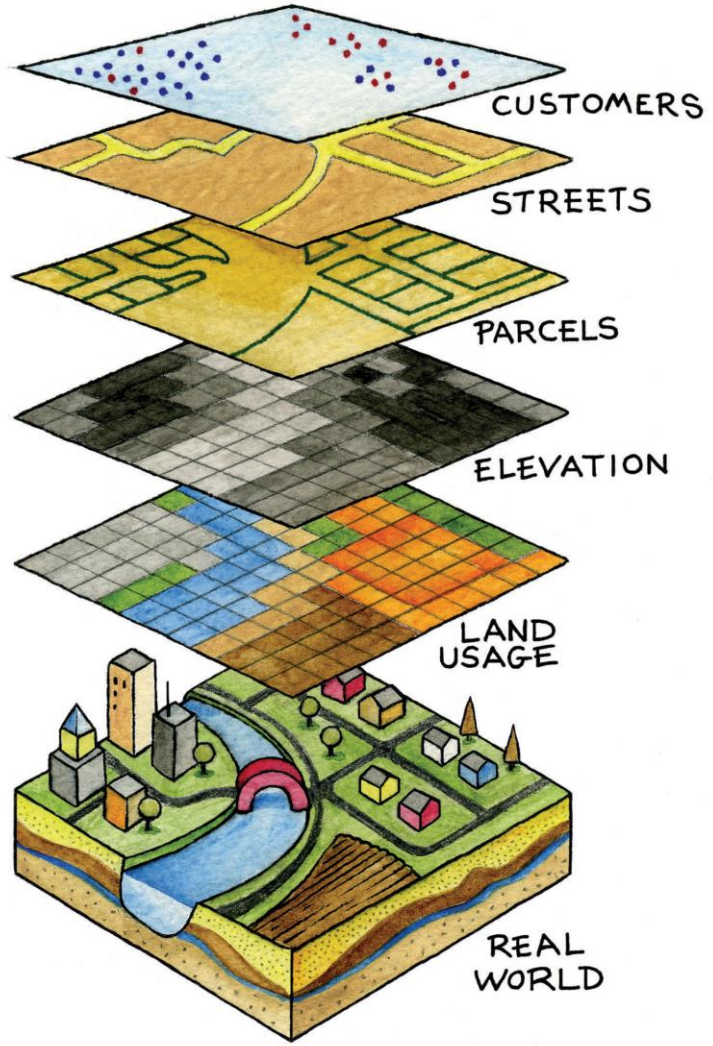
Introduction and About GIS

➢ What is GIS ?

❑ **Geographic Information Technologies** are technologies for collecting and dealing with geographic information.

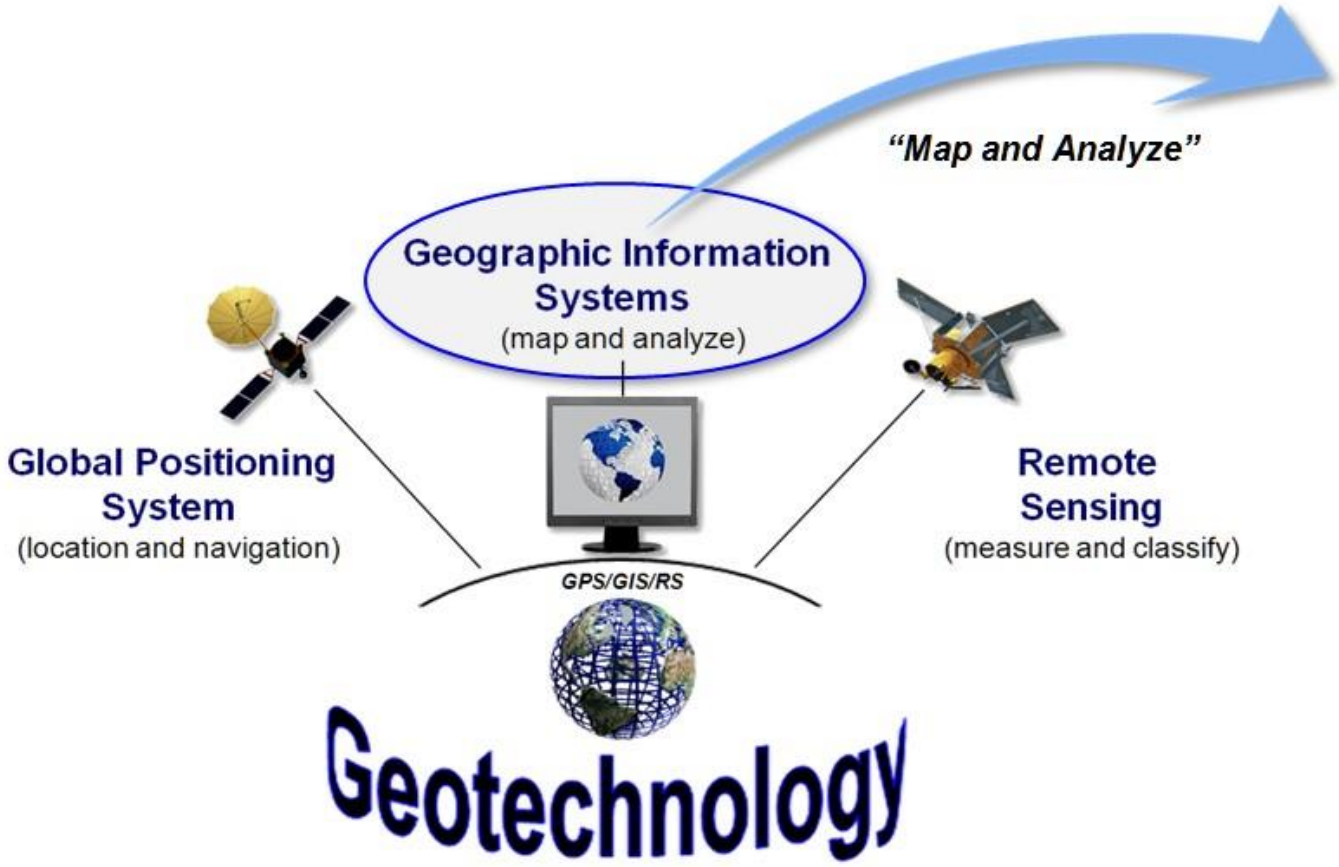
➢ There are three main types:

- **Geographic Information System (GIS)**
- Global Positioning System (GPS)
- Remote Sensing (RS)



