



Framework for Malaysian 3D SDI in CityGML

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8



Content



- Introduction
- CityGML
 - Servers and Clients of CityServer3D
 - Malaysian 3D spatial data infrastructure
- A sustainable 3DSDI
 - Standardized Web Services
 - Integration of Data Infrastructure Design
- Code lists and External Code lists
- Proposed external code lists for Putrajaya area
- Conclusions and remarks



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- Spatial Data Infrastructure is used to describe metadata relevant to the collection of technologies, technical methods and processes, policies and institutional arrangements that facilitate the access to 3D spatial data.
- The external code lists based on local culture, vegetation and heritage landmarks were proposed and approved by OGC for indexing 3D city objects of Malaysia.

- **BIM vs. CityGML**
 - until now there is no complete interoperability and transfer of semantic data and spatial relationships from BIM to the geospatial environment due to following reasons.
 - Weakness of CAD models to store semantic information and spatial relationships.
 - Although BIMs contain geometric and semantic information about the building elements in an object oriented data structure, the geospatial information models handled and treated the data in a different manner than BIMs, and were insufficient in representing all the aspects of the building Information Models.
 - BIM supports more detailed and accurate data than 3D SDI because of the type of application.



Introduction



- CityGML is a standardized information model which puts focus not only on the objects' geometry but also on their semantics, topology, and appearance.
 - Objects may comprise coexisting geometric representations for different LOD's.
 - Topological relations between objects can be recognized via links between geometries (XLink concept).
 - Complexity of the variable in the geometry, semantic and coherent structures (Stadler & Kolbe, 2007).
 - Aggregation hierarchies on the part of both geometry and semantics support complex object structures (hierarchical structuring).



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Servers and Clients of CityServer3D

