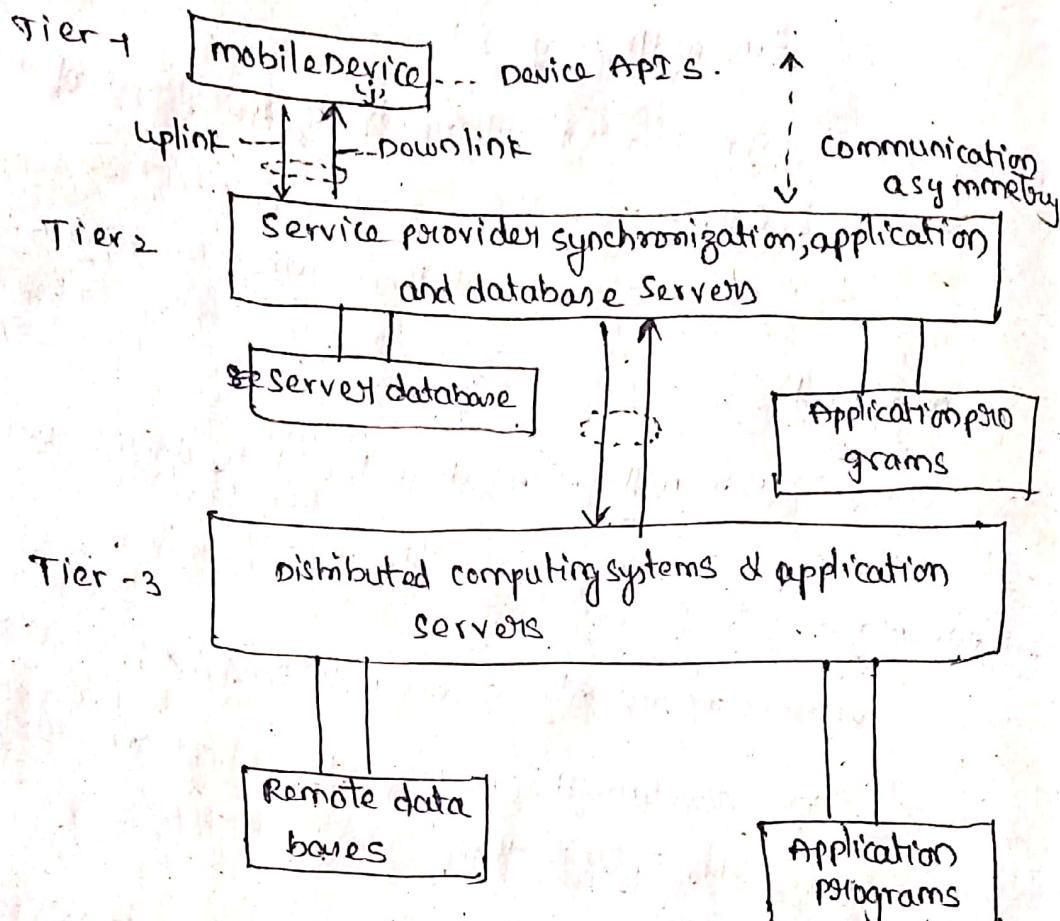
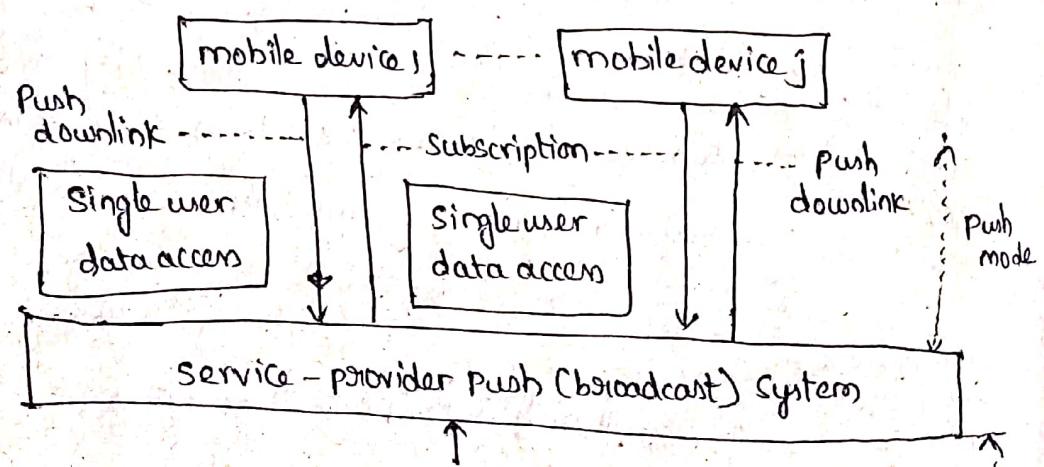


