Walchand Linux Users' Group

Presents Club Service On

How does the Internet work?

Topics Covered:

- What is Internet?
- Networking
- Working & Protocols
- Internet Model
- Hands-on Wireshark

CONNECT WITH US

www.wcewlug.org

29th Sept 6:00 PM
N2 Classroom

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What is Internet?

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What is Internet?

The Internet is the global system of interconnected computer networks that uses the Internet protocol suite (TCP/IP) to communicate between networks and devices.


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22000 Miles

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A Simple Network

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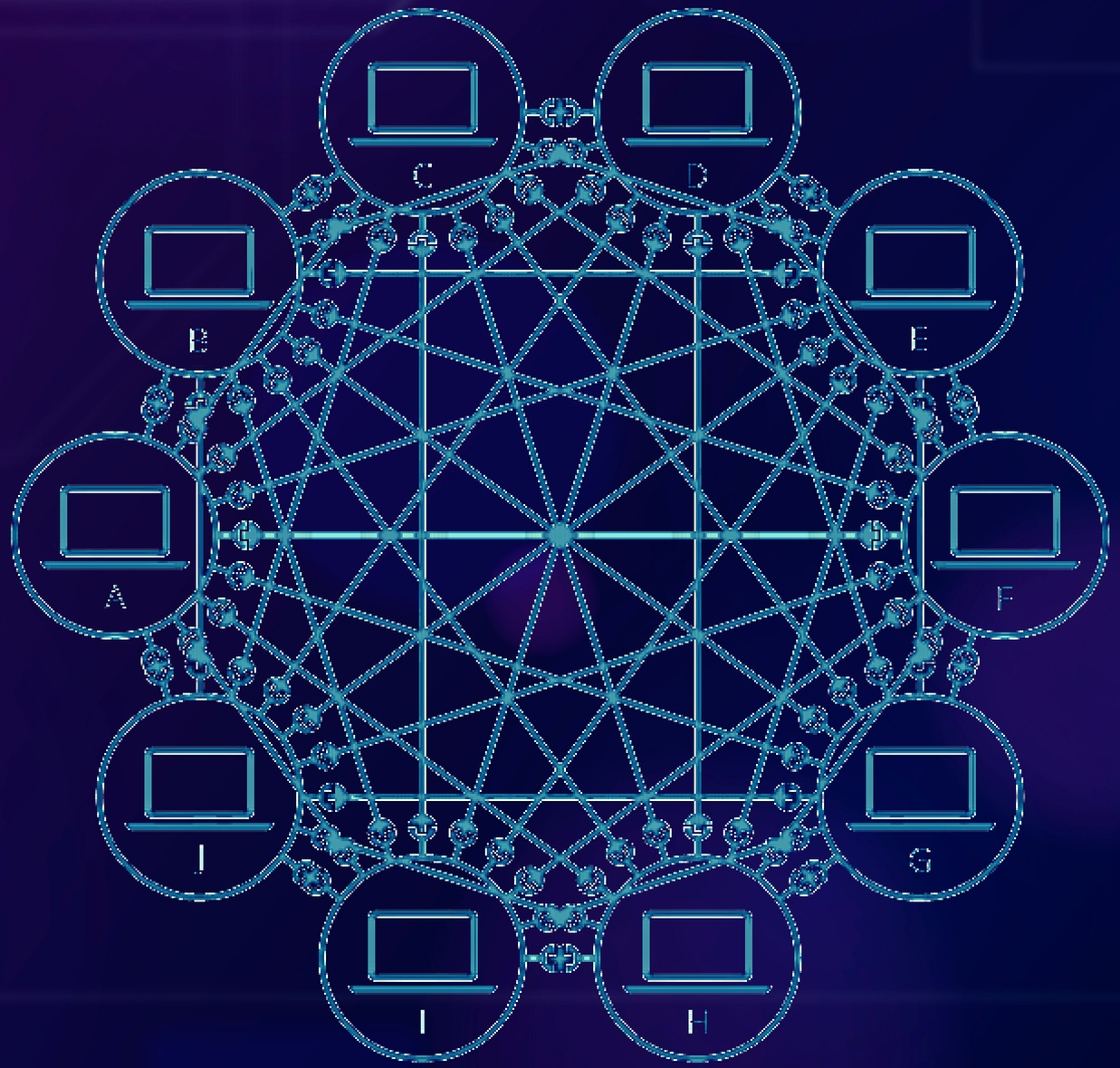

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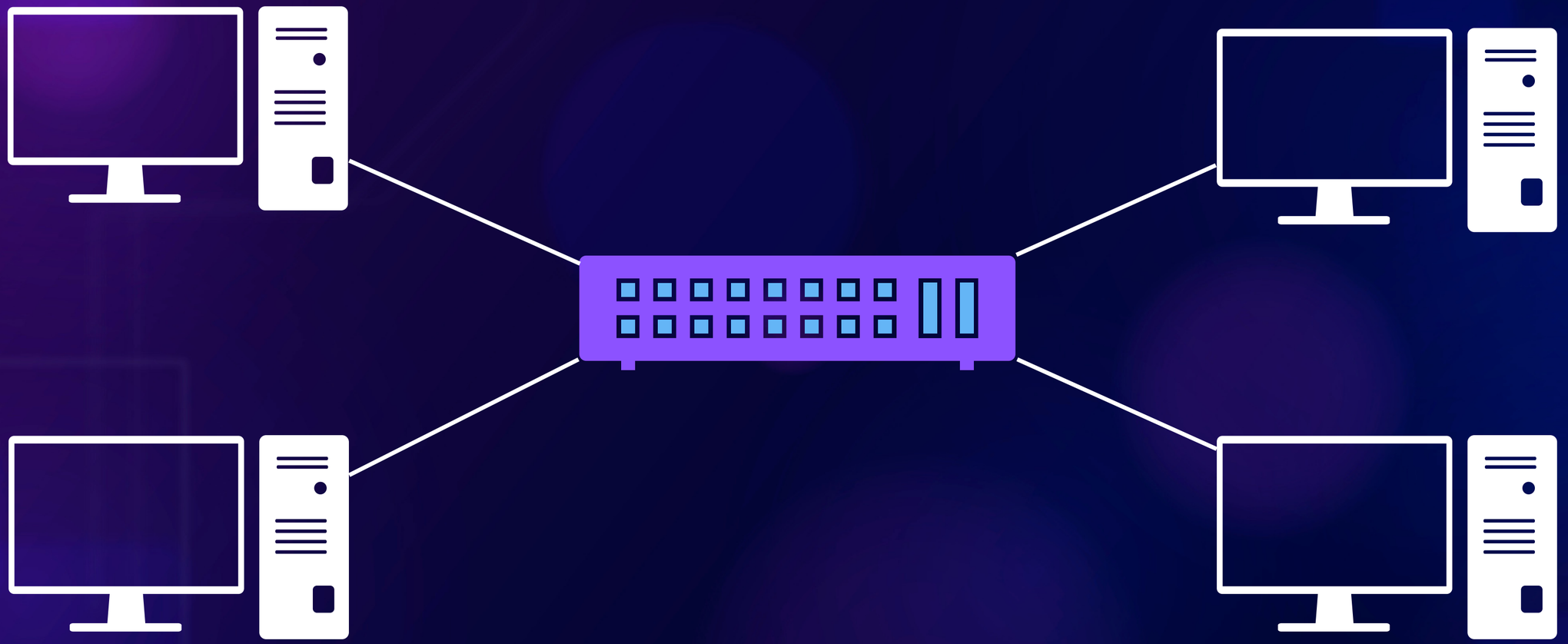
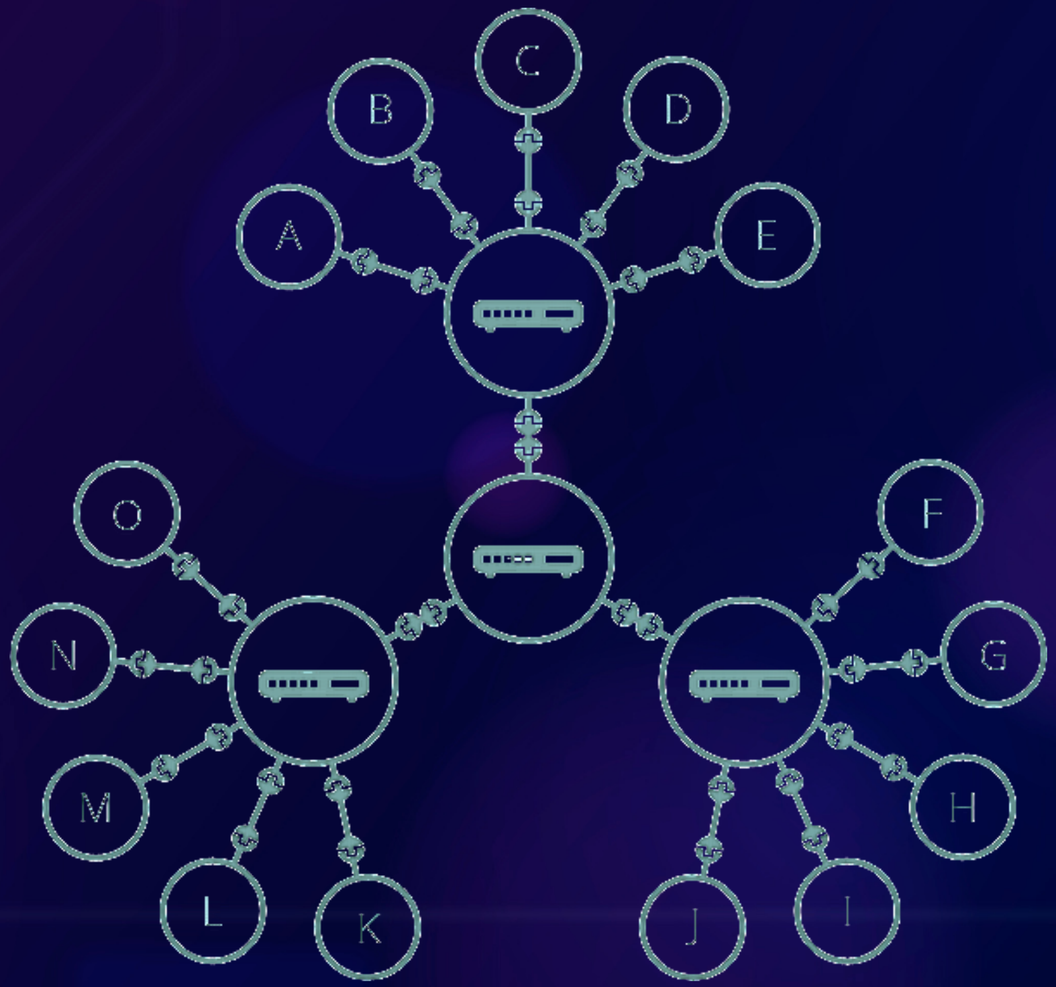
Switch



