Brief of Scope

Designing, developing, implementing and maintenance of eRevenue License 2.0 (eRL 2.0).
Assignment No: ICTA/GOSL/CON/QCBS/2019/01

1. Introduction

The e-Revenue License (eRL) initiative is one of the key initiatives of ICTA which was launched in December, 2009 in Western Province. The eRL Solution was the first connected government service and it was also the first government transactional eService offered to the citizens. The e-RL solution consists of a centralized web enabled system used by Divisional Secretariats (DS)s to issue license, and an online service (eService) which enables citizens to renew their licenses by themselves.

There are many stakeholder organizations which are connected and provide connected service through the eRL solution, such as the Provincial Departments of Motor Traffic, Department of Motor Traffic (DMT), Insurance companies, Emission testing companies, Banks and financial organizations etc. By now ICTA has successfully rolled out eRL solution in all the divisional secretariat in the country.

2. Background

The eRL system holds the revenue license records for all the vehicles running in the country and the system is now running on its fullest capacity. The system runs on outdated technologies which was initiated on year 2009.

Due to this and the current work load, the system performance has become very low. And there is lack of data analytical and forecasting components in the existing eRL system. Furthermore, the stakeholder organizations have requested number of enhancement to the system in order to provide more efficient and effective service to the vehicle owners.

3. Objective of the assignment

In order to overcome issues of the existing **eRL Phase I**, Provincial Departments of Motor Traffic is pursuing on the necessity of developing **eRL 2.0 solution.** Thus, a system which would enable the smooth functioning of services offered through the existing features of the system as well as enable the department's vision of providing a superior service through new features identified is desired.

The Software developing firmSoftware developing firm is required to design, develop and implement as well as maintain the implemented solution. The total duration of the assignment must comprise of time for system design, development and final deployment including periodic user training and demonstrations as well as the support and maintenance (45 months).

Hence, the seamless migration of the existing eRLPhase 1 system to proposed eRL Phase II solution.

Following key points need to be addressed:

- Allow citizens to obtain the revenue license from any province regardless of the province the vehicle is originally registered.
- Availability of dashboards and generate reports quickly and in intuitive way form data exists in the database (i.e. report builder).
- Use of advance technologies in order to improve the service delivery.
- Provide more robust and secure software platform for higher availability.

In addition, there needs to be an eco-system in place to provide an optimized service to vehicle owners, minimizing operational costs while achieving service excellence.

4. Scope of Work

4.1 The Software developing firm should conduct a system requirement study of the process and should propose new features such as workflows and dashboards for the relevant user levels. Some of the new features which should be available in the eRL Phase II are listed in Annex 2- Some of the new features of the proposed solution.

4.2 The selected Software developing firm should conduct workshops when necessary to identify and verify the requirements with all the relevant stakeholders. Furthermore, Software developing firm should propose any improvement if required.

4.3 The Software developing firm should study existing integrations with external organizations such as Insurance and Emission Test Companies and carry out any enhancements needed for the proposed solution in order to provide a more comprehensive service.

4.4 The Software developing firm should propose, develop (if required) and integrate external stakeholders with the proposed eRL 2.0, such as mobile application to capture vehicle fitness certificate issuance etc.

4.5 The Software developing firm should study and integrate with existing applications (i.e. Department of Motor Traffic) as it is best suited for the proposed eRL 2.0system.

4.6 The software development firm should consider the use of source code of existing eRL 1.0 application wherever possible with the intention of reducing the time and cost of the development of proposed eRL 2.0 system

4.7 On completing the above, a Detailed Software Requirements Specification (DSRS) and a Detailed Software Technical Design (DSTD) document should be submitted. Vendor should obtain approval from the committee appointed by ICTA for the DSRS and approval from ICTA for the DSTD respectively.

4.8 Upon obtaining approval from the committee appointed by ICTA for the above, vendor should design and develop the system.

4.9 The Software developing firm should implement security and governance including role-based security, user lifecycle management and complete audit-trails.

4.10 ICTA intends to develop proposed eRL 2.0 solution in Nine (09) months' time period of this assignment and provide support and maintenance for the developed solution for 3 years from the date of launch of the solution.

4.11 The web application should be compatible with latest technological components and best practices which proposed by ICTA and should be able to deploy into staging and production in cloud platform provided by ICTA.

4.12 The proposed solution should be able to generate reports quickly and in intuitive way form data exists in the database (i.e. report builder).

4.13 The proposed services/modules offer to public (eService interfaces) should available in tri-languages (Sinhala, Tamil and English).

4.14 The Software developing firm who engage with the assignment should sign a Non-Disclosure Agreement (NDA) where applicable.

4.15 The Software developing firm shall adhere to standards defined by ICTA such as relevant domain of Lanka Interoperability Framework (LIFe).

4.16 The Software developing firm shall comply with the independent quality assurance process, which will be carried by a team designated by the ICTA.

4.17 Obtain User Acceptance Test (UAT) for the implemented processes collaboratively with committee appointed by ICTA.

4.18 The Software developing firm should follow the proper coding standard and maintain project source code in the ICTA, SVN system and upload documents to the ICTA, SCM.

4.19 Document and Training

4.19.1 The Software developing firm should provide user manuals in proper format. All manuals should be in tri-languages (Sinhala, Tamil and English). The user manuals should be available in electronic format.

4.19.2 The Software developing firm should carry out overall application and administration training for eRL Champions (super user from a province).

4.19.3 The Software developing firm should carry out trainings for eRL licenses issuance users at DS's separately for 9 provinces (one training for a province)

4.20 Adhere to ICTA project management practices.

4.21 Participate for Project Review Committee meetings and Project management committee Meetings as a member and present the status of the project when necessary.

4.22 Adopt a proper application release procedure to release the eRL 2.0 to the production environments during the deployment in the staging/ production environments at the cloud and server (configure, replicate and data migration the eRL 2.0system to the server) environments provided by ICTA.

4.23 The Software developing firm should understand and ensure the existing data volume and data complexity and provide data migration strategy accordingly. Moreover, data transformation strategy should follow the proper industry standers and proper control mechanisms have been used in transforming these data in to the new system.

4.24 Solution should be adhered to Web 2.0 concepts, open standards and Service Oriented Architecture (SOA).

4.25 Proposed solution should be browser independent and able to access with less configuration in the client workstation.

4.26 The Software developing firm should coordinate with a relevant service provider to conduct system vulnerability assessment including the support and maintenance period.

