I.E.S. College of Engineering

2nd Internal Examination

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Subject : CS 364. Mobile Computing

Marks Awarded:
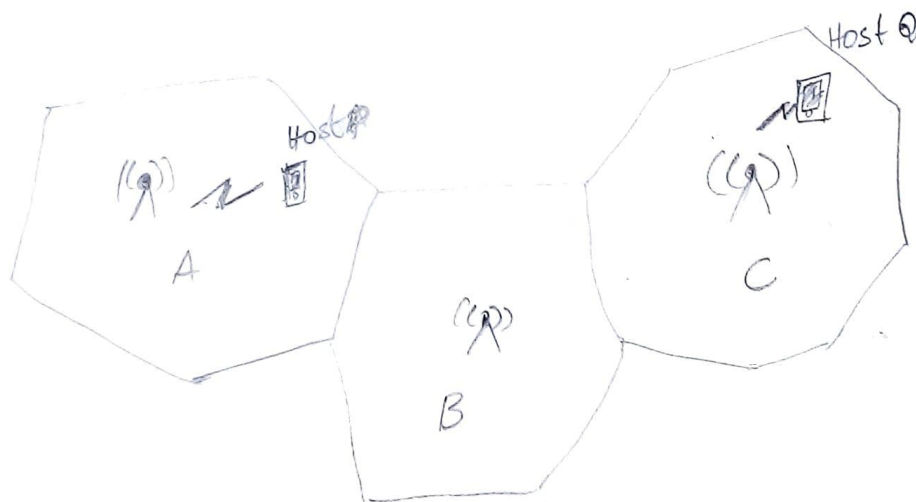
A1.) <u>Conventional TCP</u> & <u>Slow Start</u>

- A transport layer protocol has been designed for fixed networks with fixed end-systems.

~ Congestion may appear from time to time even in carefully designed networks.

~ The packet buffer of a router are filled and the router cannot forward the packet fast enough.

~ It is because the sum of the input rates of packets destined for one output link is higher than the capacity of the output link.

~ A dropped packet is lost for the transmission and the receiver notices the gap in the packet stream.

1.

- Now insead of dirdy informing sender the reuired sends back the a cknoledgut of all the present packeh in the stream.

- Then the senden acterd also notices the the gap in the alenoledgment and assend that that pakel is lost.

- To mitiacle congetion, TCP slows down the transmission rate dramatically

- The behaviour TCP shows after the detection of congection is caled slow start.

- Whdl slow start is one of the most unsefud mechanisms in fixed networks, it drastically decrease the efficiency of TCP.

- From missing aclenoledgmt, TCP wrongly assums a congection situation.

- Errort raus on wirlus links are or des of magnithd compound to fixd wired netroorks.

- Pack loss is much more comron and camot be confasses by ARQ or error comiechon.

- This why improvements hard to be brought into classical TCP such as Indieu TCP, Snooping TCP. & Mobile TCP.

A2.) Care of Address

- Care of Address is a temoporary IP addres for a mobile device.

- This also a home ajent to forward message to the mobile device.

- A seperate address in required becasle the IP addres of the devics that is used as host iodichalion is will be topological in corretic.

- The condition is that the COA (care of address) has to be a valid IP addifus with the forergn network.

eg:-
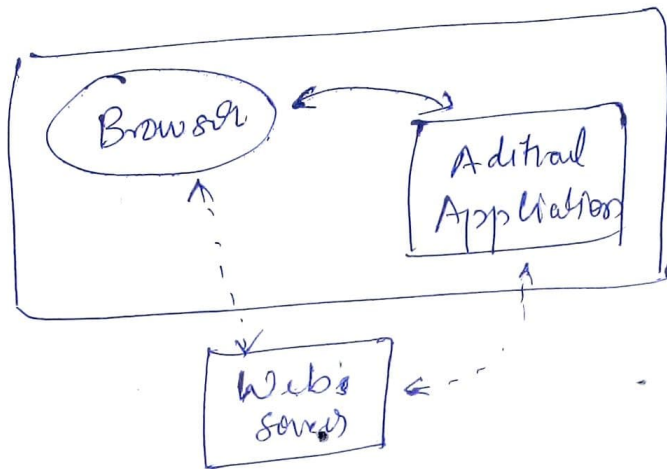

- Host P's home address is at B
- Host C want to commnicat with P, so it set network B the mussage.
- Network A has assignd a temporary IP to Host P & sent it copy to Host P's Home ie. B.

