Discover the protocols
Of the Network Layers

NET
WORKING

Network layers

Physical Layer
to send or receive the encapsulated Ethernet frame to which the cables are connected

Data-Link Layer
the protocol layer in a program that handles the moving of data into and out of a physical link in a network.

Network Layer
the part of the Internet communications process where these connections occur, by sending packets of data back and forth between different networks.
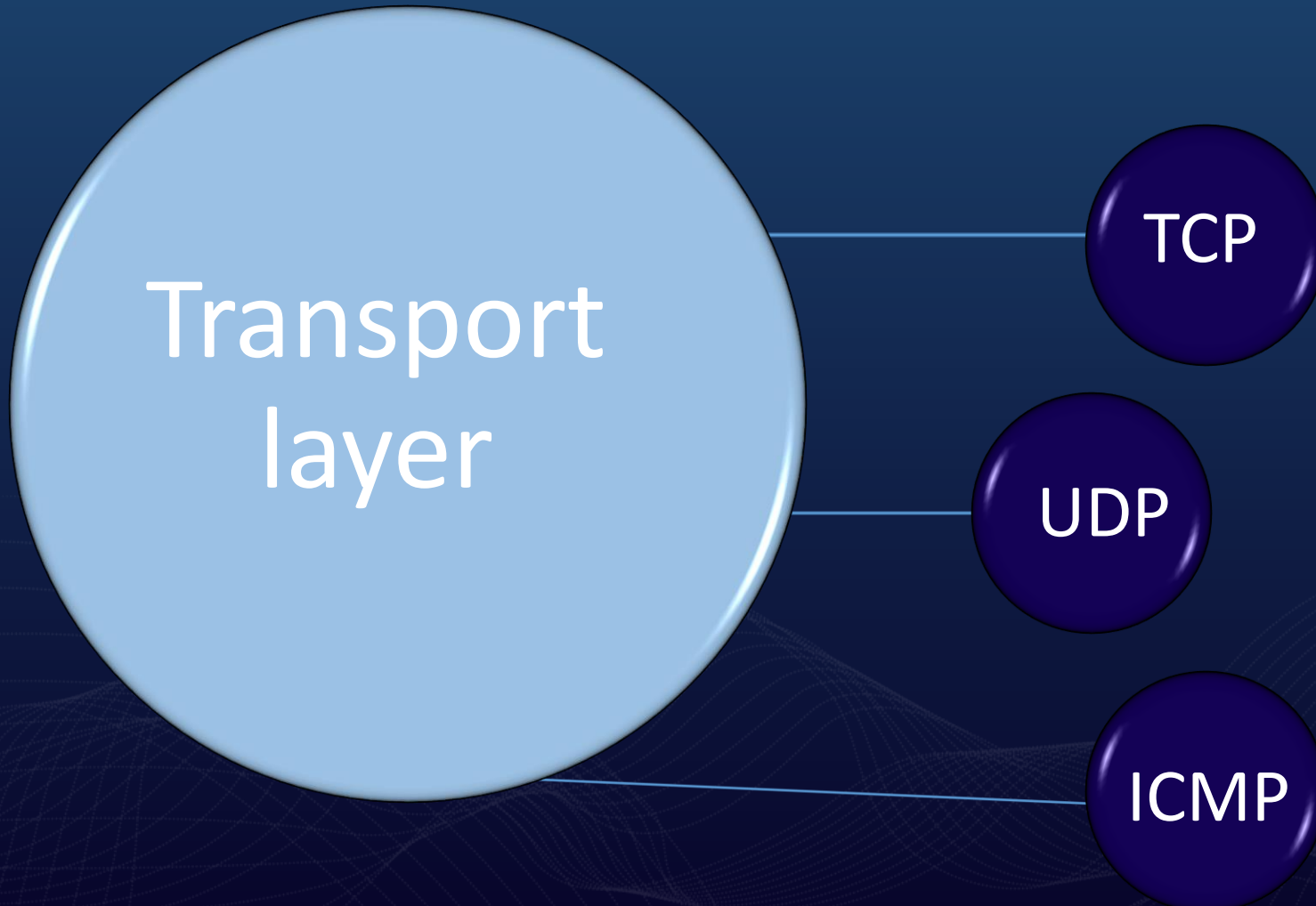
Transport Layer
provides communication between application processes running on different hosts within a layered architecture of protocols and other network components.

