



Proposal Name	Aquarium for Preparing and Supporting Information Flow between Design/ Construction and Facilities Management Applications up to Certification
Short Name	FM Handover View Aquarium
Date of Proposal	25/05/2009

Proposal Development		
<i>Date</i>	<i>Version</i>	<i>Revision</i>
05/08/2009	1.3	Updates, restrict phase 1 to two use cases: basic and extended hand over
10/07/2009	1.2	Updates, e.g. dropping the challenge fee
06/07/2009	1.1	Small updates for publication
22/05/2009	1.0	Final checks for all requirements
19/05/2009	0.5	Scope adjustment, add clarification of implementation scope for the call
18/05/2009	0.4	Add use case 2 to certification. Lower expectation on use cases 3 and 4
17/05/2009	0.3	Clarify basic view and participation table
03/05/2009	0.2	Update from review comments
19/04/2009	0.1	Initial draft

Call for participation
<p>This proposal is concerned with developing all material needed to prepare and support a certification for a defined model view definition(s) for selected exchange scenarios within the domain of facilities management. The purpose of this certification is to provide guarantees of high quality information exchange between building information modeling and facilities information management applications based on the IFC data model. This call for participation is addressed to creators and users of facilities management information and to software companies that develop building information modeling BIM applications and facilities information management applications including interfaces to such applications for the construction and facilities industries.</p>

Objective
<p>The objective of this proposal is to facilitate IFC certification of software that meet the needs of information exchange from Building Information Modeling (BIM) applications to Facilities Information Management (CAFM and CMMS) applications. It comprises 2 use cases:-</p> <ol style="list-style-type: none">1. Basic FM Handover information resulting from design and construction activities that is provided at handover to the building client/operator and that provides the basis of an asset register for their Facilities Information Management application(s). It usually comprises the spaces and architectural components, together with the HVAC/mechanical/electrical components, systems and zones and includes the placement of components within the building structure. <p>There are three sub views identified within the overall 'Basic FM Handover information' view. These are:</p> <ol style="list-style-type: none">a) Handover of architectural BIM data to CAFM/CMMS applications, focusing of space and furniture, fixture and equipment listsb) Handover of mechanical (HVAC and electrical) BIM data to CAFM/CMMS applications, focusing on MEP systems and MEP components



- c) Surveys or existing inventory data that are used to populate a 'basic FM set'. This source of information is important for the bulk of refurbishment work, or after acquiring/ leasing existing facilities.

'Basic' information within the context of this Aquarium is considered to be information that builds on the scope of the existing IFC Coordination View providing particularly for strongly typed products, systems and zones, and placement of equipment within spaces. Exchange requirements within this view will include for implementations that do not support geometry and implementations that may support geometry. Geometry to be included will support minimum representation of spaces and component bounding boxes

2. Extended FM Handover information resulting from design and construction activities that is provided at handover to the building client/operator and that provided the basis for the asset register together with warranty, resource requirement, maintenance planning and spares holding for their Facilities Information Management application(s). The extended FM Handover extends the basic FM Handover (use case 1):

'Extended' information within the context of this Aquarium is considered to include all of the information within the Basic FM view together with additional information that specifically enables operation and maintenance planning, risk assessment, and condition monitoring. It also includes links/references to document information contained in product data sheets, submittals that have been approved, and other similar items.

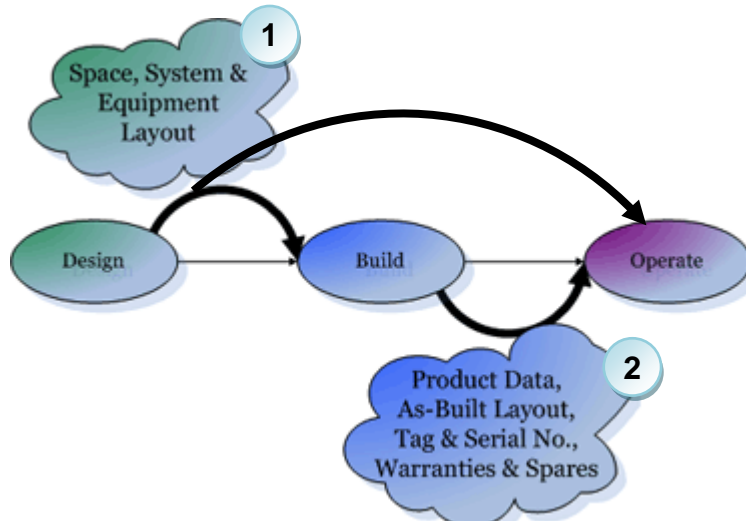


Figure 1: graphical explanation of 1st and 2nd use case¹

This proposal main objective is concerned with:

