

System and Software Architecture Description (SSAD)

Amer I Can Re-Up Website

Team 09

Team Members	Roles	
Varun Brahme	Project Manager	Prototyper
Priyanka Bhalerao	Prototyper	Operational Concept Engineer
Siddharth Sohoni	Requirements Engineer	Life Cycle Planner
Suparna Dawalkar	Feasibility Analyst	Software Architect
Anumeha Srivastava	Operational Concept Engineer	Requirements Engineer
Jeff Tonkovich	IV&V	System Engineer

12/5/2011

Version History

Date	Author	Version	Changes made	Rationale
10/07/11	SD	1.0	<ul style="list-style-type: none"> • SSAD Draft 	<ul style="list-style-type: none"> • Initial draft of SSAD
10/14/11	SD	1.1	<ul style="list-style-type: none"> • Enhanced System Context Diagram • Updated Behavior Diagram • Added process descriptions for all capabilities 	<ul style="list-style-type: none"> • To be consistent with the current system capabilities
10/18/11	SD	2.0	<ul style="list-style-type: none"> • Updated process descriptions • Edited system context diagram • Updated Behavior Diagram 	<ul style="list-style-type: none"> • Changes required as per TA's suggestions
10/19/11	SD	3.0	<ul style="list-style-type: none"> • Enhanced System Context Diagram • Updated Behavior Diagram • Fixed bugs 	<ul style="list-style-type: none"> • Changes required in response to bugs identified
10/20/11	SD	4.0	<ul style="list-style-type: none"> • Updated Artifacts and Information Diagram • Added use cases to the behavior diagram 	<ul style="list-style-type: none"> • Changes made as per clients and TAs suggestions
10/24/11	SD	5.0	<ul style="list-style-type: none"> • Updated Artifacts and Information Diagram • Edited use case diagrams 	<ul style="list-style-type: none"> • Changes made by suggestions given in FCR ARB
11/21/11	SD	6.0	<ul style="list-style-type: none"> • Added Section 3 • Edited System Context Diagram • Updated Artifacts an Information Diagram 	<ul style="list-style-type: none"> • Changes made for Draft DC Package • Suggestions given by TA, IV&V
11/30/11	SD	7.0	<ul style="list-style-type: none"> • Edited Section 3 • Updated Artifacts an Information Diagram 	<ul style="list-style-type: none"> • Changes made for DC Package • Suggestions given by TA, IV&V
12/5/11	SD	8.0	<ul style="list-style-type: none"> • Edited Software Component Diagram 	<ul style="list-style-type: none"> • Changes made as per suggestions given in DCR ARB

Table of Contents

System and Software Architecture Description (SSAD).....	i
Version History	ii
Table of Contents	iii
Table of Tables	iv
Table of Figures.....	vi
1. Introduction.....	1
1.1 Purpose of the SSAD.....	1
1.2 Status of the SSAD	1
2. System Analysis	3
2.1 System Analysis Overview	3
3. NDI/NCS Interoperability Analysis.....	18
3.1 Introduction.....	18
3.2 System Structure	19
3.3 Evaluation Summary	21

Table of Tables

<i>Table 1: Actors Summary</i>	4
<i>Table 2: Artifacts and Information Summary</i>	6
<i>Table 3: Process Description</i>	8
<i>Table 4: Typical Course of Action</i>	8
<i>Table 5: Alternate Course of Action</i>	8
<i>Table 6: Process Description</i>	9
<i>Table 7: Typical Course of Action</i>	9
<i>Table 8: Alternate Course of Action</i>	9
<i>Table 9: Process Description</i>	10
<i>Table 10: Typical Course of Action</i>	10
<i>Table 11: Alternate Course of Action</i>	10
<i>Table 12: Process Description</i>	10
<i>Table 13: Typical Course of Action</i>	11
<i>Table 14: Alternate Course of Action</i>	11
<i>Table 15: Process Description</i>	11
<i>Table 16: Typical Course of Action</i>	12
<i>Table 17: Alternate Course of Action</i>	12
<i>Table 18: Process Description</i>	12
<i>Table 19: Typical Course of Action</i>	12
<i>Table 20: Process Description</i>	13
<i>Table 21: Typical Course of Action</i>	13
<i>Table 22: Exceptional Course of Action</i>	13
<i>Table 23: Process Description</i>	14
<i>Table 24: Typical Course of Action</i>	14
<i>Table 25: Process Description</i>	14
<i>Table 26: Typical Course of Action</i>	14
<i>Table 27: Process Description</i>	15
<i>Table 28: Typical Course of Action</i>	15
<i>Table 29: Process Description</i>	15

