Course Lecturer
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- M.Sc. & Doctor of Business Administration from Hong Kong Polytechnic, M. Sc. In computer science from the University of British Columbia (Canada), B.A. in Computer science and Psychology from Southern Illinois University, USA

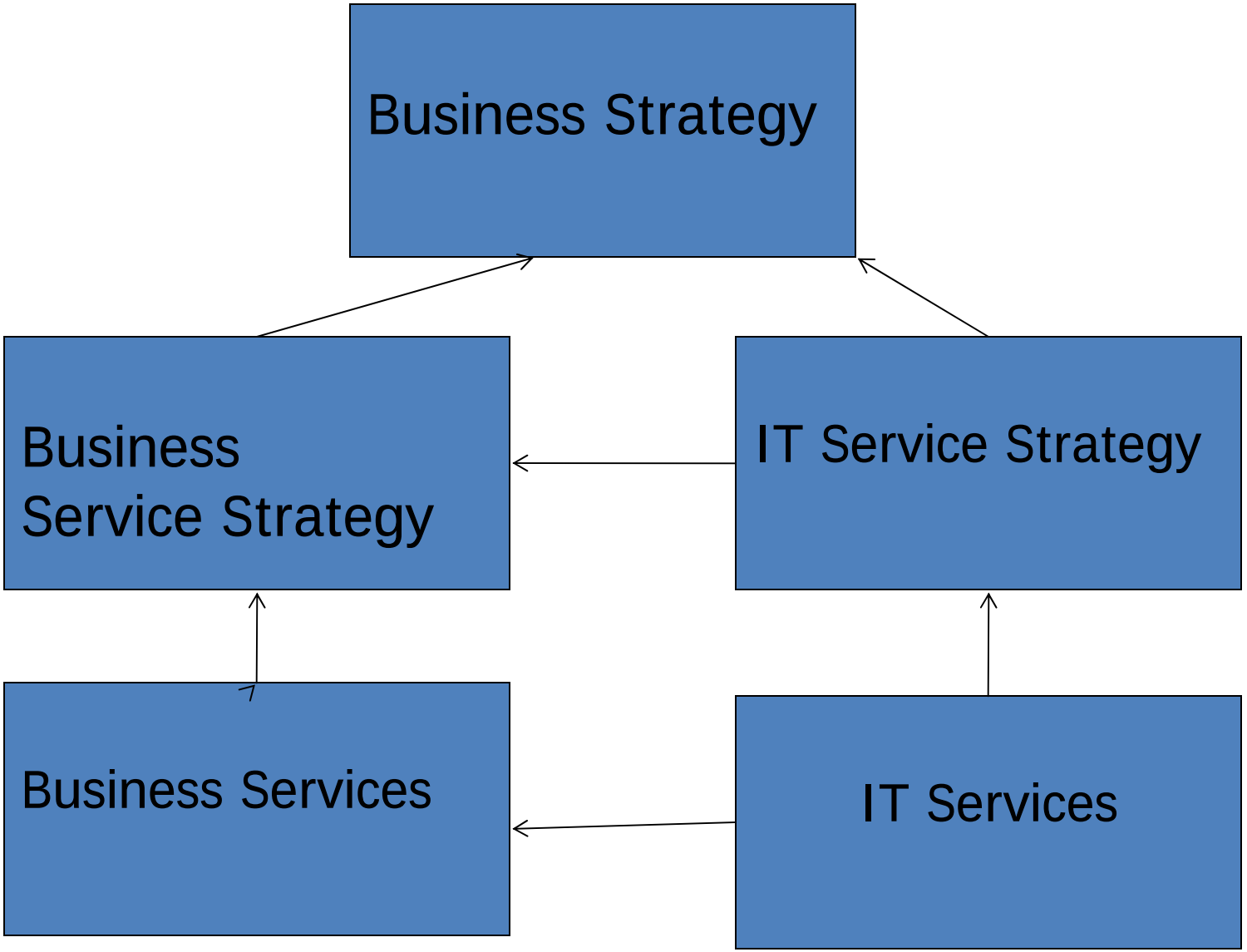
Visiting Lecturer (Dr. Franklin Leung)

- Financial Risk Manager (FRM), Certified Information Security Professional (CISSP), Certified Information Systems Auditor (CISA), 20 years of experience in information technology, recent 5 years in business process re-engineering, risk management, compliance and operations
- Thesis Supervisor for University of Warwick Master programme in project management
- IT Specialist in Hong Kong Council of Accreditation, Panel member conducting course validation

1. From Business to IT Services – An overview of frameworks

by Dr. Franklin Leung

Strategy -> Operation



Business Service vs IT Service

- External customer
- ServQual in external customer gap analysis

- Balanced Scorecard
- Service design and management
- Service vs Product

- Internal Customer
- Use of ServQual in internal customer gap analysis

- IT Service Scorecard
- IT Service Design and Management
- IT Service versus IT Product

Business Service vs IT Service

- Design/Standards/ Performance/ Communication Gap
- Customer Relationship Program
- Service Capacity/Demand Management
- Gap Analysis against best practice framework (e.g.ITIL)
- Build up IT/User relationship
- IT Service Capacity/Demand Management

Business Service vs IT Service

- Manage external customer expectation
- Service Quality Management
- Process blueprinting/analysis
- Service outsourcing

- Manage external & internal customer expectation
- Incident/Problem Management
- IT process analysis and benchmarking
- Data centre outsourcing

Definition of Service (ITIL definition)

- A ‘service’ is a means of delivering value to customers by facilitating outcomes want to achieve without the ownership of specific costs and risks.

Frameworks

- Business Strategy – Balanced Scorecard,
- IT Service Strategy – (a) IT Services Scorecard (b) ITIL Service Strategy
- IT Services
  - Application Services (Capability Maturity Model Integration)
  - IT Infrastructure Services (ITIL framework on service design, operation, delivery; certification awarded to individuals)
- Research on Services : Services Science

Business Strategy
and
IT Service Strategy Framework

MISSION

To provide acquisition and assistance services to support accomplishment of the Department's programmatic goals and objectives.

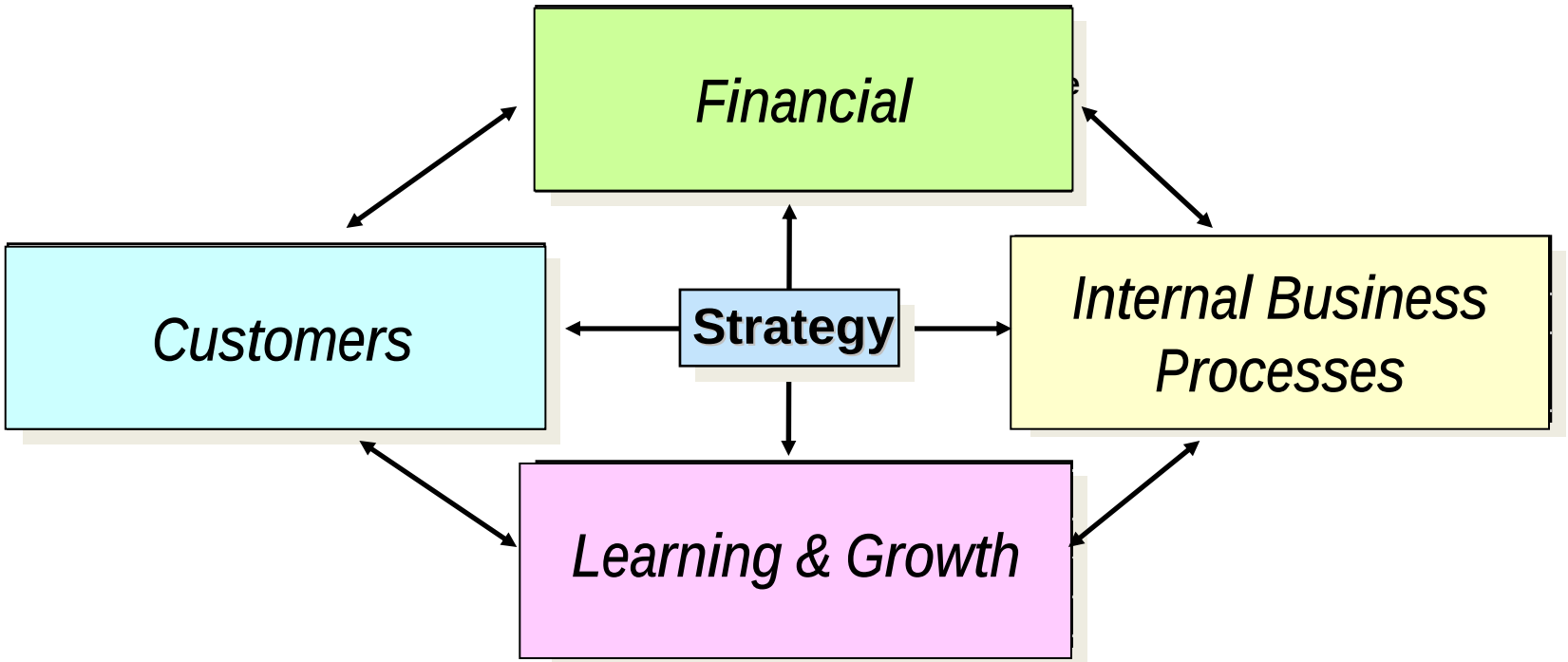
VISION

To deliver on a timely basis the best value product or service to our customers while maintaining the public's trust and fulfilling public policy objectives.

STRATEGY

To change the present system's culture, management systems, and line processes consistent with the principles of Quality Management, in order to establish and maintain: a customer focus, a sense of urgency, continuous and breakthrough process improvement, and an emphasis on results.

Four Perspectives of the Balanced Scorecard



Source: Kaplan and Norton

What is the Balanced Scorecard (BSC)?

- The balanced scorecard is a *management system* (not only a measurement system) that enables organizations to clarify their vision and strategy and translate them into action.
- It provides feedback around both the internal business processes and external outcomes in order to continuously improve strategic performance and results.
- When fully deployed, the balanced scorecard transforms strategic planning from an academic exercise into the nerve center of an enterprise.

Items under each perspective

- Objectives of initiatives
- Measurement method
- Target

Measurement in Scorecard

- “How to measure anything: finding the values of intangibles in business” by Douglas Hubbard – “Anything can be measured”
- “If you can’t measure it, you can’t manage it” from Peter Drucker
- “Data beats opinion”
- Measurement is the start of science; process measurement is the start of scientific management.

