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MEMORANDUM APR 11 2022

FOR : **The Directors**
Forest Management Bureau
Land Management Bureau
Biodiversity Management Bureau
Ecosystems and Research Development Bureau

FROM : **The Director**
Knowledge and Information Systems Service

SUBJECT : **UPDATED DENR GIS ENTERPRISE SYSTEM ARCHITECTURE**

In line with the implementation of the DENR Control Map (DENRCM), the Geographic Information Systems (GIS) software was procured to enable mapping activities and sharing of ENR maps across all offices of DENR. In 2020, the DENR's GIS system architecture was approved and deployed using the procure software.

On 29 March 2022, the proposal to update the DENR GIS System Architecture using the Distributed Web GIS concept, was approved by Undersecretary Analiza Rebuelta-Teh. With the updated GIS enterprise system architecture, the Central Office and each of the Staff Bureaus will maintain and manage their own GIS Portal while enabling a collaboration link between these Portals and that of the DENR Control Map Portal, which is lodged in the Central Office. With this architecture, the Bureaus' control over their own data and workflows will be preserved while still being able to contribute or share data to the other offices within DENR. Contents owned by the Bureaus will be updated and managed by the Bureaus in their own Enterprise GIS environment. Updates can be shared in real time or at scheduled intervals. The Central Office can also maintain its own content and share them to the Bureaus. In this approach, content can be shared in a simple but controlled manner, making authoritative data easier to access across the Agency.

In order to support the implementation of the new architecture, capacity planning will be run, through the assistance of Geodata, Inc., the distributor of ArcGIS in the Philippines. The capacity plan will allow us to identify the hardware needed to support the enterprise GIS given the conditions for use of each office. The results of the capacity plan will be included in the proposed Tier 2 budget proposal for 2023 and in the Information Systems Strategic Plan 2024-2026.

In this note, we would like to request your office to fill out the attached questionnaire prepared to gather the information needed to run the capacity plan. Please submit the filled-out questionnaire to denrcontrolmap@denr.gov.ph on or before **12 April 2022** in preparation for the individual consultation meetings with Staff Bureaus with the assistance of Geodata. Also enclosed is the copy of the updated DENR GIS Enterprise System Architecture for ready reference.

For your information and guidance.

MARIA ELENA A. MORALLOS-MANILA

cc: **Undersecretary**
Finance, Information Systems and Climate Change

Assistant Secretary
Finance, Information Systems and Mining Concerns

MEMO NO. 2022 - 229

CAPACITY PLANNING QUESTIONNAIRE

The following items shall be used to run the Capacity Planning Tool to identify the system design requirements and determine the optimum hardware solution to support the GIS operations and workflows.

I. Existing Hardware (if applicable)

A. Server specifications (where ArcGIS Server and components are installed)

Server Name	OS Version	Processor	Memory/RAM	Number of Cores	Disk Space

Type of network (e.g. LAN, WAN): _____

Network bandwidth (in Mbps): _____

II. Software

A. DBMS

DBMS (e.g. Oracle, SQL Server)	Version

III. Developed/Configured GIS Applications

Department/ Division/ Group/ Section	Name of Application	Brief Description of Functions	Number of Simultaneous Users			Data Source (e.g. DBMS, shapefile, file geodatabase, stand-alone table, web service)	Brief Description of Workflow
			Data Authors/ Editors	Field Collectors	Data Viewers		

IV. Data

Department/ Division/ Group/ Section	Available Data	Data Format (e.g. Spatial, Shapefiles, Geodatabase, Tabular, Raster, TIFF, etc.)	Is the Data stored in DBMS? If Yes? What DBMS? If No, where it is stored? Please estimate size.	Is the data available? How frequent is the data updated? When was the data last updated?

DENR Enterprise Architecture

Distributed Web GIS Concept[1]

Technology should always be aligned with the business needs. The figure below shows an overview of the approved GIS system architecture of DENR as of March 29, 2022. It is designed based on the needs to accommodate the growing number of GIS users; ensure business continuity; have access to accurate and authoritative GIS data and maps; streamline DENR's current processes and improve operational efficiency; and have effective and beneficial collaboration among the stakeholders, which include the DENR Central Offices, the Staff Bureaus, and the Field Offices. This can also be scaled and implemented by phase based on available time, resources, and budget.