Router



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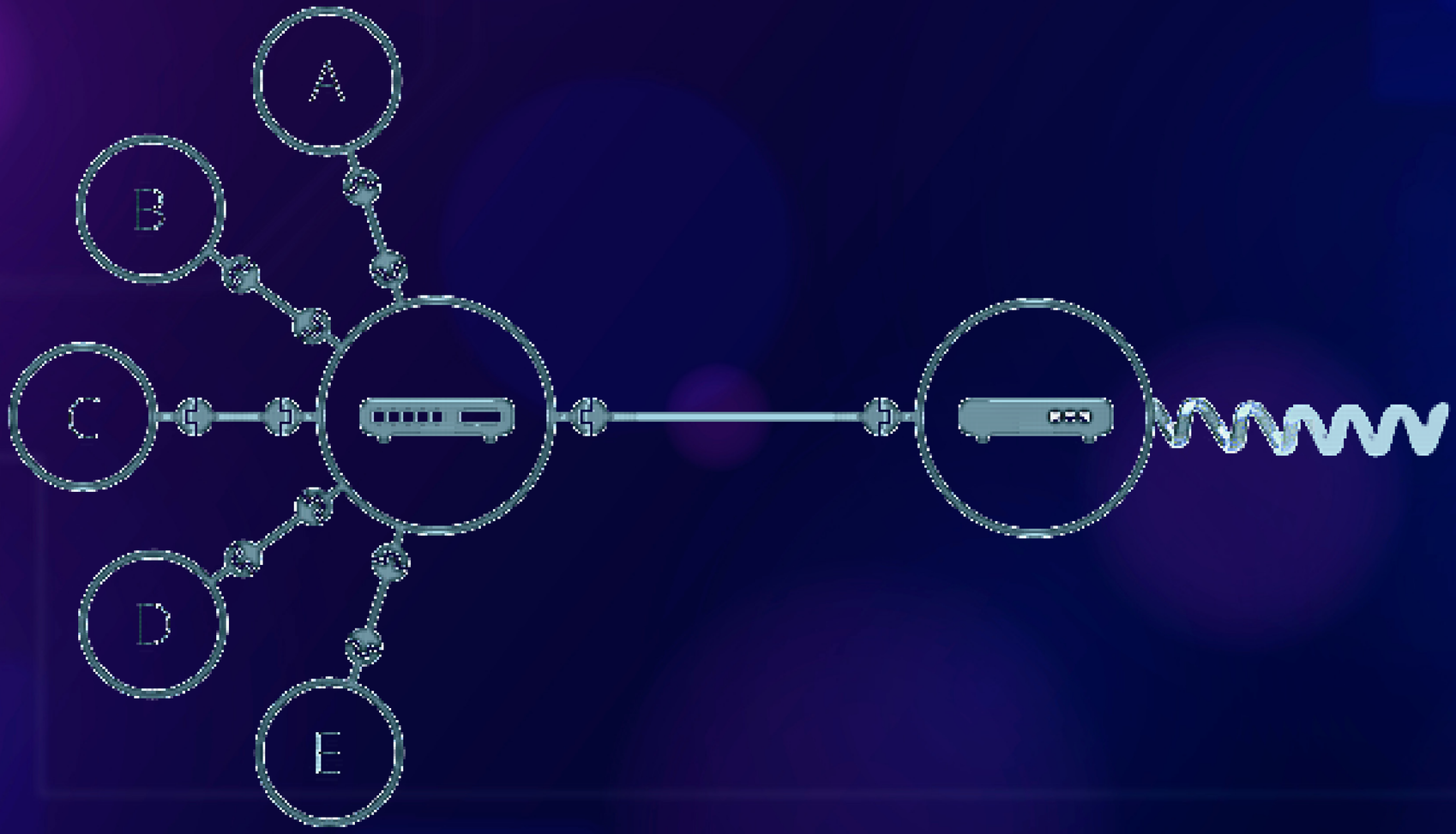
Modem



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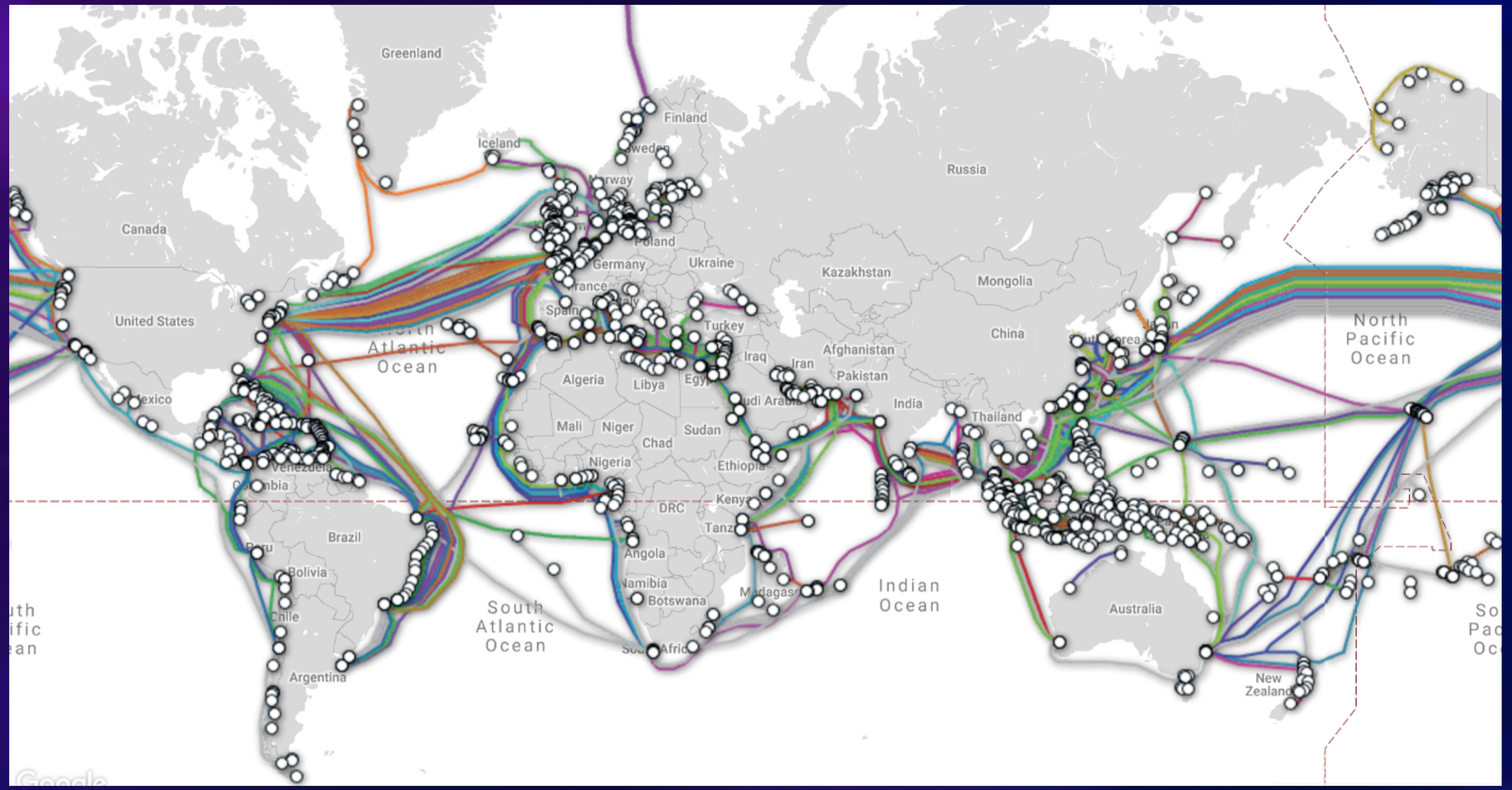
ISP


