

INFORMATION TECHNOLOGY CHARTS INDEX

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Note

It is advisable to use these colourful charts for revision after completion of every chapter. These Charts will help you to finish large volume of subject in few hours.

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Special Thanks



Miss. Swarangee Deolekar

Chapter 1 - Business Process Management & IT (Chart 1.1)

Cycles in Business Process Flow

Business Process Management

"The achievement of an organization's objectives through the improvement, management and control of essential business processes"

Accounting	Sales	Purchase	Finances	Benefits	Principles	Practices	Life Cycle
1) Source Document	1) Customer Order	1) Purchase requisition	1) Financial Planning	1) Effectiveness	1) Processes are assets	1) Process-oriented organizational structure	1) Analysis phase
2) Journal	2) Recording	2) Request for quote	2) Resource Allocation	2) Distribution of tasks to process participants	2) Value to customers	2) Appoint process owners	2) Design phase
3) Ledger	3) Pick release	3) Quotation	3) Operation & Monitoring	3) Creation of basic operational value proposition	3) Continuous improvement	3) Top-Down Commitment, Bottom-Up Execution	3) Implementation phase
4) Trial Balance	4) Shipping	4) Purchase order	4) Evaluation, Analysis & Reporting			4) Use IT to manage processes	4) Run & Monitor phase
5) Adjustments	5) Invoice	5) Receipts				5) Collaborate with Business Partners	5) Optimize
6) Adjusted Trial balance	6) Receipt	6) Payments				6) Continuous learning & process improvement	
7) Closing Entries	7) Reconciliation					7) Align employee rewards to process performance	
8) Financial statement						8) Utilize BPR, TQM & other process improvement tools	



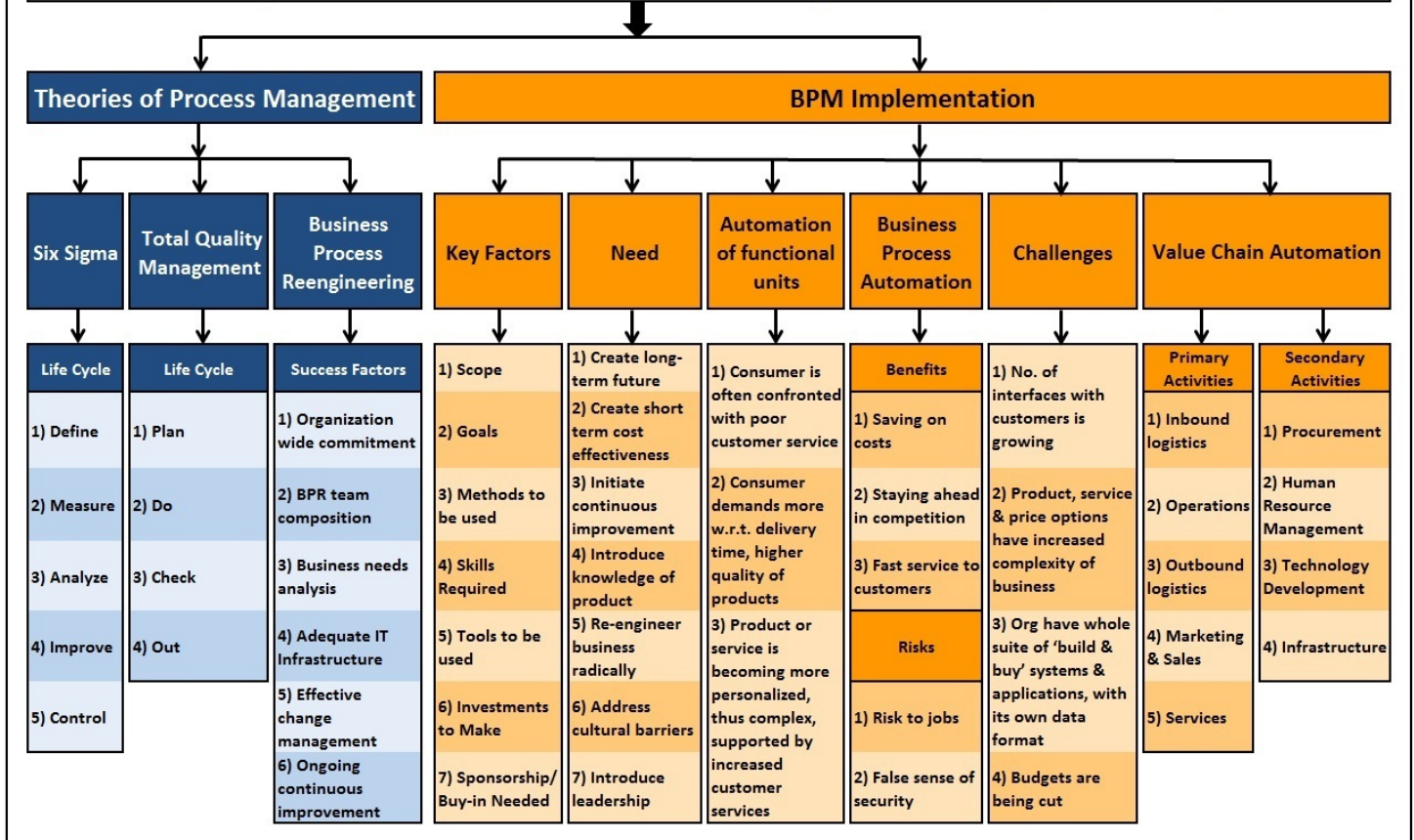
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Chapter 1 - Business Process Management & IT (Chart 1.2)



Chapter 1 - Business Process Management & IT (Chart 1.3)

Accounting Systems Automation

Impact of IT on BPM and Risks of failure of IT

Basic Functions

- 1) Collect and store data
- 2) Record transaction
- 3) Safeguard organisational assets

Processing Cycles of an Accounts BPM

Processing Cycles

- 1) Financing Cycles
- 2) Revenue Cycle
- 3) Expenditure Cycle
- 4) Human Resource Cycle
- 5) Production Cycle

General Ledger & Reporting System

Information processing operations involved in updating general ledger & preparing reports, summarize results of an organization's activities. An important function of AIS is to efficiently & effectively collect & process data about company's transactions

Data Processing Cycle - Steps

- 1) Data input
- 2) Data storage
- 3) Data processing
- 4) Information output

Benefits of BPMS

- 1) Automating repetitive business processes
- 2) Works by 'loosely coupling' with existing applications
- 3) Operational Savings
- 4) Reduction in administration involved in Compliance & ISO Activities
- 5) Freeing-up of employee time

Business Risks of failure of IT

- | | |
|--|--|
| <ol style="list-style-type: none"> 1) Superficial executive involvement 3) Breakdown in gap analysis 5) Not flexible, too complicated to be customized 7) Inadequate assessment 9) Resources not available 11) System may be over-engineered | <ol style="list-style-type: none"> 2) Deficient project management 4) Limited options for customization 6) Failure to identify future business needs 8) Persistent compatibility problems 10) Software fails to meet business needs 12) Technological obsolescence |
|--|--|

Chapter 1 - Business Process Management & IT (Chart 1.4)

Approaches to Mapping Systems

Techniques for mapping business processes

Reasons why documentation is important to Information Systems

- 1) Depicting how the system works
- 2) Training users
- 3) Designing new systems
- 4) Controlling system development and maintenance costs
- 5) Standardizing communications with others
- 6) Auditing Information Systems
- 7) Documenting business processes

	Entity Relationship Diagram		Data Flow Diagram		Flowchart		Decision Tree		Decision Table						
	Symbols	Types of Relationships	Advantages	Limitations	Component's Symbols	Advantages	Limitations	Types	Advantages	Limitations	Advantages	Limitations	Parts	Advantages	Limitations
	<ol style="list-style-type: none"> 1) Boxes 2) Diamonds 3) Ovals 	<ol style="list-style-type: none"> 1) One-to-One 2) One-to-Many 3) Many-to-One 4) Many-to-Many 	<ol style="list-style-type: none"> 1) Easily understandable 2) Understood by non-technical specialist 3) Helps in Physical Database creation 4) Generalized and specialized 5) Database design 	<ol style="list-style-type: none"> 1) May have ambiguities or inconsistency 2) Lead to misinterpretations 	<ol style="list-style-type: none"> 1) Entity 2) Process 3) Data Store 4) Data Flow 	<ol style="list-style-type: none"> 1) Describe Boundaries 2) Communicating existing system 3) Straightforward graphical technique 4) Detailed representation 5) Part of system documentation file 6) Easier to understand 7) Supports logic 	<ol style="list-style-type: none"> 1) Confusing 2) Takes long time to create 3) Physical considerations are left out 	<ol style="list-style-type: none"> 1) Document Flowchart 2) System Flowchart 3) Program Flowchart 	<ol style="list-style-type: none"> 1) Quicker grasp of relationships 2) Effective Analysis 3) Communication 4) Documentation 5) Efficient coding 6) Orderly check out of problem 7) Efficient program maintenance 	<ol style="list-style-type: none"> 1) Complex logic 2) Modification 3) Reproduction 4) Link between conditions and actions 5) Standardization 	<ol style="list-style-type: none"> 1) Simple to understand 2) Possible scenarios can be added 3) Determine worst, best & expected values 	<ol style="list-style-type: none"> 1) Biased 2) Calculations get complex 	<ol style="list-style-type: none"> 1) Condition Stub 2) Action Stub 3) Condition Entries 4) Action Entries 	<ol style="list-style-type: none"> 1) Easy to Draw 2) Compact Documentation 3) Simplicity 4) Direct Codification 5) Better Analysis 6) Modularity 7) Non-technical 	<ol style="list-style-type: none"> 1) All programmers not familiar 2) Do not express total sequence

