System Integration and Architecture

IS 22222

By KG Lohara Chathumini

Course Outline

Title: System Integration and Architecture

Course Code: IS 22222

Credits: 02

Prerequisites: System Analysis and Design (IS 21217) with 80% attendance

Course description:

This course will cover the integration of Computing and Information Systems in organizations, the process by which different computing systems and software applications are linked together physically or functionally. It examines the strategies and methods for blending a set of interdependent systems into a functioning or unified whole, thereby enabling two or more applications to interact and exchange data seamlessly. The course will explore tools and techniques for systems integration as well as proven management practices for integration projects.

Intended Learning Objectives

Upon successful completion of this course, the student will be able to:

- Understand role of Enterprise Architecture for Enterprise Integration.
- Explain the strategic planning and governance methods.
- Discuss various methods for implementing Enterprise Architecture.
- Discuss technologies and vendor products that can be used to deliver into production the priority databases, activities, and processes.
- Understand the Future Directions in Enterprise Architecture.

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Mode of Delivery

- Face-to-face interactive lectures: 30 hours
- Self –study: 55 hours
- Formal Assessment: 15 hours

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Evaluation Criteria

- Quizzes (02): 10%
- Mid Semester Examination: 20%
- Assignments (maximum 02): 10%
- End Semester Examination: 60%

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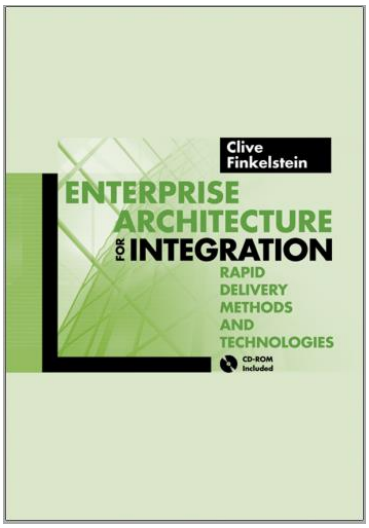
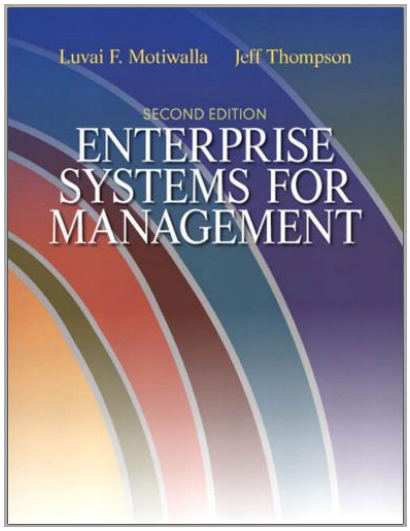
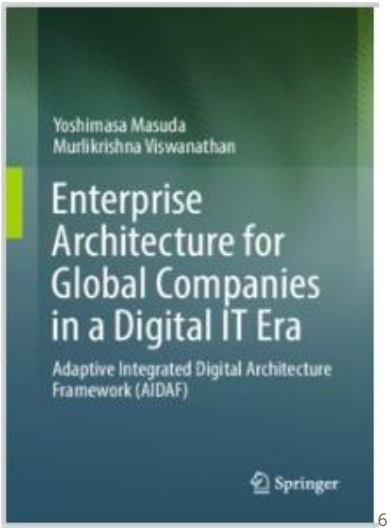
Recommended Readings







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Good Luck...!

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What is a System?

Organized, purposeful structure regarded as a 'whole' consisting of interrelated and interdependent elements. These elements continually influence one another to maintain their activity and the existence of the system, in order to achieve the common purpose the-'goal' of the system.

All System

- Have
  - Inputs,
  - Processing,
  - Outputs,
  - Feedback mechanisms,
- Maintain an internal steady-state in a changing external environment,
- Display properties that are peculiar to the whole (called emergent properties) but are not possessed by any of the individual elements, and
- Have boundaries that are usually defined by the system observer.

Categories of a system

- **Closed systems:**
  - Theoretical systems that do not interact with the environment and are not influenced by its surroundings. Only the components within the system are significant.
  - All other influences or variables from outside the system are considered to be non-existent or insignificant for the purpose of the system analysis.
- **Open systems:**
  - The 'real world' systems that have permeable boundaries through which they continually exchange energy, material, and information with their external environment the larger system in which they exist.

System Integration

- Systems integration is the process of linking together different computing systems and software applications physically or functionally.

Or

- A discipline that combines processes and procedures from systems engineering, systems management, and product development for the purpose of developing large-scale complex systems that involve hardware and software and may be based on existing or legacy systems coupled with totally new requirements to add significant functionality.

Or

- System integration is also about adding value to the system, capabilities that are possible because of interactions between subsystems.

The need for system integration

- System integration ensures that all the hardware, software and networking components work together without glitches.
- It also ensures that, as and when new applications or versions are implemented, they are properly integrated with the current applications to work seamlessly.
- As and when business rules, operating procedures and transaction mechanisms change, system integration should ensure that the applications allow easy implementation of the changes.

Proper system integration ensures that all transactions are processed in a real-time environment no time legs and latency.

Categories of System integration

There are 3 categories

1. Enterprise Application Integration (EAI)
2. Enterprise service bus (ESB) – The Next step in EAI
3. Data integration

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1. Enterprise Application Integration (EAI)

- Enterprise Application Integration (EAI) is an integration framework composed of a collection of technologies and services which form a middleware to enable integration of systems and applications across the enterprise.
- Enterprise application integration (EAI) is the process of linking such applications within a single organization together in order to simplify and automate business processes to the greatest extent possible, while at the same time avoiding having to make sweeping changes to the existing applications or data structures.
- This integrates various systems together may reside on different operating systems, use different database solutions or computer languages, or different date and time formats, or may be legacy systems that are no longer supported by the vendor who originally created them.

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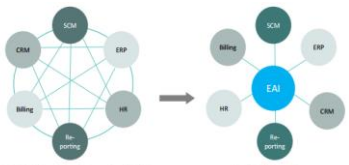
Advantage of using EAI

1. No need to use the point - to - point connection.



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Advantage of using EAI Cont...

