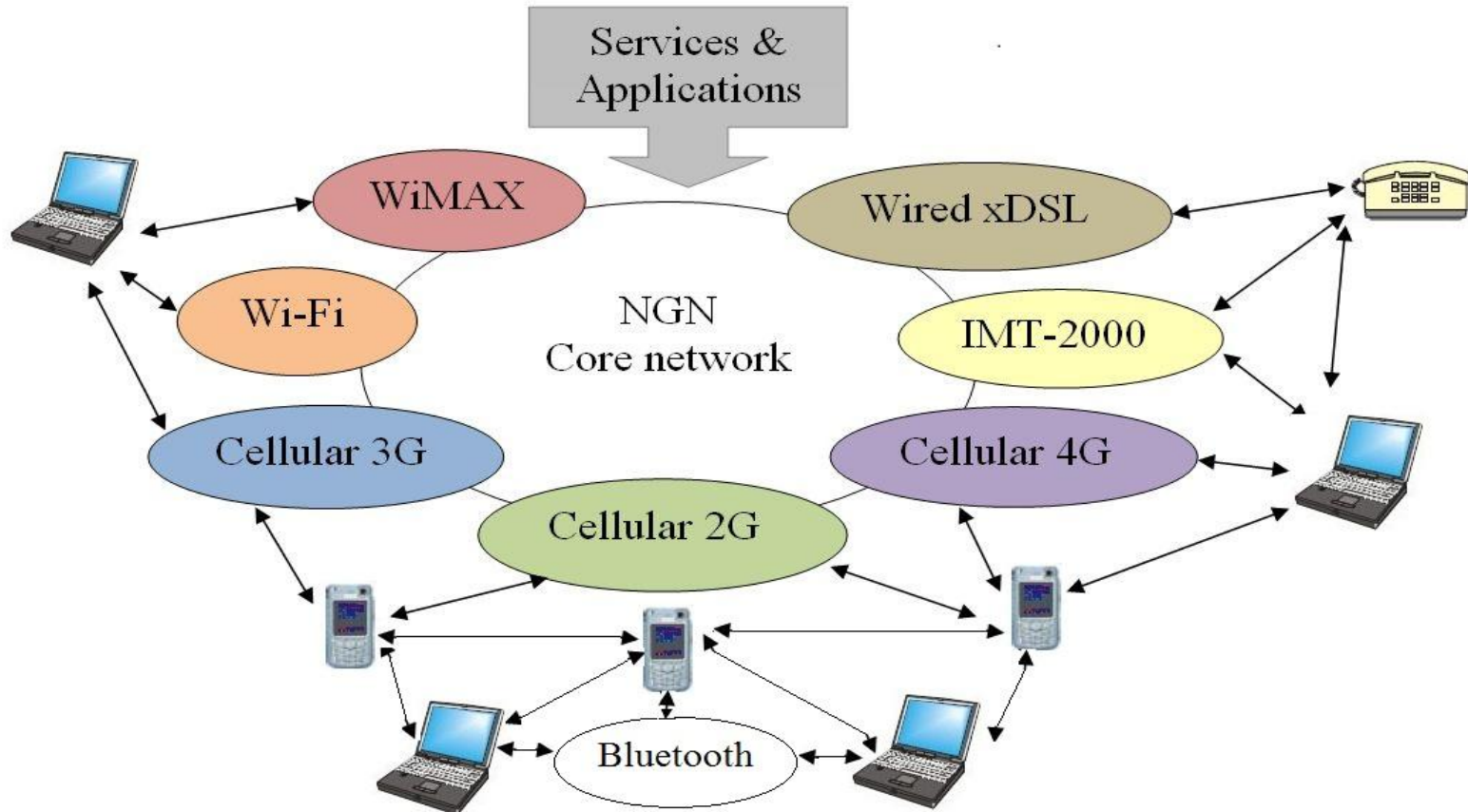


Andhra Pradesh Human Resource Development Institute  
3 Day Residential Training Programme on  
Management Information Systems

Hardware, Software and Networking

Prof. Y.K. Sundara Krishna  
Principal  
Krishna University

# Next Generation Network Systems



# Next Generation Services & Advantages

- Location based Services
- Dynamic Services
- Separation of Transport and Service
- Heterogeneous Network Support
- Supports multiuser on single SIM
- Single SIM supports multiple networks

# Next Generation Services & Advantages

- Integrates
  - Computing,
  - Communication,
  - Entertainment ,
  - Presentation
  - Storage & Retrieval
  - and Fault Tolerance Systems

# Future Networks

- Data Centric Network
  - Sender Mobility
  - Receiver Mobility
  - Network Mobility

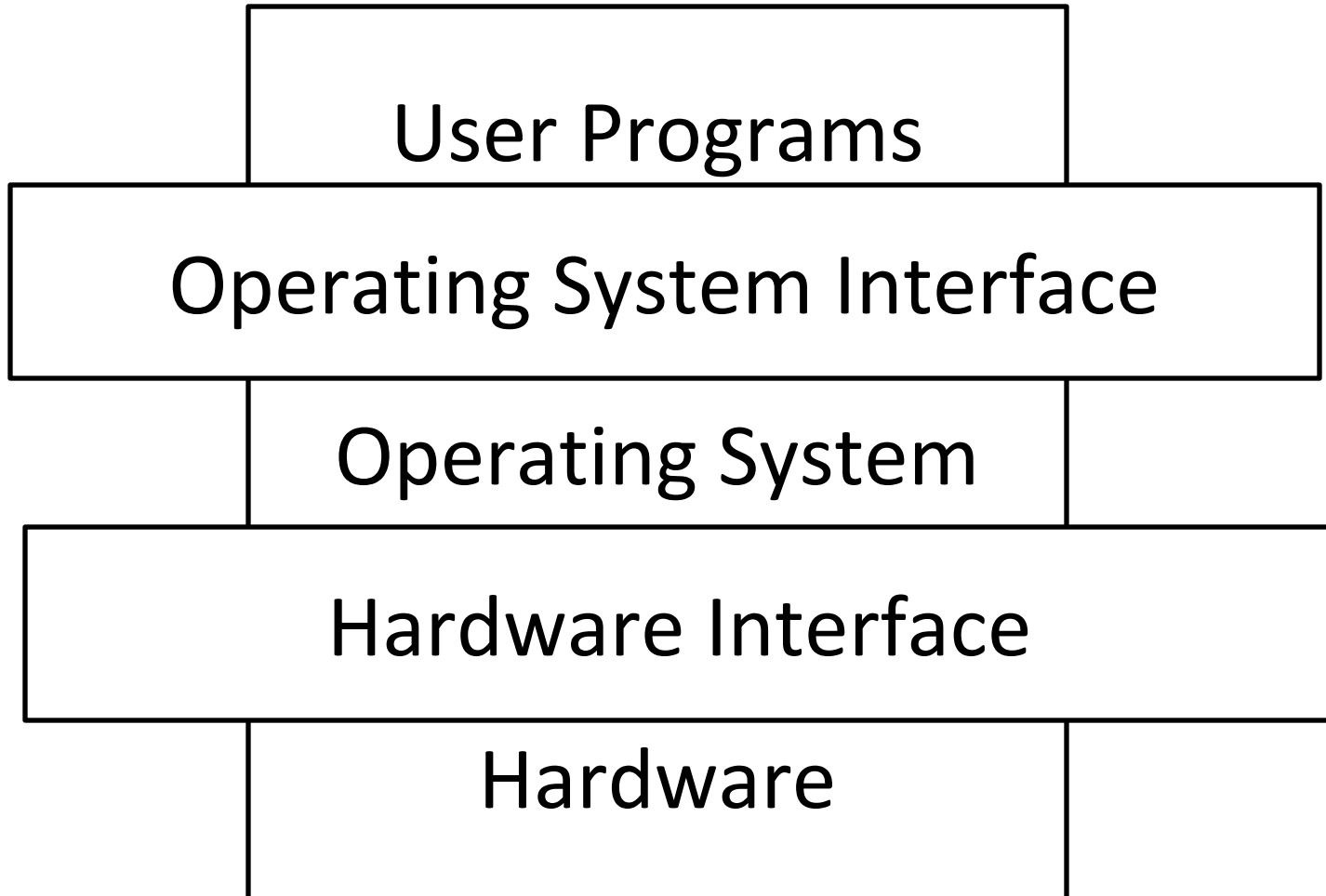
# Network Computing Systems

- Network Computing Systems are connection of
  - ✓ Autonomous,
  - ✓ Heterogeneous,
  - ✓ Intelligent Systemsin Dynamic, Distributed and Mobile Environment

