ADB

Technical Assistance Consultant's Report

Project Number: 46371
March 2017

Bhutan: Strengthening Economic Management Program II
(Financed by the Financial Sector Development Partnership Special Fund)

Prepared by iTechnologies

Bhutan

For Department of Public Accounts
    Ministry of Finance

Asian Development Bank

Final Report

Project Reference: TA-8901 BHU: Strengthening Economic Management Program II – 4 Development of ICT Application for Taxpayer Information Call Center (46371-002) and Implementation of Call Center System with MIS

Version 1.0 (Final)

March, 2017

March 23, 2017

Cigdem Akin
Public Management Specialist
Public Management, Financial Sector & Trade Division
SARD

Dear Madam,

Subject: Submission of Final Report

Ref: TA-8901 BHU: Strengthening Economic Management Program II – 4 Development of ICT Applications for Taxpayer Information Call Center (46371-002)

With Reference to the referred project, we are pleased to submit herewith the "Final Report" for your perusal.

We would like to take this opportunity to thank you for your support and cooperation during the interim project activities and look forward to the same in future. We are also grateful to Mr. Ashish Verma, Project Manager for Call Center component, for his support and DRC officials for their cooperation. We highly appreciate Ms. Cigdem Akin, Mr. Ashish Verma and Mr. Balendu Goel for providing valuable comments, suggestions and advice on Inception Report, Interim Report, Midterm Report, manuals, Draft Final Report and previous versions of Final Report.

Please let us know if there is need for any clarification on this version of the Final Report.

Thanking You.

Sincerely,

Hari Prasad Kafley
Team Leader

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1. Knowledge Summary

With ADB's support Department of Revenue and Customs has moved towards adoption of integrated information technology infrastructure for strengthening revenue administration and tax collection. RAMIS is developed and implemented as core management information system to support DRC operations. This is aimed at leveraging ICT to make revenue administration and tax collection more effective, efficient and transparent. With RAMIS gaining stability and wider acceptance by the taxpayers for several transaction, support mechanism is required to further enhance the usage of RAMIS by the taxpayers. With continuous policy reforms and business process streamlining, RAMIS will continue to evolve with new functional modules being added and new access channels being introduced. New tools and channels to assist users is required to be introduced as peripheral components to RAMIS. One such peripheral component is the taxpayer information call center.

The software components for taxpayer information call center comprises of FAQ database system, FAQ content management, document dispatch / receipt and tracking system, RAMIS data searching, call and query logger, and the telephony solution. The FAQ database provides functions for management of FAQ and searching of FAQ by the call center agents and also anonymous site visitors. FAQ database can be continuously updated by the FAQ content managers. The document tracking component provides functionality to record incoming and outgoing correspondences, internal movement of correspondences and searching of correspondence records by the call center agents. RAMIS data searching allows the call agents to search data in RAMIS using backup of the RAMIS database. Call agents can search taxpayers using CID to find different TPNs (PIT, BIT and CIT), and view details of RAMIS transactions like return filings, refund processing, appeals, and grievances. The call and query logger is similar to help desk system where queries are registered, ticket is generated and can be escalated for resolution of query. The telephony solution (Universus) is used for managing calls and provides functional features like IVR, ACD, call conferencing, voice ligger, and MIS. Numerous management reports are included for supervisors and management which can be used for decision making including access to voice recordings of the calls. All the components of the call center are on web platform.

The software solution is hosted in completely secure environment that comprises of Router, Firewall, high end servers for application, database and backup, LAN and client machines with software phone and high quality headphones. The internet connectivity is provided by TashiCell and ISDN lines is provided by Bhutan Telecom. ISDN line allows up to 30 concurrent calls using single telephone connection. Taxpayers in Bhutan can dial 399 to avail the call center service and callers dialing from outside should use 009752330122.

Six agents are trained to handle the calls and record the calls. Recorded queries can be accessed by supervisors and technical staff to resolve the queries that are not resolved by the agents. The call center timing is from 9 am to 5 pm during summers and 9 am to 4 pm during winters, Monday to Friday. Call center remains closed on government holidays, Saturdays and Sundays.

2. Background

As part of the Strengthening Economic Management Program (SEMP), under the revenue management aspect, Revenue Administration Management Information System (RAMIS) was developed, implemented and piloted by the Department of Revenue and Customs (DRC). With RAMIS, DRC moved towards adoption of integrated information technology infrastructure for strengthening revenue administration and tax collection. This is aimed at leveraging ICT to make revenue administration and tax collection more effective, efficient and transparent.

It is expected that further adoption and improvement of RAMIS will expand the revenue bases, increase compliance by the taxpayers and bring about internal efficiencies in administration. Standardization of business processes, increased awareness program for taxpayers, and other related activities further contribute to streamlining tax administration and collection along with efficiencies in internal administrative actives of DRC.

[1]Internal RAMIS Phase I which includes income tax, sales tax at point of sale, and revenue accounting modules was piloted on April 25, 2014 at the DRC Head Office, Thimphu Regional Office and Phuntsholing Regional Office. Hosting infrastructure for RAMIS is prepared at Data Center in IT Park. As part of Train the Trainer program, 60 officials from income and sales tax, revenue accounting and IT divisions were trained. Subsequently other modules were incorporated in RAMIS. Modules implemented earlier were refined based on the feedbacks during User Acceptance Testing (UAT) and user comments. During tax filing season of 2015, personal Income filing provision was made available to PIT filers. Subsequently, withholding agencies were instructed to update RAMIS on TDS information.

With continuous policy reforms and business process streamlining, RAMIS will continue to evolve with new functional modules being added and new access channels being introduced. New tools and channels to assist users are required to be introduced as peripheral components to RAMIS. One such peripheral component is the Call Center for Taxpayer Information.

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[1] Progress Report on Tranche Release, July 2014

3. Department of Revenue and Customs

Department of Revenue and Customs (DRC), under the Ministry of Finance, Royal Government of Bhutan (RGoB), has the vision to 'contribute to the nation building process through the development of an effective revenue system'. The mission is to ensure that the tax and customs administration has the capacity to collect taxes efficiently and effectively at minimum cost through impartial and consistent enforcement of regulations and to provide convenient and effective services to the taxpayers.

DRC executes its mandates with five divisions and eight regional offices.

- Tax Administration Division
- Custom and Excise Division
- Revenue Audit and Accounts Division
- Sales Tax Division
- Information Division

Regional offices are established in different regions for providing services in different Dzongkhags. The regional offices are:

1. Regional Revenue and Customs Office, Thimphu
2. Regional Revenue and Customs Office, Phuentsholing
3. Regional Revenue and Customs Office, Samtse
4. Regional Revenue and Customs Office, Gelephu
5. Regional Revenue and Customs Office, Mongar
6. Regional Revenue and Customs Office, Samdrupjongkhar
7. Regional Revenue and Customs Office, Bumthang
8. Regional Revenue and Customs Office, Paro

Some of the regional offices have check posts to manage the border entry points at different locations. Internally the regional offices function with Sections corresponding to divisions of the Department of Revenue and Customs.

4. ICT Initiatives

DRC is gradually working to overcome the challenges and other challenges that may surface in future. As of now DRC already has taken following major initiatives:

1. **Website for information dissemination** – DRC has developed comprehensive website for information dissemination to general public. However, information in the website is managed using Content Management System, which is primarily handled by the IT personnel. Information is not picked from the backend information systems.

2. **RAMIS** – With support from ADB, a web based enterprise grade software application development was initiated in 2012. Currently majority of the required modules (viz. Customs and Excise module, Revenue Accounting module, Sales Tax Module and Income Tax module) are being piloted. Efforts are being made to stabilize RAMIS to be used as single information recording system and single source of information for Department of Revenue and Customs. Additional Call center system is being deployed to provide tax related information to tax payers as and when they require.

3. **Information Technology Section**– Recognizing the importance of using information technology, DRC has established Information Division with ICT Section in the organizational structure of DRC and computer section at the Regional Revenue and Custom Offices. The Information Technology Section is entrusted with the following functions:

- Formulate, plan, analyze, design, develop and launch effective information system and operation of systems in support of organizational function
- Ensure stability and security of operation of the in-house ICT resources
- Analyze and resolve end user software program connectivity issues.
- Upgrade system- developing, testing, evaluating and installing enhanced new software
- Evaluate and recommend purchase of ICT resources (hardware and software) that has strong benefit to the organization
- Maintenance of all ICT resources of DIT in all Regional Offices and check posts
- Design and maintain physical network architecture and infrastructure
- Develop database architecture, coding standard, and quality assurance policies and procedures
- Monitor database system
- Carry out programming works
- Carry out web design and modification

4. **ICT Infrastructure** -- All the regional offices and central office is provided with internet connectivity and structure Local Area Network. Users from Regional Offices and check post offices access the RAMIS to update the records pertaining to taxes and duties. RAMIS is hosted in Data Center at IT Park premises and is managed and maintained by the ICT personnel from DRC and technical staff of Data Center Services.

5. **Mobile Applications –** Mobile application for providing tax related information like TPN search, BTC codes search, etc. is developed with support from G2C project initiative. The mobile application, developed as native app for major mobile operating systems (Android, iOS and Windows Phone) and hybrid app can be used by taxpayers to access information related to taxation.

5. Project Objectives

RAMIS is stabilizing in terms of functional requirements, information recording transactions and system access by DRC users, withholding agency users and tax payers. Organizing user training to all the potential tax payers and users from agencies other than DRC would be difficult. Every year new tax payers will be registered in the system. Therefore, call center approach to providing assistance is planned. Therefore, call center is planned with the following objectives:

- Streamline tax administration and tax collection by providing on time information to tax payers
- Provide tax related information to tax payers and users other than DRC users whenever problems are faced when using RAMIS
- Streamline process to provide tax related information to taxpayers by use of standard call center practices. DRC will have resources to focus on core activities rather than occupied with information request from taxpayers
- Build up knowledge base through FAQ database and logging of queries received by call center agents and establish one stop information center for tax related information.

6. Methodology

6.1. Document Tracking, FAQ Database and RAMIS Call Logger

We used agile approach to develop the ICT applications using a consultative mechanism so that we were able to capture maximum requirements from the users and incorporate in the system modules. After establishing the inventory of business processes and existing system process catalogue, we continued with analysis of requirement, preparation of functional requirement specifications, software requirement specification, design documents and development / customization of the components.

We adopted agile approach to system development through iterations. User representatives could get feel of the system during development and any feedbacks and comments can be collected and

incorporated in the system early on without having to wait until System UAT to collect feedbacks and comments from user representatives.
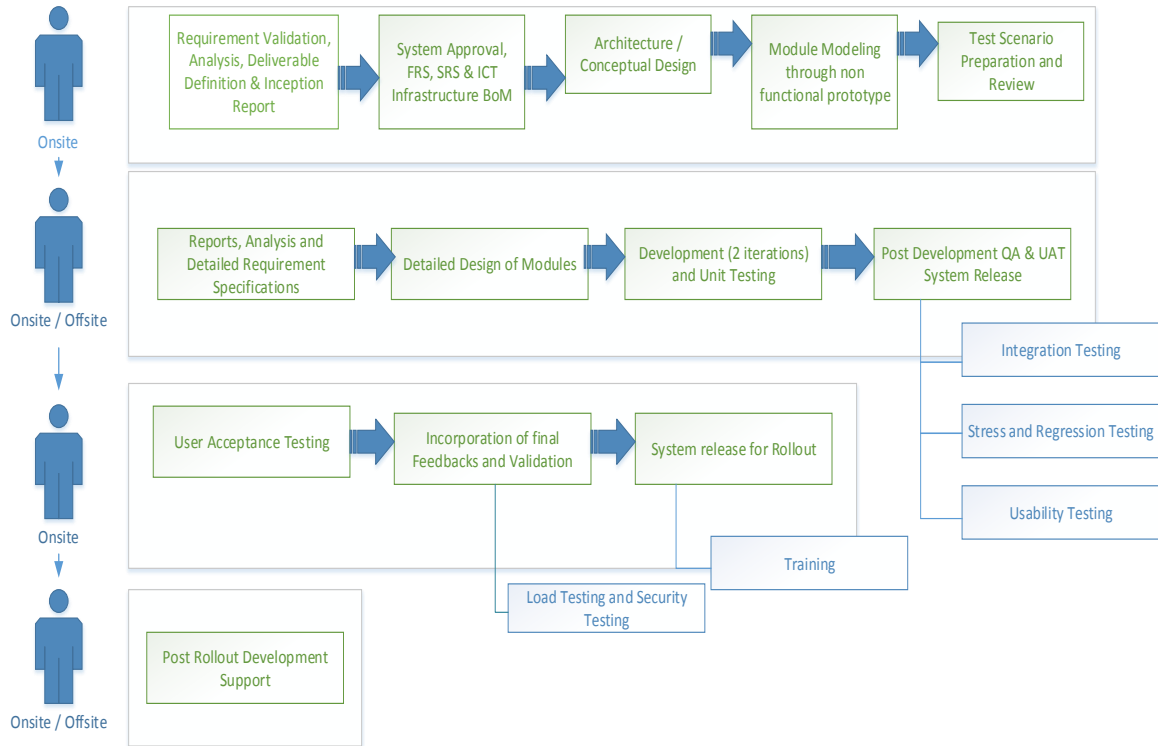
Figure 1: ICT Application Development Methodology Representation

