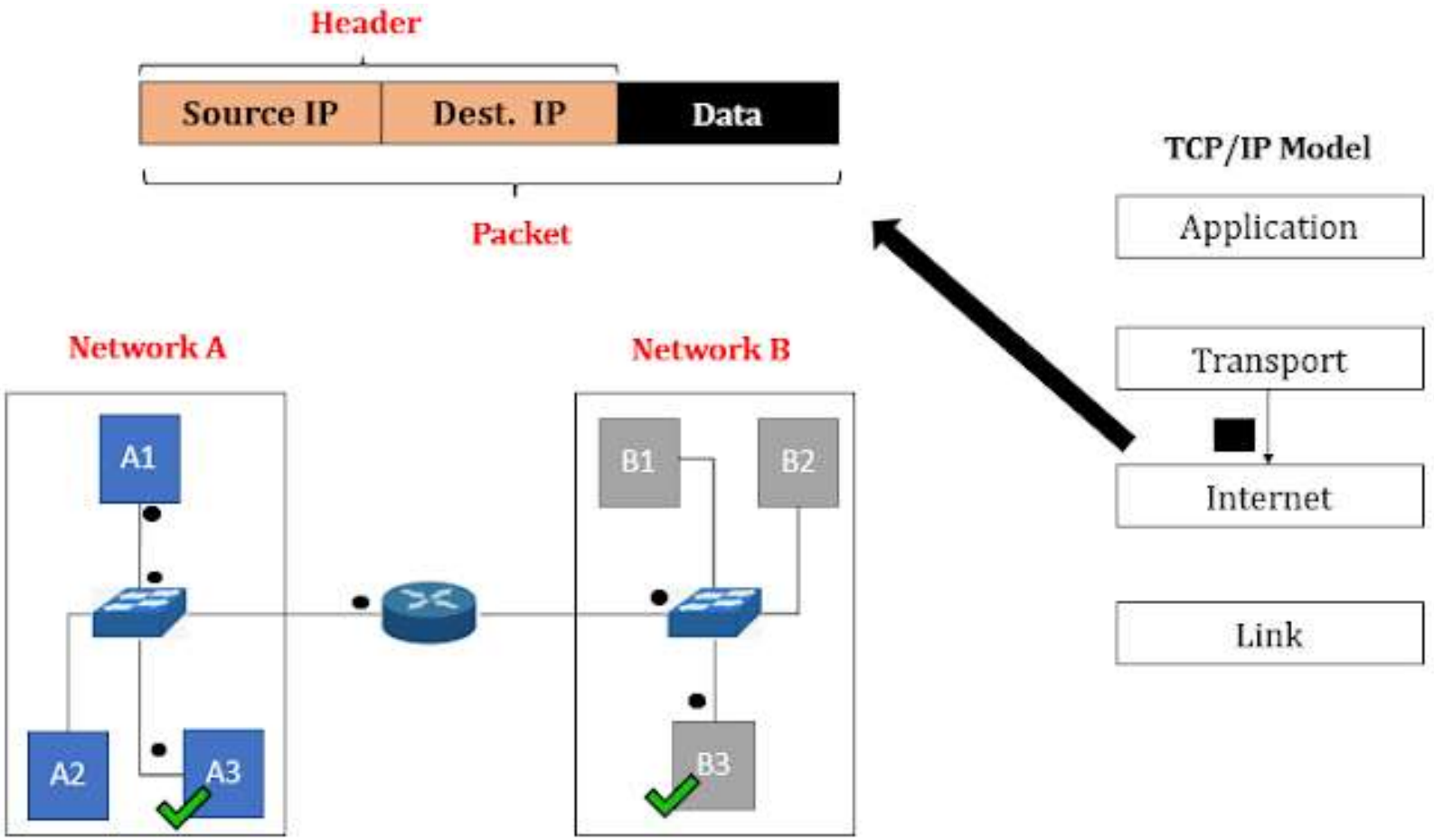
Header
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Dest. IP
Data
Packet
TCP/IP Model
Application
Transport
Internet
Link
Network A
Network B
A1
A2
A3
B1
B2
B3

Cont…

- Port No.

Types of ports	Range of Ports
Well Known Ports	0 – 1023
Registered Ports	1024 – 49151
Dynamic/Private Ports	49152 – 65535

Used for standard protocols and Process
80 – HTTP, 443 – HTTPS,
21 – FTP

Used by ordinary user process
1863 – MSN Messenger
8080 – alternate of HTTP

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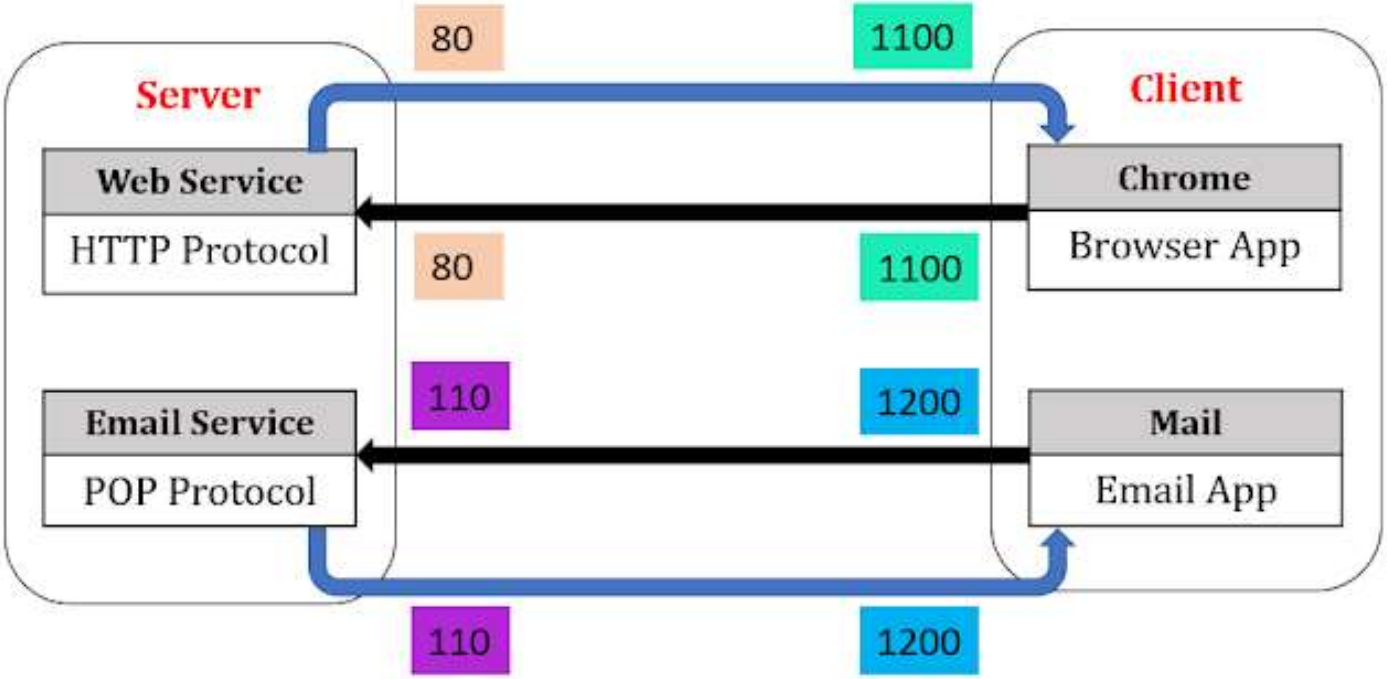

Service	Port#
HTTP	80
POP	110

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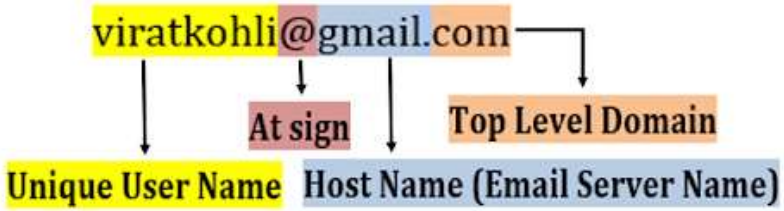
- Specific Address

Email Electronic Mail

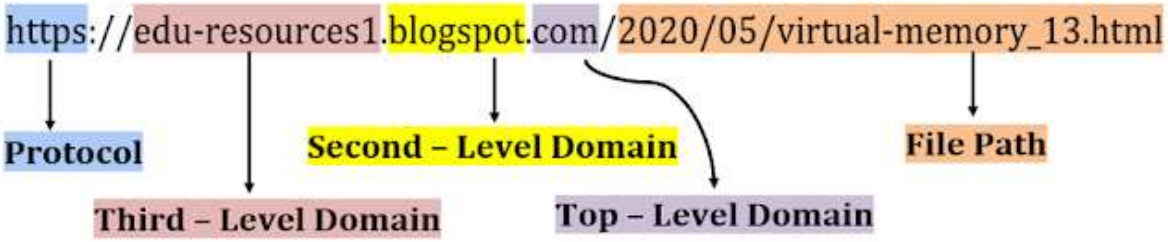
It is message contains text, file, images, videos etc….

