VIT UNIVERSITY
(Estd. u/s 3 of UGC Act 1956)

FALL – SEMESTER
Course Code: MCSE504L
Course-Title: – Operating System
DIGITAL ASSIGNMENT - II

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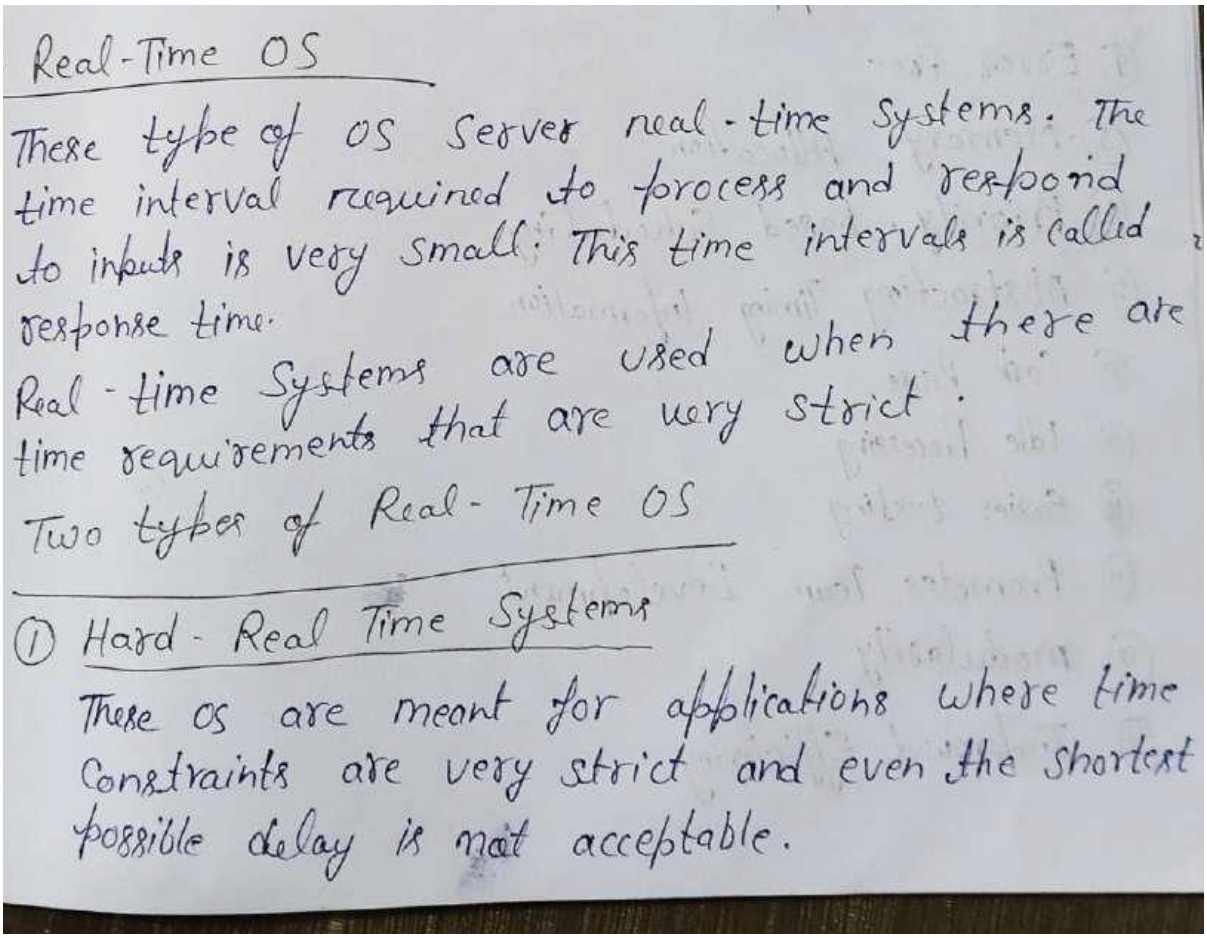
Slot- D1+TD1

Faculty : SALEEM DURAI M.A - SCOPE

Real Time Operating System :-



Real-Time OS

These type of OS Server real-time Systems. The time interval required to process and respond to inputs is very small. This time intervals is called response time.