6.2. Call Center Management and MIS Solution

The call center management and MIS solution is a mid-size call center management software to be purchased as COTS system. There are no full design and development activities involved in this component. Existing system was assessed to find the gaps and customization done to incorporate the requirements of DRC Tax Payer Information Call Center. Our approach to implementation of Call Center Management and MIS solution was based on the following:
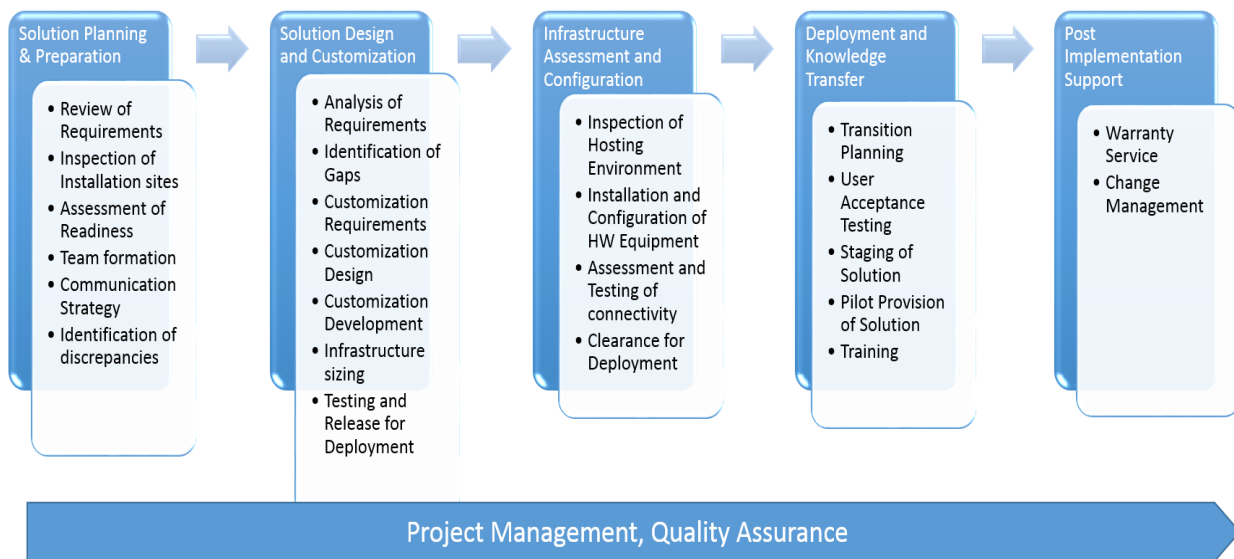
7. Activities Performed

Different set of activities were performed during different phases of the assignment. The assignment comprised of four activity phases viz. inception activities, interim activities, midterm activities and final activities. Outputs from preceding activity phase were used as inputs in the following activity phase.

7.1. Inception Activities

7.1.1. Project Kick Off

The project activities formally kicked off on February 15, 2016. Subsequently call center project team was introduced to Department of Revenue and Customs and other RAMIS stakeholders on February 17, 2016. Discussion on the ToR and requirements started with the Call center component Project Manager Mr. Ashish Verma from E&Y. Following components of the call center component were discussed:

- Procurement of Call Management Software with MIS and implementation of Call Management Software
- Development and implementation of document tracking system, FAQ database and the FAQ front end and the call loggers system
- Integration of Call Management System, RAMIS and the Call Center Applications

7.1.2. Appointment of Project Focal

Project focal from Department of Revenue and Customs is appointed. Mr. Sumit Giri from Public Information Services will function as the focal for the call center component. Appointed focal person will be responsible for the following:

- Assist consultants in carrying out AS-IS study in terms of providing process related information, ensuring availability of data, etc.
- Ensuring adequate coordination among all the relevant stakeholders
- Continuous follow up with respective divisional staff for data requirement
- Assisting consultant team in finalization of functional and technical requirement of the proposed call center applications
- Ensure validation and sign off of project documents and deliverables
- Assistance in procurement management
- Assist in conducting acceptance testing of the proposed system
- Ensure coordination during training program

7.1.3. Organizational Understanding

Department of Revenue and Customs (DRC) has a vision to 'contribute to the nation building process through the development of an effective revenue system'. The mission is to ensure that the tax and customs administration has the capacity to collect taxes efficiently and effectively at minimum cost through impartial and consistent enforcement of regulations and to provide convenient and effective services to the taxpayers.

7.1.4. Understanding of RAMIS

The tax payer information call center team initiated the process to understand DRC core system, the Revenue Administration Management Information System to integrate with the call center system. It was decided that call center team shall provide data requirement for which RAMIS team will generate data in CSV format that can be uploaded into the Call Center System Database. Call center team accessed RAMIS using taxpayer credentials to review different user screens to determine the data required from RAMIS.

7.2. Outputs of Inception Activities

Inception activities basically included tasks to enhance the understanding of the requirements of system and other activities pertaining to establishment of hosting facility to provision of the software system.

- Identification of source of information especially for FAQ and knowledge base. All the brochures and pamphlets published by DRC were collected to derive possible Q&As.

Information from DRC departmental website was also collected to be used as a source of information for Q&As

- Hosting infrastructure requirement to provision the systems that comprises of servers required, network connectivity requirement, and telephone line (ISDN line) for the planned call center system
- Inception report that consisted the understanding of the requirements, approach to execution of the assignment, reporting requirement, communication approach and time for executing the assignment including the establishment of hosting premise. The inception report also highlighted the risks and mitigation approach and project stakeholder responsibilities.

7.3. Interim Activities

The project activities started with an inception phase in mid February 2016 during which project team met relevant stakeholders to understand the critical requirement and agree on the project scope and deliverables. An inception report has been submitted post inception study. The activities completed during the interim phase are discussed in the following section.

7.3.1. Document Tracking, FAQ Database and RAMIS Call Logger

The custom components for the Tax Payer Information Call Center are developed as per the customer requirements. Following activities were undertaken during the interim phase of the assignment.

7.3.1.1. Detailed Review of Documents and Processes

In continuation with the review of documents, processes, RAMIS manuals uploaded in DRC website, thorough review of documents was done during the interim phase of the project. Document review during interim phase had specific focus on process, possible data that can be requested by the taxpayers and processes involved in processing of data. Thorough review of following documents was conducted:

We reviewed the following desk documents in relation to DRC operations and SEMP project documents:

- o SEMP and SEMP II project documents
- o Bhutan Trade Classification Codes
- o TDS Guidelines, 2013
- o Sales Tax, Customs and Excise Act, 2000
- o Income Tax Act of Kingdom of Bhutan, 2001
- o Rules on the Income Tax Act of Kingdom of Bhutan
- o RAMIS user manuals available in DRC Website
- o Tax, Custom and Excise related forms available in DRC Website
- o National Revenue Report 2014-15

- o Sales Tax Performance Indicator Report 2014
- o Tax Administration PI Report 2014
- o Forms used for different transaction available in DRC website

7.3.1.2. Preparation of Functional and Non Functional Requirement Specification

Upon completion of review of documents and process study, functional requirements for the system components were prepared. The functional requirements include the following:

- Identification of roles and functional entitlements for each role
- Process flow for the system components in cross functional flowchart format
- Process description with user roles for each step in the process description
- Field wise description with data type and validation requirement
- System architecture framework
- Non functional requirements, technology stack and system software

7.3.1.3. Preparation of Development Guide

Based on the Functional Requirement Specifications, development guide was prepared for the developers. The developers used the development guide along with functional requirement specification and solution architecture. Development guide provide specification with regard to the following:

- Roles and entitlements
- Overall component process flow
- Overall component process description
- Screen designs at different steps of the process
- Logic and validation requirement in each step of the process

7.3.2. Call Center Software and MIS

To handle telephony aspect of the call center, helpdesk and knowledge management requirement Unified Communication System (UCS), UC-2000 is chosen as off-the-shelf product. UC-2000 provides telephony solution and integrated complaint management system. Other components will be integrated with the UC-2000 screen so that agents can access all required components from UC-2000 agent interface. On the Call Center Software and MIS component following activities were undertaken:

7.3.2.1. Detailed requirements

Thorough functional assessment of UC-2000 was done to determine the inventory of available features. From the available features assessment of requirements was conducted to determine the gap between the existing system and requirements.

Majority of the requirements are available in UC-2000 in terms of telephony aspect. Some customization is required on other components. Adequate synchronization is made between the call logger and Integrated Complaint Management component of UC-2000.

Integration of FAQ, Document Tracking and RAMIS data access is achieved to enable agents' access to all the components from single page after login. The telephony component is also available in the same page.

7.3.2.2. Customization Requirements

Customization requirement was identified in the following component areas:

- Integration for FAQ Search, Document Search, and RAMIS Data search from the same page as the Telephony component of UC-2000. Integration is achieved with menu level and single sign-on for FAQ, Document Tracking and RAMIS Data search for call center agents and organization of menus for all the components in single page along with telephony functions
- Modification of complaint registration process and interfaces to synchronize with RAMIS technical call logger requirements. Appropriate knowledge management functionality is included in the call logger
- Master data and reports customization for call center system to enable generation of relevant MIS

7.4. Output of Interim Activities

Interim activities were focused to establish detailed requirements for all the components of the taxpayer information call center. During the course of interim activities different outputs were generated.

- Document review notes that concerned the system like format of document records (in register format), workflow process involved in document receipt and dispatch, initial listing of Q&As using information from DRC departmental website and other educational documents produced by DRC in the past
- **Functional and Nonfunctional Requirement of the system** – Functional requirement of the system consists of description of modules, process flows and corresponding description of process flows and description of data fields applicable in each step of the process flow. Nonfunctional requirement includes other aspect of system like technology stack to be used, audit trail feature, usability aspects and other requirement not covered in the functional requirement.
- **Data Flow Diagram** – Data flow diagram providing the visual representation of the information / data flow in the system both within the components and inter component flow of data. DFD provides description of interfaces / agents, processes of interaction, data store and data flow in the system.
- **Development and Customization Guide** – Development guide (for Document Tracking, FAQ and RAMIS Call logger) and Customization guide (for Call Center System and MIS) consisting of User Interface design for all the screens along with description of the interfaces, logic to be incorporated in accordance with the process flow was prepared. Database schema was developed along with the development guide. Developers initiated

the solution preparation using the development guide to initiate development and customization of system components

- **Interim Report** – Interim report comprised of functional and nonfunctional requirements, development guide, risk and challenges, and way forward.

7.5. Midterm Activities

The project activities started with an inception phase in mid February 2016 during which project team met relevant stakeholders to understand the critical requirements and agree on the project scope and deliverables. An inception report has been submitted post inception study and interim report has been submitted with all the outcomes of interim phase of the assignment. The activities completed after the interim phase are discussed in the following section.

7.5.1. Document Tracking, FAQ Database and RAMIS Call Logger

The custom components for the Tax Payer Information Call Center are developed as per the customer requirements. Following activities were undertaken during the interim phase of the assignment.

7.5.1.1. Preparation of Software Requirement Specification

During the interim phase of the assignment team leader executed the requirement elicitation with the Department of Revenue and Customs. Subsequently Functional Requirement Specification was prepared that comprised of user roles, Process Flows, Process Description and Field Wise Description of the processes.

Using the functional requirement specification, we continued with preparation of software requirement specifications which includes overall architecture of the system and use cases of functional features of the system. Once the use cases are developed, test cases based on the use cases are prepared. Test cases provide guideline for application testers to verify and validate as to whether the final system is developed to cater to the requirement of client and the users. The main objective of the test cases is to enable user representatives validate the system functions as required by the business and identify defects that impact their ability to do their jobs.

The test cases are derived to verify and validate the following:

- Functional Specifications
- Business Needs
- Meet reporting requirements

The steps derived in the test cases ensure the following:

- Every field and form / page that the testing team should act on is named within the test steps

- It is possible for a tester having only basic knowledge of the applications to execute the tests. The test steps provide clear actions to be taken.
- A clear transition between steps is ensured
- The expected result is clear and contain the exact message or the system state expected
- The expected result is definite

7.5.1.2. Preparation of Detailed Design Specification

Once the software requirement specification is reviewed and finalized, system design is done to cover the requirements specified in the SRS. Preparation of detailed design of the system is done as depicted in the diagram below.
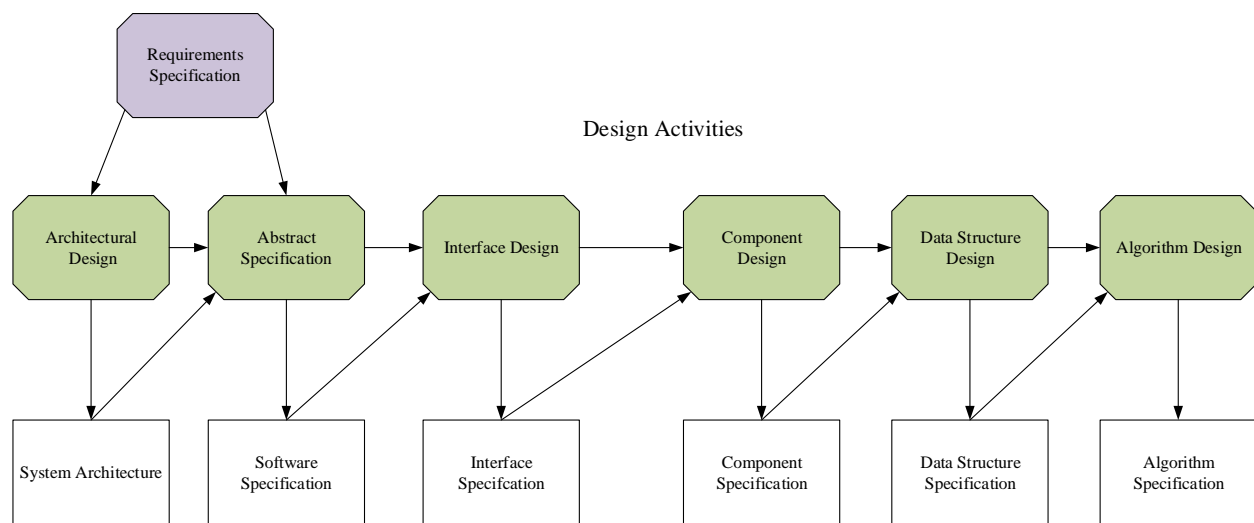
Figure 3: Design Process Representation

- **Architectural design** deals with identification of sub systems and modules making the system and linkage / relationships between the sub systems and modules to achieve the overall functionality of the system. With architectural design modules for FAQ Database, Document tracking system and RAMIS call logger was determined as follows:

Components	Modules	Description
FAQ Database	FAQ Front	The FAQ front end provides access to the FAQ database based on the access privileges. Users can search FAQ as Instant Response and Advance Search. Other options include submission of questions and suggest answers to open questions.
	FAQ Content Management	The FAQ Content Management is used by the content managers and moderators to enter FAQ, review FAQ / Questions / Answers to open questions. It provides option to modify, publish, and remove the FAQ content. Other content like news and

		announcement is also managed using the content management module.
	FAQ Masters	Master data like FAQ category, sub-category, etc. is managed using the FAQ masters module.
Document Tracking	Incoming Correspondences	This module is used to manage the incoming correspondences. Both internal correspondences and external correspondences is managed starting from recording the information on receiving the correspondence, forwarding or correspondences and filing of incoming correspondence. All the correspondences that are pending actions are listed in the inbox of the respective users.
	Outgoing Correspondences	This module records information about the outgoing correspondences. The outgoing correspondences could be to one of the DRC offices or any other agency. It could be new correspondence or response to any incoming correspondences.
	Correspondence Registers	Any incoming / outgoing correspondence can be listed and / or searched as registers.
RAMIS Call Logger	Call Logging Module	This module allows the call agents to record the queries and solutions (if any) into the system. It provides issue resolution flow like if query is resolved at call agent level then the call log is closed. If the query cannot be resolved at call agent level then the query can be forwarded to other users like supervisors and the technical support staff.
	Call Logs searching	The queries and resolutions form the knowledge based for the call agents while responding to the incoming calls. Call center agents can search the recorded queries and the resolutions during calls.
RAMIS Data Access	RAMIS Data Access	While attending the calls, agents may require to access some information from RAMIS. This module allows agents to access RAMIS related data.
	RAMIS Data Upload	Backup of the RAMIS Database base is used by the call center system to access RAMIS Data. Automatic restore from a

		pre-defined file storage is done using scheduler in the operating system.
Agent Interface	Agent Interface	This module is the agent interface where agent can access the telephony interface for attending and managing the calls and access to various information that may be used to respond to the callers.