Application Layer
provides protocols that allow software to send and receive information and present meaningful data to users.

TCP/IP network architecture

The TCP/IP network has the corresponding five layers in the OSI model.

Transport layer

TCP

UDP

ICMP

is a transport layer protocol, and the Internet Protocol (IP) is a network layer protocol.
Both protocols were evolved from a earlier packet switching network called ARPANET that was funded by the Department of Defense.

TCP/IP network architecture

The TCP/IP network has been the center of many networking technologies and applications. Many network protocols and applications are running at the top of the TCP/IP protocol.

VOIP The Voice Over IP

- is **a technology that allows you to make voice calls using a broadband Internet connection instead of a regular (or analog) phone line**.

VCA Video Conference application

- **software that allows two or more people to emulate a person-to-person meeting over the internet using real-time, multidirectional video and audio streaming**.
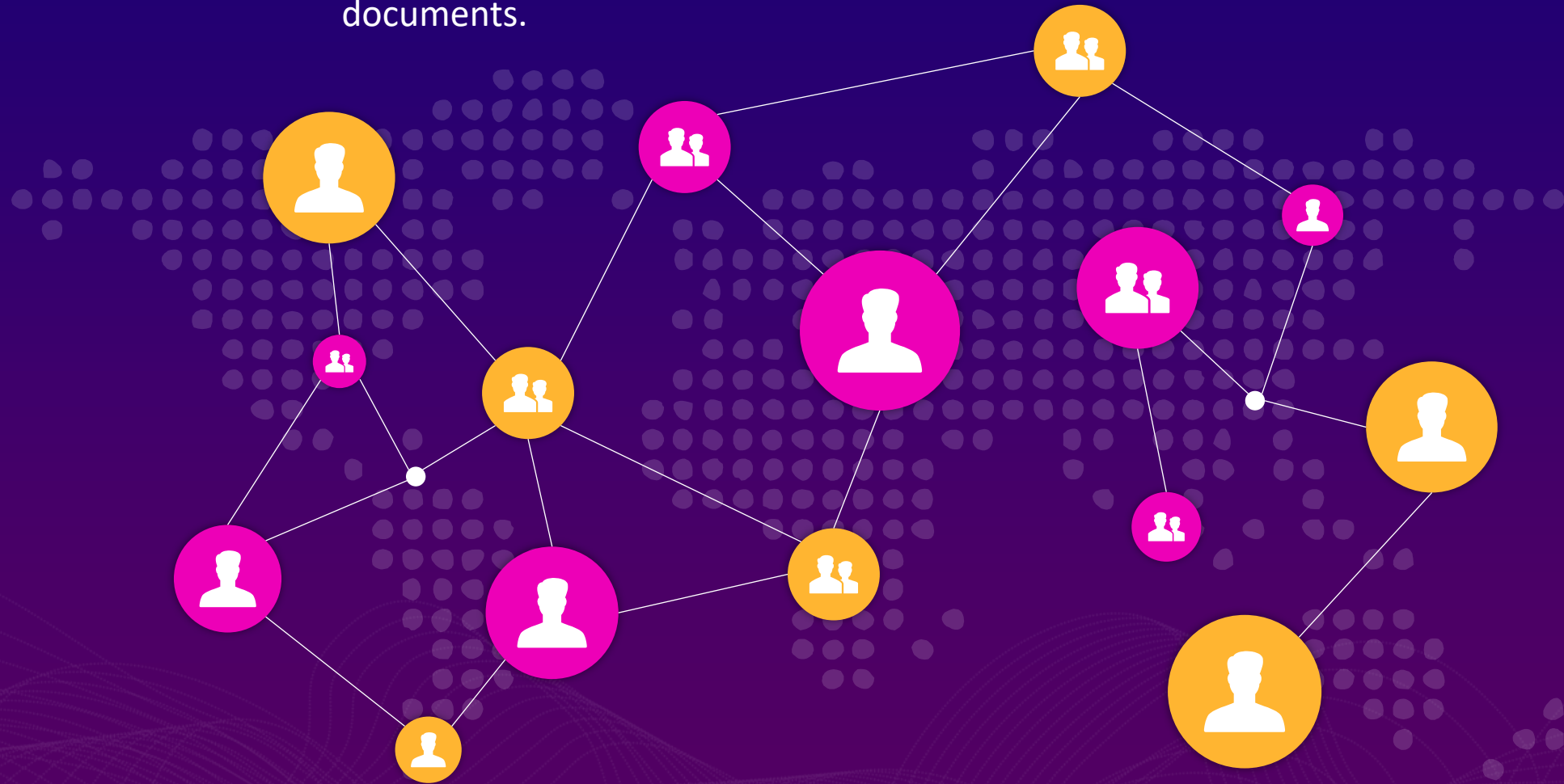
E-mail **Electronic Mail**

