



UP08/22: KURSUS PERISIAN
ARCGIS LANJUTAN
**SEMAKAN
TOPOLOGI**

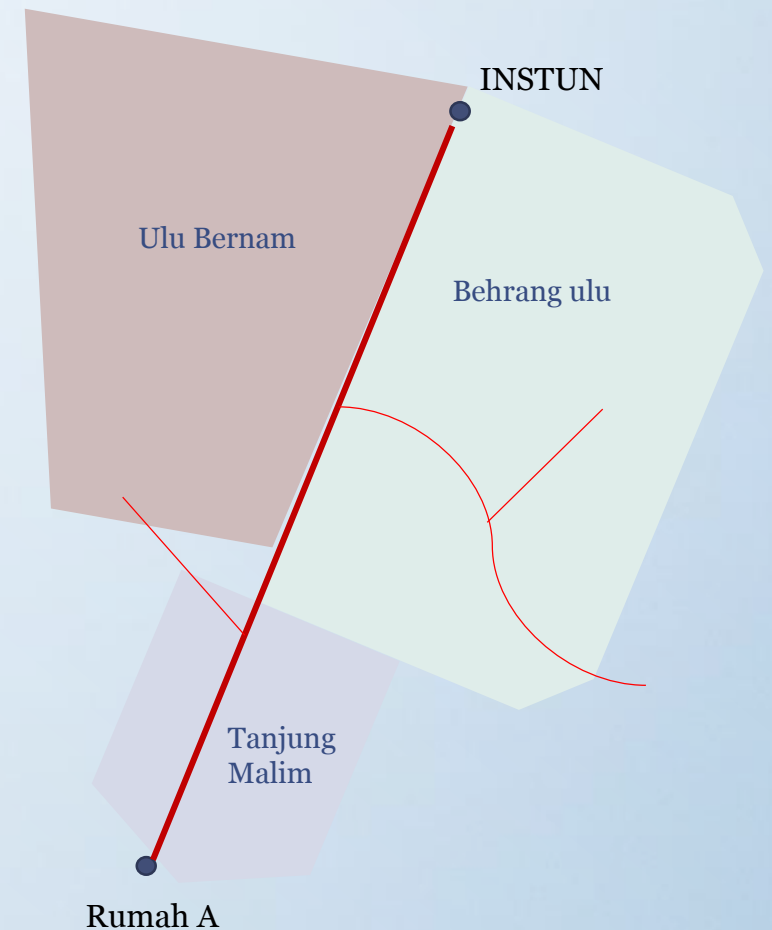
Salina Binti Ibrahim

Pusat Geospatial Negara (PGN)

TOPOLOGI?

- Topology → *spatial relationship* ataupun hubungkait spatial di antara *feature-feature* samada di dalam layer yang sama ataupun di dalam layer yang berasingan.

*(defines how **point**, **line**, and **polygon** features share coincident geometry)*

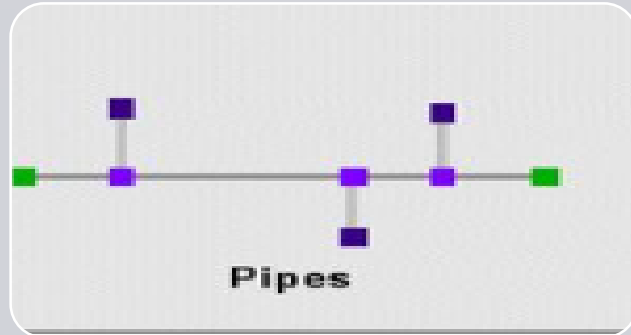


KEPENTINGAN TOPOLOGI

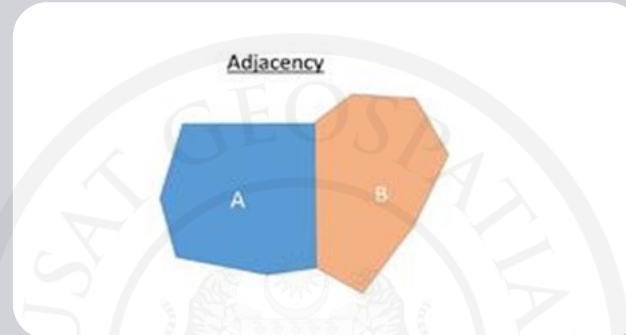
Konsep topologi digunakan di dalam GIS untuk;

- 1** Menjamin kualitas dan integriti pada data spatial
- 2** Menambah baik analisis GIS

