

THE CUBAN SPATIAL DATA INFRASTRUCTURE INITIATIVE: CURRENT WORK.

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Several countries around the world are involved in developing spatial data infrastructures to allow access to spatial data for improved decision-making for different levels of government, commercial and non-profits sectors, academia and individual citizens. There are three major global projects related to this propose at global level; these are Global Spatial Data Infrastructure (GSDI), Digital Earth and Global Mapping. In Cuba, a national group integrated among others by GEOCUBA (public enterprise for mapping and survey), National Office of Hydrography and Geodesy, Ministry of Informatics and Communications and Ministry of Science, Technology & Environment are undertaking the first steps to create the Cuban Spatial Data Infrastructure (IDERC) taking into account all these international experiences and the national real conditions.

This paper describes the necessity and the external/internal conditions that allow its developing. There are five key positive aspects that characterize the current national context: (1) growths of availability of digital data and projects to increase it (the major project is 1:25000 Digital Topographic Map of Cuba); (2) assimilation and implementation of international standards specifications (OpenGIS Consortium Specifications); (3) awareness and willingness into the national governmental, industrial and academia sectors to undertake the Cuban Spatial Data Infrastructure; (4) developing of national projects aimed to support decision making processes (economic, social, environmental and disaster management projects) that require multi-resolution access to spatial data; and (5) developing and dissemination of the new Information Technologies (IT).

Some policy, technological, legal and economic issues regarding IDERC into the framework of a National Project of Society Informatization are also commented.

A result of a Feasibility Study to develop the Cuban Spatial Data Infrastructure is made, as well as the challenges to address in the future to reach its implementation.

Finally, taking into account not only the global initiatives, but also regional initiatives as the CP IDEA, an action plan to insert Cuba into this approach is proposed.

Introduction

The advent of Geographic Information System technology has transformed spatial data handling capabilities and made it necessary for governments to re-examine their roles with respect to the supply and availability of geographic information (Masser 1998). In the last decade, different national strategies have been founded with different scopes and implementation approaches, but all of them are aimed to allow the open access to geographic information.

Several Spatial Data Infrastructures (SDI) for different levels (local, national, regional, global) have been developed and converge to similar frameworks and toward the use of international standards (OGC and ISOTC/211).

Cuba has also decided to undertake the development of its own SDI at a national scale to support the economic, political and social decision making for manager and government.

Within this framework, the following features characterize the Cuban context:

1. Growths of digital data availability and new projects to increase it. (for example: Digital Topographic Map 1:25 000)
2. Comprehension and implementation of international standards (OpenGIS Simple Feature)
3. Awareness at industrial, governmental and academy sectors to undertake a national SDI.
4. Encouragement of National Projects to support decision-making processes that require geospatial data handling.
5. Development and dissemination of new Information and Communication Technologies encouraged by Society Informatization Program directed by Informatics and Communication Ministry.

The objective of this paper is to describe the first steps carried out in Cuba to create a National Spatial Data Infrastructure, as well as, to show the future actions that will be developed in this sense.

A feasibility study made by the Hydrographic and Geodesic Service of Cuban Republic has also been commented in this paper allowing to characterize the behavior of the SDI components in our country.

Institutional Framework.

A Project of Law Decree to regulate the creation and implementation of the Cuba SDI (IDERC) has been conformed and other actors at government level are analyzing it. This regulation will establish the creation of a National Data Committee, coordinated by the Hydrographic and Geodesic Service of Cuba. The aim of the creation of the IDERC will be to support the economic, political and social decision making at different levels of government and to contribute to the Society Informatization Program.

This Program acts like a suitable framework to the IDERC, because it allows public access to varied informative resources by developing Cuban web sites, corporative intranets and mainly grants an appropriate national telecommunication infrastructure.

Fundamental Data Set.

Today, we are working in a group of projects of digital cartographic and Geographic Information Systems that should contribute to obtain the Fundamental Data Set for the National Spatial Data Framework (IDERC).

The first digital cartographic work that cover all national territory was finished in 1996 when the GIS based Digital Topographic Map 1:250 000 was developed.

The last update of it was in 2000 year. So far, this map has been used for multiple purposes in Transport Ministry, Public Health, Informatics and Communications, etc.

This has served as background to create the Project of the 1:25000 Digital Topographic Map covering the whole Cuban territory. Its importance is given by the following facts:

- First digital cartographic map of Cuba with this complexity (> 1000 sheets).
- Base to multiple applications of GIS to support decision-making processes for economy, defense and other sectors of the society.
- Basic element to complete environmental studies and to support national sustainable development.