Greenland
Iceland
Finland
Sweden
Norway
Russia
Canada
Poland
Germany
Ukraine
Kazakhstan
Mongolia
France
Spain
Italy
Turkey
China
United States
North Atlantic Ocean
Iraq
Iran
Afghanistan
Pakistan
Algeria
Libya
Egypt
India
Thailand
Mali
Niger
Sudan
Chad
Nigeria
Ethiopia
Kenya
DRC
Tanzania
Angola
Brazil
Bolivia
Namibia
Botswana
Madagascar
Chile
Argentina
South Atlantic Ocean
Indian Ocean
Australia
New Zealand
North Pacific Ocean

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Undersea Cable

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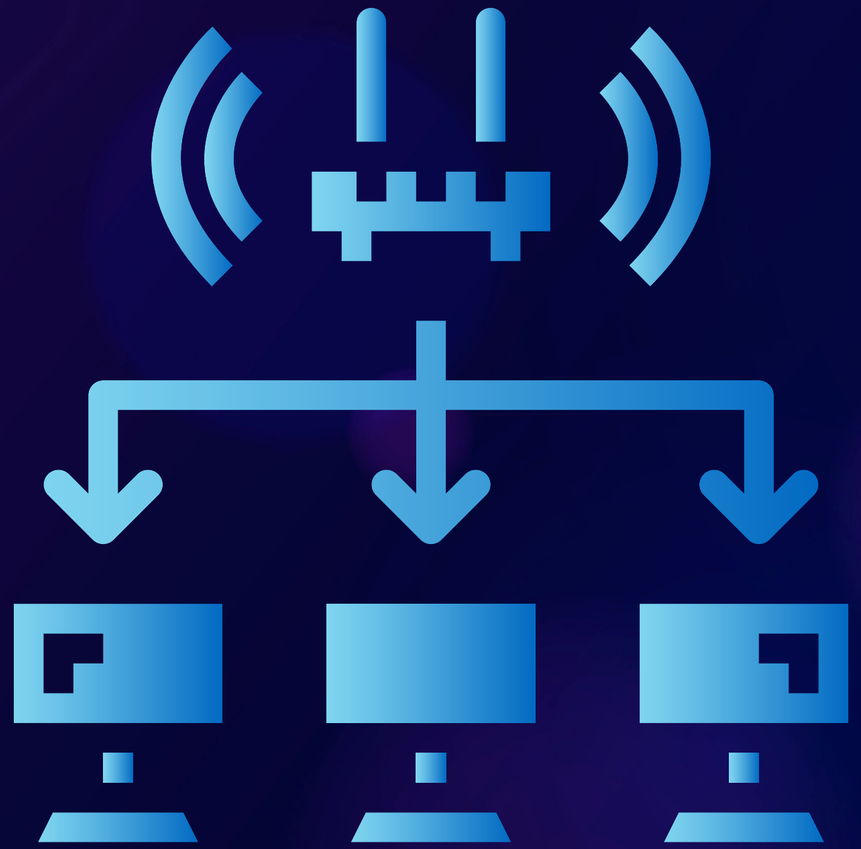
Types of area networks

