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GSDC Architecture for National Project Activities In order to Improving Collaborative Decision Making Process

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Abstract: The idea is Building a strong algorithmic and analytic component that contributes to the knowledge not only results in many publications but hope it will help decision makers to make better use of the technology for their applications, Inefficient and inadequate of those component causes invasion utilities by land-user and/or conflict in between the projects and utilities. Obviously recent advance technology comes up with technical solution and remove software and hardware problem from collaborative decision making systems. What remain is developing and implementing well designed data infrastructures aim to support decision makers. This article introduces key elements of Geo-Information process based on Taxonomy data sharing model in order to improve Collaborative Decision Making process for new project activities or build-up existing plan. Model architecture is dedicated to the methodology of collaborative geographical data /information-use aim to come up with critical requirement of organizations instead on long run project of Spatial Data Infrastructure (SDI). The Geo–information process of projects makes using of foundation, framework and derived project specific data, which are directly used in decision making process. IS analysis and problem solving is rapidly evolving, but the need for accurate data is continually increasing to identify possible alternatives to execute. Access to project specific data model is designed by data and process views incorporating elements of Geo Information process. In following paragraphs, it will be discussed about a capacity building in the context of a Geo Spatial Data centre (GSDC) and illustrates the discussion by how it might affect on data provider as well as data consumer. In addition this article recommends an effort with the same platform of building capacity by using experience of advance countries in doing Geo Spatial information.

Key word: Collaborative decision making • Data sharing concept • CDSS • Inter-organizational collaboration

INTRODUCTION

Spatial data sharing highlights as the electronic transfer of spatial data/information between two or more organizational units where there is independence between the holder of the data and the prospective user (Figure1). By mean data sharing is standing on developed electronic transfer concept as communication infrastructure and inter-organizational data sharing based on institutional and managerial relation ship. Inefficient and inadequate of each component results most national projects are lagged behind schedule or are unfinished and phased [1-2].

Strategic planning needs to exchange some critical information and key items for national projects to support decision makers' aims to prevent conflicts in between. Those unwanted conflicts can be defined as: a conflict between a new project and existing utilities that have been constructed, a conflict between protected areas, high risk

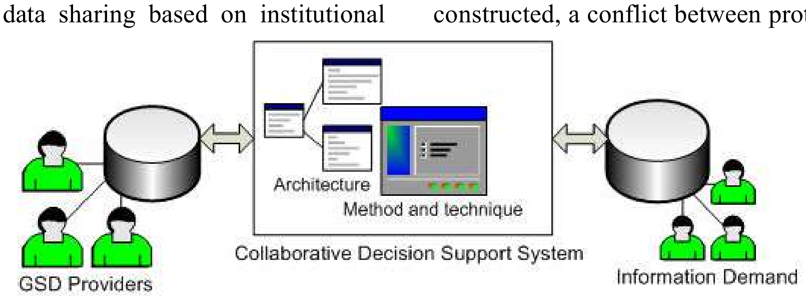

Fig. 1: Geo information processing in between data providers and data consumers in GDI context

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area and high Sequence Area. Wrong selections of the land for a project are consequence of insufficient performance of decision making system to produce timely data and misplace information.

The technical issue of data sharing is well studied and largely resolved. Institutional aspect is less well studied, but equally is important [3-5].Technological advance, such as low-cost workstation hardware, computer networking developments and more powerful software are quickly removing from the technical barriers of spatial data sharing and decision support systems. What constraints remain is mostly organizational.

Insufficient data sharing practice, lack of data security and government functions, (like low progress in development of data processing infrastructure), inadequate knowledge to use data exchange method [3] and difficulties access to existing data even if data available must to remove from decision support system barriers aims to enhance decision making performance. Problems arise from the fact that data have not been well documented and data duplications resulted from many actors involved in data collection and data distribution. Moreover, long administrative procedure (bureaucratic procedure) also resulted from difficulties access to existing and up-to-date data.