# Network Computing

- Design of Computing Algorithms for Network Computing Systems is major issue

# Layers of Computer Systems





# Functional Boundaries Computing Systems

Heterogeneous Applications	Application Layer
Mechanisms for Security Aspects	Presentation Layer
Operating System, Device Drivers & OS interface	Session Layer
	Transport Layer
	Network Layer
Hardware of Computer System & Hardware Interface (BIOS)	Data Link Layer
	Physical Layer

# Layer wise Procedures and Protocols

	Data Unit	Layer	Functions
Host Layers	Data	Application	Network process to application
		Presentation	Security Issues Data representation, encryption and decryption, convert machine dependent data to machine independent data
		Session	Inter host communication, manage sessions between applications
	Segments	Transport	End to End connection, reliability and flow control
Media Layers	Packet/ Datagram	Network	Path determination and logical addressing
	Frame	Data Link	Physical addressing
	Bit	Physical	Media, signal and binary transmission

# Layer wise Procedures and Protocols

## OSI model

### 7. Application layer

NNTP · SIP · SSI · DNS · FTP · Gopher ·  
HTTP · NFS · NTP · SMPP · SMTP · SNMP ·  
Telnet · DHCP · Netconf · (more)

### 6. Presentation layer

MIME · XDR

### 5. Session layer

Named pipe · NetBIOS · SAP · PPTP · RTP ·  
SOCKS · SPDY · TLS/SSL

### 4. Transport layer

TCP · UDP · SCTP · DCCP · SPX

### 3. Network layer

IP (IPv4 · IPv6) · ARP · ICMP · IPsec · IGMP ·  
IPX · AppleTalk

### 2. Data link layer

ATM · SDLC · HDLC · CSLIP · SLIP · GFP ·  
PLIP · IEEE 802.2 · LLC · L2TP · IEEE 802.3 ·  
Frame Relay · ITU-T G.hn DLL · PPP · X.25

### 1. Physical layer

EIA/TIA-232 · EIA/TIA-449 · ITU-T V-Series ·  
I.430 · I.431 · PDH · SONET/SDH · PON ·  
OTN · DSL · IEEE 802.3 · IEEE 802.11 ·  
IEEE 802.15 · IEEE 802.16 · IEEE 1394 ·  
ITU-T G.hn PHY · USB · Bluetooth · RS-232 ·  
RS-449

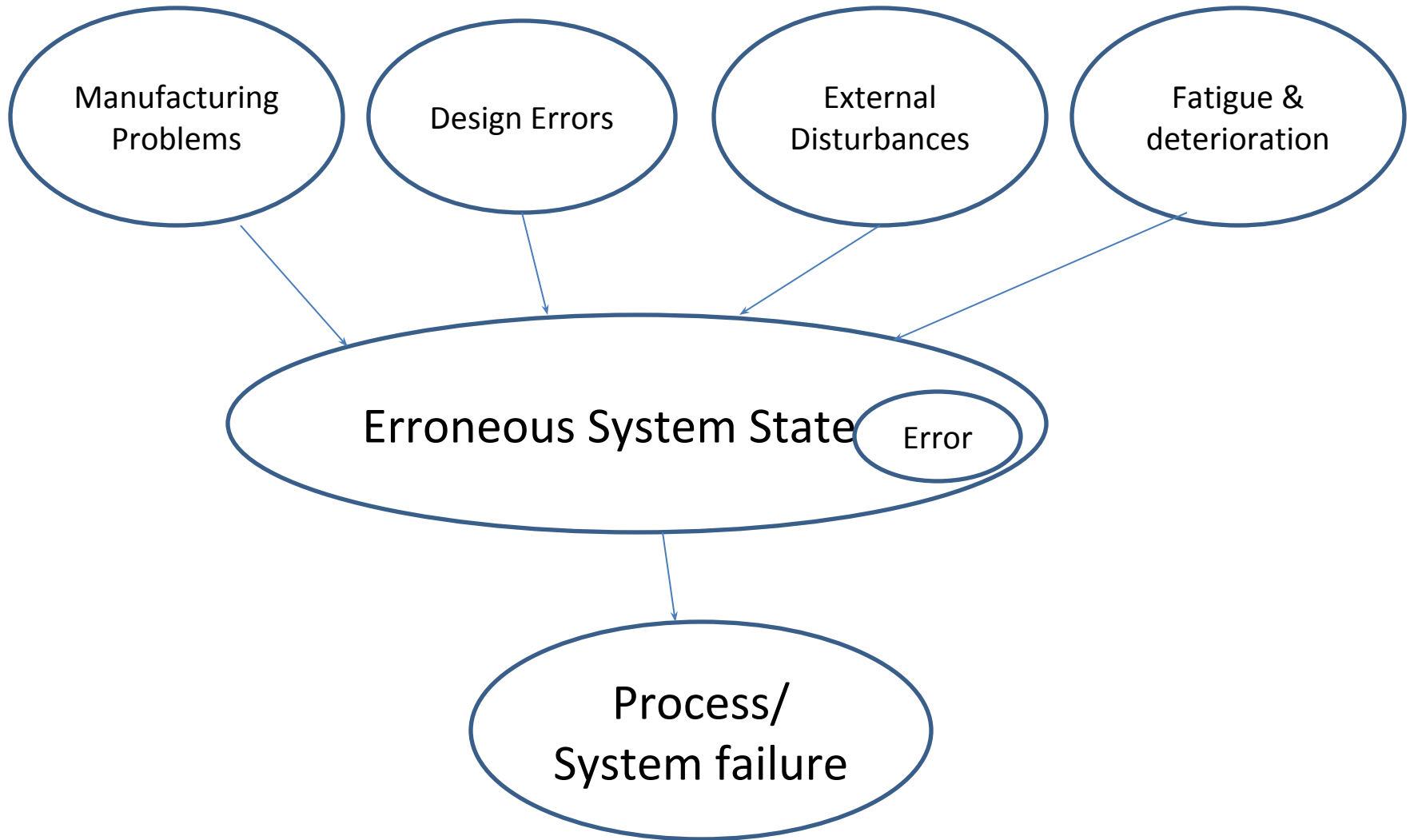
# Computer Programming

- Basic Input Output Systems (BIOS)
- Assemblers/Compilers /Interpreters
- Editors/Loaders /Linkers
- Operating Systems
- Device Drivers
- Integrated Programming Development Environments
- Tools
- General & Specific Applications

# Stages in Programming Development

- Detailed requirement-input/output
- Design & Modeling
- Implementation in one or more languages
- Test patterns at various levels
- Product Integration
- Addressing compatibility issues
- Documentation
- User & Programmer Guides
- Alpha & Beta version Product delivery
- Field Problems & Release of Patches
- New versions of Product

- An **Error** is a manifestation of **fault** and can lead to **failure**



# Design Approaches of Operating Systems

## Policy Vs Mechanism

- Policy : What should be done ?
- Mechanism : How it should be done?