- LAN
- MAN
- WAN

LAN



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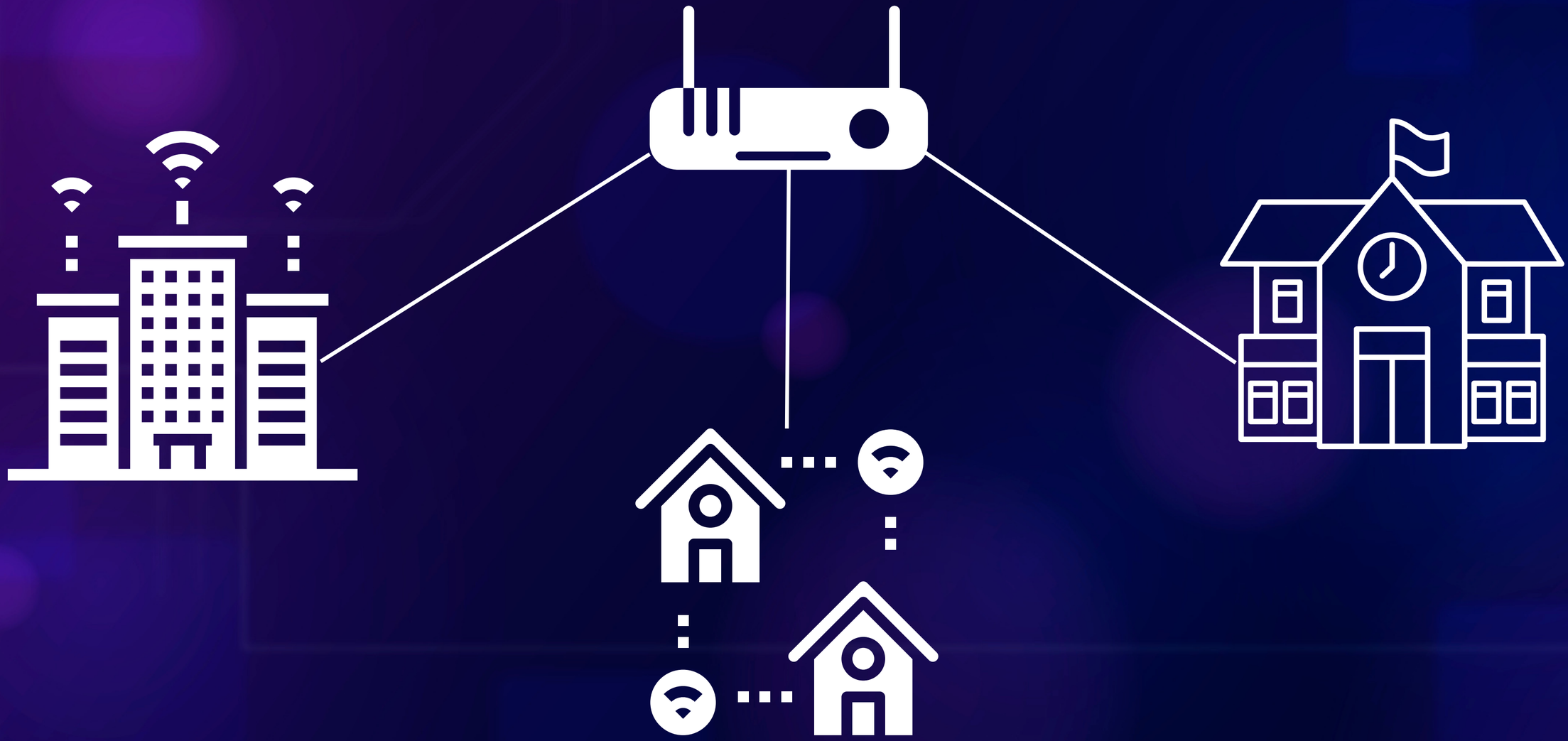
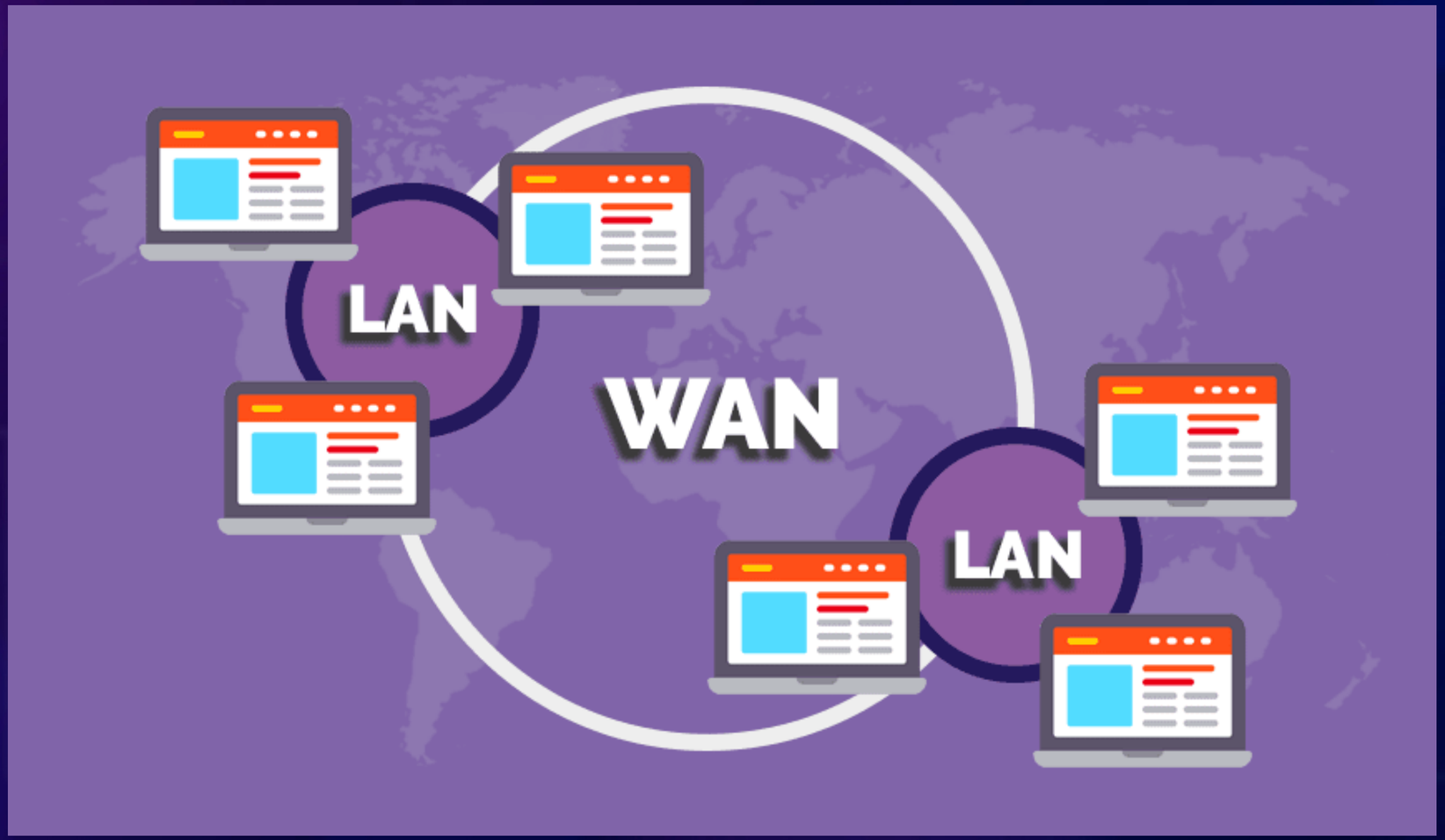
MAN



WAN



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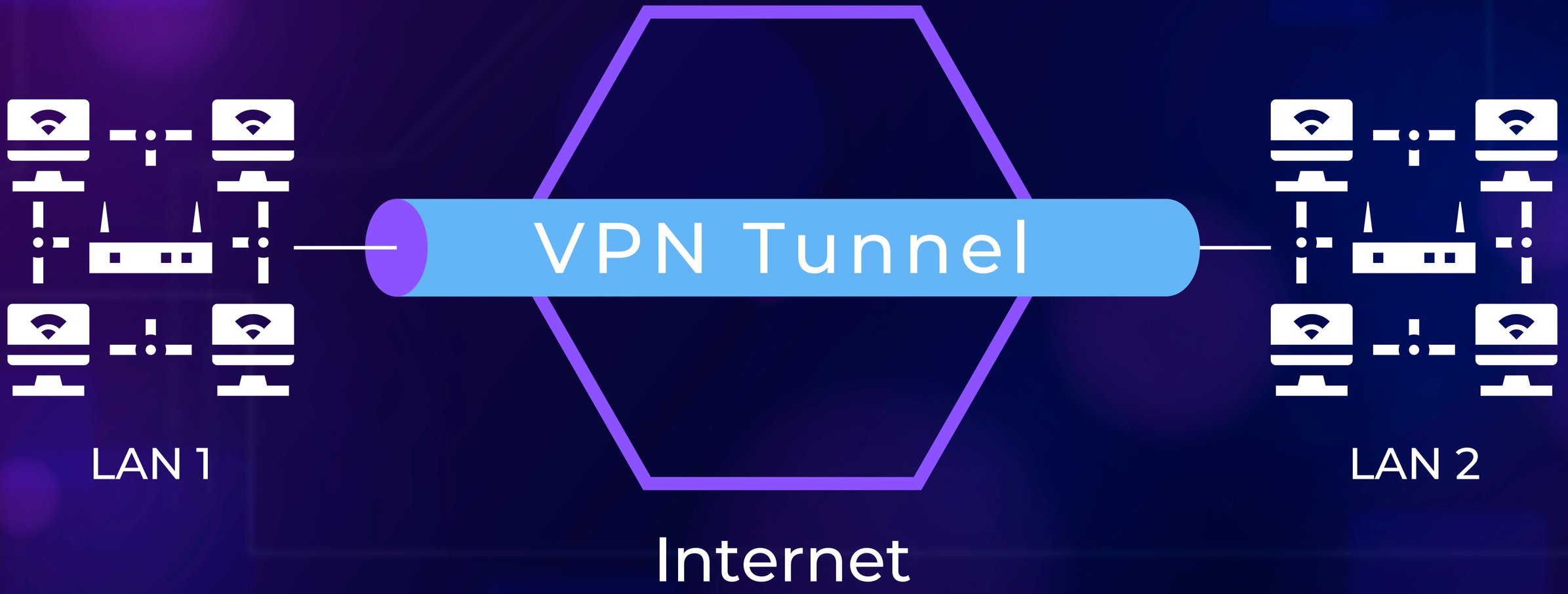
VPN



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Which is more secure?
LAN / MAN / WAN

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Internet Models

1. OSI
2. TCP/IP

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OSI Model

- Open System Interconnection Model
- Seven Layers
- Each layer has different functions
- Not used physically
- Used as reference

