

Section II: Schedule of Requirements

eSourcing reference: RFP/2021/19606

Implementation of an Integrated Civil Registration and Vital Statistic System for the National Civil Registration Authority of Sierra Leone

Background information

The NCR Act was approved by the Parliament on 4th of August of 2016. Although a new institution, it was able to carry out a successful mass civil /Voter registration exercise in 2017 in partnership with NEC and a mass civil registration conducted by NCRA both resulting in the registration of over 5 million citizens and foreign residents.

For the full implementation of these two exercises, an ICT Infrastructure was implemented at NCRA that includes the central ICT systems consisting of an IDMS (Identity Management System) and AFIS (Automatic Fingerprint Identification System). A total of nearly 3,600 mobile biometric registration kits were procured for the exercises with capability to register people both online / offline mode.

In 2020, NCRA started the digitization process of existing past births and deaths records. Each individual registration is scanned and the most important information (e.g. name, surname, date and place of birth, sex, etc.) are computerized.

The above mentioned data will serve as an initial load of the CRVS system. The migration of these existing data to the new system is within the scope of this project. Details on how this migration will be done, will be provided by the NCRA during the design and development phases.

Scope of Work

Purpose of this document

The purpose of this document is to provide the necessary background information, system scope, business requirements and high-level technical specifications for the out-sourcing of the detailed design, development, and implementation of a computerized Civil Registration and Vital Statistics (CRVS) System for the National Civil Registration Authority (NCRA) in Sierra Leone and to integrate it with the existing National Identification System.

The CRVS System is the single and authoritative source of civil registration and identity information in Sierra Leone as provided for in the National Civil Registration (NCR) Act of 2016. It will be based at the NCRA Headquarters in Freetown, Sierra Leone. This system will enable the collection and updating of civil registration information at all Districts offices and in most of the chiefdoms across the country. The registration process will have both online and offline functionalities.

The sharing of data will be done in full compliance with the current legal framework and the NCRA policy.

Objective of the Project

The objective of this project is to implement an Integrated Civil Registration and Vital Statistic system for the National Civil Registration Authority of Sierra Leone.

Location of the Project

The project is located in Freetown, Sierra Leone. The CRVS system will be implemented in Freetown. The warranty and operational support services can be performed remotely.

Implementation timeline

The CRVS system should be designed, developed and implemented within 6 (six) months from the date of signing the contract. The warranty and operational support services shall be provided for a period of 12 (twelve) months starting from the date of handing over .

Brief Description of the Project

The Government of Sierra Leone wishes to implement a computerized solution for the Civil Registration and Vital Statistics. The National Civil Registration Authority (NCRA) is the responsible authority for the civil registration and national identity in Sierra Leone, and therefore will be the owner of the new solution.

The scope of this project is to identify a suitable vendor or company or group of companies, to design, develop and implement a suitable CRVS system for the NCRA.

The required system shall support and carry out the following main processes:

1. registration of births,
2. registration of deaths,
3. registration of marriages and divorce,
4. registration of adoption and recognition,
5. registration and update of residence addresses for the persons registered,
6. secured transmission of registrations data, (on-line, off-line) into the central system,
7. generation and assignment of National Identification Number (NIN) to persons enrolling to the system,
8. printing of various certificates for all the vital events recorded in the system,
9. integration of the CRVS system with the existing National Identification System,
10. migration of the existing citizens data to the new CRVS system,
11. secured data sharing of CRVS data to third parties,
12. generation of various vital statistics reports.

As part of this contract, the supplier shall integrate the existing National Identification System, including:

13. Upgrade of the existing biometric enrolment application
14. Upgrade of the Identity Management System to accommodate the enrolment changes
15. Add the functionality to extract the daily applications for ID Card (to be exchanged with the ID Card system).
16. Transfer the IDMS and AFIS systems to the new infrastructure that will be in place at the Primary Data Site.

In addition, the supplier shall also provide other services including:

17. Training of NCRA staff on the use and administration of the new system
18. Warranty (1 year)
19. Operational support (1 year)

The system will be handed over to the NCRA after the completion of the User Acceptance Test. The operation and administration of the CRVS system after the acceptance test will be the responsibility of NCRA.

System Overview

Conceptual design

NCRA is the Authority responsible for managing Civil Registration and Identification services.

In order to support a proper civil registration and identity management processes, NCRA will implement an integrated system to support CRVS activities that will include the following components:

- **Civil Register** is the system responsible for registering all vital events. According to the UN definition, the civil register is responsible for ‘the continuous, permanent, compulsory and universal recording of the occurrence and characteristics of vital events of the population’. The goal of civil registration is to record all vital events that occur in a country as they occur.

Vital events covered in a CRVS system include:

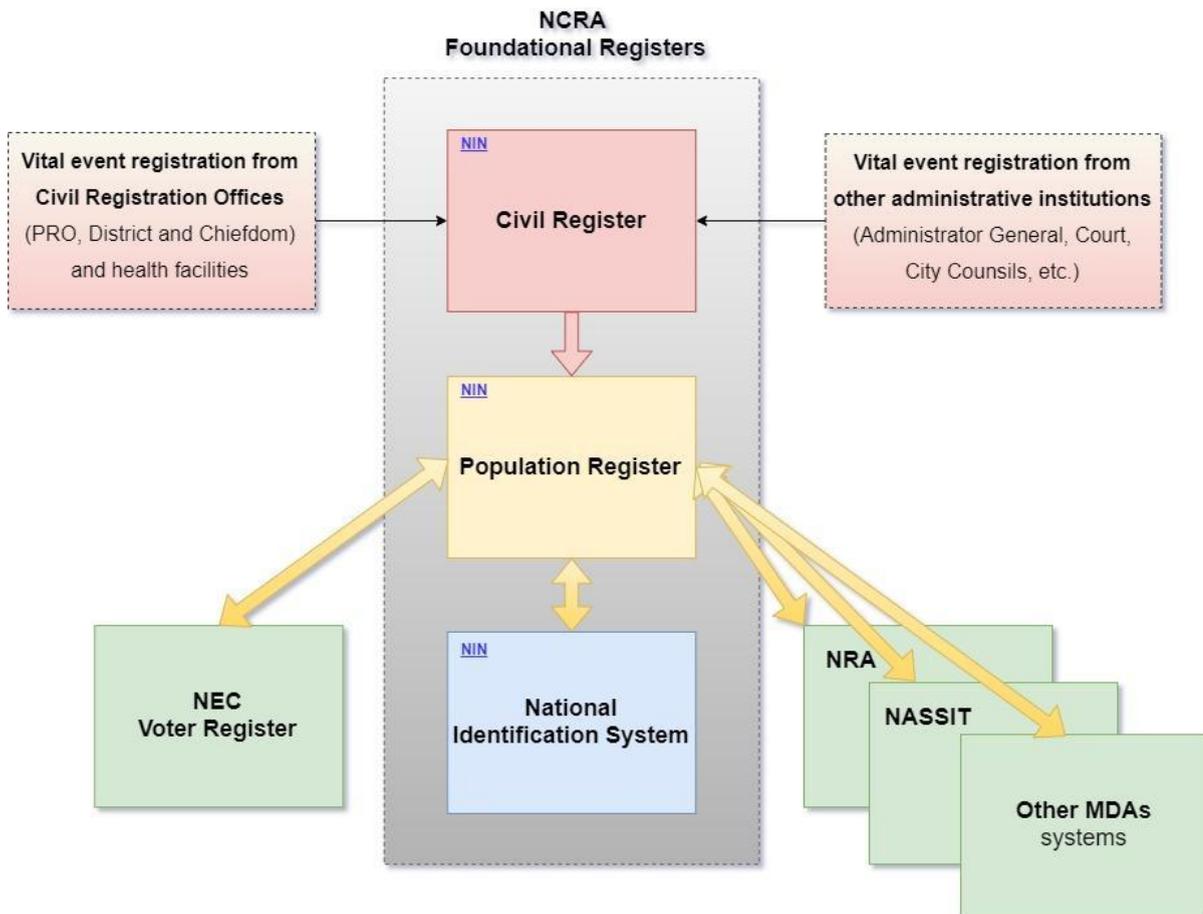
- Events that occur at the level of individuals – live birth and death
 - Events that relate to family and civil status – marriage, separation, divorce and annulment of marriage
 - Events that relate to descendants – adoption, legitimation and recognition.
- **Population register** is the system responsible for maintaining the comprehensive “list” of the inhabitants (citizens and foreign residents) of the country. According to the UN definition, the population register is “a mechanism for the continuous recording of selected information pertaining to each member of the resident population of a country or area, making it possible to determine up-to-date information about the size and characteristics of the population at selected points in time”. The population register shows most of the data gathered by the civil register but contains more demographic data, such as addresses and citizenship status. The population register’s main function is to maintain reliable data for functional registers and government services such as taxation, budgeting, voting, social insurance and welfare, and personal identification. The population register contains information on place and date of birth, sex, marital status, citizenship and address.¹
 - The **National Identity System** in simple terms is responsible for the production of legally valid proof of identity to each individual and maintaining systems for managing information and documents associated with one’s identity, which may include individual biometrics. So, the National Identification System manages the:
 - Persons’ identity data (alphanumeric data and biometric data) and

¹ The United Nations - Principles and Recommendations for Vital Statistics Systems, Revision 2, (2001)

- identity documents (e.g., National ID Cards) lifecycles.

All the above-mentioned systems should be integrated with each other. The data exchange is facilitated by the usage of the National Identification Number, which is a unique identifier to each person.

A conceptual design is given in the following scheme.



Scheme 1. Conceptual design of the civil registration and identity management in Sierra Leone

All the vital events (births, deaths, marriages, etc.) are being registered either by a civil registration registrar at the Civil Registration Offices (Permanent Registration Offices, District Offices, or health facilities) or by delegated registrars at other administrative institutions (Administrator General, City Councils, etc.).

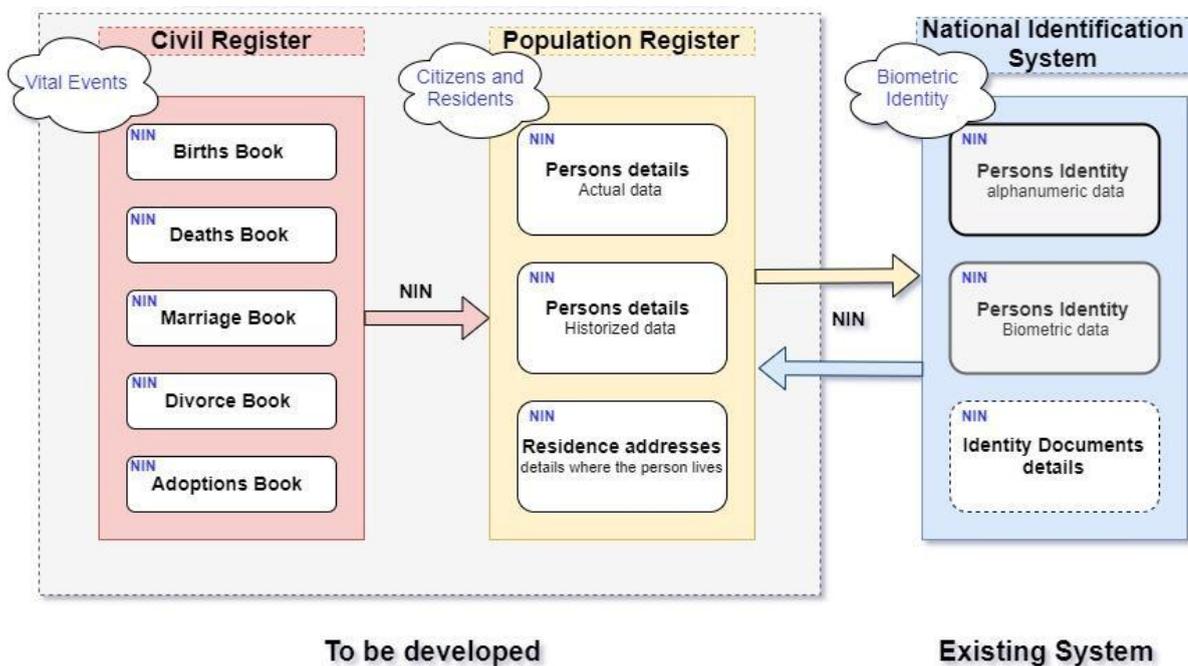
All the vital events registrations will be stored in the Civil Register. Every registration in the Civil Register will trigger an update in the Population Register. For example, a birth registration (in the Civil Register) will result in addition of a new person in the Population Register. A marriage registration (in Civil Register) will result in the update of both spouses records in the Population Register (e.g., family status changed from single to married, new Surname for the spouse, or residence address change of the spouse).

It is the Population Register that will have the comprehensive information on all the persons (eligible to be registered according to the NCR Act 2016). All the other systems, starting from the National Identification

System at NCRA and to continue with other systems at the MDAs like voter’s database (NEC), taxing authority (NRA), social insurance (NASSIT), etc. will receive data from the Population Register. The data distribution will be facilitated by the use of NIN.

At the same time these functional databases can provide valuable information to the population register. For the first phase the data are expected to flow in one direction from the Population Register to the functional databases.

More details on the systems that NCRA intends to develop (in addition to the existing one) are given in the following scheme.



Scheme 2. Interlinkage of the three systems at NCRA.

The scheme describes the classical path Civil Register -> Population Register -> National Identification System.

The Civil Register and the Population Register do not currently exist and therefore both need to be developed. The National Identification System (presented in scheme 2 as a blue box) is currently existing, but it needs some adoptions to fit in the new concept.