Example : GMAIL, YAHOO MAIL, REDIFF MAIL and many more

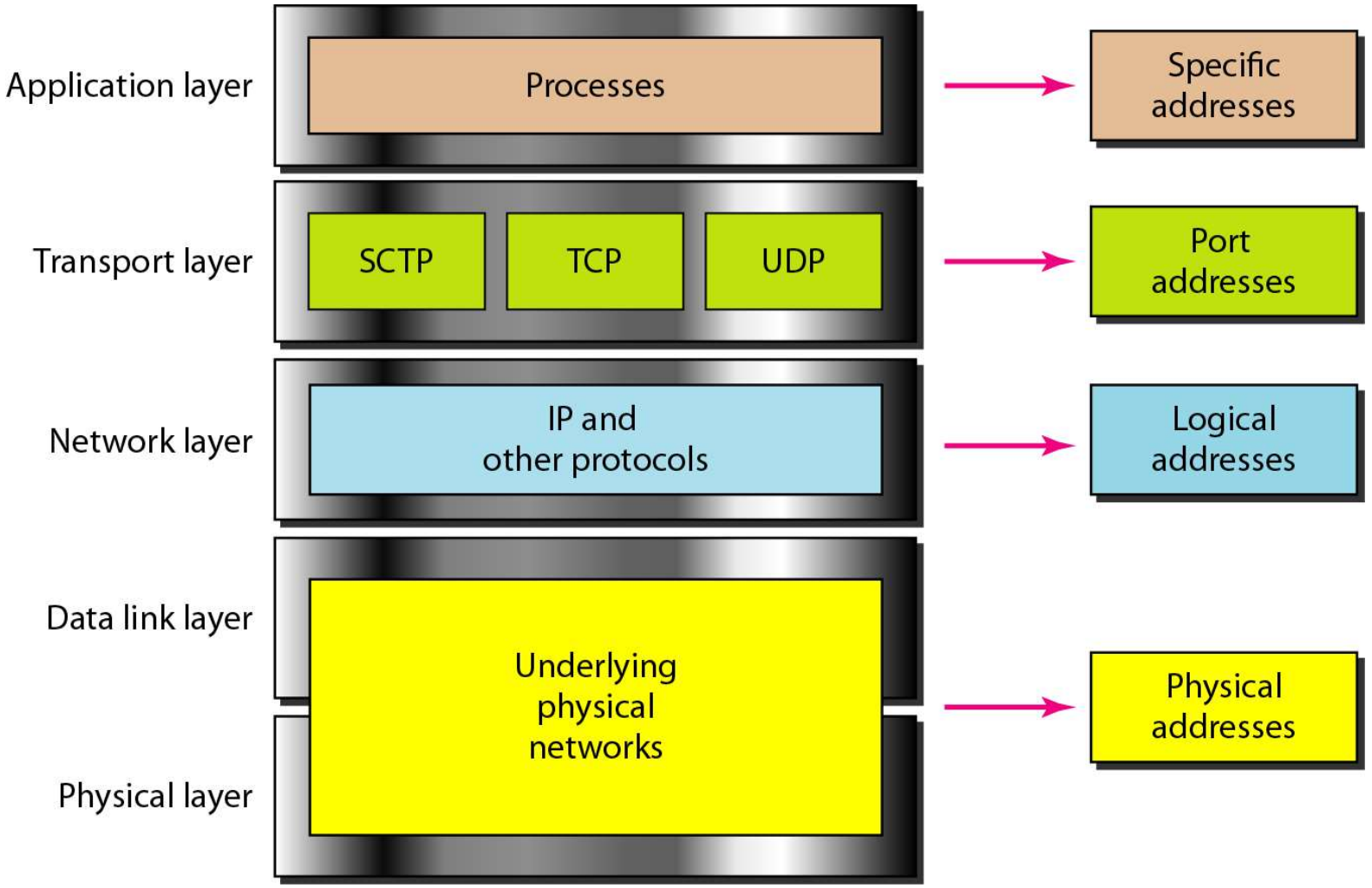


URL Unform Resource Locator

Address of resource on Internet. Ex. Website, Web Documents



Relationship of Layers and Addresses in TCP/IP



Working of TCP/IP layer

- Simple example to understand the working of layer in TCP/IP.
- Scenario
  - A host A want send a message to a Server G.
- Two options
  - Host A and Server G are in the same network.
  - Host A and Server G are in the different networks.

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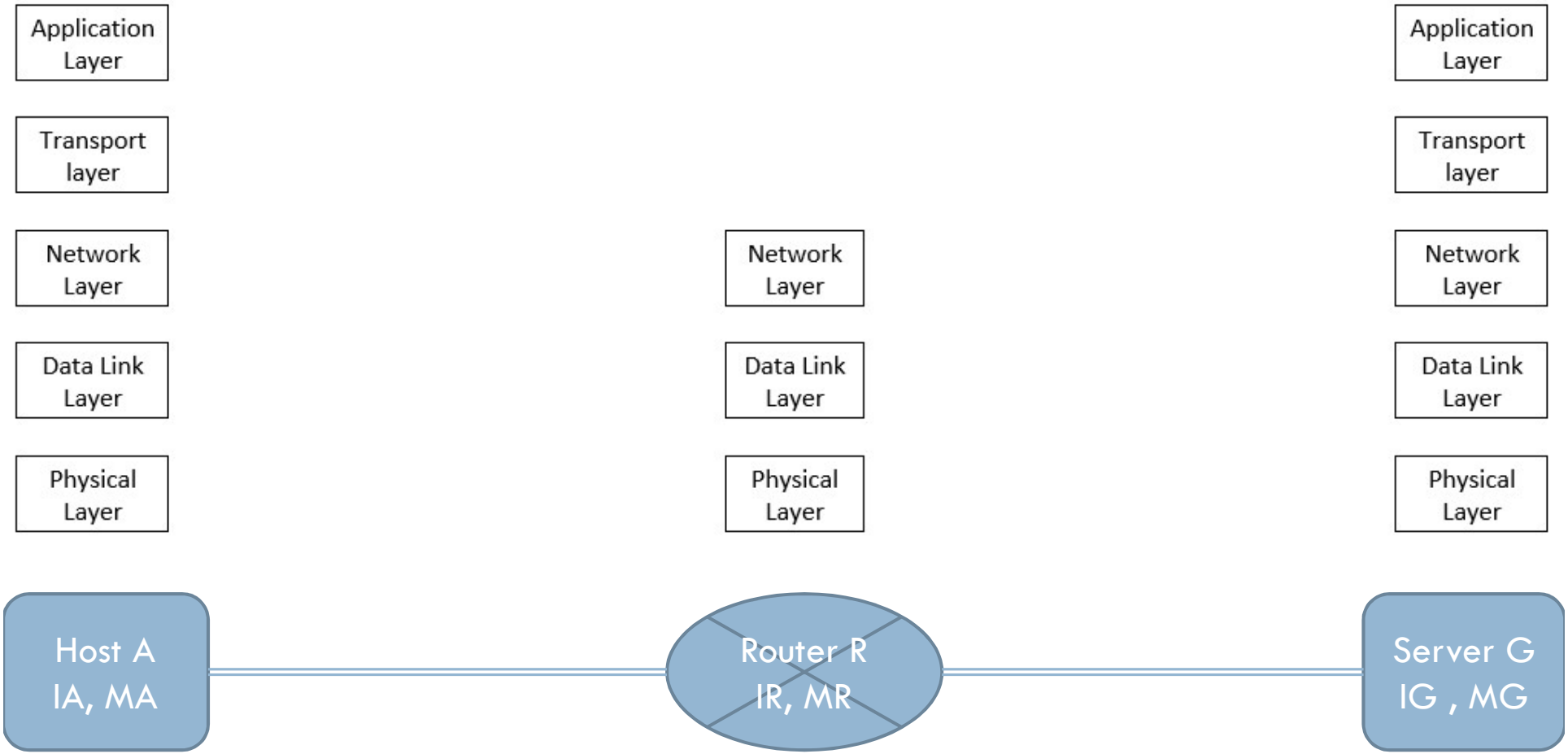
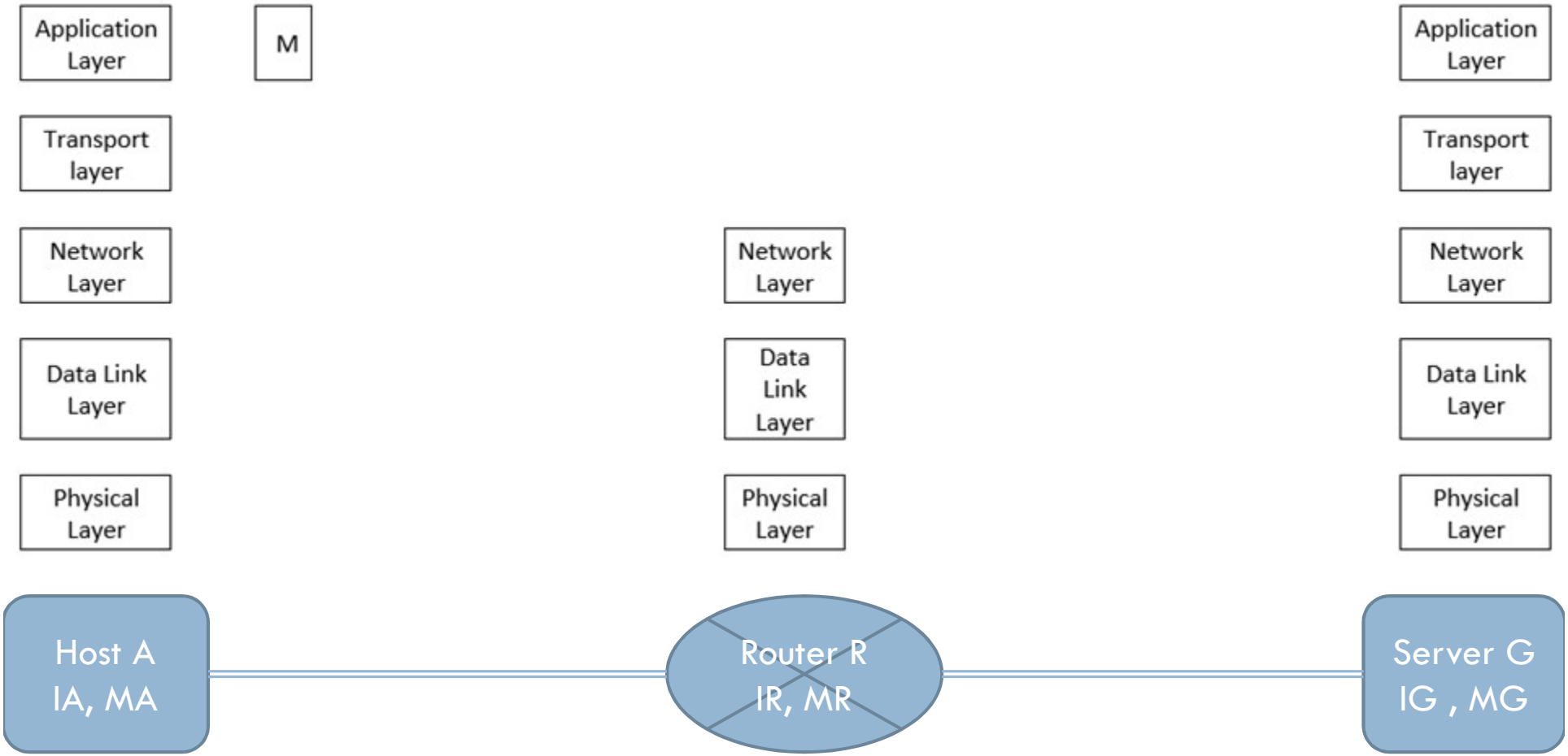

