

L'interopérabilité des systèmes GIS et BIM

Quelques éléments de discussion

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GEO+Summit 2022

DER DIGITALE LEBENSRAUM
L'ESPACE DE VIE AU NUMÉRIQUE

VERNETZT
MENSCH
UND RAUM



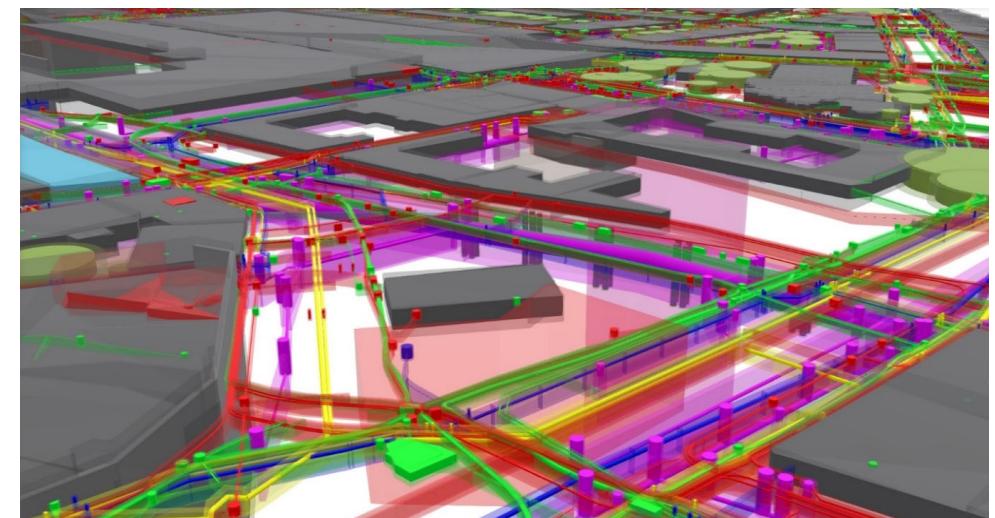
Pourquoi une convergence des geodonnées avec le BIM ?

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En raison des innombrables **cas d'usage** !



Cadastre solaire, GE



Projet InnoSubsurface, GE

Cas d'usage

Cas d'usage

Exemple d'application

Estimation of solar irradiation

Determining the suitability of a roof surface for installing photovoltaic panels

Energy demand estimation

Assessing the return of a building energy retrofit

Estimation of shadows cast by urban features

Determination of solar envelopes

Estimation of the propagation of noise in an urban environment

Traffic planning

Urban planning

Designing green areas

Emergency response

Planning evacuation

Computational fluid dynamics

Predicting air quality

Forecasting seismic damage

Insurance

Flooding

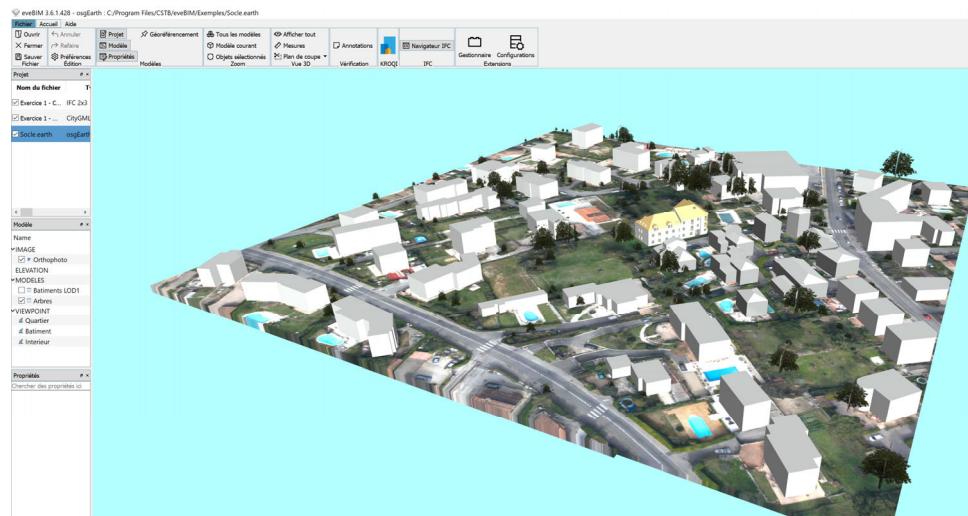
Mitigating damage to utility management

Extrait d'un tableau de Biljecki, F. (2015). Applications of 3D City Models : State of the Art Review.
ISPRS Int. J. Geo-Inf., 2842-2889.