Functional design

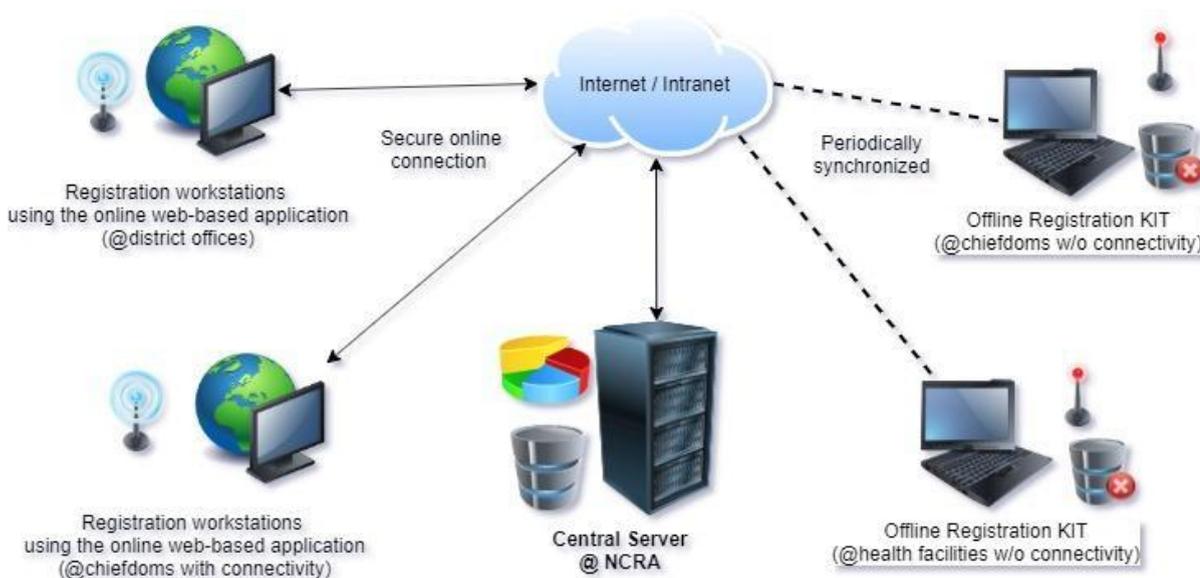
The CRVS system will be a centralized system that will store, administer and disseminate data in a secured ICT environment hosted in a state-of-the-art Primary Data Centre at the NCRA headquarters.

The application that will support all the processes described in the following chapters will be a web-application. This means that the user should have a valid connection to the central site in order to work with the system.

The CRVS system will utilize a web-based application that will enable the users to register vital events, print certificates, generate, display and print reports depending on the type of user. As it is a web-based application it will require a valid connectivity with the central server to operate. All the data will stay at the central server with no data stored in the local machine.

In addition to the web-based application, it is requested to have a light-weight application that will be able to work (perform vital events registrations) offline, when the connection to the central site is not stable or available at all. The offline application will need to communicate with a secure local database to read and retrieve the person’s data and to store the registrations. This means that each offline machine should have a subset of the data stored locally. All the registrations data will be stored locally as well. This means that as the registration will continue, the space of the offline workstations will be consumed. This is more critical with the intended machines to be used as offline workstations, as they have only 32GB storage and after the Windows installation and other supportive applications (like database engine, etc.) the free available space goes down to 16 GB.

It will be required that periodically (at a frequency defined by the NCRA) these offline workstations should be connected to the central server securely, either by bringing the machine to the district offices or to the nearest point where a valid connection is in place. Establishing a connection to the central server will synchronize the data of the offline workstation to the centre ICT Infrastructure hosted at the NCRA headquarters in Freetown. In simple terms all the registrations completed offline will be pushed (sent) to the central server and updated data (e.g., updated list of persons) is pulled (received). The synchronization process will be managed by the central server that will keep track of any record exchanged with the offline machines all over the country.



Scheme 3. Functional design of the intended use of web-based and offline applications depending on availability of the connectivity.

A detailed report on the connection time, duration, number of records sent / received, etc should be part of the management dashboard and required reports.

SOA oriented design

SOA oriented concept

The CRVS solution should be based on a SOA design. SOA specifies that an information system should be composed of several independent and specialised modules, whereby each module is responsible for a certain information domain and functionality. For example, citizen information should be collected and maintained by the citizen module only, and any need for citizen information should be requested only from the citizen module. The various modules communicate with each other via interoperability calls, which are rigorously defined when the modules are designed.

SOA communication

The system components should communicate via interoperable calls or services, according to the following principles:

- each component will **provide** a set of necessary services, via which the other components can access information or functionality for which the first component is responsible.
- each component must **use** services available in other components to access information or functionality which are provided by other components.

There are two main types of services:

- Web Services (WS), where the exchange of data takes place between components without user interaction.
- Invocation services (URL), where the exchange of user control between systems occurs to enable transactions and the synchronisation of data.

SOA flexibility

The SOA approach provides the overall information system solution with a high degree of flexibility. If a component is considered unsuitable at a later stage for whatever reason, it can be replaced without having to replace or restructure the entire software solution and databases.

Business Requirements

List of the Use Cases

Below is given the list of the Use Cases (UC). Each Use Case is identified by an identifier in the format UC-xx, the use case name and a short description of the use case.

Each Use Case is elaborated in details in the next chapters.

UC identifier	Use Case Name	Use Case Description
UC-01	Person Search	Search for a person in the database. The search can be done by the NIN, phone number, or any combination of Name, Surname and Date of Birth. The expected result is either no hit or a list of persons matching the search criteria.

		The user can navigate through the results page(s) to get the requested record
UC-02	Show Persons' details	The user selects the desired record from the results list (based on the search criteria) and the available information for this person is shown. If the user will be working offline, the level of details will be minimal, but if the user is working online then all the details will be shown.
UC-03	Create Person	The user adds a person in the database not with through the birth registration. The reasons for adding the person can be – court decision, obtaining citizenship, resident permit, other reasons. The expected result is a new person added in the system and a NIN is assigned to him.
UC-04	Change Person's details	The selected person record is displayed and opened for change. The user is able to change the respective details of the person's data, giving the reason for the change. The expected results are a change request with all the details stored in the system and the person's details are updated accordingly in the database.
UC-05	Search for Birth Registration	The user can perform a search for a birth registration. The search criteria can be: <ul style="list-style-type: none"> ● Registration number and date ● NIN of the registered person (if known) ● Any combination of Name, Surname and Date of Birth of the registered person ● Any combination of Name, Surname and Date of Birth of the Mother ● Any combination of Name, Surname and Date of Birth of the Father The expected result is either no hit or a list of birth registrations matching the search criteria. For the offline version this use case is expected to return no hits because no information about the birth registrations is planned to be loaded in the local machine. The user that has an online connection can navigate through the results page(s) to get the requested birth registration.
UC-06	Show Birth Registration	The user selects the desired record from the results list (based on the search criteria) and the available information for the selected birth registration is shown.

		This use case is available for the online version only.
UC-07	Register a new Birth	<p>The process of registering a new birth. The informant is providing the supportive document to register a new birth. Information about the mother, father and child is being given to and recorded by the user.</p> <p>The expected result is a new birth registration (new entry in the Book of Births) and a new person is being added to the population register.</p>
UC-08	Update birth registration	<p>This is the process of correcting an existing birth registration in the system. The user has to provide the reason (error during transcription, court decision, other) why he is changing the data.</p> <p>The expected results are:</p> <ul style="list-style-type: none"> - corrected birth registration stored, - the original birth registration is historized, - the person's details are updated in the database, - the person's details before change are historized
UC-09	Print a new birth certificate	<p>The process of printing a birth certificate from the birth registration. The user opens a birth registration and prints a birth certificate.</p> <p>Expected result is to print the Certificate of Birth (subsequently after the birth registration) and if the birth certificate is issued once then a Certified Copy of Birth Certificate is printed. Practically the content of the certificate is the same, only the title is different.</p>
UC-10	Search for Marriage Registration	<p>The user can perform a search for a Marriage registration. The search criteria can be:</p> <ul style="list-style-type: none"> ● Registration number and date ● NIN of the one of the spouses (if known) ● Any combination of Name, Surname and Date of Birth of one of the spouses <p>The expected result is either no hit or a list of marriage registrations matching the search criteria. For the offline version this use case is expected to return no hits because no information about the marriage registrations is planned to be loaded in the local machine.</p> <p>The user that has an online connection can navigate through the results page(s) to get the requested marriage registration</p>

UC-11	Show Marriage Registration	<p>The user selects the desired record from the results list (based on the search criteria) and the available information for this marriage registration is shown.</p> <p>This use case is available for the online version only.</p>
UC-12	Register a new Marriage	<p>This is the process of registering a new marriage. Both spouses (and witnesses) have to be present during the marriage registration.</p> <p>Information about the spouses, witnesses and translator (if applicable) is being given to and recorded by the user.</p> <p>The expected result is a new marriage registration (new entry in the Book of Marriages) and the records of both spouses are updated (e.g., marital status, Surname, residence, etc) in the population register.</p>
UC-13	Print a marriage certificate	<p>The process of printing a marriage certificate from the marriage registration. The user opens a registered marriage and from it prints a marriage certificate.</p> <p>This use case is available for the online version only.</p>
UC-14	Search for Death Registration	<p>The user can perform a search for a Death registration. The search criteria can be:</p> <ul style="list-style-type: none"> ● Registration number and date ● NIN of one of the deceased persons (if known) ● Any combination of Name, Surname and Date of Birth of deceased person. <p>The expected result is either no hit or a list of death registrations matching the search criteria. For the offline version this use case is expected to return no hits because no information about the death registrations is planned to be loaded in the local machine.</p> <p>The user that has an online connection can navigate through the results page(s) to get the requested death registration</p>
UC-15	Show Death Registration	<p>The user selects the desired record from the results list (based on the search criteria) and the available information for this death registration is shown.</p> <p>This use case is available for the online version only.</p>

UC-16	Register a new Death	<p>The process of registering a new death. The informant is providing the supportive document to register a new death. Information about the deceased person and cause of death are given to and recorded by the user.</p> <p>The expected result is a new death registration (new entry in the Book of Deaths) and the respective person in the database is marked as “deceased”. No deletion of the record of persons is allowed.</p>
UC-17	Print a Death Certificate	<p>The process of printing a death certificate from the death registration. The user searches and opens a death registration and from it prints a death certificate.</p> <p>This use case is available for the online version only.</p>
UC-18	Register an Adoption	<p>This is the process of registering an adoption. The Adoption is being registered only if a court decision is presented. Based on the details of the court decision the adoption of the child is completed in the application.</p> <p>The expected result is a new registration in the Book of Adoptions and either a new person is added to the population database (the child doesn’t exist in the database) or a person’s record is updated (the child exists in the database)</p>
UC-19	Register a Divorce	<p>This is the process of the registration of a divorce. The divorce is being registered only if a court decision is presented. Based on the court decision details, the divorce registration is completed including the information of the ex-spouses.</p> <p>There are two cases depending if the ex-spouses are registered or not in the database.</p> <p>The expected result is a new registration in the Divorce Book and the record of the two persons (ex-spouses) are updated. If the respective marriage is registered in the system, the Book of Marriage is updated too.</p>
UC-20	Check-in Residence address	<p>This is the process of registering a new residence address of a person (check-in). The user selects the person (from the result list following a person search) and opens the registration form. The user enters all the required details of the residence address that include: the district, chiefdom (if applicable), city / town / village, street, House number and postal code.</p>

		The previous residence address (if existed) is historized and the new residence address for this person is added in the database and marked as current address.
UC-21	Correct the residence address	<p>This is the process of correcting any type of errors in an existing registered residence address. This process is different from a check-in residence address registration.</p> <p>The user opens the existing residence address of the person. The user changes the specific field of address and indicates the reason for the change. The previous residence address is historized and the changed residence address for this person is added in the database and marked as current address.</p>
UC-22	Management dashboard	<p>A dashboard should display the most important information on one screen. The information should be organized in tabs that indicate daily, weekly and monthly activity.</p> <p>Dashboard should contain:</p> <ul style="list-style-type: none"> ● Total number of the Persons being registered ● Number of Births registered ● Number of Deaths registered ● Number of Marriages registered ● Number of citizens alive ● Number of divorces ● Number of adoptions <p>Connectivity of the offices, by ordering the offices by the last time they were connected (and they synchronized the data).</p> <p>A red sign should be flagged for the offices that are not connected and synchronized for a given time (e.g., 2 weeks).</p> <p>The final layout of the Dashboard will be provided by NCRA during the development phase.</p>
UC-23	Offline application dashboard	<p>A user dashboard should display on the screen important information that is currently stored in the offline workstation.</p> <p>The dashboard should contain:</p>

		<ul style="list-style-type: none"> ● Total number of registrations completed (births, marriages, deaths), stored in the local database, but not synchronized yet. ● Total amount (expected in MB) of the data to be synchronised. ● Available space in the local hard drive. ● Last time the data was synchronized. ● The next scheduled date of synchronisation. <p>This use case is needed for the offline application, as the online application does not store any data locally.</p>
UC-24	Synchronize the data	<p>After a successful connection is established with the central database, the user initiates the synchronization process.</p> <p>During the synchronization:</p> <ul style="list-style-type: none"> - Data will be sent from the local machine to the central site. This data are the offline registrations completed since the last time of synchronization. - Data is sent from the central server to the local machine. This data is: <ul style="list-style-type: none"> - Related to the civil registration data (e.g., updates on the persons' list) - Related to administrative processes (e.g., next expected synchronization date, announcement from NCRA management, etc) - When the sending and receiving of the data is completed successfully, the local registrations data is deleted from the local database. <p>This use case is needed for the offline application, as the online application does not store any data locally.</p>

Use cases required per application type

Since it is required to have two different applications to support two different working scenarios, online and offline, the following table gives information which use case is requested in each version.