Application Layer
Transport layer
Network Layer
Data Link Layer
Physical Layer
Network Layer
Data Link Layer
Physical Layer
Application Layer
Transport layer
Network Layer
Data Link Layer
Physical Layer
Host A
IA, MA
Router R
IR, MR
Server G
IG , MG

Cont…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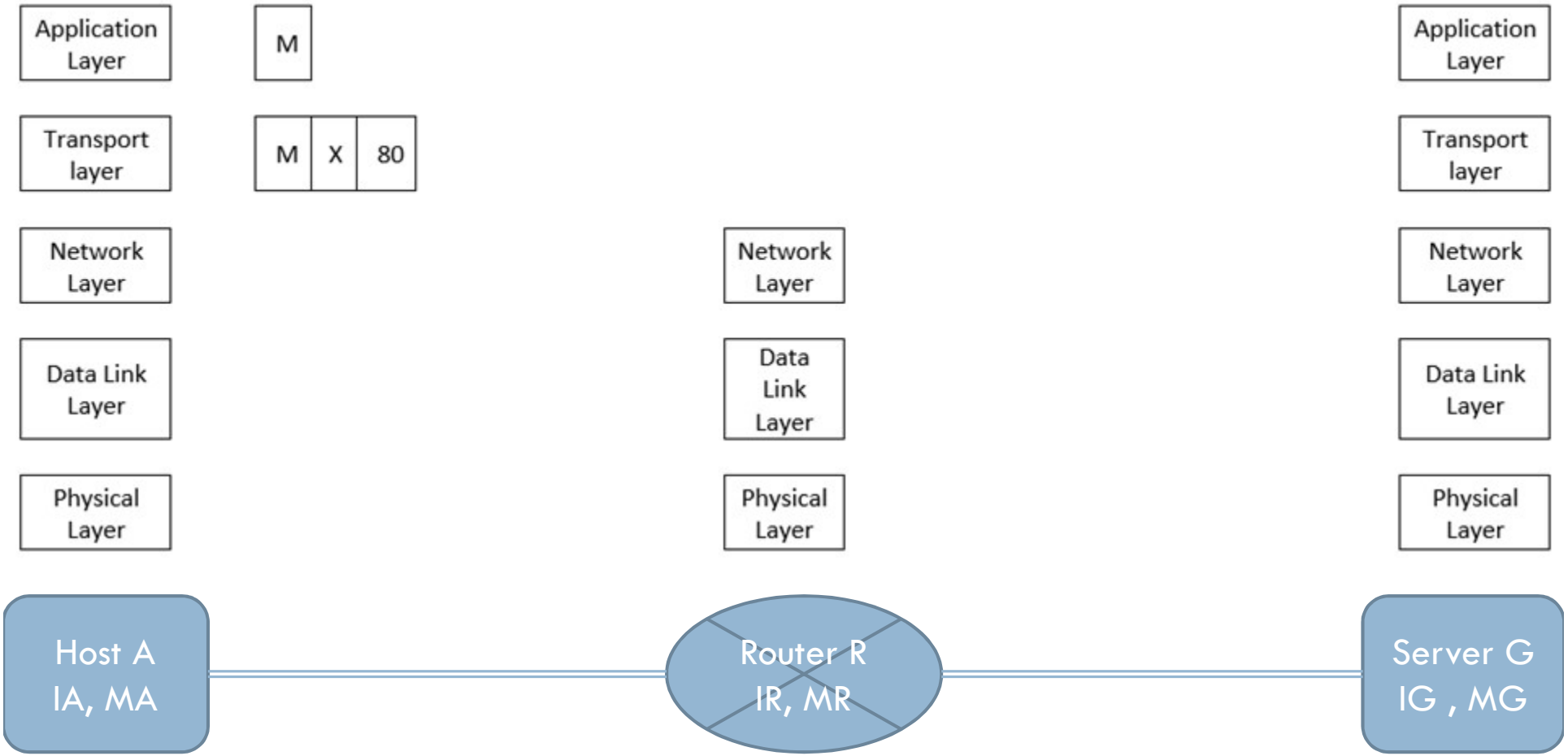
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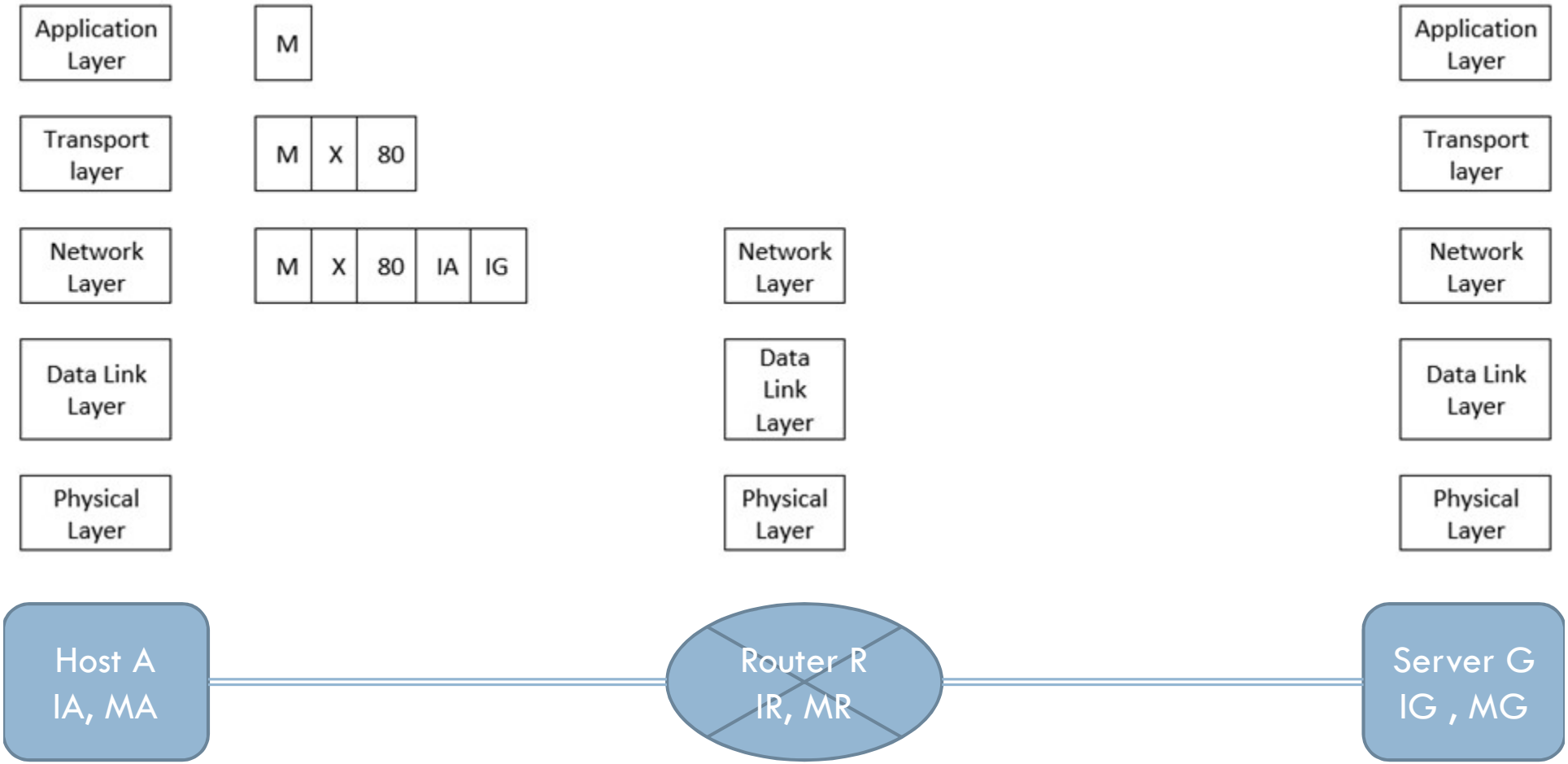
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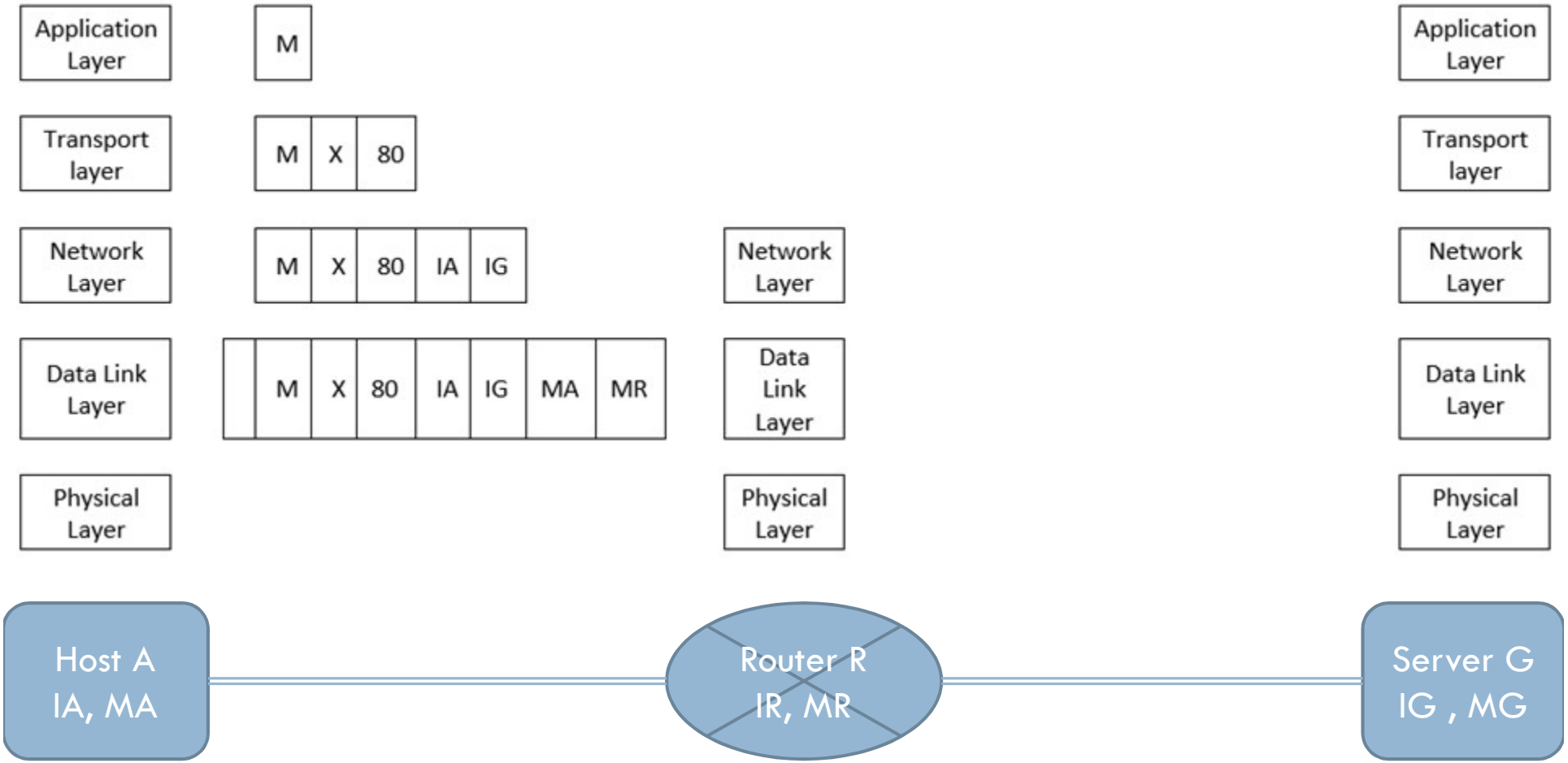
