

Web GIS Technology Using GIS Server

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Abstract:

Web-based mapping is the process of generating and providing maps on the World Wide Web for users to search and browse spatial information. Web mapping has been designed based on a client/server technology. In client/server architectures the server side is in charge of the data querying, analysis and processing, whereas the client side is based on the user interaction, map display and report generation. Web services make it easy to share GIS resources across client applications, including ArcGIS for Desktop, web mapping applications, mobile devices.

Key Words: GIS Server, Web Mapping, Geodatabase.

Introduction:

GIS resources are the maps, globes, address locators, geodatabases, and tools that one wants to share with others. It can host GIS resources on ArcGIS for Server system and allow client applications, such as web mapping applications and mobile devices, to use and interact with the resources [1]. It is possible to create web-based services, providing maps for users to search and browse geographic information [2]. ESRI's ArcGIS Server connects people with the geographic information they need. Organizations use ArcGIS Server to distribute maps and other GIS capabilities provided by web mapping applications and services to improve internal workflows, communicate vital issues, and engage stakeholders [3]. WebGIS is the integration product of GIS and Internet technologies. Web GIS differs from traditional GIS in that it masks the differences between diverse types of hardware, software, networks and databases, which results in interoperability among different applications and data sources. In addition, WebGIS promotes the sharing and synthesis of multi-source data, and enables widespread sharing of spatial data and geoscience models. Therefore, WebGIS offers a powerful and effective approach to geoscience studies. The system based on WebGIS and proposes a higher demand for the hardware and software, especially the software such as the system architecture, GIS platform and development technology [4].

Materials:

Web GIS, one of most important direction of GIS which combined the technology of WWW and traditional GIS, has been widely used in many fields. Its essence is to achieve in the Internet space in the GIS site data sharing, information dissemination, production of thematic maps, as well as a variety of spatial search and spatial analysis. Mainly by the Web server, browser, page description language, Web interactive applications, GIS database manager and other parts. Business server is applied to respond client requests and execute the function. When the client sends a spatial data service request, the Web Service between Browser and Web GIS server, will first analyze the communication protocols of user's request. Then Web Service features the requests sent to the GIS application server, application server from the GIS analyzes the user requests and calls the appropriate business process components. The business components requests data services, returned to the GIS application server after handling the end result through XML languages database server. Application server back to the client display through the web service data files. Database server is used to manage the system data source. It supports for data access, query, update, delete and other basic operations, and store of geospatial data, early warning data and other content [5].

Method:

ArcGIS Server is a distributed system consisting of various roles distributed on multiple machines. A WebGIS architecture which uses the ArcGIS Server is made up of some of the following components, see Figure (1):

- 1) GIS Server: The GIS server hosts GIS resources and exposes them as services to client applications. It is composed of two distinct parts: the server object manager (SOM) and server object containers (SOCs). As the name implies, the SOM manages the services running on the server. When a client application requests the use of a particular service, it's the SOM that actually gives one out for the client to use. There is only one SOM per GIS Server.
- 2) Web Server: The web server hosts web applications and web services that use the resources running on the GIS server.
- 3) Clients: Client applications are Web, mobile, and desktop applications that connect over Hyper Text Transfer Protocol (HTTP) to ArcGIS Server Internet services, or ArcGIS Server Local services over a LAN or WAN.
- 4) Data Server: The data server contains the GIS resources that have been published as services on the GIS server.
- 5) Manager and ArcCatalog Administrators: ArcGIS Server administrators can use Manager or ArcCatalog to publish their GIS resources as services.
- 6) ArcGIS Desktop Content Authors: They author the GIS resources using ArcGIS Desktop applications [4].