- SMTP is the TCP/IP mail delivery protocol. **It moves mail across the Internet and across your local network,** and it uses well-known port number 25.
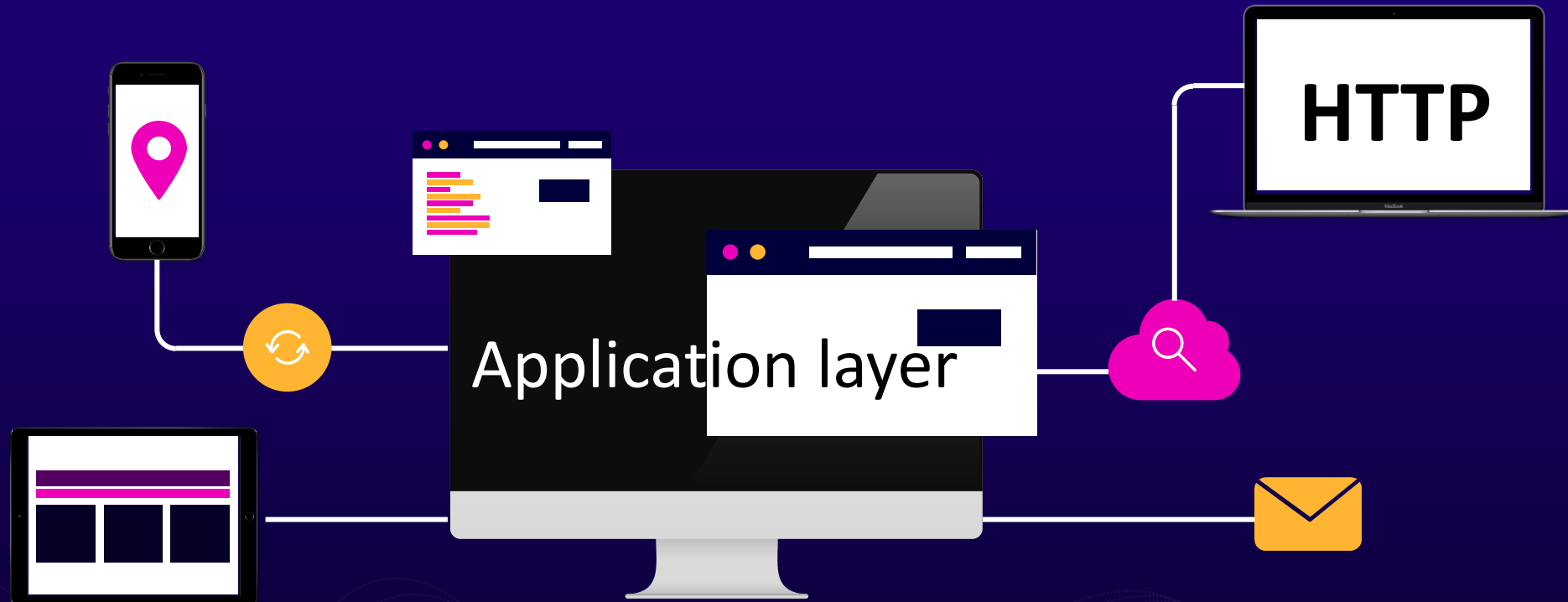
TCP/IP network architecture

The standard organization for the TCP/IP-related standard is the Internet Engineering Task Force (IETF), which issues Request-for-Comment (RFC) documents.

