

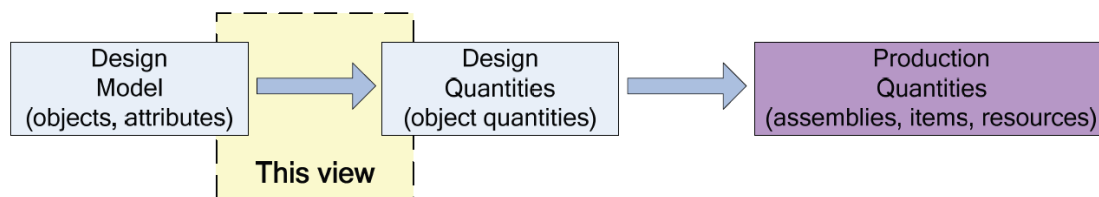
## Generic AEC/FM BIM View Specification

# Design to QTO/Cost Estimating

<b>Reference</b>	GSA-004	<b>Version</b>	1.0 -- 30-Mar-09	<b>Status</b>	Candidate
<b>History</b>	<ul style="list-style-type: none"><li>• Adapted for use in buildingSMART alliance/Open Geospatial Consortium AECOO-1 Testbed - QTO Thread - as MVD BSA-001 - in Oct-2008</li><li>• Based on IAI German Speaking Chapter (GSC) adaptation for 'Base Quantities' (2007)</li><li>• Based on SABLE DAPI 'Quantity Information for Cost Estimation' (2004)</li><li>• Based on BLIS View 'Arch. Design &gt;&gt; QTO/Cost Estimating' (2000)</li></ul>				
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### Description

This view defines the subset of the data created in architectural design software, which is useful for quantity take-off purposes.



The basic idea behind this view is that architects (and other designers) provide design object quantities (e.g. gross area of a wall), which can be used as 'underlying quantities' that drive the calculation of 'construction quantities' (e.g. material, labor, and equipment used in constructing a wall). Designers think in terms of spaces, building elements and their functional properties. Quantity take-off focuses on assemblies, items, and the resources required to construct these assemblies.

In scope for this view are:

- Site
- Spaces (and the site, buildings, and building stories that contain them)
- Building elements
- High level information about building systems (especially system type)

For each of these the following data is needed

- Identification → used for grouping design objects in a way that is meaningful to quantity take-off
- Quantity → used as 'raw material' for production quantities, named "base quantities"
- Location → used for organizing the production quantities (e.g. building floor and section)

For identification this view relies on type information, such as the construction type and space type. Such 'type' information may be reduced to simple string properties.

Internationally, it has been agreed that exchange of QTO information should be considered at 3 levels. These are:

- **QTO Level 1** - This exchange includes BIM objects, with geometry and definition properties, but no element quantities. At this level, the receiving application must be capable of using the geometry and properties to calculate all quantities.
- **QTO Level 2** - This exchange includes the BIM objects and basic quantities that are useful internationally. It does not include geometry because receiving applications at this level are not capable of using that geometry. Quantities that require national/local calculation rules are not included in level 2. More specific quantities can be derived from the generic quantities defined by this view. For example: this view includes the gross area of a wall, the gross area of an opening, and the 'voids' relationship between the opening and the wall. Receiving applications can use this information to calculate the net area of the wall using national/local calculation rules (e.g. those openings smaller than 3 square feet should be ignored). The quantities included in the view are calculated by the sending application. The receiving application is not required to extract any quantities from geometry
- **QTO Level 3** - This exchange includes the BIM objects and extended quantities that require national and local calculation rules. It does not include geometry because receiving applications at this level are not capable of using that geometry. For example: this exchange includes multiple types of area

measurement for spaces, some of which have specific regional or organizational meanings; such as 'usable area' and 'rentable area.'

This view is at QTO Level 2.

For quantity information it is crucial to define exactly and in detail what each quantity means. It is also important to document all cases in which a quantity cannot be provided or may have an invalid value. For example if complex walls, e.g. walls with an arbitrary footprint, do not have all quantities found on simpler walls.

Out of scope for this View:

- cost information
- scheduling information
- production information (assemblies, items and resources)
- construction type libraries (although construction type identifiers are required on all building elements)
- space type libraries (although space type identifiers are required on all spaces)

This document uses the official IAI View Definition Format version 1.0.11.