Chapter 2 - Information Systems and IT Fundamentals

(Chart 2.1)

Auditing in IT Environment

Audit Objectives

- 1) Existence
- 2) Authorization
- 3) Valuation
- 4) Cutoff
- 5) Compliance
- 6) Operational
- 7) Assisting management in implementing Internal Controls
- 8) Participating in designing Computer Control
- 9) Determining efficient use of Computer resources is made
- 10) Determining Computer system accomplishes business objectives

Differences in Audit Procedures

- 1) Study Technical Aspects
- 2) Use Unique Techniques
- 3) Audit Software Usage

IT Risks & Issues

Risks

- 1) Business risks
- 2) Technology risks
- 3) Operational risk
- 4) Other risks

Issues

- 1) What type of process will enterprise use to identify business & technology risks when changes in technology occur
- 2) What are risks faced by enterprise when it makes changes to critical system which cannot afford to fail?

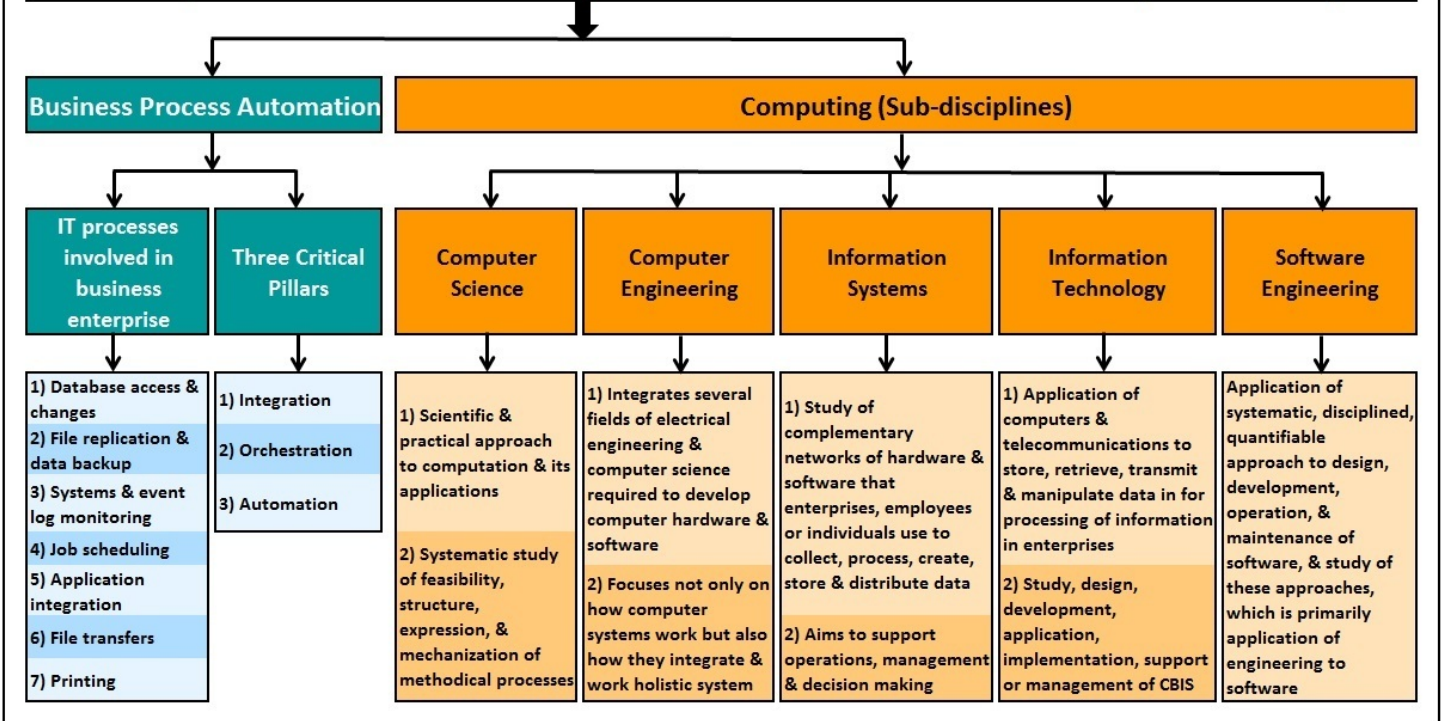
Impact of IT on Risks and Controls

- 1) Ready access to terminals as CIS are highly distributed & leads to ease in perpetration of computer related crimes thereby increasing temptation for abuse
- 2) On-line processing of data & validation checks would help prospective perpetrator in guessing passwords
- 3) If threats are not anticipated & adequate controls not designed to mitigate them, system & its resources will be vulnerable
- 4) Failure to recognize risks or potential impacts of those risks

Auditors' Concern

- 1) Develop & apply new criteria in evaluating control weaknesses in CIS
- 2) Tailor testing techniques to CIS under study
- 3) Use computers to perform some portions of audit examination

Chapter 2 - Information Systems and IT Fundamentals (Chart 2.2)



Chapter 2 - Information Systems and IT Fundamentals (Chart 2.3)

Computing Technologies

Popular Computing Architecture

Emerging Computing Models

Types of servers

- 1) File server
- 2) Print server
- 3) Network server
- 4) Database server
- 5) Application Server
- 6) Web Servers
- 7) Mail Server

Popular Computing Architecture

Instruction Set Architecture (ISA)
Classification -
1) CISC
2) RISC

Micro Architecture
1) Describes data paths, data processing elements & data storage elements
2) Describes resources & methods used to achieve architecture specification

System Design
1) Computer Bus
2) Memory Controller
3) Direct Memory Access (DMA)
4) Multiprocessing
5) Hardware Virtualization

Cloud Computing

Environment
1) Public Clouds
2) Private Clouds
3) Community Clouds
4) Hybrid Clouds

Architectural Considerations
1) Front End
2) Back End

Service Models
1) Infrastructure as a Service (IaaS)
2) Software as a Service (SaaS)
3) Platform as a Service (PaaS)
4) Network as a Service (NaaS)
5) Communication as a Service (CaaS)

Mobile Computing

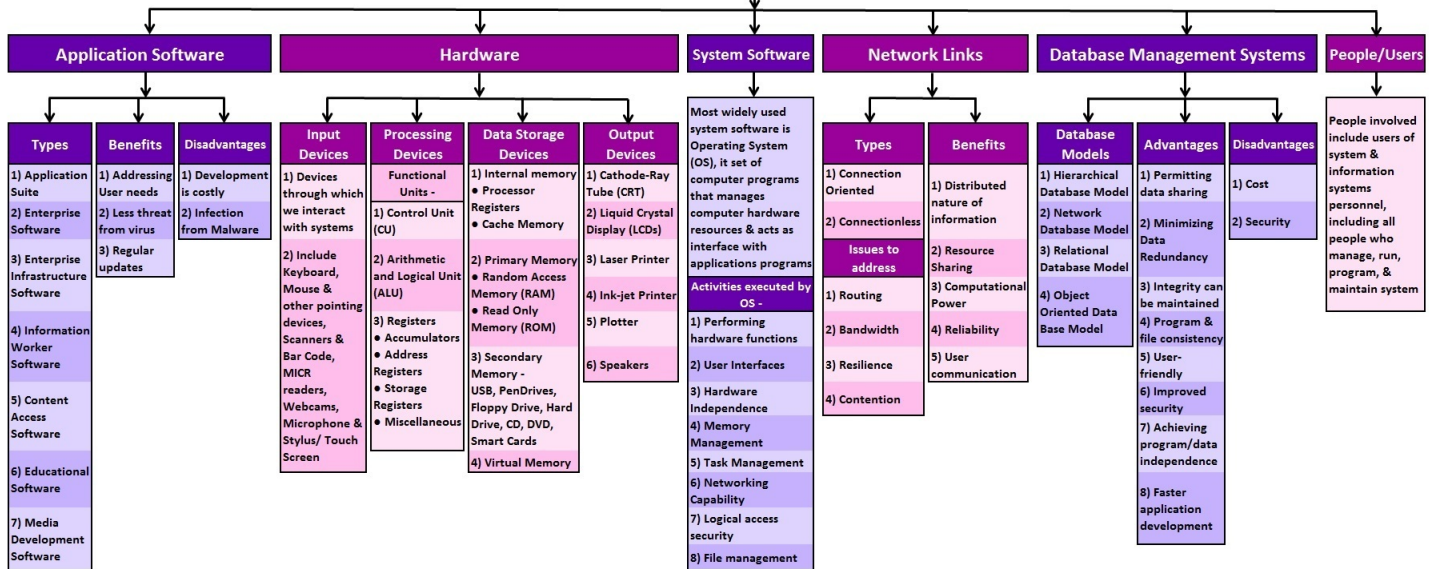
It Involves
1) Mobile Communication
2) Mobile Hardware
3) Mobile Software

