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Key Difference between TCP/IP and OSI Model. **TCP/IP is a practical model that addresses specific communication challenges and relies on standardized protocols.** In contrast, OSI serves as a comprehensive, protocol-independent framework designed to encompass various network communication methods.

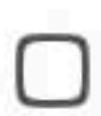
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TCP/IP	OSI
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Difference between TCP/IP Model and OSI Model...

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Parameters	OSI Model	TCP/IP Model
No. of Layers	There are 7 layers.	There are 4 layers.
Acronym	OSI stands for open system interconnection.	TCP/IP stands for transmission control protocol/internet protocol
Developed by	ISO	Department of Defense (DoD)
Layer Separation	OSI model has a separate Presentation layer and Session layer.	TCP/IP does not have a separate Presentation layer or Session layer.
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Model Concept	based on three concept i.e. Service, interface and protocol.	It did not distinguish between service, interface and protocol.
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Figure 5: Differences between OSI and TCP/IP Model [28].

Conclusion

 Semantic Scholar

Figure 5 from A Compara...

FUNCTION	TCP/IP MODEL	OSI MODEL
Definition	TCP/IP stands for transmission control protocol/internet protocol.	OSI stands for Open system interconnection.
Developed by	It is developed by DoD (Department of Defense) project agency.	ISO model is developed by ISO (International standard organization).
Technology/ Platform	It comprises a set of standard protocols which lead to development of the Internet. It is a communication medium which provides connection between hosts.	It is an independent standard and generic protocol used as a communication gateway between network and end user.

Features

- No guaranteed delivery of packets at transport layer.
- Based on horizontal approach.
- Session and presentation layers are not separate, both are included in application layer.
- Implemented model of OSI model.
- Network layer provides only connectionless service.
- Protocols can't be easily replaceable.
- Comprises of four layers.
- Services, protocols, and interfaces are not properly segregated but are protocol dependent.
- Widely used model.
- Not provide standardization of devices.

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OSI Model	TCP-IP Model
7 layers	4 layers
Model was initially defined before the implementation of the stack.	Model was defined after protocol stack was implemented.
OSI does not support internet working.	TCP-IP supports internet working.

 Network Interview
TCP/IP MODEL vs OSI M...



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OSI Model & TCP/IP

OSI

Application	High-level API, resource sharing
Presentation	Data formatting, encoding, encryption, compression
Session	Authenticate, manage sessions and reconnections
Transport	Message segmentation, acknowledgement, reliable
Network	Multi node routing and addressing
Data link	Flow and error control on physical link
Physical	Transmission of physical bit streams

TCP/IP

Application

Transport

Internet

Network Access

OSI vs TCP/IP: What's the Difference? - javatpoint

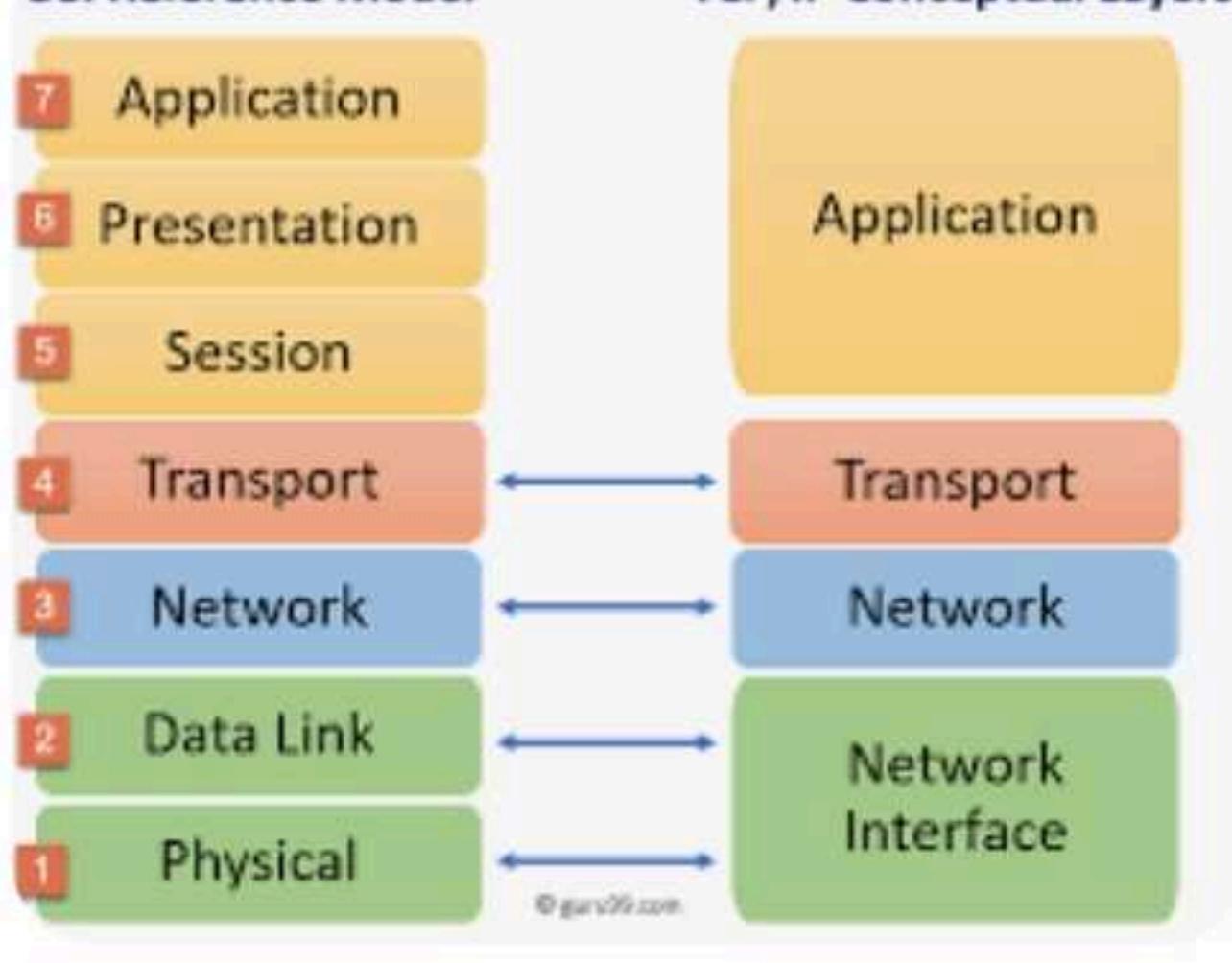
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DIFFERENCE BETWEEN TCP/IP AND OSI MODEL

TCP/IP Transmission Control Protocol/ Internet Protocol	OSI Open Systems Interconnection
The most widely used communications protocol, TCP/IP prepares and forwards data packets over a network	The OSI model is a conceptual model that characterises and standardises the communication functions of a computing system