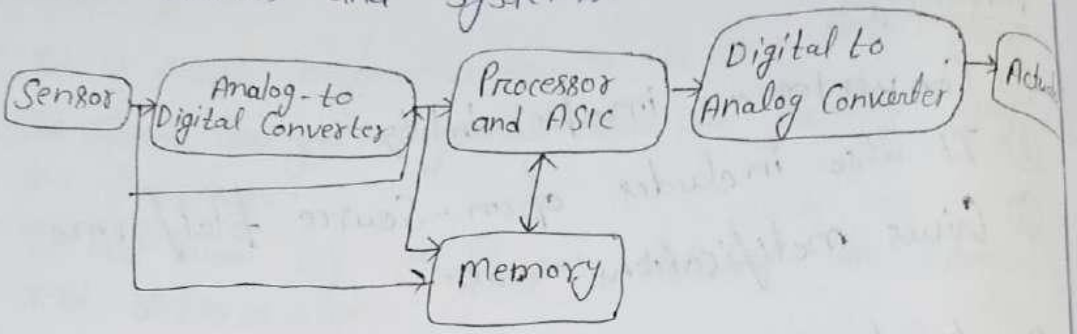
Real-time Systems are used when there are time requirements that are very strict.

Two types of Real-Time OS

① Hard-Real Time Systems

These OS are meant for applications where time Constraints are very strict and even the shortest possible delay is not acceptable.

Embedded operating Systems are built into internet of things devices. They are also part of many other devices and systems.



Advantages

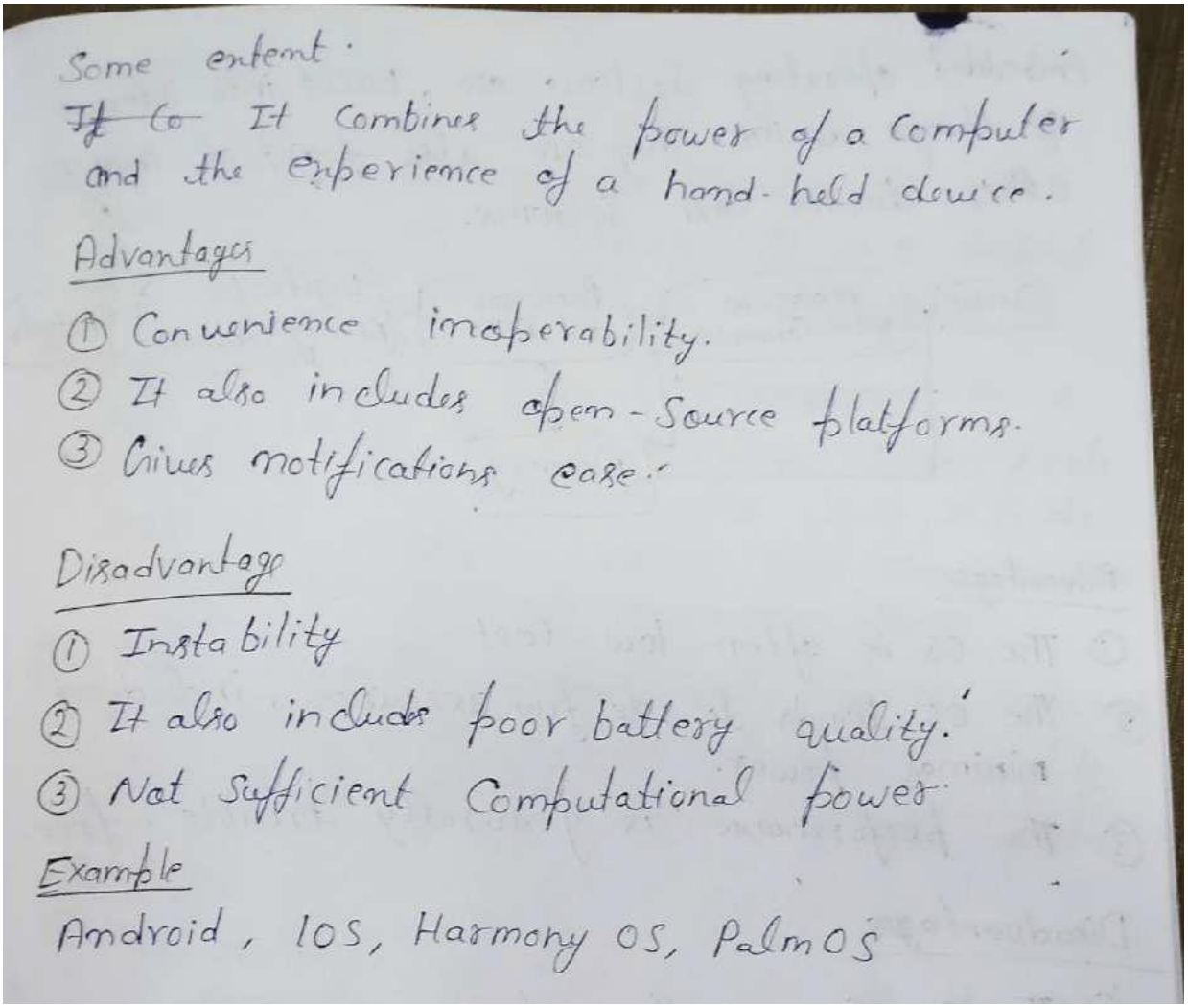
① The OS is often low-cost.
② The OS tends to use few resources, including minimal power.
③ The performance is generally trouble-free.

