ACKNOWLEDGEMENT

Every project, whether big or small is successful due to the collaborative effort of all the team members who always give their valuable advice. I sincerely appreciate the inspiration; support and guidance of all those people who have played an instrumental role in making this project a huge success.

I, **Gurpreet Singh**, student of **Amity School of Engineering and Technology, Amity University**, am extremely grateful for the confidence reposed in me and my project entitled **Truck Permit Registration & Management System** with special reference to **Vismaad Softech Private Limited.**

At this juncture I feel deeply honoured in expressing my sincere thanks to **Mr. Sukhwinder Singh** for making the required resources available at right time and providing valuable insights and much needed guidance leading to the successful completion of my project.

I would also like to owe my highest regards to my faculty guide **Mr. Sunil Kumar Chowdhary** at **Amity School of Engineering and Technology, Amity University** for their critical advice and guidance without which this project would not have been possible.

Last but not the least I place a deep sense of gratitude to my family members and my friends who have been constant source of inspiration during the preparation of this project work.

COMPANY PROFILE

Vismaad Pte Ltd is formed by IT professionals equipped with an extensive project management expertise in the IT industry. Vismaad, as a software development company, believes in delivering innovative, high quality, cost effective IT software solutions. The core belief of Vismaad lies in the protection of customer's intellectual property processes and infrastructure. Vismaad team is led by dedicated professionals having vast experience in the field of IT.

For its clients, Vismaad commits the right people for delivering the right solutions at the right time. A strong team of developers specialize in implementing & delivering solutions starting from the simple Web solutions to the most complex multi-tier windows/ web based client server solutions in various technologies. At Vismaad, products and solutions are developed, implemented and delivered by a team of highly trained and dedicated engineers with a huge collective experience of multiple decades in the IT industry.

Software Development

Our Programming Expertise

Vismaad reposes faith in **Extreme Programming Methodology** for Software Development. eXtreme Programming (XP) is defined as "a software development methodology that is based on values of communication, feedback, simplicity and courage. This methodology works by uniting the entire team through the use of simple practices, besides gathering sufficient feedback to enable the team to analyze their performance and to fine tune their existing methods to their present environment".

In Extreme Programming methodology, every contributor to the project is an integral part of the "Entire Team". The business representative called "the Customer" is the central theme of the project, which sits along with the team members and coordinates with them on a daily basis.

Professional Services

As a Professional Services organization, Vismaad has always been on the forefront, helping customers in leveraging the existing technologies and implementing solutions to realize their business objectives in the most effective manner. It is their mission to maintain integrity while providing solutions besides providing the best customer support. Their professional solutions, products and software development capabilities prove to be beneficial to the customers.

Vismaad's Professional Services comprise of 4 Portfolios: Unified Communications, Business Productivity, IT Governance and Service Management, IT Optimization.

Vismaad Professional Services can assist in:

- Streamline workflow and facilitate business collaboration
- Streamline software development
- Facilitate effective and rapid decision making
- Execute system development strategies

Unified Communication and Collaboration

In today's scenario, the need is to enable our communications infrastructure, mobile solutions, network infrastructure, computing resources and applications to work together, so as to enable the participation of users in any type of communication with anyone and at any time. We need to boost our interaction with employees, business partners, suppliers and customers by providing a common platform for all forms of communications such as messaging, email, voice, data, mobile and video conferencing.

UCC Professional Services:

- Design services
- Implementation services
- Management & Security services
- Training Services for End-users

Business Productivity

In today's scenario, the need is to enable the collaboration of our communications infrastructure, mobile solutions, desktop and applications so as to ensure the participation of users in any type of communication with anyone and at any time. Therefore, Vismaad solutions have been designed for customers to achieve their objectives by improving and supporting system workflow, business collaboration and data analysis and retrieval. The components of Business Productivity are Operating and Directory Services and Application Productivity.

a) Application Productivity

Vismaad solutions help organizations in realizing competitive business objectives, improve system execution and facilitate effective decision-making by streamlining the business methodologies and adding integrated functionality to existing systems. Application Productivity includes:

- Business Collaboration & Intelligence

- Customized Business Applications
- Enterprise Software Project Management

b) <u>Operating Systems & Directory Services</u>

Operating Systems & Directory Services solutions from Vismaad Professional Services assist customers in selection of network services and operating systems as per their business requirements and then facilitate their integration to achieve business goals in an effective manner. Further, they provide assistance in design and implementation of messaging systems; integration of directory services with Microsoft Active Directory; management of workstation and server infrastructures and ensuring security of operating system through the rightly chosen applications and processes.

VISMAAD Professional Services offers three specific services within this category which are Directory Services, Operating Systems and Enterprise Services.

TRUCK PERMIT REGISTRATION & MANAGEMENT SYSTEM

INTRODUCTION

The purpose of the project is to develop a web based Truck Permit Registration & Management System (TPRMS), which should provide online track (Super Admin) on new , renewal applications , change of profile and status and other related functions over the web application. It should also provide a browser based system for Admin(s) to process the applications submitted.

The business objectives of the proposed system are:

2.1 Roles

1. Super Admin
2. Admin Executive
3. Processing Officer (PO)

2.2 Tasks

1. PERMITS
2. FUEL TAX
3. IRP
4. TITLE
5. PTI
6. DOT COMPLIANCE

BUSINESS TYPE

1. INDIVIDUAL
2. COPRPORATION
3. LLC
4. PARTNERSHIP

INTRODUCTION TO TECHNOLOGIES USED

1. VISUAL STUDIO 2010

Microsoft Visual Studio is an integrated development environment (IDE) offered by Microsoft. It is used for development of computer programs for Microsoft Windows super family of operating systems, besides assisting in design and development of websites, web services and web applications. Visual Studio utilizes Microsoft software development platforms such as Windows API, Windows Store, Windows Presentation Foundation, Windows Forms and Microsoft Silverlight. It is capable of producing both native codes we well as managed code.

Visual Studio contains IntelliSense-supporting code editor as well as code refactoring. The integrated debugger works both as a machine-level debugger and a source-level debugger. Various built-in tools are available such as a forms designer (for developing GUI applications), web application designer and database designer. It provides support for different programming languages including the built-in languages such as C, C++ and C++/CLI, VB.NET, F# and C#. Support for other programming languages such as Python and Ruby can be provided via language services that are to be installed separately. Also, it also supports XML, HTML, XHTML, XSLT, JavaScript and CSS.

2. THE MVC PROGRAMMING MODEL

MVC is one of three ASP.NET programming models.

MVC is an effective framework used for developing web applications using a MVC (Model View Controller) design approach where the Model represents the application core; the View displays the data and the Controller handles the input to be given to the database records.

Also, the MVC model provides full control over HTML, CSS, and JavaScript. It enables the users to design and define web applications through the 3 logic layers:

- The business layer (Model logic) - It handles the logic for the application data. Often model objects retrieve data (and store data) from a database.
- The display layer (View logic) - It handles the display of the application data. Most often the views are created from the model data.
- The input control (Controller logic) - It handles the user interaction. Typically controllers read data from a view, control user input, and send input data to the model.

The MVC partitioning enables the users to manage complex applications as they may focus upon each one of these components individually. Also, it simplifies the testing of the applications. Further, the MVC simplifies effective group development as multiple developers are able to work on the view logic, the controller logic, and the business logic in parallel.

3. ENTITY FRAMEWORK

Entity Framework (EF) is an open source object-relational mapping (ORM) framework for ADO.NET, part of .NET Framework. The Entity Framework is a set of technologies based on ADO.NET that supports the design and development of data-oriented applications. Developers of data-oriented applications have been struggling to achieve two very differing objectives. Firstly, they must model the entities, relationships, and application logic of the business requirements they need to solve, and secondly, they must work with the databases and data engines used for storage and retrieval of data. Using the Entity Framework, architects and developers are able to work with greater abstraction while they deal with data, and thus they can build and maintain data-oriented applications with lesser code as compared to traditional applications.

4. SQL SERVER 2008

Microsoft SQL Server is a relational database management system developed by Microsoft. It is a database management software whose prime function is to store and retrieve data on being requested by other applications, whether those are running on the same computer system or on external computer system connected through a network. At least, a dozen different editions of Microsoft SQL Server are available which serve different audiences and are aimed at workloads ranging from simple applications to complex Internet-based applications. Its primary query languages are T-SQL and ANSI SQL.