## Good Operating System

- A good operating system design must separate Policies from Mechanisms

# Design Approaches of Operating System

- Layered Approach

Divides the operating system into several layers

- The Kernel based approach

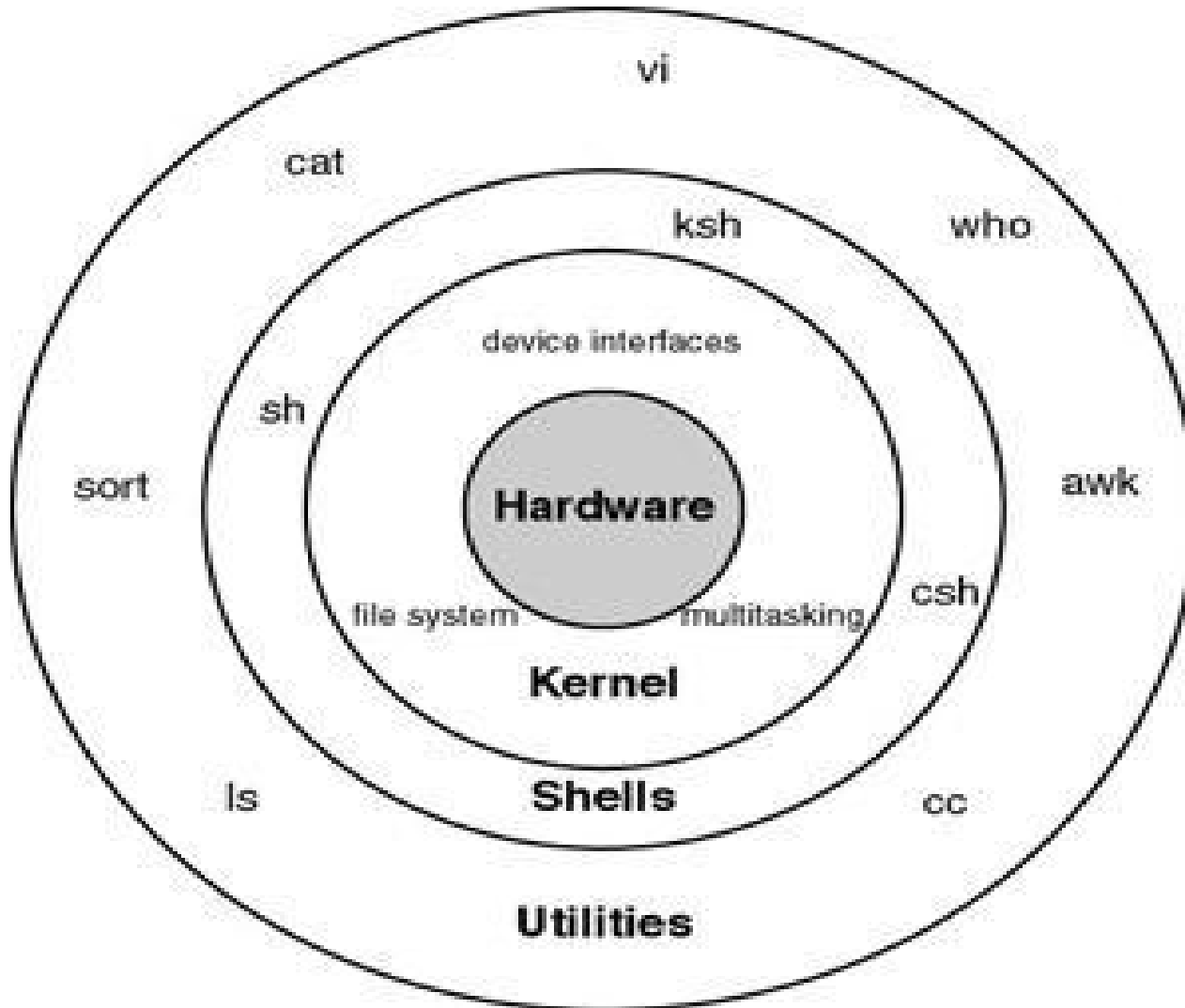
Kernel is collection of primitive facilities over which rest of Operating System is built

- The Virtual Machine approach

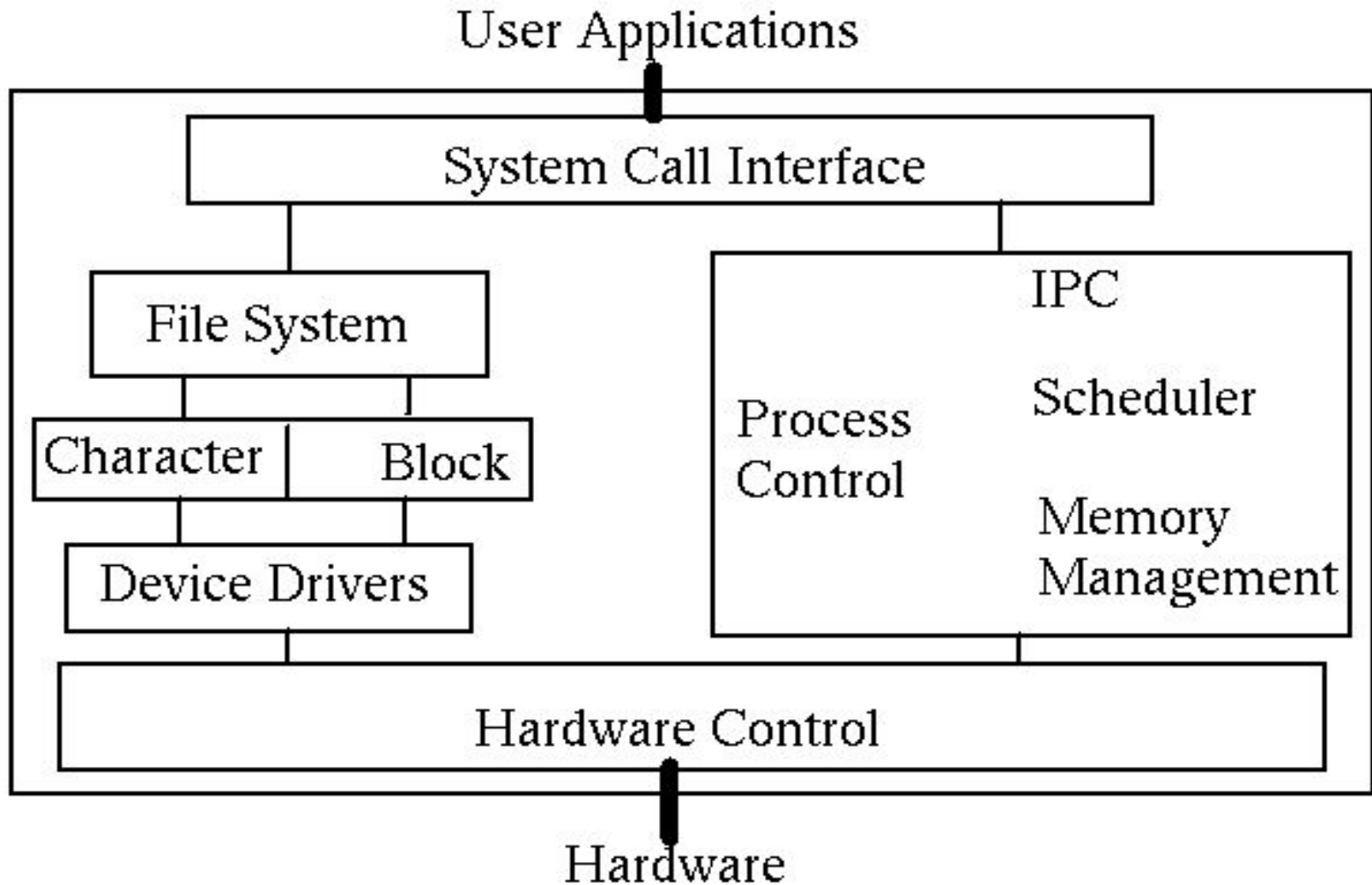
VM software on bare hardware gives illusion of whole system sole disposal of each user



