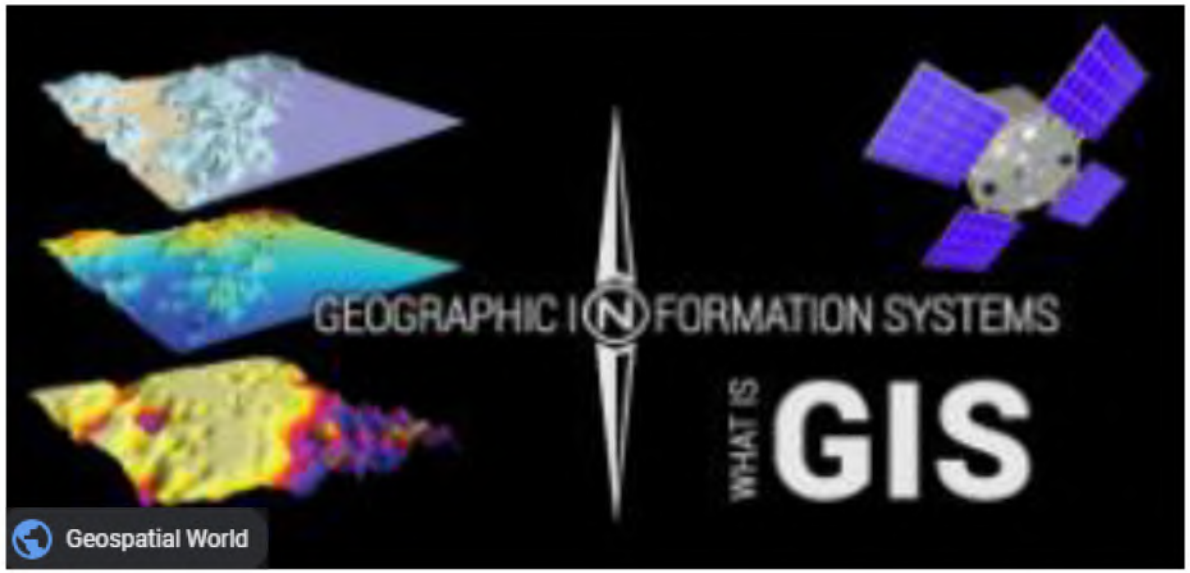
GEOGRAPHIC INFORMATION SYSTEMS

GIS CONCEPTS SIMPLIFIED



RAJENDRA DAVECHAND

Geography with Dave

Geographical Information Systems (GIS)

- Concepts of:
  - GIS
  - Remote sensing
    - Resolution
    - Pixels
  - Spatial resolution
  - Spatial and attribute data
  - Vector and raster data
  - Spatial objects
    - Points/Nodes
    - Lines
    - Area/Polygons
- Concept of layering of information
- Components of GIS
- Sources of information for GIS
- Data manipulation and analysis:
  - Concept of data manipulation
  - Data integration
  - Buffering
  - Querying
  - Statistical analysis
- Data standardisation
- Data sharing
- Data security

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GIS is a computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface.

BREAKING IT DOWN

- Geographic – place on Earth, Spatial – Where something is on earth?
- Information – data (facts) put together(layering) to make sense e.g. the number of people using a road. Data used in GIS can be the following: Maps, Remote sensing, Spatial resolution, Spectral resolution
- System – interrelated information – Using the data to make it mean something.

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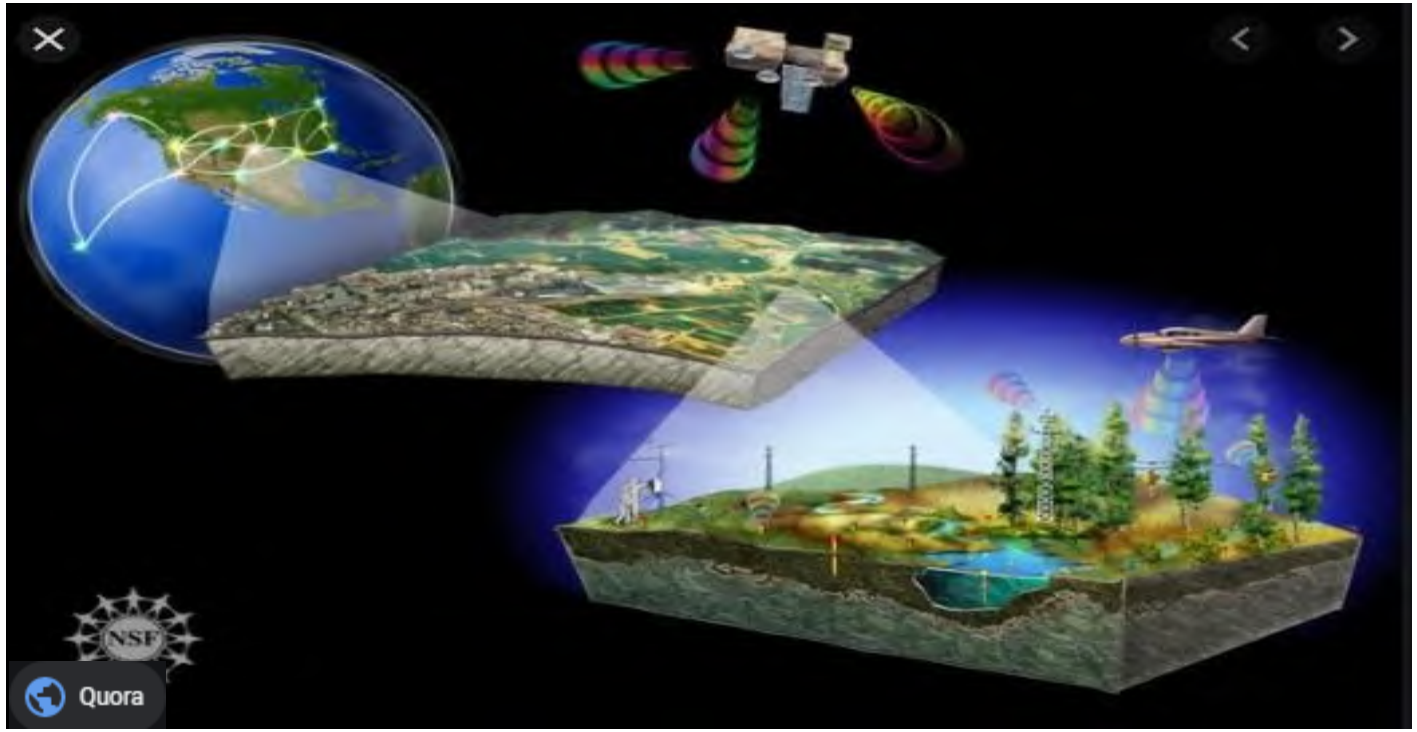
Remote sensing refers to getting information about the earth's surface from a vertical (from above) distance e.g. satellite images.



Done by:
Satellite
Aeroplane
Hot air balloon
(A distance from above)

