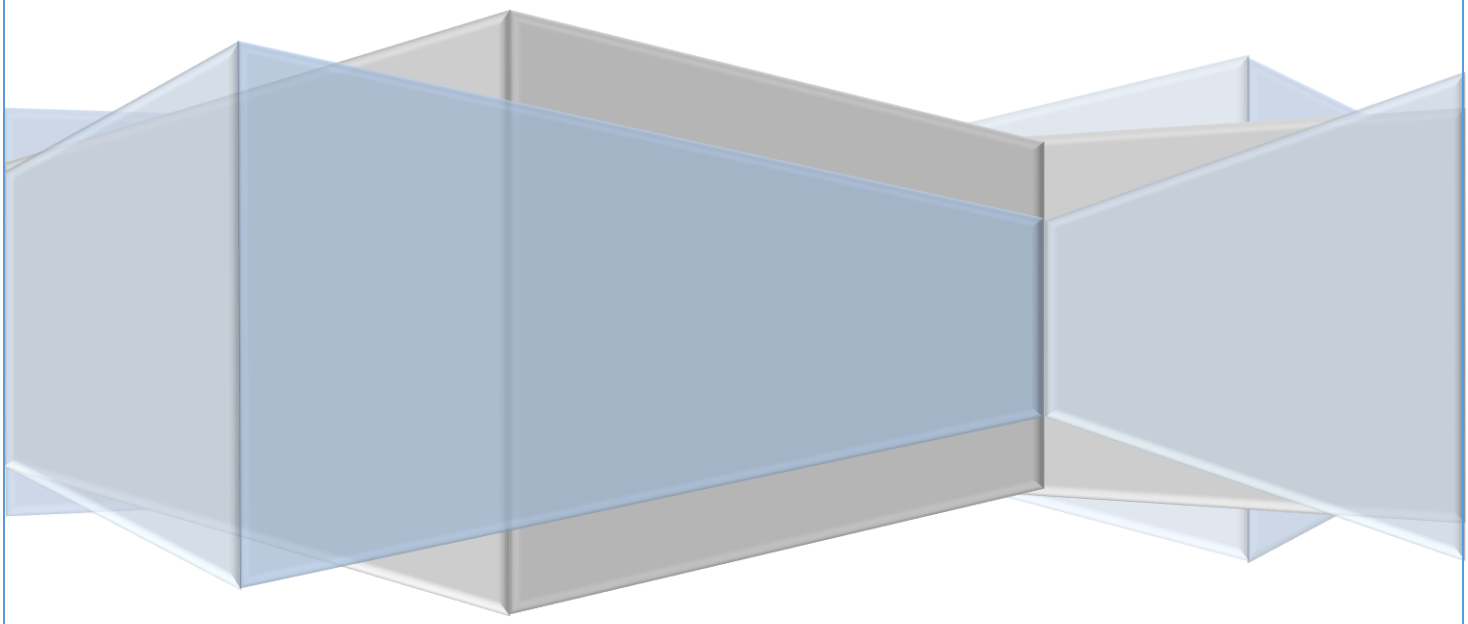
Newspaper Delivery System
Project Management Report

Aaron Molloy, James Kenny, Taras Voloshyn



B.Sc. Software Engineering Year 4

November, 2013

Newspaper Delivery System

Project Management Report

compiled by

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Glossary of Terms

AJAX – A technique for creating fast and dynamic web pages

Cloud Service – Computer services provided to customers over the Internet

Critical Path - The sequence of dependent steps that determine the minimum time needed to carry out an operation

Eclipse – An Integrated Development Environment used for Software Development

GIT – Repository used for version control

Javascript - A programming language

MySQL – A database management system

PHP – A programming language

V-model — one of the models which defines processes and their order within software development lifecycle. This model is based around continuous testing all the way through the project.

WBS — Work Breakdown Structure

Xampp - Open source cross-platform web server solution stack package

Introduction

Purpose of the Document

The purpose of this report is to outline the various project management considerations that we will undertake in designing the Newspaper Delivery Service. The report will detail:

- **System Overview –** A short description of the project requirements
- **Project Organisation -** List of the roles required to undertake the project
- **Risk Analysis –** An analysis of the risks involved in the project
- **Resource Requirements –** Details of the Hardware and Software resources required to undertake the project.
- **Work Breakdown Structure –** A diagrammatic breakdown of the work involved in bringing the project to completion.
- **Project Schedule –** A schedule of every aspect of the project detailing the timeframes involved in Requirement Elicitation, Design, Implementation and Testing.
- **Monitoring and Reporting mechanisms –** Details of how the project will be monitored and reported.

System Overview

This Newspaper Delivery System is intended to manage the delivery of newspapers and magazines in a small town or area of a larger town. It is intended for use by newsagents who are only casual users of computer systems and should run on a PC or similar hardware.

Factors which should be taken into account in specifying and designing this system are:

- For each delivery person, the system must print, each day, the publications to be delivered to each address.
- The system should also print, for the newsagent, a summary of who received what publications each day.
- Once a month, bills are delivered to customers along with their newspapers. These bills should be computed automatically by the system.
- Customers come and go and may be away temporarily on holiday or on business.
- Not all customers necessarily have a delivery every day.
- The system should be able to manage some simple geographic information so that it prints information for the delivery person in the order in which publications are delivered.

It was decided to design the system as a web application hosted by a cloud service for the following reasons:

- Our skillsets lay mostly in the web development area.
- A requirement for the system that it would be used by newsagents who are only casual users of computers. We therefore felt that a web application would be easier for the newsagent to use and more intuitive to learn.
- A web application gives greater accessibility.
- A system hosted by a cloud service would be easier and more efficient for backup and security purposes.

Project Organization

The project will be undertaken by a three man team comprising of Aaron Molloy, Jimmy Kenny and Taras Voloshyn. Mike Russell will act as the Project Manager and the team will periodically report progress or any serious issues to him.

Each team member shall share responsibility for Requirements, Design, Implementation, Testing, Integration and Deployment of the system but will be specifically responsible for the following features of the system:

- Customer Details and Printing Functions – Aaron Molloy
- Geographical Information and Summary Functions – Jimmy Kenny
- Database and Billing Functions – Taras Voloshyn

Risk Analysis

Risk No.	Risk Description	Probability (P) (of	Consequence (C) (of	Risk Exposure (RE)	Plan (Avoidance / Mitigate)
1	Development time underestimated	2	3	6	Allow for contingency.
2	Requirements change	5	2	10	Analyze the impact of the new requirements on entire project and discuss with cutomer of necessary.
3	Hardware failure	1	4	4	Have access to spare parts.
4	Data loss	3	5	15	Do regular backups.
5	Staff illness	2	2	4	Ensure that staff understand each others tasks. Reasign tasks between remaining members fo a team.
6	Budget cuts	1	5	5	Explain to customer why cuts in costing would have a detremental effect on development process.
7	Underestimation of resources	2	3	6	Understand hardware capabilities for given requirements.
8	Misunderstanding of the requirements	3	4	12	Plan interview well so all the requirement are understood correctly.
9	Poor project planning	2	3	6	Review project plan at regular intervals.
10	Lack of skills or knowledge	2	3	6	Ensure adequate training of team members.
11	Incorrect hardware requirements	3	4	12	Test hardware requirements e.g Test server under high load
12	Change in client management during the project	1	3	3	Make sure that contract cover this risk.
13	Data theft	2	4	8	Ensure adequate security measures are taken eg strong firewalls, virus protection etc.
14	System doesn't perform to expectations	3	3	9	Understand requirements fully. Ensure hardware and software resources are of high specification.
15	Budget overrun	3	3	9	On-going reviews of project spend
16	Requirements inadequate	2	4	8	Interact with customer to make sure requirements are sound
17	Design of system inadequate	2	4	8	Read and understand requirements fully. Make sure designer has appropriate skill level.

Probability of Occurrence

The Risk Exposure values in the table above were calculated from two other values: Probability of Occurrence and the Consequences of Occurrence measures. The metrics for the Probability of Occurrence calculations were chosen because they increase evenly from low to high which makes it easier to assign probability factors to our risks. As you can see, we have used 20% increments for each measure. The reason we didn't use a more detailed measurement (e.g. 1%) was due to the complexity it would introduce when deciding what the probability of each risk with consideration to the type of system we are developing.

Category	Probability Measure	Probability Meaning
Very Low	1	0% to 20% chance of occurrence
Low	2	21% to 40% chance of occurrence
Avaerage	3	41% to 60% chance of occurrence
High	4	61% to 80% chance of occurrence
Very High	5	81% to 100% chance of occurrence

Consequences of Occurrence

The table below details the metrics used for the Consequences of Occurrence evaluations.

