

System Development Life Cycle

Pavel Jirava

Ústav systémového inženýrství a informatiky, FES, Univerzita Pardubice

Abstract

Following paper is focused on the System Development Life Cycle (SDLC). The terms life cycle and SDLC are defined at the beginning of this paper. Particular phases of SDLC are analyzed in the next part of this paper. Author divided SDLC into six sequential phases. These phases are Identifying problems and planning, Analyzing system needs, Designing the system, Developing and documenting software, Testing the system, Implementing and maintenance.

Keywords

Life cycle, system development life cycle, computer information system, data flow diagram.

What is SDLC ?

There are many definitions for well-known term Life Cycle. They diverge according to the branch. Life cycle is description of the distinct phases through which each product passes during its product life. This includes phases such as requirements definition, concept design, production, operation, maintenance, etc. [1]

The period of time from when the idea for a product or service is conceived until the time it is no longer available for use. This includes phases such as a requirements phase, a development phase, an installation phase, an operation phase, and a retirement phase. [2]

A life cycle is a plan, composed of several phases, aimed at maximizing the efficient development of a quality, usable product. A life cycle is a set of procedures, some required and others optional, which serve as a template for generating an individual design process. The plan is not meant to be a strict step by step process, but rather a flexible process insuring that users, designers, and management are directly involved in the development of the final product. In general, a life cycle requires the project team to plan the development process, obtain training, generate the deliverables, and obtain timely product team manager approval for continued development. The typical life cycle is composed of five phases: Investigation, User Requirements, Analysis, Design, and Implementation & Release. Each phase is defined by activities, deliverables, and checkpoints.

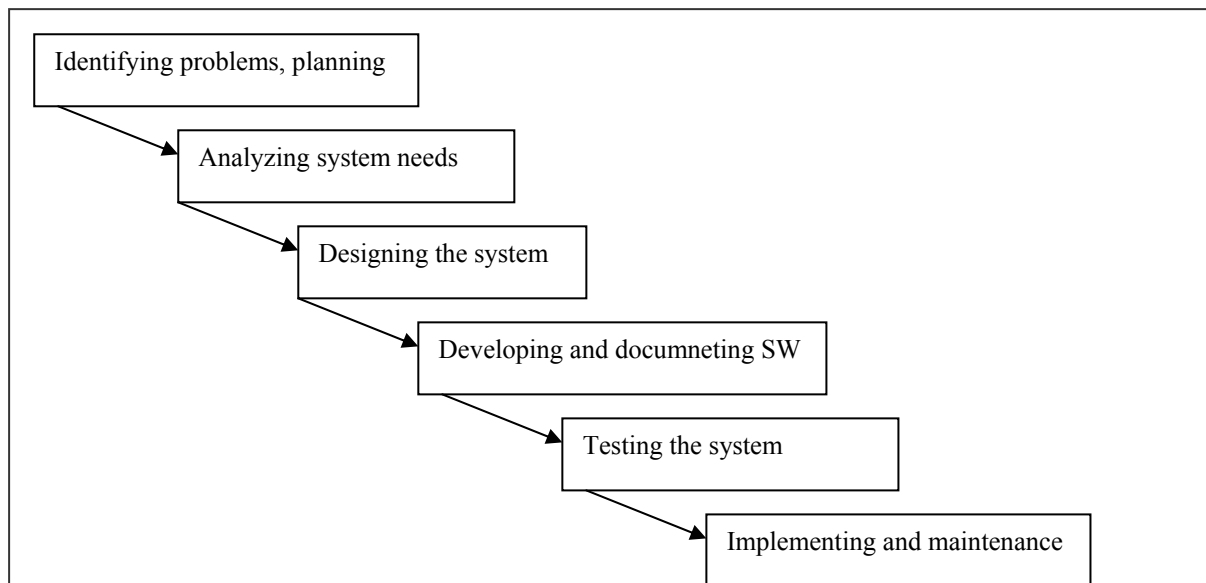


Figure 1 – SDLC

A little different meaning has term System development life cycle. It is usually seen as an organized, structured, methodology for developing, implementing, and installing a new or revised Computer Information System (CIS). Standard phases include investigation, analysis and general design, detailed design and implementation, installation, and review. The SDLC is a phased approach to analysis and design that holds that systems are best developed through the use of a specific cycle of analyst and user activities. Specialist disagree on exactly how many phases there are in SDLC. Every system development organization or textbook author uses slightly different life cycle model, with anywhere from three to almost twenty phases [3] [4]. I came out from works of this authors in the course of creating my model of SDLC. I employed my own skills with implementing new information systems too. I have divided live cycle into six stages which can be found in Figure1. This stages are not isolated – they together create entity. Some stages can occur simultaneously or may be repeated.

So what SDLC is? It is the process we would follow to build a information system. Basically it is the process companies go through to develop new information system. System development methodologies provide a framework for successful development of IS. Many information systems consulting companies develop their own methodologies. They use these proprietary methodologies as a means of differentiating themselves from the competition.

Identifying problems, planning

This is the first and very important phase of system development live cycle. This phase is critical to the success of the project .

