# System and Software Architecture Description (SSAD)

Transportation Grant Fund Database

**Team #14**

|  |  |
| --- | --- |
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# Version History

| Date | Author | Version | Changes made | Rationale |
| --- | --- | --- | --- | --- |
| 10/10/11 | KK | 1.0 | * SSAD for CoreFCD | * Initial version of the SSAD |
| 10/14/11 | KK | 1.1 | * Projects Log attributes are added in Figure 2: Artifacts and Information Diagram * The associations from Project Log, Project Schedule, and Project document to Project Profile were changed in Figure 2: Artifacts and Information Diagram * User management related Use-Cases in Figure 3: Process Diagram | * Changes according to feedback from TAs and evaluators are done |
| 10/19/11 | KK | 1.2 | * E-mail Send and Export Projects Information Use-Cases are added in Figure 3: Process Diagram * New Actor External Website is added to the System Context diagram | * Changes according to feedback from TAs, Clients and evaluators are done |
| 10/24/11 | KK | 1.3 | * Stereotype <<evolutionary>> added for External Website in the System Context diagram * Pre-condition page added for the Login Use-Case | * Changes made based on the ARB comments |
| 11/07/11 | KK | 1.4 | * Project management Use-Cases changed in Figure 3: Process Diagram | * Changes made based on the ARB comments |
| 11/21/11 | KK | 2.0 | * Pages deleted from Use-Case Preconditions * Use-Cases in Figure 3: Process Diagram updated * Status of the SSAD updated * NDI/NCS Interoperability Analysis added | * Changes made based on the TA’s feedback, prototyping results and information obtained during exploring SharePoint |
| 11/29/11 | KK | 2.1 | * Figure 2: Artifacts and Information Diagram updated * System Analysis Rational updated | * Changes made based on a feedback from prototyping |
| 12/04/11 | KK | 2.2 | * User specification added in Use-Case preconditions * COTS added in section 3.1.1 | * DCR ARB Comments |
| 02/04/12 | KK | 3.0 | * Milestone artifact added to Figure 2: Artifacts and Information Diagram * Create Project Use-Case assigned to Administrator in Figure 3: Process Diagram * PM Central NDI added in 3.2 System Structure * System Analysis Rational updated | * Changes made based on the Rebaselining activities |
| 02/14/12 | KK | 3.1 | * Milestone artifact renamed to Task in Figure 2: Artifacts and Information Diagram * Add/Edit/Remove Task Use-Case added | * Changes made based on the preparation to ARB |
| 02/17/12 | KK | 3.2 | * Project Coordinator added at Figure 1: System Context Diagram * View users and Create project Use-Cases assigned to Project Coordinator in Figure 3: Process Diagram | * RDCP ARB Comments |
| 03/26/12 | KK | 3.3 | * Minor updates to match IOC1 | * Preparation to IOC1 |
| 04/12/12 | KK | 4.0 | * Diagrams are updated according to changes in the project during the development in order to reflect current status of the system | * Preparation to TRR |
| 04/17/12 | KK | 5.0 | * Diagrams and use-cases are updated to match final version of the system * Administrator role has been removed from architecture because it is outside of the system scope | * Design-Code review |

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### Introduction

#### Purpose of the SSAD

The purpose of the SSAD document is to provide the analysis of the operational concept, design the architecture, and design the implementation of the Transportation Grant Fund Database (TGFD) System. It serves as a bridge linking between the inception and the construction phases by providing the in-depth architectural design and implementation of the proposed system.

This version of the SSAD document consists of the description of system analysis, behavior, and NDI/ NCS Interoperability Analysis of the TGFD system.

#### Status of the SSAD

The current version of the SSAD is 5.0 and it is at the end of the Development phase. At this point, all sections of the document are filled out with relevant information and Context Diagrams, Use Case Diagrams & Class Diagrams is consistent with the system. Team is done with development of the product based on Microsoft SharePoint 2010 and PM Central. Currently team is finishing testing, fixing bugs and preparing for the transition. The document is in agreement with current status of the developed system, SharePoint and PM Central features.