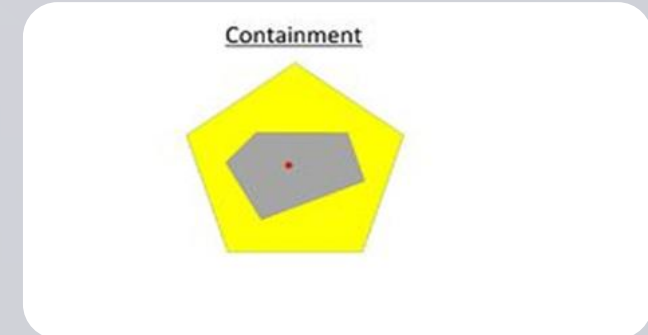
COMPONENT OF TOPOLOGY



Connectivity
how lines are connected to each other to form a network.



Adjacency
describes whether two areas are next to each other



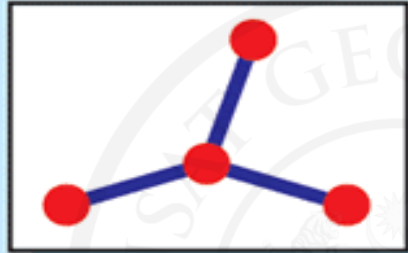
Containment
describes whether two areas are nested.

TYPES OF TOPOLOGY

Types of Topology

Line features can share endpoints

arc-node topology



Area features can overlap with other area features

region topology



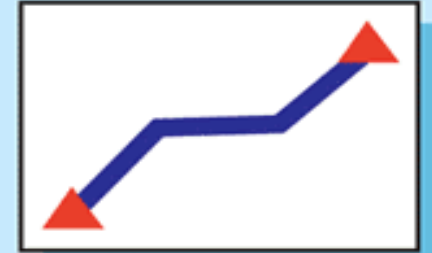
Area features can share boundaries

polygon topology



Line features can share endpoint vertices with point features

node topology



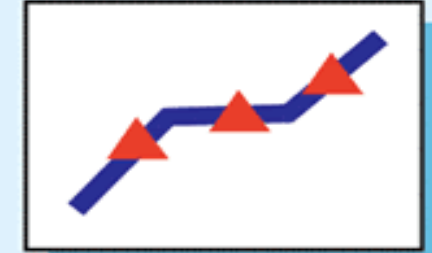
Line features can share segments with other line features

