

## A.P. SHAH INSTITUTE OF TECHNOLOGY



Semester: V	Subject: Computer Network Academic Year: 2023 - 2024
Mari	faireleins are
	ienoria 1P parkets
- Per	orming Rocking
- Ava	odnig angestin
	nt layer
- Allow bost &	pær entities on she source questination
- No	end to end proto als are defined here
	nd UDP.
-Applica	lusi Layer:
- and	oris all bighes level protocols.
- These	ni deide
	retail terminal (TELNET)
	rile transfer (FTP)
	Electronic mail (SMTP)
	mani Name system (DNS)
x H x R	TP (Real Imme protocol)
Apph	HTTP 5 mTP DNS
Transport	TCP UDP - Protocole.
N/W	IP ICMP
Work	DSL SONET ETHERNET 802.114



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multiple of m a searches aray.  Hast to network him hayen  - Protocol is used to amount bost to new so  shat packets can be sent over it  - Interface blu host of framsmission link  - Americal with what links must do to meet  the needs of the amountain his miterat layer.  Interport layer  - boths whole architectore to gether  - peromit hosts to mycel packets into any  network be have shern travel midependently  to destination  - mey may arrive in different order shap shey  were sent has such a use it is the job of  higher layer to regeneral re-amongs shern,	Semester: V	Subject: Computer Network	Academic Year: 2023 - 2024
- Used as APPANET, was he under to terrote.  APPANET - Research petwork appropriately to the Do D (US Dept or defence)  It eventually appreciated translocated of appreciations of the property of the search telephone time.  This model has the ability to appreciate multiple of m a searches any.  Host to network him have have the new so that packets can be sent over it.  Interface by host of transmission links.  - Interface by host of transmission links.  - Concerned with what links must to to meet the permit hasts to might packets that appear to the packets that appear to the stimulum.  Interpret layer to might packets that oney network by have them travel midpendently to destination.  They may arrive in different order than they are sent layer to segment a sent of the pool of them.	TCP/IP &	Reference model	
It everyteally appelled bundreds of universities  I game snowent installations rusping leared telephone  line.  This model has the ability to appear  meetingle of ma searchess any.  Host to network high fager  Protocol is used to appear host to now so  that packets can be sent over it  metriface blue host of from smission link  metrocol with what links must to to meet  the needs of the appearance less miteract layer.  Interact layer  hoths abole architectore together  permit hasts to miject packets mito my  network is base them travel midependently  to destination  mey may arrive in different order than they  are sent in such a nee it is the job of  universities	- Used on	APPANET, WOO W	unide todesort.
It eventually annected bundreds of universities  If gone snovent installations i worky learned telephone  line.  This model has the ability to annect  multiple of m is searchess any.  Host to network him layer  Protocol is used to annect host to now so  that packets can be ent over it  hord are blue host of transmission link  - ancerned with what links must do to meet  the needs of the annection has miterat layer.  Interpolating and include the packets into any  network is have them travel midpendingly  to destination  may arrive in different order than they  are sent in such a case it is the job of  higher layer to regeneral re-amonge them,	- ARPANE	P-Research network	in sponsored by the
A gene snovent installations , wormy leared telephone line.  This model has the ability to annoch  multiple of m is a searches way.  Host to network him hayer  - Protocol is used to annoch host to ofw so  that packets can be sent over it  - Interface blu host of transmission link  - Concerned with what links must to to meet  the needs of the annoclain less miteract layer.  Interpolate layer  - ho his whole architectore together  - permit hosts to migel packets into emy  network is have them travel midependently  to destination  - mey may arrive in different order than they  were sent hayer to segeneral re-amongs them,			
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- Protocol & ased to arrowch host to new so  that packets can be sent over it  - Interface blue host of transmission links  - Concerned with what links must to to meet  the needs of the annection less miteract layer,  Interact layer  - holds whole architectore together  - permit hosts to miject packets into any  network be have shem travel midgendantly  to destination  - mey may arrowe is different order than they  were sent in such a case it is the job of  higher layer to regeneral re-amonge them,	nultiple.	of ma seamers	aray.
- Protocol & ased to amoret post to specific John packets can be sent over it  - Interface blu host of framsmission links  - ancerosed with what links must do to meet  The needs of the annector's less miteract layer,  Interact layer  - bolds whole architectore together  - peront hosts to miject packets into emey  ne twork & have them travel midependently  to destination  - mey may arrive in different order than they  are sent for such a case it is the job of  higher layer to regeneral re-amonge them,	1 Hast - to	Notwork) Line Layer	
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The needs of the amnedians less miteract layer.  Interact layer  - ho Hs whole grabi-tectore to gether  - peromit hasts to miject packets into any  ne twork be have them travel margendantly  to destination  - may arrive in different order than they  were sent. In such a use it is the job of  higher layer to segment re-amonge them,	- mortal	blu bost of from	STOUSTON OFFICE
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- holds whole architectore to gether  - holds whole architectore to gether  - peronit hasts to miject packets into any  network by have them travel midrendontly  to destination  - mey may arrive in different order than they  avere sent. In such a more it is the job of  higher layer to regeneral re-amonge them,	the need.	s of the annellows	es motorist again
- holds whole architectore to germent  - peront hasts to mycet packets into emy  network be have them travel midependently  to destination  - mey may arrive in different order than they  are sent. In such a case it is the job of  brigher layer to regeneral re-amonge them,	La teamet	layer	
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ne twork et balle spens state midget de stimularion de stimularion de stimularion de state de state de sent de	harmy	harts to milet	pacifets 1.340 1.19
- mey may arrive is different order than they are sent. In such a case it is the job of brigher layer to regeneral re-amonge them,	network	E baue shem to	and magnesdassty
avere sent. In such a case it is the job of brigher layer to regeneral re-amonge them,	to alock	malum	
bigher layer to regeneral re-amonge them,	may m	ay arrive in all	event order than they
bigher layer to regeneral re-wing	111.1 00	al. on sach a ca	DE TE CO GET GET
If morder delicery is desired.  If defines an opicial packet format & protoci	1-2622	layer to segeneral	M-wary
It depines an oppicial parellet format & protocol	- psigred	or den deluery is	desired.
- It depires hospects	17 132	an opinial pa	elet format & protoci
Called P (15 Acres)	- It defin	IP (Internet protoco	10.



