



Open Standards for an Integrated Digital Built Environment

August 2026

Who are the international bodies actively developing the standards?

*buildingSMART is an open, neutral and international not-for-profit organization
(as is the Open Geospatial Consortium – OGC)*



CREATE



ADVOCATE

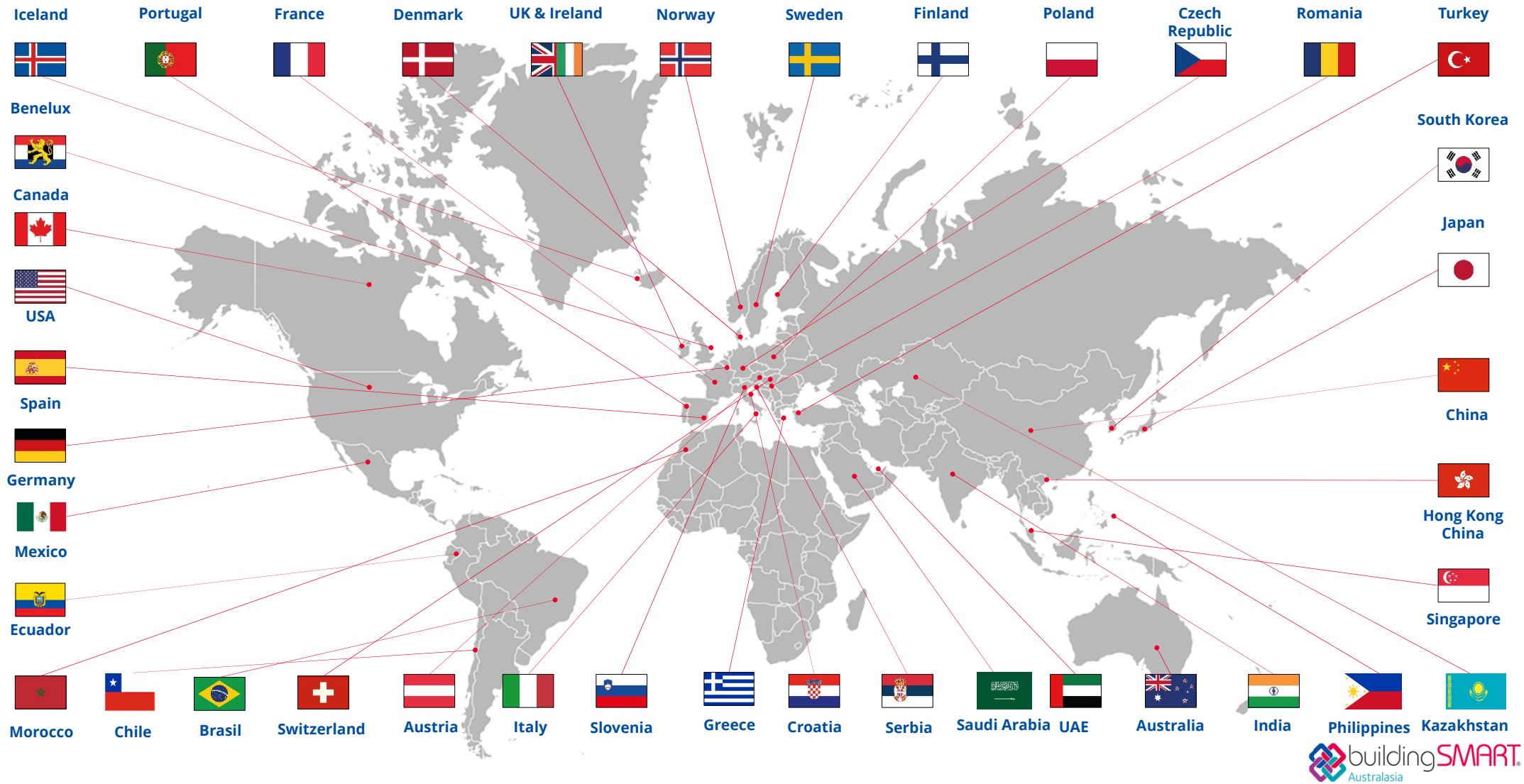


FACILITATE



EDUCATE

buildingSMART: currently around 40 Chapters worldwide ...



buildingSMART: currently around 17 International Partners ...



buildingSMART Vision, Mission & Purpose

We don't design, build or operate — we build the foundations that make it possible.



Vision:

The **seamless exchange of trusted information** across the built environment.



Mission:

To create & maintain **open & reliable digital standards** for the built environment & support their global adoption.



Purpose:

To bring together the global industry to develop & implement open digital standards & services that enhance **automation & decision-making** across the built environment life-cycle, improving **productivity, sustainability & profitability**.

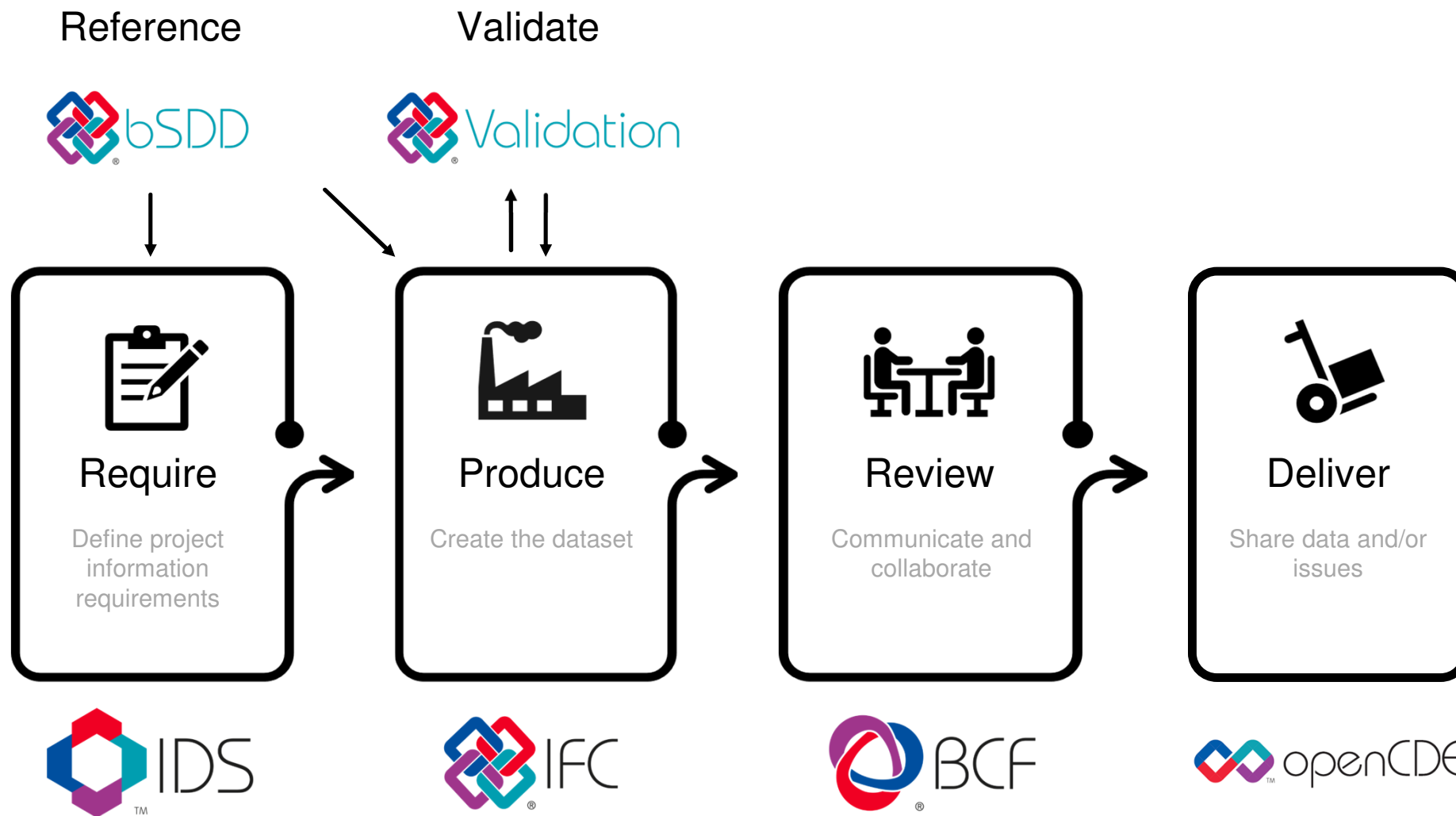
bSI is building foundations for interoperability ...



