

14. Aug. 2014

Evolution of wireless Network :-

The history of wireless networking goes as far back in 1800 with the (discovery) advent of radio waves. In 1888 a

Hamburg born physicist name Heinrich Rudolf Herz produced his first radiowave ever by 1894.

This radiowave production became way of communication.

World war 2nd became a big stepping stone for the radiowave.

The United States was the 1st party to use radiowaves for data transmission during the war.

In 1971 a group of researchers under the lead of Norman Abramson at the

University Hawaii created the first communication network an titled ALOHA NET. It was the first wireless LAN. The ALOHA NET comprises a dozen computers that communicated to each other.

The progress of wireless network can be divided into three generation.

1. 1st Generation wireless Network:- (1G)
2. 1G wireless network were target primarily at voice and data communication occurring at low data rates. The first generation of analog cellular system included the Advanced mobile Telephone System (AMPS). It was deployed in Chicago with a service area of 2100 square miles (1 mile = 1.6 km). It offered a data rate of 10 kbps.

2. 2nd Generation (2G) wireless systems

comprise to 1G system
2G system used digital multiple access technology such as TDMA and CDMA (TDMA-Time Division Multiple Access), (CDMA- Code division Multiple Access), Global System for mobile Communications (GSM) uses TDMA Technology

to support multiple user. The 2G network support voice and some limited data communication such as SMS. and 2G protocols offer different levels of encryption and security.

2.5 G :- The 2.5G time begins with General packet Radio Service (GPRS). (Packet mean slot of data) GPRS is a radio technology for GSM network which uses packet switching protocols (shorter setup times) for ISP and (Internet service provider) service.

2.75 G :- 2.75 G is more commonly refer to as edge enhanced data rate for GSM network (EDGE - Airtime data rate for GSM network which allows improve data transmission rate).

3G :- 3G services include whole area wireless voice telephone

mobile internet access, video calling and mobile P.U. all in a mobile environment compared to older standards. A 4G system provides data rates of at least 200 kbps. Recent 3G release offer denoted as 3.5G and 3.75G also provide mobile broadband access of several megabits to laptops, computers and smart phones.

TUE
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WLAN (Wireless Local Area Network) →

It is used to connect two or more computer without the use of wire. It is similar to LAN. Only the interface is wireless. It uses radio waves to facilitate the communication b/w devices. The limited range. WLAN offers mobility to the user as they can move about within the coverage area and remain

connected to the network. It has become popular due to the rapid growth in wireless portable devices such as smart phone, PDA's (Personal Data Assistant) etc. It is basically used for communication with in a building or a house. The maximum range of WLAN is that we can establish a connection b/w nearby buildings.

A WLAN consists of an access point connected to a wired LAN system and placed at convenient location so that the signal reaches each and every corner of the house or the building. The range of wireless LAN network can be increased by adding an access point.

The protocols used are IEEE 802.11 (WIFI)
IEEE 802.15 (Bluetooth)
IEEE 802.16 (WiMAX)

[IEEE Institute of electrical and E].

WPAN (Wireless Personal Area Network)

it allows us to establish wireless connection b/w a computer and hand held device or b/w two hand held devices or computers over a short range. The technologies used by WPAN are bluetooth or infrared.

It allows the devices to communicate at a distance of about 10 meters. The important concept in WPAN technology is pluggable pin. It means if two wireless devices come in each other's range they can communicate with each other as if they are connected with the help of wire.

WPAN works in Adhoc mode only.

{ WPAN is also called }
Peer to Peer Network (Spontaneous)
(that's why type)

Adhoc :-

it is a small area network especially one with a wireless or temporary plug in connections. In these networks some of the devices are part of network only for the duration of a communication session.

An Adhoc network is also formed when mobile or portable devices operate in close proximity of each other.

The term Adhoc has been applied to network in which new devices can be quickly added or removed easily bluetooth or infrared.

Typically based on short range wireless technology these networks don't require subscription services or access point.

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Wireline (wired) Networks →

It is a network which is designed over wire or tangible conductors. This network is called fixed or wireline network.

Fixed telephone network over copper and fiber optics are the part of this network family.

Broadband networks over DSL (Digital subscriber line) or cable are also the part of wireline network.

Wireline networks are generally public networks and over wide areas though microwave or satellite network do not use wire, when a telephone network uses microwave or satellite as a part of its infrastructure, it is considered a part of wireline networks.

Wireless Networks →

Mobile networks are generally termed as wireless networks. This includes land wireless network used by radio, pagers, one way or two way pagers, cellular phones. The example of mobile network would be AMPS (Advance mobile telephone system), GSM, CDMA, GPRS. In a wireless network other than the radio interface rest of the network is wirelined. This is generally called the PLMN (Public Land mobile Network).

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Application & Services

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Data and information through mobile computing are required by all people. Regardless of the fact that they are mobile or not, mobile users will include people like service engineers, sales person, mobile executives, courier or pizza delivery boy. Logically everybody is a mobile user in some respect. For people who are stationary, mobile computing is necessary in the offices hours for example:- we may need to do a bank transaction from home at night or respond to an urgent mail or while at home.

There can be many applications and services for the mobile computing. These applications run on Origin Server or ~~content~~ servers.

contents will be life style specific as individual has different life style in different social environment. One individual can be an executive needing the corporate MIS (Management Information System).

Application during the day while at home same individual can use application for entertainment from lifestyle perspective applications of mobile computing can be grouped into different categories like,

i) Personal → it includes medical records, daily diary etc.

(ii) Time Sensitive → It includes breaking news, general news, stock update etc.

(iii) Transaction Oriented → It includes mobile shopping, tele banking etc.

(iv) Location Specific → It includes information

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related to current geographical location like street direction, map, restaurant guide etc.

(v) Corporate It includes corporate business informations like mail, ERP (Enterprise Resource Planning), business news, reminders etc.

(vi) Entertainment

applications we use for fun or entertainment

Some of the examples of mobile computing application are:-

(i) Corporate Applications Standard corporate information is one of the most desirable information set for mobile workers.

This field will include corporate mail address, group, corporate

intranet, corporate ERP etc.

2. Telebanking

We need to access our banks for different transactions. Many banks in India are today offering banking over internet and mobile phone through SMS.