Measurement (Cont'd)

- Measure customer satisfaction by (a) doing customer survey (b) categorizing and counting number of complaints
- Measure operational efficiency through (a) turnaround time (b) resource utilization (c) idle time

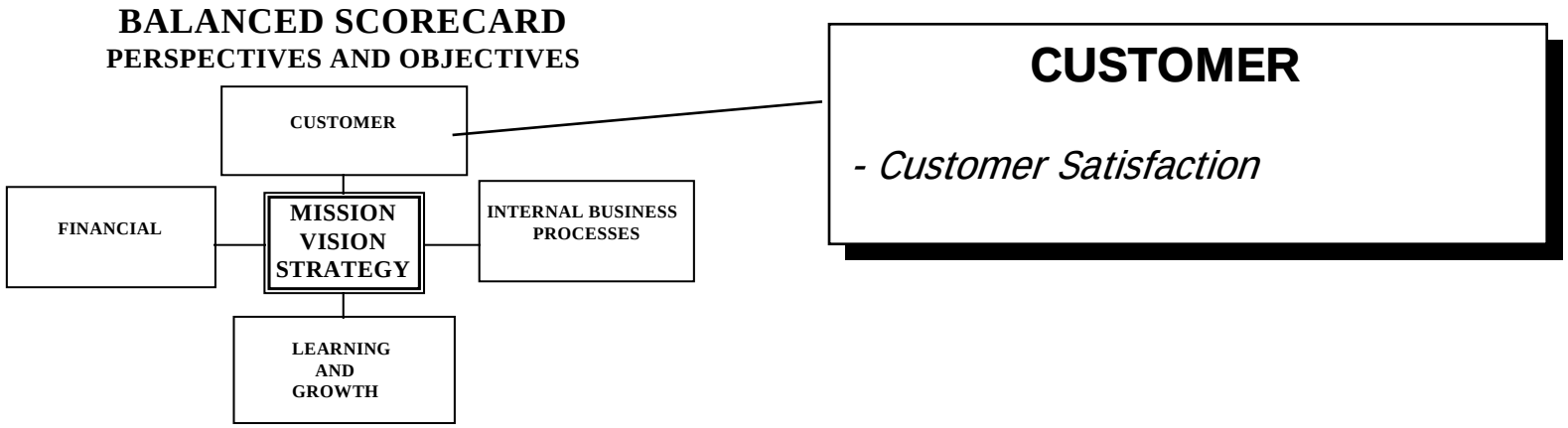
Marketing Measurements

- “Marketing Metrics: the definitive guide to Measuring Marketing Performance” by Farris, Bendle, Pffeifer & Reibstein (2010)
- “For years, corporate markets have walked into budget meetings… They couldn’t always justify how well they spent..or what different it all made.. They just wanted more money..”
- “The challenge, of course, is knowing what to measure and exactly how to measure it, e.g. the number of customers
- Over 100 metrics mentioned in the book

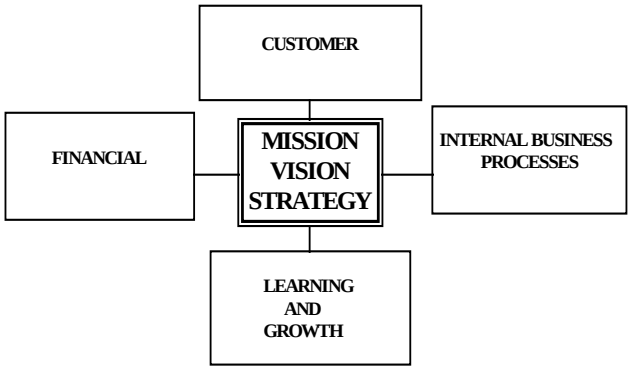
Things can't be measured?

- Love (Intensity of Love)
  - Psychologist develops metrics to measure "love"
- Uncertainty (uncertainty of stock measure)
  - Risk Management uses standard deviation of stock return to measure stock volatility (Harry Markowitz introduced this concept in 1952 and won Nobel Prize)

CUSTOMER PERSPECTIVE



INTERNAL BUSINESS PROCESS PERSPECTIVE



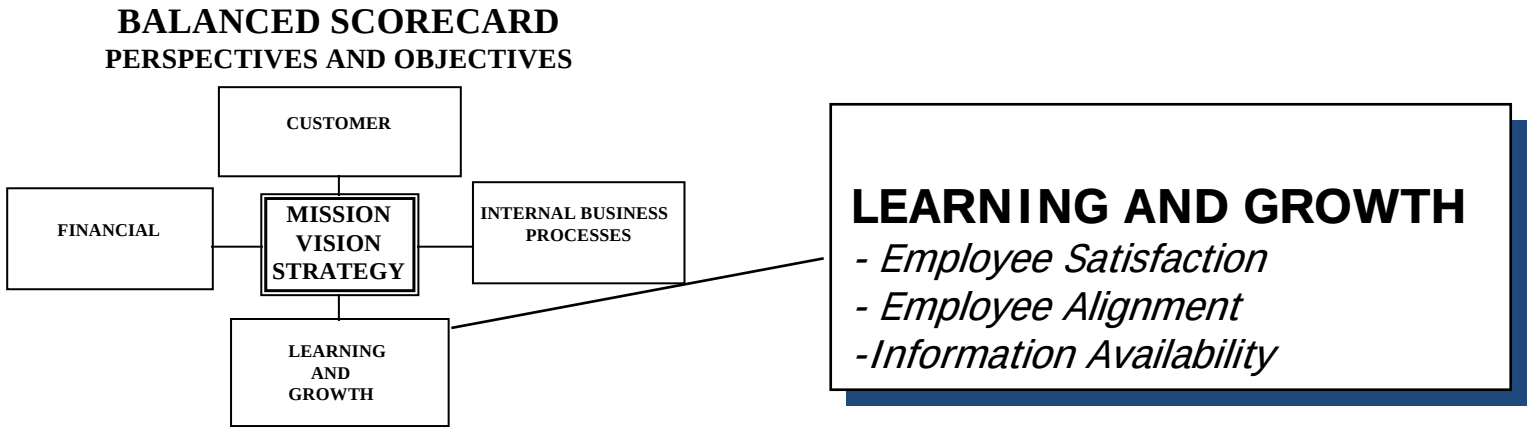
INTERNAL BUSINESS PROCESSES

-Effective Internal Controls
-Effective Supplier Management
-Effective Utilization of Alternate Procurerment Approaches
-Streamlined Processes
-Acquisition Process
-Good Corporate Citizenship through Purchasing

INTERNAL BUSINESS PROCESSES PERSPECTIVE

OBJECTIVE	MEASURE	TARGET
Effective Internal Controls Transactional review of purchasing files, review boards and Local Purchasing Information Systems (LPIS)	**Core**: % of systems in full compliance with stakeholder requirements (e.g., applicable laws, regulations, terms and conditions of contracts, ethics, etc.) based on self-assess and subject to fatal flaw considerations	Meets or exceeds expectations
Effective Supplier Management	**Core:** % Delivery on-time Optional: Supplier Satisfaction	85% on-time delivery (includes JIT)
Effective Utilization of Alternate Procurement Approaches	**Core**: % of RFPs over $100K issued electronically	

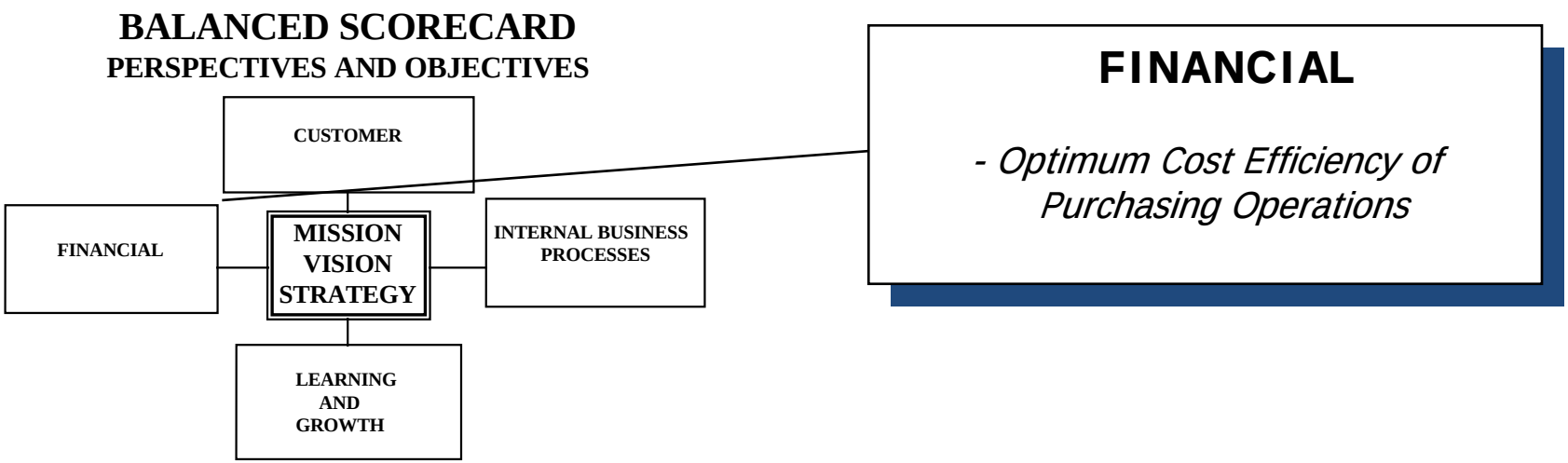
LEARNING AND GROWTH PERSPECTIVE



LEARNING AND GROWTH PERSPECTIVE

OBJECTIVE	MEASURE	TARGET
Employee Satisfaction Self-Assessments and Site Visit Evaluations	**Core:** Employee Satisfaction Index Employee Satisfaction Index includes data from employee survey, focus groups, absenteeism, and voluntary terminations	(Appropriate targets will be negotiated between the Cognizant DOE Contracting Officer and the contractor purchasing organization.)
Employee Alignment Employee Performance Appraisals	**Core:** Employee Alignment % of employees whose actual performance is aligned with Key Success Factors	90% aligned
Information Availability Establish Intranet and Knowledge Portal	**Core:** Information Availability Measure This is a measure of useful information (e.g., policies, procedures, operational reports) available to employees	90% of work groups have the data they need to do their jobs

FINANCIAL PERSPECTIVE



Initiatives Examples

Perspective	Objectives / Initiatives	Measurement	Target
Customer	Enhance customer satisfaction through service manners	No. of complaints	< 20 each year
Financial	Cost reduction	Cost to Income Ratio	< 40%
Internal Business Processes	Reduce turnaround time for invoice payment approval	Turnaround time for invoice payment approval	Cut down payment settlement time from 15 days to 10 days

Initiatives Examples (Cont'd)