route topology



Point features can share vertices with line features

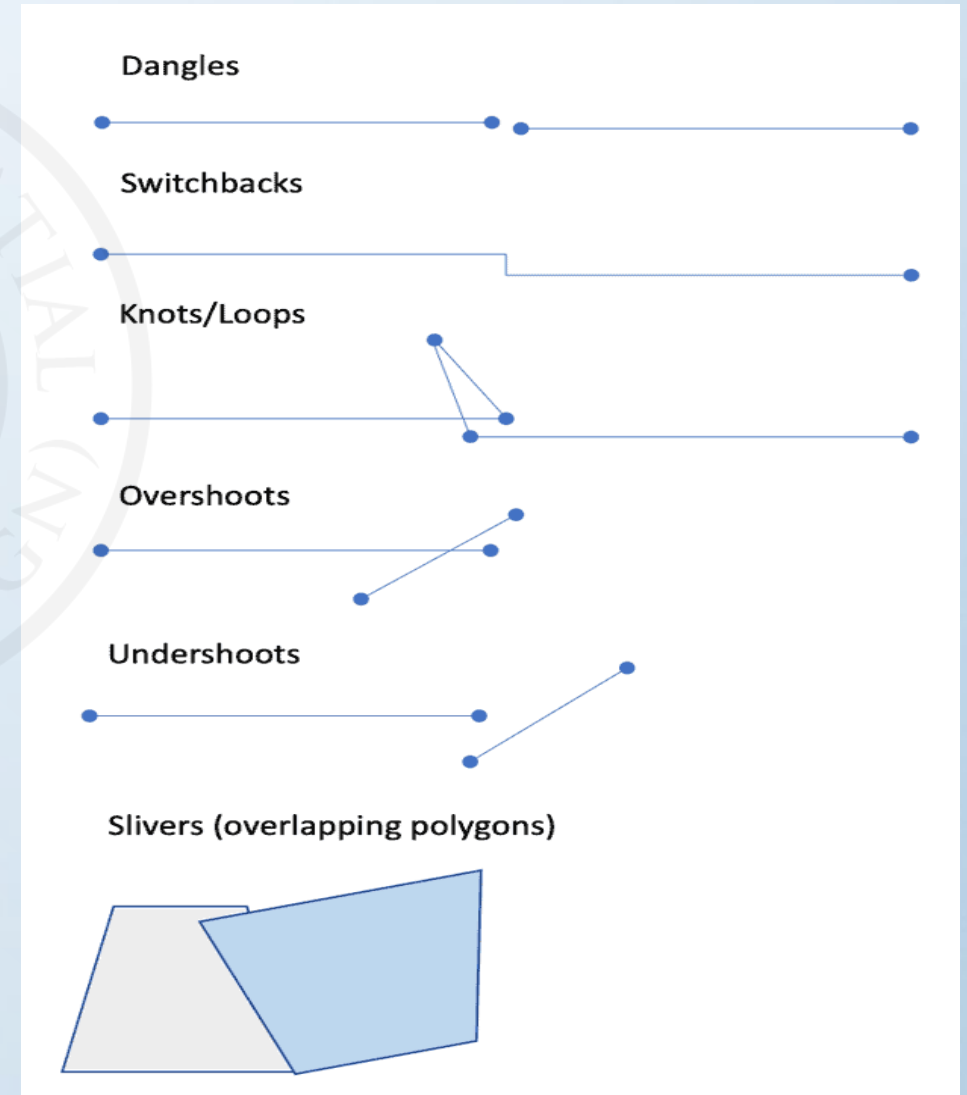
point events



TOPOLOGICAL ERRORS

Topological errors can occur when

- data is scanned or digitized.
- the result of human or computer error.
- occur when raster data is turned into vector data.



SEMAKAN TOPOLOGI













Semakan
Topologi
mengguna
ArcMap;

1. Map Topology

2. Geodatabase Topology Rules.

TOPOLOGY RULES

- Topology Rules adalah set aturan yang kita tetapkan pada data kita untuk memastikan data kita tu konsisten dan bebas dari ralat-ralat topology yang tidak sepatutnya ada pada data tersebut.

 Points	 Points on points	 Points on lines <i>Must be covered by endpoint of Point must be covered by line</i>	 Points on polygons <i>Must be properly inside polygons Must be covered by boundary of</i>
 Lines <i>Must not have dangles Must not have pseudo-nodes Must not overlap Must not self overlap Must not intersect Must not self intersect Must not intersect or touch interior Must be single part</i>	 Lines on points <i>Endpoint must be covered by</i>	 Lines on lines <i>Must not overlap with Must be covered by feature class of</i>	 Lines on polygons <i>Must be covered by boundary of</i>
 Polygons <i>Must not overlap Must not have gaps</i>	 Polygons on points <i>Contains point</i>	 Polygons on lines <i>Boundary must be covered by</i>	 Polygons on polygons <i>Must be covered by feature class of Must be covered by Must not overlap with Must cover each other</i>

ArcGIS Geodatabase Topology Rules

Topology in Data ArcGIS allows you to model spatial relationships between feature classes in a feature dataset. Topology rules allow you to define the relationships between features in a single feature class or sub-type or between two feature classes or sub-types. Topology rules allow you to define the spatial relationships that make the needs of your data model. Topology errors are violations of the rules that you can easily find and manage using the editing tools found in ArcMap.

How to read these diagrams:

- Topology rule name:** Describes the spatial relationship that the rule enforces.
- Diagram:** Shows the spatial relationship that the rule enforces.
- Example:** Shows the spatial relationship that the rule enforces.

Must not overlap
Polygon: Polygons must not overlap. Overlapping polygons are not allowed.

Must not have gaps
Polygon: Polygons must not have gaps. Gaps between polygons are not allowed.

Must be larger than cluster tolerance
Line or Polygon: Features must be larger than the cluster tolerance. Small features are not allowed.

Must not have pseudo nodes
Line: Lines must not have pseudo nodes. Pseudo nodes are not allowed.

Contains point
Polygon: Polygons must contain points. Points not contained within polygons are not allowed.

Contains one point
Polygon: Polygons must contain only one point. Multiple points within a polygon are not allowed.

Must not have dangles
Line: Lines must not have dangles. Dangling lines are not allowed.

Must not self-overlap
Line: Lines must not self-overlap. Self-overlapping lines are not allowed.

Must be covered by feature class
Polygon: Polygons must be covered by a feature class. Polygons not covered by a feature class are not allowed.