3. Interactive Games: Many mobile network operator have started offering different types of interactive games to be played using mobile phones.

4. Digital TV There are interactive TV programs through digital TV using set top boxes. On demand community programs are very popular for this media.
(Global Positioning System)

5. GPS Systems Applications related to location, tracking games

under this category, This will be a simple service like tracking a vehicle.

6. ~~E-government~~ ^(Electronic) → It is a digital interaction b/w government and citizens or b/w different govt. agencies.

7. Distance Learning → One of the most frequently used application of mobile computing is distance learning, which can deliver a lecture to a mass of people from outside the continent.

8. Community forums → There are different social and community meetings. There are lots of websites through which mass of community interact with each other.

9. Job facilitation

These could be either proactive calls or alerts or information related to jobs and employment opportunities.

TUE.

26/Aug/2014

Middleware and Gateways

Any software layered b/w user app and OS can be termed as middleware.

IVR (Interactive Voice Response) is example of middleware.

Exs of middleware are:-

Communication middleware
Transaction oriented middleware
Behaviour Management Middleware, etc.

Middlewares are new.

There are some middleware components like Behaviour Management middleware which can be layered b/w client

device and the application. In mobile computing we need different types of middleware components and gateways at the different layers of the architecture.

1. Communication Middle ware

The user application will communicate with different nodes/services through different communication middleware. e.g. would be TCP/IP

2. Transaction Oriented/Processing Middleware

In many cases a service will offer session oriented dialog (SOD). This is done through an application server. The user may be using a device which demands a short transaction, whereas the service at the back end offers an SOD. In such cases a

separate middleware is required to handle an SOD. It ends the short transaction.

3. Behaviour Management middleware

for different devices we need different types of rendering

(Rendering) e.g. if we are displaying a picture we can have one application for web another for WAP and a different one for SMS (Access protocol)

4. Communication Gateways

Gateways are deployed (Assignment & disconnection) when there are different networks with dissimilar protocols. e.g. if we need an IVR gateway to interface voice calls with a computer, or a WAP gateway to access internet over mobile phone.

device and the application. In mobile computing we need different types of middleware components and gateways at two different layers of the architecture.

1. Communication Middle ware
The user application will communicate with different node services through different communication middleware.
e.g. would be TCP/IP

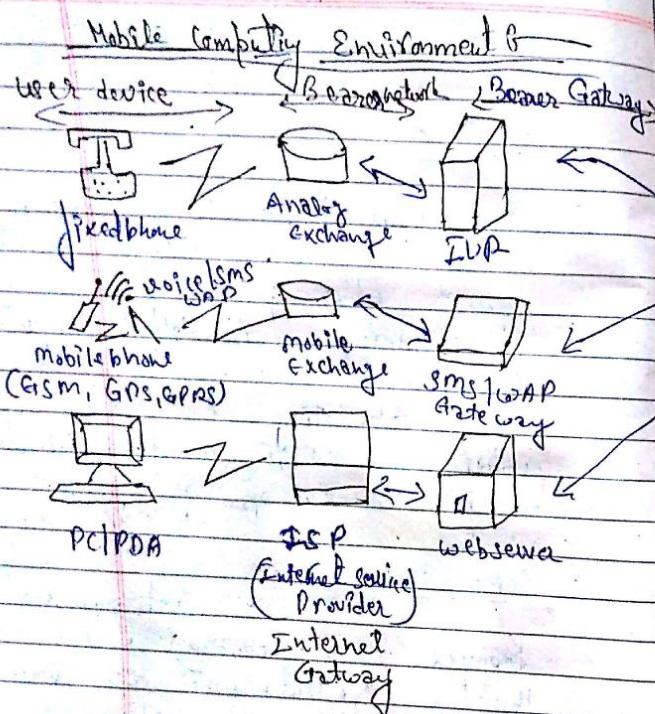
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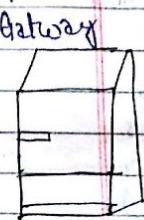
3. Behaviour Management middleware:
For different devices we need different types of rendering.
(Rendering is displaying a picture)
For e.g. - we can have one application for web another for WAP and a different one for SMS. (Wireless Access protocol)

4. Communication Gateways
Gateways are deployed (Assignment or Assignment) when there are different networks with different protocols. For e.g. we need an IVR gateway to interface voice with a computer, or a WAP gateway to access internet over mobile phone.

HW
28. Aug. 2014



Middleware (Archiv)
Middleware
Gateway



(ohne) Services



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- ① Redefining
Transactions
- ② HTTP servers
or Application servers
- ③ Customization
- ④ Connectors

Middleware Archiv

Device profile Security

mainframe
Server

Device profile

Security

Security in Mobile Computing

The security issues in mobile computing environment

base (internet) a special challenge. This is because we have to provide services over the air using networks over which we do not have any control. All the infrastructure and technology designed by GSM and other forums (organization) are primarily to increase the services of network operators. This makes the technology complex and very much dependent on the network operators.

For example:- The SMS technology is operator centric. for this it requires WAP Gateway. These Gateways are installed in the operators network and managed by operators.

The security policy implemented by the (network) operator depends upon operators priority and receives generation and not on the need of the content provider.

Thur.

02 Sept. 2014

Developing a mobile Computing Application

There are no of factors that makes a mobile computing different from desktop computing. As a result of mobility, the attributes associated with device, networks, and user constantly changing. These changes imply that context and behaviour of applications need to be adopted to suit the current environment. The context and behaviour adaptation is required to provide a

Legacy → Legacy /
Your agent

service that is created according to the were present situation.

These are several ways in which context and behaviour can be adapted. One way is to build applications without any context or behaviour awareness. context and behaviour adaptation will be handled by a behaviour management module. If we are at the run time is there option i.e. to build application specific to different context and behaviour patterns. For a new application it is possible to embed the behaviour with in the application. However for a legacy life system the context behaviour adaptation need to be done externally.

1. New mobile application
(let us assume that in a bank, some new applications need to be built for e-commerce, the bank wants to offer banking through telephone (voice), and banking through web or internet. The bank will develop two applications. one will handle the telephone interface through IVR, and other through web.)