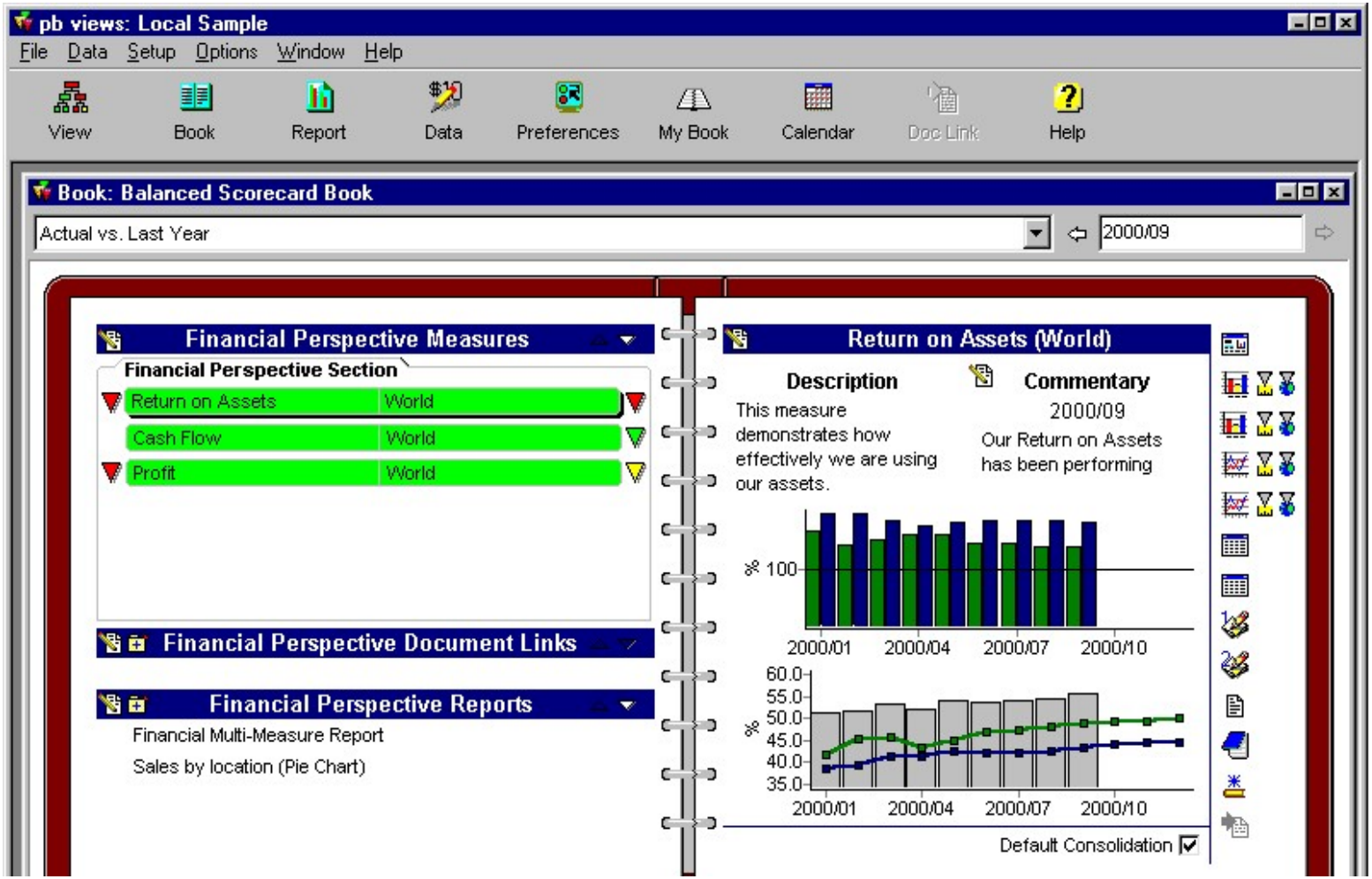
Learning & Growth perspective deals with the employee satisfaction, company culture, knowledge management, training ,

Perspective	Objectives / Initatives	Measurement	Target
Learning & Growth	Enhance English speaking ability of staff through training sponsorship	No. of training hours in English speaking for each employee	> 16 hours each year per employee

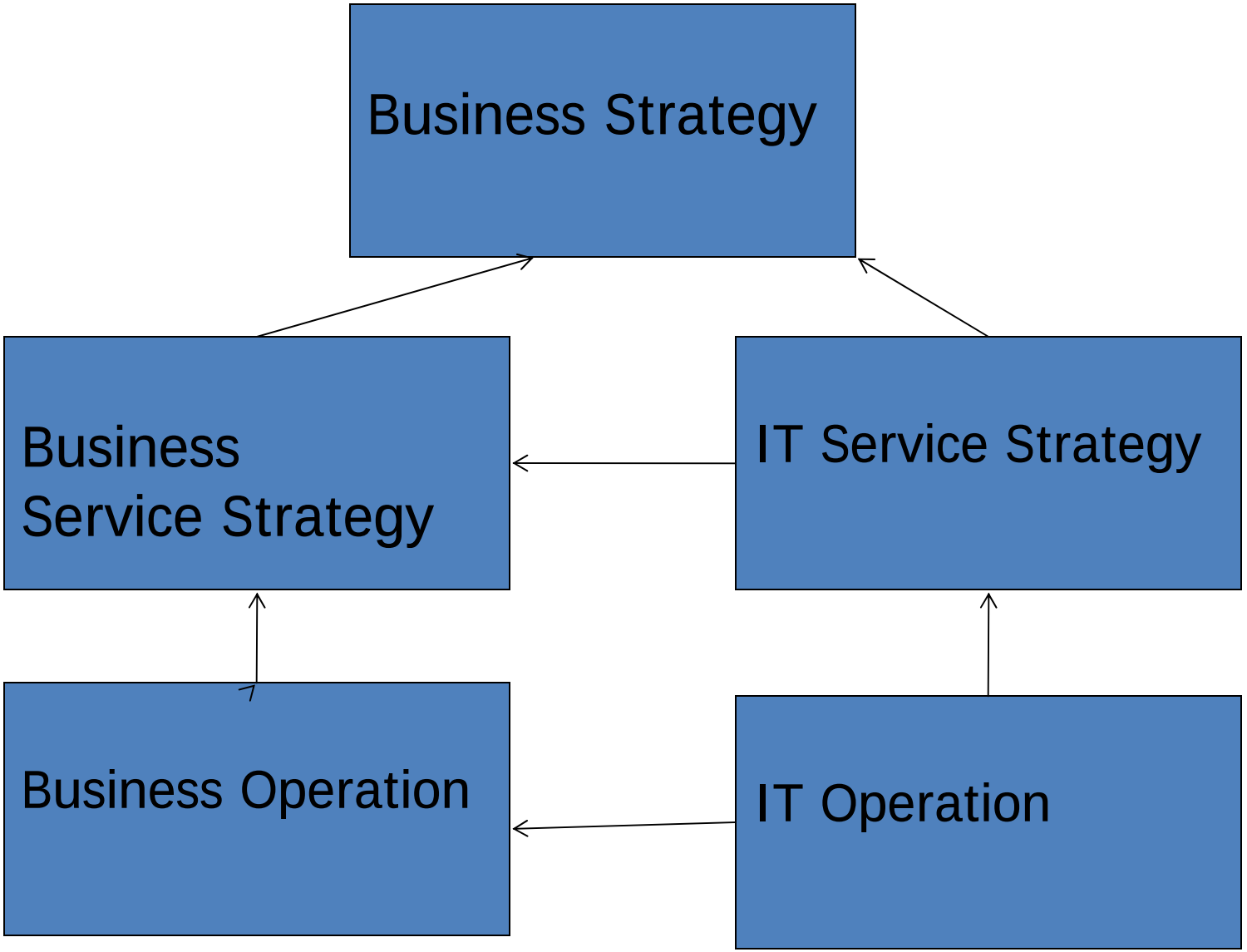
Distinction between Customer and Internal Business Operation

- Customer initiatives will directly affect customer satisfaction (e.g. service manner, service/product quality, front-end)
- Internal business operation initiatives will directly increase effectiveness, reduce cost and may indirectly contribute to customer satisfaction (e.g. back-office operation, supply chain logistics)

Example: Performance Views (dashboard)



Business Operation -> IT Service



Business Balanced Scorecard as Business Strategy Implementation Framework

- Balanced Scorecard is for implementation of business strategy, not for IT services strategy. The objectives and measurements may be or may not be related to IT at all.
- Instead, IT Balanced Scorecard is for implementation of IT Service Strategy. The objectives

IT Service Strategy Framework – IT Balanced Scorecard

Perspective	Business Scorecard	IT services Scorecard
Customer	External customer satisfaction	External/Internal Customer Satisfaction
Financial	Revenue, Income, Profit	Cost
Internal business processes	Efficiency/reliability/ compliance of service workflow	Efficiency/reliability/ compliance of IT service workflow
Learning & Growth	Professional knowledge, Company culture	IT knowledge and certifications, IT culture

Measurement of IT services

- Software quality
- Security
- Total Cost of Ownership
- Availability
- Turnaround time in producing report
- Productivity of system administrator
- Business Value

Customer Perspective

- IT services may be further categorized under services provided to external customers and internal customers.
- External Customer
  - e.g. Establish e-commerce website for customers self-help and self-use
  - e.g. Increase reliability of e-commerce website
- Internal Customer
  - e.g. Shorten turnaround time in responding to urgent cases in help desk

Financial Perspective

- For IT services provided to external customers, it will focus both on revenue and cost; For IT services provided to internal customers, it will focus on cost.
- Examples
  - Increase revenue by 10% through e-commerce internal trading web site;
  - Decrease cost by 10% through server consolidation

Internal IT Operation Perspective

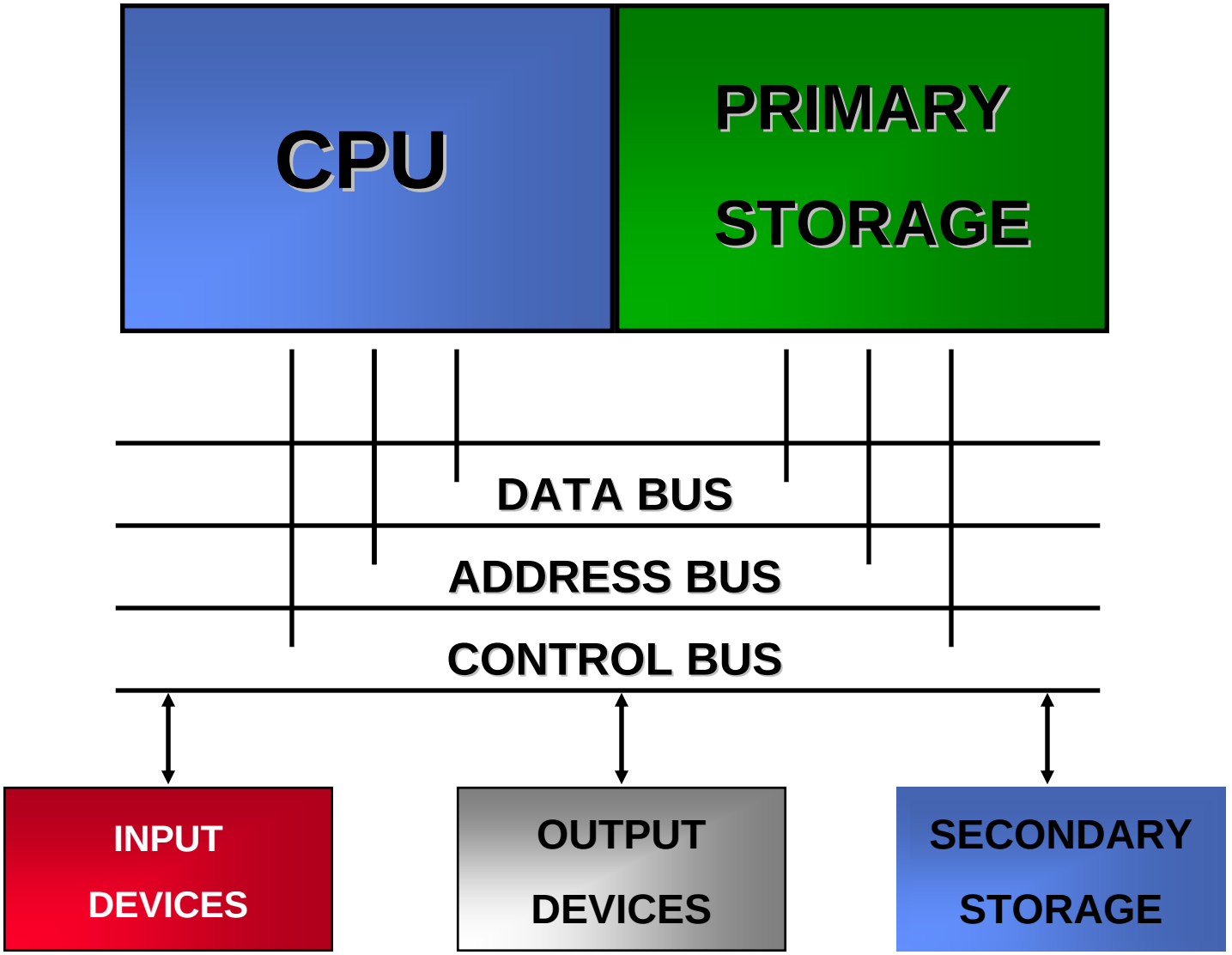
- It focus on IT operation (rather than business operation which may contain manual work)
- Examples of Initiatives:
  - Reduce downtime through better capacity planning
  - Shorten backup time through the use of disk rather than tape