Boundary must be covered by
Polygon: Polygon boundaries must be covered by a feature class. Boundaries not covered by a feature class are not allowed.

Must not overlap
Line: Lines must not overlap. Overlapping lines are not allowed.

Must not self-intersect
Line: Lines must not self-intersect. Self-intersecting lines are not allowed.

Must not overlap with
Polygon: Polygons must not overlap with a feature class. Polygons overlapping a feature class are not allowed.

Must be covered by
Polygon: Polygons must be covered by a feature class. Polygons not covered by a feature class are not allowed.

Must not intersect
Line: Lines must not intersect. Intersecting lines are not allowed.

Must be single part
Line: Lines must be single part. Multi-part lines are not allowed.

Area boundary must be covered by boundary of
Polygon: Polygon area boundaries must be covered by a feature class. Area boundaries not covered by a feature class are not allowed.

Must cover each other
Polygon: Polygons must cover each other. Polygons not covering each other are not allowed.

Must not intersect with
Line: Lines must not intersect with a feature class. Lines intersecting a feature class are not allowed.

Must be covered by feature class of
Line: Lines must be covered by a feature class. Lines not covered by a feature class are not allowed.

Must coincide with
Point: Points must coincide with a feature class. Points not coinciding with a feature class are not allowed.

Must be disjoint
Point: Points must be disjoint. Points not disjoint are not allowed.

Must not intersect or touch interior
Line: Lines must not intersect or touch interior. Lines intersecting or touching interior are not allowed.

Must be covered by boundary of
Line: Lines must be covered by a feature class. Lines not covered by a feature class are not allowed.

Must be covered by endpoint of
Point: Points must be covered by an endpoint of a feature class. Points not covered by an endpoint of a feature class are not allowed.

Point must be covered by line
Point: Points must be covered by a line of a feature class. Points not covered by a line of a feature class are not allowed.

Must not intersect or touch interior with
Line: Lines must not intersect or touch interior with a feature class. Lines intersecting or touching interior with a feature class are not allowed.

Must be properly inside
Point: Points must be properly inside a feature class. Points not properly inside a feature class are not allowed.

Must be covered by boundary of
Point: Points must be covered by a feature class. Points not covered by a feature class are not allowed.

Must not overlap with
Line: Lines must not overlap with a feature class. Lines overlapping a feature class are not allowed.

Endpoint must be covered by
Line: Lines must have their endpoints covered by a feature class. Lines with endpoints not covered by a feature class are not allowed.

- Nama File: topology_rules_poster.pdf
- C:\Program Files(x86)\ArcGIS\Desktop10.4\Documentation.

How to read these diagrams:



The topology rule occurs within a single feature class or subtype.



The topology rule occurs between two different feature classes or subtypes.

Topology rule name

Description and example of a valid case of the specified topology rule.



Description and example of a case of the specified topology rule where errors exist and will be returned. For each example, the error shape is shown in bright red.



Generalized description of when to use this rule.



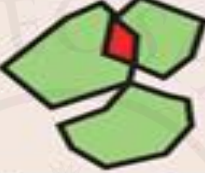

Description of a real-world application of the specified topology rule.

Rules ini digunakan untuk data polygon

Polygon


Must not overlap ← Nama Rules

Polygons must not overlap within a feature class or subtype. Polygons can be disconnected or touch at a point or touch along an edge.



Preview error yang akan dipapar

Polygon errors are created from areas where polygons overlap.



A voting district map cannot have any overlaps in its coverage.

Use this rule to make sure that no polygon overlaps another polygon in the same feature class or subtype.

Penerangan Rules

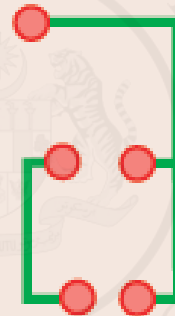
Rules *Must not overlap* hanya boleh digunakan untuk menyemak data feature polygon

*contoh melihat lot bertindih, zon gunatanah bertindih dan lain-lain.

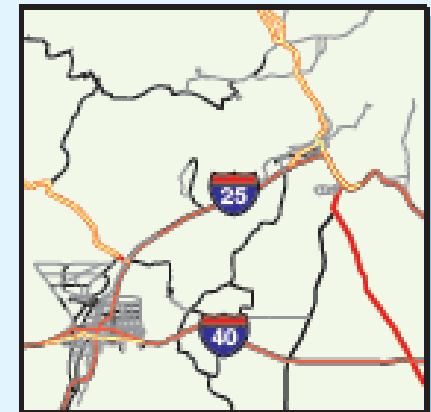
Line

Must not have dangles

The end of a line must touch any part of one other line or any part of itself within a feature class or subtype.