### System Analysis

#### System Analysis Overview

The TGFD system to be built is a web based Content and Document Management System. Users who will be using the system are LADOT employees who are responsible for Transportation Grant Fund process. The system to be delivered intends to automate the transportation grant fund project reporting process. This will centralize the information and documents of all the projects in one database, help to create various reports related to the projects, help to enforce data integrity rules, provide easy access to all the projects’ data and documents through the web browser interface and finally enhance the productivity of the employees. The system will improve communication between project participants through the both manual and automated messages.

##### System Context

Figure 1 shows the operational context of the TGFD system.



Figure : System Context Diagram

Table : Actors Summary

| **Actor** | **Description** | **Responsibilities** |
| --- | --- | --- |
| TGFD User | General type of the system user | * Browse through the projects * Retrieve required projects information * View reports * Download project documents * Send emails |
| Project Coordinator | A superior user able to create new projects and assign project managers to them | * Create and delete projects * Assign users roles and permissions |
| Project Manager | A project manager of the certain projects in the system | * Manage own projects: edit all the data * Manage tasks |
| Accountant | LADOT Accountant | * Edit project financial (accounting) information * Attach documents * Delete project documents * Manage reports |
| External Website | External website that requests projects information in XML format from the TGFD system and shows it to the public. “External” means that this site is not the part of the system. | * Request projects information through the XML interface |

##### Artifacts & Information



Figure : Artifacts and Information Diagram

Table : Artifacts and Information Summary

|  |  |
| --- | --- |
| **Artifact** | **Purpose** |
| ATF-1: Role | Role is assigned by administrator to every user and determines the permissions of the user. System has fixed number of roles with fixed permissions. |
| ATF-2: User Profile | User Profile contains all the information about user: name, password, Role, e-mail, etc. |
| ATF-3: Project Profile | Project Profile contains all the information about the project: title, owners of the project, schedule, and attached documents. Can be edited by the owners with appropriate permissions. |
| ATF-4: Report | Report contains determined information about selected projects with fixed formatting. Report is generated by certain user from the information retrieved from projects profiles. There are several fixed report types in the system. |
| ATF-5: Document | Document is a document of any type attached to a certain project. |
| ATF-6: Project Log | Project Log contains information about project creation and last changes. |
| ATF-7:Task | Tasks, such as Quarterly Report due date, contains the name and date of the Task. |

##### Behavior

The following Use-Case Diagram shows the 25 processes that were identified when analyzed the capabilities described in the OCD were analyzed.



Figure : Process Diagram

###### Authentication

Login

Table 3: Process Description (Login)

|  |  |
| --- | --- |
| **Identifier** | UC-1: Login |
| **Purpose** | Authorize the user to log into the system, and, if so, assign role and privileges. |
| **Requirements** | WC\_978: Implement user authentication method  WC\_397: Role Based (RBAC) and Data Level Security |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is connected from LADOT intranet. |
| **Post-conditions** | If user is successfully authorized he is redirected to the Projects View page. He can use the system according to his role. Otherwise access is denied and Login window showed again. |

Table : Typical Course of Action (Login)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Enter username and password |  |
| **2** | Clicks OK button |  |
| **3** |  | Verify username and password |
| **4** |  | Redirect the user to the Projects View page. |

Table : Alternate Course of Action (Login)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Enter username and password |  |
| **2** | Clicks the Login button |  |
| **3** |  | Verify username and password |
| **4** |  | Show the Login window again |

Logout

Table : Process Description (Logout)

|  |  |
| --- | --- |
| **Identifier** | UC-2: Logout |
| **Purpose** | Logout user from the system |
| **Requirements** | WC\_978: Implement user authentication method  WC\_397: Role Based (RBAC) and Data Level Security |
| **Development Risks** | None |
| **Pre-conditions** | User logged into the system |
| **Post-conditions** | User is logged out from the system and session is terminated |