- **Abstract Specification** is developed for each sub-system that includes abstract specification of the services and constraints of each sub-system. Linkage between the Document Tracking, FAQ, RAMIS Call Logger and call center agent screen is determined whereby call center can access FAQ, Document records and RAMIS Data Access is accessible to call agents in the same page. When agents login into the call center system, access to FAQ, Document Records and access to RAMIS Data is accessible as single sign-on access.
- **Interface Design** involves design of the interface between the sub systems and interface with others components and modules. Other components would be modules in the same system or other systems. Here interfacing is required between ICT applications and the Call Center software and MIS platform
- **Component Design** involves design of services / functions in different components and the interfaces for the components.
- Data Structure Design involves detail design of database structure for the system.
- Algorithm Design involves detail design of the algorithms used in the system

7.5.1.3. Development and Testing

Once the design activity is complete, designs are reviewed for completeness and requirements match. Using the design documents development of system is done. Development involves programming and debugging of codes. Development includes:

- Translation of database structure into Database (tables, functions and procedures)
- Translation of user interfaces, application interfaces, algorithms into programs
- Program testing to discover faults in the program and remove these faults
- Debugging to locate errors, design error repair, repair errors and re-test programs

During development, verification of the system is done through system testing. System testing involves executing the system with test cases that are derived from the specification of the data to be processed by the system. Our approach to testing is depicted in the figure below.
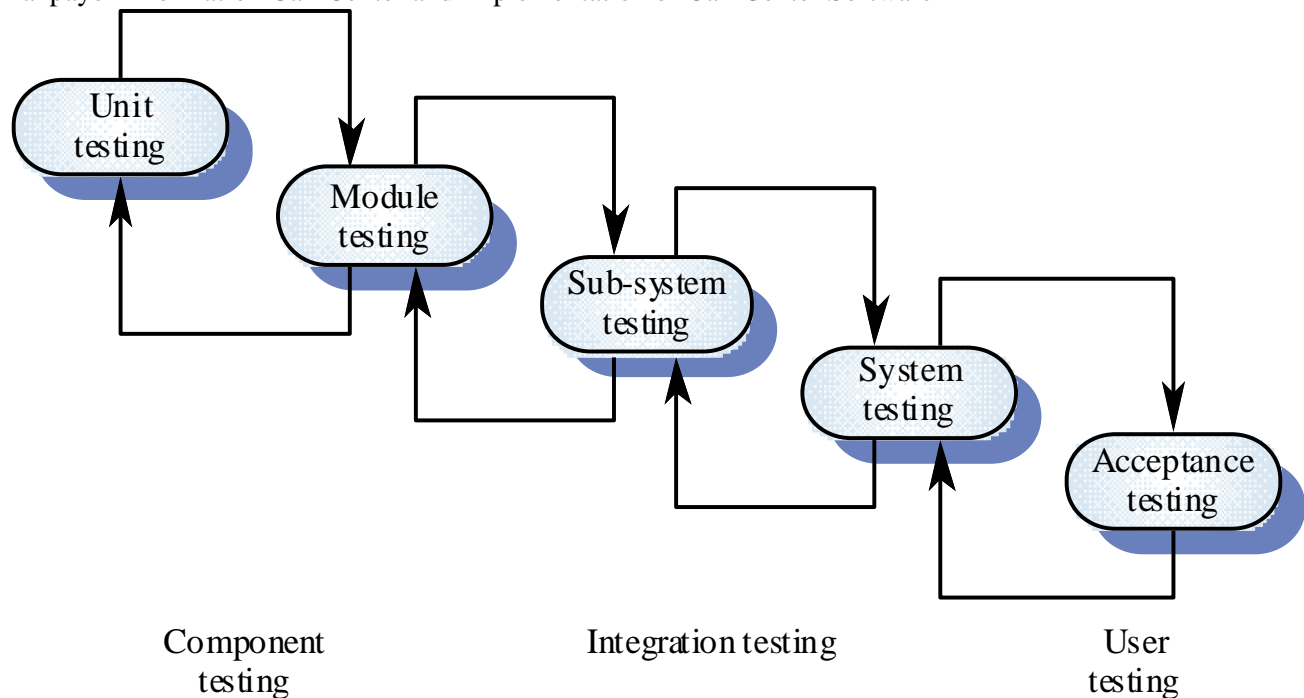
Figure 4: Testing Approach

- Component (unit) testing involves testing of individual components to insure the components work correctly
- Module testing involves testing of related collection of dependent components
- Sub-system testing involves testing of integrated modules in to sub-systems. Here main focus is interface testing.
- System testing involves testing of system as a whole that includes testing of integration and interface problems. This test is used to validate the system to meet the functional and non-functional requirement
- Acceptance testing involves testing with customer data along with user group to check that the system is acceptable to the users and customer data is compatible with the system.

7.5.2. Call Center Software and MIS

To handle telephony aspect of the call center, helpdesk and knowledge management requirement Unified Communication System (UCS), UC-2000 is chosen as off-the-shelf product. UC-2000 provides telephony solution and integrated complaint management system. Other components will be integrated with the UC-2000 screen so that agents can access all required components from UC-2000 agent interface. On the Call Center Software and MIS component following activities were undertaken:

7.5.2.1. Customization Design

Some modules of the call center software require modification to fit requirement of Department of Revenue and Customs. Further, the call center software is required to be interfaced with the

other components namely FAQ Database, Document Tracking, RAMIS data access, and RAMIS call logger.

Customization design included the following areas of customization of the call center software:

Scope of Customization	Description of scope
Modification of Forms and Web Pages	Forms and webpages used by the call center agents required modifications to include data field specific to the requirement of tax payer information and regulatory requirement of Bhutan. Fields like CID, TPN, Region, address as per Bhutanese administrative setup, etc.
Process Flow	Based on the process flow of DRC process configuration required changes. Therefore customization to modify process configuration is designed.
Integration Interfaces	The call center software is required to interface with other components, so interface design to access and update data in other components is designed. Integration interfaces are using web services and direct data access in some cases.
Agent Interface	The interface used by the agents required interfacing with FAQ, Document tracking, RAMIS Call Logger, and RAMIS data access. All the functions are available in single page with option to access data from other components in same page. Therefore, in addition to the interface design, integrated page was also designed to allow single window access to data by the call center agents.
Database modification Design	Based on the requirement of data fields / web pages, process flows, integration interfaces and agent interfaces, modification of database structure was done to add new fields / rename existing fields.
Reports Design	With changes in fields (as per business requirement and regulatory compliance requirement), report filter parameters and report output changed. New report formats and logic for new outputs were designed as well.

7.5.2.2. Customization Development and Testing

Once the customization designs are complete, the design is translated into programs for all the logic, user interfaces and database changes. The development process also included unit testing of the customized modules / functions. With development and completion of different components other forms of testing like module testing, and sub-system testing was done.

The testing for customization includes consideration on the following:

1. Testing of modifications to verify whether the modified system works as per the requirement
2. Testing of functions to ensure existing functionality is not negatively impacted due to modifications

After testing the modules that are modified, integration testing is done. Integration with other components is tested.

7.6. Output of Midterm Activities

Primarily midterm activities included detailed designing, development / customization and testing of the system components. Outputs of midterm activities included:

- **Detailed Software Required Specifications** – Detailed software requirement specification for all components of the system which included Use Case Diagrams, User Case Description, and Screenshot of the User Case along with related Process Flow, Process Description and DFD
- **Test Cases** – Test cases provide the steps involved in testing the system functions with test objective, description of functions, steps to be executed, data to be used, and expected outcome and option to record actual outcome. While conducting system test, users are supposed to ensure expected outcome matches the actual outcome
- **Detailed Design Specification** – Detailed design specifications comprise of description of classes and objects (class diagrams), functions implemented the class and database access objects. Developers translate the description into computer programs during development of the system
- **Database Schema** – Database scheme is derived from Entity Relationship Diagram (ER Diagram) where database tables are described with attributes, constraints and relationship between the different database tables
- **ICT Applications for Taxpayer Information Call Center** – Different components of the Taxpayer Information Call Center is developed and tested. Unit testing is completed. The system is ready for UAT and release for implementation
- **Call Center Software and MIS System** – Based on the requirements established, the off-the-shelf call center telephony solution is customized to incorporate requirements. Integration with the other custom developed components is done.
- **Q&A Database** – Based on the information available in rules and regulations, brochures and advocacy materials, and the departmental website, about 100 Q&As and about 40 open questions are compiled, test uploaded in the FAQ database component.
- **Midterm Report** – Midterm report consisting of software requirement specification, detailed Design Specification, Database Schema, risks and challenges and way forward is prepared.

7.7. Final Activities

In line with our methodology, we continued with the following set of activities to continue and complete the development and implementation of ICT application for tax payer call center information.

7.7.1. Document Tracking, FAQ Database and RAMIS Call Logger

During the final phase of the activities under document tracking, FAQ and RAMIS Call Logger components, following activities were carried out:

Components Integration – All the modules of different components were integrated in single package. Different modules of Document Tracking, FAQ Database and RAMIS Call Logger are tightly integrated as single package.

Integration Testing – Thorough testing of the components using different data set was done. Testing included test migration of Q&As prepared earlier, and use of user interfaces to update data in the system. Bulk data pushed into the system was accessed from UI frontend to assess the search capabilities of the system. Issues detected during testing were fixed test cases were re-executed until the system performance was consistent. Testing also included the integration testing of different modules of document tracking, FAQ database the RAMIS call logger to ensure consistent performance is achieved across all modules especially when data is to be accessed across different modules.

RAMIS Data Access – RAMIS Data access will be achieved using restore of backup database. The periodic backup of RAMIS maintained by DRC IT team will be restored to specific database in the call center database. Automatic restore function will be implemented in Linux Crontab jobs from a specific backup location.

Update Documentation – Wherever there were changes made based on the test results, design documents and database schema (if any) were updated to reflect the current system functionality and technical details.

7.7.2. Call Center Software and MIS

Final Customization and Testing – After few iteration of customization development of call center telephony solution, final testing of the telephony solution was completed. All the issues detected during the iterations were fixed.

RAMIS Data Access – RAMIS Data access will be achieved using restore of backup database. The periodic backup of RAMIS maintained by DRC IT team will be restored to specific database in the call center database. Automatic restore function will be implemented in Linux Crontab jobs from a specific backup location.

Update Documentation -- Wherever there were changes made based on the test results, design documents and database schema (if any) were updated to reflect the current system functionality and technical details.

7.7.3. Integration of Custom Components with Call Center Telephony Solution

After completion of testing of the custom components and call center telephony were integrated to use single sign on and access the system components without having to access two different systems. Integration is achieved using web service to access data from other system. Call center telephony component also required to access RAMIS Data which is achieved by using backup of the RAMIS Database which will be provided by DRC IT team.

7.7.4. Integration Testing

Upon completion of integration of custom components and call center telephony solution, integration testing of modules of complete solution was done to ensure data access is seamless and consistent across the call center system. Any inconsistencies were rectified.

Update Documentation -- Wherever there were changes made based on the test results, design documents and database schema (if any) were updated to reflect the current system functionality and technical details.

7.7.4. Infrastructure Setup

The HW components included in the BoQ were delivered at site in September and voice card delivery by end of September and E1 ISDN Link established by end of November. Upon completion of LAN setup, installation of the servers and other network components, installation of platform software was done. Platform Software includes the following:

Application Server:

- CentOS (Community Enterprise Operating System) 6.7 as Operating System. CentOS is community supported fork of Red Hat Enterprise Linux.
- Java Runtime Environment 1.7.x
- Apache Web Server 2.2.x
- Apache Tomcat 7.0.x

Database Sever:

- CentOS (Community Enterprise Operating System) 6.7 as Operating System. CentOS is community supported fork of Red Hat Enterprise Linux.
- MySQL Server 5.6.x and client tool for Database Management (phpMyAdmin / Workbench / SQL Yog)
- Postgesql Server & Client toll for Database Management (pgAdmin III)

Backup Server:

- CentOS (Community Enterprise Operating System) 6.7 as Operating System. CentOS is community supported fork of Red Hat Enterprise Linux.
- Java Runtime Environment 1.7.x
- Apache Web Server 2.2.x
- Apache Tomcat 7.0.x
- MySQL Server 5.6.x and client tool for Database Management (phpMyAdmin / Workbench / SQL Yog)
- Postgesql Server & Client toll for Database Management (pgAdmin III)

Other components requiring Configurations are:

- Router
- Voice Card
- E1 ISDN Line Musk

Configuration details is provided in the HW components configuration manual.