2. Data integration:
   EAI can be used both for data and process integration. While process or application integration, EAI can also share data between multiple systems to ensure that information in multiple systems is kept consistent. This is known as Enterprise Information Integration (EII).
3. Vendor independence:
   Extracts business policies or rules from applications and implements them in the EAI system, so that even if one of the business applications is replaced with a different vendor's application, the business rules do not have to be re-implemented.
4. Common facade:
   An EAI system can front-end a cluster of applications providing a single consistent access interface to these applications and shielding users from having to learn to use different software packages.

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Integration Patterns

Mediation

- Here, the EAI system acts as the go-between or broker between (interface or communicating) multiple applications. Whenever an interesting event occurs in an application (e. g., new information created, new transaction completed, etc.) an integration module in the EAI system is notified.

Federation

- In this case, the EAI system acts as the overarching facade across multiple applications. All event calls from the 'outside world' to any of the applications are front-ended by the EAI system. The EAI system is configured to expose only the relevant information and interfaces of the underlying applications to the outside world, and performs all interactions with the underlying applications on behalf of the requester.

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Topologies

- Hub-and-spoke
  - In the hub-and-spoke model, the EAI system is at the center (the hub), and facilitates message transformation, routing, and any other inter-application functionality and interacts with the applications via the spokes. All the communication between applications must flow through the hub, allowing it to maintain data concurrency for the entire network.
- Bus
  - In the bus model, the EAI system is the bus. (or is implemented as a resident module in an already existing message bus or message-oriented middleware).

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An Activity 1

- Group Activity
- Discuss about the Hub and Spoke and Bus Topologies
  - Group 1 – Hub and Spoke Topology
  - Group 2 – Bus Topology
- 15 Minutes
- Present it into the class

Thank You...!

See You in the next Lecture
The Next step in EAI
Enterprise service bus (ESB) and Data Integration

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So far...

- System Integration
- Enterprise Application Integration (EAI)

Today Outline

- Enterprise service bus (ESB)
- Data Integration

Drawbacks of EAI

- Day-to-day operations may be relatively inflexible.
- Route scheduling is complicated for the network operator. Resources must be used carefully to avoid starving the hub.
- Total cargo capacity of the network is limited by the hub's capacity. Delays at the hub can result in delays throughout the network.
- Cargo must pass through the hub before reaching its destination, requiring longer journeys than direct point-to-point trips.

To Eliminate the drawbacks of EAI

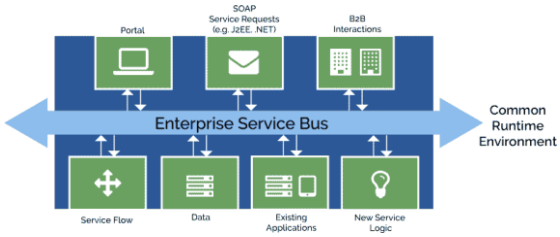
The Next step in EAI,

Enterprise service bus (ESB)

2. Enterprise service bus (ESB)

- An ESB is an approach to IT integration architecture.
- ESB is designed to integrate various applications together over what is a "bus-like" infrastructure.
- An enterprise service bus usually is located somewhere between the framework and a suite as another way to perform application integration.
- An ESB is a middleware tool that distributes tasks among different connected components that make up an application.

Enterprise service bus (ESB)



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Enterprise service bus (ESB)

- It lays down the fundamental infrastructure to do a number of tasks, such as:
  - Implement routing
  - Translation
  - Provide a blanket way to move tasks
  - Offer an application the ability to connect to the "bus"
  - Subscribe to messages sent that are based on structural and business policy rules
  - Other integration capabilities

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How ESB Works?

ESBs offer an interesting communications layer that enables an enterprise to expose data to interested parties (eg. applications, data-feeds, etc.).

- An enterprise service bus is a set of switches that sends a direct message on a specific route between either the application and/or components.
- Each enterprise has a specific business policy in place that determines which path the ESB will take these messages.

Whether it is a client or a business process, anything that is connected to an ESB do not communicate directly with one another because they communicate via the ESB itself.

Essentially, the enterprise service bus exposes the same service interface to potential clients that the connected services then expose to the ESB.

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ESB Technologies

Multiple technologies are used in implementing each of the components of the EAI system:

1. Bus/hub
2. Application connectivity
3. Data format and transformation
4. Integration modules
5. Support for transactions

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Activity 1

- Find what are these ESB technologies
- Group Activity
- 15 minutes
- Present to the Class
  - Group 1 - Bus/hub
  - Group 2 - Application connectivity
  - Group 3 - Data format and transformation
  - Group 4 - Integration modules
  - Group 5 - Support for transactions

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Advantages of ESB

- Real time information access among systems
- Streamlines business processes and helps raise organizational efficiency
- Maintains information integrity across multiple systems
- Ease of development and maintenance

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Disadvantages of ESB

- High initial development costs especially for small and mid-sized businesses.
- Require a fair amount of up front business design, which many managers are not able to envision or not willing to invest in.

Most EAI projects usually start off as point-to-point efforts, quickly becoming unmanageable as the number of applications increase.

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3. Data integration

- Data integration involves carefully combining all of the different data sources from around your organization so that analysts, users, and applications can have access to a complete picture of the entire organization.
- Performing data integration is a necessary skill in today's data-driven world.
- Benefits of Data integration includes,
  - Eliminating data silos,
  - improving collaboration,
  - supporting better decision-making, and
  - improving data quality and integrity.

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Seven Types of Data Integration Techniques

- Hand-coding
- Data warehousing
- Middleware data integration
- Data consolidation
- Data virtualization
- Data federation
- Data propagation

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What is Enterprise Architecture

- Enterprise architecture is the process by which organizations standardize and organize IT infrastructure to aligns with business goals.
- These strategies support digital transformation, IT growth and the modernization of IT as a department.
- The EA framework came as a response to the increase of business technology, especially in the 1980s when computer systems were just taking hold in the workplace.
- Companies soon realized they would need a plan and long-term strategy to support the rapid growth of technology and that remains true today.