Disadvantages

① The OS can usually only run a single or very few applications.
It is difficult to modify the OS once you establi a framework and build it into the device.
Trouble-shooting the OS when there are issues can be difficult.

Examples

① Windows Mobile/CE
② Symbian
③ Linux-based OSes.


Some extent.

It combines the power of a computer and the experience of a hand-held device.

Advantages

① Convenience inoperability.
② It also includes open-source platforms.
③ Gives notifications ease.

Disadvantage

① Instability
② It also includes poor battery quality.
③ Not Sufficient Computational power.

Example

Android, IOS, Harmony OS, PalmOS

Mobile Operating system :-

Current Mobile operating System

These operating Systems often run a top baseban or other real-time operating systems that handle hardware aspects of the phone.

① Android

⇒ Android is based on a modified Linux Kerne mobile operating system developed by Google. The base system is open-source, but the apps and drivers which provide functionality are increase becoming closed-source. Besides having the largest installed base worldwide smartphones, it is also the most popular operating system for general purpose computers, even though Android is not a popular OS for regular personal computers. Although the android operating system is free and open source, in devices much of the software bundled with it is proprietary software and closed-source.

⇒ Android's releases before 2.0 were used exclusively on mobile phones.

> Android 2.X releases were mostly used for mobile phones but also some tablets.

> Android 3.0 was a ~~tables~~ tablets-oriented release and does not officially run on mobile phones. Both phone and tablets compatibility merged with Android 4.0.

⇒ Current Android Version is Android 13 released on August 15, 2022.

② Android One

⇒ Android one, a Successor to Google Nexus, is a software experience that runs on the unmodified Android OS.

Android one versions follow those of the android open Source project starting from Android 5.0 "LolliPop".

③ Blackberry Secure

⇒ Blackberry OS is developed by Black Berry based on android open Source project.

④ Calyx OS

⇒ Calyx OS is an System for Smart phones based on android with free and open-Source Software.

⇒ It is produced by the Calyx Institute as part of mission to "defined online privacy, Security and accessibility".

