



3D Data Sources

Lecture Notes

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License



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Learning outcomes

At the end of this lecture, the learner is expected to be able to

- Identify and describe available 3D data sources that can be used for GIS and BIM

Expected competences when entering the lecture

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Summary

The lecture explains 3D data sources that can be used in BIM and GIS. It covers metadata description, authoritative and non authoritative data sources and licenses.

Expected Workload

21 slides with course learning content, 2 hours



Revision History:

Revision	Date	Author(s)	Status	Description
0.1	2023-09-09	V. Cetl	Draft	Table of content
0.2	2023-09-20	V. Cetl	Draft	Main content added
0.5	2023-11-16	V. Cetl, S. Šamanović, D. Markovinović	Draft	First complete version
1.0	2024-01-15	V. Cetl	Final	Final after revision
2.0	2025-04-29	V. Cetl	Final	Updated EU logo and disclaimer. Edited by T. Näslund



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Introduction

In data analysis and business intelligence, a data source is a vital component that provides raw data for analysis. A data source is a location or system that stores and manages data, and it can take on many different forms.

In short, data source refers to the physical or digital location where data can be stored as a data table, data object, or another storage format. It's also where someone can access data for further use — analysis, processing, visualization, etc.

Data Sources

Most data sources can be divided into two main categories: machine data sources and file data sources.

The machine data source is created on the client machine, be it a computer, a phone, an Internet of things, or another device. It is available to users currently logged onto the system and cannot be shared with other machines. They can be further categorized into user data sources (available only to a particular user) and system data sources (available to all the system users).

Machine data source examples include network traffic logs, system and application logs, output from sensors, event data from IoT devices, database query results, etc.

File Data Sources are not assigned to particular machines, applications, systems, or users. They can be shared between devices. These data sources are usually stored in separate text files. They do not have a data source name (DSN) like machine data sources. Such data sources include spreadsheets, text documents, PDFs, images, and audio and video files.

Data sources can be copied and shared in a variety of ways. Some can be downloaded to a local computer and sent via email, cloud storage, or other file-sharing services. Another way is to export the data source as a CSV, Excel, or other file format and then share the file. Finally, data sources can be shared by providing access to the source, such as a web page or database.

Data is transported with the help of existing network protocols. File Transfer Protocol (FTP) and HyperText Transfer Protocol (HTTP) are the most widely used. Other protocols for fetching data between systems, especially on the web, include NFS, SMB, SOAP, REST, and WebDAV.

Another method of moving data from sources to destinations is using Application Programming Interfaces (APIs) provided by websites, networked applications, and other services.

Metadata

In order to find data that someone needs, the very important part is metadata. Metadata means "data about data". Metadata is data that gives more detail about other data. Metadata helps to understand the structure, nature, and context of a set of data. In the context of BIM and GIS, the metadata should provide additional attributes to the data



such as: Title, Purpose, Coverage (Location), Date of Creation, Accuracy, Coordinate Reference System, Format, Size, Constraints, Licensing, etc.

Metadata should be published in order to be accessible for potential users. The most common way is through catalogue services (e.g. European data portal, INSPIRE Geoportal). Metadata allows search (filtering) and ideally discovery of data sources that were of interest.

Datasets

Publisher ⓘ

 ▼

Formats ⓘ

 ▼

Catalogues ⓘ

 ▼

Categories ⓘ

 ▼

Keywords ⓘ

 ▼

Data scope ⓘ

 ▼

Data services ⓘ

Data services ☐ Yes ☒ No

Metadata quality ⓘ

 ▼

Figure 1. Filtering by metadata on the European Data portal

Authoritative vs. non authoritative Data Sources

Authoritative Data Source is a managed repository of valid or trusted data that is recognised by an appropriate set of governance entities and supports the governance entity's business environment. The data is official and usually provided by a governmental or a public body.

For the spatial data, such bodies are usually National Mapping, Cadastre and Land Registry Authorities (NMCAs) (Figure 2).