At later stages if the bank decides to offer SMC and WAP. They will develop protocol to new application to support SMC and WAP interfaces respectively.

2. Making legacy Application mobile

An outdated device that a person or company has invested money in it seen as an essential part of the system.

we define as legacy if it has one of the following characteristics. These are:

- An application which has moved to substantial phase in the SDLC (new development life cycle) or an application which is difficult to modify due to the unavailability of original source code.
- In these cases the adaptation is done by behaviour management middleware on the fly.

THU
104 [Sept. 2014]

Chapter - 4.

Mobile computing functions

Mobile computing functions can be logically divided into following major segments

1. User with Device → The user device could be a fixed device, like desktop computer in office or home or a portable device like mobile phone. Examples are: laptop, desktop comp., fixed telephone, mobile phones, Digital TV with setup box, palmtop etc.

2. Networks → Whenever a user is using a mobile, he/she will be using different networks at different places at different times. Examples are: GSM, CDMA, Bluetooth, WiFi etc.

3. Gateway

This is a device to interface different transport bearers. These Gateways convert one transport bearer to another transport bearer. Example is: From a fixed phone with a voice interface we

aggregate → combined.

access services by pressing keys on the telephone. These keys generate analog signals. These signals are DTMF (Dual)

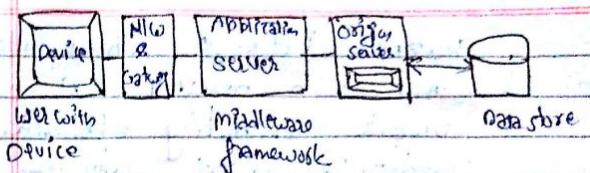
Tone Multiple frequency)

These analog signals are converted into digital data by IVR to interface with a computer application.

4. Middleware: This is more of a function rather than a separate visible node. In the present context middleware handles the presentation of the control on a particular device. It will also handle the security for different users.

5. Content— This is the domain (data) where the origin server & content is located. This could be comp. system or even an aggregation (multiple system).

SSL - Secure Sockets Layer



7/11/2014

Tier-1 - Presentation tier

This is the user interface system in tier-1. This is the layer of agent application and systems.

These applications run on the client device. And affect on the user interface. This tier is responsible of presenting the info. to the end user. Humans, generally use visual and audio means to receive the info. from machine. In the case of visual presentation of information will be through

a screen presentation of information will be through a screen. presentation tier included web browser like

mozilla, Internet explorer etc.
and web browser 'n'
mobile computing application
need to be context aware and
device independent - in general
the agent sits in the client
device and web browser.

Pier-2 Application layer:-

It
perform the function like
processing the user input
obtaining data and making
decision. The application
tier may be include technologies
like JSP, CGI etc.

CGI (Common gateway interface)
JSP (Java server page)

It is also related to
the functions like security
network management data
stores etc. most of these
functions are performed by
different middleware. The
middleware covers a wide

range of services like
transaction oriented communication
middleware can also be considered
as a service gateway connecting to
independent objects.

Pier-3 Data tier:-

The data tier is
used to store data needed by the application
and act as a store for both
temporary & permanent data. The data
could be stored in any form of
database. These can range from
relational database to even simple text
files. Database middleware are
use to allow direct access to data
structure and provides direct
interaction with data bases.

The data base middleware run
between the application program and
database. These are sometimes
called database connectors.
eg. of such middleware would be
JDBC (Java Database Connector)

Why these middleware. The application will be able to access data from any datasource. Data sources can be text files, spread sheet, relational database etc.

Design Consideration for mobile computing

The mobile computing environment needs to be context independent as well as context sensitive. Context info is the info which is related to the surrounding environment of an object. This object can be a person, a device, a place, a physical or computational object or any other entity being tracked by the system. In a mobile computing environment context data is captured so that the decision can be made about how to adopt context or behavior to suite the context.

Mobility implies that

attributes associated with devices and users will change constantly. These changes mean that content and behaviour of application should be adapted to suite the current situation. There are many ways in which content and behaviour can be adopted.

1- Content with Context Awareness

Build each application with context awareness. There are different services for different client contexts.

e.g.: A bank decides to offer mobile banking application through Internet, PDA, and mobile phone.

Tue.
16/sep/2014

Mobile computing through internet b

For mobile computing the access network will be both wireless and wired. In the case of wireless access network, it could range from infrared, bluetooth, wi-fi, GSM, GPRS etc. for wired it is expected to be some kind of LAN.

In the case of wired network, the network is stable and the devices are likely to be workstation with large memory & display.

Also these devices are not constrained by the limited battery power.

When the user facing device is wired then the chances of complexity and challenges are far less.

Chapter - 4.

Mobile Computing through Telephony

Evolution of Telephony

Multiple Access Procedures

In PSTN (Public switched telephone network) Network a separate physical wire is used to connect the subscriber telephone with the switch. The scenario is different in the case of wireless communication. Radio channel used in wireless network is shared by multiple subscribers. Therefore every mobile subscriber must be assigned a dedicated communication channel.

There is a need for technologies that allow multiple users to share same frequency. Currently

there are three common types of multiple access systems. These are:-

- i) FDMA
- ii) TDMA
- iii) CDMA

(i) FDMA (Frequency Division Multiple Access)

Each FDMA user is assigned a specific frequency channel.

FDMA is the oldest of these schemes and the least efficient. It started in 1950's.

The telephone company began to use FDM to combine multiple analog voice signals over one line, to maximize efficiency of their long distance trunked calls. In FDMA the available frequency band is divided into channels of equal bandwidth so that each communication is carried out on the different frequency.

In FDMA only one transmission is propagated over each channel at a

The channel is dedicated to the one transmission regardless of whether data is being transmitted and the channel is not available until the device using it terminates the transmission.

It is used in all the first generation analog mobile networks like AMPS

TACS (Total Access Communication System)

FDMA generally supports voice signals.

[19 Sept. 2014]

TDMA - TDMA stands for Time Division Multiple Access. It is a channel access method for shared medium network. It allows several users to share the same frequency channel by dividing the signal into different time slots. The users

transmit in rapid succession one after another, each using its own time slot. This allows multiple users to share the same transmission medium.