Consequence Measure	Consequence Meaning
1	Insignificant
2	Tolerable
3	Serious
4	Critical
5	Catastrophic

- **Insignificant** — something that will not affect project development.
- **Tolerable** — something that affects development of a project at some level (e.g. Requirements Change, Staff getting sick).
- **Serious** —something that might significantly influence scheduling and project development (e.g. Lack of knowledge).
- **Critical** — something that might cause project development to freeze (which also affects scheduling) for example misunderstanding of the requirements or hardware failure.
- **Catastrophic** — project might not be completed at all (e.g. Data loss, budget cuts).

Hardware and Software Resource Requirements

Hardware Requirements:

- PC x 3
- Printer
- Internet Connection

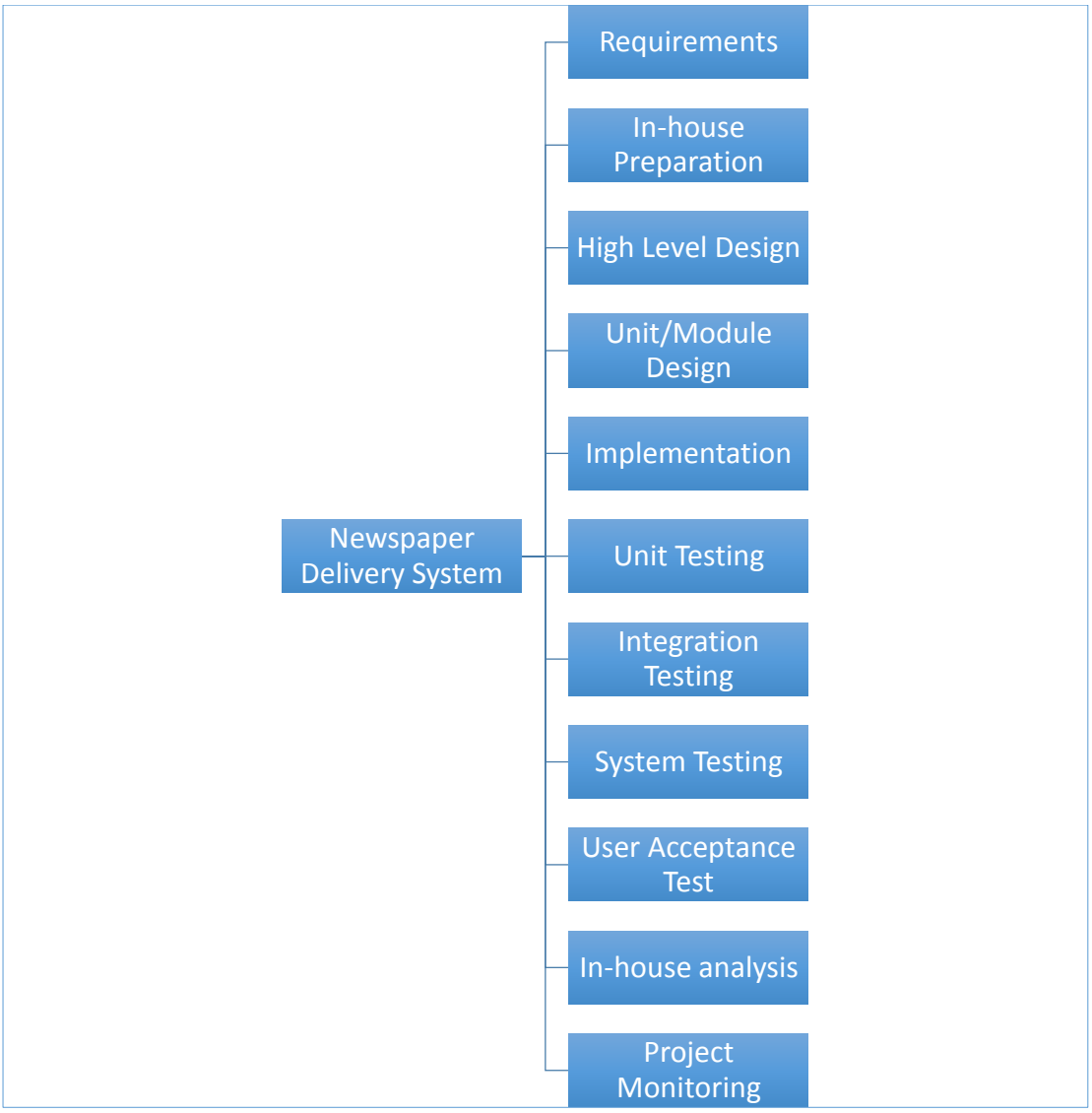
Software Requirements:

- Eclipse with JUnit plugin shall be used to develop and test the project.
- MySQL shall be used to develop the database required for the project.
- Google Maps integration shall be used to find out where customers are located.
- PHP shall be used in the development of the project.
- Xampp
- JavaScript
- AJAX/JSON
- Microsoft Office Excel shall be used to organize and input users billing information.
- Microsoft Office Word shall be used to write up the requirements document.
- HTML
- CSS shall be used to design the look of the application.
- GIT shall be used to manage the changes to the project.

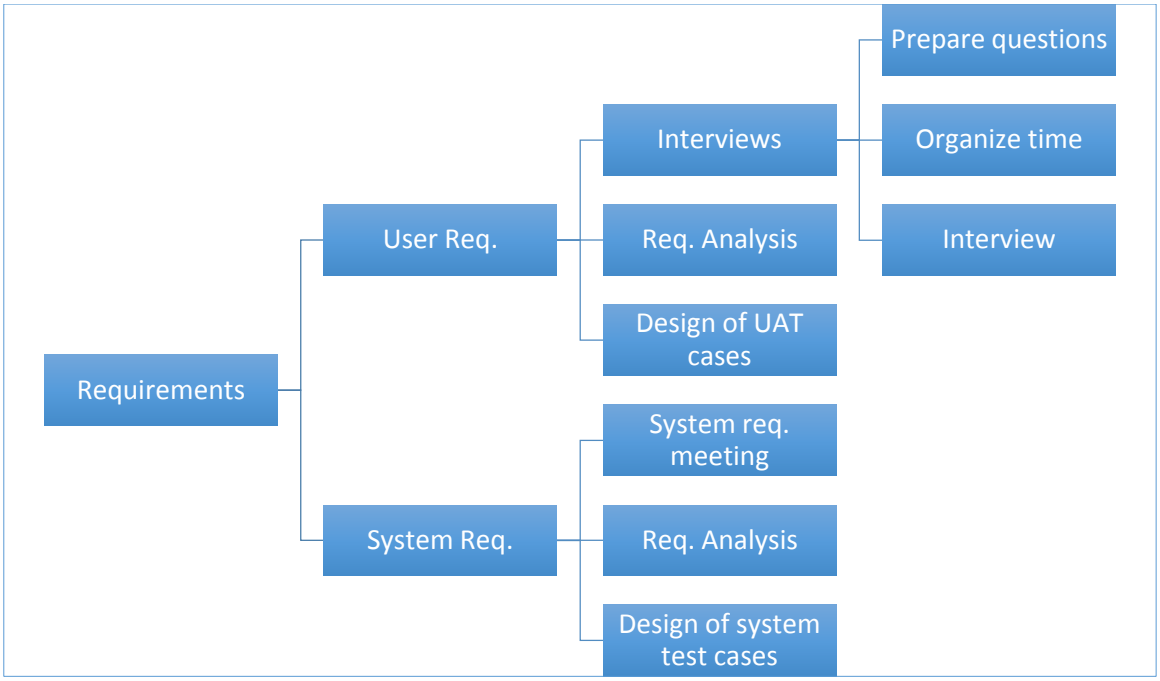
Work Breakdown Structure

In order to do a WBS, we had to choose a software development model for our project. Due to amount of sensitive data (Customer details etc.) that would be handled by the system, we decided that we should devote as much time as possible to the testing phases of the development particularly with regard to security of data. We decided to use the V-model as we believed that this would be more suitable in addressing those concerns.