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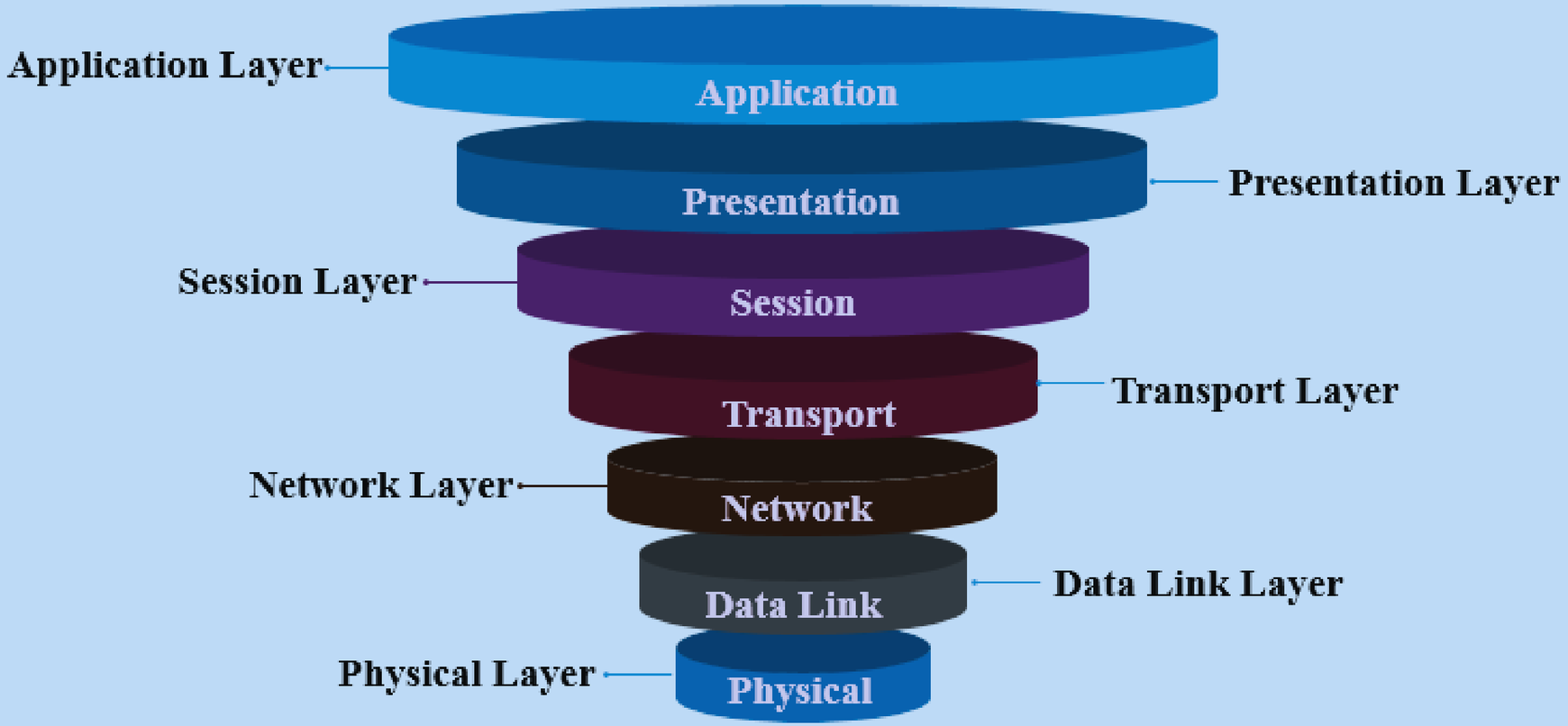
OSI Model



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1. Physical Layer

- Transmission and reception of unstructured raw data between devices
- Data Transmission

Data transmission

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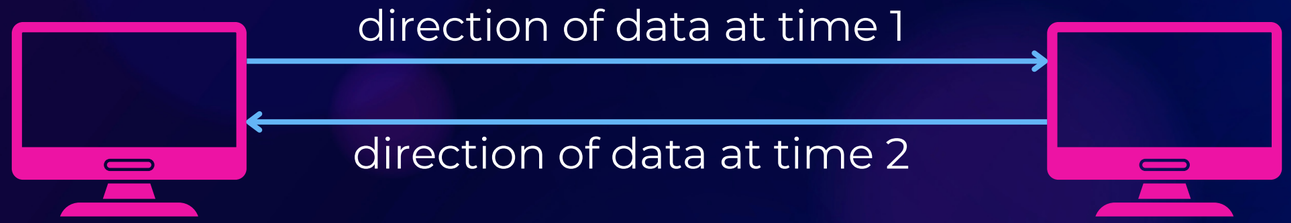
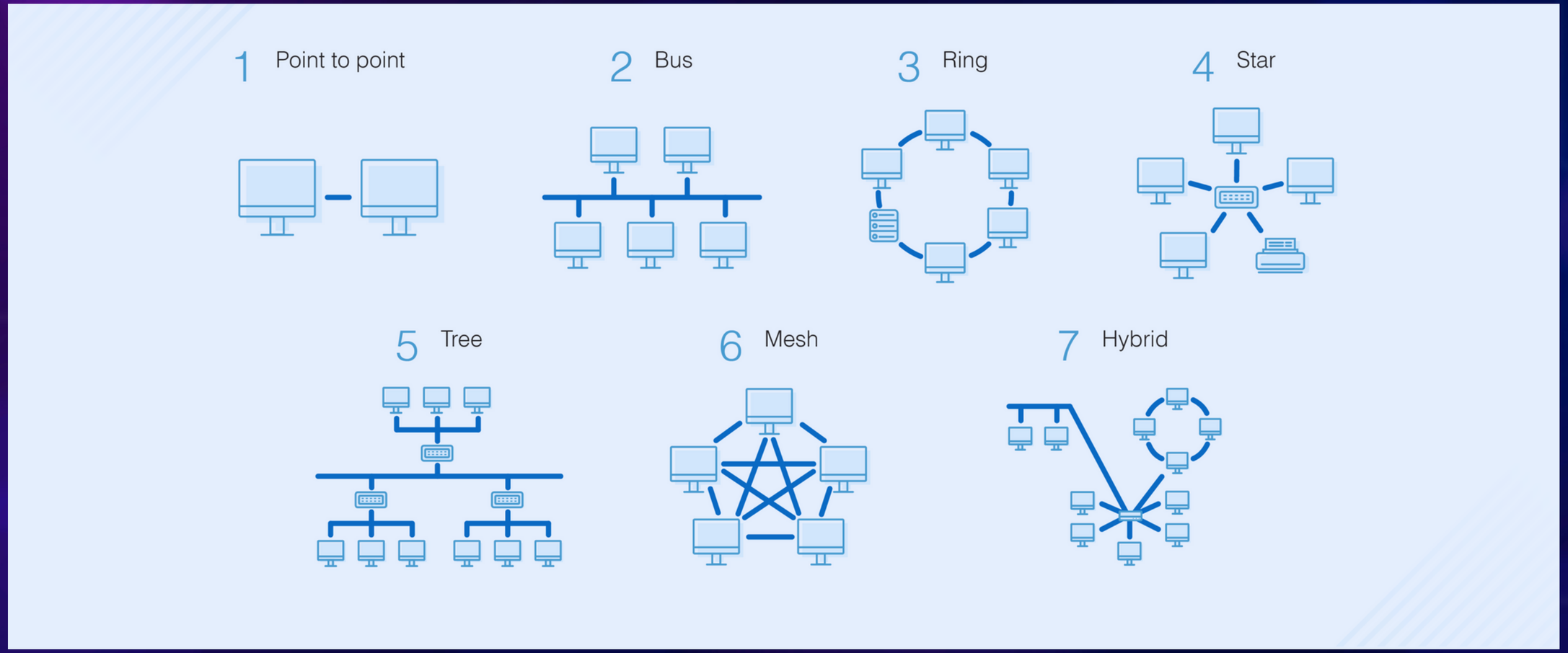
Simplex

Half Duplex



Full Duplex

Topology



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2. Data Link Layer

- Physical Addressing
- node-to node data transfer
- Flow control
- Error control
- Access control

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3. Network Layer

- Logical Addressing
- host-to-host delivery
- Routing via best path

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4. Transport Layer

- Transmission of messages in order
- process-to-process delivery
- Connection control
- Reliability

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5. Session Layer

- Inter-host Communication
- Setup, management and termination of connection

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6. Presentation Layer

- Data Representation
- Encryption & Decryption
- Compression

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7. Application Layer

- Closest layer to user
- User can access network
- Resources allocation
- File sharing
- Message handling
- Email services