Hypertext Transfer Protocol

Application layer

HTTP

The Hypertext Transfer Protocol is an application protocol for distributed, collaborative, hypermedia information systems that allows users to communicate data on the World Wide Web.
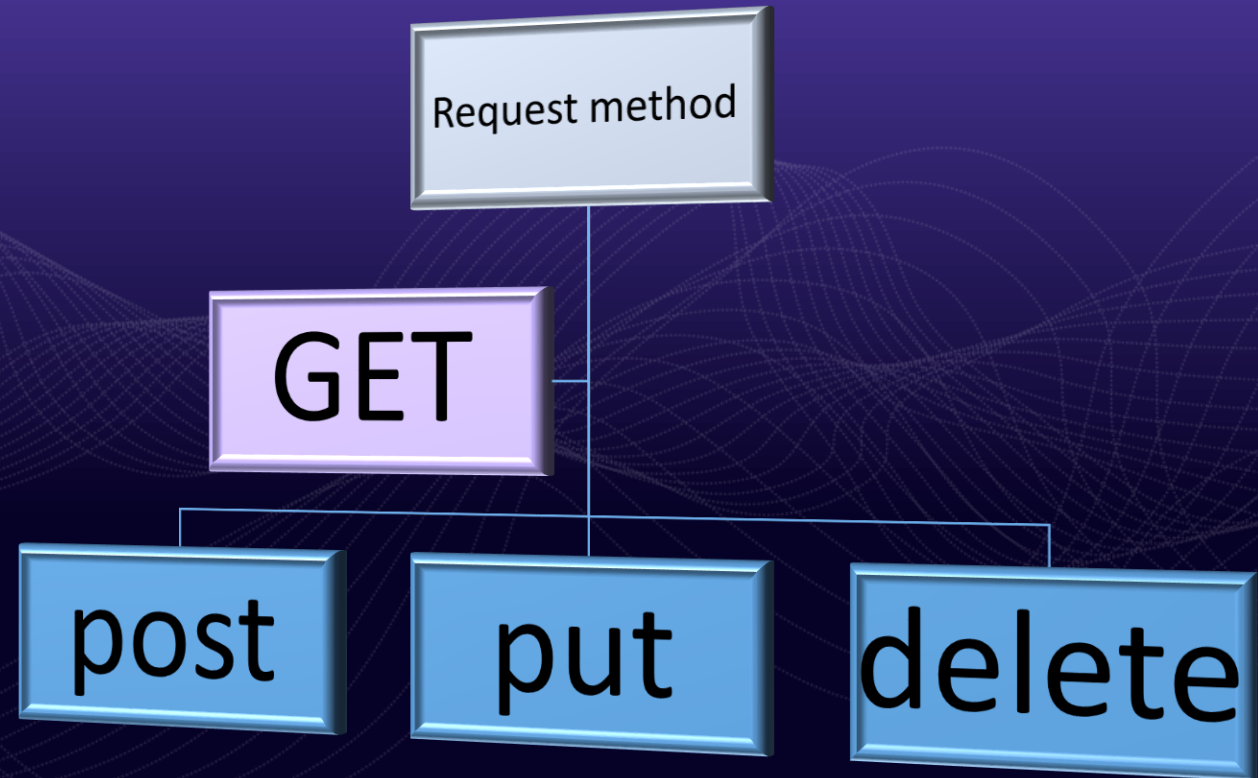
Hypertext Transfer Protocol

How does HTTP work

request-response protocol, HTTP gives users a way to interact with web resources such as HTML files by transmitting hypertext messages between clients and servers. HTTP clients generally use Transmission Control Protocol (TCP) connections to communicate with servers.

HTTP utilizes specific request methods in order to perform various tasks. All HTTP servers use the GET and HEAD methods, but not all support the rest of these request methods:

Request method

GET

post   put   delete

Hypertext Transfer Protocol

Security Concerns Around HTTP

01 adversaries can choose from many vectors to attack web servers, web applications, and websites.