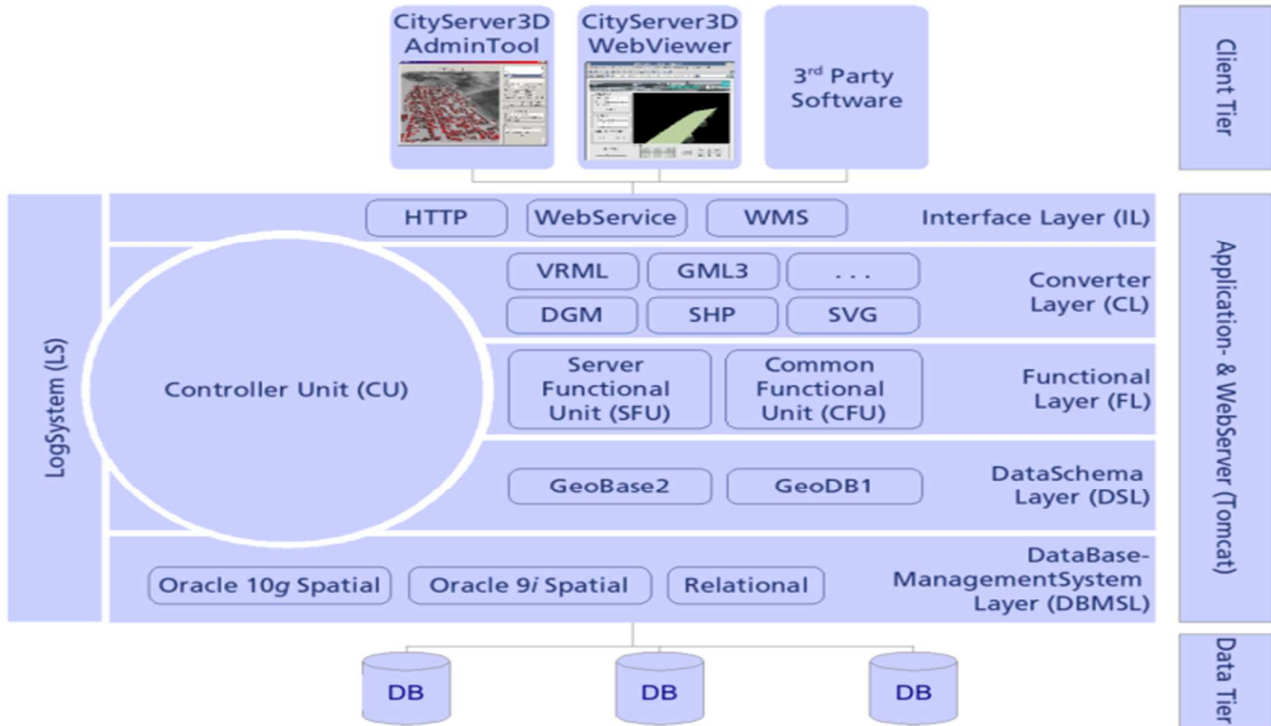


- What are the necessary tools for the clients system
 - A web based visualisation system
 - Management of the database for importing and exporting data



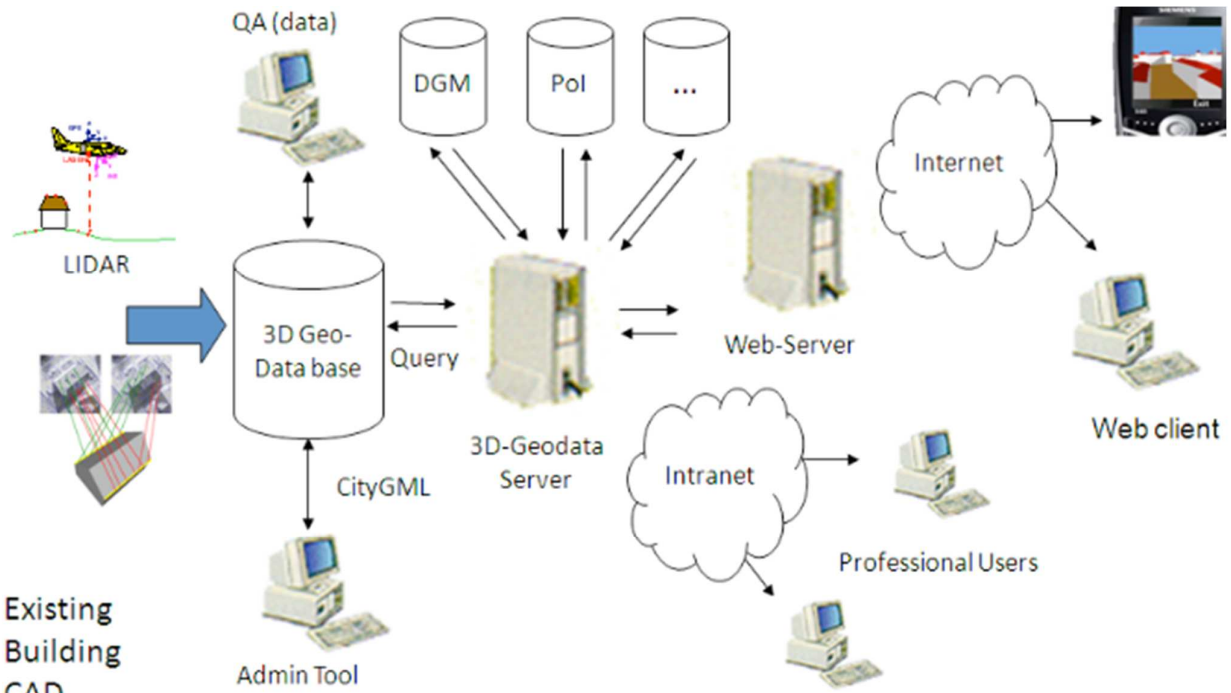
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Malaysian 3D spatial data infrastructure

- The Malaysian 3D SDI aims to provide 3D information to many users within the existing Malaysian Geospatial Data Infrastructure (MyGDI) framework.
- MyGDI contains various 2D spatial data and layers.
- Malaysian 3D SDI will be used to serve the community with appropriate interface especially applications like navigation, urban planning, police simulation and crime monitoring system, building management, homeland security, ...