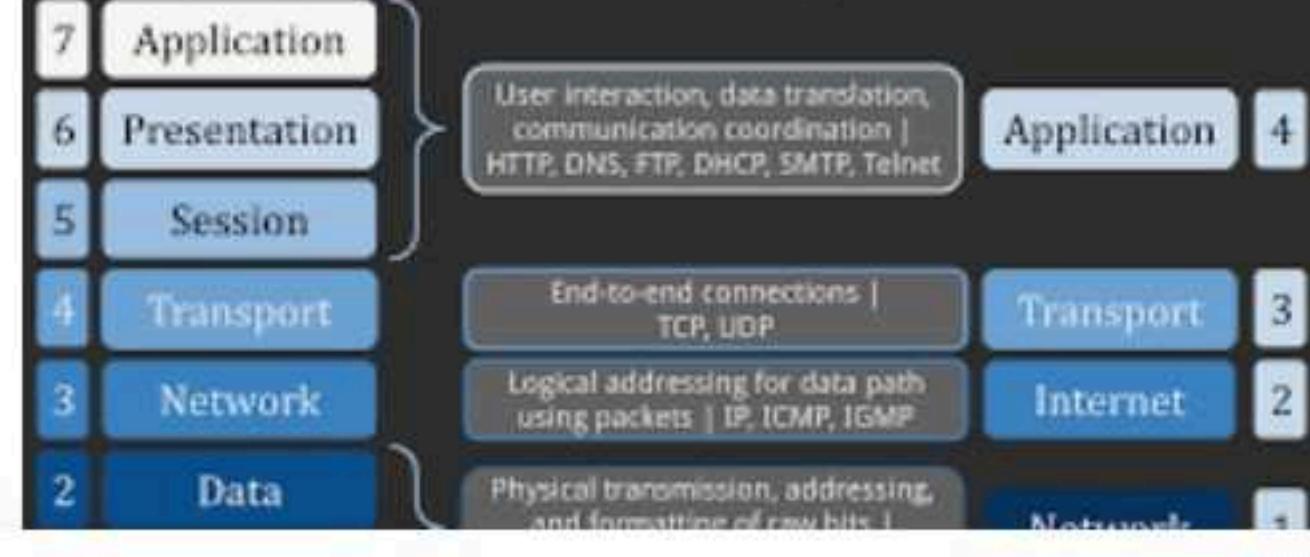


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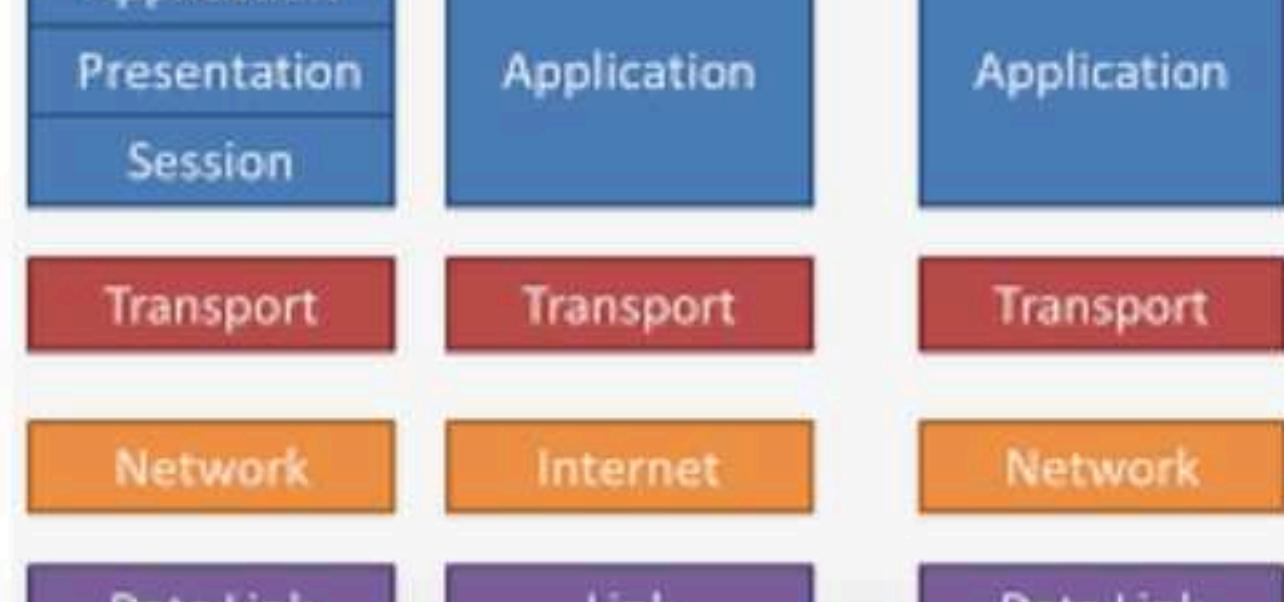
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OSI Model

TCP/IP Original

TCP/IP Updated



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Difference between TCP/I...

Network Interview

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In the OSI model, the transport layer is only connection-oriented.	A layer of the TCP/IP model is both connection-oriented and connectionless.
In the OSI model, the data link layer and physical are separate layers.	In TCP, physical and data link are both combined as a single host-to-network layer.
Session and presentation layers are a part of the OSI model.	There is no session and presentation layer in the TCP model.
It is defined after the advent of the Internet.	It is defined before the advent of the Internet.
The minimum size of the OSI header is 5 bytes.	The minimum header size is 20 bytes.

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Figure 5: Differences between OSI and TCP/IP Model [28].

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Figure 5 from A Comparative Evaluation of OSI and TCP / IP...

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Strict layered	Loosely layered
Support connectionless and connection-oriented communication in the network layer.	Support only connection-oriented communication in the transport layer.
Horizontal layer	Vertical approach
Separate session layer and presentation layer exist.	There are no session and presentation layers. Characteristics of session layer are provided by transport layer whereas characteristics of presentation layer are provided by application layer.

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TCP/IP Model. Prerequisite...

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Figure 5 from A Compara...



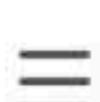
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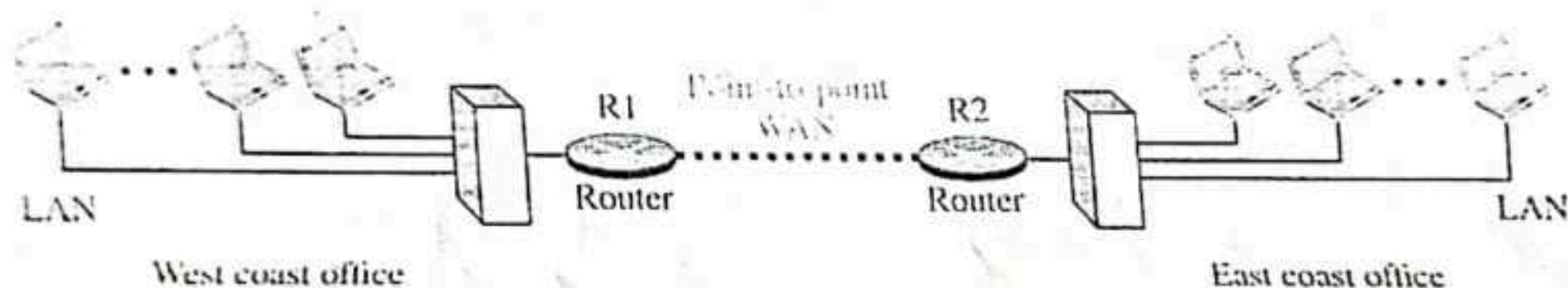
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✓ Answer any five (05) of the following questions. Marks

1. Why do we need protocol layering? Depict single layer protocol and three layer protocol to explain the necessity of protocol layering. 5

2. Using the following figure, show the layers of the TCP/IP protocol suite and the flow of data when two hosts, one on the west coast and the other on the east coast, exchange messages. The figure represents an internetwork made of two LANs and one point-to-point WAN. 5



✓ What will happen when you send your data through a channel that has 0 SNR? The attenuation of a signal is -10 dB. What is the final signal power if it was originally 5 W? 2+3

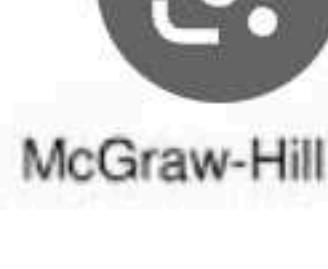
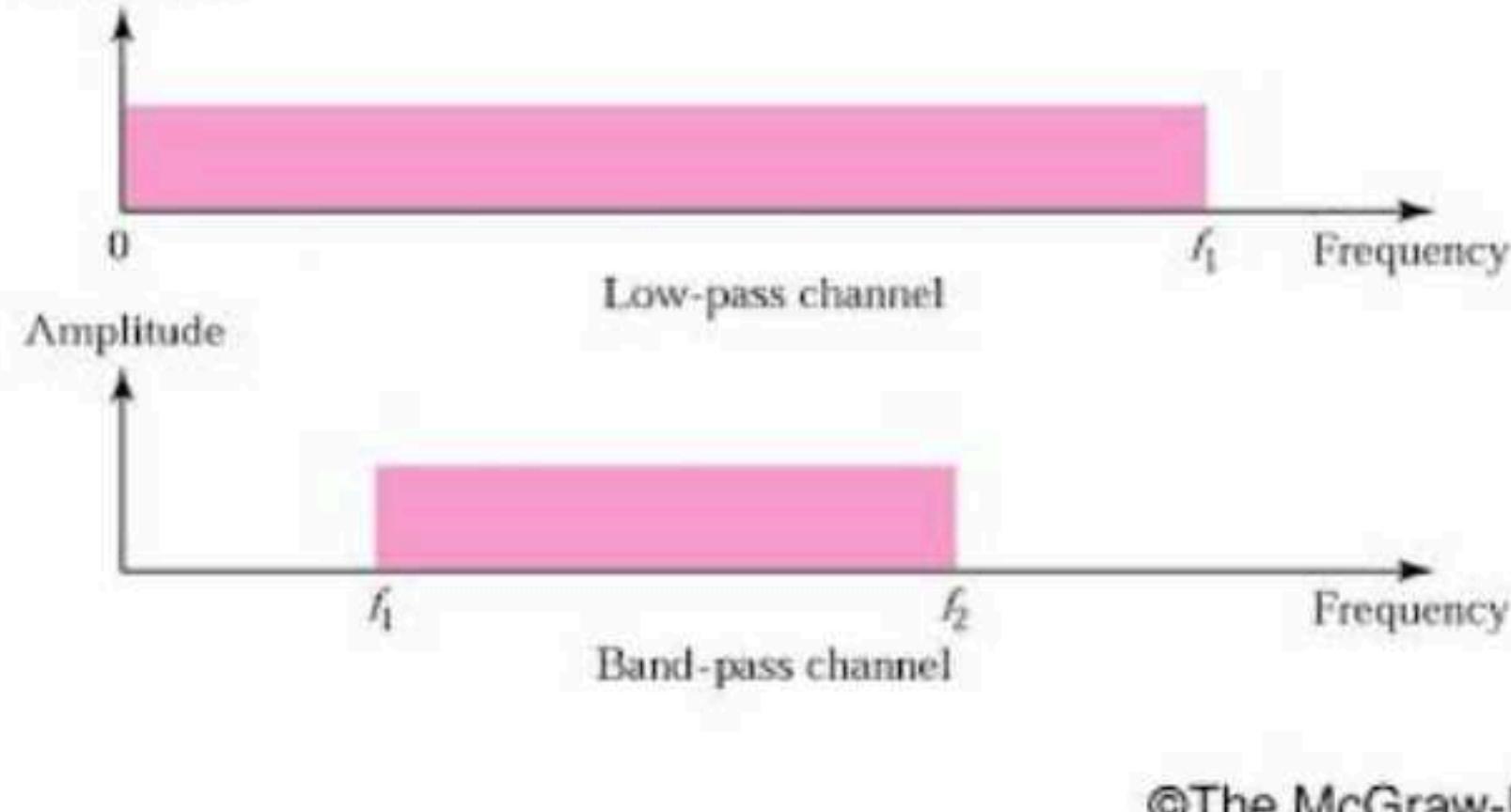
4. Create a diagram that represents the steps of modulation of a digital signal for transmission on a bandpass channel. 5

5. A telephone subscriber line must have an SNR_{dB} above 40. What is the minimum number of bits per sample? Define baseline wandering and its effect on digital transmission. 2+3

6. What do you understand by digitization? Find the 8-bit data stream for each case depicted in the following figure. 2+3

**Figure 3.19 Low-pass and band-pass**

- Low pass channel has a bandwidth with frequencies between 0 and f . Lower limit is 0, the upper limit can be any frequency (including infinity)
- Band-pass channel has bandwidth with frequencies between f_1 and f_2 .
- The analog bandwidth of a medium is expressed in hertz; the digital bandwidth, in bits per second
- Low-pass channel is suitable for digital transmission because of 0 frequency for square wave.
- Cannot use band-pass to transmit digital signal.
- Analog transmission uses a band-pass channel to avoid low frequency interference.