The GIS orientation of this map will permit to many national organizations to use it more efficiently. It will have a key significance to develop the IDERC. It will be finished in 2005 year, although new ways are being explored (technological transference, international collaboration funds and other similar experiences around the world) in order to undertake its development faster and better.

Regarding the Society Informatization Program (INFOSOC), a group of projects that will contribute to create the fundamental data set to the IDERC are being developed.

According to the different subprograms included in INFOSOC, these works can classify in:

IS-C: "Management and Government Informatization"

GIS to several utility companies (Telecommunication-ETECSA, Petroleum-CUPET, Electrical Enterprise, etc) are being carried out. They will allow to increase the availability of spatial data (1:2000 for cities and towns and lesser scales for rural territories). On the other hand, this subprogram includes GIS projects to governmental institutions as National Statistical Office for example.

IS-D: "Territory Informatization"

This subprogram includes the GIS development of municipal, province and national levels aimed to government decision-making.

The spatial data generated by these projects will be available for multipurpose use in the IDERC.

Technological and Standard Component.

At the present time, Cuba undertakes an investment process to extend its national telecommunication infrastructure. This is an important factor to support Information Infrastructure and particularly, the Spatial Data Infrastructure of Cuba Republic (IDERC).

On the other hand, since two years ago a group of specialists have been developing COM-based specifications from OpenGIS and so far, the OpenGIS Simple Features are implemented and now we are assimilating Web Mapping Testbed Specifications. This factor joined with the last decade experience in developing geoprocessing tools by GEOCUBA provide part of the technological base necessary for the implementation of IDERC.

An important knowledge source for our national initiative is the guide provided by The SDI Cookbook, Version 1, result of the Global Spatial Data Infrastructure work.

The following general Service Architecture, shown in the Figure 1, was extracted from this book and will be adopted for our IDERC.

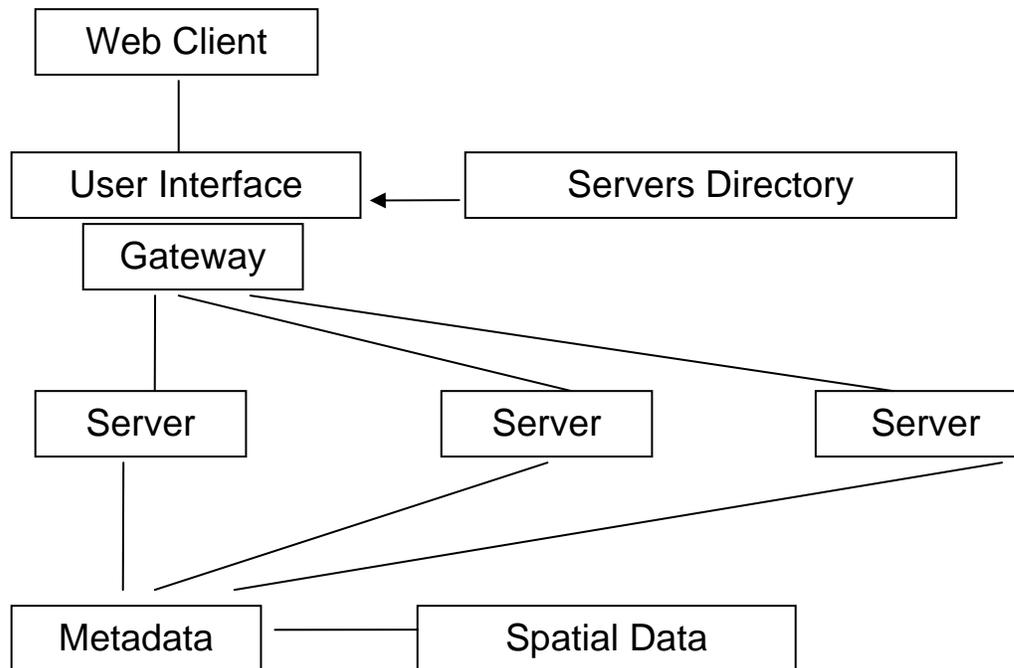


Fig 1. General Services Architecture of SDI (Source: The SDI Cookbook).

Future work.

Once finished the Feasibility Study, and with the Decree approved to regulate the organization and implementation of the IDERC, we will use some scenarios like pilot cases in order to demonstrate its effectiveness.

One of them would be related with a Map Server of 1:250000 scale to satisfy governmental decision-making and to support sustainable development.

At the same time, we are working to involve our Hydrographic and Geodesic Service in the regional initiative Permanent Committee of America Spatial Data Infrastructure (CP –IDEA) and in Global initiatives (GSDI, Global Map).

The following months will be very hard, not only in the institutional framework work, but also in the technical aspects as clearinghouses and metadata, as well as the necessary training of the human resources.

References.

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