

Constraints in geographical information system (GIS)

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Constraints are an important aspects of geographic objects in *Geographical Information System (GIS)*. The common integrity constraints of key, domain, referential integrity, and general semantic constraints cannot capture the distinctive characteristics of geographic information. Constraints that deal specifically with spatial information can be classified into topological, semantic and user-defined.

Types of Constraints in Geographical Information system (GIS) are as follows:

1. Topological integrity constraints –

- Topology deals with the behaviour of features and spatial relationship between them.
- Topological integrity constraints are used during insert and update processes to help reduce error and improve data quality.
- Spatial relationship are defined for entities within the data model and are application specific.
- When subdividing a parcel for example, we can constrain the new sub-parcel to be completely constrained within the same old parcel boundaries.

2. Semantic Integrity constraints –

- Semantic deals with the meaning of the spatial features.
- This constraints basically define whether the database state is valid according to the semantic rules that apply to feature.
- For example, a parcel boundary cannot cross a building outline and two building cannot share an edge. Some semantic constraints that apply to roads like one way streets may be hard to incorporate.

3. User-Defined Integrity Constraints –

- User-defined integrity constraints are the business rules of non spatial DBMS's.
- An example of such a rule might be that a house should be located within a certain distance from a fire hydrant.

4. Temporal Constraints –

- Temporal constraints are differentiated into punctual and durable temporality.
- Punctual temporality defines an occurring event with a specific time, such as accident, earthquake, party and so on.
- Durable refers to the description of changes that occur over time.
- For example, a bridge was built, maintained, and then demolished. Therefore,

besides the location/geometry change, the data needs to have a time component attached.

5. Generalization Constraints –

- This constraint relates to different level of scales and abstraction within a system.
 - When a certain layer of data is uploaded into a system it satisfies different constraints.
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