Mobile Computing Data Dissemination



Push-based mechanism



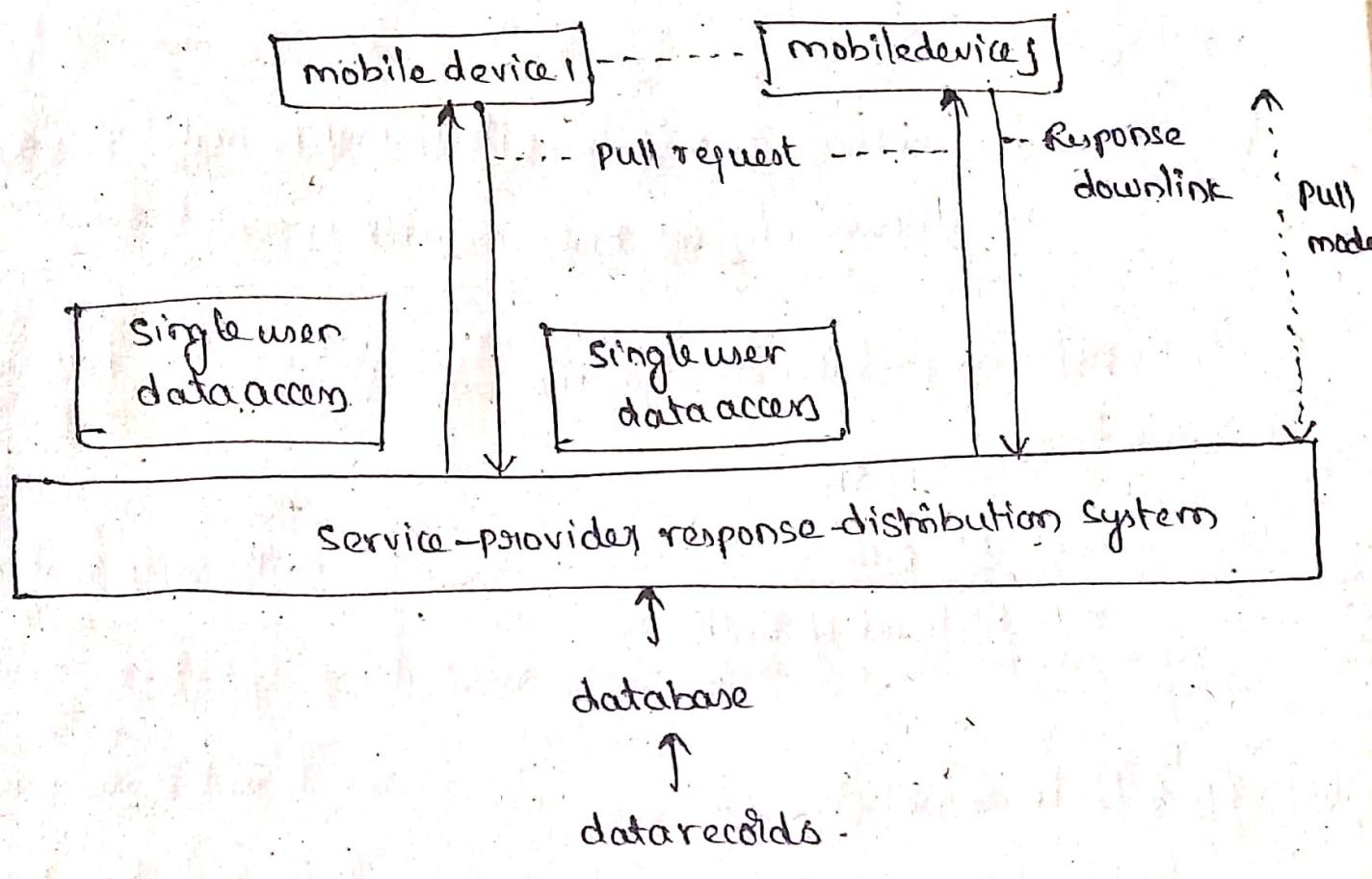
Broadcast bandwidth select algorithm

Algorithm for selecting interval between pushes of records

Data record → Algorithm for selecting and structuring of records

Broadcast disk model

Pull based data delivery mechanism.



Mobile data access can be broadly classified into two categories:-

- Data access in mobile client/server and
- Data access in ad-hoc network

→ client/server data access method

- server-push
- client-pull
- A hybrid of both

① Mobile transaction:

A mobile transaction is a long-live transaction whose host point of control moves along with the mobile user. Mobile data transactions may access remote data wirelessly, through a weak connection or may access local replicas of data in disconnected mode.