4.27 The system should consume existing government authentication services and integrated with existing government software platforms (i.e. GOVSMS etc.) and also should expose API/web-services to external stakeholder organizations. (if required)

4.28 The Software developing firm should provide support and maintenance for 3 years to the developed solution from the date of launch.

4.29 The Software developing firm should provide support and maintenance services, from the date of launch to an agreed time period. Moreover, the Software developing firm should adhere to the Service Level Agreement (SLA), during the support and maintenance (S&M) phase (Refer Annex 4 – Service Level Agreement for Support and Maintenance Services).

4.30 The Software developing firm should ensure efficient support to the proposed eRL II and should attend to any configuration changes related to parameters proposed for the system. (i.e. apply security patch and changes in resource files)

4.31 During the support and maintenance period the Software developing firm should attend to any issue reported and fix and carryout configuration changes (if required) and apply relevant security patches to make sure the security of the solution.

4.32 Adopt a proper release procedure to release the patches/updates and deployment into the staging /production environments after completion of successful User Acceptance Test (UAT).

4.33 At the end of the S&M period, the Software developing firm should handover the source code and relevant documents to ICTA, with a proper knowledge transfer session to the ICTA technology team including following updated artifacts (DSRS, DSTD and deployment document).

4.34 The Software developing firm should work collaboratively with all stakeholders and attend to weekly progress meetings and management meetings.

4.35 The above Proposal should include all deliverables as specified in below item '5 – Deliverables and Time Schedule

4.36 The proposed solution should have proper data backup plan (Province wise) and equipped with high availability and fault tolerance.

4.37 Work collaboratively with ICTA and Provincials Motor Traffic Departments throughout the tenure of the project and finalization of decision making related to management and policy decision and are taken by Project Governance Steering Committee. (Refer Annex 5 - Project Governance Steering Committee Model)

4.38 The Software developing firm should accommodate change requests (CR) after obtaining the approval from the Change Control Board and as per the CR rate agreed in the contract.

4.39 Refer following Annexes which form a part and parcel of the Terms of Reference.

Annex 1 - Overview of current system
Annex 2 -Some of the new features of the proposed solution
Annex 3 - The Lanka Gate Initiative - Overall architecture & design
Annex 4- Service Level Agreement (SLA)
Annex 5 - Project Governance Steering Committee Model
Annex 6 – None functional Requirement

5. Final outputs, Reporting Requirements, Time Schedule for Deliverables;

The total project duration is Forty-Five(45) months. Out of which 9 months for the implementation of the application including requirement gathering, designing, and developing and 36 months (03 Years)for the support and maintenance.

Consultancy firm is required to submit the following list of deliverables for eRL application development and support & maintenance project for system.

No	Deliverables	Phase	Duration
1	eRL Solution Implementation Proposal 5.1.1 Requirement specification of the eRL application 5.1.2 Implementing schedule / Project Plan 5.1.3 QA Plan 5.1.4 Detailed Software Requirement Specification (DSRS) 5.1.5 Acceptance criteria for Deliverables and UAT 5.1.6 User Training Plan	Inception	Commencement + 6 Weeks
2	5.2.1 Detailed Software Technical Documentation (DSTD) 5.2.2 Release Management plan (including staging, production and support and maintenance) 5.2.3 Data migration and integration plan	Elaboration	Commencement + 11 Weeks
3	5.3.1 Proper maintenance of source code in SCM 5.3.2 Test Cases and Test scripts	Construction	Commencement + 20 Weeks
4	5.4.1 Solutions installation guide 5.4.2 User manual 5.4.3 Administrator manual 5.4.4. Updated Lanka Gate Help Desk templates (Knowledge Tree and T1 Document) 5.4.5 Government organization level training 5.4.6 Successful UAT acceptance of the eRL Application and deployment 5.4.7 Test Results (Functional and Non-Functional)	Transition	Commencement + 36 Weeks
5	5.5.1 Monthly Support and Maintenance Report 5.1 Final S&M report should consist with comprehensive knowledge transfer documentation.	S&M	Date of launch + 144Weeks

Refer http://en.wikipedia.org/wiki/IBM_Rational_Unified_Process for more information about RUP (Rational Unified Process) phases.

6. Services and Facilities Provided by ICTA

6.1 ICTA will provide following artifacts related to existing eRL 1.0 application
- 6.1.1. Source code with deployment guide
- 6.1.2. Detail software design specification with the technical architecture
- 6.1.3. QA test plan and test cases

6.2 Web-based access to the ICTA SCM system

6.3 Access to staging/ production servers

6.4 Web-based access to the ICTA SVN system and SCM.

6.5 Arrange meetings with Provincial commissioners at ICTA

6.6 Arrange meetings with relevant stakeholder (if required)

6.7 Arrange and facilitate the workshop/training with relevant stakeholders

7. Review Committees and Review Procedures

The Software developing firm is required to work closely with the ICTA Technology Team and the Software Process Audit (SPA) consultants.

All versions of deliverables will be reviewed by the team appointed by ICTA.

All the deliverables must be verified and confirmed to be accurate and complete by the Project Implementation Committee (PIC) or the Project Management Committee (PMC).

References:

[1] eGovernment Policy Approved By Cabinet of Sri Lanka - https://www.icta.lk/icta-assets/uploads/2016/03/eGov-Policy-structured-v4-0.pdf

[2] Lanka Interoperability Framework - http://www.life.gov.lk/

– END –

[ANNEX 1]

Overview of the current System

Current eRL solution was developed in year 2009, to implement a centralized revenue license issuance to allow issuing provincial license from any divisional secretariats. And also citizen have facility to renew the revenue license online by paying with credit card from anywhere and anytime. This solution was implemented, to having a centralized management and monitoring of revenue license issuance process and avoiding data duplication and manual data entering.

There are many stakeholder organizations which are connected with this system, such as the Provincial Departments of Motor Traffic, Department of Motor Traffic (DMT), Insurance companies, Emission testing companies, Banks and financial organizations etc., that provide connected services which are essential to the system.

The table below gives the number of vehicles license issued in year of 2017.

#	**Provinces**	**No of license (From 1st January to 31 December 2017)**
1	Western	1,736,003
2	Southern	652,903
3	Sabaragamuwa	366,735
4	Central	431,977
5	North-Western	696,543
6	Uva	343,607
7	Northern	268,911
8	Eastern	353,043
9	North-Central	269,146
	Total	**5,118,868**

1. Access mechanism and deployment architecture

- The existing eRL solution is deployed in Lanka Government Cloud. The Provincial Departments of Motor Traffic and license issuing staff at Divisional Secretariats access the system through Lanka Government Network (LGN).