- preparing use cases 1 and 2 to enable a buildingSMART level 1 certification inclusive of fully completed Exchange Requirements and Model View Definition, reference files and test cases, and conformance criteria for verifying the correct exchange,
- providing initial support to buildingSMART International in the formal certification process

¹ Figure adapted from E. William East, Construction Operations Building Information Exchange (COBIE), see <http://www.wbdg.org/resources/cobie.php>



Business Case

The cost of preparing handover information for a project, measured as a separate activity, depends on several factors;

- Size of facility
- Complexity of construction and services
- Whether new build or refurbish

Figures that are available relate to the cost of preparing operating and maintenance (O&M) material either as a percentage of the construction cost or of the total facility life-cycle cost, or as an estimated figure per square meter (or foot). This should incorporate the cost of producing the handover information since this provides a significant proportion of the total handover information required.

Cost may vary between 0.75% and 3% of the construction cost (or up to 5 € per square meter); projects that are smaller, or more complex or that involve greater degree of refurbishment lead to higher costs. All of the information that is required for handover should however, be available for capture during the design and construction stages of a project. Where an information model is being used, this should mean that there is no specific need to have the collection of handover information as a separate activity.

Having the information available in a suitable form at project handover also means that the information can be used to directly populate downstream Facility Information Management systems (this being used in preference to the older 'Computer Aided Facilities Management' or CAFM term). For the client, there is therefore a significant cost saving through not having to analyze and enter information again.

The benefits of collecting information during design and construction and then using it to populate a Facilities Information Management (CAFM and CMMS) application go further. Anecdotal evidence points to the fact that lack of confidence in the available handover information on projects leads the building operator to make substantial risk provision in the ongoing operating costs. It has been reported that there may be typically 20% on a new build project and up to 40% on a refurbishment project. The uncertainty leading to this risk provision should be mitigated through information exchange at handover. Even if the risk is reduced only by 50%, this may have a significant impact on the operating budgets of the Facilities Manager.

Result

The result of the Aquarium will be a set of documentation, methods and test cases that enable certification of Facilities Information Management applications to level 1 of the buildingSMART certification methodology for:

1. Basic FM Handover information
2. Extended FM Handover information

The certification workshop at which level 1 certification is tested will be organized and managed by buildingSMART International according to published certification procedures.

Based on the experiences of the aquarium, another expected outcome is to acquire material for taking the two use cases to a demonstration 'Challenge' prior or in parallel to the certification process.



User requirements will be expressed as Exchange Requirements ER developed according to the Information Delivery Manual methodology (ISO 29481 part 1) and software requirements are developed as IFC bindings as part of the Model View Definition(s) MVD according to the buildingSMART methodology.

Method

The approach to be used for development will be the buildingSMART International Aquarium process that brings together 'problems owners' who are users looking for solutions to specific problems, software vendors who can implement solutions in software and information specialists who can interpret requirements and deliver technical solutions.

The specific technical steps of this process include:

- Develop process maps that identify flow of information to CAFM from the earliest project stages

For each of the use cases:

- Define exchange requirements and exchange requirement models that specify particular points in the process at which verifiable information exchange is needed
- Create the model view definition that sets out those aspects of the model that need to be supported within software
- Work with software vendors to support their implementation of the exchange requirements and model view definitions
- Provide test cases for use within a facilitated certification workshop
- Support a facilitated workshop that is organized and managed by buildingSMART International at which certification to level 1 of the buildingSMART certification methodology will be tested and from which it is expected that buildingSMART International will award the appropriate certification.

Visibility/Dissemination

In keeping with the ideas of 'transparency of the Aquarium' Information about the progress of the work shall be published on a publicly accessible web site that shall be linked through key buildingSMART International and local sites. A web manager shall be appointed whose task shall be to design, set up, operate and maintain the web site including the collection and preparation of materials considered to be appropriate for publication.

Aquarium Agreement

Participation in the Aquarium does not obligate an organization to any other participating organization.

Prior Work

Work on facilities management handover information and operations and maintenance information will draw on work carried out in the COBIE project in the US (Common Operational Building Information Exchange) led by the US Army Corps of Engineers Engineer Research and Development Centre (ERDC) and also for the buildingSMART German Speaking FM10 project (data exchange project for "FM Bestandsdaten") organized by buildingSMART German Speaking with support by the ZukunftBAU initiative of the Federal Office for Building and Regional Planning and the CAD Stelle Bayern, Staatliches Bauamt München.

- Work in FM10 has already progressed significantly to providing the Exchange Requirements and Model View Definition for the 'Basic FM Handover View' and includes initial test cases and a set of benchmark criteria.



- Work in COBIE has already progressed significantly to providing the COBIE View Model and functional parts as a subset of the IFC model.

Essentially these projects have already undertaken the detailed general work necessary and, in the case of the COBIE work, have also developed conformance methods to check the validity of data provided.

