

Identifier-driven sharing and application mechanism based on primitive topographic features: An example of buildings

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SUMMARY

The national-level dissemination of geospatial resources necessitates the effective integration of data across multiple domains. A notable challenge arises from the fact that numerous datasets specific to certain domains contain only indirect spatial references, thereby limiting their direct applicability in spatial contexts. Traditionally, topographic maps have been regarded as essential national data, distinguished by their clearly defined themes, specifications, and quality. Topographic features can serve as valuable geospatial references for cross-domain data, thereby enabling effective integration with information acquired from various stakeholders. This study seeks to broaden the applications of national base maps by investigating how building features with diverse specifications can function as a foundation for the geospatial referencing of cross-domain data. By associating building features with multiple domain identifiers, such as building numbers and street addresses, various themes of building-related data that lack spatial context can be geospatially referenced. This methodology not only revitalizes the potential applications of building features but also facilitates their integration and interaction with other domain data based on location, thus allowing for effective incorporation into geospatial applications. As a critical component of topographic maps, building data is characterized by spatial units with clear semantics according to the selected Level of Detail (LOD). Each semantic spatial unit of a building possesses specific identifiers, and each type of identifier adheres to its own design and maintenance protocols, necessitating a separate examination of the linking operations. Through an analysis of various identifier systems of buildings in Taiwan, this study demonstrates that establishing unambiguous cross-domain linking relationships requires the spatial units of building features, the temporal versions of identifiers, and the domain data meet the criteria of both uniqueness and temporal consistency. This requirement transcends the traditional approach of merely linking disparate data based solely on common identifiers. From the perspective of national spatial data infrastructure, this underscores the necessity for a more comprehensive temporal version management system for the

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topographic feature database, driven by the characteristics of the identifiers. Furthermore, it emphasizes the importance of incorporating temporal considerations into domain data to achieve accurate integration with topographic features, thereby facilitating optimal utilization of cross-domain information.

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