<i>Table 30: Typical Course of Action</i>	<i>16</i>
<i>Table 31: Exceptional Course of Action</i>	<i>16</i>
<i>Table 32: Process Description</i>	<i>16</i>
<i>Table 33: Typical Course of Action</i>	<i>16</i>
<i>Table 34: Exceptional Course of Action</i>	<i>17</i>
<i>Table 35: NDI Products Listing.....</i>	<i>18</i>
<i>Table 36: NDI Evaluation</i>	<i>21</i>

Table of Figures

<i>Figure 1: System Context Diagram</i>	<i>4</i>
<i>Figure 2: Artifacts and Information Diagram.....</i>	<i>5</i>
<i>Figure 3: Process Diagram.....</i>	<i>7</i>
<i>Figure 4: Hardware Component Diagram.....</i>	<i>19</i>
<i>Figure 5: Software Component Diagram.....</i>	<i>20</i>
<i>Figure 6: Deployment Diagram</i>	<i>21</i>

1. Introduction

1.1 Purpose of the SSAD

The purpose of the System and Software Architecture Description (SSAD) is to document the architecture of the system being developed, which in this case is the Amer I Can Re-up Website. This document gives the feasible architecture of the system. It will help the developers to ensure that the system being developed is in synchronization with the decided architecture of the system. It will also be helpful to the clients and maintainers to understand the architecture of the system, once the system is delivered.

1.2 Status of the SSAD

This is version 7.0 of the SSAD. All sections of the SSAD are complete at this point of time. The document includes the System Context, the artifacts and information created by the system, the various use-case scenarios that the system will go through, its behavior and its various capabilities, along with the exceptional course of action that the system might take under certain conditions. This version also includes NDI Interoperability Analysis, the deployment diagrams, which show the physical (hardware) and logical (software) deployment of the system. The SSAD concludes with the advantages and evaluation of the NDI selected for the project implementation.

2. System Analysis

2.1 System Analysis Overview

The primary purpose of the Amer I Can Re-up Website is to provide the members of the website the ability to enter the tasks and long term goals that they want to accomplish and also to enter the sacrifices they are willing to make in order to accomplish their tasks and long term goals. The website and other participating members who form a given member's 'squad' hold each other accountable to their submitted tasks and goals. A member can add a maximum of 25 members to his squad. The system also provides the user the functionality to upload his personal legend (a video blog) and theme song. The system will generate the statistics for each member depending on the grades assigned to him by the members in his squad. Those statistics include – will power, myG (grades), task totals and honor code. The system will also generate a report card on a quarterly basis, first quarter being January 1st to March 31st, and so on. The contents of the report card will be myG, honor code, task totals, and will power. The report cards will be stored in the database so that the user can view them whenever he wants to.

2.1.1 System Context

The system context diagram shows the actors outside the system that interact with the system. Our project involves actors like anonymous user, member and squad member. The member of the website will interact with the website interface and the mobile app interface [future scope].

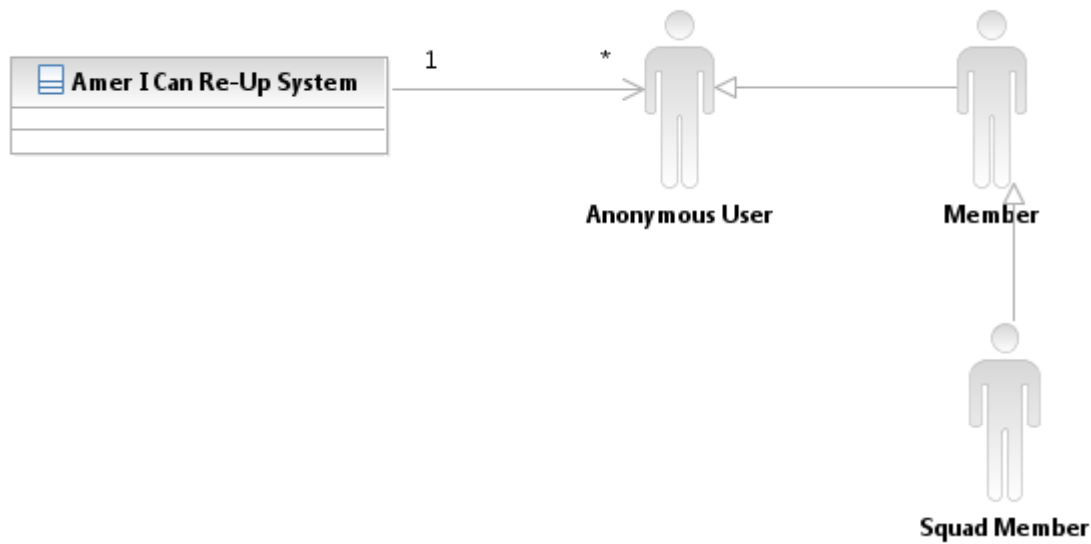


Figure 1: System Context Diagram

Table 1: Actors Summary

Actor	Description	Responsibilities
Member	A member is a user of the website. The user will have to register with the website to become a member.	Add/update status Enter tasks in the ttBox (3<=task <=5) Add sacrifices for each task that has been entered in the ttBox. Upload personal legend, theme song. View report card Search other members; add a member to his/her squad
Squad Member	A type of member of the website who grades other members of the squad he is a part of.	A squad member along with performing all the functions that a member can perform, also grades other members in his squad.
Anonymous User	Any person who can visit the website, and watch the tutorial video and register to become a member.	An anonymous user can only watch the tutorial video and can register (sign up) to become a member of the website.