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Enterprise Architecture Strategies

- Modern EA strategies now extend this philosophy to the entire business, not just IT, to ensure the business is aligned with digital transformation strategies and technological growth.
- EA is especially useful for large businesses going through digital transformation, because it focuses on bringing legacy processes and applications together to form a more seamless environment.

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Goals of enterprise architecture

- The EA framework successfully combines people, data and technology to show a comprehensive view of the inter-relationships within an information technology organization.
- EA is guided by the organization's business requirements — it helps lay out how information, business and technology flow together.
- This has become a priority for businesses that are trying to keep up with new technologies such as the cloud, IoT, machine learning and other emerging trends that will **prompt digital transformation**.

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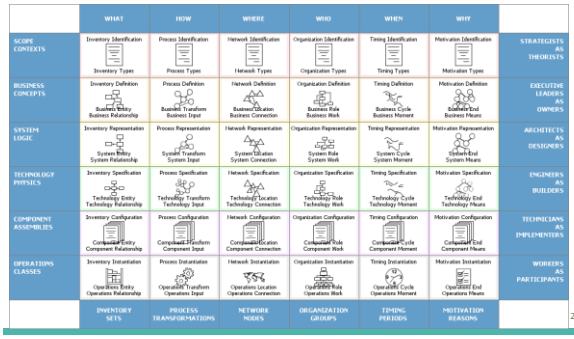
Zachman Framework

- The Zachman Framework is a fundamental structure for Enterprise Architecture which provides a **way of viewing an enterprise and its information systems from different perspectives**, and showing how the components of the enterprise are related.
- The Zachman framework provides a means of classifying an organization's architecture. It is a proactive business tool, which can be used to model an organization's existing functions, elements and processes - and help manage business change.
- The framework draws on Zachman's experience of how change is managed in complex products such as airplanes and buildings.

Structure of Zachman Framework

- Zachman Framework is a two dimensional classification scheme for descriptive representations of an Enterprise that is structured as a matrix containing 36 cells, each of them focusing on one dimension or perspective of the enterprise.
- Rows are often presented as different viewpoints involved in the systems development process, while columns represent different perspectives of the stakeholders involved in the organization.



Columns of Zachman Framework

The columns represent the interrogatives or questions that are asked of the enterprise. These are:

- What (data) - what is the business data, information or objects?
- How (function) - how does the business work, i.e., what are the business' processes?
- Where (network) - where are the businesses operations?
- Who (people) - who are the people that run the business, what are the business units and their hierarchy?
- When (time) - when are the business processes performed, i.e., what are the business schedules and workflows?
- Why (motivation) - why is the solution the one chosen? How was that derived from? What motivates the performance of certain activities?

Rows of Zachman Framework

Each row represents a distinct view of the organisation, from the perspective of different stakeholders. These are ordered in a desired priority sequence. A row is allocated to each of the following stakeholders:

- Planner's View (Scope Contexts) - This view describes the business purpose and strategy, which defines the playing field for the other views. It serves as the context within which the other views will be derived and managed.
- Owner's View (Business Concepts) - This is a description of the organization within which the information system must function. Analyzing this view reveals which parts of the enterprise can be automated.
- Designer's View (System Logic) - This view outlines how the system will satisfy the organization's information needs. The representation is free from solution specific aspects or production specific constraints.

Rows of Zachman Framework Cont...

- Implementer's View (Technology Physics) - This is a representation of how the system will be implemented. It makes specific solutions and technologies apparent and addresses production constraints.
- Sub-Constructor's View (Component Assembles) - These representations illustrate the implementation-specific details of certain system elements: parts that need further clarification before production can begin. This view is less architecturally significant than the others because it is more concerned with a part of the system than with the whole.
- User's View (Operations Classes) - This is a view of the functioning system in its operational environment.

Enterprise Engineering

- Enterprise engineering is a discipline that integrates other types of disciplines in order to efficiently deal with all the endeavors related to an enterprise or any organization.
- An EE is encompasses almost all elements involved in any company, such as finances, management, human resources, and even marketing.
- The purpose of enterprise engineering is to constantly oversee improvements and progress in one or all elements of an enterprise by applying certain techniques and methods.

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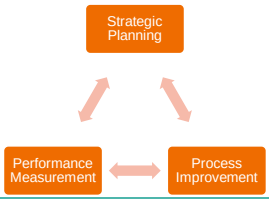
Enterprise Engineering

- In general, the enterprise engineering uses a cyclical process to evaluate and make improvements on the structure of an enterprise.



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1. Strategic Planning

- In strategic planning, all existing information and data about the enterprise are analyzed.
- From all the information, several implications about the enterprise will be formed, including
  - its place in the market,
  - its status quo regarding profits, and
  - the efficiency of the human resources.
- The SWOT analysis of the enterprise is also included in this stage.

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2. Process Improvement

- The second state in the cycle of enterprise engineering is "process improvement" .
- Here, all the gathered information is utilized to further advance the efficiency of the enterprise's system.
- This stage involves a team effort wherein everyone in the enterprise works together to get to the goal.
- In many cases, the enterprise engineer can provide a diagram or systems model that the company can try to follow. Sometimes, this involves a trial-and-error process, trying out different methods until the company finds the one that suits it best.
- Process improvement not only gives importance in short-term goals, but also in long-term achievements as well.

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3. Performance Measurement

- Here, the enterprise evaluates its progress since the first stage of strategic planning.
- This phase of the enterprise engineering makes sure that the list of goals is being realized and that the enterprise experiences improvements steadily.
- Evaluation reports and surveys are usually undertaken to quantify and measure these improvements, which may bring back the enterprise engineering to its first stage.

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Thank You...!

See You in the next Lecture

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So far...

- System Integration
- Enterprise Application Integration (EAI)
- Enterprise service bus (ESB)
- Data Integration
- Enterprise Architecture
- Enterprise Engineering

Today Outline

- Balanced Scorecard and Strategy Maps

What is a Strategy Map?