In other words in TDMA system each user uses the whole channel bandwidth for a fraction of time.

The operation of TDMA requires an uplink control to all the remote sites which contains some control information.

TDMA is a multiplexing technique where multiple channels are multiplexed over time.

Assuming that we have 64 kbps channels to transmit one voice channel but we are having a high speed carrier of 2 Mbps we can transmit this voice channel in 1/32 secs.

This implies that we can theoretically divide the 2 Mbps channel into a 32 time slots, and

we one of them for transmission our voice channel.

In TDMA several users share the same frequency channel of higher bandwidth by dividing the signal into different time slot.

User transmit their data using their own respective time slot in rapid succession.

TDMA system divides its transmission medium into frames which are repeated in definitely. It is used in digital transmission like GSM, satellite systems etc.

CDMA: CDMA stands for code Division Multiple access. CDMA is a broadband system. In CDMA each subscriber uses the whole system bandwidth unlike FDMA and TDMA, where a frequency of time slot is assigned exclusively to a subscriber. In CDMA all subscribers use the same frequency band simultaneously to separate the signals. Each subscriber is assigned a code called a chip. It does not let everyone transmit at the same time. Each user's signal is spread over the entire bandwidth by a unique spreading code. At the receiver the same unique code is used to recover the signal. Multiple calls are overlaid on each other on the channel.

CDMA simply means the data is sent in small pieces over a no. of discrete (\rightarrow different) frequencies available for use at any time.

In CDMA, multiple stations can transmit or talk of each other on the same or overlapping frequencies and at the same time.

The Disadvantage of CDMA system is channel pollution. This occurs when signals from too many stations are present at the subscriber phone but none are dominant.

When this situation occurs, the audio quality degrade.

Signal pollution occurs frequent in densely populated

populated urban environment where service provider must build many sites in close proximity.

Advantages:-

- (i) Multiple user access
- (ii) Information security
- (iii) Can accommodate more users per mega hertz of bandwidth than

any other technology.

- (iv) All users use same frequency & may transmit simultaneously.
- (v) It uses spread spectrum technology, which is more secure and offers high transmission rates.

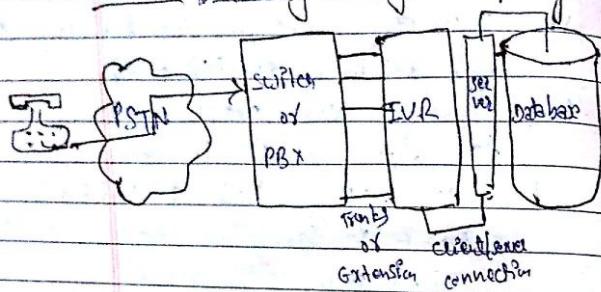
Disadvantages:

- (i) Receivers must know transmitters code word
- (ii) High bandwidth is need.
- (iii) Complex HW
- (iv) Channel pollution.
- (v) Synchronization problem.
- (vi) Inappropriate for ultra high rate wireless access.

SDMA :- Space division multiple access. SDMA is used

in radio transmitters & it is more useful in satellite communication to optimize the use of radio spectrum by using smart antenna technology & directional properties of antenna.

Mobile computing through telephone



The IVR Architecture

One of the prime example of mobile computing through telephone is IVR system. In IVR a user inputs in the form of text either or voice and interact in turn gets a response in the form of voice.

There exists a text to speech (TTS) which retrieves the data or convert the data (which resides in database in the form of text and figures) converts in the form of speech.

If we are checking balance of any service provider we dial a tollfree no. then

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[30/Sept/2014]

Developing an IVR Application

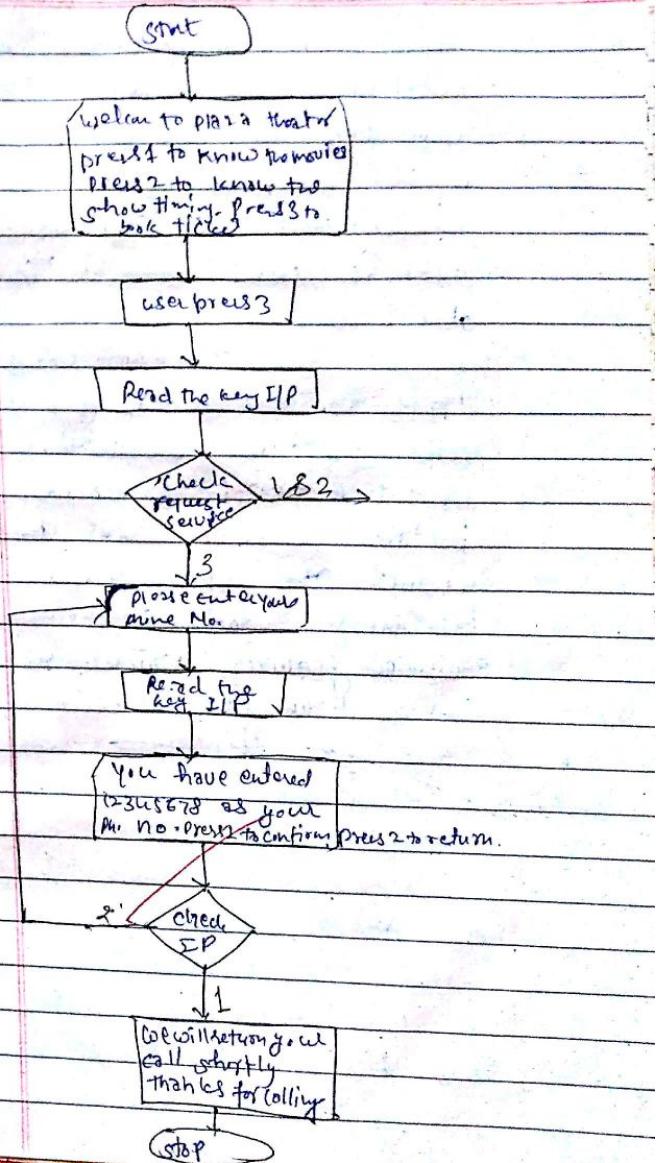
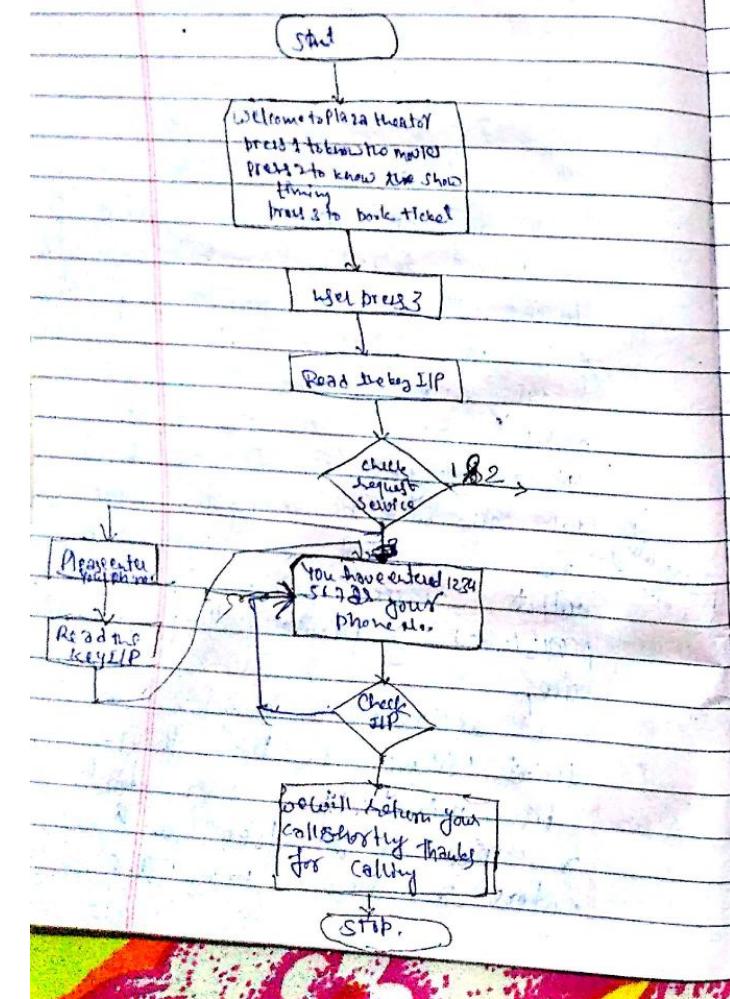
Like any other application development computer telephony or IVR application development also required definition of the user interface.