2.1.2 Artifacts & Information

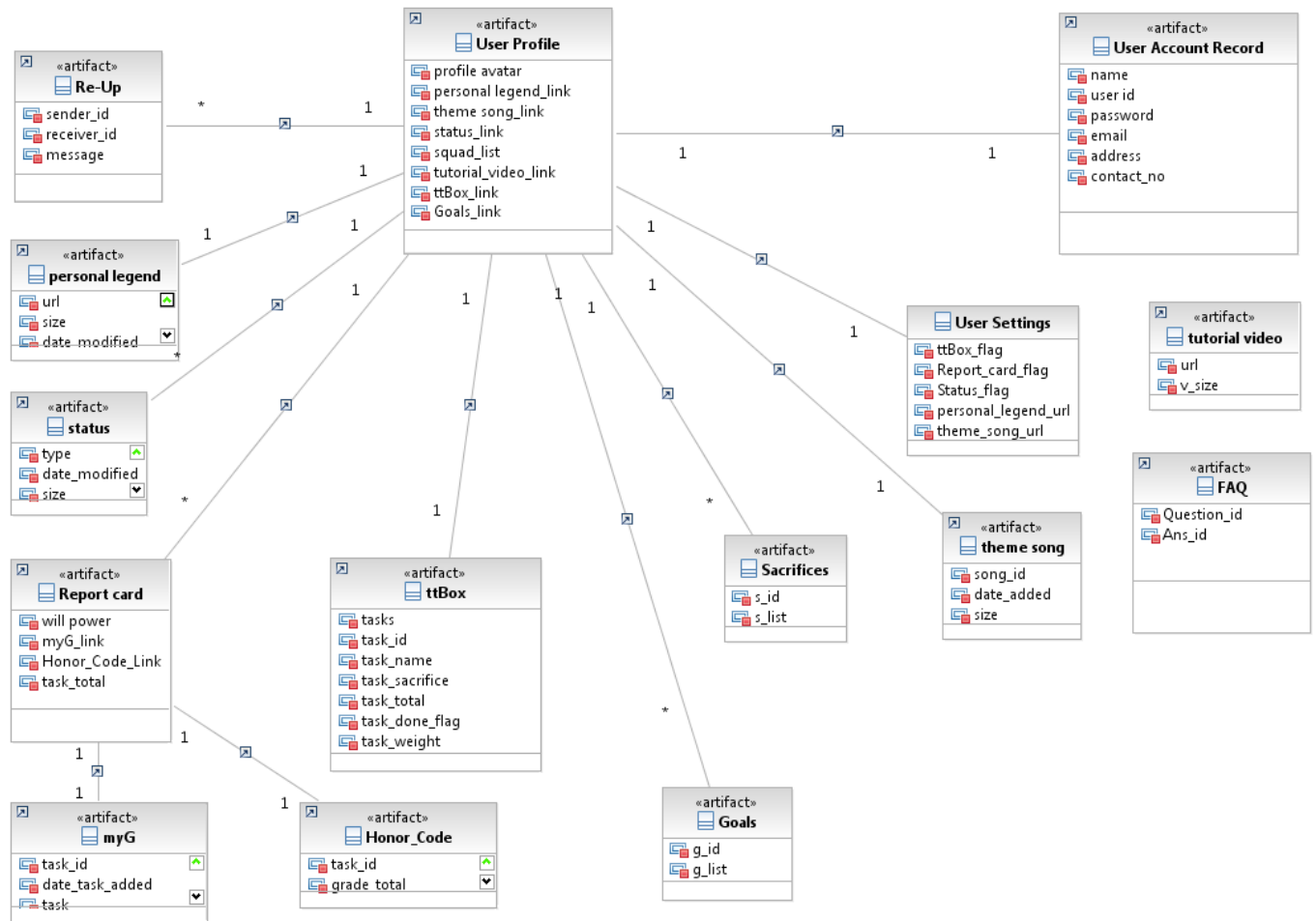
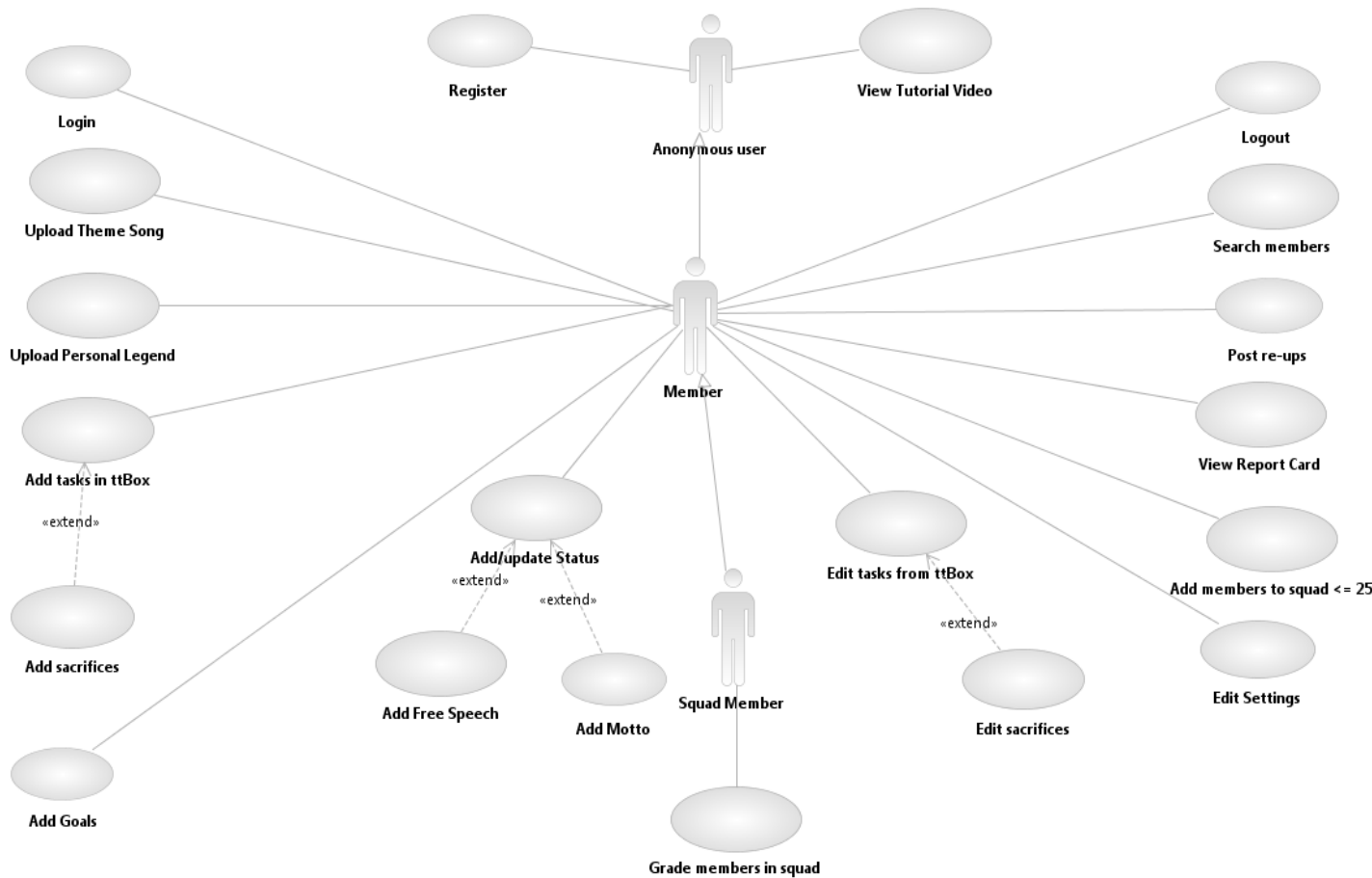


