SGHU 2552
Introduction to Geographic Information System

Chapter Two

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SPATIAL DATA

Content

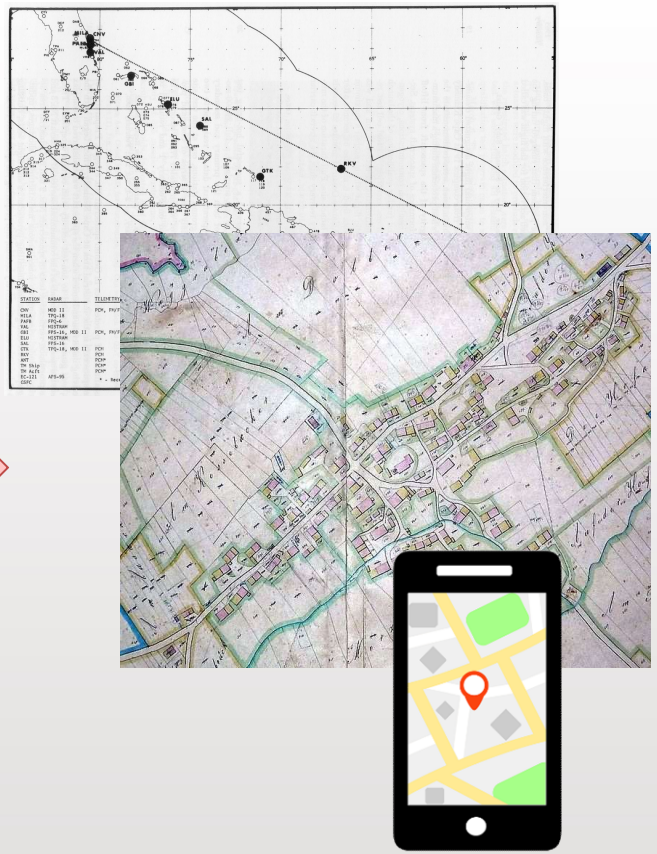
- Introduction
- Map and its influence on the character of spatial data
- Other source of spatial data
- Conclusion

INTRODUCTION

Spatial data: Introduction

- **Why spatial data is important?**

why?
how? who?
WHEN?
Where?



Some questions to ponder;

- How to show?
- How to model it?
- What the characteristic to view?
- What map projection to use?
- What the different methods of spatial referencing?
- What is topology?
- What the main source of spatial data?

Spatial data

- Data is an observation from real world; facts of evidence
- Information; additional content and with meaning

Cont... Spatial Data

- **Two type of spatial data;**

Primary;

collected first hand

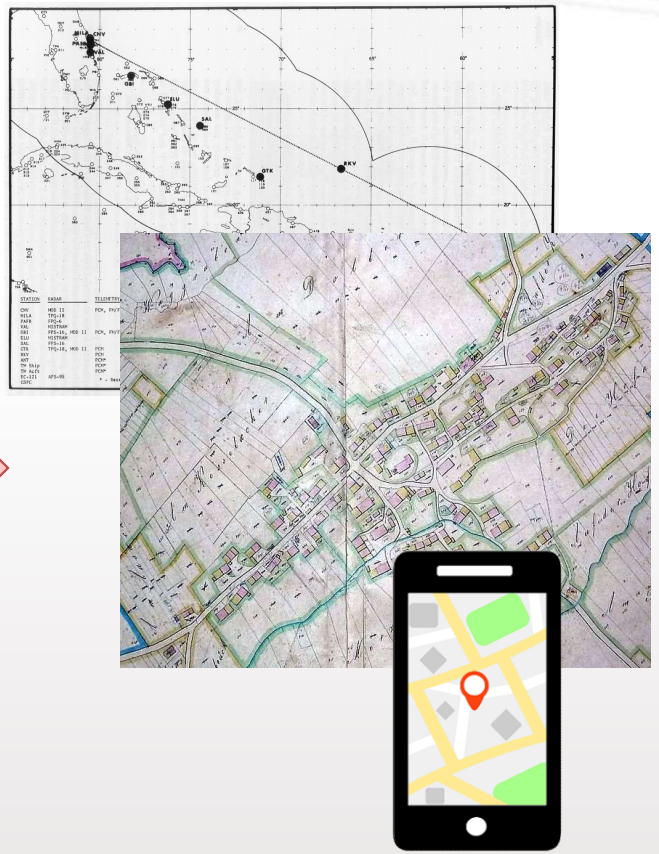
Secondary;

collected by other parties/person

Cont... Spatial Data

Temporal:	Thematic:	Spatial:
involved with time	what happen, spatial and attribute	location of the data

why?
how? who?
WHEN?
Where?



How to model? What methods needed?