Types of transactions:

- Reparting & Co-Transactions
- The Kangaroo transaction model
- The clustering model
- Isolation-only Transactions
- The two-tier transaction model

→ Semantic-based Normadic Transaction processing

Repelling & co-transactions

- Atomic transactions: is an indivisible and irreducible series of database operations such that, either all occur, or nothing occurs.
- Compensatable transactions: Compensatable transaction can be formed from a pair of programs: one that performs an action and another that performs a compensation for that action.
- This model is based on the Open Nested transaction model.
- A computation in the mobile environment is considered to consist of a set of transactions, some of which may execute in a mobile node and some of which may execute on the fixed host.
- This model defines a mobile transaction to be a set of relatively independent transactions which interleave with other mobile transactions.
- * — A Repelling transaction (TR) shares its partial results to the top-level transaction S by delegating its operations. The delegation process can happen at anytime during execution of transaction (TR).

- A co-Transaction is reporting transaction but it can't continue executing during the delegation process.

The co-transaction behaves as a co-routine and resumes execution when the delegation process is completed.

- This model arranges the mobile transaction into following four types

- Atomic transactions: It is related with substantial events the normal aborts and commits properties

- Compensatable Transactions: It is not linked with compensating transaction. It can execute at any time and the parents of these transactions have the responsibility to commit and abort.

- Reporting transactions: A report can be regarded as a delegation of state between transactions.

- The reporting transaction ~~not~~ assigning all its results to its parent transactions

- It only has one receiver at any time during execution

- The parent has the responsibility to commit or abort the transaction later on.

- If the updating is successful then the receiving parent transaction is successfully executed but if receiver parent transaction unsuccessfully terminate then corresponding transaction abort

- Co-transactions: These transactions executed like co-procedures executed. When one transaction is executed then the control passes from current transaction to another transaction during sharing the results.

At a time either both transactions successfully executed or failed.

" A reporting transaction reports its results to other transactions by delegating the results. A reporting transaction can have only one recipient at any given point of time. The changes made by reporting transaction is made permanently by only when the receiving transaction commits. If the receiving transaction aborts, the reporting transaction aborts as well."

A co-transaction on the other hand, reports its results in a way similar to the reporting transactions. But upon delegation, the transaction stops execution and is resumed from the point it left off. For any pair of co-transaction, either both commit or both abort."

The Kangaroo Transaction model

KT model is designed to capture the movement behaviour and the data behaviour of transaction when a mobile host moves from one mobile to cell to another.

- This transaction model is built based on the concept of global and split transactions in multi-base environment
- The GT splits when mobile host moves from one mobile cell to another and split transactions doesn't combine & join back to form GT

Characteristics of KT model

- Mobile transaction that include a set of sub transactions called global & local transactions initiated by mobile host
- these mobile transactions are entirely executed at the local data base servers that reside on the fixed & wireless connected n/w s.
- The execution of each KT sub-transaction is supported by Joey Transaction that operates in the scope of mobile support station.
- The movement of mobile host from one mobile cell to another is captured by the splitting of the on-going joey transaction at the

old mobile support station and the creating a new Joey transaction at the new mobile support station.

- The execution of Joey transaction is supported by DAA Data Access Agents (DAA) that act as mobile transaction manager at mobile support stations.