The user interface in an IVR applic. is call the call flow.

In a call flow are defined how the call will be managed. there are prompts that are played as an output. These prompts are generally pre-recorded by people with professional voice.

Let us take an example of ticket booking in the theater in this appl. user dials a service or toll free no. & enters a phone no. The

operator calls the user back and accepts the user booking request.



Voice XML[®] (extensible markup language)

In mobile computing through telephone the IVR is connected to the server through client server architecture. These days HTTP is used in addition to client server interface b/w the IVR and the server.

HTTP is also used for voice portale as well.

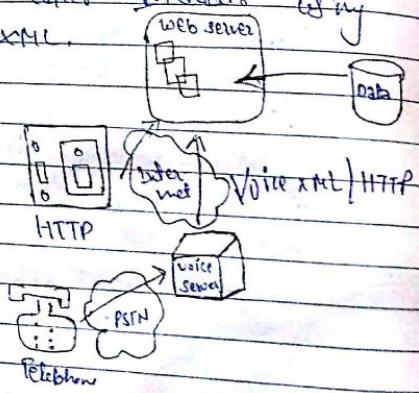
In the case of voice portale a user uses an internet site through voice interfaces for all these advanced features voice XML has been introduced.

How voice XML fits in a web environment - we use visual GUI web browser which renders and interprets HTTP requests to present information to the user. When user makes a selection for ex - clicking a hyperlink, the web browser sends an HTTP request to the web server. The web server responds by locating the page and return the page to the user.

The voice + web server extends the paradigm. A telephone and a voice server have been added to the web environment. The voice server manages several voice browser sessions. Each voice browser session includes one instance of the voice browser, the speech recognition engine & text to speech engine. Voice XML introduced a new way of presenting the web information instead of presenting

The information visually the voice server presents the info to the caller in audio way

Voice XML.



Structure/ Essential element of voice XML :-

first line <?XML>

Second line <VXML>

Use of XML coding

</VXML>

Prompt

(Prerecorded voice.)

<prompt>

press 1 to book ticket →

</prompt>

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14 | Oct | 2014

TAPI :- Telephony Application Programming Interface
It is a Microsoft Windows API which provides computer telephony integration.

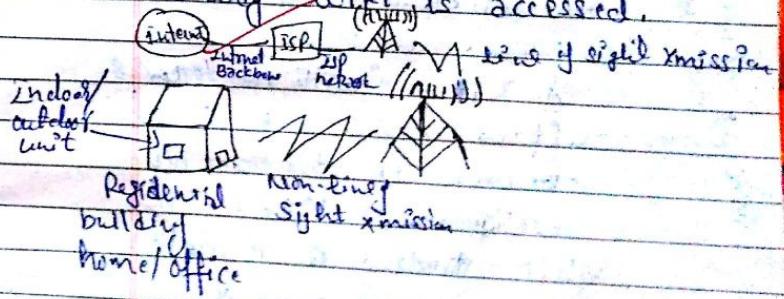
TAPI allows applications to control telephony functions between a computer and a telephone network for data fax and voice call using TAPI. Programmers can take advantage of different telephone systems including ordinary PSTN or ISDN (Integrated Services Digital Network).

TAPI is a standard program interface that lets us let our computer talk over telephone line or video call to people. Through TAPI one will be able to:

1. Make calls using simple user interface
2. use simple graphical user interface to setup a conference call & then attend the call at the schedule time
3. Attach voice greeting with an email.
4. Send & receive fax
5. See who we are talking to.

WiMAX stands for wireless interoperability for microwave Access and it also goes by the name IEEE 802.16

WiMAX would operate similar to WiFi but at higher speed over greater distance and for a greater no. of users. A WiMAX system consists of two parts a WiMAX tower and a indoor or outdoor unit. A single WiMAX tower can provide coverage to a very large area as big as 8000 sq miles. A WiMAX receiver could be a small box or a card which is built into a laptop as the way WiFi is accessed.