What are foundations for the built environment?

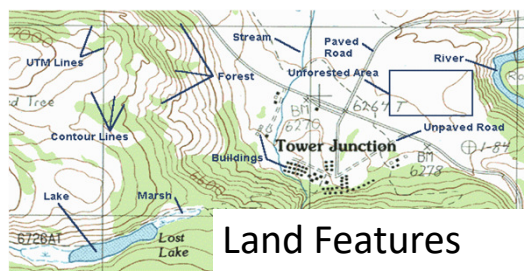


buildingSMART International: what's in its kit?

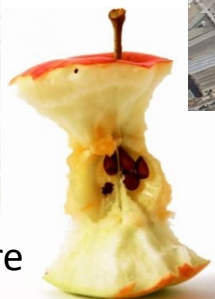


Open Geospatial Consortium (OGC): what's in its kit?

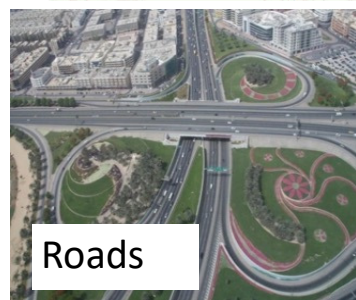
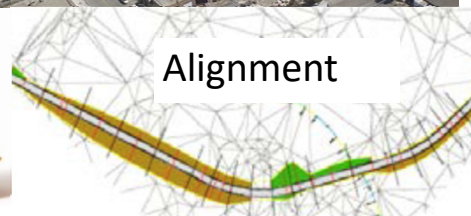
LandInfra / InfraGML



Core



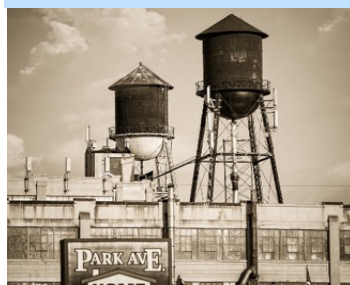
Facilities



Railway



Water Distribution



Underground Utilities

Storm Drainage

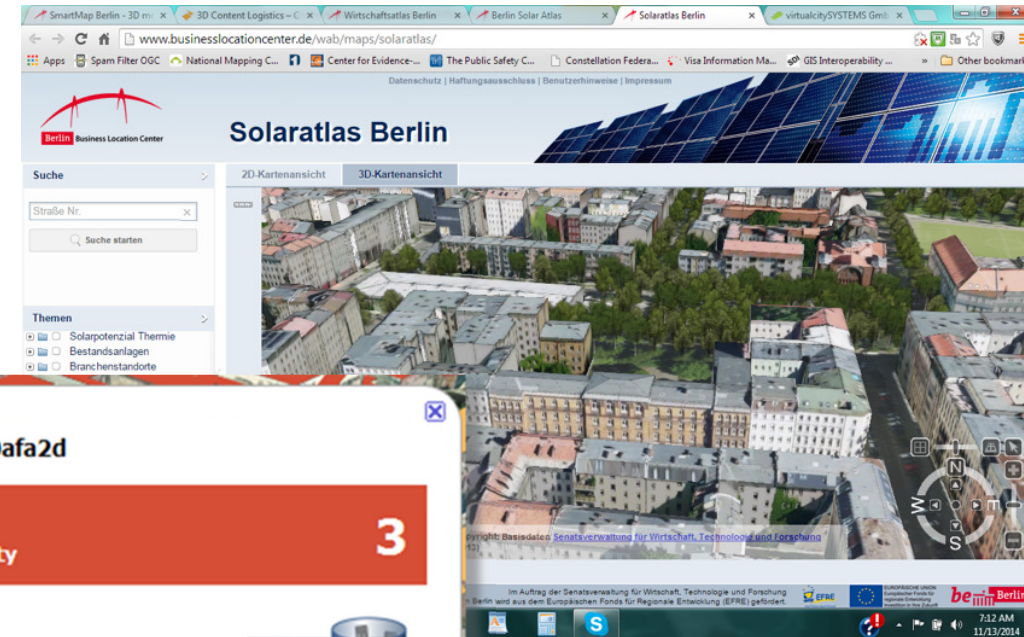
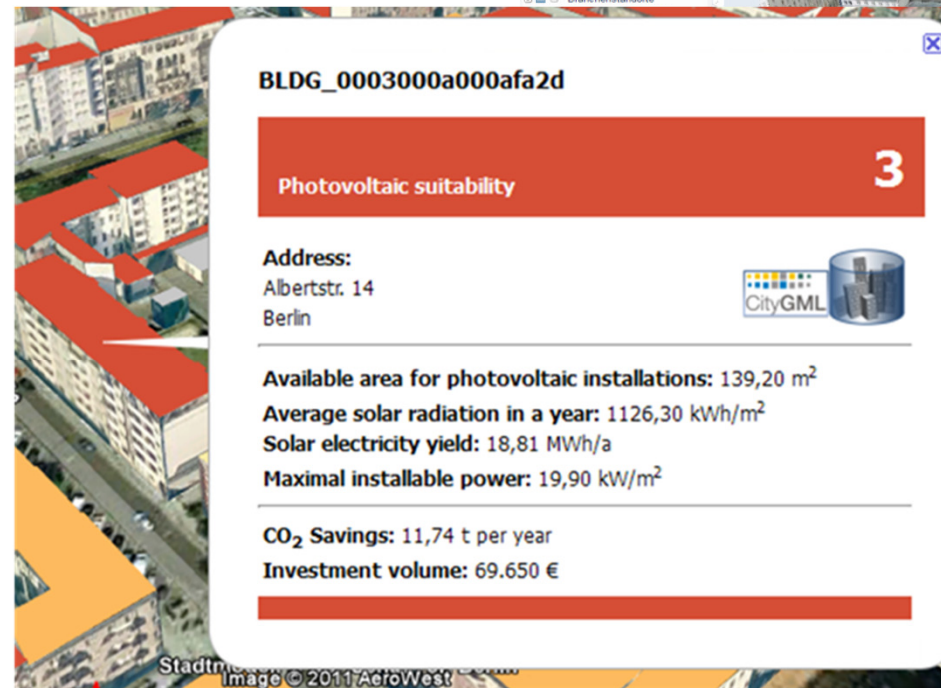