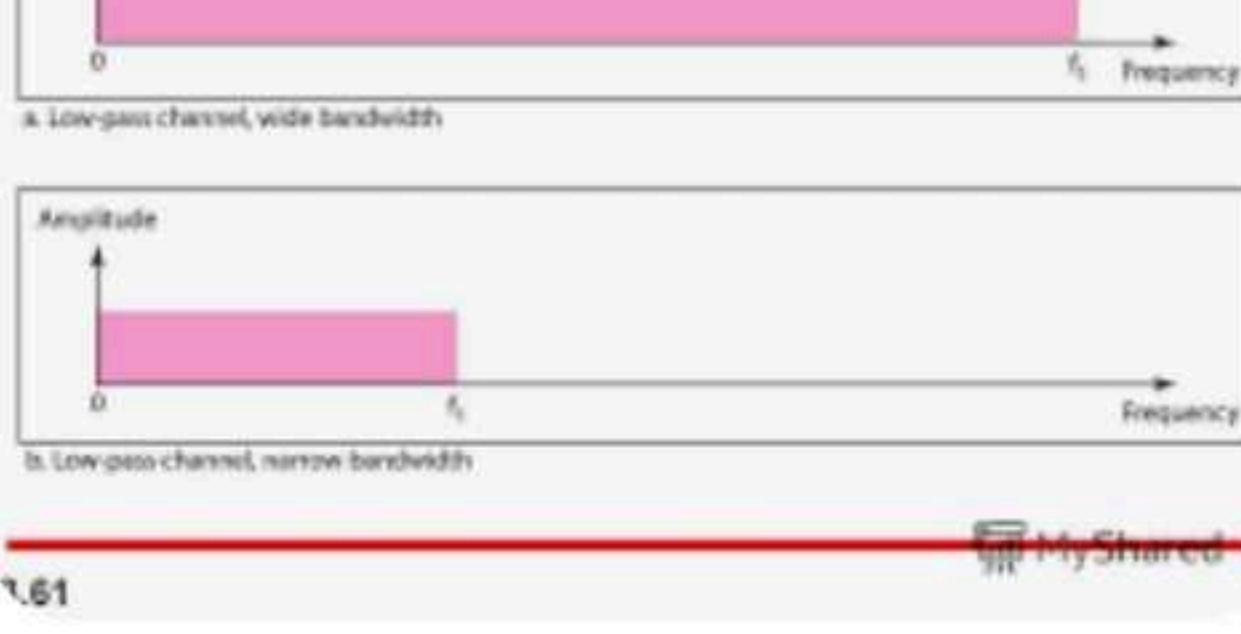


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Figure 3.19 Bandwidths of two low-pass channels

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Channel Properties

- A communication channel only operates at a certain frequency range.
- Channels are either be **low-pass** or **band-pass** channels.

**Figure 3.23 Bandwidth of a bandpass channel**

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Baseband vs Broadband

Comparison Chart

Baseband	Broadband
It refers to a communications channel in which information is carried in digital form.	The signals are modulated as radiofrequency analog waves that use different frequency ranges.
Communication is bi-directional which means the same channel is used to transmit and receive signals.	Communication is unidirectional meaning two different channels are needed in order to send and receive signals.
Every device on a baseband system shares the same channel.	Multiple independent channels can carry analog or digital information through FDM.
Baseband LANs are inexpensive and easier to install and maintain.	Broadband systems are generally more expensive because of the additional hardware involved.
Baseband LANs have a limited distance reach which is no more than a couple miles.	Broadband LANs span much longer distances than baseband (up to tens of kilometers).

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Baseband vs Passband Signal

Comparison Chart

[Baseband Signal](#)[Passband Signal](#)

BASEBAND VERSUS BROADBAND

TRANSMISSION

2 KEY DIFFERENCES

BASEBAND TRANSMISSION

Baseband Transmission is a transmission technique that one

BROADBAND TRANSMISSION

Broadband Transmission is a transmission technique that many

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Baseband	Broadband
Communication is bidirectional	Communication is unidirectional
Uses digital signals	Uses analog signals
Signals can be sent for short distances	Signals can be sent for long distances
Works with bus topology	Works with tree and bus topology
In order to improve the strength of signals, repeaters are utilized	In order to improve the strength of signals, amplifiers are utilized
Capacity of frequency is less than 100 kHz	Bandwidth capacity is higher than 100 kHz
Signals are sent and received on the same channel	Two distinct channels are required to deliver and receive signals
Signals are sent over copper wires or fiber-optic cables	Signals are sent over the air through an RF network
Best suited for wired networks	Best suited for wireless networks
Supports time division multiplexing	Supports frequency division multiplexing
The impedance of baseband transmission is 50 ohms	A 70-ohm impedance is used for broadband transmission
Installation and maintenance are both simple	Installation and maintenance are challenging
Use in Ethernet	Use in telephone networks

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COMPARISON CHART

BROADBAND TRANSMISSION	BASEBAND TRANSMISSION
Broadband is a type of signal with width bandwidth used for transmitting multiple signals simultaneously and can be used to transmit different traffic types.	Baseband signals are used for transmitting the signals in the telecommunication world without using the modulation that means no alteration in the frequency of a signal.

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BASIS FOR COMPARISON	BASEBAND TRANSMISSION	BROADBAND TRANSMISSION
Type of signalling used	Digital	Analog
Application	Work well with bus topology.	Used with a bus as well as tree topology.
Encoding Used	Manchester and Differential Manchester encoding.	PSK encoding.
Transmission	Bidirectional	Unidirectional
Signal range	Signals can be travelled over short distances	Signals can be travelled over long distances without being attenuated.

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Difference between Bro...

	ATM	SONET/SDH	IP	DVB ASI
Overhead	12%	3.3%	14%	1%
	(5-byte cell header)		(1 MPEG-2 transport packet per UDP packet)	(2 sync bytes per MPEG-2 transport packet)
QoS	Admission control and connection management guarantees	Constant bit rate link	Differentiated class of service	Constant bit rate link
Advantages	Supports switching and integrates voice, video, and data	Supports long-haul optical networks; may also be used to carry ATM, IP, and DVB ASI traffic	Supports routing, ubiquitous network layer for data communications networks	Cost-effective interconnection of headend components
Disadvantages	ATM adaptation cost	Expensive Telco-class service, payloads only in multiples of 52 Mbps	Lack of proven QoS mechanisms for streaming services	Limited reach and lack of switching function

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Difference Between Base...

	BASEBAND	BROADBAND
DEFINITION	Baseband transmission is a transmission technique that one signal occupies the entire bandwidth of the channel to send data.	Broadband transmission is a transmission technique that many signals with multiple frequencies travel simultaneously through a single channel simultaneously.
TYPE OF SIGNAL	Digital signals	Analog signals
TRANSMISSION	Unidirectional	Unidirectional
DATA TRANSMISSION	Baseband transmission uses digital signals to send data through the media to a single channel. One signal occupies the entire bandwidth of the network's media for transmission.	Wideband transmission supports data that are divided into a range. Therefore, in broadband transmission, it can carry more than one signal that travel the both simultaneously.
MULTIPLEXING TECHNIQUE	Baseband transmission utilizes Time Division Multiplexing (TDM).	Broadband transmission uses Frequency Division Multiplexing (FDM).
NUMBER OF SIGNALS	Works one signal at a time.	Works multiple signals simultaneously.
DISADVANTAGE	Signals travel in short distance.	Signals travel a long distance without signal attenuation.



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Low-pass versus Band-pass

A low-pass channel has a bandwidth with frequencies between 0 and f .

A band-pass channel has a bandwidth with frequencies between f_1 and f_2 .

Digital transmission needs a low-pass channel.

Analog signal uses a band-pass channel.

In addition, bandwidth of analog signal can be shifted as long as width of bandwidth remains same.

 A band-pass channel is more available than a low-pass channel.

Shashank Srivastava Motilal
Nehru National Institute Of...

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Digital Band-Pass Modulation Techniques

When a serial data stream is represented in PAM, it can be transmitted over a low-pass channel, like a coaxial cable. The needs to transmit the data stream over a band-pass channel, like wireless or satellite channels will require digital modulation techniques with band-pass data transmission capability.