- A strategy map is a simple graphic that shows a logical, cause-and-effect connection between strategic objectives (shown as ovals on the map).
- It is one of the most powerful elements in the **balanced scorecard methodology**, as it is used to quickly communicate how value is created by the organization.

Why Strategy Map?

Strategy Map can help us to:

- Increase focus on Strategy and Results
- Improve organizational performance by measuring what matters
- Align the work people do on a day-to-day basis with strategy
- Focus on the drivers of future performance
- Improve communication of the organization's vision and strategy
- Prioritize action items in the implementation roadmap in tough economic times

What is a Balanced Scorecard?

- The balanced scorecard (BSC) is a strategic planning and management system. Organizations use BSCs to:
  - Communicate what they are trying to accomplish
  - Align the day-to-day work that everyone is doing with strategy
  - Prioritize projects, products, and services
  - Measure and monitor progress towards strategic targets
- The name "balanced scorecard" comes from the idea of looking at strategic measures in addition to traditional financial measures to get a more "balanced" view of performance.

Balanced Scorecard (BSC)

- Balanced Scorecard proposed a simple design method for choosing the content of the Balanced Scorecard based on answers to four generic questions about the strategy to be pursued by the organization.
- The Balanced Scorecard These four Performance Measure questions:
  - To satisfy stakeholders, what financial objectives must be accomplished?
  - To achieve the financial objectives, what customer need must be met?
  - To satisfy customers, and stakeholders, which internal organizational process are critical?
  - To achieve goals, how must the individuals be enabled?

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Perspectives in Balanced Scorecard

The BSC suggests that we examine an organization from four different perspectives to help develop objectives, measures (KPIs), targets, and initiatives relative to those views.

- Financial (or Stewardship): views an organization's financial performance and the use of financial resources
- Customer/Stakeholder: views organizational performance from the perspective of the customer or key stakeholders the organization is designed to serve
- Internal Process: views the quality and efficiency of an organization's performance related to the product, services, or other key business processes
- Learning & Growth: views human capital, infrastructure, technology, culture, and other capacities that are key to breakthrough performance

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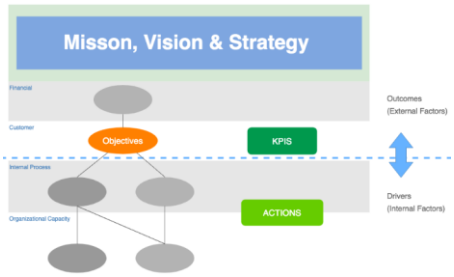

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Balanced Scorecard | Strategy maps | Performance Management | Performance evaluation | kpi

https://www.youtube.com/watch?v=I1xO7_KktSE

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The basic idea of a strategy map on BSC (Steps to follow)

We can develop a strategy map based on the following steps:

- It Is An Underlying Framework Of Horizontal Perspectives Arranged In A Cause And Effect Relationship, Typically Financial, Customer, Process And Learning & Growth
- Objectives Within Those Perspectives. Each Objective As Text Appearing Within A Shape (Usually An Oval Or Rectangle). Relatively Few Objectives (Usually Fewer Than 20)
- Vertical Sets Of Linked Objectives That Span The Perspectives. These Are Called Strategic Themes.
- Clear Cause-And-Effect Relationships Between These Objectives, Across The Perspectives.
- The Strategic Themes Represent Hypotheses About How The Strategy Will Bring About Change To The Outcomes Of The Organization.

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The basic idea of a strategy map (Example 1)

- The main idea of a strategy map is that each strategic objective in the balanced scorecard is represented by a shape, usually **oval**. Very rarely are there more than 20 objectives.
- These objective ovals are then grouped into perspectives like "Financial" or "Learning and Growth." Every organization is different, but most strategy maps have four perspectives, and they're often similar to the ones shown here.

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The basic idea of a strategy map (Example 1)

- Many strategy maps also have arrows between the objectives to show their cause and effect chain.
- By following the arrows' paths, you can see how the objectives in the lower perspectives drive the success of the higher ones.

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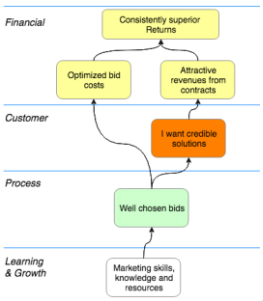
The basic idea of a strategy map (Example 1)

The basic idea of a strategy map (Example 2)



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Combining the Strategy Map and Balanced Scorecard

- A Strategy Map does not contain measures, it contains objectives.
- We can combine the power of both tools by using a strategy map as a part of the Balanced Scorecard.
- Strategy maps provide the means of linking the objectives to the balanced scorecard which provides a roadmap giving direction and linking the performance indicators and initiatives to the strategy of the company.
- Measures within the scorecard framework are aligned to the objectives and targets set.
- An action plan is linked to the objectives and along with an associated budget.

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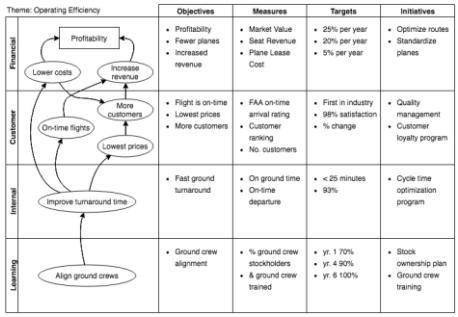

Balanced Scorecard with Strategy Maps

https://www.youtube.com/watch?v=3vjpZO-DP7g

An example of a commercial strategy map: South West Airlines (SWA)

- SWA essentially invented the 'low-cost' business model now used worldwide by many airlines.
- South West began with some drivers about the need to use their expensive planes more effectively, the idea of offering lower fares to encourage passengers to fly with SWA rather than competitors, the requirement to persuade staff to work more flexibly together, etc

An example of a commercial strategy map: South West Airlines (SWA)

Notice that,

- To make money – **finance** – you need to satisfy **customer** needs.
- These needs are met by having strong **internal processes**.
- To achieve the processes requires a **learning and growth** strategy that engages and develops staff, and builds an appropriate culture.
- The **Objectives** show what activity must take place in each perspective to deliver the overall goal of running a profitable airline. The objectives are a way of addressing the drivers.