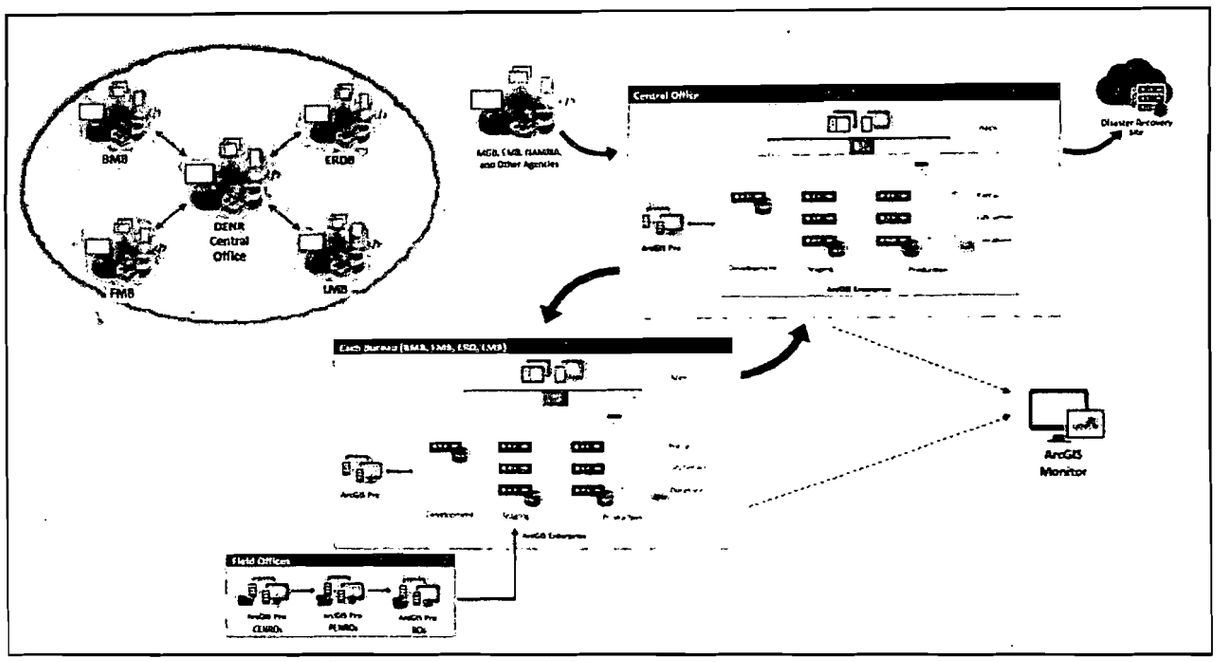

Figure 1. Recommended System Architecture Overview

In the new architecture, the Central Office and each of the Staff Bureaus will maintain and manage its own ArcGIS Enterprise system. Sharing of data, maps, and apps will be done through distributed web GIS or also called distributed collaboration. A distributed web GIS is a modern approach to sharing information, where the different GIS deployments can be integrated to work together allowing each group to share content with each other. Distributed web GIS is based on a foundation of trust among the participating groups and is motivated by common goals that support data sharing.

[1] The distributed web GIS concept was discussed in the report on the Discovery Workshop conducted on September 28-29, 2021 (pages 24-27). Prior to the actual conduct of the activity, consultation meetings with the field offices were done. The workshop was attended by bureaus, attached agencies and central office.

In this architecture, the DENR Central Office will act as the host, and the Bureaus will be the guests. This type of implementation or architecture will preserve the Bureaus' control over their own data and workflows while being able to contribute or share data to the whole Agency. Contents owned by the Bureaus will be updated and managed by the Bureaus in their own Enterprise GIS environment. Updates can be shared in real time or at scheduled intervals. The Central Office can also maintain its own content and share them to the Bureaus. In this approach, content can be shared in a simple but controlled manner, making authoritative data easier to access across the Agency.

With distributed collaboration, getting the cooperation of the participating groups will be less challenging because the data owners will have control on the access and the level of details that will be shared. Shared authoritative content can then be disseminated to other important stakeholders, like the executives and decision makers, through dashboards and web apps that are hosted in the Central Office's ArcGIS Enterprise system.

Other government agencies and Line Bureaus, who have deployed ArcGIS Enterprise may also join the collaboration, or they can simply share their web maps and map services to DENR Central Office to be included in the web apps and dashboards

Furthermore, tasks related to administration, management, and maintenance of the servers, including accountability on ensuring the quality of shared content will also be distributed to the participating Bureaus, offloading some of the tasks from the Central Office.

Implementing a distributed web GIS architecture will help address the following gaps and challenges:

- Siloed systems and apps;
- Inaccessibility of data;
- Multiple versions of data;
- Limited manpower resources; and
- Challenges in stakeholders' participation.