There are three basic modulation schemes:

1. Amplitude-shift Keying (ASK)
2. Phase-shift Keying (PSK)
3. Frequency-shift Keying (FSK)

Digital Band-Pass Modulation Techniques

Low-pass and Bandpass Channels

- Low-pass channel: low frequency signal can pass the channel while high frequency signal is blocked
- Bandpass channel: pass the signal with a frequency range $[f_1, f_2]$



Y YUMPU

Digital Band-Pass Modul...

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1 Chapter 3 Physical Lay...

loss-pass channel, baseband, non-modulated

- Messages transmitted in baseband or broadband depend on the properties of transmission media and channels
- If a physical channel is a low-pass wideband channel
 - A low pass channel with a bandwidth that starts from zero, will only allow electrical signals below a certain frequency

TYPES OF LINK/CHANNEL

- A channel or link is either low-pass or band-pass.
- **Low-Pass Channel**
- A low-pass channel has a width with frequencies between 0 and f .



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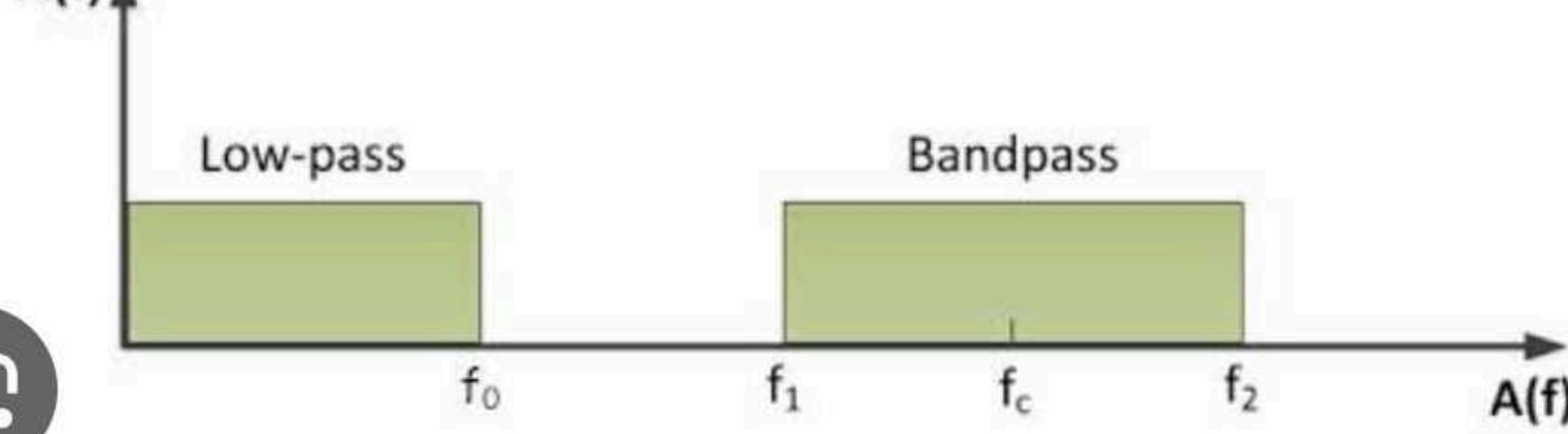
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1 Chapter 3 Physical Layer: Digital Transmission...

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Low-pass & Band-pass

A channel is either low pass or band pass.

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When a serial data stream is represented in PAM, it can be transmitted over a low-pass channel, like a coaxial cable. The needs to transmit the data stream over a band-pass channel, like wireless or satellite channels will require digital modulation techniques with band-pass data transmission capability.

loss-pass channel, baseband, non-modulated

- Messages transmitted in baseband or broadband depend on the properties of transmission media and channels
- If a physical channel is a low-pass wideband channel
 - A low pass channel with a bandwidth that starts from zero, will only allow electrical signals below a certain frequency
 - Digital signals can be transmitted over the baseband



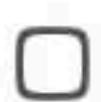
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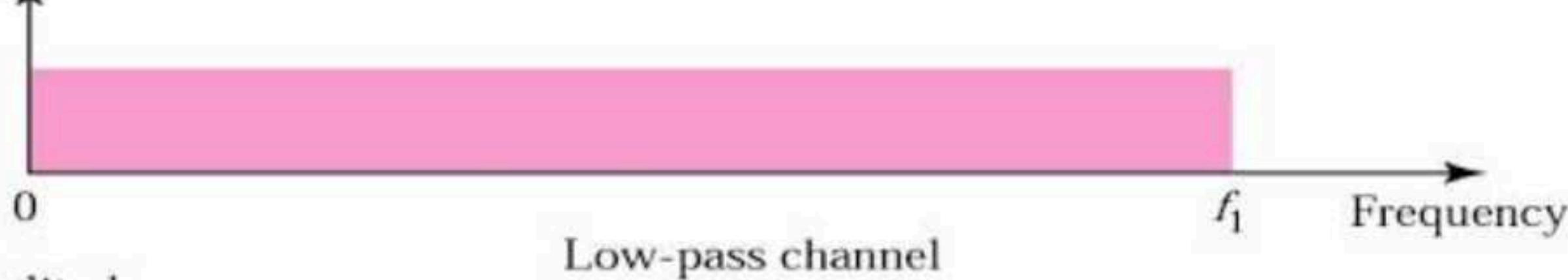
Low-pass & Band-pass

A channel is either low pass or band pass.

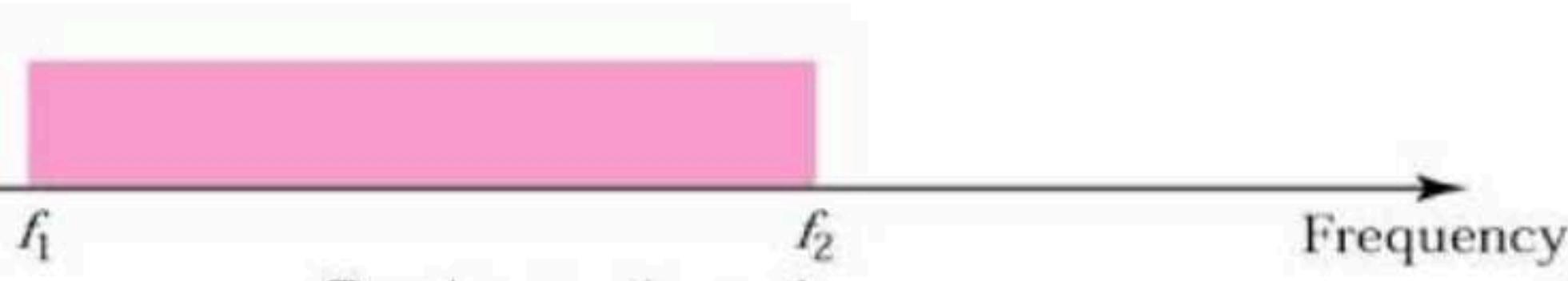
A low – pass channel has a B/W With frequencies between 0 & f .

A band pass has B/W with frequencies between f_1 & f_2 .

Amplitude



Amplitude



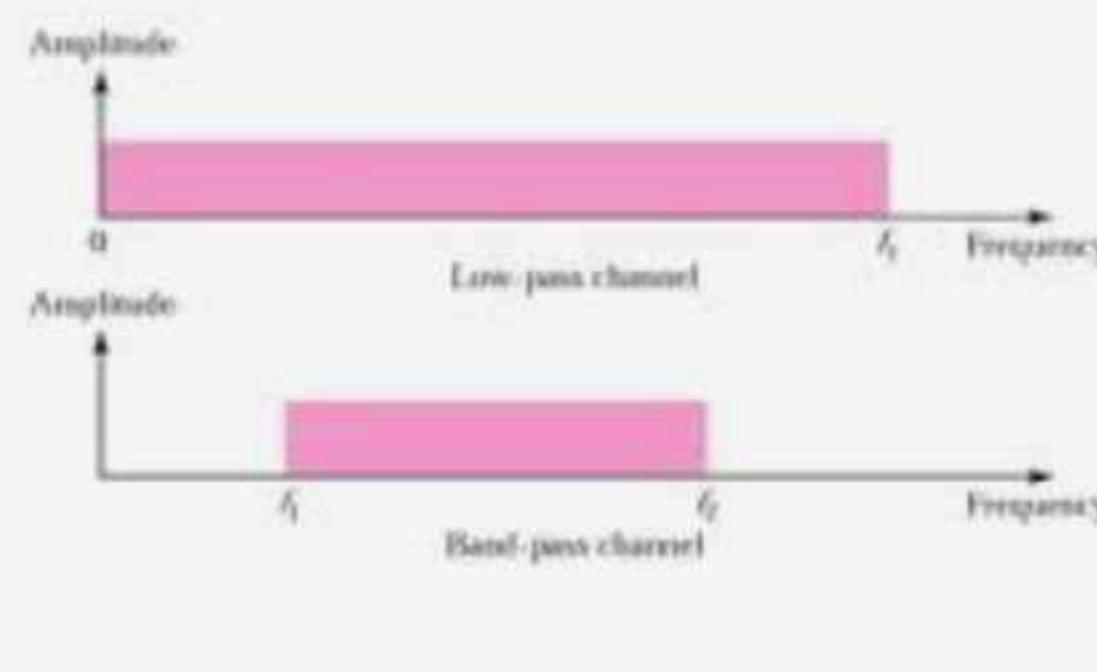
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Figure 3.19 Low-pass and band-pass



Low-pass and Bandpass Channels

- Low-pass channel: low frequency signal can pass the channel while high frequency signal is blocked
- Bandpass channel: pass the signal with a frequency range $[f_1, f_2]$



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1 Chapter 3 Physical Lay...