⑤ Color OS

⇒ Color OS is a 'custom front-end touch interface based on the android open Source project.

⇒ Developed by OPPO electronics Corp. in 2016.

⇒ OPPO officially released Color OS with every OPPO and realme device and released an official ROM for the one plus one.

⑥ Copperhead OS

⇒ Copperhead OS is a Security - hardened Android.

⑦ Divest OS

⇒ Divest OS is a soft fork of Lineage O.S. includes monthly updates. FOSS FOCUS, Deblobbing, security and privacy focus.

⑧ EMUI

⇒ Huawei EMUI is a front-end touch interface developed by Huawai Technologies and sub brand Honor based on android open Source project.

⇒ Huawei and Honor devices preinstalled EMUI.

⑨ lelo

⇒ lel is an OS forked from the Lineage OS.

⇒ lel targets android Smart phone device and uses micro G as a replacement for Gogle play Services.

⑩ Fire OS

⇒ Amazon Fire OS is a mobile OS forked from android and produced by Amazon for its fire range of Tablets, Echo and Echo Dot, and other Content delivery devices like Fire TV.

Fire OS Primarily centers on Content Consomption with a Customized User interface and heavy ties to Content available from Amazon's own Storefronts and Services.

(16) IQOO UI

→ IQOO UI is Custom User interface that is based on Vivo's Funtouch OS

⇒ The UI mostly resembles its predessor but with a customized UI on top of the Funtouch OS.

(17) Indus OS

⇒ Indus OS Custom mobile operating System developed by the Indus OS team based in India.

⇒ Indus OS is available on Micromax, Intex, Karbonn, and other indian Smartphone brands

(18) LG UX

⇒ LG OS is front-end User interface developed by LG Electronics featuring full touch user interface.

⇒ LG UX is used internally by LG for sophisticated feature phones and tablet Computers.

(19) Lineage OS

→ Lineage android distribution is a Custom mobile OS. It serves as a Successor to the highly popular Custom ROM.

(20) Magic UI

⇒ Magic UI is touch interface developed by Honor

⇒ Magic UI is based on EMUI, almost identical to EMUI.

(11) Flyme OS

⇒ Flyme OS is developed by Meizu Technology an open-source OS based on android open source project.

⇒ mainly install on Meizu Smart phones MX Series, also has officials ROM support for a few android devices.

(12) Fun touch OS

⇒ Fun touch OS is Custom user interface by VIVO.

⇒ Fun touch OS 10.5 had a redesigned UI that resembled stock androids.

(13) Graphene OS

⇒ Varient of android for Pixel hardware.

(14) Hi OS

⇒ HiOS is android based OS developed by Teeno mobile.

⇒ Allows wide range of user Customization without requiring rooting the mobile device.

⇒ bundled with utility application that allow users to free up memory, freeze applications, limit data accessibility to applications among others.

⇒ Comes with feature like Launcher, private safe, Split Screen and LockScreen notification.

(15) HTC Sense

⇒ HTC Sense is a software suite developed by HTC. primarily on the Company's android based devices.

(21) MIUI

⇒ Mi User Interface developed by chinese electronic Company Xiaomi based on android open Source project.

⇒ Mostly found in Xiaomi and Mi and Redmi Series.

(22) My OS

⇒ My OS formerly Mi Favor developed by ZTE for their flagship Smartphones based on android.

(23) My UI

⇒ My UI formerly My UX is Custom Android UI developed by Motorob for their devices.

⇒ look like Stock android ux until My UI 3.X.

(24) Nubia UI

⇒ Nubia UI is a Custom UI developed by ZTE and nubia based on android.

(25) One UI

⇒ One UI formerly called TouchWiz and Samsung Experience is front-end touch interface developed by Samsung Electronics in 2008 with full touch.

⇒ Used internally by Samsung for Smartphones, tablets, features phones.

⇒ Similar to MS Continuum, Samsung Dex allowed high end galaxy devices to Connect into docking station.