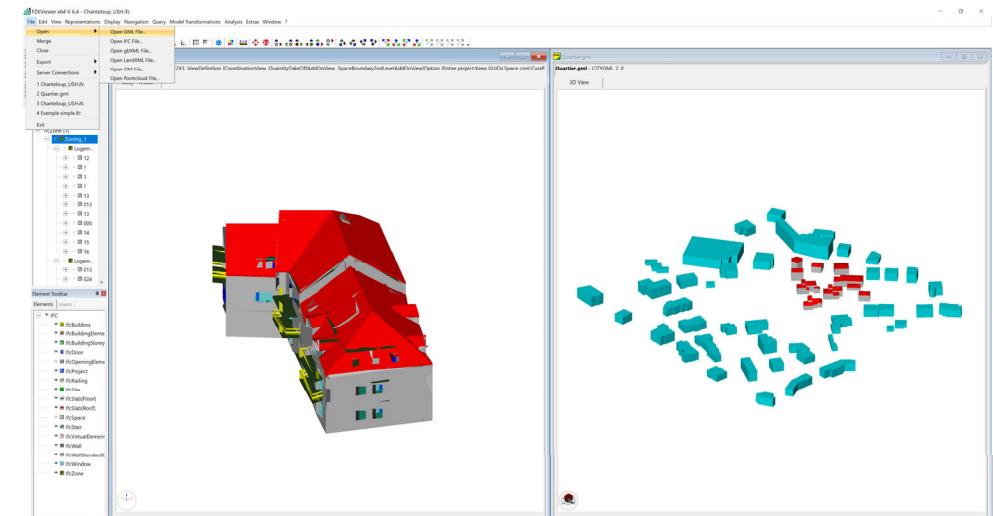
Quels logiciels pour visualiser aisément les données GIS et BIM ?

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Quelques exemples de viewer BIM/GIS



eveBIM (CSTB)
IFC, CityGML, Earth



FZK Viewer (KIT)
IFC, CityGML, gbXML

Les différences conceptuelles entre les systèmes GIS et BIM



Source: OGC, & buildingSMART. (2020). Built environment data standards and their integration : An analysis of IFC, CityGML and LandInfra. <https://portal.ogc.org/files/92634>

CityGML vs IFC

CityGML

IFC

Markup language

basé sur l'interprétation des documents

- + Schéma moins complexe que celui des IFC
- + Facile à implémenter comme schéma interopérable

- + Facilement extensible

- Schéma avec « peu d'intelligence », l'intelligence est dans les applications

Data modeling language

pour modeler des structures et contextes complexes

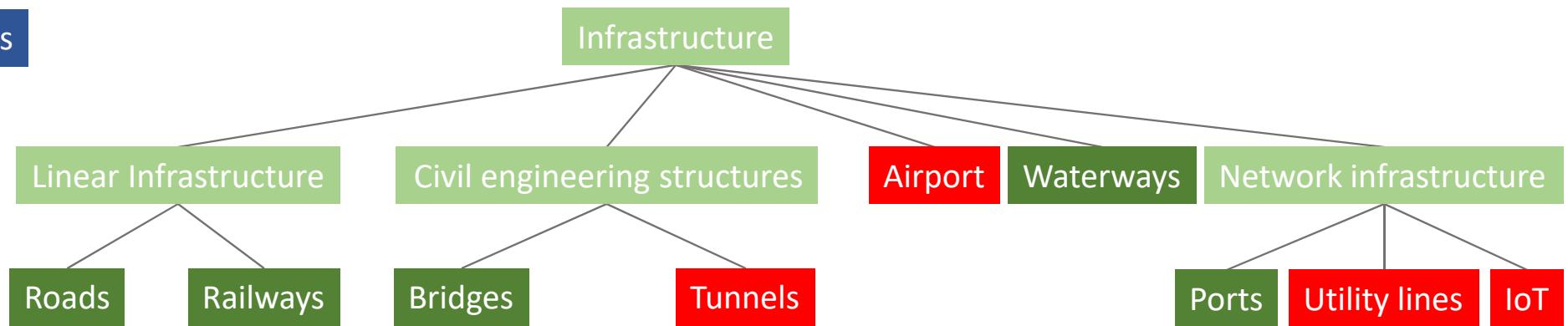
- Schéma complexe
- Implémentation pour l'export et l'import difficile

- Extensions complexes

- + Schéma « intelligent » permettant de proposer des applications complexes

La prochaine version 4.3 des IFC

Buildings

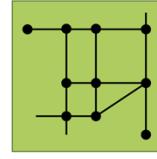
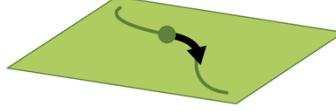
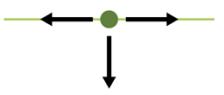
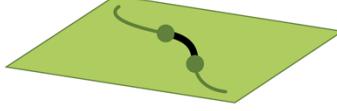