- The online portal (Citizen App) is exposed through the Official Government Web Portal (www.gov.lk) allowing citizens to renew revenue licensee online.

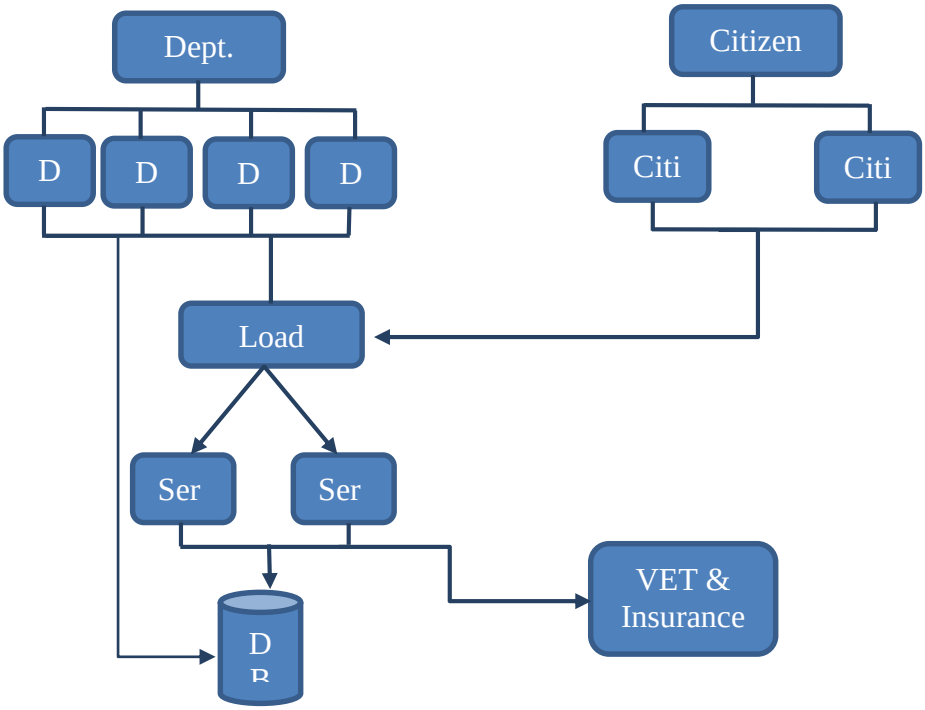


Figure 1: Deployment Architecture

2. User levels of the existing eRL Application

Main user roles identified in e-Revenue Licence system are listed as below:

- **eCitizen** – A Sri Lankan Citizen with internet access to the government web portal (www.gov.lk) and sufficient IT literacy to use simple web based applications.
- **PDMT User** – The current licence issuing staff of the Provincial's DMT and DS with access to process the normal licence issuance.
- **PDMT Supervisor** – Provincial's DMT and DS System users with additional privileges to be able to process exceptions, override the standard business logic and correct errors
- **PDMT Admin** – The technical IT system supervisors with access to perform security, update and maintenance of the system
- **PDMT Commissioner** – This will include both the commissioner and senior most accountant at Provincial's DMT and DS who overlook Provincial's DMT and DS operations
- **DS (Divisional Secretariat) User** – Standard users in the Divisional Secretariat office of the particular Province that are process normal licence issuance

- **DS (Divisional Secretariat) Supervisor** – DS System users with additional privileges to able to process exceptions and correct errors.

The group of roles that has a higher level or authority than a standard user, specifically the PDMT/DS Supervisor, PDMT Admin and PDMT Commissioner will be referred to as superusers.

3. Workload

By now ICTA has successfully rolled out eRL solution in all provinces (9) provinces in the county.

No of License Issuing Locations	
Provincials Department of Motor Traffic	9
Divisional Secretariat	331
No of License Issuance Management Users:	800
Daily Average License Issuance (All 9 Provinces)	25,353

4. Features of the existing system

4.1 Normal License Issuance

Issuance of a Revenue Licence and there are different types of revenue licence issuances that are mentioned in below:

- Revenue Licence Renewal
- Revenue Licence Reissuance
- Free Licence Issuance

4.2 Issuance of Licenses for Vehicles with Converted Engines

Issuance of a licence for vehicles with Fuel Type Conversions. There are two main possibilities due to Fuel Type Conversions:

1. Change in Vehicle Registration Number
   The vehicle is considered as a newly registered vehicle and licences are issued starting from the effective conversion date.

2. No Change in Vehicle Registration Number
   The vehicle will continue to be issued revenue licences while considering the effective conversion date as the licence start date

4.3 Issuance of Non-user Certificates

4.4 Payment of Arrears - paying arrears due for a particular vehicle.

4.5 License Issuance for Fleets of Vehicles

a. Issuing Quotations- Creating and printing a quotation for a group of vehicles.
b. Issuance of Licenses for Quotation - in issuing Revenue Licences for a fleet of vehicles

4.6 Correction of Past Revenue License Information

a. Edit / Delete Existing Revenue License records
b. Add New Revenue License record

4.7 Processing Ineligible Revenue Licence Applications- Processing Revenue Licence records that have been marked as ineligible.

4.8 Edit Vehicle / Owner Information

4.9 Managing Transitions

a. Categorizing Vehicles as Free Licensed
b. Categorizing Vehicles as Non-user Licensed
c. Print Loose Slip - Print loose slip which is required when transferring a vehicle to a DS of another province.
d. Blacklisting of Vehicles

4.10 Vehicle Activity Log - View the activity log pertaining to a particular vehicle.

4.11 Registered vehicle checking with Department of Motor Traffic (DMT) Update Module

Import the details of newly registered vehicles and updated vehicles from the DMT to the centralized database.

The DMT web service will be accessed by this module which is hosted at the central database. Any requests that come from DS offices seeking updates from the DMT will invoke this module which in turn will consume the DMT web service and retrieve the updated information.

4.12 Counter Configuration

4.13 Holiday Configuration

4.14 Adding Reference Data

Add reference data to the system. The reference data types associated with the system are given as below:

• Classes of Vehicles
• Fuel Types
• DS Authorities
• License Status
• Vehicle Status
• License Types
• Provinces
• Revenue License Rates
• Insurance Companies
• VET Companies
• Banks

4.15 User Account Management - Create / Edit / Delete User Account

4.16 Differences between provinces

There are some differences between provinces when issuing revenue license

i. Differences in printed license

ii. Price category

iii. Vehicle category

5. Reporting requirements

Below mentioned reports are generated though current system.