OGC: <https://www.ogc.org/standards/infragml/>

Source: Open Geospatial Consortium

OGC CityGML Standard: Solar Energy Production Potential Analysis

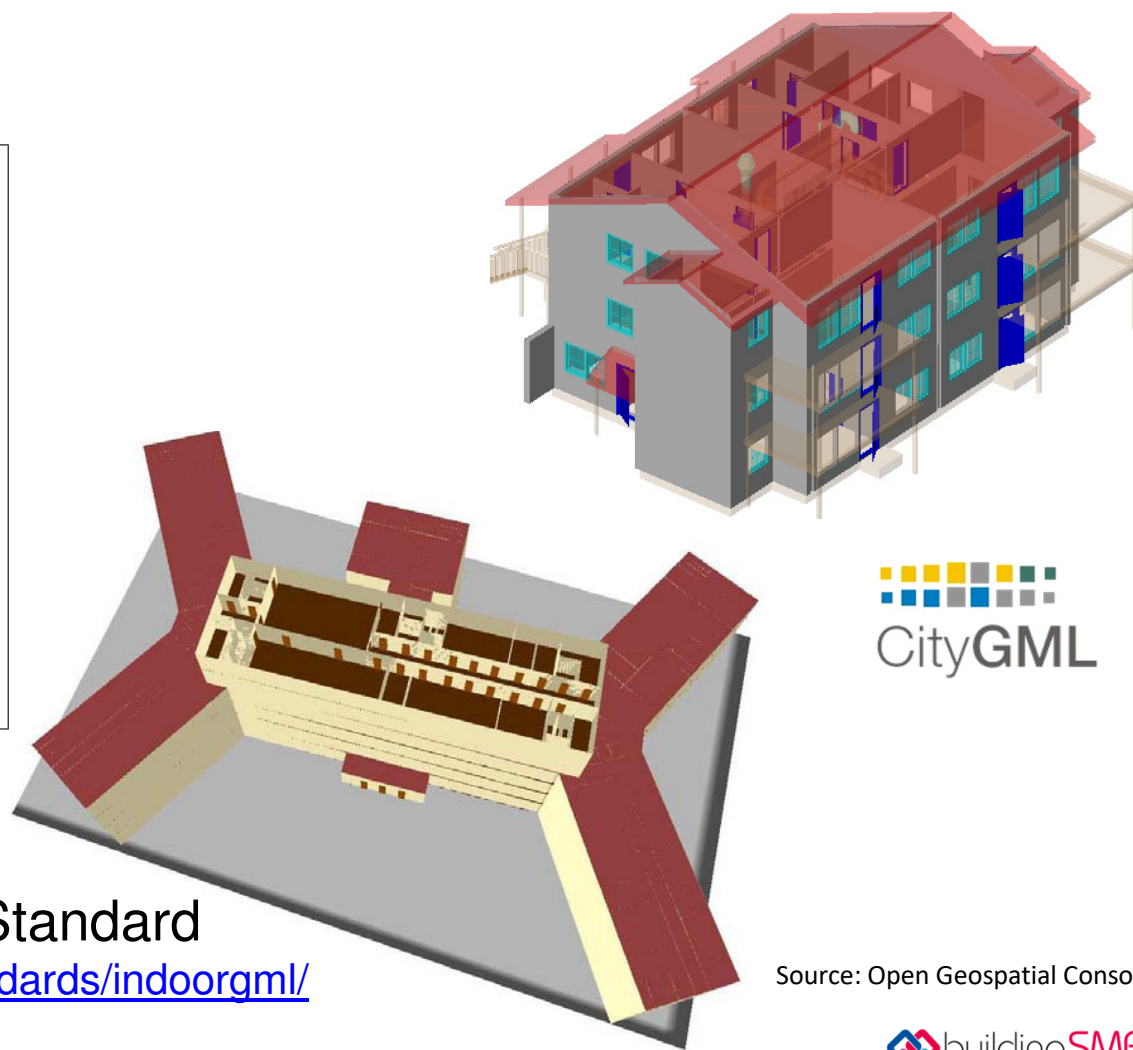
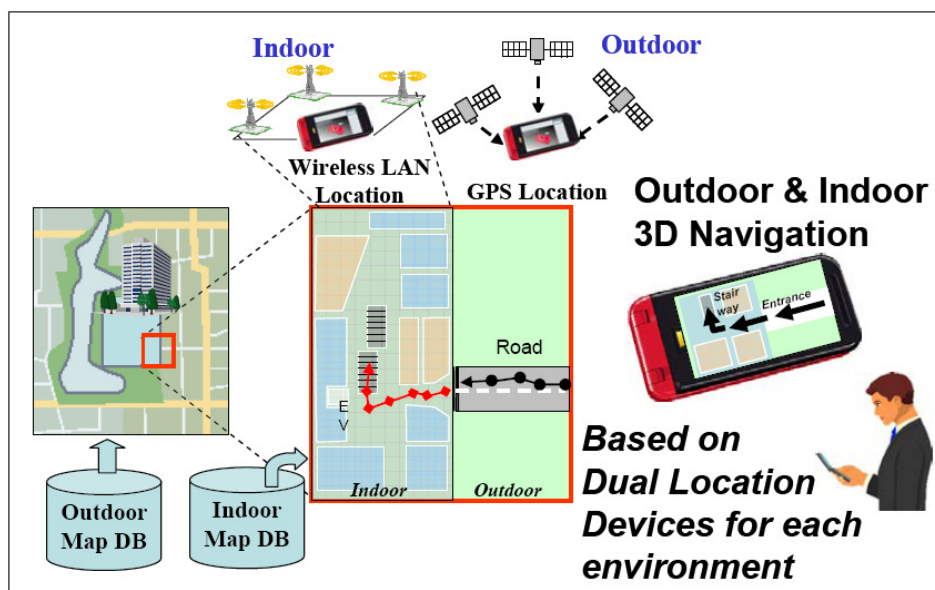
- Solar power potential and CO₂ offset potential computed for the 550,000 buildings in the Berlin 3D city model.
- City Model is based on OGC CityGML Standard
<https://www.ogc.org/standards/citygml/>



Source: Open Geospatial Consortium

OGC: Integrated Outdoor / Indoor location/navigation

IndoorGML Approved Sept 2014



OGC IndoorGML Standard

<https://www.ogc.org/standards/indoorgml/>

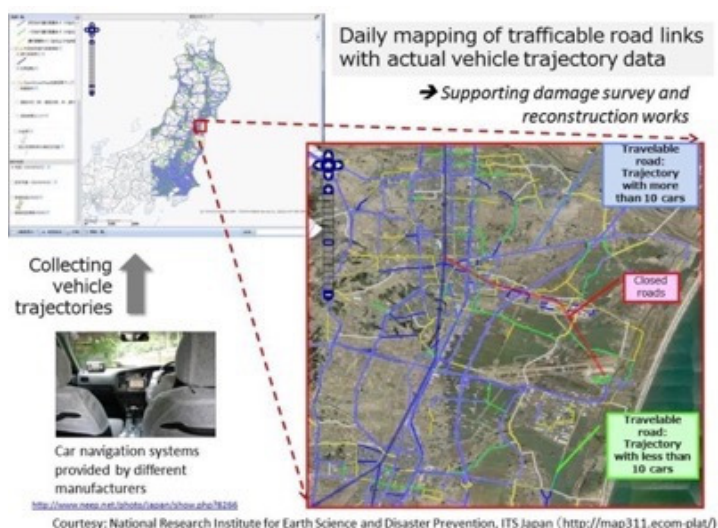
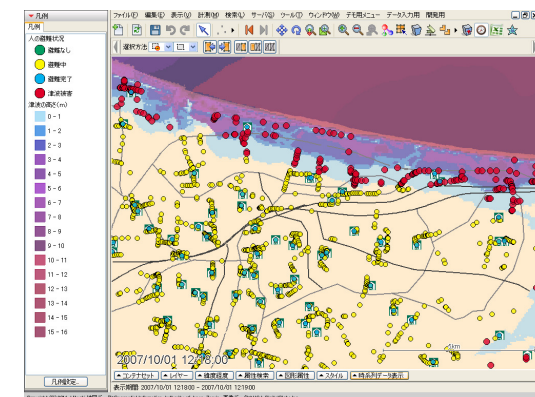
Source: Open Geospatial Consortium

OGC: Moving Features Encoding Standard

"Moving features" data describes such things as vehicles, pedestrians, airplanes and ships.

