Autodesk and COBIE
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Agenda

• Autodesk Update

• Autodesk AEC Solutions Quick Overview

• Interoperability Efforts and Examples

• Applying COBIE to Autodesk BIM Solutions
World’s Leading 2D and 3D Design Software Company

Unparalleled Global Presence:

- Portfolio of markets and industries
- Geographically diversified revenue stream
- From small business to enterprise customers
- Over 8 million seats have been registered globally

Unsurpassed Channel:

- 1,700 Partners with 7,500 Feet on the Street
- 4,500 Instructors
- 2,700 Development Partners
Diversified Industry Revenues

- Building: 36%
- Manufacturing: 31%
- Infrastructure: 21%
- Media: 12%
Outstanding Financial Position

A 25-year history of financial success:

- Fiscal 2008 net revenue was $2.172 billion
- $7.25 billion market cap
- Cash and equivalents of $958 million, as of 1/31/08
- No debt
Building Information Modeling

Design Authoring Tools

Analysis Tools

Autodesk NavisWorks®

Autodesk Revit® Structure

Revit® MEP

MEP SYSTEMS ENGINEERS

Robobat

GBS IES

CIVIL ENGINEERS

Intelisolve

AutoCAD® Civil 3D®

GSB

CARMELSOFT IES

ARCHITECTS

OWNERS

BUILDERS

REVIT® Architecture

ARCHITECTS

REVIT® Architecture
Analysis + Prediction + Simulation + Validation

- Daylighting
- Carbon emissions
- Lifecycle analysis
- Energy
- Ecological footprint
- Electrical lighting
- Thermal comfort/HVAC (dry-side)
- Building water use (wet-side)
- Material takeoffs
- Bill of materials
- Consultant integration
- Structural/MEP/Interiors
- Clash detection
- Sequence of construction

1.2 Building systems carbon dioxide summary

Carbon dioxide totals in lbCO₂

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<th>System (boilers, chillers, fans, pumps etc.)</th>
<th>Lights</th>
<th>Equip.</th>
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Interoperability?

- API’s
- CIS/2
- DGN
- DXF™
- DWF™
- DWG
- gbXML
- COBIE
- IFC
- ODBC
- OGC
- PDF
- SAT
- XLS
- XML
IFC Advantages

- Predictable 3D objects for exchanging data between application software(s)
- 3D object definitions facilitate interoperability discussions
- A vehicle to test interoperability concepts
- Efficient with “well documented business practices” – GSA Program
Focus of GSA BIM Initiative

IFC-Based Final Concept Submissions
- 3D Object-Based Geometry
- Program
  - Spatial Information for Tenants
  - Measure of GSF, USF, RSF
- Criteria
- Cost

Project Year
-3 -2 -1 0 1 2 3 4 5 6 7 8

- Complete Virtual Model
- O&M
- Space Assignment

Scope
- Schedule
- Budget
- Quality
- Criteria

Planning | Design | Construction | Tenant | Closeout
Feasibility | Program Development | Final Concepts | Design Development | Construction Documents | Bid / Award | Cost Loaded CPM | Submissions / Shop / Coordination Drawings | As Builts | O & M Manuals | Tenant Improvement Drawings | FF&E and Move Management | Project Archives and POE
GSA Spatial Program BIM – Data Elements

GSA Requirements
- GSA Net Area
- Space Name
- Space Number
- Occupant Organization
- GSA Space Type

Model Elements
- Walls
- Doors
- Windows
- Columns
- Beams
Pankow Precast Interoperability Pilot

- Modeled
- Documented
- Exported IFC, SAT, DWG, DWF, RVT
- Imported files back to Revit
Energy Analysis

Building Information Model exports to gbXML file which is converted in Green Building Studio web service to DOE2 or eQuest input file to eliminate manual geometric data input. Automated input of geometric coordinates can save HUNDREDS of hours of manual labor. This facilitates better integration of architecture/engineering allowing energy analysis earlier and for varying iterations and keeps the cost of sustainable design down.
Autodesk’s Involvement with Standards Bodies

• Fiatech Member

• IAI (International Alliance for Interoperability)/BuildingSmart

• National BIM Standard (Under NIBS)

• AGC (Association of General Contractors)

• AIA

• US Green Building Council

• Open Geospatial Consortium

• Participating in ICC Smartcodes Project

• COBIE (Construction Operations Building Information Exchange)

• BIM to Facilities Management / O&M at LetterKenny Arsenal

• Various others (STEP, IGES)
Autodesk NavisWorks – Model Aggregation

Single, Unified Design & Construction Model

Problem

Architects, engineers and subcontractors use several modeling tools that do not easily work with each other (Revit, Civil 3D, ADT, ABS, Bentley, Nemetschek, Graphisoft, SolidWorks, QuickPen, CADPIPE etc.)

High definition laser scans (ex. Leica) are used for construction progress & QA (ex. Seattle library) and to capture as-built information, but need to be translated into design app to compare to model but data is not tied back to models

Solution

Create single, unified design model by aggregating models from multiple file formats in a easy to understand environment

Import point cloud data from laser scans into unified environment with the design model for comparison and interrogation
COBIE Demonstration & Discussion

COBIE Data in Revit Model for Demonstration
- Data Computed from BIM Model
- Manual Data entered as attributes attached to BIM Elements
- Methods for exporting this data for downstream use

Autodesk Vision for a more optimal work flow
- Move towards Integrated Project Delivery
- Large gaps between Design Intent Model and one useful for O&M
- Owners need to ask for “As-Built” BIM models

Rolling out COBIE requirement to A&Es and Contractors
- How do you get their buy in?
- How does this effort scale?
- Open questions?
Thank You!

Questions?