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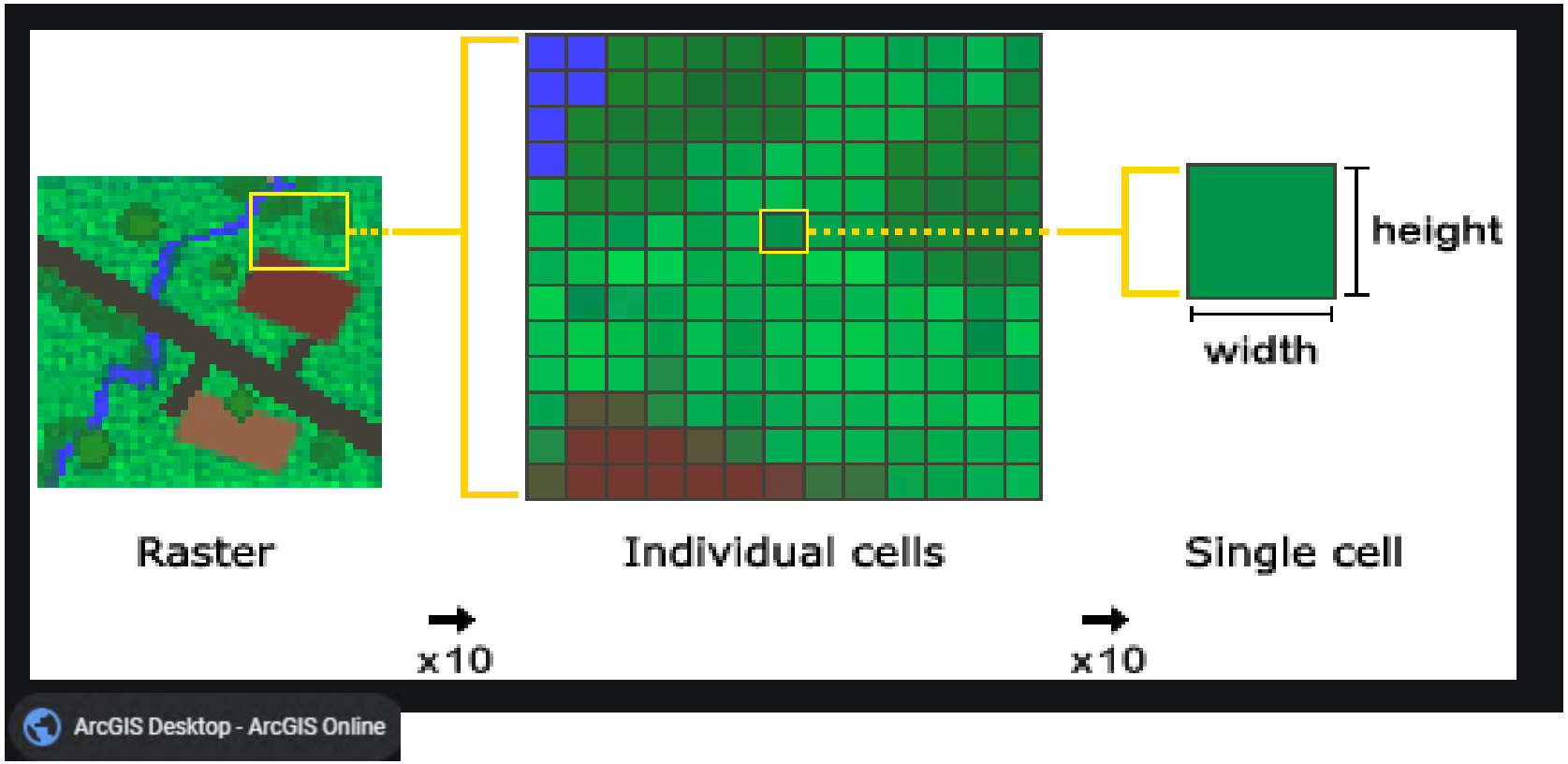
A pixel is the smallest unit of a digital image or graphic that can be displayed and represented on a digital display device.

Refers to digital/grid cells



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Resolution refers to the clarity of an image.

The more the pixels the clearer the image

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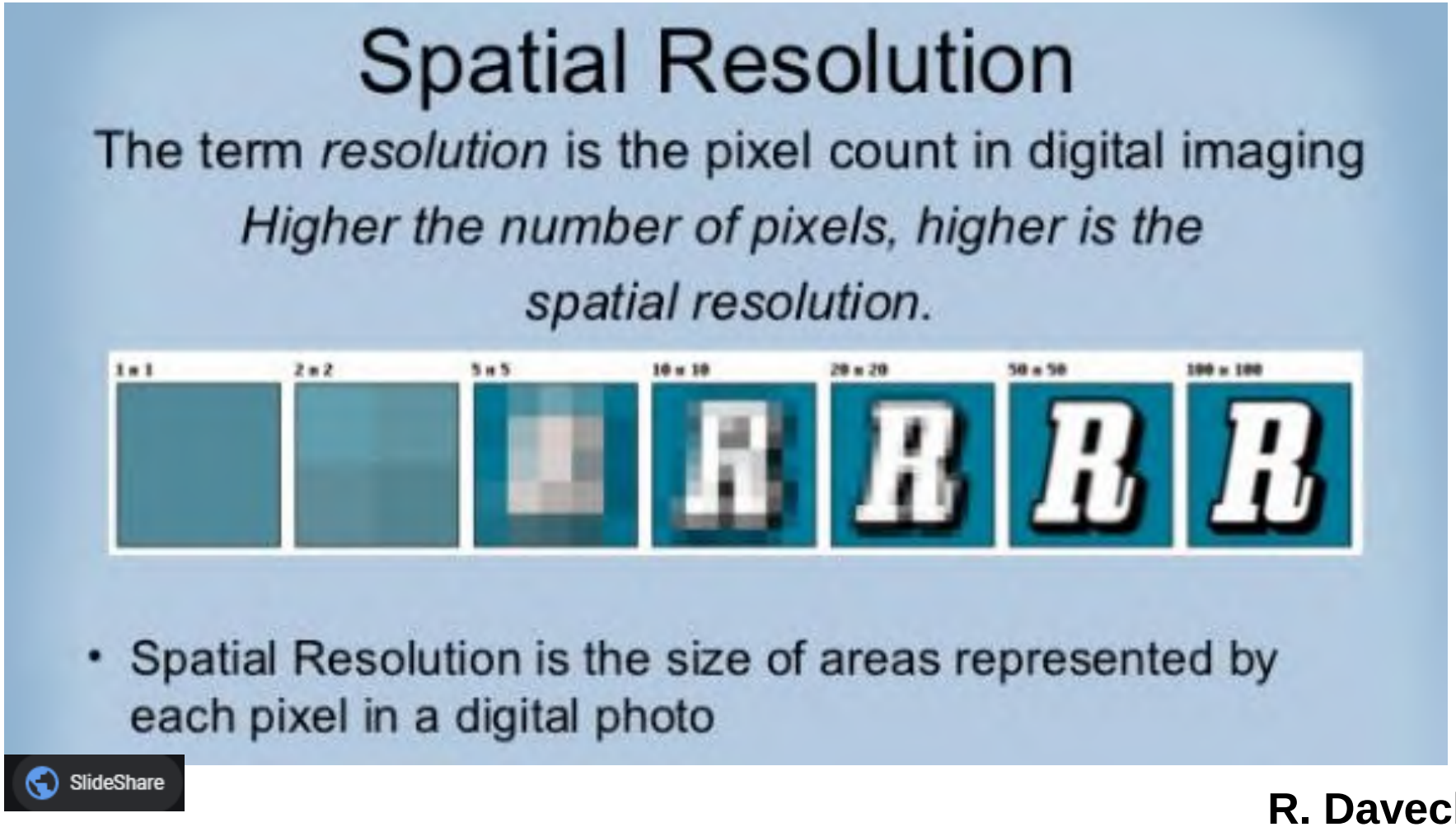
Spatial Resolution refers to the detail of an image determined by the size and number of pixels
E.G. the size of the smallest feature that can be detected by a satellite sensor or displayed in a satellite image.