THU.
16 Oct. 2014.

Features of 802.11 abgnf

IEEE 802.11 :- 802.11 is the generic name of a family of standards for wireless networking. The numbering system for 802.11 comes from the IEEE 802 committee which was set up in 1980 to set the standard for LANs whereas 802 to designate many computer networking standards. 802.11 standards define rules for communication on wireless Local Area Networks (WLAN).

802.11 (with no letter suffice) was the original standard in the family developed in 1997.

This standard is obsolete today. Each extension to the original 802.11

(at sign) → adds a unique letter to the end of the name.

while 802.11g and 802.11n are the most interesting to the average consumer.

Features of 802.11 abgnf :-

802.11a :-

Due to its higher cost 802.11a is usually found on business networks. It supports a bandwidth up to 54 mbps and uses a frequency of 5 GHz. Some vendors offer hybrid 802.11a/b network gear. (AT&T)

The higher frequency of 802.11a signals have more difficulty penetrating walls and other obstructions (AT&T). It has fast speed signal interference is less, but has high cost shorter range signals that are more easily obstructed.

802.11 b: It is developed in 1999

This standard uses a frequency of 2.4 GHz and supports bandwidth up to 11 mbps. Vendors often prefer these frequencies to lower their production cost. This networking gear could be interfaced by cordless phones, microwave ovens and other home appliances that bandwidth. It has fewer cost. Signal range is good and not easily obstructed but it has slower speed. Home appliances may interfere on the frequency band.

802.11 g: Speed 54 mbps & frequency - 2.4 GHz

It is developed in 2002.

It attempts to combine best of both 802.11 a

and 802.11 b.

It has backward compatibility with 802.11 b. It has fast speed. Signal range is good and not easily obstructed. But it costs more than 802.11 b and home appliances may interfere on the frequency.

802.11 n:

It is the newest IEEE standards in WLAN. It was design to improve the bandwidth 802.11 g. It has fast transmission speed, best signal rate and more resistance to the interference. Disadvantage is that it has high cost compare to 802.11 g.

Speed of 802.11 n is 100 mbps and frequency of 802.11 n is 2.4 GHz.

TKL
17 Oct 2014

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Mobile IP:-

A standard that allows users with mobile devices whose IP address are associated with one network who stay connected when moving to a network with a different IP address, when a user leaves the network with which his/her device is associated (Home network) and enters the domain of a foreign network uses the mobile IP to inform the home network of a table of address to which all data packets for the user device should be sent.

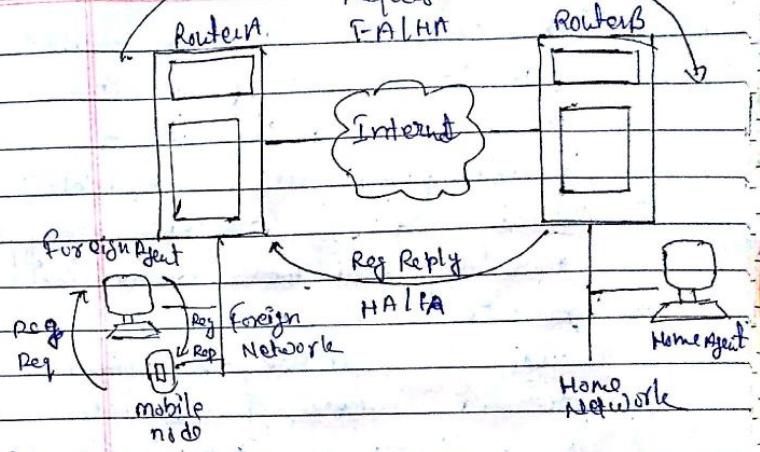
Mobile IP is often found in wireless LAN environments where users need to carry their mobile devices across multiple LAN's with different IP addresses,

mobile IP

Registration Request

FATHA

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Home Agent
Foreign Agent
mobile node

When the mobile node is on its home network and the neighbour node sends packet to the mobile node. The mobile node ignores them and answer as normal host, but if an mn is arriving from its home network it needs and agent to work on its behalf of it that agent is called home agent.

This agent must be able to communicate with the mn all the time.

If it must know the physical

In order to do this when
MN is away from home
network, it must get a
temporary address (which is
called care of address)
which will be communicated
to the home agent to
tell its current location.
This care of address
is assigned by the foreign
agent.

To support this operation
mobile IP needs to
support three basic capabilities

Discovery — An MN uses
a discovery procedure
to identify prospective home
agent and foreign agent.

(ii) Registration — A MN uses
a registration procedure
to inform its home agents
of its care of address.

(i) Tunneling — This procedure
is used to forward
data packets from a home
address to care of address.



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Design constraints for applications for handheld devices

The combinations of mobile internet and wireless communication technology has promised users any time, anywhere access of the information for work and personal use.

However the design constraints such as screen size hinder

- (i) limited battery life
(ii) small screen size
(iii) memory limitation.
(iv) cumbersome input device
(v) low end processor

(difficult to handle)

Design Guidelines for applications for handheld device

Category	Guideline
i) Input	Input on handheld device must be minimised.
ii) Display	Short and concise display are preferred on handheld devices so widely accepted short names are appropriate for the items in a drop down menu.
iii) Navigation	Wireless websites must be consistent with regular websites exit from an application must be visible buttons must be clearly separated from each other. Items in drop down must be sorted.
iv) feedback	For successful submission or task involving multiple steps confirmation is necessary.

28/10/14

Palm operating system^o

These are also known as
smart OS. It is a
mobile OS initially
developed by Palm Incorporation
(Inc.) for PDAs (Personal
Data Assistance) in 1996.

