Optimization of Project Management

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ABSTRACT

OPTIMIZATION OF PROJECT MANAGEMENT

Good Communication is essential in organizations and is more prominent in Business organizations specifically. Products are designed, made and sold. Good communication is essential for these events to take place. At present management spends a lot of time in meetings and emailing. This Project will help make communications easy and efficient. This Project Management Tool will form a network where managers can easily communicate. The purpose is to give a Web-based platform to share everyday tasks. The project is aimed to reduce the burden on management required to manage the activities within the organization. This tool will cover three important activities: Project budget, Scope and Schedule. This includes Planning, organizing, giving directions or commands, checking in progress, and issue in the project, document management and progress of the project. This paper also presents the market opportunities and competitor analysis to determine the feasibility of our project management software. This Project Management tool assists managers in making better decisions and helps minimize the unnecessary actions. There is a large market for this software application creating a business opportunity that will make this project a profitable venture.
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Mandeep Sethi
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1.0 Project Overview

1.1 Introduction

Efficient communication is necessary in every organization, whether it is big or small industry. Products are designed, made and sold. The aim of this project is to develop a common platform for all the workers, project manager and higher management, so that they can work concurrently on any project. The purpose of this project management tool is to design, classify and manage the events so that all events within in the project are completed on time without any risk. This project will help the managers of the companies to track project, budget and schedule in a proficient way.

This paper also presents the market opportunities and competitor analysis to determine the feasibility of our project management software. The balance sheet of Versatile Management Solutions shows assets, liabilities, and ownership equity. An asset is equal to liabilities plus ownership equity. A balance sheet and income statement shows the cash and credit relationship of Versatile Management Solutions. Decision Making Tools were used to decide between two alternatives. Break Even Analysis showed the breakeven point or the number of unit to sell before making profit. (The Purpose of Project Management, 2010)

1.2 Scope

At present, there are many similar software management tools in the market such as @task, Team Work Project, Desk Away etc. These are not fully web based management software as ours is. Installation of files is not needed in our project and the features we are providing make it better than other project management tools. Through our cost and price analysis we tagged our product at a $40 price to one user. This project or application is the best suited for the individuals working on many projects simultaneously. It is extremely more
efficient and cost effective than the other products in market.

1.3 Description

The aim is to develop a web portal that can perform various management tasks. Our project has a three tier architecture i.e. Client, Server and database. As the project is Web based so the Communication between parts is done HTTP response request mechanism. The client will get graphical interface using internet explorer etc. The front end is developed using HTML and the features that the tool is providing are developed using ASP.Net. The server is accountable for the interaction between client and Database. The database is accountable to save and get the data. The SQL server is used to provide data security. Main interactions or communication are performed via an HTTP request response mechanism.
2.0 Literature Review

This master’s project has given us the privilege to learn about the major issues in
project management. We learned that one of the most important steps to be successful in a
master’s project is to do as much research on the given topic as possible and finding out a
sufficient amount of information on other project management software. In this literature
review four main concepts were covered:

a. Internet management

b. Key elements of project management software

c. Top ten project management problems,

d. Technical Research.

2.1 Introduction to Literature Review

This project software is a user friendly compound which endorses to access data of
continuous projects. The software performs many tasks and activities for sound management
of ongoing projects and also stores all the information in a form of file in the central database
for future references. Some of the tasks and functions performed are scheduling, calculating
critical paths, and providing information. We were able to complete this project with the help
of the software project manager and other team members involved while working on the
identical platform.

Laufer and Hoffman really pressure the fact in article we read that a project is a one-shot
activity with it’s best objectives to meet in order to reduce the cost and increase the quality.
The Laufer and Hoffman Project Management decrease the risks of delays in areas of cost,
scheduling, and failure of final product to meet all the needs expected. (Laufer and Hoffman, 2000)

A project must be completed by the given time and date and everything should be turned in on a timely manner according to the standardized schedule by Management. Deadlines are extremely important especially the final project due date which many are not able to reach so the time and cost being the two most important factors must be changed and taken into account such as: monitoring periodically tasks completed and tasks that are yet to be completed, selection criteria, and schedule estimation project manager skill levels. This randomly monitors all assignments, tasks, important duties, and is lastly to be completed.

2.2 Internet Based Project Management

A website named Internet Man informs us about the numerous advantages of using internet based software management systems.

1. Enjoy being a premium client:—no appointments, no phone calls. Just a text message to inform project manager or other team member.

2. Sound Communication which leads to all tasks and duties being performed on time

3. Ease Access—only internet access is needed for the user to start up.

Key features of Internet Managing Software

1. Web Document manager: documents can be viewed and accessed anytime. Anywhere, and Any day.

2. Web database: All members included in the project share their information and documents and anywhere and anytime on the web.
3. **Company Calendar**: informs everyone involved in the project by sending an automatic email whenever a task is completed on time or late and when a new event or changes are added.

4. **Event presenter**: informs everyone when anyone logs in or logs out.

5. **Web Security System**: Full administration is monitored at all times to view who is accessing any data by firewall protection, SSL Security, login, and validation.

6. **Project system**: Only allows project members to view information regarding the project and work that needs to be completed. (Internet Man, 2009)

### 2.3 Top 6 Project Management problems

1. Management provides deadlines and due dates for all projects, but many times does not begin on time and therefore aren’t completed on time. Every task assigned has certain times associated with them so they are completed on time. The schedule programmed in the software changes the due date if tasks are delayed and not finished on time. One of the common sources is the Gantt chart which is associated with certain tasks or durations.

2. Many projects have an unclear POS (Project Objective Statement) which also doesn’t have clear guidelines therefore the POS is not concise. Every project should have a brief well explained goal with 25 words or less because a long POS can lead others with different goals and alternatives.

3. Project Scope Grows! A project team roster should also be well developed and concise. Experienced users know that most projects grow to a certain extent and even if the project scope grows, resources and new deadlines are establishes by management.
4. Communication Breakdowns: Managers and project managers make frequent updates to make sure the overall project is going in the correct direction they decided. One of the most important tasks is recording and tracking the project which allows everyone involved know the process of the project or if it has hit any ups or downs. If issue arises it should be discussed in a proper and appropriate language that does not point fingers or blames anyone. Keeping track of issues, deadlines, due dates are important concepts to keep in mind. Managers should be organized and create team rosters with their responsibilities and duties assigned to them. After completing the roster every group member’s information is on one tab which is illustrated in the figure below:

<table>
<thead>
<tr>
<th>Name &amp; Title Role(s)</th>
<th>Organization</th>
<th>Phone &amp; Fax Numbers</th>
<th>E-Mail Address</th>
<th>Location/Maildrop</th>
</tr>
</thead>
</table>

Table 1: Team Roster

5. There is a lot pressure of when a project is taking place. Less time is spent on testing and the majority of the time is spent on designing. There is more and more stress to launch an ideal design but not functionality.

6. Closing out the project: When projects are being completed many companies take a few minutes to close out the project and the following questions must be answered:

   a. Is it archived in the database, so it can be retrieved as reference for future projects?

   b. What aspects of Project management were effective?

   c. Can the process be improved in any way?
d. How can an individual learn from the project?

e. Is the key learning recorded? And is all of the paper work completed?

The goal of this project is to provide a web-based platform for corporate personnel so complex project is completed with minimum management problems that occur due to scope, schedule, and budget.