Business Applications
1) Increase in Workforce productivity
2) Customer Service can be improved
3) Incident management can be improved
4) Business processes can be transformed
5) Enterprises can dynamically modify & update their offerings
6) Freedom to roam, with access to data & services at any time & in any place

Concerns
1) Security Concerns
2) Dangers of misrepresentation
3) Power consumption
4) Potential health hazards

Chapter 2 - Information Systems and IT Fundamentals (Chart 2.4)

Information System Layers

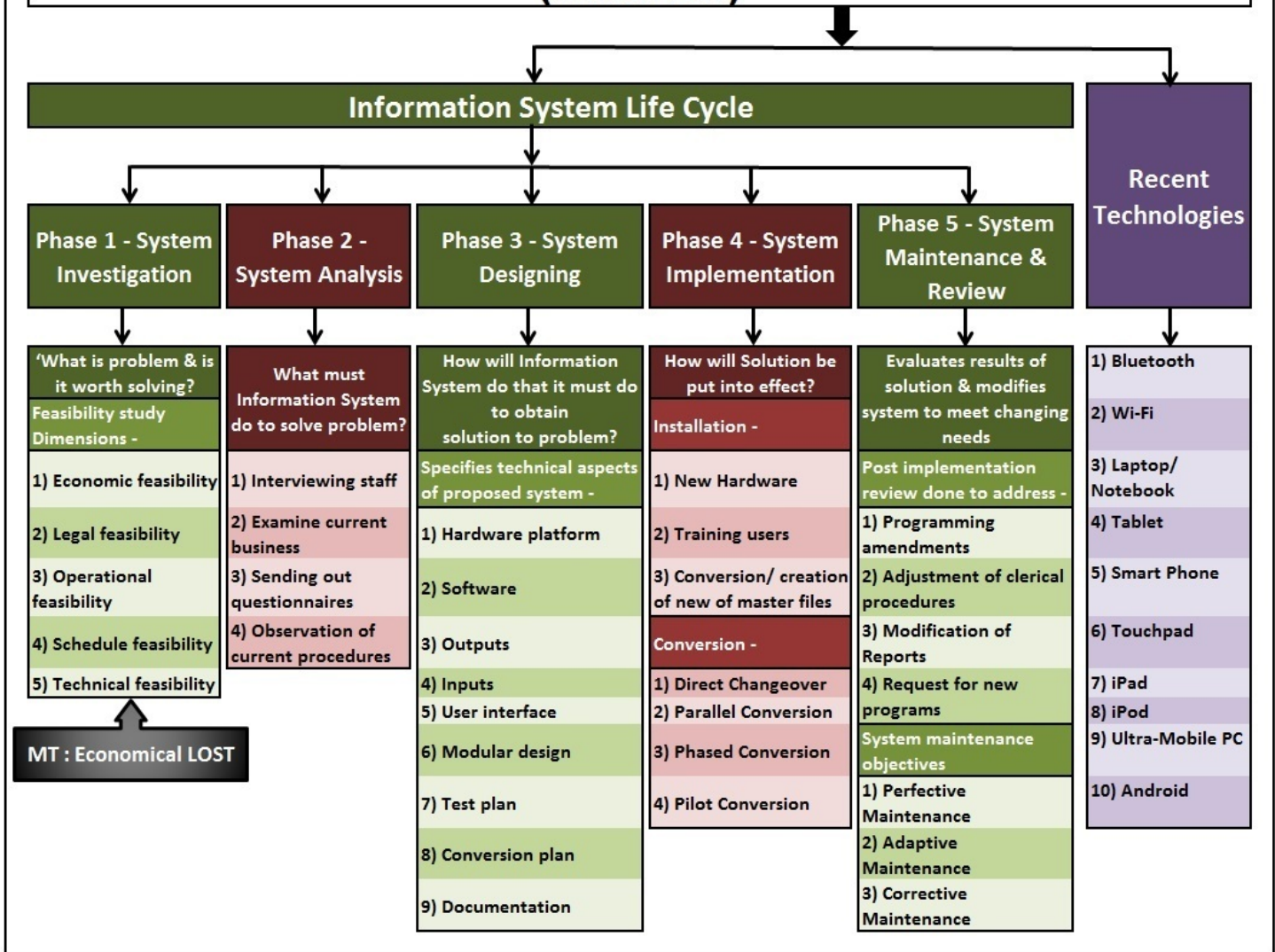


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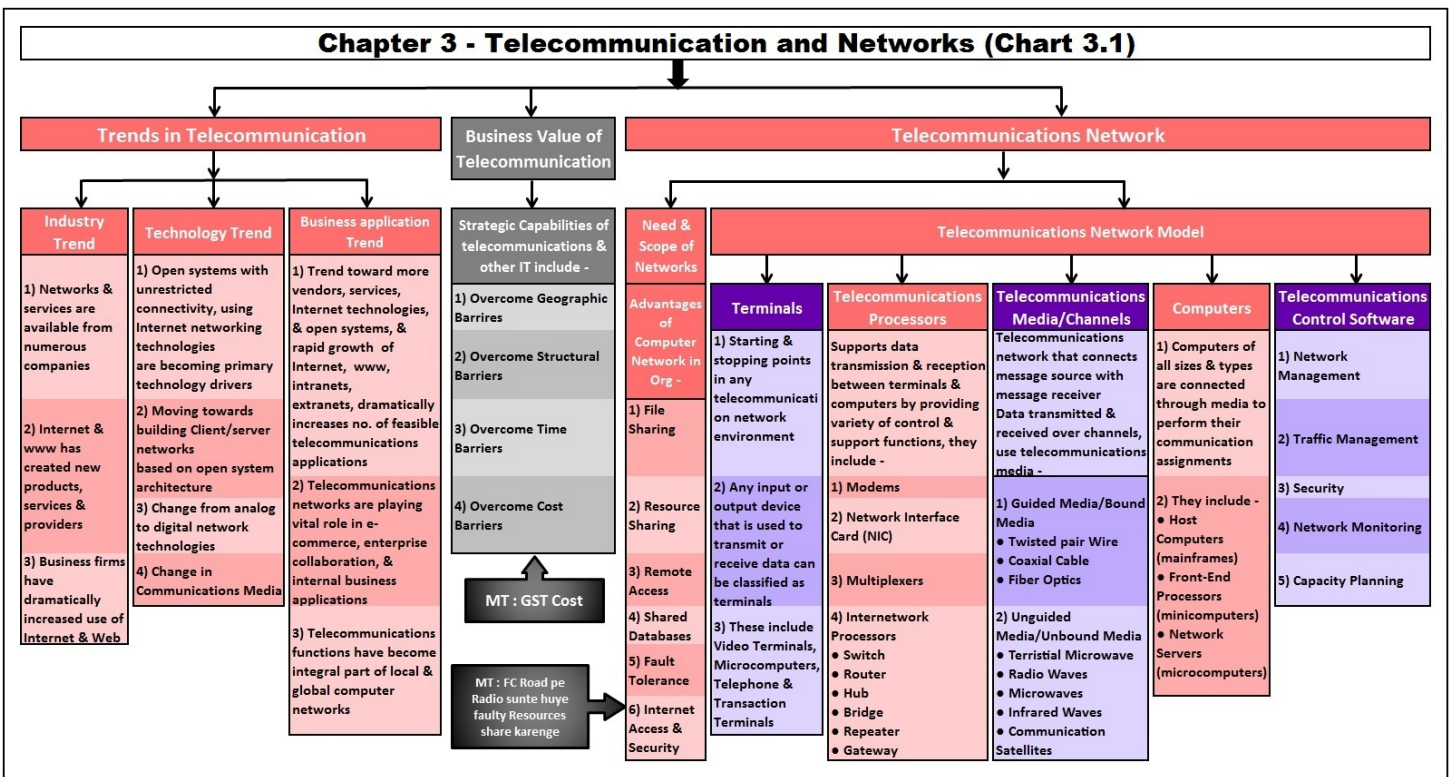
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Chapter 2 - Information Systems and IT Fundamentals (Chart 2.5)



Chapter 3 - Telecommunication and Networks (Chart 3.1)



Chapter 3 - Telecommunication and Networks (Chart 3.2a)

Classification of Telecommunication Networks

Area Coverage Based Classification

Ownership Based Classification

Local Area Network (LAN)

Metropolitan Area Network (MAN)

Wide Area Network (WAN)

Public Data Network

Private Data Network

Virtual Private Networks (VPN)

Characteristics

- 1) LANs use variety of telecommunications media
- 2) PC usually has circuit board called network interface card
- 3) Use powerful microcomputer with large disk capacity
- 4) Allow end users to communicate electronically