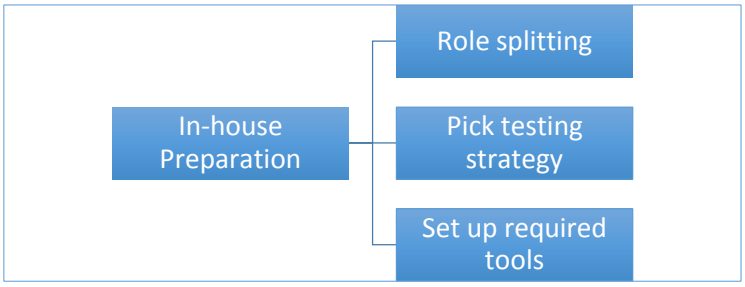
So our WBS was based around phases of the V-model such as the different levels for Requirements, Design, Implementation and Testing. We also found it necessary to have some preparation and post analysis within the company so we can split the roles and gather necessary metrics afterwards. For the actual WBS, a top-down approach was used which was more logical to us, as we didn't know at the time all the possible underlying tasks we might have.



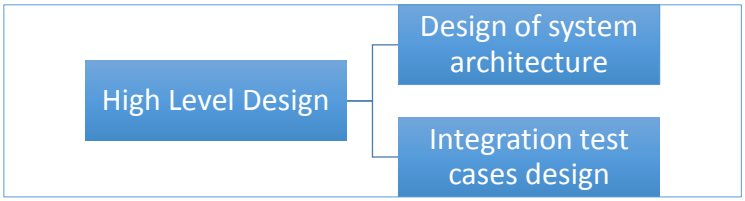
Overall Work Breakdown Structure



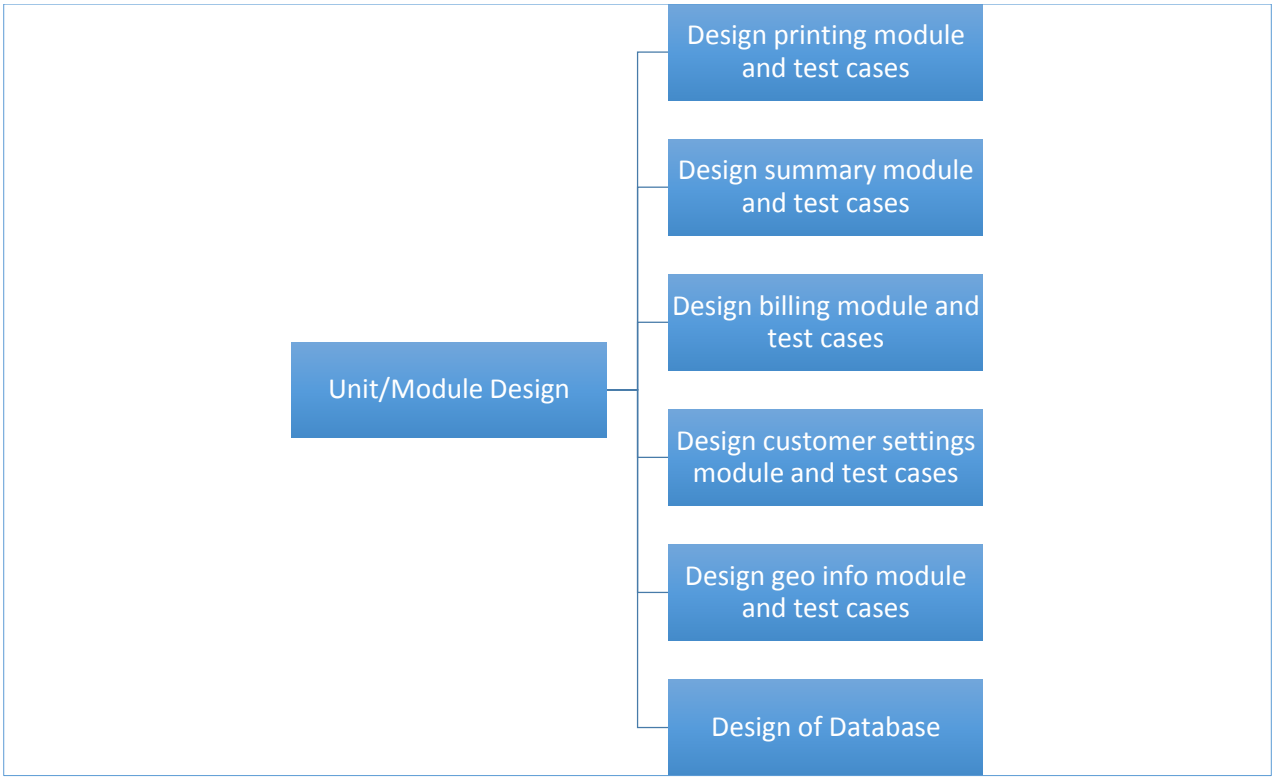
Requirements Work Breakdown Structure



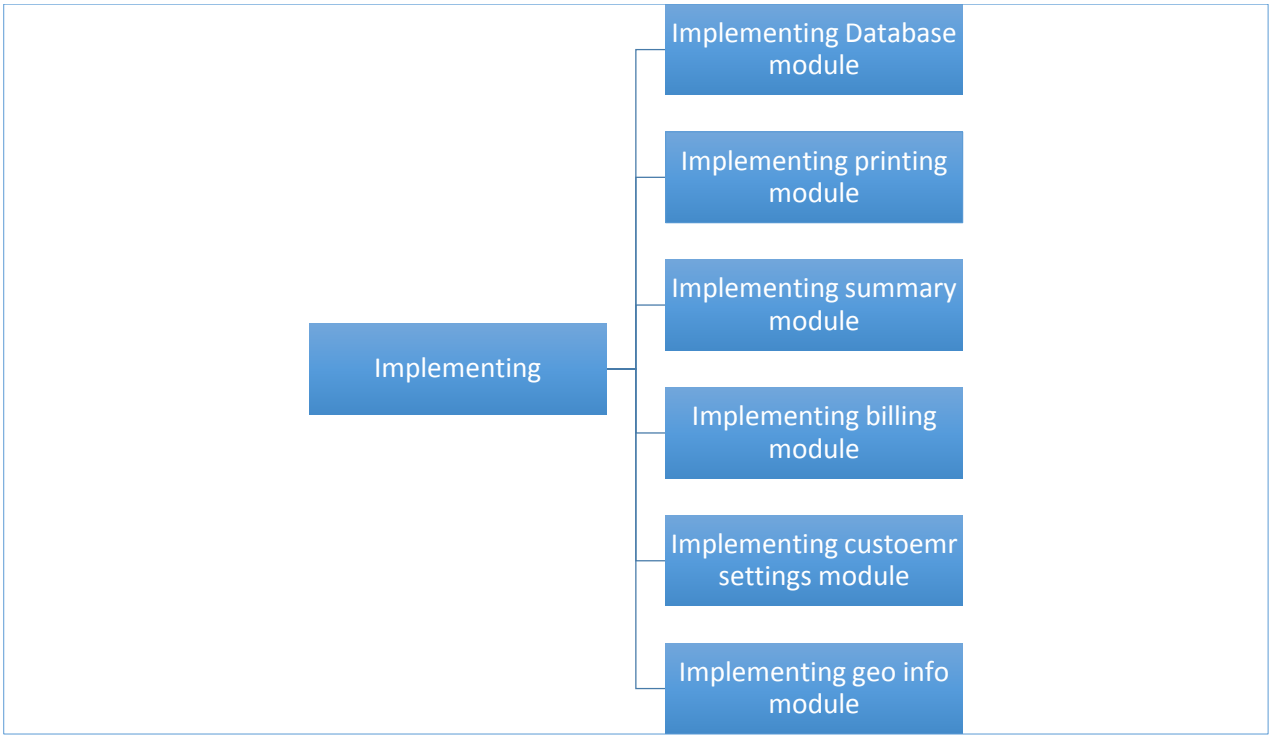
In-house Preparation Work Breakdown Structure