Introduction and About GIS

➢ **What is GIS ?**



*...**GIS** is both a **Technological Tool** involving —*

*–**Mapping** that creates a spatial representation of an area*

*–**Display** that generates visual renderings of a mapped area*

*–**Geo-query** that searches for map locations having a specified classification, condition or characteristic*

*and an **Analytical Tool** involving —*

*–**Spatial Mathematics** that applies scalar mathematical formulae to account for geometric positioning, scaling, measurement and transformations of mapped data*

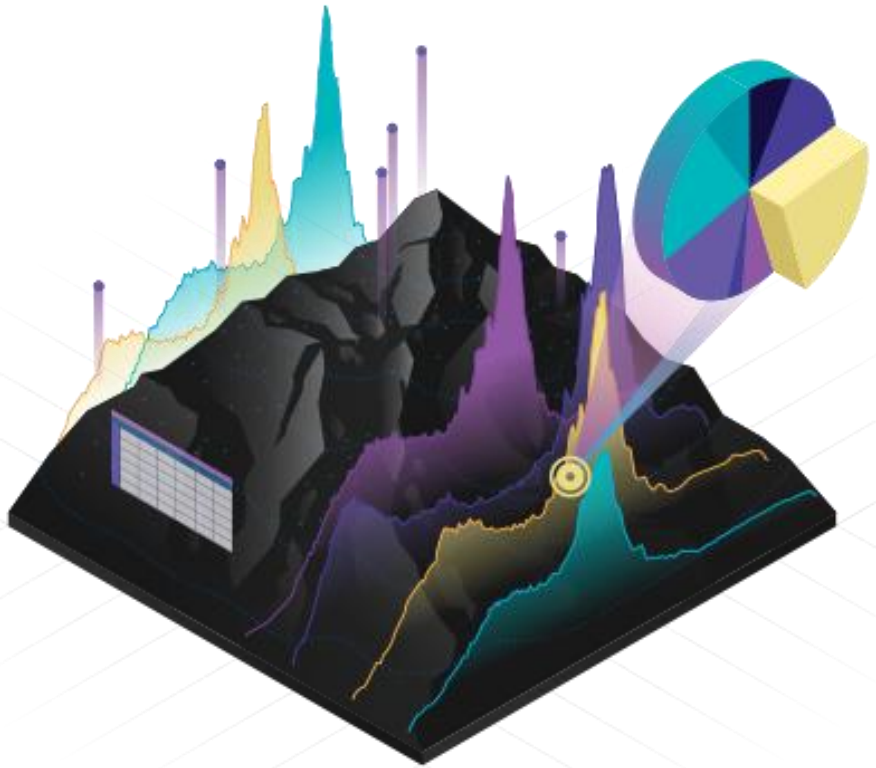
*–**Spatial Analysis** that investigates the contextual relationships within and among mapped data layers*

*–**Spatial Statistics** that investigates the numerical relationships within and among mapped data layers*

Introduction and About GIS

➢ What is GIS ?

- A geographic information system (GIS) is a system that **creates, manages, analyzes, and maps all types of data.**
- **GIS connects data to a map**, integrating location data (where things are) with all types of descriptive information (what things are like there).
- This provides a **foundation for mapping and analysis** that is used in science and almost every industry.
- GIS helps users **understand patterns, relationships, and geographic context.**
- The benefits include improved communication and efficiency as well as **better management and decision making.**

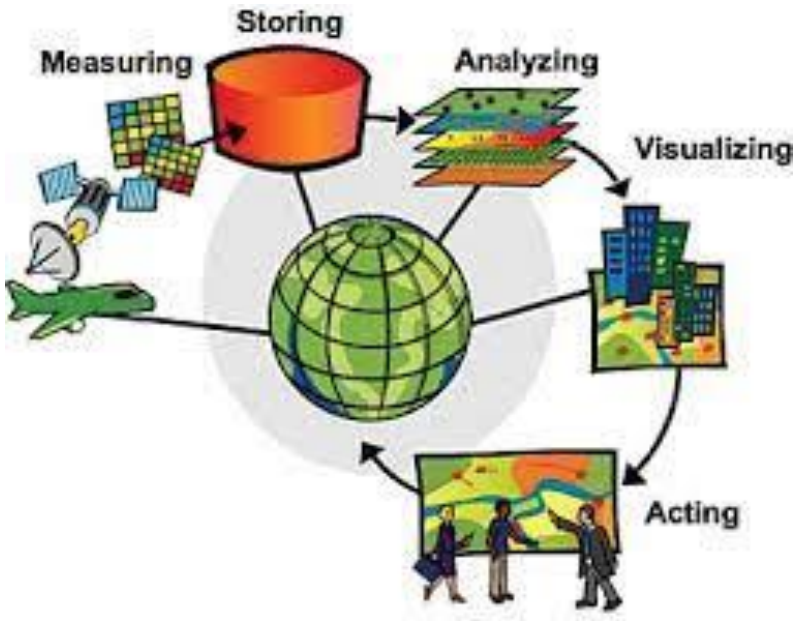


Introduction and About GIS

➢ What is GIS ?

- Geographic Information Systems (GIS) are defined differently **different disciplines** their wide range of uses

- **Here, will briefly define a GIS as a computer system where coordinated spatial data can be entered analyzed, and visually presented**

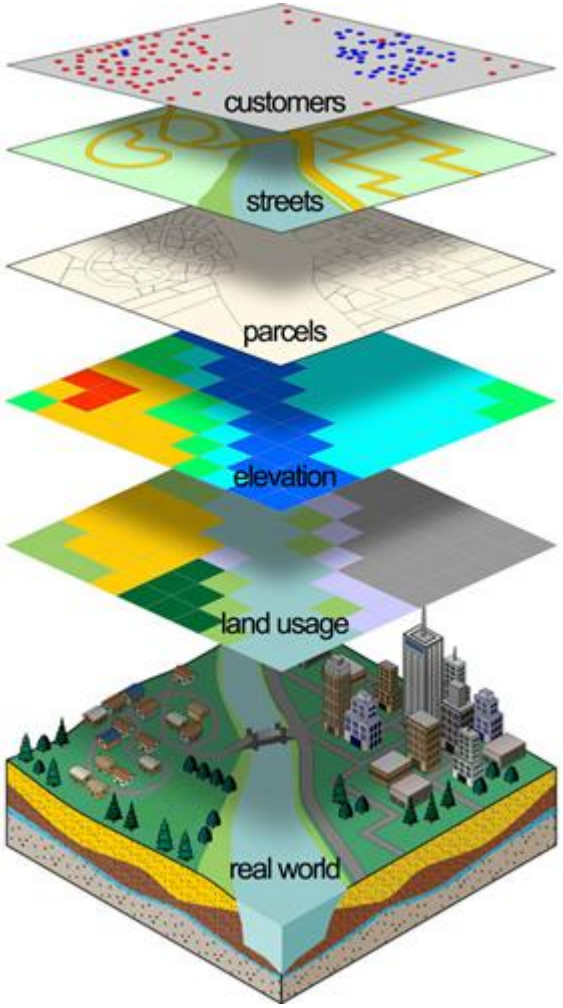


- **Geography**
- Geology
- Geophysics
- Oceanography
- Archaeology
- Agriculture
- Biology, particularly ecology, biogeography
- Environmental science
- Sociology
- Political science
- Anthropology
- and many more

Introduction and About GIS

➢ What is GIS ?