~ There the base B will forward Q's message to the base A and which will inturn forward it to P but at the same time it will be sent a copy of B's COA to P so that direct communication can take place

~ From the above example it is clear that the Care of Addas will be copied atleast at the foreign Base and the Home Base station.
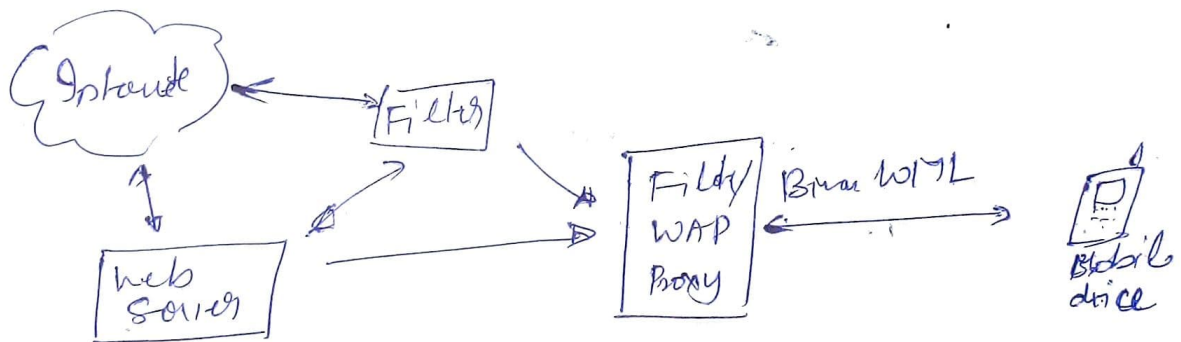
A3.) Wireless Access Protocol (wAP)

~: Wireless Access Protocole is a protocol or mos specified a technical standad for accessing information over a mobile network.

~ Before the introduction of WAP, mobile services provid had limited opportunites to offere interactive data services.

~ Just like any other protocol, WAP also has its own protocol stack.

~ WAAP combines the telephone network and the internet by integrating telephony application into the web by it own wireless markup language.

4.

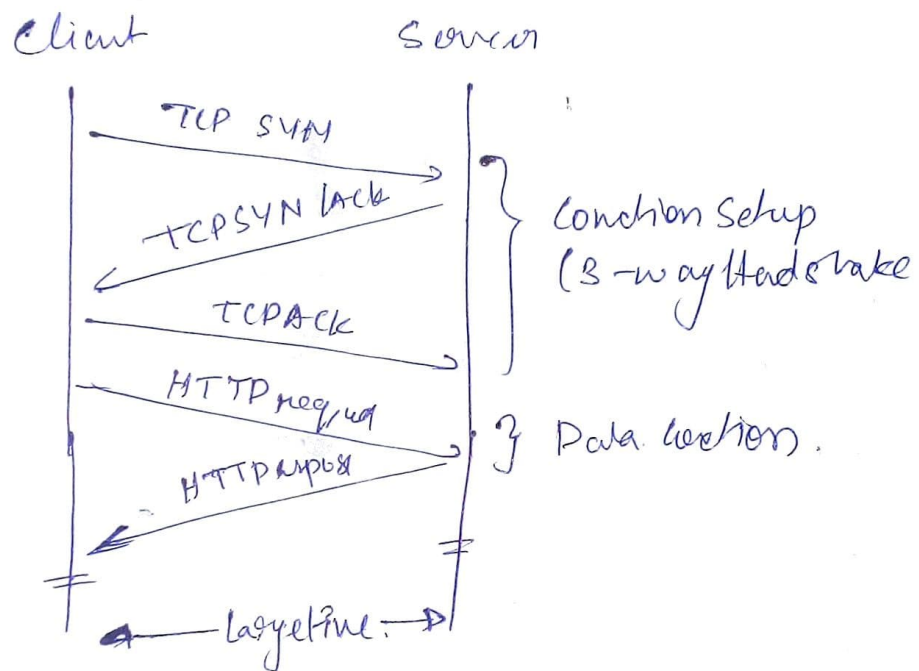~ WAP intrgrass seval connections leyes for security matress.

~ WAP dosd ala alway fore oll application to use the whole protocol abrdune.

~ One cand theye protocb as servies of the existing netword and the WAP - enable devices.

