

GEOGRAPHIC INFORMATION SYSTEM (GIS)

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What is Geographic Information Systems (GIS)?

"GIS turns data into knowledge and maps into insights—because everything happens somewhere."





What is Geographic Information Systems (GIS)?

- ❑ Geographic Information Systems (GIS) refer to a system that integrates hardware, software, and human resources to facilitate the **storage, analysis, querying, and visualization** of geospatial data,
 - ❑ GIS enables the processing and presentation of various data through different analytical methods, ultimately generating **maps, reports, and graphical representations** for decision-making purposes.
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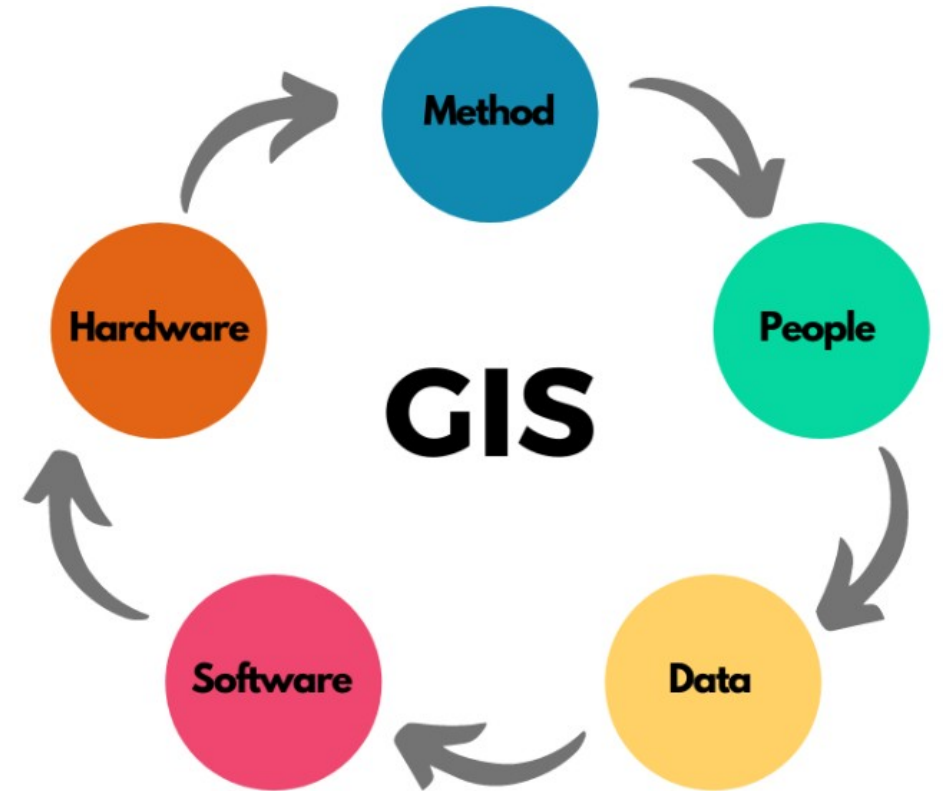
Components of GIS

❑ Hardware

Hardware in GIS refers to technological tools that support the operation of GIS software, data processing, and analysis.

Examples include:

- Computers
- Tablets
- Smartphones

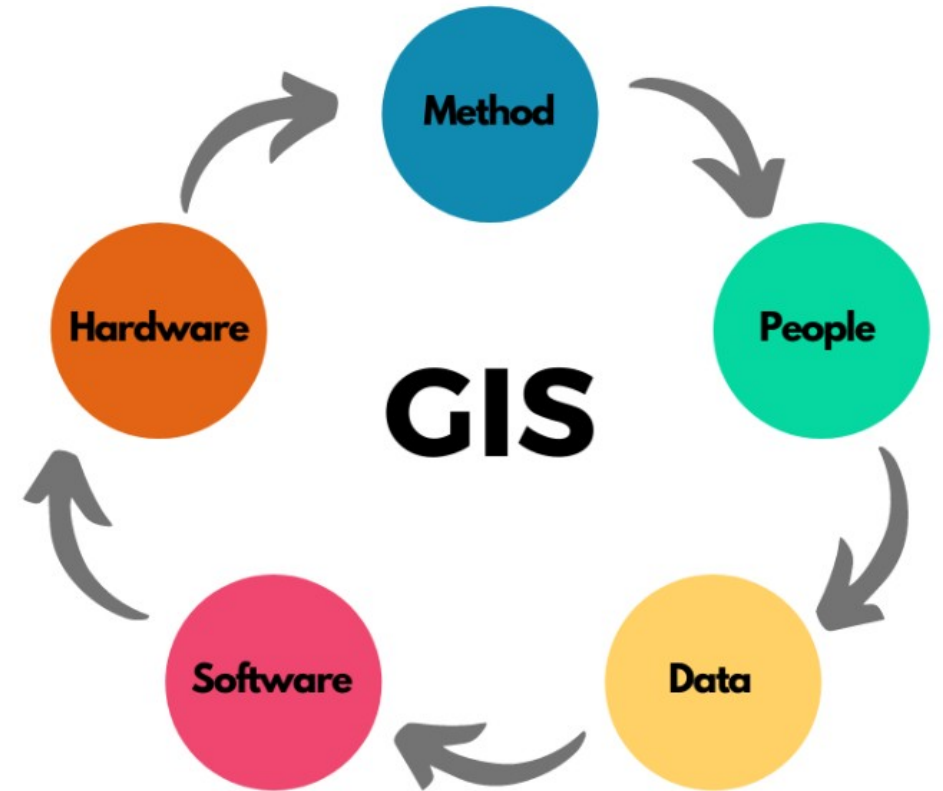


Components of GIS

❑ Software

GIS software is essential for visualizing, processing, and presenting geospatial data. Some common GIS software products include:

- Database Management Systems (Oracle Spatial, ArcSDE, PostGIS, etc.)
- Desktop GIS Applications (ArcGIS, MapInfo, Netcad, QGIS, Idrisi, etc.)
- Geo-Web Servers (ArcGIS for Server, MapServer, GeoServer, Mapnik, etc.)