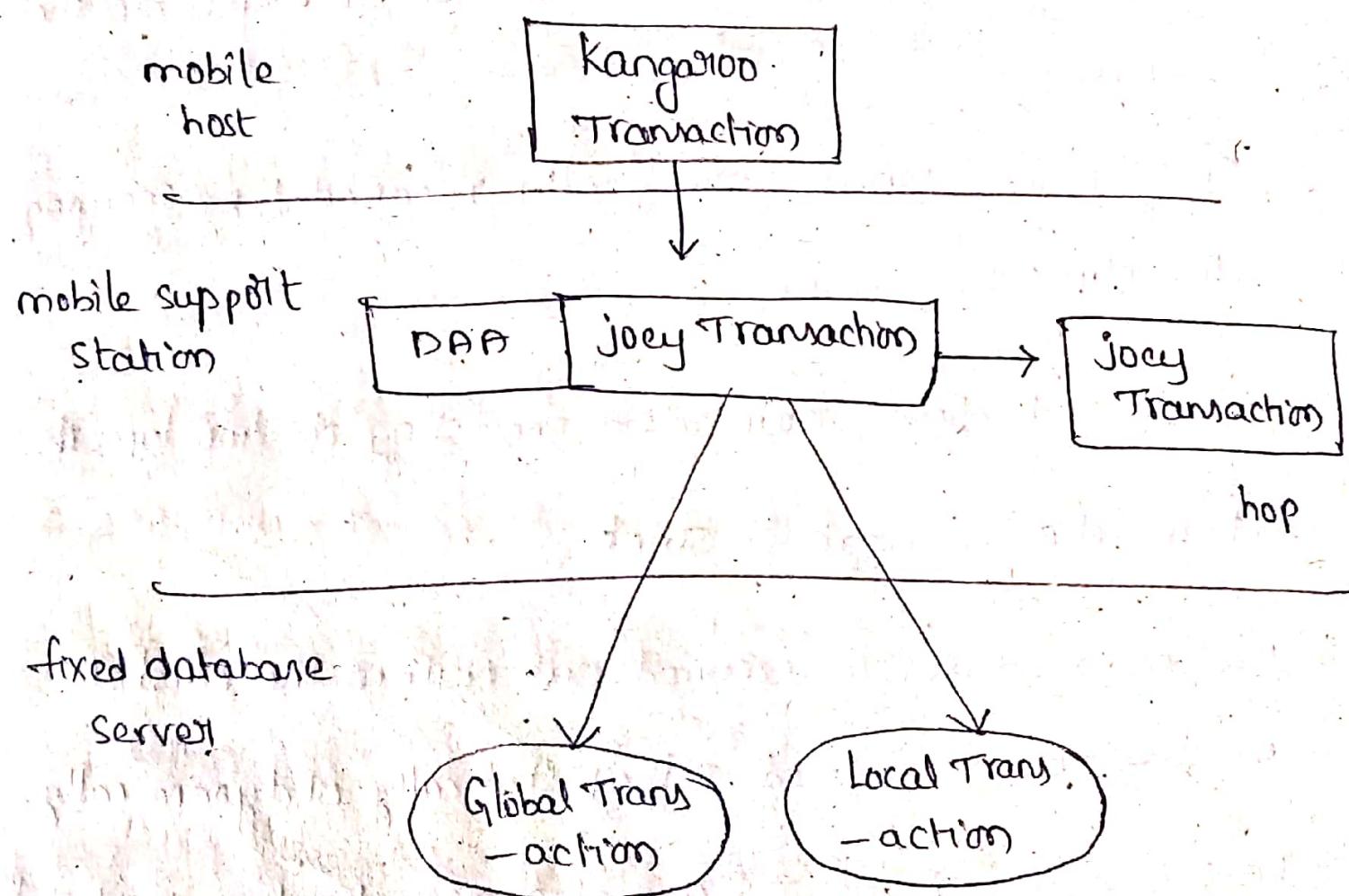


Fig: Kangaroo Transactional model

- The clustering model

- It is also called as weak-strict transaction model
- This model assumes fully distributed system.
- The database is divided into clusters.
- A cluster defines a set of mutually consistent data.
- Bounded inconsistencies are allowed to exist b/w the clusters.
- These inconsistencies are finally reconciled by merging the clusters
- The weak-strict transaction consisting of two types of transaction : weak & strict
- These transactions are carried out within the cluster.
- Clusters can be defined either statically or dynamically.
- Read & write operations are also considered as weak & strict transactions
- the weak operations are allowed to access only data elements belong to the same cluster. whereas strict operations are allowed to database-wide access
- At data item, two copies can be maintained, one of them is strict & other weak.
- ^{Operation}
weak transaction can access only local copies of data item. weak operations are initially committed in their local clusters

When the clusters are finally merged, they are once again committed across the clusters.

