# State GIS: An Integrated & Collaborative Platform for Geo-enabling Governance

## Introduction

State Governments have identified IT as a major thrust area for the growth and development of the state. State Governments are taking all possible measures for implementing e-Governancethroughout the state, covering all the sectors with a view to provide hassle free, transparent and efficient service to the common man (both in Urban and Rural areas).As part of the goal for adopting good Governance, State Governments have introduced a number of initiatives including Geo-enabling Departments for effective Governance.

GIS is a powerful platform that facilitates all requirements of effective Decision Support Systems.

### Key Challenges

Although, Geo-spatial technology is in use at various levels in different departments but potential of the Geospatial technology has not yet been explored in public administration & governance for planning and effective decision support owing to following challenges:

- Non availability of any standard state policy with regard to use of geo-data
- Lack of awareness among the stakeholders regarding the use of geo-spatial data
- Lack of qualified and trained manpower having expertise in Geospatial system
- Non availability of structured data
- GIS initiatives are only visible in silos and are not extended in a collaborative and pervasive way
- Collating and validating data is a cumbersome activity
- Restrictions imposed by various line departments does not allow public usage of Geospatial data / information
- Effort duplication and lack of transparency
- Non availability of high resolution maps in the state departments
- No standard mechanism for data integrity and updation
- Lack of a collaborative and integrated Geo-Spatial Platform

The objective of State Governments is to overcome/address these challenges by way of a new paradigm for sustainable development as well as to support a new model of g-Governance through a comprehensive GIS based Decision Support Systems (DSS) as State GIS. It would be crucial that the new implementation extends the characteristics of being integratable, collaborative, open and scalable in order to meet the current GIS aspirations of the state as well as amenable to new paradigm of computation such as cloud.

### State GIS: A Technology Vision

State GIS is expected to provide a single gateway for integrated view of information across all state agencies for local level planning. This will facilitate a single window service to citizens to increase the efficiency and productivity of all department/agencies such as Agriculture, Medical & Health, Law Order & Police, Energy & Utilities, Revenue & Commercial Taxes, Water & Waste water, Environment & Forestry. It will further support to develop and maintain up-to-date geospatial and non-geospatial data sets for dissemination of right information to the right people (including govt. agencies, NGOs, RWAs, private sector and citizens) at right time for faster analysis and decision making. The system needs to be designed with open standards & work flows to facilitate interoperability with existing applications.

The primary objective of the State-GIS is to establish and implement a web based single gateway integrated GIS platform to access, acquire, process, store, distribute and improve the utilization of geospatial information through:

- Intelligent Web Services being generated and published by various agencies
- Advanced Tools for GIS based analysis
- Web & Mobile Maps & Apps
- Segment Specific Solution Templates
- Executive Dashboards and
- Spatial Information for further integration with other enterprise applications and empowering citizens.

In the way of building the state-wide platform for State-GIS, we have to assess various components such as satellite imagery, thematic maps, geo-tagged socio-economic data etc. which are already available with state agencies (different departments), and require to be brought up to a seamless, integrated standard.

Hence, the establishment of "State-GIS" is envisaged for the State to:

- Leverage Geo-Spatial technology to support the accelerated implementation & monitoring of projects through implementation of Enterprise GIS solutions for efficient DSS and help aligning their objectives for national development
- Standardize geospatial datasets for national use, published via standard web services
- Implement Geo-enabled Decision Support Systems aligned with objectives of national development
- To be a major support to GOVERNANCE by embedding GIS in all aspects of planning and development at national/ district / local levels; bringing transparency and geo-spatial information support in decision-making; enable a sound process of monitoring development and identifying "gaps in development"; make GIS data available at all levels –that helps bringing accountability and responsibility in governance
- Create a portfolio of GIS projects to improve services at reduced costs
- Reforming the government to increase effectiveness of flagship programs and in achieving the objective of greater performance and productivity
- Facilitate collaboration and knowledge sharing among departments
- Serve the basic needs of citizens by providing access to

nation-wide maps / image / geo-spatial information; geo-enabling governance and public services and also enabling a "crowd sourced" interactive process of citizen involvement in providing feed-back/ inputs