# Unix Layered Approach



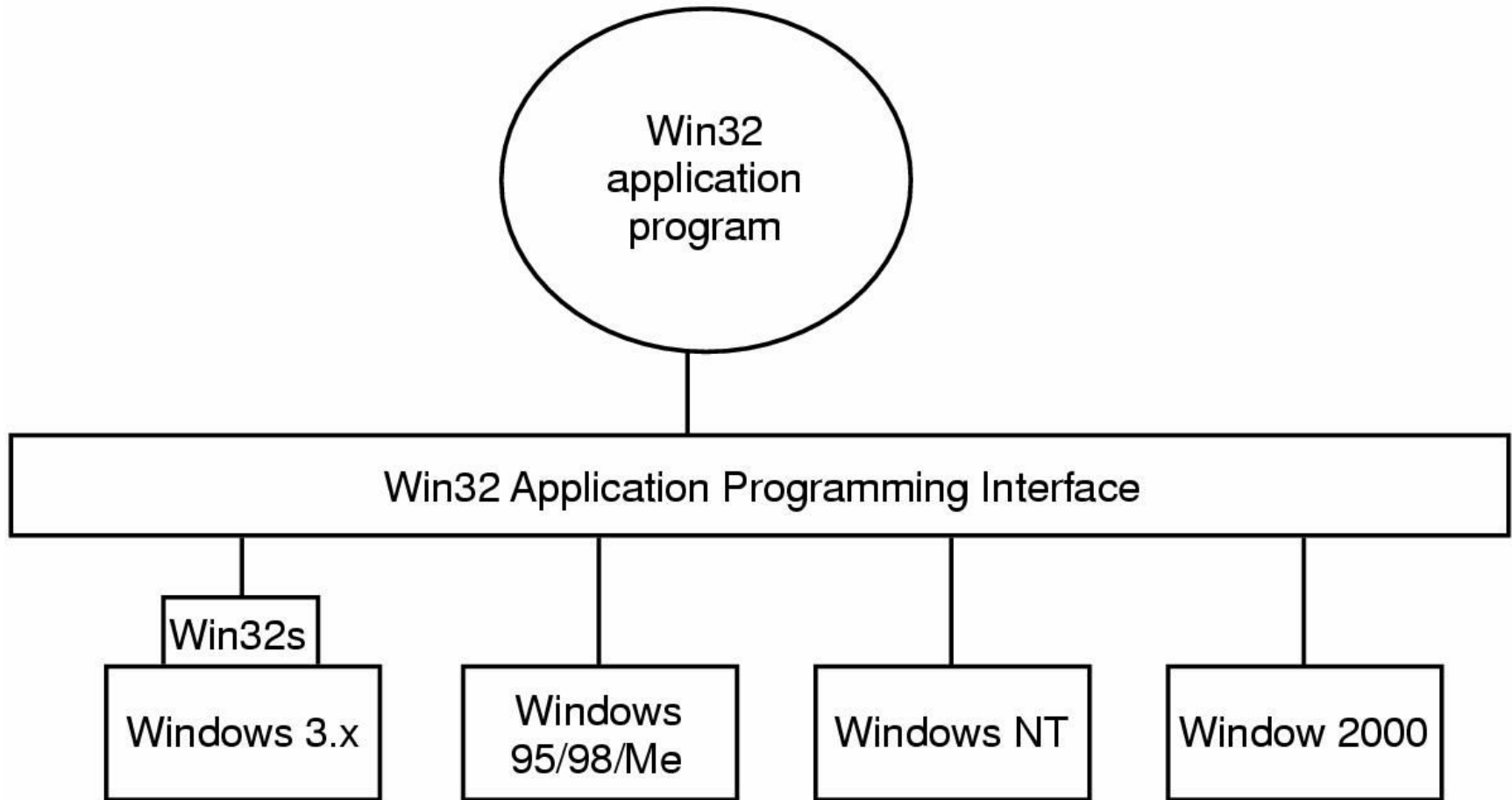
# Block Diagram of Unix Architecture



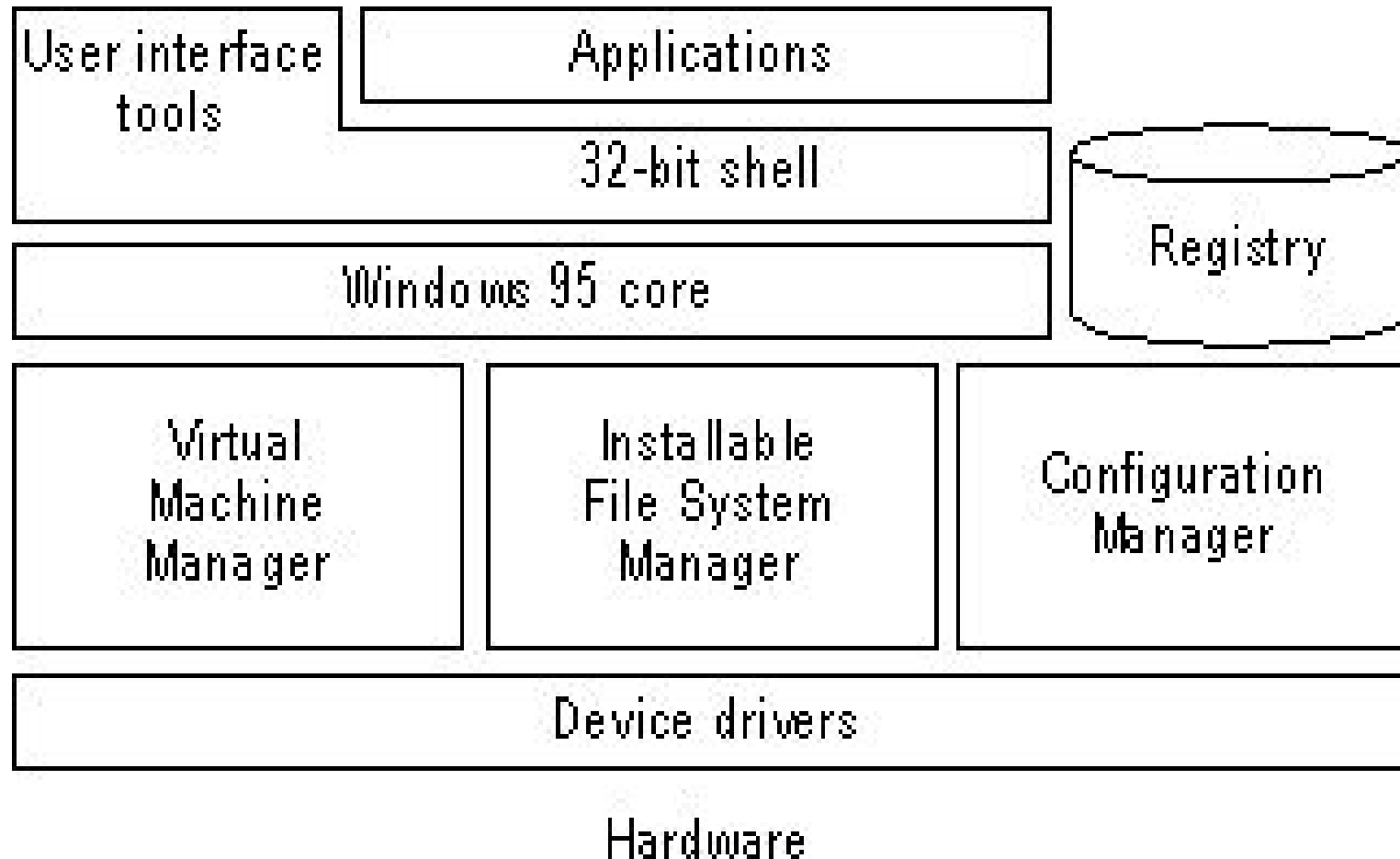
# DOS Operating System

- `Io.sys`
- `System.sys`
- `Command.com`
- External commands
- System Programs
- Application Programs