An example of a commercial strategy map: SWA

Notice that,

- They also follow a vertical logic – with the down path answering '**how?**' and the up path answering '**why?**'

An example of a commercial strategy map: SWA

- Reading the map from the top perspective to the bottom should explain how the strategy works, so:

"How will we succeed in our strategy?"	By meeting our financial objectives.
"How will we meet the financial objectives?"	By delivering to our customers.
"How will we be sure to deliver to our customers?"	By excelling in key internal business processes.
"How can we be sure we are excellent in those processes?"	By learning and improving.

You normally begin with this 'how' logic when creating a map.

An example of a commercial strategy map: SWA

- If you read the map from the bottom perspective to the top, it should explain why you have chosen the objectives in each perspective, as shown below:

"Why are we learning and growing in this way?	In order to excel in our internal processes.
Why are we focusing on those particular processes?	To deliver high-quality service to our customers.
"Why do we need to deliver this service to our customers?"	To ensure we achieve our financial objectives.
"Why do we need to achieve the financial objectives?"	To succeed in our strategy and move towards our vision.

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An example of a commercial strategy map: SWA

- The objectives – in the 'bubbles' – link the map and the scorecard so appear in both. There are four main components in the scorecard which answer different questions:

Objectives	Indicators	Targets	Initiatives
What do we need to achieve?	How will we measure success?	How much do we need to improve?	What do we need to do to get there?

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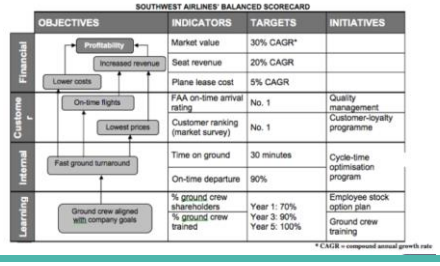
An example of a commercial strategy map: SWA



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- System Integration
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- Enterprise service bus (ESB)
- Data Integration
- Enterprise Architecture
- Enterprise Engineering
- Balanced Scorecard and Strategy Maps

Today Outline

- Strategy Analysis in Business Planning

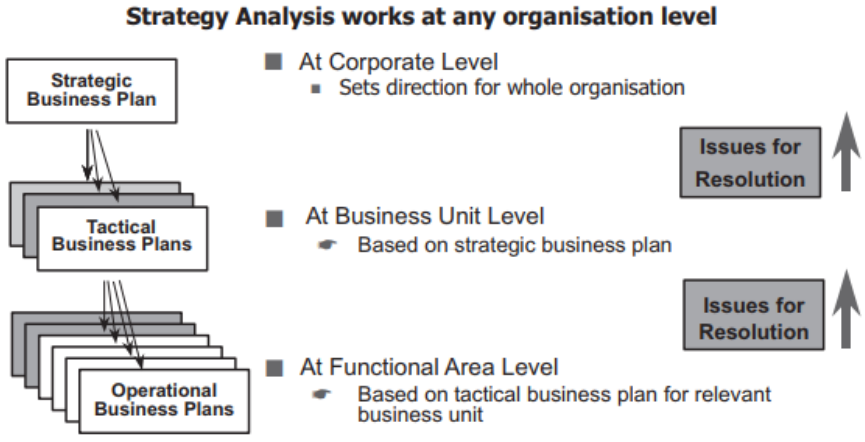
Strategy Analysis in Business Planning

At the corporate level, strategic business plans provide guidance for the organization, which comprises many tactical business units and operational functional areas:

- Tactical business plans are used to manage each tactical business unit.
- Operational business plans are used to manage operational functional areas, which carry out many business functions.

Strategy analysis can be used to define these plans so that the needs of managers at each level are clearly understood and expressed.

Strategy Work at Organizational Level



The hierarchical nature of business plans.

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Strategy Work at Organizational Level

- Plans documented at one level provide input to define plans at the next lower level.
- At this level, problems or opportunities may be identified that need clarification or resolution from the higher level managers, called issues.
- By examining these issues, can identify strategies that address problems or opportunities. There may be many alternative strategies.
- The proposed strategies are presented along with the issues to upper management for their direction or resolution.

For example, an issue associated with a business function may require to use of new technologies. This feedback obtains management agreement for directions to be taken by the organization and the resources needed for implementation.

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Strategy Analysis Example

- The XYZ Corporation. This is documented as a mission statement and associated critical success factors (CSFs)

Example Mission Statement and CSFs

XYZ Mission and Purpose	Develop, deliver, and support products and services that satisfy the needs of customers in markets where we can achieve a return on investment of at least 20% within 2 years of market entry.
XYZ Critical Success Factors	Market analysis
	Market share
	Innovation
	Customer satisfaction
	Product quality
	Product development
	Staff productivity
	Asset growth
	Profitability

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The Quality of Planning Statements

- A mission statement is also called a "mission and purpose." To provide clear guidance it should answer Drucker's questions:
  - What is our business?
  - Who is the customer?
  - Where is the customer located?
  - What products or services does the customer want from us?
  - What does the customer consider as value?
  - What is the customer prepared to "pay"?
  - What will the business be, in the future?
  - What should the business be, in the future?
  - What is the key strategic thrust?

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The Quality of Planning Statements

- Many organizations focus on the products and services that they deliver to their customers, rather than first finding out the needs of those customers.
- By understanding those needs, a better appreciation of existing (or new) products and services that satisfy those needs can be gained.
- By knowing what customers consider as value, we can better decide whether price is important, or quality, or service.
- When these questions are used in conjunction with an enterprise architecture project, each manager becomes an internal customer.
- Their needs must be understood, so that information "products and services" can be designed and delivered to satisfy those needs.