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Spatial Data refers to information about the location and shapes of (geographic) features.
E.G. grid reference

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Attribute Data refers to further information about an area (feature) in addition to its location. (descriptive data) E.G. The temperature of a given area

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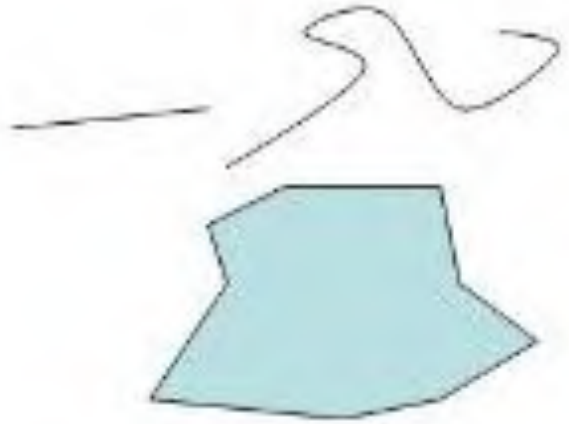
Spatial objects

Type	Symbol
• Points	Δ 252 .1328
• Lines	
• Polygons	



Adapted from SlidePlayer

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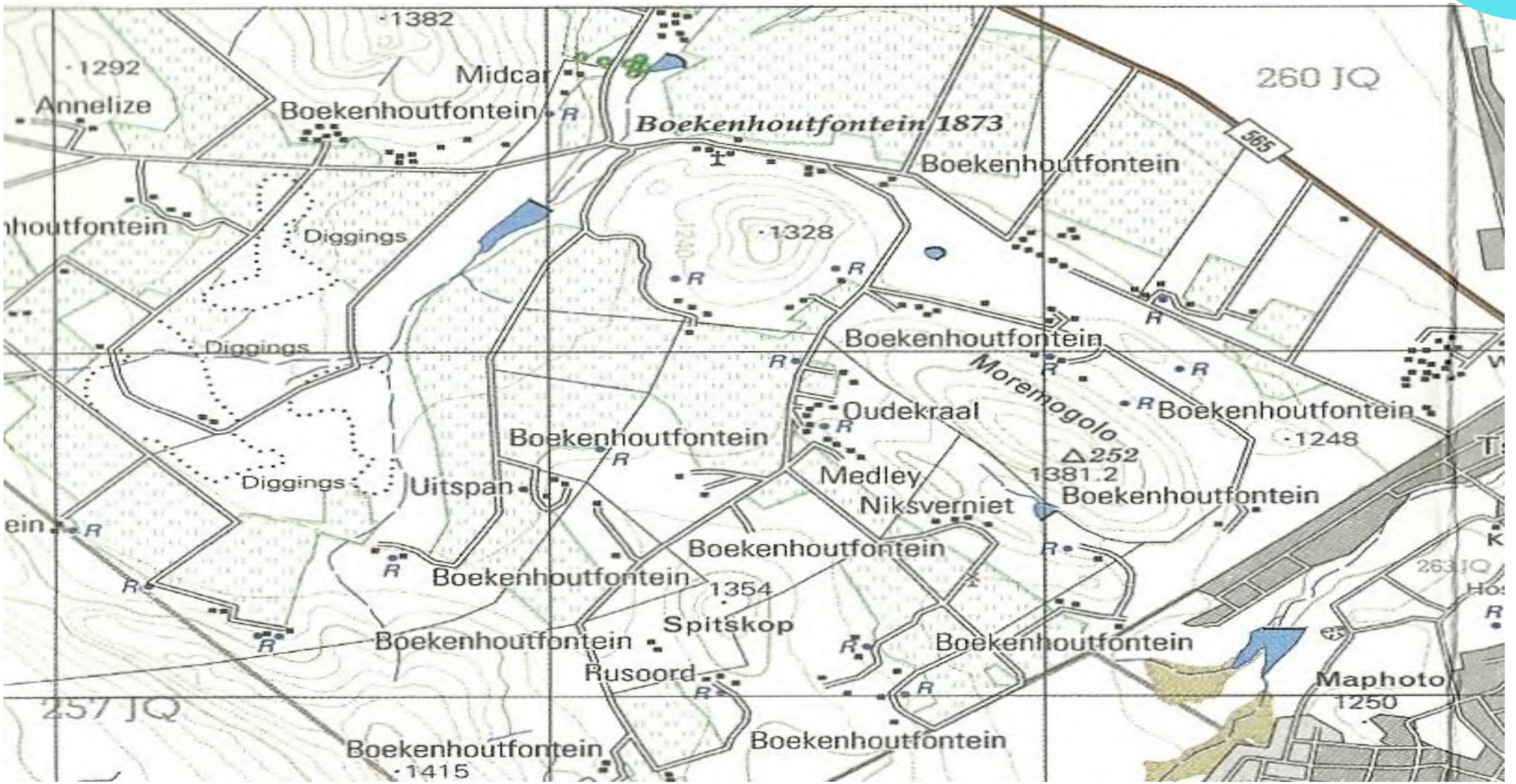

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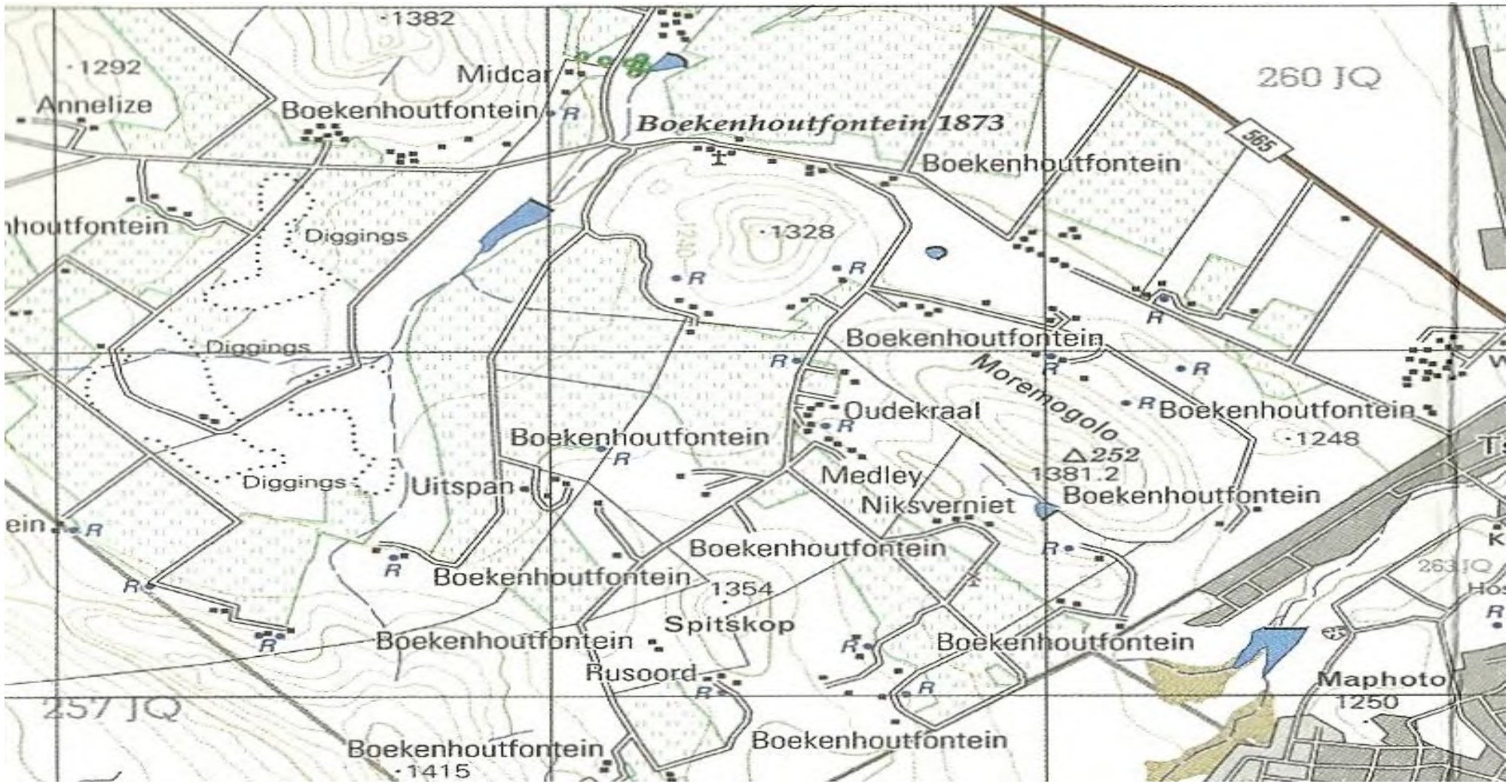
Vector data refers to the representation of a geographic feature using point, lines and polygons



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Raster Data refers to the representation of a geographic feature using rectangular grid cells also referred to as pixels or picture elements