02 cross-site scripting (XSS) to HTTP request smuggling, adversaries typically exploit well-known vulnerabilities and misconfigurations

03 HTTP security concerns around sending plaintext credentials via HTTP.
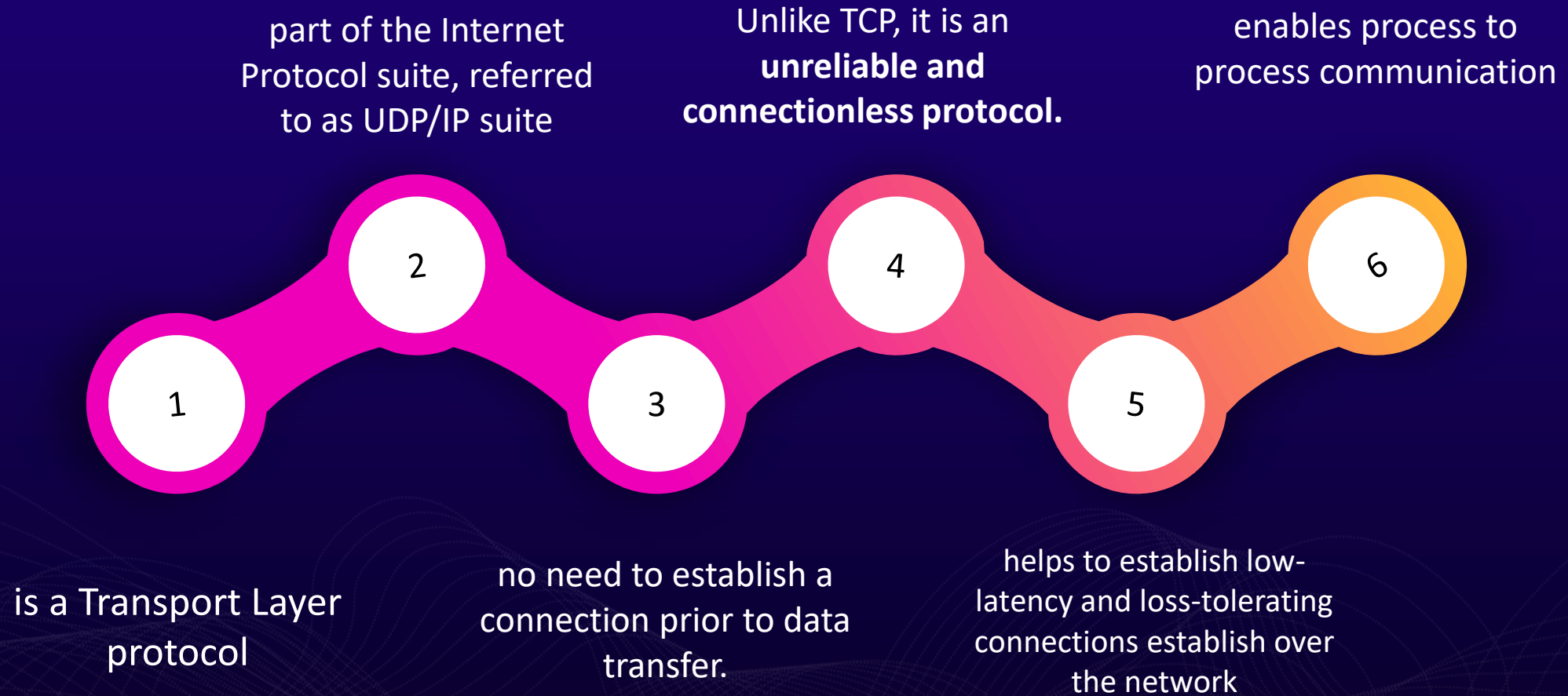
04 encrypted HTTP connection established with SSL/TLS for detecting attacks like Log4j which can hide in encrypted HTTPS traffic.

User Datagram Protocol
UDP

part of the Internet Protocol suite, referred to as UDP/IP suite

Unlike TCP, it is an unreliable and connectionless protocol.

enables process to process communication

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is a Transport Layer protocol

no need to establish a connection prior to data transfer.

helps to establish low-latency and loss-tolerating connections establish over the network

User Datagram Protocol UDP

Advantages:

UDP is frequently used when communications are time-sensitive. For users, it is better to have the overall transmission arrive on time than wait for it to get there in a near-perfect state.

used for time-critical data transmissions such as DNS lookups, online gaming, and video streaming.

User Datagram provides faster delivery of data as there is no acknowledgment mechanism in UDP.

Disadvantages:

provides an unreliable connection delivery service. It does not provide any services of IP except that it provides process-to-process communication.