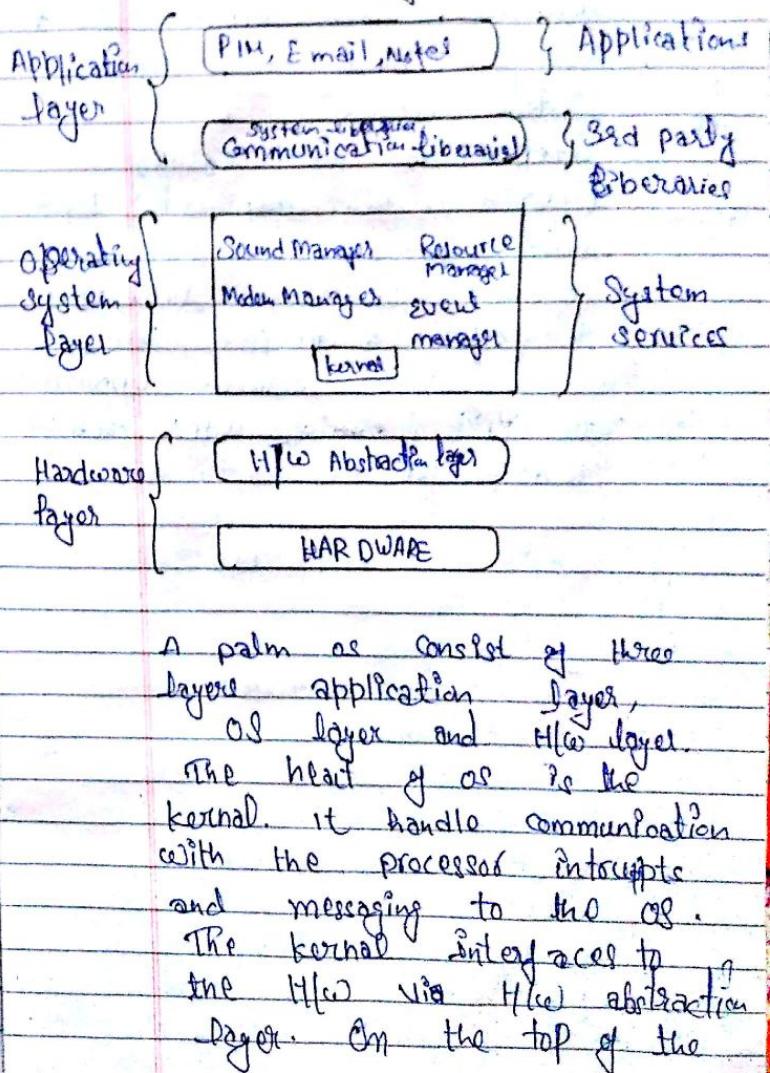
Palm OS is designed for
easy-to-use
with a touch screen based

GUI. It is provided
with a set of basic application

Application for personal
information management (PIM)

Later version of the OS
have been extended to
support smart phones. It
provides the user with the
assistance in record management,
instant messenger, data collection,
PIM tools, SMS, fax-fax,
audio video and lots
more.

Architecture of Palm OS^o



A palm OS consists of three
layers: application layer,
OS layer and H/W layer.
The heart of OS is the
kernel. It handles communication
with the processor, interrupt
and messaging to the OS.
The kernel interfaces to
the H/W via H/W abstraction
layer. On the top of the

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kernel there are the system services. Each service has a manager. There are the system libraries and independent third party libraries. The topmost layer consists of the application that use the underline libraries to perform a specific task.

The common applications are PIM, email, Notes, calendar, To do! etc.

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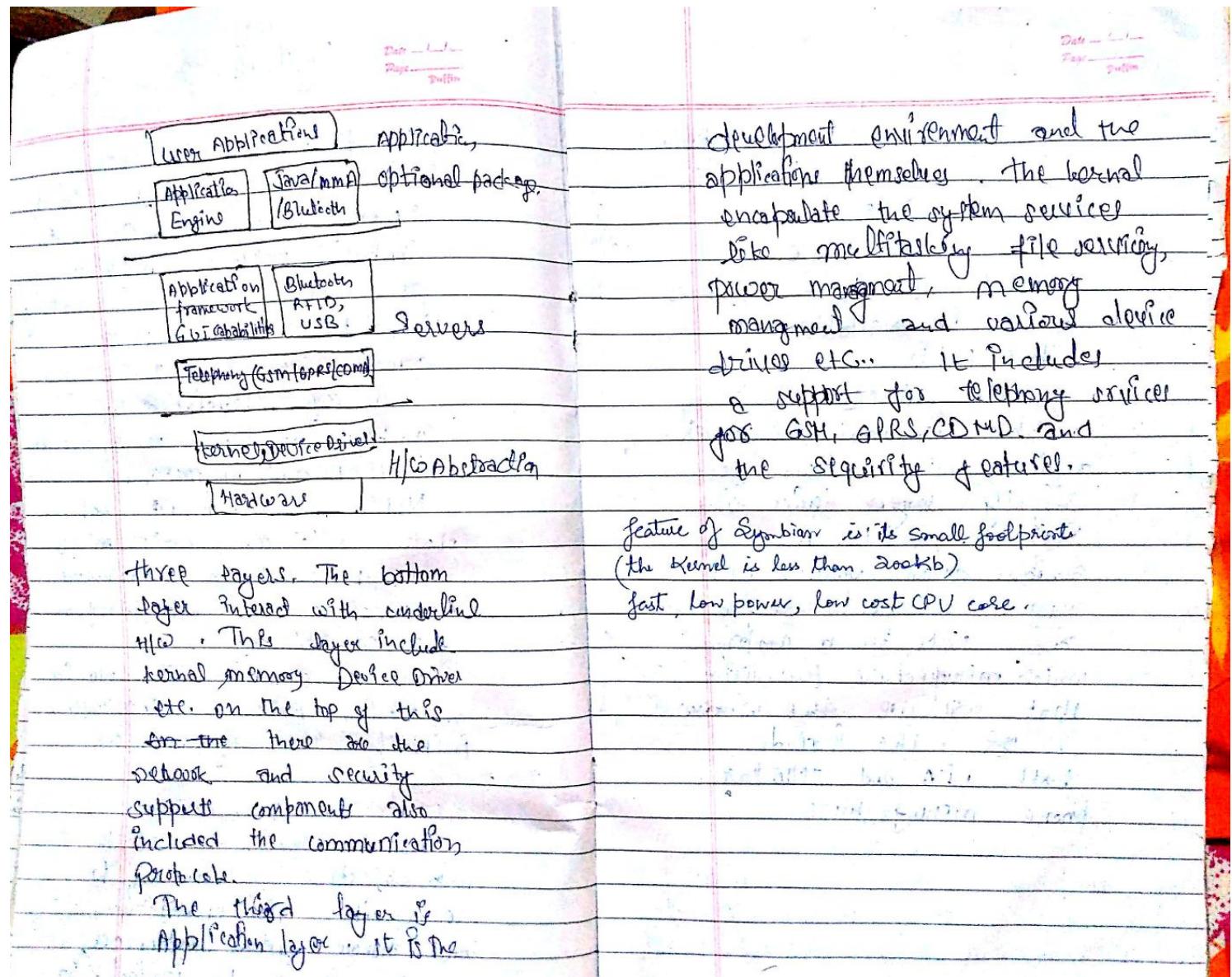
31/ Oct/ 2014