**Basic Elements of Project Management Software:**

1. Collaboration Software

2. Issue Tracking System

3. Project Portfolio Management

4. Resource Management

5. Document Management

**Collaboration Software**

The softwares are created to assist people and employees in general assignments. It helps them in with chatting online, instant text messaging, emails, web conferencing, data conferencing these all belong to this category. Some of the Collaborative Management Tools are the following:

a. Online Spreadsheets: Shares information and data with employees of the organization.

b. Extranet Systems: Organizes, shares, and collects information regarding the delivery and completion of projects.

c. Project Management: A schedule which illustrates the number of duties being performed inn the project also similar to the Gantt chart.
d. Workflow System: Keeps the tasks and documents well maintained in a systematic way.

e. Knowledge Management System: Collects information and manages it in various forms.

**Issue Tracking Information**

This system looks after issues reported by customers or employees. It looks after the number of issues in an organization. It is the filed within the system in which the information is written by staff to report the incidents.

The process procedures are worked as the following:

Step 1: Recording the Problem

Step 2: Reproduce the Problem

Step 3: Identifying Solution and resolution

Step 4: Verifying the resolution

Step 5: Communicate the result

Step 6: Audit and record

**Project Portfolio Management:**

The product used for management, also known as the project manager is used mainly as an organizational aspect to manage current and future projects. The product allows effectuating organizational goals. These goals include economic goals, strategy goals, and technical goals. However, many organizations comply to old methods of making and dealing with the project. The old methods have been proven to be ineffective and time consuming. On the other hand,
using PPM allows for more evident and proficient use. It does so by ensuring continuous flows of project from its initial stages, on through completion. Such uses include the tracking and storing of documents.

Project Management Software allows for an ability to work simultaneously with other users. For example, storing information or data in a database, allowing employees to share such information when working under the assigned project.

It provides us vast amount of information such as:

a. It brings to our attention risks and warnings, which may affect the project.

b. Informs us about the ways the project has elevated or advanced and also tells us whether the project is following a plan or not.

c. Tasks and allotment of schedules with approximate estimations of how long the completion of a project takes.

**Document Management**

Document management is a system used for managing files, and also tracking and storing paper documents.

a. Efficient ways documents can be kept secure by allowing only an authorized person with access to the document.

b. Location: the place of storage of the files with information on access to the file or document.

c. How competently information can transfer from one person to another assisting us with the rules of the work flow.
d. Should have access to information, such as when and by whom the document is created along with when it was published and stored allowing everything to be traceable.

**Resource Management**

This sort of system establishes an efficient and effective manner of usage of resources whenever they are needed. These resources include: Financial resources, technical information, human skills, etc. (Comparison of Project Management Software)

**2.4 Languages**

The project will be using a system that has been proven to make development easy which is known as .NET technologies. The diverse technologies involved are C# NET, ASP.NET, ADO.NET, Web Services, and SQL Server 2005 require a profound understanding in development of this project.
3.0 Project Architecture

The goal of our project is to develop a web-based application which can optimize various project management tasks. The proposed system has 3-tier architecture: Client, Server and Database. Major interaction between the modules is via HTTP request-response mechanism.

The overall architecture of our project is depicted in the diagram below:

Figure 1: System Architecture Diagram
3.1 Architecture Description

a. **Client Tier:**

The function of the client tier is to provide Graphical User Interface (GUI), using any web browsers such as Mozilla, Internet explorer, and many more. Also, this application can also be used by the smart phone clients. The entire front end will be developed using HTML and AJAX libraries for User Interface. Dynamic features can be provided by using ASP.NET Server.

b. **Server Tier:**

The function of the server is to build a communication platform between the client and database. The server contains the important business logic to provide functionality. Windows XP Professional OS will be used to run this. To run asp.net libraries and assemblies we will be using .NET runtime 3.5. The data in the database will be accessed by web pages using ADO.NET to send the data, web services will be provided.

c. **Database Tier:**

The function of the database is to store the data. To store and retrieve the data, we will be using SQL Server and also to provide data security. All the database tables and procedures to execute queries are contained in this database.
1.1 System Interface Diagram

Figure 2: System Interface Diagram
This system has three important layers and the corresponding subsystems. Each layer communicates with another layer with different technologies that allow the communication to happen.

- The System consists of multiple clients. Client can either be an Administrator or a User. They access the workspace which resides on the project-specific web page. All the web pages are created using HTML, CSS & AJAX technologies.

- The IIS web server accepts multiple client connections to allow them to browse through the project workspace for updating status, access schedules and project documents and tools.

- Client and server communicate by HTTP request-response mechanism. Logical flow of the content in the web pages is generated using ASP.NET and HTML.

- The business logic of the system is developed using C#. This module queries the database for report generation or project status calculation. This module also takes care of the schedule updates and alert generation by streaming messages to users.

- The business logic module interacts with database by using ADO.NET classes which reside in Data Access Layer. Data access classes have a data adapter class which provides connection to the SQL database.

- The SQL database consists of all the tables, stored procedures related to the system that can be retrieved through SQL OLEDB connection. Logical calculations and data retrieval and updates are performed by using stored procedures. This will avoid round trips and improves performance of the system.
3.2 Architecture Subsystems

![Diagram of Architecture Subsystems]

Figure 3: Architecture Subsystem Diagram

3.2.1 Architecture Subsystems Description

1. **Project Creation:** For a particular project, the Project Manager has an option to create users to access all the related files of the project. This group of Users will be able to communicate their activities via a stream of messages. Project managers can delete users once their requirement is finished.

2. **Status Update:** As the users work on the tasks, they have an option to update the status through widget or through the User Interface in the Project workspace. Project manager
can track the changes made to any of the documents, schedules and get updates on team performance

3. **Send Alerts:** The system can send alerts to the users to update the status of the tasks assigned. User will be provided with an option to select the alert reoccurrence time. Updates of status can be provided through Widget.

4. **Report Generation:** Managers or users can query database to get the latest status reports/ performance charts based on time/day. Reports are generated based on the estimated schedules to real time schedules.

5. **Project Status Update:** Project managers will be able to retrieve status reports and performance charts from the database based on the status updates provided by the users. This will provide overall project status to track performance and track back to estimated schedule.

6. **Message Streaming:** The system will send the status updates sent by all the users as a stream of messages on the widget. System provides information continuously to everyone present in the project group so that they can react to the situations as they arise.

7. **Resource Management:** The system will allow everyone to work on a particular project providing all the required tools and documents for the team in a repository. Project manager has the privileges to assign resources (human, software, hardware) while creating the project.

8. **Task Allocation:** The project manager can assign tasks based on the skill set of the employee while creating the project workspace. He/She also has an option to change the tasks dynamically during the project life cycle.
9. **Scheduling**: The project schedule is decided upon and posted on the project workspace for everyone to view. Also individual schedule estimates are also posted on the workspace. Based on these schedules and assigned tasks, alerts are generated.

10. **UI**: UI allows the users to interact with the system to update status, access the resources and track changes. UI displays alerts to individual user thereby helping in scheduling and tracking progress.

4.0 **Technology Descriptions**

4.1. **DOT NET**

ADO.NET is an evolution of the ADO data access model that directly addresses user requirements for developing scalable applications. It was designed specifically for the web with scalability, statelessness, and XML in mind. ADO.NET uses some ADO objects, such as the Connection and Command objects, and also introduces new objects such as DataSet, DataReader, and DataAdapter.