⇒ Allows devices to allow desktop like functionality by Connecting mouse, Keyboard, monitor.

⇒ Annouced "Linux on Galaxy" which allows users to use the standard Linux distribution on Dex Plateform.

(26) Origin OS

⇒ Developed by Vivo based on android.

⇒ Currently only available in china.

(27) Oxygen OS

⇒ developed by one plus based on android to replace Cyanogen OS.

⇒ Focused on stabilizing and maintaining stock android functionalities.

(28) Pixel UI

⇒ Google Pixel UI or Pixel Launcher developed by Google based on android.

⇒ Unlike Nexus phones where shipped with stock android this UI Come with first generation Pixel modified.

⇒ only available on pixel family devices.

(29) Realme UI

⇒ realme UI is mobile OS developed by Realme based on OPPO COlor O.S.

(30) Red Magic OS

⇒ Red magic OS is mobile OS developed by ZTE and Nubia for Red magic devices.

(31) Replicant OS

⇒ Replicant is mobile OS based on android with all proprietary drivers and bloated closed-software removed.

(32) TCL UI

⇒ Custom user interface developed by TCL tech for their in-house smartphone based on android.

(33) VOS

⇒ VOS is Custom android UI developed by BQ Aquaris and Vsmart.

(34) XOS

⇒ XOS formerly XUI is android based mobile OS developed by Infinix mobile.

⇒ Comes with utility applications that allow users to protect their privacy, improve speed, enhance their experience etc.

⇒ Comes with features like XTheme, Scan to recharge, Split Screen and X managers.

(35) Xperia UI

⇒ Sony Xperia user interface developed by Sony mobile based on android.

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(35) Xperia UI

⇒ Sony Xperia user interface developed by Sony mobile based on android.

⇒ differed from Standard android UI [illegible] of bottom part app dock, they were located at four Corners of the home Screen while middle of the Screen Consisted of the widget.

(36) Zen UI

⇒ Zen UI is front-end user interface developed by ASUS. featuring full touch interface.

⇒ Used by ASUS for android phones and tablet Computers.

⇒ Comes with preloaded apps like Zen link.

(37) ZUI

⇒ ZUI is a Custom OS originally developed by Lenovo Subsidiary ZUK Mobile. later took over

⇒ by Lenovo.

Based on android open Source project.

(38) Wear OS

⇒ Wear OS is a version of google's Android OS designed for Smart watches and other wearables.

(39) One UI Watch

⇒ User interface by Samsung for their wear OS based Smart watch.

(40) Chrome OS

⇒ Chrome OS is designed by Google based on the Linux Kernel and uses the Chrome web browser as

(44) Smart Feature OS

⇒ Custom Version of Kai OS that was developed and used by HMD Global for Kai OS line of Nokia feature phone.

⇒ Main difference between stock Kai OS and Smart feature OS is mainly on atheistic such as icon and some UI element.

(45) Fuchsia

⇒ Fuchisia is a capability-based, real-time OS currently being developed by google

⇒ Fuchia is based on a new micro kernel called "Zirom".

⇒ a small OS intended for embedded Systems,

⇒ Capability to run on universal devices from embedded Systems to Smartphones, tables and PCS.

(46) Lite OS

⇒ Lite OS is light weight open source real time OS which is part of Huawei's "1+2+1" Internet of things Solution.

⇒ Similar to android things and Samsung Tizen

⇒ Features lightweight, low-power, fast-response, multi Sensor Collaboration, multi protocal inter-Connect Connectiwity.

⇒ Enabling IOT terminals to quick by access to network.

⇒ Makes intelligent H/w development easier.

(47) Open Harmony

⇒ Open Harmony is open-source version of Harmony OS developed and donated by Huawei to openAtom Foundation.

⇒ Supports devices running a mini system with memory as small as 128 KB, or standard system with memory greater than 128 MB.

⇒ Based on lite OS Kernel.