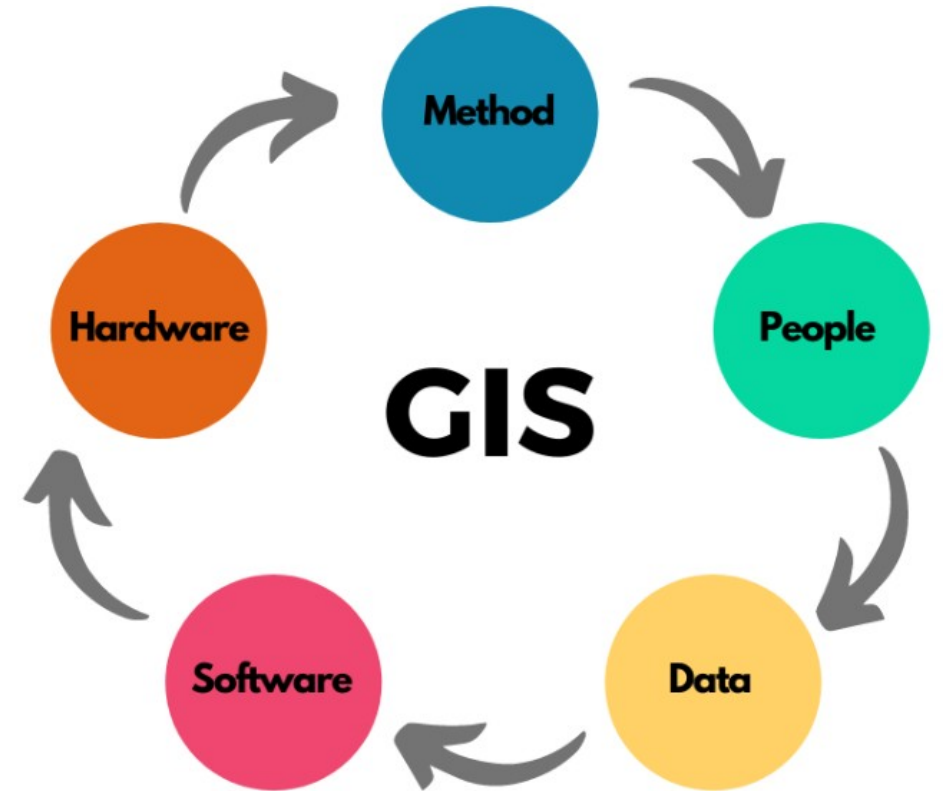
Components of GIS

❑ Data

Data is the most critical component of GIS. Without data, GIS operations cannot be performed.

❑ Methods

Once data is acquired, it must be analyzed using appropriate methodologies based on the intended purpose of the study.





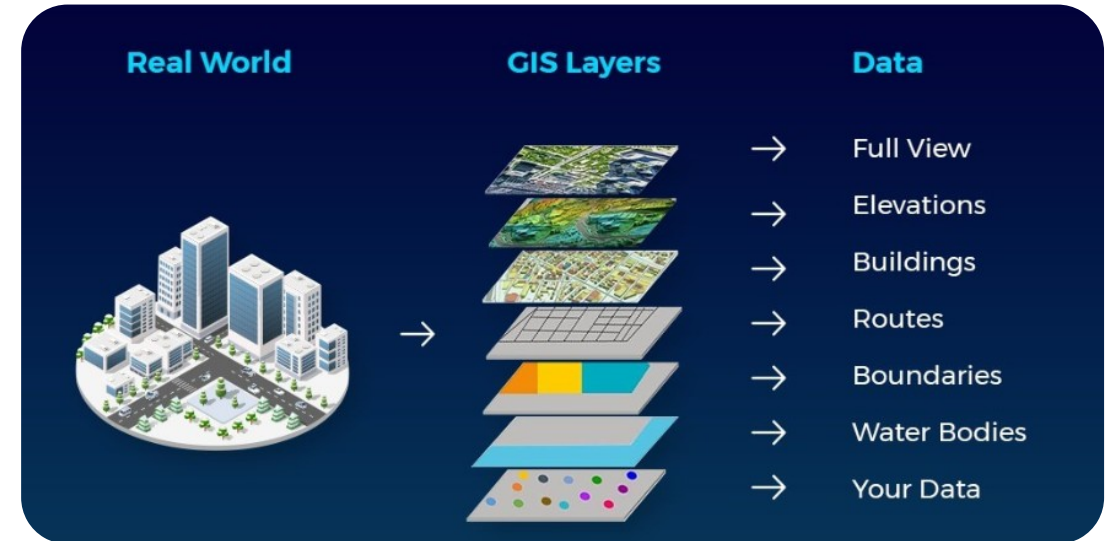
Objectives of GIS

- ❑ GIS is a powerful technology that integrates **spatial and non-spatial data** to **analyze, visualize, and interpret patterns, relationships, and trends**. The objectives of GIS can be categorized into several key areas:

Objectives of GIS

❑ Data Management and Integration

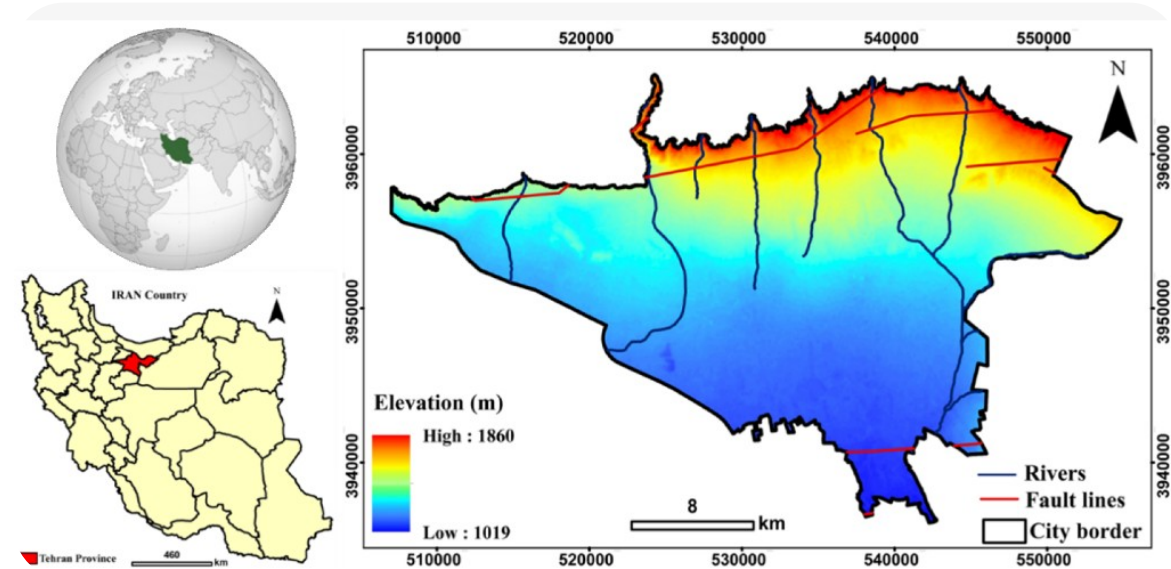
- Collect, store, manage, and retrieve spatial data efficiently.
- Integrate data from different sources such as satellite imagery, maps, GPS, and remote sensing.
- Maintain spatial databases for various applications like urban planning, environmental monitoring, and transportation.



Objectives of GIS

❑ Spatial Analysis and Decision Support

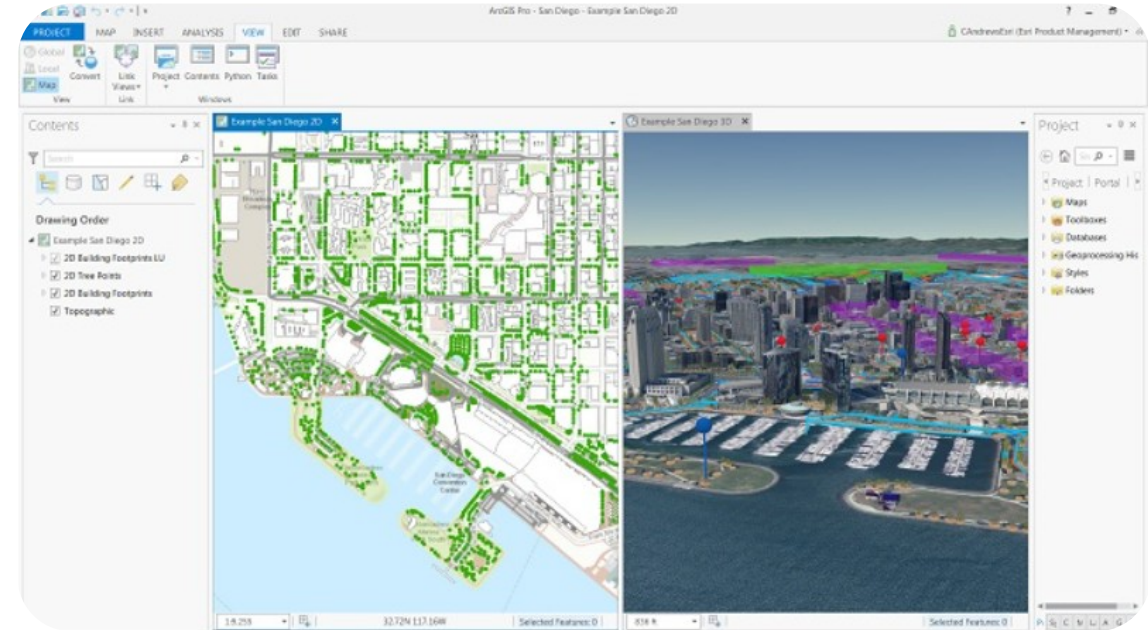
- Perform spatial analysis to identify trends, patterns, and relationships in geographic data.
- Support decision-making in urban planning, disaster management, resource allocation, and environmental conservation.
- Use spatial modeling and predictive analytics to forecast future scenarios.