Channel Properties

- A communication channel only operates at a certain frequency range.
- Channels are either be low-pass or band-pass channels.



Low-pass versus Band-pass

A low-pass channel has a bandwidth with frequencies between 0 and f .

A band-pass channel has a bandwidth with frequencies between f_1 and f_2 .

Digital transmission needs a low-pass channel.



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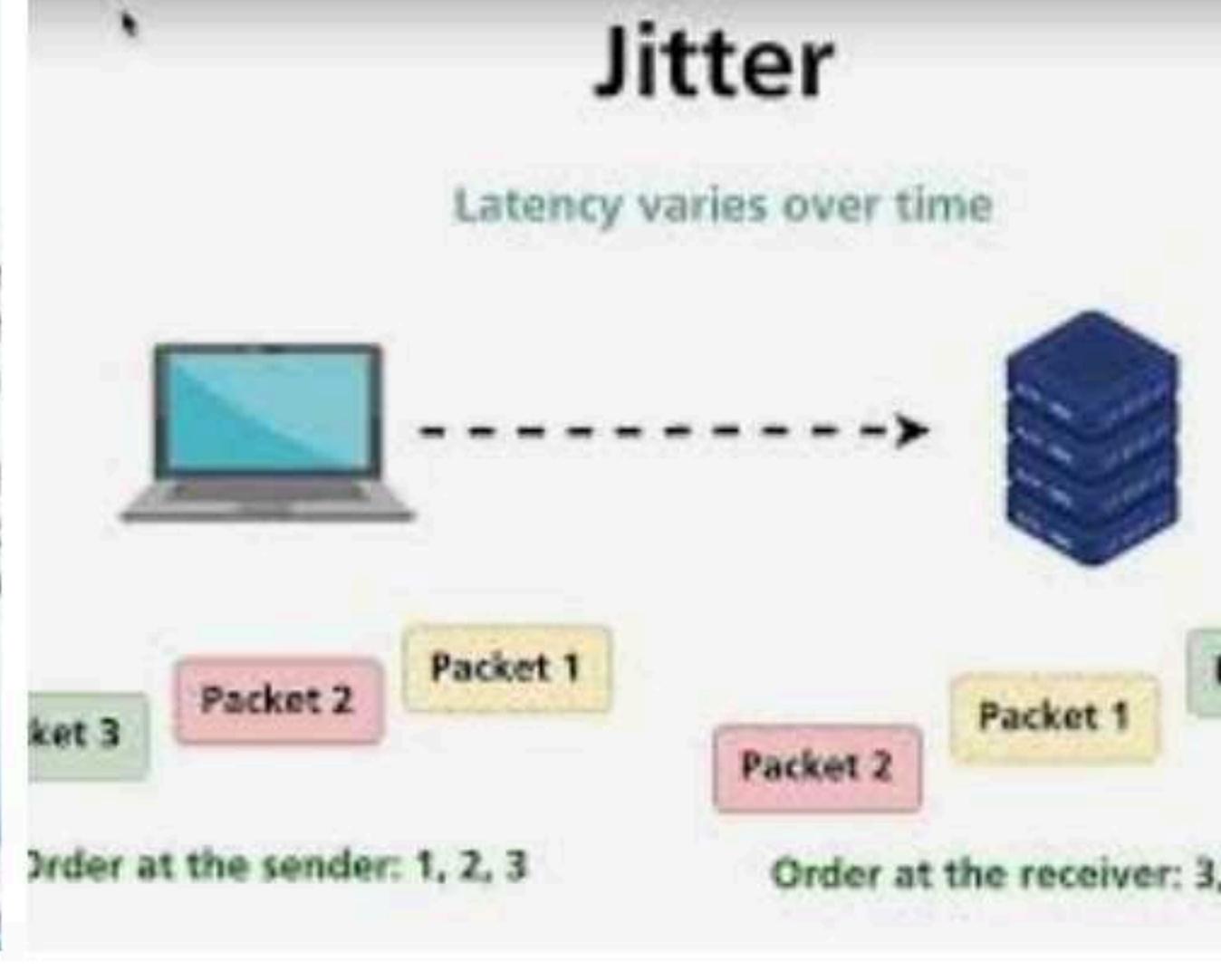
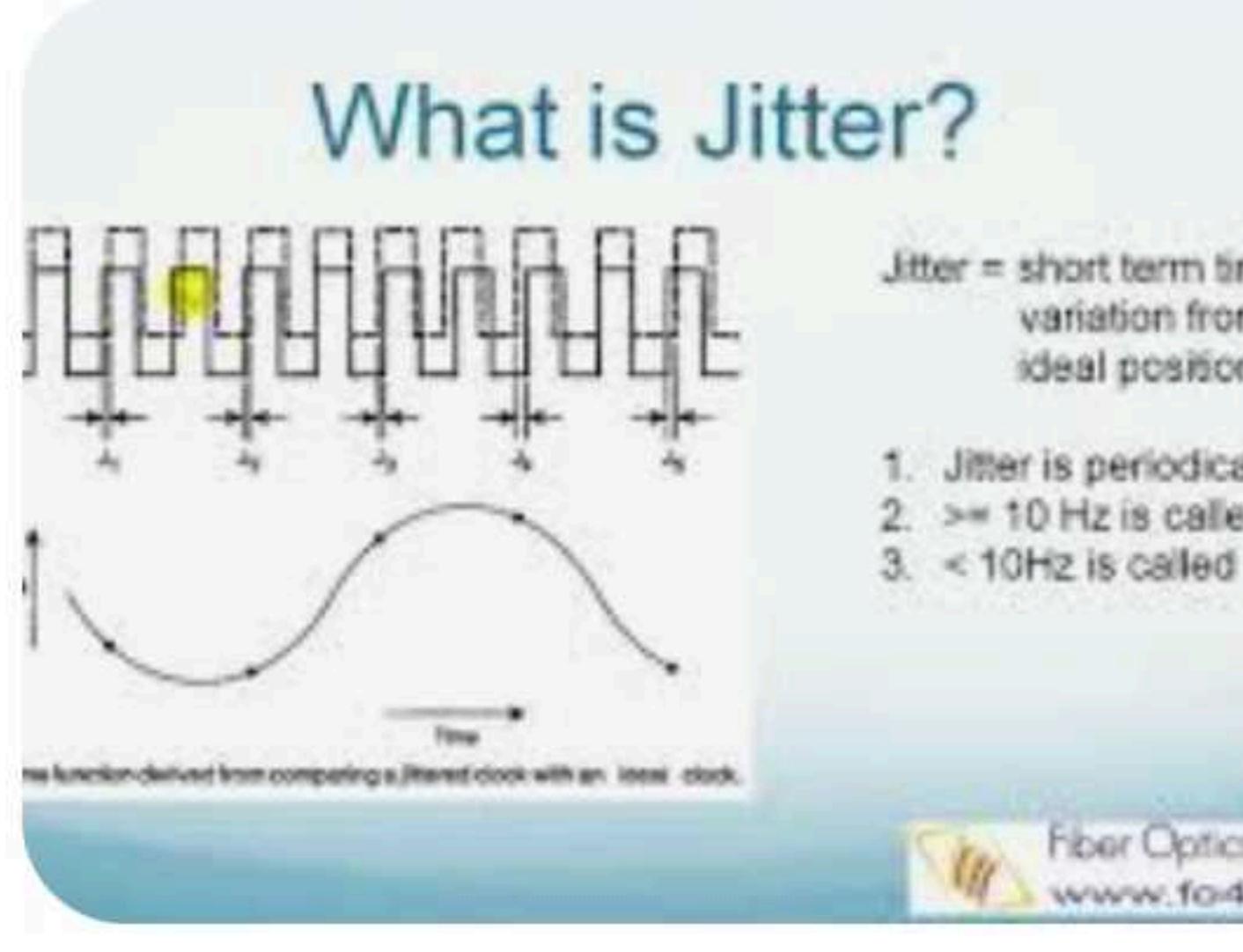


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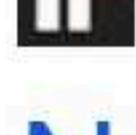
jitter in data communication



বাংলায়

In English

Jitter is the variation in time delay between when a signal is transmitted and when it's received over a network connection, measuring the variability in ping. This is often caused by network congestion, poor hardware performance and not implementing packet prioritization.

<https://www.ir.com/guides/what-is-jitter-in-data-communication>

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Network Jitter - Common Causes and Best Solutions

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What is jitter? How to test and reduce internet jitter - RingCentral

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What is jitter in communication?



What is jitter and latency?



Latency is the time it takes for data to maneuver from one endpoint on the network to a different. It's a posh measurement suffering from multiple factors. Jitter, on the opposite hand, is the difference in delay between two packets. Similarly, it's going to even be caused by several factors on the network. Nov 9, 2022

🔗 <https://www.geeksforgeeks.org/difference-between-latency-and-jitter/> dif...

Difference between Latency and Jitter in OS - GeeksforGeeks

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What is called jitter?



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ISO stands for International organization of Standardization. This is called a model for Open System Interconnection (OSI) and is commonly known as OSI...

