

COMPONENTS OF GIS

There is almost as much debate over the components of a GIS as there is about its definition. At the simplest level, a GIS can be viewed as a software package with various tools to enter, manipulate, analyze and output of geographical data (Heywood et al., 2006). At the other extreme, GIS components include the computer hardware, software, spatial data, data management and analysis procedures and the peoples to operate it (Figure No:1). If the computer is located on a network, it can also be considered as the component of GIS since it enables data sharing among users. Hence, GIS is the combination of all these six components organized to automate, manage, and deliver information through geographic presentation (ESRI, 1999

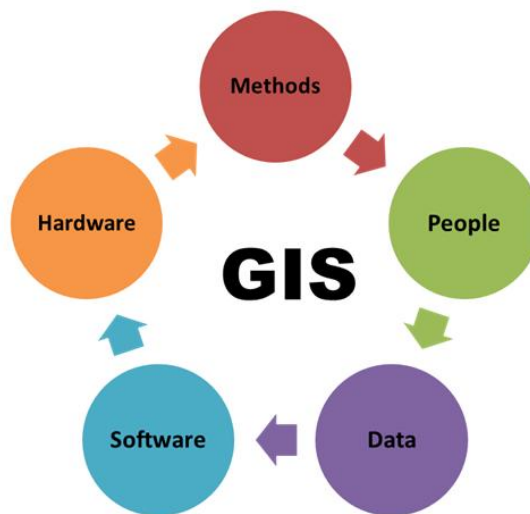


Figure- Components of GIS

Hardware

The hardware components of a GIS consist of a computer, memory (CPU or workstations), data storage devices, tape drives or others, scanners, digitizer, plotter, printers, global positioning system (GPS) units, and other physical components (Figure 2). The user controls the computer and the peripherals via a visual display unit (VDU) or terminal.

- ❖ The disk drive unit provides space for storing of map and document data in a digital format and sends them to the computer.
- ❖ The plotter used to present the results of the data processing.
- ❖ A tape or CD/DVD drive is used for storing data or programs.
- ❖ A scanner or digitizer is required to convert the analogue data into digital format.

Software components GIS software components and sub-components have several functional elements to perform different operations. All GIS software fit this requirement; except in their user interface differences

Some of the software used in GIS environment includes-

ArcGIS/Arc Info

Quantum GIS (Qgis)

ERDAS,

ENVI,

Integrated Land and Water Information System(ILWIS)

Terraset

Data

Perhaps data is the most important component of a GIS. GIS can integrate spatial data with other existing data resources stored in a DBMS. All GIS software is designed to handle spatial data (also called geographical data). GIS technology utilizes two basic data types: attribute and spatial data

Attribute data describes the characteristics of spatial features often referred to as tabular data such as a name, number of stories, depth, or population.

Spatial data refer to the real-world geographic objects such as streets, buildings, and countries, and their respective locations. They are represented in the form of vector data (points, lines and areas feature) or in the form of raster or image data (grid form). GIS processes any data that has a spatial component. This information is quite diverse—it can be aerial photographs or satellite imagery, a collection of terrain contours, digital maps of the built environment, or legal records of land ownership. However, geographic data can reside in some unexpected places (i.e. any company that keeps a database of its customers has geographic data).

People or expert

People are the key components of GIS, without which, nothing else would work or the GIS will be useless. Hence, there must always be people to plan, design, program, maintain it, supply it with data, interpret its results, implement and operate the system as well as make decisions based on the required output. People are the most complex component of GIS. This component is the most failure prone, and the only component capable of self-correcting; and able to repair other components. People may operate individually or within a group or team. Individuals may function as a GIS manager, analysts, technicians, or as a user. Almost all should have the basic knowledge needed to work with geographic data– knowledge of data sources, scale and accuracy, and software products (Heywood et al., 2006).

Procedures or method

A successful GIS operates according to a well-designed plan, business rules, procedures and methods unique to each organization. Sophisticated GIS technologies and new tools can only be used effectively if they are properly integrated into the entire business strategies and operations of any organization. It is simply not sufficient for an organization to purchase a computer with some GIS software, hire some enthusiastic individuals and expect instant success. In fact, the importance the application should not be undermined. From the application, a set of procedures will flow as a means by which organizations solve the problems inherent in the application. The procedures and software requirements will help to define a list of skills required to operate on the GIS functions, procedures, and make judgment. In summary, this component incorporates the following functions:

- ❖ Methods and procedures of data collection, encoding and storage in the GIS database,
- ❖ Methods and procedures of data quality assurance/verification to make sure that all data are correct, consistent, correct and up-to-date for analysis
- ❖ Methods and procedures of data manipulation and query,
- ❖ Methods and procedures of data preparation and transformation of different sources,
- ❖ Techniques of data retrieval, operation, analysis, representation, presentation, and dissemination; and so on.

Bibliography

<http://www.dspmuranchi.ac.in/pdf/Blog/duttasurajit34gmailcomCOMPONENTS%20OF%20GIS1.pdf>

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