The OLE, DB, and SQL Server .NET Data Providers that are part of the .Net Framework provide four basic objects: Command, Connection, DataReader and DataAdapter. Connections are used to 'talk to' databases, and are represented by provider-specific classes such as SqlConnection. Commands travel over connections and result sets are returned in the form of streams which can be read by a DataReader object, or pushed into a DataSet object. Commands contain the information that is submitted to a database, and are represented by provider-specific classes such as SqlCommand.
DataReaders is used for reading a forward-only stream of data records from a SQL Server data source. DataSets is used for storing, removing and programming against flat data, XML data and relational data where as DataAdapters is used for pushing data into a DataSet, and reconciling data against a database.

4.2 C#

We use C#.NET as the programming language to code our business logic. It is Object Oriented and also it is integrated with other .NET technologies which make it a perfect choice for programming. It provides very good control to developers and powerful new language constructs easily understood by most developers. It also has complex features like Delegates, Generics, and Attributes etc which can help us write neat and elegant code.

Also in its latest release i.e. C#3.0 entertains new features like Auto-Implemented Properties, Object Initializers, and LINQ etc which tap in to the common design patterns which developers follow to make programming very easy. It will be primarily used to write the code behind logic for our Web Forms and to create Web services.

4.3 ASP.NET

We use ASP.NET to create Web forms. ASP.NET helps programmers to build dynamic Websites, Web applications, and XML Web services. It makes placing server side controls in to a Web page very easy and also to create behavior behind controls via code behind is super simple. It is also very easy to host this application on an IIS. Our project requires pulling data from backend on a regular basis to facilitate this operation we use ADO.NET. In addition to improve performance and provide security we use Microsoft Data Access block which helps us optimize the data access. To store and retrieve data we need a reliable backend server.
4.4 SQL Server 2005

We used Microsoft SQL Server 2005 as our backend. It is most commonly used as a database for small and mid-sized applications. It handles issues like security, performance, scalability etc which are all critical. All we need is to focus on writing our queries and stored procedures. In addition to pulling data and applying some logic on it we also need to present the data in a pleasing way to the user. Data management and analysis required by our project is made easy with SQL Server.

5.0 Project Design

Project Design consists of the following artifacts describing both visually and textually the design of the system.

a. Data Flow Diagrams are presented in Figure 4-6
b. System Class Diagram is presented in Figure 7
c. Use Case Diagrams are presented in Figure 8
d. Textual Use Cases (5.4)
e. Use Case Sequence Diagram are presented in Figure 9-11
f. ER Diagram is presented in Figure 12
g. Deployment Diagram is presented in Figure 13
5.1 Data Flow Diagrams

Default.aspx

frmLogin.aspx

frmClientHome.aspx
- Allow to view the vulnerabilities found for that site.

frmProjectDetails.aspx
- This gives complete info about projects.

frmEmpHome.aspx
- This page gives complete information about the employee’s task.

frmProjectInfo.aspx
- User will provide complete info about the projects.

frmCompleteProjectStatus.aspx

frmSearch.aspx
- This contains complete search module for all the Users

frmAdminHome.aspx
- This page is to input the complete work for Admin to add/update all the task

frmEmpDetails.aspx
- Lists the matching Employees

frmProjectDetails.aspx
- Allow to modify selected website about complete projects.

frmClientDetails.aspx
- Allow to mark a site for Client information.

Main console for Users

View of statistical report generated by Emp.

Figure 4: System workflow diagram
Figure 5: Employee Workflow

Figure 6: Client Workflow
5.2 System Class Diagram

![System Class Diagram Image]

Figure 7: System Class Diagram
5.3 Use Case Diagram

![Use Case Diagram]

Figure 8: Use Case Diagram
### 5.4 Textual Use Cases

<table>
<thead>
<tr>
<th>Use Case Number</th>
<th>UC#1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Case Title</td>
<td>To Setup Workspace</td>
</tr>
<tr>
<td>Actors &amp; Roles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Actor</td>
</tr>
<tr>
<td></td>
<td>User</td>
</tr>
<tr>
<td>Pre-Conditions</td>
<td>The User must be connected to the Server.</td>
</tr>
<tr>
<td>Use Case Description (Steps)</td>
<td>Steps:</td>
</tr>
<tr>
<td></td>
<td>1. Create project group page</td>
</tr>
<tr>
<td></td>
<td>2. Add users to a project</td>
</tr>
<tr>
<td></td>
<td>3. Set individual privileges to the users</td>
</tr>
<tr>
<td></td>
<td>4. Click on ‘Submit’ button to add users</td>
</tr>
<tr>
<td></td>
<td>5. Assign project tasks</td>
</tr>
<tr>
<td></td>
<td>6. Click on ‘Complete’ button to finish set up.</td>
</tr>
<tr>
<td>Alternative Solution (Error Case)</td>
<td>1. If the User is already assigned tasks in a different project, system will not allow Admin to add this particular user.</td>
</tr>
<tr>
<td></td>
<td>2. Warning message is displayed to guide the Admin to select another User.</td>
</tr>
<tr>
<td>Post Conditions</td>
<td>1. Project page displays a list of all the users working on that particular project with corresponding tasks assigned to them.</td>
</tr>
<tr>
<td>Use Case Number</td>
<td>UC#3</td>
</tr>
<tr>
<td>-----------------</td>
<td>------</td>
</tr>
<tr>
<td>Use Case Title</td>
<td>To Retrieve Status Performance Reports</td>
</tr>
<tr>
<td>Actors &amp; Roles</td>
<td></td>
</tr>
<tr>
<td>Actor</td>
<td>Role</td>
</tr>
<tr>
<td>1. User</td>
<td>Project Manager</td>
</tr>
<tr>
<td>2. User</td>
<td>Team Lead</td>
</tr>
<tr>
<td>Pre-Conditions</td>
<td>1. User must be connected to the server.</td>
</tr>
<tr>
<td></td>
<td>2. Users should have sent out updates.</td>
</tr>
<tr>
<td>Use Case Description (Steps)</td>
<td>Steps:</td>
</tr>
<tr>
<td></td>
<td>1. Project Manager/Team Lead should select the User who they want to review.</td>
</tr>
<tr>
<td></td>
<td>2. Project Manager should also select the time period for the status.</td>
</tr>
<tr>
<td></td>
<td>3. Project Manager should select the type of ‘Report’</td>
</tr>
<tr>
<td></td>
<td>4. Click on ‘Submit’ button to generate the reports.</td>
</tr>
<tr>
<td></td>
<td>5. View all the requested Status/Performance reports.</td>
</tr>
<tr>
<td>Alternative Solution (Error Case)</td>
<td>None</td>
</tr>
<tr>
<td>Post Conditions</td>
<td>1. Page containing User Status/Performance reports will be displayed.</td>
</tr>
</tbody>
</table>
5.5 Sequence Diagrams

Set up workspace

Figure 9: Sequence Diagram - Set up work space
Update status of assigned tasks

Figure 10: Sequence Diagram - Update status of tasks
Retrieve status/performance reports

Figure 11: Sequence Diagram – Retrieve status
5.6 ER Diagram

Figure 12: ER Diagram
5.7 Deployment Diagram

The above figure shows the idle deployment scenario. First the client which is a web browser is deployed and the IIS server hosts the code behind the application and also the data connections to the database. Database server has all the tables related to the application and this data is stored, updated and retrieved by the web server as per the client requests.
6.0 Project Implementation