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Transport layer
- Accept douba from above, spit it up to smaller
cepits of pass strese es oxtexale layer
= Determonics what type of service, le provide
to the session layer q to users of network
- True end-la-end layer
Sessivos layer
- Allba users on different machines le establis
- Sessions between them
- Services offered are dialog control ( Keeping trace
of whose turn it is to fransmit) / token
presentation layer
- ancerored with syntax & semanties of originality
Application layer
-andains variety of protocole shat are anonomy
Decdod by users
- one acidely ased is HTTP which is the bass for
acort d'aide acb.



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he sand a bit last
thoumany nanosears a bit last  n howmany pin annector has a what pin is  ased for
cused for
I abelber transmisson proceed smellaneously
m' both disections.
Data loish layer
Data bish layer  - Transform naw transmission gacility mito a
line shad appears free of andetected for
errors to the sexwork layer.
- sender breakup data nito data Jeanes etransoniting
11 2 1/20/1
11 the service is reliable, seceiver antions correct
It she service is reliable, securer amprons crossed secure of each journe by sending back actionale
descent grame.
bound for keep a door growing
1 Ames & a stow receives
h / Patrivilla / Suus
bow to antrol acces to shored channel.
Maturak / ages
1 64 0/00 051 3000000
- Design esser - bow partets are receted from
Source to massiving caused due to too many
antrolling angestim aused due to too many
packets over arms the problems to allow between of the be interconnected.
potonogenous Alw W DE 115



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Semester: V	Subject: Computer Network	Academic Ye	<u>ar:</u> 2023 - 2024
Applica lu	Application Protect	Applicalin	Appu
Pearantal	presentation portocol	71	2021
	D Cooker /	resentation	PPDU
Session	Session Pootocol	Session	SPDU
	Transport protocol		
To anspor	t Communication Subnet boun	Transport	TPDU
01-1-1	K   K   K   K   K   K   K   K   K   K		
Netaxok	I Internet Subret	Network	Paelet
Datalinh	hoternet subret  protocol  C -> K-> K->	Data link	Frame
Physican Host A	1	Physical	Bit
Host A		Host B	Pr.
	Ly Physical layer to	est socilis,	protocol
b/ . / /			
Physical Laye		2.	
ammunicaler	with domsons thing	saw bit.	s over
ammuni caler	5 channel		
- Design Ossu	ies are		
» whother	the bit is recen	ied in	niverted
10000 00 1	of		
o bowonone	1 volts are used	le repo	rescot
bit 1 ass	do.		