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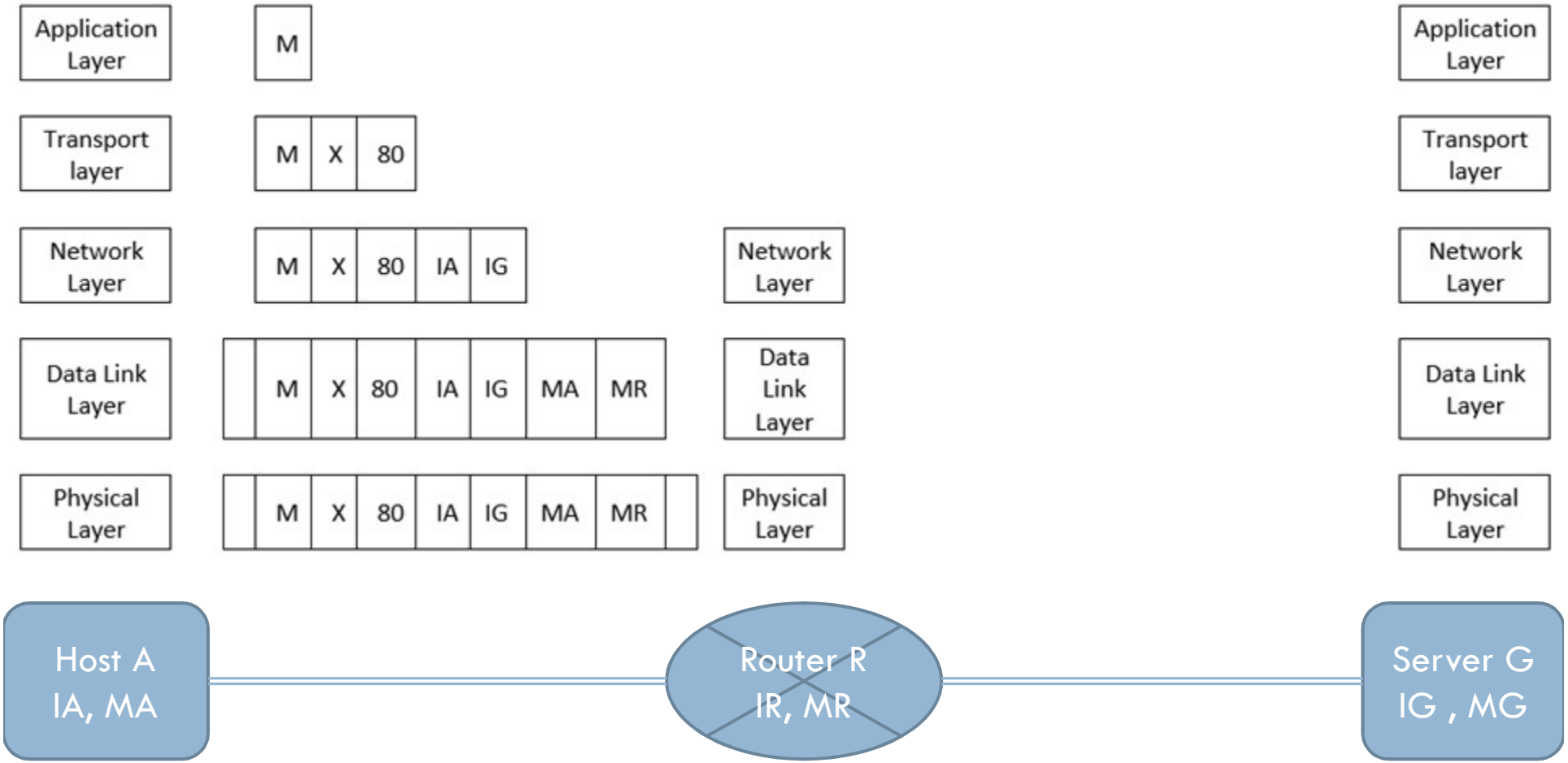
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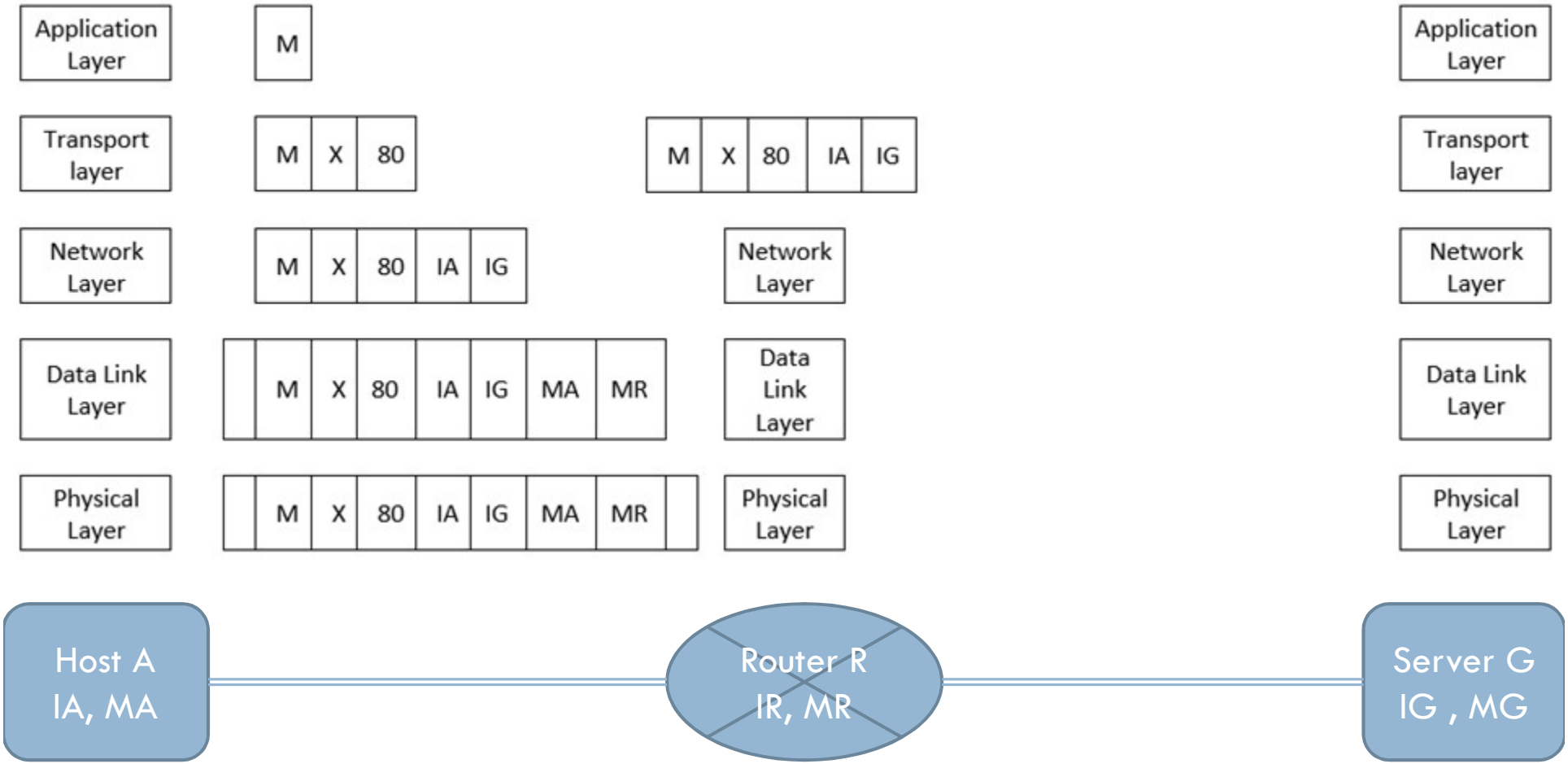
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