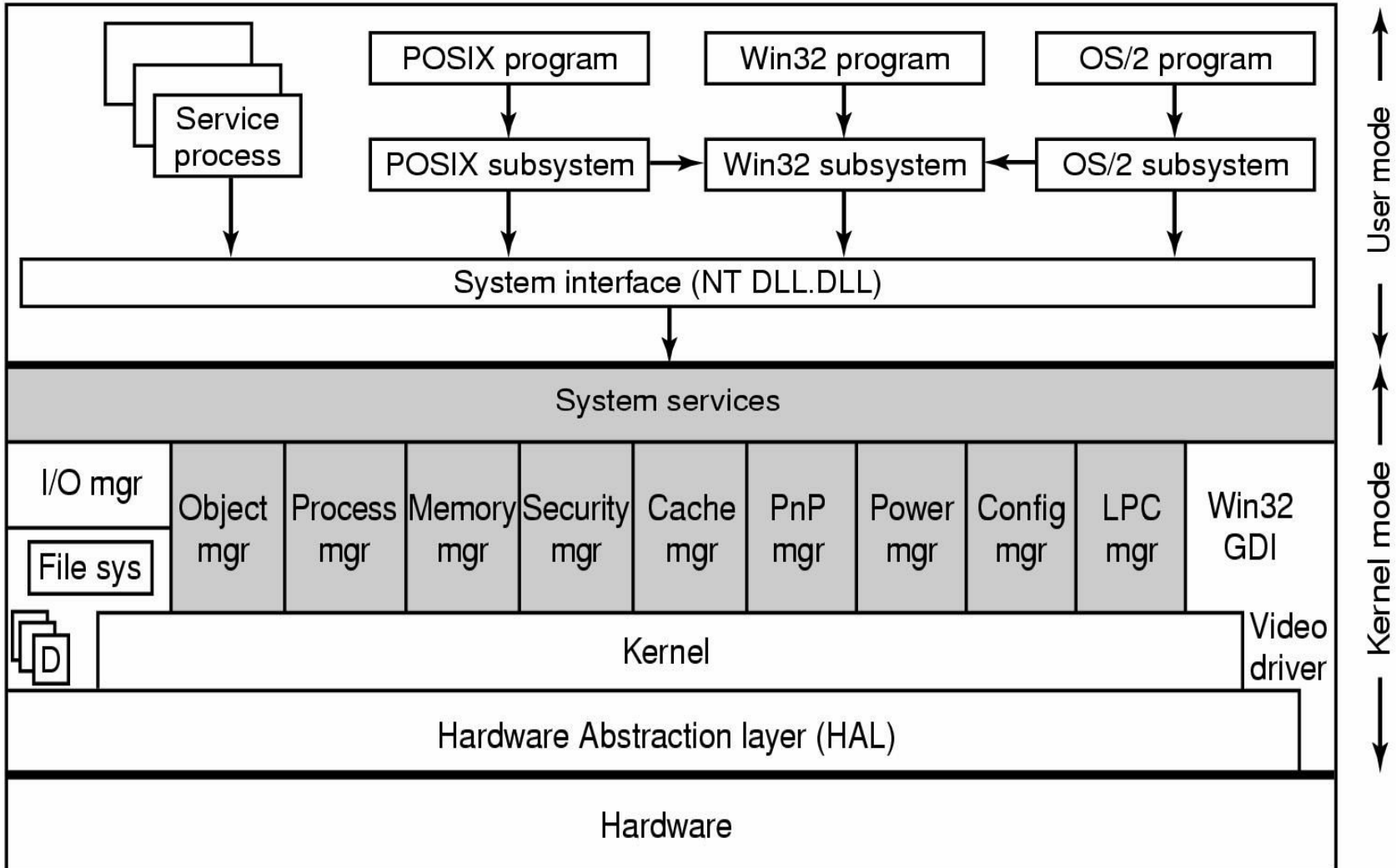
# Programming Interface of Windows



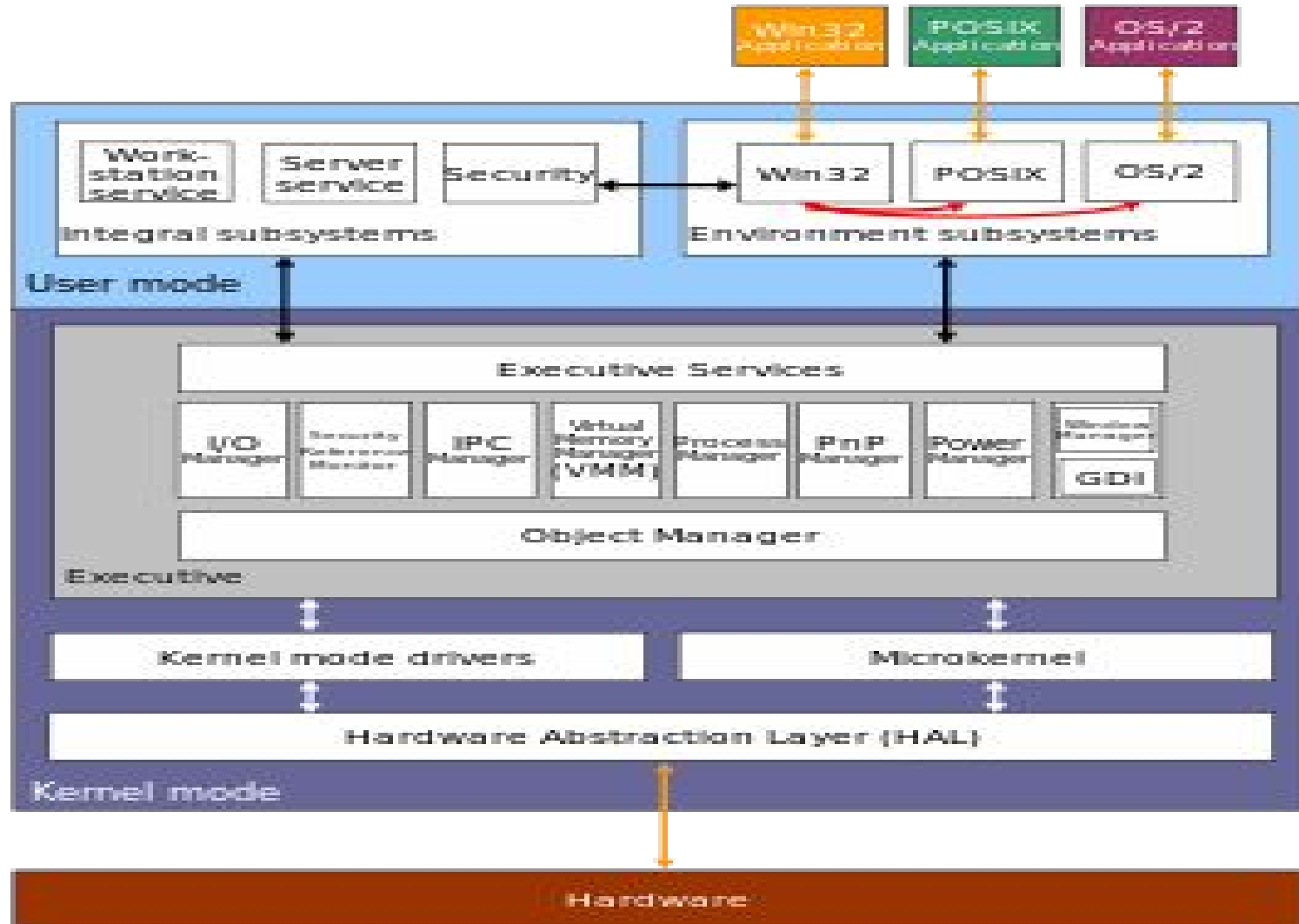
# Windows 98 Architecture



# Windows 2000 Structure



# Windows NT Architecture



# Windows NT OS Structure

- HAL and kernel written in C and assembly
- Upper layers written in C; device drivers in C, some in C++
- HAL
  - Layer to hide many of the machine dependencies
  - Operating with abstract hardware devices is in form of machine-independent services
  - HAL does not provide: services to I/O devices such as keyboard, disk, mice.



# Unix Vs Windows

- Unix
  - Multi user-Multi Tasking
  - Layered approach
  - Text based
  - Well Structured Directory
  - Tuning parameters in Text Files
  - Static Libraries
  - Static Linking
  - Dynamic Loading
  - Round Robin

# Unix Vs Windows

- Windows
  - Single user-Multi Tasking
  - Kernel based approach
  - Binary files ( different formats)
  - Limited structuring
  - Tuning parameters in Text / Binary Files