Learning and Growth Perspective

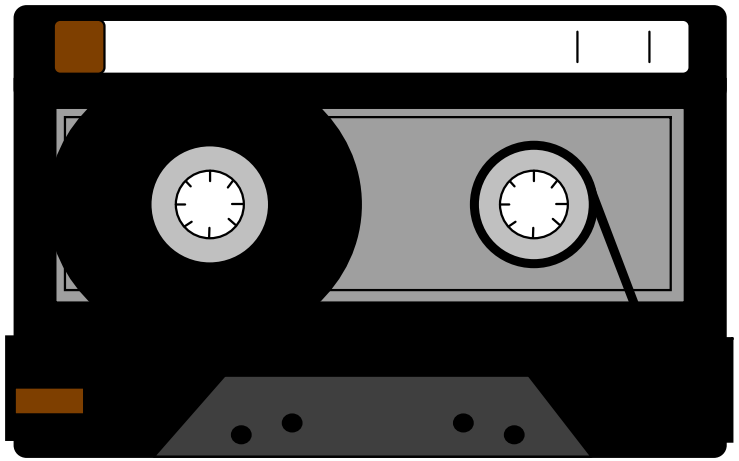
- e.g. provide technical training to administrators
- Measurement: Number of certified database administrator

2. IT Infrastructure Technology Overview

CPU & PRIMARY STORAGE



SECONDARY STORAGE



- DISK
- TAPE
- OPTICAL STORAGE

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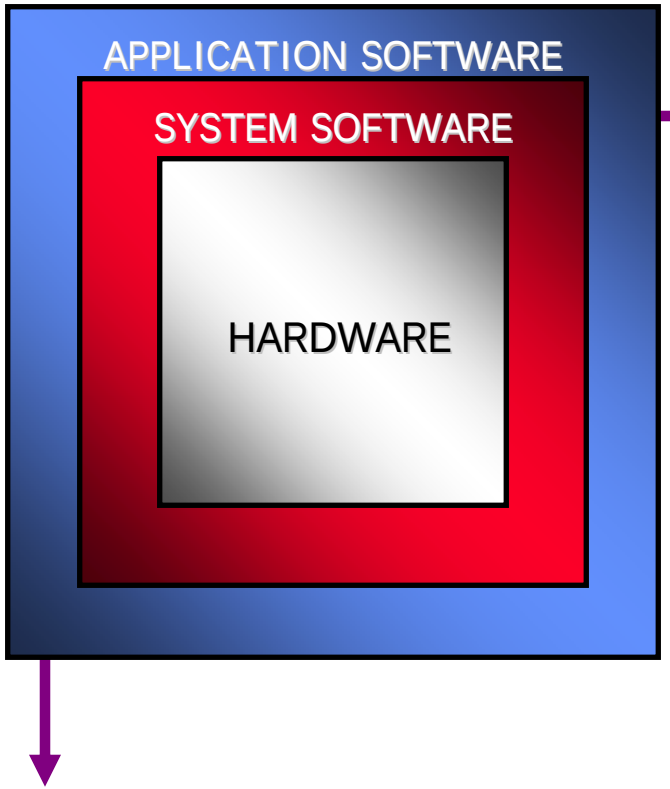
SOFTWARE



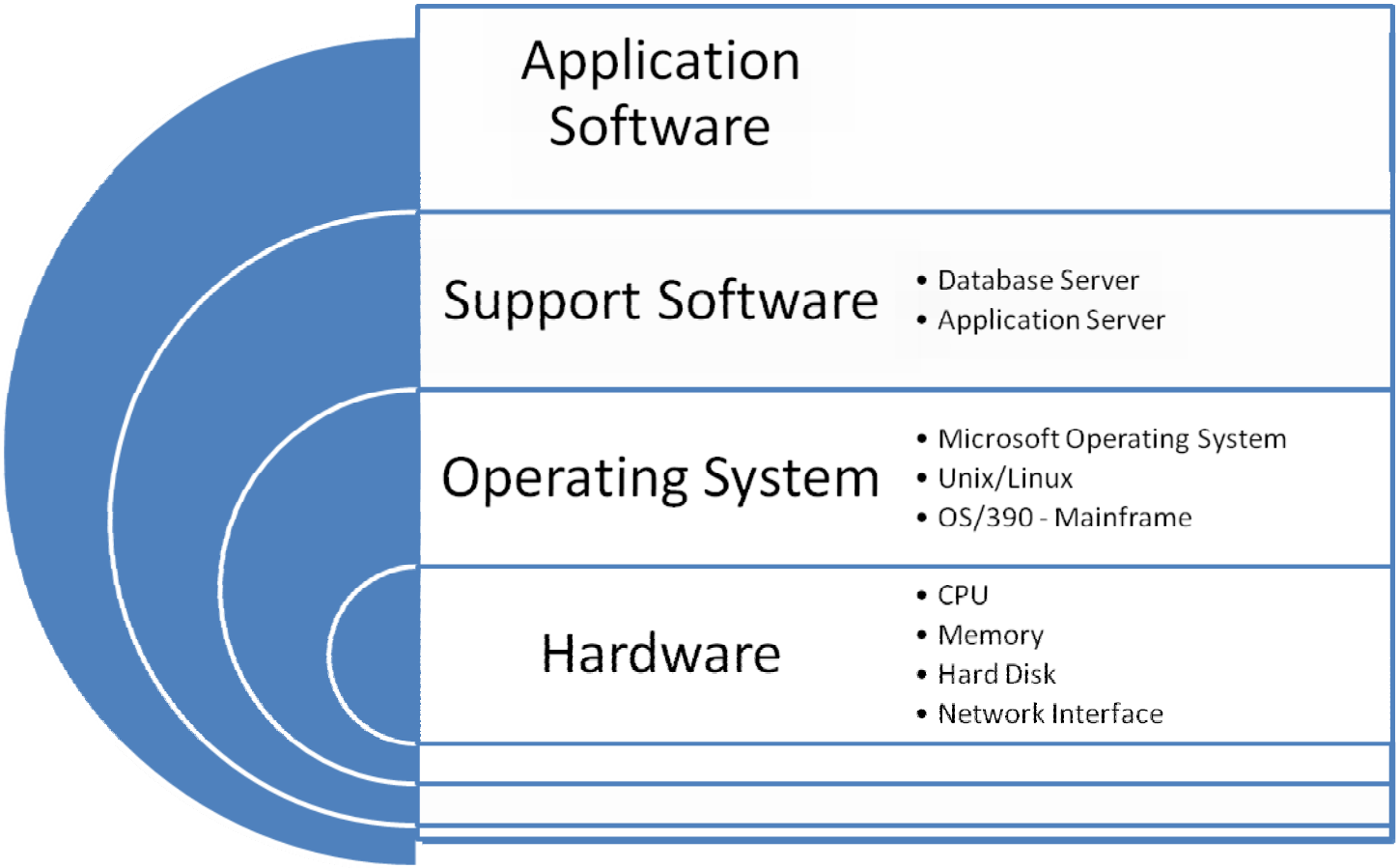
OPERATING SYSTEM:
- SCHEDULED COMPUTER EVENTS
- ALLOCATES COMPUTER RESOURCES MONITORS EVENTS

LANGUAGE TRANSLATORS:
- INTERPRETERS
- COMPILERS

UTILITY PROGRAMS:
- ROUTINE OPERATIONSMANAGE DATA

PROGRAMMING LANGUAGES:

ASSEMBLY LANGUAGE; FORTRAN;
COBOL; PL / 1; QBASIC; PASCAL; C; C++;
FOURTH GENERATION LANGUAGES


Application Software
Support Software
• Database Server
• Application Server
Operating System
• Microsoft Operating System
• Unix/Linux
• OS/390 - Mainframe
Hardware
• CPU
• Memory
• Hard Disk
• Network Interface

Types of System Software Running on Operating System

- Application Server (IBM Websphere, Oracle Application Server)
- File Server (Microsoft Servers)
- Database Server (Oracle, Microsoft SQL servers, Sybase)
- Gateway to mainframe

MAINFRAME

- LARGEST ENTERPRISE COMPUTER
- COMMERCIAL, SCIENTIFIC, MILITARY APPLICATIONS
- MASSIVE DATA
- Applications running on mainframe may be used for long time, often referred to as Legacy System
- IBM/Hitachi

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MIDRANGE/MINICOMPUTER

- MIDDLE-RANGE
- UNIVERSITIES, LARGE CORPORATES, SME, FACTORIES, LABS
- Usually run Unix Operating System
- IBM, HP, SUN (Sun acquired by Oracle)

*

MICROCOMPUTER

- DESKTOP OR PORTABLE
- PERSONAL OR BUSINESS COMPUTERS
- AFFORDABLE
- MANY AVAILABLE COMPONENTS
- CAN BE NETWORKED
- LENOVO/HP

DOWNSIZING

- TRANSFER APPLICATIONS FROM LARGE COMPUTERS TO SMALL/MEDIUM COMPUTERS
- REDUCES COST
- SPEEDS RESULTS TO USER
- FROM THIN CLIENT (TERMINAL) TO CLIENT/SERVER CODE (CLIENT CONNECTING TO SERVER)
- COOPERATIVE PROCESSING