A4.) Translation Oriented TCP

~ If an application relable trasport of-padets it may node TCP.

~ Using TCP required seural pals ove the wirlus links.

5.

~ First TCP uses a three-way had shake to establish the conction.

~ If the conction has a lot of traffic the overhead will be huge.

~ The classical TCP conion is shown:

~ If GPRS is used the the delay is even greater

~ Therfore transaction tcp was introded.

~ Transiction TCP can combine packs for conction establishmet and conction field with uses data packst.

~ This reduced the maber of pactuks downto two.

~ Therfore the obvious merike is the reduction of overhead of a Standard TCP conection.

A5.)

Mobile Application Language

- These languages are utilized so that the application developed an computation with mobility enable become easier.

- These language enable developer to program more application which makes life easier on mobile devices. eg:- J2ME, XML, Kotlin, Dart. etc.

J2ME

- J2ME or Java 2 Platform Micro section is a computing platform.

- It is developed for deployed of potable code in embedded and mobile system.

- J2ME uses the like vctionof Java language.

- Third party implementation are wield md on mobile devices.

- There are more than 2.1 billon J2ME enable digital phone and poseal devices for amelauts.

- It uses JRSv1.3 & Java17E 3.0 SDK is supported by the Netbean IDE.

A6.) Security in Mobile computing

- GSM offers several security services using confidential information storage.

- But even then mobile computing has a good strong security concerns.

- Due to its mobility itself it is not easily to monitor proper usage.

- Improper and unethical practices are some of the probs that are experienced by mobile computing.

- A big problem is credential verification.

- As usual way steal usernat and secrets it posed a major security theft threat.

- And the identity theft is a serious issues that prevails the current mobile application era?

- As blinced there are at large 5 componets of Information security.

1. Computer Hardware
   - This is that tangible technology that work with the information.

8.

~ It also includes the peripheral devices like printers, keyboard, scanners, routers.

~ with the rise of intent of this any-network connected thing is at risk of security threat.

eg:- In 2011 a major bot-attack happed accross the US servers - shutting them down apparetly.

2. Computer Software

~ This is the non-physical part that refers to the intent.

~ This is the most inseccure areas where the information is manipulated.

~ Software must be regulary updated to prevent security issue.

eg:- WannaCry Attack on the old PC running on Windows XP & Vista

3. Telecommication

~ This part form what connects all these devices.

~ This into both wired and wireless networks

~ Reente fiber-optics has proven to be more secure than any other types of devices.

9.

4. **Database Silos**

- This is where the actual data get stored
- This are huge data centers that churn massive amount of data from the internet
- They are viable to attacks such as SQL injection, impersonation etc.

  eg:- Amazon server was hacked once to retrive five million user information

5. **Awareness & Procedure**

- This is what the ultmate purpose of any development should be.
- The people are the most crucial aspect of all that is gorron.
- And thus it make each and every idividual responsible for the security.

A.7.) **Usage of XML** (in Mobile Computing)

- XML stads for Xeuisible markup language.
- It defined a set of rules for encoded document in a format that that is both human & machine readble.
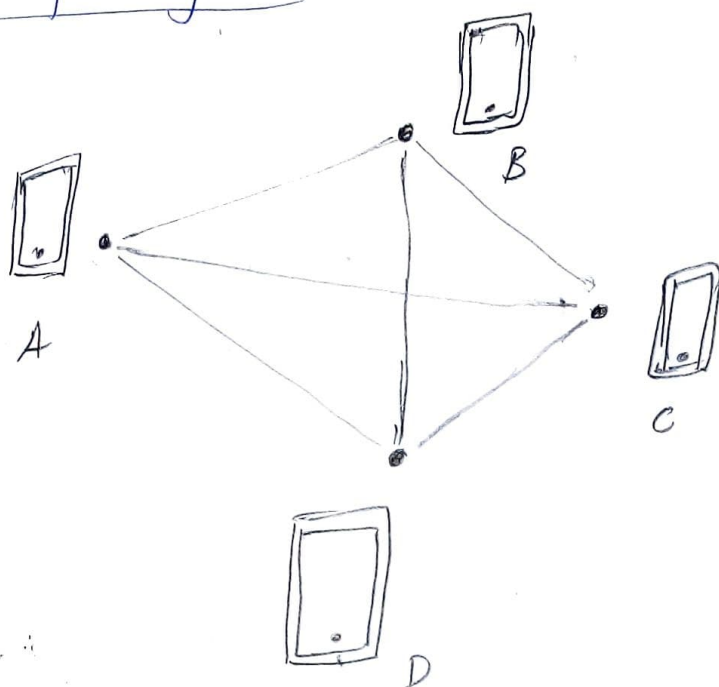- It improves simplicity and quality and usability accross the internet.