Table : Typical Course of Action (Logout)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | User clicks Log Out button |  |
| **2** |  | Log user out and delete user’s session |
| **4** |  | Show the message “Sign Out: Close Browser To Complete Sign Out” |

Alternate Course of Action for User Logout is not applicable

###### Permissions Management

Grant Permissions

Table : Process Description (Grant Permissions)

|  |  |
| --- | --- |
| **Identifier** | UC-3: Grant Permissions |
| **Purpose** | Add new user (group) to the system (site) and specifies its role. |
| **Requirements** | WC\_398: user registration to the system must be approved by administrator  WC\_397: Role Based (RBAC) and Data Level Security  WC\_977: administrator has a capability to assign fixed roles |
| **Development Risks** | Manually assigning roles to users can be difficult and time-consuming for Project Coordinator |
| **Pre-conditions** | System database is properly initialized.  User is logged in as Project Coordinator. |
| **Post-conditions** | New permissions are granted |

Table : Typical Course of Action (Grant Permissions)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Grant Permissions button |  |
| **2** |  | Redirect to the empty Grant Permissions Form |
| **3** | Fill in Grant Permissions Form with new user (group) information and click OK |  |
| **4** |  | Check input information for correctness |
| **5** |  | If information is correct, add new permissions |
| **6** |  | Redirect to the permission management page |

Table : Alternate Course of Action (Grant Permissions)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-4** | Refer to typical course of action |  |
| **2** |  | If data is incorrect, redirect back to the Grant Permissions Form with corresponding message (e.g. “No exact match was found.”) |

Edit Permissions

Table : Process Description (Edit Permissions)

|  |  |
| --- | --- |
| **Identifier** | UC-4: Edit Permissions |
| **Purpose** | Edit Permissions information including assignment of a new role |
| **Requirements** | WC\_398: user registration to the system must be approved by administrator  WC\_397: Role Based (RBAC) and Data Level Security  WC\_977: administrator has a capability to assign fixed roles |
| **Development Risks** | Editing permissions can be confusing for Project Coordinator |
| **Pre-conditions** | System database is properly initialized.  User is logged in as Project Coordinator. |
| **Post-conditions** | User(group) permissions has been changed |

Table : Typical Course of Action (Edit Permissions)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Edit User Permissions button |  |
| **2** |  | Redirect to the Edit Permissions Form filled in with permissions data |
| **3** | Change permissions and click OK |  |
| **4** |  | Save new permissions in the database |
| **5** |  | Redirect to the permissions management page |

Table : Alternate Course of Action (Remove Permissions)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-2** | Refer to typical course of action |  |
| **3** | Click Cancel |  |
| **4** |  | Return to the user management page |

Remove Permissions

Table : Process Description (Remove Permissions)

|  |  |
| --- | --- |
| **Identifier** | UC-5: Remove Permissions |
| **Purpose** | Delete existing user permissions from the system |
| **Requirements** | WC\_397: Role Based (RBAC) and Data Level Security |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as Project Coordinator. |
| **Post-conditions** | User deleted from the system |

Table : Typical Course of Action (Remove Permissions)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Remove Permissions button |  |
| **2** |  | Ask for conformation |
| **3** | Click confirm |  |
| **4** |  | Remove Permissions from the database |
| **5** |  | Redirect to the user management page |

Table : Alternate Course of Action (Remove Permissions)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-2** | Refer to typical course of action |  |
| **3** | Click Cancel |  |
| **4** |  | Return to the user management page |

View Permissions

Table : Process Description (View Permissions)

|  |  |
| --- | --- |
| **Identifier** | UC-18: View Permissions |
| **Purpose** | View list of users |
| **Requirements** | WC\_398: user registration to the system must be approved by administrator  WC\_397: Role Based (RBAC) and Data Level Security  WC\_977: administrator has a capability to assign fixed roles |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as Project Coordinator. |
| **Post-conditions** | List of permissions displayed to Project Coordinator |

Table : Typical Course of Action (View Permissions)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Site Permissions link |  |
| **2** |  | Select permissions data from database |
| **3** |  | Redirect to the Permission Management Page and show list of permissions |