Client Tier Implementation

Figure 14: Home Page of the Application
Figure 15: Log In page for Admin

Figure 16: Admin: Manage Department
Figure 17: Admin: Manage Employee

Figure 18: Admin: Manage Project
Figure 19: Project Manager Functions: Managing Modules of Project
Figure 20: Assign Task to Employee

Figure 21: View Status of Project
Figure 22: View Status of Tasks on a Department

Figure 23: Client Functions  High Level View of Project News
Figure 24: Employee Functions Project Resources

Figure 25: View Modules of Project
Figure 26: Idea Forum on Modules

Figure 27: Update Status of Project
Figure 28: View Tasks

Figure 29: Message Blog for a Task
### Table - dbo.tbl_TaskDetails

<table>
<thead>
<tr>
<th>TaskId</th>
<th>RequestDate</th>
<th>ProjectId</th>
<th>RequestingEmpId</th>
<th>AssignedEmpId</th>
<th>TaskTitle</th>
<th>TaskDescription</th>
<th>DepId</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7/31/2008</td>
<td>255</td>
<td>157</td>
<td>150</td>
<td>Development</td>
<td>CUI testing</td>
<td>70</td>
</tr>
<tr>
<td>12</td>
<td>7/31/2008</td>
<td>255</td>
<td>157</td>
<td>150</td>
<td>Development</td>
<td>CUI design</td>
<td>70</td>
</tr>
<tr>
<td>13</td>
<td>7/31/2008</td>
<td>255</td>
<td>157</td>
<td>150</td>
<td>Testing</td>
<td>Review Test Res</td>
<td>71</td>
</tr>
<tr>
<td>14</td>
<td>7/31/2008</td>
<td>255</td>
<td>157</td>
<td>150</td>
<td>Testing</td>
<td>Sign off test res</td>
<td>71</td>
</tr>
<tr>
<td>15</td>
<td>7/31/2008</td>
<td>255</td>
<td>157</td>
<td>150</td>
<td>Database dev</td>
<td>Work on databases</td>
<td>70</td>
</tr>
<tr>
<td>16</td>
<td>7/31/2008</td>
<td>255</td>
<td>157</td>
<td>150</td>
<td>Customer Agile</td>
<td>Work with Mark</td>
<td>70</td>
</tr>
<tr>
<td>17</td>
<td>6/1/2008</td>
<td>255</td>
<td>157</td>
<td>150</td>
<td>Performance Test</td>
<td>Start performance</td>
<td>71</td>
</tr>
<tr>
<td>18</td>
<td>6/1/2008</td>
<td>255</td>
<td>157</td>
<td>150</td>
<td>Prepare servers</td>
<td>Prepare 4 servers</td>
<td>79</td>
</tr>
</tbody>
</table>

### Table - dbo.tbl_ProjectDetails

<table>
<thead>
<tr>
<th>ProjectId</th>
<th>ProjectName</th>
<th>StartingDate</th>
<th>EndingDate</th>
<th>ProjectEndDate</th>
<th>DeliveryDate</th>
<th>ProjectExpense</th>
<th>ClientId</th>
</tr>
</thead>
<tbody>
<tr>
<td>253</td>
<td>SAP</td>
<td>12/2/2008</td>
<td>12/20/2008</td>
<td>12/31/2008</td>
<td>NULL</td>
<td>353</td>
<td>51</td>
</tr>
</tbody>
</table>

*Cell is Read only.*
7.0 Performance and Benchmarks

Our project is implemented using ASP.NET. ASP.Net is the Microsoft programming framework that allows for the rapid development of powerful web applications. The performance of ASP.NET is better than other web technologies for various reasons. ASP.NET is object-oriented and has many programming tools, which facilitates for faster development and more functionality. It also allows programmers to develop web applications that interface with the database. ASP.NET was tested and found to be 10 times faster for the average user than Java and J2EE technology.

For building rich Graphical User Interface, .NET has an advantage over Java, because it delivers contents to web browsers. As this project has rich GUI and many home pages, we preferred .NET to java. Since our project works on both web and mobile devices, we preferred Visual Studio since it provides built in emulator for smart phone when compared to java because java needs third party emulators, which needs Jad and Jar files. Though java is also improving, .NET is easier to use, with low cost and quick turnaround.
Microsoft Visual Studio provides more flexibility to its programmers as they can develop applications using 25 different languages. So if a developer is familiar with any one language, he/she can work on our web application and make enhancements.

Performance of the application also depends on running system’s configuration, CPU speed, and Internet speed. As our project connects to maps.google.com for finding directions, it depends on Google server speed.

<table>
<thead>
<tr>
<th>Total no. of Bugs</th>
<th>Bugs according to severity</th>
<th>Bugs according to Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Minor 11</td>
<td>Major 1</td>
</tr>
</tbody>
</table>

Table 2: Bug Report
8.0 Deployment, Operations, Maintenance

The ‘Controller’ project has been developed using .NET and tested exhaustively for issues. All outputs match the expected outputs.

8.1 Software Tools

- Visual Studio 2005 – It is a Microsoft product which is used to develop dynamic web and mobile applications
- IIS server – IIS (Internet Information Services) is a powerful web server, which provides scalable and manageable infrastructure for web applications.
- SQL server – It is an effective database.

Administrator (Admin) manages Controller by entering/updating the information about employees, projects, active teams and project schedules. The admin updates the database as requested by various project managers to store the recent data in the database.

8.2 Deployment

Project Controller requires following pre-requisites:

1. Install .Net Runtime 3.5
2. Install IIS
3. Install IE 5.0 or above
4. Install Microsoft SQL Server 2000 or above

First we start with deployment of database and then move to configuring IIS. The operating steps are outlined below:
1) Open up Microsoft SQL Server Management Studio and Click Connect to Database Engine.

2) In the prompt screen enter username and password details and click connect. Note that web.config file needs to be updated with this information.
3) Open up databases and select Attach. It opens up a new window where you click on Add button in Databases to attach section. Browse to ProjectControl.MDF

4) It automatically detects the Log file i.e. ProjectControl_1.LDF. Verify Details section and click ok.
5) Verify that Databases now lists Project Control. Browse to its tables section to verify all tables and their data have been properly restored.

Next we need to deploy and configure IIS.
1) To do this, go to Control Panel > Administrative tools > IIS

- Enter the Computer Name and Username / Password in the dialog box
• Once it is connected open up the websites to locate Project Control

• This can be mapped to another name so that clients are unaware of the physical folder hierarchy. To do this right click on Project Control and Select New > Virtual Directory.
• It starts off a wizard which guides us through the process of mapping. Select Next

• Set the Alias name as Scheduler and Click Next.
• Browse to the directory in Inetpub with our Project Control and click Next.

• In the following screen make sure the first three options are selected and click Next.
• Click on Finish. Now a Alias will be created in our folder. All requests can now be made on this alias.

Now our deployment is complete. To run this website

Copy the Project Control folder in to C:\Inetpub\wwwroot in Web Server.

Then to run this open up IE and browse to

http://<WebServerIPAddress>/ProjectControl/Default.aspx

Our website will be converted to a web application that runs inside IIS. Client request will be routed to appropriate web application by the ASP Engine. It will send the response back as html
and client browser renders this response as a page.