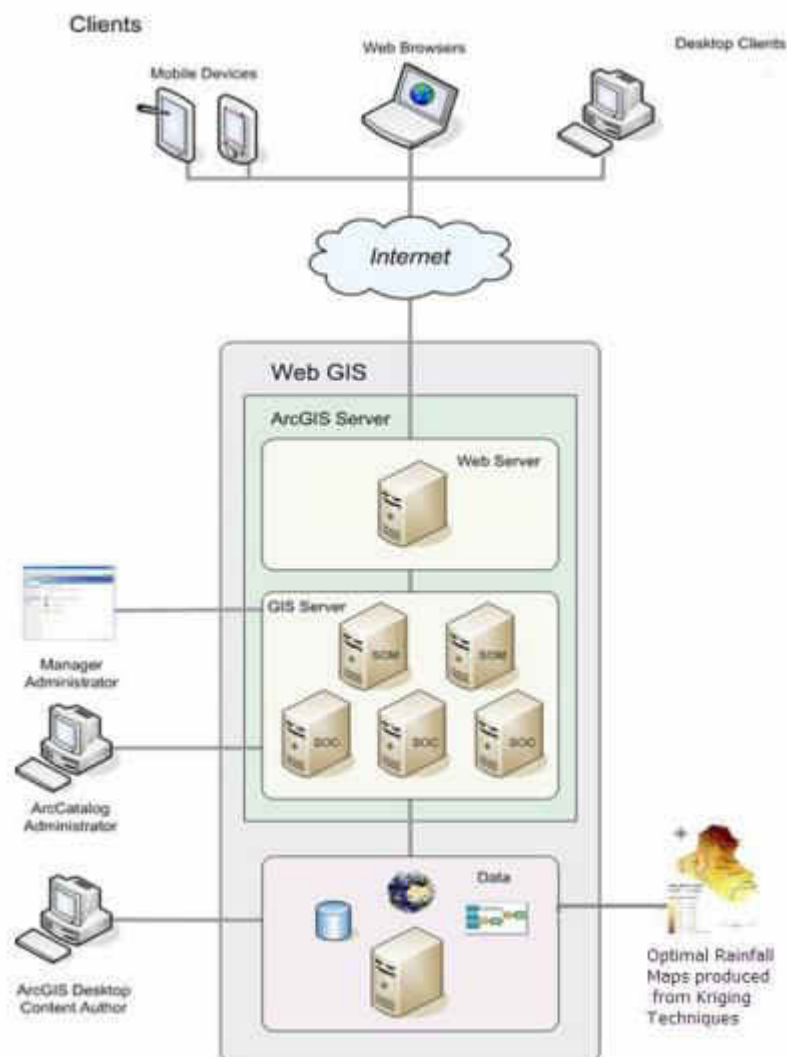


Figure (1): ArcGIS server architecture

Discussion:

ArcGIS Server consists of two primary entities, a GIS server and an Application Developer Framework (ADF). The GIS Server consists of a Server Object Manager (SOM) and Server Object Container (SOC). The ADF provides the framework to build web applications and web services that make use of ArcObjects running in the GIS server. The GIS Server and the ADF are available for .NET and Java developers. After installing ArcGIS Server, admin needs conduct Post Installation Configuration. Following the prompts, admin needs fill in the name and password of the server, container account and configure the license file. The ArcGIS Server security model uses the operating system's security model to determine who can connect to and administer the server. The user needs to determine who can require administrative access to the server, and then it uses the operating system tools to add them to the ArcGIS Server Administrators group (agsadmin) on the server object manager (SOM) machine. At a minimum, the user needs add itself to the (agsadmin) group. In the same way, the user should identify who only needs user-level access, and then it adds them to the ArcGIS Server Users group (agsusers) on the SOM machine. Through the Eclipse plug-ins, developers can quickly build and customize web applications [4].

Result:

In Figure (2) web application displaying the optimal map produced from ArcGIS Desktop software in client side using GIS Server.

