

Terms of Reference for

Requirement Study of the National Spatial Data Infrastructure (NSDI) ICTA/GOSL/CON/IC/2016/27

1. Introduction;

National Spatial Data Infrastructure (NSDI) has emerged due to lack of a centralized platform for sharing government spatial data. A centralized Spatial Data Infrastructure makes the decision making process efficient with real-time evidence. Therefore, effective and efficient decision making is one of the key factors for a productive government service delivery process and to ensure the good governance.

Ministry of Lands as the main stakeholder for the national spatial data infrastructure. In addition, Department of Surveys, Land Commissioner General's Department, Registrar General's Department, Ministry of Environment, Ministry of Wildlife, Ministry of Agriculture and Ministry of Disaster Management have also been identified as key other stakeholder for this initiative.

2. Background;

The Government of Sri Lanka has spatial information collected by various government departments. Spatial information technology skills are highly developed in some of the government institutions and the systems used to collect this information are also advanced.

Usage of spatial information across government institutions in a collaborative manner is in significance with respect to the service provisioning and decision making process. Further, spatial information is not able to be easily shared between organizations at the present time; nor is it accessible to the broader community.

Spatial data sets are collected by a number of government organizations to facilitate conduct of an organization's business and not with other agencies needs in mind. These data are managed in closed systems and this has created a multitude of information silos. Currently, data collected by organizations is not accessible. It is difficult to know what information is available and where it is held. This has led to several organizations collecting the same information because they are unaware that the information already exists.

Organizations across the government sector recognize that current processes are inefficient and that more cooperation across the sector is required. However, existing data sharing policies are restricting collaboration. There is a significant paper trail of agreements that need to be processed before data sets can be transferred from one organization to another. Manual data sharing procedures contribute to delay in sharing, and the effort required to manually integrate updates from one agency to another is labour intensive and time consuming.

3. Concise statement of the objectives;

The objectives of this requirement study for the National Spatial Data Infrastructure are;

- a) Conduct a requirement study
- b) Prepare a detail system requirement specification
- c) Prepare an information and service classification
- d) Develop a system prototype

4. Scope of Work;

- 4.1 Consultant should extensively but not limited to study the National Spatial Data Infrastructure requirements such as,

Meta data portal, National Map portal with OGC standards which required to address the data transformation (datum transformation and map projection), data exchanging formats, data uploading, data tiling formats, identify the data migration requirements and methodology to be followed

Spatial data infrastructure management system should be capable of handling import data, upload data, export data, search and query, view, analyze, publish, printing data and data presentation techniques.

Further this system should be capable of developing and extending spatial/geospatial applications and services, authentication and user groups, payment reconciliation, data services with payment facility, broker service registration and service provisioning facility, copy right verification, data encryption, data versioning and third party application and services verification process.

- 4.2 Consultant should conduct a literature review of latest findings and contributions for Spatial Data Infrastructure developments.

- 4.3 Investigation of system architecture and functions of the already implemented and functioning SDIs in selected best five countries as per the literature review. Make recommendation of best practices to be followed locally.

- 4.4 System Architecture should generally cover the following parameters such as,

- Flexibility and extensibility
- Data and application interoperability across different platforms
- Cloud based and centralized processing capability
- Distributed storage for data owners
- Hardware and software requirements for open source and proprietary products separately or in-combination where it is required
- For the Non-Functional Requirements, please refer sample guidelines given in “Annex A”

- 4.5 System architecture should consist of software architecture as well as the hardware components.
- 4.6 Study the baseline survey findings and need to incorporate findings for the implementations approach, functional requirements, capacity development needs of the potential system users and administrators.
- 4.7 Consultant should study the documentation relating to Sri Lanka SDI such as SLSDI strategy and road map.
- 4.8 Conduct the interviews, meet-ups and group discussion for the requirement study.
- 4.9 The consultant should conduct requirement gathering workshops for the organizations identified under each thematic area.
- 4.10 The system requirement study report should cover the recommendations to re-engineer the existing processes with data providers to increase the efficiency of the proposed system.
- 4.11 Generate draft requirement study report, conduct the presentations and incorporate the amendments.
- 4.12 Develop a draft prototype for the proposed system.
- 4.13 Information and service classification to be conducted based on the Information and Service Classification Framework (Annex B) and prepare a classification report.
- 4.14 Cost estimation for each component as per the item 4.4 above.
- 4.15 Identify the connectivity requirements, concurrent users and access control, privileges and user roles.
- 4.16 Identify the capacity development requirements for the required team members at NSDI office and client locating.
- 4.17 Identify the data synchronization requirements at client (data providers) organizations.
- 4.18 Identify data processing requirements including Software, Hardware, Networks at client organizations.
- 4.19 Consultant should provide specifications required for above stated Hardware, Software and Networks requirements.
- 4.20 Consultant should attend to the pre-bid conference of the system development tender to explain the requirements for bidder of the system development tender.
- 4.21 Consultant should provide a functional model as a prototype for the proposed system
- 4.22 Scope of the Governing body that is required for the NSDI office.