8.3 Operations

Operations need to be aware of two services.

- Go to Control Panel > Administrative Tools > Services
• Check if IIS Admin status is started. If not right click on it and select start.

• Check if SQL Server status is started. If not right click on it and select start.
8.4 Maintenance

All websites need to be updated periodically with new and upcoming features. We have followed MVC pattern throughout our web site development which separates the logic from view. This makes it extremely easy to change the look and feel without worrying too much about breaking underlying code logic. We have put most of our code logic inside classes with well defined interfaces. These interfaces are used extensively in our code behind files. This leads to easier code maintenance in future as any changes to code logic have to be performed only at one place.

9.0 Economic Justification

The economic justification provides an overview of the cost and market analysis to ensure the success of the project. This justification covers the cost and investment to produce the product. It also covers the market, the price customers are willing to pay, and competitor analysis.

A large market is currently open for web-based applications. Web-based applications can be a great marketing strategy and method for the company to increase revenue. Market research shows a need for a project management tool at a lower cost which our competitors are offering at higher cost. Lower cost will enable even small business to use project management tools and this project to be a successful venture.

This economic justification also covers Norden Analysis which shows the expenditures relative to time. Some risks such as technical, competitive, and industry were considered when calculating cost relative to time. In addition this economic justification covers the exit plan to improve if return on investment is not as high as expected. Targeting indirect competitor or
different geographic location from our competitor will help the company gain reach revenue goals.

9.1 Executive Summary

Versatile Management Solution is a start up firm based in Santa Clara, CA. The co-founders of this firm are Ramandeep Kaur, Jasjot Singh, Prabhjyot Singh and Mandeep Kaur Sethi. The primary goal is to develop project management software. The marketing team found the need for a project management tool that is cost effective and is web based. Further requirements were gathered by interviewing company executives. Once the requirements for the software were collected then software was developed. The platform used to develop this software is ASP.NET. Although the market size for the product is big, but so are the competitors. The market size for our product extents from small to large companies since our main focus for developing the product has been cost effectiveness and easy usability. The marketing team will use marketing techniques and networking to reach target revenues. Versatile Management Solution core team also has strong experience in engineering management and software development courses. This company is committed to build user friendly, highly reliable and efficient management software. This Software will offer the following features:

- Web database
- Project calendar
- Messaging
- Web document manager
- Event presenter
The initial investment is $38,000 which is made by two investors and personal funds from the founders. Through the break even analysis we can see that the company will start making profits after a year. In year 2011 the company is expected to have a profit of $62,250 and in 2012 a profit of $116,075. According to our analysis the company will continue to be profitable.

Problem Statement
Project management has gained popularity over the past few years and this has increased the need for project management tools. There are many tools available in the market today however there is a need to develop a software which is cost effective, less complex, better reliable and easy to use. There is also a need for the software to be web based and hence we were inspired to develop software that satisfies all the above mentioned requirements.

9.2 Product Summary and Value Proposition
Versatile Management Solutions is a start up privately owned company which aims on providing its clients highly reliable and innovative management software that does not exist on the market. This project management software focuses on managing the project life cycle by offering the following features:

1. **Manage project**: In this application we can create new projects and manage current projects. It contains a project list in which all existing active projects and the latest activity across all projects are shown.

2. **Manage Task List**: We can view the tasks in each and every existing or active project by just clicking on to the individual project.
   - Empty task list: new task list.
• Assigned Task: one can easily see that which task is assigned to us

• Completed task: Completed tasks will be shown below the active task

3. **Add Message:** it will make communication more efficient. One can add messages, receive replies, and get notifications on every task or project.

4. **Track Time:** one can track time that the project manager and his team spent on a particular project. Interface is designed so that user can quickly login and logoff their time.

5. **Upload Files:** Members can upload files and can have access to the project data. Project Manager or his team can select file as private so that it cannot be shared with the clients or with the other member of the team if manager wants to. Every uploaded file will be placed in a category so that it is easy to find file later. Manager can leave comment on the uploaded file and notification about the comments will be send through e mails. (Team Work Project)

   Our tools help the customer by cutting their expenses. Since the tool is web based, the manager can give direct feedback to the customer. However, this tool is web-based and can be accessed anywhere by anyone on the team at any time.

The product summary explains all the features of our product which satisfy the customer requirements. The product will save time, cost and help the project managers/users be more effective and communicate better with their group.

### 9.3 Revenue Model

**Revenue from subscription/Purchase**- Revenues are generated both by purchase and subscription. Revenue is generated every time a customer subscribes to use the software.

Customer can buy the monthly subscription to use the project management tool for 40 dollars.
The customers can also choose the time period of subscription. Below are a few choices for customer’s subscription:

- 3 months
- 6 months
- Yearly

On a yearly subscription, customers are given a 5% discount.

**Revenue from advertising** - Advertising is used to promote our product and also to get attention of possible customers. Our mode of advertising is media, fliers and we have sales executives who go to offices and talk about our product and its benefits. Advertising is a powerful tool to bring awareness about our product and help get more customers which increases the revenue.

**9.4 Targeted Market for the product**

Initially, Versatile Management plans to target small to medium size business. We will talk directly with mid-level manager or the vice president of the company to show them the benefits of using project management tools. For instance, we will show the managers how this tool will save them money and time.

All the Project Management Software users stand as our target market but presently we have more than 1 million MS project management users as our potential buyers. Presently there is no market segmentation as we have only one segment of customers who uses MS project management as presented in Figure 14.
We projected our available market for next few years of operation with minimal growth rate. Mindview and Kickstart stand as our major competitor. Mindview stands as our major market and Kickstart as our second biggest market with higher growth followed by Rational Plan. All the applications from these manufacturers are non web based and right now they are looking to step into web based application with following features:

- Share projects with colleagues and clients seamlessly in seconds.
- One can easily update tasks and project plans from every computer anytime you need it.
- It does not require installation of any other software applications, except your Web browser.
- It is 10 times cheaper than Microsoft Project.

Figure 30: Web Based Vs. Non Web Based
9.5 Competitors and their Key Features

The key features customers consider when buying project management software are presented in Table 4:

<table>
<thead>
<tr>
<th>Competitors</th>
<th>Collaboration</th>
<th>Resource Management</th>
<th>Project Management</th>
<th>Ease of Use</th>
<th>Help/Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenrox Project Management</td>
<td>4</td>
<td>3.5</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Microsoft Project</td>
<td>2.5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Mindview</td>
<td>4</td>
<td>2.5</td>
<td>3.5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Kickstart</td>
<td>4</td>
<td>2.5</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Project Plant</td>
<td>3.5</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Fast Track</td>
<td>1.5</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 4: Competitors and their Key Features
Tenrox Project Management, Microsoft Project, Mindview, Kickstart, Project Plant and Fast Track are major competitor to our product. Project Management Software is rated according to the following four categories:

- **Collaboration** – How information is exchanged with team member such as email, meetings, or conference calls.

- **Project Management** - The practice, process, and activities and their tracking, are key to project management. Managing budget, scope, and schedule is valuable to the interest of the company.

- **Ease of Use** – Project Management tool must be user – friendly to use and easy to learn.