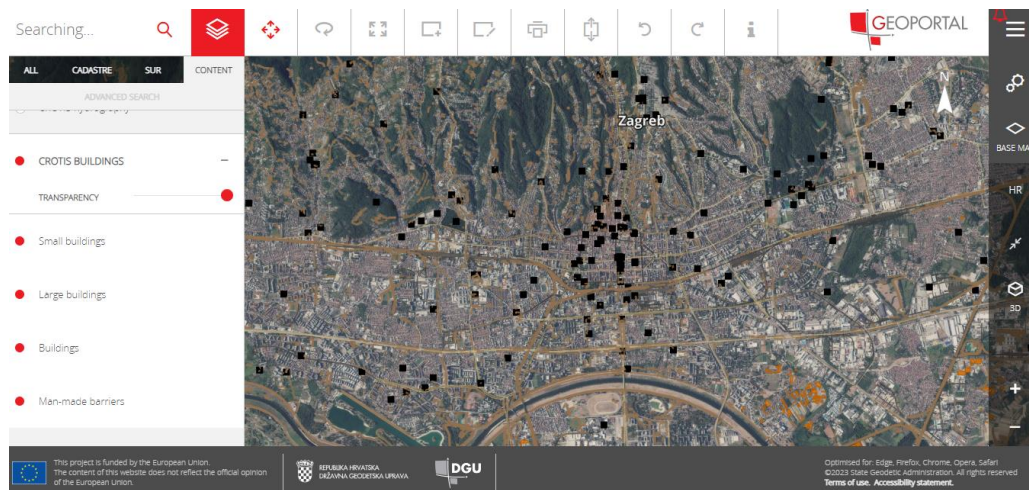


Figure 2. Croatian State Geodetic Administration geoportal

Today, the most of the authoritative data is open. Open (Government) Data refers to the information collected, produced or paid for by the public bodies (also referred to as Public Sector Information) and made freely available for re-use for any purpose. Public sector information is information held by the public sector. The Directive on the re-use of public sector information provides a common legal framework for a European market for government-held data. It is built around the key pillars of the internal market: free flow of data, transparency and fair competition. It is important to note that not all of the public sector information is Open Data.

Non-authoritative data are coming from different sources: Private Sector, Volunteered data, Citizen Science, etc. The very known sources are e.g. Google Earth (Figure 3) Google Maps and OpenStreetMap (Figure 4). The data coming from the private sector could be open or restricted, while the data coming from volunteers is usually free and open.

Open building data faces several challenges related to standardisation, data interdependency, data access, and security. In addition to these technical challenges, there remains the barrier among BIM developers who wish to protect their intellectual property, as full 3D BIM development requires expertise and effort. This means that there is often limited availability of building data.

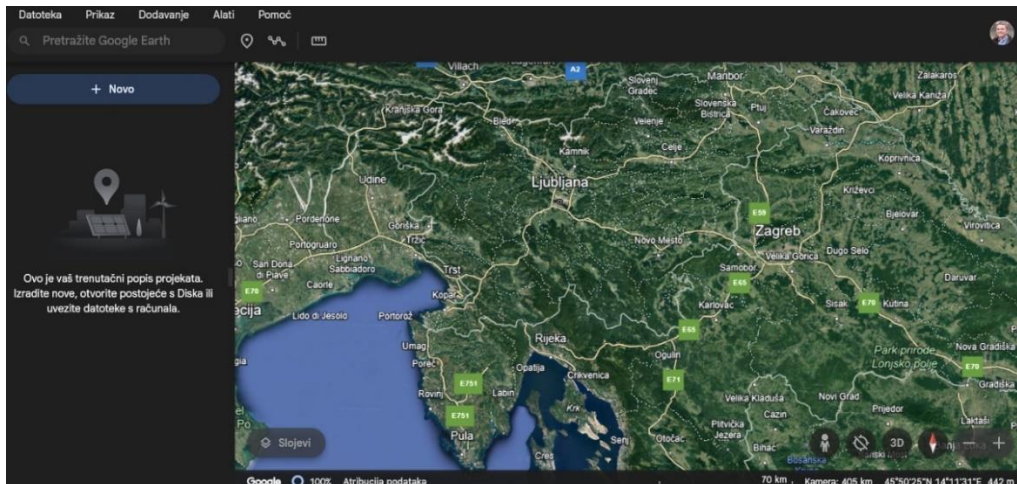


Figure 3. Google Earth

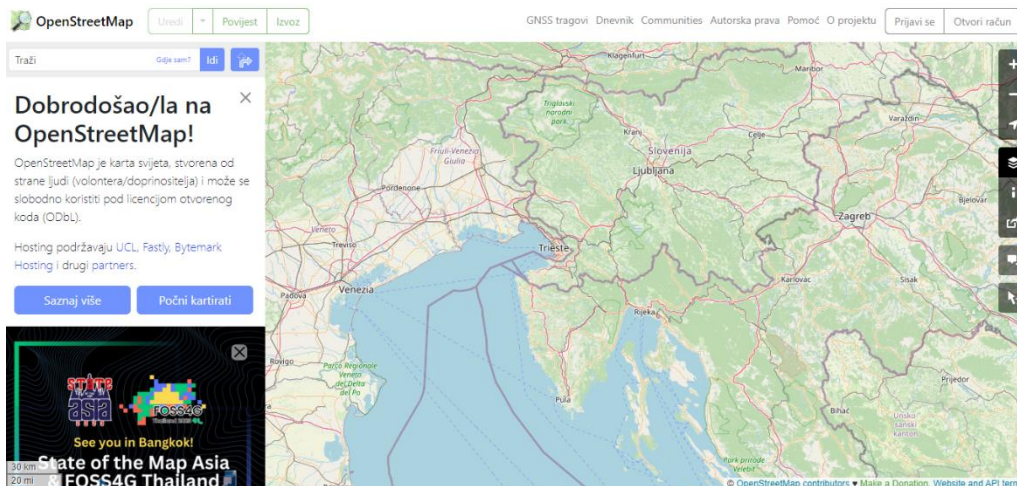


Figure 4. OpenStreetMap

Licenses

A license is a legal agreement that allows someone other than the copyright holder to use the copyrighted work under certain terms and conditions set by the copyright holder. It is very important to understand license in order to use the data source.

Common licenses often used with free geospatial data sources are: Creative Commons licenses, Open Government Licence (OGL), Open Government Licence (OGL), Open Database License (ODbL) etc.



References:

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