⇒ Provide rich-Kernel mechanisms, more comprehensive POSIX, unified driver framework, H/w driver Foundation.

⇒ offers unified access to device developers and friendly development experience for application developers.

(48) Fedora Mobility

⇒ Under developing mobile OS by Fedora project that are porting Fedora to run on portable devices such as phones and tablets.

(49) Lune OS

⇒ Modern implementation of the palm/HP web OS interface.

to allow in experienced users to install the operating System on third-party devices without damaging their hardware.

(56) iOS

⇒ iOS was created by Apple Inc.
⇒ Has the second largest installed base worldwide on Smartphones.
⇒ It is close-Source and proprietary, and built on open-Source Darwin OS.
⇒ Used for iphone, ipod Touch, iPad and Second and third generation Apple TV.

(57) iPad OS

⇒ IPad OS is a tablet OS created by Apple Inc.

(58) Watch OS

⇒ Is a OS System for Apple watch.
Features focus on Convenience, such as being able to place phone calls, Send texts, health, fitness and heart rate tracking.

(59) Bridge OS

⇒ Mobile OS created by Apple Inc.
Use exclusively with T Series Apple Silion processors and operates OLED touch Screen Strip.

(60). Kindle firmware

⇒ Mobile OS specially design for Amazon Kindle e-readers.
⇒ It is based on Custom Linux, Kernel, manufactured under Amazon brand.

2. Various Network operating system

Network operating System

An operating System, which includes Software and associated protocals to Communicate with other autonomous Computer via a network Conveniently and Cost - effectively, is called Network operating System.

The Composition of hardware that typically uses a NOS includes a number of personal Computers, a printer, a Server and file Serve with a local network that Connects them together.

The roles of the NOS is to then provides basic network Services and features that support multiple input requests Simultaneously in a multiuser environment.

Types of Network operating System

There are two basic type of operating System:-

1. Peer-to-Peer network operating System
2. Client/Server network operating System

Features of network operating System

1. Printer's and application sharing on the network File System and database sharing
2. Provide goal Security by using functionality like User authentication and access Control.
3. Create backups of data.
4. Inter-networking.

Functions of Network operating System

Following are the main function of NOS :- —

1. creating and managing user accounts on the network.
2. Controlling access to resources on the network.
3. Provide Communication Services between the devices on the network.
4. Monitor and troubleshoot the network.
5. Configuring and managing the resources on the network.

Advantages of NOS

1. Highly stable due to Central Server.
2. Provide good security.
3. Upgradation of new technology and hardware can be easily implemented in the network.
4. Provide remote access to Servers from different locations.

Disadvantages of NOS

1. Depend on the Central location to perform the op^n
2. High cost by buying Server.
3. Regular updating and maintenance are required.

Example of Network operating System—

Following are the examples of network operating System:—

1. MicroSoft Windows Server 2003
2. UNIX/Linux
3. Artisoft's LANtastic
4. Banyan's VINES
5. MicroSoft windows Server 2008
6. MicroSoft Windows 2000
7. MicroSoft windows XP
8. Novell NetWare
9. Sun Solaris
10. Apple Share
11. Mac OS X
12. BSD

Types of NOS

1. Peer to Peer Network operating System

⇒ Peer to Peer networks are the network resources in which each System has the same capabilities and responsibilities, i.e., none of the Systems in this architecture is superior to the other in terms of functionality.

⇒ This is no master-slave relationship among the System, i.e., every node is equal in a Peer Peer

⇒ Network operating System. All the nodes of the Network have an equal relationship with others and have a similar type of software that helps the sharing of resources.

⇒ Peer-to-peer Network is organized, simply a group of computers that can share resources. Each computer in a workstation keeps track of its user accounts and security settings. So no single computer is in charge of the workgroup. workgroups have little security, and there is no central login process.

⇒ Any user can use any shared resources once the logs into a peer on the Network. As there is no central security, sharing resources can be controlled by a password, or the user may stop the accessibility of certain files or folders by making them not shared.