- **Help/Support** – Project Management should have user guide. The manufacturer should offer best customer service in case the user cannot find the answer in the guide. (Comparison of Project Management Software)

### 9.6 Targeted Customers

Our targeted customers range from small to large businesses. The tool can be bought by any company looking to be more flexible, accountable, and to improve their communication channel. Flexibility keeps everyone on the same page by delegating task, monitoring progress, and scheduling deadlines. Accountability provides easier method to monitor budget and track expenses. Collaborating work with teammates is easier with web based tool. This tool is also user friendly and easy for companies to adopt. The following is the list of target industries:
9.7 Personnel required

Versatile Management Solutions is a privately owned start-up which aims on providing its clients highly reliable and innovative solutions for time management. The company is a partnership between Ramandeep Kaur, Mandeep Sethi, Prabhjyot Singh, and Jasjot Singh. Each team member has key responsibility.

Mandeep Sethi – Head software developer: She is responsible for developing software and making sure that all desired features are included in the final product. She interacts with the marketing department to collect all the customer requirements and features. She is also responsible for making sure that all deadlines are met.

Ramandeep Kaur – Project Manager: She is responsible for making schedules, scope, budget, work break down structure, ensures that goals are met on time, project charter. She is responsible for managing finances at versatile management. Her responsibilities include collecting and analyzing financial data, reduce cost, manage company funds effectively, provide financial statements such as balance sheet, cash flow and income statement for the company. She is also responsible for outsourcing any human resources or any activity that is not the strength of
the company.

**Prabhjyot Singh - Marketing Manager:** This person has a major role both during the initiation of the project and after the final product is made. His main responsibilities include market research to identify the needs of targeted customer. He is also responsible in marketing the product to the right customer and make sure that sales increase. He is the person who decides on the techniques used for promotion, product development, pricing and public relation activities.

**Jasjot Singh – Quality Assurance:** He is the head of quality department. He manages a team that test the product and decides if the product meets the standards. Although he is involved throughout the project, his main role is during the testing phase. It ensures that the quality matches the standard level for better customer satisfaction. He gives a summary report at the end of testing phase which gives details of the performance of the product. It also provides information on the bugs detected and if all the bugs were debugged.

Key Requirements and skill for all employees are:

- MS in Engineering with minimum of two years of industry experience.
- Be able to work independently.
- Enthusiastic about working at Versatile Management.
- Dedication toward their work.
- Effective communication.
- Good workman’s spirit.
- Equal involvement.

**The keys to our success are:**

- Working cooperatively with the software developers and management service providers.
• Following efficient business management policies.

• Working in accordance with balanced scorecard in order to compare results like customer satisfaction goals, financial goals, business process goals.

• Providing our clients with highly reliable and innovative native software applications.

9.8 Product Cost summary

Several costs are associated with our product. Start up cost represents the amount of money to start the business. Total cost of the product is considered to calculate the price of the product. Not only does Versatile Management focuses on decreasing variable cost, but the total cost of the product which includes cost not associated directly with the producing the product. Versatile Management reduces cost include by minimizing cost through design, quality cost, and overhead cost.

9.8.1 Start-up Summary

Our start up costs comes to approximately $30,000. In the initial first few months the employees will not receive salary or until the company sells enough units to pay for the salary. Projected Start-up costs; expenses and funding sources are presented in Tables 5&6

<table>
<thead>
<tr>
<th>Start-up Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-up Expenses $20,000</td>
</tr>
<tr>
<td>Start- Assets to Fund $10,000</td>
</tr>
<tr>
<td>Total Funding Required $30,000</td>
</tr>
</tbody>
</table>

Table 5: Start-Up Funding
Other assumptions related to liabilities, capital, debit, assets are shown in the following table 6.

<table>
<thead>
<tr>
<th>Liabilities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Borrowing</td>
<td>$0</td>
</tr>
<tr>
<td>Long-Term Liabilities</td>
<td>$10,000</td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>$0</td>
</tr>
<tr>
<td>Other Current Liabilities</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Total Liabilities</strong></td>
<td><strong>$10,000</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capital</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned Investment</td>
<td></td>
</tr>
<tr>
<td>Investor-1</td>
<td>$15,000</td>
</tr>
<tr>
<td>Investor-2</td>
<td>$15,000</td>
</tr>
<tr>
<td>Other</td>
<td>$8,000</td>
</tr>
<tr>
<td><strong>Total Planned Investment</strong></td>
<td><strong>$30,000</strong></td>
</tr>
<tr>
<td>Loss at Start-Up</td>
<td>$20,000</td>
</tr>
<tr>
<td><strong>Total Capital</strong></td>
<td><strong>$18,000</strong></td>
</tr>
<tr>
<td><strong>Total Capital and Liabilities</strong></td>
<td><strong>$28,000</strong></td>
</tr>
<tr>
<td><strong>Total Funding</strong></td>
<td><strong>$38,000</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assets</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Cash Assets from Start-up</td>
<td>$10,000</td>
</tr>
<tr>
<td>Cash Requirements from Start-up</td>
<td>$5,000</td>
</tr>
<tr>
<td>Additional Cash Raised</td>
<td>$500</td>
</tr>
<tr>
<td>Cash Balance on Starting Date</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td><strong>$15,500</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Start-up Expenses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal Expenses</td>
<td>$2,000</td>
</tr>
<tr>
<td>Stationery etc.</td>
<td>$500</td>
</tr>
<tr>
<td>Insurance</td>
<td>$1,500</td>
</tr>
<tr>
<td>Rent</td>
<td>$2,500</td>
</tr>
<tr>
<td>Software &amp; IT</td>
<td>$10,000</td>
</tr>
<tr>
<td>Web-Site</td>
<td>$500</td>
</tr>
<tr>
<td>Office Equipment</td>
<td>$1,500</td>
</tr>
<tr>
<td>Membership Fees</td>
<td>$500</td>
</tr>
<tr>
<td>Other</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Total Start-Up Expenses</strong></td>
<td><strong>$18,000</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Start-up Assets</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cash Required</strong></td>
<td><strong>$5,000</strong></td>
</tr>
<tr>
<td><strong>Other Current Assets</strong></td>
<td>$0</td>
</tr>
<tr>
<td><strong>Long-Term Assets</strong></td>
<td><strong>$10,000</strong></td>
</tr>
<tr>
<td><strong>Start-up inventory</strong></td>
<td><strong>$8,000</strong></td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td><strong>$23,000</strong></td>
</tr>
</tbody>
</table>

Table 6: Start-Up Summary
9.8.2 Fixed Cost

Fixed Cost does not vary with the number of units sold. Fixed Cost includes rent, utilities, phone, internet, and licenses. Each category also has a subcategory. For example there are many types of licenses: business license to operate and license to utilize other software. Fixed Costs for the year 2010 are shown in the table below.

<table>
<thead>
<tr>
<th>Expense</th>
<th>Cost/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>License/Legal Expense</td>
<td>$2,000</td>
</tr>
<tr>
<td>Rent</td>
<td>$12,000</td>
</tr>
<tr>
<td>Furniture</td>
<td>$1,500</td>
</tr>
<tr>
<td>Phone</td>
<td>$1,200</td>
</tr>
<tr>
<td>Utilities</td>
<td>$1,200</td>
</tr>
<tr>
<td>Internet</td>
<td>$1,000</td>
</tr>
<tr>
<td></td>
<td>$18,900</td>
</tr>
</tbody>
</table>

Table 7: Fixed Cost

9.8.3 Variable Cost

Variable Costs are cost that varies with the increase in the business activity. As the business expands supply and marketing cost increase. In addition, more personnel will be hired to meet the needs of the growing business. As employees increase, insurance expenses will also increase along with the supplies. Variable Cost for the year 2010 is shown in Table 8.