*

STORAGE AREA NETWORK (SAN)

- HIGH-SPEED NETWORK
- CONNECTS VARIOUS STORAGE DEVICES
  - TAPE LIBRARIES
  - DISK ARRAYS

STORAGE SERVICE PROVIDER:

3rd party rents storage space

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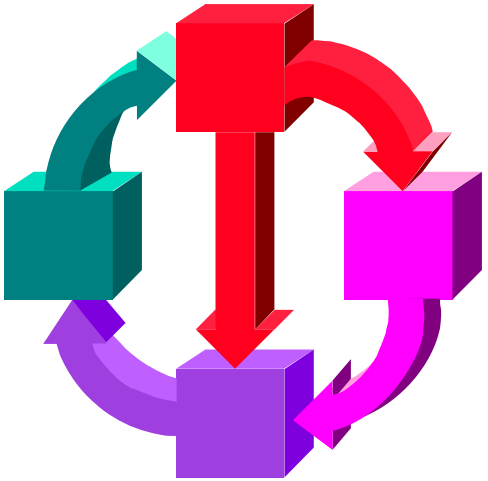
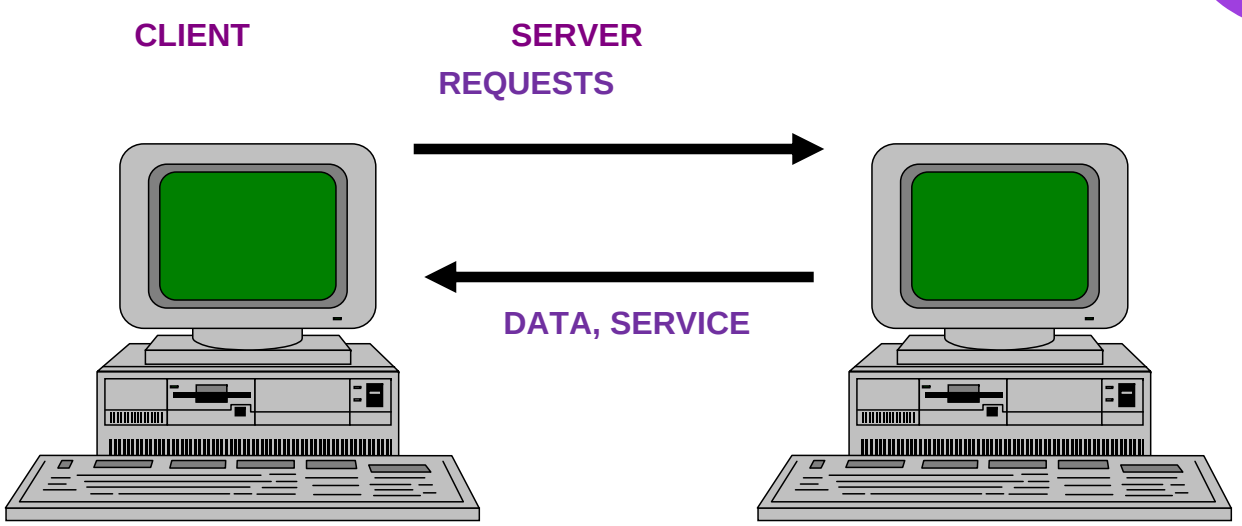
CLIENT / SERVER





USER INTERFACE

APPLICATION

FUNCTION

DATA

APPLICATION FUNCTION

NETWORK RESOURCES

MIDDLEWARE

SOFTWARE ALLOWS DIFFERENT APPLICATIONS TO EXCHANGE DATA (e.g. IBM MQ Series)

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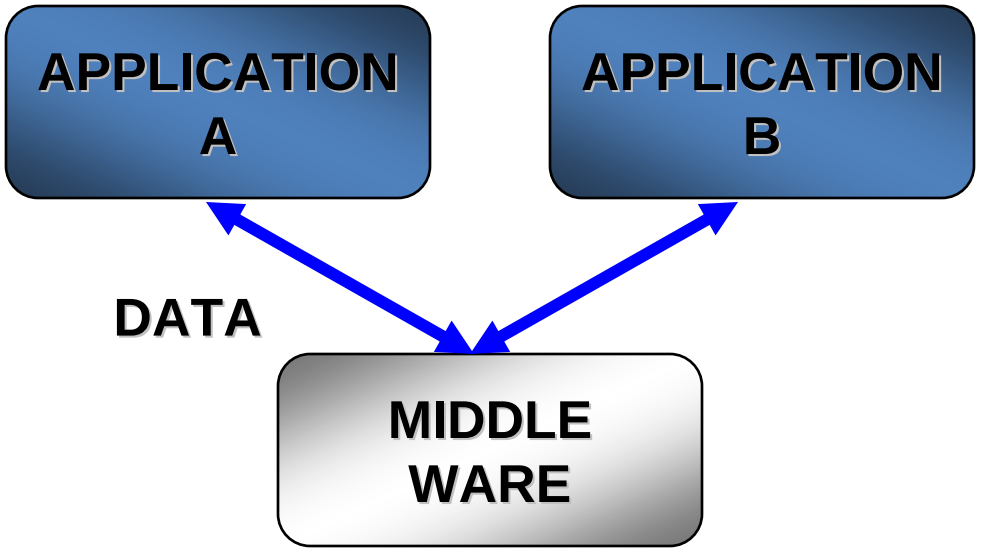

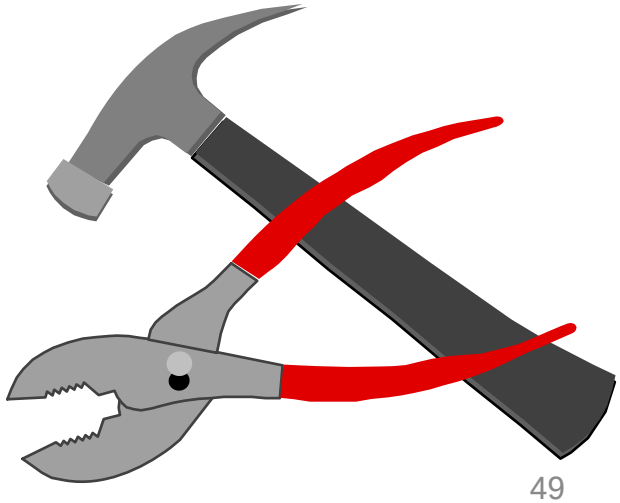

INTERNETWORKING

LINK NETWORKS

EACH RETAINS IDENTITY

INTO INTERCONNECTED NETWORK

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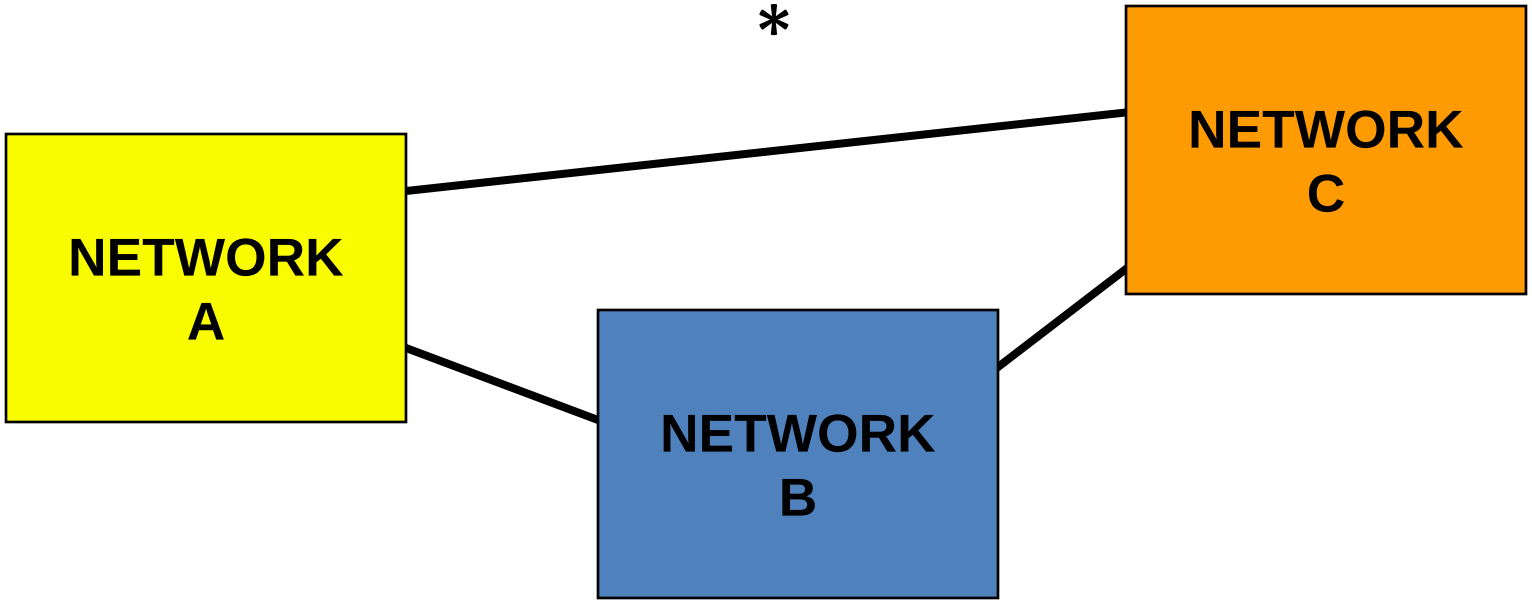
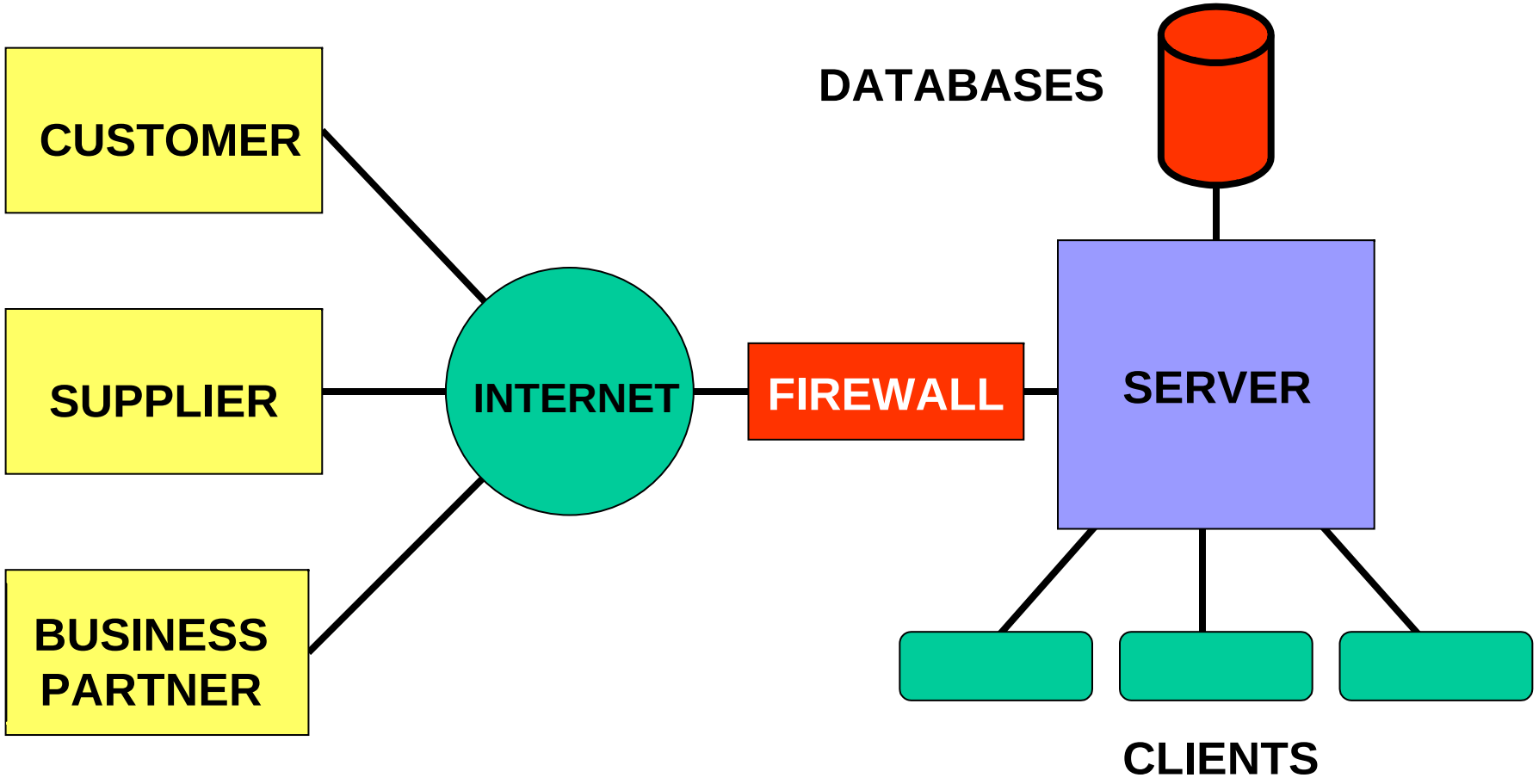
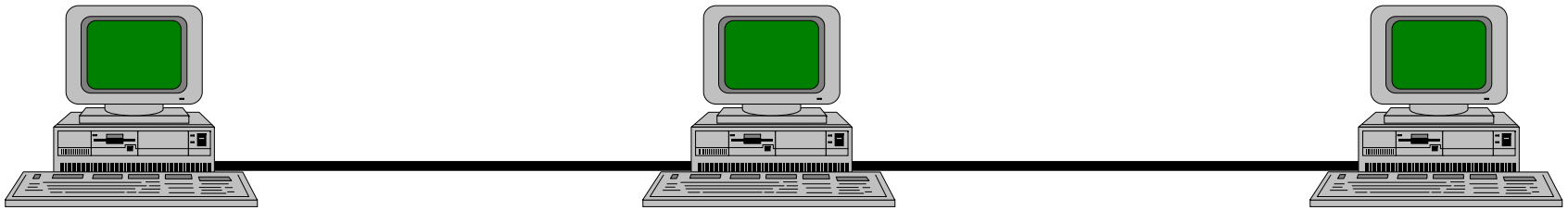