MATERIALS AND METHODS

Usually data providers have to operate in the concept of governments' role that impact the development of national Geospatial data infrastructure even in the modern evolving information societies[6-7]. In such societies new business and Geo-ICT environment enforce GI-providers to develop new business strategy. They also have to develop Geo-ICT strategy and Geo-ICT architecture (Figure 2).

Model architecture is dedicated to the methodology of collaborative geographical data /information-use in order to come up with critical requirement of organizations. It provides ready-to-use geospatial data products either as a web services or as packaged media. Acquiring the best data in the time and cost-effective manner has become a high priority in those organizations.

As depicted in Figure 3, Field-use study need project deliverables included 0.6-meter pixel resolution, color, digital orthophotography, 2-meter contours, black/white orthophotos and mapping and imagery in a variety of formats for CAD and GIS applications as time sequence and data acquisition in first steps. Furthermore, detection analysis and decision making helps decision makers by feedback.

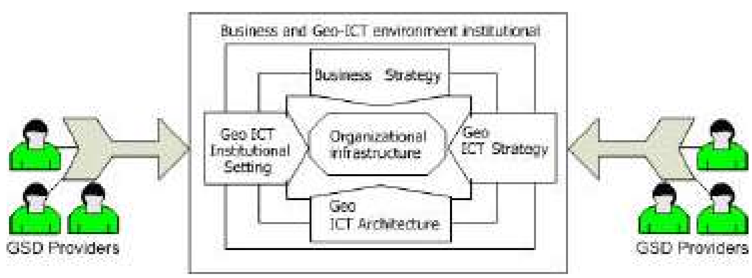

Fig. 2: GI-Provider might be adjust strategy that have been emerged of role of government concept

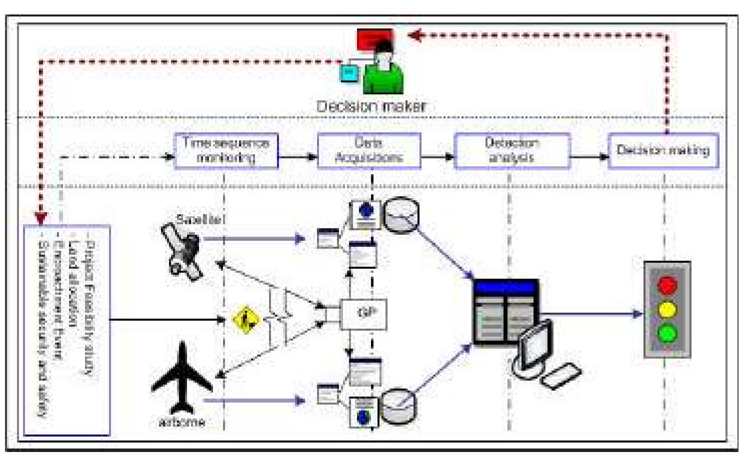

Fig. 3: Airborne & satellite information base and decision support system for monitoring of field area