5.1 Detailed Report

Get detailed report of all transactions carried out by a particular counter for a particular day

5.2 Summary Report

Summary of all transactions for each counter on a particular day

5.3 Summary Report based on vehicle category

Based on vehicle categories, the number and value of all license issued between two dates per class of vehicle.

5.4 Non- licensed Report

New vehicle registrants who haven't obtained revenue license within 3 months of registration

5.5 Other Income Report

Arrears collected between two dates grouped by the first part of the license plate number (e.g. GA or 301)

5.6 Special licenses report

Includes details of other authority licenses (other DSs), free licenses and licenses for vehicles with fuel conversion between two dates. Note that the report can be sorted based on license authority, license no. or date

5.7 Synchronization Report (only for PDMT)

Report of synchronization status of DSs within the province. The DSs which have had not had a successful synchronization within the last 24 hours should be highlighted.

6. External integrations

6.1 Mobile Payment Gateway or SMS Gateway

6.2 Credit Card Payment Gateway

Processing on online credit card payment to be handled entirely by the system.

6.3 Insurance Company's Web Services

A Web Service implemented to a given specification to check insurance validity.

6.4 Vehicle Emission Testing centers Web Services

A Web Service implemented to a given specification to check emission test certificates.

6.5 DMT Web Service

A Web Service implemented to a given specification to check vehicle data (for new vehicles and transfers).

7. Online portal

To renew the revenue license citizencan obtain the service from government web portal www.gov.lk. This service is available for all the provinces in the country.

[ANNEX 2]

Some of the new features of the proposed solution

Software developing firm should study the current eRL solution and should carry out requirement study with the stakeholders to identify new features to be implemented in new eRL solution. Some of the new features listed in the following report.

[ANNEX 3]

Module	Feature	Description
Admin Functionalities	Manage new user profiles in the system	The admin user must be able to define the different user roles along with the login credentials to log in to the system. The admin user must be able to add, update, remove and view user roles defined in the system.
	Manage user privileges	The admin user must be able to add, update, remove and view the privileges assigned to each user role in terms of permissible functionalities (role based access control). User roles and privileges displayed should be specific to different stakeholder organizations.
License / certificates/permit Issuance process	Issuance of single revenue license	Allow citizen to obtain the vehicle revenue license from any province regardless of the province the vehicle is originally registered. The Software developing firm should provide a dashboard to view other province licenses and reports for the same.
	Vehicle fitness certificates issuance	The Software developing firm should study the process, propose and implement the best suitable approach. It is preferred to implement a mobile application (registration based) to capture vehicle fitness data into the system
	Route permit issuance authorities	The Software developing firm should study the process, propose and implement the best suitable approach. It is preferred to implement a mobile application (registration based) to check the validity of the route permission though the system
	Real-time Emission test verification	The Software developing firm should study the process, propose and implement the best suitable approach for real time emission test verification.
	Enhancement to Department of Motor Traffic data synchronization service	Enhancements should be carried out the DMT data synchronization service and should be able to generate various analytical reports.
User Authorization	Workflow based authorization	Study and propose different workflows to issue license in different scenarios with the facility to alert the relevant user. As well as allow different user level authentication via dashboard.

Document Management System	Workflow based document authorization	Study different sets of documents to be scanned and sent through different workflow for authorization. Scanned documents should be stored in a DMS for future references
System Logging		An audit trail of all the user actions performed on the application must be maintained. The information to be maintained includes (not limited to), • User / user role • Date and Time • Module / Feature Accessed • Action Performed
Reports	Ability to generate analytical reports	The system should support generating analytical reports for difference provinces. The Software developing firm should study and propose the facility to generate various kind of report and filtering facility. (i.e. report builder).

THE LANKA GATE INITIATIVE

OVERALL ARCHITECTURE & DESIGN

(a) Introduction to Lanka Gate

As an important component of the e-Sri Lanka initiative, it is envisioned that practically all the eServices and electronic information in Sri Lanka will be delivered via a comprehensive integration platform. This wide collection software infrastructure and systems which is envisioned to be the gateway for electronic information and electronic interactions in Sri Lanka, is generally referred to as the 'Lanka Gate' initiative.

Many eServices will be generated as a result of various projects done at the ICT Agency, such as the Population Registry project, the ePensions project and the Samurdhi Services project. In addition, many other eServices could be generated by government, public and private sector organizations as well as by community groups. Lanka Gate would include a comprehensive collection of infrastructural mechanisms to easily 'plug-in' an eService or to 'compose' a set of eServices in order to generate a composite eService, such that these eServices would be readily and easily available to other applications and portals that comprise Lanka Gate. For this purpose, it is envisioned that the projects within Lanka Gate would be designed to leverage Web 2.0 concepts, open standards and a Service Oriented Architecture (SOA), enabling dynamic, customizable, collaborative and compose-able services via multiple delivery channels.

Thus the collection of software systems that comprise Lanka Gate would collectively provide an *enabling infrastructure for rapid integration and delivery of eServices*, leveraging loosely-coupled architectural principles to encourage the creation of innovative applications, solutions, and business models, communication models, pricing models and service mash-ups by various stakeholders across the country.

The intention is that this architectural blueprint will guide the various software engineering projects that would eventually be integrated into Lanka Gate. Since Lanka Gate will always be in a state of

flux with the continuous addition of eServices from new projects, removal of old eServices as well as the generation of new applications, portals or composite eServices via services mash-ups or services composition, it is hoped that this overall architectural blueprint would continue to 'live' as a vision of what the end result should embody. Furthermore, it is expected that the launch of the Lanka Gate initiative will be coupled with the roll-out of a strong SOA Governance Model.