EXTRANET


DATABASES
CUSTOMER
SUPPLIER
BUSINESS PARTNER
INTERNET
FIREWALL
SERVER
CLIENTS

LOCAL **AREA** NETWORK (LAN)

- GATEWAY: Connection to other networks
- ROUTER: Forwards data to other networks (e.g. CISCO routers)
- NETWORK OPERATING SYSTEM (NOS): Manages file server; routes communications on network (e.g. Linux, Microsoft Operating System)



WIDE - AREA NETWORK (WAN)

Network spans large geographic distances. Can include cable, satellite, microwave

- SHARED LINES: Route determined by current traffic
- DEDICATED LINES: Constantly available for high-volume traffic
- VPN (Virtual Private Network) over Internet
- SPEED: Mbps/Gbps

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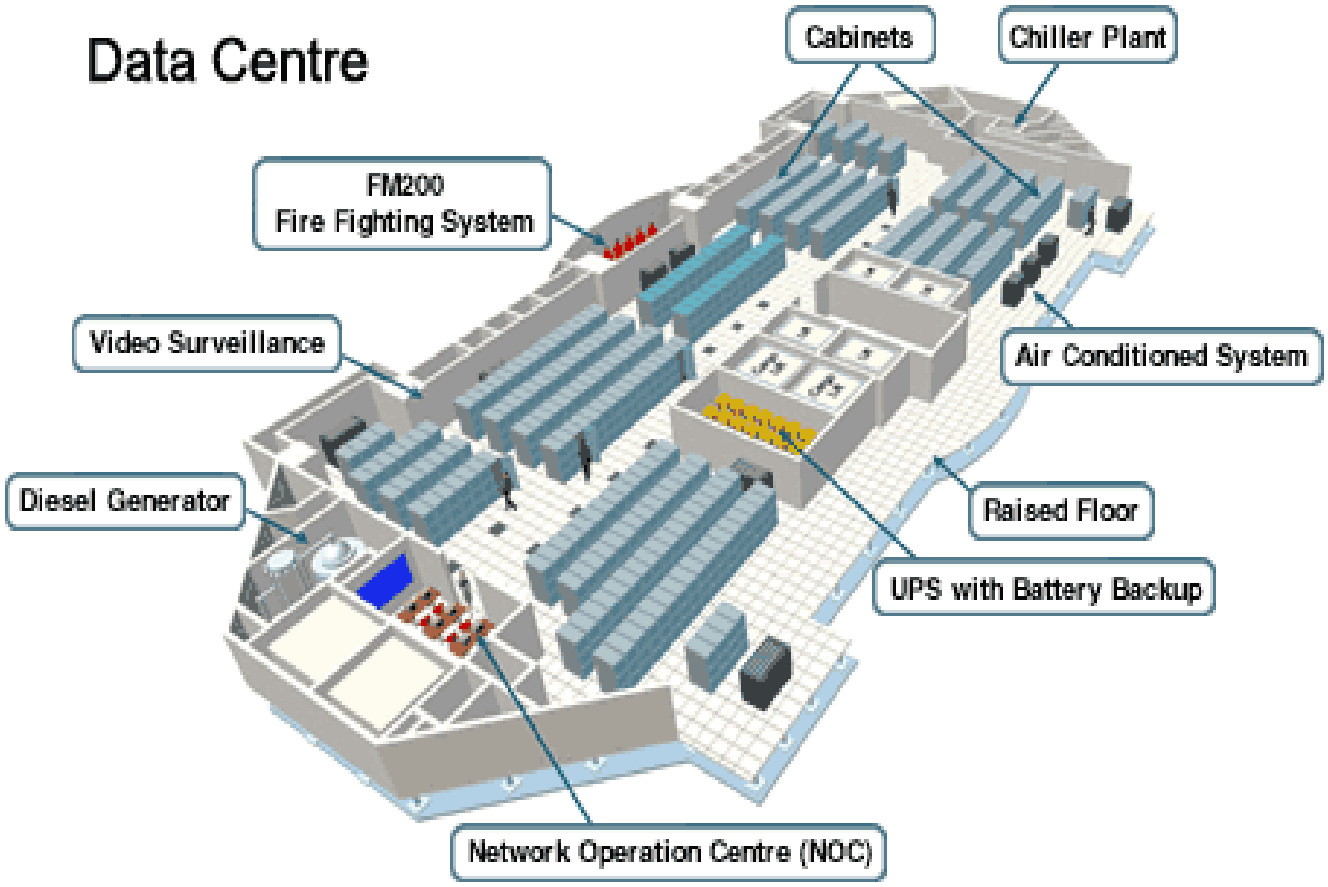
Data Centre Overview



Data Centre Environment

- Security (video surveillance)
- Air conditioned system
- Raised Floor (wiring) and Cabinets
- HA configuration (high availability)
- UPS (Uninterrupted Power Supply) – Consider Electricity Generator – esp. in China
- Business Continuity(Back-up data centre)

Rack-Mounted Server

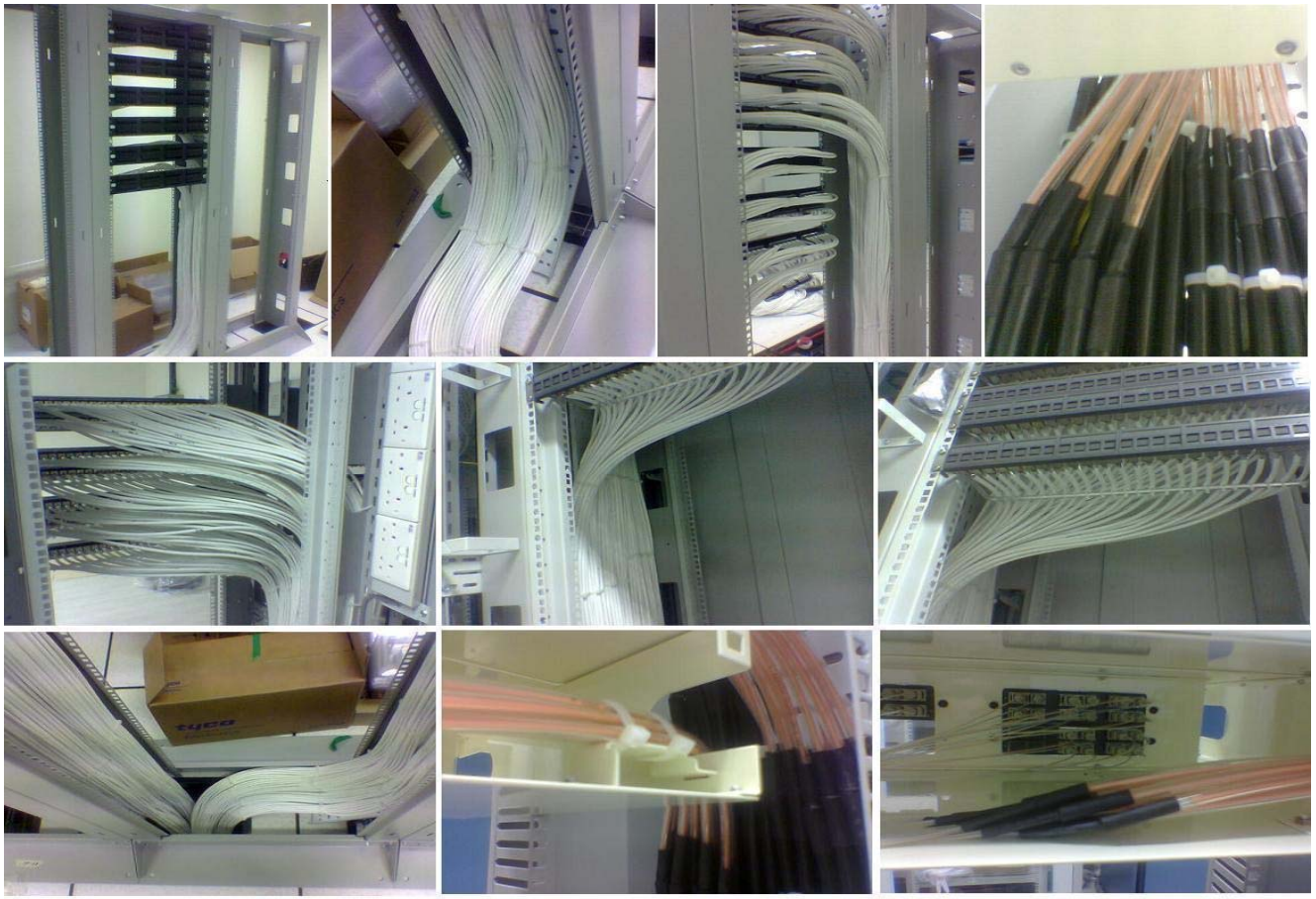
Cabinets in Data Centre

Shared console for multiple servers

High Availability

- HA configuration for firewall, application server, database server
- Redundant hardware/software component for real-time backup