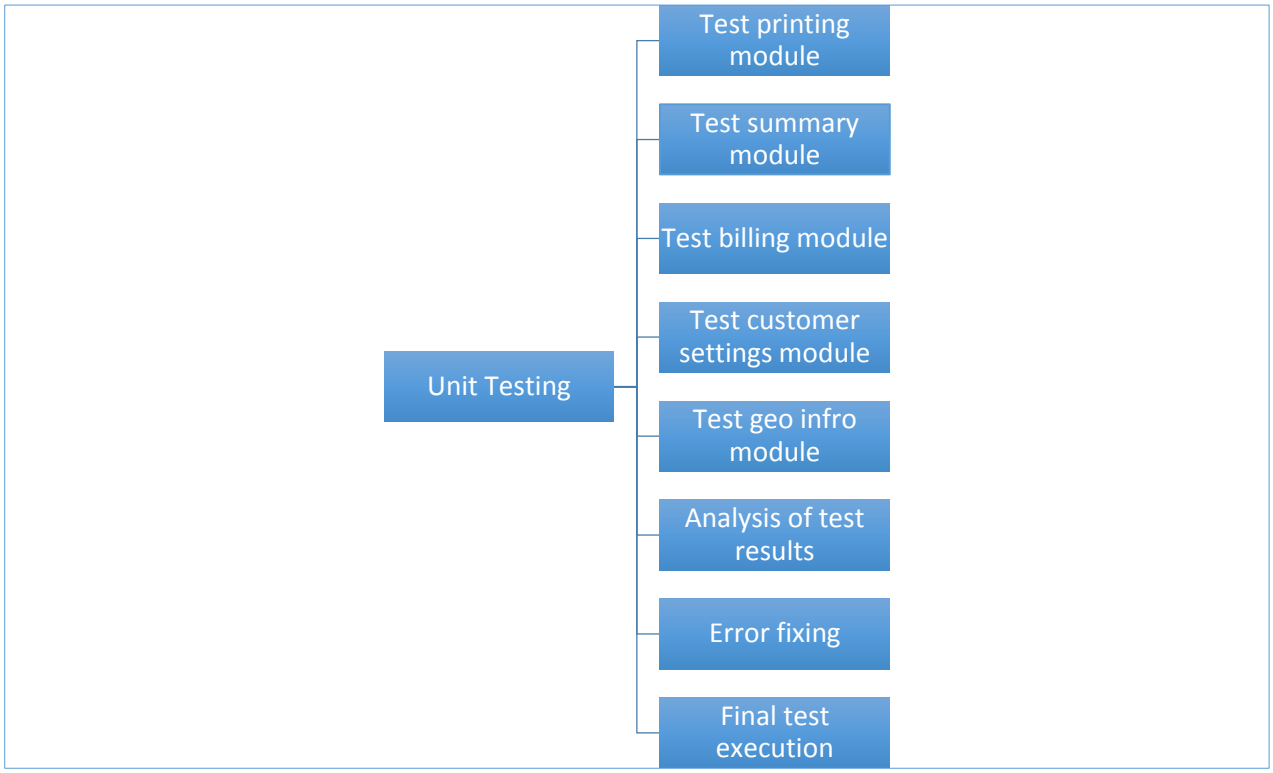
High Level Design Work Breakdown Structure