MODULAR DESCRIPTION

1. INDIVIDUAL

In this Module there is entry for an Individual Person. If an individual has it's own truck and want to register itself then it will be done in individual module. All the necessary information related to an individual is input.
Such Information may include:

a. Individual Name
b. DBA (Doing Business As)
c. SSN (Social Security Number)
d. Physical Address
e. Mailing Address
f. Email

2. CORPORATION

In this Module, there is an entry for a Corporation. Corporation means there is company of Trucks and its details will be included in this module. There will also be Director Entry for a particular Corporation All the necessary information related to Corporate Company may include:

a. Business Name
b. DBA (Doing Business As)
c. Corporation Number
d. Corporation Registration Date
e. Physical Address
f. Mailing Address
g. Director Name

3. PARTNERSHIP

In this Module there is an entry for a Partnership. It means that the Trucks are owned by two or more partners There will also be Partner entry in the Partnership. All necessary information required for Partnership includes:

a. Business Name
b. DBA (Doing Business As)
c. Physical Address
d. Mailing Address
e. Partners Name

4. LLC

LLC here means Limited Liability Company. There is also entry for a LLC. It will also include the member entry. All the necessary information required for LLC includes:

a. Business Name
b. DBA (Doing Business As)
c. LLC Number
d. LLC Registration Date
e. Physical Address
f. Mailing Address
g. Member Name

Tasks

1. IRP

IRP is a procedure to be followed for registering fleets of vehicles those are travelling in two or greater member jurisdictions. Member jurisdictions include all U.S. states, except for Alaska and Hawaii; Washington D.C.; and all Canadian provinces, excluding the territories of Northwest Territories, Yukon and Nunavut. Motor carriers those are operating across state boundaries are subject to IRP licensing unless the vehicle has been exempted or a trip permit has been obtained. IRP registration fees are determined by the type of operation requested (private, for-hire, or rental) and by the:

- Percentage of distance (miles) traveled in each of the member jurisdiction
- Registered total weight of each motor vehicle
- Number of motor vehicles forming the fleet

2. IFTA

IFTA (International Fuel Tax Agreement) is a cooperative agreement among the Canadian provinces and most American states to make it easier for inter jurisdictional carriers to report and pay taxes on the motor fuels they use.

The agreement allows registered inter jurisdictional carriers to get one licence, issued by their home jurisdiction, to report and pay motor fuel taxes to a single jurisdiction.

Under IFTA, inter jurisdictional carriers report the amount of fuel consumed and the distance travelled in each jurisdiction. Member jurisdictions work together to track, collect and share

the taxes payable on motor fuels such as gasoline, diesel, propane, gasohol, methanol, ethanol, natural gas and biodiesel.

Vehicles registered under IFTA display identifying decals issued by their home jurisdiction.

Registering gives you the benefit of:

- having one IFTA licence to allow travel in all member jurisdictions, and
- dealing with one jurisdiction for the reporting and payment of motor fuel taxes.

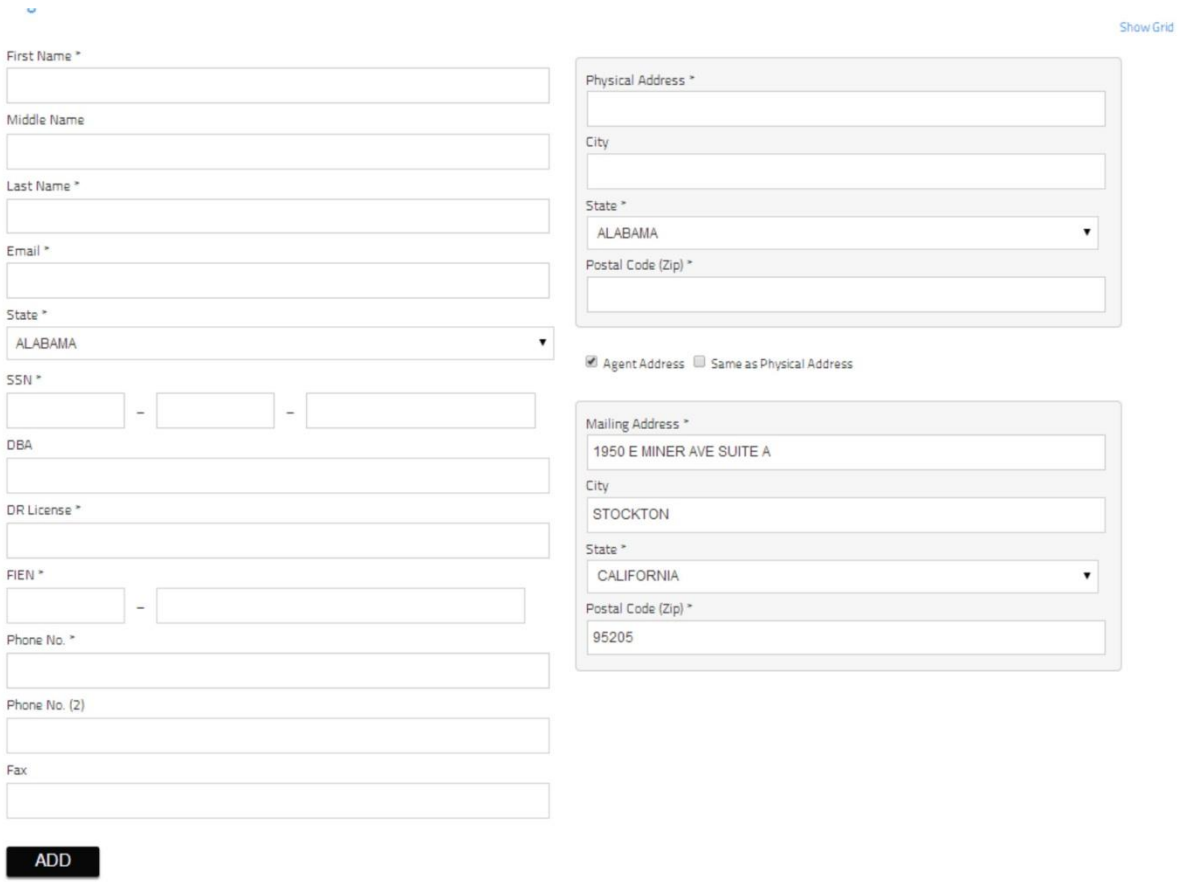
3. PERMIT

It is mandatory for the owner of the transport vehicles to obtain a permit for their vehicles and use those permits in accordance with the terms and conditions of the permit granted or countersigned by the State or Regional Transport Authority.

DETAILED ANALYSIS OF INDIVIDUAL MODULE

Add Individual

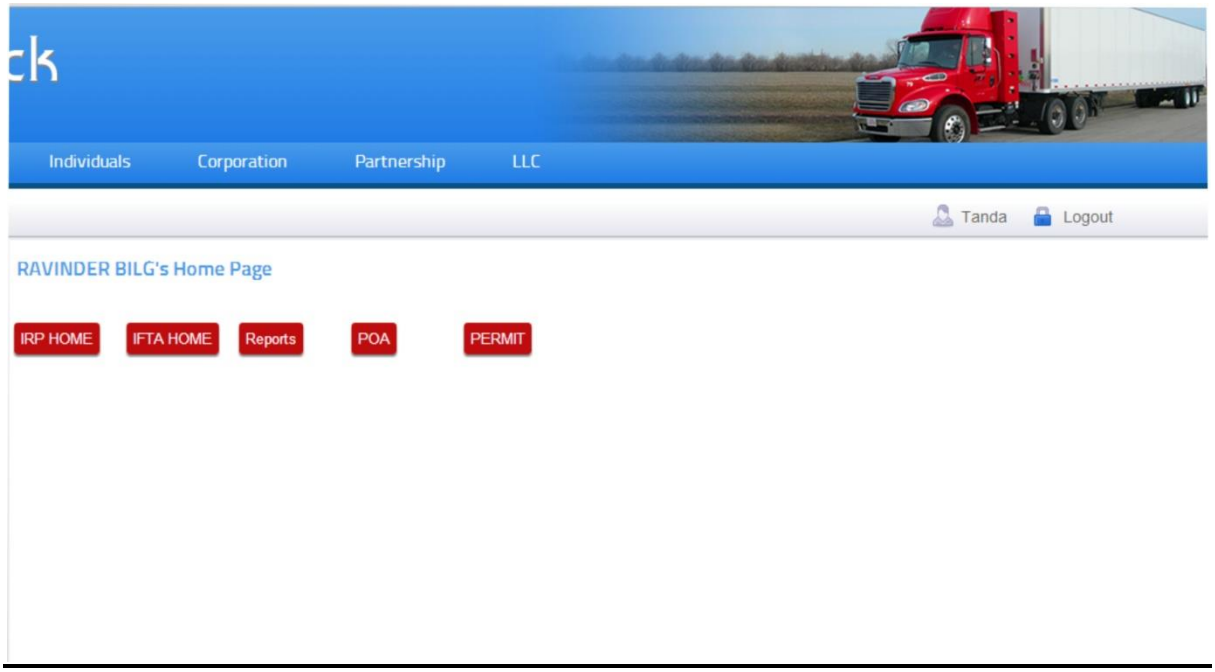
In this we have to fill the details regarding an individual registration. All necessary information is taken of an individual.