MAPS AND IT INFLUENCE TO THE CHARACTER OF SPATIAL DATA

Maps and spatial data

- Traditionally, GIS was based on maps.

Maps and spatial data;
1. Purpose

- Map have purpose
- Basic: turn data into information
- Example: Navigation

Maps and spatial data;
2. Scale

Device smaller than real world

Scale: will help to “squish” world to our device

Scale: define as ratio of a distance on the map to the corresponding distance on the ground (Heywood et al, 2002)

Maps and spatial data;
2. Scale

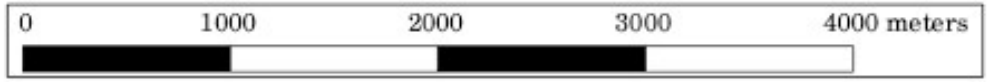
Three type of scale;

- Ratio scale
- Verbal scale
- Graphical scale

Can you tell?

a) (1 centimeter represents 250 meters)

b) 1: 25 000

c) 

Maps and spatial data;
3. Spatial Entities

What is spatial entities?

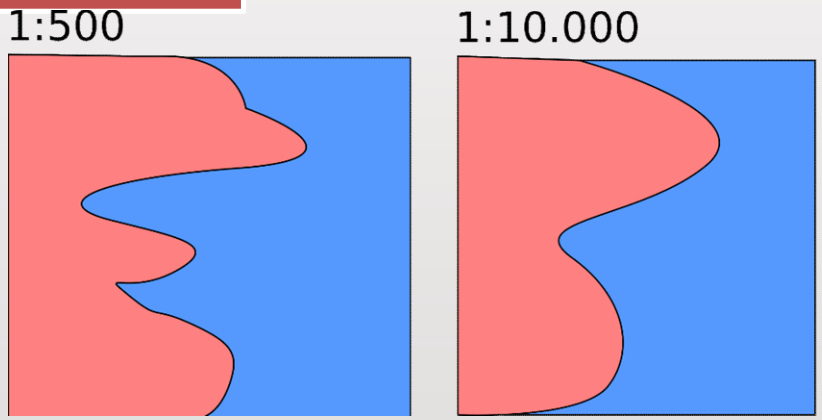
An object in real world

3 basic symbols type;

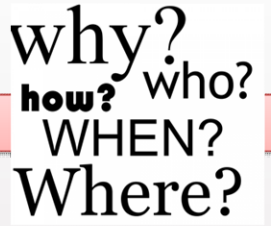
- Point
- Line
- Polygon

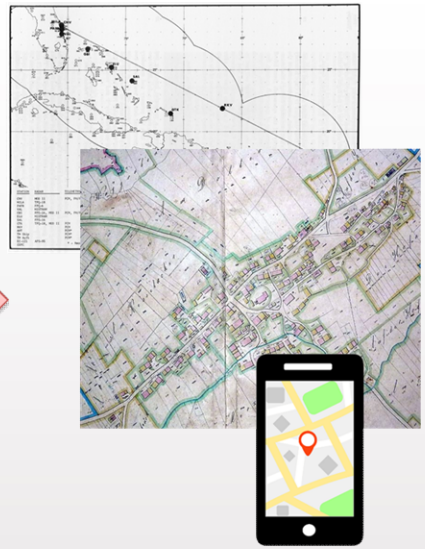
Maps and spatial data;
4. Generalization

