Chapter 4

4. Approach.

4.1 Introduction

Available technologies that are needed for developing the proposed solution have been discussed in earlier chapter. Most appropriate Software Development Process, System Analysis and Designing Methodology, and necessary Software were selected based on the nature of the project by considering many factors. This chapter discusses the importance of the selected technology for successful system development and implementation of the solution.

4.2 Selected Software Process Model and Justification

Selecting a software process model is not simple, as no one methodology is always best. Below Table 4.1 shows a summary of best Process Model based on the nature of the system [7].

Ability to Develop Systems	Structured Methodologies		RAD Methodologies			Agile Methodologies
	Waterfall	Parallel	Phased	Prototype	Throwaway Prototyping	*XP*
with unclear user requirements	Poor	Poor	Good	Excellent	Excellent	Excellent
with unfamiliar Technology	Poor	Poor	Good	Poor	Excellent	Poor
that are Complex	Good	Good	Good	Poor	Excellent	Poor
that are Reliable	Good	Good	Good	Poor	Excellent	Good
with a Short Time Schedule	Poor	Good	Excellent	Excellent	Good	Excellent
with Schedule Visibility	Poor	Poor	Excellent	Excellent	Good	Good

Table 4.1 : System nature Vs best Software Process Models

Since this was a new system, the possibility of changing the requirement was very high. Some requirements were unknown. Hence, the selected approach should have the facility for catering the future requirement changes. It should be possible to revisit the requirements and do the necessary requirement changes at later stages.

This solution was not a so complex project and scope of the project was in medium scale. Fast development & implementation were also expected. Further, the

requirements were not overly complex and the project is not a very large and it is a medium scale project.

This application is for updating databases and producing reports from the data in the database and can be developed on structured forms for input and output.
Fast implementation was needed. Hence, an approach which supports for fast delivery was considered.

Since, the system was planned to develop in the site, the facility was there to discuss with the users at any time, to have meetings and show them a prototype and get their feedback was possible.

The methodology works best for projects where the scope is small and work can be broken down into manageable chunks.
Small project team is also another characteristic of proposed solution.

The problem with conventional methodologies like waterfall was that applications took so long to build and there is a long delay before the customer gets to see any result. The requirements had changed before the system was completed, often resulting in unusable systems. With conventional methods, there is nothing until 100% of the process is finished, then 100% of the software is delivered.

Waterfall approach is OK for small projects, and when requirements & design can be done near-perfectly upfront. The “spiral” model is risk-driven. Risks are analyzed after each iteration to figure out whether to continue and what to do in the next iteration to reduce risks. This model is most commonly used in vary large software development projects. This allows for flexibility that is not afforded by the Waterfall model. However, the Spiral model has its advantages. It is far more flexible than the Waterfall model and can cope with the changes and adjustments that will inevitably have to be made during the project.

Characteristics of the project were compared with the capabilities, advantages and weaknesses of the different software development process models and it was found that project characteristics fit with Rapid Application Development(RAD) approach and it was selected as the most suitable software process. Other than the main

advantages of increased speed and increased quality, RAD has many core elements that make it a unique methodology including prototyping, iterative development, time boxing, team members, management approach, and RAD tools.
Further, powerful facilities of RAD environment like screen generation, report generation can be used very effectively to achieve fast development and delivery.

4.3 Selected Analysis and Design Methodology

Systems analysis is about understanding business requirements so that information systems can be developed to meet business needs. Many IT development projects fail to deliver because not enough effort is spent on analysing and prioritising business requirements. The central theme is that system development should be business driven rather than led by technology. It also encompasses the view that information systems include business processes as well as information technology.

System development can generally be thought of having two major components: systems analysis and systems design. In System Analysis more emphasis is given to understanding the details of an existing system or a proposed one and then deciding whether the proposed system is desirable or not and whether the existing system needs improvements. Thus, system analysis is the process of investigating a system, identifying problems, and using the information to recommend improvements to the system.

Although it was possible to use both SSADM and Object Oriented methodology for analysing and designing the system, SSADM was used as the system Analysis and Design Methodology in this particular project. Further, As per the rules and regulations of the company, SSADM has to be used in documenting of software development projects.

Further, not availability of any licence version of tools that is needed to use in object oriented methodology like rational rose, also was another reason to select the SSADM as the methodology.

4.4 Selected Application Development Environment

4.4.1 Selected Database Technology

Selecting unsuitable RDBMS results in unnecessary licensing, training, development, deployment, administration and support costs.

Two data base types called desktop databases and server databases are available. There are sets of factors to be considered in order to select a suitable database. Answers for questions bellow can be used as a guide to decide the data base type.

- Who will be using the database and what tasks will they perform?
- How often will the data be modified? Who will make these modifications?
- Who will be providing IT support for the database?
- What hardware is available? Is there a budget for purchasing additional hardware?

