Spatial Management and The Data Life Cycle Final Project

GIS 5003-Spatial Data Management

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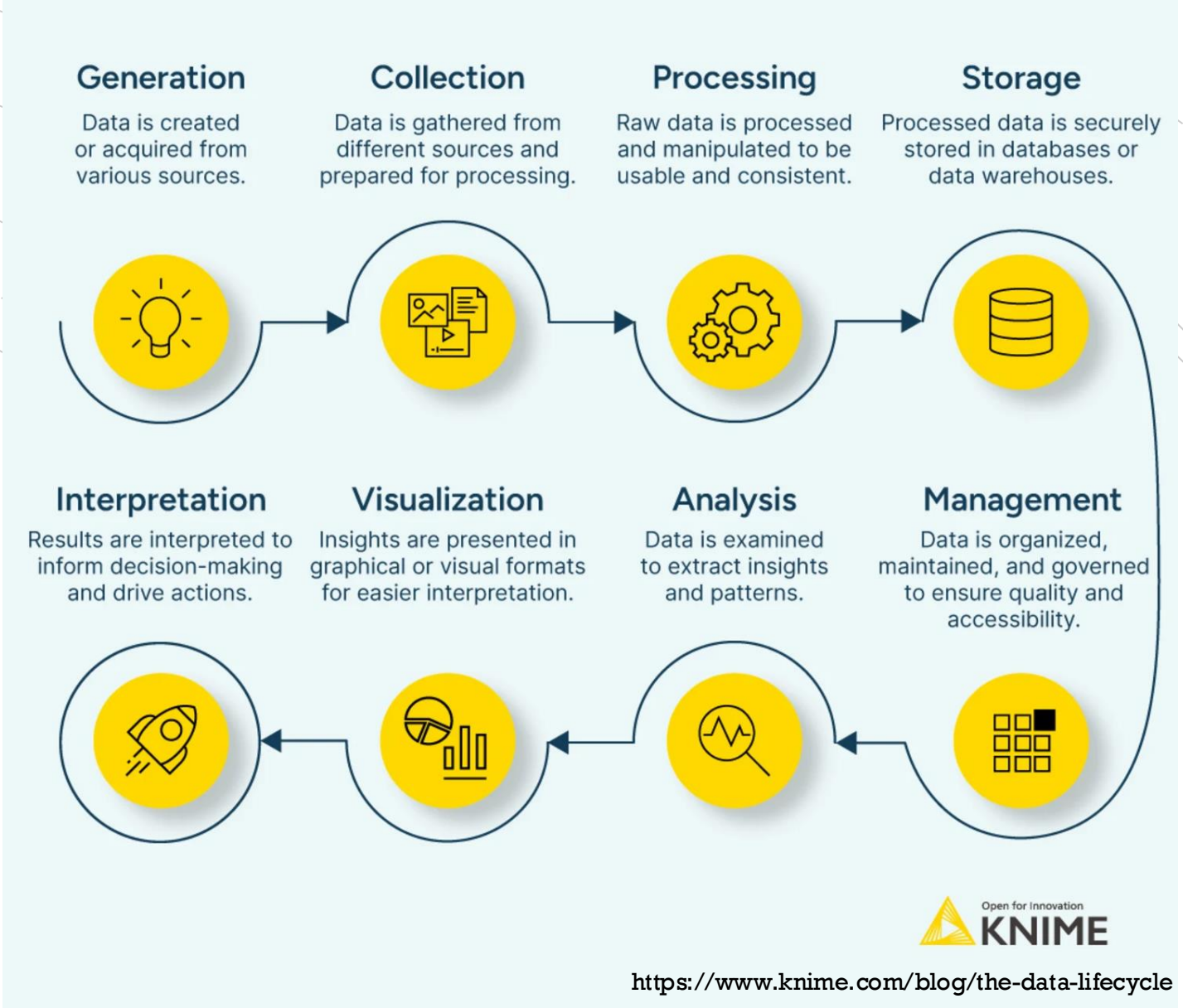
The Data Life Cycle

Spatial data management and the data life cycle were applied to a dataset of choice to demonstrate its application.



https://www.knime.com/blog/the-data-lifecycle

Smart Location Database

- This dataset was selected to provide a demonstration of the application of spatial data management and the data life cycle.
- Location efficiency is important in showing how land use and urban form has an effect on transportation outcomes and access.
- Metadata Source: ISO-19139 Metadata

Generation

- The dataset selected has been generated by the U.S. Environmental Protection Agency as part of the U.S. EPA Smart Growth Program and accessed on DATA.GOV
- Metadata created date: 2011

Collection

- Since the Smart Location Database is metadata accessible as a zip file download there was no collection of the data.
- The dataset consists of the following categories for census block groups in the United States:
  - Demographic Variables
  - Employment Variables
  - Built Environmental Variables
- Database consists of 31 feature layers. For all layers:
  - Geometry Type: esriGeometryPolygon
  - Spatial Reference: 102100 (3857)
  - Spatial Extent:
    - **North Bound Latitude:** 61.711016
    - **South Bound Latitude:** 6.652233
    - **East Bound Longitude:** -12.681516
    - **West Bound Longitude:** -138.214549
  - Projected Coordinate System: WGS 1984 Web Mercator (auxiliary sphere)
  - Geographic Coordinate System: WGS 1984
  - Each layer consist of their own fields and data collected from sources such as U.S. Census, Urban Design 4 Health, HERE Maps NAVSTREETS, U.S. Geological Survey, Transit-Oriented Development, TravelTime API, and American Community Survey (ACS)

Processing

- Since the Smart Location Database is metadata accessible as an encrypted zip file download there was no processing of the data.