LAN provides

- 1) Security
- 2) Expanded PC usage through inexpensive workstation
- 3) Distributed processing
- 4) Electronic mail & Message Broadcasting
- 5) Organizational Benefits
- 6) Data management benefits
- 7) Software cost & up gradation

1) Somewhere between LAN & WAN

- 2) Networks which connect systems or LAN within metropolitan area
- 3) It interconnects computer resources in geographic area or region larger than that covered by LAN but smaller than area covered by WAN
- 4) MAN can support both data & voice
- 5) Cable television networks are examples of MANs that distribute television signals

1) Telecommunications networks that cover large geographic areas with various communication facilities such as long distance telephone service, satellite transmission

- 2) These networks cover areas such as -
 - Large city or metropolitan area
 - Whole country
 - Many countries & continents
- 3) Examples of WANs are interstate banking networks & airline reservation systems

- 1) Network shared & accessed by users not belonging to single organization
- 2) It is a network established & operated by telecommunications administration, or recognized private operating agency, for specific purpose of providing data transmission services for public
- 3) Internet is an example of Public Data Network

Provide businesses, government agencies & organizations of all sizes as dedicated network to continuously receive & transmit data critical to both daily operations & mission critical needs of organization

- 1) Many companies have offices & plants scattered over many cities, sometimes over multiple countries

- 2) Private networks work fine & are very secure

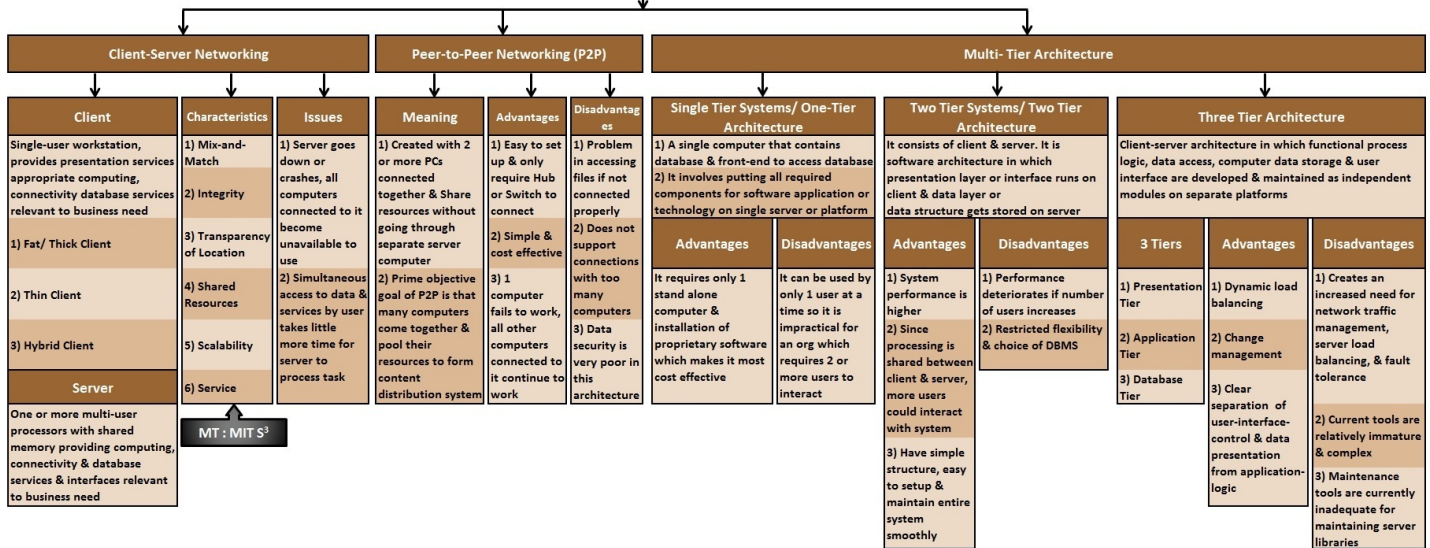
- 3) VPNs are networks on top of public networks but with most of properties of private networks. They are called "virtual" because they are an illusion, just as virtual

- 4) VPN is private network that uses public network (usually Internet) to connect remote sites or users together

- 5) It is secure network that uses Internet as its main backbone network, but relies on firewalls & other security features of Internet & Intranet connections & those of participating organizations

Chapter 3 - Telecommunication and Networks (Chart 3.2b)

Classification of Telecommunication Networks - Functional Based Classification



MT: MIT'S



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Chapter 3 - Telecommunication and Networks (Chart 3.3a)

Network Computing

Network Topology

Centralized Computing

- 1) Computing done at central location, using terminals that are attached to central computer
- 2) It offers greater security over decentralized systems because all of processing is controlled in central location

Decentralized Computing

- 1) Allocation of resources both hardware and software, to each individual workstation, or office location
- 2) Decentralized systems enable file sharing & all computers can share peripherals such as printers as well as modems, allowing all computers in network to connect to internet

Star Network

Characteristics	Advantages	Disadvantages
<ol style="list-style-type: none"> 1) Ties end user computers to central computer 2) Central unit acts as traffic controller 3) Well suited to companies with one large data processing facility shared by number of smaller departments 	<ol style="list-style-type: none"> 1) Several users can use central unit at same time 2) Easy to add new nodes & remove existing nodes 3) Node failure does not bring down entire network 4) Easier to diagnose network problems through central hub 	<ol style="list-style-type: none"> 1) Whole network is affected if main unit goes down 2) Considered less reliable 3) Cost of cabling are very high

Bus Network

Features	Advantages	Disadvantages
<ol style="list-style-type: none"> 1) All communications travel along this cable called bus 2) Bus networks have decentralized approach 	<ol style="list-style-type: none"> 1) Reliable as well as easy to use & understand 2) One of microcomputers fails, it will not affect entire network 3) Requires least amount of cable 4) Easy to extend 5) Repeater can be used to extend 	<ol style="list-style-type: none"> 1) Heavy network traffic can slow 2) Each connection between 2 cables weakens electrical signal 3) Bus configuration can be difficult to troubleshoot

Ring Network

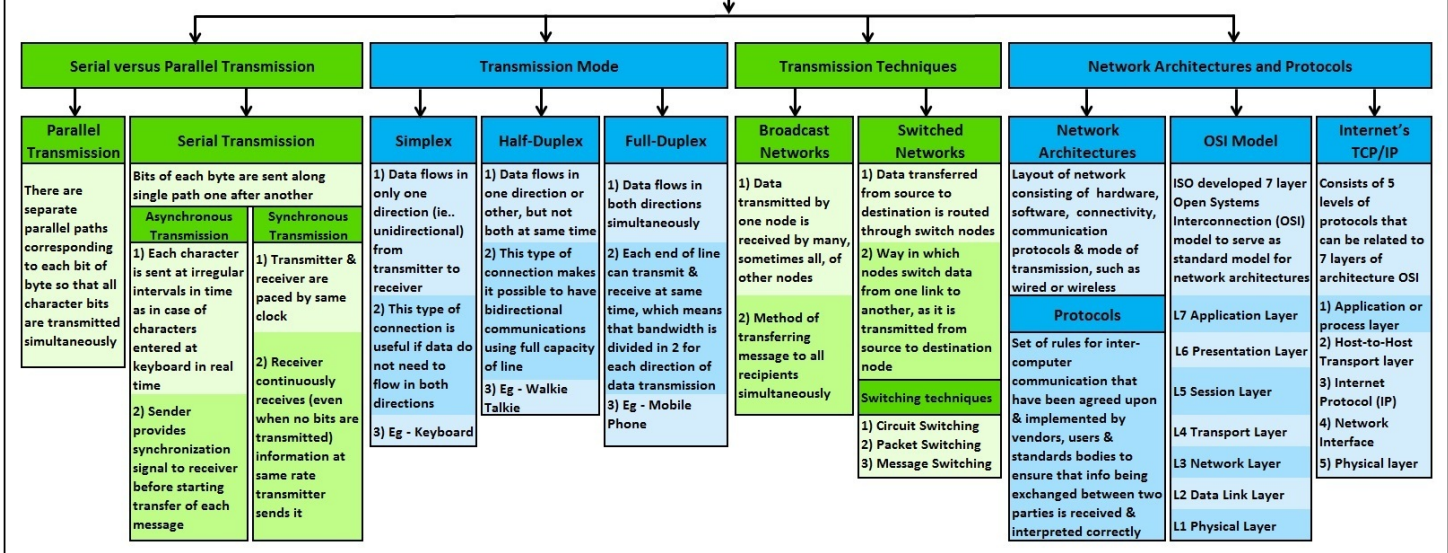
Characteristics	Advantages	Disadvantages
<ol style="list-style-type: none"> 1) Local computer processors are tied together sequentially 2) Has decentralized approach 3) Data is passed along ring 4) Reliable & less costly 	<ol style="list-style-type: none"> 1) Do not require central computer 2) Direct communication between each computer 3) Not susceptible to breakdowns 4) Offer high performance 5) Span longer distances 6) Easily extendable 	<ol style="list-style-type: none"> 1) Relatively expensive & difficult to install 2) Failure of one computer can affect whole network 3) Difficult to troubleshoot 4) Adding or removing computers can disrupt network