UC identifier	Use Case Name	Online application	Offline application
UC-01	Person Search	Yes	Yes
UC-02	Show Persons' details	Yes	No
UC-03	Create Person	Yes	No
UC-04	Change Person's details	Yes	No
UC-05	Search for Birth Registration	Yes	Yes
UC-06	Show Birth Registration	Yes	Yes
UC-07	Register a new Birth	Yes	Yes
UC-08	Update birth registration	Yes	Yes
UC-09	Print a new birth certificate	Yes	No
UC-10	Search for Marriage Registration	Yes	No
UC-11	Show Marriage Registration	Yes	No
UC-12	Register a new Marriage	Yes	Yes
UC-13	Print a marriage certificate	Yes	No
UC-14	Search for Death Registration	Yes	No
UC-15	Show Death Registration	Yes	No
UC-16	Register a new Death	Yes	Yes
UC-17	Print a Death Certificate	Yes	No
UC-18	Register an Adoption	Yes	No
UC-19	Register a Divorce	Yes	No
UC-20	Check-in residence address	Yes	Yes
UC-21	Correct the residence address	Yes	No
UC-22	Management dashboard	Yes	No
UC-23	Offline application dashboard	No	Yes
UC-24	Synchronize the data	No	Yes

Detailed Use Cases

Below are given details of each of the Use Cases (UC).

Person search

Use Case ID	UC-01	Use Case Name	Person Search
Actors	<ul style="list-style-type: none"> ● Local CRVS Registrar ● District CRVS Registrar 		
Description	The user's objective is to perform a search in the system and to identify the record he's looking for.		
Pre-Conditions	<ol style="list-style-type: none"> 1. The user is successfully logged in. 2. The user will have enough knowledge to use the application. 		
Post-Conditions	A hit list is returned containing the records matching the search criteria.		
Normal Course	<p>The user selects the Search Person function and enters the search parameters.</p> <ol style="list-style-type: none"> 1. The search can be done by: <ol style="list-style-type: none"> a. the NIN, b. phone number, c. Name + Surname d. Name + Date of Birth e. Surname + Date of Birth 2. The common layout of date fields is 'dd.mm. yyyy'. If 'dd' or 'mm' is not known then it can be replaced with '??'. It is not possible to replace the year, it must be entered. All three groups (dd.mm. yyyy) must be declared, what means that each date must include two points. Examples for valid values: 09.01.2001 9.1.2001 ???.1.2001 9.???.2001 9.1?.2001 9.?1.2001 3. By default, the search is performed on actual data of persons 4. As a parameter, the search can be performed on historic data too. If this parameter is selected then the search is expanded to the historic data for person. 5. After entering the search criteria, the user clicks on the Search button. 		
Alternative Courses	None		
Expected result	The expected result is either no hit or a list of persons matching the search criteria.		

	<p>The user can navigate through the results page(s) to get the requested record.</p> <p>Historical records should be shown in a different colour, so the user can easily identify them from the actual records.</p> <p>The search result list should display the following details of the persons:</p> <ol style="list-style-type: none"> 1. Name Surname 2. Date of Birth (optional Place of Birth) 3. Reason of Registration 4. Valid from 5. Valid to
Priority	High
Special Requirements	None
Assumptions	<ol style="list-style-type: none"> 1. The connection should be available and meet minimal bandwidth requirements. 2. For the offline application, the local database should be synchronized with the central database.
Notes & Issues	None

Show person details

Use Case ID	UC-02	Use Case Name	Show Persons' details
Actors	<ul style="list-style-type: none"> ● Local CRVS Registrar ● District CRVS Registrar 		
Description	The user's objective is to see the full details of a person after a search is performed on the system.		
Pre-Conditions	1. The user has performed a successful search and there is at least one hit in the search result.		
Post-Conditions	The user can see the person's details and this activity is logged in the transaction logs.		
Normal Course	<ol style="list-style-type: none"> 1. The user navigates the search results and identifies the record he's looking for. 2. The user selects the record. 3. The available details of the person are shown on the screen. 		
Alternative Courses	None		
Expected result	The expected result is the display on the screen of the person's details		

	<p>If the user will be working offline, the level of details will be minimal (NIN, Name Surname, Date of Birth), but if the user is working online then all the details will be shown.</p> <p>The person's details should be grouped (e.g., information grouped in tabs) and should include:</p> <ol style="list-style-type: none"> 1. Person's details <ol style="list-style-type: none"> a. Person's identity: <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Marital Status, etc. b. Reason <ul style="list-style-type: none"> - Registration type (e.g., Birth Registration, Marriage, correction of details, etc) - Valid from dd.mm. yyyy - Valid to dd.mm. yyyy (in the case of the historical records) c. Last change on the record <ul style="list-style-type: none"> - Timestamp (dd.mm. yyyy hh:mm), - User (user ID and full name) - Office (office code and office full name) 2. Identity documents <ul style="list-style-type: none"> - Document type (Passport, Identity Card, Resident Permit, etc) - Document number - Issuing Authority - Issuing date - Expiration date - Picture (portrait picture if found in the database) 3. Other personal information <ul style="list-style-type: none"> - Citizenship(s) - Legal barrier(s) 4. Residence address information <ul style="list-style-type: none"> - District - Chiefdom - Village / City - Street - House number - Area code
Priority	High
Special Requirements	None

Assumptions	For the web-based application, the online connection should be available and meet minimal bandwidth requirements and the central system is up and running
Notes & Issues	None

Create person

Use Case ID	UC-03	Use Case Name	Create Person
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	<p>The user's objective is to add a person to the register if this is not done with a birth registration. This can be used to add residents, foreigners that have been naturalized, etc.</p> <p>If the person is added to the system a valid NIN is generated and assigned to the person.</p>		
Pre-Conditions	<p>The system is up and running</p> <p>The user has performed a search in the system with the name of the person to be added, and no match is found.</p>		
Post-Conditions	A new person is added in the system and a NIN is assigned to the person.		
Normal Course	<ol style="list-style-type: none"> The user selects the reason for adding the person. Following reasons can be selected for the creation of a person: <ul style="list-style-type: none"> - court decision - naturalization - resident permit - other reasons <p>If "other reasons" is selected then the user has to write a description about the reason.</p> <p>On "court decision" or "naturalization" it is necessary to enter the number and date of the decision.</p> The user scans and saves the supportive document(s) presented by the person. The user enters person's details <ol style="list-style-type: none"> Person's identity: <ul style="list-style-type: none"> - Name and Surname, - Date and Place of Birth, - Sex, - Marital Status, - etc. The user enters the Parents information: 		

	<p>If the parents are registered in the system, the user can perform a lookup, and collect their data.</p> <p>If the parents are not registered in the system, the user has to enter their details manually:</p> <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address <p>5. Identity documents</p> <ul style="list-style-type: none"> - Document type (Passport, Identity Card, Resident Permit, etc) - Document number - Issuing Authority - Issuing date - Expiration date <p>6. Residence address information</p> <ul style="list-style-type: none"> - District - Chiefdom - Village / City - Street - House number - Area code
Alternative Courses	None
Expected result	<p>The expected result is a new person is added in the system.</p> <p>A new NIN is generated and assigned to the added person</p> <p>New residence address is registered for the added person</p>
Priority	High
Special Requirements	None
Assumptions	The application should be available online and meet minimal bandwidth requirements and the central system is up and running.
Notes & Issues	None

Change person's details

Use Case ID	UC-04	Use Case Name	Change Persons' details
Actors	<ul style="list-style-type: none"> ● Registrars 		

Description	<p>The user's objective is to change the person's details in the system.</p> <p>This process is available after the selection of a person from the person search result.</p> <p>With this process the user can change the person's data.</p> <p>The following reasons are selectable for this process:</p> <ul style="list-style-type: none"> - change name surname - change date of birth - official correction - death - creation of an information barrier - change of travel documents - change of parents data - other reasons (to be defined by NCRA during the development phase)
Pre-Conditions	<ol style="list-style-type: none"> 1. The user has a valid online connection and is connected to the central database. 2. The user has performed a successful search and there is at least one hit in the search result. 3. The user is able to navigate the search result and can select the person's record
Post-Conditions	<p>The person's details are updated in the database.</p>
Normal Course	<ol style="list-style-type: none"> 1. The user navigates the search results and identifies the record he's looking for. 2. The user selects the record. 3. The user selects "Change person's data". 4. The details of the person are shown. 5. The user selects the reason of change from the predefined list. If the user selects "other reason" then a description of the reason is needed to be entered. 6. The user scans and saves the supportive document(s) presented for the change person request. 7. Depending on the reason selected, respective fields of the records are opened for change (e.g., name change – name and surname fields are opened for change). 8. The user performs the changes and saves the data.
Alternative Courses	<p>None</p>
Expected result	<p>The expected results are:</p> <ul style="list-style-type: none"> - a change request is stored in the system, - the person's details are updated accordingly in the database.
Priority	<p>High</p>

Special Requirements	None
Assumptions	The application should be available online and meet minimal bandwidth requirements and the central system is up and running.
Notes & Issues	None

Search for Birth

Use Case ID	UC-05	Use Case Name	Search for Birth Registration
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	<p>The user's objective is to search in the system for a birth registration.</p> <p>Every birth registration process will start with a birth registration search to check if the birth is already registered.</p> <p>The same is valid with the printing of the birth certificate (original and certified copy).</p>		
Pre-Conditions	<ol style="list-style-type: none"> 1. For the web-based application, the system is up and running 2. For the offline version, the database engine is up and running in the local machine. 3. The user will have enough knowledge to use the application. 		
Post-Conditions	<p>Either no birth records are found or a list of birth registrations matching the search criteria is shown. User activity is logged by the system.</p>		
Normal Course	<ol style="list-style-type: none"> 1. The user goes to Birth Registration and selects Search for a Birth 2. The search can be performed on the person or in the birth registration form The common points (search options, search with wildcards, etc.) concerning the search of a birth registration are equivalent to the "person search". The search on the Birth registration form can be done with any combination of following criteria: <ul style="list-style-type: none"> - Civil Registration Office - Birth Registration number - Birth Registration year 3. The user enters the desired search criteria 4. The user can reset the search criteria by selecting "Reset" button 5. When the user is satisfied with the search criteria he selects "Search" button 		
Alternative Courses	None		
Expected result	<p>The expected result is:</p> <ul style="list-style-type: none"> - No birth registration found, or - One birth registration found, or - More than one birth registrations found 		
Priority	High		
Special Requirements	None		

Assumptions	The central database is up and running (online version) The local database (of the workstation) is up and running.
Notes & Issues	None

Show birth registration

Use Case ID	UC-06	Use Case Name	Show Birth Registration
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	The user's objective is to display the birth registration details.		
Pre-Conditions	<ol style="list-style-type: none"> 1. The user has performed a successful search for birth registration and there is at least one hit in the search result. 2. The user is able to navigate the search result and can select the desired birth registration 		
Post-Conditions	The selected birth registration is displayed in the screen. User activity is logged by the system.		
Normal Course	<ol style="list-style-type: none"> 1. The user navigates the search results and identifies the desired birth registration. 2. The user selects the record. 3. The user selects / clicks "Open birth registration" 4. The selected birth registration details are shown. 		
Alternative Courses	None		
Expected result	<p>The expected result is the birth registration record displayed</p> <p>The details of the birth registration need to be grouped (e.g., in tabs) and should include:</p> <ol style="list-style-type: none"> 1. Person's details <ul style="list-style-type: none"> - Date of Birth - Place of Birth - Name and Surname, - NIN - Sex, - Citizenship - Child residence address <ul style="list-style-type: none"> o Mother's residence address (when the child stays with the mother) o Father's residence address (when the child stays with the father) 		

	<ul style="list-style-type: none"> o Child's residence address (Child stays a different address from mother's or father's address, e.g., social shelter) <ol style="list-style-type: none"> 2. Parents information: For each of the parents <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address 3. Informant information: <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address 4. Child address: The child's residence address is shown here <ul style="list-style-type: none"> - District - Village / City - Street - House number - Area code 5. Supportive document The supportive document(s) presented during the registration of birth process.
Priority	High
Special Requirements	None
Assumptions	<p>The central database is up and running (online version)</p> <p>The local database (of the workstation) is up and running.</p>
Notes & Issues	None

Register a new birth

Use Case ID	UC-07	Use Case Name	Register a new Birth
Actors	<ul style="list-style-type: none"> ● Registrars 		
Description	The user's objective is to record a new birth registration.		