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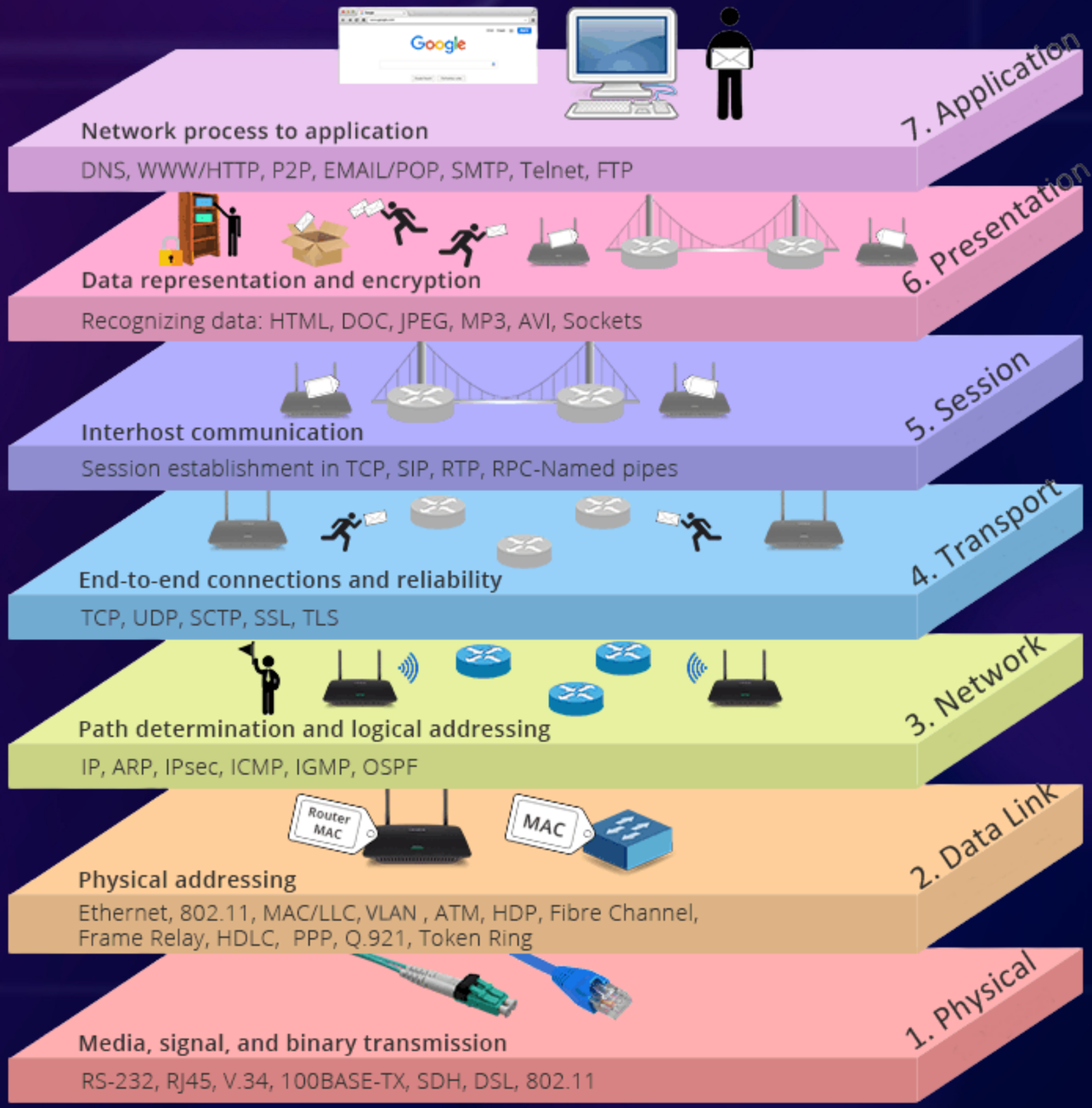

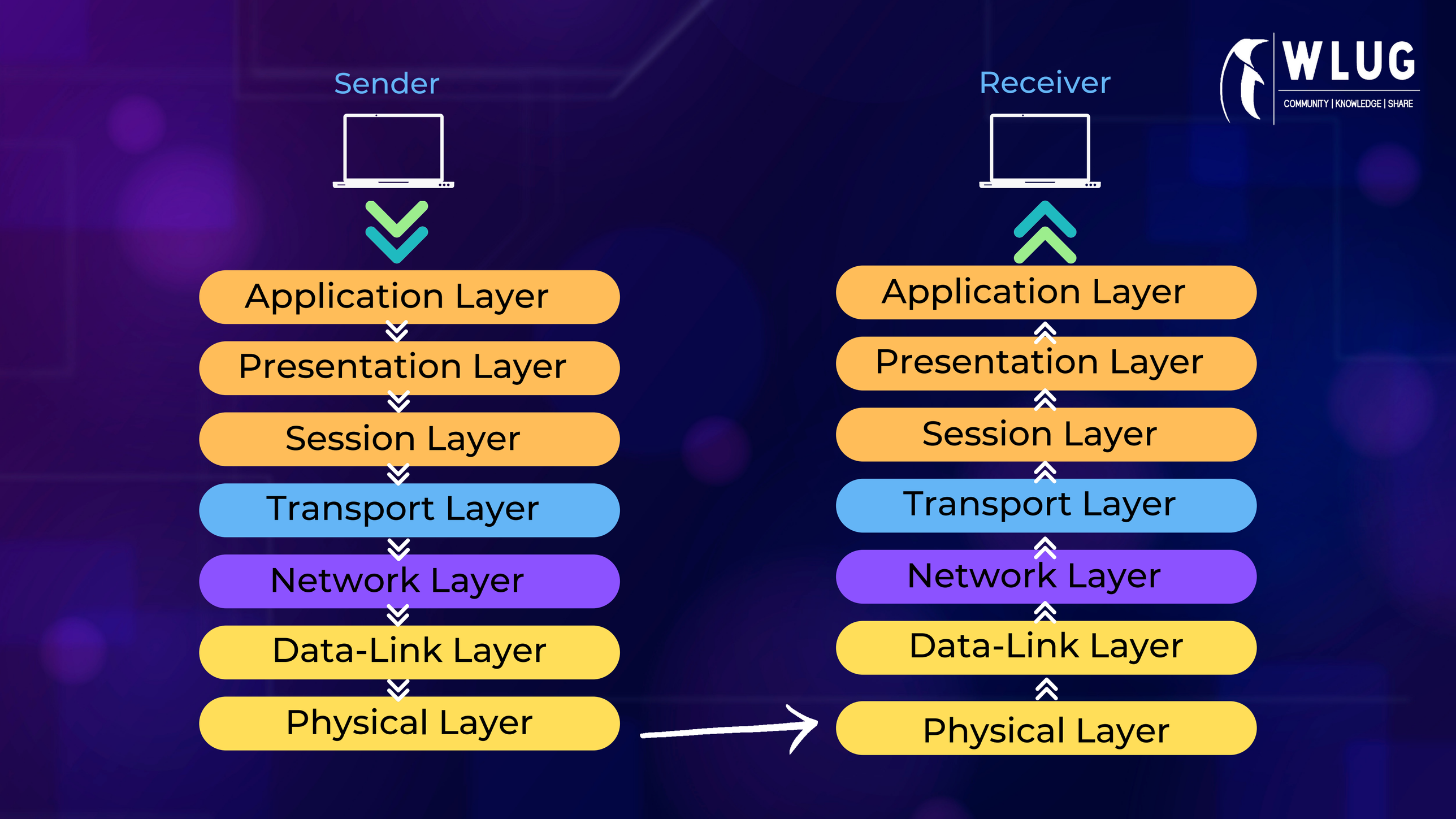
Sender
Application Layer
Presentation Layer
Session Layer
Transport Layer
Network Layer
Data-Link Layer
Physical Layer
Receiver
Application Layer
Presentation Layer
Session Layer
Transport Layer
Network Layer
Data-Link Layer
Physical Layer
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TCP / IP