Generalization: simplification of spatial entities



Maps and spatial data;
5. Projection

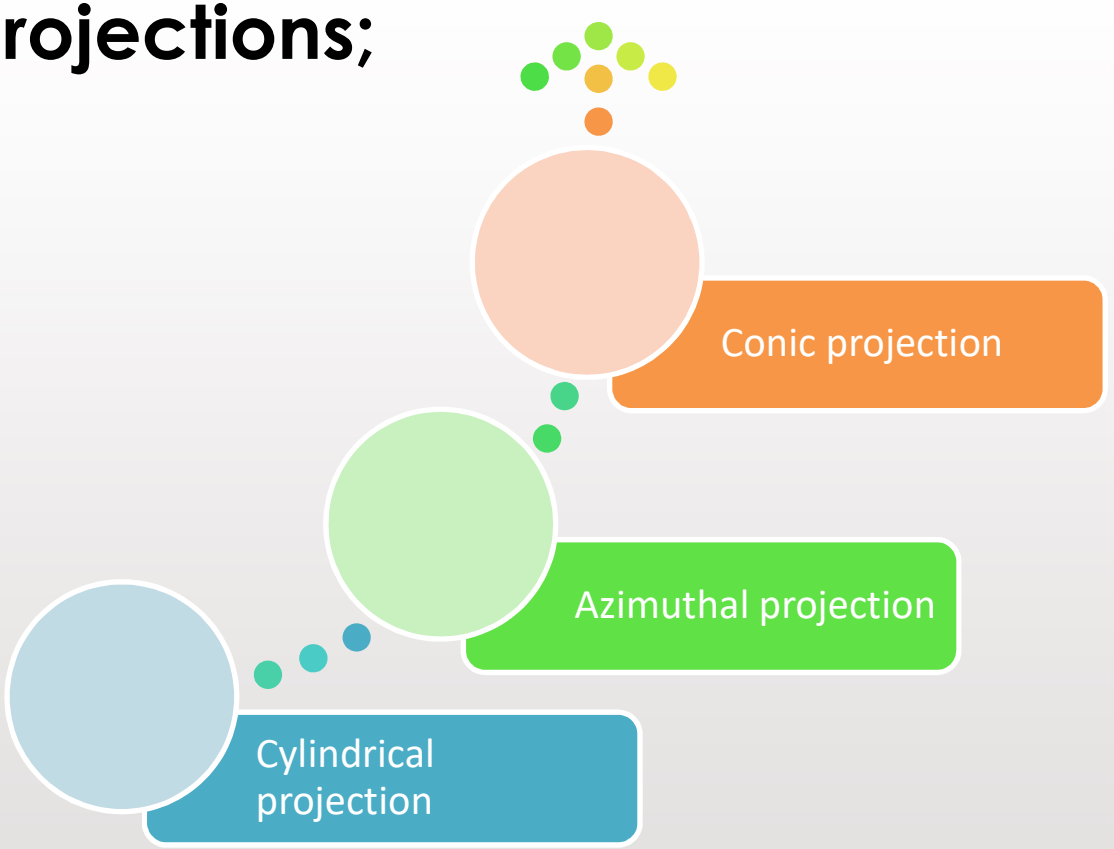




- Produce error
- Character change (based on projection used)
- Have distortion

Maps and spatial data;
5. Projection

- **Type of projections;**



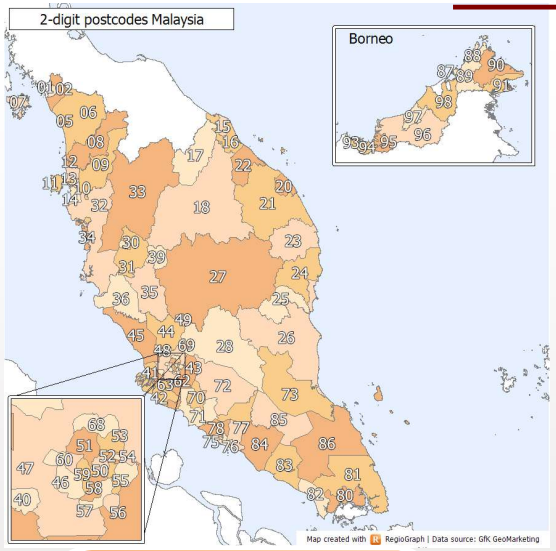
Maps and spatial data;
6. Spatial Referencing

Used to locate features on earth's surface

Need to show;

- Stability
- Ability to show features; point, line, and polygon
- Ability to measure; length, size, and shape

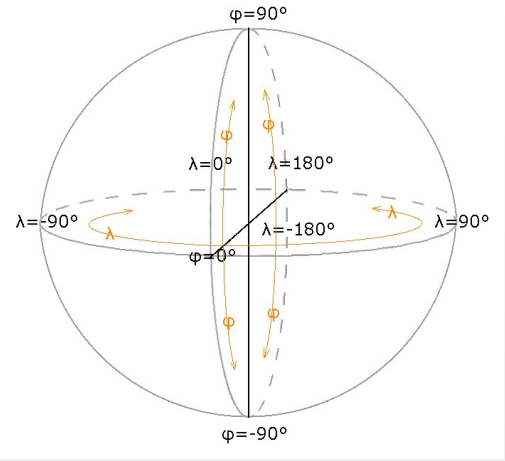
Maps and spatial data;
6. Spatial Referencing



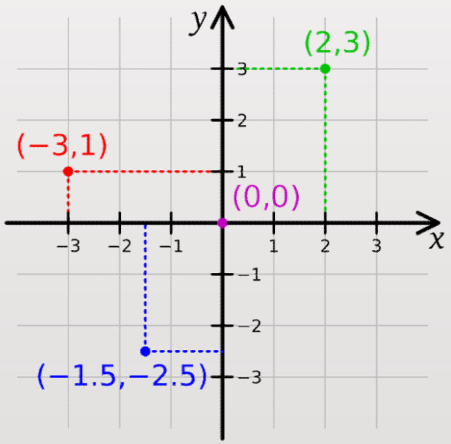
Non-coordinate system

Have 3 main categories;