This is Big Data – high volume, high velocity

CSV and XML encodings of ISO 19141

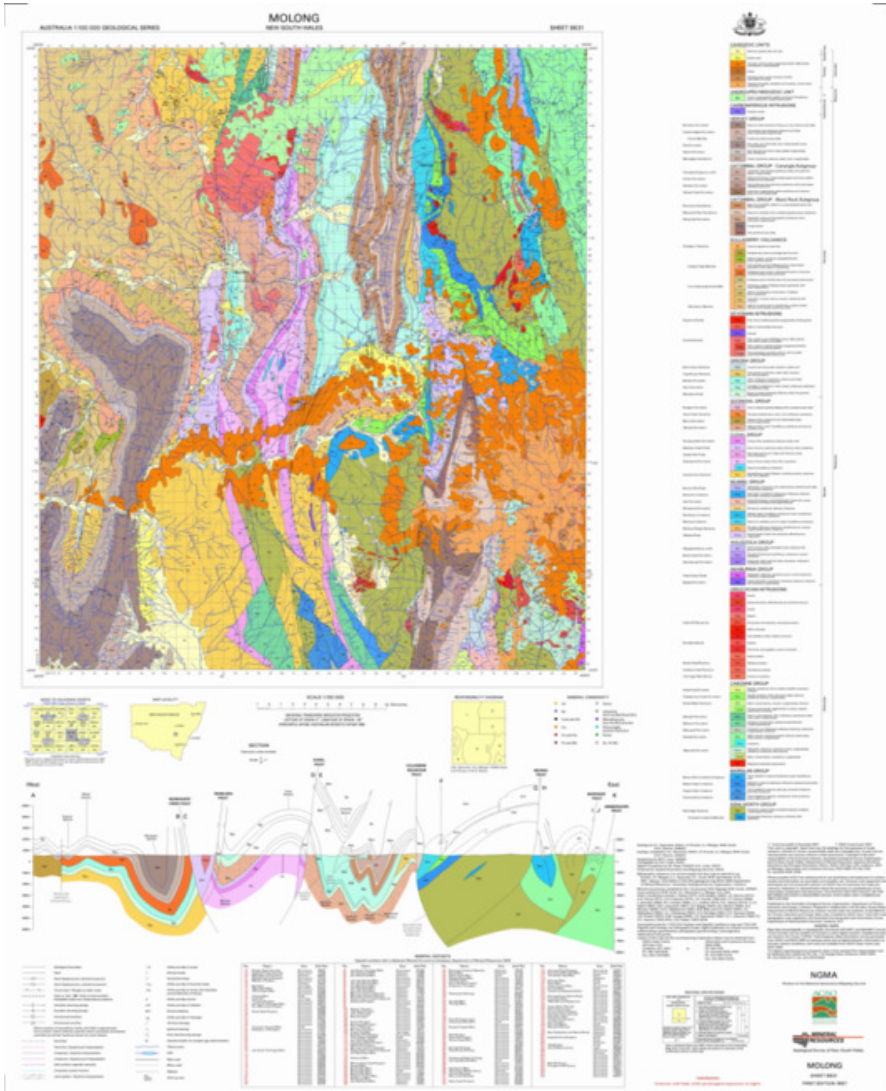


Source: Open Geospatial Consortium

OGC Moving Features Encoding Standard:

<https://www.ogc.org/standards/movingfeatures/>

OGC: GeoSciML



GeoScience Markup Language

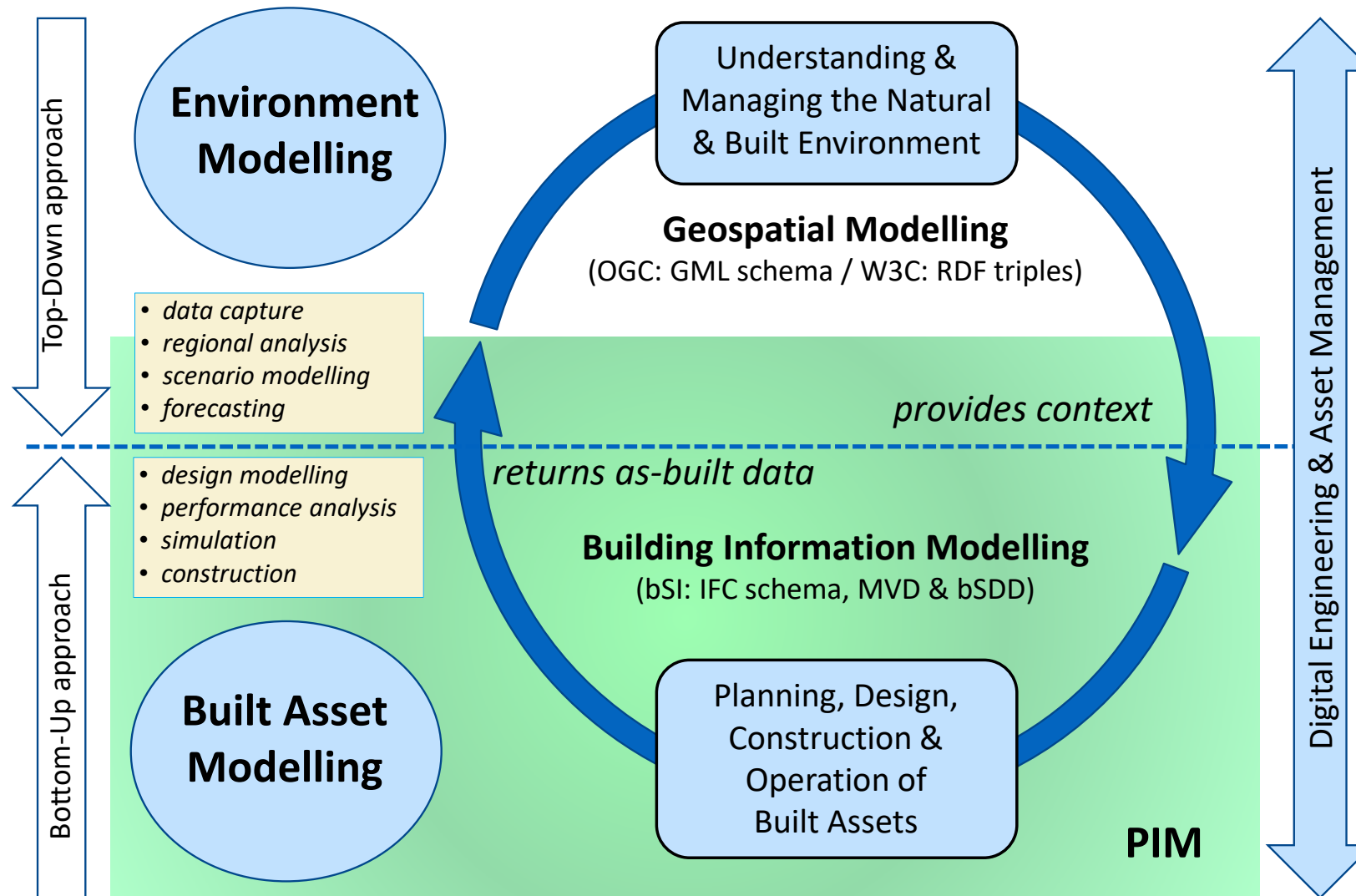
<https://www.ogc.org/standards/geosciml/>

- the original use case was to exchange data typically found on a geological map:
 - geologic units, geologic time, faults, folds, etc
- the scope of GeoSciML has expanded over recent decades to cover geological sampling and analytical data