- Transmission Control Protocol
- Four layers
- More reliable

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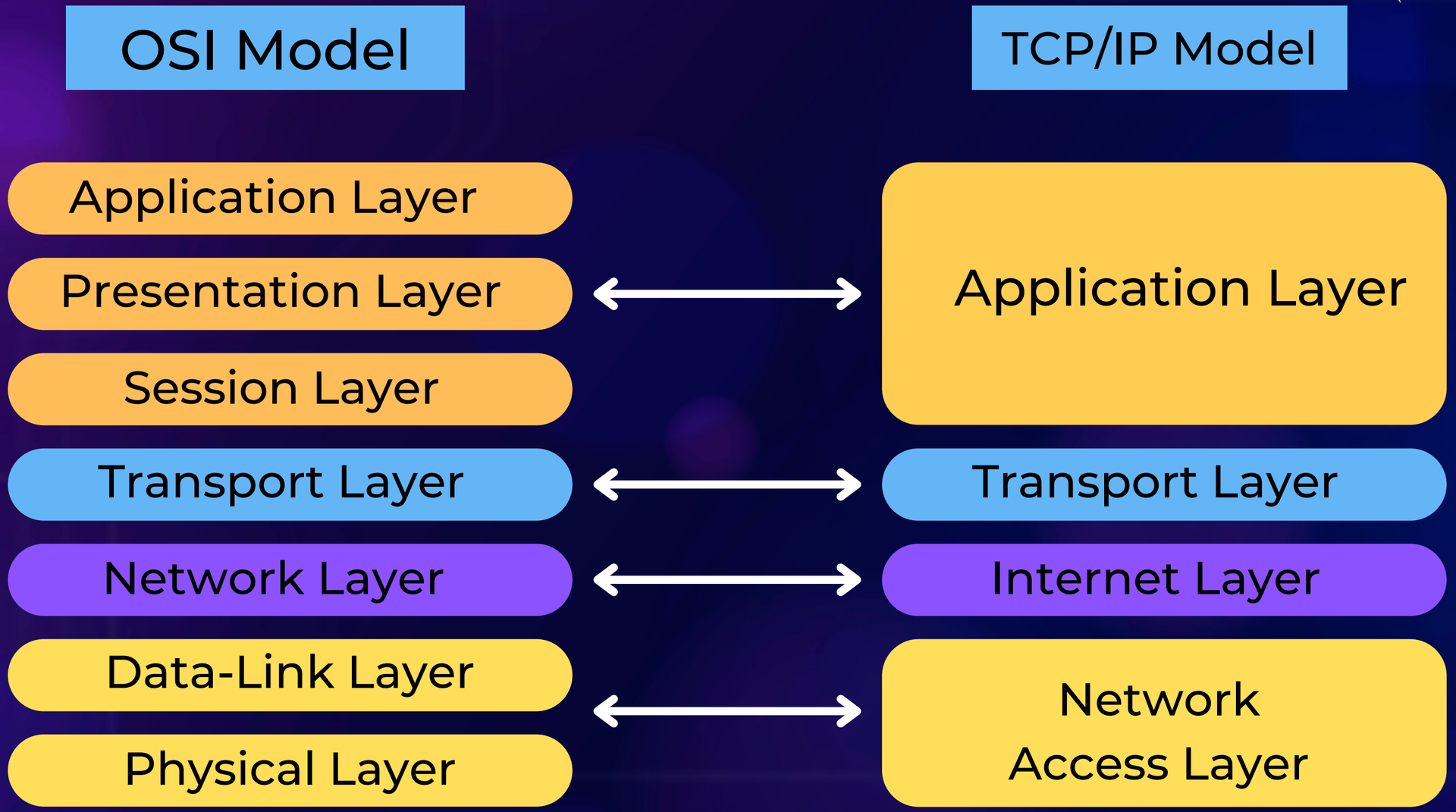

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Protocols

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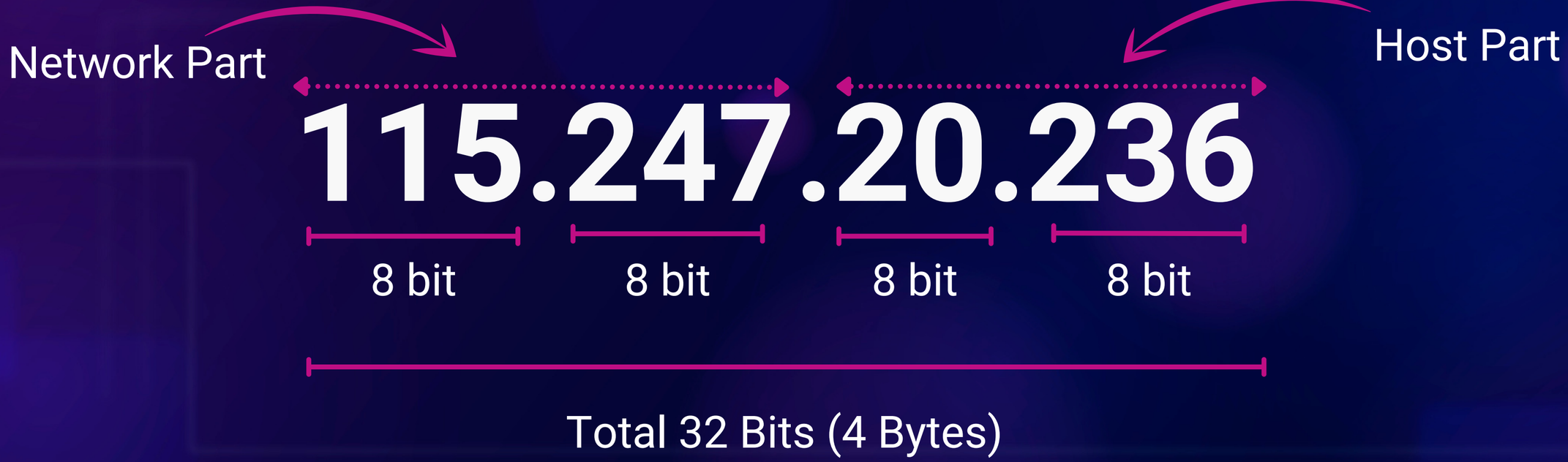
IP
(Internet Protocol)

- Unique for every node



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IPv4

- 32 bits IP address, divided into 4 parts.
- Each part has a different meaning.
- Can go up to 4.7B (approx) devices.
  e.g. 192.168.0.1

IPv6

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- 128 bits IP address, divided into 8 parts
- Hexadecimal notation is used.
- Can go up to 340 Trillion Trillion Trillion address.
  e.g. 2001:0db8:85a3:0000:0000:8a2e:0370:7334

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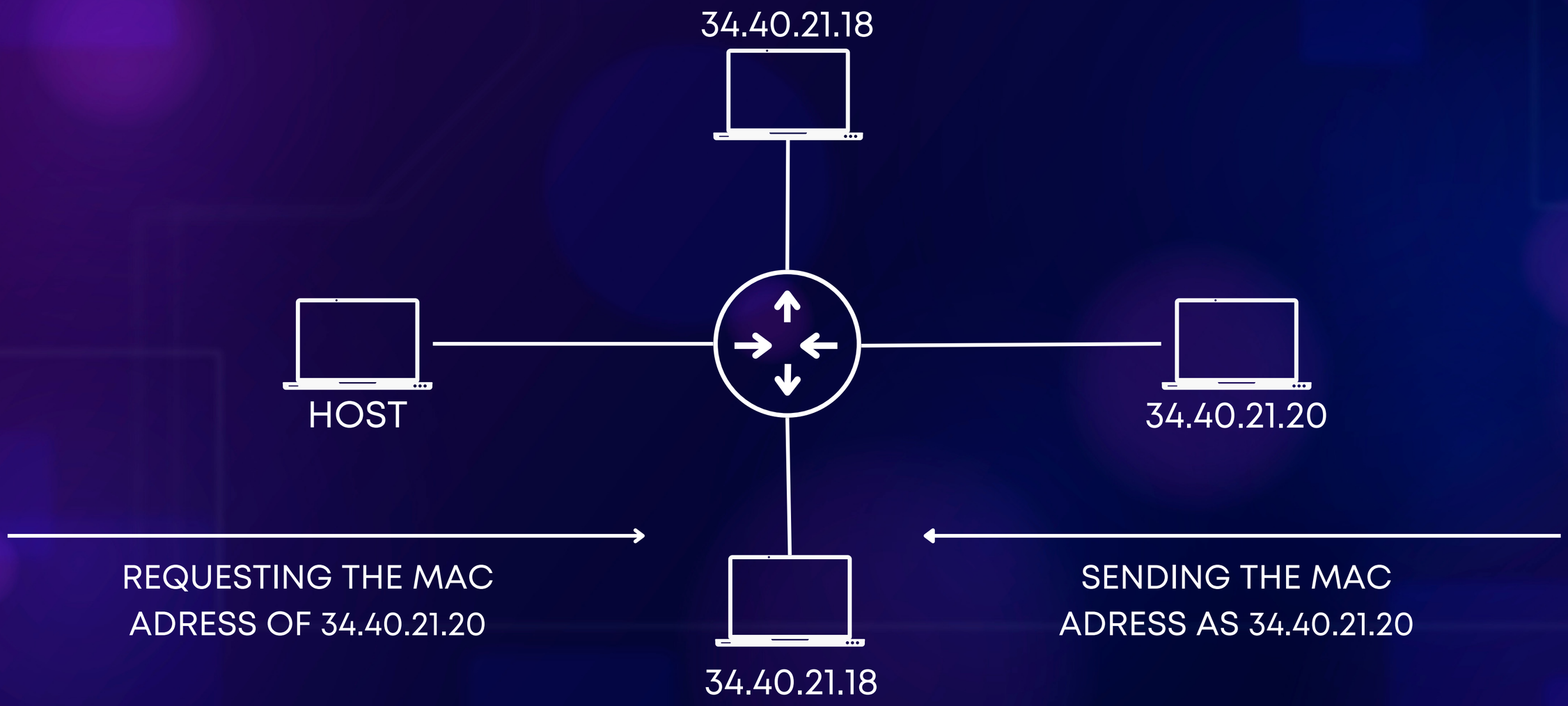
MAC