Objectives of GIS

❑ Mapping and Visualization

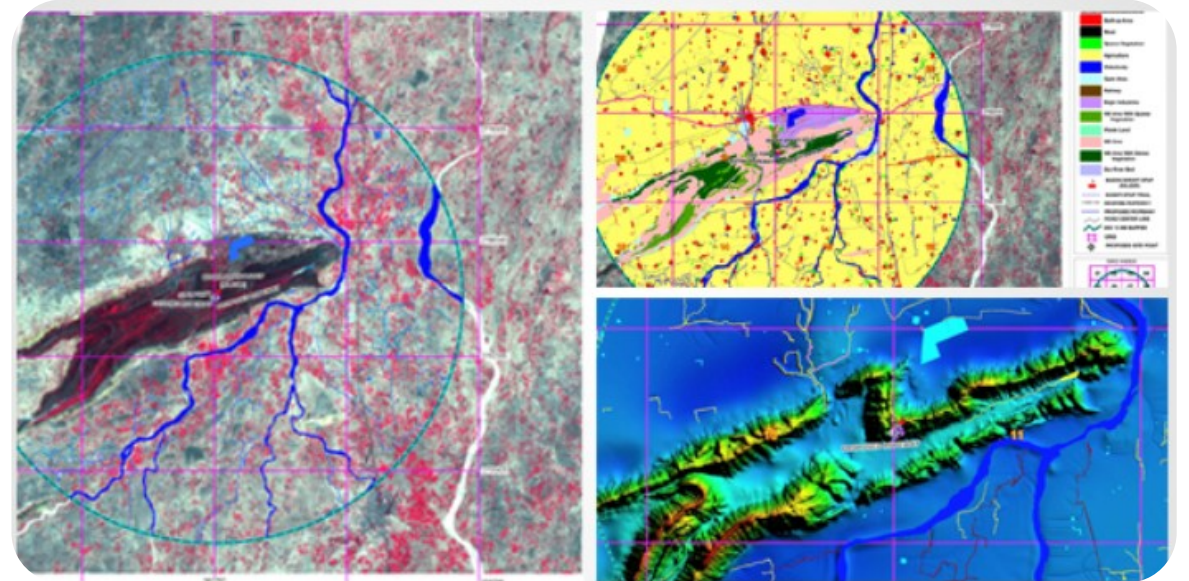
- Create accurate and interactive maps for better understanding and communication.
- Generate thematic maps (e.g., climate maps, population density maps, land-use maps) for various sectors.
- Develop 3D visualization and geospatial simulations for urban development and infrastructure projects.