How create your CityGML file form SketchUp 3D models

- <http://www.citygml.de/index.php/sketchup-citygml-plugin.html>

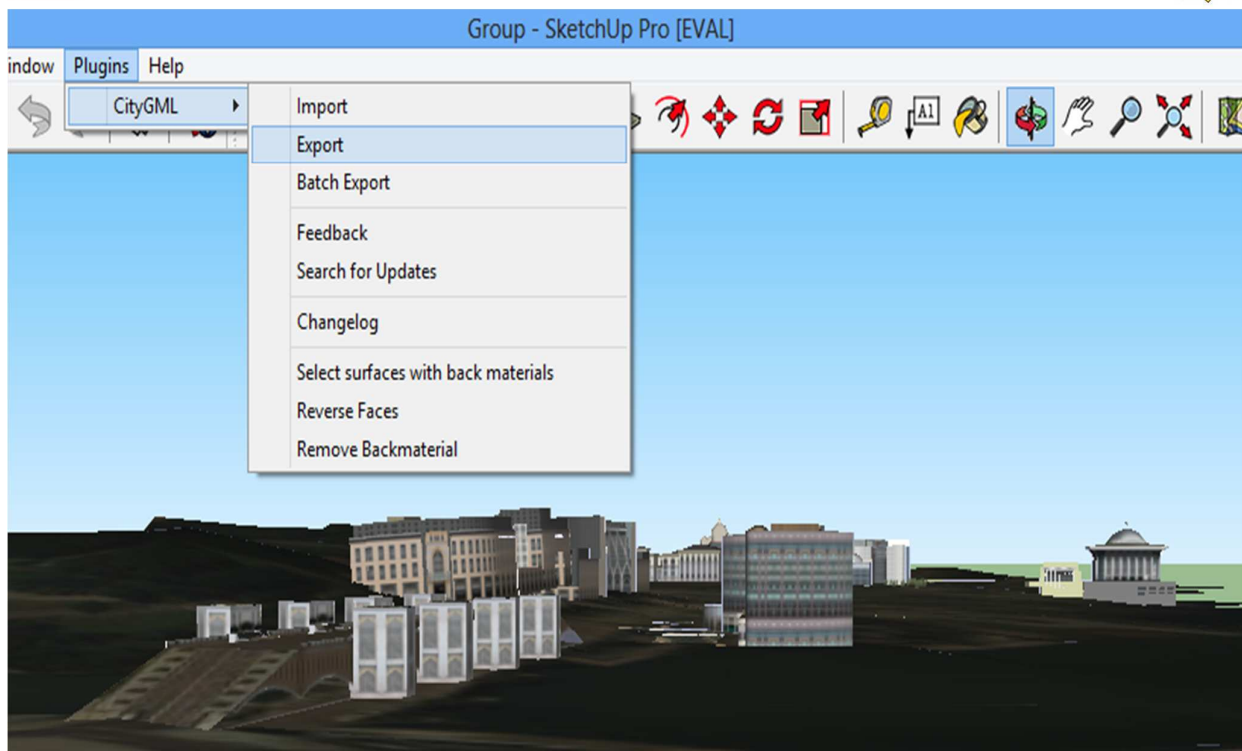
CityGML Toolchain	CityGML Editor 1.8
Survey	CityGML Editor 1.8. is released.
Projects	13/11/2012
Lectures & Co.	CityGML Editor 1.7
Media	CityGML Editor 1.7. is released.
Team	11.06.2012
Others about us	CaveViewer video
SketchUp plugin	About the project CaveViewer, which was performed with the Hamburg University of Applied Sciences, is now also a video .
Survey	08.03.2012
► Download	
Forum	