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Service prionities	
	My specified by set of pointie
	ble to user process to access
	Ties tell she service to perform
^	report to an action taken
by pear estity.	
Primitaie	Meaning
LISTEN	Black waiting for marring annecle
CONNECT	Establish connection with waiting fe
ACCEPT	Acept mi Comoning Consociety from Jose
RECEIVE	Block aging for marring message
SEND	Sent a message to peer
DIOCONNECT	germinate l'anocelin
Rojerence models:	
nosi Reference ma	lel
2) TCP/IP Reference m	del
asi Reference mortel	
_ 14 has 7 layers.	
- Each Cager part	orms a well Junelin defined
- Lucalusa .	
function.	



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when	One 2048 by te mes	sage arrives at
- Rollin	, it could be send	as one 2048 byte
022	1024 by te messages.	
- Not lela	eble.	
anneclariles	85 Services=5	
* madalad	all hackal action	0,
* Each sn	essage avoises full of	restination address
each one c	à routed through	system omkpendar
of all sh	e others. When 2 me	ssages are send to
	lesting a limit jurist one	
am also	be delayed so show	t sound one ambre
Riost,		
a Each Ser	me services are re	cressed by quality
Service . 30	me services are he	liable they never
	4 4	24
	acknowledge receip	
	he sender is sur.	
	n'troduces overhead	
	6 annochimiless se	
called de	day ram service (Noer	not actisowledge



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Subject In charge: Prof. Aavani N

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long mesiggs.
a Statistical multiplexing - shoring based on
statisties g demand.
- annection orientet annectionless services.
* Empecturis oriented services =>
modeled after telephone ston.
- ho some abes when apprecless is
established, sender, receiver psuboret anduct
a negotialism about parametes be used
such as maximum message size / quality
_ of Service
x ho some cases when annection is esta
blother. Sender, Receiver of Subnet anduct a
negotilun about paramets to be ensured such
as maximum message size, quality of service
Required fother issues.
· A typical example is the transfer.
» Reliable anneclero mented service has a minu
variations:
D message sequence =>
- message boundanies are preserved
-2 lose byte messages are sood. They arrive
as 2 distinct 1024 byte messages.
2) by 6 Streams=
-no message boundaries.



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Semester: V	Subject: Computer Network	Academic Year: 2023 - 2024
Design 1	ssues for the layer	8 -
DE volution	of petwork.	
» Each	layer need a	one chamison for
- 1dentilyn	g senders & rece	recens
~ Protocol	must determin	i how arrany logic
- channele	the appellin aro	esporas to and what
- their pr	i volies are.	
& Not all	amornent calini de	sommel present, the
- Osder of	messages sent on	them.
p To setup	separate anne	timo for each pair
of amm	cers calering processe	1
& Mechani	sons for disassem	bing (multiplexmg
_ acrowys	exmg	
2) Reliabile		
p No- of p:	it of packets move	erteel.
me me	chanism for por	long errors on recired
opporonalum	uses orde for	estable of or est
	ses code por error	avvectory or co
se tromsm	Finding a west	mg past strongs
x Roulring -		0
3) Resource	Allegalon .	
3) Response	n trans mission	lines
- Lapacisy	of forms on ission	to accept aribinarily
- x VISUBIU	7	



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+ Peros amonuniate by woring the protocol.
» No data are directly transferred form layer
non best 1 to layer n in bost a. Instead
actual amounication occurs atmosph physical
medium. Between each pair of adjacent
layers is notesface hoterface deposes which
promittée operations à services une lours layer
makes available le coppor one.
A set of layers & postocole es alled opticisk.
Destroy Stock - list of portocols used by a certing
eystem one protocol per layer is called protocol  stack: layers protocol
Stack :   layer 5 protocol   MK M   layer 4 protocol   M4 M K H4 M   H2 M2   M2 K H3 H4 M   H2 M2   M2   M3 M2 K H3 H4 M   H2 M2   M2   M3 M2 K
MK
layer 4 protocol
14 M = H4 M   layer3,
Ho Ho MI Ho M2 K >H3 HW MI HS M2
113 14 11
H2 H3 H4 M1 T2 H2 H3 M2 T2 <-> H2 H3 H4 M T2 H2 H3 M2 T2  Protocol
protocol
Sousa machine Destinations machine