	<p>This process is always starting with a search of a birth registration. If the birth registration for the person already exists, this process is not possible.</p> <p>If a person without a birth registration is found, the entry for this person can be made afterwards.</p> <p>New Act of Birth</p> <p>All personal and address data as well as the birth specific information must be entered. By storing the birth registration, the child is registered.</p> <p>The National Identification Number (NIN) is generated and assigned to the child.</p> <p>A new entry of birth registration is added in the system and a new person is created to the system.</p>
Pre-Conditions	<ol style="list-style-type: none"> 1. The system is up and running 2. The user has performed a search and there no such birth registration is found.
Post-Conditions	<p>The new-born is registered in the system.</p>
Normal Course	<ol style="list-style-type: none"> 1. The user selects / clicks “New Birth Registration”. 2. The Birth Registration form appears. The “new birth registration” should share the same screen mask as the “Show birth registration “ 3. The user should add the birth registration references: <ul style="list-style-type: none"> - Birth Book Volume Number - Birth Registration Number - Birth Registration Date 4. The user should enter the details of the child <ul style="list-style-type: none"> - Date of Birth - Place of Birth - Name and Surname, - Sex, - Citizenship - Child residence address 5. The user selects the residence address of the child: <ul style="list-style-type: none"> - Mother’s residence address (when the child stays with the mother) - Father’s residence address (when the child stays with the father) - Child’s residence address (Child stays a different address from mother’s or father’s address, e.g., social shelter) 6. The user enters the Parents information: <p>If the parents are registered in the system, the user can perform a lookup, and collect their data.</p> <p>If the parents are not registered in the system, the user has to enter their details manually:</p>

	<ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address <p>7. The user enters the Informant's information:</p> <p>If the informant is registered in the system, the user can perform a lookup, and collect his data.</p> <p>If the informant is not registered in the system, the user has to enter his details manually:</p> <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address <p>8. If the child address is selected (different from mother's and father's address) than the user has to enter the address manually:</p> <ul style="list-style-type: none"> - District - Chiefdom - Village / City - Street - House number - Area code <p>9. The user scans and saves the supportive documents presented to register the birth.</p>
Alternative Courses	<p>Post registration of a birth</p> <p>A person is registered in the system, but the birth is not registered.</p> <p>The data of the selected person is taken over into the screen mask and cannot be changed by the registration officer. By storing the birth registration neither a new person nor a new residence is created. The correlating references to the existing person are stored in the birth registration.</p>
Expected result	<p>The expected results are:</p> <p>Normal course</p> <ul style="list-style-type: none"> - New Birth Registration, new entry in the Births Register - New person added in the database - New NIN generated and assigned to the new person

	<ul style="list-style-type: none">- New residence address added to the database Alternative course <ul style="list-style-type: none">- New Birth Registration, new entry in the Births Register
Priority	High
Special Requirements	None
Assumptions	The central database is up and running (online version) The local database (of the workstation) is up and running.
Notes & Issues	None

Correct birth registration

Use Case ID	UC-08	Use Case Name	Correct birth registration
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	<p>The user's objective is to correct the details of an existing birth registration.</p> <p>This process is always starting with a search for a birth registration. If the birth registration for the person is not found, this process is not possible.</p>		
Pre-Conditions	<ol style="list-style-type: none"> 1. The user has performed a successful search and there is at least one hit in the search result. 		
Post-Conditions	<p>The birth registration is corrected and updated in the system accordingly.</p> <p>The original birth registration is historized.</p>		
Normal Course	<ol style="list-style-type: none"> 1. The user selects the Birth Registration that needs correction. 2. The user select / click "Correct Birth Registration" 3. The Birth Registration form appears. 4. The user selects the reason of the correction, from a predefined list of reasons: <ul style="list-style-type: none"> - Error during transcription from paper book. - Court decision. - Other. 5. If a Court decision is selected, the user enters the court decision date and number. 6. The user scans and saves the supportive documents to justify the correction process. 7. The user makes the proper changes in the respective fields. 8. User saves the changes. 		
Alternative Courses	None		
Expected result	<p>The expected results are:</p> <ul style="list-style-type: none"> - The original birth registration is historized - The updated / corrected birth registration is added to the Births Register. - The person's details are updated in the database - The before change person's details are historized 		
Priority	High		
Special Requirements	None		
Assumptions	<p>The central database is up and running (online version)</p> <p>The local database (of the workstation) is up and running.</p>		

Notes & Issues	None
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Print birth certificate

Use Case ID	UC-09	Use Case Name	Print birth certificate
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	The user's objective is to print a birth certificate from the birth registration.		
Pre-Conditions	<ol style="list-style-type: none"> 1. The user has a valid online connection and is connected to the central site 2. The user has performed a successful birth registration search and he has identified the birth registration of the person. 		
Post-Conditions	A new entry on the issued certificate is stored in the system.		
Normal Course	<ol style="list-style-type: none"> 1. The user selects / clicks on Birth Registration. 2. The user opens the birth registration. 3. The user read from the blank certificate the pre-printed security serial number and enters it in the system 4. The user saves the data and selects / clicks the button Print. 		
Alternative Courses	This functionality can be available following a successful birth registration. For that the user needs to have an online connection to the central database, so the birth registration is stored there, and a NIN is assigned to the child.		
Expected result	<p>The expected results are:</p> <ul style="list-style-type: none"> - a new birth certificate is printed, - a new entry about the printed certificate is added in the system. <p>If this is the first copy following a birth registration, then it will be marked as Original otherwise it will be marked Certified copy.</p>		
Priority	High		
Special Requirements	None		
Assumptions	The local workstation has online connectivity with the central CRVS system and therefore it can retrieve the birth registration data and print certificates.		
Notes & Issues	None		

Search for Marriage

Use Case ID	UC-10	Use Case Name	Search for Marriage Registration
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	<p>The user's objective is to search in the system for an existing marriage registration.</p> <p>Every marriage registration process will start with a marriage registration search to check if the marriage is already registered.</p> <p>The same is valid with the printing of the marriage certificate (original and certified copy).</p>		
Pre-Conditions	For the web-based application, the system is up and running		
Post-Conditions	Either no marriage records are found or a list of marriage registrations matching the search criteria is shown. User activity is logged by the system.		
Normal Course	<ol style="list-style-type: none"> 1. The user goes to Marriage Registration 2. The user selects Search for a Marriage 3. The search can be performed on the spouse(s) or in the marriage registration form The common points (search options, search with wildcards, etc.) concerning the search of a marriage registration are equivalent to the "person search". The search on the marriage registration form can be done with any combination of the following criteria: <ul style="list-style-type: none"> - Civil Registration Office - Marriage Registration number - Marriage Registration date 4. The user enters the desired search criteria 5. The user can reset the search criteria by selecting "Reset" button 6. When the user is satisfied with the search criteria he selects "Search" button 		
Alternative Courses	None		
Expected result	The expected result is: <ul style="list-style-type: none"> - No marriage registration found, or - One marriage registration found, or - More than one marriage registrations found 		
Priority	Normal		
Special Requirements	None		
Assumptions	The central database is up and running		

	There is a valid data connection to the central database
Notes & Issues	None

Show marriage registration

Use Case ID	UC-11	Use Case Name	Show Marriage Registration
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	The user's objective is to display the marriage registration details.		
Pre-Conditions	<p>The user has performed a successful search for marriage registration and there is at least one hit in the search result.</p> <p>The user is able to navigate the search result and can select the desired birth registration</p>		
Post-Conditions	The selected marriage registration is displayed on the screen. User activity is logged by the system.		
Normal Course	<ol style="list-style-type: none"> 1. The user navigates the search results and identifies the desired marriage registration. 2. The user selects the record. 3. The user selects / clicks "Open marriage registration" 4. The selected marriage registration details are shown. 		
Alternative Courses	None		
Expected result	<p>The expected result is the marriage registration record is displayed</p> <p>The details of the marriage registration need to be grouped (e.g., in tabs) and should include:</p> <ol style="list-style-type: none"> 1. Husband's details <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address 2. Wife's details: <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address 3. Witness(es) information: 		

	<ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address <p>4. Supportive document The supportive document(s) presented during the registration of marriage (e.g., marriage capacity document – if requested).</p>
Priority	Normal
Special Requirements	None
Assumptions	<p>The central database is up and running</p> <p>There is a valid data connection to the central database</p>
Notes & Issues	None

Register a new marriage

Use Case ID	UC-12	Use Case Name	Register a new Marriage
Actors	<ul style="list-style-type: none"> ● Registrars 		
Description	<p>The user's objective is to record a new marriage registration.</p> <p>For the online version, the user searches for an existing marriage to ensure the marriage is not already registered.</p>		
Pre-Conditions	<p>The system is up and running</p> <p>Both spouses are registered in the system</p>		
Post-Conditions	<p>The new marriage registration is added in the system. Respective records of spouses are updated.</p>		
Normal Course	<ol style="list-style-type: none"> 1. The user selects / clicks "New Marriage Registration". 2. The Marriage Registration form appears. The "new marriage registration" should share the same screen mask as the "Show marriage registration " 3. The user should add the marriage registration references: <ul style="list-style-type: none"> - Marriage Book Volume Number - Marriage Registration Number - Marriage Registration Date 4. The user enters the details of the Husband 		

If the husband is registered in the system, the user can perform a lookup, and collect his data.

If the husband is not registered in the system (e.g., because he is a foreigner), the user has to enter his details manually:

- NIN,
- Name and Surname,
- Date and Place of Birth,
- Sex,
- Citizenship
- Residence address

5. The user enters the details of the Wife

If the wife is registered in the system, the user can perform a lookup, and collect her data.

If the wife is not registered in the system (e.g., because she is a foreigner), the user has to enter her details manually:

- NIN,
- Name and Surname,
- Date and Place of Birth,
- Sex,
- Citizenship
- Residence address

6. The user enters the details of the witness

If the witness is registered in the system, the user can perform a lookup, and collect his data.

If the witness is not registered in the system, the user has to enter his / her details manually:

- NIN,
- Name and Surname,
- Date and Place of Birth,
- Sex,
- Citizenship
- Residence address

7. The user selects the residence address of the couple.

The user can select:

- a) Husband residence address
- b) Wife residence address
- c) New residence address

	<p>If new residence address is selected, then the user has to enter his address manually:</p> <ul style="list-style-type: none"> - District - Village / City - Street - House number - Area code <p>8. The user scans and saves the supporting documents presented to register the marriage.</p>
Alternative Courses	none
Expected result	<p>The expected results are:</p> <ul style="list-style-type: none"> - New Marriage Registration, new entry in the Marriages Register - Two persons; details updated in the database - New residence address added to the database
Priority	Normal
Special Requirements	None
Assumptions	<p>The central database is up and running (online version) The local database (of the workstation) is up and running.</p>
Notes & Issues	None

Print marriage certificate

Use Case ID	UC-13	Use Case Name	Print marriage certificate
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	The user's objective is to print a marriage certificate from the marriage registration.		
Pre-Conditions	<p>The user has a valid online connection and is connected to the central site</p> <p>The user has performed a successful marriage registration search and has identified the marriage registration of the person.</p>		
Post-Conditions	A new entry on the issued certificate is stored in the system.		
Normal Course	<ol style="list-style-type: none"> 1. The user selects / clicks on Marriage Registration (from the results list). 2. The user opens the marriage registration. 		

	<ol style="list-style-type: none"> 3. The user reads from the blank certificate the pre-printed security serial number and enters it in the system 4. The user saves the data and selects / clicks the button Print.
Alternative Courses	This functionality can be available following a successful marriage registration. For that the user has to have an online connection to the central server. Therefore, this can be available for the online version only.
Expected result	<p>The expected results are:</p> <ul style="list-style-type: none"> - a new marriage certificate is printed, - a new entry about the printed certificate is added in the system. <p>If this is the first copy following a marriage registration, then it will be marked as Original otherwise it will be marked Certified copy.</p>
Priority	normal
Special Requirements	None
Assumptions	The local workstation has online connectivity with the central CRVS system and therefore it can retrieve the marriage registration data and print the certificate.
Notes & Issues	None

Search for Death Registration

Use Case ID	UC-14	Use Case Name	Search for Death Registration
Actors	<ul style="list-style-type: none"> ● Registrars 		
Description	<p>The user's objective is to search in the system for an existing death registration.</p> <p>Every death registration process will start with a death registration search to check if the death is already registered.</p> <p>The same is valid for the printing of the death certificate (original and certified copy).</p>		
Pre-Conditions	For the web-based application, the system is up and running		
Post-Conditions	Either no death records are found or a list of death registrations matching the search criteria is shown. User activity is logged by the system.		
Normal Course	<ol style="list-style-type: none"> 1. The user goes to Death Registration 2. The user selects Search for a Death registration 3. The search can be performed on the deceased details or in the death registration form 		

	<p>The common points (search options, search with wildcards, etc.) concerning the search of a death registration are equivalent to the "person search".</p> <p>The search on the death registration form can be done with any combination of the following criteria:</p> <ul style="list-style-type: none"> - Civil Registration Office - Death Registration number - Death Registration date <p>4. The user enters the desired search criteria</p> <p>5. The user can reset the search criteria by selecting "Reset" button</p> <p>6. When the user is satisfied with the search criteria he selects "Search" button</p>
Alternative Courses	None
Expected result	<p>The expected result is:</p> <ul style="list-style-type: none"> - No death registration found, or - A hit list with one or more death registration(s) found
Priority	High
Special Requirements	None
Assumptions	<p>The central database is up and running</p> <p>There is a valid data connection to the central database</p>
Notes & Issues	None

Show death registration

Use Case ID	UC-15	Use Case Name	Show Death Registration
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	The user's objective is to display the death registration details.		
Pre-Conditions	<p>The user has performed a successful search for the death registration and there is at least one hit in the search result.</p> <p>The user is able to navigate the search result and can select the desired death registration</p>		
Post-Conditions	The selected death registration is displayed on the screen. User activity is logged by the system.		
Normal Course	<ol style="list-style-type: none"> 1. The user navigates the search results and identifies the desired marriage registration. 2. The user selects the record. 		