Wiring (e.g. unshielded twisted pair (UTP), fiber optics cable)



Data Centre Infrastructure

- Hetereogeneous Computing Environment
- Multiple dedicated servers (boxes)
- Client Server + middleware + gateway
- LAN/WAN/Internet/Firewall
- Primary/Backup Data Centre (Consider 9/11 attacks at the buildings with data centre inside)
- Location of Data Centre/Data Centre consolidation

Challenges for system administrator

- Monitor performance for CPU, Memory, Disk
- Capacity planning and upgrade for different components
- Interconnected network makes troubleshooting difficult; placing the blame on the scapegoat often happens
- Expertise for different areas
- Architecture planning is challenging

3. IT Services Overview

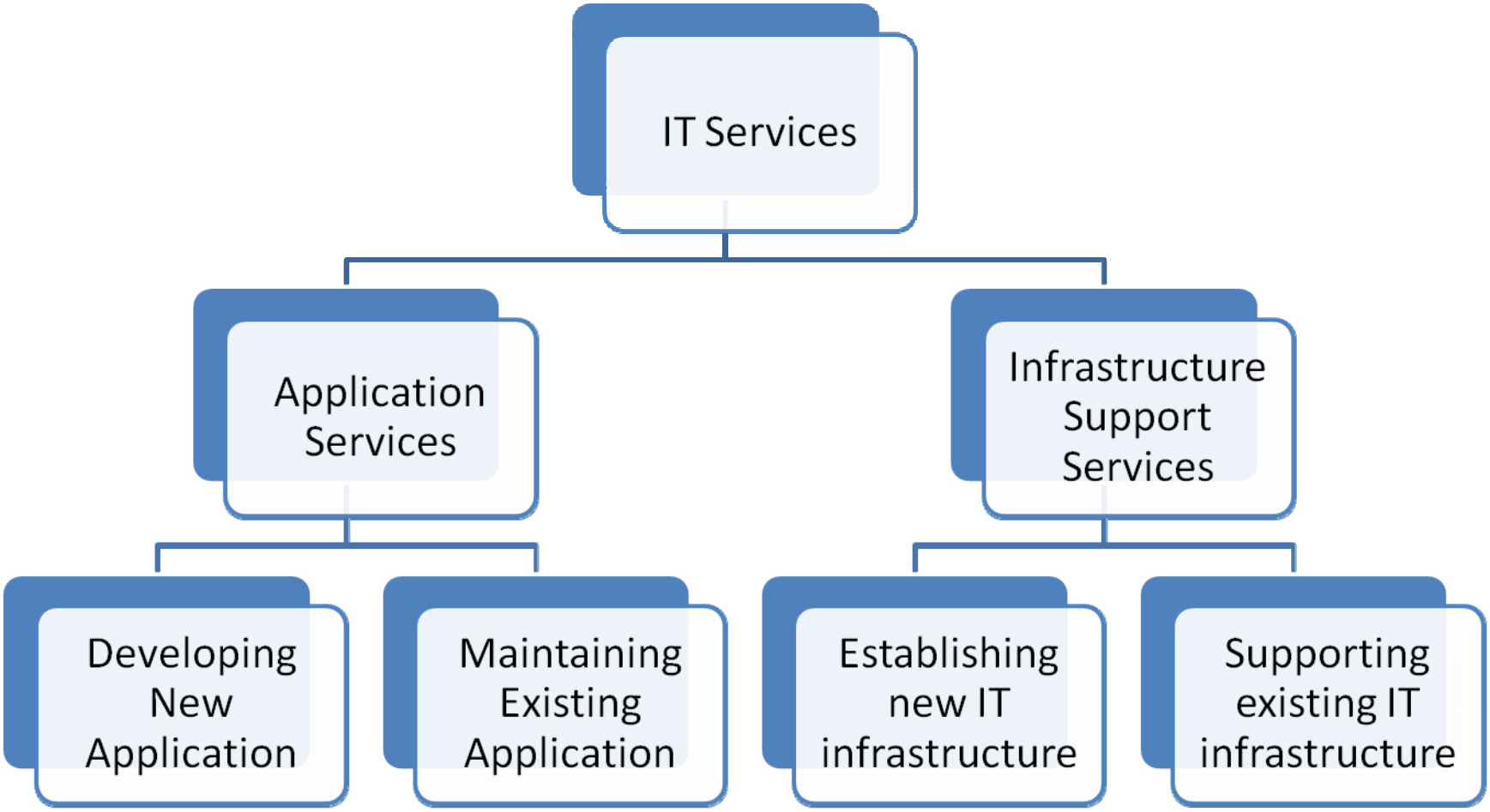
Infrastructure versus Application

- Application systems are collection of programs running on system infrastructure
- Infrastructure refers generally to network infrastructure, server infrastructure, data infrastructure, PC/desktop infrastructure, middleware infrastructure, office automation infrastructure (e.g. e-mail)

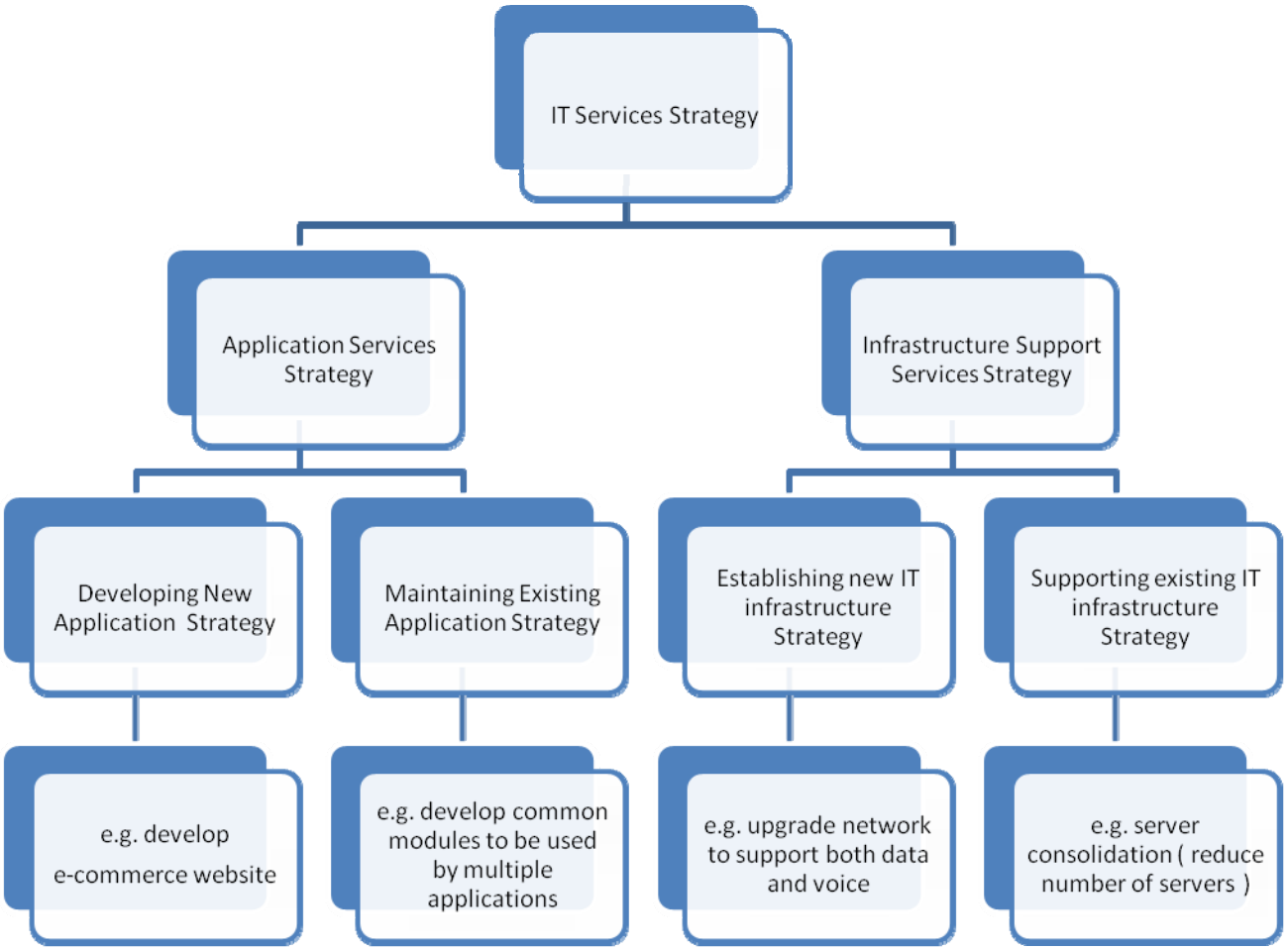
IT Infrastructure Support Services versus IT application Services

	IT application	IT Infrastructure Support services
Technology	Computer Program	Hardware (PC/Unix/mainframe) , Software(Office automation, database), Network(routers, firewall)
People	Project Manager, Systems Analyst, Programmers	Technical support manager, database/network/security administrator, help desk administrator, architect,
Processes	Program development, System testing, Application architecture	Server/Operational Management(capacity, performance, availability), Help desk support, security policy, technical infrastructure, procurement