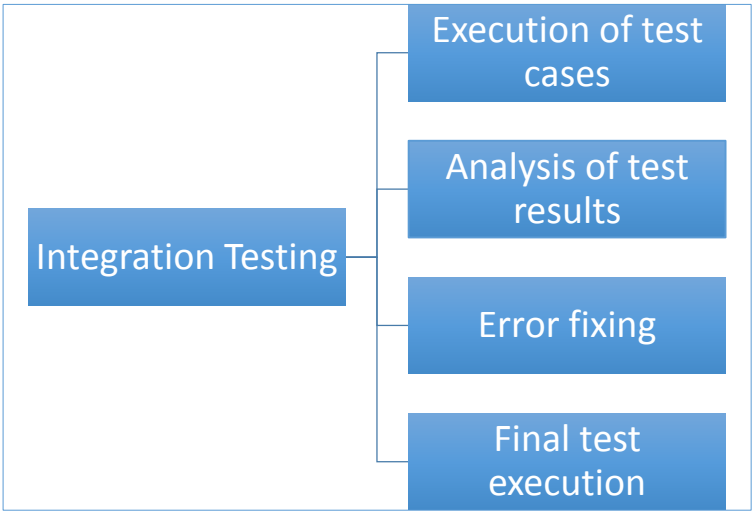
Unit/Module Work Breakdown Structure



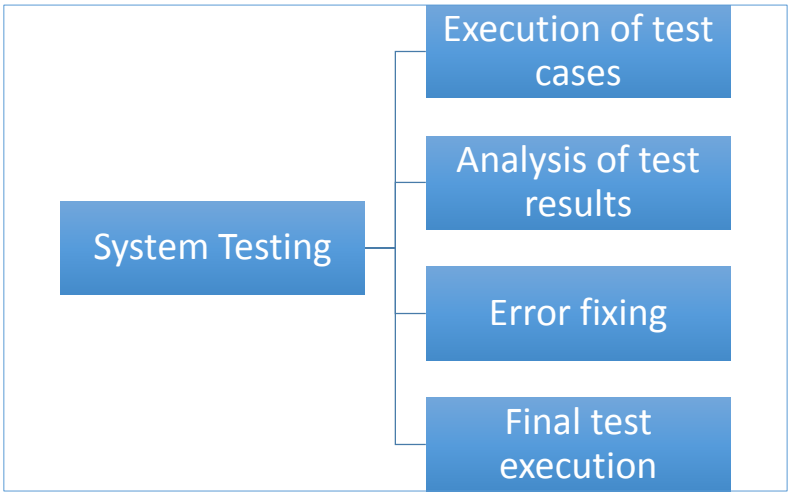
Implementation Work Breakdown Structure



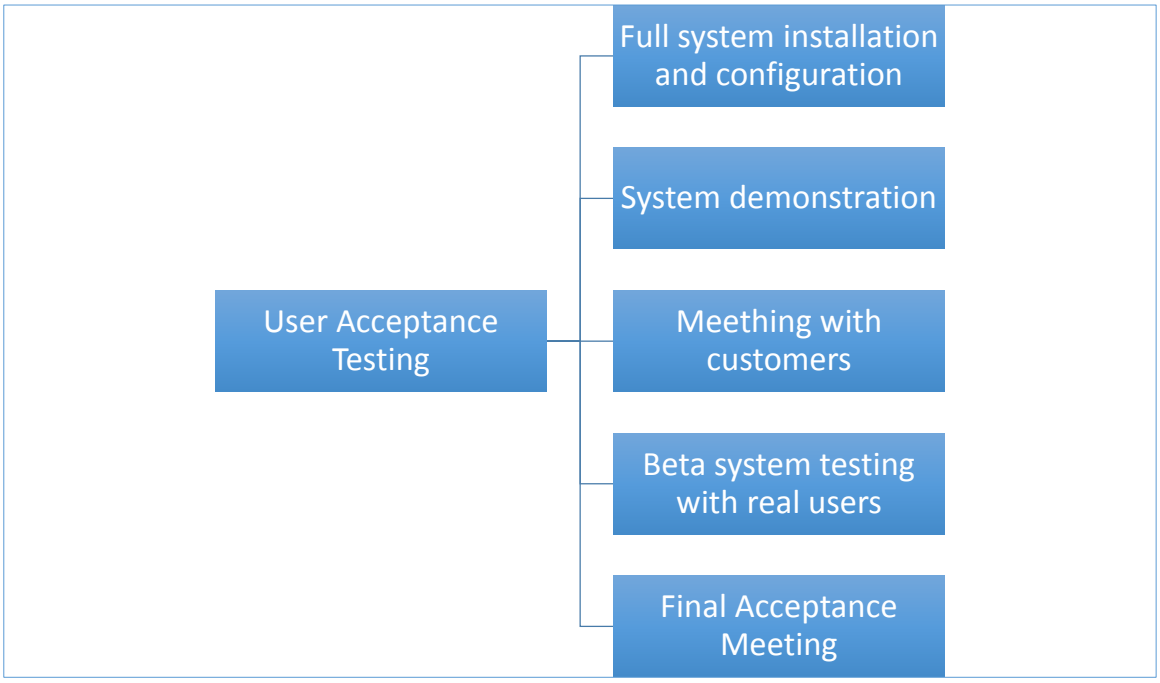
Unit Testing Work Breakdown Structure



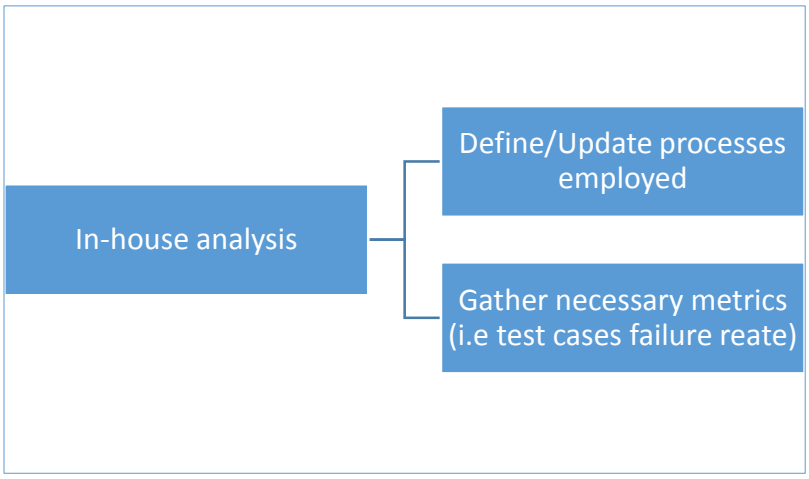
Integration Work Breakdown Structure



System Testing Work Breakdown Structure



User Acceptance Testing Work Breakdown Structure



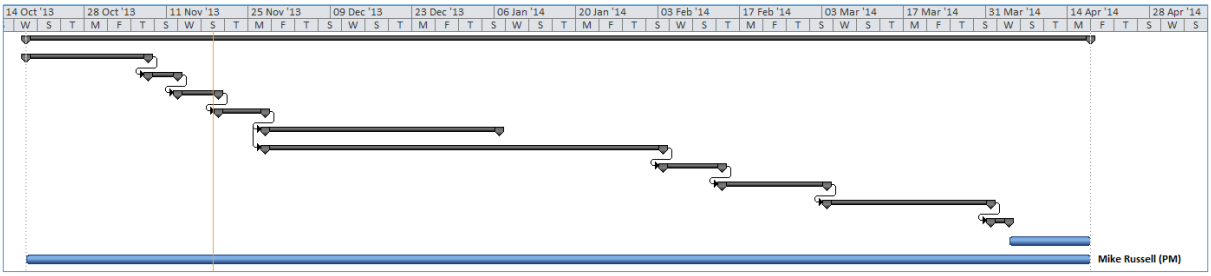
In-house Work Breakdown Structure

Project Scheduling

Overall structure

We used Microsoft Project to schedule our project. The structure was dictated by the Software Development Model we chose – the V model. From the figure below it can be seen that project is scheduled to take 130 days but we have also built in 10 days for Contingency. Over these 130 days the project will be overseen by Mike Russell, the Project Manager.

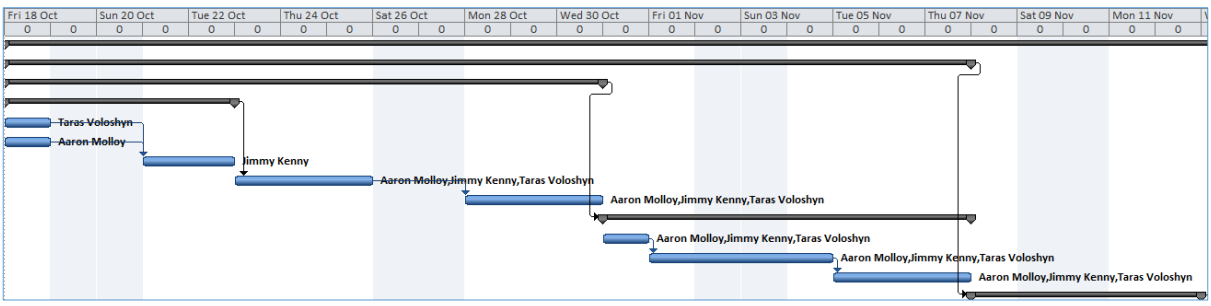
1		1 Newspaper delivery system	130 days	Fri 18/10/13	Thu 17/04/14	
2		1.1 Requirements	15 days	Fri 18/10/13	Thu 07/11/13	
14		1.2 In-house Preparation	3 days	Fri 08/11/13	Tue 12/11/13	2
18		1.3 High-Level Design	5 days	Wed 13/11/13	Tue 19/11/13	14
21		1.4 Unit/Module Design	6 days	Wed 20/11/13	Wed 27/11/13	18
28		1.5 Implementation	28 days	Thu 28/11/13	Mon 06/01/14	21
35		1.6 Unit Testing	48 days	Thu 28/11/13	Mon 03/02/14	21
44		1.7 Integration Testing	8 days	Tue 04/02/14	Thu 13/02/14	35
49		1.8 System Test	12 days	Fri 14/02/14	Mon 03/03/14	44
54		1.9 User Acceptance Test	20 days	Tue 04/03/14	Mon 31/03/14	49
60		1.10 In-House Analysis	3 days	Tue 01/04/14	Thu 03/04/14	54
63		1.11 Contingency	10 days	Fri 04/04/14	Thu 17/04/14	
64		1.12 Project Monitoring	130 days	Fri 18/10/13	Thu 17/04/14	Mike Russell (PM)



Requirements

Requirements is scheduled to take 16 man days and 15 actual working days. Two tasks run concurrently with the rest running consecutively.

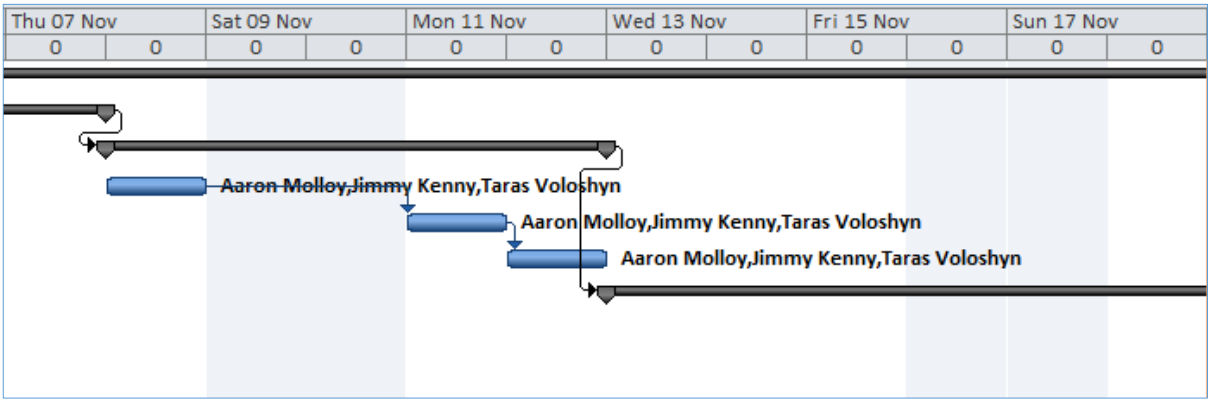
2	1.1 Requirements	15 days	Fri 18/10/13	Thu 07/11/13		
3	1.1.1 User Requirements	9 days	Fri 18/10/13	Wed 30/10/13		
4	1.1.1.1 Interviews	3 days	Fri 18/10/13	Tue 22/10/13		
5	1.1.1.1.1 Prepare questions for interview	1 day	Fri 18/10/13	Fri 18/10/13		Taras Voloshyn
6	1.1.1.1.2 Organize interview time	1 day	Fri 18/10/13	Fri 18/10/13		Aaron Molloy
7	1.1.1.1.3 Interviewing	2 days	Mon 21/10/13	Tue 22/10/13	5,6	Jimmy Kenny
8	1.1.1.2 Requirements Analysis	3 days	Wed 23/10/13	Fri 25/10/13	4	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
9	1.1.1.3 Design user acceptance test cases	3 days	Mon 28/10/13	Wed 30/10/13	8	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
10	1.1.2 System Requirements	6 days	Thu 31/10/13	Thu 07/11/13	3	
11	1.1.2.1 System requirements meeting	1 day	Thu 31/10/13	Thu 31/10/13		Aaron Molloy,Jimmy Kenny,Taras Voloshyn
12	1.1.2.2 Requirements Analysis	2 days	Fri 01/11/13	Mon 04/11/13	11	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
13	1.1.2.3 Design system test cases	3 days	Tue 05/11/13	Thu 07/11/13	12	Aaron Molloy,Jimmy Kenny,Taras Voloshyn



In-house Preparation

This phase will take 3 working days with all tasks running consecutively.