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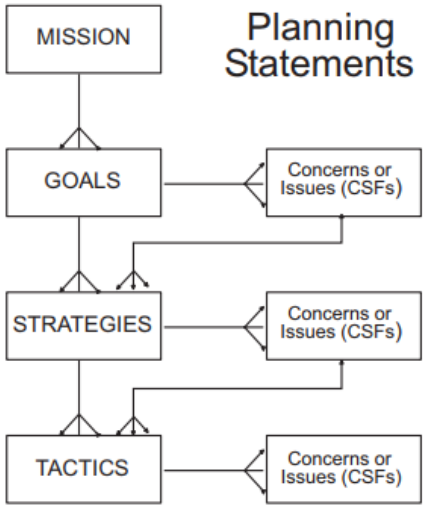
Relationship between planning statements



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The Steps of Strategy Analysis

- Step 1—Understand the mission and purpose.
- Step 2—Identify the major business areas.
- Step 3—Determine what has to be achieved.
- Step 4—Identify issues representing opportunities or problems.
- Step 5—Determine what will achieve or resolve the issues.
- Step 6—Define Key Performance Indicators (KPIs).
- Step 7—Identify the current functions that exist.
- Step 8—Allocate functional responsibility to implement strategies.
- Step 9—Define job responsibilities for each function.

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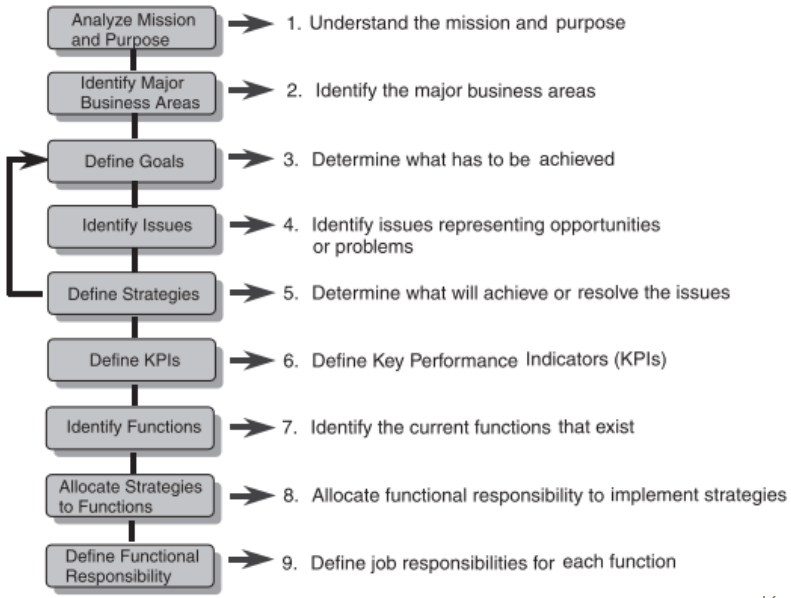
The Steps of Strategy Analysis



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Step 1—Understand the Mission and Purpose

- To understand the mission and purpose, we must be aware of the environment in which the organization operates and how the environment will change in the future. **Geography, industry, markets, legislation, the economy, and technology all affect the environment.**
- They also affect the public- and private-sector organizations that operate in that environment as **partners, customers, suppliers, and competitors**.
- The vision statement for an enterprise defines where the organization is going and how it will get there.
- It is the organizing force behind every corporate decision.
- Core values are factors that are important drivers of decisions or activities and these can be incorporated in the mission statement.

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Step 1—Understand the Mission and Purpose Cont…

This step should clearly express:

- What the business is doing now;
- What is happening in the environment;
- What the business should be doing in the future;
- It should broadly indicate markets, customers, products, and services

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Step 1—Understand the Mission and Purpose Cont…

Examples of Typical Mission Statements

A Corporate Mission for a Private Sector Company	We are the leading provider of electronic and fiber-optic connections and accessories. We bring the benefits of modern products and their technologies from the world's leading suppliers. We will create and satisfy the needs of professional users to achieve physical connections for communications or control purposes. We are skilled and dedicated people working in partnership with our customers to satisfy their needs and their expectations for our long-term mutual benefit. Our major focus is to provide exceptional service and value so that we will be their first choice. We will increase the value of our company, and improve the economic well-being and quality of life of our customers, suppliers, staff, and other stakeholders.
A Document Management Unit Mission for Local Government	To provide any individual or organization who is located predominantly within our local government area, or anywhere in the country or overseas, document-based information: about the activities for which our authority has responsibility, either as prescribed by legislation or on an elective basis, or that enhances decision making by elected members and/or our employees. Our primary focus is the efficient and effective provision of timely, accurate, and complete document-based information consistent with the recipient's security classification and the document-based information's release status.

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Step 2—Identify the Major Business Areas

- From the understanding of the mission gained from Step 1, we will now analyze its focus further to identify major business areas that should be involved.

Example: XYZ strategic planning statements.

- Start by examining the mission and purpose statement, looking for explicit and implicit nouns in the statement. There will typically be 6 to 10 major nouns. These nouns should enable us to determine what parts of the business are involved.

Develop, deliver, and support ***products*** and ***services*** which satisfy the ***needs*** of ***customers*** in ***markets*** where we can achieve a ***return on investment*** of at least 20% within two years of market entry.

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Step 2—Identify the Major Business Areas Cont...

XYZ Corporation's Major Business Areas

Noun	*Involved Business Area*
Product (or service)	Production/service delivery
Customer	Sales and distribution
Need	Product development, R&D
Market	Marketing
Investment (or performance)	Finance

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Step 3—Determine What Has to Be Achieved

- Step 3 focuses on identifying and refining goals.
- This depends on the policies set by management, which define "the rules of the game." *Policies are qualitative guidelines that define boundaries of responsibility in the organization*; they must be known if valid goals are to be defined based on those policies.
- They are the internal rules (as company policies) or external rules (as legislation, laws, and so forth) that the business follows to achieve its goals.
- Goals are typically layered hierarchically and are made up of principal goals and contributing key performance indicators (KPIs) or CSFs.