Geographic coordinate system



Rectangular coordinate system



Maps and spatial data;
7. Topology

- To describe the geometric characteristic of an objects

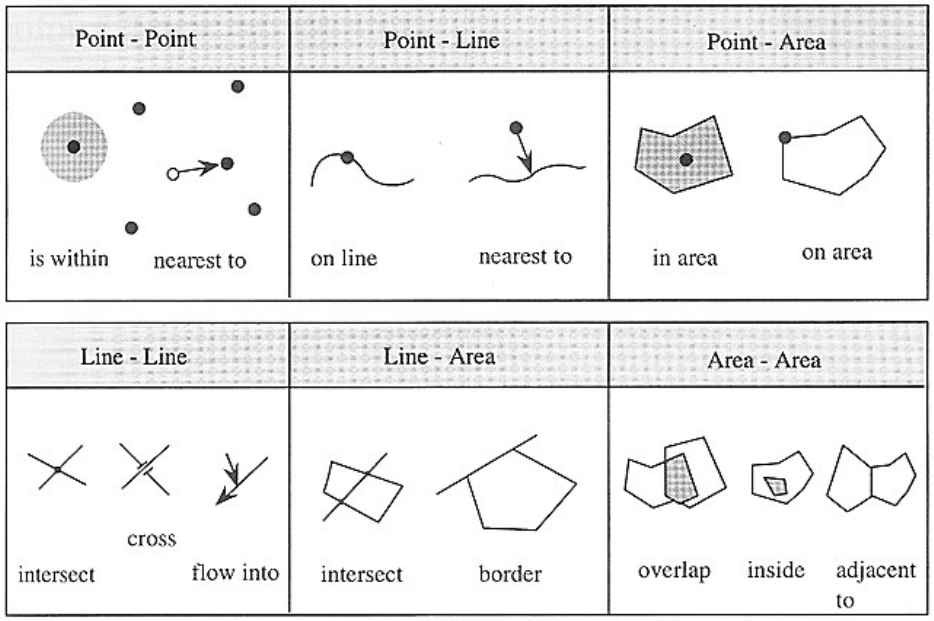


Figure 2.4 Topological Relationships Between Spatial Objects

Source: Heywood et al, 2002

Maps and spatial data;
7. Topology

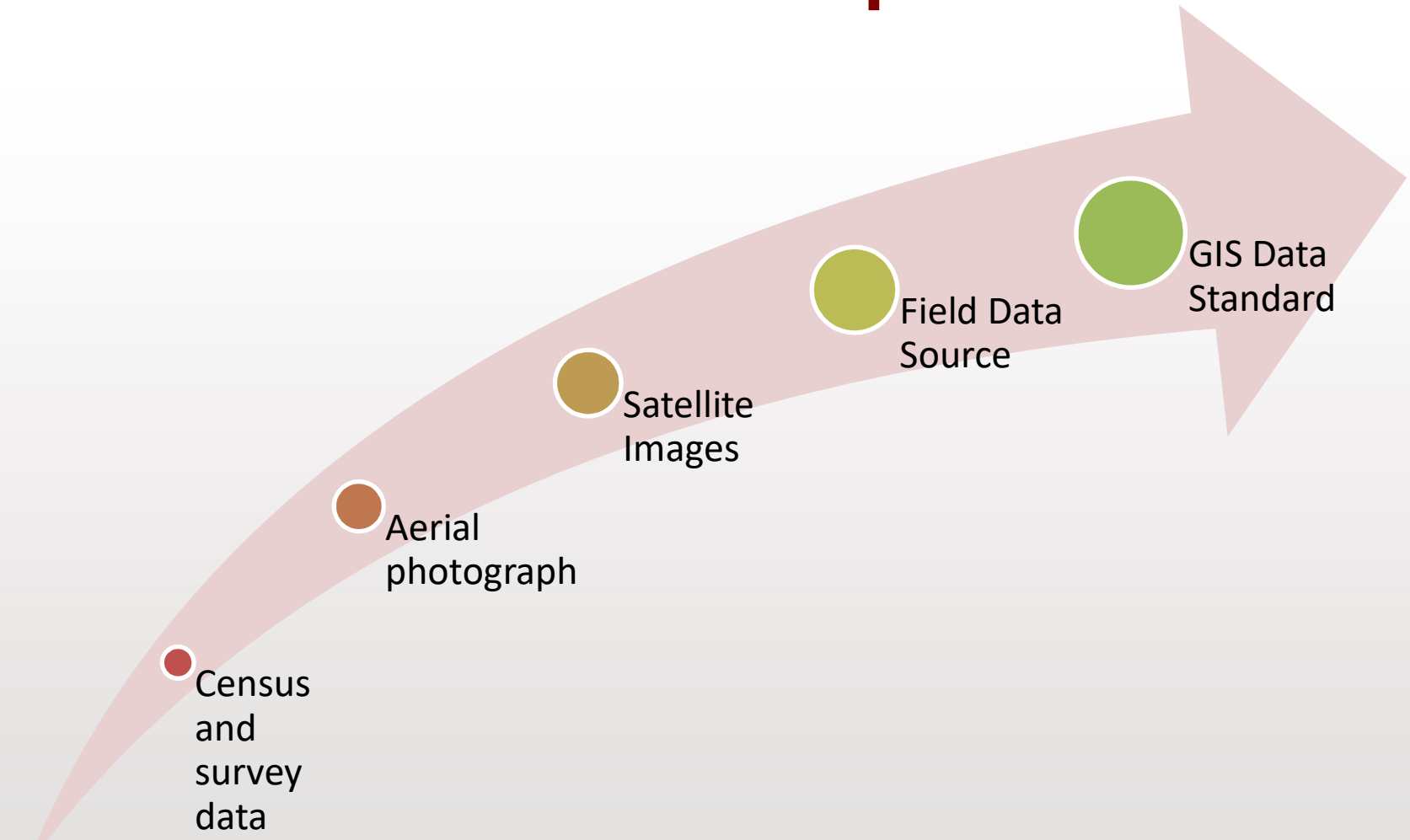
- Other issues in topology?
  - Road above road?
  - House below the apartment?
  - High rise housing?
  - How to model the topology?

