

System Analysis & Design

CSCI 2783

Analysis Phase

- Project Selection (Already done)
- Creating a Plan
- Staffing the Project (Already done.)
- Coordinating project Activities

Analysis Phase

The Analysis Phase involves discussing how organizations evaluate and select projects to undertake from the many available projects. Once a project has been selected, the project manager plans the project. Project management involves selecting a project methodology, creating the project work plan, identifying project staffing requirements, and preparing to manage and control the project. These steps produce important project management deliverables, including the work plan, staffing plan, standards list, project charter, and risk assessment.

Analysis Phase

The Analysis Phase is so named because the term analysis refers to breaking a whole into its parts with the intent of understanding the parts' nature, function, and interrelationships. In the context of the SDLC, the outputs of the planning phase (the system request, feasibility study, and project plan), outline the business goals for the new system, define the project's scope, assess project feasibility, and provide the initial work plan. These planning phase deliverables are the key inputs into the analysis phase. In the analysis phase, the systems analyst works extensively with the business users of the new system to understand their needs from the new system.

Analysis Phase

The basic process of analysis involves three steps:

- Understand the existing situation (the as-is system).
- Identify improvements.
- Define requirements for the new system (the to-be system).

Analysis Phase

Sometimes the first step (i.e., understanding the as-is system) is skipped or done in a limited manner. This happens when no current system exists, if the existing system and processes are irrelevant to the future system, or if the project team is using a RAD or agile development methodology in which the as-is system is not emphasized. Traditional methods such as waterfall and parallel development (see Chapter 2) typically allot significant time to understanding the as-is system and identifying improvements before moving to capture requirements for the to-be system.

Analysis Phase

To move the users “from here to there,” an analyst needs strong critical thinking skills. Critical thinking is the ability to recognize strengths and weaknesses and recast an idea in an improved form. These skills are needed in order for the analyst to understand issues and develop new and improved business processes that are supported by information system technologies. These skills are essential in examining the results of requirements discovery and translating those requirements into a concept for the new system.

Analysis Phase

The final deliverable of the analysis phase is the system proposal, which compiles the detailed requirements definition statement, use cases, process models, and data model together with a revised feasibility analysis and work plan. At the conclusion of the analysis phase, the system proposal is presented to the approval committee, usually in the form of a system walk-through. The goal of the walk-through is to explain the system in moderate detail so that the users, managers, and key decision makers clearly understand it, can identify any needed modifications, and are able to make a decision about whether the project should continue.

Analysis Phase

Before moving into the design phase, the project should be reviewed to ensure that it continues to contribute business value to the organization. If approved, the system proposal components (requirements definition, use cases, process models, and data model) are used as inputs to the steps in the design phase, which further refine them and define in much more detail how the system will be built.

Analysis Phase

The line between the analysis and design phases is very blurry, because the deliverables created in the analysis phase are really the first step in the design of the new system. Many of the major design decisions for the new system are found in the analysis deliverables. In fact, a better name for the analysis phase would really be “analysis and initial design,” but because this name is rather long and because most organizations simply call this phase “analysis.”

Analysis Phase

Nonetheless, it is important to remember that the deliverables from the analysis phase are really the first step in the design of the new system. In many ways, determining requirements is the single most critical aspect of the entire SDLC.

Although many factors contribute to the failure of systems development projects, failing to determine the correct requirements is a primary cause.

What is Requirements Analysis?

Requirements Analysis is the process of defining the expectations of the users for an application that is to be built or modified. It involves all the tasks that are conducted to identify the needs of different stakeholders. Therefore, requirements analysis means to analyze, document, validate and manage software or system requirements.

High-quality requirements are documented, actionable, measurable, testable, traceable, helps to identify business opportunities, and are defined to a facilitate system design.

Requirements Analysis Process

The software requirements analysis process involves the following steps/phases:

- Eliciting requirements
- Analyzing requirements
- Requirements modeling
- Review and retrospective

Eliciting Requirements

The process of gathering requirements by communicating with the customers is known as eliciting requirements.

Analyzing Requirements

This step helps to determine the quality of the requirements. It involves identifying whether the requirements are unclear, incomplete, ambiguous, and contradictory. These issues resolved before moving to the next step.

Requirements Modeling

In Requirements modeling, the requirements are usually documented in different formats such as use cases, user stories, natural-language documents, or process specification.

Review and Retrospective

This step is conducted to reflect on the previous iterations of requirements gathering in a bid to make improvements in the process going forward.

Analysis Phase Checklist

- Apply requirements analysis techniques (business process automation, business process improvement, or business process reengineering).
- Use requirements gathering techniques (interview, JAD session, questionnaire, document analysis, or observation).
- Develop requirements definition.

Business process modeling notation (BPMN)

This technique is similar to creating process flowcharts, although BPMN has its own symbols and elements.

Business process modeling and notation is used to create graphs for the business process. These graphs simplify understanding the business process. BPMN is widely popular as a process improvement methodology.

UML (Unified Modeling Language)

UML consists of an integrated set of diagrams that are created to specify, visualize, construct and document the artifacts of a software system. UML is a useful technique while creating object-oriented software and working with the software development process. In UML, graphical notations are used to represent the design of a software project. UML also help in validating the architectural design of the software.

Flowchart technique

A flowchart depicts the sequential flow and control logic of a set of activities that are related. Flowcharts are in different formats such as linear, cross-functional, and top-down. The flowchart can represent system interactions, data flows, etc. Flow charts are easy to understand and can be used by both the technical and non-technical team members. Flowchart technique helps in showcasing the critical attributes of a process.

Data Flow Diagram

This technique is used to visually represent systems and processes that are complex and difficult to describe in text. Data flow diagrams represent the flow of information through a process or a system. It also includes the data inputs and outputs, data stores, and the various subprocess through which the data moves. DFD describes various entities and their relationships with the help of standardized notations and symbols. By visualizing all the elements of the system, it is easier to identify any shortcomings. These shortcomings are then eliminated in a bid to create a robust solution.

Role Activity Diagrams (RAD)

Role-activity diagram (RAD) is a role-oriented process model that represents role-activity diagrams. Role activity diagrams are a high-level view that captures the dynamics and role structure of an organization. Roles are used to group together activities into units of responsibilities. Activities are the basic parts of a role. An activity may be either carried out in isolation or it may require coordination with other activities within the role.

Gantt Charts

Gantt charts used in project planning as they provide a visual representation of tasks that are scheduled along with the timelines. The Gantt charts help to know what is scheduled to be completed by which date. The start and end dates of all the tasks in the project can be seen in a single view.

IDEF (Integrated Definition for Function Modeling)

Integrated definition for function modeling (IDEFM) technique represents the functions of a process and their relationships to child and parent systems with the help of a box. It provides a blueprint to gain an understanding of an organization's system.

Gap Analysis

Gap analysis is a technique which helps to analyze the gaps in performance of a software application to determine whether the business requirements are met or not. It also involves the steps that are to be taken to ensure that all the business requirements are met successfully. Gap denotes the difference between the present state and the target state. Gap analysis is also known as need analysis, need assessment or need-gap analysis.

Summary

For the success of a project, it is utmost important to analyze project requirements when they are gathered as well as throughout the lifecycle of the project. Software Requirements analysis helps to keep the requirements in line with the need of the business. A good project requirements analysis process will render a software application that caters to the objectives of the business set forth.