As part of the prior work on COBIE, seven software vendors have already participated and met a COBIE 'Challenge'. For each of these early adopters, it is expected that the effort to conform to the Model View Definitions will be strongly supported by this prior work.

Participants

The call for participation has been initiated by the Engineer Research and Development Center on behalf of the buildingSMART Alliance of North America and by the CAD Stelle Bayern, Staatliches Bauamt München, on behalf of the buildingSMART German Speaking Chapter.

The following Alliances/Chapters have committed to supporting the FM View certification activity:

- buildingSMART Alliance (North America)
- buildingSMART German Speaking Alliance
- buildingSMART UK and Ireland
- buildingSMART Nordic Chapter (Norwegian Forum)

The following user organizations have indicated their support for this initiative:

- Engineer Research and Development Center
- Staatliches Bauamt München, CAD Stelle Bayern
- Statsbygg

The following software companies have participated in prior COBIE Challenge efforts and will be asked to participate:

Autodesk	(Autocad Architecture, Revit Architecture)
Bentley	(Bentley Architecture)
Nemetschek	(ArchiCAD)
Nemetschek	(Vectorworks)
Onuma	(OPS)

The following software companies have participated in prior COBIE Challenge efforts and will be asked to participate:

MicroMain	(MicroMain)
Project BluePrint	(RoomData)
TMA Systems	(TMA)
Tokmo	(Tokmo)

The following software companies have participated in prior FM-10 / ZukunftBAU validation and demonstration efforts and will be asked to participate

Autodesk	(Autocad Architecture, AutoCAD MEP, Revit Architecture)
Nemetschek	(ArchiCAD)
Nemetschek	(Allfa)
DDS	(DDS-CAD / MEP)
SMB	(Morada)



Other software companies developing Facilities Information Management software or interfaces to Facilities Information Management software are invited to join. A local participation is possible particularly in case of local software developers of CAFM and CMMS applications. Please contact one of the following representatives of buildingSMART International.

Dr. Bill East, project coordinator of buildingSMART Alliance (Bill.W.East@us.army.mil)

Dr. Thomas Liebich, leader of buildingSMART Modeling Support group (tl@aec3.com)

Requirements

- Problem Owners (willing to invest in the solution)
- Software Vendors (willing to commit to software implementation)
- buildingSMART UK (to perform interpretation)
- Other owners/users/software vendors to participate comment and test
- Institutions

Programme

Prospectus		May 2009
Launch/RFP		June 2009
Launch website	Website to be linked through buildingSMART International	June 2009
Working Group initiation		June 2009
Exchange Requirements	Work commences in parallel to working groups, a draft is presented to work group initiation, a release candidate to work group round 2	June 2009 (draft) End July (final)
Model View definition	Work commences in parallel to working groups, a draft is presented to work group initiation, a release candidate to work group round 2	June 2009 End August (final)
Engage software vendors		Commence early June
Test cases		Initial set of test cases by end July, final set in Early October 2009
Working Group round 2		Mid/end July 2009
Initial software vendor meeting	Initial meeting will be held at a physical location in or near Washington DC. Vendor telephone conferences will be held at 2 week intervals thereafter.	Early August 2009 (Washington DC)
Intermediate results	Show intermediate results. Processes, exchange requirements, MVD developments, test cases, initial software results, software showcase etc.	23. September 2009: German buildingSMART conference Berlin
Facilitated Certification Workshop	This is the first workshop of stage 1 certification	AEC/ST show December 2009



Facilitated Certification Workshop	This is the final software certification	Location and date to be confirmed Spring 2010
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Participants	Contribution to the Aquarium
Problem Owners	
First Problem Owner	The first problem owner for the Aquarium is the Engineer Research and Development Center who will provide financial and personnel support
Second Problem Owner	The second problem owner for the Aquarium is the CAD Stelle Bayern, Staatliches Bauamt München, who will provide in-kind resources
Supporting Problem Owners	Supporting owners are invited to support and participate in the Aquarium. A supporting problem owner shall contribute \$10000 in financial support to the Aquarium and personnel support to assist in development and testing.
Software Vendors	
To Certification level	Software vendors committing to certification will provide the certification fee direct to buildingSMART International Ltd and will commit to providing the effort necessary to develop and certify the software interface required
To Challenge level	Software vendors committing to the challenge demonstration will commit to providing the effort necessary to develop the software interface required
Others	
Institutions	A professional or trade institution or association may participate in the Aquarium and shall contribute \$1000 in financial support
buildingSMART International	Technical personnel active in model, exchange requirement, view definition development and implementation testing within the buildingSMART International technical committees shall be engaged for managing the Aquarium process

In memory of [Jeffrey Wix](#), former IDM Coordinator for buildingSMART International, having initiated this aquarium to improve interoperability in the operation and maintenance process for public clients.