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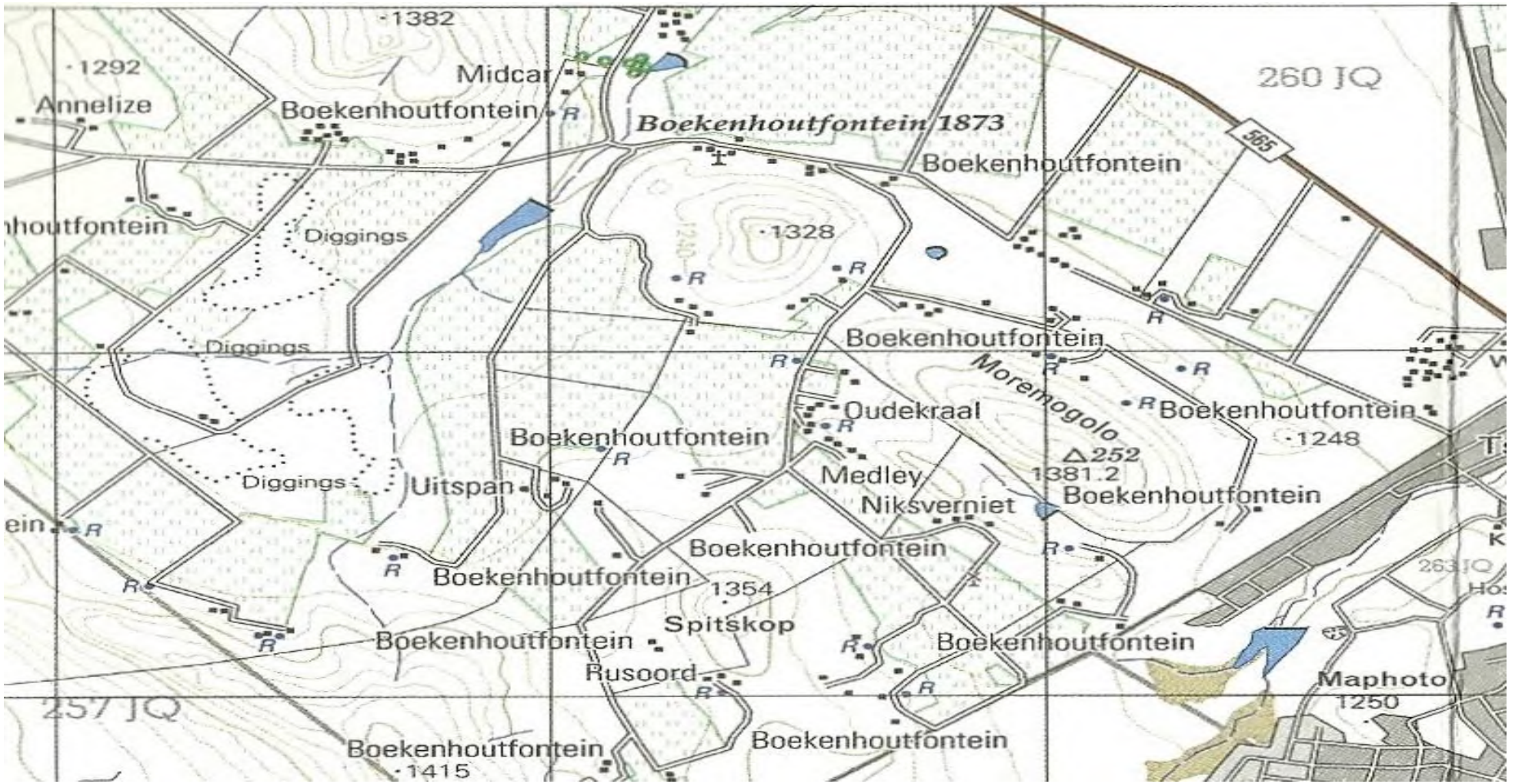
Data layering refers to different types of information/data layers are projected onto one another/placed on top of one another



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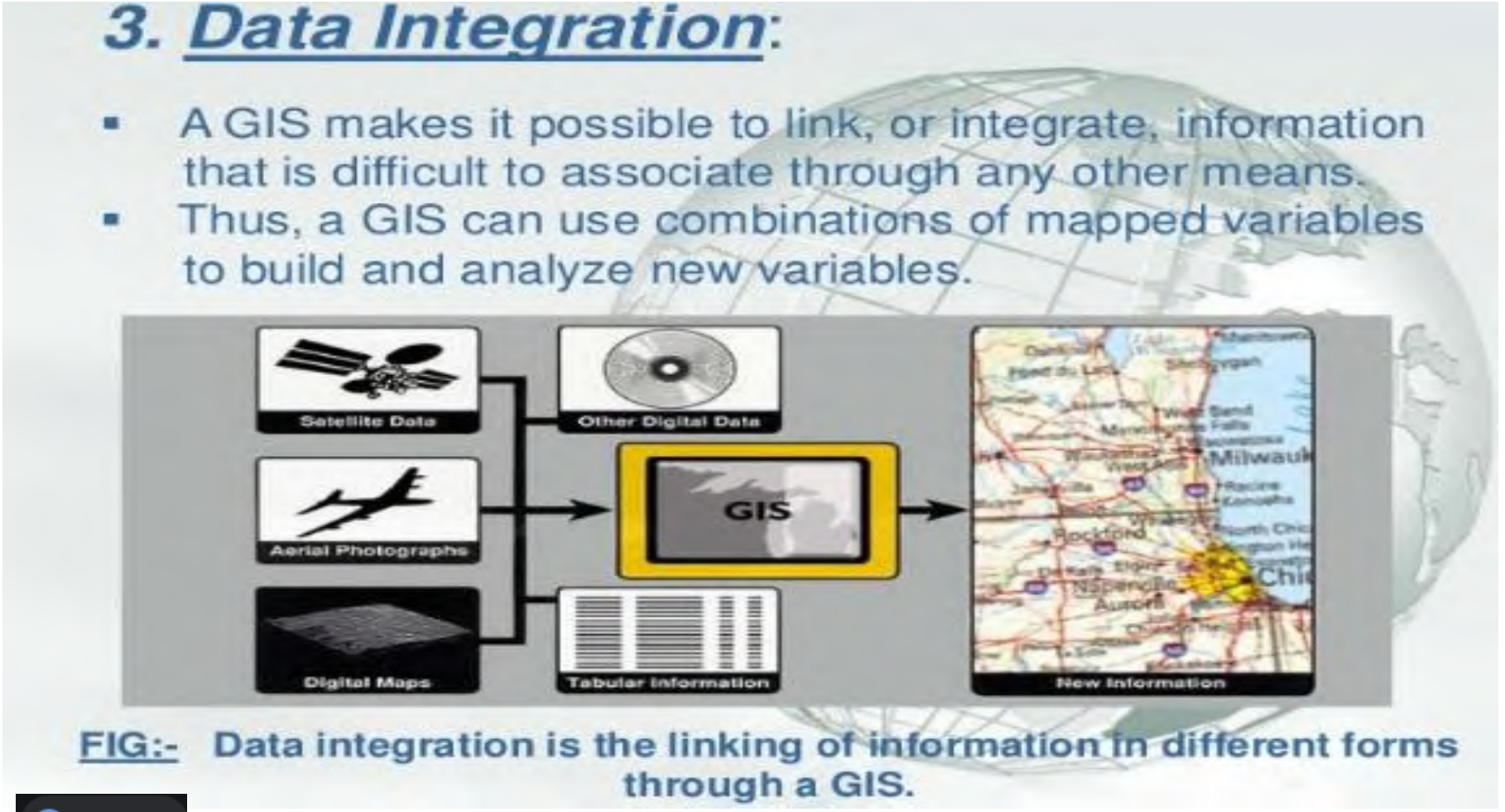
Data integration refers to the combining of two or more data layers.



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THE FIVE COMPONENTS OF A GIS ARE:

Hardware, Software, Data, people and organizations, processes (methods).

.It allows us to collect, store and process data e.g. to produce maps and answer on spatial queries.

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Sources of information

The most common general sources for spatial data are: hard copy maps; aerial photographs; remotely-sensed imagery; point data, samples from surveys; and existing digital data files. Existing hard copy maps, e.g. sometimes referred to as analogue maps, provide the most popular source for any GIS project.