7.7.5. Deployment of System

Once the connection was made live, deployment of ICT applications for Tax Payer Information Call Center is deployed. Deployment of solution includes the following activities:

- Verification of all required platform software including version requirement, verification of configuration required to run the ICT applications
- Assessment of security configurations in all components (routers, firewall, server operating system and the application servers)
- Uploading of program files in the servers as required
- Configuration of paths and dependencies required to run the software systems
- Restore database to the database server
- Upload the data in the database
- Configure Database setting in the software systems

Description of the deployment process with description of steps and parameters and configuration file content is provided in the system administration manual.

7.7.6. Deployment Testing

After completion of deployment of solution in the server, system access test is done to ascertain the systems are accessible from the call center location and the other external networks. Deployment testing activities include:

- System access from different networks
- Data access and data update to ensure availability and performance of system
- Security testing of the system by replicating common web application vulnerabilities
- Fix securities issues is found vulnerable

7.7.7. User Acceptance Test

User Acceptance Test includes execution of test cases by actual users of the system. The final state of UAT will be completed once the agents are recruited and trained. Agents will be asked to execute the test cases to validate the test results.

7.7.8. User and System Administrator Training

It is expected that the agents will have intermediate level of competency skills in IT and software application usage. The training for users and administrator is focused as follows:

➢ The Application Administrator / Application Owner will be trained on managing the User Roles and Privileges
➢ The System Administrators will be trained on configuring the different modules, web services and databases, taking periodic back-ups and restore in case of any event
➢ Technical training on Technology Stack to technical team on managing of system in future

For users following is the focused during training:

- The purpose and functions of all modules and components

- Tasks the user will complete with all modules and components

- Common problems users may encounter

- Security issues related to the software

For system administrator the training program includes:

- System maintenance techniques and tips

- System backup and recovery techniques

- Other issues originated during the needs assessment stage

7.7.9. Preparation of Manuals

To ensure the continuity, manuals for users and system administrators is developed.

- **User Manuals** – System user manuals provide processes details, steps for using the system and description of data managed to use the system.
- **System Administration Manual** – System Administration manual provides information about the current configuration of the system, guideline to manage the configurations like deployment of application, loading of data into the database, database backup procedure, application migration procedure, etc.
- **Hosting Infrastructure Management Manual** – This manual provides information about the current configuration of all the components and procedure to manage the configurations.

7.8. Output of Final Activities

Outputs of the final phase activities will be the final version of the following:

- Technical documentation appropriate to ICT Applications for Tax Payer Information Call Center which will be hosted in file share in the call center
- System Analysis and Design Documents/Reports
- System Diagrams and schematics documents
- Technical Manual for Administration for software and the infrastructure
- Set up and installation guide
- Trouble-shooting Guide
- Data Flow Diagram
- Database Structure/ Design
- Detailed manual for maintenance of the system

8. Solution Description

The implemented system for consists of four major functional components viz. Document Receipts and Dispatch Record system, FAQ Database System with FAQ content Management system, call and query call logger and integration interface system. The integration interface will enable information retrieval from RAMIS and the call center and MIS system. Other dependent components included are master data management, system access and security, and system administration tools like database backup and configuration. The Query Management Process is depicted below.

Basic Steps
- Registration through Phone
- Assignment through Web
- Rectification through Web

Process
- Customer calls the advertised number
- System transfers the call to Agents (based on DNIS / Caller Id)
- System will populate the customer details on the agent screen
- Agent will register the Query

Supervisor Login to Panel →
View Query
Rectify Query
Assign Query

Agent Login to Panel →
Rectify Query
Update Query Status

Types of Users
1. Customer: Person who register Query
2. Supervisor: Who can
   A) Rectify Query
   B) Assign Query to Agent
3. Agent: Who can
   A) Rectify Query
   B) Update status of Query

Escalation and Aging

Escalation: In case Query is not rectified in speculated time, it will get escalated to the senior person

Aging: Color codes are given for the different stages of Escalation

Notification and Alerts

Customer will be notified at different through SMS and Email

The complete solution is web enabled system. All the users will access the system using URL (uniform resource locator) or a public IP address. Access Control Privilege (ACP) implemented in the system controls the menu and functional entitlement for each user. Currently public IP Address is used to access the call center applications by different users. Call center agents will access the telephony component in LAN using web browser.

8.1. Modules

8.1.1. Web Access Interface

The web application that is visible to the user once system is accessed is the system access web interface. It will provide login interface to the user. Once the user credentials are entered, system menu based on the access control mechanism is provided. All the features and menus are provided based on the entitlements provided to logged in users. Upon successful login, user dashboard with appropriate menu is available to the user. For some user based on the roles activity and executive dashboard will be provided.

The system will have dashboard feature which is the landing page after successful login. Based on the access privilege of the user appropriate information is displayed in the activities. The dashboard provided three category of information namely Pending Tasks, Notifications and entitled reports.

The pending task will be displayed if the logged in user has to take action on certain transaction. For example if a user is required to approve certain transaction then such information is provided as pending task. User can navigate to the task details by click **Go** button. The pending task entry is removed once required action is taken by the user.

Notification information is provided when the user is not required to take action in the system or when there is disconnect between the previous transaction and the transaction that follows. It is provided just for information only. Notification is removed after some time as per the configuration in the system.
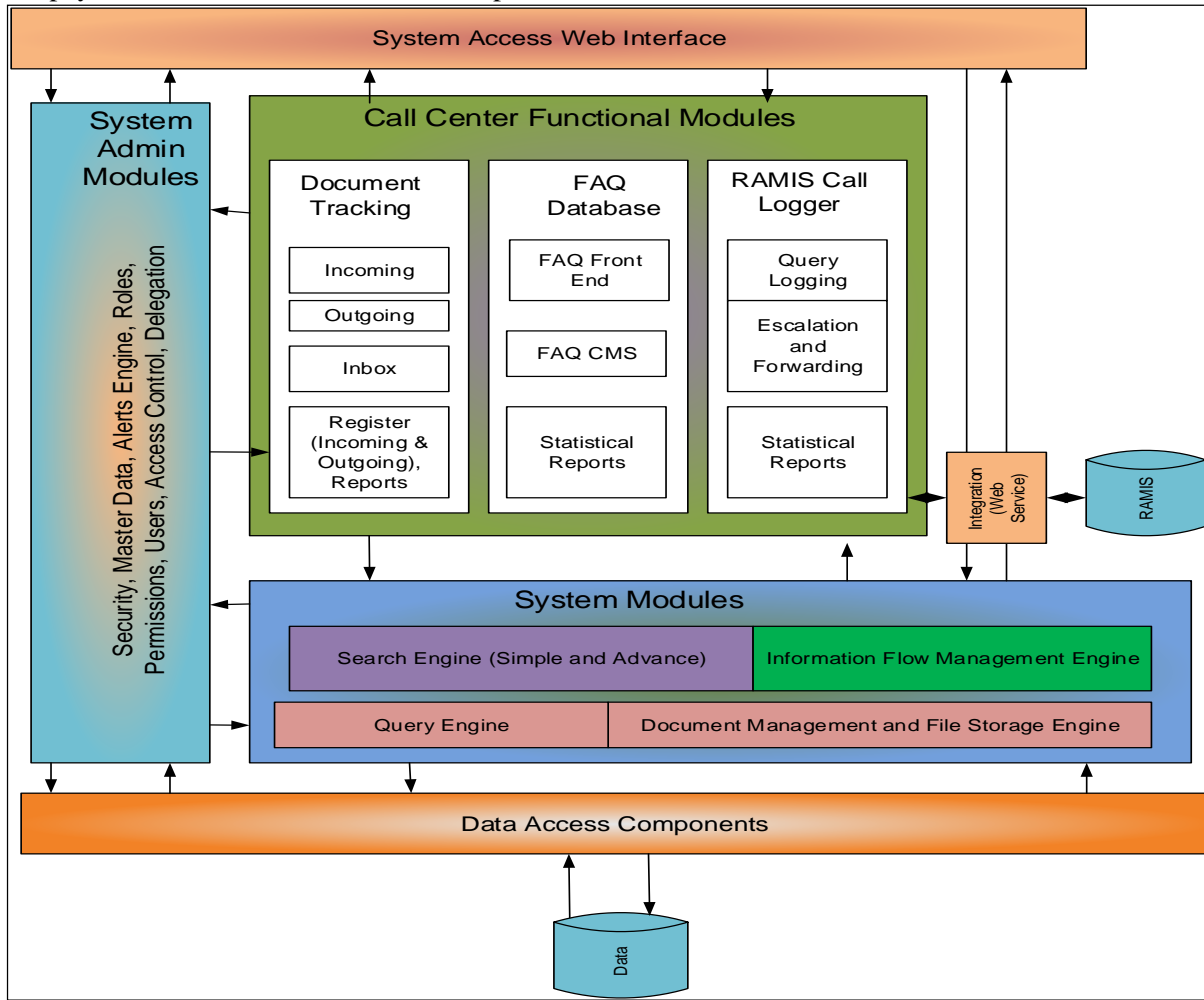
8.1.2. Document Receipts & Dispatch Record System (Document Tracking System)

The Document Receipts & Dispatch Record System will cater to keeping records of documents received and dispatched in / from Department of Revenue and Customs (DRC) Head Office and Regional Revenue and Customs offices (RRCOs) so that any query of the taxpayers regarding any officially received and dispatched documents could be traced and addressed adequately. The record base will allow recording of documents throughout the document life cycle. The document receipts and dispatch record system will to enable tracking the correspondence / letter /documents movement and receipt. The users can maintain constant watch over movement of correspondences. The system will have features for supervisors and management to view the movement of correspondences and status of correspondences and documents.

Incoming Sub - Module – This sub-module is used for creating receipt details and capturing movements for correspondence received at different offices of DRC. On saving the record, a unique receipt number is generated and displayed by the system.

Sl. No.	Functional Features	Description
1	Create Document Receipt Record	For entering details of letter / document / correspondence receive. Generates unique receipt number. Option to upload the scan of incoming document will be available.
2	Edit Records	For changing the details of already received letter / document / correspondence
3	Forward Document	For sending the document / letter to some other users for further action. Physical document will be send as well. Forwarding to multiple users will be possible and also recording of forward outside the DRC organization hierarchy will be possible. When a response is received from the outside agency then the incoming response record will be linked to original document.
4	Document Close / Filing	For closing the document / letter when action is taken and no further action is required on the document.
5	Open Filed Letter	When there is need to open filed document for reference, such files can be opened by the administration of the system for a period of time and will be automatically closed.
6	Physical file receipt	For marking a document that has been received physically when document is forwarded to different users and record sent status of physical document.
7	Comments sharing	The system will have provision to share comments for any document that is being moving among the users.

Inbox – Whenever any document is forwarded to any user in the system, inbox will display the list of documents pending action. Once action is taken / forwarded / filed then the document will be removed from the list. Information like sender information, required action, etc. will be displayed for the item in the inbox.

Outgoing module -- When any correspondence is dispatch system will generate dispatch number, information about recipient, copy to information, etc. will be captured in the system. If it is in response to any incoming document then linkage will be done so that searching such document in future will provide comprehensive information.

Registers – Incoming register, out-going register, correspondence searching, view of history of correspondence like receipt date, current dealing hand, current status, current location, correspondence movement.

Searching of correspondences with different filter parameters like date, status, recipients, offices (HQ, Regional Offices, checkpoints). Complete history of any correspondence can be generated.

All the correspondences handled in the system will also contain information about the files used to store office copies and filed copies of correspondences.

8.1.3. FAQ Database

The FAQ database will be used by the managers of FAQ information to update the FAQ which will be used by agents to respond to the queries. The FAQ database can be updated as and when required.

8.1.3.1. FAQ Content Management System

Content management system is used to manage categories, FAQ Records, attachments, comments, glossary items, **W**hat **Y**ou **S**ee **I**s **W**hat **Y**ou **G**et (WYSIWYG) editor, Add FQA, Add Questions, and add Answers. When question is submitted, system checks the words for the questions and will do a full text search on the FAQ database. If any match is found, the matching question and answer will be displayed. The CMS will have provision to create different categories and nested sub-categories of FAQ.

FAQ Administration - The system will have provisions to create entries in the CMS. Created entries will not be published directly by default. All the FAQ will be published and available for agents only upon approval by the approving authority. Edit of FAQ is possible any time with option to edit or create new version. All the questions and answers will be categorized and subcategorized for easy searching of FAQ records. CMS will allow attachments for FAQ records, posting of comments, maintain glossary of items so that agents can use different search option.

While updating FAQ database, provision to record keywords will be available. Information about the author of the questions and answers and approving authority will be maintained in the system. Whenever any questions and / or answers becomes irrelevant system will have option to

mark the question and / or answer as inactive so that such questions and answers will not appear in search results.

Popular FAQ and frequently will be displayed based on manual marking of FAQ as popular / frequently asked and based on the search statistics. The FAQ CMS will have revision system whereby all the old entries are stored so that any time old entries can be switched for view in the FAQ frontend.

Using the backup function it is possible to create a copy of the database to a single file. This makes it possible to restore the FAQ after a possible "crash" or to move the FAQ from one server to another. It is recommended to make regular backups of your FAQ.

- **Backup data** -- A backup of all **data** will include all entries, users, comments, etc.
- **Backup logs** -- The sessions of visits and the admin log will be saved (i.e. all **log** files).