Similarly, corporation, partnership and LLC forms are also there to add the necessary information related to each module.

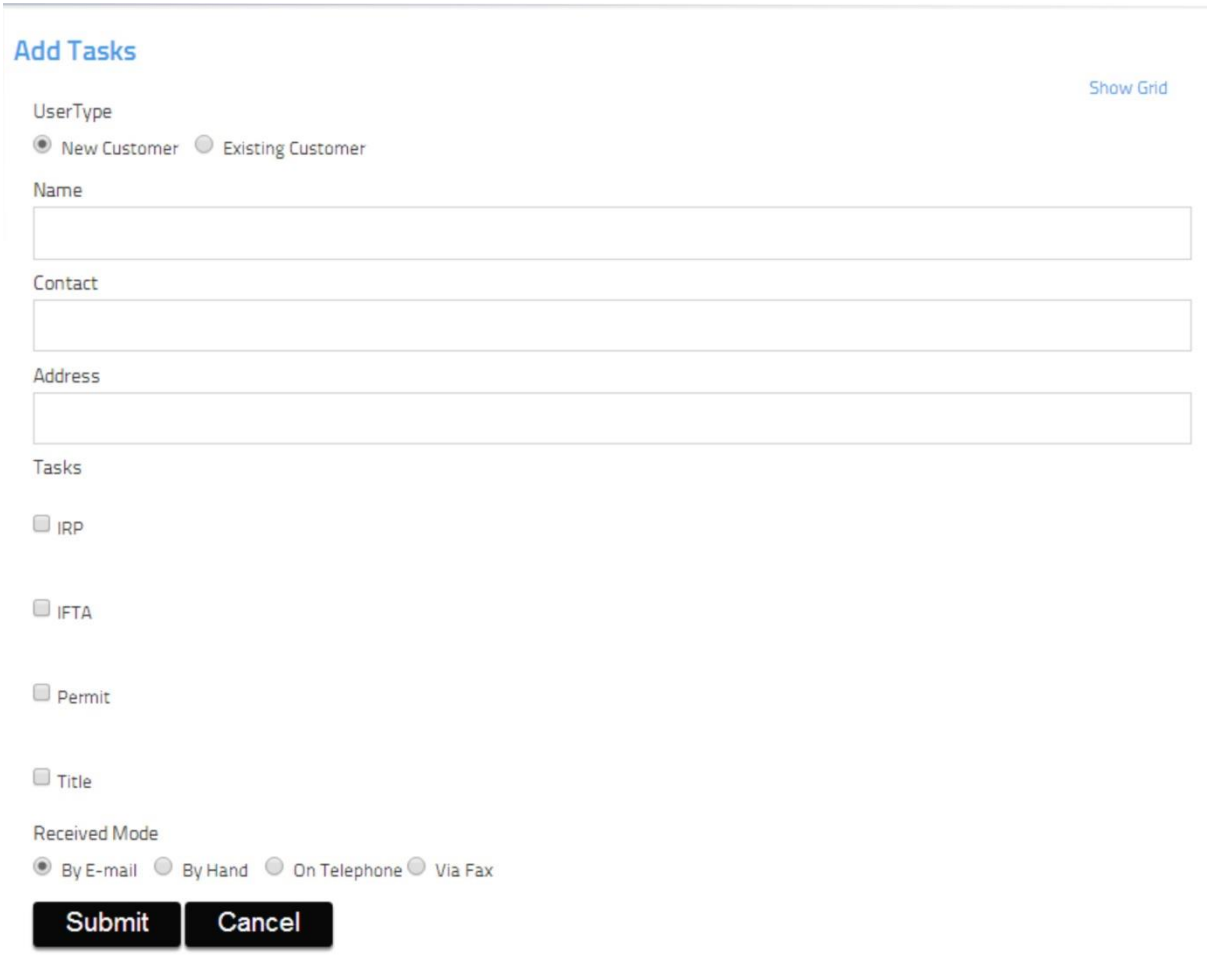
USER TASKS

In this form we have to select what particular task customer want . Either customer wants IRP registration, IFTA Registration, generating of reports or want to ask for Permit etc. Either Individual, Corporation, Partnership or LLC anyone can go for these tasks.



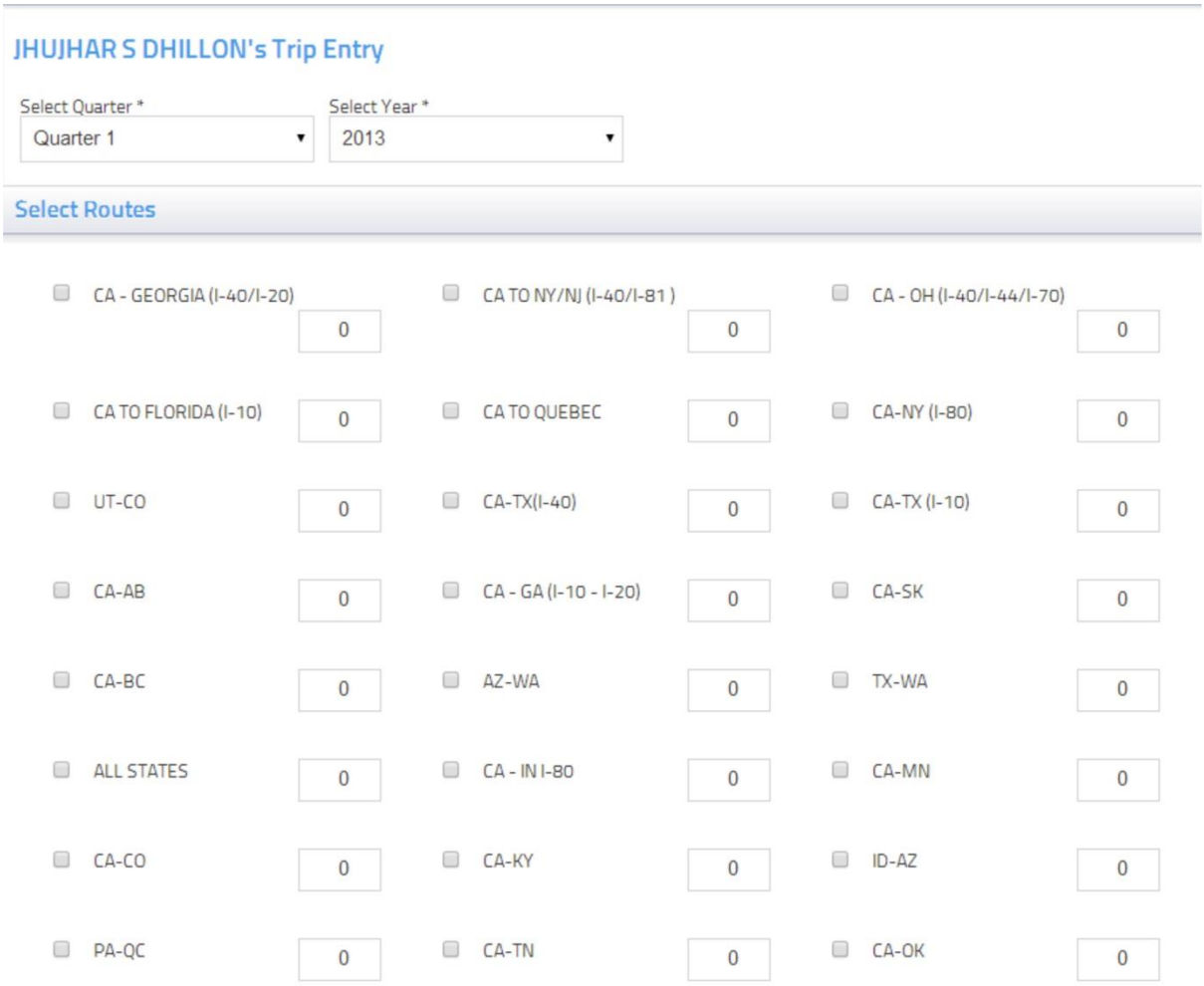
Input Tasks

This form is required to assign the tasks to the Customers. There are two types of Customers:- New Customer and Existing Customer. New Customer doesn't have their earlier registration in any of the business type. Existing Customer exists either in Individual, Corporation, Partnership or LLC business type. Here we assign the tasks to the customers. The tasks are IRP, IFTA, PERMIT and TITLE which further have the subtasks to be assigned to the customer.