Advantages

① This type of System less expensive to set up and maintain.

② In this, dedicated hardware is not required.

Disadvantages

① This failure of any node in a system affects the whole System.

② Its performance degrades as the Network grows.

③ Lack of Central Control over the Network.

④ Peer to Peer networks are usually less secure because they Commonly use Share-level-Security

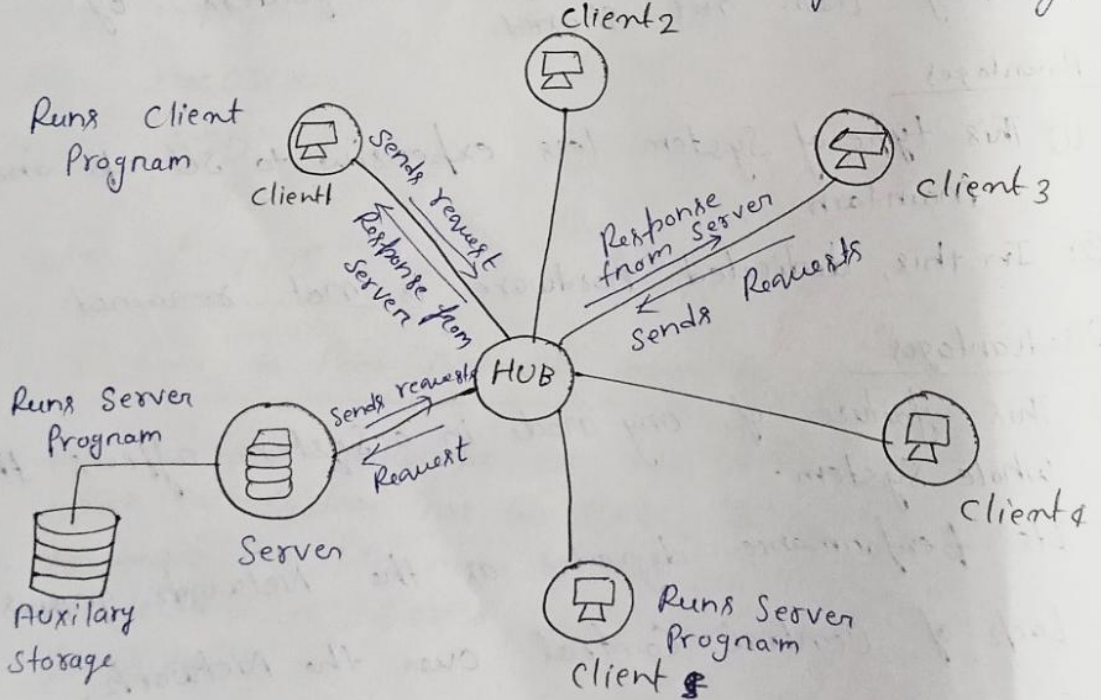
Client - Server Network operating System

In Client - Server Systems, there are two broad Categories of Systems:-

1. The Server is called backend.
2. A Client called as frontend.

Client - Server Network operating System is a Server - based Network in which storage and processing workload is shared among clients and Servers.

Client - Server Network was developed to deal with the environment when many PC printers and servers are connected via a network. The fundamental Concept changed to outline a Specialized Server with unique functionality.



Advantages

① This nw is more secure than the Peer Peer Network System due to Centralized data Security.

② Network traffic reduces due to the division of work among clients and the Server.

Disadvantages

① In client-Server Networks, Security and performance are important issues. So trained network administrators are required for network administration.

② Implementing the Client-Server Network can be a costly issue depending upon the Security, resources, and Connectivity.

Example

① MicroSoft window Server 2003

⇒ Microsoft window Server 2003 follows the fixed Lifecycle Policy.

② Designed for small organizations and departmental use, windows Server 2003, Standard Edition, delivers Intelligent file and printer sharing, Secure internet Connectivity, centralized desktop policy management, and web Solutions that Connect employees, partemers, and Customers, windows Server 2003, Standard Edition, provides high levels of dependability, Scalability, and Security.