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Step 3—Determine What Has to Be Achieved Cont…

- Goals and objectives are measurable targets. To be measured, they must of course be quantitative.
- They have three characteristics—measure, level, and time:
  - The measure defines what performance indicator will be used for measurement.
  - The level indicates what result value must be achieved.
  - The time specifies when that result should be achieved.
- If only two of the three characteristics are defined, goals and objectives are meaningless; all three must be known for quantitative targets

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Step 4—Identify Issues Representing Opportunities or Problems

- When we know problems or threats that are barriers to, the achievement of goals or when we are aware of the opportunities or technologies that enhance or facilitate their achievement, we can then determine the most relevant strategies to follow for those goals.
- They should ask the following questions for each point discussed in that step:
  - What should we do to take advantage of the opportunities?
  - What technologies are available to assist us?
  - What strengths can we use to help us?
  - What has to be done to resolve the problems?
  - What should we do to protect ourselves from the threats?
  - What should we do to correct our weaknesses?

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Step 5—Determine What Will Achieve or Resolve the Issues

- With this knowledge of issues (strengths, weaknesses, opportunities, and threats) we have gathered in step 4,
  - We know what has to be corrected or protected—this is reactive.
  - We know where we should focus our strengths to achieve opportunities or take advantage of technologies—this is proactive.
- And our understanding of comparative advantage helps us to use our strengths as weapons for competitive advantage to resolve the issues, while being aware of our weaknesses.
- We will use this new understanding to identify relevant strategies in this step

Step 5—Determine What Will Achieve or Resolve the Issues Cont…

- Example: The XYZ managers defined the following strategies for asset disposal and market exit.
- Asset Disposal Strategy: Identify assets that cannot provide a return within 2 years consistent with the mission ROI, and dispose of them at the best possible price.
- Market Exit Strategy: Identify markets that are unprofitable and in decline, and exit those markets at the lowest possible cost.

Step 5—Determine What Will Achieve or Resolve the Issues Cont...

Information from market surveys will permit analysis of existing and potential markets. Decisions can be made of products to satisfy those needs, product ranges, and pricing for each market. After discussion, the managers suggested the following strategies:

- Market Survey Strategy: Ensure regular surveys are undertaken to determine market size and our market share, and to understand the needs and the expectation characteristics of our chosen and potential market segments.
- Product Range Strategy: Establish and maintain a product range definition that recognizes the strength of our products and technology, and the capabilities for bundling products into innovative packages.
- Product Pricing Strategy: Establish and maintain a pricing policy that will sustain long-term achievement of market share targets by market segment, which is consistent with achieving profitability targets.

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Step 6—Define Key Performance Indicators

- We saw that performance measures are quantitative: while goals and objectives as quantitative targets with long-term goals and short-term objectives.
- We use KPIs to express the level and time. Changes in either or both of these only need to reference the relevant KPI. KPIs cannot only be used to define goal achievement, but also can monitor the effectiveness of strategies.

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Step 6—Define Key Performance Indicators

For example, the product pricing strategy was defined earlier as "Establish and maintain a pricing policy that will sustain long-term achievement of market share targets by market segment, which is consistent with achieving profitability targets."

- We can set market share targets in particular market segments by reducing sales price. But customers must be aware of these prices.
- Market share depends not only on pricing, but also on advertising.
- Advertising costs money; a manager must decide what proportion of funding should be allocated to advertising.

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Step 7—Identify the Current Functions That Exist

- The plans are pointless unless their implementation is well managed. Specific managers must be given this responsibility.
- We first must be aware of the current functions. These functions are typically intertwined with ownership (and empires).
- A function is defined as a group of related activities and can be executed across multiple business units.
- Some business activities can also be shared across several functions.
- We need to identify or define function responsibilities independently of how the organization is currently structured.

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Step 7—Identify the Current Functions That Exist

Example: The current functions of XYZ:

- Corporate;
- Finance;
- Forecasting;
- Marketing;
- Sales;
- Research and development;
- Production;
- Purchasing;
- Personnel.

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Step 8—Allocate Functional Responsibility to Implement Strategies

- This step helps us to establish action plans for strategy implementation. It allocates responsibility for achieving goals and KPIs.
- A matrix is developed, with each strategy on a separate row and each function listed as a column heading.

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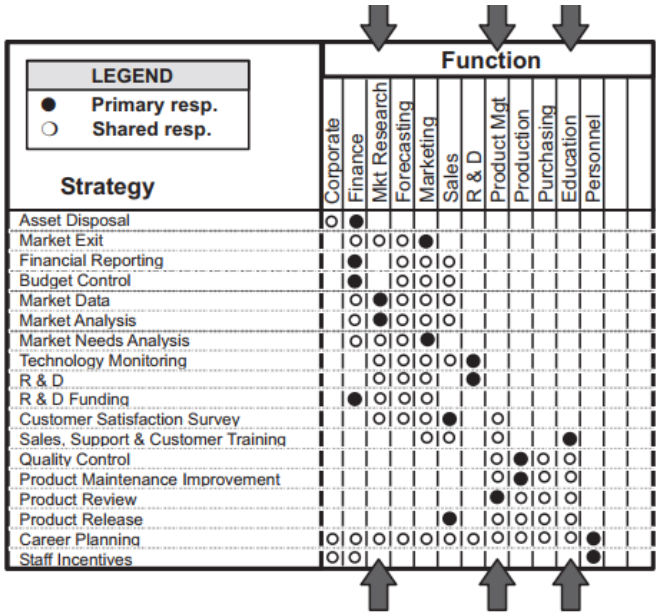
Step 8—Allocate Functional Responsibility to Implement Strategies Cont...



Business function–strategy matrix. Arrows identify new functions not currently supported by XYZ Corporation.

Step 9—Define Job Role Responsibilities for Each Function

- This is used to document the responsibilities for each manager appointed to a job role to manage these functions.