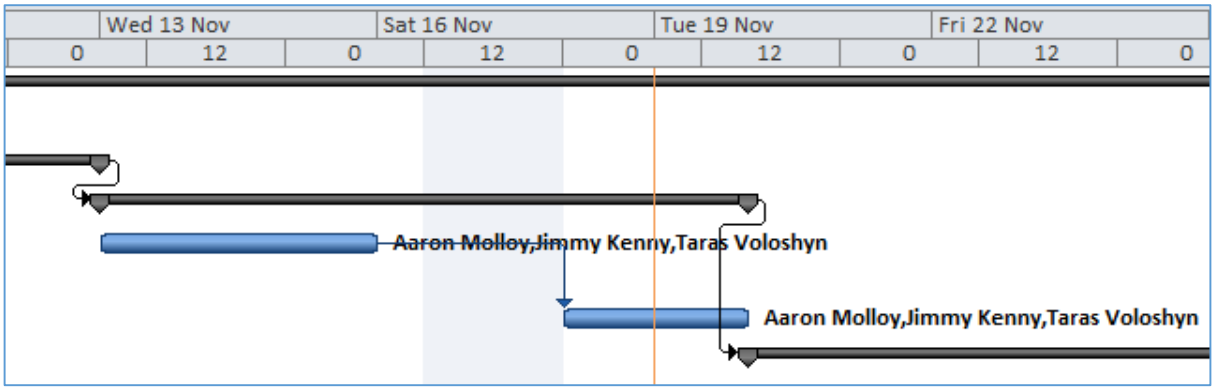
14	**1.2 In-house Preparation**	**3 days**	**Fri 08/11/13**	**Tue 12/11/13**	**2**	
15	1.2.1 Meeting about role splitting	1 day	Fri 08/11/13	Fri 08/11/13		Aaron Molloy,Jimmy Kenny,Taras Voloshyn
16	1.2.2 Discuss test strategy/approach	1 day	Mon 11/11/13	Mon 11/11/13	15	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
17	1.2.3 Setting up of required Tools	1 day	Tue 12/11/13	Tue 12/11/13	16	Aaron Molloy,Jimmy Kenny,Taras Voloshyn



High-Level Design

The High-Level Design phase will take 5 days with both tasks running consecutively.

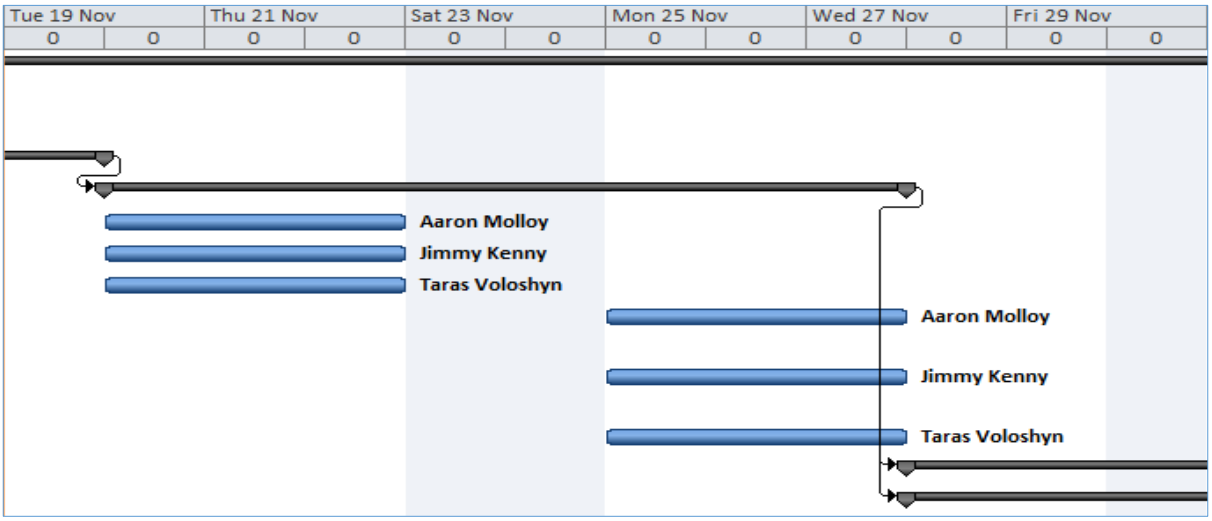
18	**1.3 High-Level Design**	**5 days**	**Wed 13/11/13**	**Tue 19/11/13**	**14**	
19	1.3.1 Design discussion about overall architecture of a system	3 days	Wed 13/11/13	Fri 15/11/13		Aaron Molloy,Jimmy Kenny,Taras Voloshyn
20	1.3.2 Design of Integration test cases	2 days	Mon 18/11/13	Tue 19/11/13	19	Aaron Molloy,Jimmy Kenny,Taras Voloshyn



Unit/Module Design

This phase will take a total of 6 actual working days and 18 man days because there are two occasions when the three team members are working concurrently on tasks which take 3 days to complete. The start and end date of the concurrent tasks are the same (this type of scheduling will have an effect on the determination of the critical path of the project)

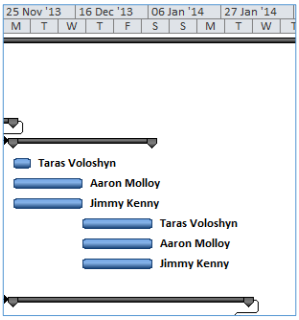
21	1.4 Unit/Module Design	6 days	Wed 20/11/13	Wed 27/11/13	18	
22	1.4.1 Design of printing module and test cases	3 days	Wed 20/11/13	Fri 22/11/13		Aaron Molloy
23	1.4.2 Design of summary module and test cases	3 days	Wed 20/11/13	Fri 22/11/13		Jimmy Kenny
24	1.4.3 Design of billing module and test cases	3 days	Wed 20/11/13	Fri 22/11/13		Taras Voloshyn
25	1.4.4 Design of customer settings module and test cases	3 days	Mon 25/11/13	Wed 27/11/13		Aaron Molloy
26	1.4.5 Design of geographical information module and test cases	3 days	Mon 25/11/13	Wed 27/11/13		Jimmy Kenny
27	1.4.6 Design of Database	3 days	Mon 25/11/13	Wed 27/11/13		Taras Voloshyn



Implementation

This Implementation is an important phase and takes 28 working days and 73 man days because of tasks being done concurrently.

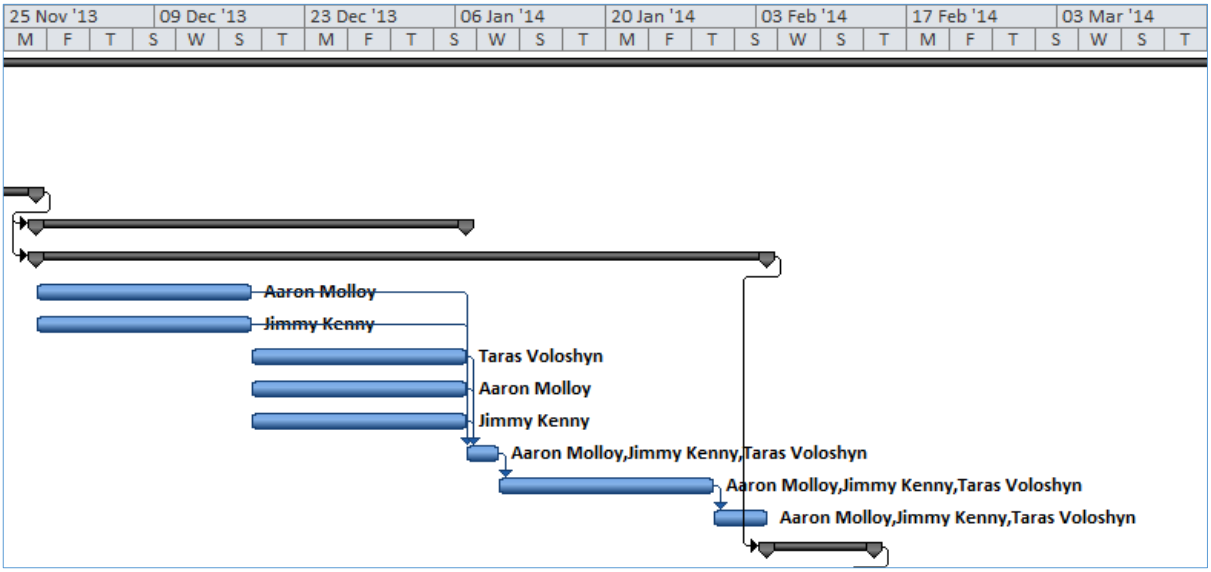
28	1.5 Implementation	28 days	Thu 28/11/13	Mon 06/01/14	21	
29	1.5.1 Implementing Database structure	3 days	Thu 28/11/13	Mon 02/12/13		Taras Voloshyn
30	1.5.2 Implementing printing module	14 days	Thu 28/11/13	Tue 17/12/13		Aaron Molloy
31	1.5.3 Implementing summary module	14 days	Thu 28/11/13	Tue 17/12/13		Jimmy Kenny
32	1.5.4 Implementing billing module	14 days	Wed 18/12/13	Mon 06/01/14		Taras Voloshyn
33	1.5.5 Implementing customer settings module	14 days	Wed 18/12/13	Mon 06/01/14		Aaron Molloy
34	1.5.6 Implementing of geographical information module	14 days	Wed 18/12/13	Mon 06/01/14		Jimmy Kenny