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corned the	ee or more transm	pission lines ei,
Socilers.		
nous subr	et is the collections	of gouler of Commer
sicalim 1	line stat onered	packets from the
source bas	t lo destination	fost.
eg: Offices	aust different	branches
	subnet     Transmissim     line	
B	Transmissim !	
FI		
	ョ <sub>c</sub>	Harris Harris
Internet was	ks.	
- collection of	miterannected or	two to called
an intero	etwork or internet	
- Galeways	are machines tha	t make emoceters
between -	two or more n/w	and provided
Decessary	translations but m	terms of boralwares
software.		
0	soltware.	
Network -	U	
Protocol hie	les desses and	with most returk
· 10 red	luce design ample	end or lavele The
are designe	d as stack of lay	jos vo www.



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Semester: V
Transmirsim Tabel
- Transmission Technology =)
-copper cuire
- Optical Pibre
- wired LAN's Speed - 100 mbps - 1 mbps
- compared to WIFI, wixed LAN exceed in all
dimensions of performs.
Metropolitan Area Network (MAN)
- covers a city
- eg: cable teleuisum o/w  Antenna Junction Fai Fai  Mead end Fai  Antennet
Wide Area Network (WAN)
- sporos a large geoprephical area
- alledon of machines intended for running
user programs - basks.
- bosts are annected by amonumation subout
haste are owned by users of subnet is owned
by ISP or telephone ampany.
- Job of suboret is to army messages from
bost to bost.
- In most WAN, subject assists of 2 aromprosons
D toms mission lines: mey more bits blow machine.
1 L 1 Consolis 1:20 all Geomorphers don't



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n 2 or more ma	chmes want to tran
1 meauly,	
19.	1
propagales associ	nd on 145 own, not
in ohe rest of po	acket to which It
device pane lo	be easy to mistall
is execution for su	100015
a salas falita	
ts -> 7 4 4 4 4	
Pc Pc Pc	To nest of network.
1=> Acces print	
5 6 7	
PCI PCI PC	= 7
	device bave to  selvability  propagates associated for sure to  propagates associated for sure to the sure t



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PC .
7 5 3
mouse keyboard Printer
Local Area Network CLAND:
- privately - owned networks within snige builting.
They are widely used to armed po Ep work status
mi ampany affices & jactories le stare resources
_ ANS are distinguished from other kinds of solw
LANS are astroguisted from ourse trais of
by shope charactersties.  1. size 2. Transmission technology 3. Topology.
* LANS are restricted in size. This simplifies
network management.
* Also called entemposes optwork.
x guo brookast petwests - Bus and Ring
- Computer
R cable.
Bus Topology
Bus Topology.  At most one machine is master pis allowed
in transmit. Others are required to refram from
to transmit. Others are required to refram from sending. Arbitration mechanisms to seconded to resolve



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	ase broo	ed rastring where	as larger networks
usu	cally are	point to point	
01	ricas brig -	Point - 15 - point	transmission auth
me	sender	and one receive	2 /
			on she's scale=>
	Distance	located in some	Example
	1m	Square meter	PAN
		Room	
		Bui Hrsg	& LAN
	1km	ampus	
	10 pm	city	MAN
	Looken	country	7 WAN
	1000 Km	antinent	5
	10,000km	planet	Internet
-		1. 1. 0	
Yers.	osal area	Network CPAN)	
- Ne	etworks ob	at are meant for	one person
- 89	: mireless	setwork ann	sectors amputer auth
1	ts periphe	sal like blue;	footh.
_ (	se maste	slave parades	9m.
- PC	e is 16	e mouster tall	eng to mouse,
14	es boord et	e. as slaves m	paster telle stanes
<i>c</i> 2	hat addre	se a cese when	obey can broadcast
- W1	in long to	her com transm	it what Ise quence
100	1 6000 6100	and co on	sit, what frequence
one	y consuse		



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B2c	Business-to-consumer	Academic Year: 2023 - 2024
B2B	Business - LE - Business	ordering books anlone.
	2007(74)	lines pour supplier
620	avenment - lo -	Crovernment distributing
	Consumer	tax froms electronically
P2P	Peer - to-peer	· Se sherring
C2C	Consumer lo -	E-glea
	ansumer	
3. mobile	2 Users	
- Poo 10	ble office	
	less hotspots	
	any	
	Le Commerse	
- GPS		
	01,	Service)
	able arospulers	
4. Social		
	1 provacy.	
Sm	all files called cookers	that web boncers
		allow ampanies 15
	users' actuillés m	
	tily shaft.	<i>-</i>
- mini	es collect enough	mitamolari about
10/-	le obtain get cred	lit carsels fother documents
Uicum	1-1 s' pami:	
no vic	Imis' name.	