- The physical address is used to identify a device in computer networks
- Worldwide unique hardware address
- Assigned directly by the hardware manufacturer
- Represented by 12 digits Hexadecimal number
  e.g 00:1b:63:84:45:e6

ARP (Address Resolution Protocol)



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DNS
Domain Name System

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FTP

File Transfer Protocol

-Login Credentials
-FTP Commands
-Browse Directory

-Authentication
-Show Directory
-Port Assignment

Control Channel

Data Channel

-Upload Files
-Download Files

FTP CLIENT

FTP SERVER

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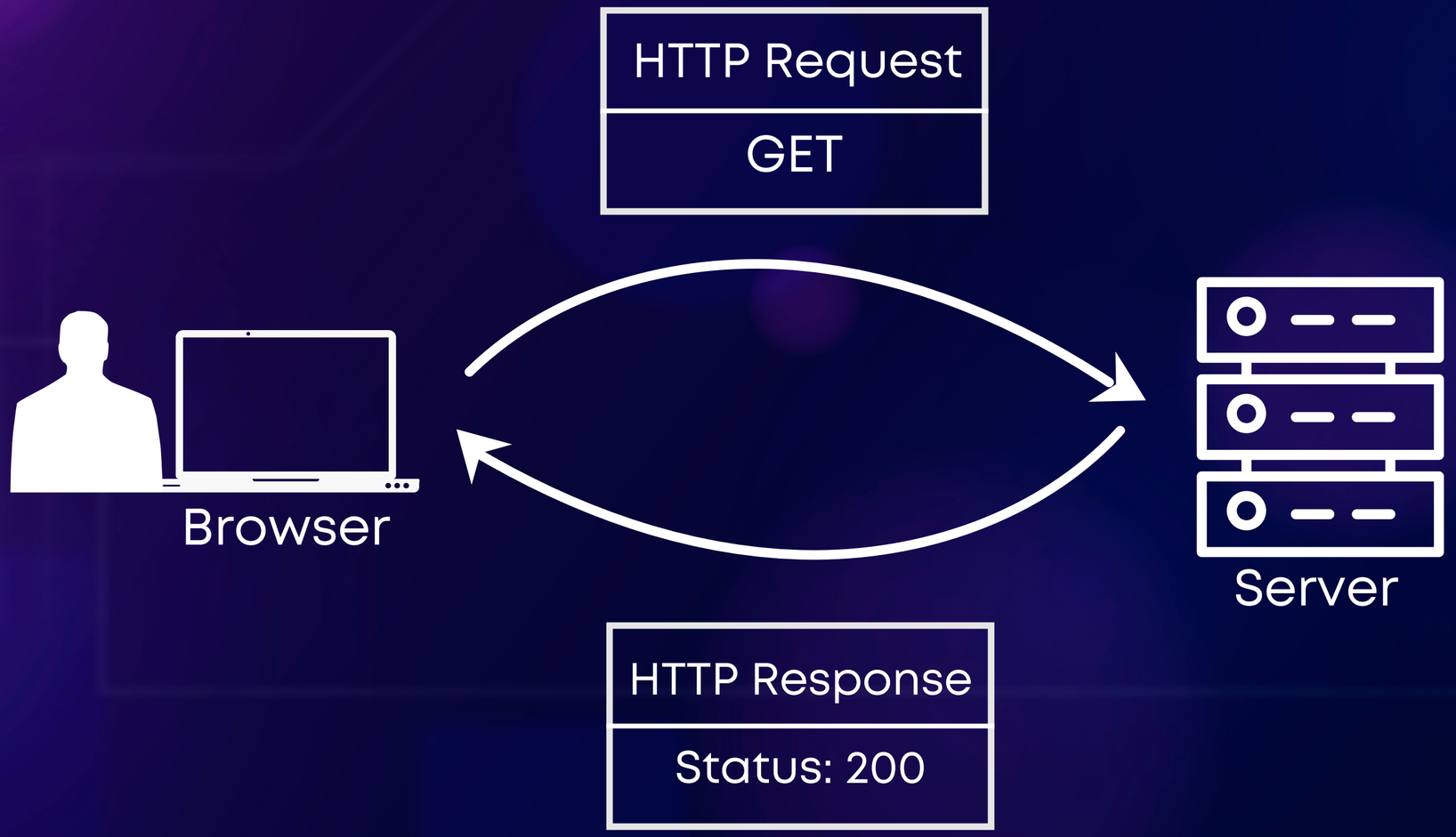
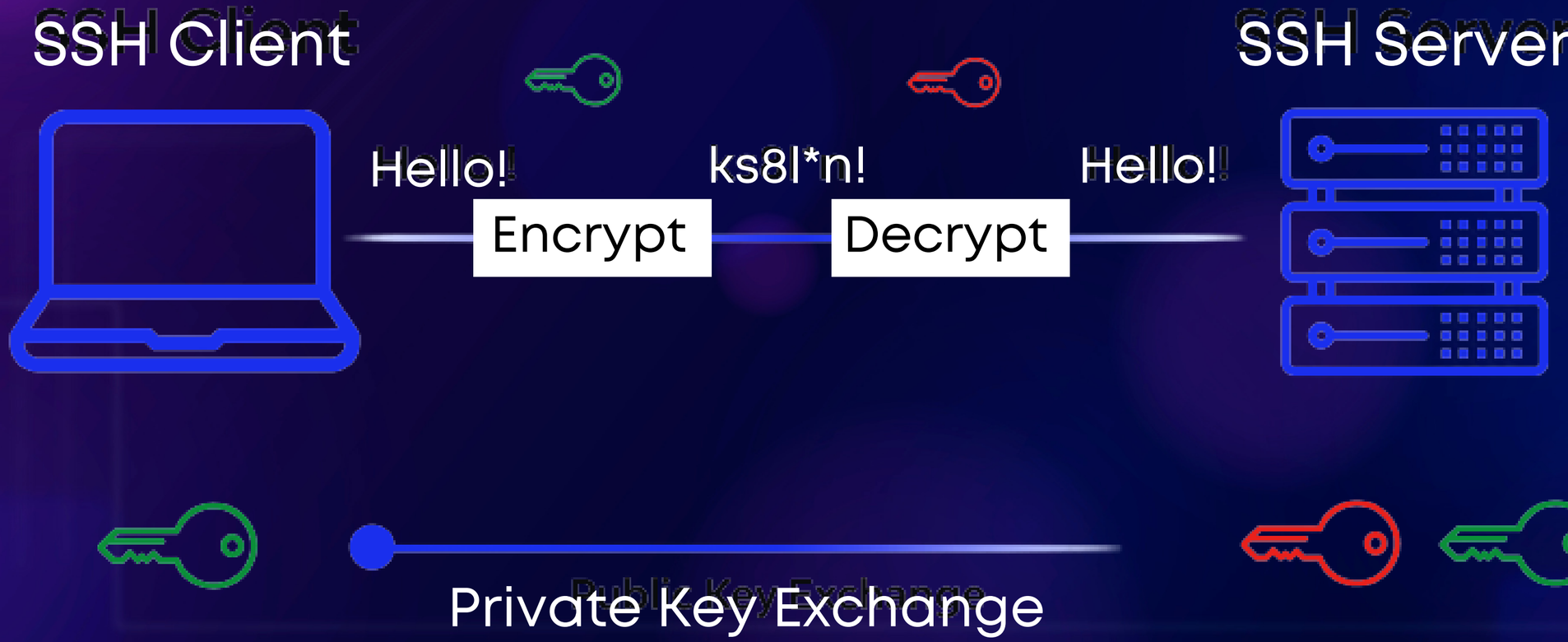
HTTP

Hyper Text Transfer Protocol



SSH

Secure SHell



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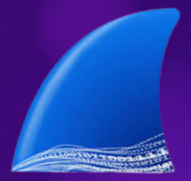

WIRESHARK

- Wireshark is a Network Packet Analyzer
- Free and Open Source

WIRESHARK

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How to Install Wireshark?

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On Windows

On Linux

$ sudo apt update

$ sudo apt-get install wireshark

$ sudo dpkg-reconfigure wireshark-common

$ sudo usermod -a -G wireshark $(whoami)

$ sudo reboot

Once you have completed the above steps, you then log out and log back in, and then start Wireshark:

$ wireshark

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DEMO

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http://vbsca.ca/login/login.asp

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Thank You!