  - Static & dynamic Libraries
  - Static & dynamic Linking
  - Static & Dynamic Loading

# General Issues in Windows

- Not well tested kernel
- DLLs can be replaced by different vendors with new versions
- Memory Conflicts among applications
- Unused Memory – Garbage collection
- Lack of File level Security unlike unix
- Friendly network and remote access

# Authentication Vs Authorization

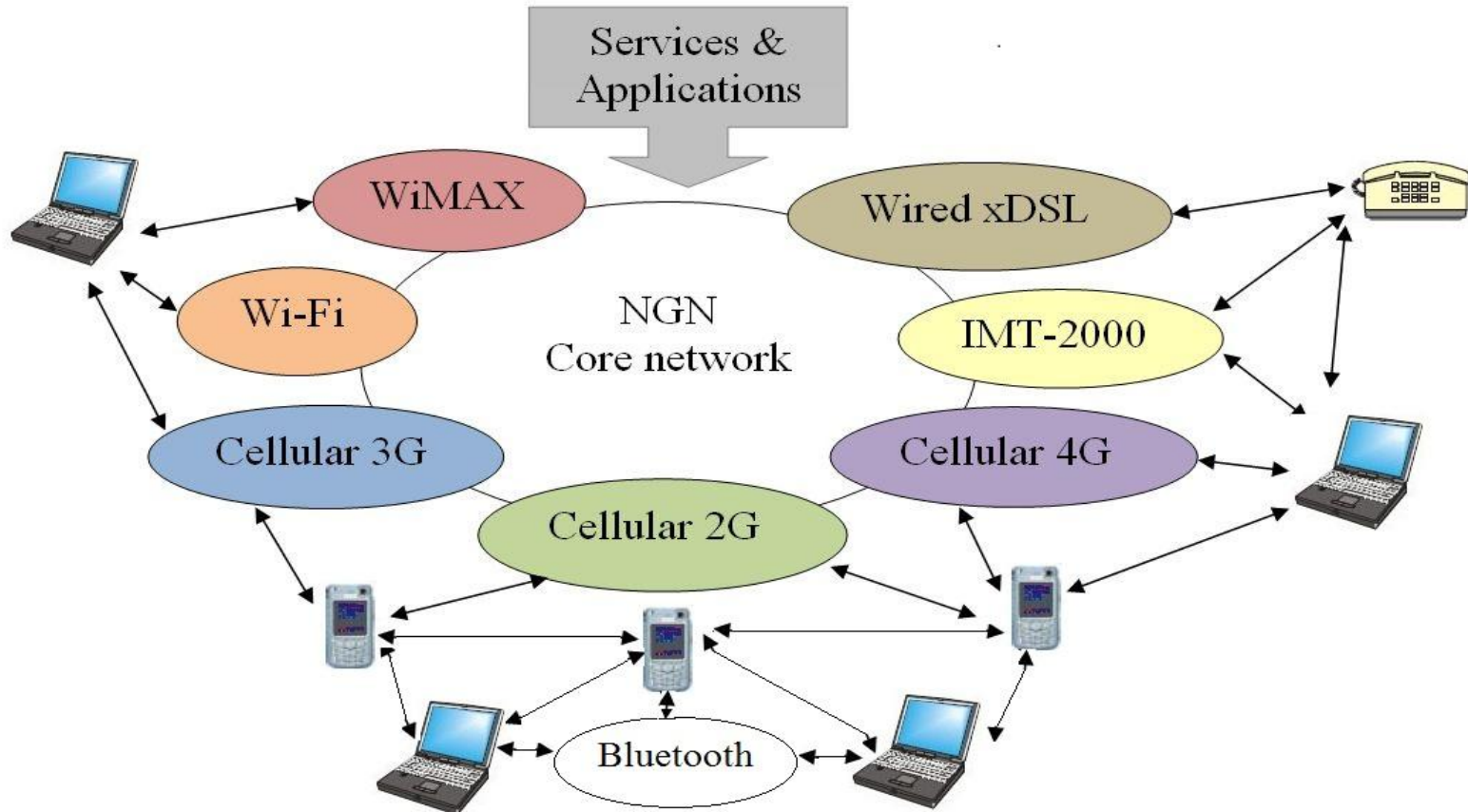
## Authentication

- In authentication is process of proving identity of user in system

## Authorization

- Authorization is a process determining permission of a user
  - to use a resource
  - or access a file.

# Next Generation Network Systems



# Communication Technologies

## – Wired Technologies

- High Bandwidth
- Limited Channels
- Costly for Establishment & Maintenance
- High SNR

## – Wireless Technologies

- Low Bandwidth
- Unlimited Channels
- Economical for Establishment & Maintenance
- Low SNR results less clarity