❑ **A Geographic Information System (GIS)** *is a computer-based system including software, hardware, people, and geographic information.*



A GIS can:

create, edit, query, analyze, and display map information on the computer

Geographic

- 80% of government data collected is associated with some location in space

Information

- attributes, or the characteristics (data), can be used to symbolize and provide further insight into a given location

System

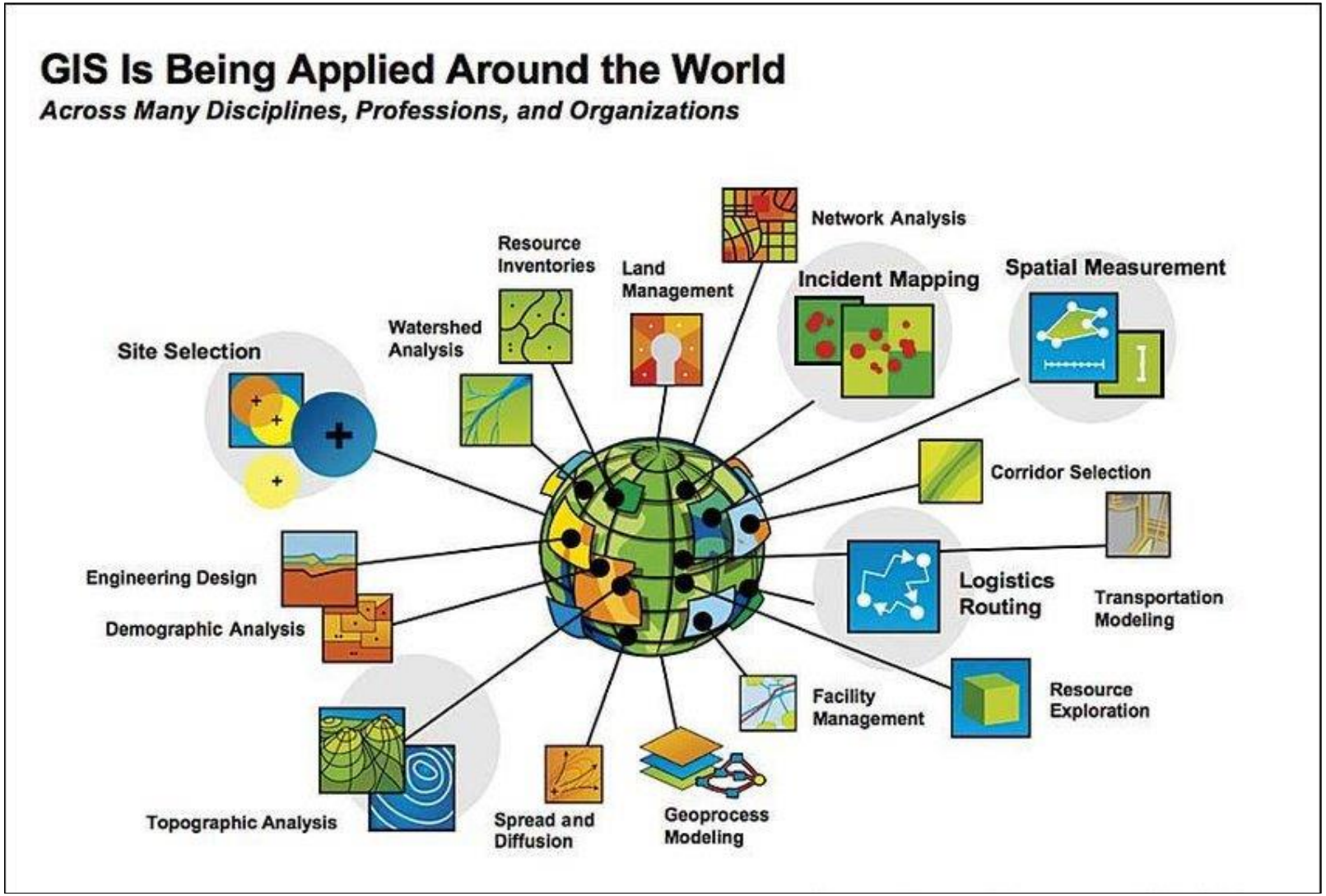
- a seamless operation linking the information to the geography – which requires hardware, networks, software, data, and operational procedures

Introduction and About GIS

What is GIS ?

- A computer system for
  - collecting,
  - storing,
  - manipulating,
  - analyzing,
  - displaying,
  - querying,
  - reporting

  geographically related information.