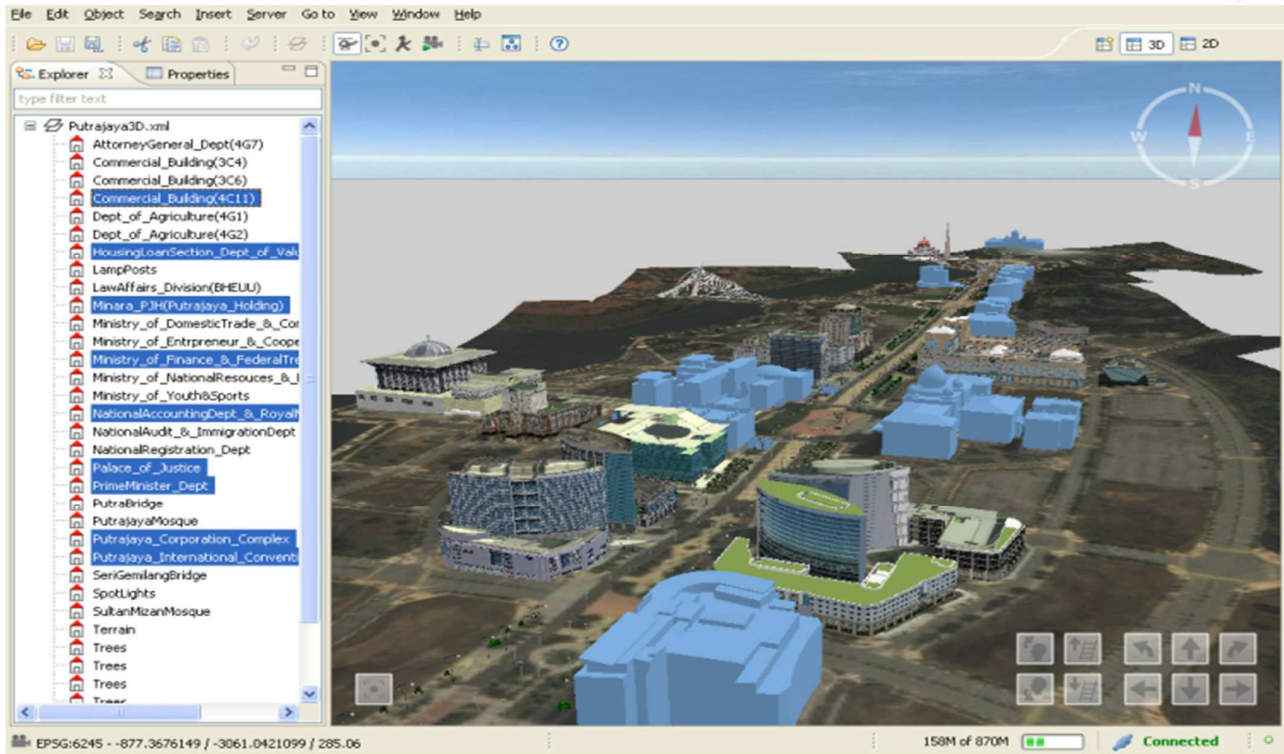
C:\Program Files (x86)\SketchUp\SketchUp 2013\Plugins

Filename:

CityGML_Editor_18.zip

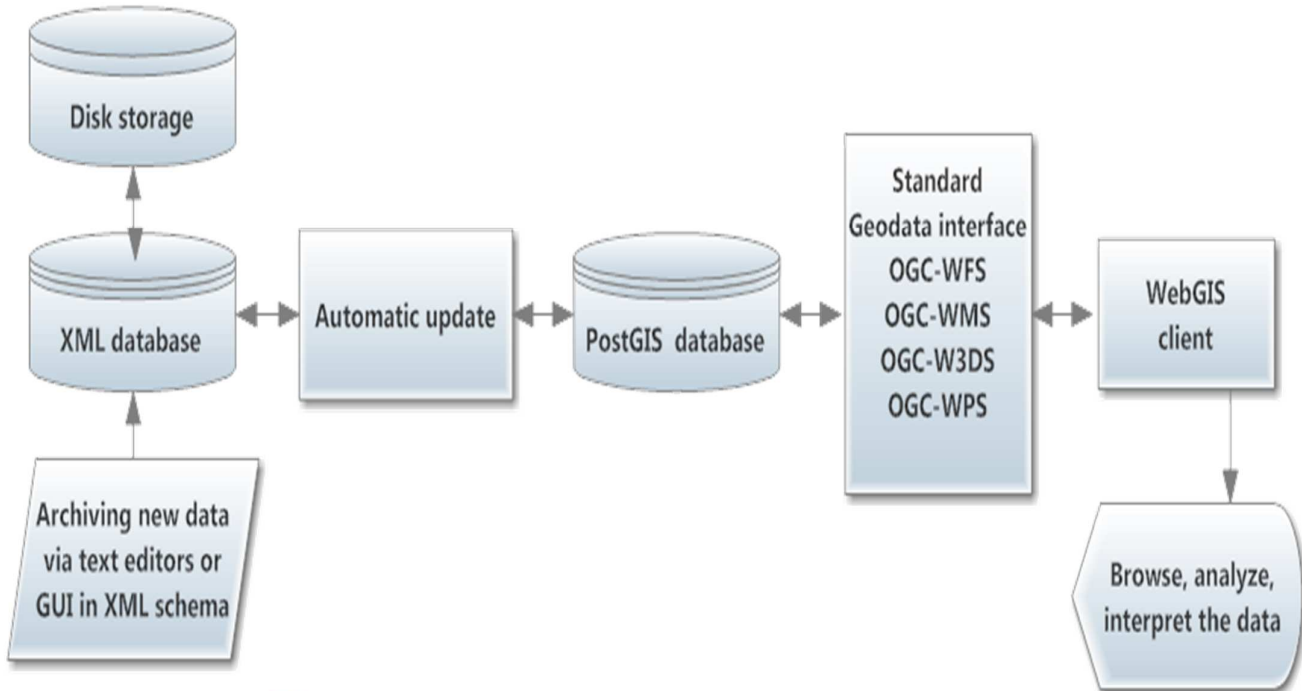
Name	Type
CityGML	File folder
CityGmlExtension.rb	RB File



