Joint OGC / bSI Whitepaper  
Agreed Framework for Collaboration

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# Purpose

This whitepaper sets out the Terms of Reference for the collaboration between buildingSMART international (bSI) and the Open Geospatial Consortium (OGC) in a joint Planning Committee ‘to find solutions to increase the interoperability between data for both the geospatial and built environment domains.

# Background

This section sets the context of this Whitepaper by reporting the stated vision and goals of each organisation, drawn in part from the respective web sites.

## buildingSMART International (bSI)

*We believe significant improvements in cost, value and environmental performance can be achieved through the use of open sharable asset information in the creation and operation of civil infrastructure and buildings worldwide.*

*We believe open sharable asset information will help the owners, clients and supply chain unlock more efficient and collaborative ways of work throughout the entire project and asset life-cycle.*

Mission: Proactively facilitate with key leaders the active use and promulgation of open data standards enabling civil infrastructure and building asset data and life-cycle processes to be seamlessly integrated, improving the value achieved from investments in the built environment and enhancing opportunities for growth.

bSI Strategic Goals:

* Provide openBIM standards of tangible value to society and which bring measurable benefits to users.
* Provide the leading neutral international forum for consensus building supporting the creation, adoption and use of openBIM standards.
* Lead globally in the timely development of relevant value-enabling openBIM standards.
* Provide timely and thorough software certification and people compliance testing services to accelerate adoption of openBIM standards.
* Become a trusted resource and partner for governments and industry leaders desiring adoption of openBIM standards worldwide.

## Open Geospatial Consortium (OGC)

The OGC provides a consensus process that communities of interest use to solve problems related to the creation, communication and use of spatial information. This process has generated a large portfolio of geographic information standards that have been widely implemented by technology providers.

*We believe that a world in which everyone makes use of geospatial information and supporting technologies is going to benefit government, private sector and citizens.*

Mission: To advance the development and use of international standards and supporting services that promote geospatial interoperability. To accomplish this mission, OGC serves as the global forum for the collaboration of geospatial data / solution providers and users.

OGC Strategic goals:

* Provide free and openly available standards to the market that are of tangible value to Members and have measurable benefits for users.
* Lead worldwide in the creation and establishment of standards that enable global infrastructures for delivery and integration of geospatial content and services into business and civic processes.
* Facilitate the adoption of open, spatially enabled reference architectures in enterprise environments worldwide.
* Advance standards to support formation of new and innovative markets and applications for geospatial technologies.
* Accelerate market assimilation of interoperability research through collaborative consortium processes.

## Joint work between OGC and bSI

Collaboration first began with an MOU signed in March 2006 between the International Alliance for Interoperability (IAI) International Council Ltd and OGC for general work on standard coordination and alignment. This MOU had an initial focus "to assess member interest in advancing the creation, testing, validation and implementation of an ifcXML-IFC/GML model to improve the ability of IFC building models to be shared between the AEC and geospatial technologies and user communities.”

The 2013 MOU was signed in February and included specific tasks to develop a white paper on cooperation, define key use cases, and pursue liaisons with the appropriate ISO bodies.

On 27 March 2014, a more specific MOU was signed to undertake a joint effort to develop software standards for (road and railway) Alignments.

The first cooperative effort between OGC and bSI resulted in two respective software standards: OGC InfraGML Part 3: Alignment and bSI IFC Alignment 1.0. Both are implementations of the jointly-developed LandInfra Conceptual Model Standard. Because Alignments are used for linear positioning throughout the entire infrastructure facility life cycle, it was deemed necessary to agree first on a common set of concepts, prior to encoding by either group. This was successfully achieved by joint participation of team members from both groups participating directly in each other’s development projects, as enabled by the project-specific MOU. This cooperative effort continues with the development by the OGC LandInfra SWG of InfraGML Parts 4 and 5 for Road and Railways and the corresponding bSI Infrastructure Room’s development of IFC Alignment 1.1, Overall Architecture (for Infrastructure), and IFC Road and Railways.

## Resolution: 16 June 2016

Agreed that a “joint whitepaper” should be prepared that spells out what is important to both organisations and the purpose of the collaboration. The following headlines were considered a good guide:

* For domains in which OGC and bSI standards overlap, ensuring that the conceptual models are identical or consistent;
* Thereby, ensuring that data can seamlessly interoperate between an OGC standard to a bSI standard and vice versa;
* In so doing, offering users trust in the continuity of data between the geospatial and built environment domains.

## Agreement 11 November 2016 (Coordination meeting in London)

The resolution from 16 June 2016 was refined as follows:

* If no joint conceptual model is feasible, explore how
  + Models can be linked at a conceptual level
  + Instances encoded in bSI and OGC standards can be linked
* Consider the use of sematic web technologies to implement these linkages, i.e. through common or matched identifiers

# Agreed Basis for Coordinated Activities

The collaboration between OGC and bSI is based on the following shared aspirations, whereby both organisations:

* pursue a common goal to develop open standards for information sharing to enhance the quality and efficient management of the built environment throughout its life cycle;
* undertake standards development based on consensus within a global community of experts, informed by clear use cases to ensure relevance and adoption;
* OGC standards provides the geospatial context for construction projects;
* have a commitment to support asset management, with the bSI focus on the handover and representation of appropriate data coming out of the design and construction process, while the OGC focus is on utilising data for a variety of purposes (information could be created from spatial data capture or aggregated as part of the handover from the design and construction process);
* recognise the importance of information modelling to support our custodianship of the natural and built environments through informed decision-making, not telling users how to think, but providing the information so they can do the thinking;
* foresee the importance of digital information to enhance human understanding and experience of, as well as interaction with, the physical world in order to maximise the utilisation of the built environment in a respectful, safe and sustainable manner;
* recognise that delivery of digital data is now seen to be as important as the delivery of the physical asset and more clients require infrastructure to be supported as a service (For example by delivering and managing an integrated transport network not just “a road”); and
* embrace the life cycle of infrastructure, integrating project specific deliverables into a lifecycle management paradigm.