10.

~ Serial schema system exists to aid the deploit of O/X layers and the programates have developed APIs based on that.

- In mobile computing however we are including this layout to enena the mobility of application.

~ To be used in a mobile one embedded system it been far easter to have multiple application of the same.

A8.) - A wireless ad hoc network is a decenralised type of wireless network.

— The network is <u>ad hoc</u> — be cause it does not rely on any pre—existing infrastructs, such as routers or access points.

- Insted each nod partiupals in routing by forwed data for otumdaus.

- Thes the deluration of colhtusnaus fanal ddusiy nad dynahuy.

- This is based on the network conectivity and the routing algorithm in use.

11.

Consider the following Network

A

B

C

D

~ Now there are three types of routing

   (i) Proactive Routing

   (ii) Reactive routing

   (iii) Hybrid routing.

         Proactive

(i) In Proactive routing each of the nodes A, B, C & D maintains a fresh list of destination & their routes by periodually distributing routing tables throu the whoud.

   eg:- Distance Vector routing. (One hop is one distance)

          Reactive

(ii) In Reactive routing each of the nodes flood the network with route request & detail packets

   eg:- Flooding - eun pramp packs is then trough ev-routing ding link ex kept the one it is ariving.

12.

(iii) Hybrid Routing — utilizes both proactive &
reactive routing.

eg:- ~~Protocol~~ Zone Routing Protocol — which
uses either proactive or reactive based on
conditions & thus optimizing the network.

A9.) 5G Network

~ Radio technologies are rapidly changing and
the evolution of each ~~net~~ version is much better
than the previous one.

» 5G technology is expected to provide high frequency
bands with wider bad width.

Advantage

- High speed network connection.
- Large data volume per unit area.
- High capacity to dense connectivity.
- Higher security
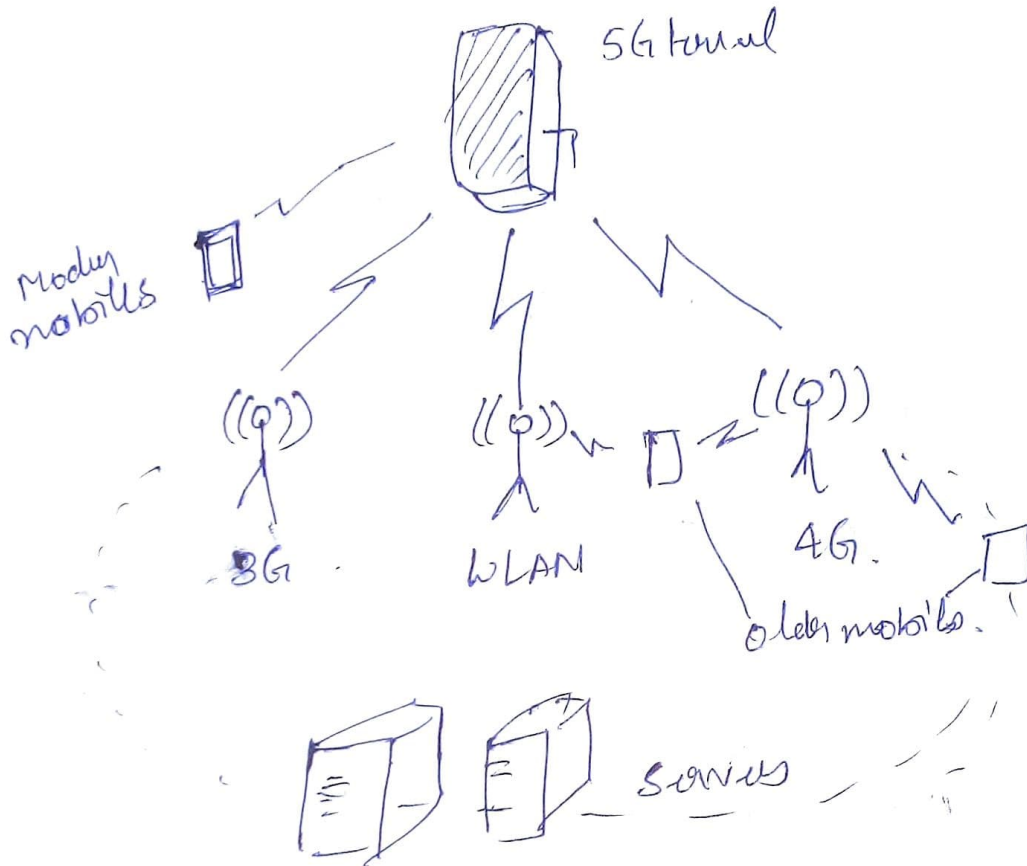- A huge potential of industrial
  revolution.