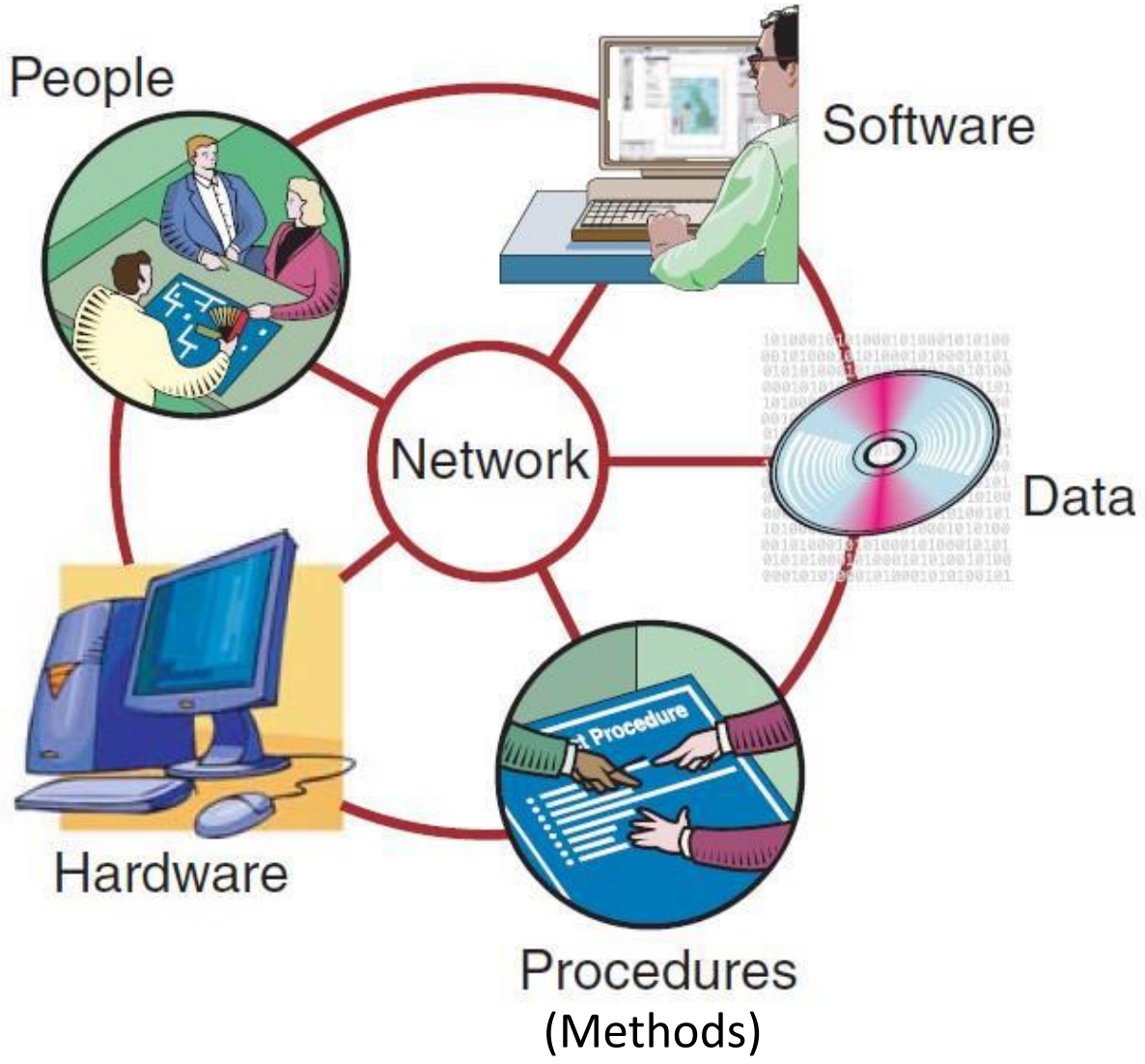
Introduction and About GIS

➢ Components of GIS

- GIS components include computer **hardware**, **software**, spatial **data**, data management, **analysis procedures (methods)**, and the **people** operating it.

- The computer on a **network** can also be considered a GIS component since it enables user data sharing.

- Hence, **GIS combines all these six components** organized to automate, manage, and deliver information through geographic presentation (ESRI, 1999).



Introduction and About GIS

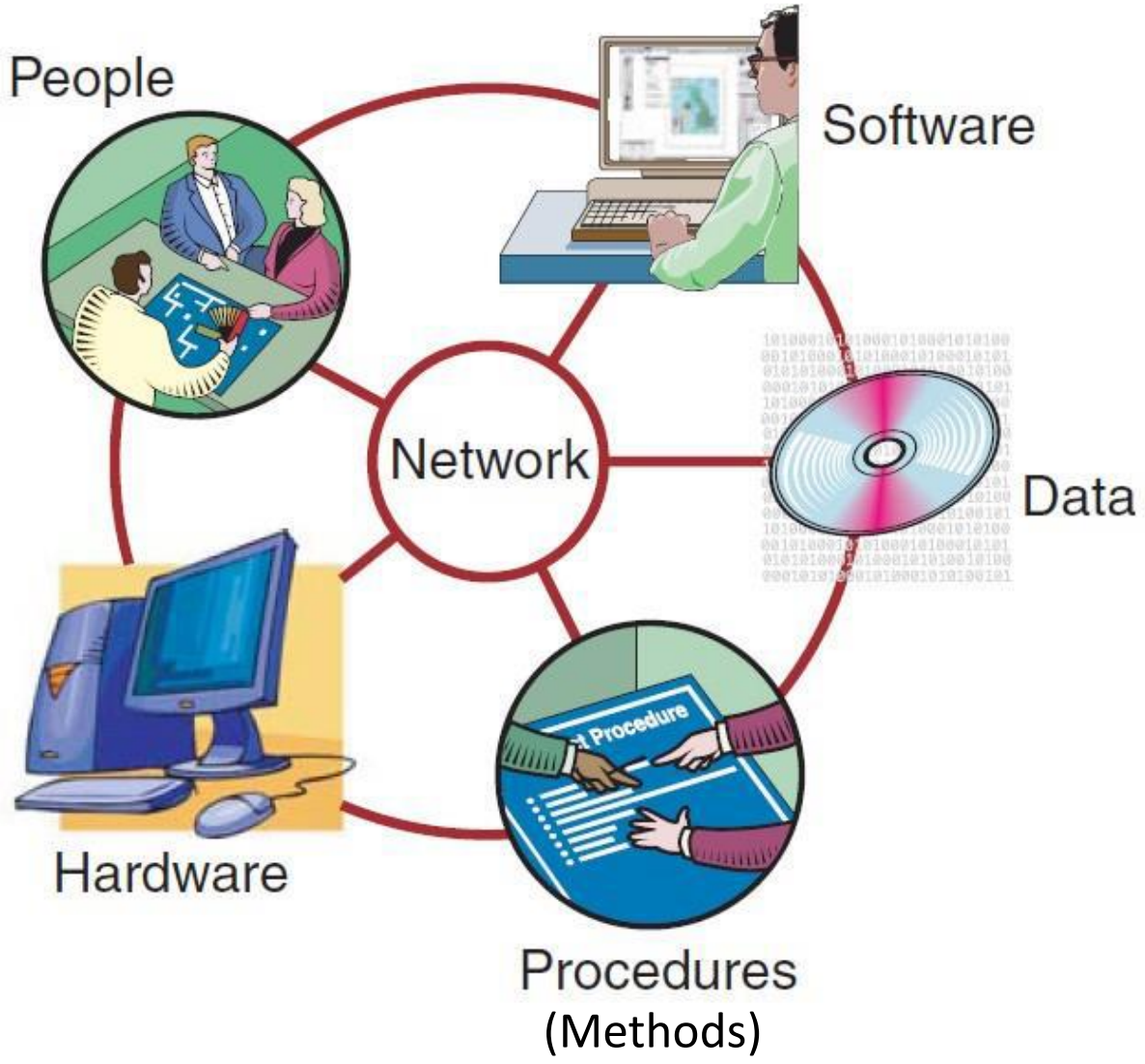
➢ Components of GIS

1- Software

GIS software provides the functions and tools needed to **store, analyze, and display geographic information.**