Mesh Network

Meaning	Advantages
<ol style="list-style-type: none"> 1) Random connection of nodes using communication links 2) Reliability is very high as there are always alternate paths available if direct link between two nodes is down or dysfunctional 3) Military installations, which need high degree of redundancy, may have such networks 	<ol style="list-style-type: none"> 1) Yields greatest amount of redundancy if one of nodes fails, network traffic can be redirected to another node 2) Network problems are easier to diagnose <p style="text-align: center;">Disadvantages</p> <p>High cost of installation & maintenance, more cable is required</p>

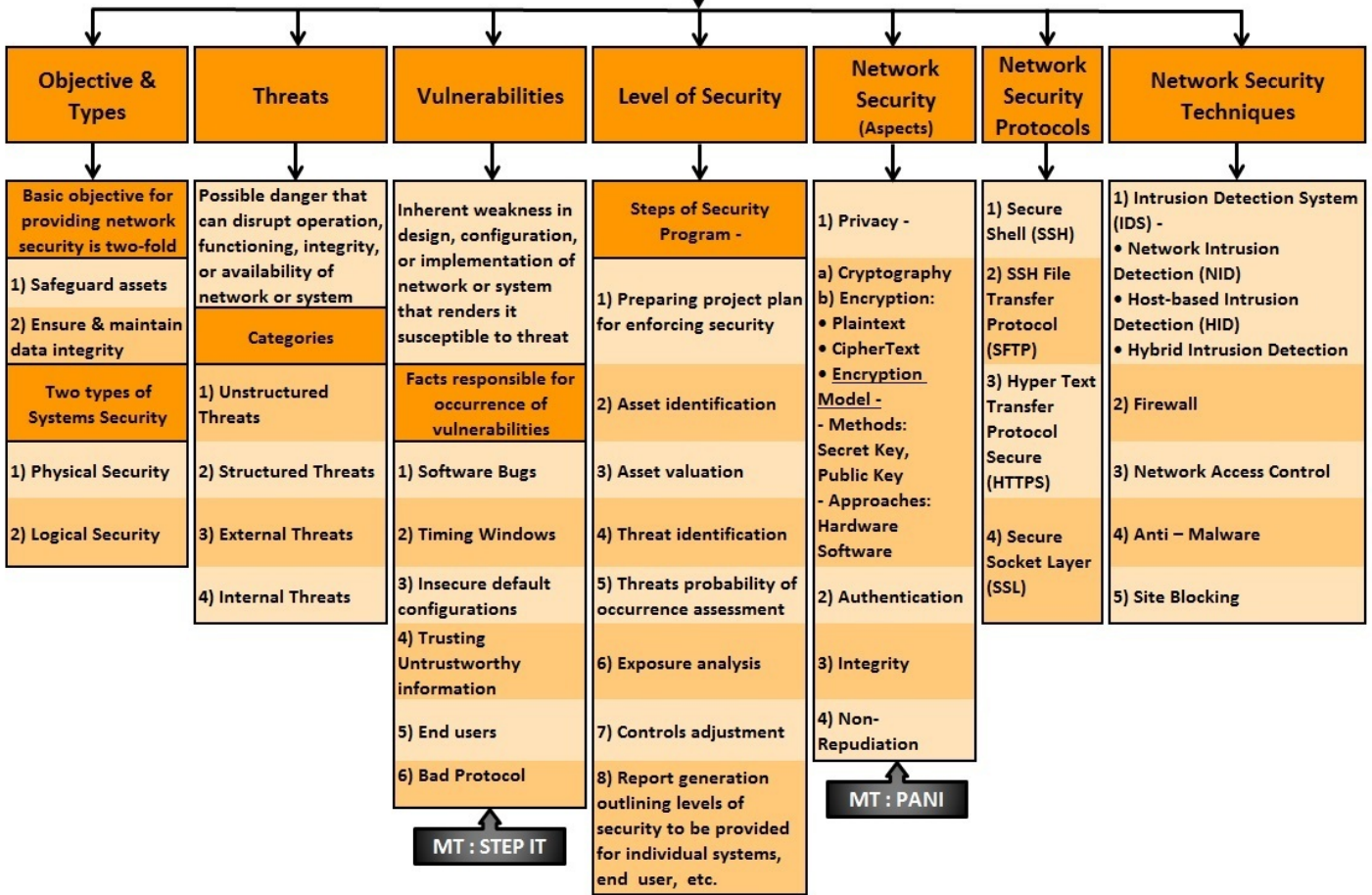
Chapter 3 - Telecommunication and Networks (Chart 3.3b)

Network Computing - Digital Data Transmission

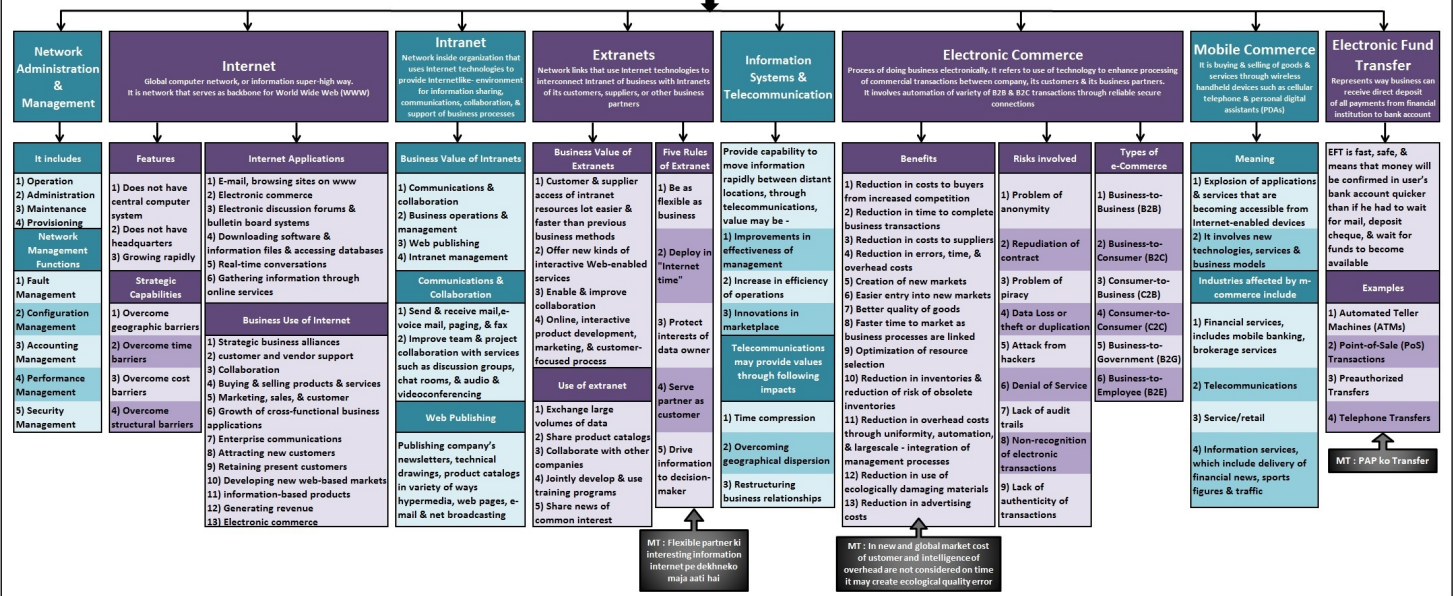


Chapter 3 - Telecommunication and Networks (Chart 3.4)