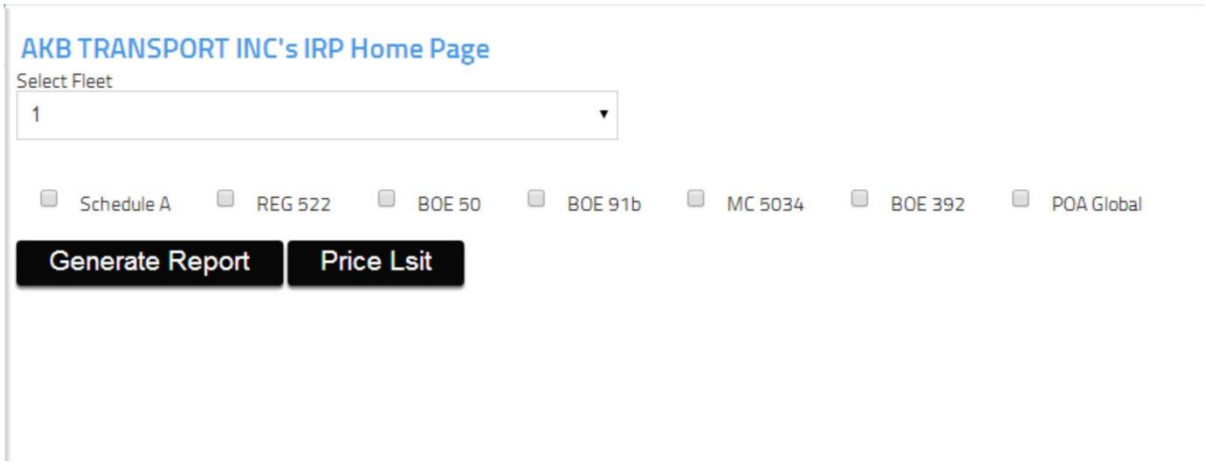
Add Trip Entry

This Form is to add the Trip Entry for the vehicles. Trip Entry is done for a particular quarter and the year. Trip Entry is done to record the entry of the vehicle that in which route the vehicle has entered and the distance covered by it.



Generating Reports

In this we generate the reports in the pdf format. All the necessary information that is to be required in pdf is taken from the database. Adobe Acrobat is used to edit the pdf's and then bringing the data into the pdf via generating reports.

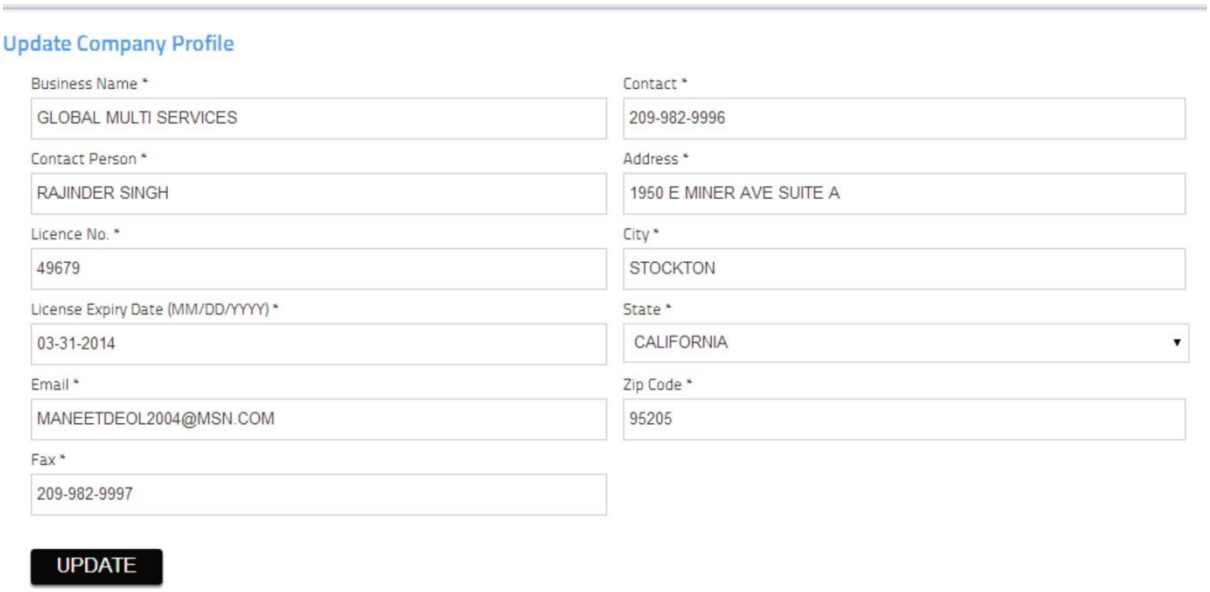


Add Driver

This module comes under the Pemit Task. In this we add the drivers in each business type. All the necessary information related to driver like driver name , dob, licence number etc are added in this module.

Company Profile

This module allows updation of the company profile. It contains the address of the agent. All the necessary information related to the agent is input in this form.



PDF Files Worked Upon In Project

1. EPN1100

STATE OF CALIFORNIA DMV DEPARTMENT OF MOTOR VEHICLES
A Public Service Agency

COMMERCIAL EMPLOYER PULL NOTICE
ENROLLMENT OR DELETION OF DRIVERS

CHECK ONLY **ONE** PROCESS PER FORM
☐ **ENROLL OR** ☐ **DELETE**

Department of Motor Vehicles
Information Services Branch
Employeer Pull Notice–H265
P.O. Box 944231
Sacramento, CA 94244-2310

Please type or print in ink

EMPLOYER	**REQUESTER CODE**	DATE
CURRENT ADDRESS	TELEPHONE ( )	
CITY STATE ZIP CODE	CONTACT PERSONS NAME AND TITLE (FIRST, MI, LAST)	

CLASS LICENSE

A - Class A **B/P -** Class B with passengers (Charter-Party) **C/S -** Class C with Special Certificates
B - Class B **C/H -** Class C with Hazardous Materials Endorsement **C/P -** Class C with PUC permit issued

	CALIFORNIA DRIVER LICENSE OR TEMPORARY "X" NUMBER	DRIVER'S LAST NAME ONLY	CLASS LICENSE	"REMARKS" FOR YOUR USE (LIMIT TO 21 SPACES)
1)				
2)				
3)				
4)				
5)				
6)				
7)				
8)				
9)				
10)				
11)				
12)				
13)				
14)				
15)				

_____ **TOTAL DRIVERS ADDED** (A $5 ENROLLMENT FEE FOR EACH DRIVER WILL BE BILLED TO YOUR ABIS ACCCOUNT)
_____ **TOTAL DRIVERS DELETED** (NO FEE)

FOR ENROLLMENT ONLY:

I certify (or declare) under penalty of pejury under the laws of the State of California that the foregoing is true and correct.

The driver(s) listed above are (1) mandated for enrollment under California Vehicle Code S 1808.1. **OR** (2) have signed and "Authorization for Release of driver Record Information" from (INF 1101) or internal document with similar language **AND** are currently in an employer/ employee relationship **AND** frequently drive during the course of their employement.

DATE	SIGNATURE
	X

PRINTED NAME AND TITLE

To obtain additional forms and information please visit our website at: **http://www.dmv.ca.gov/vehindustry/epn/epngeninfo.htm**

INF 1100 (REV. 2/2010) **WWW**

2. EPN1102

STATE OF CALIFORNIA
DMV
DEPARTMENT OF MOTOR VEHICLES
A Public Service Agency

COMMERCIAL EMPLOYER PULL NOTICE
ENROLLMENT OF OUT OF STATE LICENSED DRIVERS
(THIS FORM IS FOR ENROLLING DRIVERS ONLY)

Department of Motor Vehicles
Information Services Branch
Employeer Pull Notice–H265
P.O. Box 944231
Sacramento, CA 94244-2310

Please type or print in ink

EMPLOYER		
CURRENT ADDRESS		
CITY	STATE	ZIP CODE

REQUESTER CODE	DATE
TELEPHONE ( )	
CONTACT PERSONS NAME AND TITLE (FIRST, MI, LAST)	

CLASS LICENSE

A - Class A
B - Class B
B/P - Class B with passengers (Charter-Party)
C/H - Class C with Hazardous Materials Endorsement
C/S - Class C with Special Certificates
C/P - Class C with PUC permit issued

PRINT AS SHOWN ON OUT-OF-STATE LICENSE **("REMARKS FOR YOUR USE (LIMIT TO 21 SPACES)**

1) COMPLETE LAST NAME,FIRST,MIDDLE **(DO NOT USE INITIALS)**				BIRTH DATE / /
(HOME STATE ADDRESS)		CITY	STATE	ZIP CODE
DRIVER LICENSE NO.	CLASS LICENSE	REMARKS		