Specialist identifies the need for a new or enhanced system. Information needs of the organization are examined and projects to meet these needs are proactively identified. The organizations IS needs may result from requests to deal with problems in current procedures, from the desire to perform additional tasks, or from realization that information technology could be used to capitalize on an existing opportunity. These needs can then be prioritized and translated into a plan for the IS department, including a schedule for developing new major systems. In smaller organizations determination of which systems to develop may be affected by ad hoc user requests submitted as the need for new or enhanced systems arises, as well as from formalized information planning system. Two additional major activities are also

performed during the planning phase, the formal, yet still preliminary , investigation of the system problem or opportunity at hand and the presentation of reasons why the system should or should be not developed by the organization.

Analyzing system needs

In this phase special tools help the analyst make requirement determinations. One such tool is the use of data flow diagrams. With DFD (see Figure 2) are input, processes and output of the business functions convert into structured graphical form. During analysis the analyst studies the organization's current procedures and the information systems used to perform organizational tasks. They prepares materials that summarizes what has been found , provides cost and benefits analyses of alternatives and makse recommendations on what should be done. Once the recommendation is accepted the analyst can begin to make plans to acquire any hardware and system software necessary to build or operate the system as proposed.

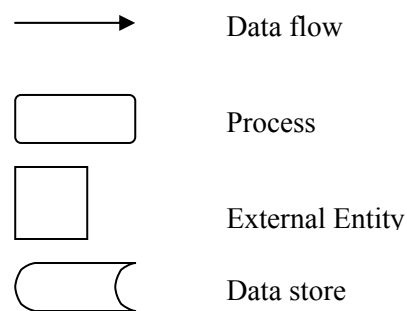


Figure 2 - Data flow diagram symbols

Designing the system

In this phase of SDLC analyst uses the information collected earlier to accomplish the logical design of the information system. The analyst designs accurate data entry procedures so that data going into the information system are correct. In addition the analyst provides for effective input to the information system by using techniques of good form and screen design.

Part of the logical design of the information system is devising the user interface. The interface connects the user with the system and is thus extremely important. Examples of user interface include keyboard or onscreen menus.

This phase also includes designing files or databases that will store much of the data needed by decision makers in the organization. A well organized database is the basis for all information systems. In this phase analyst also works with users to design output that meets their information needs.

They must design also controls and and backup procedures to protect the system and the data and to produce program specification packets for programmers. Each packet should contain input and output layouts , file specifications and processing details – it may also include data flow diagrams, system flowcharts.

Developing and documenting software

In this phase the analyst works with programmers to develop any original software that is needed. Some of the structured techniques for designing and documenting software include structure charts or Nassi Scheiderman charts.

The system analyst uses one or more of these devices to communicate to the programmer what needs to be programmed.

During this phase the analyst also works with users to develop effective documentation for software including procedure manuals, online help, „Frequently asked questions“, Read me files. Documentation tells users how to use software and what to do if software problems occurs. Programmers have a key role in this phase because they design, code and remove syntactical errors from computer programs. If the program is to run in a mainframe environment job control language must be created.

Testing the system

So the system is build but is not ready for implementation. Before a company can run the system, it must be tested. It is much less costly to catch problems before the system is signed over the users . Some of the testing is completed by programmers alone, some of it by system analyst in conjunction with programmers. A series of tests to pinpoint problems is run first with sample data and eventually with actual data from the current system.

Implementing and mainterance

This is the last phase of system development. The analyst helps to implement the information system. This phase involves training the users to handle the system. Some training is done by vendors, but oversight of training is the responsibility of the system analyst. In addition the analyst needs to plan for a smooth conversion from the old system to the new one. This process includes converting files from old formats to new ones or building a database, installing equipment and bringing the new system into production.

This phase of SDLC requires employees to use the new, unfamiliar system. This should be critical for final success.

A number of implementation approaches exists:

Direct cutover implementation is when company quickly changes an old system for a new one. Usually a direct cutover implementation takes place over a weekend when employees are out of office. It can be very risky. It is risky in that, even after all of the testing , the new system may not function correctly.

In *parallel conversion* approach a company installs a new system alongside its old system. This approach allows the organization and its employees to move to the new system gradually.

The risk is that empoees will continue to use old system.

Pilot testing is next approach. In pilot testing a company installs a new system at only one location or in one department. Once the system has passed testing in this department is installed in all departments.

By some estimates the mainterance accounts much as 80 percent [5] of the total costs of an information system. These estimates make sense when we consider that it might takes only a few month to a year to develop a new information system, but that system might be placed for decades. Mainterance includes , but is not limited to , correcting errors, backing up data or supporting end users. Some of the errors go undetected in the testing phase. It is when employees start using a new system that these errors come to the surface. Correcting these errors is one of the most important part of system mainterance.

Conclusion

System analysis and design is a systematic approach to identifying problems, opportunities and objectives to analyze the information flows in organizations, and to designing computerized information systems to solve the problems. The framework for this systematic approach is provided in what is called the system development life cycle (SDLC). This cycle can be divided into 3 – 20 stages [3]. I divide SDLC into six sequential stages. The six stages are Identifying problems and planning, Analyzing system needs, Designing the system, Developing and documenting software, Testing the system, Implementing and maintenance.

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Kontaktní adresa:

Ing. Pavel Jirava
Univerzita Pardubice
Fakulta ekonomicko správní
Ústav systémového inženýrství a informatiky
Studentská 84, 532 10 Pardubice
e-mail: pavel.jirava@upce.cz
tel: 466036001

Recenzovala: Ing. Hana Kopáčková, Ph.D., ÚSII, FES UPa