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Step 9—Define Job Role Responsibilities for Each Function

Position:	Chief financial officer
Reports to:	President and CEO
Asset Growth	Monitor performance of all aspects of our business so that each activity has a favorable effect, directly or indirectly, on our mission ROI.
Issues	Many investments in declining markets High market entry cost into marginal markets High debt levels for assets in sunset markets
Asset Disposal Strategy	Identify assets that cannot provide a return within 2 years consistent with the mission ROI, and dispose of them at the best possible price.
Asset Disposal Objective	Following Board approval, dispose of all nonperforming assets within 12 months.
Profitability	Monitor financial performance of all activities to ensure that profit and cash flow projections are achieved according to, or ahead of, plan.
Issues	Delayed financial reporting High interest costs Poor cash flow management
Strengths	Profitable Cash rich
Weaknesses	Poor financial reporting Poor budget control
Financial Reporting Strategy	Implement flexible financial reporting systems able to be introduced at any organizational level, and which can provide profit and loss statements for any defined reporting frequency, with associated balance sheet statements.
Financial Reporting Objective	Implement financial reporting systems within 6 months that provide profit and loss, balance sheet, and cash flow reporting within 1 day of the close of any defined financial period.
Budget Control Strategy	Establish and maintain strong budgetary controls for all expenditures, linked directly to revenue achievement. All financial statements must clearly show actual revenue and expenditure against budget, and indicate percentage change from the previous reporting level.
Budget Control Objective	Implement budget control systems directly linked to financial reports according to the budget control strategy, within 6 months.

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Thank You...!

See You in the next Lecture

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System Integration and Architecture

IS 22222

By KG Lohara Chathumini

So far...

- System Integration
- Enterprise Application Integration (EAI)
- Enterprise service bus (ESB)
- Data Integration
- Enterprise Architecture
- Enterprise Engineering
- Balanced Scorecard and Strategy Maps
- Strategy Analysis in Business Planning

Today Outline

- Governance Analysis Using Enterprise Architecture

Sarbanes-Oxley

- The Sarbanes-Oxley Act of 2002 (also called Sar-Ox or SOX) was enforced by Securities and Exchange Commission (SEC)of USA.
- Which assigns responsibility to senior management of public and nonpublic organizations in the United States.
- It shows how internal controls can be established by senior management using a governance analysis framework (GAF).
- This is used to document the relationships within an enterprise that support financial and other reporting requirements.
- Why, to Improve Auditing, financial Regulations, and better business practices at publically traded companies.

Why Sarbanes-Oxley

- This SOX act was enforced to protect shareholders, employees and public from fraudulent financial practices and error in accounting audits.
- This act was made the responsibilities to
  - CEOs
  - Auditors
  - Corporate Offices and
  - Accountants

5

Focus Areas of Sarbanes-Oxley

- New Audit Rules
- Enhanced Corporate Responsibilities
- Protection to Shareholders
- Criminal Punishment

6

Sarbanes-Oxley – Section 404

- Key provision introduced in SOX Act, which deals with management assessment of internal control.
- This section was,
  - Annual Financial Report must include an Internal Control Report.
  - Management should responsible for an adequate internal control structure.
  - Registered external auditors must attest to the accuracy of internal controls asserted by management of company.
  - If any violation found by SEC, the management become and actions can be taken accordingly.

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Governance Analysis Framework (GAF) for SOX

- The Zachman framework provides a way to cut through the complexity of today's enterprises and document the relationships that exist between each column for each row. These relationships are illustrated as matrices.
- They address governance of the project management business unit of a typical enterprise.
- These matrices are based on a high-level strategic model of the enterprise.

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Different types of matrices

- Data matrices: data to locations, data to people or business units, data to events, data to business plans
- Process matrices: processes to data, processes to locations, processes to business units, processes to events, processes to business plans
- Location matrices: locations to data, locations to processes, locations to people or business units , locations to events, locations to business plans
- People or business unit matrices: people or business units to data, people or business units to processes, people or business units to locations, people or business units to events, people or business units to business plans

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Different types of matrices

- Business event matrices: business events to data, events to processes, events to locations, events to people or business units, business events to business plans
- Business plan matrices: business plans to data, business plans to processes , business plans to locations, business plans to people or business units , business plans to business events.

When senior managers use governance analysis framework matrices as described here, they are able to demonstrate that they have a powerful management.

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Developing a Governance Analysis Framework

- All the matrices were manual.
- Manually determining the relevant row and column titles for each of these matrices is extremely difficult
- To keep them manually updated continually as the enterprise changes overtime is even more difficult

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How strategy model works?

- A strategic model provides a “picture of the business Just like a city map
- The strategic model also enables key business activities and processes to be identified and named.
- This report includes an executive summary and key recommendations, with a description of the methods used to maintain the delivered tailored GAF matrices over time.

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Components of the defined strategic model

- Business plan: Documents the strategic business planning statements that were used as the catalyst for the facilitated strategic modeling session. These address the why questions for SOX compliance.
- Strategic model: Documents the enterprise strategic model and high-level tactical models for key business units. These models are represented as data maps that show a “picture of the business. ”
- Strategic data: Documents the underlying data represented in the enterprise strategic model and high-level tactical models for key business units. This answers the what questions for SOX compliance.

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Components of the defined strategic model Cont…

- Business activities: Identifies key business activities that are reflected in the strategic model, as determined during and after the facilitated session. This answers the how questions for SOX compliance
- Business activity clusters: Documents automatically derived project plans that identify the data required by each activity. This identifies activities that can be reused throughout the enterprise— with large potential cost savings from this reuse. This also answers the how questions for SOX compliance.
- Business locations: Lists key locations (where relevant) that were identified during and after the facilitated session. This answers where questions for SOX.

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Components of the defined strategic model Cont...

- Business units: Lists key business units identified during and after the facilitated session based on the high-level tactical models from the strategic model. This answers the who questions for SOX compliance.
- Business events: Lists key business events (where relevant) identified during and after the facilitated session. This answers the when questions for SOX compliance

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Step-by-Step Approach for Governance Analysis

- Step 1—Establish plan for strategic modeling project
- Step 2—Capture initial business planning input as catalyst
- Step 3—Conduct strategic modeling facilitated session.
- Step 4—Carry out strategic model analysis.
- Step 5—Derive governance analysis framework documentation.
- Step 6—Review matrices and governance implementation plan.
- Step 7—Manage progressive completion of GAF matrices
- Step 8—Manage implementation of governance analysis systems.

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Thank You...!

See You in the next Lecture

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