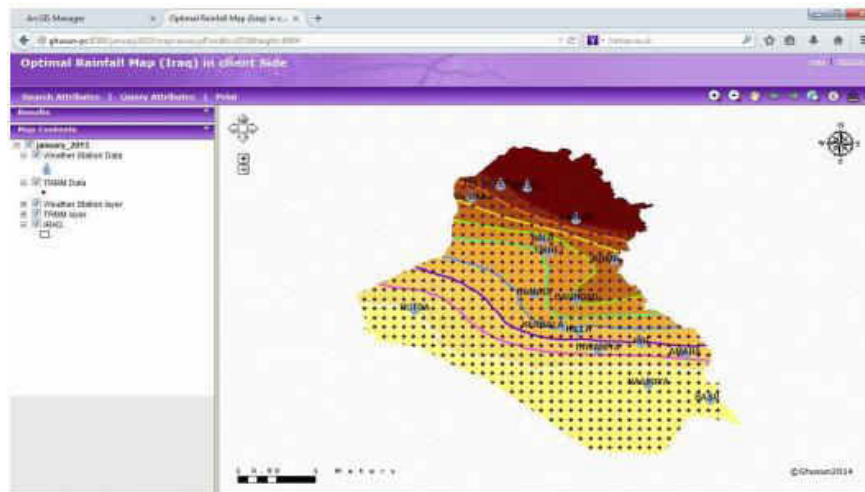


Figure (2): display map in client side

In Figure (3), the user in client side can use search task to find any station with value of geodatabase. As example client search for Baghdad station the result is displays and table of content display all values only at Baghdad station.

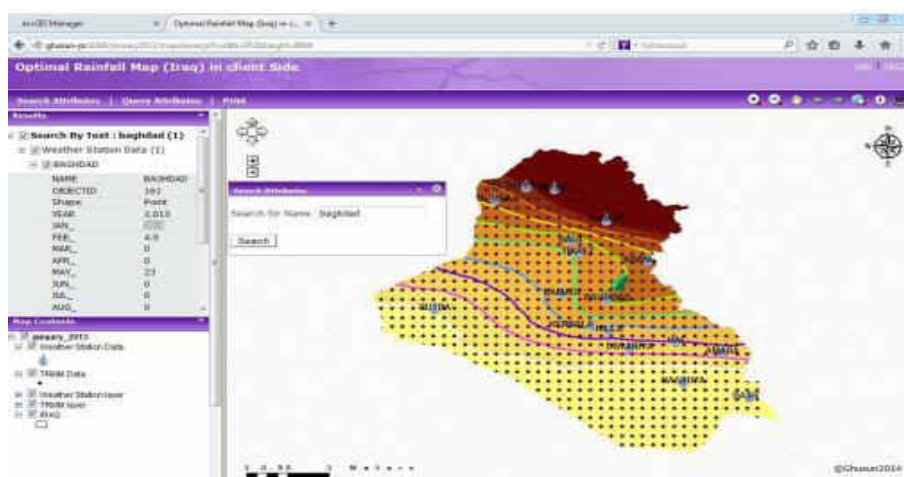


Figure (3): Searching task in GIS Server

In Figure (4), user can be identified any point in map using Identify task in GIS Server.

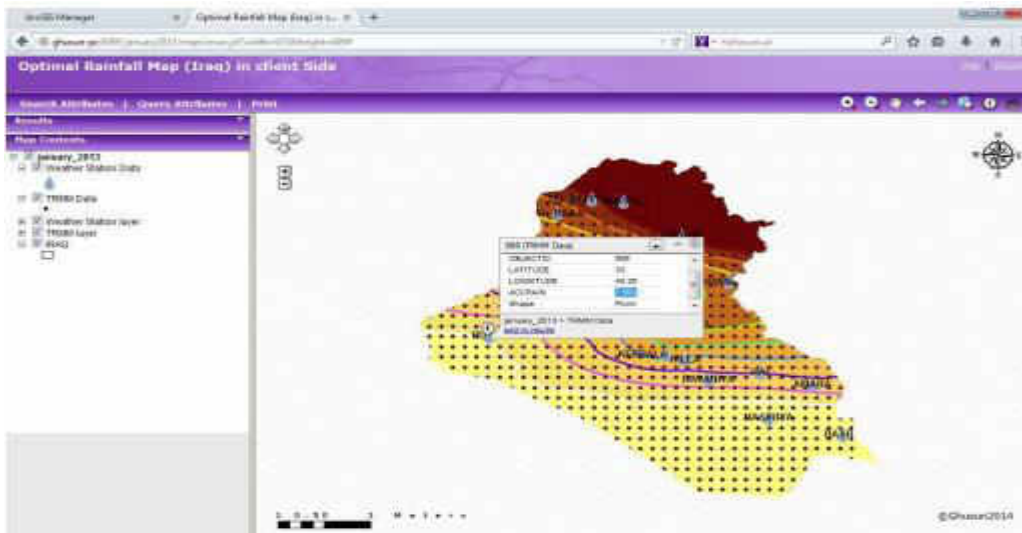


Figure (4): Identify task in GIS Server

In Figure (5), user can use Measure task to find any location with value of longitude and latitude.