<table>
<thead>
<tr>
<th>Variable Cost</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplies</td>
<td>1200</td>
</tr>
<tr>
<td>Employee Salary</td>
<td>120,000</td>
</tr>
<tr>
<td>Marketing Cost</td>
<td>2000</td>
</tr>
<tr>
<td>Employee Insurance</td>
<td>3000</td>
</tr>
<tr>
<td>Others</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>126300</td>
</tr>
</tbody>
</table>

Table 8: Variable Cost

The following plan is for VERSATILE Project Management. The table and charts show the three year financial plan for our company. Initially, there will be two individuals investing in our team,
who greatly believe in our product. As shown, the overhead cost will be kept as minimal as possible. Our major cost is labor.

**Important Assumptions**

The following assumptions were made to create the financial plan:

- Successful Completion of VERSATILE Project Management Software by 2010.
- No major changes in the Economy.
- Three employees will be sufficient to complete all the work in the Company.
- Sales team will reach the targeted Sales for each year.

**9.8.4 Profit and Loss Statement**

Our business expects to incur a loss during its first year by .04%. The following year, we expect the sales to increase by 17%. However, in 2011, profit will increase to 23%, amounting to $81,252.

<table>
<thead>
<tr>
<th></th>
<th>FY2010</th>
<th>FY2011</th>
<th>FY2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$200,000</td>
<td>$260,000</td>
<td>$350,000</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>$150,000</td>
<td>$260,000</td>
<td>$350,000</td>
</tr>
<tr>
<td>Gross Margin %</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Expenses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payroll</td>
<td>$120,000</td>
<td>$150,000</td>
<td>$180,000</td>
</tr>
<tr>
<td>Sales and Marketing Expenses</td>
<td>$2,000</td>
<td>$3,000</td>
<td>$4,500</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
</tr>
</tbody>
</table>
## Table 9: Profit & Loss Statement

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leased Equipment</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Utilities</td>
<td>$300</td>
<td>$350</td>
<td>$425</td>
</tr>
<tr>
<td>Insurance</td>
<td>$3000</td>
<td>$3300</td>
<td>$3800</td>
</tr>
<tr>
<td>Rent</td>
<td>$1000</td>
<td>$1000</td>
<td>$1,000</td>
</tr>
<tr>
<td>Payroll Taxes</td>
<td>$25,000</td>
<td>$32,500</td>
<td>$40,000</td>
</tr>
<tr>
<td>Other</td>
<td>$6400</td>
<td>$6600</td>
<td>$7000</td>
</tr>
<tr>
<td>Total Operating Expenses</td>
<td>$156,700</td>
<td>$197,750</td>
<td>$233,925</td>
</tr>
<tr>
<td>Profit before taxes</td>
<td>$6700</td>
<td>$62250</td>
<td>$116,075</td>
</tr>
<tr>
<td>Taxes Incurred</td>
<td>$0</td>
<td>$18,675</td>
<td>$34,822</td>
</tr>
<tr>
<td>Net Profit</td>
<td>$-6700</td>
<td>$44,575</td>
<td>$81,252</td>
</tr>
<tr>
<td>Net Profit/Sales</td>
<td>-.04%</td>
<td>17%</td>
<td>23.61%</td>
</tr>
</tbody>
</table>

### 9.9 Break-Even Analysis

Break even analysis shows the amount of units necessary sell to for the company to have a net profit of zero. The summary of profit is presented in Table 10. Fixed Cost is cost that occurs regardless of number of units sold. Variable cost is cost that varies with increase in business activity. Total cost is variable plus fixed cost. Profit is revenue minus total cost. The table below shows the number of customers, sales, fixed cost, variable cost, total cost and profit for fiscal years 2010, 2011, and 2012. As shown in Figure 16, break even occurs around in the beginning of 2011.
Table 10: Summary of Profit

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Customers</td>
<td>3750</td>
<td>6500</td>
<td>8750</td>
</tr>
<tr>
<td>Sales</td>
<td>$150,000</td>
<td>$260,000</td>
<td>$350,000</td>
</tr>
<tr>
<td>Fixed cost</td>
<td>$18,900</td>
<td>$18,900</td>
<td>$18,900</td>
</tr>
<tr>
<td>Variable cost</td>
<td>$137,800</td>
<td>$178,850</td>
<td>$215,025</td>
</tr>
<tr>
<td>Total cost</td>
<td>$156,700</td>
<td>$197,750</td>
<td>$233,925</td>
</tr>
<tr>
<td>Profit</td>
<td>($6,700)</td>
<td>$62,250</td>
<td>$116,075</td>
</tr>
</tbody>
</table>

Figure 32: Break Even Analysis

Table 17 shows summary of the Sales, Cost, and Profit. In 2010, the company face a loss of $6700. In 2011, 6500 customers provided revenues of $260,000 with a profit amounting to $62,250. In year 2012, 8750 customers bought the tool leading to profit of $116,075. It is projected that the company will continue on this success path in the future as well.
9.10 Return on investment (ROI)

ROI is return on investment. It is a ratio that shows return on the money invested. Investors look at the ROI ratio to ensure that they get maximum amount of money for the dollar invested. The higher the ROI ratio, more the investor is willing to invest. Versatile Management’s ROI for year 2010, 2011, and 2012 is summarized in Table 11.

\[
\text{ROI} = \frac{(\text{Total Revenue} - \text{Total cost})}{\text{Total cost}}
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Cost</th>
<th>Total Revenue</th>
<th>ROI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>156,700</td>
<td>150,000</td>
<td>-0.04276</td>
</tr>
<tr>
<td>2011</td>
<td>197,750</td>
<td>260,000</td>
<td>0.314791</td>
</tr>
<tr>
<td>2012</td>
<td>233,925</td>
<td>350,000</td>
<td>0.496206</td>
</tr>
</tbody>
</table>

Table 11: Return on Investment
The ROIs for the year 2010, 2011, and 2012 are shown in Figure 18. For the first year, the company ROI is negative, since the company did not sell enough units to break even. However, in year 2011, the company had positive ROI with sustained growth in year 2012.

9.11 SWOT Analysis

SWOT analysis outlined in Table 12 is performed to analyze the strength, weakness, opportunities and threats involved in the project.
<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provide web-based management tool.</td>
<td>• Not well known in industry or established</td>
</tr>
<tr>
<td>• High Project Management demand.</td>
<td>name.</td>
</tr>
<tr>
<td>• Reduce both time and cost.</td>
<td>• Not for a specific industry.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Due to economy, more companies are looking</td>
<td>• Many well established competitors such as</td>
</tr>
<tr>
<td>for ways to decrease their cost.</td>
<td>Microsoft Project.</td>
</tr>
<tr>
<td>• Continuous improvement or upgrade to add</td>
<td>• Less contacts with our customer when</td>
</tr>
<tr>
<td>additional features.</td>
<td>compared to competitors.</td>
</tr>
</tbody>
</table>

Table 12:  SWOT Analysis

9.12 Exit Strategy

Exit Strategy

The exit strategy is an important part of the business plan. It helps us decide when ROI must be released. Since breakeven point occurs after the first year, the company experiences an ROI in the second year. We are most likely to sell to bigger company and obtain high profits for the initial investors. However, this market is highly competitive and can change very quickly.