Key software components are:

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

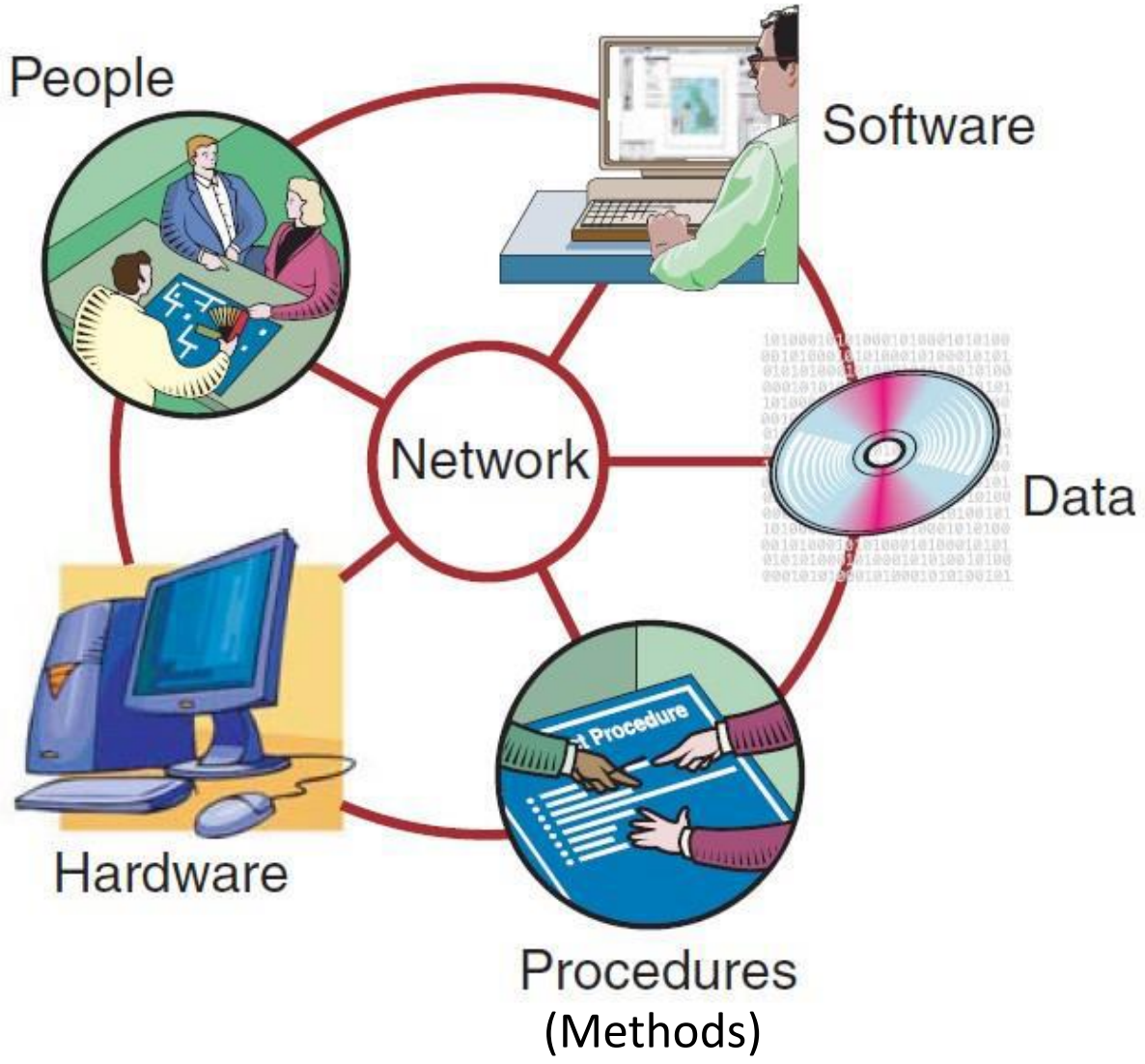


Introduction and About GIS

➢ Components of GIS

2- 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.