8.1.3.2. FAQ Frontend
The FAQ frontend will have simple HTML5/ CSS3 based pages developed using responsive frameworks like Twiter Bootstrap or Foundation 5.0. The main menu will have link for all categories, add FAQs, add questions, open questions, etc.

Powerful Search -- Agents can easily find questions and answers using the search feature. Most popular searches can be used to generate statistical reports. Simple search and advanced search options will be available.

Social network integration – will have option to share FAQ content in social media. When agent enters a question the system will automatically will display all related questions and answer to matching questions.

Users / Agents can post comments which will be available for approving authority to review and approve / reject. Approved comments will be available for other agents to refer.

FAQ Export – Agents and users can export FAQ in PDF with table of contents.

8.1.3.3. Reports
Statistics can be generated to enable analyzing the users with built-in user tracking, analyze the quality of FAQs with the statistics of user access records.

View Sessions -- This function allows to keep track of agents using the FAQ system. Every visitor is assigned an ID when coming to your starting page that identifies him during his whole

visit. Using the information gathered here we reconstruct the way visitors use FAQ and make necessary adjustments to categories, content or keywords.

View Admin logs -- The admin logs allow to track any actions taken by users in the admin area. If there is any intruder in the system you can find out for sure by checking the admin log.

Search statistics -- On the search statistics report about which keywords and how often your users are searching can be generated. This information is split into keywords, the number of searches for this term, and the overall percentage.

8.1.4. RAMIS Technical Call Logger

The RAMIS Technical Call Logger will have provision for agents to record all the technical queries received in the system. The information captured will include name of caller, contact details caller, type of query, related information about RAMIS like transaction tried, page in RAMIS, query description, status of query like responded, forwarded to relevant authority, etc. When agents record, call log issue number is generated, and based on query, priority escalation process is invoked. Based on the priority of query appropriate resolution time is assigned by the system.

If the queries are not resolved as per the time period, issue will be escalated to call center supervisor with details of queries like type of query, responsible agent, responsible officer providing information to agent, date of query registration and expected date of resolution.

Agents can access the FAQ database and RAMIS to resolve the queries. Once the issues are resolved agents can update the query status.

Provision to search queries raised by the caller in the past and other related queries in the system assist agent to respond to the caller. All the pending issues / queries will be displayed in agent's dashboard until queries are resolved and closed. If issues are not closed in allocated time, it will be escalated to call center supervisor.

Agents can send reminders to technical staff regarding the queries which are yet to be resolved and also agents can add notes on queries. Several statistical reports can be generated related to the Query logging like list of queries filter by parameters (received, status, region, agent, etc.)

8.1.5. Interface with RAMIS and Call Center System

The call center ICT application will have interface with RAMIS to view taxpayer information, the status of transaction and transaction history of caller. The RAMIS data will be access from restore point of the RAMIS Backup database. Linux Crontab jobs will be implemented to

automatically restore the backup every day to ensure data is updated at the restore point. This interface will only allow to fetch the data from RAMIS and will not allow posting of data into RAMIS. The system will also have integration interface with call center management software used for call management, call distribution and call routing.

Data fetching from the backup point is using simple data access web service. The data access from RAMIS will be based on periodic restore of backup database between RAMIS and the call center application.

8.1.6. System Modules
System modules include modules for information flow management, management of attachment documents, information search engine (simple search and advanced search) and query engine for searching.

8.1.7. System Administration Modules
System administration modules include management of access privileges, roles, users, master data, alert engine, and service standards for query resolution, delegation and other tools. The system uses many parameters for making decisions and the parameter values are subject to change. We propose that these parameters used are maintained at configuration level. These parameters are used for validation by the system. The advantage of having such parameters at configuration level is it is easy to manage the parameter values with effective date. The transaction history is maintained intact even after changing the parameter values.

Sl. No.	Functions	Functional Description
1	Security	This module implements the security features in the system, which will be applied throughout the system. Security features like data encryption (for required fields), logging of CMS access machine IP, prevention against SQL Injection, prevention from Cross Site Scripting, input validation, user verification with LDAP, etc. will be implemented.
2	Master Data management	Master data management for global master data as well as module specific master data will be managed using master data management. Information like agencies, location, query types, document types, etc. are termed as master data.
3	Alerts Engine	The system will have alert mechanism to remind users about the events and query actions, and other

|		
		information updates. Relevant users will be alerted with information on any configured alert requirements.
4	Roles	The call center ICT system will be role-based system, which will be managed by system administrator. Creation of roles and management of roles will be handled through this module.
5	Permissions	For each role, appropriate permissions need to be provided as page access as well as the action on data through add, update and view permission.
6	Users	Creation of users and management user information along with role assignment, permission and system access mechanism. Any user can be either active user who can access the system or inactive user who cannot access the system for a period of time.

Data access by the application from the database will be achieved by implementation of web services. The web services will manage data from the application. No direct access to the database is done.

8.1.8. Call Center Software and MIS

The call center solution will be implemented at the DRC call center infrastructure. The solution proposed is a unified communication Solution by ALLIANCE Infotech Pvt. Ltd named UC – 2000. Brief functionalities and features of the proposed product are:

1. IVR
2. ACD
3. Call Conferencing
4. Caller List Management with update facility for DNC
5. Voice Logger. Complete Recording of all the voices for audit is available on UC – 2000 with detailed MIS reporting. All reports can be saved in Microsoft Excel format on a single click
6. Customizable Tele Caller Screen
7. Automated Rescheduling Re churning of leads and Reassignment of calls
8. Sticky Agent where a particular customer is always handed over to the same agent
9. Real time reporting (like live channel status, Agent statistics for live agents status, call statistics for live disposition status, List statistics for live list (Data Source) status, Meet-me statistics for live meet me or conference status
10. MIS reporting for dialed ACD, CRM agent which includes CDR reporting
11. Web Based Management Panel with facility to create multiple access levels for secured and easy operation
12. Rules based automated and manual backup of recorded calls and data
13. Print option and save reports in excel format

The complaint management system of UC-2000 is used for managing the queries submitted by the callers as depicted below.
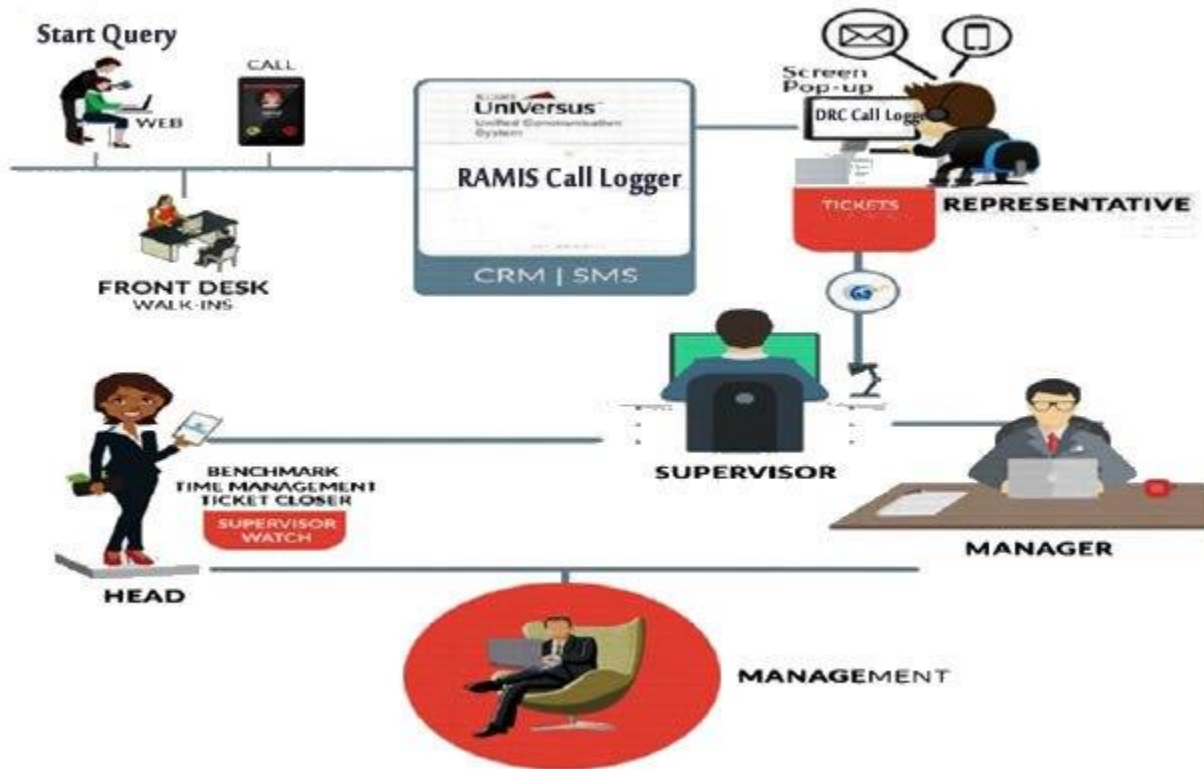
Solution Highlights

- Manage information of tax payer calling in
- Manage communication of agent and caller
- Streamline help desk process
- Assign information to the hierarchy for proper resolution
- Ageing of complaints incase resolution is not offered in stipulated time
- Dashboard for Manager to manage the team well and see the activities happening live
- Automated screen popup with caller information
- Reports to manage call center better
- Integration with RAMIS, FAQ Database, Document Tracking System and RAMIS call logger
- Enhance skills of the agents
- Rate Agents performance
- Manage compliance

8.1.8.1. ACD

The proposed solution provides and in built ACD. It is the brain of the solution and makes all the decisions regarding call routing and call control. It is one of the most robust call controllers and provides seamless control on each whether originating from VoIP network of a PSTN network or a PRI network.

- Normal and Skill based routing
- Roaming agent and Queue
- Advanced Web based campaign manager
- Support for multiple campaigns
- Inbound, Outbound and Blended Campaigns
- Call transfer (Agent to Agent) and (Campaign to Campaign)
- Detailed ACD reporting with all such statistics as
  - Total Calls Offered,
  - Percentage Offered,
  - Percentage Abandoned,
  - Average Talk Time,
  - Average Call Handling Time
  - Total Hold Time
  - Average Hold Time,
  - Total Queue Time
  - Average Queue Time

8.1.8.2. Voice Logger

The proposed solution has inbuilt voice logger, which can be used to do a blanket recording for a campaign, or the recording facility can be given to each agent in a campaign. The recorded files are saved in .wav format and can be zipped, archived and downloaded from the admin panel of the solution.

Voice logger is completely integrated with other component and provides a complete quality tool for the quality team to analyze and do grading and reporting of the voice calls.

- Recording of call across all campaigns
- Saved in .wav format
- Sound files can be archived and downloaded from the admin UI
- Sound files can be played in the browser itself

The solution provides unique feature of call quality management for quality appraisal and maintenance for the call centers. The quality team can listen to any sound file and put its comment with standard disposition based quality of the call. The quality team as per the set standards can create dispositions. Detailed reporting with quality disposition and remarks can be generated for each call recorded.

8.1.8.3. Interactive Voice Response System (IVRS)

IVRS system is an integral part of the proposed solution with n x n level of nodes possible separately for each campaign.

- Integration with any kind of database including MySQL, MS SQL server and Oracle
- Display of IVRS node traversal on Agent UI
- Time base IVRS announcement
- Detailed IVRS Reporting
- Each campaign can have a different IVRS flow
- IVRS available on VoIP, PSTN, and PRI connectivity
- Secured authentication with https for IVRS prompt without actually accessing the database

8.1.8.4. Auto Dialer with IVRS

The proposed solution has a unique functionality of auto dialing and playing prerecorded message to the end customer. The messages are in IVRS format with the capacity of accepting DTMF inputs from the customer. The feature is very useful for marketing and survey companies who can upload a set of lead list and take feedback from the end customers without involving any human interface. The complete reporting of the options selected by the end user is made available to the administrator at the end of the calling day.

8.1.8.5. Call Transfer, Call Barge in and Conferencing

Call barge in and Conferencing is an integrated feature of the proposed solution. The solution also provides screen transfer facility with call transfer. The complete screen with customer information can be transferred to another Tele caller with the call transfer.

- Supports both call barge in as well as line barge in
- Call barge in possible from remote location
- Agents can initiate conferencing for the customer with a third party verifier
- Agents can join the conference or can go ahead to take the next calls
- Secured process of taking vital information like credit card details etc from the customer by doing a conference call between customer and a customized IVRS

8.1.8.6. Dialer

The Predictive dialer of the proposed solution is truly adaptive in nature and evolves its dialing pattern over a shift based on the quality of lead list, the gateway connectivity pattern, Average Handling time for agents and the abandon call percentage as prescribed list by the FCC norms. The dialer makes sure that even on worst quality lead list the agents are able to get a decent connection and that leads are churned as quickly as possible.