Point errors are created at the end of a line that does not touch at least one other line or itself.



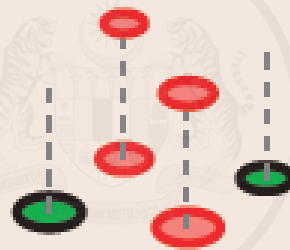
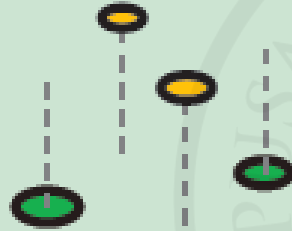
Use this rule when you want lines in a feature class or subtype to connect to one another.

A street network has line segments that connect. If segments end for dead-end roads or cul-de-sacs, you could choose to set as exceptions during an edit session.

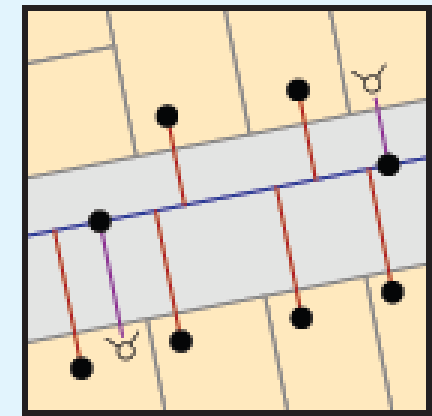
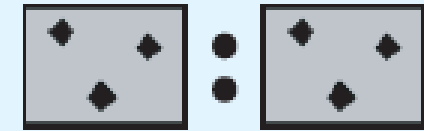
Point

Must be disjoint

Points cannot overlap within the same feature class or subtype.



Point errors are created where points overlap themselves.



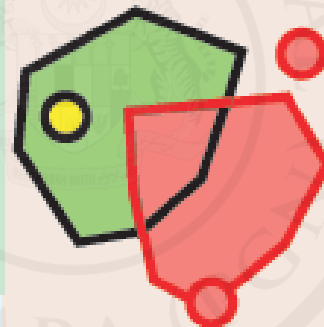
Use this rule when points within one feature class or subtype should never occupy the same space.

Fittings in a water distribution network should not overlap.

Polygon

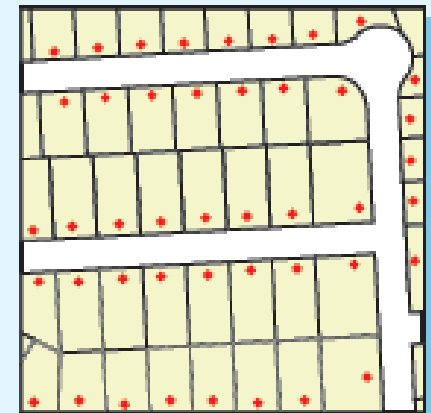
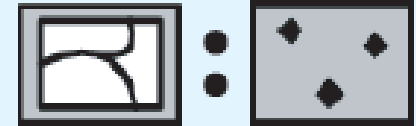
Contains one point

Each polygon must contain exactly one point. Each point must fall within a polygon.



Polygon errors are created from the polygons that do not contain exactly one point. Point errors exist where points are not within a single polygon.

Use this rule to make sure that there is a one-to-one correspondence between features of a polygon feature class and a point feature class.



Parcels must contain exactly one address point.



LATIHAN AMALI

SEMAKAN TOPOLOGI SECARA MAP TOPOLOGI

- Soalan
 1. Mukim mana yg terlibat dalam topology error dan nyatakan?
 2. Jenis topology error yang terlibat?

SEMAKAN TOPOLOGI SECARA GEODATABASE TOPOLOGY

1. Berapakah error **Must Not Overlap** yang dikenalpasti?
2. Berapakah error **Must Not Have Gap** yang dikenalpasti?

Rujukan

- <http://www.sukagis.com/2012/06/membina-geodatabase-topology-rules.html>
- <https://desktop.arcgis.com/en/arcmap/10.3/manage-data/editing-topology/geodatabase-topology-rules-and-topology-error-fixes.htm>
- <https://www.esri.com/news/arcnews/summer02articles/arcgis-brings-topology.html>
- <http://wiki.gis.com/wiki/index.php/Topology>



TERIMA KASIH

www.mygeoportal.gov.my

salina@ketsa.gov.my

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