2) COMPLETE LAST NAME,FIRST,MIDDLE **(DO NOT USE INITIALS)**				BIRTH DATE / /
(HOME STATE ADDRESS)		CITY	STATE	ZIP CODE
DRIVER LICENSE NO.	CLASS LICENSE	REMARKS		

3) COMPLETE LAST NAME,FIRST,MIDDLE **(DO NOT USE INITIALS)**				BIRTH DATE / /
(HOME STATE ADDRESS)		CITY	STATE	ZIP CODE
DRIVER LICENSE NO.	CLASS LICENSE	REMARKS		

4) COMPLETE LAST NAME,FIRST,MIDDLE **(DO NOT USE INITIALS)**				BIRTH DATE / /
(HOME STATE ADDRESS)		CITY	STATE	ZIP CODE
DRIVER LICENSE NO.	CLASS LICENSE	REMARKS		

5) COMPLETE LAST NAME,FIRST,MIDDLE **(DO NOT USE INITIALS)**				BIRTH DATE / /
(HOME STATE ADDRESS)		CITY	STATE	ZIP CODE
DRIVER LICENSE NO.	CLASS LICENSE	REMARKS		

_____ **TOTAL DRIVERS ADDED** (A $5 ENROLLMENT FEE FOR EACH DRIVER WILL BE BILLED TO YOUR ABIS ACCCOUNT)

I certify under penalty of pejury, under the laws of the State of California, that driver(s) listed above are (1) mandated for enrollment under California Vehicle Code S 1808.1. **OR** (2) have signed an "Authorization for Release of driver Record Information" form (INF 1101) or internal document with similar language **AND** are currently in an employer/employee relationship **AND** frequently drive during the course of their employment.

Executed at _____ , _____ , _____
CITY COUNTRY ADDRESS

DATE _____ Signature X _____

Printed name and title _____

To obtain additional forms and informatino please visit our website at: http://www.dmv.ca.gov/otherservice/epn

INF 1102 (REV. 12/2003)

3. EPN1104

STATE OF CALIFORNIA
DMV
DEPARTMENT OF MOTOR VEHICLES
A Public Service Agency

INFORMATION SERVICES BRANCH

EMPLOYER PULL NOTICE PROGRAM APPLICATION

PLEASE PRINT CLEARLY IN INK OR TYPE

MAIL COMPLETED FORMS TO:
DMV Information Services - EPN
P.O. Box 944231 - MS H-265
Sacramento, CA 94244-2310

DMV USE ONLY
REQUESTER CODE

SECTION A — ACCOUNT INFORMATION

COMPANY NAME	DBA	
ATTENTION	EMAIL ADDRESS	TELEPHONE NUMBER ( )
MAILING ADDRESS	CITY	STATE ZIP CODE
ACCOUNT CONTACT PERSON	EMAIL ADDRESS	TELEPHONE NUMBER ( )
STREET ADDRESS (PHYSICAL ADDRESS)	CITY	STATE ZIP CODE

SECTION B — BILLING ADDRESS (Complete only if different from above)

BILLING ACCOUNT CONTACT PERSON(S)		TELEPHONE NUMBER ( )
ATTENTION :		TELEPHONE NUMBER ( )
BILLING ADDRESS	CITY	STATE ZIP CODE

SECTION C — LICENSING AND BUSINESS IDENTIFICATION

Instructions: Complete the following on the individual participating in the direction, control or management of the business. Provide federal employer identification number.

NAME (LAST,FIRST,MI)	TITLE	
DL/ID NUMBER	STATE ISSUED	EXPIRATION DATE
EMAIL ADDRESS	FEDERAL EMPLOYER IDENTIFICATION NUMBER	

SECTION D — ACCOUNT USE AND HISTORY (Answer each question)

1. STATE YOUR PURPOSE FOR ENROLLMENT (BE SPECIFIC)

2. ARE ALL OF YOUR EMPLOYEES MANDATED TO BE ENROLLED IN THE PULL NOTICE PROGRAM PURSUAN TO VEHICLE COE SECTION 1808.1(b)?

☐ Yes
☐ No (NOTE: Any employee who is not mandated to be enrolled in the pull notice program must have a signed waiver [INF 1101 or similar] on file at the employer's worksite.)

3. HAS YOUR COMPANY PREVIOUSLY BEEN ISSUED A REQUESTER CODE?

☐ Yes ☐ No If yes, complete the following:

a) Company name(s) in which Requester Code(s) issued:

b) Requester Code(s) previously issued:

SECTION E — CERTIFICATION

I certify (or declare) under penalty of pejury under the laws of the State of California that the information contained herein is true and correct to the best of my knowledge and belief. I understand that this information is provided for the lawful conduct of this business and the pursuit of its interest and that any misuse will result in both cancellation of the requester number and refusal of subsequent application for requester number.

SIGNATURE OF AUTHORIZED REPRESENTATIVE (SAME PERSON AS IN SECTION C) X	PRINT NAME OF AUTHORIZED REPRESENTATIVE

DMV USE ONLY

APPROVED BY	DATE APPROVED	DATE RECEIVED

NOTE: If any information submitted on this application changes, you **MUST** submit a Notice of Change form (INF 4) within 10 days.

INF 1104 EPN (REV.6/2011) **WWW**

4. NOTICE OF CHANGE

STATE OF CALIFORNIA
DMV
DEPARTMENT OF MOTOR VEHICLES
A Public Service Agency

MOTOR CARRIER (CA) #

NOTICE OF CHANGE

Motor Carrier Permit

This form is to be completed for a change of name, change of address, or adding or deleting a "Doing Business As" (DBA) name. If your business entity (i.e., individual, partnership, corporation, limited liability company) has changed in some way, a new application must be filed and a new CA number must be obtained from the California Highway Patrol. A Fictitious Business Name Statement is required when adding a DBA name.

☐ CHANGE OF NAME ☐ CHANGE OF ADDRESS ☐ ADDING/DELETING DBA

SECTION A: INFORMATION ON RECORD WITH THE DEPARTMENT

Complete all items in this section.

MOTOR CARRIER LEGAL NAME

BUSINESS ADDRESS | CITY | COUNTRY | STATE | ZIP CODE

MAILING ADDRESS (IF DIFFERENT FROM BUSINESS ADDRESS) | CITY | COUNTRY | STATE | ZIP CODE

SECTION B: REQUESTED CHANGES TO THE MOTOR CARRIER PERMIT ACCOUNT

Complete only the items that are changing.

MOTOR CARRIER LEGAL NAME | TELEPHONE NUMBER ( )

BUSINESS ADDRESS (NOT P.O. BOX OR PMB) | CITY | COUNTRY | STATE | ZIP CODE

MAILING ADDRESS (IF DIFFERENT FROM BUSINESS ADDRESS) | CITY | COUNTRY | STATE | ZIP CODE

ADD DBA | DELETE DBA

I certify (or declare) under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

SIGNATURE OF AUTHORIZED REPRESENTATIVE
X

DATE

If you have any questions, call (916) 657-8153.

Return the completed form to:

REGULAR ADDRESS:
DEPARTMENT OF MOTOR VEHICLES
REGISTRATION OPERATIONS DIVISION MS: G875
P.O. BOX 932370
SACRAMENTO, CA 94232-3700

OVERNIGHT ADDRESS:
DEPARTMENT OF MOTOR VEHICLES
REGISTRATION OPERATIONS DIVISION MS: G875
2415 1ST AVENUE
SACRAMENTO, CA 95818

MC 152 M (REV. 12/2012) **WWW**

How the Industry works in Real Environment?

SOFTWARE DEVELOPMENT LIFE CYCLE

This Software Development Life Cycle (SDLC) document has been developed to provide a consistent framework for DOH BIT staff and other Bureau staff to proceed with a Systems Development Project. Some of the potential benefits to following the proceeding framework are:

- Project failure's risk reduction
- Full consideration of data requirements throughout the system lifespan
- Early identification, assessment and management of issues
- Consideration of the life cycle costs incurred due to business-related decisions
- Formation of achievable expectations about what the systems will/will not provide
- Consideration for meeting current and future business requirements
- Improved communications with the business units
- Better understanding of the business processes that drive systems development

The structure of the SDLC process provides a flexible and simplified framework for dealing with a multitude of system projects. The framework allows system developers, program analysts, project managers, system end users and clients to combine processes, activities and products and to select the tools and techniques as per the project under development.