- Highly adaptive in nature with auto pacing
- Intuitiveness to detect and mark a lead list as bad or a gateway as Unreachable
- Facility for the agents to move to Preview (Manual Mode) in between Predictive calling
- Web Based Interfaces for configurations

- Telnet based access for monitoring the call flow
- Live update on the lead status for each list
- Facility to set bulk rescheduling and re-churning of the leads
- Facility to set call backs from the agent interface
- Facility to set strict mode for a call back so that the same agent receives the call the next time when the lead is called back
- Setting up call back in predictive mode based on basic disposition of the dialer as well as customized disposition for the campaigns as created by the administrator

The call center solution when integrated with RAMIS, FAQ database, Document tracking system and the RAMIS call logger will function as follows:

1. The citizen would call the call center and agent will get a screen popup with caller's information fetched from RAMIS and previous call records.
2. The agent will greet caller with name and will ask the concern, incase agent is able to resolve the concern then he or she will enter into RAMIS call logger the query and the resolution. During query resolution agent can access the FAQ database for reference
3. In case the agent is not able to resolve the query / complaint of the caller, the agent will register it into the RAMIS call logger. RAMIS call logger will generate a complaint number and a timeline by which the resolution has to be provided based on the type of compliant
4. The agent will share the complaint number and a resolution timeframe with the caller
5. All the complaints are forwarded to supervisor and resolution is offered by supervisor or by the relevant technical person
6. All tickets which are resolved are automatically transferred to the agent in a queue to alert agent for callback, the agent can call these complainant to resolve their issues and close the complaint
7. In case the complaints are not closed within the stipulated time then these are escalated to the Manager for prompt action
8. The manager will have a dashboard to see the working of call center and keep a check on escalation
9. Reports can be seen from time to time to manage the call center

The proposed solution UC 2000 Call Center Suite will be implemented with the flowing modules;

Sl. No.	Modules	Description
1	Alliance Voice Xchange Module (IVRS)	This is a configurable call flow generator, it offers fully integrated Interactive Voice Response (IVR) product to connect tax payers, databases and telephones
2	Automatic Call Distribution Module (ACD)	This forms part of the voice Xchange. It is an intelligent Call routing mechanism using ACD

		module. Calls are transferred to agents based on certain logic such as equal distribution of calls, skills based routing, etc.
3	Integration Interface	Integration interface to integrate the call center solution with RAMIS, FAQ Database, document tracking system and RAMIS Call Logger
4	Computer Telephony Integration Module	Using the CTI module, the system integrates with other systems to populate information of the caller on the screen.
5	Alliance Arcane	Arcane is the performance monitoring system which forms a key to monitor, record, store and evaluate voice and data interactions in a call center.
6	Voice Mail Module	Allows callers to leave a voice message based on the business rules / after office / holidays, etc.
7	Alliance Predictive Dialer / Click to Call	An automated dialer with intelligent routing and distribution of calls. A click to call option where the agent can initiate a call.

8.2. Infrastructure

Hosting infrastructure schematic is as depicted below.
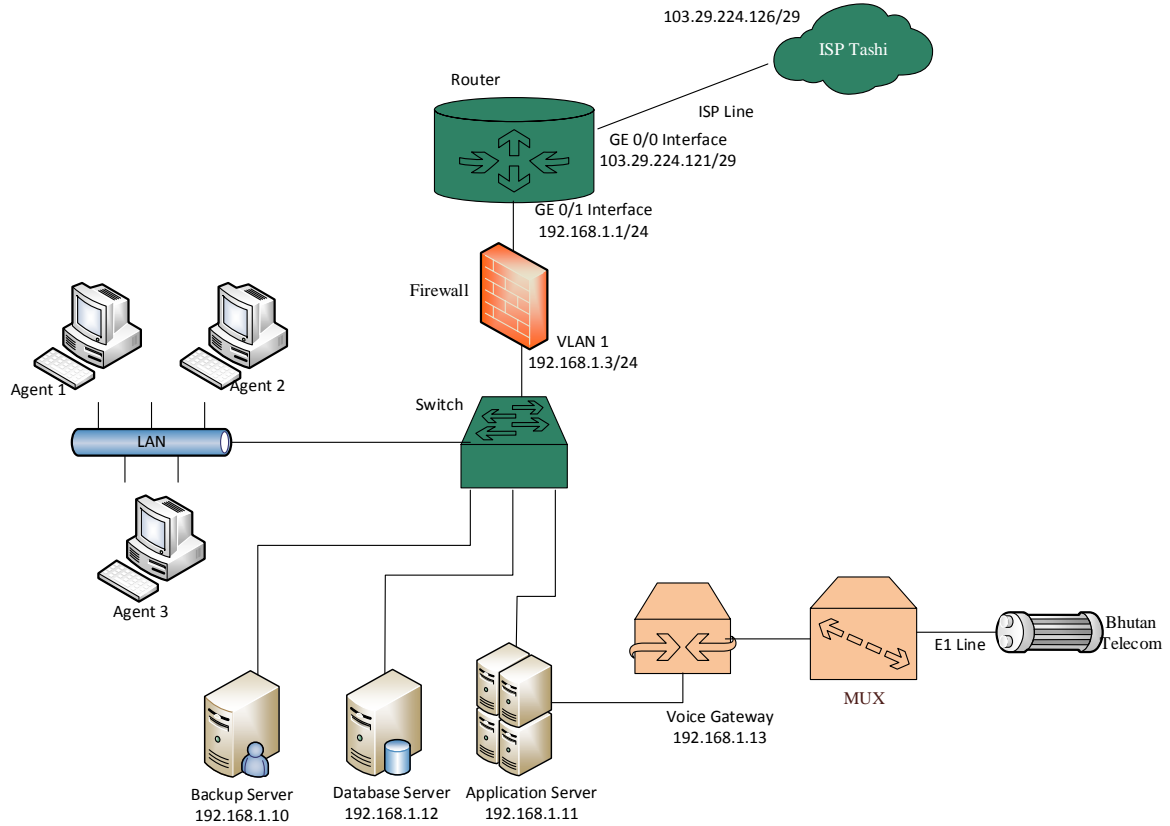
Device Configuration Details

Sl. No.	Device Name	Serial No.	Private IP	Public IP	Username	Password
1	Router	CN67FTS00N	192.168.1.1	103.29.224.121	Admin	admin@123
2	Firewall					
3	Switch	CN65FP7100	192.168.1.2		Admin	admin@123
4	Voice Gateway	SANGOMA	192.168.1.13		admin	Admin
5	MUX	NROTEK				
6	Backup Server (HP ProLiant DL160 Gen 9)	SGH633Y5FV	192.168.1.10		root	drc@2016
7	Application Server	SGH633Y5HM	192.168.1.11	103.29.224.124	root	drc@2016
8	Database Server	SGH633Y5HS	192.168.1.12		root	drc@2016

Server ILO Details

Sl. No.	Device Name	Operating System	Ilo IP Address	Username	Password

1	Backup Server (HP ProLiant DL160 Gen 9)	CentOS 6.7	192.168.4.2/24	Administrator	p@ssw0rd
2	Application Server (HP ProLiant DL560 Gen 9)	CentOS 6.7	192.168.4.3/24	Administrator	p@ssw0rd
3	Database Server (HP ProLiant DL560 Gen 9)	CentOS 6.7	192.168.4.4/24	Administrator	p@ssw0rd

9. Activities Completed

In line with our methodology, we will continue with the following set of activities to continue and complete the implementation of ICT application for tax payer call center information.

Immediate set of activities during final phase are as follows:

- Complete extended training for the agents and other designated users
- Incorporate feedbacks raised during training (if any)
- Provide support during operation for one year as warranty support

FAQ Database, Document Tracking, RAMIS Call Logger and RAMIS Data Access

Sl. No.	Activities	Start Date	End Date
1	Project Kick Off	15/02/2016	17/02/2016
2	Inception	15/02/2016	15/03/2016
3	Requirement Validation	16/02/2016	26/02/2016
4	Requirement understanding	16/02/2016	29/02/2016
5	Requirement Analysis	1/3/2016	10/3/2016
6	Preparation of Functional Requirement Specification	10/3/2016	21/03/2016
7	Preparation of Software Requirement Specification	15/3/2016	23/03/2016
8	Non Functional Prototype Modeling	15/03/2016	25/03/2016
9	System Concept Design	17/03/2016	25/02/2016
10	Test Scenario and Development of Test Cases	17/03/2016	30/03/2016
11	Analysis of Concept Detailed System Design (Application and Database)	19/03/2016	30/03/2016
12	Development (iteration 1) and unit testing	2/4/2016	17/4/2016
13	Development (iteration 2) and unit testing	18/4/2016	5/5/2016
14	Integration Testing	6/5/2016	15/5/2016
15	Usability Testing	6/5/2016	15/5/2016
16	UAT	29/08/2016	02/09/2016

17	FAQ Data Preparation and Migration	November 2016	
18	Hosting Infrastructure Preparation	November, 2016	
19	Solution Deployment	November, 2016	
20	Pilot System	Jan, 2017	
21	Training (system)	February 6 – February 10, 2017	
22	Feedback and comments incorporation	February 10 – February 28, 2017	
23	Final System Launch	March 6, 2017	
24	Warranty Support	March, 2017	February end, 2018

Note: Activities in green text are complete. Warranty support commences from the date of service launch.

Call Center Software and MIS Solution

Sl. No.	Activities	Start Date	End Date
1	Review of Requirements	15/02/2016	17/02/2016
2	Inspection of Installation Sites	15/02/2016	18/02/2016
3	Assessment of Readiness	16/02/2016	26/02/2016
4	Team Formation	16/02/2016	29/02/2016
5	Identification of Discrepancies	1/3/2016	5/3/2016
6	Analysis of Requirement	6/3/2016	12/03/2016
7	Identification of Gaps	13/3/2016	23/03/2016
8	Customization Requirement	24/03/2016	05/04/2016
9	Customization Design	06/04/2016	14/04/2016
10	Customization Development	15/04/2016	15/05/2016
11	Infrastructure Sizing	Done by Project Manager, E&Y	
12	Testing and Release for Deployment	15/09/2016	19/09/2016
13	Inspection of Hosting Environment	November 2016	
14	Installation of HW components, system software and platform software	November 2016	
15	Assessment and testing of connectivity	November 2016	
16	Clearance for Deployment	November 2016	
17	Transition Planning	November 2016	
18	Staging of Solution	November 28, 2016	December 8, 2016
19	Pilot Provision of Solution	January, 2017	
20	Training	February 6 – February 10, 2017	

21	System Launch		March 6, 2017
22	Warranty Support	March, 2017	February end, 2018

Note: Activities in green text are complete. Warranty support commences from the date of service launch.

10. Training

The call center agents are provided with training to handle the queries raised by the callers. Handling of call typically include greeting the caller, listening to query raised by the caller, searching information for identified sources, provide response to caller's queries, recording of caller information (if not available in RAMIS database), and recording of the query. The training sessions focused on the following:

- Tax domain by Department of Revenue and Customs
- Soft skills by E&Y
- Call center suite system user training by iTechnologies

Following call center agents were trained during the training sessions:

Sr. No.	Name	Qualification & Year of Passing	No. of Years of Experience	Date of Joining	Mail ID
1.	Kelzang Dorji	BCA, 2014	1 Year	30-Jan-17	kelzang.dorji21@gmail.com
2.	Kuenzang Lhaden	BCA, 2010	6 Years	30-Jan-17	kuenzangjl99@gmail.com
3.	Wangmo	BCA, 2009	5 years	30-Jan-17	wangmolady87@yahoo.com
4.	Ugyen Wangmo	BSc. IT 2014	2 years	30-Jan-17	wngmoupee@yahoo.com
5.	Sonam Tobgay	B.Sc. Computer Science, 2015	Nil	30-Jan-17	17248146tobgay@gmail.com
6.	Tashi Dendup	B.Sc. IT, 2015	1.5 years	30-Jan-17	tashisld7@gmail.com

11. System Launch

Call center service was launched on March 6, 2017 by Finance Minister, Lyonpo Namgay Dorji at the conference hall of Ministry of Finance, Tashichho Dzong. The event was attended by ADB's Country Director in Bhutan, ADB's Project Manager for SEMP II Program, Finance Secretary, DRC Director along with heads of different divisions in DRC and consultants from E&Y, iTechnologies and Barma Enterprises.

Picture story: Finance minister Namgay Dorji inaugurated the Department of Revenue and Customs Taxpayer Call Centre yesterday. The call centre can be reached by dialling the toll free number 399 for services related to procedures and processes, tax payer specific queries, and RAMIS, among others. The objectives of establishing the call centre include the promotion of voluntary tax compliance, and minimising the work load and cost of tax administration, among others. The Asian Development Bank assisted the government in establishing the call centre.

Source 1: Kuensel dated March 7, 2017

DRC Director, Finance Minister, ADB's Country Director to Bhutan and ADB's SEMP II Project Manager highlighted the relevance of taxpayer information call center. The real benefits of the call center would be realized through improvement in tax law compliance and to reduce the communication burden on DRC officials. Queries handled by DRC officials earlier can now be handled by call center agents. Further, the call center can be used to send out communication to taxpayers during return filing periods.

12. One Week Operation

As of the March 13 around 500 queries are recorded in the system. More than 400 callers recorded. Some callers have already made multiple calls. During first week of the service launch queries recorded are as depicted as below.
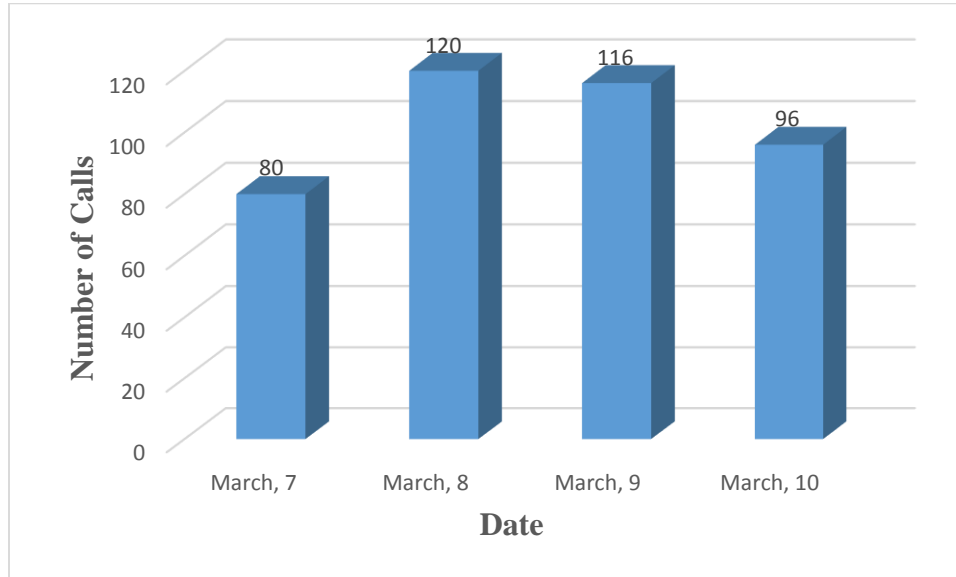
Majority of the queries are related to RAMIS. Status and login issues are raised by the callers.