Objectives of GIS

❑ Environmental and Natural Resource Management

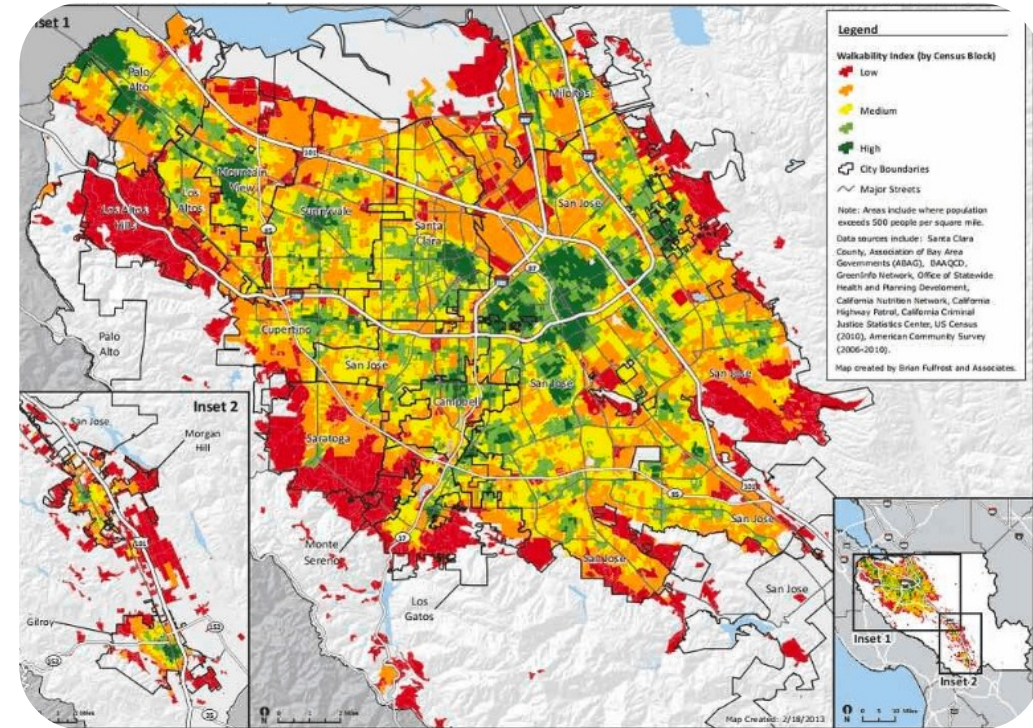
- Monitor and analyze environmental changes such as deforestation, air pollution, and water quality.
- Manage natural resources like forests, water bodies, and mineral deposits.
- Support conservation efforts by identifying areas of ecological importance and vulnerability.



Objectives of GIS

❑ Urban and Regional Planning

- Assist in land-use planning, zoning regulations, and infrastructure development.
- Optimize site selection for facilities such as schools, hospitals, and public transportation.
- Improve traffic management, transportation networks, and smart city initiatives.



Objectives of GIS

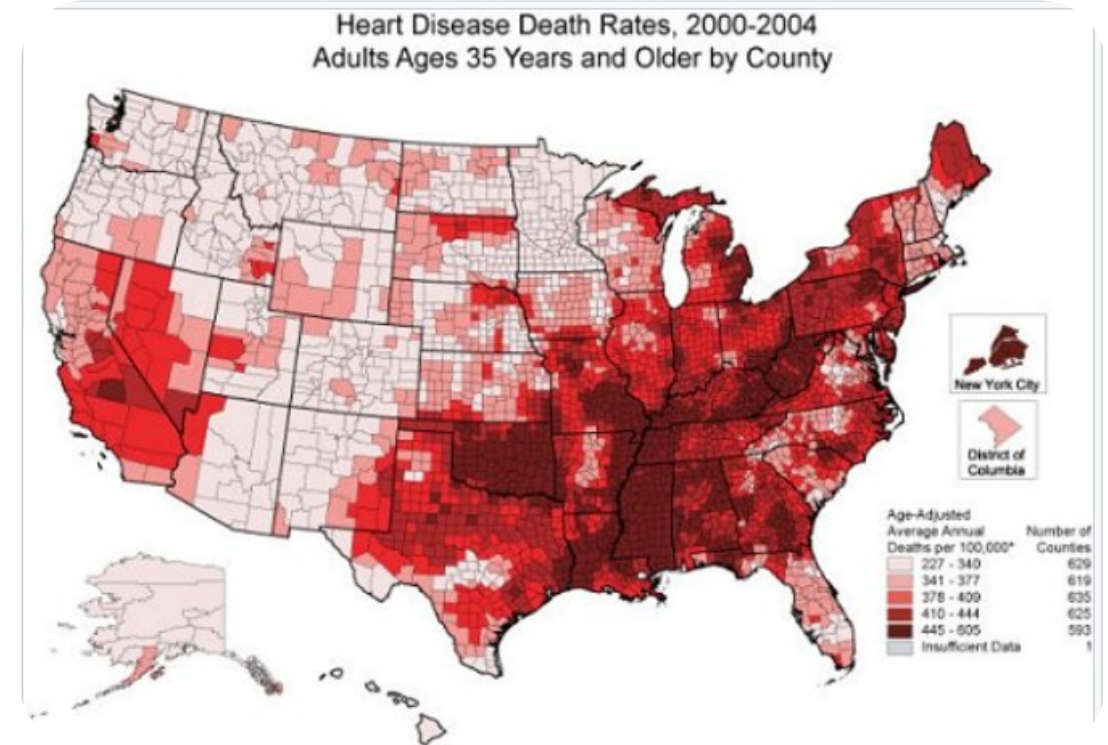
- ❑ Disaster Management and Risk Assessment
 - Analyze risk factors related to natural disasters such as earthquakes, floods, and hurricanes.
 - Develop early warning systems and emergency response plans.
 - Support post-disaster recovery and reconstruction efforts.