The tasks in this document are divided between three areas of concentration: Technical Development, Operational, and System Support. The tasks in these areas may be done concurrently by varying team members or may be performed by only one team member. They have been divided to demonstrate the flexibility and timing of the SDLC activities.

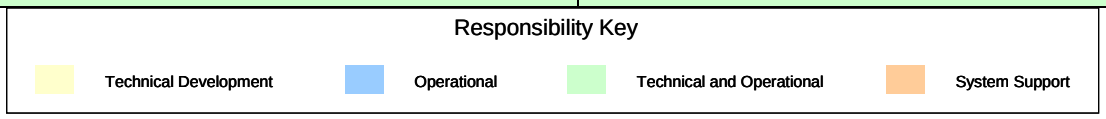
Throughout the document you may see the following images:

SDLC PHASES

1. Requirement Validation and Definition

The following table illustrates the activities and outputs of this phase:

Activity	Output
1A. Execute Requirements Management Standards	
1B. Validate Business Model and Business Requirements	
1C. Define Functional Requirements	1C1. Functional Requirements Document 1C2. Disaster Recovery Plan
1D. Define Test Processes and Responsibilities	1D1. Initial System Test Plan 1D2. Initial Acceptance Test Plan



Overview

The Requirements Validation and Definition Phase focuses on confirming the business process and requirements previously identified and clearly defining the functional requirements for the solution. In the Planning Phase of the PMM (Project Management Methodology), the business process has been documented and the business requirements identified. The validation of this information becomes especially important if there has been a time lag between the Planning Phase and the Execution and Control Phase of the project lifecycle.

The Functional Requirements Document details 'what' the solution should do but does not delve into the 'how' of the process. After completing the requirements gathering and documentation, the 'how' will be defined in detail during the Analysis and Design Phase. All the requirements are required to be testable and measurable and must also relate to the business opportunities identified.

An Initial System Test Plan and an Initial Acceptance Test Plan should be developed after the completion of the Functional Requirements Document. The initial plans should include the test responsibilities and overall processes for the testing phases. Detailed test scenarios will be incorporated into the final plans (completed in the Analysis and Design, and Development Phases).

In addition, the project team should use the Data Recovery and Backup Requirements collected in order to create a Disaster Recovery Plan. The Disaster Recovery Plan is an essential document for the ongoing success of a solution. If there is an organizational Disaster Recovery Plan, the project team must ensure that the solution is integrated into the existing plan.

1A. Execute Requirements Management Standards

Created in the Planning Phase of the PMM (Project Management Methodology), the Requirements Management Plan outlines the methods of gathering requirements as well as the procedures for maintaining those requirements. The project manager must ensure that the project implementation team is fully aware of and implements the process, the plan and the associated responsibilities.

1B. Validate Business Model and Business Requirements

Created in the Planning Phase of the project development, the Business Requirements document (which may include Business Process models) should be validated. Any changes that may have occurred to the business process should be incorporated into the documentation. If new requirements have been identified, the project Change Control process should be followed to determine if the new requirement will be incorporated into the solution.

1C. Define System Requirements

During Requirements Definition, the system is defined in terms of system inputs, outputs, processes and interfaces at the functional level. Functional user requirements include data, security, performance and maintainability requirements. Also, all the requirements are required to be testable and measurable and also need to relate to the business requirements. A variety of requirement analysis techniques can be used in isolation or in combination with other techniques, to gather, document and verify the requirements.

1C1. Updated Requirements Document

The objective of the updated Requirements Documents is to complete the foundation for the design and development of a technical solution that began with the business requirements elicited and documented during the Planning Phase. The Business Requirements describe the high-level business process and also outlines the business needs that will be fulfilled by the successful completion of the project. The System Requirements (functional and non-functional) takes this one step further and identifies actual technical or system requirements for the solution.

1C2. Disaster Recovery Plan

The Disaster Recovery Plan is one of the most important parts of the SDLC. The organization would turn up to this plan in case a disaster or some other alarming incident occurs. The disaster recovery plan may prove to be the differentiating factor between the loss of business continuity and possibly its continuity and survival. Therefore, it is highly important that the

disaster recovery plan is executable and is of optimum quality so as to sail the organization through the crisis period. Reviews, tests and audits of contingency and back-up arrangements should be performed on a regular basis. It is required to help ensure that the organization and its systems are able to withstand and to recover from a serious incident.

The disaster recovery plan includes a backup strategy and a restore strategy. The backup part of the overall plan defines the frequency and type of backups, the speed and nature of the hardware, how the backups would be tested, where and how backup media would be stored and the security considerations. On the other hand, the restore part defines the responsibility for performing restores and how restores must be performed.

1D. Define Test Processes and Responsibilities

In any SDLC, it is essential to test the product to ensure that the requirements are being fulfilled and the solution functions to support the organizational business needs. In this early phase of the SDLC, the project team should focus on defining the test process. This process should include the type of testing that will occur, the general time frame and schedule of the testing, and the documentation and resolution of identified defects and enhancements. In addition, the project team should identify the responsibilities of the team members and any additional stakeholders during the testing process.

Please Note: Every difference between the expected output and the test output itself should be recorded and entered into the defect tracking system with a description of the severity and impact on the test process. When all tests are run successfully and all defects are resolved and retested, the test plan will have been completed.

1D1. Initial System Test Plan

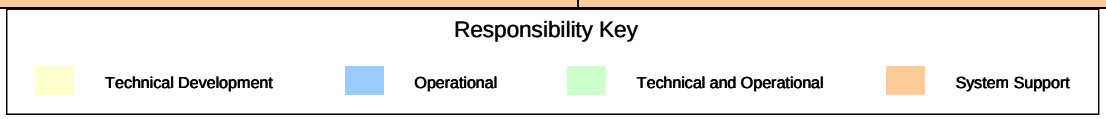
The Initial System Test Plan should include as much of the information as possible from the System Test Plan template. Minimally, the pieces identified in step 1D should be included. The Final System Test Plan (completed in the Detailed System Design Phase) will include detailed test scenarios to be executed.

1D2. Initial Acceptance Test Plan

The Acceptance Test Phase is required for the success of the SDLC. This phase is the opportunity for the end user community to interact with the developed solution and ensure that the system responds as defined in the previous phases. The Initial Acceptance Test Plan should the processes and responsibilities identified in step ID. In addition, the initial plan should incorporate a timeline for the activities required to prepare testers prior to the testing phase. The test scenarios will be completed in the Development Phase and be incorporated into the plan to finalize the Acceptance Test Plan.

2.1. Analysis and Design Phase: General System Design

Activity	Output
2A. Design End User Interface	2ABCDE1. General System Design Document
2B. Create Logical Data Model	
2C. Create Data Dictionary	
2D. Create Technical Documentation	
2E. Update Traceability Matrix	
2F. Create Architectural Review Board Presentation	2F1. ARB Presentation
3A. Identify Training Team Members	3AB1. Initial Training Plan
3B. Define Training Objectives and Curriculum	
3C. Define Roles, Responsibilities, and Timeline for Implementation	3C1. Implementation Plan
3D. Initiate Implementation Readiness Activities	
4A. Initiate Procurement of Hardware and Software	
4B. Define Conversion Processes and Responsibilities	4B1. Initial Conversion Plan
4C. Define System Capacity	4C1. Capacity Plan
4D. Define Transition Objectives, Responsibilities, and Procedures	4D1. Transition Plan
4E. Define Operational Procedures, Risks, and Constraints	4E1. Initial Operational Documentation



Overview

The General Systems Design Phase focuses on creating a preliminary design of the solution. The GSD describes the preliminary system architectural design (logical model of the proposed system), including data dictionary, process logic definition, and database design.

The GSD conceptualizes what the system will do in order to solve the problem identified through earlier analysis. Conceptual design begins with higher-level functions within the new system and moves downward through a series of functions and sub-functions, adding depth and detail at each level. Conceptual design involves deciding on the role of each system element, irrespective of hardware and software considerations. Specifically, the general system design component consists of the first-level technical definition of the new information system being proposed. It documents what the new system is to do, how it is to perform in the user's environment, the technical definition of the new application, and its associated technical support approaches for systems software and hardware.

This phase also signals the beginning of the training and implementation activities. If the project plan and team responsibility matrix designates an individual or individuals to be focused on training and implementation activities, this team member should be on-boarded during the late stages of the Requirements Validation and Definition Phase or the early stages of the GSD phase.

If the solution requires a formal training effort, training team members should be identified and contacted during this phase for initial training planning and activities. The implementation team members should also be identified and contacted during this phase for initial implementation planning and readiness activities.