Figure 2: Artifacts and Information Diagram

Table 2: Artifacts and Information Summary

Artifact	Purpose
User profile	Contains the user's profile page information like his personal legend video, theme song, ttBox, statistics, etc.
User account Record	Database contains information about the user's details
ttBox	Contains all the tasks entered by the user. It is a flex component, which is plugged in to Drupal. A user can enter up to 5 tasks in the ttBox.
Sacrifices	Contains the sacrifices entered by the user; the user can enter a maximum of 5 sacrifices.
Goals	Contains the goals entered by the user; the user can enter 1 major and 3 minor goals.
FAQ	Contain a list of commonly asked questions regarding the website.
Report Card	A quarterly artifact generated by the system that contains the user's statistics like myG, will power, honor code and task totals.
Status	It is an artifact that will be displayed on the member's profile page, and the member can either quote it himself (free speech), or motto.
Re-Up	Contains information that a user can post in his squad like job postings, internships, etc.
Tutorial Video	Contains a video that shows first time users the purpose of the website and how to go about using the website.
Honor Code	Contains the data about the user's grades that have been given to him by the members of his squad.
myG	Contains the grades of the member as given by the system.
Theme song	Contains a song that will be played when all the tasks in the ttBox are complete.
Personal Legend	Contains a video that the user can choose to upload, which will be available on the profile page of the member.