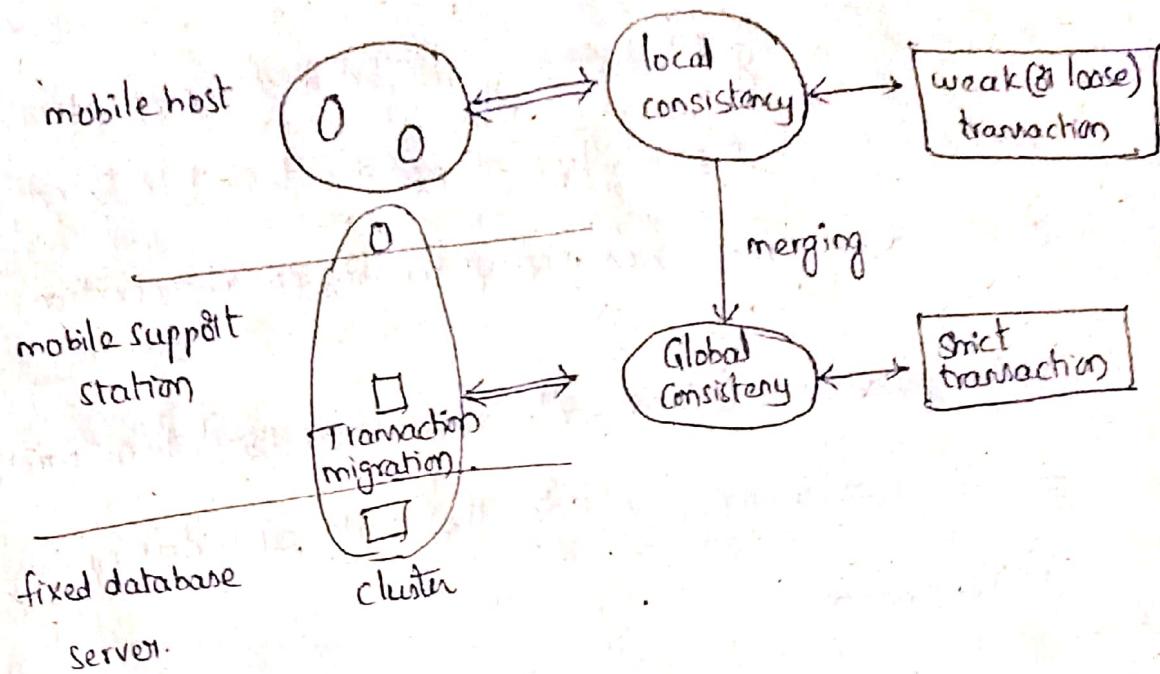


Fig: Architecture of cluster model (8) weak-strict transaction model.

Isolation-only Transaction

Coda is a distributed file system developed as research. Coda uses a local cache to provide access to server data when the network connection is lost. During normal operation, a user reads & writes to the file system normally, while the client fetches, & "hoards" all of the data the user has listed as important in the event of n/w disconnection. If the n/w connection is lost, the coda client's local cache serves data from this cache and logs all updates. This operating state is called disconnected operation. Upon n/w reconnection, the client moves to

reintegration state, it sends logged updates to the servers, then it transitions back to normal connection-mode operation.

- clients by using file hoarding and optimistic concurrency model control. A proxy logs all updates to the file system during disconnection and replays the log on reconnection.

coda provides Isolation-only Transactions (IOT) to automatically detect read/write conflicts that could occur during disconnection.

- The SEER hoarding system developed at UCLA is based on the coda file system. It operates without user intervention by observing user activities and predicting future needs. It defines and uses a measure called "semantic distance" between files to determine how best to cluster files together in preparation for hoarding.
- The semantic difference between two files is based on the time elapsed in the events of opening the files and on how many references to other files occur in between.

Two-TIER Transactional model

The two-tier (also called base-tentative) transaction model is based on the data replication scheme.

- For each data copy there is a master copy and several replicated copies.
- There are two types of transactions: Base & tentative
- Base transactions operate on master copy.
- while the tentative transactions access the replicated copy version.
- A mobile host can cache either master or the copy version of data objects.
- When the mobile host is disconnected, tentative transactions update replicated versions.
- When the mobile host reconnects to the observer, tentative transactions are re-executed on the master copy.
(converted to base transactions that are executed on the master copy.)
- If the base transaction does not fulfill an acceptable correctness criterion, the associated tentative transaction is aborted.
(which is specified by the application)

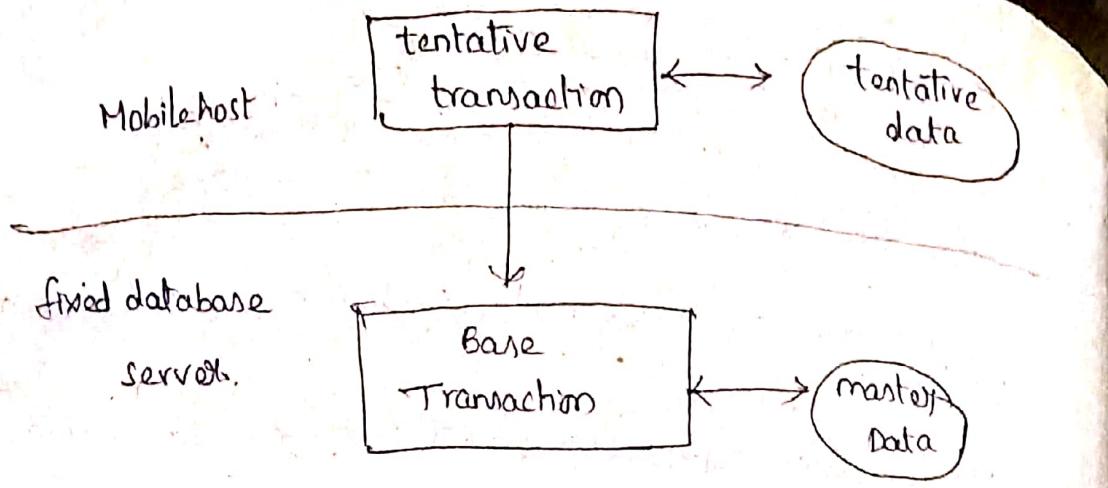


Fig: two-tier transaction model.