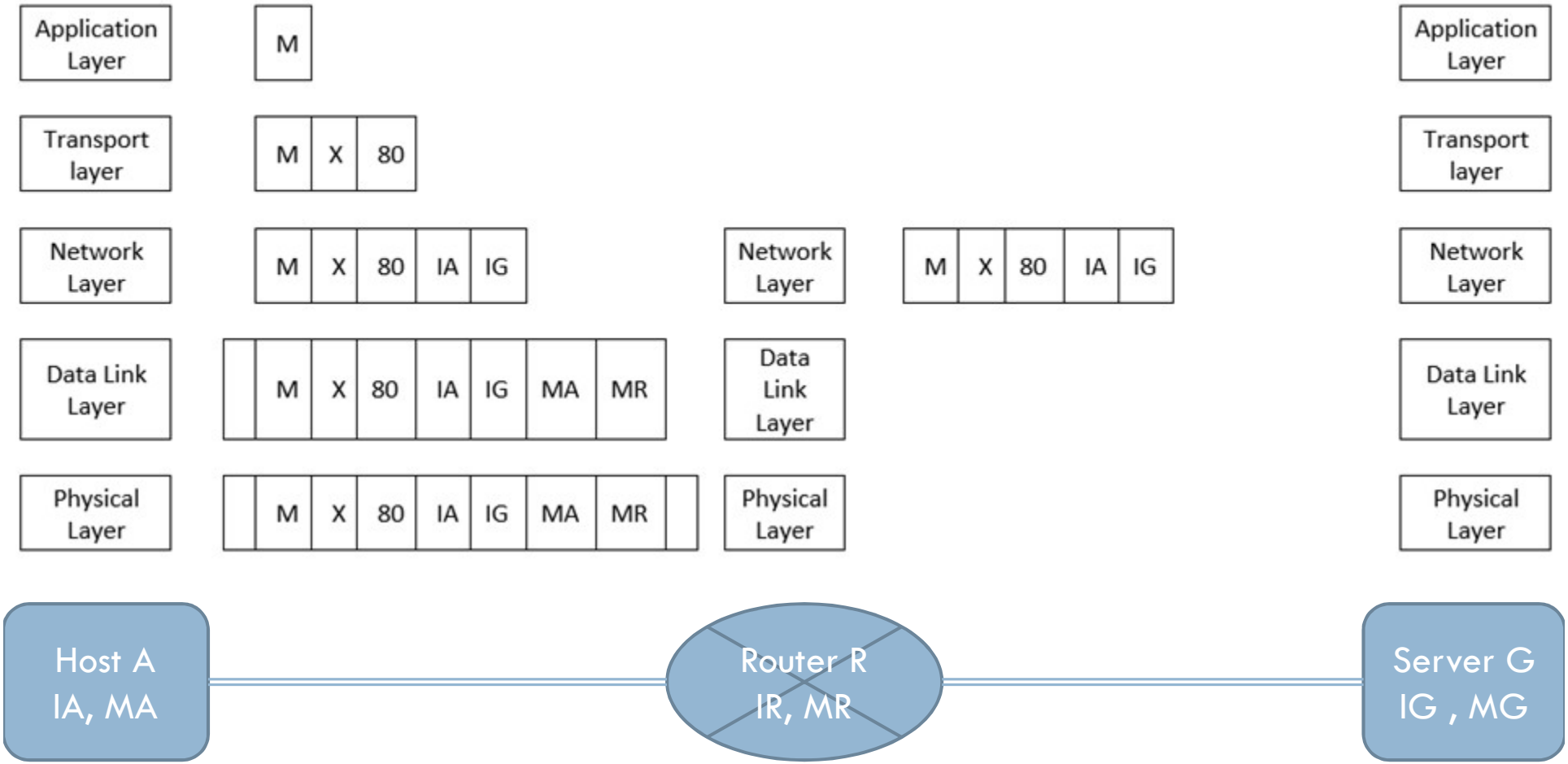
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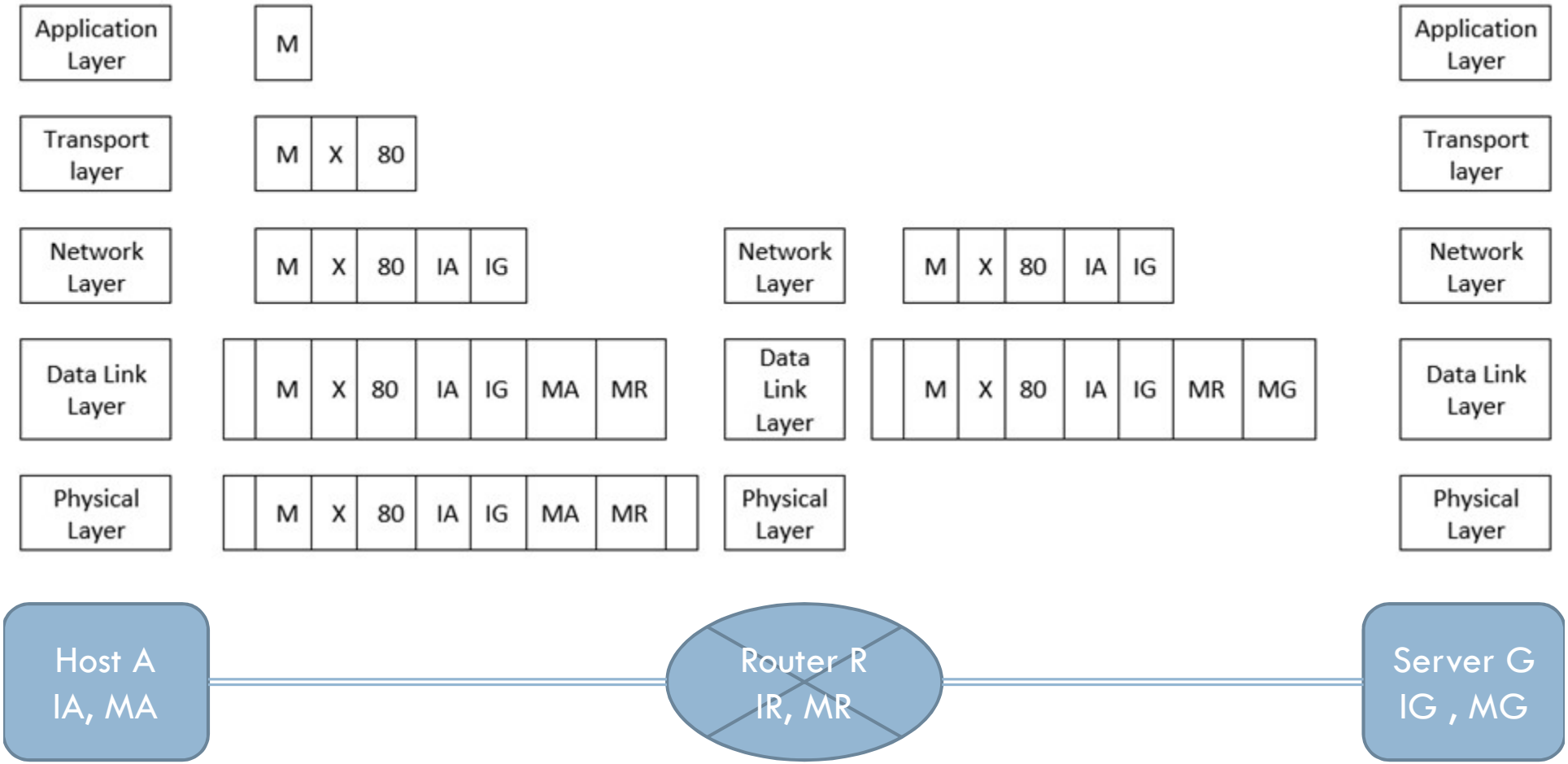
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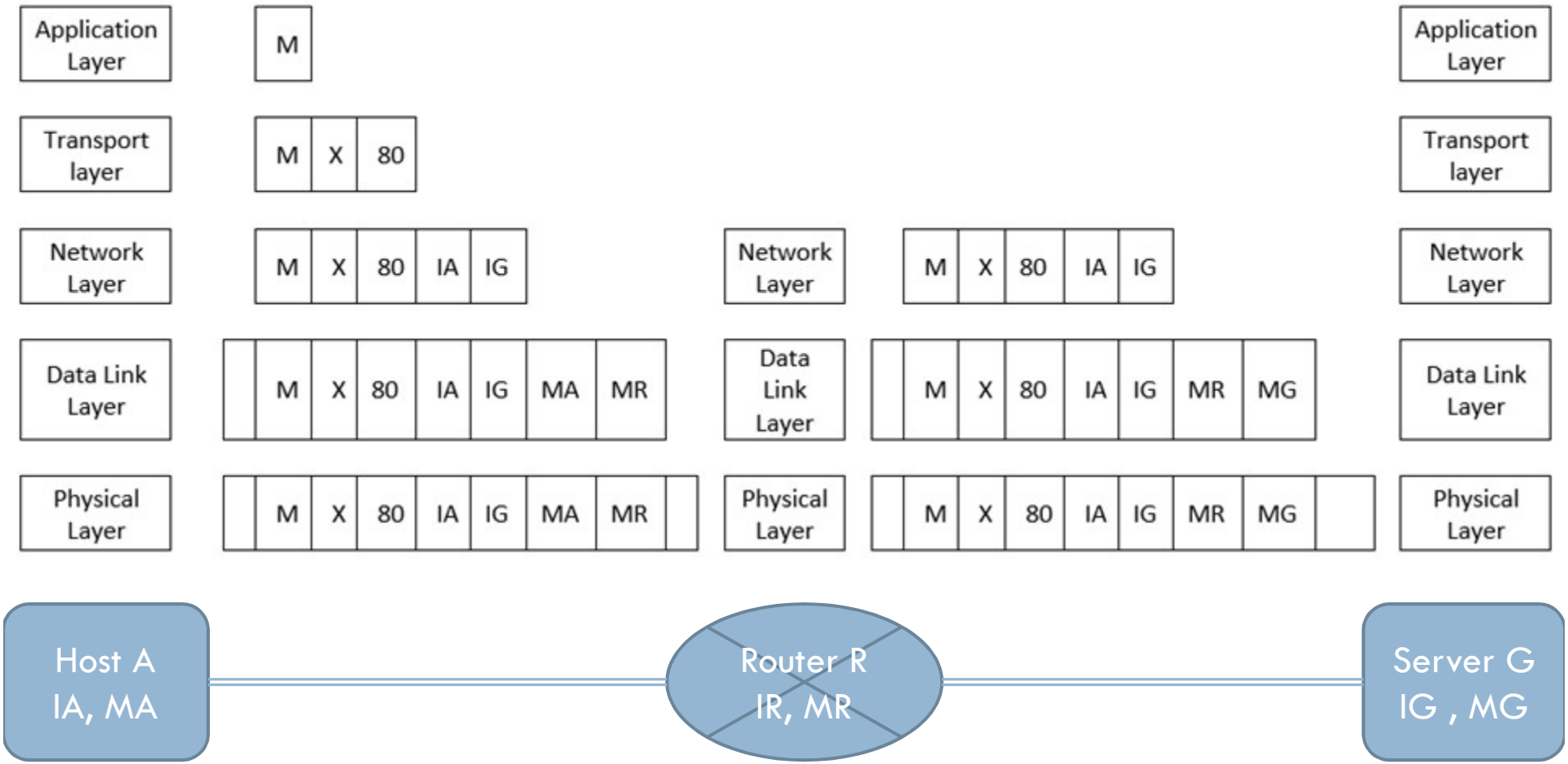