Alternate Course of Action for View Permissions is not applicable

###### Project Management

Create Project

Table : Process Description (Create Project)

|  |  |
| --- | --- |
| **Identifier** | UC-6: Create project |
| **Purpose** | Create new project in the system |
| **Requirements** | WC\_366: Grant information can be tracked by the system.  WC\_357: all projects should be manageable - budget, schedule, project docs, general project reports generation, individual project and summary of project status |
| **Development Risks** | none |
| **Pre-conditions** | System database is properly initialized.  User is logged in as Project Coordinator. |
| **Post-conditions** | New project created in the system |

Table : Typical Course of Action (Create Project)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Add New Project button |  |
| **2** |  | Redirect to the empty Project Form |
| **3** | Fill in Project Form with new project information and click Submit |  |
| **4** |  | Check input information for correctness and absence of duplicate project names in the database |
| **5** |  | If information is correct, create new project and add project information to the database |
| **6** |  | Redirect to the Project Home page |

Table : Alternate Course of Action (Create Project)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-4** | Refer to typical course of action |  |
| **2** |  | If data is incorrect, redirect back to the Project Form with corresponding message (e.g. “Please input Title of the New Site”) |

Edit Project

Table : Process Description (Edit Project)

|  |  |
| --- | --- |
| **Identifier** | UC-7: Edit project |
| **Purpose** | Change project information (except financial information) |
| **Requirements** | WC\_366: Grant information can be tracked by the system.  WC\_357: all projects should be manageable - budget, schedule, project docs, general project reports generation, individual project and summary of project status |
| **Development Risks** | none |
| **Pre-conditions** | System database is properly initialized.  User is logged in as a Project Manager or Project Coordinator. |
| **Post-conditions** | Project information was changed |

Table : Typical Course of Action (Edit Project)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Edit Item button |  |
| **2** |  | Redirect to the empty Project Form filled in with project information |
| **3** | Change project information in Project Form and click Save |  |
| **4** |  | Check input information for correctness and absence of duplicate project names in the database |
| **5** |  | If information is correct, save new project information to the database |
| **6** |  | Redirect to the Projects View page |

Table : Alternate Course of Action (Edit Project)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-4** | Refer to typical course of action |  |
| **5** |  | If data is incorrect, redirect back to the Project Form with corresponding message |

Delete Project

Table : Process Description (Delete Project)

|  |  |
| --- | --- |
| **Identifier** | UC-8: Delete Project |
| **Purpose** | Delete existing project from the system |
| **Requirements** | WC\_366: Grant information can be tracked by the system.  WC\_357: all projects should be manageable - budget, schedule, project docs, general project reports generation, individual project and summary of project status |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as a Project Coordinator. |
| **Post-conditions** | Project deleted from the database |

Table : Typical Course of Action (Delete Project)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Site Actions -> Site Settings -> Delete this site link |  |
| **2** |  | Show warning message |
| **3** | Click Delete |  |
| **4** |  | Ask for conformation |
| **5** | Click OK |  |
| **6** |  | Delete project from the database |
| **7** |  | Show the message “Your Web site has been deleted” and redirect to the Projects View page |

Table : Alternate Course of Action (Delete Project)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-5** | Refer to typical course of action |  |
| **6** | Click Cancel |  |
| **7** |  | Return to the Project Settings page |

Get Project Information

Table : Process Description (Get Project Information)

|  |  |
| --- | --- |
| **Identifier** | UC-9: Get Project information |
| **Purpose** | Get project information from the database and show it to the user |
| **Requirements** | WC\_366: Grant information can be tracked by the system.  WC\_357: all projects should be manageable - budget, schedule, project docs, general project reports generation, individual project and summary of project status |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as any registered user. |
| **Post-conditions** | Project information showed to the user |

Table : Typical Course of Action (Get Project Information)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click on a project name in Project Info table |  |
| **2** |  | Find project information in the database |
| **3** |  | If information found redirect user to the Project Home page with project information |