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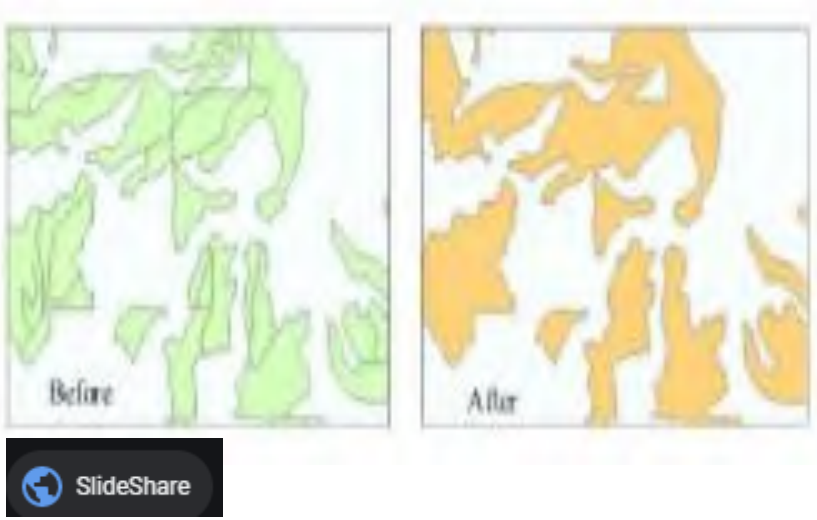
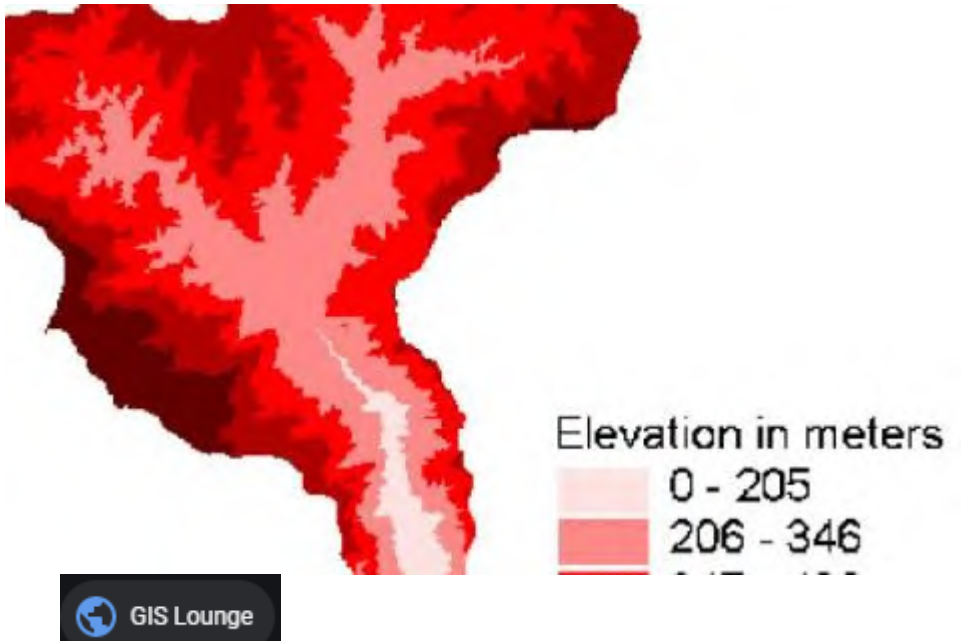
Data manipulation occurs when data is processed and converted making it easier to use (into more useful information).
E.G. correcting distortions and sharpening definitions





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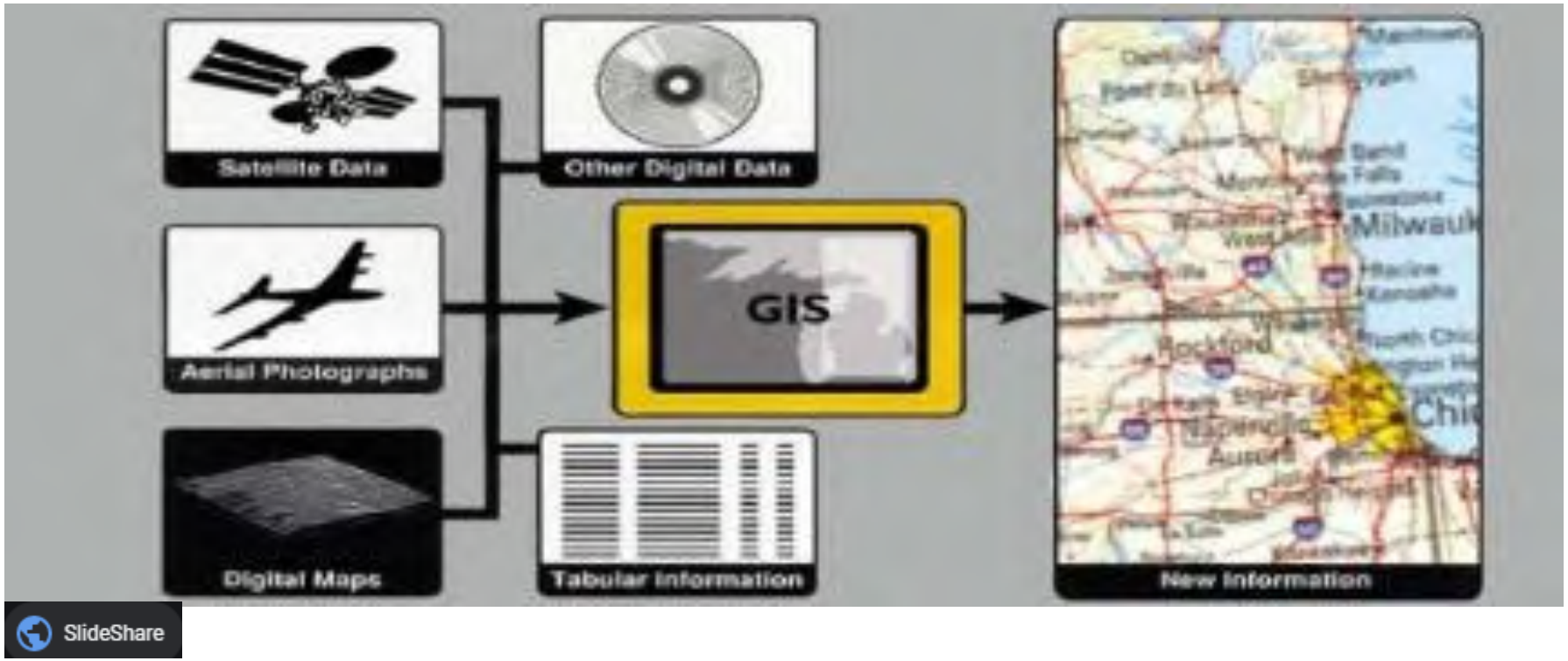
Data integration involves the combining of data layers. (creating more useful information)