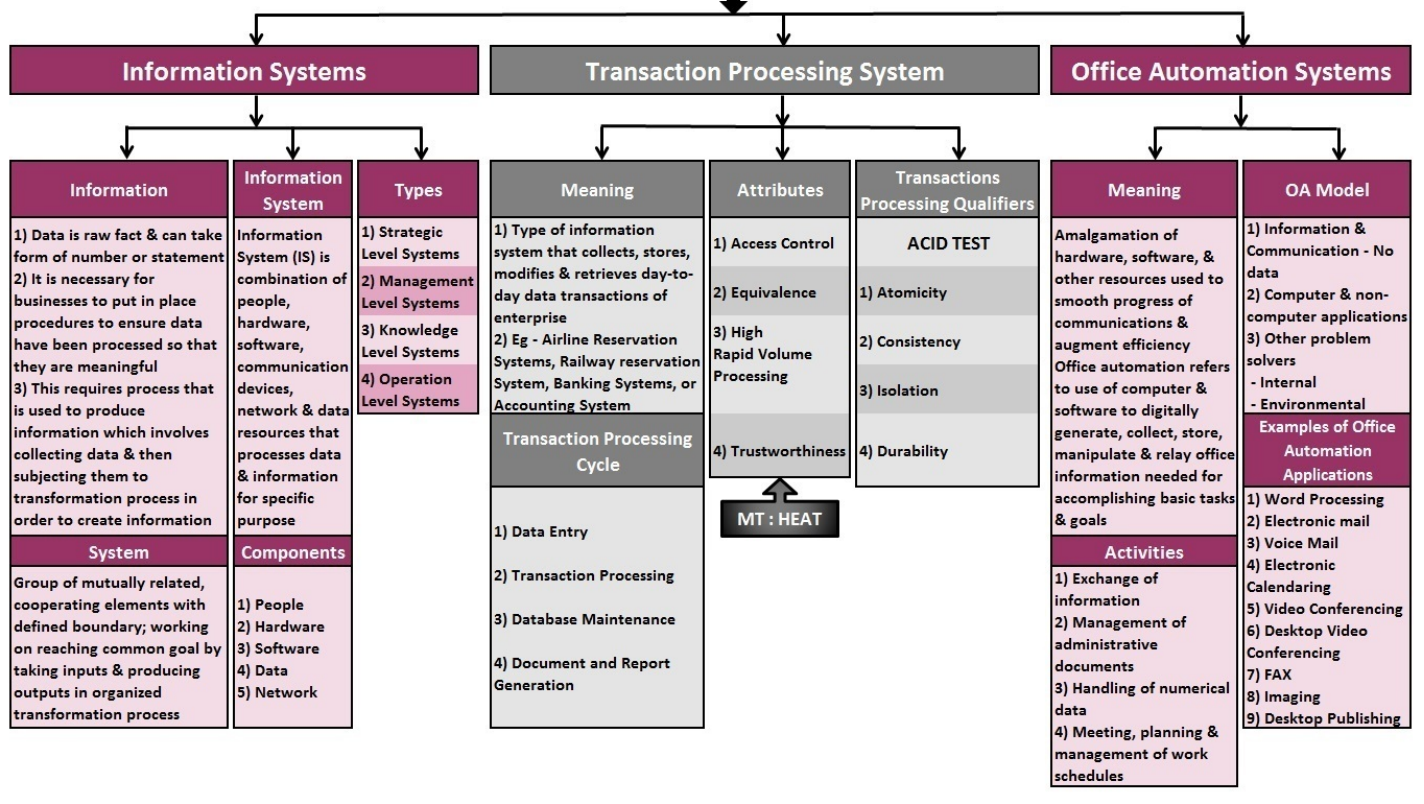
Network Risks, Controls and Security



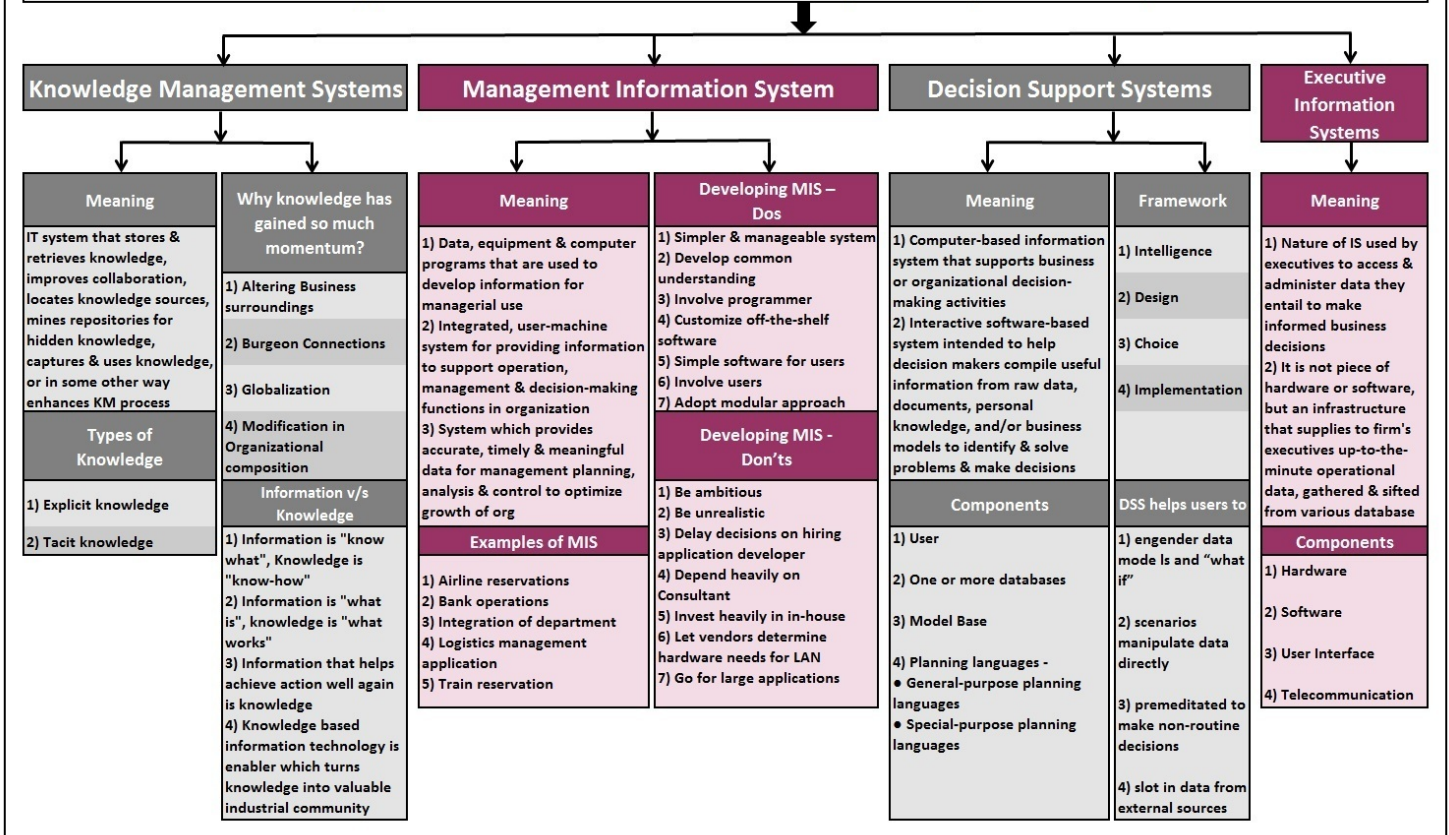
Chapter 3 - Telecommunication and Networks (Chart 3.5)



Chapter 4 - Business Information Systems (Chart 4.1a)



Chapter 4 - Business Information Systems (Chart 4.1b)



Chapter 4 - Business Information Systems (Chart 4.2)

Specialized Systems

Enterprise Resource Planning (ERP)	Customer Relationship Management (CRM)			Supply Chain Management (SCM)	Human Resource Management Systems (HRMS)	Core Banking System (CBS)	Accounting Information System (AIS)		
<p>Meaning</p> <p>1) Enterprise Resource Planning (ERP) systems integrate internal & external management information across entire organization taking on finance/accounting, manufacturing, sales & service, customer relationship management</p> <p>2) Rationale of ERP is to make easy flow of information between all business functions in interior boundaries of organization & control connections to exterior stakeholders</p>	<p>Meaning</p> <p>Business process in which client relationships; customer loyalty & brand value are built through marketing strategies & activities</p> <p>CRM Mechanisms</p> <ul style="list-style-type: none"> • Customer: He is source of company's profit & future growth • Relationship: Between company & its customers involves continuous bi-directional communication & interaction • Management: CRM is not only an activity of marketing department; rather it involves continuous corporate change in culture & process 			<p>Definitions</p> <p>1) Analytical CRM Definition -</p> <p>a) CRM Equation: CRM = Customer Understanding + Relationship Management</p> <p>b) Customer Understanding: Analysis of customer data to gain deep understanding down to level of individual customer</p> <p>c) Relationship Management: Interaction with customer through various channels for various purposes</p> <p>d) Analytical CRM: Use customer understanding to perform effective relationship Management</p> <p>2) Greenberg's definition of CRM - This states that CRM must establish with business strategy, which drives transformation in the business, and influences work processes. These processes are enabled by information technology (IT)</p>	<p>Benefits</p> <p>1) Generating customer loyalty, raising market intelligence enterprise, & integrated relationship</p> <p>2) Developing connection & affiliation with customer & supervising it professionally & effectively so that it is advantageous to both customer & business</p> <p>3) CRM applications smoothen progress to capture, consolidate, analysis, & enterprise-wide dissemination of data from existing & potential customers</p>	<p>Meaning</p> <p>1) SCM is chain that starts with customers & ends with customers</p> <p>2) It is process of planning, implementing & controlling operations of supply chain with purpose of satisfying customer's requirement as efficiently as possible</p>	<p>Meaning</p> <p>1) It is software application that combines many human resources functions, together with benefits administration, payroll, recruiting & training, & performance analysis & assessment into one parcel</p> <p>2) It refers to systems & processes at intersection between human resource management (HRM) & Information Technology</p>	<p>Meaning</p> <p>1) Banks use core banking applications to sustain their operations where CORE stands for "Centralized Online Real-time Environment"</p> <p>2) It is set of basic software components that manage services provided by bank to its customers through its branches</p>	<p>Meaning</p> <p>1) System of collection, storage & processing of financial & accounting data that is used by decision makers</p> <p>2) Computer-based method for tracking accounting activity in conjunction with information technology resources</p>
				<p>Components</p> <p>1) Procurement/Purchasing</p> <p>2) Operations</p> <p>3) Distribution</p> <p>4) Integration</p>	<p>Key Modules</p> <p>1) Workforce Management</p> <p>2) Time & Attendance Management</p> <p>3) Payroll Management</p> <p>4) Training Management</p> <p>5) Compensation Management</p> <p>6) Recruitment Management</p> <p>7) Personnel Management</p> <p>8) Organizational Management</p> <p>9) Employee Self Service (ESS)</p> <p>10) Analytics</p>	<p>Elements</p> <p>1) Making & servicing loans</p> <p>2) Opening new accounts</p> <p>3) Processing cash deposits & withdrawals</p> <p>4) Processing payments & cheques</p> <p>5) Calculating interest</p> <p>6) Customer relationship management (CRM) activities</p> <p>7) Managing customer accounts</p> <p>8) Establishing criteria for minimum balances, interest rates, no. of withdrawals allowed</p> <p>9) Establishing interest rates</p> <p>10) Maintaining records for all bank's transactions</p>	<p>Key Components</p> <p>1) People</p> <p>2) Procedure & Instructions</p> <p>3) Data</p> <p>4) Software</p> <p>5) Information Technology Infrastructure</p> <p>6) Internal Controls</p>		
<p>Relationship between ERP, CRM & SCM</p> <p>Primary goal of ERP is to improve & streamline internal business processes, CRM attempts to enhance relationship with customers & SCM aims to facilitate collaboration between org, its suppliers, manufacturers, distributors & partners</p>									