So far more than 700 calls are recorded that translates of more than 30 hours of call time. An average of 120 calls per agent is recorded in the system.

USER	CALLS	TALK	TALK AVG.
wangmo	156	05:34:41	00:02:08
kelzang	143	06:20:30	00:02:39
ugyen	134	04:22:51	00:01:57
kuenzang	129	05:28:57	00:02:33
tashi	83	04:34:37	00:03:18
sonam	80	04:27:08	00:03:20
TOTALS:	725	30:48:4	00:15:57

Inbound Detailed Report

Start Date : 2017/03/06 09:00   End Date : 2017/03/10 17:00

Agent : ALL   Status : ALL

DID : ALL   Queue Name : ALL

SUBMIT

Total Call between 2017-03-06 09:00:00 and 2017-03-10 17:00:00 is : **676**

Details of Inbound Call

Agent	DID Name	Queue Name	Call Date	Status	Disposition	Phone Number	TT	Wrap Time	CHT	In Queue(in Sec)	Hangup By	File
kelzang	330122	TEST	2017-03-06 09:13:43	AGENT DROP	NSET	7517624708	424	306	730	0.00		
wangmo	330122	TEST	2017-03-06 09:14:15	DONE	NSET	7517172308	126	23	149	0.00	CALLER	
wangmo	330122	TEST	2017-03-06 09:16:43	DONE	NSET	7517403744	430	415	845	50.00	AGENT	
kuenzang	330122	TEST	2017-03-06 09:18:21	DONE	NSET	7517624708	313	274	587	0.00	AGENT	

Call Distribution by Hours – Calls are also made during apart from office hours like more than 20 call attempts before 9 am and similar number of attempts after 5 pm on March 7, 2017.

Date: 2017-03-07
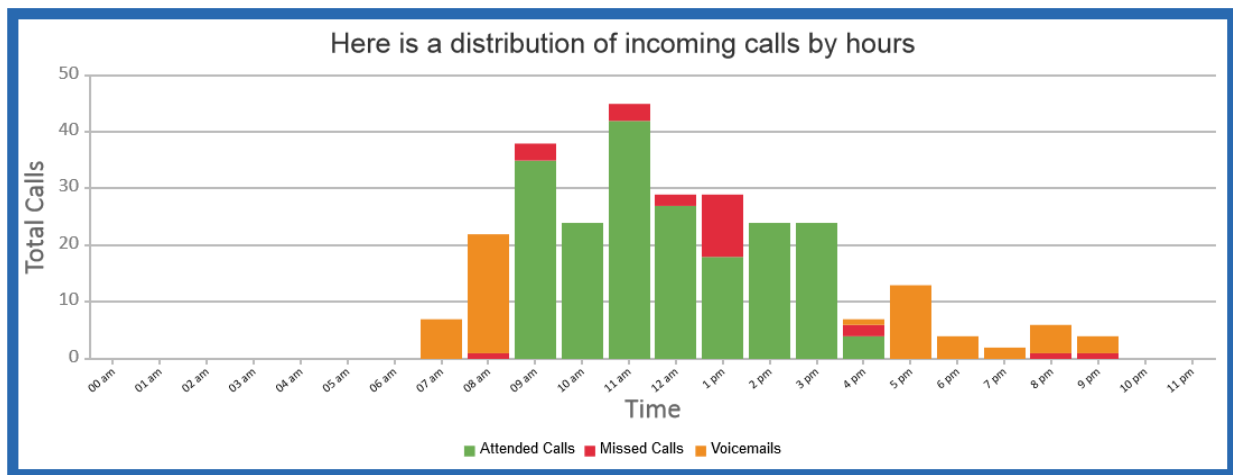
Call Wrap Report – Agents are able to record the queries within two (2) minutes of call disconnection. Analyzing the queries recorded it is evident that required information is recorded for supervisors and the technical staff to provide resolution or prepare Questions and Answers using the call logs.

Agent Call Wrap Report

Start Date : 2017/03/06 09:00   End Date : 2017/03/13 14:14

Campaign : BLENDED12

SUBMIT   DOWNLOAD

Date/Time Range: 2017-03-06 09:00:00 to 2017-03-13 14:14:00

USER	CALLS	WRAP TIME	WRAP AVG.
wangmo	159	02:56:30	00:01:06
kelzang	148	04:06:51	00:01:41
ugyen	139	03:13:55	00:01:24
kuenzang	132	03:41:19	00:01:39
tashi	86	04:22:54	00:03:05
sonam	81	02:48:49	00:02:05
TOTALS:	745	21:10:18	00:11:02

Agent handling details – The call cycle which includes conversation between the agents and the caller, recording of caller information (if not available in RAMIS database) and recording of queries is completed within 3 – 5 minutes on an average.

Agent Detailed Handling Report

Start Date : 2017/03/06 09:00   End Date : 2017/03/13 14:17

Campaign : BLENDED12

SUBMIT   DOWNLOAD

Date/Time Range: 2017-03-06 09:00:00 to 2017-03-13 14:17:00

USER	CALLS	HANDLING TIME	HANDLING AVG
wangmo	159	08:39:31	00:03:16
kelzang	148	10:34:33	00:04:20
ugyen	139	07:45:09	00:03:22
kuenzang	132	09:14:48	00:04:10
tashi	86	08:59:09	00:06:20
sonam	81	07:17:58	00:05:24
TOTALS:	745	04:31:08	00:03:42

13. Support Framework

We provide one year of support to DRC during the operation on technical platform as warranty support whereby development team will coordinate the support as per the following framework.

Level 1 – Function Help Desk support will provide the following:

- Answer calls or messages received from users via a phone number to be established or the Post Implementation Support email box, also to be established, which will record service calls during office hours
- Special extended hours of coverage may be provided for critical periods
- Enter and track tickets for calls in a system to be determined
- Provide on-call escalation services for critical problem resolution after regular working hours
- Answer "how to" questions, reset passwords, and be able to explain business processes associated with implemented application functionality
- Work with the Level 2 or Applications Production Support Senior Analyst to resolve interface errors
- Escalate problems they cannot solve to the Level 2 Analysts
- Escalate technical problems to Technical Support or Technical Services, and re-route problems to other Help Desks as needed
- Log the Calls and Issue Database for recurring problems to identify areas requiring additional training or changes to business processes.
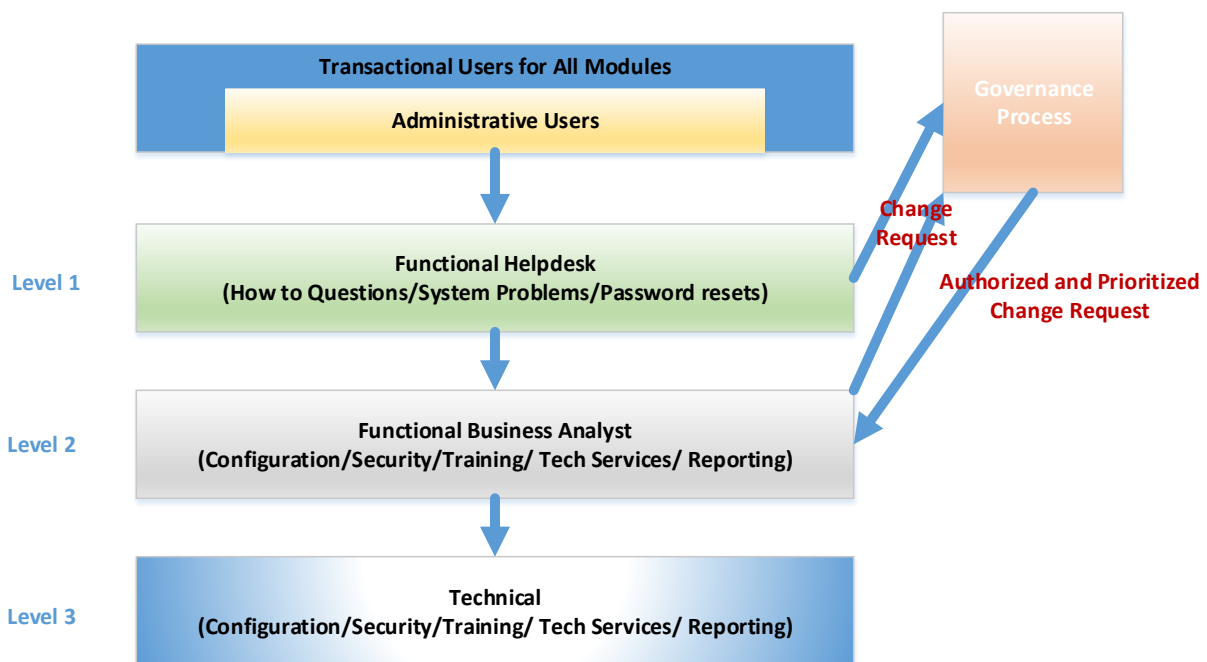

Figure 5: Support Framework

Level 2 - Functional Analysts Level 2 – Functional Analyst will provide the following:

- Respond to Issue Database tickets entered by the providers of Level 1 support
- Escalate tickets to Level 3 Senior Technical Analyst or re-route as required
- Perform configuration changes required as a result of system problem or changes in process or procedures
- Participate in testing for system problem fix, support packs, upgrades, or new functionality
- Provide on-call escalation services for critical problem resolution after regular working hours
- Create specifications for Development Requests
- Participate with the Governance Board to evaluate change requests for existing functionality or requests for new functionality
- Work with Integration Manager on interface error correction
- Meet periodically with Business Process Owners to evaluate and/or suggest changes in processes that will enhance the use of Applications
- Provide training for new functionality being implemented
- Work with Security Administrators to clarify, process and test any security maintenance

Level 3 - Technical Level 3 –Technical Support will provide the following:

- Respond to Issue Database tickets entered by the providers of level 1 support
- Send messages to application vendor if required
- Make necessary application changes as required, schedule and approve update migration to resolve system problem
- Participate in testing for system problem fix, support packs, upgrades, or new functionality
- Provide on-call escalation services for critical problem resolution after regular working hours
- Create specifications for Development Requests
- Participate with the Governance Board to evaluate change requests for existing functionality or requests for new functionality
- Meet regularly with Business Process Owners to evaluate and/or suggest changes in processes that will enhance the use of Applications
- Provide training for new functionality being implemented
- Work with Security Administrators to clarify, process and test any security maintenance

14. Knowledge Transfer

iTechnologies team is working to ensure that adequate knowledge is transferred to the DRC team with regard to business processes implemented in the system, technical knowledge required to maintain and manage the call center system components and other related aspects. Our approach to knowledge transfer to DRC team is based on the following:

Capacity Building – Required training is provided to the users of the system (agents, supervisors and management) based on the functional entitlements. The DRC technical team is provided with

system maintenance and system operational areas. All required tasks are identified, training is provided on identified tasks.

Documentations -- All the documentations generated during the execution of the project will be provided to DRC before the completion of agreement term. The documents will be updated based on the activities till the end of the contract term.

15. Source Code

Source code will be delivered to DRC for the following components:

- FAQ Database
- Document Tracking System
- RAMIS Call Logger
- Custom Components (if any) for call center software

Source code shall not be provided for the following components:

- Call center software as this will be off-the-shelf system

16. Document Transfer

Following documents will be provided to DRC for future reference:

- Inception Report
- Interim Report
- Midterm Report
- Draft Final Report
- Final Report
- Training Materials
- Functional Requirement Specifications (included in Interim Report)
- Software requirement specifications (Included in Midterm Report)
- High Level Software Design Documents (Included on Midterm Report)
- Low Level Software Design Documents (Included in Midterm Report)
- Hardware Configuration Documents
- System user manual
- System Administration and Maintenance manual
- System Troubleshooting manual
- Database development scripts

System user manual will be provided in the system for users to refer during system operations. Further the documents along with the system source (for applicable components) will be delivered to DRC in CD / DVD format.

Same set of documents will be provided using file sharing mechanism at the call center premises for easy access by relevant stakeholders.

17. Risks and Challenges

After launch of the call center system we foresee following challenges which require dedicated effort for relevant stakeholders:

- Data, especially for FAQ, will be dynamic where new questions and answers should be added continuously through review of call logger records. DRC will be required to designate staff to manage the FAQ database
- The call center system has provision of knowledge management which can be utilized to provide any changes in rules, regulations, processes, etc. related to taxation. However, this requires dedicated effort to update the knowledge base module with relevant information. iTechnologies can handle the information update during the warranty support time but ultimately DRC will have to take the responsibility.
- Now the call center applications are deployed, for proper testing call agents will have to be recruited and adequately oriented on the tax related rules, regulations and other tax related subjects before being trained on using the system.
- As the agents to be recruited are going to be interns proper retention strategy will have to be devised so that the attrition of agents is low. If attrition of the agents is high then majority of the time will have to be spent on training the agents leading the lower productivity of the agents at any time of service
- As RAMIS data access by the call center application is from the backup of the RAMIS database, it is very important that the backup of RAMIS is done as required. Therefore, responsibility will have to be delegated to accountable IT staff to take the required backup of the RAMIS database.

18. Responsibilities

During the warranty support period iTechnologies will provide dedicated support on the technical solution implemented for one year after the launch of the system i.e. until 28 February, 2018. The warranty support is limited to ICT applications for Taxpayer Information Call Center and the Call Center Suite with MIS. Support on Hardware components will have to be provided by the Hardware vendor.

During the warranty support period following responsibilities are envisaged:

18.1. iTechnologies

After the launch of the call center system, iTechnologies will be responsible for the following:

- Provide dedicated technical support for one year after the launch. During this time any technical bugs / issues will be fixed and minor changes will be incorporated in the system to make system more user friendly and feature rich.
- Attend requests submitted by DRC and / or users

- Assist DRC users to manage data related to FAQ and knowledge base. iTechnologies will assist DRC people to format, validate and import information into the knowledge base.
- Provide required training to agents when new agents are recruited during the support period. iTechnologies will provide trainings on the ICT solution only.
- Assist agents to use the ICT applications during initial months of the system launch to enhance the usage of the system
- Provide periodic reports to DRC regarding system usage and other technical aspects of the call center operation.