2A. Design End User Interface

By definition, user interface is defined as "the elements of a computer system that are used by the system users to interact with the system such as the display, mouse, keyboard, touch controls, etc. Practically, this activity involves creating screen mock-ups of the solution functionality to present to the end user for review and approval.

The screen mock-up visualizes the requirements gathered in the previous phase and allows the end user to better understand the conceptualization of the solution.

2B. Create Logical Data Model

A Logical Data Model is the visual representation of system entities and their relationship. The purpose of the logical data model is to give a normalized and pictorial representation of the requirements and related business rules to the stakeholders; and to correct and validate the understanding and assumptions about the represented requirements and business rules. Data modeling, as a discipline can be done through various technical tools including the Microsoft Office Suite.

2C. Create Data Dictionary

A Data Dictionary is the metadata consisting of representations and definitions of the data elements. Also, it defines the basic layout structure of a database. The data dictionary includes but is not limited to the table name (for the individual field), field name, its description, its size, data type, primary key, and the default value.

2D. Create Technical Documentation

For the purposes of the DOH BIT, technical documentation refers to the documentation created for the solution artifacts. Unlike the operational documentation, the technical documentation outlines the intent of and execution of the design. This documentation will be a significant portion of the Design Baseline (created at the beginning of the Development Phase). It allows various developers to reference the same detailed information to allow for the consistent and accurate implementation of the requirements. Two possible examples for this documentation would be Unified Modeling Language (UML) including Use Cases, Sequence, Class, and Activity Diagrams and Process Model Narratives (a detailed narrative of the solution components).

2E. Update Traceability Matrix

A traceability matrix is formed by associating requirements with the work products that satisfy those requirements. Also, tests are associated with their foundational requirements and the system under test.

2ABCDE1. General System Design Document

The General Systems Design Document describes the high level design specifications for the system under development. It provides a description about how the application would be constructed, which components would be used, how the components would be organized, and the application's internal construction.

It should incorporate all the information created and/or updated in Steps 2A, 2B, 2C, 2D, and 2E.

2F. Complete Architectural Review Board Checklist and Presentation

2F1. Architecture Review Board Presentation

The application project manager will submit a presentation package to the ARB Chairperson one week prior to the scheduled ARB meeting. The ARB chairperson will distribute the presentation package to the ARB for review.

The application project manager will be responsible for having a Program Office Sponsor attend the ARB presentation. The application project manager is also responsible for obtaining the approval of the AR Checklist and ARB Presentation by the Project Sponsor and Bureau Director prior to the ARB meeting.

Immediately following the review meeting, the ARB will make a recommendation to the DOH CIO for approval or rejection of the proposed application architecture. One of the three decisions described below will result from the first ARB meeting.

- If the ARB and the DOH CIO unconditionally approves, detailed design can begin.
- If the ARB and the DOH CIO conditionally approves, detailed design can begin but the recommended ARB changes must be incorporated into the design.

- If the ARB and the DOH CIO rejects the proposed architecture, the application team must re-examine and return to the ARB with a revised design and architecture review packet.

3A. Identify Training Team Members

3B. Define Training Objectives and Curriculum

3AB1. Initial Training Plan

The Initial Training Plan defines the requirements, objectives, strategy, and course structure to be considered when training users about the enhanced information systems. The training plan supports the creation of training resources, coordination of training time schedules, reservation of human resources and facilities, strategizing for training requirements, and various other training-related activities. It includes the approach to the training and the detailed structure and format of the training module, topics to be briefed upon, space and time requirements, and training schedules.

3C. Define Roles, Responsibilities, and Timeline for Implementation

3C1. Implementation Plan

The Implementation Plan defines how the solution would be delivered to the end user, including the special requirements such as phased implementation or "roll out", delivery requirements and training needs.

3D. Initiate Implementation Readiness Activities

The implementation of any new system asks for the careful planning and implementation of all the individual activities to ensure the successful implementation of the project. The Implementation Readiness Activities provide a roadmap for the activities necessary to ensure the successful implementation of the solution.

Some of the implementation readiness activities may include:

- Business Process Review and Reengineering (if not already completed)
- Change Management Process Review
- Site Assessments and Readiness Reviews

Successful & effective project implementation requires coordination to be disciplined, documented and well planned.

4A. Initiate Procurement of Hardware and Software

As outlined in the Procurement Plan and the Project Plan, any necessary hardware and software should be procured during this phase. Based on the procurement vehicle selected, it may be necessary to begin this process earlier in the SDLC. Please use procurement knowledge and lessons learned to determine the most appropriate time in the project lifecycle to begin procurement.

4B. Define Conversion Processes and Responsibilities

In order to successfully migrate a business unit's data from one environment to another, conversion processes and responsibilities must be identified. If a standard conversion approach has been identified, the project should ensure its compliance. If there is no standard available, the approach and the activities of the various stakeholder groups should be outlined.

4C. Define System Capacity

Capacity Planning is the science or art of quantitative estimation of computer hardware, computer software, storage and network infrastructure resources that would be required over the future course of time.

4C1. Capacity Plan

The Capacity Plan describes the following information; so that appropriate system hardware/resources can be put in place prior to when it will be required, but within the current 12-months:

1. Estimate increases or decreases in the number of end-users (to include county users, application developers, technical support personnel, Agency end-users, etc.) that will be accessing the Agency's computing environment in using either existing applications or planned new applications.
2. Estimate the increase or decrease in the percentage of CPU utilization, host, server or workstation memory utilization, disk storage capacity consumption and or tape subsystem usage that may occur as a result of changes being made to existing applications in production.
3. Estimate the increase in the percentage of CPU utilization, host, server or workstation memory utilization, disk storage capacity consumption and or tape subsystem usage that may occur as a result of new applications being put into production.
4. Estimate the increase or decrease in online transactions anticipated in response to changes being made to existing applications in production, or for new applications to be placed into production.
5. For new applications (batch or online) identify the time of day and frequency (daily, weekly, quarterly, yearly) when these will be run, as well as the timing of any anticipated peak application usage.
6. Description of anticipated changes to existing backup requirements.
7. Description of desired or required changes to existing availability requirements for existing applications.

4D. Define Transition Objectives, Responsibilities, and Procedures

When a technical solution is developed and tested, an organization should establish objectives, responsibilities, and procedures for migrating the development code from one environment to another. If the organization has an existing Transition Plan, the project should ensure compliance with the standard.

4E. Define Operational Procedures, Risks, and Constraints

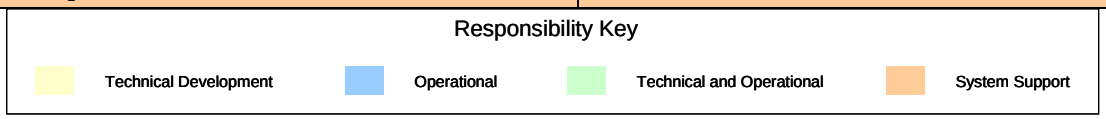
Operational procedures are the tasks required to effectively maintain a technical solution. The roles and responsibilities of staff, support environment and the frequent tasks necessary for the maintenance and support of the application, workflows, and database activities should be defined. In addition, risks to ongoing operations and organizational constraints should be identified.

4E1. Initial Operational Documentation

The Initial Operational Documentation should contain, minimally, an outline of the information collected in the previous step. While detailed information about solution operations (e.g. batch jobs, backup procedures) may be unknown, these relevant areas should be identified for inclusion in the Final Operational Documentation.

2.2 Analysis and Design Phase: Detailed System Design

Activity	Output
2H. Create Physical Data Model	2HIJKL1. Detailed System Design Document
2I. Create Detailed Technical Documentation	
2J. Update Data Dictionary	
2K. Update Traceability Matrix	
2L Create Prototype	
3E. Create Unit Test and Integration Test Scenarios	3E1. Final System Test Plan
3F. Document System Roles and Responsibilities	3F1. Role Mapping Survey/Matrix
3G. Document End User Information Required for Implementation	3G1. Implementation Guidebook
4F. Refine Conversion Process	4F1. Final Conversion Plan
4G. Define Security Considerations and Acceptance Metrics	4G1. Electronic Security Assessment



Overview

The Detailed System Design (DSD) translates the functional design requirements specified in the General System Design (GSD) into a detailed set of system requirements. This includes detailed system flows, program specifications, and database specifications that are required to construct the application.

The detailed system design describes how the system will behave (from a users' point of view) and how the system will meet the requirements developed in the requirements definition component. If a design requirement is dependent on other systems, development activities, procurement, or efforts outside of this project, it should be documented at this point in the design process. The detailed system design may include:

- Physical Data Model
- Detailed Technical Documentation
- Updated Data Dictionary

- Updated Traceability Matrix
- Prototype (if applicable)

2H. Create Physical Data Model

The Physical Data Model consists of all required data tables, columns (attributes), relationships and other database properties to enable the physical implementation of databases. Database performance, physical storage, indexing methodology and de-normalization are important characteristics of a physical data model.