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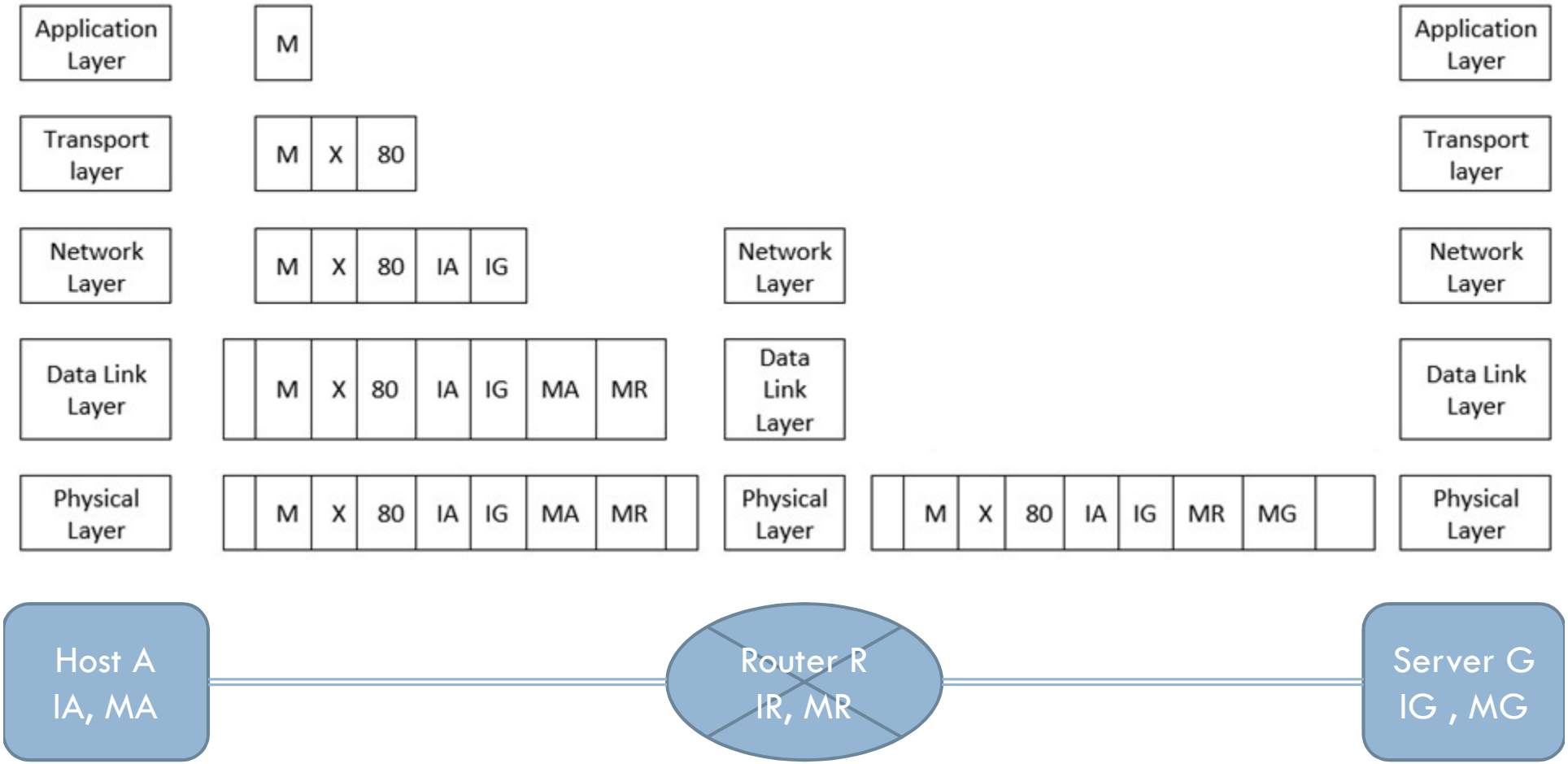
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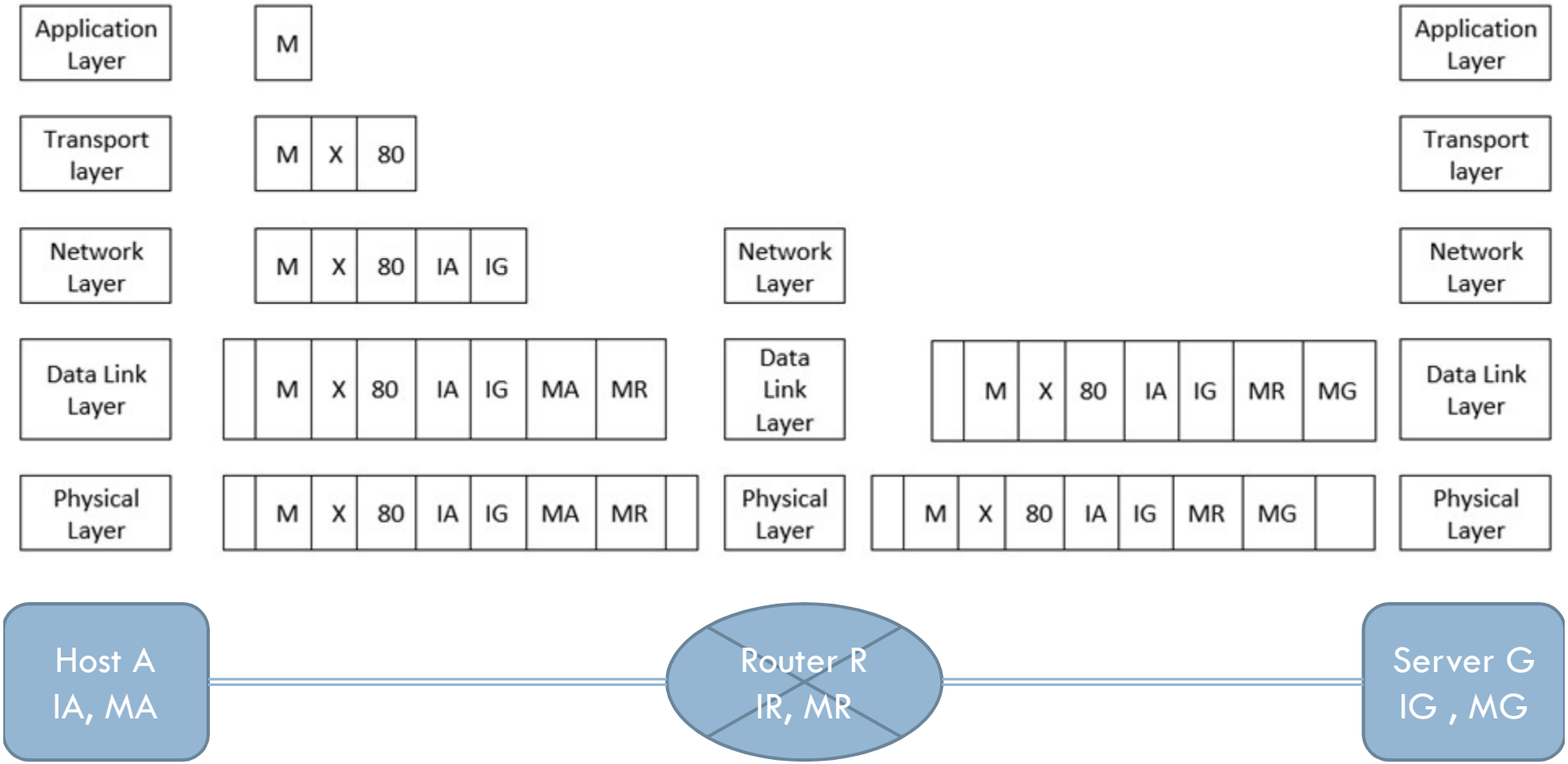
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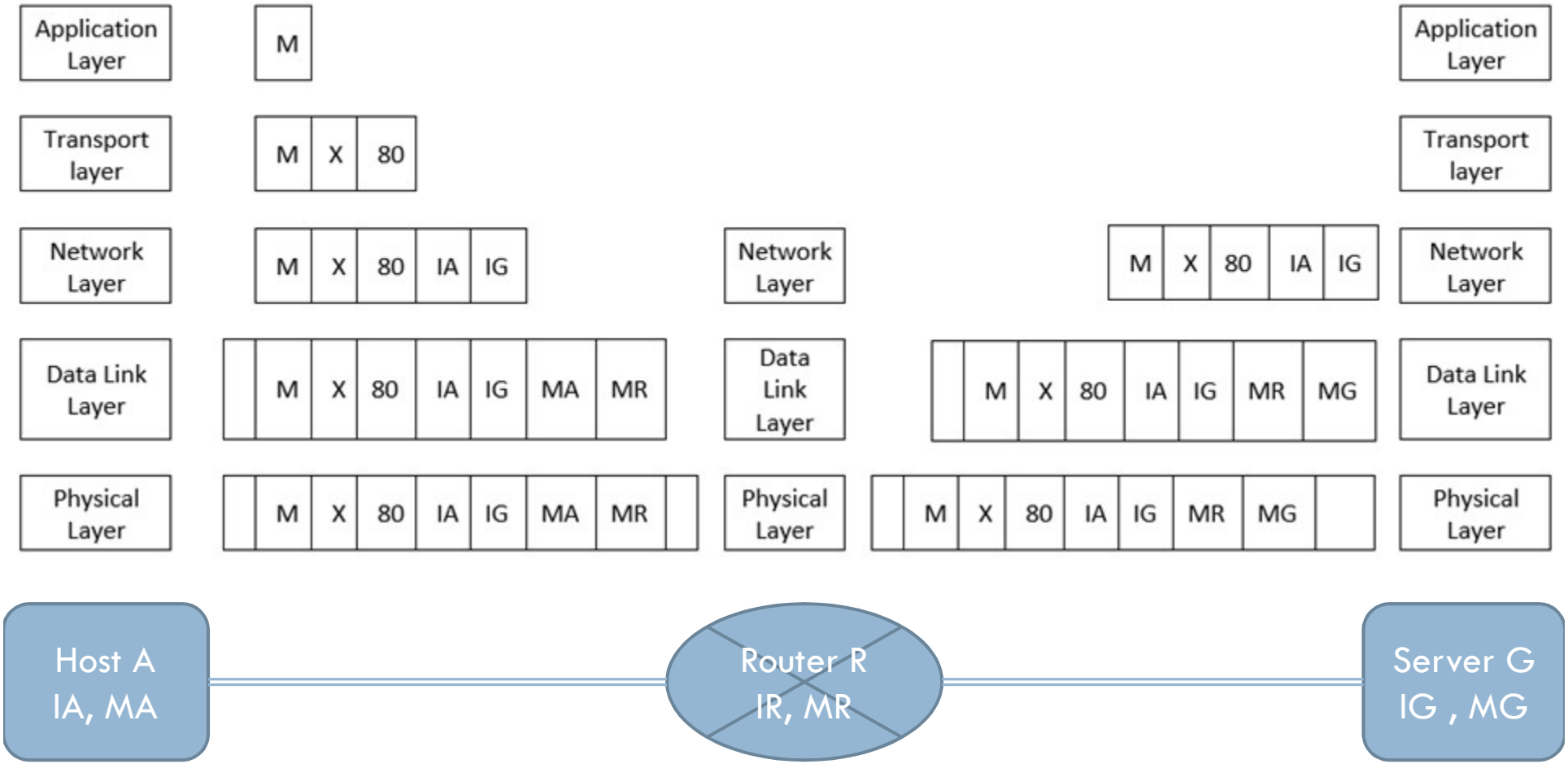
