

Definition of GIS:

“In the strictest sense, a GIS is a computer system capable of assembling, storing, manipulating, and displaying geographically referenced information, i.e. data identified according to their locations. Practitioners also regard the total GIS as including operating personnel and the data that go into the system.”

-----[USGS](#)

A geographic information system (GIS) is a computer-based tool for mapping and analyzing things that exist and events that happen on earth. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps.” -----

--[ESRI](#)

“GIS is an integrated system of computer hardware, software, and trained personnel linking topographic, demographic, utility, facility, image and other resource data that is geographically referenced. -

NASA

Components of GIS

Like any other information technology, GIS require following components to work with geospatial data;

1) Hardware

Hardware component of the GIS includes the following;

Item	Usage
Hard disk drive	Storing data and programs
Digital tape cassettes, Optical CD-ROM's etc.	Storage of data
Digitizer or Scanner	Converts maps and documents into digital form
Plotter, Printer or any other display device	Gives the output of data processing
Local & Global electronic network with either of the following; 1. Optical fibre data lines 2. Telephone lines with 'modem'	Provides Inter-Computer communication
Computer screen, Keyboard & mouse or other pointing device	To control the computer and the peripherals such as the digitizer, plotter, printer etc. which are linked to the computer.

Today, GIS software runs on a wide range of hardware types so the computer must have a **fast processing speed** and a **large hard drive** capable of saving many files. Because a GIS

outputs visual results, **a large high resolution monitor** and a **high quality printer** are recommended.

2) Software

GIS software provides the **functions and tools** which allow the user to input, store, manage, transform and analyse the data. Key software components include

- Tools for input and manipulation of GIS,
- Tools that supports geographic query, analysis and visualization.

There are a wide range of software packages for GIS analysis, each with its own advantages and disadvantages. Even those lists are too long to be mentioned here, the important ones are different versions of **ARC View, ARC Info, Map Info., ARC GIS, Auto Cad Map** etc. The industry leader is **ARC/INFO**, produced by Environmental System Research Institute. The same company produces a more accessible product **Arcview** that is similar to ARC/INFO in many ways.

3) Data

Possibly the most important component of a GIS is the data. A GIS without data is like a car without fuel. Without fuel, a car cannot move, likewise without data a GIS will not produce anything. **Data consists of various kinds of inputs that the system takes to produce information.** There are three ways to obtain data to be used in a GIS;

- Spatial data can be collected in house or produced by **digitizing images** from aerial photograph, published maps, satellite imageries, or conventional maps.
- Data can be purchased from **commercial data provider**,
- data can be obtained from the **federal government** at no cost.

The data obtained from various sources can be classified into two types – **spatial data** and **attribute data**. Spatial data describes the locations of spatial features while attribute data describes characteristics of spatial features. Spatial data tells us, “Where the object is?” Attribute data tells us “What the object is?” or “How much the object is?” In other words, it tells the characteristics at that location. (For more Knowledge See GIS Data Types).

4) METHODS

The procedures used are simple the steps taken in a well-defined and consistent method to produce correct and reproducible results from the GIS system.

The procedures used to input, analyze, and query data determine the quality and validity of the final product.

Procedures include how the data will be retrieved, input into the system, stored, managed, transformed, analyzed, and finally presented in a final output.

The procedures are the steps taken to answer the question needs to be resolved.

The ability of a GIS to perform spatial analysis and answer these questions is what differentiates this type of system from any other information systems.

The transformation processes includes such tasks as adjusting the coordinate system, setting a projection, correcting any digitized errors in a data set, and converting data from vector to raster or raster to vector.

5) People

GIS technology is of limited value without the people who manage the system and develop plans for applying it to real-world problems. GIS users range from technical specialists who design and maintain the system to those who use it to help them perform their everyday work.

There are basically three groups of people: –

Geographic Information Viewer – Viewers are the public at large whose only need is to browse a geographic database for referential material. These constitute the largest class of users.

The General GIS user – General Users are people who use GIS to conducting business, performing professional services, and making decisions. They include facility managers, resource managers, planners, scientists, engineers, lawyers, business entrepreneurs, etc.

GIS specialist- GIS specialists are the people who make the GIS work. They include GIS managers, database administrators, application specialists, systems analysts, and programmers. They are responsible for the maintenance of the geographic database and the provision of technical support to the other two classes of users.