Maps and spatial data;
7. Topology

HOW TO DO TOPOLOGY?

OTHER SOURCE OF SPATIAL DATA

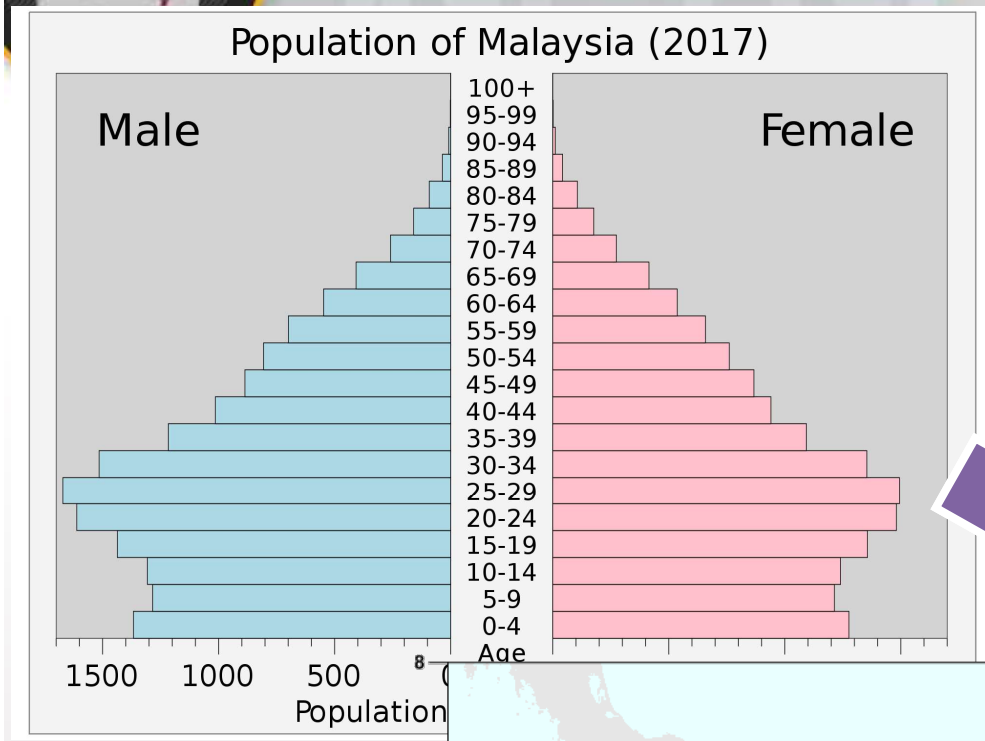
Other sources of spatial data

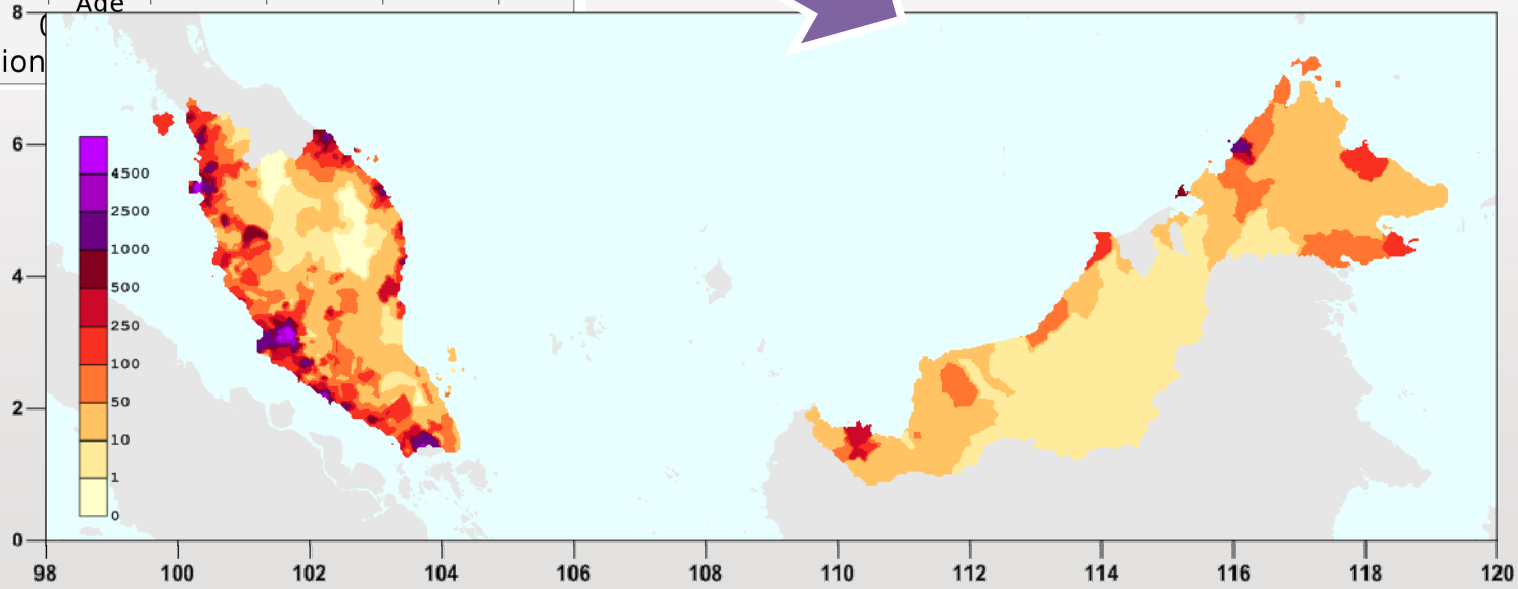


Other sources of spatial data

1. Census and Survey data

- If census and survey data have spatial reference, it allow the locations to be identified
- Example;
  - Population, employment data, agricultural, or marketing
  - For Election Boundaries

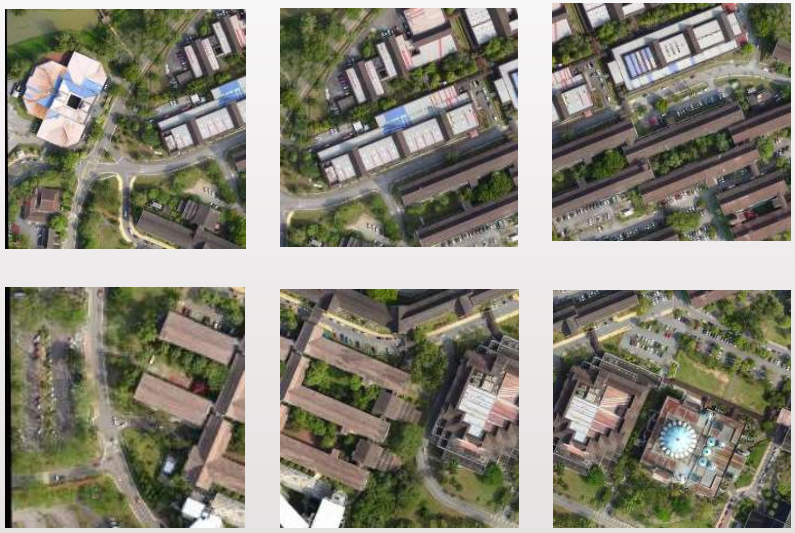

Population of Malaysia (2017)
Male
Female
100+
95-99
90-94
85-89
80-84
75-79
70-74
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
Age
1500
1000
500
Population


4500
2500
1000
500
250
100
50
10
1
0
8
6
4
2
0
98
100
102
104
106
108
110
112
114
116
118
120

Other sources of spatial data

2. Aerial Photograph/Unmanned Ariel Vehicle

- Snapshots of surface at certain time and place
- Usually use as background
- Can also used to analyse DSM and DTM