Source: Open Geospatial Consortium

The Integrated Digital Built Environment: collaboration



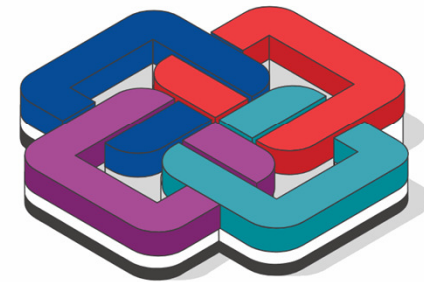
Industry Foundation Classes

IFC is not a format—it's the structural foundation of interoperability

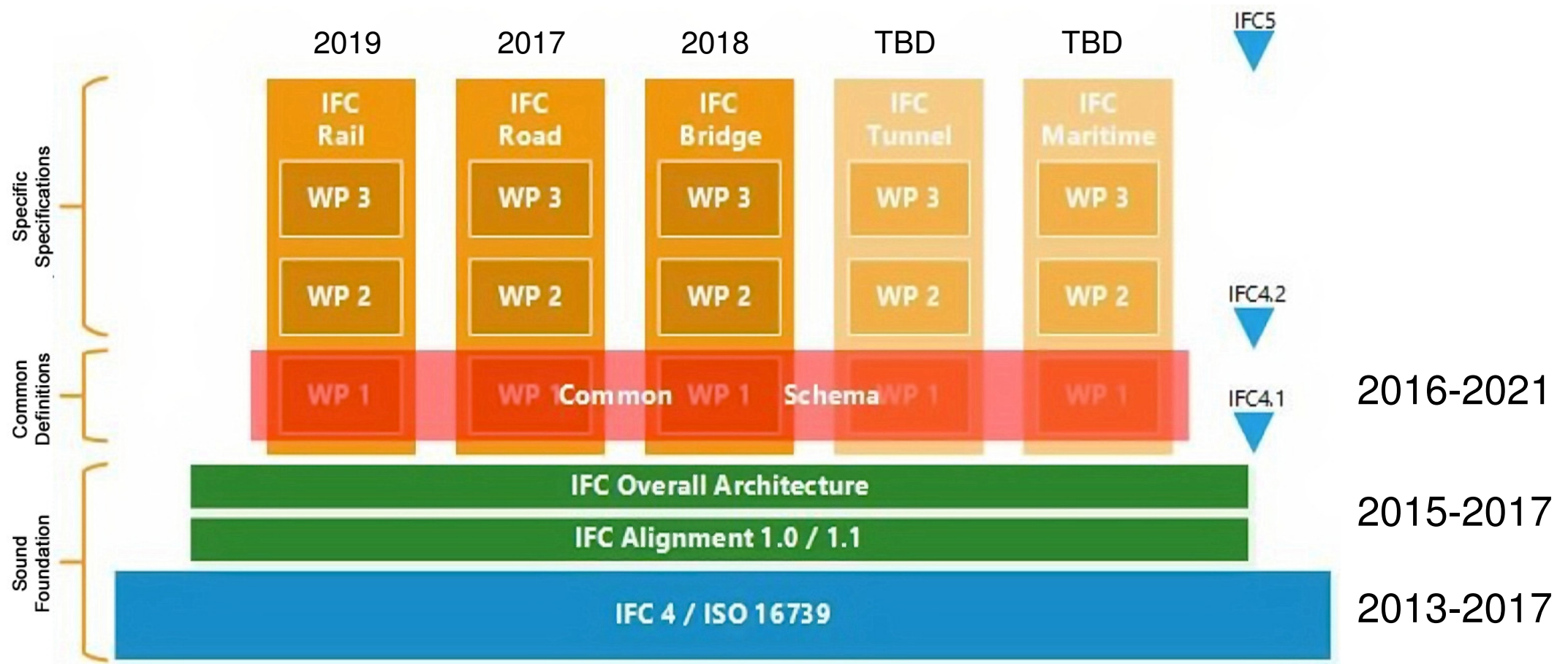
❖ IFC is buildingSMART's flagship standard and has been ISO certified since 2013.

- ❖ IFC 2x3 – widely used
- ❖ IFC 4.3 – ISO approved
- ❖ IFC 4.4 – going to ISO
- ❖ IFCX – project plan

bSI committed **both** to the **development of IFCX** as well as to the **maintenance and updates of existing IFC** series



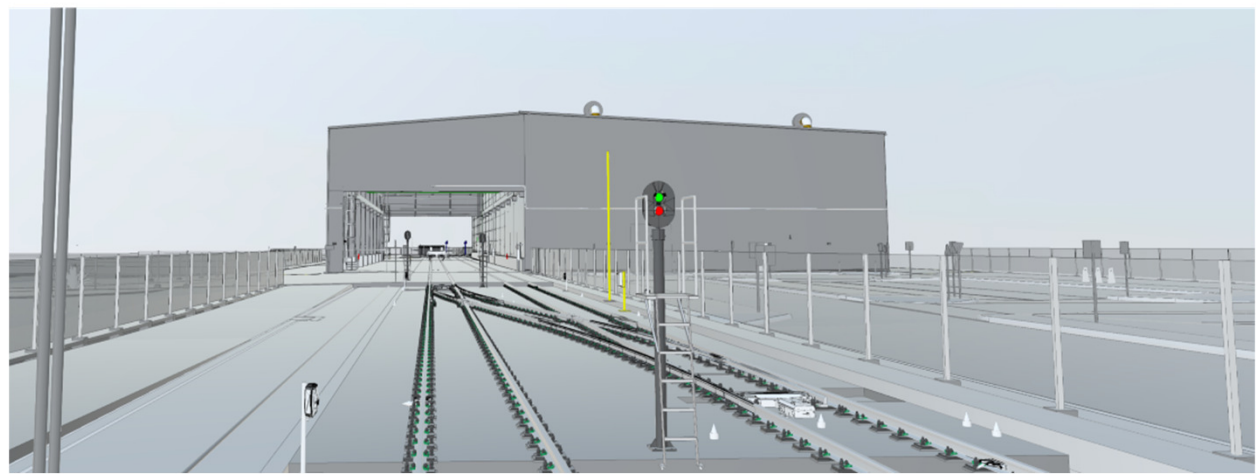
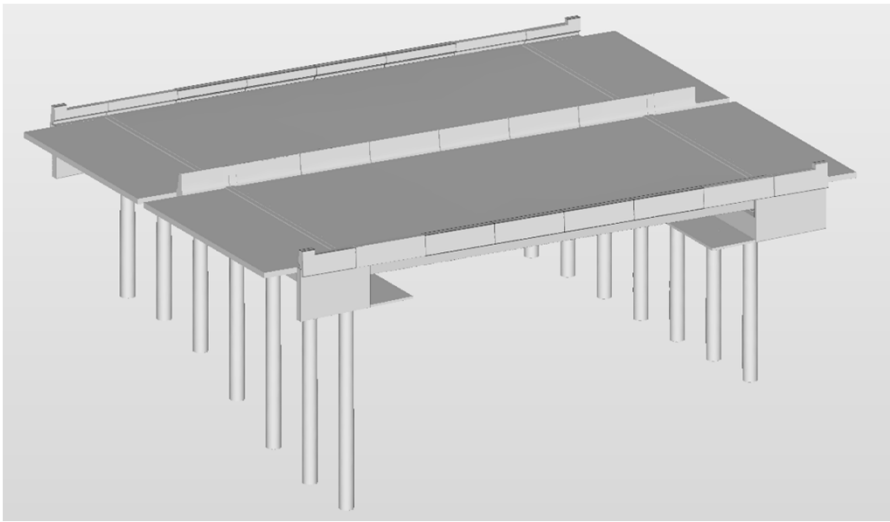
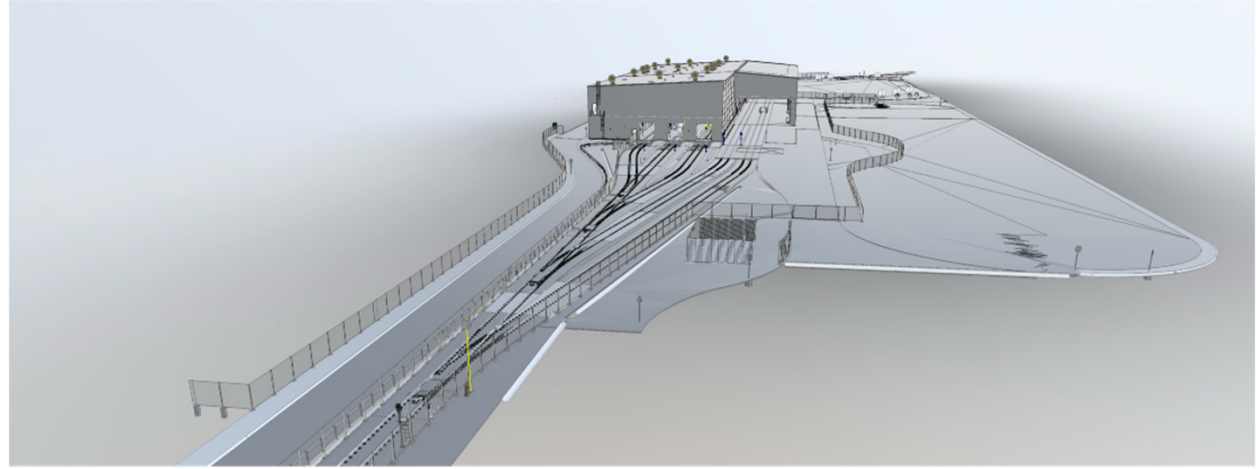
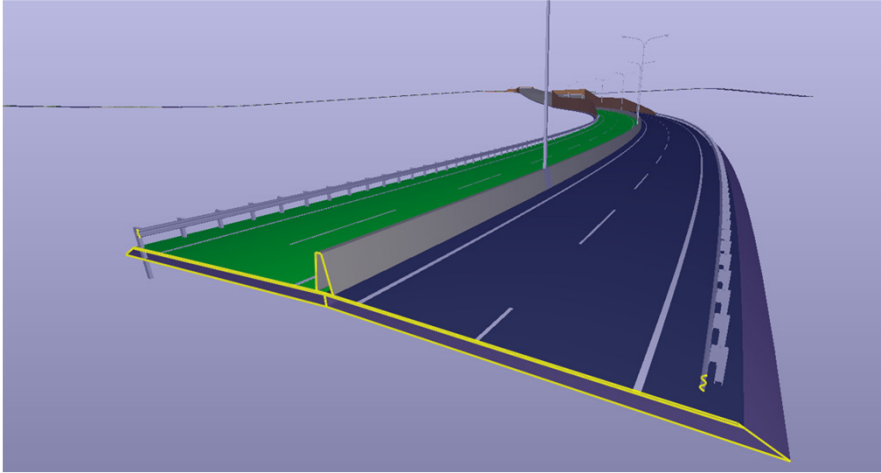
IFC extensions for Infrastructure (2013 – 2019)