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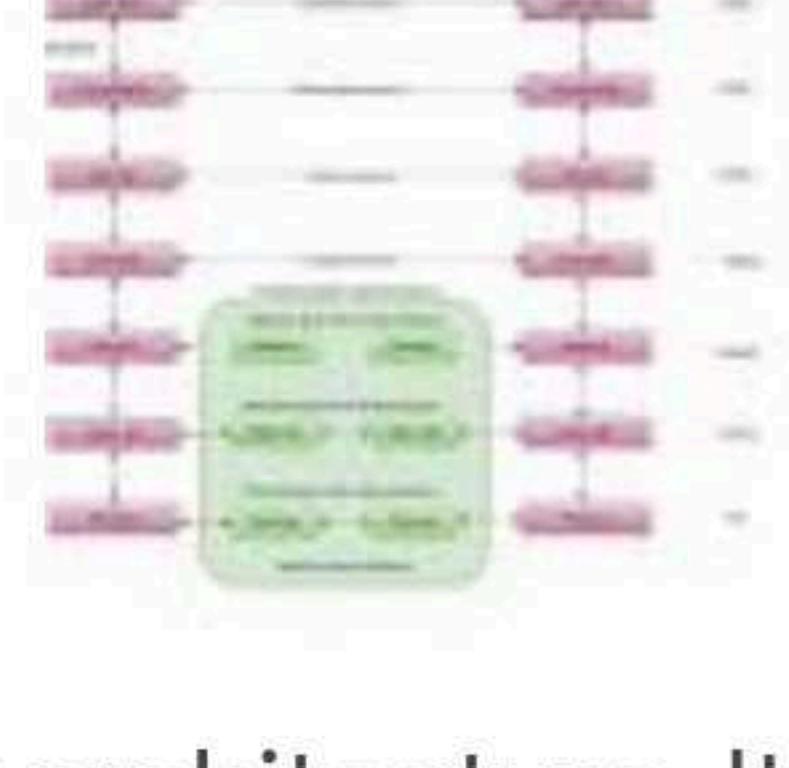


What is ISO in data communication?



ISO stands for **International organization of Standardization**.

This is called a model for Open System Interconnection (OSI) and is commonly known as OSI model.



The ISO-OSI model is a seven layer architecture. It defines seven layers or levels in a complete communication system.

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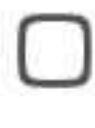
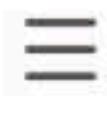
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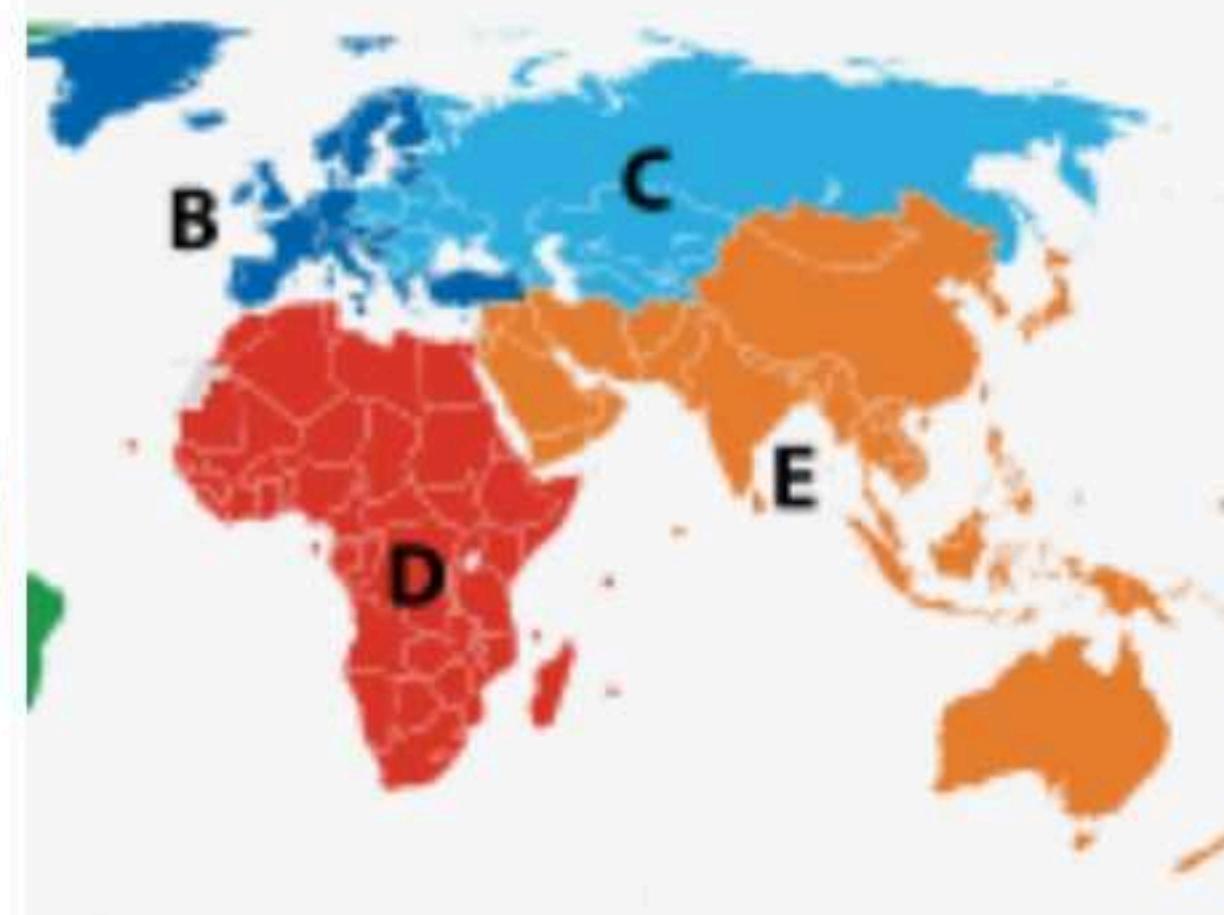
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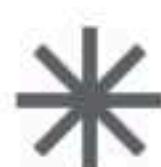
In English

The International Telecommunication Union (ITU) is a specialized agency of the United Nations responsible for many matters related to information and communication technologies. It was established on 17 May 1865 as the International Telegraph Union, making it the oldest UN agency.

W https://en.m.wikipedia.org/wiki/International_Telecommunication_Union

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[International Telecommunication Union](https://en.m.wikipedia.org/wiki/International_Telecommunication_Union)
- Wikipedia



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Wikipedia

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ANSI C12.22

ANSI C12.22/IEEE Std 1703 describe a protocol for transporting ANSI C12.19 table data over networks, for the purpose of interoperability among communications ...

People also ask



What is ANSI in data communication?



ANSI can refer to the **American National Standards Institute**. The term also refers to a protocol for encoding data that many Unix-operating systems and telecommunications devices use, and a set of standards that govern how computers and other devices should display certain documents. Aug 12, 2022

🔗 <https://www.geeksforgeeks.org/ansi/>

What is ANSI? - GeeksforGeeks

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What do you mean by ANSI?



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বাংলায়



In English

The IEEE standards in computer networks ensure communication between various devices; it also helps to make sure that the network service, i.e., the Internet and its related technologies, must follow a set of guidelines and practices so that all the networking devices can communicate and work smoothly.

[https://www.scaler.com › topics › ie...](https://www.scaler.com/topics/ie...)

IEEE Standards in Computer Networks - Scaler Topics



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What is the IEEE used for?



The Institute for Electrical and Electronics Engineers (IEEE) is a professional organization **supporting many branches of engineering, computer science, and information technology.**

In addition to publishing journals, magazines, and conference proceedings, IEEE also makes many standards for a wide variety of industries.

Apr 27, 2023

 <https://pitt.libguides.com/ieee>

[Citation Styles: APA, MLA, Chicago, Turabian, IEEE](#)

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What is meant by IEEE standards?



IEEE standards means **the standards published by the Institute of Electrical and Electronic Engineers**, available at www.ieee.org.

 <https://www.lawinsider.com/ieee-s...>



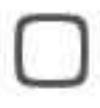
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বাংলায়



In English

EIA/TIA (Electronic Industries Association and the newer Telecommunications Industry Alliance) is the standards body that creates the Physical layer specifications for Ethernet.

<https://uotechnology.edu.iq> › ...

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[The EIA/TIA \(Electronic Industries Association and the newer ...](#)



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What is the EIA standard RS-232?



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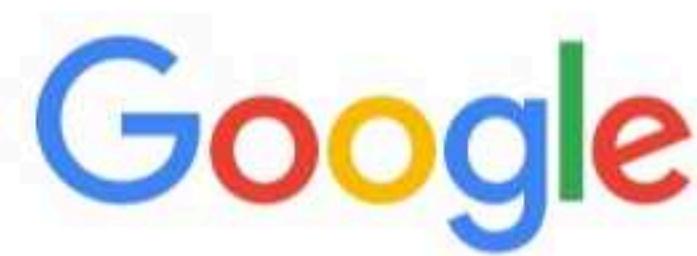


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বাংলায়



In English



The Internet Engineering Task Force (IETF) is the body that defines standard operating internet protocols such as TCP/IP. The IETF is an open standards organization supervised by the Internet Society's Internet Architecture Board (IAB).