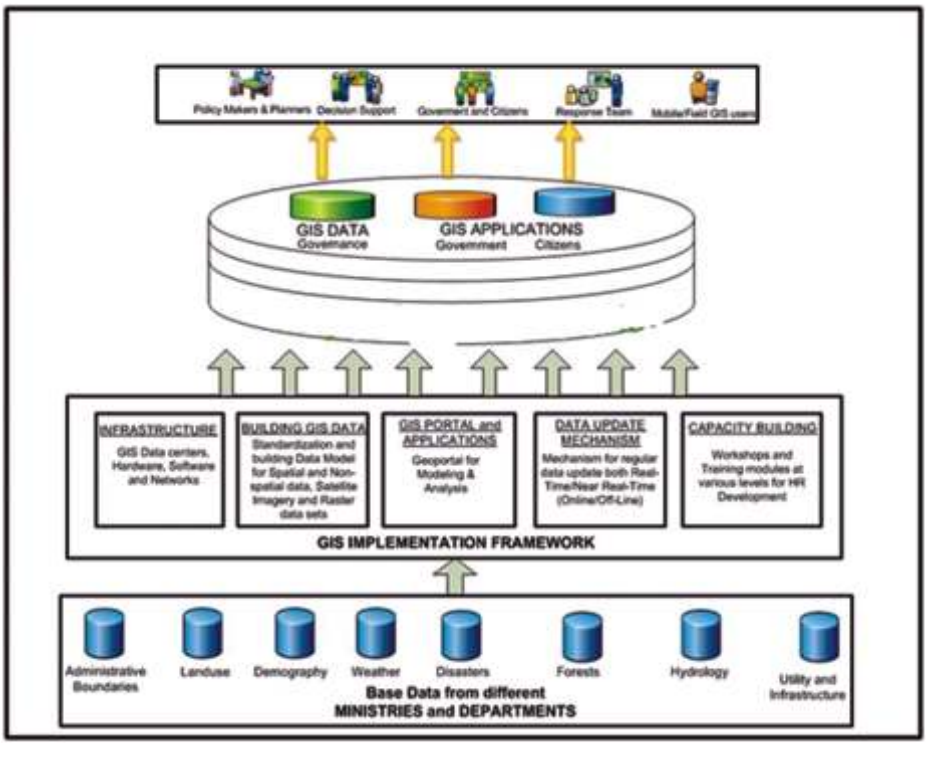
State – GIS: Key Elements

The major elements / pillars of the State GIS, includes specific activities. All these activities will be equally important for a holistic development and establishment of the State-wide GIS.

Following depicts the key Elements of State-GIS :

State-GIS Infrastructure

It comprise of GIS Platform and the computing and networking infrastructure for the State GIS. The State-GIS platform is expected to be developed, hosted and maintained at State Data Centre.




State-GIS Assets

These are the seamless, state-wide GIS digital content layers equivalent to1:10,000 scale and better including maps and geo-tagged attributes/tabular data on demographics, natural resources, planning and development activities, infrastructurea nd other sectorial datasets. It is also proposed to allow crowd-sourced geo-taggeddata content into the State-GIS as an additional "citizen-layer" where citizens can populate their datasets/grievance-points etc on the GIS frame.

In addition to integration of existing Spatial & Legacy Data, access to a large number of Base maps, Web Services, Live Feeds are also required to be integrated.

State-GIS Portal and DSS Applications

It will provide a Single Gateway access and a Service Platform to different State line departments in government; target groups in private enterprises and also for citizens. The State GIS DSS would also be integrated with the proposed National-GIS framework.

State-GIS will be implemented as a Single Gateway Platform to

- Access Spatial data/Web services generated and published by various agencies
- Access and use tools for GIS based analysis
- Create Web Maps, Web Applications & Mobile Applications
- Associate / Build Solutions using Templates
- Host Executive Dashboards and
- ShareSpatial information with agencies for further integration with various applications.

Possible applications are as follows:

- Geo - Planning - for Planning Department and the State Planning Board for supporting the planning, monitoring and reviewing plans and development.
- Geo-Rural Development - for various rural development programmes of the Department of Rural Development.
- Geo-Urban Development - service to planning, management and development of different urban areas for departments of Urban Development bodies.
- Geo-Policing –for geo-enabling Law Enforcement and supporting Law & Order agencies.
- Geo-Transportation- for hosting PWD Services of Road Information, Rails, Airways, Waterways etc. For information on Transport Planning, Routing & local commuting.
- Geo-Water Resources - to support identification of water authorities in identification of drinkable water and managing its supply and distribution.
- Geo-Disaster Management & Emergency Response - for supporting management of disasters at state level through SDMC / SDMA
- Geo-Agriculture –to support Department of Agriculture and Farm sector
- Geo-Irrigation –to support water resources department
- Geo-Horticulture- for Department of Horticulture for Horticulture crops and suitability analysis
- Geo-Forestry- to support & integrate applications implemented at Department of Forests
- Geo-Health– to support Health departmentin manage Health facilities
- Geo-Security– to support Police & Law Enforcement departmentsin enforcing Law & Order in the State
- Geo-Education–to support the Education department in

managing Education facilities

- Geo-Panchayats- to support PanchayatiState department
- Geo-Industry- for Industrial development and planning support, inputs, and cluster analysis and other decision support
- Provision for private sector GIS applications to be hosted and published on State-GIS
- Citizen access to State-GIS would be enabled through simple GIS Applications and integrated e-services.
- As part of the State-GIS, it is also planned to implement State-GIS Dashboards for key dignitaries such as CM Office (CMO) and Chief Secretary for high-level reviews / meets etc. and promote the GIS usage to key dignitary-Levels.

## State-GIS Capacity building

Under Capacity Building, the State-GIS will ensure that benefits of GIS technologies are easily accessible and affordable to diverse users in governance, enterprises and citizens. Hence, a series of Trainings in Geo-Spatial Technologies will be required at different levels.