Unit Testing

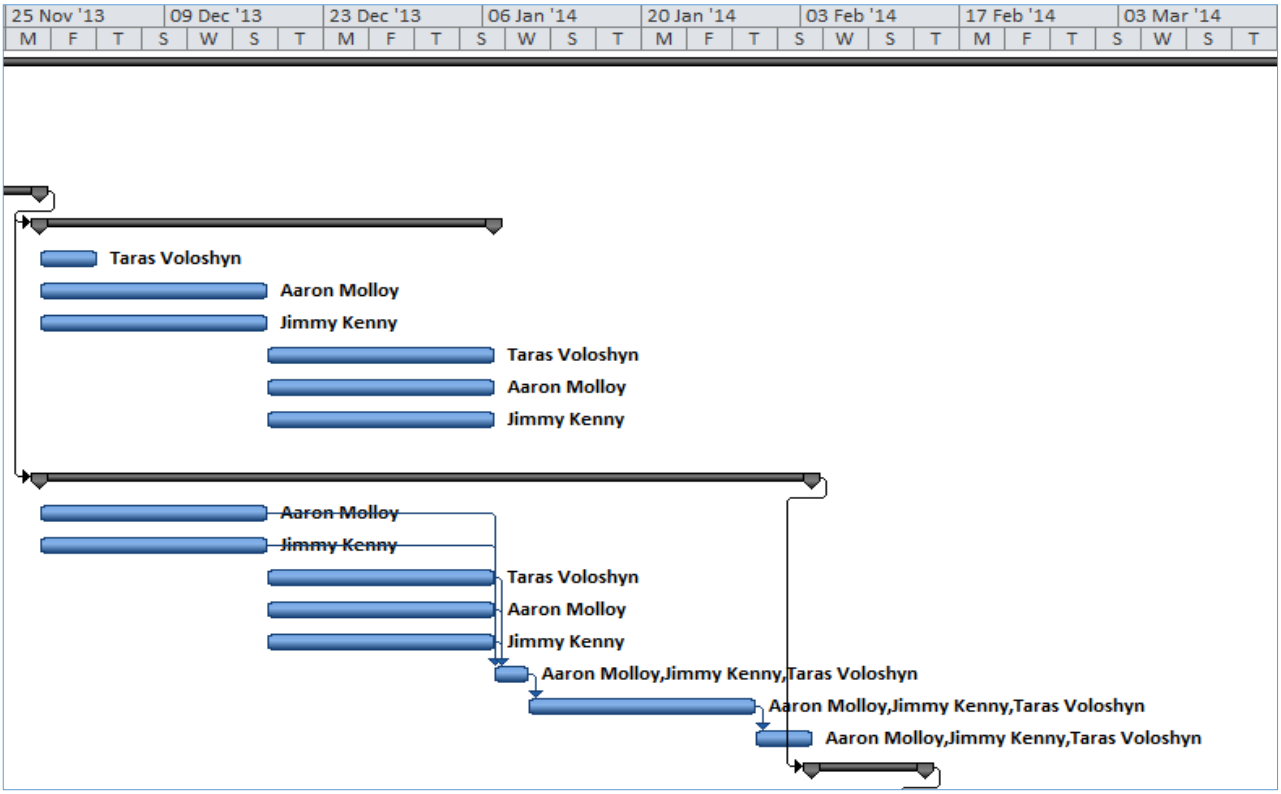
Unit Testing is allocated 48 days because as previously stated rigorous testing is a priority when designing a system that will deal with sensitive personal data. The actual number of man days slotted is 90.

35		1.6 Unit Testing	48 days	Thu 28/11/13	Mon 03/02/14	21	
36		1.6.1 Test printing module	14 days	Thu 28/11/13	Tue 17/12/13		Aaron Molloy
37		1.6.2 Test summary module	14 days	Thu 28/11/13	Tue 17/12/13		Jimmy Kenny
38		1.6.3 Test billing module	14 days	Wed 18/12/13	Mon 06/01/14		Taras Voloshyn
39		1.6.4 Test customer settings module	14 days	Wed 18/12/13	Mon 06/01/14		Aaron Molloy
40		1.6.5 Test of geographical information module	14 days	Wed 18/12/13	Mon 06/01/14		Jimmy Kenny
41		1.6.6 Analysis of test results	3 days	Tue 07/01/14	Thu 09/01/14	36,37	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
42		1.6.7 Error fixing	14 days	Fri 10/01/14	Wed 29/01/14	41	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
43		1.6.8 Final test cases execution	3 days	Thu 30/01/14	Mon 03/02/14	42	Aaron Molloy,Jimmy Kenny,Taras Voloshyn



Concurrency (Implementation and Testing)

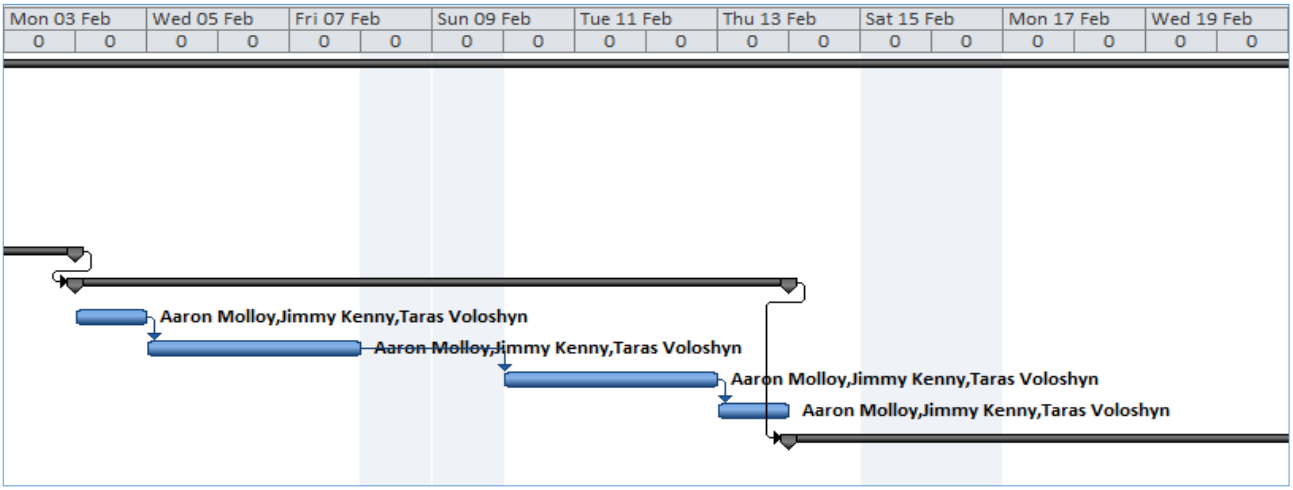
The diagram below shows how the Implementation and Testing phases run concurrently



Integration Testing

The Integration Testing phase will take 8 working days. The tasks in this phase are all consecutive with each task being dependant on the previous.

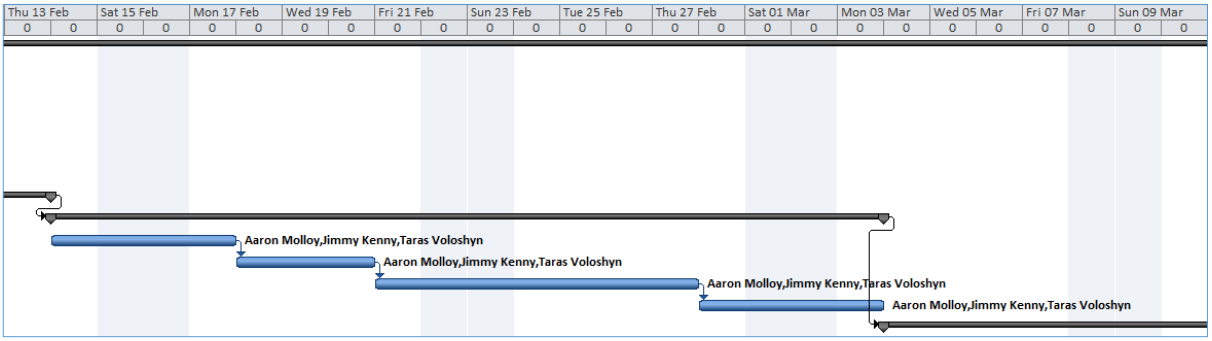
44	1.7 Integration Testing	8 days	Tue 04/02/14	Thu 13/02/14	35	
45	1.7.1 Execution of integration test cases	1 day	Tue 04/02/14	Tue 04/02/14		Aaron Molloy,Jimmy Kenny,Taras Voloshyn
46	1.7.2 Analysis of test results	3 days	Wed 05/02/14	Fri 07/02/14	45	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
47	1.7.3 Error fixing	3 days	Mon 10/02/14	Wed 12/02/14	46	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
48	1.7.4 Final test cases execution	1 day	Thu 13/02/14	Thu 13/02/14	47	Aaron Molloy,Jimmy Kenny,Taras Voloshyn



System Test

System testing will take 12 consecutive working days with each task having a dependency on the previous one.