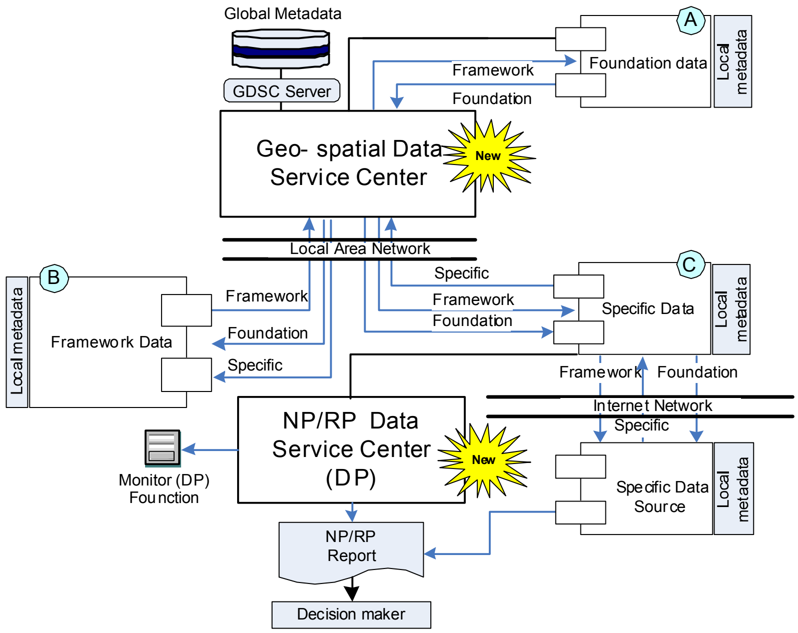

Fig. 4: New approach on Geo-Information management

Model of the Approach: A system can modelled in different ways. Available modelling techniques can be separated into two categories; technique for data modelling and techniques for process modelling [8]. A data model used to describe the static space of a system whereas a process model describes the dynamic behaviour of a system. This effort provided accurate GIS data products to support the permitting process and increase the capacity of the project especially in difficult or remote access area.

Static Space: Data-view designed to introduce an approach on Geo-Information management, involving rule and specification for data sharing among the data users (Figure 4). Collecting Geo-Information task as a result of storing mission specific data, reducing cost of Project Specific Data collection for further upgrading phase and eliminate data duplication. Introduction of GSDC will ensure accessibility of data at any time hence will speed up the feasibility study for proper decision.

A- Foundation data is composed by elevation and boundaries. The source of foundation data are field survey technique. Foundation data are also used in program of feasibility studies by Decision maker, key-person of organization or consultancy group. Multiple GPS base stations were set up every certain kilometer along the route. GPS field work a day coincide with the LIDAR/photo shall be collected accurately and validated at the time-of-collection.

After the initial data collection, surveyor collected GPS ground points along the field-use for validation purposes. As depicted in Figure 3, the surveyor was directed to remote locations along the route to provide the photogrammetrists with the ground measurements required to validate the data collection. Pay to the root mean square error (RMSE) for the data collection in vertical variation is important issue.

B- Framework data is composed by public utilities, Geodetic data, Contour and land use map. After data validation, the LIDAR will be processed into usable data sets. First, the SEM was developed by removing noise. Then, detect crossing node and trees by using with triangulated irregular network (TIN) of the first surface in Surface Elevation Model (SEM) for a portion of field use. Developing a bare-earth elevation model (DEM) of the same area is the next. Finally, it is a 2D view of the same corridor showing the primary corridor and intersecting transmission line corridor from the 0.6 meter resolution orthophoto database.

The LIDAR DEM is merged with the oriented aerial photography in an orthophoto processing environment to produce a 0.6 meter pixel digital orthophoto. The SEM model illustrates component of the area and complements the digital orthophoto. The bare-earth DEM is a vertical TIN of the same area showing the variability of the terrain.

C- Project specific data includes information about the area of the projects, such as communal services and environmental data. The large size (gigabytes) of

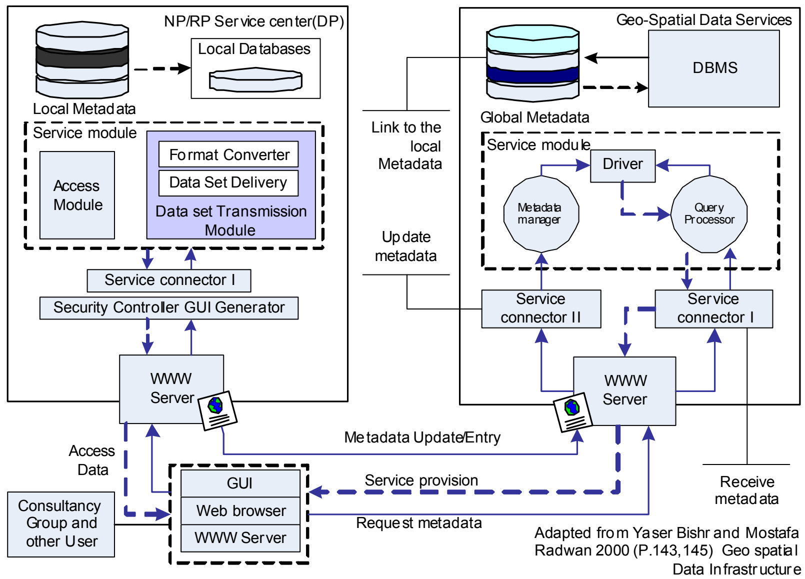

Fig. 5: New element of Geo-Information management approach (GSDC)