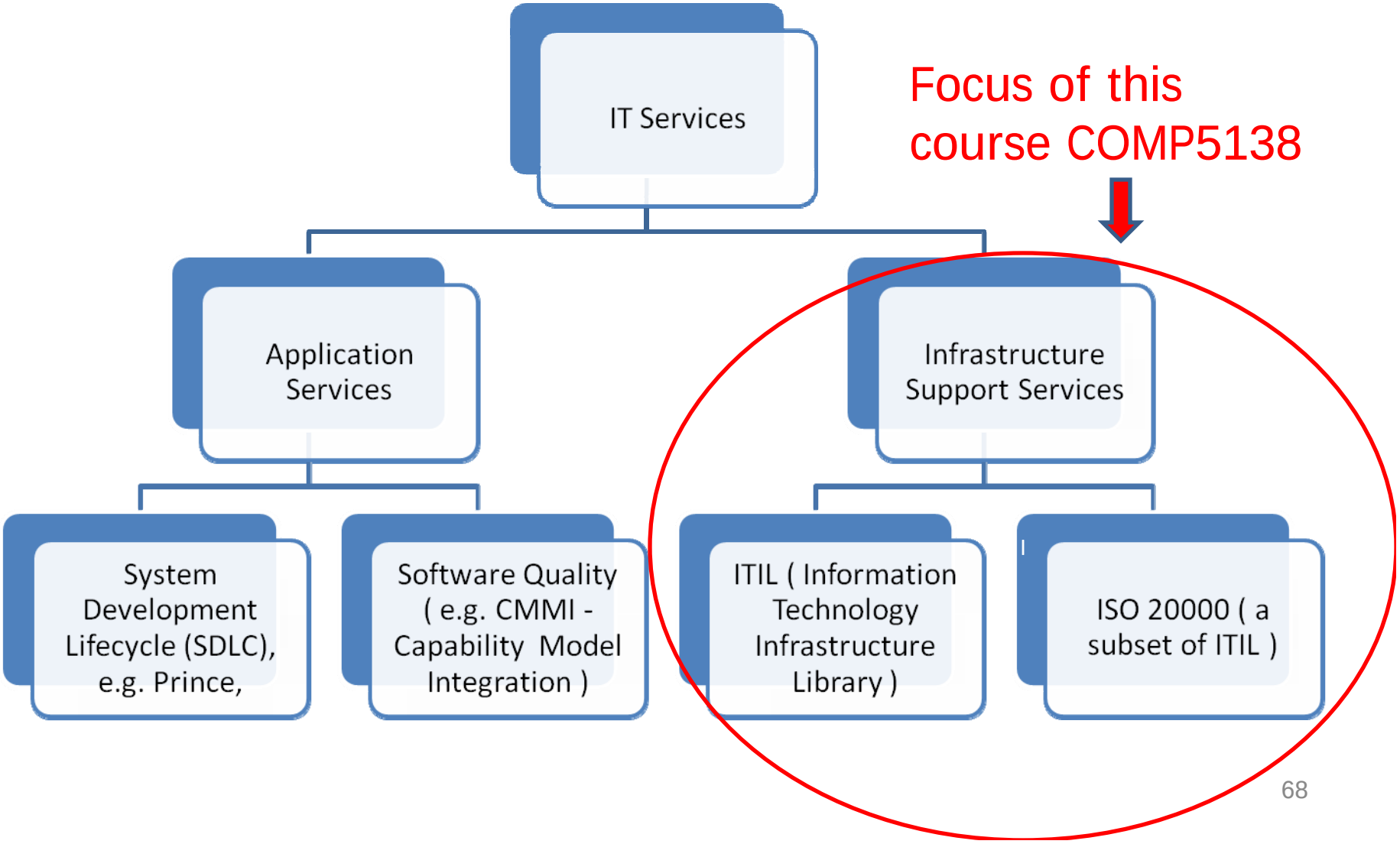
Hierarchy of IT Services



Breakdown of IT Service Strategy



IT Service Processes Framework



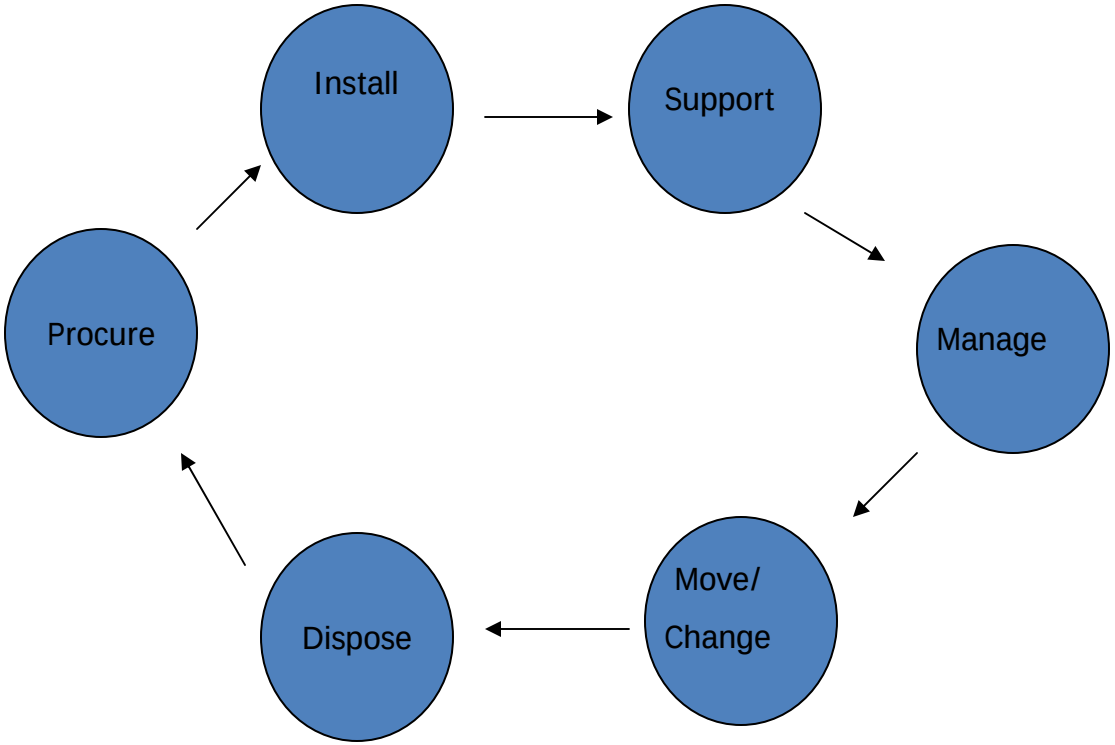
Process Frameworks

- Infrastructure Support Services
  - ISO/IEC20000: IT Service Management (certification awarded to company) – aligned with ITIL
  - Control Objectives for Information and Related Technology (COBIT) – related to IT Audit
- Others
  - Project Management Body of Knowledge (PMBOK)
  - Six Sigma

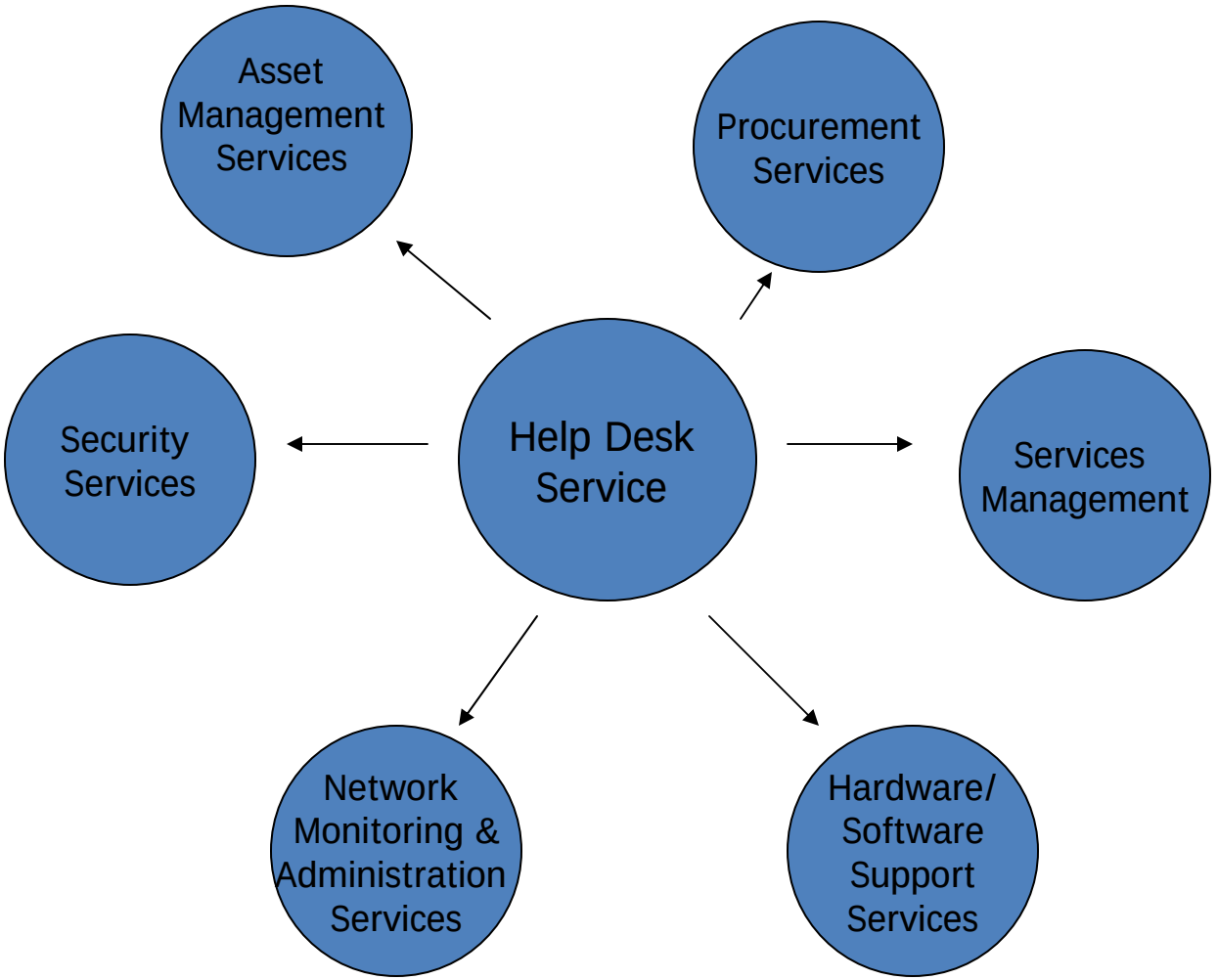
Focus of IT Service Standard /Best Practice

- Process-focused (that is, it is not focusing on people or technology)
- It is vendor-neutral
- Provides a documentation of recommended processes
- Provides certification in most cases

IT Service Process Life Cycle



Examples of Managed Services



Routine jobs in IT service

- Operators take care of the regular operation of the computer system, e.g. report printing, doing back-ups, running scheduled jobs at night
- Help desk staff take care of calls from end-user

Routine jobs in IT service

- Network administrators take care of network devices, network routing design and change, network devices version upgrade
- Server administrators take care of storage planning and management, server performance tuning, fix application, server version upgrade, capacity upgrade

Routine jobs in IT service

- E-mail administrators take care of e-mail userid creation, e-mail routing configuration
- Security administrators take care of user id creation, assignment of access rights to user id

IT Services versus IT products

- IBM transforms itself successfully from selling products to selling IT Services (e.g. customized solution, data centre outsourcing)
- Services involve customization, integration, business consulting.