<https://www.techtarget.com/whatis>

[Internet Engineering Task Force \(IETF\) - TechTarget](#)



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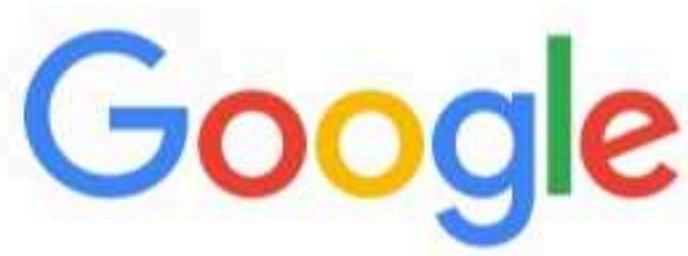


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In English

What is bus topology? Bus topology is a type of network topology in which all devices are connected to a single cable called a "bus." This cable serves as a shared communication medium, allowing all devices on the network to receive the same signal simultaneously.

<https://www.lenovo.com/glossary>

[What is a Bus Topology & How Does it Work? | Lenovo US](#)



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[What is bus topology use with example?](#)



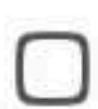
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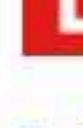


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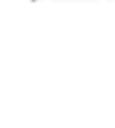
In a ring topology, data is transmitted from one device to the next in a sequential manner. When you send data from your device, it travels to the next device in the ring, and that device passes it along to the next device until it reaches the intended recipient.

<https://www.lenovo.com/glossary>

[What is Ring Topology & its Advantages - Lenovo](#)



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What is ring topology and its types?



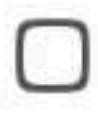
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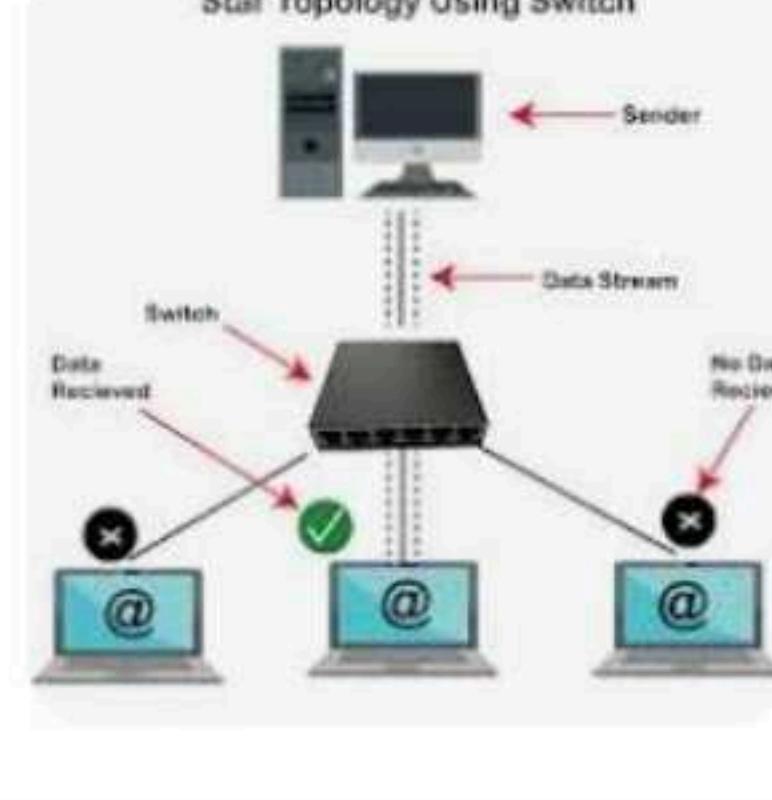
Javatpoint

<https://www.javatpoint.com/what-is-star-topology>

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What is Star Topology? Definition and Explanation

A star topology, sometimes known as a star network, is a network topology in which each device is connected to a central hub.



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What is star topology in communication?



What Does Star Topology Mean? Star topology is a network topology in which each network component is physically connected to a central node such as a router, hub or switch. In a star topology, the central hub acts like a server and the connecting nodes act like clients. Jun 28, 2023

<https://www.techopedia.com/what-is-star-topology>

What is Star Topology? - Definition from Techopedia

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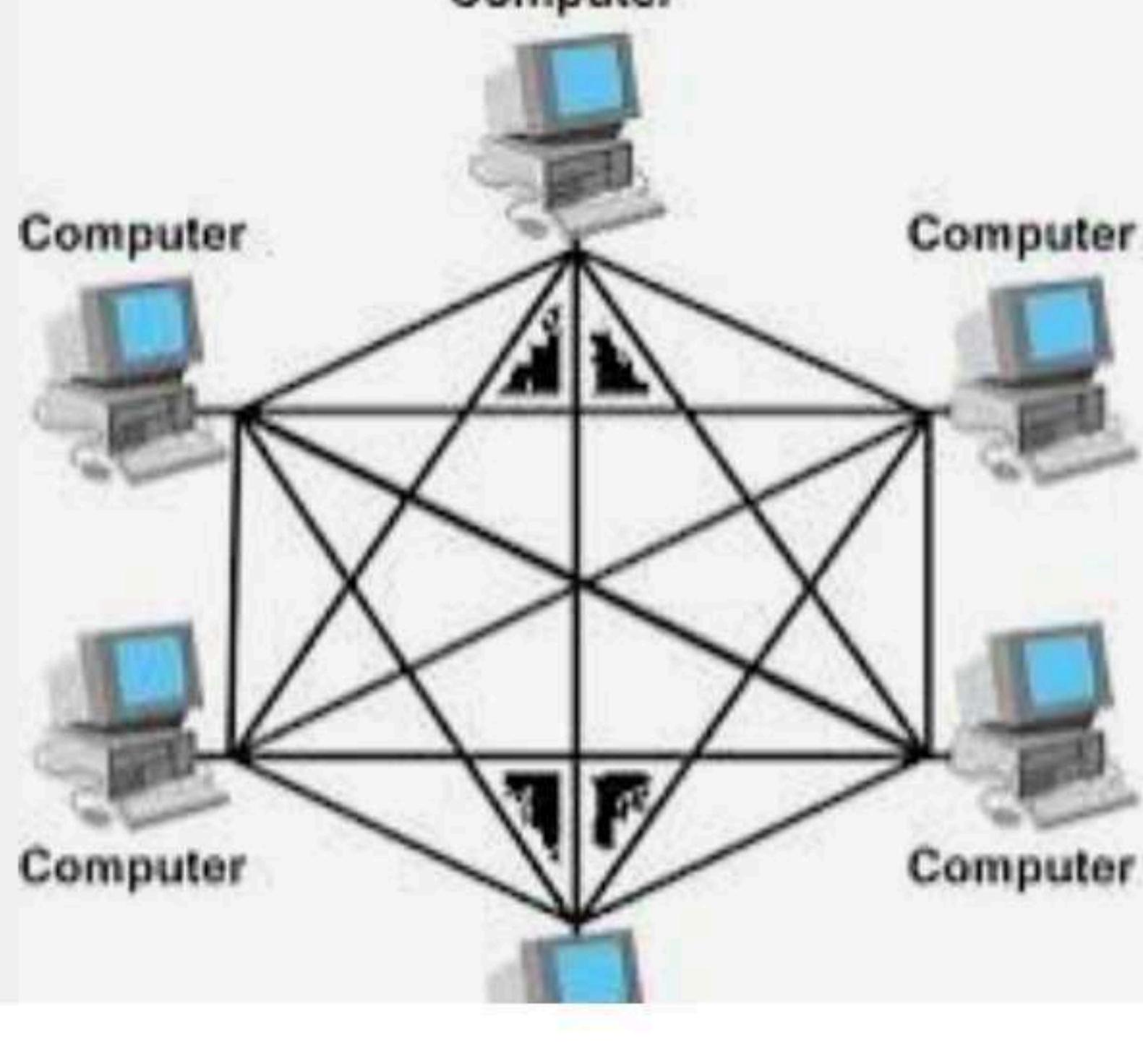
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In English

Mesh topology is a type of networking in which all the computers are interconnected to each other. In Mesh Topology, the connections between devices take place randomly. The connected nodes can be computers, switches, hubs, or any other devices.

<https://www.javatpoint.com/what-is-mesh-topology-in-data-networking>

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connected nodes can be computers, switches, hubs, or any other devices.

https://www.javatpoint.com › what-i...



What is Mesh Topology? Definition and Explanation - Javatpoint



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What is mesh topology types?



What is a mesh topology and its advantages?

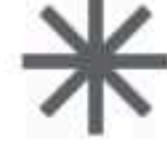


Mesh topology is a type of network topology in which every node is connected to every other node in the network. This topology **provides a high level of redundancy and error tolerance**, making it a popular choice for large-scale networks. Apr 18, 2023



https://www.tutorialspoint.com › ad...

Advantages and Disadvantages of Mesh Topology - Tutorialspoint



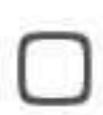
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What is ring topology and its types?



What is an example of a ring topology?



What is ring topology advantages and disadvantages?



A Comparison Table for Advantages and Disadvantages of Ring Topology

Advantages

Disadvantages

1. Fast Execution

1. Quite Expensive

2. Better Administration

2. Slow Activity Rate

3. Straightforward adaptability

3. Unprotected use

4. Fidelity of network

4. Need for Hardiness

3 more rows



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[Ring Topology Advantages and Disadvantages - Javatpoint](https://www.javatpoint.com/ring-t...)



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Why use ring topology?