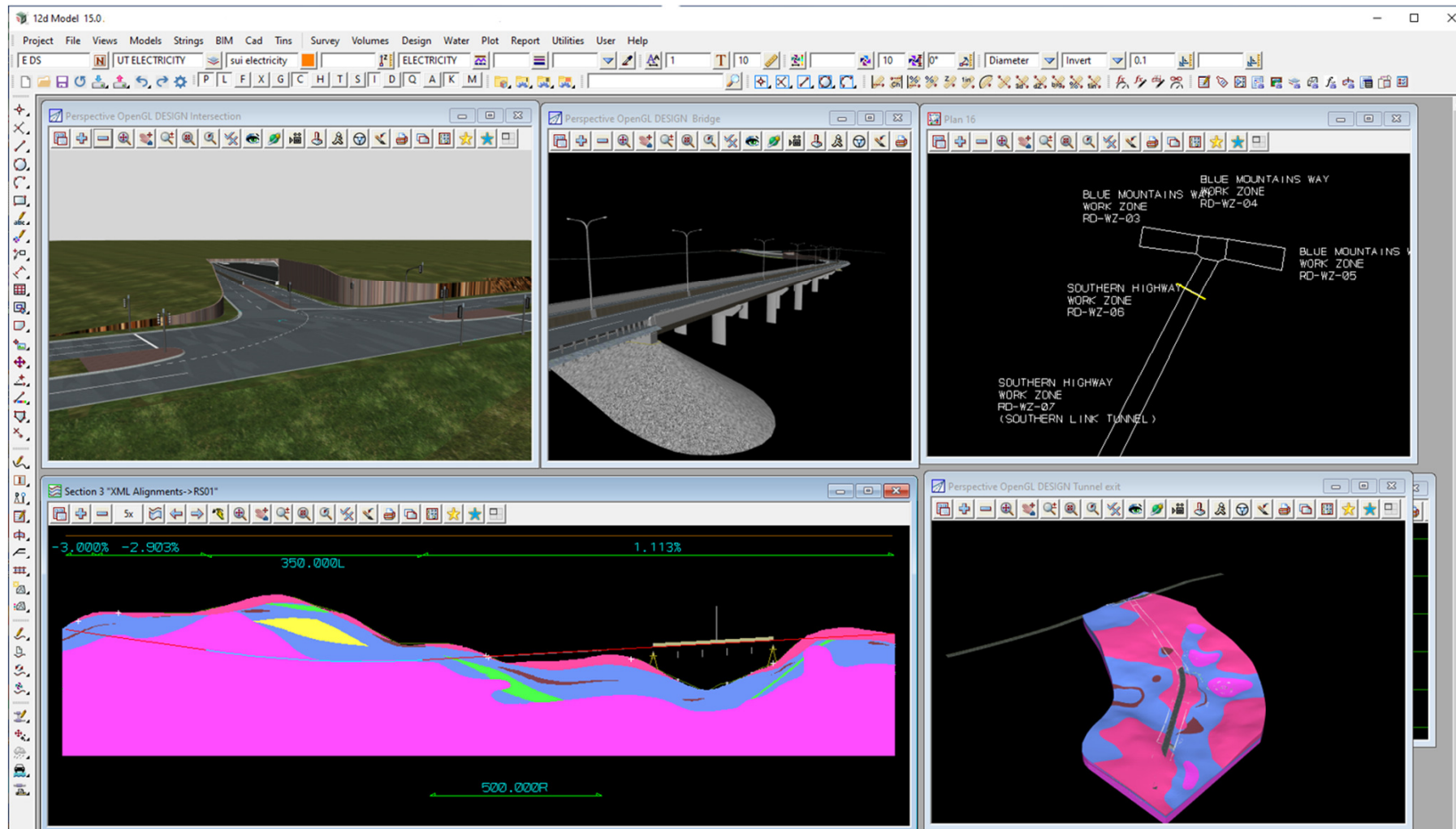
Infrastructure Extensions

Source: buildingSMART International

Linear Infrastructure – IFC models ...



Linear Infrastructure – IFC models ...