Desktop Databases

Desktop databases offer an inexpensive, simple solution to many less complex data storage and manipulation requirements. They earn their name by virtue of the fact that they are designed to run on “desktop” (or personal) computers. Microsoft Access, FoxPro, FileMaker Pro, Paradox and Lotus Approach are the major players. A few of the benefits can be gained by utilizing desktop databases are listed below:

- **Desktop databases are inexpensive.**

  (most desktop solutions are available for around $100 (compared to thousands of dollars for their sever-based cousins). If a copy of Microsoft Office Professional is owned, it includes a license version of Microsoft Access.

- **Desktop databases are user-friendly.**

  A thorough understanding of SQL is not required when using these systems. Desktop DBMSs usually offer an easy-to-navigate graphical user interface.

Server Databases

Server databases, such as Microsoft SQL Server, Oracle and IBM DB2 offer organizations the ability to manage large amounts of data efficiently and in a manner that enables many users to access and update the data simultaneously.

The benefits that can be achieved through the use of a server-based system are diverse:

- **Flexibility.** Server-based databases can handle just about any data management problem. Developers love these systems because they have programmer-friendly application programmer interfaces (or APIs) that provide for the rapid development of database oriented custom applications.
- **Powerful performance.** Server-based databases are as powerful. The major players are able to efficiently utilize just about any reasonable hardware platform. Modern databases can manage multiple high-speed processors, clustered servers, high bandwidth connectivity and fault tolerant storage technology.
- **Scalability.** This attribute goes hand-in-hand with the previous one. If the necessary hardware resources can be provided server databases are able to gracefully handle a rapidly expanding amount of users and/or data.

By considering above factors it was understood that desktop data bases can not be used mainly because those are not supported for heavy data volumes in the multi user environment. Further Server databases contain mechanisms to ensure the reliability and consistency of data. Server Databases are designed to run on high-performance servers. Hence it was decided to go for server data bases.

Although there are many commercial RDBMSs available which offers a convenient and powerful way to organize the information, out of them MS SQL server RDBMS was selected as the database software for this project. SQL Server is a true "client/server" database. One of the major reasons was that the company is having the licence version of the software. Further, all the existing hardware and software configurations of the servers including processing speed, memory and operating system are compatible with the requirements that need to have the MS SQL server as the RDBMS.

4.4.2 Selected Programming Method

Since, the application is a processing-intensive and highly responsive application that needs the full functionality of the client computer, the Windows Forms method was selected. Further windows forms can provide a rich user interface and advanced application functionality to solve business problems.

4.4.3 Selected Programming Language

Visual Basic (VB) was selected as the programming language because of following reasons and advantages.

- It's simple languages. Things that may be difficult to program with other language can be done in Visual Basic very easily.
- **VB** is not only a language but primarily an integrated, interactive development environment ("IDE").
- The ***VB-IDE*** has been highly optimized to support for rapid application development ("***RAD***"). It is particularly easy to develop graphical user interfaces and to connect them to handler functions provided by the application.
- ***VB*** provides a comprehensive interactive and context-sensitive online help system.
- ***VB*** is a component integration language which is attuned to Microsoft's Component Object Model ("***COM***").
- ***COM*** components can be written in different languages and then integrated using ***VB***.
- Very easy for Debugging the source code
- .(dot) operator for objects to expose its properties and methods
- Visual Basic can be used to extend the power of Crystal Reports which was used as the reporting tool

Further VB is the approved language for internal software development in the company and it is a licensed software.

4.4.4 Selected Reporting Tool

Crystal Reports is a business intelligence application used to design and generate reports from a wide range of data sources with a minimum of written code. This is a general purpose reporting tool which 100% compatible with SQL server and the VB. Complex and professional reports can be created easily. Hence crystal report was selected as the reporting tool. Further, advantages of crystal report are mentioned below.

- Crystal Reports can access data from most widely-used databases and can integrate data from multiple databases within one report using Open Database Connectivity.
- Reports can be designed easily and hence can save time in designing reports
- Stunning graphics and visualizations can be included in reports easily
- The use of many options of report creation
- Comprehensive calculation options are available
- Report output can be exported into many formats – PDF, Excel, Word, Crystal
- Many Destination Options are available – E-mail, FTP, Enterprise
- Feature Rich Graphics
- Connectivity includes, SQL, Oracle, AS/400 etc.
- Huge list of formatting options is available
- Unlimited subtotal labels can be used
- Able to do crosstab reports and sub reports
- Drilldown Functionality

4.5 Selected Operating System

OS of client computers

Microsoft windows XP was used as the operating system of the client machine because it is the standard licence operating system of the company. Since, Windows XP is compatible with all other selected technologies like development languages, reporting tools and the database system used for the project and Windows XP is familiar OS for the users, Windows XP was select as the most suitable operating System.

OS of the Database Server

Licence server operating system software of the company is Windows server 2003 and the since it is compatible with the selected database technology (MS SQL server) it was selected as the server operating system.

4.6 Summary

Selected technology for solving the problem has been discussed in this chapter. Advantages of selected technology and the justification also have been discussed. System Analysis and Design process has been discussed in the next chapter.