	<ol style="list-style-type: none"> 3. The user selects / clicks “Open death registration” 4. The selected death registration details are shown.
Alternative Courses	None
Expected result	<p>The expected result is the death registration record displayed</p> <p>The details of the death registration need to be grouped (e.g., in tabs) and should include:</p> <ol style="list-style-type: none"> 1. Death Registration References <ul style="list-style-type: none"> - Civil Registration Office - Death Registration number - Death Registration date 2. Death Registration details <ul style="list-style-type: none"> - Date of death - Place of death - Cause of death 3. Deceased’s details <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address 4. Informant’s details: <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address 5. Supportive document <p>The supportive document(s) presented during the registration of death (e.g., medical document describing death details including the cause of death).</p>
Priority	High
Special Requirements	None
Assumptions	<p>The central database is up and running</p> <p>There is a valid data connection to the central database</p>
Notes & Issues	None

Register a death

Use Case ID	UC-16	Use Case Name	Register a Death
Actors	<ul style="list-style-type: none"> ● Registrars 		
Description	<p>The user's objective is to record a new death registration.</p> <p>For the online version, the user searches for an existing death to ensure the death is not already registered.</p>		
Pre-Conditions	<p>The system is up and running</p>		
Post-Conditions	<p>The new death registration is added in the system.</p> <p>The deceased record is updated in the system (marked "deceased").</p>		
Normal Course	<ol style="list-style-type: none"> 1. The user selects / clicks "New Death Registration". 2. The Death Registration form appears. The "new death registration" should share the same screen mask as the "Show death registration" 3. The user should add the death registration references: <ul style="list-style-type: none"> - Death Book Volume Number - Death Registration Number - Death Registration Date 4. The user enters the death details: <ul style="list-style-type: none"> - Date of death - Place of death - Cause of death 5. The user enters the details of the deceased person <p>If the deceased is registered in the system, the user can perform a lookup, and collect the data.</p> <p>If the deceased is not registered in the system (e.g., because the person is a foreigner), the user has to enter the details manually:</p> <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship - Residence address 6. The user enters the details of the informant <p>If the informant is registered in the system, the user can perform a lookup, and collect his data.</p> 		

	<p>If the informant is not registered in the system the user has to enter her details manually:</p> <ul style="list-style-type: none"> - NIN, - Name and Surname, - Date and Place of Birth, - Sex, - Citizenship <p>7. The user scans and saves the supportive documents presented to register the death (e.g., medical report).</p>
Alternative Courses	none
Expected result	<p>The expected results are:</p> <ul style="list-style-type: none"> - New Death Registration, new entry in the Deaths Register - The deceased details updated in the database
Priority	High
Special Requirements	None
Assumptions	<p>The Central database is up and running (online version)</p> <p>The Local database (of the workstation) is up and running.</p>
Notes & Issues	None

Print death certificate

Use Case ID	UC-17	Use Case Name	Print death certificate
Actors	<ul style="list-style-type: none"> • Registrars 		
Description	<p>The user's objective is to print a death certificate from the death registration.</p>		
Pre-Conditions	<p>The user has a valid online connection and is connected to the central site</p> <p>The user has performed a successful death registration search and has identified the death registration of the person.</p>		
Post-Conditions	<p>A new entry on the issued certificate is stored in the system.</p>		
Normal Course	<ol style="list-style-type: none"> 1. The user selects / clicks on Death Registration (from the results list). 2. The user opens the death registration. 3. The user read from the blank certificate the pre-printed security serial number and enters it in the system 		

	4. The user saves the data and select / click the button Print.
Alternative Courses	This functionality can be available following a successful death registration. For that the user has to have an online connection to the central server, therefore this can be available for the online version only.
Expected result	The expected results are: <ul style="list-style-type: none"> - a new death certificate is printed, - a new entry about the printed certificate is added in the system. If this is the first copy following a death registration, then it will be marked as Original otherwise it will be marked Certified copy.
Priority	High
Special Requirements	None
Assumptions	The local workstation has online connectivity with central CRVS system and therefore it can retrieve the marriage registration data and print the certificate.
Notes & Issues	None

Register an Adoption

Use Case ID	UC-18	Use Case Name	Register an adoption
Actors	<ul style="list-style-type: none"> ● Registrars 		
Description	The user's objective is to record an adoption. This registration can be completed at the district offices and NCRA HQs.		
Pre-Conditions	The system is up and running The adopted child is in the system		
Post-Conditions	The new adoption registration is added in the system. Respective record of adopted child is updated.		
Normal Course	To be decided during the design phase.		
Alternative Courses	none		
Expected result	The expected results are: <ul style="list-style-type: none"> - New Adoption Registration, new entry in the Adoption Register - The adopted child details updated in the database 		
Priority	Normal		
Special Requirements	None		

Assumptions	The central database is up and running There is a valid data connection to the central database
Notes & Issues	None

Register a Divorce

Use Case ID	UC-19	Use Case Name	Register a divorce
Actors	<ul style="list-style-type: none"> Registrars 		
Description	The user's objective is to record a divorce. This registration can be completed at the district offices and NCRA HQs.		
Pre-Conditions	The system is up and running The marriage registration is in the system		
Post-Conditions	The new divorce registration is added in the system. Respective records of divorced spouses are updated.		
Normal Course	To be decided during the design phase.		
Alternative Courses	none		
Expected result	The expected results are: <ul style="list-style-type: none"> - New Divorce Registration, new entry in the divorces Register - The divorced spouses' details updated in the database 		
Priority	Normal		
Special Requirements	None		
Assumptions	The central database is up and running There is a valid data connection to the central database		
Notes & Issues	None		

Register a residence address

Use Case ID	UC-20	Use Case Name	Update a residence address
Actors	<ul style="list-style-type: none"> Registrars 		
Description	The user's objective is to add a person's residence address. The new residence address can have one of the following residence qualities:		

	<ul style="list-style-type: none"> - main residence (M) - temporary residence (T) - foreign residence (F) - homeless (H) <p>There is allowed only one active main residence for a person.</p> <p>A homeless "residence" is only possible if no other active residence exists.</p> <p>It is not possible that a person has an active main residence and an active foreign residence at the same time.</p> <p>There is only one active foreign residence allowed.</p> <p>It is possible for a person to have more than one active temporary residence.</p>
Pre-Conditions	<p>The system is up and running</p> <p>The user has performed a search in the system and has selected the person whose residence address is going to be registered.</p>
Post-Conditions	<p>A new residence address is registered.</p>
Normal Course	<ol style="list-style-type: none"> 1. The user selects the person from the search result 2. The user opens the Register new residence address form 3. The person details are automatically taken to the form 4. The address is entered manually. The districts can be selected. The chiefdom, city / village can be selected as well. All other data from the address is entered by the user. 5. The user can delete the entered information by pressing the reset button 6. Once satisfied with the entered information, the user saves the information.
Alternative Courses	<p>None</p>
Expected result	<p>A new residence address is registered for the selected person.</p> <ol style="list-style-type: none"> 1. If a foreign residence is stored all active residences in Sierra Leone for this person are checked out. The check-out date is the same as the check in date for the foreign residence. 2. If a main residence or a temporary residence is stored then there is a check if an active foreign residence exists. If there is an active foreign residence for the person than this foreign residence is automatically checked out. 3. If a main residence is stored and there exists an active main residence then the existing main residence is checked out. 4. It is not checked if the address entered by the user is already in the system.

	5. The Reset button deletes only the fields in the form. There is no delete in the system done.
Priority	Normal
Special Requirements	None
Assumptions	For the web-based application, the online connection should be available and meet minimal bandwidth requirements and the central system is up and running
Notes & Issues	None

Change Residence Address

Use Case ID	UC-21	Use Case Name	Change residence address
Actors	<ul style="list-style-type: none"> Registrars 		
Description	<p>The user's objective is to change the person's residence address. This use case is used to change (correct) an already registered residence that has errors (e.g., typos in the street name).</p> <p>If the person is registering a new residence address it should be done with the Register new Residence Address use case.</p> <p>It is not allowed to change the quality of residence with this use case. All other fields can be changed.</p>		
Pre-Conditions	<p>The system is up and running</p> <p>The user has performed a search in the system and has selected the person whose residence address is going to be registered.</p>		
Post-Conditions	An existing residence address registered for a person is changed.		
Normal Course	<ol style="list-style-type: none"> The user selects the person from the search result The user opens the Change residence address form. The residence address details are open for changes. The user can change all the fields that need to be changed (e.g., entered wrongly during the residence address registration) The user can delete the entered information by pressing the reset button Once satisfied with the entered information, the user saves the information. 		
Alternative Courses	None		
Expected result	Updated residence address registered for the selected person		

Priority	Normal
Special Requirements	None
Assumptions	For the web-based application, the online connection should be available and meet minimal bandwidth requirements and the central system is up and running
Notes & Issues	None

All the above listed Use Cases will be fine-tuned during the developing phase to ensure full compliance with the legal and regulatory framework of civil registration in Sierra Leone.

Reports requirements

Below is given the descriptions of the reports that are expected to be delivered with the proposed CRVS solution. The fine tuning of the reports will be finalized in close cooperation with NCRA during the development of the system.

ID	Feature	Content
RE-1	Report Contents	<p>The CRVS System shall contain functionality to prepare reports on the following:</p> <ul style="list-style-type: none"> - number of persons registered; - number of citizens of Sierra Leone registered; - number of foreign residents registered; - number of birth registration; - number of death registration; - number of marriage registration; - number of divorce registration; - number of updates; - number of residence addresses registered; - number of persons registered grouped by age (e.g. 0-5, 5-18, 18-50, 50+). <p>- All the above reports should have two configurable parameters entered by the user:</p> <ul style="list-style-type: none"> ● <i>Period of time</i>, providing two dates From – To, e.g. 01.01.2021 to 31.03.2021 ● <i>Area of catchment</i>, which can be a single PRC (Permanent Registration Centre), a group of PCRs, representing a district, a region of the whole country. <p>The NCRA shall provide the final list of required reports to the supplier during the development phase.</p>
RE-2	Report Format	<p>The CRVS System shall contain functionality to prepare reports in at least the following formats:</p> <ul style="list-style-type: none"> - .csv; - .json; - .pdf;

		<p>The NCRA shall provide the final list of required formats to the supplier during the development phase.</p>
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Operation Environment

In the following table are given all the key information defining the operation environment of the CRVS System.

ID	Feature	Content
OE-1	Typology of the solution	<p>The CRVS application shall be able to operate both online and offline.</p> <p>Therefore, the Vendor should provide either:</p> <ul style="list-style-type: none"> ✓ one single application capable of working online and offline, or ✓ two separate applications supporting each type of the connectivity scenarios: <ul style="list-style-type: none"> - for the online scenario, a web-based application is required; - for the offline scenario, an offline-capable (e.g. stand-alone, progressive-web-app, etc.) application is required.
OE-2	Workstation	<p>The CRVS System user functions shall be configured to operate on:</p> <ul style="list-style-type: none"> - <u>Portable kit</u> with the following configuration: <ul style="list-style-type: none"> -Processor Intel Atom CPU @ 1.44 GHz -RAM: 2 GB -HDD: 32 GB, 17 GB usable (after operating system and database engine are installed) -Operating System: Currently running Windows 10 Enterprise 2016 LTSB 32-bit (10.0, Build 14393) -10" touchscreen - <u>Laptop or desktop computer</u> with the following configuration: <ul style="list-style-type: none"> -Processor equivalent or superior to an ---Intel i3 processor -RAM: 4 GB or more -HDD: 64 GB or more available free space -Operating System: MS Windows 10

		-Browser: Firefox / Chrome / Internet Explorer 11 / Edge on Win10
OE-3	Operating System, DBMS and COTS / Open Source Software	<p>The CRVS System shall be implemented using a suitable database management system (DBMS) and a reliable operating system.</p> <p>The supplier shall, at the proposal stage, include in their proposal the operating system and database management system (whether Commercial or Open Source) that are required as part of the comprehensive solution for the CRVS System, along with any costs associated with the ongoing use of these software packages. Any cost on the licenses or usage of these software packages should be included in the financial proposal offered and covered by the supplier.</p> <p>The minimum period covered by the supplier for the licensing or usage of the above-mentioned software packages is 3 (three) years.</p>
OE-4	Network	<p>The CRVS System will be implemented at the District Registration Offices and Permanent Registration Offices (PRO)</p> <p>The CRVS System will utilize the Government network hub / national fibre, as well as the mobile operators (Africell / Orange and other ISP) to offer connectivity to the PRC (if within coverage area). It is expected that some PRC will either have a non-stable connection or no connectivity at all. The registration process in such PRC will continue in the offline scenario. Periodically (to be defined by NCRA), the kits used in these PRCs need to be connected to the central servers to transmit and synchronize the data. This can be done at the NCRA District Registration Office or at the nearest place with a valid connectivity.</p>
OE-5	Servers	<p>NCRA will complete the installation of a new Data Centre in the NCRA HQ. A blade server infrastructure is part of this new installation. This blade infrastructure is planned to host the following CRVS system servers:</p> <ul style="list-style-type: none"> -- Development server -- Test server