## State GIS: Platform Overview

State GIS will act as Single gateway to facilitate and coordinate the exchange and sharing of geospatial data between stakeholders from various jurisdictional levels in the spatial data community such as medical and health, police, commercial taxes, utilities, water resource department, security agencies, forestry etc. With simple to use GUI, platform will be implemented as a Single Gateway Access for accessing and sharing GIS contents & web services, spatial data, tools, templates, solution templates and web applications for Decision Support. The Platform will have capabilities of integrating information (spatial & non-spatial) from multiple sources (different departments), perform analysis and aid the concerned authorities in quick and effective decision making for State Government.

The sample snapshot of State GIS portal is shown below:

The solution will be developed over industry standard RDBMS solution, which will be a powerful, reliable support for an organization's mission-critical applications of State-GIS along with flexible Internet deployment architecture, object capabilities, and robust data management utilities that ensure data integrity, data recovery, and data security.

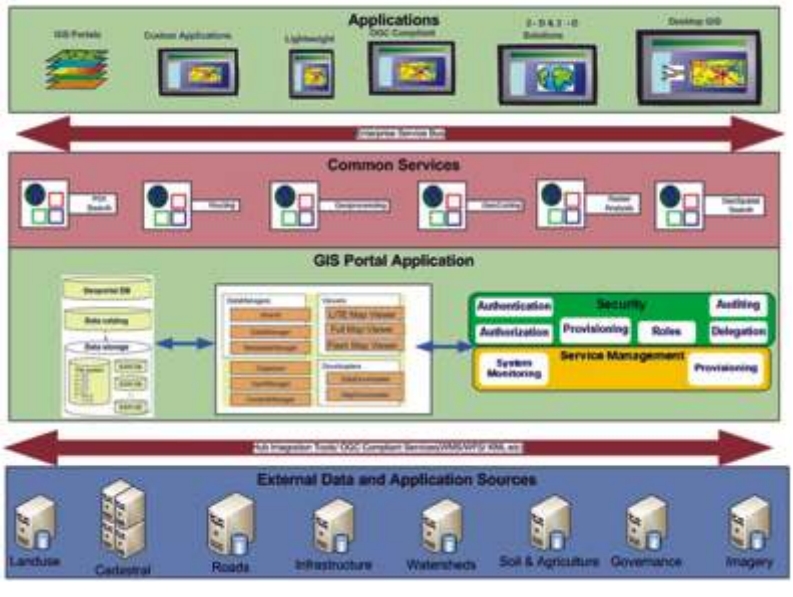
State GIS Portal will provide a collaborative platform for sharing geo-spatial data and tools for publishing Web Apps behind organization's firewall and ensuring highly secured data sharing environment.

## High Level Solution Architecture

State GIS Solution is recommended to be based on ArcGIS Platform -Hybrid In-Premises Cloud, aSoA based distributed server architecture which supports creation, access, sharing & dissemination of Geo-Spatial Information i.e. web maps, apps, tools & services through a simple to use common platform.

This ArcGIS platform—combined not only with the government's authoritative data but also its high-quality

High Level Solution Architecture





maps, visualizations, spatial analysis, models, and other rich applications made available as geoservices — would lead to the creation of government-to-citizen,government-to-business, government-to-education, and government to-government applications that would integrate all levels of government and support open access, collaboration, and transparency.

The proposed architecture is a high-availability solution that will mask the

effects of the hardware or software failure and will maintain the availability of applications so that the perceived downtime for users can be minimized.

Solution Challenges & Key Benefits

Challenges

The government has to bring all user departments in consensus along with bureaucratic and political system to make this a success. The data layers are to be procured from various departments along with attributes sensitive for the efficient functioning of the geo-enabled services. The spatial and attribute data updation is very critical to maintain the authenticity and application usability which is critical for any geo-enabled application.

Key Benefits

- Standardized state-wise geospatial datasets, Geospatial web services, Geospatial data exchange formats, Geospatial data quality and Metadata
- A Geospatial Platform with a gallery of standardized datasets to allow state-wide use, published via standard
\ web services so that government and private sector entities and citizens at large have the same state level view of GIS data
- Collaborative platform for accessing & publishing contents in a secured way, utilize tools and solution templates for building segment specific solutions & dashboards.
- Seamless integration of standardized data warehouse covering spatial / non spatial information required by various levels of state and district administration. All organizations will benefit as it will save time, money, and eliminate duplication of efforts.
- Standardized modular GIS applications for planning, management, analyzing data repository for GIS based Decision Support System
- User friendly data capturing and update mechanism for improved accuracy and validity
- Promote "virtual geographic information" and transactional workflows that allow department users to remotely update and add content to designated layers.
- Inclusive access to State-wise GIS and its GIS-DSS by private enterprise and citizens – bringing the state onto a single GIS frame and oriented to an all-inclusive support to development activities;
- A designated State-wise entity to drive the effort, a g-data based governance model, an oversight board, providing accountability and transparency to the process, and institutionalized relationship with other government departments, private enterprise and citizens.
- Capacity building & empowering departments by development of expert level resources through structured trainings at various levels.