

Use Case of National Digital Twin Standard for Buildings

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SUMMARY

The digital twin, a key technology in the fourth industrial revolution, is to predict results in advance by creating twins of real things in the digital space and simulating situations that may occur in real life. In this regard, in Korea, National Digital Twin projects are actively being promoted to build real-world land in the virtual world. The Korean government has established national standards based on geographic information standards to get interoperability of national digital twin data. The standards were developed a reference model standard first for establishing a sharing system of Korean national digital twin, and then profiled and expanded based on various standards of OGC, such as OGC CityGML 3.0, to define a data model of Korean national digital twin for each major domains of the country. The data quality, metadata, and data product specification standards of each domains were developed by profiling ISO 19109, 19131, 19157, which are the fundamental standards for geographic information, centering on the data model defined as Korean standards.

In order to secure the usability of national standards, this study aims to analyze national digital twin data built for building domains and to present examples modeled to standards. Sample data is composed of three: an UML diagram, a XML schema, and a GML, and was produced according to the data construction flow based on a use case for administrative service called "Computation service of Building permit areas"

First, a UML diagram was drawn to suit the purpose and requirements of data construction based on the national standard of the building data model. Then the geometry, semantic, properties information of building's feature catalogue were written as XML schema of the Korean national digital twin for building data model based on the CityGML 3.0 schema. Finally, according to the XML schema, three-dimensional building data was encoded into

GML.

This case is an implementation case of Korean standards based on OGC City GML 3.0, and it is hoped that it will be meaningfully used for data implementation based on standards. Also it is expected that this case will be a cornerstone internationally in strengthening the utilization of geographic information standards in the future.

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