		<p>-- Production server</p> <p>-- Distribution server</p> <p>-- Backup server.</p> <p>In addition, the following servers will be hosted too:</p> <p>-- IDMS Server</p> <p>-- AFIS Server</p> <p><i>Details of the expected blade infrastructure are given below:</i></p> <p>Blade enclosure 2 pieces</p> <p>Blade servers 16 pieces</p> <ul style="list-style-type: none"> • Latest generation of 2 x CPU Intel Xeon Processors with 16 cores (min 22M Cache or higher, 2.0 GHz or higher), • 256 GB DDR-4 LRDIMM Memory (scalable to 1TB) with memory protection features, 19200MHz or higher. • Integrated Hardware Disk Controller to support RAID 1 • The server should support SAS, SATA and SSD hard disk drives • Should include at least SAS 2 hard drives with minimum capacity of 480 GB 12G SSD HDD • Should have at least 2 40Gbps Ethernet ports that are FCoE-capable • Support at least 40Gbps m-LOM for blade servers • OS and Virtualization Software Support for VMware, Microsoft Windows, Server, RHEL, SLES, Oracle Solaris. • Hypervisor software licenses included for all server processors, including VMware ESXi and vCenter.
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		<p>Storage system 2 pieces</p> <ul style="list-style-type: none"> ● Midrange hybrid storage system to provide redundancy, scalability and high availability, with no single point of failure. Should have at least two redundant storage controllers working in an active/active mode. Connection between controllers should be via backplane or via direct connected cables. ● The storage controllers should have at least 2 x single-socket Intel Xeon™ 1.7GHz CPUs, supporting at least 12 cores per storage array. ● Minimum 128GB cache memory per system (64GB per controller). ● Support for 12Gb/s drives (SSD Flash and HDD drives). At least 4 x 12Gb/s SAS ports for backend drive connection. ● Expandable to a minimum of 500 drives. ● Must support 2.4PBs of internal raw storage capacity. ● Must have functionality of de-stage to disk safely by lowering the data from the memory cache. ● Should support 16Gb FC host ports and 10Gb/25Gb iSCSI/NFS/SMB ports. ● Min 4 x 16Gb FC host ports. <p>Capacity:</p> <ul style="list-style-type: none"> ● The proposed storage should be configured with at least: 50TB raw storage. ● Storage should also support SSD and HDD disks with different capacities. Spare drives for each drive type should be additionally included as per vendor best practices.
OE-6	Backup	<p>CRVS database backup and restore functionality via the Backup Server shall be provided. Automated backup routines shall be run in non-peak periods on a regular basis.</p>

		The final backup plan and procedure will be defined during the development phase.
OE-7	Peripherals	All registration kits / workstations will be configured for optimal performance of the CRVS System, as well as be capable of running printers (to print certificates) or cameras to capture supportive documents.
OE-8	Warranty	The provision of a comprehensive warranty for one year for all software and customized applications that are delivered as part of the software solution and database for CRVS System. The warranty will be implemented via locally-based first-level inputs, while second and third level content may be provided internationally.

Non-functional Requirements

Performance

ID	Feature	Type
PF-1	The system shall be available 8:00 a.m. – 18:00 p.m. on every work day.	Mandatory
PF-2	<p>The system shall be available online to the NCRA, regional and district offices and to Permanent Registration Offices.</p> <p>Up to 2 users may be connected at each PRO at any one time (up to 100 in total).</p> <p>Up to 7 users may be connected at each regional district office at any one time (up to 120 in total).</p> <p>Up to 30 users may be connected at NCRA at any one time.</p> <p>The total number of users connected at the same time shall be up to 250 (two hundred fifty).</p>	Mandatory
PF-3	<p>System response times for data entry will be measured at NCRA as the delay between a keystroke action by the user and the completion of the system operation, on an online workstation.</p> <ul style="list-style-type: none"> ● 90% within 2 seconds ● 99,9% within 4 seconds 	Mandatory
PF-4	<p>System response times for data search will be measured at NCRA by the time taken to display the record required by the user, on a client desktop workstation.</p> <ul style="list-style-type: none"> ● 90% within 2 seconds ● 99,9% within 4 seconds 	Mandatory

PF-5	The system shall be scalable to handle up to twice the currently planned volumes of online CRVS system activity.	Mandatory
PF-6	The vendor should provide system requirements and a reference architecture for performance.	Mandatory

Reliability

ID	Feature	Type
RL-1	The mean time between critical Civil Registration and Vital Statistics System failures shall be more than 4 months in a year of operating (in other words, the system shall not have a loss of function more often than every four months maximum).	Mandatory
RL-2	Mean time for repair of any failure shall be 1 (one) working day.	Mandatory
RL-3	Rigorous backup regime which would provide for reconstitution of CRVS database with maximum loss of 1 day of transactions in case of disaster.	Mandatory
RL-4	The vendor should provide a recommended architecture for reliability in line with best practices.	Mandatory

Usability

ID	Feature	Type
UB-1	The CRVS System solution shall be able to be used by NCRA / district / PRO staff with minimal to average computer experience.	Mandatory
UB-2	System administration training is required for NCRA system administration and user support personnel.	Mandatory
UB-3	User training in the use of the CRVS System shall be provided, and this training must cater for: <ul style="list-style-type: none"> ● Local registrars working with offline version of the system ● Regional and district registrars working with the offline version and online version as well ● Birth and Death Department staff ● NCRA staff (max 30) ● NCRA System Administrators 	Mandatory
UB-4	The system must provide the option on every page of CRVS System to view the headings, menus, labels, and any software control values on any page in English language.	Mandatory

Error Handling

ID	Feature	Type
ER-1	All written software to be subject to a comprehensive error handling regime	Mandatory
ER-2	Error and Warning messages shall be informative and identify the error as completely as possible (e.g., identifying the module, the procedure or function, any variables passed to the procedure or function, the identifier of the record being processed at the time of the error, the last SQL statement, etc.)	Mandatory
ER-3	All error and warning messages shall be written to the CRVS System logs.	Mandatory
ER-4	Critical errors shall be emailed automatically to all relevant software support personnel.	Mandatory

Licensing

ID	Feature	Type
LI-1	The CRVS System shall be able to scale up connection without the need to pay for additional software license fees.	Mandatory
LI-2	All software license fees for the software packages supporting the CRVS system, shall be included in the bid price offer of the vendor, and shall cover a minimal period of three (3) years. The software license fees mentioned above are for the supportive software packages (operating system, database management system, etc) that enable CRVS systems to function.	Mandatory

System Administration

ID	Feature	Type
SA-1	The system will keep a log of all changes to key data tables (these tables will be identified during the system design phase and approved by NCRA).	Mandatory
SA-2	The system will keep the log of all changes for at least 6 months, and then archive it.	Mandatory
SA-3	No user can change the log of changes, not even the System Administrator.	Mandatory
SA-4	There will be a minimal overhead for database administration and maintenance.	Mandatory
SA-5	The system should log all the searches performed by the user and the individual data accessed / viewed by the user. The logged information should include the user ID, machine ID, timestamp and respective information (search criteria, etc.	Mandatory

Delivery

ID	Feature	Type
DV-1	The CRVS application and database should be structured so as to facilitate a SOA-based approach to delivering and receiving various civil registration services from other information system components within NCRA.	Mandatory
DV-2	CRVS data delivery to NEC shall be in the format agreed by NEC. The structure of this file, and the frequency of its update, will be approved by NCRA and NEC.	Mandatory
DV-3	CRVS data delivery to all other MDAs outside of NCRA shall only be available through the CRportal on the open side of the NCRA firewall, via exposed SOAP and RST / JSON-compliant services.	Mandatory

Security Management

ID	Feature	Type
SM-1	System Administration tools for the definition of the following user roles: <ul style="list-style-type: none"> ● Read-only ● Local Edit ● District Edit ● Central Edit 	Mandatory
SM-2	The deletion of records in the CRVS database is strictly forbidden. The records can be flagged or marked but they are not allowed to be deleted.	Mandatory
SM-3	All changes (including inserts and updates) to critical database tables are to be written to an audit table, recording the user initiating the change, the time and date of the change, and the before and after values (the list of critical database tables will be defined during the design phase together with NCRA, and will be subject to NCRA approval).	Mandatory
SM-4	The Vendor should propose a MFA (Multi Factor Authentication) scheme that can use one or more of the following: <ul style="list-style-type: none"> ● Client certificate authentication, ● Token generation (e.g. push-based authentication, OTP or email verification, physical token, etc.)” 	Mandatory
SM-5	The Vendor should propose a suitable scheme of secure storage of passwords in such a way that prevents them from being obtained by an attacker even if the application or database is compromised. The proposed scheme should use modern hashing algorithms (e.g. SHA-256, SHA-3, or stronger), and should be in combination with at least the salting technique. The Vendor is free to propose additional layers of security like pepper and work factors (number of iterations).	Mandatory
SM-6	The vendor should utilize existing hardening standards such as the Centre for Internet Security (CIS) benchmarks or equivalent. These hardening standards should be used for all hypervisors, operating systems, web	Mandatory

	servers, database servers, network devices and other components of the solution.	
SM-7	<p>The vendor should ensure that key controls are in place to facilitate encryption of data at rest and in-transit. The same controls should be in place for the data stored locally in the offline workstations.</p> <p>A data encryption plan should be included in their proposal that aligns with current global best practices..</p> <p>In addition the Vendor should develop “a threat model” where all the possible threats are defined, distinguished and treated with priorities.</p>	Mandatory
SM-8	<p>The vendor needs to demonstrate that their supply chain has robust controls to address specific threats to the integrity of hardware and software products throughout the product life cycle.</p> <p>The end goal is to provide a product that has been designed, developed, and delivered with integrated security at every phase of the product life cycle.</p> <p>All the components used (open-source libraries or third-party dependencies) that will be used in the proposed CRVS solution should be verified as secure.</p> <p>While compliance is not required, ISO 20243 can be used as a reference point with regards to the required control framework</p>	Mandatory
SM-9	<p>The vendor shall provide a generalized API that is developed based on security best practices (e.g., OWASP Top 10 or equivalent), including key considerations for encryption, authentication, authorization, data validation, audit logging, quotas/throttling, data validation, audit logging, API gateways, etc.</p>	Mandatory

CRVS Portal

General description

The proposed CRVS system should include a portal solution. The portal is responsible for single-sign-on authentication, authorization and administration of applications and portal user data.

The portal solution for the CRVS system will manage the access rights of individuals and organisations. The portal solution has to be open for new applications within NCRA and multiple organizations outside it.

The portal is divided into two components:

1. The **User Portal** authenticates and authorizes the users and manages their roles. The administration will be done by a dedicated module (e.g. "CRVS User administration") or any other user administration of a connected organization where the user is employed / registered and well known.

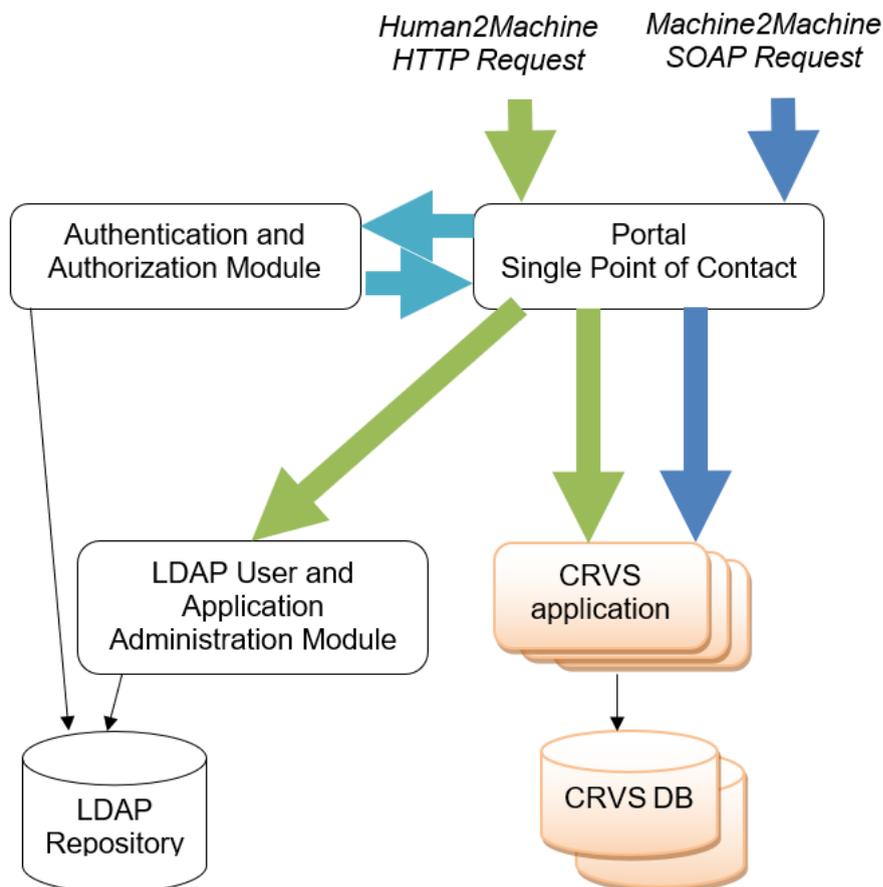
Therefore every organization who has users who want to access the CRVS application offered in a composite portal has to install and implement this User Portal.

2. The **Application Portal** controls access to a set of applications. It will administer the roles and rights for the applications.

Private users can be authorized through public User Portals that can communicate with the Application Portals.

Any request to access an application is directed to the User Portal to check the user. If this check is ok the request is forwarded to the Application Portal. The Application Portal checks the credentials and forwards the request to the application. The response is returned to the calling client or application.

The following picture depicts the components ('modules') of the portal and the systems in its environment. Portal components are coloured white. CRVS components are coloured light orange. HTTPS request path is coloured green. SOAP request path is coloured blue. Authentication and authorization path is coloured cyan.