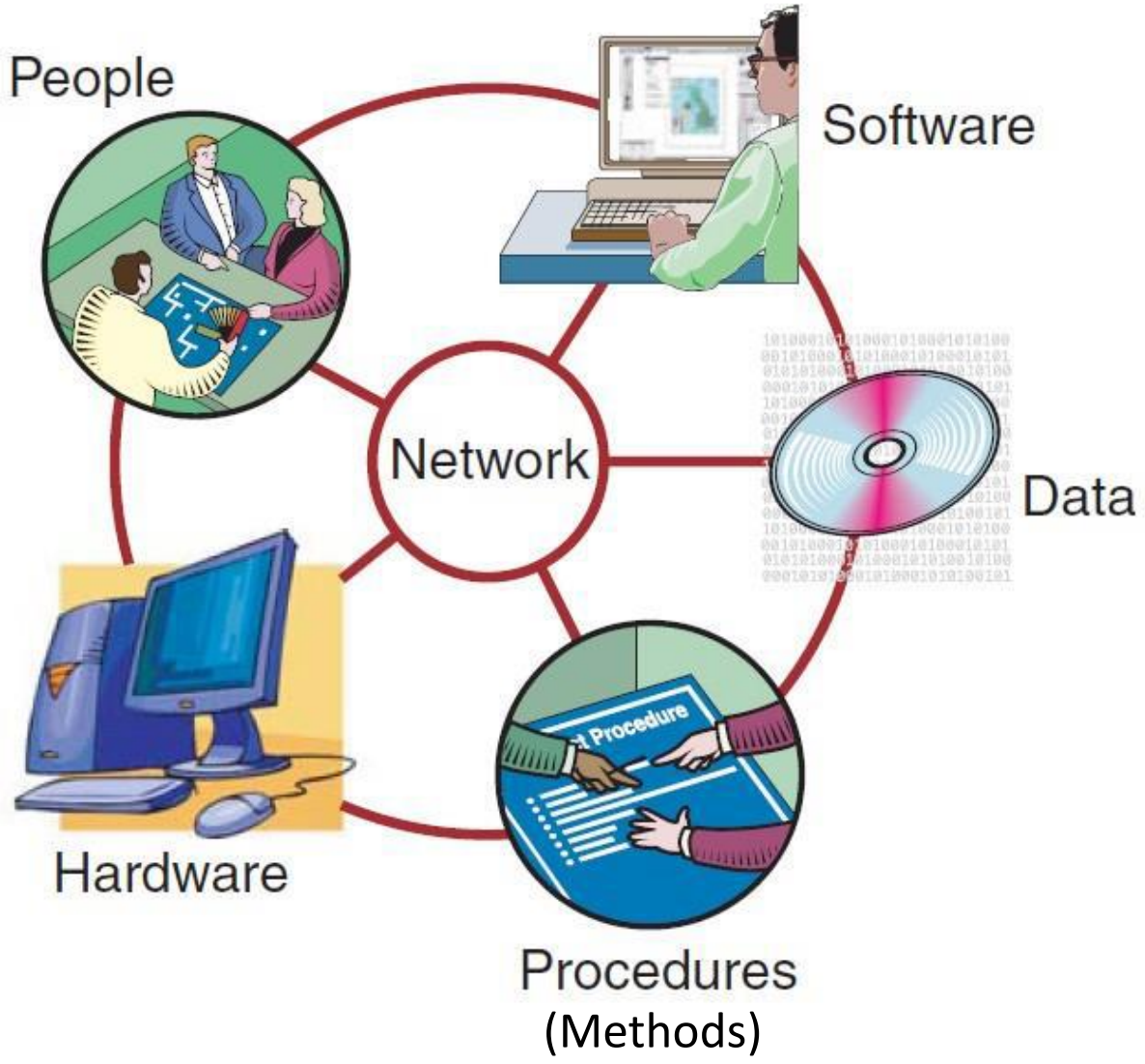


Introduction and About GIS

➢ Components of GIS

3- Methods

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



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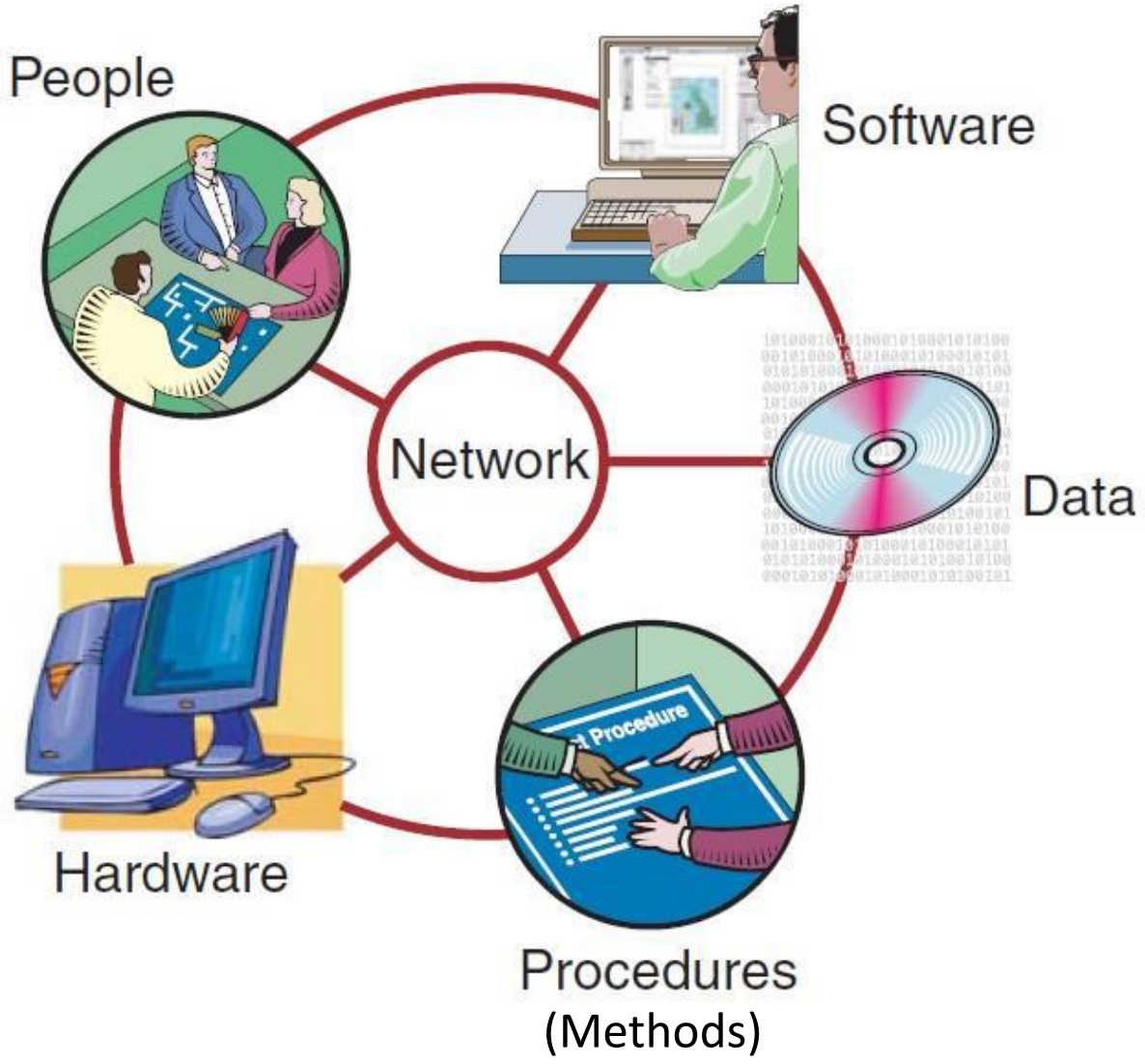
➢ Components of GIS