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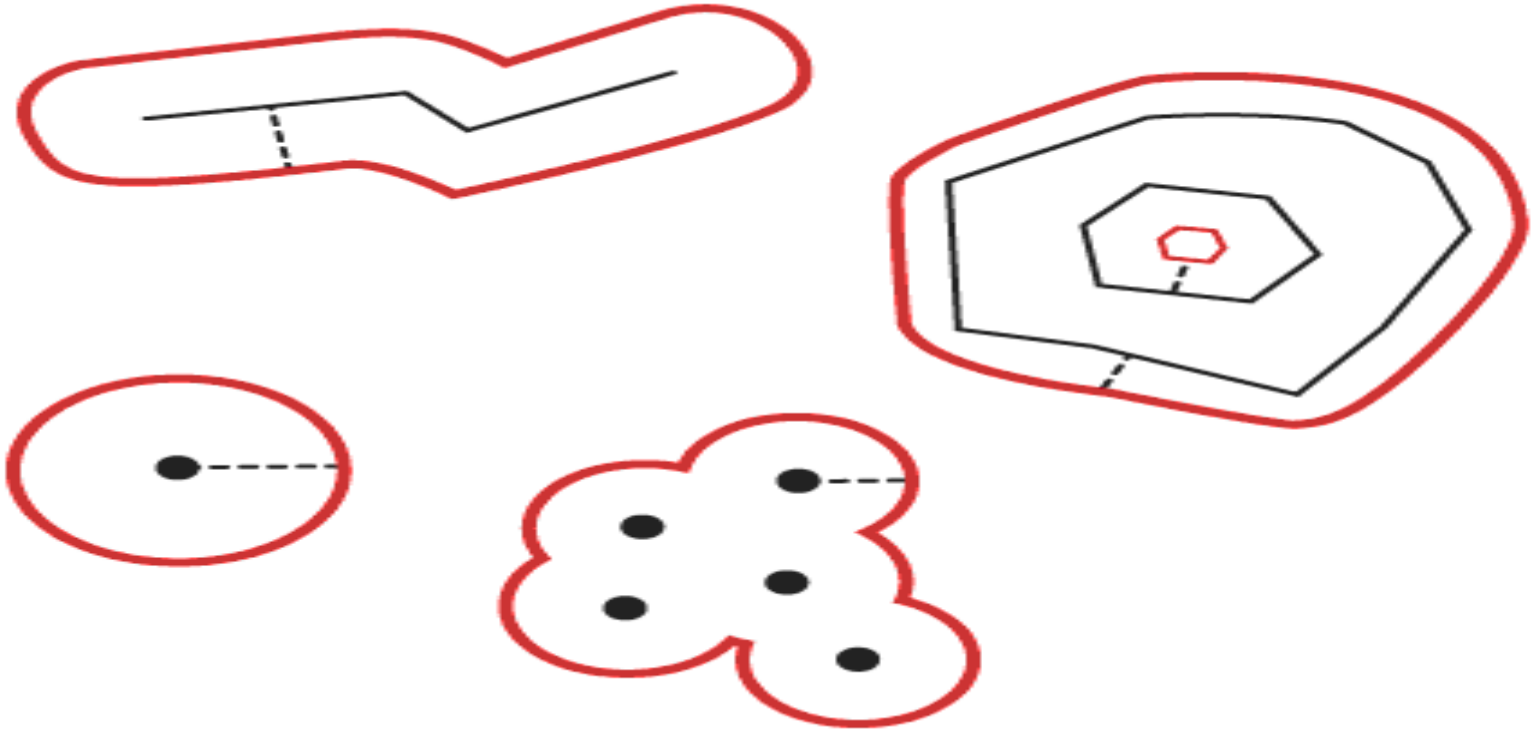
Buffering refers to the demarcation of an area around a (geographic) feature or location.



Adapted from ArcGIS Desktop - ArcGIS Online

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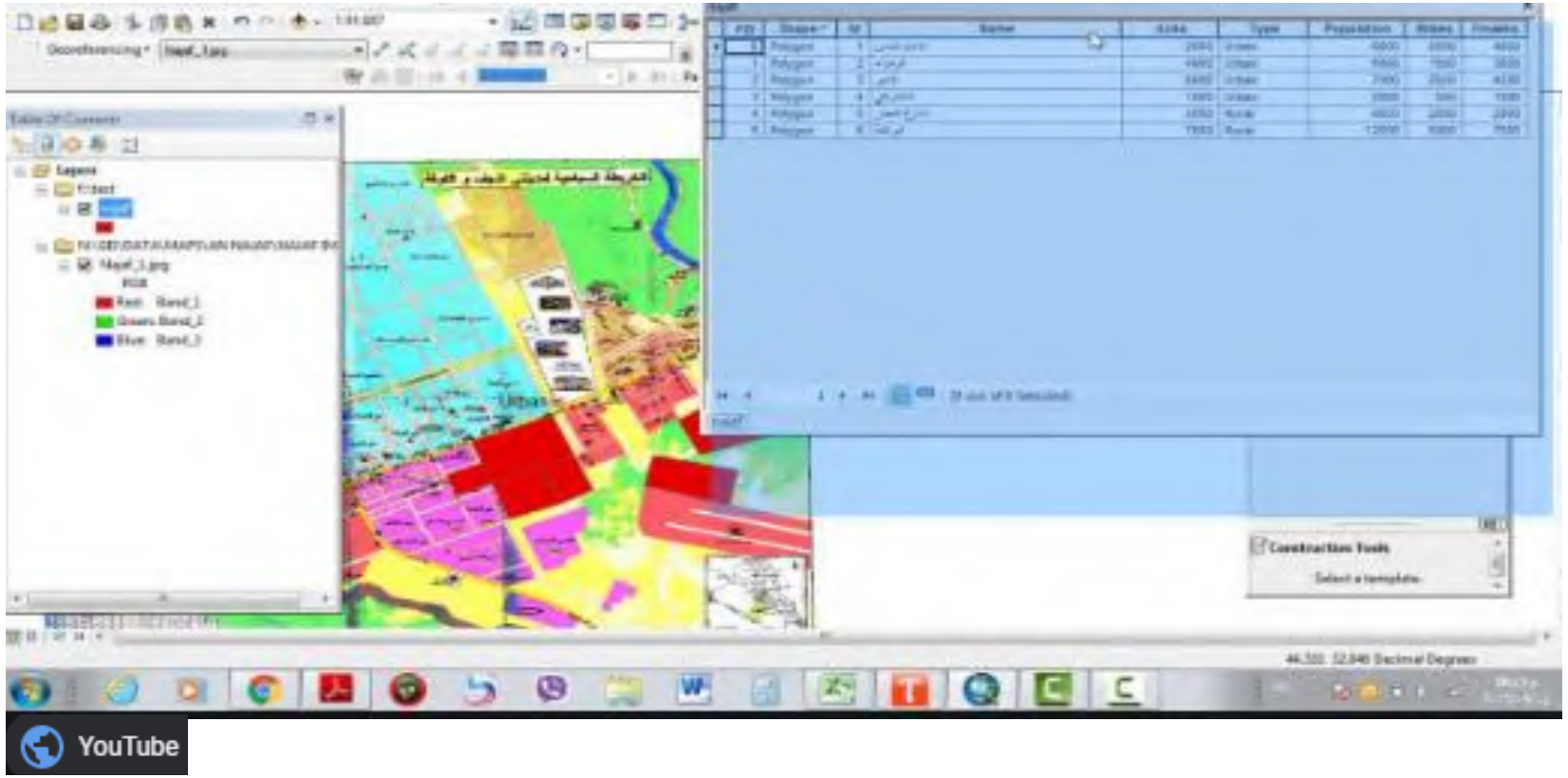
Querying is the ability to ask and answer questions about geographic features and their attributes and the relationship between them



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Statistical analysis Interpreting the various forms of statistics in relation to a query that might not be obvious simply by looking at a map

PERCENTAGE (%) INCREASE IN CRIME LEVELS			
TYPE OF CRIME	**SUBURBS**		
	Townhill (**F7**)	Mountain Rise (**F1**)	Plessislaer (**I6**)
Housebreaking	18,6%	11,3%	23,4%
Car hijacking	100%	177,8%	36,4%

[Adapted from SAPS crime statistics 2015–16 by Theuns Kruger, Graphic 24]