Other sources of spatial data

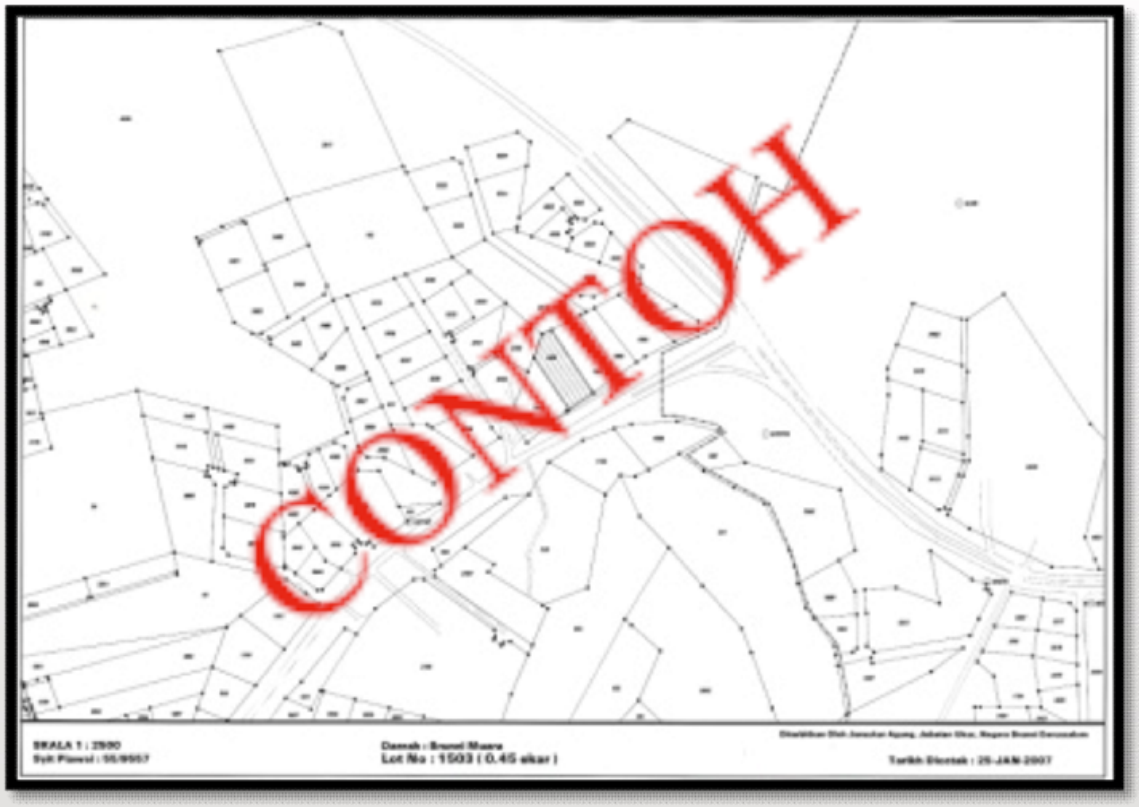
3. Satellite Images

- Capture by satellite, to produce the image
- Scale: image resolution
- Other sensor; thermal, hyperspectral, etc.