(b) Lanka Gate: The Core Components

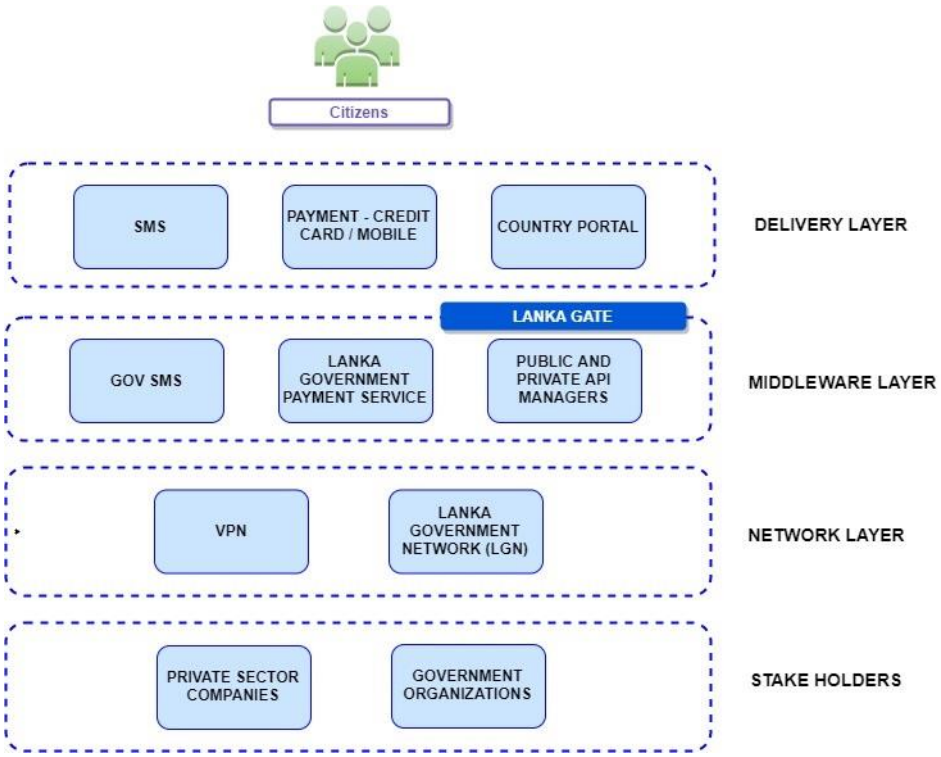


Figure 1 – The Conceptual Architecture

The conceptual design shown above in Figure 1 illustrates the loosely-coupled and flexibility of the Lanka Gate infrastructure. It is composed of following core components.

1. API Manager

The API Manager exposes it core processes, data and services as API to the public. External parties can mash up these APIs in innovative ways to build new solutions. However, leveraging APIs in collaborative manner introduces new challenges in exercising control, establishing trust, security and regulation. API Manager overcomes these challenges though a set of features for API creation, publishing, life cycle management, versioning, monetization, governance, security etc.

External consumers and partners, as well as internal users can publish secured, authenticated, authorized and protected APIs. API Manager supports publishing multiple protocols including SOAP, REST, JSON and XML style services as APIs. This includes extremely high performance pass-through message routing with sub-millisecond latency.

2. Country Portal (CP)

The Country Portal (www.gov.lk) serves as a primary web interface that connects users to the eServices provided within the Lanka Gate concept. Thus the Country Portal is a fundamental access point for citizens, non-citizens, businesses, agents and government employees to various government

organizations and businesses in Sri Lanka. The Country Portal features multiple service delivery channels to accommodate various end user realities.

The Country Portal project is a container which provide access to eServices Web application which are self-contained front-end interfaces to either a single eService, several eServices from a specific project, or a transactional/mashup combination of eServices across several projects.

The web browser based delivery channel of the Country Portal features a highly user-friendly, dynamic interface, providing the end-user with the capability to design their own interactive user experience based on their particular needs and preferences. Most of the Web 2.0 capabilities available in Lanka Gate will be delivered through the web browser based delivery channel.

3. Credit Card On-line payment and Mobile payment Services

A system to enable credit card payments and payment via a mobile phone for government enabled eServices, thereby facilitating electronic commerce for credit card holders.

4. SMS Gateway (GovSMS)

A common interface open for mobile service providers to establish in-bound and out-bound Short Messaging Services (SMS) with Lanka Gate architecture. The mobile information and service gateway built as a part of Lanka Gate by ICTA to use the common, short telephone code "1919" should be used by all government organizations for delivery of such information and services.

(c) E-service Development for Lanka Gate

As mentioned above, the eServices to be implemented are NOT expected to implement any major systems or replace any of the existing systems at the various government departments. They are expected to tap into any existing services already implemented, or expose new services as required with minimal disruption and changes to these existing systems. Hence, there can be two basic scenarios that can be envisioned (See Figure 2).

Scenario 1: This is where a minimal changes are required. The considered department consists of a working application with a connected database OR even it may have well-written web services that can be exposed to Lanka Gate. If not, it will be a matter of exposing some according to the requirement.

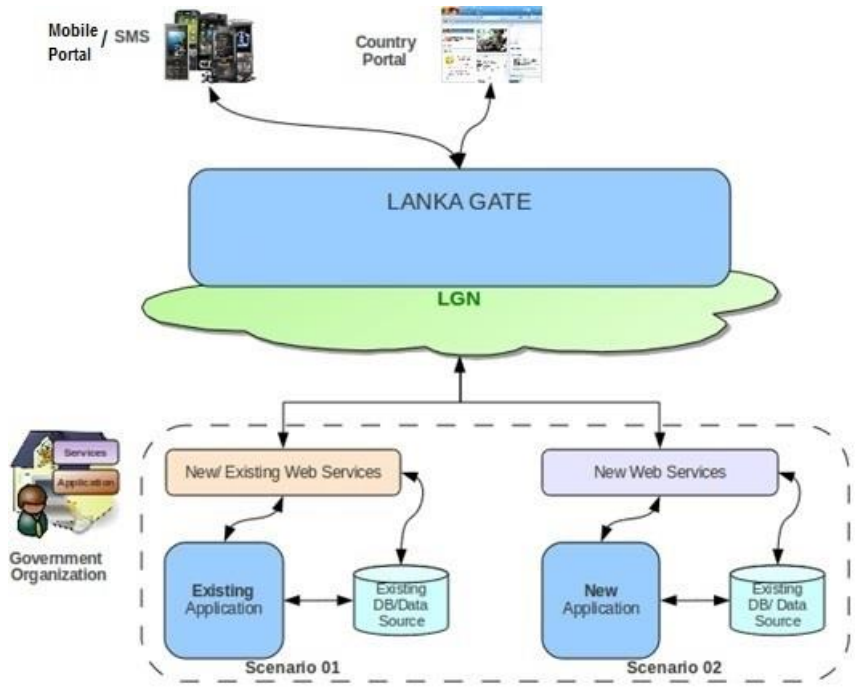


Figure 2: Developing eServices to Lanka Gate

Scenario 2: This is where SOME changes required. If the department only has a data source such as a spreadsheet, it is required to write a new application allowing the data source to be connected to the newly written web services. Otherwise, if the existing DB needs cannot be used directly to a web service, again a new application should be written to bridge the DB with web services. This complexity of this newly created application will depend on the complexity of other back office applications within the department. A proper *Business Process Modeling* (BPM) tool can be leveraged to ease this task depending on this complexity.