Scheme 4. Graphical overview of the portal components, and its environment

Explanation of components and their responsibilities:

Component	Description
Portal Single Point of Contact	Single point of contact (SPoC) for all requests to the portal; For human users it shows the 'Portal GUI' with login form and list of applications available after successful login and role check; Applications - after a successful login

	and role check – are routed automatically through the Portal SPoC to the target application
Authentication and Authorization Module	The 'A&A module' does both the authentication and authorisation – it supports single-sign-on (SSO) with X.509 certificate authentication and form-based login against a LDAP server.
LDAP User and Application Administration	The 'LDAP admin module' consists of a GUI and logic for administering user accounts and maintenance of available applications
LDAP Repository	LDAP Server that keeps all the relevant data in a LDAP schema
CRVS application	One of many CRVS system instances (production, external test, internal test); other NCR-specific applications
CRVS DB	One of many CRVS database instances (production, external test, internal test)

The portal is preferred to be based on open-source products that should be selected to meet all requirements regarding security, reliability and operation stability. These open-source building blocks should be mature and used in large installations all over the world. Nevertheless, the bidder can propose alternative solutions that can be based partially or completely on proprietary products. All the related costs for these components should be covered by the bidder, should be detailed and included in the financial offer.

The portal acts as a single point of contact (SPoC) for all requests that are targeted towards the CRVS system and all its related applications. Requests are authenticated and enriched with authorization information. This authorization information is then presented to the target applications which then allows or disallows specific operations. This implements role-based access control called 'RBAC'.

Portal architecture

The CRVS solution should be designed to work behind a special reverse proxy server.

This is a type of proxy server that retrieves resources on behalf of a client from one or more servers. These resources are then returned to the client as though they originated from the server itself.

The reverse-proxy functionality is extended by two major features:

1. Authentication and Authorization
2. URL-Mapping: a part of the URL determines to which target application server the request is forwarded. Also parts of HTTP-headers and cookies which contain URL parts must be rewritten correctly.

Required features:

- Hide the existence and characteristics of the application servers.
- Application firewall to protect against common web-based attacks. Without a reverse proxy, removing malware or initiating takedowns, for example, can become difficult.
- Perform SSL encryption. The web server does not perform SSL encryption itself, but instead offloads the task to the portal server.
- Authentication: It is used to authenticate users who want to access resources, by asking them to identify themselves, such as with a username and password and/or certificates.
- Roles and rights: Each user has associated applications with roles and rights.
- Filtering: Internet connections have to be filtered, by analysing both client requests (roles and

rights URL) and server replies. When filtering is done by comparing a client's request to a list of authorized requests, this is called whitelisting, and when it's done with a list of forbidden sites, it's called blacklisting. (Optional content filtering: analysing server replies that comply with a list of criteria - such as keywords).

- Make multiple web-servers accessible via a single public IP address.

The portal environment should consist of the following components (but not limited to):

- User Portal
- Application Portal
- LDAP Repository storing users, roles, certificates, applications
- Administration utility for the user and application management in the LDAP repository

User Portal requirements

Required features of this component are as follows:

ID	Requirement
A.01	Reverse proxy functionality
A.02	Authentication of users
A.03	Authorization of users
A.04	URL-mapping and request forwarding
A.05	Filter internet connections (blacklisting/whitelisting)
A.06	Check and filter roles and rights
A.07	Determine/check security class
A.08	URL-rewriting
A.09	Configurable and extensible password encryption.
A.10	Black-list for trivial passwords.
A.11	Check client certificate if available for higher security-class.
A.12	Single-Sign-On (SSO) for all users serviced by the portal.
A.13	Assign roles to each user
A.14	Filter out all roles not allowed for the user if passed in the request.
A.15	User login/logout with UserId/Password
A.16	Login with certificate
A.17	Change password

Application Portal requirement

Required features of this component are as follows:

ID	Requirement
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B.01	Authenticate users-portals and applications: check certificate of the client (user portal servers).
B.02	Rejected unauthorized communication with an error.
B.03	Any request for a service that requires a higher security-class than assigned to the current user session has to be rejected with an error.
B.04	Define level of trust to user-portals. Limit the credentials a user-portal may use.
B.05	SSL encryption

LDAP requirement

Required features of this component are as follows:

ID	Requirement	Remarks
C.01	Reuse existing LDAP schema/repository	If there is any existing LDAP schema / repository
C.02	Migrate to new LDAP schema/repository	If NCRA want to use the existing LDAP schema / repository
C.03	Description of new schema, if different to existing schema	

Administration Application requirement

Required features of this component are as follows:

ID	Requirement
D.01	Administer rights and rights-parameter
D.02	Import and assign certificate
D.03	Deactivate (lock) certificate
D.04	Define a principal for a user (uid, initial-password)
D.05	Assign a principal to an organization (or change)
D.06	Reset password lock, set new initial-password
D.07	Locking/unlocking principal
D.08	Define new application
D.09	Administer or remove application
D.10	Change application attributes
D.11	(temporal) lock of application
D.12	Notification of user-portal users (by banner-message on login screen)
D.13	Deactivate an application in the portal system
D.14	Manage application rights

D.15	Define organization-unit with access-rights, administer rights
D.16	Change portal-configuration
D.17	Import and assign certificates
D.18	Deactivate (lock) a certificate
D.19	Define user portal

Migration of the existing data, connection with the National Identification System and distribution of the data to the third parties

Migration of the existing citizens data to the new CRVS system

It is within the scope of work of this project to migrate the existing data to the new CRVS system. As it indicated in the “Background information”, NCRA has registered around 5.2 million persons (citizens and residents). These records are planned to be migrated to the new CRVS system to serve as the initial load. The data are currently stored in the National Identification System, are well structured, but may need to undergo a final quality check before importing to the CRVS system. The quality check will be done in close cooperation with NCRA.

Only alphanumeric data will be imported in the CRVS system.

Connection of the CRVS system with the existing National Identification System

The new CRVS system should be connected with the existing National Identification System to exchange data.

The National Identification System is expected to request information from the CRVS system about the actual alphanumeric data of a person (e.g. name, surname, date of birth, place of birth, etc.). This information will be used during the person’s biometric enrolment. This can lead to a change in the current biometric enrolment process of the persons and / or to be the new process of application for the Identity Card. Currently the person’s alphanumeric data is entered by the officer based on the supportive documents provided and form filled.

On the other side, the CRVS system is expected to retrieve information on the produced Identity Document of the person from the National Identification System. The information sent to the CRVS system should include document type, document number, issue date, expiry date and the photo. As there are no Identity Cards being produced yet, this functionality will wait for more details to be provided. In any case, the details shall be provided during the design phase, by the supplier of the Identity Cards system through NCRA.

Secured distribution of CRVS data to third parties

NCRA intends to distribute the population data to the other Ministries, Departments and Agencies (MDAs). The data distribution will be in full compliance with the actual National Civil Registration Act, that defines the institutions receiving the data and the reason they will use this data.

To satisfy this requirement the bidder should include in their proposal a suitable module that enables data distribution. The third parties need to be registered, a set of data fields per institution should be defined. The bidder should provide a generalized API for external services to enable the data distribution.

All the requests coming from the third parties (successful or not successful) , data shared with each third party, timestamps, should be saved in the system.

The supplier should set up a dedicated environment for the data distribution, referred to in this document as a distribution server. The distribution server should be updated from the production server.

National Identification System adoptions requirements

Existing infrastructure of National Identification System

The current ICT infrastructure that supports the registration, storage, administration and verification of the citizens and residents in Sierra Leone is based on the following technology:

- **Biometric Registration Kit VIU-820.** It is a portable, all-in-one device, that allows NCRA to register citizens wherever they are. VIU-820 incorporates tools to capture biometric and biographic information such as: camera, fingerprint reader and printer. This is referred in the document as biometric kit.
- **Solar Power Kit.** Each registration kit is equipped with solar panels and external batteries to allow at least 12 hours of independent operation.
- **PARClient.** This software component, used to run the entire identity management solution deployed in Sierra Leone, is used to allow the recording of biographic and biometric information, as well as authentication of individuals. This is the application used by the Biometric Registration Kits to register citizens and residents. This software component is referred as the registration module in this document.
- **IDMS.** Identification Management System, is the server application deployed in the NCRA Data Centre to receive and consolidate the data gathered at the registration sites. All the information captured during the registration processes are stored and managed by the IDMS
- **AFIS.** Automated Fingerprint Identification System for the fingerprints comparison. This is a service used for deduplication of records, authentication and verification, using the fingerprints comparison.
- **Supportive Hardware and Software.** Several physical servers are dedicated to the registration of the citizens and residents. The servers are hosted in the Server Room at NCRA HQ. Servers are running Linux based operating systems (CentOS 6, Ubuntu Linux 16 LTS) and utilizing Oracle as database engine.

All the above mentioned technology was deployed late 2016 early 2017. This means that it is 4-5 years old. With the setup of the new Primary Data Centre in the NCRA HQs, the above mentioned systems are planned to be installed in the new infrastructure (new servers).

Upgrade of the existing biometric enrolment application

The NCRA currently is registering the citizens using a registration module that captures alphanumeric identity data of the persons (name, surname, sex, date of birth, etc.) following by biometric enrolment of face, ten fingerprints and signature. The Registration module (ParClient as explained in the previous section) is installed in the biometric registration kits which can function online and offline.

Since the CRVS system will be in place, the registration module needs to be adopted to accommodate this new reality. The eligible persons (citizens and foreign residents) can be biometrically enrolled only if they are registered in the CRVS system. So it's a prerequisite that the citizens should be registered in the CRVS system either because they have a birth registration (citizens) or because they are residents or have obtained citizenship.

Since the persons are requested to be registered in the CRVS system first, there is no need to enter their data again in the registration module. A search in the CRVS system (preferably with NIN) should be initiated and the alphanumeric data of the person are retrieved.

The NCRA is also in the process of introducing the National and ECOWAS Identity Cards. The NCRA plans to use the same registration module for the application of citizens and residents for the Identity Cards. So, the existing modules should capture the fact if the person enrolled is applying for an ID Card or not, and if yes for which type of card (National or ECOWAS).

So, to summarize, the existing registration module, should be upgraded to accommodate the new reality of the CRVS system and Identity Card, as follows:

- a. A search to the CRVS system (using NIN or name, surname and date of birth) should be initiated and the alphanumeric data of the person should be retrieved. If the person is not found, he has to be sent back to complete the birth registration.
- b. Additional information should be added to address the fact if the person is applying or not for an ID card, as follows:
 - i. No ID card application (for the persons that are enrolling their biometric but are under eligible age to obtain an ID Card)
 - ii. Application for the National Identity Card
 - iii. Application for the ECOWAS Identity Card

There is no need to change the biometric registration of the face, fingerprints and signature.

With the new planned changes of the registration module, the name of it should be changed to “Biometric enrolment / ID Card application” to reflect the (expected) reality.

The NCRA has the source code of this module which will be provided to the successful bidder to complete the above mentioned upgrades.

Upgrade of the Identity Management System to accommodate the enrolment changes

All the information captured through the Biometric enrolment module (registration module) is stored in the Identity Management System (IDMS) and AFIS. There is no change on the biometric capture, and therefore no modifications are needed on the AFIS ecosystem.

Since all the changes on the Biometric enrolment module are on the alphanumeric part (as described in the above section), there is a need to adjust the database model of IDMS. This is mainly to accommodate the additional information selected for the ID card application.

The Supplier will be requested to perform this change. The NCRA will provide all the needed information and the needed permissions to access and modify the database structure to the successful bidder.

Extract the daily applications for ID Cards

There is a need to generate the full list of persons (citizens and residents) that have applied for any type of the Identity Card (National or ECOWAS). The Supplier should develop a new functionality on the existing IDMS to extract and generate a list of the applications for the Identity Cards.

The list should have all the needed information of persons (NIN, name, surname, sex, date of birth, place of birth, type of card, time of application, etc.) to be provided to the ID Card production facility. The list should be generated automatically on a daily basis (e.g. close of business day at 17:00) and should include all the

new applications since the last list generation. This functionality can be called / executed manually by the system administrators.

This functionality will generate only the alphanumeric data of the persons applying for the ID Card. It will be the ID Card producer's responsibility to be connected to AFIS (via web services) to retrieve the applicants respective biometrics.

Since the identity cards tender is run in parallel, this requirement will be fine-tuned with the supplier of the identity card system.

Setup and transfer of the IDMS and AFIS systems to the new infrastructure in the PDS

The new Primary Data Centre that will be built in the new NCRA headquarters will host the Identity Management System (IDMS) and Automatic Fingerprint Identification System (AFIS) too. These systems are currently installed and running in the existing hardware (at least 4-5 years old).

The transfer of the current National Identification System (IDMS and AFIS) from the existing infrastructure to the new infrastructure of the Primary Data Centre (PDC) is within the scope of this project. The NCRA will provide all the needed information and access to both infrastructures (existing and new) and will closely collaborate with the Supplier to successfully set up the transfer of the components of the National Identification System.

Training, Testing, Warranty and Operational Support Requirements

Training Requirements

As part of the scope of work for this project, it is required of the supplier to work with the NCRA and other stakeholders identified by the NCRA to ensure knowledge transfer and further build local capacity for maintaining the system. In particular the supplier will involve NCRA staff when developing administration and users' manuals. The Supplier will provide NCRA with the profiles and minimal knowledge requirements needed for its staff to take part in training in order to ensure proper knowledge transfer. As part of the final handing over process, the Supplier will provide NCRA management with a written assessment of the trainees for the administration and management of the system and make appropriate recommendations for further training.

In addition to informal learning through collaborative working environment, the Supplier will also prepare a formal training programme which will identify timing, structure and content of training programmes for the CRVS System:

- Training of trainers. Trainers shall be staff designated by the NCRA. Trainers may include, but not limited to, the responsible NCRA staff listed below.
- Training of responsible NCRA staff, including
 - NCRA IEC Department Staff,
 - NCRA Births and Deaths Department,
 - NCRA System Administrators.

The trained trainers (designated by NCRA) will be responsible for the training of the local staff, including:

- Regional and District registration offices
- Chiefdom registration offices staff
- Registrars designated by NCRA at health facilities / governmental hospitals

The supplier should oversee and assess the first 2 (two) training sessions to ensure that the trainers are capable and the knowledge is transferred to the end users.