Table : Alternate Course of Action (Get Project Information)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-2** | Refer to typical course of action |  |
| **3** |  | If project information not found, redirect to the Projects View page and show message “Project was not found in the database” |

View Projects

Table : Process Description (View Projects)

|  |  |
| --- | --- |
| **Identifier** | UC-10: View Projects |
| **Purpose** | View list of all projects |
| **Requirements** | WC\_366: Grant information can be tracked by the system.  WC\_357: all projects should be manageable - budget, schedule, project docs, general project reports generation, individual project and summary of project status |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as any registered user. |
| **Post-conditions** | Projects list showed to the user |

Table : Typical Course of Action (View Projects)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Open View Projects page |  |
| **2** |  | Find projects information in the database |
| **3** |  | If information found redirect user to the View Projects page with a list of selected projects |

Table : Alternate Course of Action (View Projects)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-2** | Refer to typical course of action |  |
| **3** |  | If projects information not found, redirect to the Projects View page and show a message “No records to display” |

View Project Home

Table : Process Description (View Project Home)

|  |  |
| --- | --- |
| **Identifier** | UC-25: View Project Home |
| **Purpose** | View list of all projects |
| **Requirements** | WC\_366: Grant information can be tracked by the system.  WC\_357: all projects should be manageable - budget, schedule, project docs, general project reports generation, individual project and summary of project status |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as any registered user. |
| **Post-conditions** | Projects Home Page showed to the user |

Table : Typical Course of Action (View Project Home)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click on a project site path |  |
| **2** |  | Find project home page and select project information from the database |
| **3** |  | If information found redirect user to the View Project Home page with project information |

Table : Alternate Course of Action (View Project Home)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-2** | Refer to typical course of action |  |
| **3** |  | If projects information not found, show an error message “Page not found” |

Edit Project Financial Information

Table : Process Description (Edit Project Financial Information)

|  |  |
| --- | --- |
| **Identifier** | UC-11: Edit Project Financial Information |
| **Purpose** | Change project financial information |
| **Requirements** | WC\_366: Grant information can be tracked by the system.  WC\_357: all projects should be manageable - budget, schedule, project docs, general project reports generation, individual project and summary of project status |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as an Accountant. |
| **Post-conditions** | Project financial information was changed |

Table : Typical Course of Action (Edit Project Financial Information)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Edit Fin. Information button |  |
| **2** |  | Redirect to the empty Project Accountant Form filled in with project financial information |
| **3** | Change project financial information in Project Accountant Form and click Submit |  |
| **4** |  | Check input information for correctness |
| **5** |  | If information is correct, save new project financial information to the database |
| **6** |  | Redirect to the Project Home page |

Table : Alternate Course of Action (Edit Project Financial Information)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-4** | Refer to typical course of action |  |
| **5** |  | If data is incorrect, redirect back to the Project Accountant Form with corresponding message (e.g. “Data in the field [Field Name] is incorrect”) |

###### Report Generator

Create Report

Table : Process Description (Create Report)

|  |  |
| --- | --- |
| **Identifier** | UC-12: Create Report |
| **Purpose** | Create Report of the selected type filled with selected project information |
| **Requirements** | WC\_370: System can create progress reports |
| **Development Risks** | none |
| **Pre-conditions** | System database is properly initialized.  User is logged in as any registered user. |
| **Post-conditions** | Projects report created and saved in the database |

Table : Typical Course of Action (Create Report)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Add Document button |  |
| **2** |  | Find corresponding project information in the database and fill corresponding fields |
| **3** | Fill in remaining information |  |
| **4** | Click the button Save |  |
| **5** |  | If information is correct save the report |

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-4** | Refer to typical course of action |  |
| **5** |  | If information is incorrect show the error message |

Table : Alternate Course of Action (Create Report)

View Reports

Table : Process Description (View Reports)

|  |  |
| --- | --- |
| **Identifier** | UC-19: View reports |
| **Purpose** | Show saved reports |
| **Requirements** | WC\_370: System can create progress reports |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as any registered user. |
| **Post-conditions** | Projects reports showed to the user |