2.1.3 Behavior



UC-1

Figure 3: Process Diagram

2.1.3.1 Login

2.1.3.1.1 Authenticate and redirect

Table 3: Process Description

Identifier	UC-1 : Login
Purpose	Determine if a registered user can log in successfully into the system, and is authorized to use all the functions that he/she is eligible for.
Requirements	WC_154 Details provided by the user in the new user form.
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	If the user is authenticated, he/she will be logged in and a session will be created.

Table 4: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User enters login name and password	
2	User clicks on Login Button	The user is authenticated by the system.
		The user is taken to his/her profile page.

Table 5: Alternate Course of Action

Unsuccessful Login:

Seq#	Actor's Action	System's Response
1-2	Same as Table 4: Typical Course of Action	
3		A window pops up stating "Invalid Username and/or password"
4	Click on OK button	The user is redirected by the system to the main page of the website.

2.1.3.2 Register

2.1.3.2.1 Authenticate and redirect

Table 6: Process Description

Identifier	UC-1 : Register
Purpose	Register a new user to become a member of the website
Requirements	WC_154 Details provided by the new user in the registration form
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	If the user is registered to become a member, the user's profile details will be stored into the database. The user will be logged in and a session will be created.

Table 7: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User enters data in the registration form.	
2	User clicks on 'Sign Up' Button	The data entered is validated by the system.
3		The user's data is successfully added to the database.
4		The user is logged in, taken to his profile page, and a session is created.

Table 8: Alternate Course of Action

Seq#	Actor's Action	System's Response
1	User enters some invalid data in the registration form.	
2	User clicks on 'Sign Up' Button	The data entered is checked by the system.
3		Wrong information entered by the user is displayed in a prompt window.
4		The user is taken back to the registration page to re-enter correct information.

2.1.3.3 Add tasks to the ttBox

Table 9: Process Description

Identifier	UC-1 : Add tasks to ttBox
Purpose	Enable a member of the website to add tasks that he wishes to accomplish into the ttBox.
Requirements	WC_151 Provide the user capability to add tasks to the ttBox
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The tasks will be added to the database table – ttbox

Table 10: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User enters upto 5 tasks	The entered tasks will be displayed in the ttBox and the user will be prompted to enter sacrifices.

Table 11: Alternate Course of Action

Seq#	Actor's Action	System's Response
1	The user may choose to edit or alter an already existing task	
2		Same as for typical course of action.

2.1.3.4 Upload Personal Legend

Table 12: Process Description

Identifier	UC-1 : Register
Purpose	Enables a member to upload his personal legend which is a video that the user wishes to display on his/her profile page.
Requirements	WC_152 Upload personal legend on profile page.
Development	---

Risks	
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The personal legend will be stored on the cloud. The link for the video will be stored in the database. The user himself and other members will be able to view the video. Any user can view any other user's personal legend video.

Table 13: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on 'Upload Personal Legend'	The system will ask the user to input the URL of the location of the video.
		Once the URL is given, the system will check whether the syntax entered is that of an URL or not.
		The system will update the path in the database.

Table 14: Alternate Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on 'Upload Personal Legend'	The system will ask the user to input the URL of the location of the video.
		If not, the user will be prompted to enter a valid URL, and will be taken back to the upload personal legend tab.

2.1.3.5 Upload Status Message

Table 15: Process Description

Identifier	UC-1 : Upload Status Message
Purpose	Enable a member of the website to upload auto motto or free speech, which are types of status messages
Requirements	WC_158 Upload Status – Motto/Free Speech
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The status message will be added to the database. The member's status message will be visible to his squad in the news feed.

Table 16: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on 'Add/edit status'	The system will give the user an option to enter his own status message – which is of two types – motto or free speech.
		The corresponding status message will be displayed on the user's profile page, visible to his squad.

Table 17: Alternate Course of Action

Seq#	Actor's Action	System's Response
1	The user may choose to remove his status message from his profile.	The system will remove the corresponding status message from the user's profile.
		The status message will no longer be displayed on the user's wall.

2.1.3.6 Upload Theme Song

Table 18: Process Description

Identifier	UC-1 : Upload Theme Song
Purpose	Enables the user to upload a theme song that will be played when the user completes all his tasks.
Requirements	WC_471 Upload a theme song which plays when all tasks are complete.
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The theme song will be stored on the cloud. The link to the theme song on the cloud will be stored in the database.