Storage

- The Smart Location Database is stored by the EPA as a MapServer in an ArcGIS REST Services Directory that can be accessed at geodata.epa.gov

Management

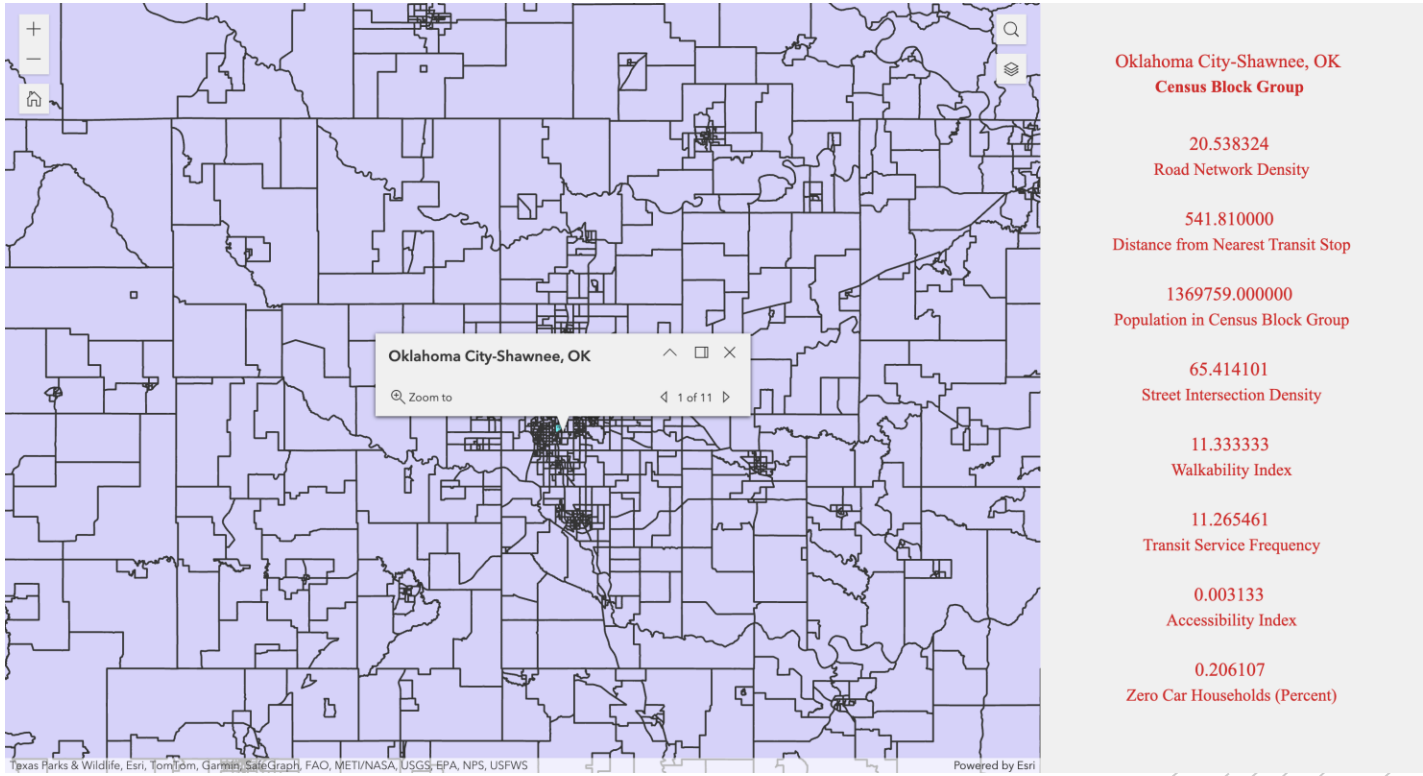
- The Smart Location Database is managed with an Open Source platform, MapServer, and is a free resource available for download, web service, or online viewing.
- It can be downloaded as a file geodatabase and available as a map service, JSON, SOAP, and KML.
  - Web Services it can be viewed in ArcGIS JavaSript, ArcGIS Online Map Viewer, ArcGIS Earth, and ArcGIS Pro.
- Downloaded the database and set up a database connection to the ArcGIS Enterprise and Portal.

Analysis

- Smart Location Database supported query formats: JSON, geoJSON, PBF
- Analysis can be performed to query the dataset for project needs using querying tools such as QBE or SQL
- Analysis can also be performed using ArcGIS Pro's spatial analysis tools to query the dataset to create output layers

Visualization

- Visualization tools applied to the Smart Location Database
  - ArcGIS Pro-created feature layer into a web layer and published to ArcGIS Portal
  - ArcGIS Portal- created a Web Experience map with Experience Builder using a select variables from the dataset as an example of criteria that can be used to visualize location efficiency



Interpretation

- This dataset was selected to provide a demonstration of the application of spatial data management and the data life cycle.
- Future Applications: Database variables can be used in urban planning for a site-suitability analysis for determining locations ideal for a smart mobility hub that integrates shared and sustainable mobility options.
- EPA source also suggests this database can be used for "travel demand models, baseline data for scenario planning studies, and combined into composite indicators characterizing the relative location efficiency" of census block groups in the United States.

Sources

- https://www.epa.gov/smartgrowth/smart-location-mapping#SLD
- https://catalog.data.gov/dataset/smart-location-database8
- https://www.geoplatform.gov/metadata/99d4b7ef-80b8-48bc-8bba-21fbfd108036
- https://geodata.epa.gov/arcgis/rest/services/OA/SmartLocationDatabase/MapServer
- https://www.epa.gov/system/files/documents/2023-10/epa_sld_3.0_technicaldocumentationuserguide_may2021_0.pdf