Demerits

- High frequency means short
  range.

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~ ~~How~~ Expensive to Implement

~ Faster battery consumption (High frequency
more power).

—

~ A modern 5G Architecture is shown below.

5G terminal

Modern
mobiles

((φ)) 3G

((ο)) WLAN

((φ)) 4G

older mobiles.

Servers

~ This show how influental a 5G network would be

~ The 5G MasterCore is a converge point for other
older technologied.

~ This helps even the user with older phones
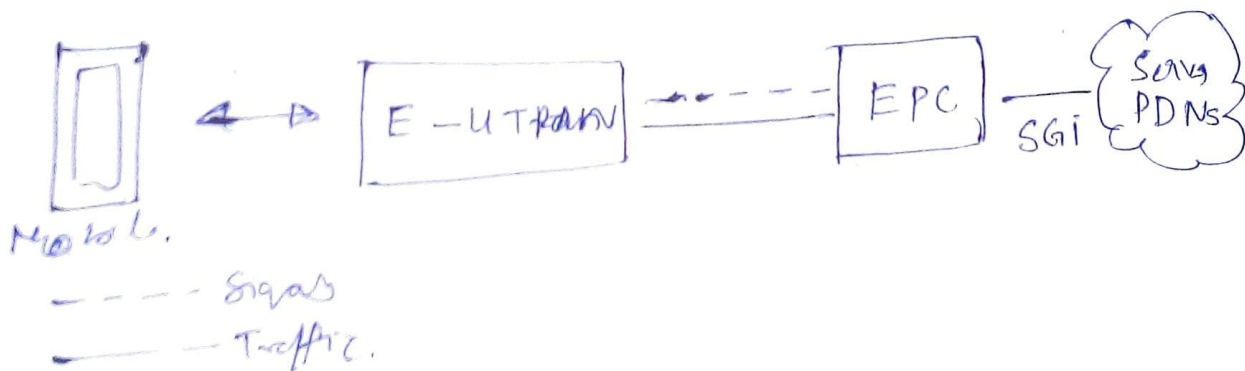connect with the 5G Network in directly.

~ And this backward compatibility makes 5G
even more welcoming.

A 10.) **LTE - Long Term Evolution**

~ Long term Evolution is a project started in 2004. and it evolved from an earlier 3GPP (Third Generation Partnership Project).

~ A rapid increase of mobile data users and the emergence of multimedia enlarged, based wave of 4th gaction mobile networks.

A High level network Architure

Mobile.

- - - - - Signas
———— Traffic.

E U-TRAN- Evolved UMTS Terrestrial Patro Access network.

EPC - Evolution pah core

~ The E-UTRAN has the radio connection between the mobile and the evolved packs core and just has one component, the evolved base station call eNodeB.

15.

~ Each eNode B is a base station that controls the mobile in one or more cells.

- The base station that is connection with a mobile is when as serving eNode B (eNP).

~ The eBN serves and recievesand radio trasmission toal the mobile esoing the analoguar and digital processing fuchon of the LTA air. interface.

~ The eN B control the low-level opidron of all its mobrls, by sending then signaly messge such as heelovved comnads.

~ A hone eNB is a base station that has be purdase by the user to provied covrage within the home.

~ The 5G core netwoar is the heart of into 5G sprehation and enabs the incrased througput denard that 5G must support.

~ The 4G codle is significally differt from 5G, with to the labtil levorging uisdirction & cloud native sofroid dand dthi aun unpreedet levels.

~ The 5G stand alone mode is essedul 5G deployint from ground up with new codle & backward compalibility.

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