4.23 Identify system development functionality, NSDI Framework, Data standards and prepare the requirement specification using relevant diagrammatic tools such as Use Case Specifications, Diagrams.

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

Requirement Study duration of NSDI is 03 months including Hiring an Individual Consultant and the Requirement Study Report.

Requirement Study is required to submit the following list of deliverables for the NSDI project.

No	Deliverables
5.1	Detail System Requirement Specification for the processes of the NSDI.
5.2	Information and service classification, data standards and related data policies.
5.3	Detailed hardware and software requirement specifications and cost estimations.
5.4	Report findings of literature survey and best practices of the SDIs of selected five countries.
5.5	System Prototype.
5.6	Proposed phased out implementation approach.

6. Qualification Requirements for the Consultant

Essential

The consultant will demonstrate a minimum of five (05) years of experience in Sri Lanka and/or a country of comparable social, economic and development conditions, where the consultant has worked with government and the private sector as the Business Analyst/ Business Consultant / Process Designer in government sector NSDI models and the primary implementer of an NSDI projects, specifically in the areas of Geographical Information Requirement study, Functional analysis and mapping.

Applicant will demonstrate extensive knowledge on implementation of ICT and SDI projects in Sri Lanka preferably in government sector.

Key Experience

The consultant should have extensive experience in the following areas.

- .SDI functions and components
- .Business Process Re-engineering and Mapping to Software Application system
- .Database concepts and Management
- .High awareness of Network Infrastructure & basic Application Security Concepts
- .Change management and approval process

The consultant should also be able to demonstrate;

- a) a minimum of five (05) years of post academic/professional qualification experience in the relevant areas of ICT and SDI development projects
- b) Excellent writing and communication skills in English.

7. Services and Facilities Provided by ICTA

- 7.1 Information and Service Classification Framework and Information Sharing Policy
- 7.2 Proposed NSDI strategy document, NSDI framework and Road Map document

8. References:

- [1] eGovernment Policy Approved By Cabinet of Sri Lanka - <http://www.icta.lk/index.php/en/e-governement-policy>
- [2] Lanka Interoperability Framework - <http://www.life.gov.lk/>

9. Review Committees and Review Procedures

ICTA will appoint a review committee in collaboration with stakeholder organizations to review the documents prepared by the selected consultant.

Annex (A)

Non-Functional Requirements

1. Security

1.1. User authentication and authorization

An administrative application need to be developed wherever applicable.

1.2. Availability

The system should be developed to ensure “High Availability” to remain the system available all the time. (e.g. Portlets clustering capability should be taken into consideration in the development)

1.3. Non-repudiation

The system should ensure non-repudiation by having standard audit-trails and provisions to have WS-Security using digital signatures.

2. Audit Facilities

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

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

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

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

3. Backup and Contingency Planning

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

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

- Breach in Security

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

4. Performance

Following performance criteria is provided as a guideline only. If the actual performance is falling below the stipulated figures, the consultant is to justify the reasons. However, the performance level must be accepted by the technical evaluation committee appointed by the client.

The bandwidth is assumed at 512kbps (shared) (point to point between LIX and the Department web service) with 1,000 concurrent users (50% load factor) in total.

Item	Performance
Screen Navigation: field-to-field	< 10 milliseconds
Screen Navigation: screen-to-screen	< 5 seconds
Screen Refresh	< 3 seconds
Screen list box, combo box	< 3 seconds
Screen grid – 25 rows, 10 columns	< 5 seconds
Report preview – (all reports) – initial page view (if asynchronous)	< 60 seconds in most instances. It is understood that complicated / large volume reports may require a longer period
Simple enquiry – single table, 5 fields, 3 conditions – without screen rendering	< 5 seconds for 100,000 rows
Complex enquiry – multiple joined table (5), 10 fields, 3 conditions – without screen rendering	< 8 seconds for 100,000 rows
Server side validations / computations	< 10 milliseconds
Client side validations / computations	< 1 millisecond
Batch processing (if any) per 100 records	< 120 seconds
Login, authentication, and verification	< 3 seconds
Daily backups (@ Dept.) – max duration	1 hour (on-line preferred)
Total Restore (@Dept) – max duration	4 hours