Objectives of GIS

❑ Public Health and Epidemiology

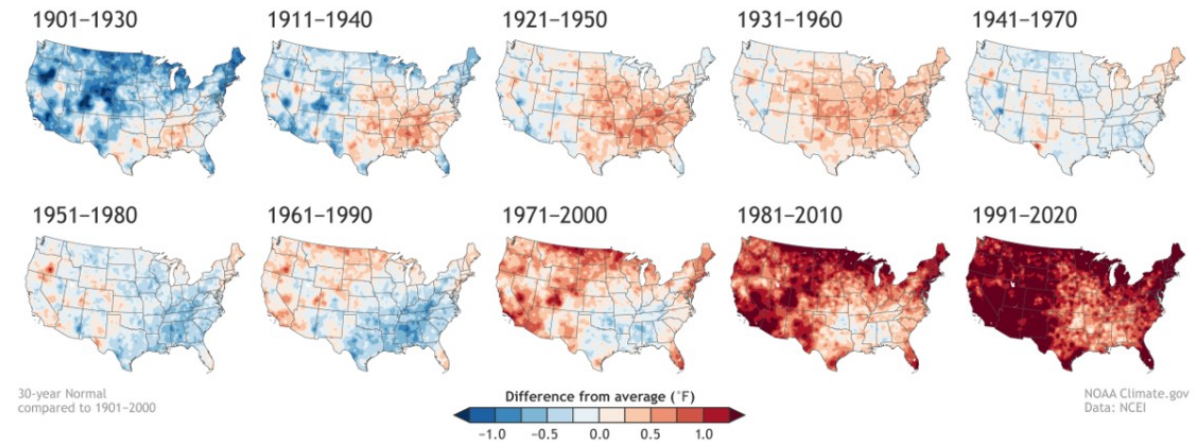
- Track disease outbreaks and assess public health risks.
- Optimize healthcare facility distribution based on population needs.
- Conduct spatial epidemiological studies to understand the spread of diseases.



Objectives of GIS

- ❑ Climate Change Analysis and Sustainability
- Model climate change impacts on urban and natural environments.
- Assess carbon footprints, heat island effects, and air quality changes.
- Develop sustainable development strategies and policies.