orthophoto raster data, SEM, DEM and contours provide the GIS system with a solid foundation for a base mapping and layer development. All digital imagery and terrain data were organized, cataloged and named with a developed protocol.

Projection system was selected based on the project orientation, coverage area and the need for data consistency.. The imagery served as the base map on which all collected data were projected and quality controlled. The created GIS thematic layers greatly assisted in the project demands into one comprehensive GIS interface.

The required data includes the following: Pipeline Location, Proposed New Pipeline, Reroute Alternatives and Mileposts along the Pipeline, Aboveground Facility Locations, Access Roads, Land Ownership and Field-derived GPS Data for Biological Resources, Wetland Areas and Stream Networks, Classified Vegetation, Right-of-Way Corridor from Ground Surveys.

Geo-Spatial Data Service Centre: Geo-Spatial Data Centre will be responsible for integrity of the service, which matches data demand and supply in two directions. As is shown in Figure 5 Right, it facilitates data discovery, evaluation, access and dissemination by providing the following function to fulfil the priority organization requirement.

It makes easy access to the local metadata that contain detail information of specific data and Global metadata means generalized information about all database connected with GSDC. In terms of data-use policy coordination of both providers and consumers must be in compliance with data use policy of all data sources and assure that data will fit to specific standards of GI processes of feasibility study procedure.

To convert the shareable data in required data exchange standard and deliver it online, the World Wide Web technology will assure data sharing between external and internal user through the GSDC. LAN will still enable data sharing among internal user. In this data exchange model inter-operability problem will be solved by applying standards to data framework.

Dynamic Behaviour: As shown in Figure 6, the process view of a system on the other hand describes the system's decomposition into process and tasked and the communication and synchronization among these elements[8].

To design the process view of Geo-Information process in feasibility study the activity modelling diagram can be used. In this technique, a business process is decomposed step-by-step into activities that make up the process.

Access request from Existing LAN will make the access online possible for internal user, aim to eliminate queuing time by placing "receive request" even off line. Access to view metadata; this action state is open to internal users. It gives them access to metadata (detail and general) of existing data.