The training shall include all training facilities, materials (including printed materials) and handouts. All training materials shall be available in the English language.

The number of participants for each training session will be no less than 3 (three) and no more than 15 (fifteen).

In addition to developing the courses listed below the supplier will also be responsible for delivering the training of trainers as well as providing on the job training and support to the NCRA staff. A general approach to the training is suggested below.

Training Courses

The participants in the training of trainers should be a mixture of the dedicated training staff who are based in the NCRA and trainers from every district to ensure adequate trainers are available outside of Freetown.

Training Content

The training should cover:

- System use (introduction and functionality to all modules, data entry, searches, reporting etc.);
- Information management procedures (how and when information is captured, used and shared as part of the business processes);
- Training Methods and Delivery (basic skills and techniques of training including how to design a course, presentation styles, learning activities and how to assess impact).

Training Style

The training should be delivered in English language and involve:

- Presentations;
- Discussions;
- Practical exercises using the system.

The learning of participants should also be evaluated against agreed criteria. When using the system, each participant's work should be checked before moving on to the next exercise and a final practical exam should be held requiring participants to receive a passing grade before they can complete the training.

It is particularly important that the newly trained trainers are evaluated not just on system knowledge but on training skills. Before completing the training, each participant should have an individual session with trainers to review the training skills and identify strengths and areas for enhancement.

Training Outcome

At the end of the Training of Trainers programme, the NCRA will:

- Have an adequate number of trainers (minimum 20) to meet current and future training needs;
- A plan for the initial delivery of training to the NCRA and local staff;
- A detailed trainers manual in English which includes:
 - Course Programme;
 - Timings of sessions;
 - Slides and other training tools;
 - Presenter's notes;
 - Evaluation tools.

At the end of training a trained user (trained either by the supplier or by a trainer) shall be able to work with the CRVS system.

On the Job Training

As noted previously, the supplier will work closely with the NCRA staff during the design and implementation phase and provide support and mentoring. As part of the implementation process the supplier will also sit in on the initial training sessions delivered by the new trainers and provide support and feedback on performance.

Testing requirements

The supplier shall provide description of the software test and acceptance procedures.

The supplier shall prepare test case scenarios and provide them to the NCRA for approval. The NCRA shall have the right to request modifications to the test case scenarios. The NCRA shall have the right to use amended and expanded test case scenarios User Acceptance Test (UAT).

The supplier shall develop testing, and development environments:

- The System must have a dedicated User Test Environment;
- The system must have a dedicated Development Environment.

User tests shall be performed at the NCRA and at least one local office. User test acceptance will be done after the training is completed for the relevant NCRA staff.

After the user test the supplier shall incorporate all errors identified during the test and will correct the software. After the error is corrected, the supplier shall release a new version of the software and shall install it. Another user test shall be performed until all critical/major errors are corrected.

The supplier shall also participate in the UAT (User Acceptance Testing) process at a time defined by the NCRA. The UAT shall take place at the premises of NCRA.

Warranty requirements

A comprehensive warranty for one year shall be provided by the supplier for all software and customized applications and their usage, which are delivered as part of the software solution and database for the CRVS system. The warranty will be implemented via locally-based first-level inputs, while second and third level content may be provided from the region or internationally.

The warranty period shall begin once End User Acceptance Testing as well as Training is complete and approved by NCRA.

During the installation, acceptance and warranty period the supplier must provide corrective services. During the use of the system the NCRA will report each error to the supplier. The error report shall include the following minimum information:

- Error ID
- Error Description
- Where found
- Time and date
- Severity of the error and the timescale for its resolution
- Central contact point.

The supplier must resolve errors in accordance with time-frames contained in the comprehensive software warranty. When errors are resolved (error corrected, software system is rebuilt, and user has formally accepted the resolution) the supplier shall provide a Summary Report that includes the following information:

- Information originally provided by the NCRA (NCRA Error Report)
- Duration of resolution
- Source of defect
- List of software code components that have been changed and the exact nature of amendment.

Operational support

An operational support for one year shall be provided by the supplier for all software and customized applications and their usage, which are delivered as part of the software solution and database for the CRVS system.

Main objectives of the services are to support the NCRA to properly manage and operate the CRVS system, and are listed below:

- Ensuring that all ICT related actions with the CRVS system are compliant with the current legal framework in Sierra Leone.
- Ensuring at the level of 99% availability of functioning of the System, data security and accuracy of the CRVS System.
- Ensuring authentication, authorization, communication security and speed for all the authorized users of the CRVS system.

The operational support includes the following services:

System and operation planning

- Planning upgrades and patches implementation
- Planning tasks to be executed periodically.

System Administration

- The Supplier must isolate and diagnose the problems which affect the CRVS System and must prepare a report with relevant suggestions for the solution of the problem.
- Administration System (including basic operating system, standard applications)
- Coordination of installations and modifications
- Installation of upgrades and patches
- Administration and distribution of system resources
- Administration of operating system and access rights
- Solving problems and bugs in the area of system administration
- Backup/Restore of operating system and standard applications
- Active support and assistance for the maintenance of infrastructure
- Documentation of all related activities
- Documentation of all scheduled activities, completed tasks, changes, problems and analysis of what went wrong.

Storage Administration

- Adjust / customize settings
- Solving of problems and bugs related to storage administration
- Activities related to infrastructure maintenance
- Documentation of all related activities
- Documentation of all scheduled activities, completed tasks, changes, problems and analysis of what went wrong.

Management of access rights

- Administration of developer rights and management of test users
- Rights' management - production
- Rights' management - test
- Rights' management - development
- Designation of roles
- Security planning and management

Administration of applications

- Types of applications
 - Interface with the Portal
 - Application portal
 - User- and Right management
 - Civil Registration Service
 - Mirroring Service
 - Query and Reporting Service
- Applications environment
 - Production
 - Test
 - Development
- Management of versions and installations
 - Management of operations (implementation of data migration)
 - Installation of application versions
 - Installation in Production system
 - Installation in Test System
 - Installation in Development system
 - Documentation of all performed installations.
- Service validation and testing
 - Ensuring quality of data model
 - Testing workload and performance

Documentation

- To ensure and update:
 - Second level operational manuals

- o All types of applications mentioned above
- o Monitoring system
- o Backup & Recovery
- o Data security and data protection
- o Logical and physical design of the system
- “How To” support for the first level
- Documentation :
 - o of escalation procedures
 - o planning
 - o contact lists
 - o roles and responsibilities
 - o operational manuals
 - o Activities and monthly statistics (Monthly Report)
 - o Meetings

Monitoring

- Monitoring of the CRVS system and its services.
- Periodic monitoring of the roles and user activity of the CRVS System.
- Following periodic monitoring the Supplier must submit reports in line with a schedule determined together with the NCRA.
- Assessment of monitoring reports and drafting of reports for the improvement of infrastructure, including also suggestions for the NCRA.

Payments and Deliverables/ Milestones

A service contract shall be made between UNOPS and the contractor who shall be responsible for completion of all activities within these terms of reference. Should there be any problems with the delivery of the contracted outputs, the contractor is expected to take the necessary corrective actions without affecting the final deadline for submission of the research report and at no additional cost to UNOPS.

Payments will be made as follows:

Deliverables	Percentage of Total Price (Weight for payment)
Payment on completion of build phase	35
Payment on completion of testing (generally both System Integration Testing and User Acceptance Testing must be completed)	35
Final payment on successful deployment to Production	30

Technical capacity

Project References

Bidders shall provide references for at least two similar projects in nature, size and complexity, realized with SOA architecture-based solutions such as development and maintenance of a civil registration and / or a population register during the last 5 (five) years; These similar projects will be as attested in introducing the following documents:

- The contract signed, accompanied by a certificate of performance for the carrying out of this service, issued by the respective Contracting Authority when implemented with public institutions, or
- The contract was signed, accompanied by a certificate of performance for the carrying out of this service, accompanied by a sales tax invoice when realized with private entities.

Certifications

Company certification

Bidders shall be certified according to ISO 9001. For the fulfillment of this requirement, Bidders should submit the relevant Certificates, which should be in the same field with the category and the specification of the products / services that are procured.

Staff certifications

Project management

- The bidder should have at least 1 (one) Project Manager certified with the "SCRUM Master" certificate or equivalent.
- The bidder should have at least one (1) certified staff for the management of maintenance and SLA with ITIL Foundation Certificate or equivalent.

Developers team

In order to prove that the bidder has the necessary professional and technical staff qualified to develop the required system, it should present the following certificates:

- At least 4 (four) developer certificates at foundation level, related to the programming language chosen to develop the system (e.g. Microsoft Certified Solutions Developer, C Certified Professional Programmer, Oracle Certified Java programmer, etc.). The certificates should be related to the programming language(s) used to develop the system.
- At least 2 (two) developer certificates at professional level, related to the programming language chosen to develop the system (similar to the above point but at a professional level). The certificates should be related to the programming language(s) used to develop the system.
- At least 1 (one) developer certificate at master, related to the programming language chosen to develop the system (similar to the above points but at a master level),
- At least 1 (one) certified professional for Software Architecture
- At least 1 (one) certified Database Expert

Staff experience

a. Project Management.

The leader of the team for contract implementation and management support shall meet the following criteria:

1. Degree in Information Technology and Communication and/or Management in or minimum equivalent job experience of three years, proven by a letter of reference (*as per the explanation in the end*) or employment record certificate.
2. Experience in leading positions to manage a team of specialists, including IT specialists, for a minimum period of 5 (five) years, proven by a job letter of reference (*as per the explanation in the end*).
3. Job experience with or for the institutions of public/private administration for not less than 5 years, proven by a job letter of reference (*as per the explanation in the end*) ;
4. Letter of reference under the lead of a similar IT project (civil registration and / or a population register project with SOA-architecture based solution (*Service-oriented architecture*));
5. To declare that he/she has knowledge of written and spoken English.
6. CV.

b. Software Development Team

The leader of the development team shall meet the following criteria:

1. Degree in Information Technology and Communication and/or Management in the field of IT or minimum equivalent job experience of 5 (five) years, proven by a letter of reference (*as per the explanation in the end*) or employment record certificate.
2. Experience in leading positions to manage a team of specialists, including IT developers, for a minimum period of 3 (three) years, proven by a job letter of reference (*as per the explanation in the end*).
3. Job experience with the institutions of public/private administration with SOA architecture-based solutions (*Service-oriented architecture*) for not less than 3 (three) years, proven by a job letter of reference (*as per the explanation in the end*).
4. Job experience of not less than 3 (three) years with the components applied in the system.
5. To declare that he/she has knowledge in written and spoken English.
6. CV.

The personnel of software programming shall meet the following criteria

1. To have at least 4 (four) specialists with minimum job experience of 2 years in programming and maintenance with the technologies included in the proposal, proven by a job letter of reference (*as per the explanation in the end*).

For each specialist, the following should be presented:

1. Degree in Information Technology and Communication or a minimum equivalent job experience of two years, proven by a letter of reference (*as per the explanation in the end*) or employment record certificate.
2. Job experience with the institutions of public/private administration with SOA architecture-based solutions (*Service-oriented architecture*) for not less than 2 years, proven by a job letter of reference (*as per the explanation in the end*).
3. To declare that he/she has knowledge of written and spoken English.
4. CV.

c. Operational Support Team

The leader of the team for support to operations shall meet the following criteria:

1. Degree in Information Technology and Communication and/or Management in the field of IT or minimum equivalent job experience of two years, proven by a letter of reference (*as per the explanation in the end*) or employment record certificate.
2. Experience in leading positions to manage a team of specialists, including IT specialists, for a minimum period of 3 (three) years, proven by a job letter of reference (*as per the explanation in the end*).
3. Job experience with the institutions of public/private administration with SOA architecture-based solutions (*Service-oriented architecture*) for not less than 2 (two) years, proven by a job letter of reference (*as per the explanation in the end*).
4. Job experience of not less than 2 (two) years with the components applied in the system.
5. To declare that he/she has knowledge in written and spoken English.
6. CV.

The personnel of operational support shall meet the following criteria:

To have at least two specialists with job experience in troubleshooting, maintenance and installation of components using in the system., proven by a job letter of reference (*as per the explanation in the end*).

For each specialist, the following should be presented:

1. Degree in Information Technology and Communication or equivalent job experience, as the case may be, for half a year, proven by a letter of reference (*as per the explanation in the end*) or employment record certificate.
2. Job experience with the institutions of public/private administration with SOA architecture based solution, proven by a job letter of reference (*as per the explanation in the end*).
2. To declare that he/she has knowledge of written and spoken English.
3. CV.
4. Job letters of reference (*as per the explanation in the end*) for the implementation of a similar IT project based on SOA (Service-oriented architecture).

Explanation: Job references requested as above shall:

- a. Have full data on the client (third party) such as:
 - name of the organization/company,
 - position and name of the signatory,
 - contact details (address, email, telephone).
- b. Have listed in details data on the project:
 - Purpose of the project
 - Project contents (focused on the qualified services provided)
 - Duration
 - Result of the qualified provided services.

The projects implemented within the company (where the company itself is the project beneficiary) shall not be valid as experiences for the above mentioned qualified services.

Proposal Evaluation Criteria

- Please refer to Sections I and III of this RFP and criteria section of the eSourcing system.
- The scoring of proposals will be weighted 60% for technical proposals and 40% for financial proposals. However, the minimum score for technical compliance is 70% of the technical points. Only proposals that are assessed as passing the technical requirements of the assignment will have their financial proposals considered.