Other sources of spatial data

4. Field data source

- Data from field work, surveying, and GNSS



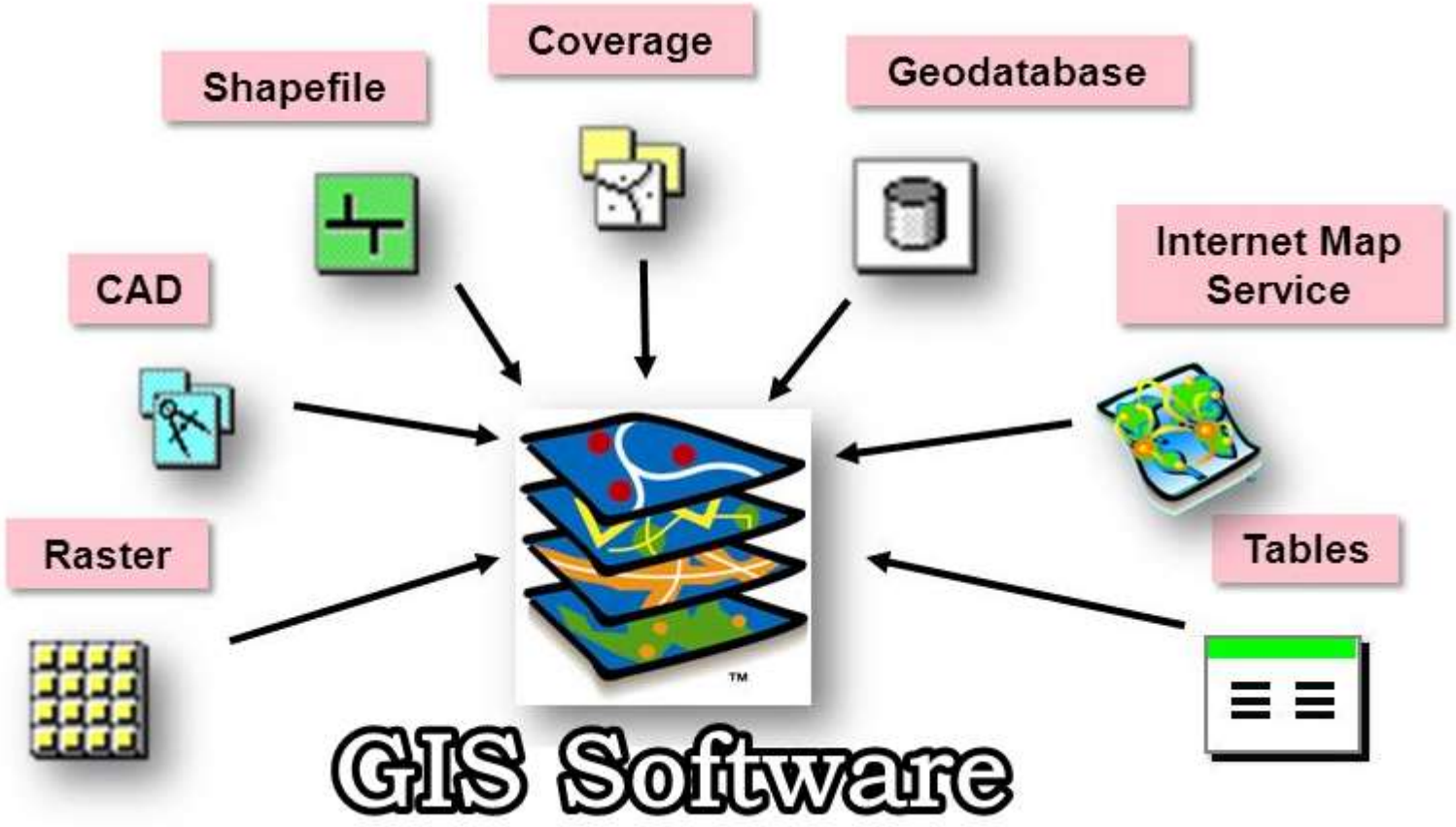
Other sources of spatial data

5. GIS data standard

- Need standardization to adapt between format
- OGC (Open Geospatial Consortium) Proposed GML (Geographic Mark-up Language)

```
#define dp_draw_wait
/// dp_draw_wait(text)
// Draws the "waiting" spinner
var w, h;
w = window_get_width()
h = window_get_height()
d3d_set_projection_ortho(0, 0, w, h, 0)
draw_set_color(c_white)
draw_circle_color(w / 2, h / 2, point_distance(0, 0, w / 2, h / 2) * 1.1,
    $303030, $202020, false)
d3d_transform_stack_push()
{
    d3d_transform_add_rotation_z(dp_elapsed() * 45)
    d3d_transform_add_translation(w / 2, h / 2, 0)
    d3d_model_draw(global.dp_waiting, 0, 0, 0, -1)
}
d3d_transform_stack_pop()
dp_draw_text(w / 2, h / 2, argument0)
```

Different format can be used if using the same standard



Conclusion

- This topic identified three main dimensions of data, and how the different data sources portray the spatial dimension.
- Besides that, this topic review the characteristic of map influence spatial data
- GIS data model will be influence by spatial data used

Terima kasih
thank you
danke
謝謝
ngiyabonga
شكراً جزيلاً
рахмат
teşekkür ederim
Баярлалаа
спасибо
gracias
dank je
tapadh leat
хвала
bedankt
dziękuję
hvala
mauruuru
obrigado
sukriya
kop khun krap
go raibh maith agat
mochchakkeram
merci
terima kasih
grazie
arigatô
dakujem
takk
merci
мерси
sagolun
taiku
enkosi
sobodi
dėkuji
mesi
didi madloba
kam sah hamnida
najis tuke
tanemirt
rahmet
diolch
dhanyavadagalu
shukriya
merce
trugarez
asante
manana
tenki
obrigada
murakoze
chokrane
mamnun
djiere dieuf
tau
akun
dankon
aciù
köszönöm
dhanyavad
nandri
nanni
bayarlalaa
grâcie
kiitos
dankie
faafetai lava
vinaka
спасибі
blagodaram
misaotra
matondo
paldies
grazzi
mahalo
barka
welalin
tack
mersi
kia ora
spas
chnorakaloutioun
gratias ago
gràcies
sulpáy
дякую
ありがとう
감사합니다
ευχαριστώ
xiexie
rahmat
তোমাকে ধন্যবাদ

Reference

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