Table : Typical Course of Action (View Reports)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Quarterly Report tab |  |
| **2** |  | Find reports in the database and show them to the user |

Alternate Course of Action for View Reports is not applicable

Edit Report

Table : Process Description (Edit Report)

|  |  |
| --- | --- |
| **Identifier** | UC-20: Edit report |
| **Purpose** | Edit report information |
| **Requirements** | WC\_370: System can create progress reports |
| **Development Risks** | none |
| **Pre-conditions** | System database is properly initialized.  Report exist in the database.  User is logged in as any registered user. |
| **Post-conditions** | Edited report information saved in the database |

Table : Typical Course of Action (Edit Report)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click on the report |  |
| **2** |  | Find corresponding projects information in the database and fill corresponding fields |
| **4** | Fill in remaining information |  |
| **5** | Click the button Save |  |
| **6** |  | If information is correct save the report |

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-5** | Refer to typical course of action |  |
| **6** |  | If information is incorrect show the error message |

Table : Alternate Course of Action (Edit Report)

Submit Report

Table : Process Description (Submit Report)

|  |  |
| --- | --- |
| **Identifier** | UC-24: Submit Report |
| **Purpose** | Submit Report information |
| **Requirements** | WC\_370: System can create progress reports |
| **Development Risks** | none |
| **Pre-conditions** | System database is properly initialized.  User is logged in as any registered user. |
| **Post-conditions** | Update report information in the database and generate a report in pdf format |

Table : Typical Course of Action (Submit Report)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click on the report or click Add document button |  |
| **2** |  | Find corresponding projects information in the database and fill corresponding fields |
| **3** | Fill in or change information |  |
| **4** | Click the Submit button |  |
| **5** |  | If information is correct save the report, generate and save pdf version of the report |

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-4** | Refer to typical course of action |  |
| **5** |  | If information is incorrect show the error message |

Table : Alternate Course of Action (Submit Report)

###### Project Document Management

Attach Document

Table : Process Description (Attach Document)

|  |  |
| --- | --- |
| **Identifier** | UC-13: Attach Document |
| **Purpose** | Upload and attach a new document to the project |
| **Requirements** | WC\_392: Ability to upload (attach) any files to the project |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as a Project Manager. |
| **Post-conditions** | New document uploaded to the server and attached to the project |

Table : Typical Course of Action (Attach Document)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Add Document button |  |
| **2** |  | Show “Upload Document” dialog |
| **3** | Choose a file to be attached and click OK |  |
| **4** |  | Upload file to a server and link to the project in the database |
| **6** |  | Show Project Home page with attached file |

Alternate Course of Action for Attach Document is not applicable

Download Document

Table : Process Description (Download Document)

|  |  |
| --- | --- |
| **Identifier** | UC-14: Download Document |
| **Purpose** | Download selected document form server to the user workstation |
| **Requirements** | WC\_392: Ability to upload (attach) any files to the project |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as any registered user.  Link to the document shown on the Project Home page |
| **Post-conditions** | Document downloaded to the user workstation |

Table : Typical Course of Action (Download Document)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click on the link of the desired document |  |
| **2** |  | Show Save File dialog |
| **3** | Choose location and name and click Save File button |  |
| **4** |  | Save File on a user workstation |

Alternate Course of Action for Download Document is not applicable

Delete Document

Table : Process Description (Delete Document)

|  |  |
| --- | --- |
| **Identifier** | UC-15: Delete Document |
| **Purpose** | Delete existing document from the system |
| **Requirements** | WC\_392: Ability to upload (attach) any files to the project |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as a Project Manager. |
| **Post-conditions** | Deleted deleted from the system |

Table : Typical Course of Action (Delete Document)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Delete Document button in a drop-down menu in front of the corresponding document |  |
| **2** |  | Ask for conformation |
| **3** | Click OK |  |
| **4** |  | Delete document from the file system and information about it from the database |
| **5** |  | Redirect to the renewed Project Home page without deleted document |