~~26/09/19~~ Ad-hoc network (MANET)

- temporary network which is formed by some mobile nodes
- to maintain connectivity a mobile node will send messages to the all the other mobile nodes.
- + time when it want
- dynamic link
 - this link will not be constant / remain same for longtime
 - Under this a links are there
 - broken links
 - new links
 - If any node want to go out the n/w, it will break the all the links which are existing called broken link.
 - when new node enters into a communication range temporary n/w is called new link

→ Protocols in coined of w.

- Distance Vector Routing

- A node will maintain connection with all other nodes
- At time, it need cost no. of hops from destination, e.g. no. etc to all its neighbour nodes (which are directly connected to the node)
- At time, it shares info about TTL, and periodically Routing table will be updated.

disadvantage

- At time, it frequently updates table, there is a waste of bandwidth in order to update

- Link State Routing

- A node have a complete topology of the network for them
- So, it requires cost, to store the entire topology & slow required to maintained
- It requires more bandwidth & time
- It requires unidirectional links.
- Redundant links. (small no. of nodes will be connected in a small area).
- Routing table updatations (frequently) ~~freq~~
- Periodic routing updates (wastes bandwidth).
- still no changes in the mobile device / device, there is a routing updation is there.

There is no need of any protocol which helps to route the data in a wireless connection.

- TTL - importance.

- two routing techniques

- Pro-active
 - Re-active
- Routing techniques in Ad-hoc nw.
(wireless nw).

Pro-active approach

- It works more efficiently when the data is transmitted b/w same source & destination.
- It is efficient when there is a frequently used route.
- Sending a query 1st & data is sent and no frequent routing table updation is seen here.

Assignment -3

1. Wireless Application protocol-

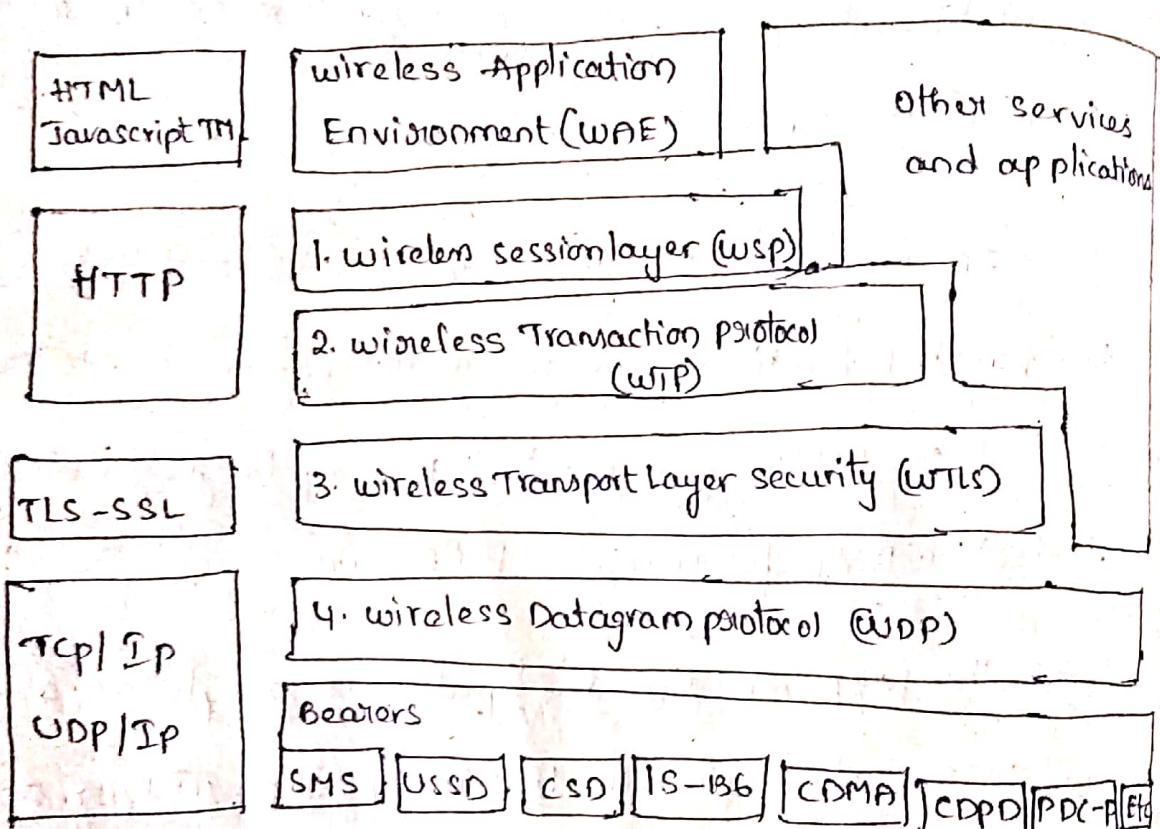
Wireless Application Protocol is a programming model which is made on the concept of world wide web(www) programming model and the hierarchical design is somehow similar to