# Access Networks in NGN

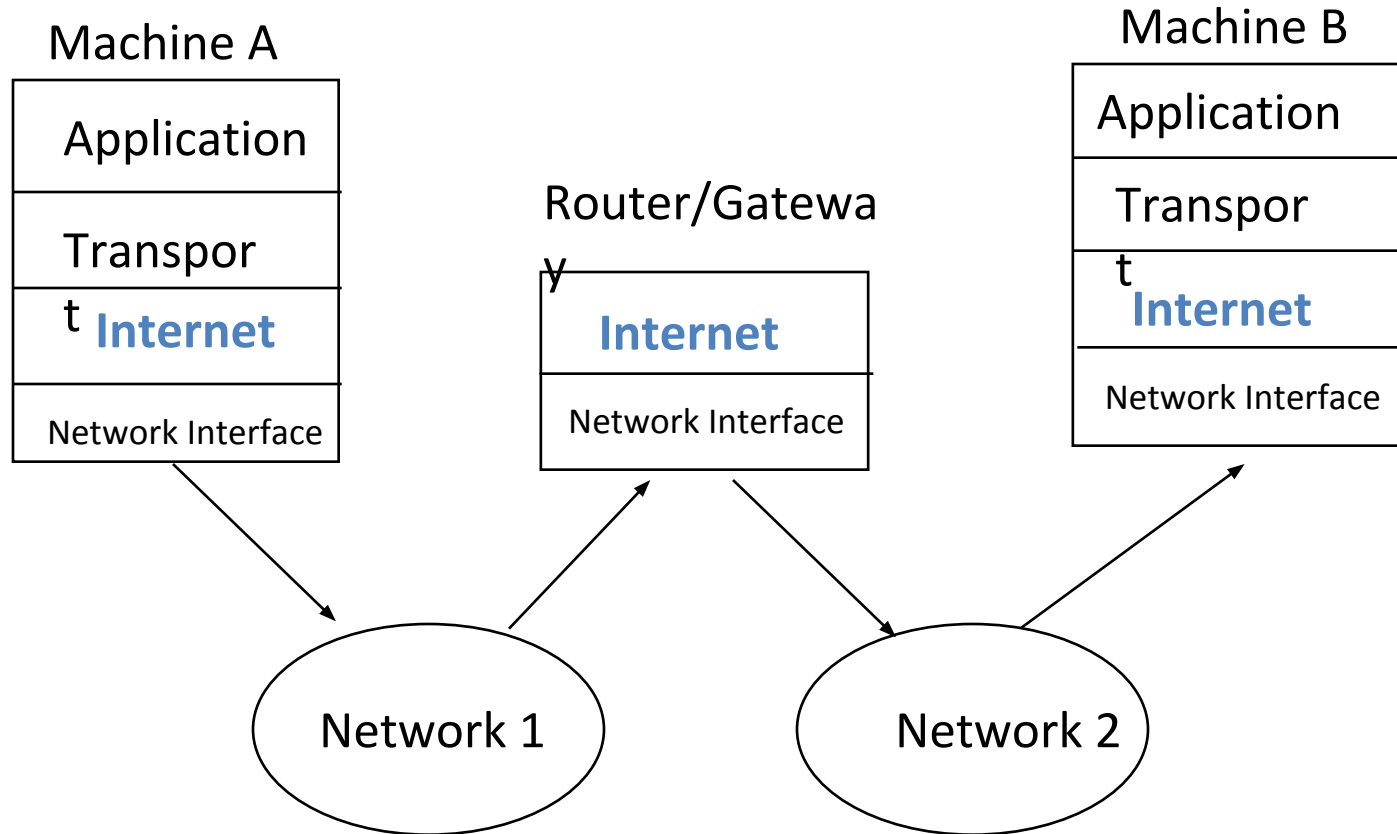
Access Network	Technology used
Cellular 2G	GSM, GPRS, EDGE, CDMA
Cellular 3G	UMTS, UMTS+HSPA, CDMA 2000
Cellular 4G	LTE
Wireless LAN	Wi-Fi
Wireless MAN	WiMAX
Wireless PAN	Bluetooth

# Metrics for Quality of Service

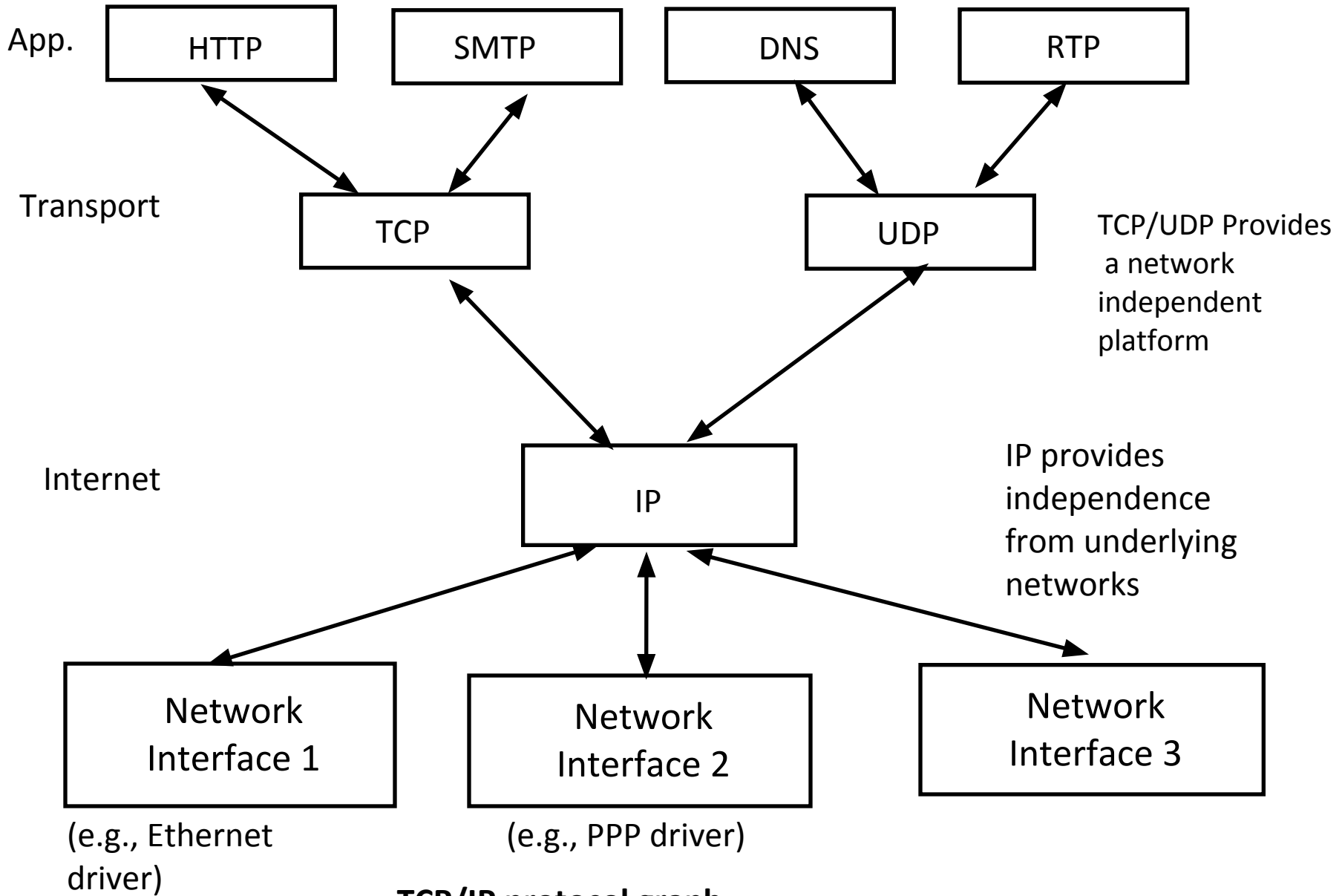
<b>Throughput</b>	Average rate of successful delivery
<b>Latency</b>	Time taken for sending a data frame
<b>Jitter</b>	Variation in time transit delay
<b>Bit Error</b>	One or more bits of data fail to reach destination
<b>Signal to Noise Ratio (SNR)</b>	Power ratio between signal (meaning full information) and background noise (unwanted signal)



# TCP/IP architecture- Internet layer

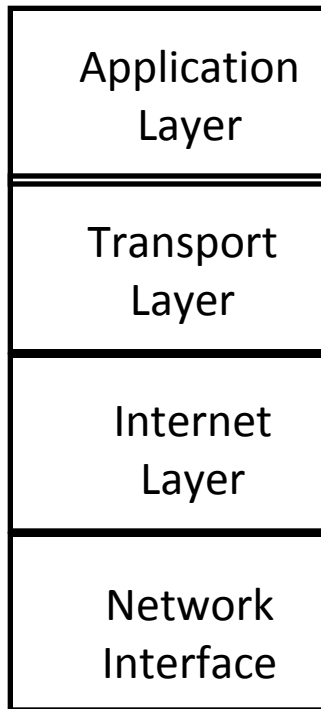


1. Transfer of information across networks through gateways/routers
2. Corresponding to OSI network layer: routing and congestion control
3. Global unique IP address and IP packets
4. Best-effort connectionless IP packet transfer: no setup, routed independently, robust, out of order, duplicate, or lose of packet