4- Hardware

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

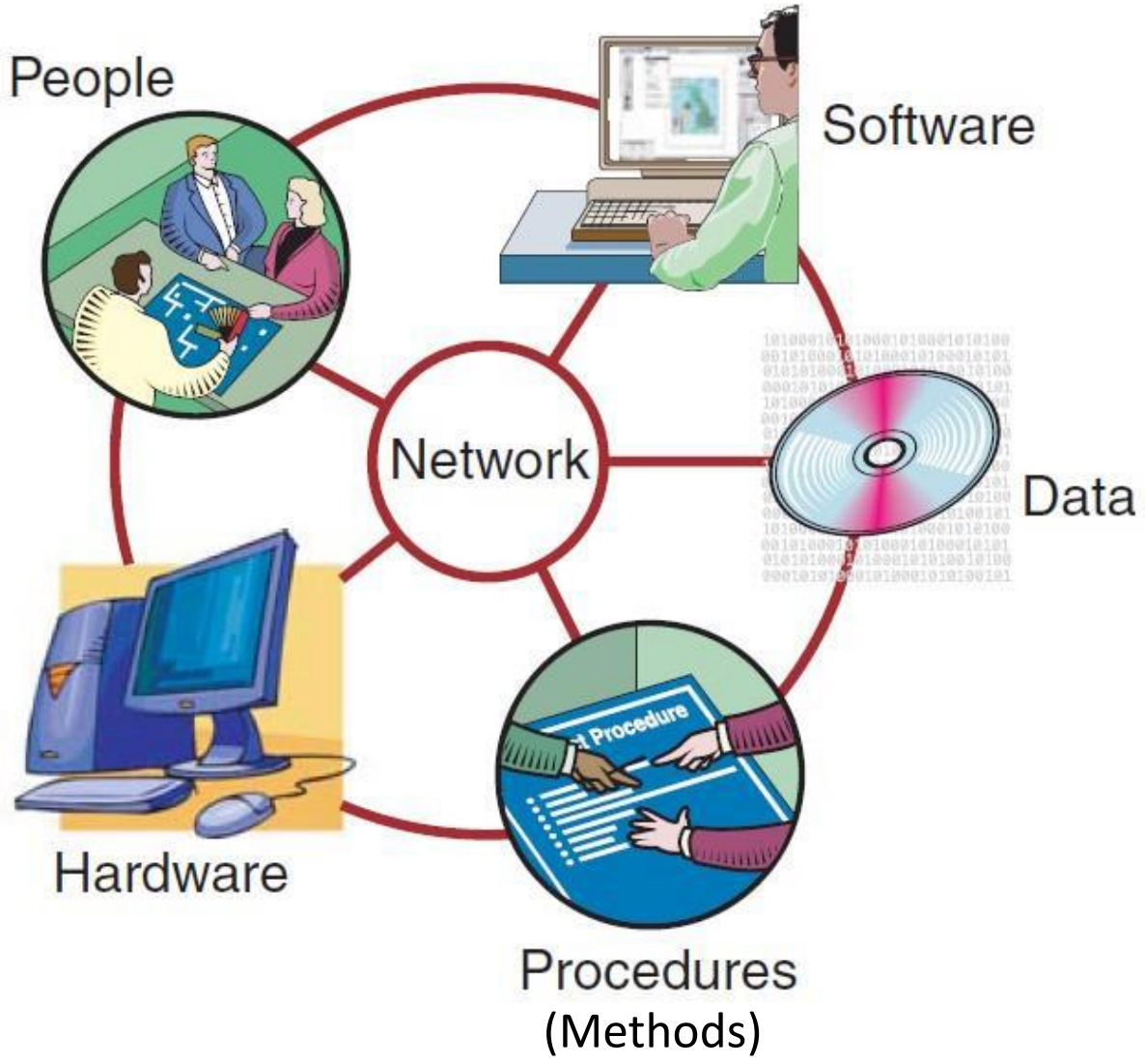


Introduction and About GIS

➢ Components of GIS

5- People

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

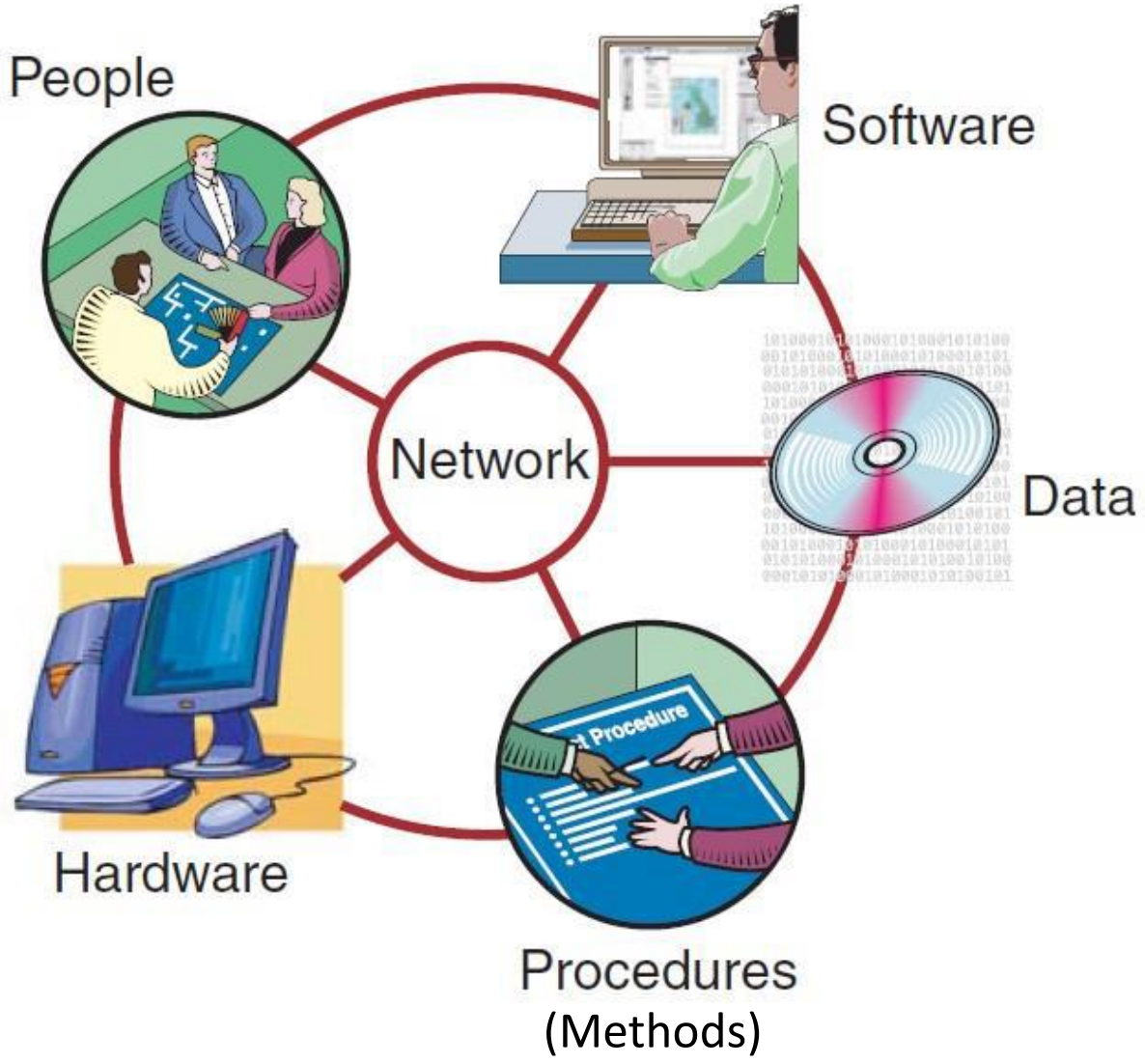


Introduction and About GIS

➢ Components of GIS

6- Network

- Today, the **most fundamental component of GIS** is probably the network.
- Without rapid development of IT, the network, there is no rapid communication or sharing of digital information could occur, except between a small group of people crowded around a computer monitor.
- Users connected to the Internet could zoom in to parts of the map, or pan to other parts in their desktop WWW browser without ever needing to install specialized software or download large amounts of data.
- **The Internet is increasingly integrated into the GIS.**



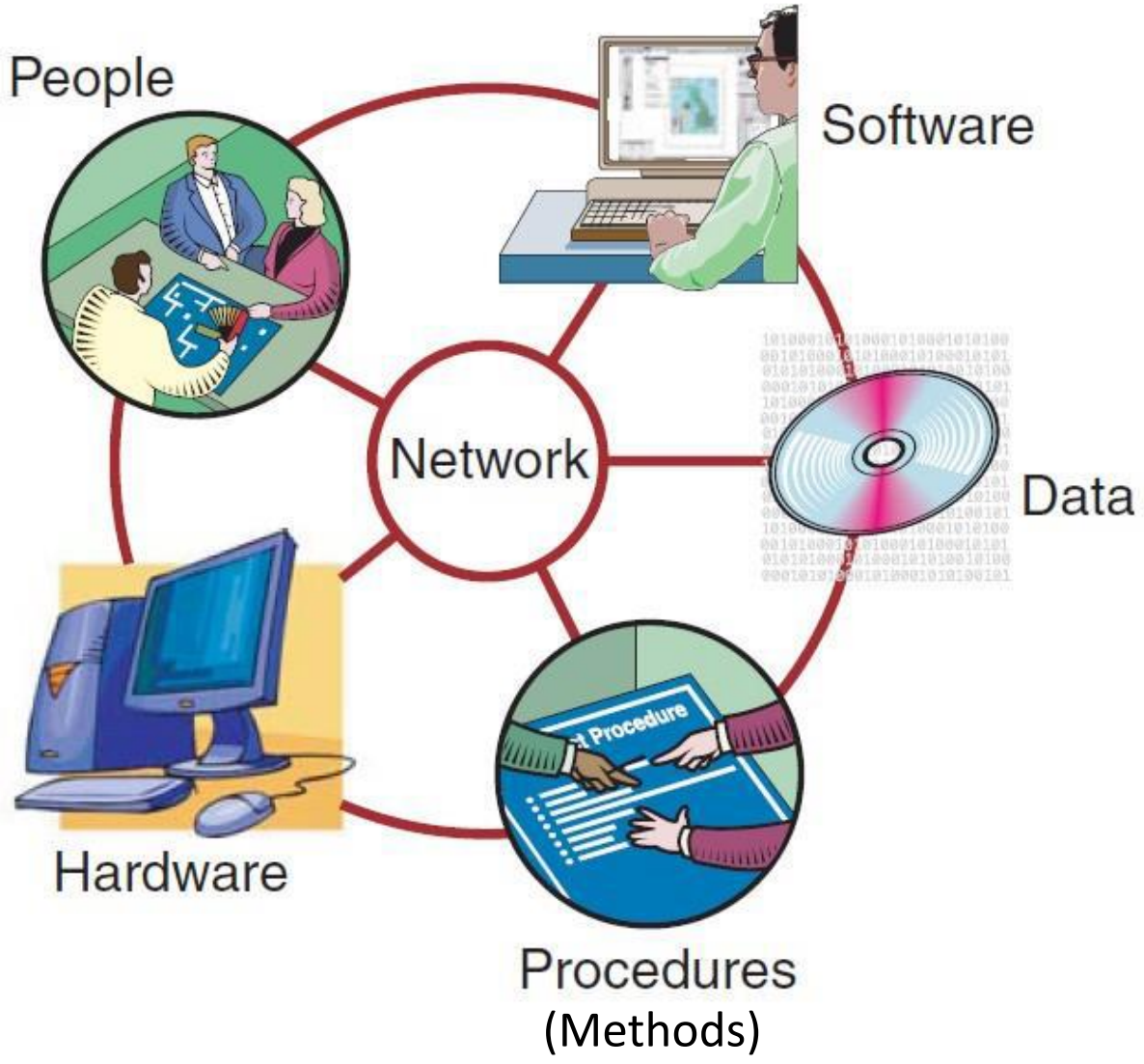
Introduction and About GIS

➢ Components of GIS

6- Network

The rapidly growing application of Web GIS has the following capabilities:

- **Displaying static maps** which users can pan or zoom whilst online;
- **Creating user-defined maps online** which are in turn used to generate reports and new maps from data on a server;
- **integrating users 'local data with data from the Internet;**
- Providing data that are kept secure at the server site;
- Providing maps through high-speed intranets within organizations;
- **Providing maps and data across the Internet to a global audience**



Introduction and About GIS

➢ Components of GIS

✓ dedicated GIS workstation

✓ desktop GIS

✓ GIS on hand-held devices

✓ GIS on hand-held devices

Introduction and About GIS

➢ **Components of GIS**

✓ People are a key component of GIS

References

- Burrough, P. A., McDonnell, R. A., & Lloyd, C. D. (2015). Principles of geographical information systems. Oxford university press.
- Turoğlu, H. (2016). Coğrafi Bilgi Sistemlerinin Temel Esasları. İstanbul: Çantay Yayınları.
- Campbell, J. E., & Shin, M. (2011). Essentials of geographic information systems. https://www. saylor. org/books/.
- https://www.rst2.org/ties/GENTOOLS/comp_gis.html