However, irrespective of the DB or the data source, it is required to write new web services to expose the back office systems to the Lanka Gate.

Certain eServices may allow the citizens to save information into the new systems, and these systems would require a database for persistence of this information. In addition, certain services may require a citizen to make payments – and these would be facilitated via the mobile or on-line payment gateways, or any existing payment mechanisms used by the department – such as via direct payment to a bank. Thus the back-end support systems would need the ability to interact with the payment gateways and any direct interfaces to bank payment information, to ensure proper payments have been made.

In addition, some of these new systems may require an internal web based system to query information on these new eServices, as well as generate reports etc. To support these use cases, an internal web based application may need to be developed, supporting role based access for use by the internal departmental staff. As an example, if a citizen applies for some facility and electronically submits a set of documents, and makes a payment, the citizen should be able to visit the department with the relevant reference numbers, and a staff officer would then be able to verify the authenticity of the supporting documents, and confirm the payment, so that the facility could then be made available to the citizen with a shorter processing time. In addition, some of these eServices may allow a citizen to schedule such a visit to the department – to ensure expected levels of service. Hence such

a scenario would require the back end system to perform a simple scheduling of the applicants to the department depending on certain variables.

Developing Web Applications for Lanka Gate eServices

For any eService, a simple web application should be developed and these web applications must be able to access via country portal as well as independently via the respective department's web site. The web applications must be able to support English, Sinhalese and Tamil. If the eService is a simple query (e.g. status check), the web application would be able to call into the existing web services or a new web service developed to cater to the use case in question.

Developing SMS Services for Lanka Gate eServices

If the query service in question, is also offered over SMS, the SMS gateway would be able to invoke this same web service, and respond back to the user with the results. Some eServices may allow the user to subscribe to certain events (e.g. change of status, delay of an application etc), at which point, the system should push SMS updated back to the user via the SMS gateway – if the user has specified a mobile number, and requested SMS notifications. When a new SMS is received by the SMS gateway, it will be routed to a REST service of the target department, and each department will then have to implement the SMS request processing logic, and optionally response where applicable.

[ANNEX 4]

SERVICE LEVEL AGREEMENT *for* SUPPORT AND MAINTENANCE SERVICES

1 Introduction

The aim of this agreement is to provide a basis for close co-operation between the Client and the Software developing firm for support and maintenance services to be provided by the Software developing firm, thereby ensuring a timely and efficient support service is available. The objectives of this agreement are detailed in Section 1.1.

This agreement is contingent upon each party knowing and fulfilling their responsibilities and generating an environment conducive to the achievement and maintenance of targeted service levels.

1.1 Objectives of Service Level Agreements

1. To create an environment conducive to a co-operative relationship between Client, Software developing firm and Client's representatives (government organizations) to ensure the effective support of all end users.
2. To document the responsibilities of all parties taking part in the Agreement.
3. To define the commencement of the agreement, its initial term and the provision for reviews.
4. To define in detail the service to be delivered by each party and the level of service expected, thereby reducing the risk of misunderstandings.
5. To institute a formal system of objective service level monitoring ensuring that reviews of the agreement is based on factual data.
6. To provide a common understanding of service requirements/capabilities and of the principals involved in the measurement of service levels.
7. To provide for all parties to the Service Level Agreement a single, easily referenced document which caters for all objectives as listed above.

1.2 Service Level Monitoring

The success of Service Level Agreements (SLA) depends fundamentally on the ability to measure performance comprehensively and accurately so that credible and reliable information can be provided to customers and support areas on the service provided.

Service factors must be meaningful, measurable and monitored constantly. Actual levels of service are to be compared with agreed target levels on a regular basis by both Client and Software developing firm. In the event of a discrepancy between actual and targeted service levels both Client and Software developing firm are expected to identify and resolve the reason(s) for any discrepancies in close co-operation.

Service level monitoring will be performed by Client. Reports will be produced as and when required and forwarded to the Software developing firm.

1.3 Support Levels

The Software developing firm must provide support and maintenance services during Support Levels mentioned below;

Support Level: **High**

1) Component/ Service 1 — For the internal department administration system/ external department integrations, API exposed to external departments
   Support Hours: From 08:00 AM to 05:00 PM Monday to Friday (excluding public holidays)

2) Component/ Service 2 — Online services offer via portal/ external integrations related to smooth operation of the online services
   Support Hours: From 08:00 AM to 05:00 PM, all days in the week (including public and mercantile holidays)

1.4 On-Call Services Requirements

Software developing firm MUST make at least ONE qualified personnel available to the Client by telephone and email for the reporting and resolution of non-conformities or other issues, defects or problems. Dedicated telephone numbers and emails should be available for reporting issues. Client will nominate the personnel who are authorized to report non-conformities or other problems with the system from the departments. Reporting of non-conformities includes requests by the Client to apply critical software updates or patches.

Table-1 shows the response priority assigned to faults according to the perceived importance of the reported situation and the required initial telephone response times for the individual priority ratings. All times indicated represent telephone response time during specified Support Levels. The indicated telephone response time represents the maximum delay between a fault/request being reported and a Software developing firm 's representative contacting the Client by telephone. The purpose of this telephone contact is to notify the Client of the receipt of the fault/request and provide the Client with details of the proposed action to be taken in respect of the particular fault/request.

Support Level	**Business Critical**	**Business Critical**	**Non-Business Critical**	**Non-Business Critical**
	Fatal	**Impaired**	**Fatal**	**Impaired**
High	10 minutes within Support Hours	20 minutes within Support Hours	30 minutes within Support Hours	45 minutes within Support Hours

Table-1: Response Priority

Note:

Fatal - Total system inoperability
Impaired - Partial system inoperability

Business Critical - Unable to perform core business functions
Non-Business Critical - Able to perform limited core business functions

Software developing firm notification can occur outside Support Level time, and thus the response may occur after the next Support Level begins. Furthermore, "Time to Arrive On-Site (Table-3)" starts from Support Level starting time and "Time to Resolve the Problem" is Support Level time starting from the actual time of arrival on site.