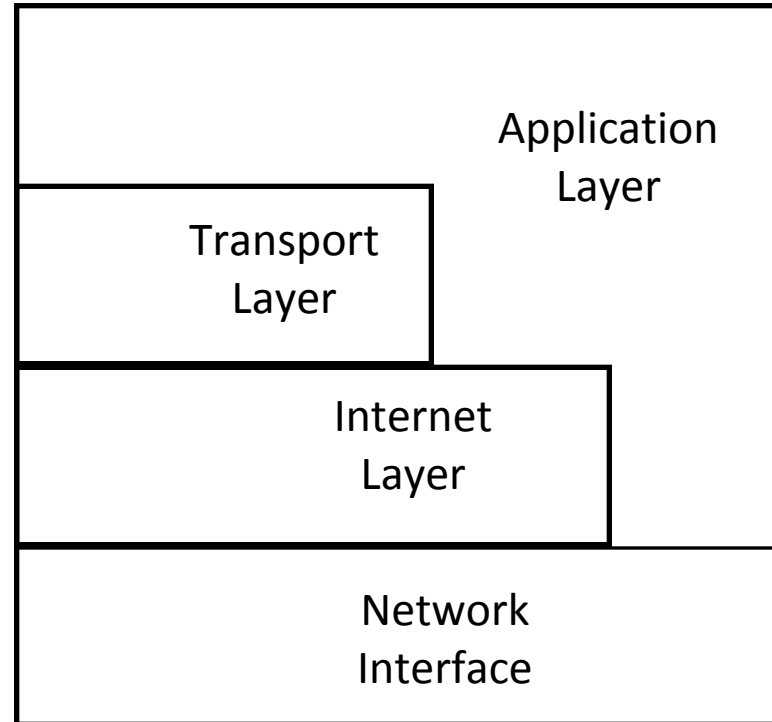


**TCP/IP protocol graph**

# TCP/IP network architecture



(a)



(b)

**\*\* TCP/IP model does not require strict layering**

# Performance of Higher Layer Solutions

- Involve lot of Mathematical Computations
- Any solution can be breakable in short duration
- Degrading the performance of the Next Generation Network Systems

# Lower Layer Solutions

- Modified TCP/IP Protocols
- Incorporating New Hardware
- Incorporating OS interface
- Service Oriented Architecture

NGN Systems for Security

Services

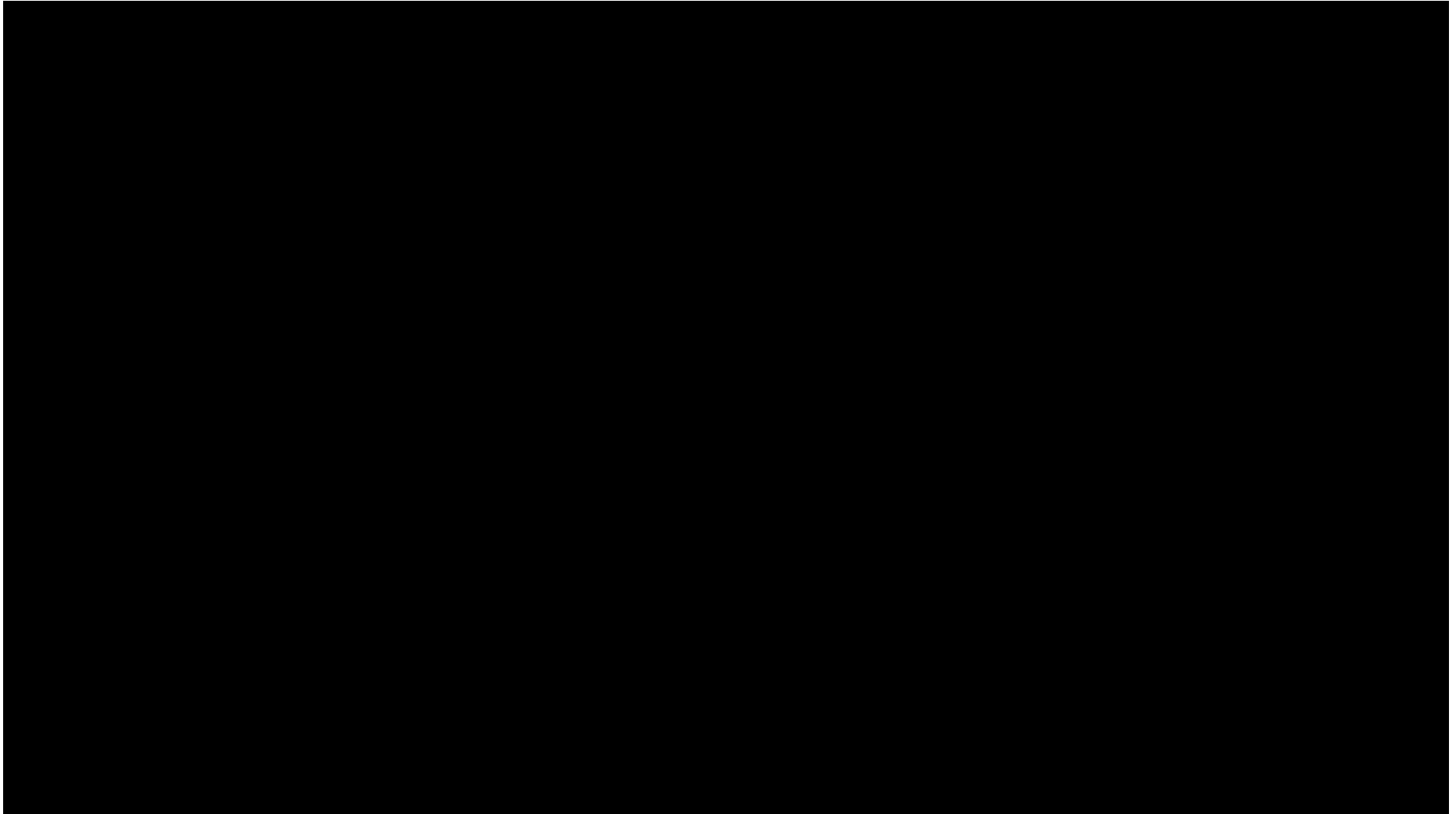
# Goal of Education

- Learning Marketable Skills
- Developing New Concepts
- Developing New Technologies
- Storing & Maintaining Knowledge
- Developing Information Center
- Practicing & Developing Ethics and Values in Society

# ICT in Education

- Useful as a Tool for
  - Availability of Information
    - at any Place,
    - at any Time
    - and at any Where(Situation)
  - Presenting Concepts
  - Demonstrating Practicals
  - Clarity in information
  - Dynamic Storing & Retrieving of information

# Nature by Numbers





# Phi

- Phi.docx

# Geetha

## A Way to Reach the GOD

- Do real research  
Narada Vs Sanathkumarudu
- Do work  
Narada Vs Vishnu

# Answer following questions

- Who is human being?
- What is real richness?
- What is human Life?
- How to Live in Society?
- What is the necessity of Value Added Social Culture?

# Value Added Social Culture is Real Real Goal of Education

- No Cyber Crimes
- No Need of Security Measures
- One can concentrate on real Research

Indian Philosophical Life is Great  
in the World

Thank You