Table : Alternate Course of Action (Delete Document)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-2** | Refer to typical course of action |  |
| **3** | Click Cancel |  |
| **4** |  | Return to the Project Home page |

###### Projects Information Export

Request Projects Information

Table : Process Description (Request Projects Information)

|  |  |
| --- | --- |
| **Identifier** | UC-17: Request Projects Information |
| **Purpose** | External website can request projects information through the HTTP protocol and receive it in XML format |
| **Requirements** | WC\_382: Ability to export information for the general public (for example xml) |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  External Website has access to the LADOT intranet. |
| **Post-conditions** | XML information provided to the External Website |

Table : Typical Course of Action (Request Projects Information)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Send an HTTP request with specified parameters to the System |  |
| **2** |  | Check the correctness of the request |
| **3** |  | Select requested projects data from the database |
| **4** |  | Form XML with projects data and return it to the External Website |

Table : Alternate Course of Action (Request Projects Information)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-2** | Refer to typical course of action |  |
| **2** |  | If request is incorrect return a response “Incorrect request” |

###### Email System

Send Email

Table : Process Description (Send E-mail)

|  |  |
| --- | --- |
| **Identifier** | UC-16: Send E-mail |
| **Purpose** | Send E-mail to selected users |
| **Requirements** | WC\_376: System has the capability to send out emails through the system |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as any registered user. |
| **Post-conditions** | E-mail sent to the selected users |

Table : Typical Course of Action (Send E-mail)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Send E-mail button |  |
| **2** |  | Show empty E-mail form |
| **3** | Fill in the form |  |
| **4** | Click Send button |  |
| **5** |  | Check correctness of data |
| **6** |  | Send E-mail to the selected users |

Table : Alternate Course of Action (Send E-mail)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-5** | Refer to typical course of action |  |
| **6** |  | If data is incorrect, show corresponding message (e.g. “Please enter valid e-mail.”) and redirect back to the E-mail Form |

###### Tasks

Add Task

Table : Process Description (Add Task)

|  |  |
| --- | --- |
| **Identifier** | UC-21: Add Task |
| **Purpose** | Add a new task to selected project |
| **Requirements** | WC\_379: Scheduling functions (ability to set deadlines and send reminders (ex: quarterly reports by email)) |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as Project Manager. |
| **Post-conditions** | New task is added to the project |

Table : Typical Course of Action (Add Task)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Add new item button in the Tasks table |  |
| **2** |  | Redirect to the empty Task form |
| **3** | Fill in the form |  |
| **4** | Click Save button |  |
| **5** |  | Check correctness of data |
| **6** |  | Add Task to the project |

Table : Alternate Course of Action (Add Task)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-5** | Refer to typical course of action |  |
| **6** |  | If data is incorrect, redirect back to the Task Form with corresponding message (e.g. “You must specify a value for this required field.”) |

Edit Task

Table : Process Description (Edit Task)

|  |  |
| --- | --- |
| **Identifier** | UC-22: Edit Task |
| **Purpose** | Edit existing task |
| **Requirements** | WC\_379: Scheduling functions (ability to set deadlines and send reminders (ex: quarterly reports by email)) |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as Project Manager. |
| **Post-conditions** | Task information is updated |

Table : Typical Course of Action (Edit Task)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Edit Item button |  |
| **2** |  | Redirect to the Task form filled with the tasks information |
| **3** | Change the information |  |
| **4** | Click Save button |  |
| **5** |  | Check correctness of data |
| **6** |  | Update tasks information |

Table : Alternate Course of Action (Edit Task)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-5** | Refer to typical course of action |  |
| **6** |  | If data is incorrect, redirect back to the Task Form with corresponding message (e.g. “You must specify a value for this required field.”) |