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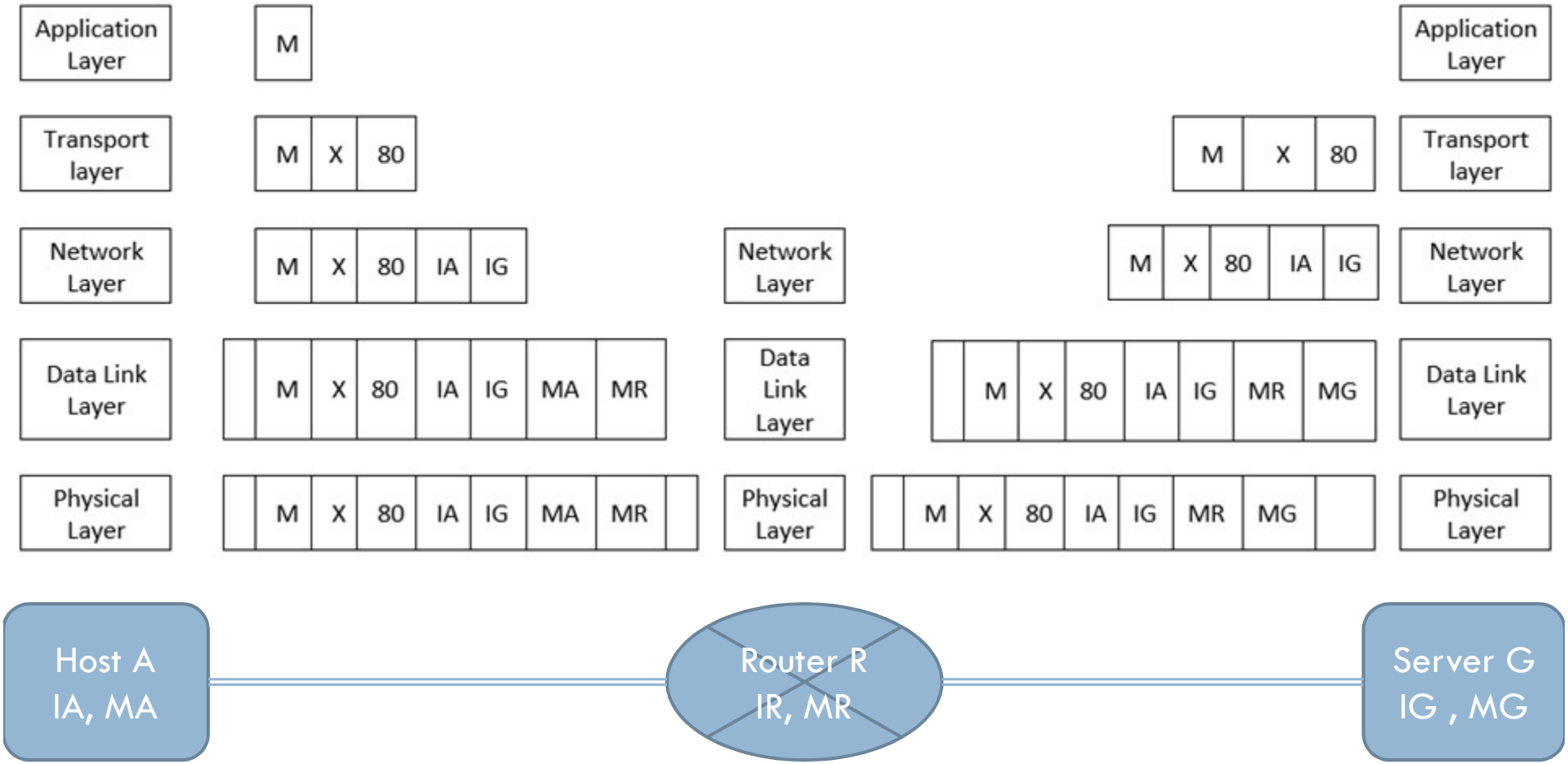
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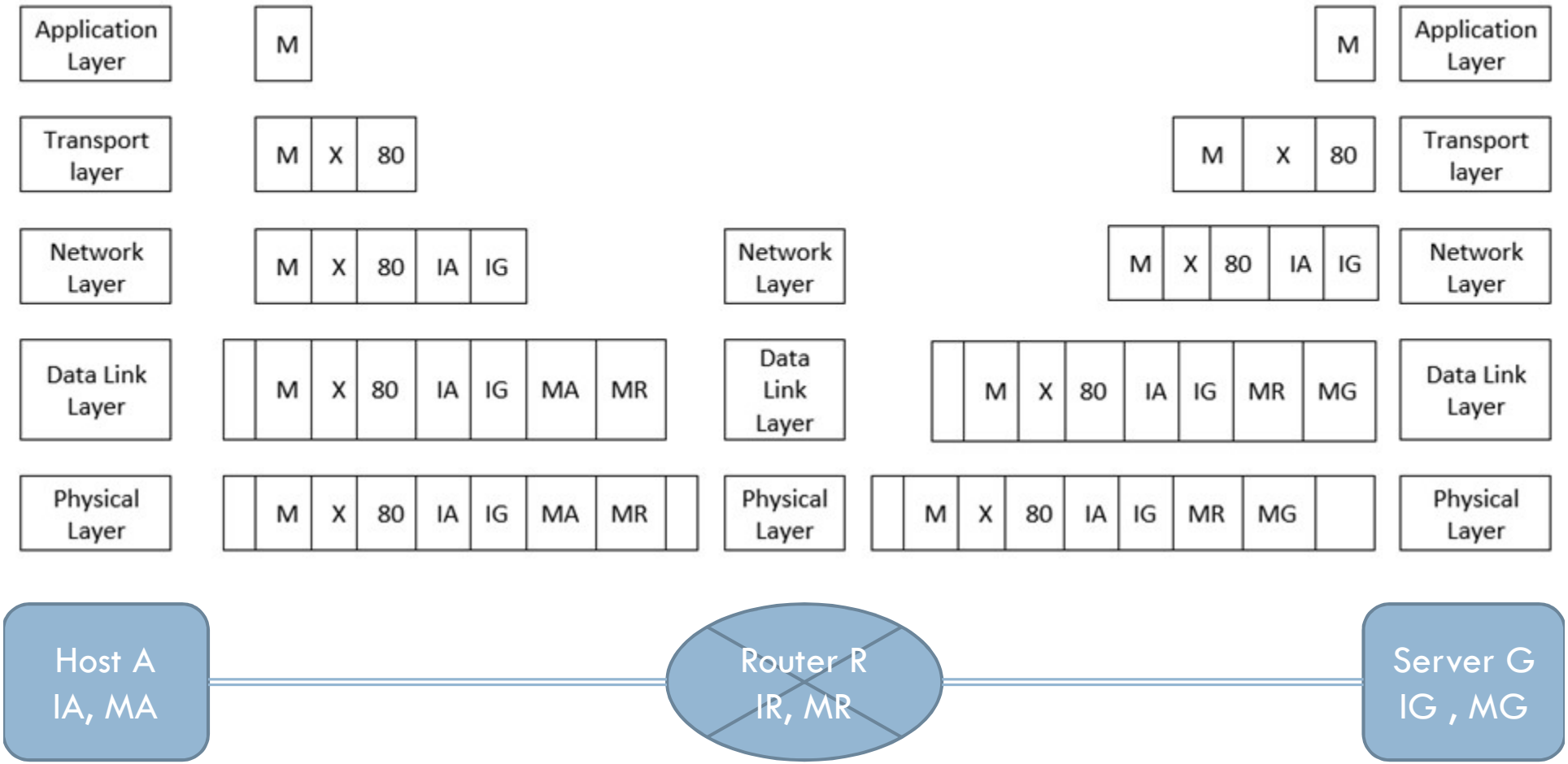
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