18.2. Department of Revenue and Customs

After the launch of the system, DRC will have ensure following:

- Regular review of FAQs and recommend updates of the FAQs. With evolution of processes and dynamism of policy adoption, some FAQ may become obsolete and new Q&As may need to be added. DRC should take the responsibility of updating the FAQs on regular basis
- Provide training to agents on the Tax domain as and when there is change in policies, procedures, etc. It is the responsibility of DRC to ensure that the agents are well versed with the knowledge on taxation domain
- Report issues and challenges faced by users to iTechnologies so that technical and / or functional support can be provided.

19. Business Continuity

Given the critical nature of the Call Center system to provide tax information to taxpayer it is very important to have adequate business continuity strategy and plan to avoid service disruptions. A business continuity plan addresses actions to be taken before, during and after any incident that disrupts the services. Actions taken before are designed to avoid any situation for service disruption, action taken during the incident ensure smooth recovery from the service disruption and post incident actions should focus on avoiding circumstances for service disruption in future. Connectivity disruptions, equipment failures, agents change, shifting of call center location, data availability and linkage disruption to access RAMIS data, inconsistent data and system backup, equipment health issues, software system health issues, lengthy procurement process, and loss of equipment can cause disruption in normal operations of the call center.

19.1. Connectivity Disruptions

Two types of connectivity, viz. internet and ISDN line, are critical for normal operation of the call center. Internet connection is provided by Tashi Cell and ISDN Line is provided by Bhutan Telecom. Unavailability of internet causes disruption in information access by the call center agents and issues with ISDN line will impact the call processing. Department of Revenue and Customs should have checklist of activities for the following:

- Ensure that the contracts with the Internet Service Providers is managed adequately to avoid internet connectivity disruption. The management / representative should check the validity contract agreement and process for renewals well in advance
- Ensure that the contracts with the ISDN Line provider is managed appropriately to avoid voice line disruption
- Any changes in the system that has impact on the internet connectivity and ISDN line is reported to service providers and jointly planned to implement the envisaged changes
- Adequate Service Level Agreement should be signed with the service providers and compliance monitoring should be ensured
- During the disruptions rapid decision making to establish contingency connectivity

The service providers should ensure the following:

- Provide in honest the services in compliance with Service Level Agreement (SLA)
- Inform DRC regarding any maintenance activities that would lead to connectivity outage
- Provide contingency connectivity during main line disruptions

19.2. Equipment / Software Failures

The call center hosting facility comprises of several sophisticated equipment that have chances of failure. Failure of any equipment will disrupt the normal operations of the call center. DRC should ensure the following:

- Support agreements with the vendors are up-to date so that service requests can be raised to the vendors
- Any disruptions due to equipment / software failures is reported to the vendors and service request is raised
- Decision making should be simple to ensure timely decision is made on the requests made by the vendors
- Procure required parts that are not covered in the support agreement within very short time frame

Vendors are responsible to bring back the operation to normalcy as per the service description agreed in the support agreement.

- Provide information to DRC regarding major maintenance activities
- Execute the maintenance activities with minimum impact on the normal operation of the call center
- During disruptions provide contingency solution to reduce the impact of down time
- Provide required spare parts or source the parts within very less lead time

19.3. Agents Change

Any trained agent may leave the call center. It is very important that agents are recruited and trained in very short time span. Outgoing agents should ensure that the incoming agents are provided with all necessary skills. DRC should ensure the following:

- The planned number of agents is available to manage the call load. In case of agent leaving the job, timely recruitment is to be ensured
- Required training on the domain knowledge and call handling should be provided in collaboration with outgoing agents and the vendor
- It is recommended that at least one agent can be kept in the waiting list so that the candidate can be inducted during disruption of the services

Outgoing Agents should:

- Provide information regarding resignation so that DRC gets sufficient time to recruit and train new agent
- All the necessary skill should be transferred to new agent before the outgoing agent is relieved

Incoming agent should:

- Acquire required knowledge in honest before the outgoing agent is relieved
- Provide comments and feedbacks for DRC

19.4. Shifting of Call Center Location

As current location of call center is in residential area, it may be appropriate to move the call center location to more strategic location. Movement of call center will impact normal operations of the call center. Moving of call center from current location to any new location will require following to be ensured:

- Availability of internet connectivity in the new location
- Availability of ISDN line in the new location
- Availability of adequate power supply. One phase for powering the server room and a different phase for powering the client machines

As change of location is dependent on above requirement, it is important that proper planning be done prior initiating shifting of call center location.

- Internet connectivity is tested and verified as per the requirement
- ISDN Line is available and tested
- Movement of equipment to be done by the vendor providing the support services
- Movement of equipment and configuration should be planned during weekend to reduce the disruption of services
- Required testing should be executed before declaring service be resumed

19.5. Data Availability

The main source of data consumed by the call center system is from RAMIS. Therefore, it is very important that RAMIS data is available to agents while handling the queries. Current approach of RAMIS fetching is using backup of the RAMIS database which is restored at call center server. DRC technical team should ensure that:

- RAMIS database backup is made available at the storage location agreed
- Inform the call center system service provider if there are modification in RAMIS database structure so that necessary changes can be incorporated in the call center system
- Report whenever issues are faced to prepare and store backup database so that the caller are informed about the validity of information fetched from RAMIS database
- If RAMIS data access using standard mechanism not possible, as contingency other options to access RAMIS data (e.g. DRC official access RAMIS directly) should be established

The call center system service provider should ensure:

- RAMIS data is made available to the call center system
- Implement high level security on RAMIS data and call center data
- Any disruption in RAMIS data access is reported to DRC
- Incorporate changes in call center system when there are changes in the RAMIS database structure

19.6. Backup

Lasted tested application backup and daily database backup of the call center system is required to be managed to recover system in cases of disruption due to system issues. A backup location (either at DRC HQ office or Government Data Center or any other data center in Bhutan) should be identified which can be the storage for latest tested system and daily database backup of the call center system.

- Latest stable full backup of the application system should be maintained at the selected backup location. Every stable revision should be backed up in the selected backup location.
- Latest stable full backup of the complete database should be maintained at the selected backup location
- Daily incremental backup of database should be maintained in the selected backup location
- During disruption due to system flaws, latest stable revision of application system and latest stable full backup of database along with latest daily database backup will restored to bring the system live
- Service provider of the ICT applications and Call Center Suite is required to maintain backup of latest stable revision of the application system components

19.7. Equipment Health

The equipment used for hosting the call center system is expected to run 24x7x365. Hence, performance of the components may deteriorate over time due to accumulation of equipment operation logs, issue logs, etc. To ensure performance of the equipment, support service provider for the hardware component should:

- Conduct health check of the equipment periodically and fix any issues flagged in the health check result
- Support service provider should always ensure that the equipment are operated as per conditions prescribed by the manufacturers of the equipment
- The health check status report should be submitted to DRC along with requirement for major maintenance, if any.
- DRC should provide required resources for the required maintenance as per the support agreement

19.8. Software System Health

The software components require health check to ensure performance of the system. Health check will include verification of application logs, database logs, application server logs, database tuning and application server tuning activities.

- The software support service provider is required to execute health check of the software application and share the health check report to DRC
- Remove the log files after verification to improve the performance of software system
- Perform database tuning and application server tuning and fix any issues identified during the tuning process
- The software support service provider should ensure that the software system components are hosted in updated operating system and other dependency packages as per the design document of the software system

19.9. Procurement Process

During incidents that disrupt the normal operation of the call center requirement to purchase spare parts, additional components, upgrade package may be required. Department of Revenue and Customs is expected to ensure smooth and fast procurement of required spare parts, additional components and package upgrades. Delay in procurement will increase time of disruption.

19.10. Loss of Equipment

Loss of essential equipment would disrupt call center operations. Loss of equipment should be prevented with physical security of the facility.

- Ensure access to the call center hosting facility uses standard access control mechanism like maintain visitors log
- Tight physical security is ensure using adequate locking mechanism, installation of strong shutters, and security personnel deployed all the time
- Appropriate log of equipment movement in and out of the call center premises should be maintained

In case there is a loss of equipment, then the services should be restored within 24 hours by using equipment kept on standby. If the lost equipment were database server or application server, then the software system components should be restored using the latest backup of the systems.

Such recovery management should be included in the support agreement with the support service providers.

19.11. Utilities Disruption

Call Center service disruption can result due to disruption of power supply. Current location is in a residential area with low voltage connection. Currently one line powers the server room equipment and another line powers the client machines. The Uninterrupted Power Supply (UPS) solution can power the equipment for two hours. In cases of power disruption more than 2 hours, alternate source of power is required.

- Backup generator should be managed to power the equipment if power disruption is more than two hours
- A competent personnel who can power on the generator and has knowledge about the fuel requirement should be available
- The power from generator should not be used in heaters, ACs, etc. One required equipment should be powered using generator power.
- All the equipment should be powered off during non-working hours when generator is used.

Other communication channels may go down:

- The call center agents should have mobile phones and the contact numbers of agents are shared with all the officials.
- When official mail server is down, DRC should ensure that the agents use personal emails to communicate
- When leased line internet is down, option to use mobile data connectivity should be used for communication.

19.12. Alternate Site

In case of major damage in the call center premise, alternate site can be established in the DRC HQ office to provide services. The alternate site can be decommissioned once the actual site is commissioned.

20.   Support Requirement for DRC

To provide smooth and continuous service to taxpayer from the call center, Department of Revenue and Customs would require continuous support from the Telco Service Providers, Hardware and Network Service providers and the software service providers.

Annual Maintenance Support Agreement for Hardware and Network Operations – DRC should ensure all time active annual maintenance support agreement with hardware and network operations service providers. The scope of support agreement should cover, but not limited to, the following:

- Periodic health check of the equipment and suggest proactive maintenance / replacement requirement
- Suggest updates required for firmware used to operate the equipment, plan for updates and update the firmware. Firmware update should not impact the normal operation of the call center
- Carry out recommended scheduled maintenance of the equipment provided by the equipment manufacturers
- Ensure that the equipment are operated as per the terms and conditions specified in the manuals provided by the equipment manufacturers
- Provide / source spare parts during time of incidents to minimize the disruption time

DRC call center team should work in close coordination with the hardware support service provider.

Annual Maintenance Support Agreement for Software Solution -- DRC should ensure all time active annual maintenance support agreement with the software support service provider. The scope agreement should cover, but not limited to, the following:

- Periodic health check of all the software solution components viz. the call center software solution, the ICT application components, the database packages and the operating system used for hosting the software solution
- Suggest required updates in the dependent middleware used to host the software application, plan for updates and update the middleware. Firmware update should not impact the normal operation of the call center service
- Carry out recommended scheduled maintenance of the system components provided by the developers of the system. Scheduled maintenance can include database tuning, application tuning, clearing of unwanted logs, etc.
- Ensure that the system components are operated as per the terms and conditions specified in the manuals provided by the developers of the systems. Keeping the updated platform software, required dependencies, etc.
- Make minor modifications in the system that are essential for operating the call center and for generation of MIS reports.

Service Agreements with Telco Service Providers – DRC should ensure that the service agreements as up-to-date with TashiCell for internet connection and Bhutan Telecom for ISDN Line.

Department of Revenue and Customs should have adequate budget provisions for required services. The recurring budget required is indicated below.

Sl. No.	Particulars	Indicative Amount yearly
1	Internet Connectivity Cost – Tashicell for a connection of 4 MBPS Per month	USD 8800
2	ISDN Line cost to be paid to Bhutan Telecom	USD 600
3	Toll free Number charge @ Nu. 0.20 per call	USD 500
4	Rental Cost of ISDN MUX Per month for 2 years.	USD 500
5	Rental Cost of Voice Gateway @ Nu. 12000 per month for 12 months. After 12 months the voice gateway will be handed over to DRC	USD 2200
6	AMC charge for Hardware & Network Operation (12 % of the original contract amount per year)	USD 22,000
7	AMC charge for software (12 % of the original contract amount per year)	USD 12000

Internet connectivity cost, ISDN line cost, Toll free number charge, AMC charge for hardware and software is ongoing charge whereas Rental cost for Voice gateway will be only for 12 months and rental cost of MUX will be for 2 years. MUX and Voice Gateway will be handed over to Department of Revenue and Customs after 24 months and 12 months respectively.

AMC charges for hardware and software may be increased at rate to 3 % to 5 % every year to account for inflation and other increments related to wage increases.

The Toll free charge is calculated based on the number of calls estimated by E&Y consultants.

21. Recommendations

For smooth and effective call center service Department of Revenue and Customs should integrate the call center operation with the tax related operational activities. We would like to recommend the following to ensure smooth call center operation without much hiccups.

- Take ownership of the call center system – the equipment, software systems and other components of the call center. Call center should be integrated in yearly activities plan and budget preparation
- Ensure that the requirements listed in the Business Continuity section are adhered to. Some of the requirement would require budgetary allocation.
- The call center agents are to be continuously trained to enhance domain related knowledge. Appropriate domain know how will greatly enhance the performance of agents eventually leading to higher satisfaction level of callers. Higher satisfaction level of taxpayer will ultimately be determining factor for the success of the call center.
- The queries logged from the call center are to be regularly analyzed and collated and questions and answers and published as FAQ. As the FAQ can be accessed by any anonymous site visitor, taxpayers can use the FAQ self-service to resolve queries.
- Call center knowledge base should be continuously updated so that the agents can search the knowledge base to resolve queries raised by the taxpayers. Queries related to RAMIS data could be forwarded to the supervisor and the technical staff.
- The call center supervisors and the technical staff should ensure that the queries that are not resolved by the agents are followed up properly and resolved. Such activity will win confidence level and trust of the taxpayers.
- Supervisor should review and analyze the issues logged and the voice recording to determine the level of services provided by the call center. Based on the assessment strategies and planning should be prepared for capacity development of the agents
- Currently only six agents are available. It is recommended that at least two agents should be kept on standby for deployment during emergency situations like agents taking leave, etc.