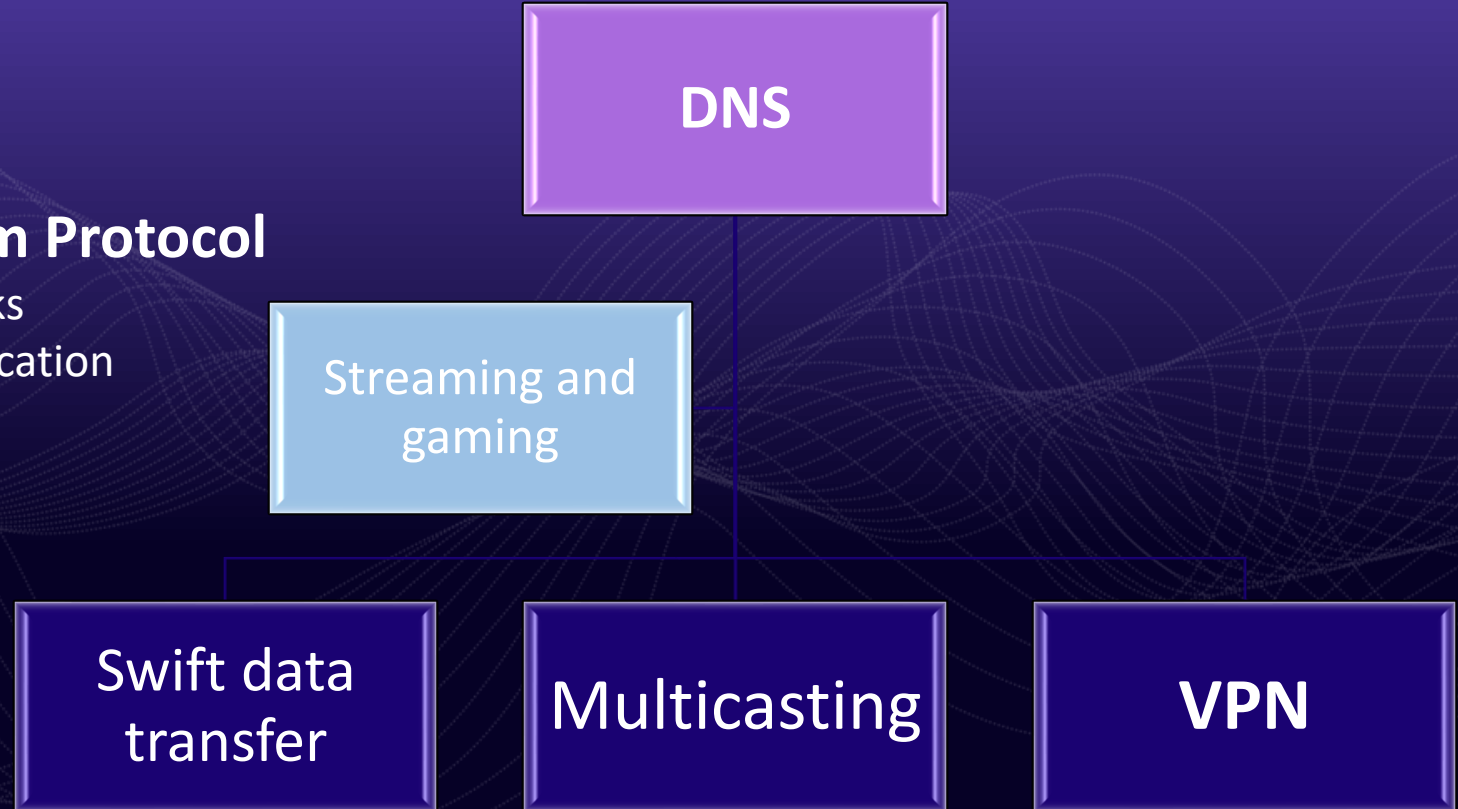UDP message can be lost, delayed, duplicated, or can be out of order.

How does UDP work

by gathering data in a UDP packet and adding its own header information to the packet. This data consists of the source and destination ports on which to communicate, the packet length and a checksum.

Applications of User Datagram Protocol

Now that we understand how UDP works
let's take a look at where this communication
protocol is used:

DNS

Streaming and gaming

Swift data transfer

Multicasting

VPN

THANK YOU

THE END