



## INTRODUCTION

A **Geographical Information System (GIS)** is a conceptualized framework that provides the ability to capture and analyse spatial and geographic data. GIS applications are computer-based tools that allow the user to create interactive queries. It store and edit spatial and non-spatial data, analyse spatial information output, and visually share the results of these operations by presenting them as maps. Geographic information systems are utilized in multiple technologies, processes, techniques and methods. It is attached to various operations and numerous applications that relate to: engineering, planning, management, transport/logistics, insurance, telecommunications, and business

## MAIN ELEMENTS OF GIS

A working GIS integrates five key components

- ❖ People
- ❖ Method
- ❖ Data
- ❖ Hardware
- ❖ Software

### **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.

### **METHOD**

A successful GIS operates according to a well-designed plan and business rules, which are the models and operating practices unique to each organization.

### **DATA**

Possibly the most important component of a GIS is the data. Geographic data and related tabular data can be collected in-house or purchased from a commercial data provider. A GIS will integrate spatial data with other data resources and can even use a DBMS, used by most organizations to organize and maintain their data, to manage spatial data.



## **HARDWARE**

Hardware is the computer on which a GIS operates. Today, GIS software runs on a wide range of hardware types, from centralized computer servers to desktop computers used in stand-alone or networked configurations.

## **SOFTWARE**

GIS software provides the functions and tools needed to store, analyze, and display geographic information. Key software components are:

- Tools for the input and manipulation of geographic information
- A database management system (DBMS)
- Tools that support geographic query, analysis, and visualization
- A graphical user interface (GUI) for easy access to tools.

## **WORKING**

A GIS stores information about the world as a collection of thematic layers that can be linked together by geography. This simple but extremely powerful and versatile concept has proven invaluable for solving many real-world problems from tracking delivery vehicles, to recording details of planning applications, to modelling global atmospheric circulation.

## **GEOGRAPHIC REFERENCES:**

Geographic information contains either an explicit geographic reference such as a latitude and longitude or national grid coordinate, or an implicit reference such as an address, postal code, census tract name, forest stand identifier, or road name. An automated process called geocoding is used to create explicit geographic references (multiple locations) from implicit references (descriptions such as addresses). These geographic references allow you to locate features such as a business or forest stand and events such as an earthquake on the Earth's surface for analysis.

## **VECTOR AND RASTER MODELS:**

Geographic information systems work with two fundamentally different types of geographic models--the "vector model" and the "raster model." In the vector model, information about points, lines, and polygons is encoded and stored as a collection of x,y coordinates. The location of a point feature, such as a bore hole, can be described by a single x,y coordinate. Linear features, such as roads and rivers, can be stored as a collection of point coordinates. Polygonal features, such as sales territories and river catchments, can be stored as a closed loop of coordinates. The vector model is extremely useful for describing discrete



features, but less useful for describing continuously varying features such as soil type or accessibility costs for hospitals. The raster model has evolved to model such continuous features. A raster image comprises a collection of grid cells rather like a scanned map or picture. Both the vector and raster models for storing geographic data have unique advantages and disadvantages. Modern GISs are able to handle both models.

## APPLICATION OF GIS

- ✚ Mapping
- ✚ Telecom and Network Services
- ✚ Accident Analysis and Hot Spot Analysis
- ✚ Urban planning
- ✚ Transportation Planning
- ✚ Environmental Impact Analysis
- ✚ Agricultural Applications
- ✚ Disaster Management and Mitigation
- ✚ Navigation
- ✚ Flood damage estimation
- ✚ Natural Resources Management
- ✚ Banking
- ✚ Taxation
- ✚ Surveying
- ✚ Geology
- ✚ Assets Management and Maintenance
- ✚ Planning and Community Development
- ✚ Dairy Industry
- ✚ Irrigation Water Management
- ✚ Pest Control and Management

## ADVANTAGES OF GIS

- ✚ It has the ability of improving the organizational integration. GIS would then integrate software, hardware and also data in order to capture, analyse, manage and so display all forms of information being geographically referenced.



# GEOGRAPHICAL INFORMATION SYSTEM



- ✚ GIS would also allow viewing, questioning, understanding, visualizing and interpreting the data into numbers of ways which will reveal relationships, trends and patterns in the form of globes, maps, charts and reports.
- ✚ Geographic Information System is to provide a help in answering questions as well as solve problems through looking at the data in a way which is easily and quickly shared.
- ✚ GIS technology could also be integrated into framework of any enterprise information system and there would be numbers of employment opportunities.

## DISADVANTAGES OF GIS

- ✚ GIS technology might be considered as expensive software.
- ✚ It as well requires enormous data inputs amount that are needed to be practical for some other tasks and so the more data that is to put in.
- ✚ Since the earth is round and so there would be geographic error that will increase as you get in a larger scale.
- ✚ GIS layers might lead to some costly mistakes once the property agents are to interpret the GIS map or the design of the engineer around the utility lines of the GIS.
- ✚ There might be failures in initiating or initiating additional effort in order to fully implement the GIS but there might be large benefits to anticipate as well.