

INFS 328

Systems Analysis and Design

Session 7 – System Design – Part 2

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Session Overview

This session is a continuation of the systems design phase. With this session, you will learn about systems architecture and systems design specification, which are all part of the physical design of an information system that will meet the specifications described in the system requirements document.

Session Outline

The key topics to be covered in the session are as follows:

- System Architecture
- System Design Specification



Topic One

SYSTEM ARCHITECTURE



System Architecture

This section of the systems design phase, translates the logical design of an information system into a physical structure that includes hardware, software, network support, processing methods and Security. The end product of the systems design phase is the system design specification document. This document if approved by the owners of the information system allows you to move to the next phase called System Implementation.

The section will enable you to provide a checklist of issues to consider when selecting a system architecture; understand the environment of a new information system; describe the system design specification document and explain the contents of each section.

System Architecture

SYSTEM ARCHITECTURE CHECK LIST

In a similar manner to the way an architect design a plan using the owner's requirements, a system analyst must approach system architecture with an overall checklist. The following specific issues affect the architecture choice:

- Enterprise resource planning (ERP)
- Initial and total cost of ownership (TCO)
- Scalability
- Web integration
- Legacy system interface requirements
- Processing Options
- Security issues

System Architecture

ENTERPRISE RESOURCE PLANNING

This establishes an enterprise-wide strategy for IT resources and specific standards for data, processing, network and user interface design. ERP describes a specific hardware and software environment, also called platform that ensures connectivity and easy integration of future systems including in-house software and commercial packages. Many companies use ERP software. They are and extending ERP systems to suppliers and customers in a process called Supply Chain Management. ERP can help companies achieve faster response, better customer service and lower operating cost.

System Architecture

INITIAL AND TOTAL COST OF OWNERSHIP (TCO)

During the final design stage, you make decisions that will have a major impact on the initial costs and TCO for the new system. At this point, you should review all previous cost estimates and ask the following questions:

- If in-house development was selected as the best alternative initially is it still the best choice? Is the necessary technical expertise available, and does the original cost estimate appear realistic?
- If a specific package was chosen initially, is it still the best choice? Are newer versions or competitive products available? Have any changes occurred in pricing or support?
- Have any new types of outsourcing become available?

System Architecture

INITIAL AND TOTAL COST OF OWNERSHIP (TCO)

- Have any economic, governmental, or regulatory events occurred that could affect the proposed project?
- Have any significant technical developments occurred that could affect the proposed project?
- Have any new trend occurred in the market place? Are new products or technologies on the verge of being introduced?
- Have you updated the original TCO estimate? If so, are there any significant difference?

The answers to these questions might affect the initial cost and TCO for the proposed system. You should reanalyze system requirements and alternatives now, before proceeding to design the system architecture.

System Architecture

Scalability

Scalability, also called extensibility refers to a system's ability to expand, change or downsize easily to meet the changing needs of a business enterprise. A scalable system is necessary to support a dynamic, growing business. For example, a scalable network could handle anywhere from a few dozen nodes to thousands of nodes, a scalable DBMS could support the acquisition of a new sales division. When investing large amount of money in a project, management is especially concerned about scalability issues that could affect the system's life expectancy.

System Architecture

WEB INTEGRATION

You should know if your new system will be Web-centric and should realize that a web-centric architecture follows that internet design protocols and extranets.

System Architecture

LEGACY SYSTEM INTERFACE REQUIREMENT

The new system might have to interface with one or more legacy systems, which are older systems that typically run on mainframe computers. For example, a new marketing information system might need to report sales data to a mainframe based accounting system and obtain product cost data from a legacy manufacturing system.

Interfacing a new system with a legacy system involves analysis of data formats and compatibility. To select the best architecture, the analyst must know if the new application eventually will replace the legacy system.

System Architecture

PROCESSING OPTIONS

Designers must consider how the system will process data online or in batches. For example, a high-capacity transaction processing system such as an order entry system, requires more network, processing and data storage resources than a monthly billing system that handles data in batches

System Architecture

SECURITY ISSUES

Security is a concern at each stage of system development. As the logical and physical design is translated into specific hardware and software the systems analyst must consider security issues that relate to system design specifications and determine how the company will address them.

Questions

Individual Assignment:

What is enterprise resource planning (ERP) and why is it important? What is supply chain management?

Forum Question

Define the term system architecture. Define the term scalability, and explain why it is important to consider scalability in system design.

Topic Two

SYSTEM DESIGN SPECIFICATION



System Design Specification

Introduction

This section is the final activities of the system design phase which also include, obtaining user approval and delivering a presentation to management. It explains what system design specification is about in the system design process.

System Design Specification

The Structure of System Design Specification

The system design specification is also called the technical design specification. It is a document that presents the complete design for the new information system, along with detailed costs, staffing and scheduling for the implementation phase.

It is the baseline against which the operational system will be measured. Unlike the system requirements documents, which is written for **users** to understand, the system design specification is oriented toward the **programmers** who will use it to create the necessary programs.

System Design Specification

The structure of the system design specification is made up of the following:

- **Executive summary**

The specification starts with an executive summary which provides a brief overview of the project for company managers and executives. It outlines the development efforts to date, provides a current status report, summarises current project costs and costs for the remaining phase. It also has reviews of the overall benefits of the new system, presents the system development phase schedule and highlights any issues that management will need to address.

System Design Specification

- **System components** – This section contains the complete design for the new system, including the user interface, outputs inputs, files, database, and network specifications. Source documents report and screen layouts. Data Flow Diagrams (DFD's) and all other relevant documentation should be included. It also must include requirements for support processing such as back up and recovery, start up processing and file retention. Software information is also included.
- **System environment** – This section describes the constraints or conditions affecting the system, including any requirements that involve operations, hardware, systems software or security

System Design Specification

- **Implementation requirements** – they specify start up processing, initial data entry or acquisition, user training requirements and software test plans.
- **Time and cost estimates** – This section provides detailed schedules, cost estimates and staffing requirements for the systems development phase and revised projections for the remainder of the system development life cycle. It also looks at total costs-to-date for the project and compares those costs with earlier estimates.
- **Appendices** – Supplemental material can be included in appendices at the end of the system design specification. Documents from the first three phases that may provide a helpful reference for readers can be included.

Questions

Individual Assignment:

1. Describe in detail a system design specification.
2. Describe the major activities in the design phase of a systems development project.
3. Using any database software such as visual basic design the output for a payroll system on your computer.

Forum Question

Discuss the difference between system requirement and system specification

References

- Checkland, P. (1999). *System Thinking, System Practice*. Chiches: John Wiley.
- O'Brien, J. A. (2003). *Introduction to Information Systems: Essentials for E-Business Enterprise*. Boston: Irwin
- O'Leary, I. and O'leary, T. I. (2004). *Computing Today*. Boston: Mc Craw-Hill
- Rowley, J. (1990). *The Basics of Systems Analysis and Design for Information Managers*. Ludin: Clive Bingley
- Whitten, J. et al (2000). *Systems Analysis and Design Methods*. 6th ed., Boston: Mc Craw-Hill