Below is the list of a few other exit strategies

- Sell to indirect competitors
- Better market the product
- Reduce cost
9.13 Norden-Rayleigh Analysis

The Norden-Rayleigh analysis models time-phasing of expenditures. This analysis shows the expenses for our project relative to time. We calculate the probability density function and cumulative distribution function using the formulas below:

\[ V(t) = d(1-e^{-at^2}) \]

\[ V(t) = 2adte^{-at^2} \]

- \( V(t) \) represents the total cost/effort expended.
- \( T \) represents time.
- \( D \) represents the actual/estimate total budget.
- \( A \) represents the shape parameter that represents financial cost drivers such as technical, personnel, and competitive.

<table>
<thead>
<tr>
<th>t</th>
<th>d</th>
<th>a</th>
<th>(-at^2)</th>
<th>e(-at^2)</th>
<th>V = d(1-e(-at^2))</th>
<th>V = 2adte(-at^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>150000</td>
<td>0.35</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>150000</td>
<td>0.35</td>
<td>-0.35</td>
<td>0.70471</td>
<td>44292.95056</td>
<td>73994.93461</td>
</tr>
<tr>
<td>2</td>
<td>150000</td>
<td>0.35</td>
<td>-1.4</td>
<td>0.24663</td>
<td>113005.0857</td>
<td>51792.88003</td>
</tr>
<tr>
<td>3</td>
<td>150000</td>
<td>0.4</td>
<td>-3.6</td>
<td>0.02733</td>
<td>145899.9115</td>
<td>9840.212387</td>
</tr>
<tr>
<td>4</td>
<td>150000</td>
<td>0.35</td>
<td>-5.6</td>
<td>0.0037</td>
<td>149444.9983</td>
<td>1554.004804</td>
</tr>
<tr>
<td>5</td>
<td>150000</td>
<td>0.25</td>
<td>-6.25</td>
<td>0.00193</td>
<td>149710.2442</td>
<td>724.3895728</td>
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<tr>
<td>6</td>
<td>150000</td>
<td>0.25</td>
<td>-9</td>
<td>0.00012</td>
<td>149981.4712</td>
<td>55.58625843</td>
</tr>
<tr>
<td>7</td>
<td>150000</td>
<td>0.25</td>
<td>-12.25</td>
<td>4.8E-06</td>
<td>149999.2813</td>
<td>2.515379468</td>
</tr>
<tr>
<td>8</td>
<td>150000</td>
<td>0.25</td>
<td>-16</td>
<td>1.1E-07</td>
<td>149999.9831</td>
<td>0.067633212</td>
</tr>
<tr>
<td>9</td>
<td>150000</td>
<td>0.25</td>
<td>-20.25</td>
<td>1.6E-09</td>
<td>149999.9998</td>
<td>0.001085806</td>
</tr>
<tr>
<td>10</td>
<td>150000</td>
<td>0.25</td>
<td>-25</td>
<td>1.4E-11</td>
<td>150000</td>
<td>1.0443E-05</td>
</tr>
<tr>
<td>11</td>
<td>150000</td>
<td>0.25</td>
<td>-30.25</td>
<td>7.3E-14</td>
<td>150000</td>
<td>6.03126E-08</td>
</tr>
<tr>
<td>12</td>
<td>150000</td>
<td>0.25</td>
<td>-36</td>
<td>2.3E-16</td>
<td>150000</td>
<td>2.09538E-10</td>
</tr>
<tr>
<td>13</td>
<td>150000</td>
<td>0.25</td>
<td>-42.25</td>
<td>4.5E-19</td>
<td>150000</td>
<td>4.38496E-13</td>
</tr>
</tbody>
</table>

Table 13: Norden Rayleigh
Figure 35: Cumulative Distribution Function

Figure 36: Probability Density Function
### 10.0 Gantt Chart

#### 10.1 Phase-I

<table>
<thead>
<tr>
<th>Number</th>
<th>Task</th>
<th>Resource</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project Scope</td>
<td></td>
<td>8/25/2009</td>
<td>10/2/2009</td>
</tr>
<tr>
<td>1.3</td>
<td>Project Scope Presentations</td>
<td></td>
<td>9/25/2009</td>
<td>10/2/2009</td>
</tr>
<tr>
<td>2</td>
<td>Literature Survey</td>
<td></td>
<td>10/2/2009</td>
<td>10/16/2009</td>
</tr>
<tr>
<td>2.1</td>
<td>Resources</td>
<td></td>
<td>10/2/2009</td>
<td>10/7/2009</td>
</tr>
<tr>
<td>2.2</td>
<td>Literature Survey Report</td>
<td></td>
<td>10/7/2009</td>
<td>10/14/2009</td>
</tr>
<tr>
<td>2.3</td>
<td>Literature Survey Presentations</td>
<td></td>
<td>10/10/2009</td>
<td>10/16/2009</td>
</tr>
<tr>
<td>3</td>
<td>Economic Analysis</td>
<td></td>
<td>10/16/2009</td>
<td>10/30/2009</td>
</tr>
<tr>
<td>3.1</td>
<td>Research</td>
<td></td>
<td>10/16/2009</td>
<td>10/20/2009</td>
</tr>
<tr>
<td>3.3</td>
<td>Economic Analysis Presentation/</td>
<td></td>
<td>10/24/2009</td>
<td>10/30/2009</td>
</tr>
<tr>
<td></td>
<td>Presentation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Final Project</td>
<td></td>
<td>10/30/2009</td>
<td>11/20/2009</td>
</tr>
</tbody>
</table>

#### 10.2 Phase-II
<table>
<thead>
<tr>
<th>Number</th>
<th>Task</th>
<th>Resource</th>
<th>Start</th>
<th>End</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Develop the Architecture</td>
<td>12/15/2009</td>
<td>1/6/2010</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Develop the Code</td>
<td>1/6/2010</td>
<td>2/10/2010</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>Finalize the Software</td>
<td>2/10/2010</td>
<td>3/3/2010</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>Modification &amp; Testing</td>
<td>3/22/2010</td>
<td>3/22/2010</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Final Project Presentation</td>
<td>4/8/2010</td>
<td>4/16/2010</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

11.0 Conclusion
The idea behind this project is to develop a common platform for all the workers, project managers and higher management, so that they can work concurrently on any project. We designed a Web Gateway for the management to follow all the actions taken by the employees. The software developed offers the following features: planning, organizing, giving directions or commands, checking progress, look after number of issues in the project, document management and progress of the project. Managers can check the progress of the project anytime by logging in. Files stored can be used anytime in the future as a reference. The application developed will be useful for the individuals working on a variety of projects simultaneously. Specific tasks are performed by this tool such as scheduling, calculating critical path along with the other information. The final product is turned out to be cost effective and efficient as compared to other products in the market.

Balance sheets and income statements were made to show the cash and credit relationship of Versatile Management Solutions. As we are a bit optimist we expect our business to increase profit within the first year. Benefits of using Project Management tool are:

1. One can make better decisions regarding the status of different projects and budgets
2. Better project planning and efficient communication system.
3. Easy data management, there will be a worksheet which will allow us to add task, assign users, helps in creating subtasks, and durations. It will helps us to do different tasks simultaneously.
4. Project Management Software presents cost data that facilitate you to make better judgment.

(Project Management Software Review, 2010)

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