2I. Create Detailed Technical Documentation

For the purposes of the DOH BIT, technical documentation refers to the documentation created for the solution artifacts. Unlike the operational documentation, the technical documentation outlines the intent of and execution of the design. This documentation will be a significant portion of the Design Baseline (created at the beginning of the Development Phase).

It allows various developers to reference the same detailed information to allow for the consistent and accurate implementation of the requirements. Two possible examples for this documentation would be Unified Modelling Language (UML) including Use Cases, Sequence, Class, and Activity Diagrams and Process Model Narratives (a detailed narrative of the solution components). The Technical Documentation created in the GSD phase should be modified and expanded upon to incorporate the detailed design.

2J. Update Data Dictionary

A Data Dictionary is a collection of metadata that consists of representations and definitions of the data elements. Also, it is a file that defines the basic structure of a database. The data dictionary includes but is not limited to the table name (for the individual field), field name, its description, its size; data type, the primary key and the default value. The Data Dictionary created in the GSD phase should be modified and expanded upon to incorporate the detailed design.

2K. Update Traceability Matrix

A traceability matrix is formed by associating requirements with the work products that satisfy those requirements. Also, tests are associated with their foundational requirements and the system under test.

2L. Create Prototype

Prototyping is a cyclic version of a linear model. During the course of Prototyping, the requirement analysis and prototype designing is followed by the development process. After the creation of prototype, it is forwarded to the customer for evaluation.

2H. Detailed System Design Document

The Detailed System Design Document defines the specifications for the system under development. It provides a detailed description on how the application would be built, by mentioning the components that would be used, how they would be organized among each other, and the basic principles related to the internal construction of the application.

It should include the information gathered, documented, and developed in steps 2H, 2I, 2J, 2K, and 2L.

3E. Create Unit Test and System (Integration) Test Scenarios

Unit Testing is the process of validating that a particular piece or module of source code performs as designed. Unit Test Scenarios should isolate each function and method individually so comprehensive testing can occur. The isolation of each function and method also facilitates the effective identification of errors.

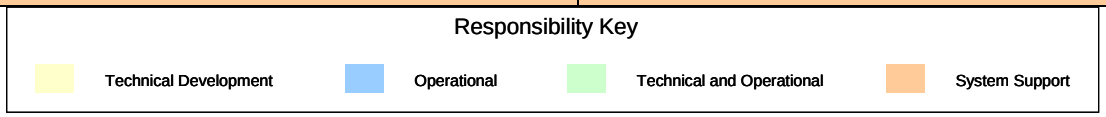
In system (integration) testing, the modules that have been unit tested are taken as inputs, then those modules are grouped in larger aggregates, then the tests are applied to those aggregates as defined in an Integration test plan, and finally the integrated system is delivered as an output. Scenarios are constructed to test that all components within the solution interact correctly, for example, across procedure calls or process activations.

3E1. Final System Test Plan

The Initial System Test Plan, created in the Requirements Definition and Validation Phase, should be modified and expanded upon to incorporate the scenarios developed in 3E.

4.1.2.3 Development Phase

Activity	Output
2M. Establish Baseline	2M1. Design Baseline
2N. Develop Technical Solution	
2O. Conduct Unit Testing	
3H. Create Acceptance Test Scenarios	3H1. Final Acceptance Test Plan
3I. Begin Creating Training Materials and User Documentation	
4H. Install Hardware and Software	
4I. Establish Development Environment	
4J. Establish Testing Environment	



2M. Establish Baseline

The Design Baseline is the collection of all the approved versions of the major design documents of the system project, including the General System Design Document, the Capacity Plan, and the Detailed System Design Document. After completion, these design documents are version controlled to manage and document the changes across several versions.

2N. Develop Technical Solution

Based on the Design Baseline, application developers can now begin the actual creation of the technical solution. If there are organizational development standards, the project team should ensure compliance to those standards.

2O. Conduct Unit Testing

Unit Testing is the process of validating that a particular piece or module of source code performs as designed. Unit Test Scenarios should isolate each function and method individually so comprehensive testing can occur. The isolation of each function and method also facilitates the effective identification of errors.

3H. Create Acceptance Test Scenarios

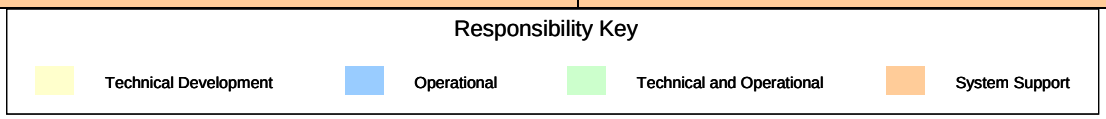
The Acceptance Test Scenarios are a simulation of normal business transactions. The scenarios should demonstrate the required functionality defined in the Requirements Validation and Definition Phase. The Traceability Matrix should be complete upon the creation, execution, and acceptance of these scenarios. The business unit is often fully, or at least partially, responsible for the creation of the Acceptance Test Scenarios.

3H1. Final Acceptance Test Plan

The Initial Acceptance Test Plan, created in the Requirements Definition and Validation Phase, should be modified and expanded upon to incorporate the scenarios developed in 3H.

2.4 Testing and Quality Assurance Phase

Activity	Output
2P. Execute Transition Plan Activities	
2Q. Conduct System Testing	
2R. Execute Transition Plan Activities	
1E. Execute Acceptance Test Plan Readiness Activities	
1F. Conduct User Acceptance Testing	1F1. Test Report
4K. Establish Training Environment	
4L. Establish Production Environment	



2P. Execute Transition Plan Activities
The activities identified in the Transition Plan, created in the GSD Phase, should be implemented in this step.

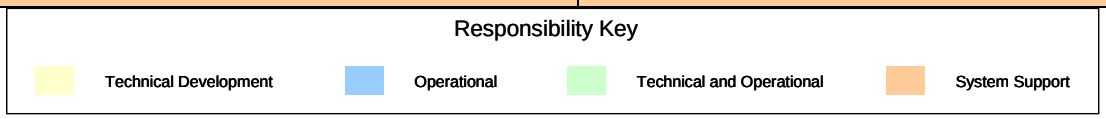
2Q. Conduct System Testing
In system (integration) testing, the modules that have been unit tested are taken as inputs, then those modules are grouped in larger aggregates, then the tests are applied to those aggregates as defined in an Integration test plan, and finally the integrated system is delivered as an output. Scenarios are constructed to test that all components within the solution interact correctly, for example, across procedure calls or process activations.

2R. Execute Transition Plan Activities
The activities identified in the Transition Plan, created in the GSD Phase, should be implemented in this step.

1F. Conduct User Acceptance Testing
1F1. Acceptance Test Certification
The Test Report should be completed for both the System and Acceptance testing. Based on the size, complexity, and scope of the project, it may be recommended that a separate System Test Report and Acceptance Test Report is completed.

2.5 Accept and Install Phase

Activity	Output
2S. Execute Transition Plan Activities	
2T. Conduct Test for Production Activities	
2U. Finalize Design Documentation	
2U1. Updated Design Baseline	
3J. Finalize Training Materials and User Materials	3J1. Training Materials Deliverable
3K. Conduct End User Training	3K1. Training Evaluation Surveys
3L. Complete Implementation Readiness Activities	
3M. Create and Distribute Final Announcement of Transition to Production	
4M. Finalize Operational Documentation	4M1. Final Operational Documentation
4N. Transfer File Access and Documentation to Maintenance	



2S. Execute Transition Plan Activities

The activities identified in the Transition Plan, created in the GSD Phase, should be implemented in this step.

2T. Conduct Test for Production Activities

Prior to the implementation of a technical solution, it is essential to 'stage' or mimic the production environment to assess the performance and impact of the solution.

3. Create and Distribute Final Announcement of Transition to Production

The Final Announcement of the Transition to Production should be sent to all the stakeholders including the users and the organizations or individuals affected by the system implementation. The notification must include the following:

- The timeline of the project implementation
- Description of the expected advantages of the newly implemented system
- Differences between the new and old system, if applicable
- Roles and Responsibilities of all the stakeholders those would be affected by the project implementation, including the end users.

CONCLUSION

1. It has been a great pleasure for me to work on this project.

2. This project proved beneficial to me as it not only provided practical knowledge but also helped me to enhance my technical skills.

3. In this project, I worked on the advance Dot net (MVC), the technology which the industry is currently working upon.

4. Working on this project, I got an opportunity to work in a real industrial environment.

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