In this Edition

Advanced networking features such as Internet Authentication Service (IAS), the Network Bridge,

feature, and Internet Connection Sharing (ICS).

⇒ four way Symmetric multiprocessing (SMP).

② UNIX

⇒ With this strong OS, multiple user can Simultaneously access the System and run their programs, Communicating interactively with the System using remote terminals. Users could thus Collaborate in real-time on Computing projects by sharing files and resources.

⇒ UNIX became widely available around 1975 and established strong roots in academic Computing environments, where it is still used and taught today. This OS has evolved into a number of different "flavors" as Vendors have adapted to it their own hardware platforms.

These flavors include the following:

⇒ **SystemV**

Envolved from version of UNIX developed by UNIX Systems Laboratories and AT & T.

⇒ **BSD**

Developed at the University of California, Berkeley the basis of the SunOS from Sun microsystems.

⇒ **AIX**

Devloped by IBM for its mid-range Computer Systems.

⇒ **HP/UX**

Developed by Hewlett-Packard.

⑦ Junos OS

Junos OS is a network operating System, from Juniper Networks.

Pros

⇒ BGP auto-peering
⇒ Juniper ATP cloud for threat profiling
⇒ Segment Routing algorithms allows Customization.

Cons

⇒ GUI has come a long way, but can be improved.
⇒ SDN features
⇒ Training, documentations and online discussion forums can be improved.

⑧ Cisco IOS

Cisco IOS, presently in its 15th edition, is a network operating System for service providers and enterprises alike.

Pros

⇒ User friendly CLI
⇒ Quick fixes for critical bugs.
⇒ Longer uptime

Cons

⇒ No good element managers like Nokia.
⇒ Load balancing functionalities are not the best.
⇒ Memory issues.

⑨ NVIDIA Cumulus Linux

NVIDIA acquired Cumulus Networks in June 20
to supports its networking division, a network

operating System designed to give users a choice of ingredients to power data centers that are accelerated, disaggregated and software-defined to meet the growth in AI, cloud and high performance.

(10) Arista EOS

Arista Extensible operating System (EOS) is a network operating System.

(11) Dent

Dent is a Linux based network operating System, which is free to use, and iterated on by an active community of developers.

(12) Graphiant

Graphiant is a venture capital firm partnered Startup in the Bay Area, developing its own Computer networking technology.

(13) eola

eola is an OS for experience providers. They enable businesses to automate their processes - from data bookings to resources management - while Significantly increasing revenue.

(14) NVIDIA Onyx

NVIDIA Onyx (formerly Mellanox Onyx) is a Switch operating System, designed for the scale and demands for next generation data centers

HiSec OS

HiSec OS is the latest OS for industrial Security Routers, Combining performance with robust security. It provides the user with Comprehensive Security mechanisms to protect networks against attacks and operating errors..

Alliedwars Plus

Alliedwars Plus is a network operating System that aims to deliver the functionality, Scalability, performance, and reliability. Built on industry Standards and with a user interface designed to be understand by any network engineer.

Nodogrid OS by ZPE Systems

Nodegrid OS from ZPE Systems features a hypervisor for guest OS & application hosting, and support Virtualized network functions (VNFs) Users have a lightweight Virtual Stack that can be managed from anywhere.

Axinos AX BIZ

Business Router ManagementAXBIZ is the Axinos OSS and network management framework for telco business edge routers. It enables for life-cycle management and automation of voice and VPN provisioning, real-time monitoring and proactive troubleshooting across multi- vendor

SONiC

SONiC is an open source network operating System based on Linux that runs on switches from multiple vendors and ASICs. SONiC offers a full-suite of network functionality, like BGP and RDMA, that has been production-hardened in the data centers of some of the largest Cloud Service.

Open Network Linux

Open Network Linux is an open source network operating system, providing businesses with a highly customizable network operating