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Semester: V	Subject: CN	AI1-V 2022 2024
x Person to person	Subject: CN	Academic Year: 2023 - 2024
- E-mail	- inaniaum	
- bostort messagin	0	
- world wide pairs	a cours	
- peer le peer	Common in Calif	
Individuals from	long agains	P 22
aush others on 1	he asper. There	is no bixed during
mito clients query	CON -	y and a second
	3 K	Ţ.
e-mail is miles	costly peer-to-	- peer.
- Using miternet	to carry te	lenhme calle viden
phone & internet		
-tele learning.		
photeracties enter	tamment.	
- game playing.	sce ( Selling & Buyr	ing goods over net
- acces to pinancia	1 mishitalens	
- electronic 2/2 or	makets (e-Hea).	- on line autlus a
- electronic flea or	lo.	
second hand good	sia- wise of and	6 sacrota sho
Obsquitous amput	Courte land	000000000000000000000000000000000000000
short michigle door	r quisique se	. 200 1.



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Semester: V
Semester: V Subject: CN Academic Year: 2023 - 2024  Communication takes she from of the dient process  Sendone a messes and the dient process
sending a message pour the title poules
sending a message over the network to the sorre
when the server process gets the request, it
performs the requested walk a looke or security
data & Send back sent sent
data P Bend back Reply.
machine.
Request Server Masses
Chient machine.  Request Network.  Repty  Gient process.  Description of the server process
Reply
dient process. gerver process
- provide pocuerful cononcinication medicino among
etoployees (e-mail, video anjeroning 1.)
- Doing business electronically wish other ampanies,
especially suppliers of austroners
manufactures an place arters electornically as
neceled.
- Doing business awith ansumers over lotentelle-
ammera).
2. Home Applications:
* Access le remote infranction
- Busting the world with web for information
- Online neues papers
- ordine digital library.



### **A.P. SHAH INSTITUTE OF TECHNOLOGY**

Semester: V	Subject: CN	Academic Year: 2023 - 2024
_ cuide cueb.		
	tes setwork, shis co	bereno model al
Software are	absent, Users are	exposed to actual
machines, 12	the machines has	ue different handame
Edifferent ope	esatrong system se,	July visible lo cusers
13 a wer au	ests le sun a progr	am on a remote
machine, he	has to log onto tha	t machine & run it
there.	O	
Thus distribe	led show is a sof	Hware system built
on top of a	setwerk.	
Uses.		
1. Business Ap	plicaluris	
& Resource for he	stormalan sharing.	
Goal is to	- make all progre	ms, equiponents &
especially de	ata available is a	The state of the s
widhout re	gard le physical	localeros of the
sesousce q of	e ciser.	
dient serve	er model=>	
Data are.	Strond as powerfu	I wonputers ralled
CONCETT : Phos	e are contrally to	bused poman tamed
6. 0 5/00	administration Con	sployees have susp
machinis. ca	led chest auth a	orich oney area
sempte date	a. client que se over	machones are
connected 6	y a setwake	
- disole 1	n/w	
- cuerk -		Server
client !		
chem		



## A.P. SHAH INSTITUTE OF TECHNOLOGY

Semester: V	Subject: CN	Academic Year: 2023 - 2024
Module-I.	networks - A con	nputer network or
, tuesa / c	is a digital tele	communication retwood
- Defaul	aked compuling de	enios exchange data
The apprection	er usong dedaloish between nodes ax	established using
Objectures:-	sedia or aireless	
- Transfer data - Facilitate Sh	naving of data.	e to another.
- facilitate Applicaleris:-	access of remote	nifumalión.
- world wide and		
- consider social.		
is a distributed	d system that	scors on top of the
ho distribudea	1, a collectoris of	midependent computer
appears to 145	model or paradig	a bereast system.
to she asers. A	A layer of Softwa	ne on top of the os
Li middlewa	re, is responsible of	to a series ing