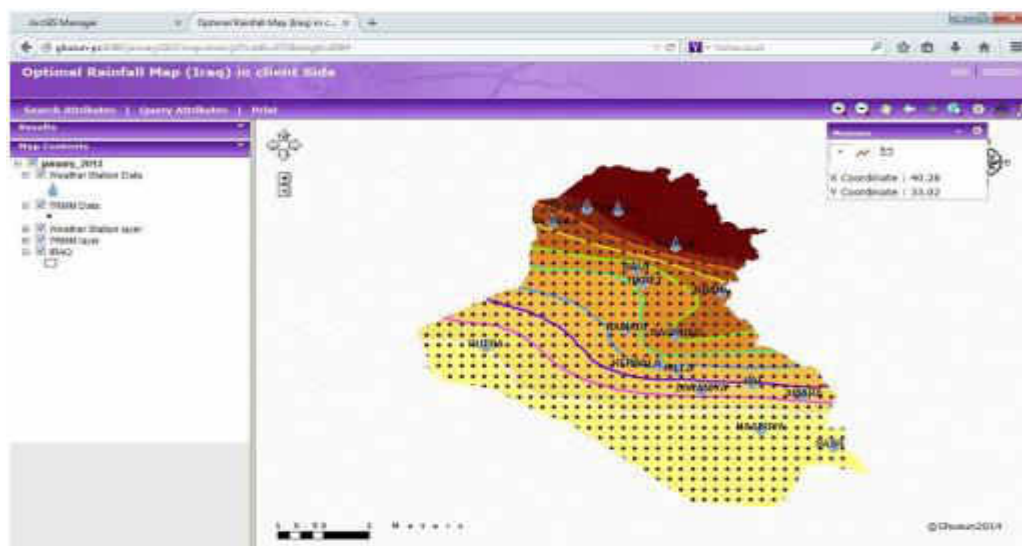


Figure (5): Measuring coordinate task in GIS Server

In Figure (6), user can use print task to print all the results from searching task and another tasks in GIS Server.

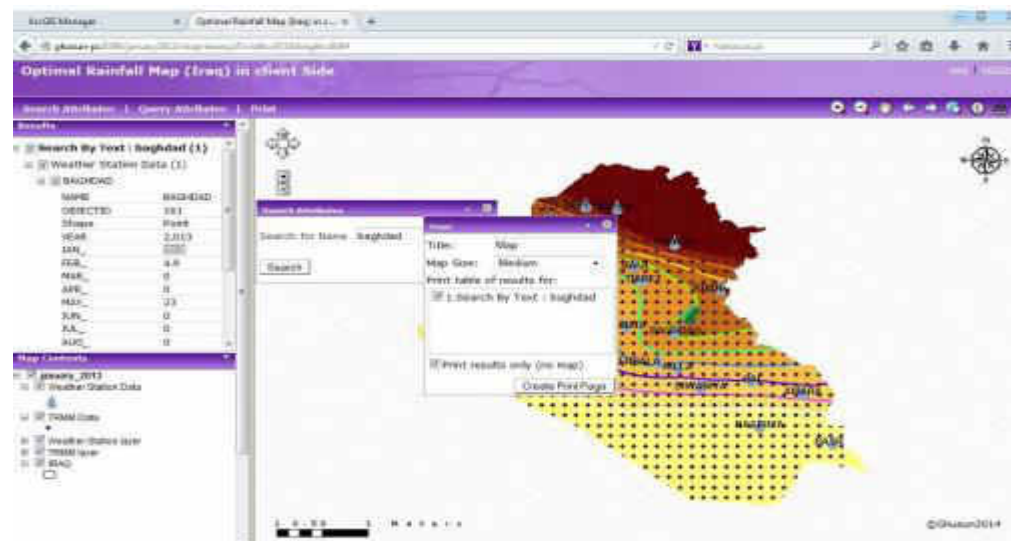


Figure (6): Printing the results in GIS Server

Conclusion:

This work is designed to minimize the user's effort with the web based methodology. In this paper we are used geo database to produce accurate maps in ArcGIS Desktop and applying them to be available on client side using GIS Server. Client can use print task to print the results from all tasks that are available in GIS Server such display map, identify point, search and measure distance between points.

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