Within the context of those agreed aspirations, both organisations endorse the following principles in the pursuit of their shared collaboration:

* need to identify where the domains/focus of the two organisations overlap and require commonality, respectfully acknowledging the contribution of existing standards;
* being mindful of different semantics that might lead to misunderstandings and give a commitment to value other viewpoints;
* the importance of aligning conceptual models used across both domains with respect to built and natural environment assets, acknowledging that the different encodings will bring focus to different aspects;
* not being constrained by current approaches, such as IFC and GML;
* support for seamless interoperability of information between models that are based on OGC and bSI standards with respect to those identified areas of overlap;
* three modes of interoperability are identified, viz. translation (moving data bi-directionally between data models), federation (coordinating separate data models) and linkage (at object instance level), but also total convergence where appropriate;
* the integrity of domain information must be respected and maintained where appropriate in any information exchange;
* the role and value of multi-model containers, incorporating semantic links between objects in different models, is seen as an effective mechanism to support interoperability between the two domains (noting the current work towards a proposed ISO standard for “Information Containers for Data Drops” being developed by ISO TC59/SC13/WG8);
* users of information must be able to trust the continuity or correlation of data across the two domains.

# Complementary Approaches

The differing approaches adopted by OGC and bSI to modelling the physical world can generally be described as the spatial and built environment view respectively. The rationale behind each approach can be described as follows.

* The OGC (spatial view) is primarily concerned with the effective utilisation of the things that make up the world, both natural and man-made. The goal is to understand the physical world through information modelling, and then develop software tools, strategies and standards that facilitate our management of the physical world. This includes the tracking of changes over time. Information models can be both multi-purpose and optimised for particular tasks. CityGML, for instance, is both a data integration standard combining data from different domains (such as transportation data) as well as having detailed representations for objects like buildings.
* The bSI (built environment view) is primarily concerned with providing support for professionals who plan, design, execute interventions and manage assets, primarily with respect to the built environment across all scales from urban planning, landscape and urban design, architecture and civil engineering. The goal is to use information modelling as a core collaborative tool to support that process through the development of standardised schema and related processes, with the buildingSMART data dictionary (bsDD) providing an essential service to address terminology issues and shared schemas.

The two organisations balance each other in a synergetic way in terms of both intent and workflow: the OGC work provides a comprehensive understanding of the physical world, forming the information context for project-based interventions facilitated by the work of bSI; on completion of any intervention (large or small), the information generated through that process must be fed back into the comprehensive understanding of the physical world.

Both approaches adopt an object view of the physical world: in reality, we are dealing with physical entities in the real world, at various levels of granularity, that are held within those two respective views. The challenge is to ensure that our respective schema-based models of those entities are consistent within that grey area where those schemas intersect.

In order to facilitate the modes of information exchange required to enable that synergy of purpose (whether through translation, federation or linkage of information models, or convergence of approach), our collective endeavour must be to identify the interface between our separate views of the world; this defines the essential purpose of our on-going collaboration.

Areas of overlap can be identified where there is a reasonable expectation, based on use cases, of a need for data alignment across the two domains, giving due regard to the traditional or anticipated application of both standards. For example, early reflections about how BIM can be applied to linear infrastructure led to a recognition that a positioning entity would be required to define alignment and that should be wholly consistent with the way that OGC spatial standards define the same thing. That was identified as a significant overlap.

On the basis of these recognised synergies and the opportunity to collaborate, both OGC and bSI have established an MOU and Planning Committee, and the first action is to establish a joint IDBE Working Group.

# Management Arrangements

bSI and OGC have agreed to collaborate in the following way:

* Within bSI, the main connection point to OGC is the Infrastructure Room.
* within OGC, the main connection point to bSI is the 3D Information Management Domain Working Group (3DIM DWG).
* The joint co-chairs of the Planning Committee are therefore drawn from the OGC 3DIM DWG and the bSI Infrastructure Room Steering Committee.
* The collaboration operates on three levels:
  + Management (to meet 3 times p.a.), with the responsibility to develop business / operating models to suit joint initiatives.
  + Planning (to meet 4 times p.a.), facilitated by the Principal leads of OGC and bSI, directed through liaison with the Management level.
  + Development (to meet 3/4 times p.a.), effected by working groups as appropriate under the guidance / direction of the Planning level.
* A roadmap is developed, published and maintained and contains a managed work programme. This task is assigned to the Integrated Digital Built Environment Working Group.

The organisation is represented in the following table:

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| --- | --- | --- | --- | --- |
|  |  | **OGC** | **bSI** | Documents |
| 1 | **Executive** | M Reichardt | R Petrie | MOU |
| 2 | **Planning committee leads** | B De Lathouwer | R Kelly | White paper (joint charter document)  Framework model |
|  | **Planning committee members** | D Mackenzie  P Scarponcini  S Simmons  C Roensdorf | C Castaing  A Kemp  J Plume  P Jackson |
| 3 | **IDBE Working Group** | C Roensdorf | J Plume | Populate the framework model  Use case / aspect matrix |