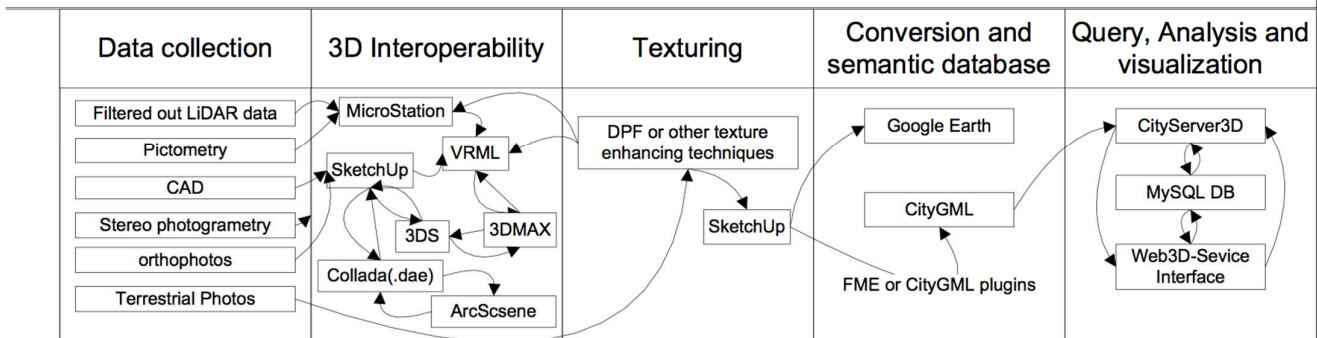


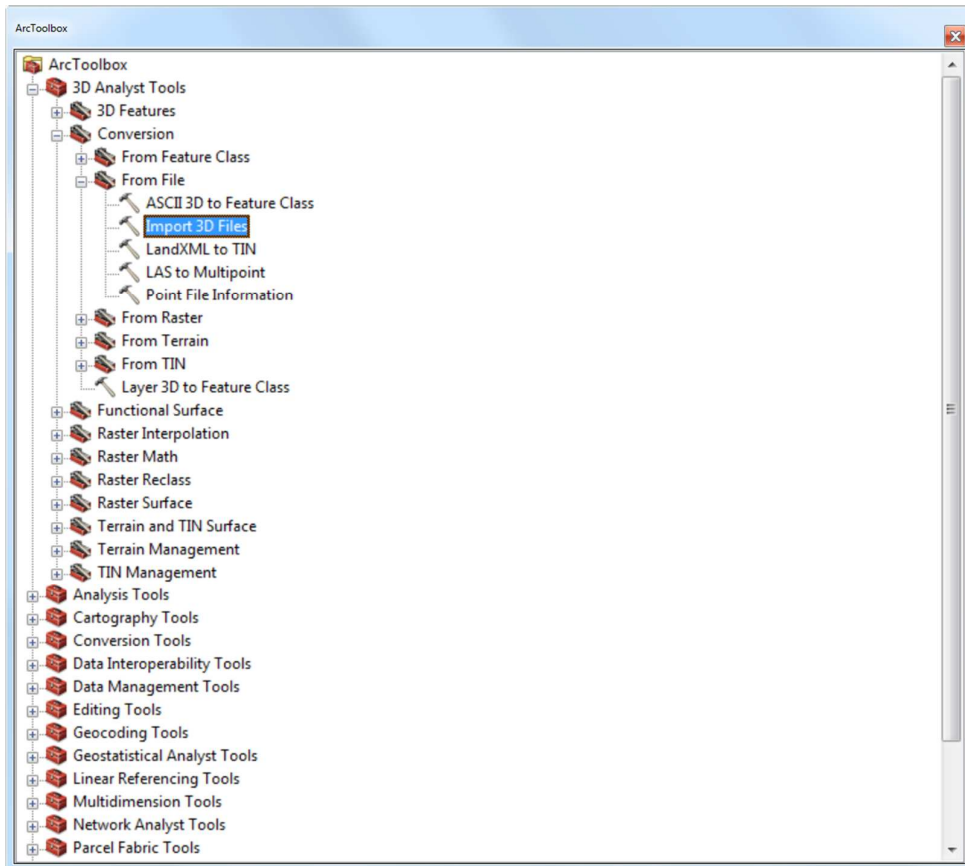
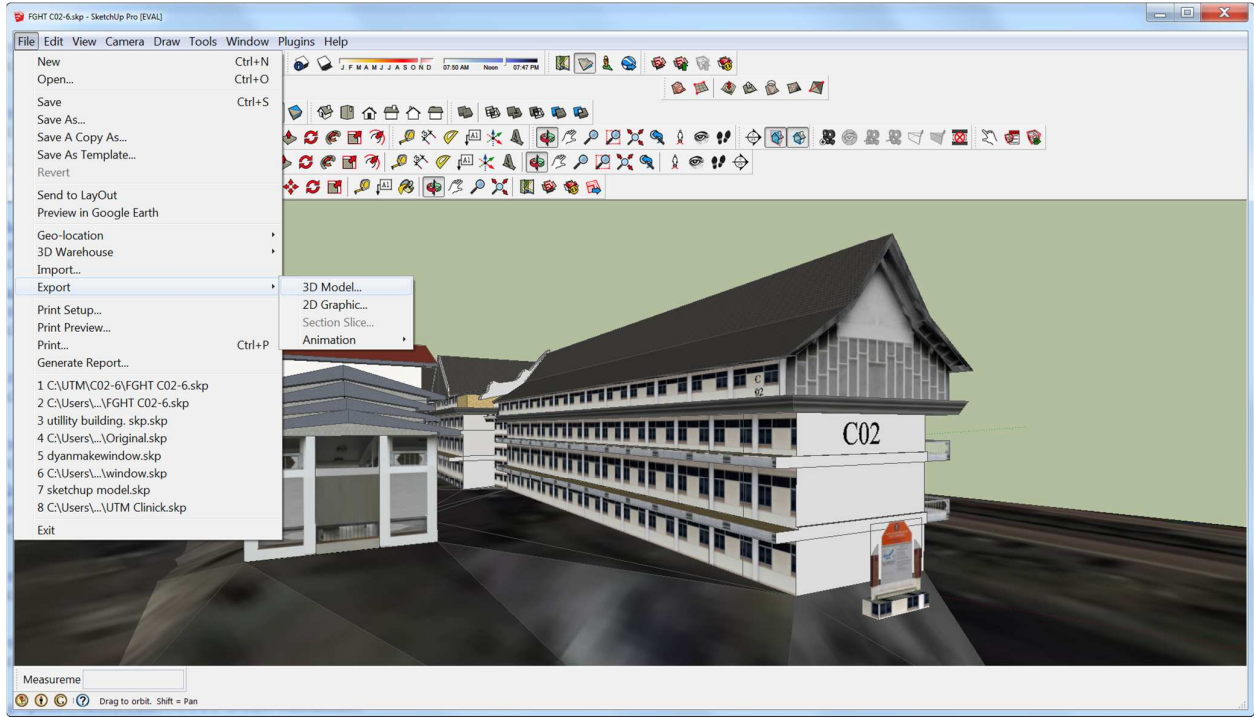
- **Standardized Web Services**
 - how to make use of the data
 - which formats are available
 - how to update and maintain and etc.
 - web atlas is fed by four different OGC-Web-Services (OWS)
 - WMS for the 2D map presentation
 - WFS for vector data
 - WPS for analysis processing
 - W3DS for the 3D scenes