Table 19: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on 'Upload Theme song'	The system will prompt the user to enter the theme song.

2.1.3.7 Add up to 25 members in your squad

Table 20: Process Description

Identifier	UC-1 : Add up to 25 members in your squad
Purpose	Enables a member of the website to add up to 25 members in his/her squad.
Requirements	WC_148 Users have the capability to add a maximum of 25 members to their squad.
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The database will be updated to reflect the additions that a member has made to his squad. The number of members and pointers to their profile will be stored in the user's table in the database.

Table 21: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User adds a member to his squad	The system will check in the database whether the number of members in the squad is less than 25.
2		If yes, the system will add that corresponding detail to the database.
3		The system will display a message to the user stating "Member successfully added to your squad"

User tries to add 26th member to his squad:

Table 22: Exceptional Course of Action

Seq#	Actor's Action	System's Response
1	User tries to add 26 th member to his squad, which exceeds the maximum number 25.	The system will display a message to the user "Maximum number of members reached. Please delete some member from your squad to add a new member"

2.1.3.8 Post Re-Ups to member/s:

Table 23: Process Description

Identifier	UC-1 : Post Re-Ups
Purpose	Enables a member of the website to post re-ups to a particular member's profile. The user can post the re-up to one or more members.
Requirements	WC_161 A user can post re-ups to a squad, or keep public.
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The Re-Up

Table 24: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User will post a particular re-up to one or more members.	That re-up will appear on either the squad member's profile or can be made public.

2.1.3.9 Set sacrifices

Table 25: Process Description

Identifier	UC-1 : Set sacrifices
Purpose	Enables a member of the website to add sacrifices for the tasks that he has entered in the ttBox.
Requirements	WC_1103 A user can add up to 5 sacrifices.
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The database will be updated to reflect the sacrifices that the user has given.

Table 26: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User adds one/more sacrifices	The system will add the sacrifices to the

	for the tasks entered in the ttBox	database for the corresponding task.
2		The system will display the sacrifices for a task, when the user's cursor hovers over the task.

2.1.3.10 Set Goals

Table 27: Process Description

Identifier	UC-1 : Set Goals
Purpose	Enables a member to set goals (1 major, 3 minor)
Requirements	WC_1102 A member can set goals.
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The system will store the goals in the database.

Table 28: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User adds goals to his profile.	The system will add the goals to the database.
2		The system will display the goals on the member's profile page.

2.1.3.11 Search a member

Table 29: Process Description

Identifier	UC-1 : Search a member
Purpose	Enables a member to search other members of the website
Requirements	WC_149 Query based searching of other members of the website.
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The system will search the database and return the corresponding

	results.
--	----------

Table 30: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User types a name in the search box	The system will search for the corresponding name in the database.
2		The system will return the member's profile as a result of the query.

Table 31: Exceptional Course of Action

Seq#	Actor's Action	System's Response
1	User types a name in the search box	The system will search in the database to find the corresponding member.
		If such a member does not exist, the system returns "Member not found" message in result of the query.

2.1.3.12 View Report Card

Table 32: Process Description

Identifier	UC-1 : View Report Card
Purpose	Enables a member to view his quarterly report card
Requirements	WC_743 Report card - quarterly
Development Risks	---
Pre-conditions	Proper initialization of the database, servers.
Post-conditions	The system will retrieve the corresponding user's report from the database.

Table 33: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on 'view report card'	The system will search in the

		corresponding user's record .
2		The system will display the report card to the user on his profile.

Table 34: Exceptional Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on 'view report', when he has not completed even the first quarter.	The system will search in the database to find the corresponding report card.
		The system will display a message to the user saying that "Report card not complete"

3. NDI/NCS Interoperability Analysis

3.1 Introduction

The website is going to be developed using Drupal, which is a content management system, as a framework. Drupal is an open source, easy to use framework that is especially advantageous for developing social reality/networking websites, like the Amer I Can Re-Up Website.

3.1.1 COTS / GOTS / ROTS / Open Source / NCS

Based on the various advantages offered by Drupal like development flexibility, ease of use, we plan to use Drupal as our NDI. It is advantageous to use Drupal for development of social networking/reality websites.

Table 35: NDI Products Listing

NDI/NCS Products	Purposes
Acquia Drupal Dev Desktop 7.4.4	<p>Drupal is an open source Content Management System, that will be used as an infrastructure framework for the development of our website.</p> <p>It is a Drupal specific xAMP stack installer, which means Apache Server, MySQL, PHP.</p> <p>It consists of Acquia Drupal, Apache HTTP Server, MySQL Database Server, PHP, phpMyAdmin, Control Panel, Xmail Server.</p>

3.1.2 Connectors

The system is using PHP to connect to the MySQL Database.
The PHP connectors will manage the data transfer between various modules and the MYSQL database.

