Research Topic:

Software development methodology is extremely important in developing robust applications that meets the needs of clients. Methodologies help the software development team build information systems that solve business needs in a timely manner. Review various software development methodologies that are currently used today.

Where does database design fit into those methodologies? What are some

activities and deliverables of the database design phase? How does database

design affect the overall success of the information system? Describe some ways to ensure the database design phase is successful and meets the goals of the information system.

Introduction

Software development methodology helps establish a set process for the development of robust applications. The Systems Development Life Cycle (SDLC) is a general framework that helps us to track and understand tasks that contribute to the maintenance and evolution of information systems.

The *SDLC* is a general framework which highlights one of the many ways we can pursue modern application development. The *Waterfall framework* is a popular framework that software project managers commonly orchestrate for their development resources. In the waterfall framework we have various stages like Requirements, Analysis, Design, Implementation and Testing. (Liviu, 51) Each stage has its own deliverables with tasks that are linear. The other common approaches are *Unified Modeling Language (UML)* which provides object oriented tools to support development tasks. (Coronel, 414)

There are other approaches for software development as well. *Rapid Application Development* an iterative software development methodology utilizes concepts such as prototypes, CASE tools and adaptive management to develop application systems. (Liviu, 43) This approach highlights benefits over traditional project development methodologies which are sometimes burdened by longer turnaround times and dropped requirements. (Coronel, 414)

Another important type of development methodology and perhaps the more popular one today is the *Agile software development* framework. This method highlights sprint driven approach to development. Each sprint has a certain number of work items commited which help tackle the broader requirements in a piecemeal manner. (Coronel, 414)

More recently the advent of test driven development has also become popular in software developer circles. (Liviu, 47) This approach highlights a test driven approach to development of applications. Each application is developed, tested for bugs and improved continuously. This approach is helpful and ensures that systems and user acceptance testing stages are smooth and swift leading into production deployment of the application.

Analysis & discussion

The Systems Development Life Cycle (SDLC) comprises of five phases. These phases are planning, analysis, detailed system design, implementation and maintenance. (Coronel, 415)

Each phase in SDLC is then broken down to the actions that comprise it. For example in the planning phase we have the initial assessment and the feasibility study. In the analysis phase we gather user requirements, conduct existing system evaluation and conduct the logical system design. In the detailed system design phase we chart out the detailed system specifications. In the implementation phase we implement coding, testing and debugging followed by installation and fine tuning of our application. Finally, in the maintenance phase we pay attention to evaluation, maintenance and enhancement of the existing apps.

Within the larger information system the database is an important component and has its own life cycle. The database life cycle is comprised of six initial phases of database initial study, database design, implementation and loading, testing and evaluation, operation and finally maintenance and evolution.

Each phase in the database life cycle is important and is comprised of a set number of activities. In the database initial study the data analyst analyzes the initial company situation. Once this is done we can define problems and constraints. This is largely done via the charting out of business rules and the limitations and exceptions to those rules. The data analyst then defines objectives and establishes the scope and boundaries of the project. (Coronel, 418)

In the second phase called database design, the data analysts and DBA’s create the conceptual design of the database, this involves implementing the data models and Entity Relationship Diagrams. An appropriate Database Management Software is selected. Then the logical and the physical implementation of the ERD is carried out via SQL language and data is normalized. (Demba)

The third phase is called implementation and loading, in this phase the database management system is loaded, the databases are created and the data schemas are loaded.

The fourth phase is called the testing and evaluation phase. In this phase the database is tested and fine tuning is made. A formal evaluation of the database and its application programs is conducted.

The fifth phase is the operation phase and we mainly produce the required information flow in this step.

The final phase is maintenance and evaluation and in this phase we upkeep the database via patches and enhancements.

Summary & conclusion

So in summary there are a number of development frameworks, the most popular today are Waterfall, Agile, UML, Test driven development and Rapid Application Development. As a software project matures through the Systems Development Life Cycle each component is analyzed, implemented and tested for performance requirements.

Any mission critical application often relies on a database for storing its operational data. The Database Life Cycle characterizes important phases in assessing requirements, designing the database solution and implementing, testing and enhancing the database solution over time. A thoroughly designed database not only helps in supporting the systems’ applications but it also provides a cornerstone in establishing data integrity and governance via unique data models for the organization it serves. When an appropriate framework is selected for both the system and the database component it ensures that we have a robust application that is continuously improving.

Works Cited:

Casteel, Joan. (2010). Oracle 11g SQL. 2nd Edition. Cengage Learning.

Coronel, Carlos & Morris, Steven. (2015). Database Systems: Design, Implementation, and Management   11th Edition. Cengage Learning.

Demba, Moussa. (2013). Algorithm for Relational Database Normalization up to 3NF. International Journal of Database Management Systems (IJDMS) Vol.5, No.3, Pg. 1-13

Hamilton, J., Hellerstein, J. M., Stonebraker, M. (2007).Architecture of a Database System. *Foundations and Trends in Database*s.Vol.1, No.2, Pg. 141-259.

Liviu, Mihai. (2014). Comparative Study on Software Development Methodologies. *Database Systems Journal*. Vol 5, No.3, Pg. 37-57.