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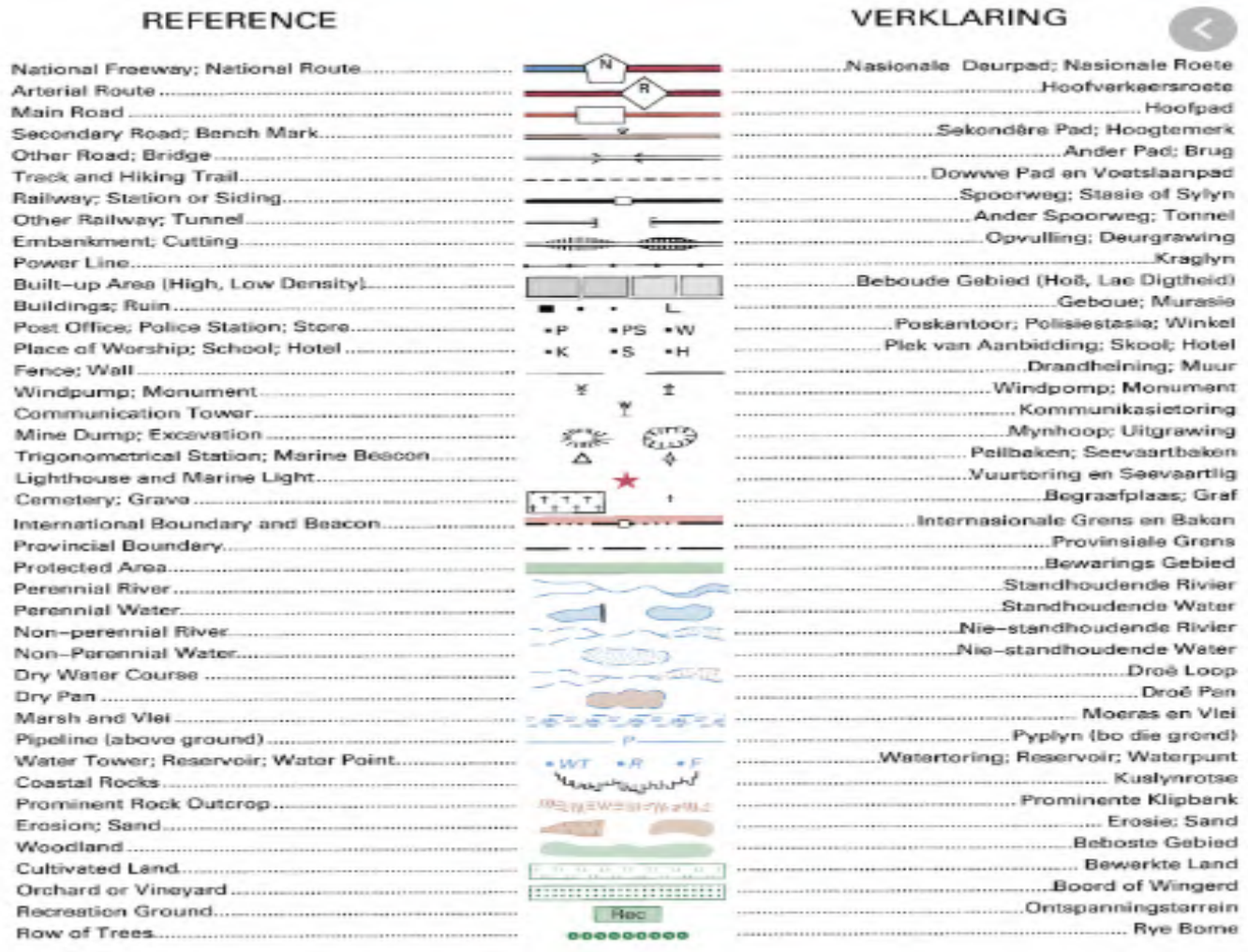
Data Standardisation is a process of transforming a variable into a more analytically useful form making (spatial) data more interchangeable



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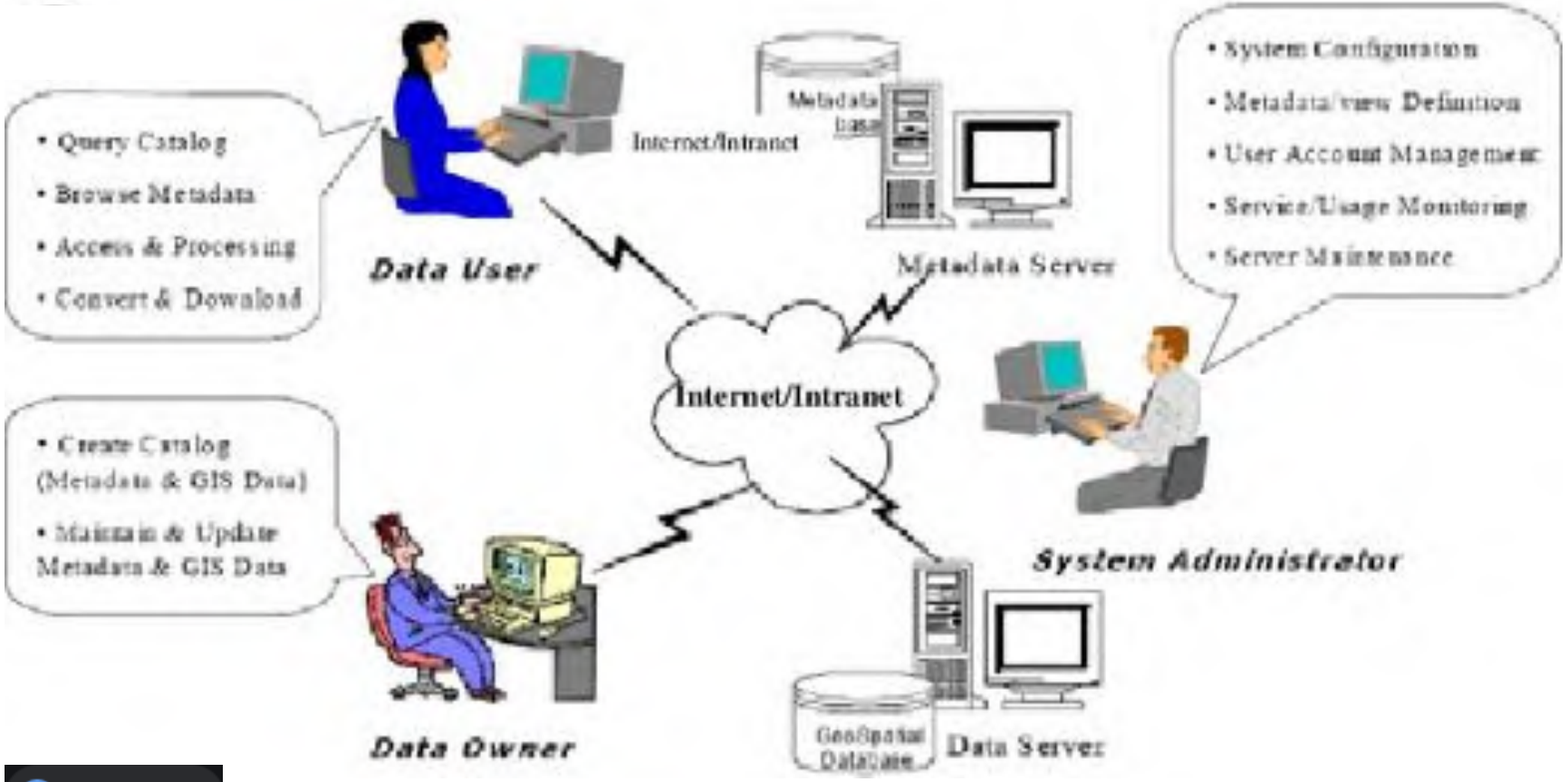
Data sharing refers to GIS systems that allows others to use your (spatial or non-spatial data) data.
E.G. Cloud GIS