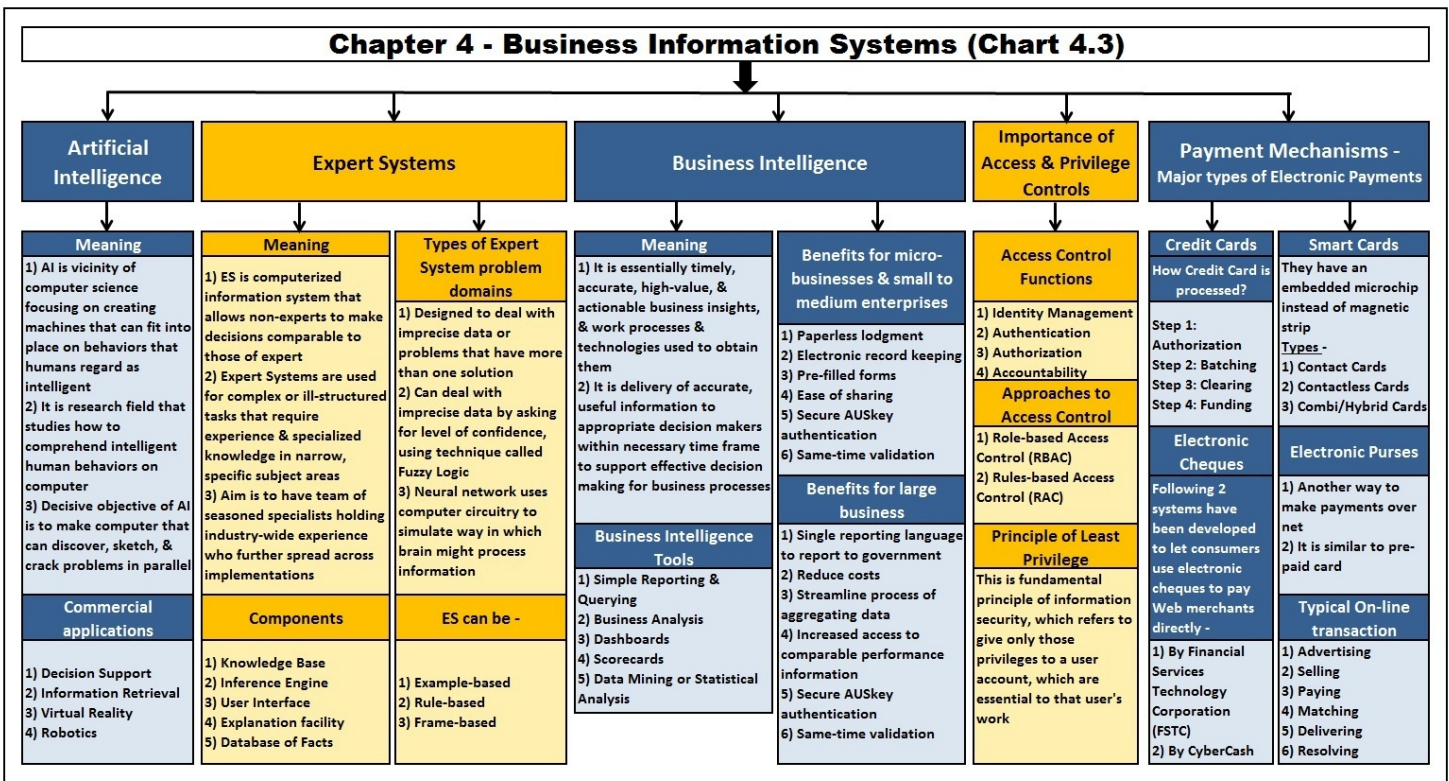


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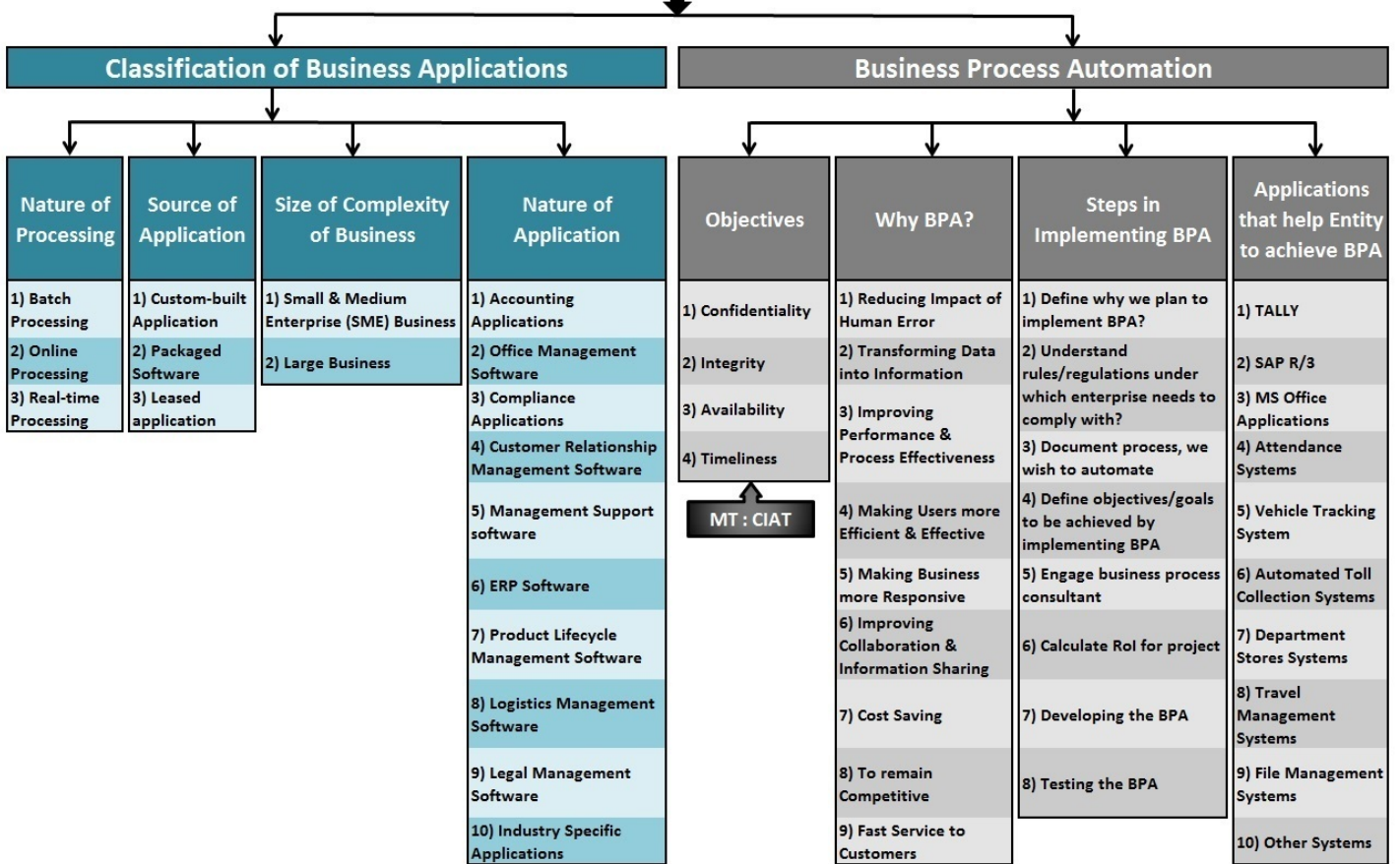
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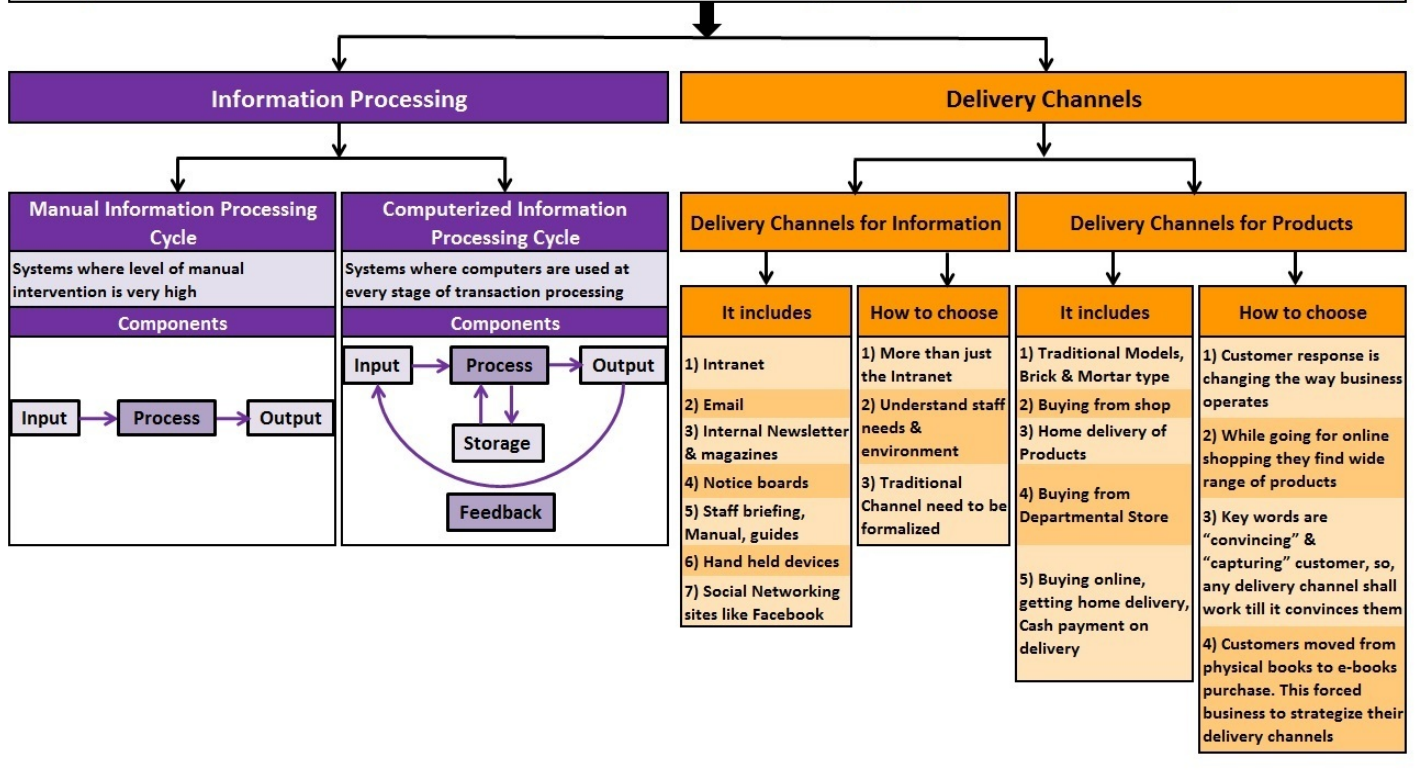
Chapter 4 - Business Information Systems (Chart 4.3)