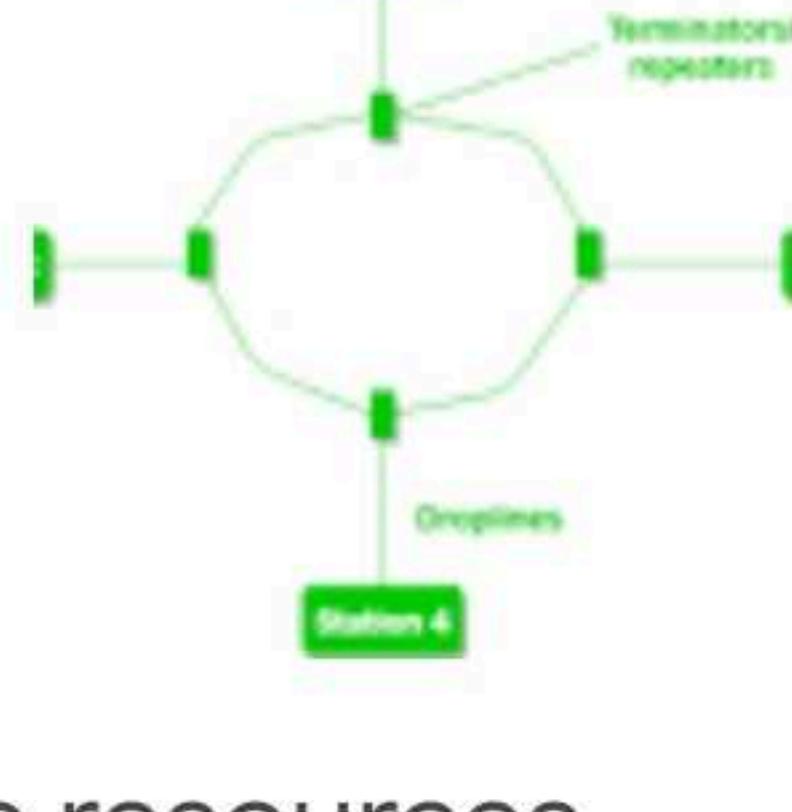


What is ring topology 3 advantages?



Advantages of Ring topology :

In this topology **additional workstations can be added after without impacting performance of the network**. Equal access to the resources.



There is no need of server to control the connectivity among the nodes in the topology. It is cheap to install and expand. Aug 5, 2022

🔗 <https://www.geeksforgeeks.org/advantages-and-disadvantages-of-ring-topology/>

[Advantages and Disadvantages of ring topology - GeeksforGeeks](#)

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What are 2 disadvantages of ring topology?



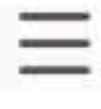
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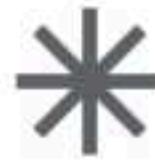
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Semantics refers to **the interpretation or meaning of each section of bits or fields**. It specifies which field defines what action. It defines how a particular section of bits or pattern can be interpreted, and what action needs to be taken. It includes control information for coordination and error handling.

Dec 6, 2019

<https://afteracademy.com> › blog

[What are Protocols and what are the key elements of protocols? - AfterAcademy](#)

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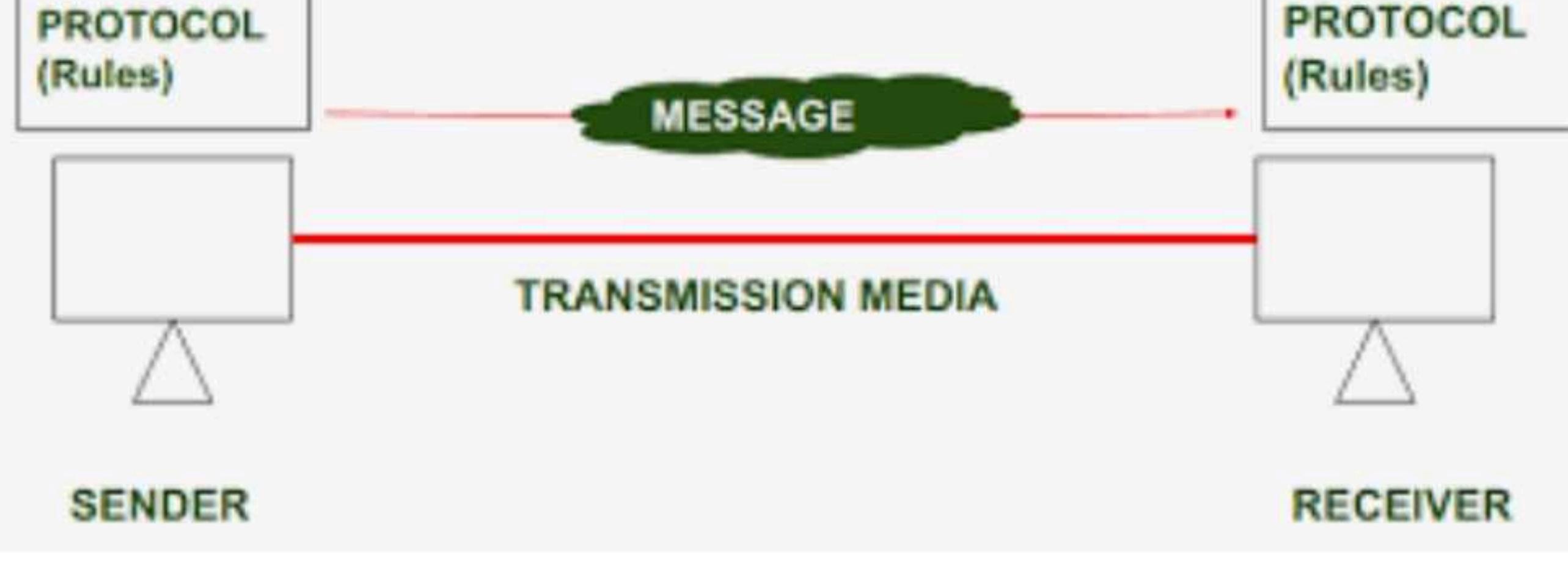
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তথ্য যোগাযোগের মান

[বাংলায়](#)[In English](#)

Standards are the set of rules for data communication that are needed for exchange of information among devices. It is important to follow Standards which are created by various Standard Organization like IEEE , ISO , ANSI etc. Jun 22, 2023

<https://www.geeksforgeeks.org/standards-in-data-communication/>

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[Protocol and Standard in Computer Networks - GeeksforGeeks](#)



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বাংলায়



In English

MESSAGE

TRANSMISSION MEDIA

Protocols and standards enable secure and efficient computer network communication. They regulate data exchange, formatting, endpoints, and reliable device communication. These protocols and standards ensure network security and performance. Complying can prevent data breaches and system breakdowns.

Jun 22, 2023

<https://www.geeksforgeeks.org/protocols-and-standards-in-computer-networks/> ...

Protocol and Standard in Computer Networks - GeeksforGeeks



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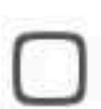
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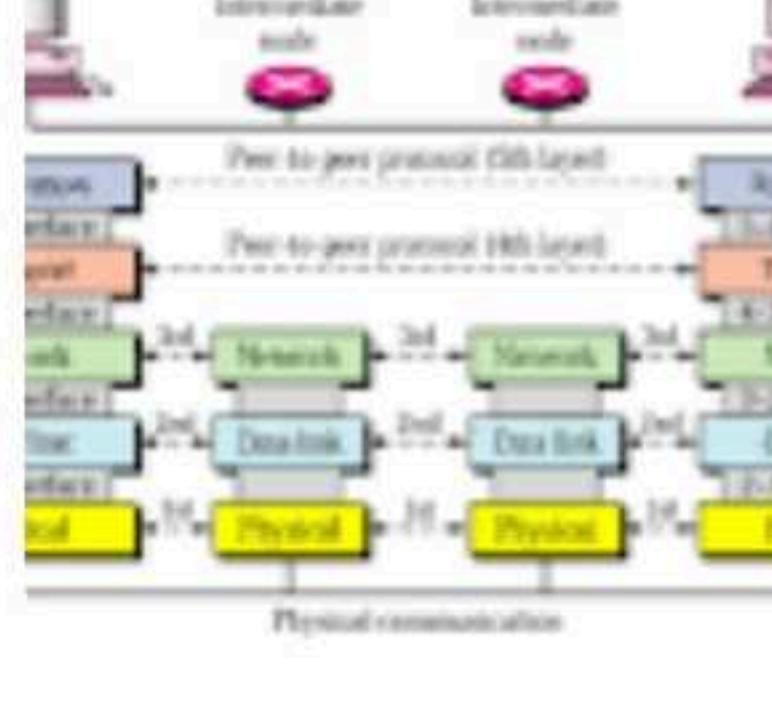
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ওএসআই মডেলে পিয়ার টু পিয়া.

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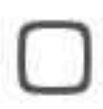
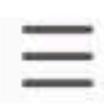
Within a single machine, each layer calls upon the services of the layer just below it. Layer 3, for example, uses the services provided by layer 2 and provides services for layer 4. Between machines, layer x on one machine communicates with layer x on another machine.

<http://www.myreadingroom.co.in> > ...

Peer-to-Peer Process - Myreadingroom

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- P3-33.** What is the total delay (latency) for a frame of size 5 million bits that is being sent on a link with 10 routers each having a queuing time of $2 \mu\text{s}$ and a processing time of $1 \mu\text{s}$. The length of the link is 2000 Km. The speed of light inside the link is $2 \times 10^8 \text{ m/s}$. The link has a bandwidth of 5 Mbps. Which component of the total delay is dominant? Which one is negligible?