Ten sector-facing Domains + focussed use case WGs



Airport



Building



Construction

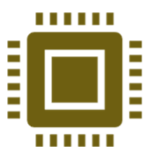


Infrastructure



Electrical

Industry experts from Member and Chapter representatives lead the Domains



Product



Railway



Regulatory



Technical



Maritime



Power Transmission



Water Management



Healthcare

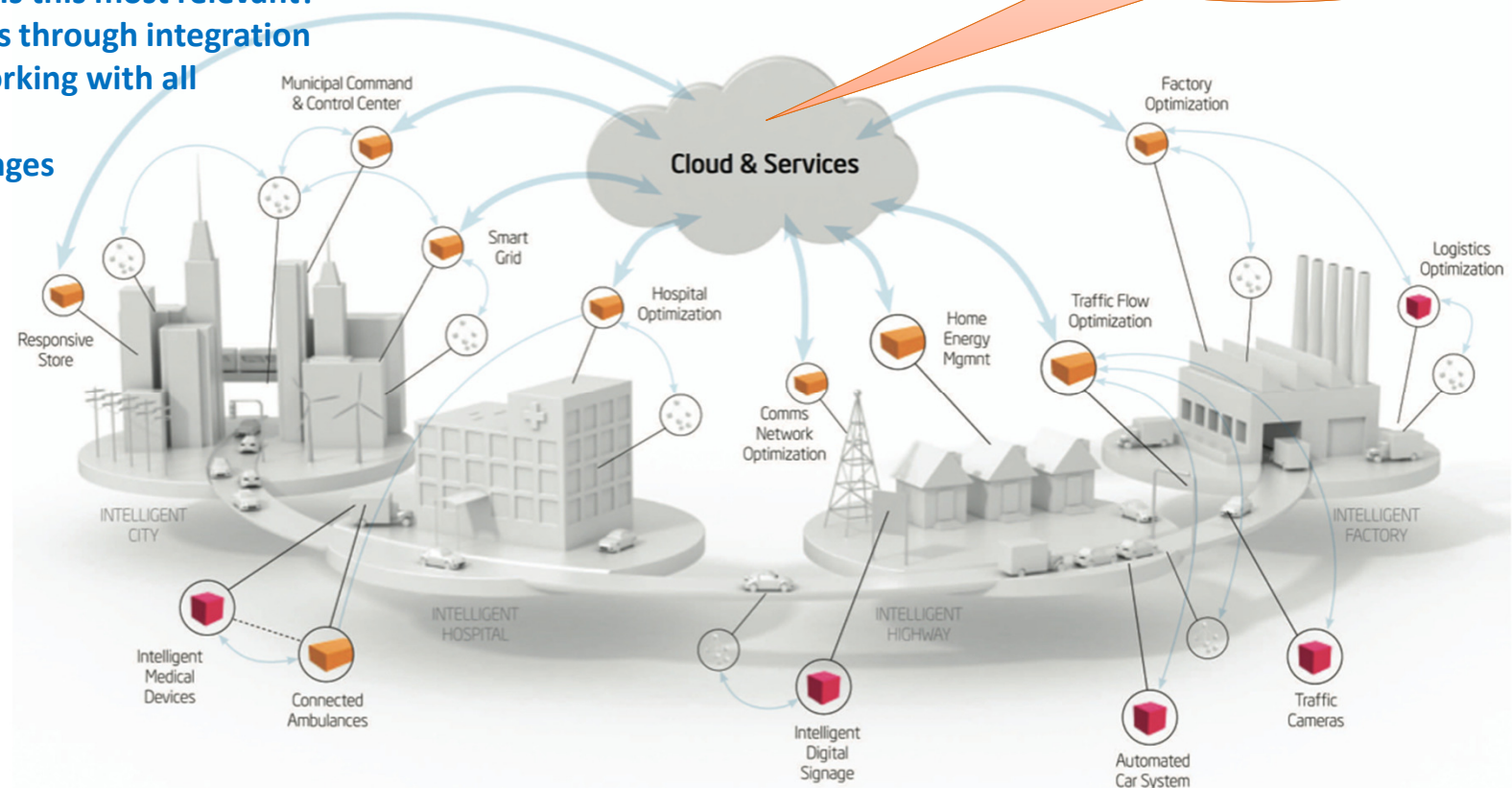


Energy & Energy Transition

Integrated Digital Built Environment – connected things

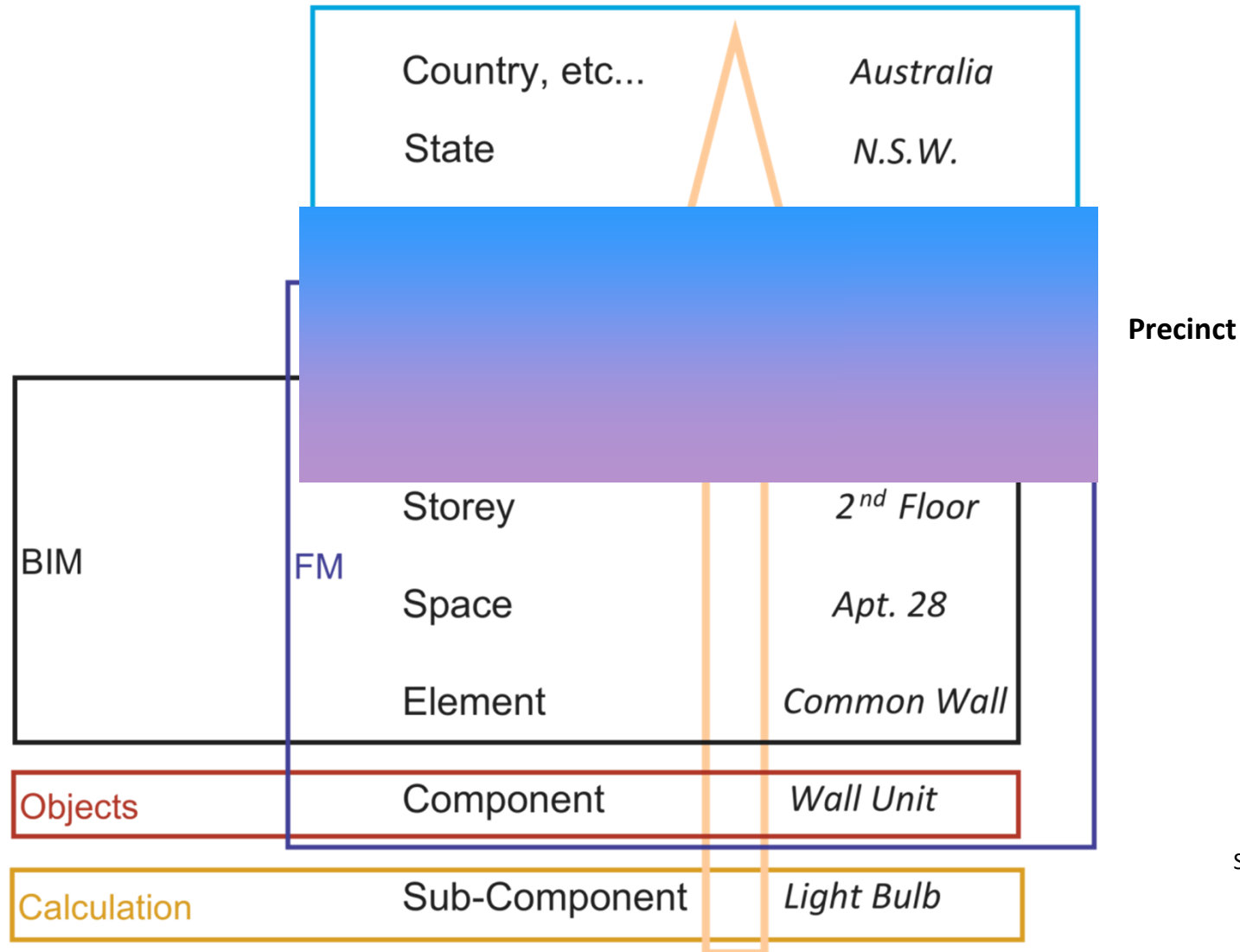
50 billion Internet-connected things by 2020

- Objectives of integration BIM and GIS
- In what areas and sectors is this most relevant?
- Benefits and opportunities through integration
- How buildingSMART is working with all stakeholders
- Understanding the challenges