Delete Task

Table : Process Description (Delete Task)

|  |  |
| --- | --- |
| **Identifier** | UC-23: Delete Task |
| **Purpose** | Delete existing task |
| **Requirements** | WC\_379: Scheduling functions (ability to set deadlines and send reminders (ex: quarterly reports by email)) |
| **Development Risks** | None |
| **Pre-conditions** | System database is properly initialized.  User is logged in as Project Manager. |
| **Post-conditions** | Task deleted from the project |

Table : Typical Course of Action (Delete Task)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1** | Click Delete Item button |  |
| **2** |  | Ask confirmation for deleting |
| **3** | Click OK button |  |
| **4** |  | Delete Task from the project |

Table : Alternate Course of Action (Edit Task)

|  |  |  |
| --- | --- | --- |
| **Seq#** | **Actor’s Action** | **System’s Response** |
| **1-2** | Refer to typical course of action |  |
| **3** | Click Cancel button |  |
| **4** |  | Return to the Project Home page |

##### Modes of Operation

The TGFD System is intended to operate in only one mode. Thus, no further information is giving in this section.

#### System Analysis Rationale

Based on the clients’ description, the following information about External Website Actor is given:

In future clients want to be able to build a website for the general public which will contain information about LADOT projects. In order for this site to be able to pull data from TGFD System that we develop there will be an HTTP interface which will allow retrieving projects information in XML format. This can be done with SharePoint with minimal efforts.

Note about Users Profile:

User Profile will contain only basic information about the system user (e.g. name, e-mail address) and will be populated and managed by admin. Users will not have ability to change their profiles.

Note about accounting information:

As for now clients requested for accountants only the ability to attach files with financial information and manage reports. In the future separate project fields can be dedicated to accountants.

Note about SharePoint and PM Central capabilities:

After prototyping with SharePoint and PM Central team determined that SharePoint and PM Central provide all the required capabilities with very minor coding (only small script was used).

Note about Administrator: as for now the IT department will perform administrative functions for the system: manage users and add new projects. Later on a special position called Project Coordinator can be created to perform these functions. This should not affect system architecture.

### NDI/NCS Interoperability Analysis

#### Introduction

We are currently planning to use two NDIs in our project: Microsoft SharePoint 2010 Enterprise and PM Central from Bamboo Solutions.

##### COTS / GOTS / ROTS / Open Source / NCS

Table 45: NDI Products Listing

|  |  |
| --- | --- |
| **NDI/NCS Products** | **Purposes** |
| Microsoft SharePoint 2010 Enterprise | Web application platform for the project |
| Microsoft SQL Server 2008 | Relational database management system |
| Active Directory service of Windows Server 2008 R2 | Directory service (responsible for authenticating and authorizing) |
| PM Central | Web-based workspace solution for Microsoft SharePoint |
| Muhimbi PDF Converter (Sharepoint Add-in) | This product allows us to convert Microsoft documents to pdf |

##### Connectors

Two NDIs are used in this project: Microsoft SharePoint 2010 Enterprise and PM Central. PM Central is just a plug in (collection of templates and web applications) to Microsoft SharePoint 2010. Microsoft SharePoint 2010 NDI uses Microsoft SQL Server 2008 R2. However, communication with the database is hidden from the users and in our case from developers as well. Thus no connectors are required for the TGFD system.

##### Legacy System

At this point there are no requirements for interoperability with other systems.

#### System Structure



Figure **: Hardware Component Diagram**



Figure : **Deployment Diagram**

#### Evaluation Summary

Table 46: NDI Evaluation

|  |  |  |
| --- | --- | --- |
| **NDI** | **Usages** | **Comments** |
| Microsoft SharePoint 2010 Enterprise | Web application platform for the project | The project is planned to be developed using SharePoint with minor coding. Thus all the functionality will be developed using SharePoint tools and will use build in SharePoint functionality. |
| PM Central | Web-based workspace solution for Microsoft SharePoint | PM Central provides a collection of site templates and web-applications for project management. Its functionality will be used in the project. |
| Muhimbi PDF Converter (Sharepoint Add-in) | Converter of Microsoft documents to pdf | This product allows us to convert our report forms to pdf which is one of the main system purposes |