Symbian OS

Symbian is a closed source mobile OS and computing platform designed for smart phones and currently maintained by Accenture. It is a slow company. It was originally developed by Symbian Limited. Later Symbian Limited was merged with Nokia. In February 2011 Nokia announced a partnership with Microsoft and announced Windows as its main platform for smartphones.

Mobile companies like Nokia, Motorola, Arixn and Samsung initially used Symbian OS.

Architecture of Symbian OS
As in any other OS the main objective of the OS is to provide high abstraction and manage system resources, a symbian system can be divided into

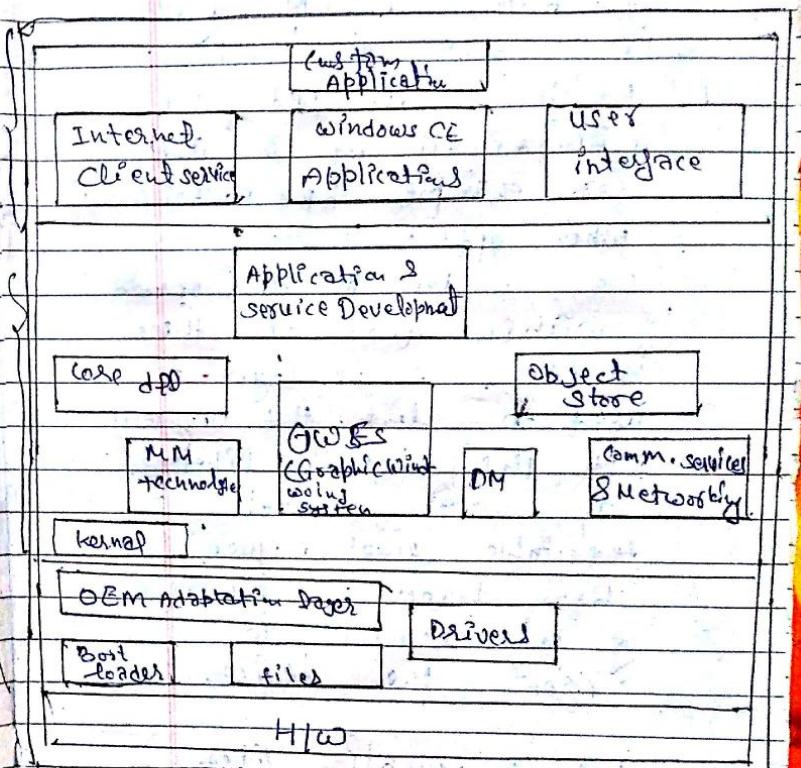


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Windows CE - MS has an operating system solution for all small devices. This OS is Windows CE. first released in 1997. Windows CE will be available for the initial range of handheld devices.

This includes the smaller devices like a phone to slightly larger device like PDA or pocket PC. It is available from various OEM

(Original Equipment Manufacturer) and OEM is a company which manufacture the device that will run the Windows CE. The include both PDA and cellular phone manufacturers.

Windows CE Architecture



Windows CE Architecture

It is a layered architecture at the bottom most layer we have the H/W. Next layer is OEM layer which is responsible for getting a Windows

based OS to run on a new
hardware platform. OEM layer
is a layer of functions
which is developed and
maintained by an OEM.
For example HP (Hewlett Packard)
who offers Windows
CE with the HP iPAQ
within the OEM there
is DAL. This layer is
used to link the programs
with the kernel library
to create kernel
executable files. Then
Boot Loader is the piece
of code required to
boot the device.

In configuration files
configuration parameters
are stored.

DRIVERS! - It is compatible
drivers for various
functionalities.

OS layer! - It contains all the
SW supplied by the
MS as a part of an
OS main component
1) This layer is kernel
And core DLL is the
DLL for kernel object
stores is a database for
special kind of info.
(like PIM (Personal Info
Manager))

1) communication services
2) networking providers
support for
various types of media access

GUI: provides control menus
display boxes etc.

NN technologies provides
technologies like NN devices
(like MMS, message)

13 Nov 2014

J2ME :-

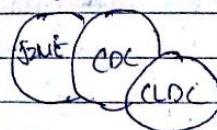
Java 2 Micro

Edition.

To be able to support the large set of devices a modular structure was essential. The designers of J2ME came up to with the concept of configuration and profile towards achieving this goal. It is

A configuration defines the minimum capabilities that will be available across a given range of devices. It is a complete JRE (Java Runtime Environment) consisting of JVM, a set of core Java run time classes, a set of supported API (Application Programming Interface), Configuration specification classes and methods that are inherited from J2SE (Java 2 Standard Environment).

Thus J2ME is a subset of J2SE. A configuration can be defined as a specification that identifies the system level facilities available. J2ME defines only two configurations. They represent the two distinct categories of devices that are CDC and CLDC.



CDC → Connected Device Configuration

CLDC → Connected Limited Device Configuration.

The first category is devices that have supervisory interface facilities, higher computing power and are constantly connected.

These implement the connected device configuration (CDC)

for example:- Set top box, Internet TV, internet enabled screen phone and navigation system.

The second being personal mobile information devices that are capable of

intermittent communication

These implement the

connected limited device configuration (CLDC)

for example:- mobile phones, PDA's and two way pagers.

*fridder klyp
Beach zone*