Tcp/IP protocol stack design

- WAP is a standard which enables the mobile devices to interact, exchange and transmit information over the internet.
- It is a De-Facto standard.
- As, WAP is based upon the concept of world wide web, the backend functioning also remains similar ie., HTML is used on WWW and wireless Markup language(WML) is used in WAP for using the WAP services.
- Since the WAP model is developed, it is accepted as a wireless protocol globally that is capable of working on multiple wireless technology such as mobile, printers, pages etc.
- Another reason for opting and making WAP as De-Facto standard was its ability of creating web applications for mobile devices.

Architecture:

- The WAP architecture comprises several components, each serving a specific function. These components include a wireless application environment, session and transaction support, security and data transfer.
- The exact protocols used depend on which version of WAP you are implementing.



WAP - architecture

Wireless Application Environment (WAE): This layer is of most interest to content developers because it contains among other things, device specifications, and the content

development programming languages, WML and wml

script

Session Layer (Wsp): Wireless Session protocol (Wsp)

Unlike HTTP, wsp has been designed by the wap forum to provide fast connection suspension and reconnection.

Transaction Layer (WTP): Wireless Transaction Layer protocol

(WTP) The WTP runs on top of a datagram service, such as

User Datagram protocol (UDP) and is part of the standard

Suite of TCP/IP protocols used to provide a simplified protocol suitable for low bandwidth wireless stations.

Security Layer: Wireless Transport Layer Security

(WTLS). WTLS incorporates security features that are based

upon the established Transport Layer Security (TLS) protocol

standard. It includes data integrity checks, privacy,

service denial, authentication services.

Transport Layer: Wireless Datagram Protocol (WDPP) The WDPP

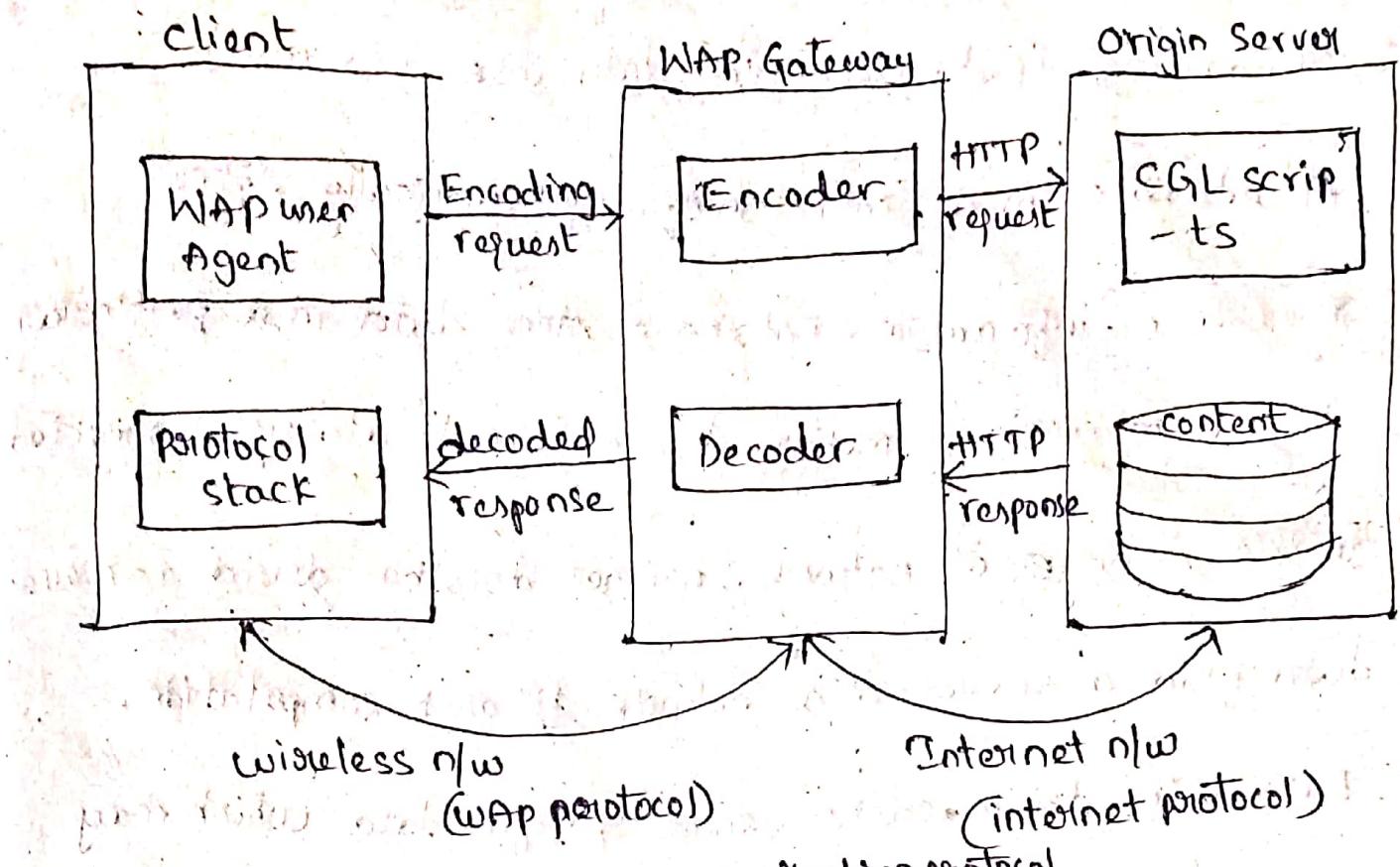
allows WAP to be bearer-independent by adapting the