■ Depuis IFC 2x3

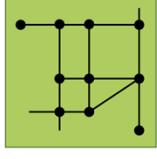
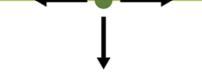
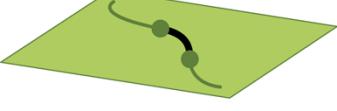
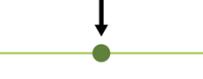
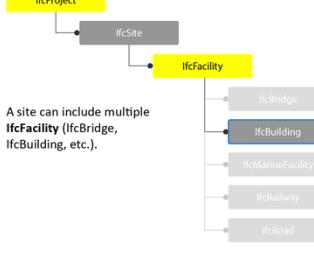
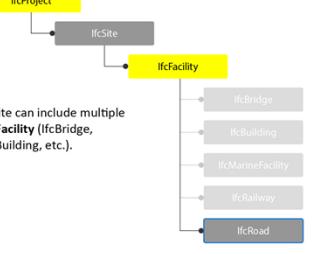
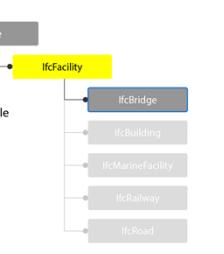
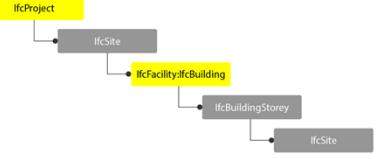
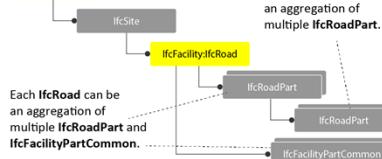
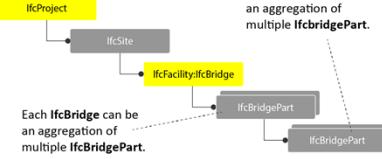
■ Prévu dans des futures extensions

■ Avec IFC 4.3 RC 4

La prochaine version 4.3 des IFC

Buildings		Infrastructures			
		Transport infrastructures			
		Linear infrastructures		Civil engineering structures	
		Roads	Bridges		
Design logic (in order of priority)	<ul style="list-style-type: none"> Vertical (level)  <ul style="list-style-type: none"> Horizontal (space, HVAC, people flow)  	<ul style="list-style-type: none"> Longitudinal/horizontal (alignment)  <ul style="list-style-type: none"> Lateral (carriageway organization) Vertical (loads, alignment)  	<ul style="list-style-type: none"> Horizontal (path or alignment)  <ul style="list-style-type: none"> Vertical (loads, path or alignment)  		
Georeferencing	Description <ul style="list-style-type: none"> Refer to chapter 9.2.1 "Georeferencing" Refer to table "Level of Georeferencing" of the same chapter Related IFC classe(s) <p>Is either integrated for the entire project on the <i>IfcProject</i> or <i>IfcSite</i> level</p>	Description <p>Refer to level of georeferencing, multiple survey points necessary, project coordinate system with scale factor, etc.</p> Related IFC classe(s) <p>Is either integrated for the entire project on the <i>IfcProject</i> or <i>IfcSite</i> level.</p>	Description <ul style="list-style-type: none"> Project coordinate system mapped to a survey point Angle to north Related IFC classe(s) <p>Is either integrated for the entire project on the <i>IfcProject</i> or <i>IfcSite</i> level.</p>		
Positioning of objects / local placement • <i>IfcPositioningElement</i>	Axis, Grid, Levels	<i>IfcGrid</i>	Road alignment, stationing (linear referencing points)	<i>IfcLinearPositioningElement</i>	Start and end points, bridge alignment, stationing (linear referencing points)
Containment of objects	Level (Storey) Zone Space	Objects for zones are provided by <i>IfcSystem</i> class (no geometrical representation). Objects for spaces are provided by the <i>IfcSpatialElement</i> class (with geometrical representation)	Elements defining a road, e.g.: <ul style="list-style-type: none"> Road segment Intersection Roundabout etc. 	Objects are provided by the <i>IfcSpatialElement</i> class	Elements defining a bridge, e.g.: <ul style="list-style-type: none"> Superstructure Substructure Foundation etc."

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Spatial breakdown structure	<p>General</p>  <p>A site can include multiple IfcFacility (IfcBridge, IfcBuilding, etc.).</p>	 <p>A site can include multiple IfcFacility (IfcBridge, IfcBuilding, etc.).</p>	 <p>A site can include multiple IfcFacility (IfcBridge, IfcBuilding, etc.).</p>
Specific	 <p>Each IfcRoadPart can be an aggregation of multiple IfcRoadPart.</p> <p>Each IfcRoad can be an aggregation of multiple IfcRoadPart and IfcFacilityPartCommon.</p>	 <p>Each IfcRoadPart can be an aggregation of multiple IfcRoadPart.</p> <p>Each IfcRoad can be an aggregation of multiple IfcRoadPart and IfcFacilityPartCommon.</p>	 <p>Each IfcBridgePart can be an aggregation of multiple IfcBridgePart.</p> <p>Each IfcBridge can be an aggregation of multiple IfcBridgePart.</p>

Merci beaucoup pour votre attention!

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Auf Wiedersehen am GEOSummit 2023!