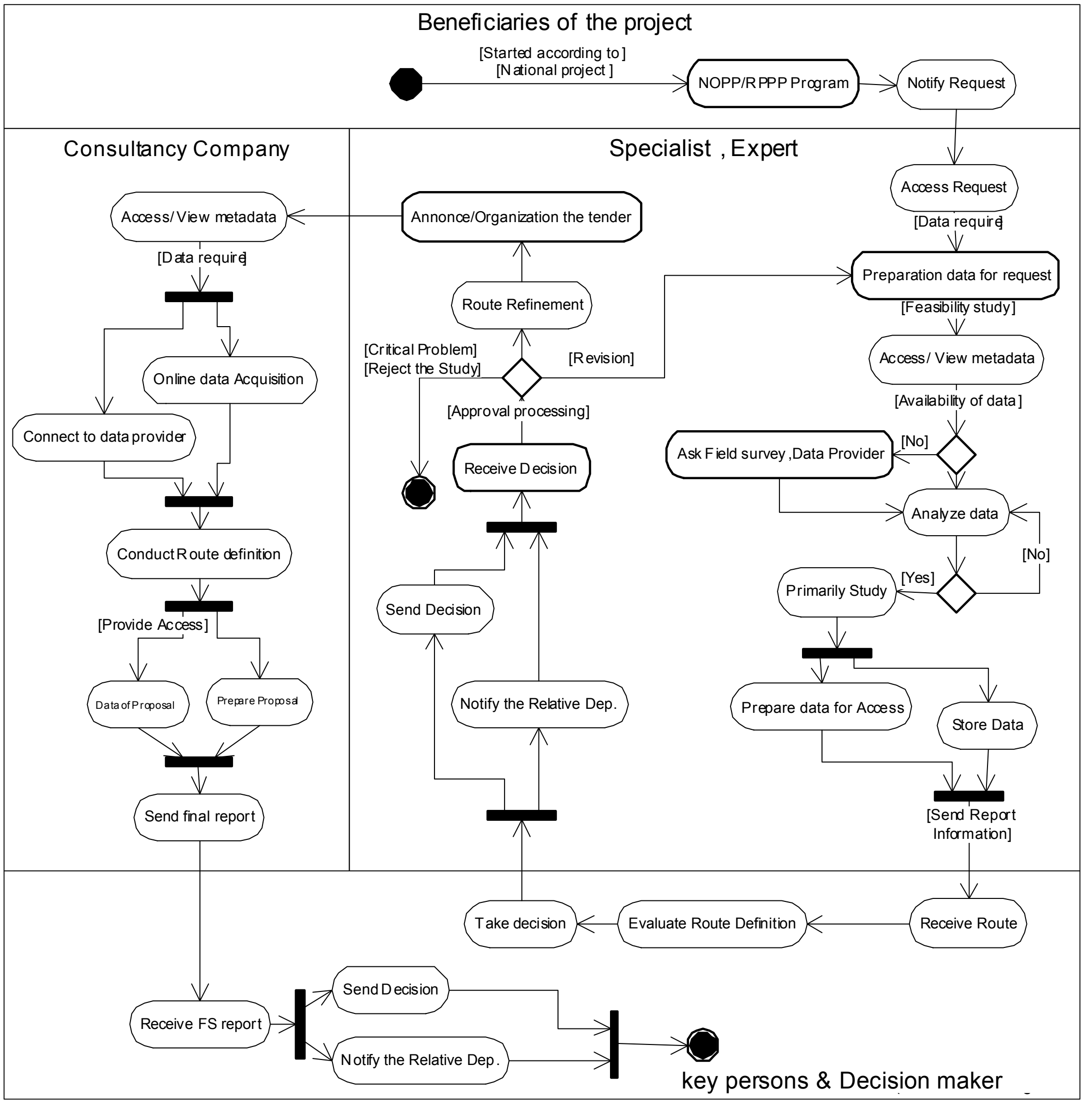

Fig. 6: Activity diagram for processes view in To-Be situation

Access to data online gives possibility to key person, decision maker and specialist (internal user) have access to data stored in local and central databases. Consultancy group (external user) will be able to access data online this will eliminate their queuing time in the current procedure. Control Planning Department (internal user) will also save their time by not being involved in data preparation. Sign up process for Consultancy Group will make them possible access in order to control of data.

Route definition study on the other hand is a process aim to define a proper route or location of the project by using additional techniques for data analysis and possibilities to visualize the result.

Store data process, aims to archive the information generate from route definition and route refinement study. This state keeps archive for further upgrading phase. Prepare data to access is an action state includes establishment of the rules for inter-organizational data sharing.

CONCLUSION AND RECOMMENDATION

Well planned project in proper land in time and schedule, predictive conflict and fade away problems, save big money (Billions Dollar) are good result from study on project activities. It highly attributed to the generation of good information based on a strong dependency between decision–making and Geo-Information management systems. It also involves to the establishment of policies, standards and agreements for Geo-Information use. Introduction of static space and dynamic behaviour of system probably will be associated with changes in organizational structure. It also stipulates the proper technology to support availability of Geo-Information.

Finally the approach is expected to facilitate the performance of decision making process. A recommendation is building a necessity professional training program to ensure the human capability for Geo-Information management and developed decision making process. Participating in the world wide chain business and technology, getting beneficiary of international developing systems, time and cost- effective of implementing well done systems are resulted from applying experience of advance countries.

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