1.5 Problem Resolution and Penalties

If problems have not been corrected within two (2) hours of the initial contact, the Software developing firm shall send qualified maintenance personnel to the respective Client's site to take necessary actions to correct the issue reported (defect, problem or non-conformity).

If faults are not corrected within the time limits specified in the Table-2, the Client shall be entitled to a penalty payment for each hour that the Software developing firm fails to resolve the fault.

Maximum ceiling of penalty for a given month is 10% of the monthly support and maintenance price.

The time to arrive on-site is specified in the Table-3.

Support Level	**Business Critical**	**Business Critical**	**Non-Business Critical**	**Non-Business Critical**
	Fatal	**Impaired**	**Fatal**	**Impaired**
High	3 Hours LKR 12,000.00 per hour	6 Hours LKR 8,000.00 per hour	5 Hours LKR 6,000.00 per hour	10 Hours LKR 4,000.00 per hour

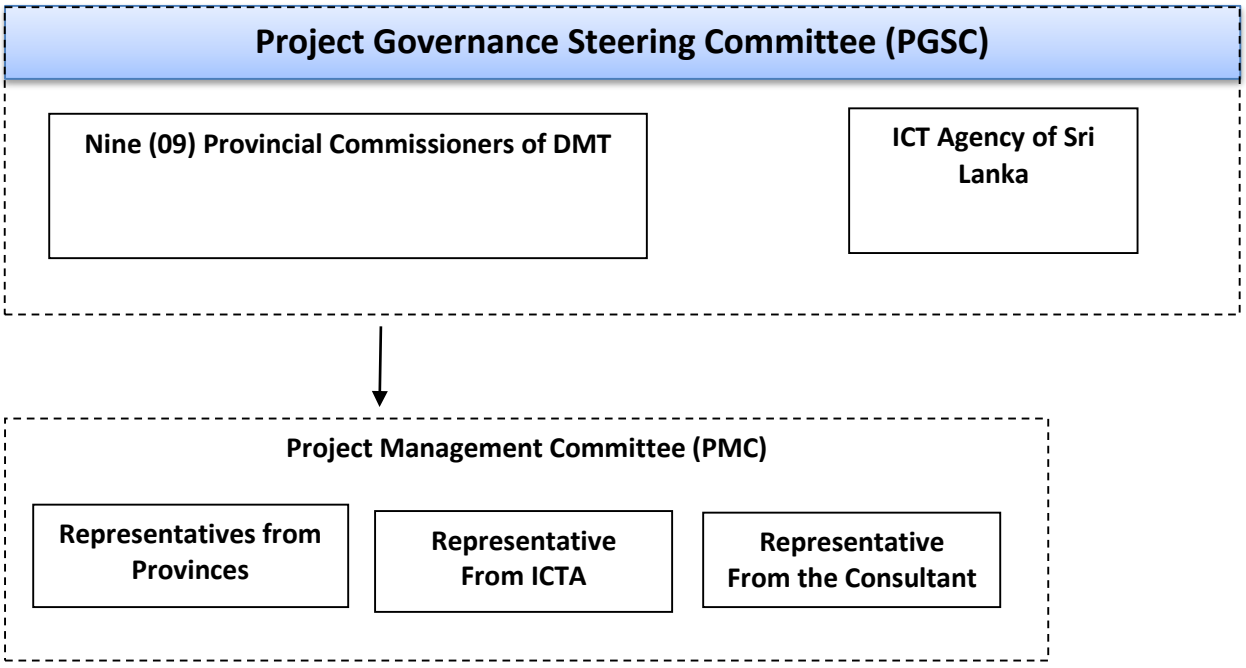
Table-2: Resolution Time and Penalties

Support Level	**Business Critical**	**Business Critical**	**Non-Business Critical**	**Non-Business Critical**
	Fatal	**Impaired**	**Fatal**	**Impaired**
High	Not applicable	Not applicable	Not applicable	Not applicable

Table-3: Time to arrive on-site

[ANNEX 5]

PROJECT GOVERNANCE STEERING COMMITTEE MODEL



Key roles and responsibilities of Project Governance Steering Committee (PGSC)

1. The Project Governance Steering Committee's role is to provide advice, ensure delivery of the project outputs and the achievement of project outcomes.
2. Manages project operational and issues and risks.
3. Provide required dispute resolution related to the project operation and implementation.
4. Review periodic monitoring and evaluation reports and advise PMC project team accordingly.
5. Resolve policy level issues and dependencies related to smooth functionality of the proposed system implementation and operation (with different stakeholder organizations)

Key roles and responsibilities of Project Management Committee (PMC)

1. Monitor the objectives and outcomes of the project to ensure delivery as planned.
2. Provide required consultancy, and technical advisory services for the successful design, development, implementation and operation of the proposed solution.
3. Artifacts deliverable reviews.
4. Provide required dispute resolution related to the project operation and implementation.
5. Assess risks which may impair progress towards the project objectives and suggest strategies to minimize risks whenever possible.

[ANNEX 6]

Non-Functional Requirements

1. SECURITY

1.1. User authentication and authorization

All applications should be able to access via ICTA's common infrastructure/application itself and independently via respective department's web site if required. Any authorization requirements should be implemented within the specific web/mobile application.

However, the solution should have the provision to integrate with the ICTA's proposed Identity Management solution in future.

An administrative application need to be developed wherever applicable.

Wherever applicable internal small applications need to be developed to capture and store relevant data.

1.2. Confidentiality and Integrity

All developed web/mobile applications should ensure "confidentiality" and "integrity" whenever required by adhering to transport and message level security standards. (i.e.: HTTPS, WS-Security)

1.3. Authentication

The web/mobile application should be able to verify the users.

1.4. Authorization

The web/mobile application should be able to verify that allowed users have access to resources.

1.5. Non-repudiation

All Web/mobile applications should ensure non-repudiation by having standard audit-trails and provisions to have WS-Security using digital signatures.

1.6. OWASP Guidelines

All web/mobile applications should ensure that the OWASP guidelines for security are followed when designing, developing and deploying the web/mobile application.

2. AUDIT FACILITIES

Wherever applicable, an audit trail of all activities must be maintained. On a service or operation being initiated, the system should log the event, creating a basic 'audit log entry'. It should not be possible for the operation to be executed without the log entry being made.