Chapter 5 - Business Process Automation through Application Software (Chart 5.1)



Chapter 5 - Business Process Automation through Application Software (Chart 5.2)



Chapter 5 - Business Process Automation through Application Software (Chart 5.3)

Controls in BPA

Information Systems Control

Managerial Controls

Applications Controls

Control Objectives

- 1) Authorization
- 2) Completeness
- 3) Accuracy
- 4) Validity
- 5) Physical Safeguards & Security
- 6) Error Handling
- 7) Segregation of Duties

Top Management & Information Systems Management
Major functions Senior Manager must perform -
1) Planning
2) Organizing
3) Leading
4) Controlling

Systems Development Management
Audits conducted during System Development process -
1) Concurrent Audit
2) Post-Implementation Audit
3) General Audit

Programming Management
Phases of Program Development life cycle -
1) Planning
2) Design
3) Coding
4) Testing
5) Operation & Maintenance

Data Resource Management
Data is critical resource that must be managed properly. It must be controlled carefully because consequences are serious if data definition is compromised or destroyed. Careful control be exercised over roles by appointing senior, trustworthy persons, separating duties to extent possible & maintaining & monitoring logs of data & database administrator's activities

Quality Assurance Management
Users are becoming more demanding in terms of quality of software they employ to undertake their work. Organizations are undertaking more ambitious information systems projects that require more stringent quality requirements & are becoming more concerned about their liabilities if they produce & sell defective software

Security Management
Major Threats -
1) Fire
2) Water
3) Energy Variations
4) Structural Damage
5) Pollution
6) Unauthorised Intrusion
7) Viruses & Worms
8) Misuse of Software, data & Services
9) Hackers

Operations Management
Operations Mtg performs controls over functions like Computer Operations, Communications Network Control, Data Preparation & Entry, Production control, File Library; Documentation & Program Library; Planning & Performance Monitoring. Controls must continuously monitor performance of hardware/software platform to ensure that systems are executing efficiently, an acceptable response time or turnaround time is being achieved

Boundary
1) Cryptographic Controls
2) Access Controls
3) Personal Identification Numbers(PIN)
4) Digital Signatures
5) Plastic Cards

Input
1) Source Document Control
2) Data Coding Control
3) Batch Control
4) Validation Control

Communication
1) Physical Component Controls
2) Line Error Controls
3) Flow Controls
4) Link Controls
5) Topological Controls
6) Channel Access Controls
7) Internetworking Controls

Processing
1) Run-to-run totals
2) Reasonableness Verification
3) Edit Checks
4) Field Initialization
5) Exception Reports
6) Existence/ Recovery Controls

Output
1) Storage & Logging of Sensitive Forms
2) Logging of output program executions
3) Controls over Printing
4) Report Distribution & Collection Controls
5) Retention Controls
6) Existence/ Recovery Controls

Database
1) Sequence Check Transaction & Master
2) Ensure all records on files are processed
3) Process Multiple transactions for single record in correct order



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Chapter 5 - Business Process Automation through Application Software (Chart 5.4)

Emerging Technologies

Virtualization

Grid Computing

Cloud Computing

Meaning	Major Applications	Common Types	Benefits	Types of Resources	Using a Grid : User's Perspective	Using a Grid : Administrative Purpose	Grid Computing Security	Characteristics	Advantages	Disadvantages
<ol style="list-style-type: none"> 1) Virtualization means to create virtual version of device or resource, such as server, storage device, network or even operating system where framework divides resource into one or more execution environments 2) It refers to technologies designed to provide layer of abstraction between computer hardware systems & software running on them 	<ol style="list-style-type: none"> 1) Server Consolidation 2) Disaster Recovery 3) Testing & Training 4) Portable Applications 5) Portable Workspaces 	<ol style="list-style-type: none"> 1) Hardware Virtualization 2) Network Virtualization 3) Storage Virtualization 	<ol style="list-style-type: none"> 1) Making use of Underutilized Resources 2) Resource balancing 3) Parallel CPU Capacity 4) Virtual Resources & Virtual Organizations for Collaboration 5) Access to Additional Resources 6) Reliability 7) Management 	<ol style="list-style-type: none"> 1) Computation 2) Storage 3) Communications 4) Software & Licenses 5) Special Equipment, Capacities, Architectures & Policies 	<ol style="list-style-type: none"> 1) Enrolling & Installing Grid Software 2) Logging onto the Grid 3) Queries Submitting Jobs 4) Data Configuration 5) Monitoring Progress & Recovery 6) Reserving Resources 	<ol style="list-style-type: none"> 1) Planning <ul style="list-style-type: none"> • Security • Organization 2) Installation 3) Managing enrollment of Donors & Users 4) Certificate Authority 5) Resource Management 6) Data Sharing 	<ol style="list-style-type: none"> 1) Single Sign-on 2) Protection of Credentials 3) Interoperability with Local Security Solutions 4) Exportability 5) Support for Secure Group Communication 6) Support for Multiple Implementations 	<ol style="list-style-type: none"> 1) Elasticity & Scalability 2) Pay-Per-Use 3) On-demand 4) Resiliency 5) Multi-Tenancy 6) Workload Movement 	<ol style="list-style-type: none"> 1) Cost efficient 2) Almost Unlimited storage 3) Backup & Recovery 4) Automatic Software Integration 5) Easy Access to Information 6) Quick Deployment 	<ol style="list-style-type: none"> 1) Technical Issues 2) Security in the Cloud 3) Prone to Attack