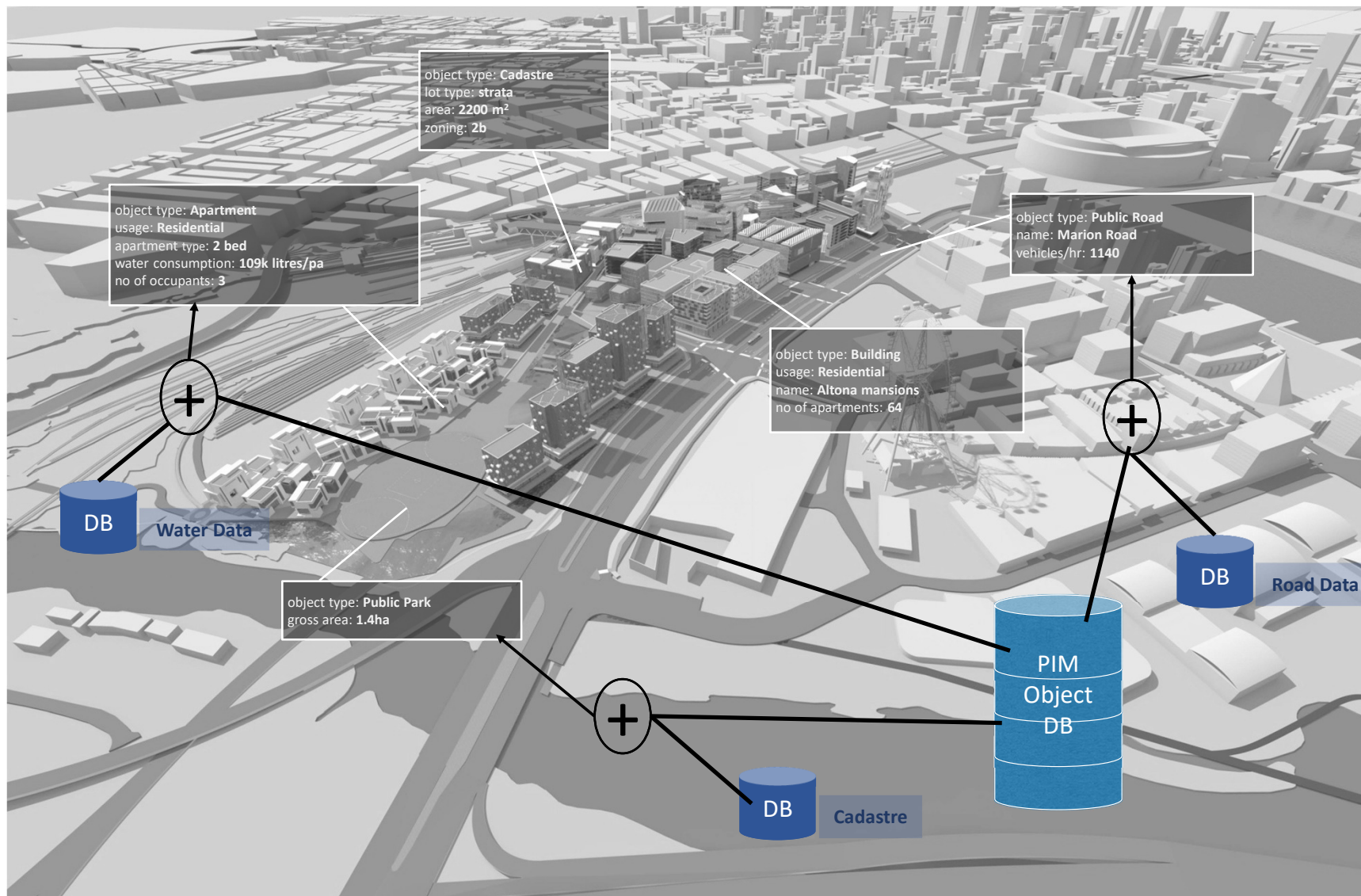
Source: Open Geospatial Consortium & Intel 2013

Integrated Digital Built Environment – the scale of things



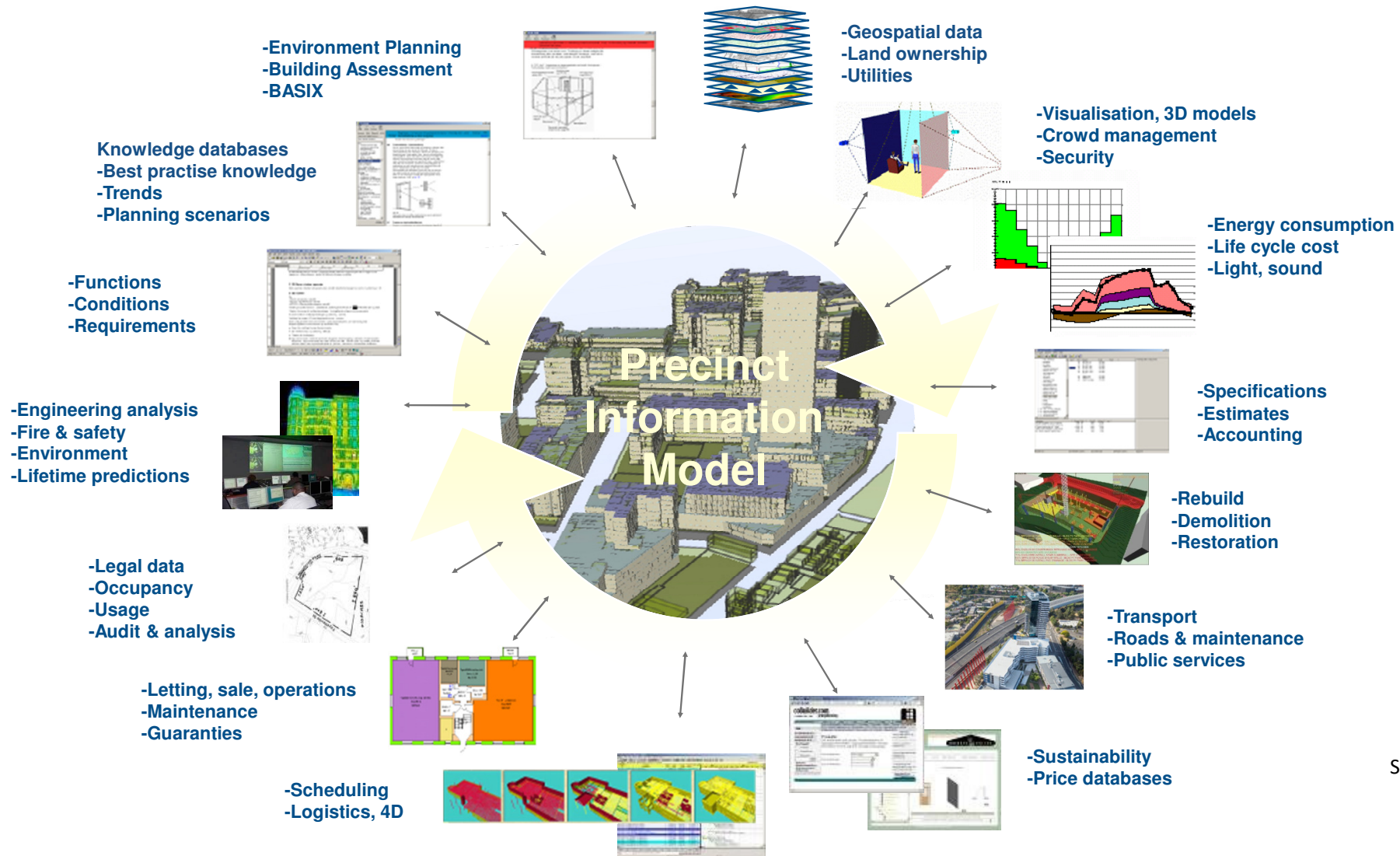
Source: UrbanIT, after Andreas Kohlhaas

Precinct Information Modelling



Source: CRC Low Carbon Living

Precinct lifecycle



Source: CRC Low Carbon Living

Thank You - Questions?



Conclusions:

- Data Standards are the foundation of a Digital Earth
- Two complementary industry bodies: bSI and OGC
- Collaboration: BIM / GIS working group (bSI)
- Vision: Integrated Digital Built Environment

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