3.1.3 Legacy System

The Amer I Can Re-Up System is a completely new concept and the clients do not have an existing system in place. So we are not using any legacy system code for development.

3.2 System Structure

The system will be deployed on a hardware server hosting Linux CentOS. The software components like PHP, MySQL and Apache Web Server will run on Drupal that will be deployed on the server.

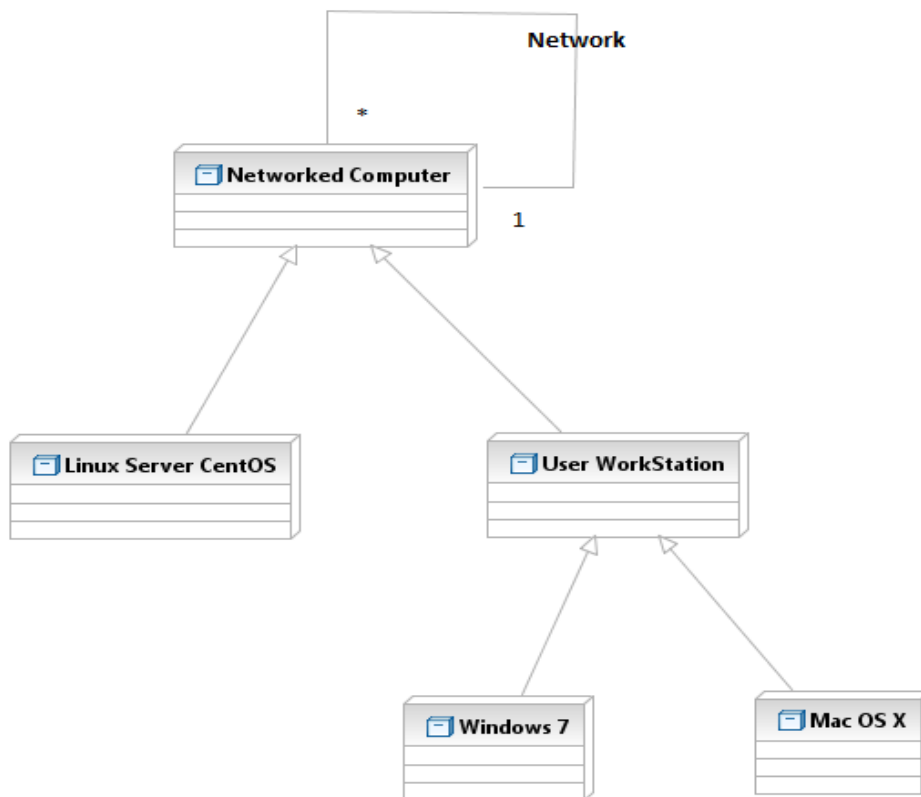


Figure 4: Hardware Component Diagram

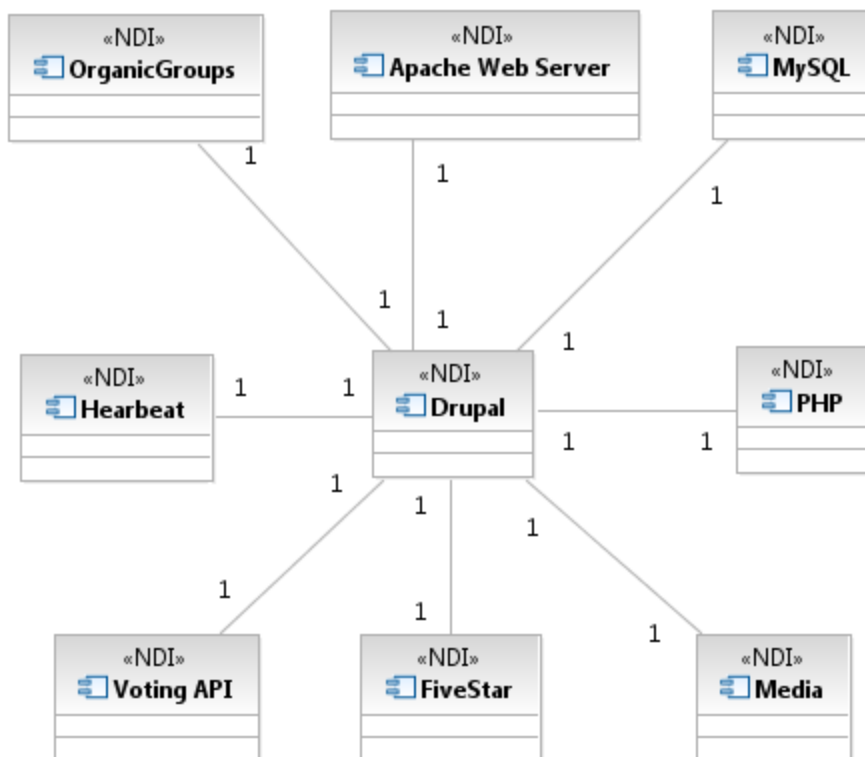


Figure 5: Software Component Diagram

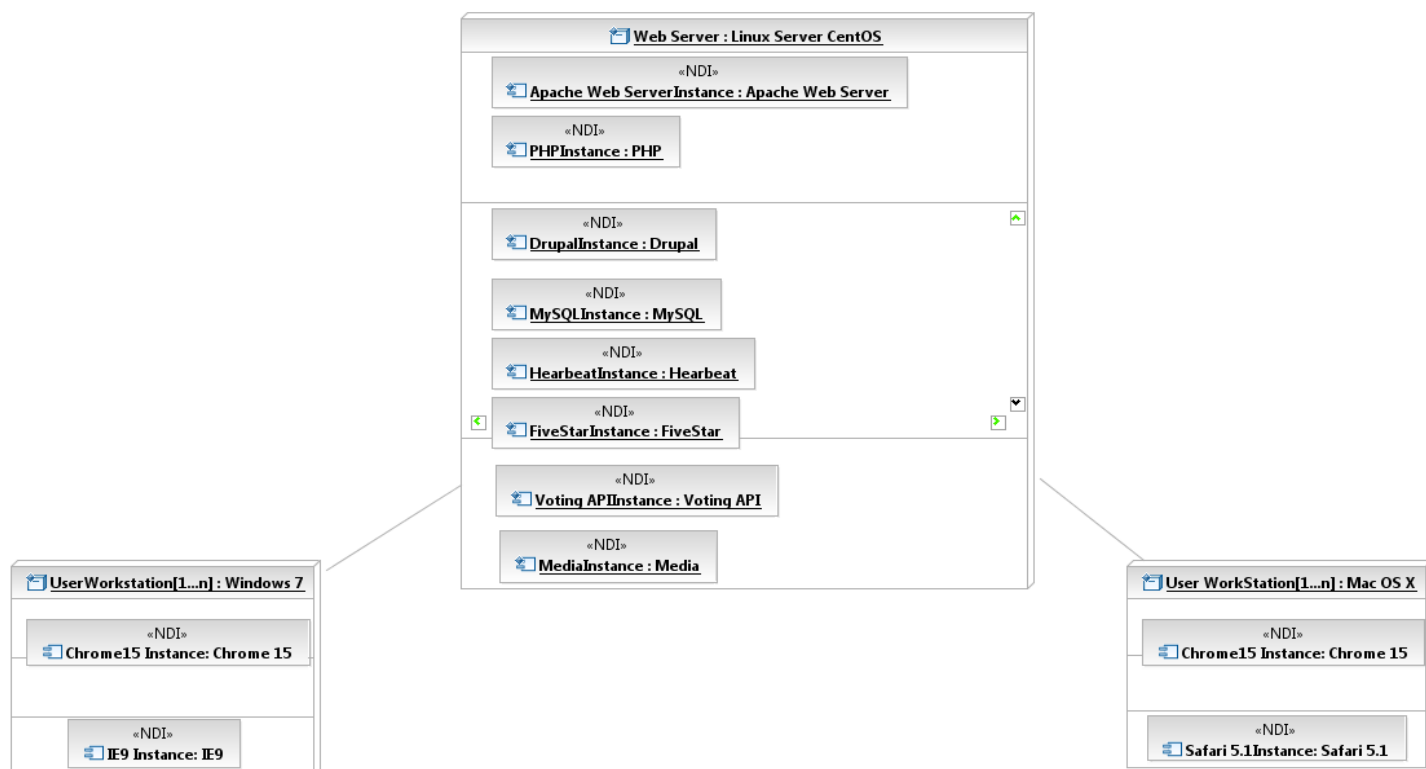


Figure 6: Deployment Diagram

3.3 Evaluation Summary

Table 36: NDI Evaluation

NDI	Usages	Comments
Acquia Drupal Dev Desktop 7.4.4	<p>Drupal, is a powerful content management system, that is used for developing websites:</p> <ul style="list-style-type: none"> • that generally have high traffic, • need to be modified frequently. <p>Drupal provides a lot of modules that can just be plugged in to suit your application needs, and if such a module does not exist, it is easy to develop your own module.</p>	<p>Thus, due to the advantages offered by Drupal, we have chosen this CMS as a framework for the development of our website.</p> <p>Drupal can handle increasing traffic, which is usually the case with social reality websites.</p> <p>Flexibility, scalability and a fair amount of security are the factors that make Drupal a choice for our project.</p>