- Integration of Data Infrastructure Design



3D model Interoperability and production pipeline





- CityGML supports implicit geometries, prototypic objects, scene graph concepts such as vegetation model, city furniture and generic objects. Implicit geometry is a kind of prototypical geometry which can be generated once and reused unlimited number of times based on 7 well known parameters (3 for rotation, 3 for translation and 1 scale factor). The implicit geometry can be an external file in different formats such as VRML, DXF or 3D Studio MAX on a local or remote machine and loaded to CityGML scene via URL. Alternatively, it can be defined by a GML3 geometry object (Gröger et al., 2008). This concept can be utilized to represent uniform shapes such as coconut or palm trees, street furniture and so etc. It can solve the lagging and rendering problems while visualization.

- To represent the object attributes of the city, having an enumerative range of values is needed.
 - CityGML_ExternalCodeLists.xml
 - BuildingClassType
 - BuildingFunctionType
 - BuildingUsageType
 - RoofTypeType
 - BuildingInstallationClassType
 - BuildingInstallationFunctionType
 - BuildingInstallationUsageType
 - IntBuildingInstallationClassType
 - IntBuildingInstallationFunctionType
 - IntBuildingInstallationUsageType
 - BuildingFurnitureClassType
 - BuildingFurnitureFunctionType
 - BuildingFurnitureUsageType
 - RoomClassType
 - RoomFunctionType
 - RoomUsageType

RoofTypeType			
Code list for Roof Type			
1000	Flat roof	1070	pavilion roof
1010	monopitch roof	1080	cone roof
1020	skip pent roof	1090	copulan roof
1030	gabled roof	1100	shed roof
1040	hipped roof	1110	arch roof
1050	half-hipped roof	1120	pyramidal broach roof
1060	mansard roof	1130	combination of roof forms
1131	hip and gabled roof	1151	Pyramidical roof
1141	dome roof	1161	Double eaved roof

Conclusions & Remarks

- The code lists can also be used for the objects on the façade in different layers such as windows, doors and backgrounds to enhance the usage of 3D SDI for a variety of privileges from end-users to professionals in the near future.
- DPF can be used in the near future to generate the CityGML file automatically for whole facades of the 3D virtual model along with semantic information of the components on the façade and their external code lists.



Acknowledgement



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Thank you for your attention!

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