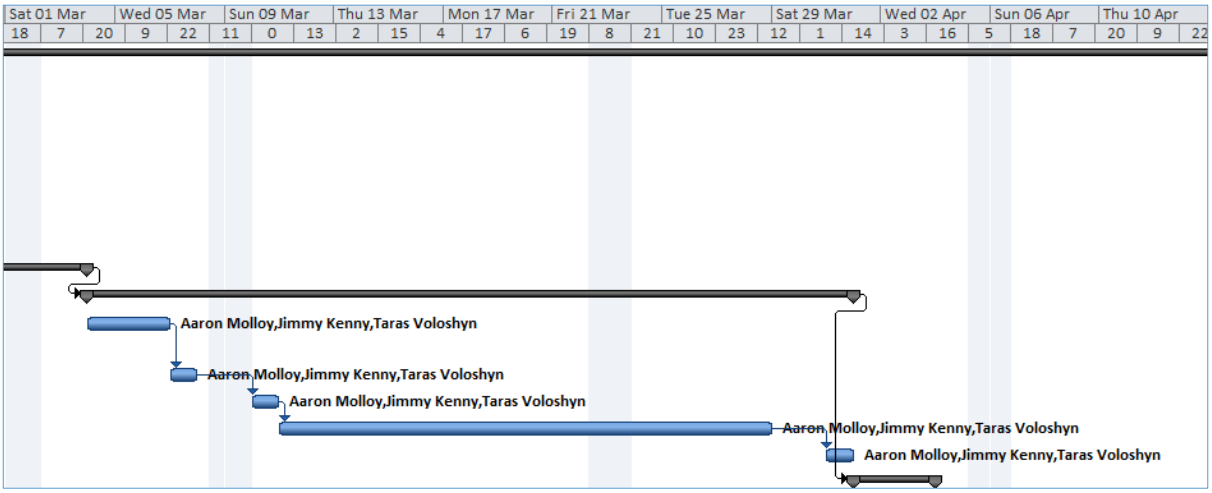
49		**1.8 System Test**	**12 days**	**Fri 14/02/14**	**Mon 03/03/14**	**44**	
50		1.8.1 Execution of system test cases	2 days	Fri 14/02/14	Mon 17/02/14		Aaron Molloy,Jimmy Kenny,Taras Voloshyn
51		1.8.2 Analysing test results	3 days	Tue 18/02/14	Thu 20/02/14	50	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
52		1.8.3 Error fixing	5 days	Fri 21/02/14	Thu 27/02/14	51	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
53		1.8.4 Final execution of system test cases	2 days	Fri 28/02/14	Mon 03/03/14	52	Aaron Molloy,Jimmy Kenny,Taras Voloshyn



Use Acceptance Test

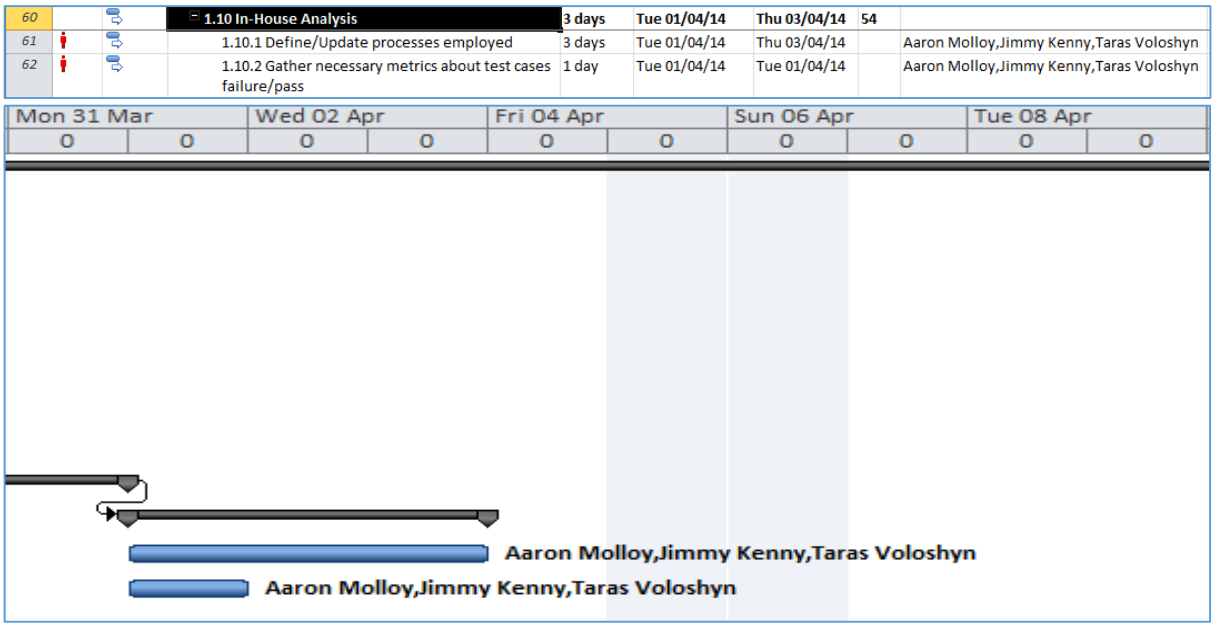
This phase of testing takes place over 20 consecutive working days with each task having a dependency on the previous one.

54		**1.9 User Acceptance Test**	**20 days**	**Tue 04/03/14**	**Mon 31/03/14**	**49**	
55		1.9.1 Full system installation and configuraiton	3 days	Tue 04/03/14	Thu 06/03/14		Aaron Molloy,Jimmy Kenny,Taras Voloshyn
56		1.9.2 System demonstration	1 day	Fri 07/03/14	Fri 07/03/14	55	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
57		1.9.3 Meeting with customers	1 day	Mon 10/03/14	Mon 10/03/14	56	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
58		1.9.4 Beta System Testing with real users	14 days	Tue 11/03/14	Fri 28/03/14	57	Aaron Molloy,Jimmy Kenny,Taras Voloshyn
59		1.9.5 Final Acceptance Meeting	1 day	Mon 31/03/14	Mon 31/03/14	58	Aaron Molloy,Jimmy Kenny,Taras Voloshyn



In-House Analysis

The In-House Analysis phase will take 3 working days or 4 man days as the two tasks run concurrently.



The Critical Path

When drawing up a schedule for the management of the project we decided to run concurrent tasks over the same timeframes. As a result there are no divergent paths through the project and consequently the Critical Path is the only path and runs for 130 days.

Milestones and Deliverables

We set Milestones to correspond to the end of each phase of the project based on the V-model. When each milestone is reached we will assess the progress of the project up to that point. The milestones are as follows:

- **Requirements Elicitation and User Acceptance Test**
- **Requirements Analysis and System Testing**
- **High Level Design and Integration Testing**
- **Unit/Module Design and Unit/Module Testing**
- **Implementation**

Deliverables are the work products we will give the client for evaluation. The deliverables are as follows:

- **Project Plan**
- **Requirements Document**
- **Design Document**
- **Executable Code Modules**
- **Integrated Modules for testing**
- **User Manual**

Monitoring and Reporting

Throughout the course of the project we will implement Monitoring and Reporting mechanisms as follows:

- Each week there will be informal team meetings to discuss the status of the project and any issues that need addressing.
- When each Milestone is reached a formal report will be written and submitted to the Project Manager. This report will detail what was done during that particular phase and highlight any actual or potential problems (e.g. budgetary or project implementation). A formal meeting will be held with the Project Manager and the team to discuss the report. Follow-up meetings may be required.
- When a Deliverable is ready a report will be written and both will be handed to the Client. A formal meeting will then be arranged to discuss with the Client any issues arising. Follow-up meetings may be required.