The information recorded in the audit trail depends on the type of activity which takes place. Each service would be responsible for logging detailed information. The different types of operations are -

- Data Capture & Maintenance
- Creation of an entry / item
- Modification an item
- Deletion
- Control (or status change)
- Process execution
- Data synchronization
- Print (only selected item)
- Retrieval
- Monitor

Detail logging may be enabled or disabled for each type of operation, and/or for each business object. It should be possible to configure which attributes of a data item should be traced at the detail level. Tracing of some attributes may be considered mandatory, and they should not be turned off.

3. BACKUP AND CONTINGENCY PLANNING

The main contingencies that should be considered and the training with regards to these shall be given to the relevant staff -

- Equipment failure
- Physical / natural Disaster
- Messaging or communication facilities.
- Changes in operations and policy
- Sudden absence of key personnel
- Breach in Security

Automatic Backups daily, weekly and monthly should be taken. All the backup procedures and backups needs to be tested regularly for restoration.

4. PERFORMANCE TESTING

Please find the below index as a guide to determine the benchmark values for the Application under the test.

Following performance criteria is provided as a guideline only. If the actual performance is falling below the stipulated figures, the Software developing firm is to justify the reasons. However, the performance level must be accepted by the technical evaluation committee appointed by the client. The bandwidth is assumed at 1mbps (shared) with 1,000 concurrent users (50% load factor) in total.

Item	Performance
Screen Navigation: field-to-field	< 5 milliseconds
Screen Navigation: screen-to-screen	< 3 seconds
Screen Refresh	< 3 seconds
Screen list box, combo box	< 2 seconds
Screen grid – 25 rows, 10 columns	<3 seconds
Report preview – (all reports) – initial page view (if asynchronous)	< 40 seconds in most instances. It is understood that complicated / large volume reports may require a longer period
Simple inquiry – single table, 5 fields, 3 conditions – without screen rendering	< 4 seconds for 100,000 rows
Complex enquiry – multiple joined table (5), 10 fields, 3 conditions – without screen rendering	< 6 seconds for 100,000 rows
Server side validations / computations	< 10 milliseconds
Client side validations / computations	< 1 millisecond
Batch processing (if any) per 100 records	< 120 seconds
Login, authentication, and verification	< 3 seconds
Daily backups (@Dept.) – max duration	1 hour (on-line preferred)
Total Restore (@Dept.) – max duration	4 hours

4.1 Performance Test Process Outputs

- Performance Test Scripts
- Performance Test Results

5. USABILITY

The web/mobile application should be extremely usable, even a greenhorn user should be able to handle the system and incorporate all the functionality of the system in a simple and user friendly interface. The web/mobile application should be internationalized and localized if needed. The web/mobile application should be responsive where it should be viewable on any computing device.

6. INTEROPERABILITY

The web application should be able to view in standard compatible web browsers.

7. AVAILABILITY

The web/mobile application should be performed as follows,

- 99.99% available unless the web/mobile application is designed with expected downtime for activities such as database upgrades and backups.
- Hence to have high availability, the web/mobile application must have low downtime and low recovery time.

8. ROBUSTNESS

The web/mobile application should be able to handle error conditions gracefully, without failure. This includes a tolerance of invalid data, software defects, and unexpected operating conditions.

- Failure Detection
    - Once deployed, there should be appropriate tools to discover anomalies and failures of the system
- Fault Tolerance
    - Web/mobile application developer should anticipate exceptional conditions and develop the system to cope with them. The web/mobile application must be able to use reversion to fall back to a safe mode, meaning, the application should continue its intended functions, possibly at a reduced level, rather than falling completely.

9. MAINTAINABILITY

The code of web/mobile application should be properly documented with appropriate comments and no complex codes (highly cohesive and loosely coupled) to do modifications such as corrections, improvements or adaption.

10. COMPLIENCE TO STANDARDS

The code of web/mobile application should be standardized by following web/mobile standards like W3C and ECMA – European Computer Manufacturers Association, to save time, augment the extensibility of the code, increase web/mobile traffic and improve the accessibly and load time of your application.

11. REUSABILITY

The web/mobile application should be able to use of existing assets in some form with the software product development process. Assets are products and by-products of the software development life cycle and include code, software components, test suites, design and documentation.

12. INTERNATIONALIZATION

The web/mobile application should be able to access in Sinhalese, English and Tamil. The web/mobile application should be able to view in a usable manner in all three languages in any computing device.

13. API MANAGEMENT

13.1. API Standards and Best Practices

API standards and best practices that *should be adhered* to the code.

13.2 API Documentation

- Swagger documentation should be provided.

13.3. API Security

The web/mobile application should be used appropriate API security protocol mentioned below.

- Basic API authentication
    - Basic authentication should never be used without TLS (formally known as SSL) encryption as user name and password combination can be easily decoded otherwise.
- OAuth1.0a
    - Uses cryptographic signature value that combines the token secret, nonce, and other request based information. Can be safely used without SSL.
    - Recommend for sensitive data applications
- OAuth2
    - No need to use cryptographic algorithms to create, generate and validate signatures as all the encryption handled by TLS.
    - Recommend for less sensitive data applications
- JWT (JSON Web/mobile Tokens)

14. SCALABILITY

The web/mobile application should be both scalable and resilient. A well-designed application should be able to scale seamlessly as demand increases and decreases. It should be resilient enough to withstand the loss of one or more hardware resource.

15. LEGAL AND LICENSING

The web/mobile application should comply the national law.

15. EXTENSIBILITY

The web/mobile application should be designed and developed in a way that it can cater to future business needs.

16. TESTABILITY

The web/mobile application should be designed and developed in a way that testability is high, meaning, the ease of testing a piece of code or functionality, or a provision added in software so that test plans and scripts can be systematically executed. In simple terms, the software should be tested easily with most famous 5 testing categories;

- Unit test
- Integration test
- System test
- Safety test
- Experience test

Refer Aden (2016)'s view on semantic testing for more information.

The web application should be working according to the given criteria in the latest version and 5 versions before in web browsers such as Mozilla Firefox, Google Chrome, Opera, and Apple Safari and the latest version and 2 versions before in Internet Explorer.

17. NOTES

- Some of the none-functional requirements shall be excluded based on the project requirement with the approval of the ICTA Technology Team.
- The vendor can propose similar standards/requirements for the above-mentioned standards/requirements with the approval of the ICTA Technology Team.
- The design documents should be based on 4+1 architecture model.

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1. The White House. *White House Web/mobile API Standards*. Washington, D.C.: git hub.com, 2015. Print.

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