transport layer of the underlying bearer. The WDPP

presents a consistent data format to the higher layers, the WAP protocol stack, thereby offering the advantage of bearer independence to application developers.

Wireless Application protocol Model : Working:-

- WAP model comprises of 3-levels that are:
Client, Gateway and origin server.
- The WAP user agent sends a request via mobile to WAP gateway by using encoded WAP protocol i.e., called as encoding request.
- The encoding request is translated through WAP gateway and is further forwarded in the form of HTTP request to the server side where scripts are available.
- Response from the scripts and content is picked up as requested, through HTTP and its forwarded to the WAP gateway once again.
- The required HTTP responses is then forwarded in decode format to the client protocol stack as the final response for the initial request made by client.



Advantages:

- fast paced technology
- open source - free
- can be implemented on multiple platform
- independent of network standard
- higher controlling options

Disadvantages:

- fast speed paced Technology
- Less secured
- User interface of is small
- Less available

2. Hoarding Techniques in database issues

A database is a collection of systematically stored records of information. Database store data in a particular logical manner. A mobile device is not always connected to the network or network, neither does the device retrieve data from a server of a network for each computation.

Rather the device caches some specific data which may be required for future.

Computations, during the interval in which the device is connected to the server of network. Caching entails saving a copy of select data of a part of a database from a connected system with a large database. The cached data is hoarded in the mobile device database.

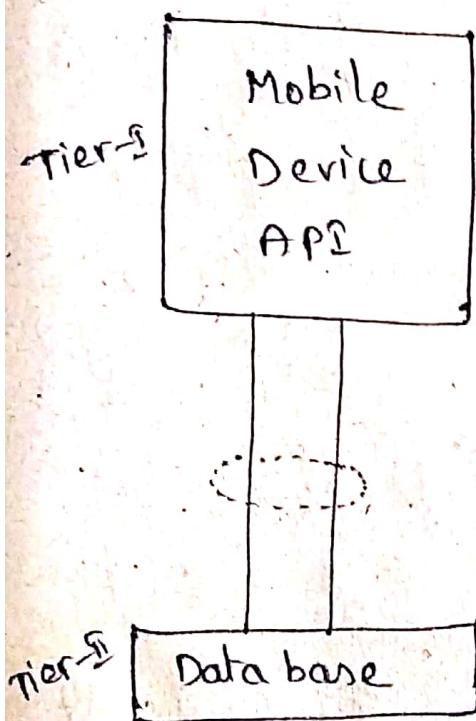
Hoarding of the cached data in the database ensures that even when the device is not connected to the network, the data required from the database is available for computing.

Database hoarding:

Database hoarding may be done at the application tier itself. The following figure shows a simple architecture

in which a mobile device API directly retrieves the data from a database. It also shows another simple architecture in which a mobile device API directly retrieves the data from a database through a program,

Exs IBM DB2 Everyplace (DB2e)



Mobile device database API ; J2ME or BREW, XML database or other database and the cached databases from remote servers; OS (Windows CE or palm OS or Symbian v6)

Application/ database on a mobile device