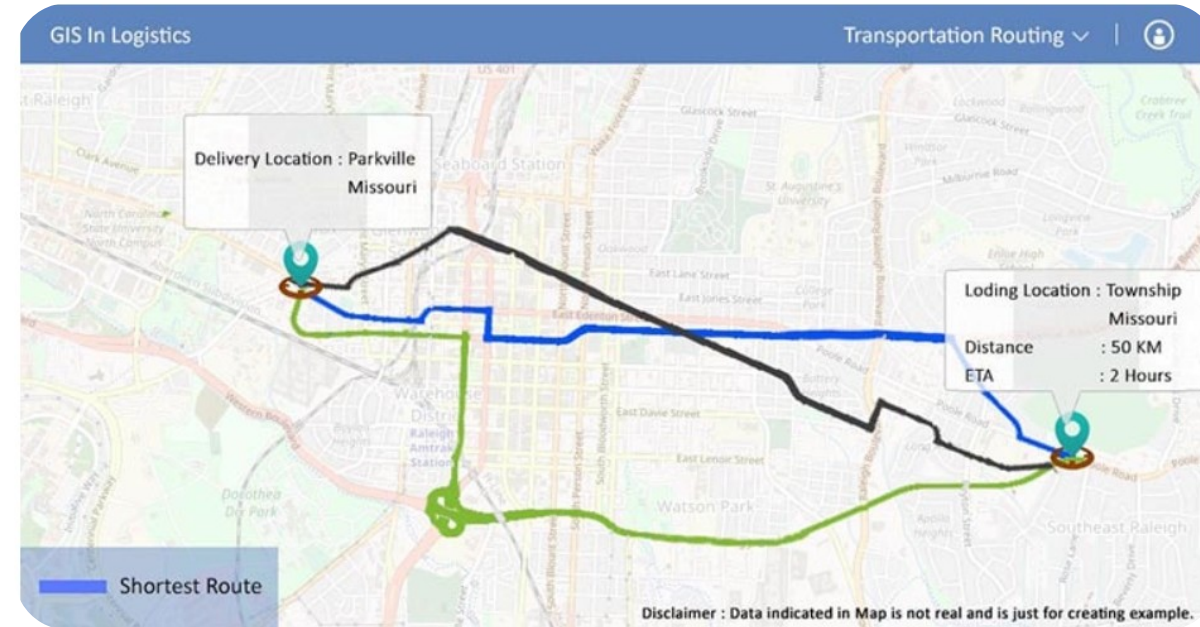
U.S. ANNUAL TEMPERATURE COMPARED TO 20th-CENTURY AVERAGE



Objectives of GIS

❑ Transportation and Logistics

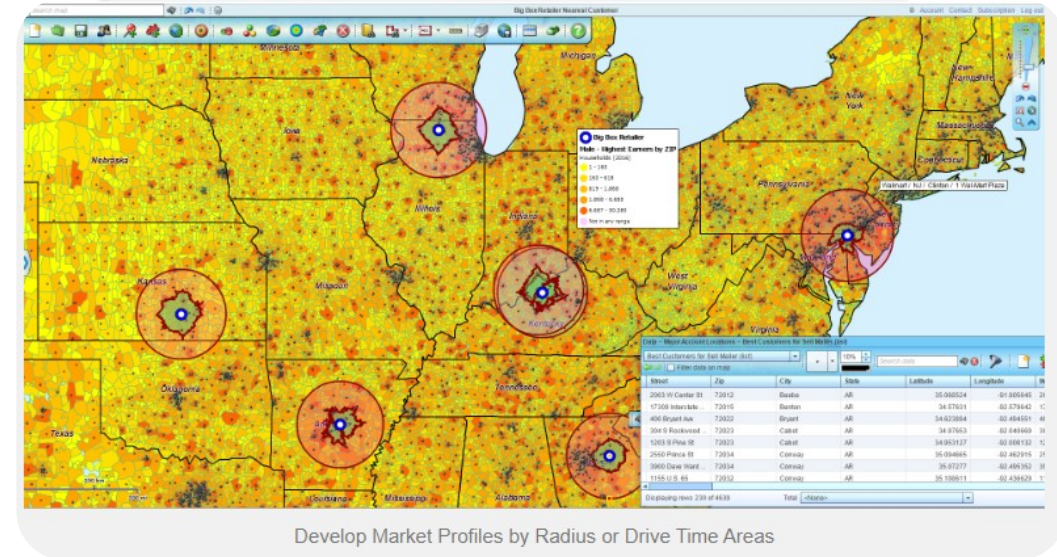
- Optimize route planning and logistics for supply chain management.
- Improve navigation systems, public transportation planning, and smart mobility solutions.
- Analyze traffic congestion and road safety patterns.



Objectives of GIS

❑ Business and Market Analysis

- Support site selection for businesses based on demographic and economic data.
- Conduct market analysis using geospatial intelligence.
- Improve customer targeting and regional marketing strategies.



Thank you...