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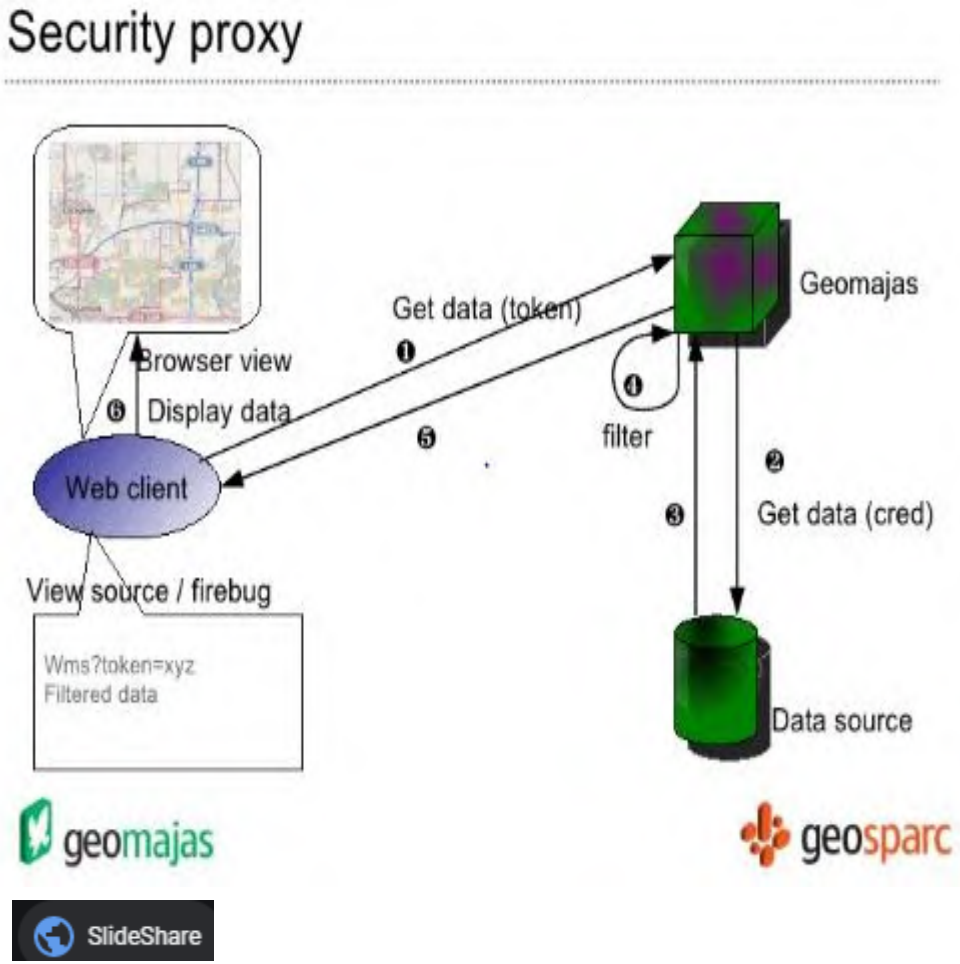
Data security refers to restricting the availability of data to certain people or organisations.



Shop Acer

MiStore South Africa

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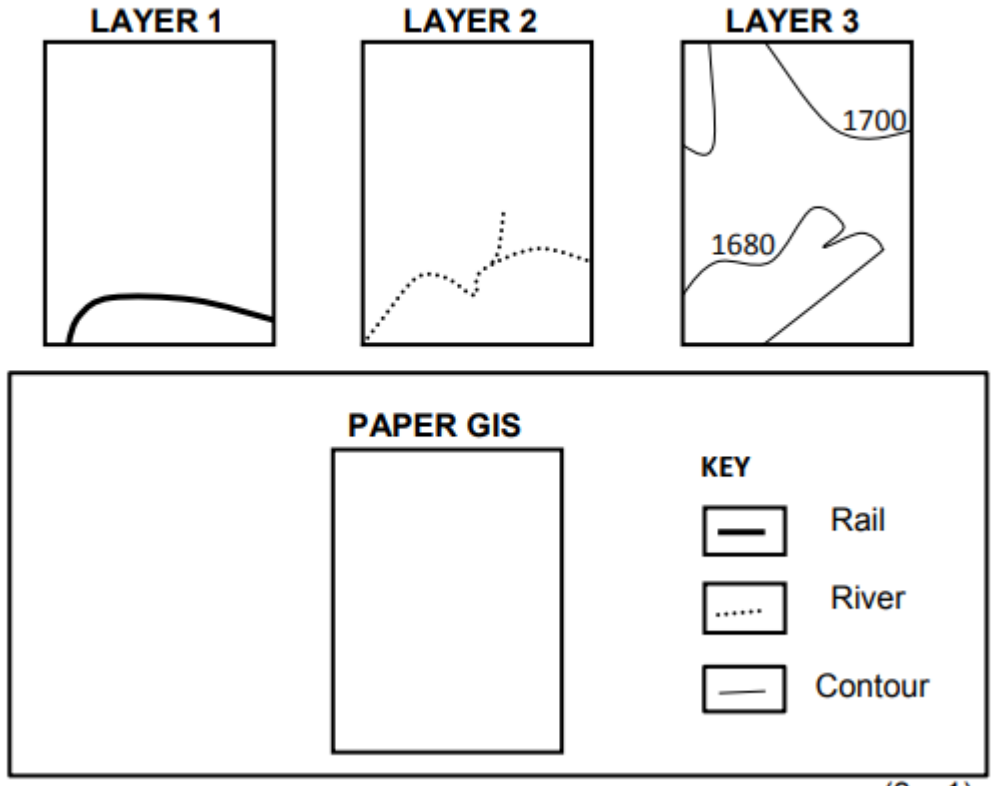
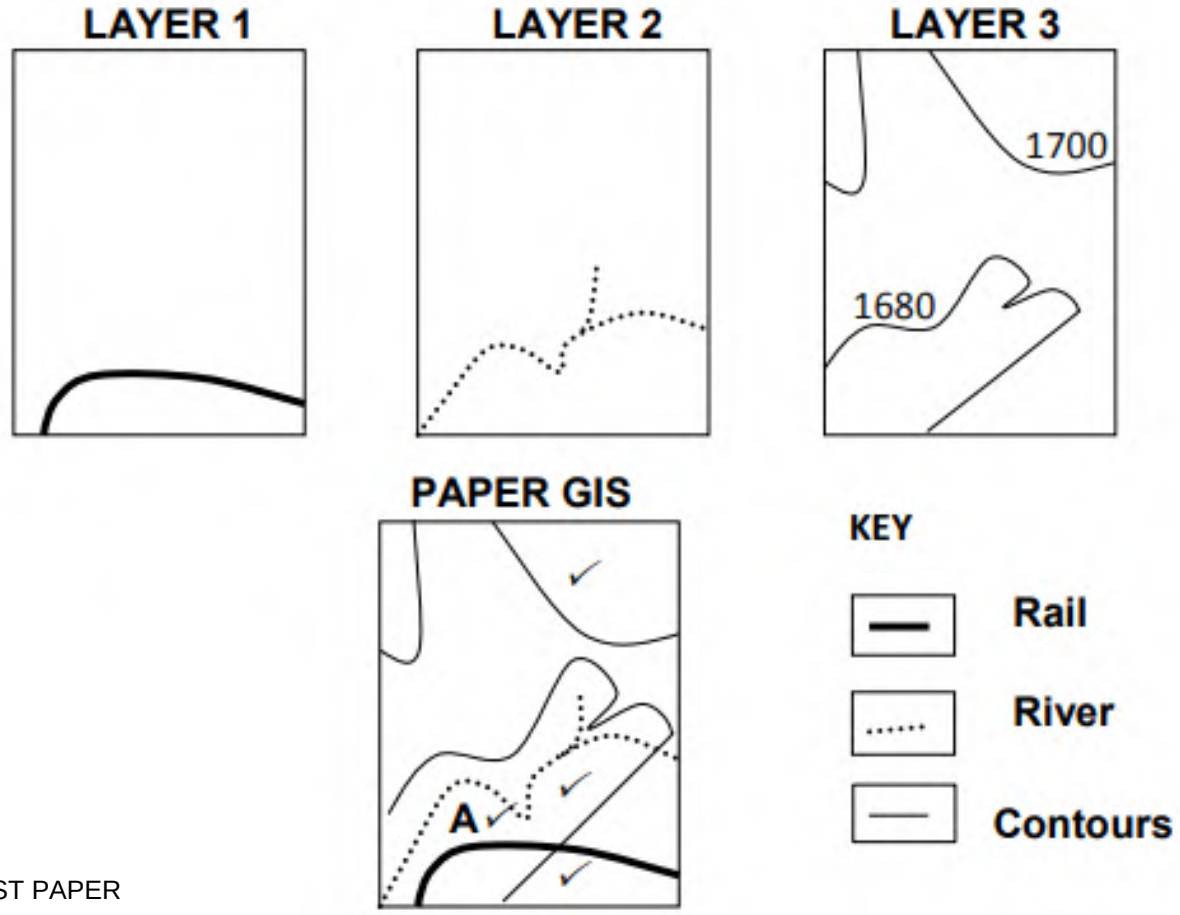
4.2.1 Use the THREE data layers below to create a paper GIS in the block provided.



(3 x 1) (3)

. Paper GIS



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