

Topics of Discussion

- Bentley Participation Statement and Industry Observations
- Introduction to Contracted Information Exchanges
- Space Compliance Information Exchanges
- Coordination View Information Exchanges
- Construction Operations Building Information Exchanges



Participation Statement and Industry Observations



Bentley Participation in Workshop

SCIE (space compliance information exchange)

Bentley Architecture provides tools to easily define, manage and report on spaces. An IFC data file can be exported for downstream analysis.

CVIE (coordination view information exchange)

Bentley ProjectWise Navigator provides tools for BIM review, clash detection, data reporting and drawing publishing. An IFC data file can be exported for downstream analysis.

COBIE (construction operations building information exchange)

Bentley's "BIM suite" (Bentley Architecture, Bentley Building Mechanical Systems, and Bentley Structural) provides a multi-disciplinary design environment. An IFC data file can be exported and converted to the COBIE Excel Workbook using a 3rd party tool (ifcCOBIE from AEC3). This is a prototype demonstrating capability.



Vendor Challenge

- Bentley's commitment, industry observations
- How to create a BIM with data rich components
- Live demo showing process
- How to export IFC and import to COBIE Excel Workbook



Bentley's Commitment to Interoperability

- ✓ Bentley has been a member of the International Alliance for Interoperability (now buildingSMART) since 1995
 - Bentley is active in the IAI and is on several regional chapter boards, e.g. US, UK, German-speaking, and Japan
 - Bentley is providing global and regional financial support for the IAI/buildingSMART
- ✓ Bentley TriForma was first certified by the IAI as IFC2x compliant in May 2003
 - Bentley supports IFC2x2, the Singapore code checking view
 - Bentley was certified by the IAI as compliant with the Extended Coordination View of IFC2x3 Step 1 in June 2006 and Step 2 compliant in March 2007 > [link](#)



Bentley's Commitment to Interoperability

- Bentley participated and presented in the IFC based HITOS Interoperability Demonstration held in conjunction with the IAI/buildingSMART meeting at the National Academies of Science in Washington, DC in October of 2006.
- ✓ Bentley provided prototypical Service Oriented Architecture IFC client for the Open Geospatial Consortium (OGC) Open Web Services demonstration number 4 (OWS-4) in December of 2006 – reference [link](#)
- Bentley published an IFC position paper in March 2007 – reference [link](#)
- ✓ Bentley is certified by the General Services Administration (GSA) as compliant with the GSA specific Concept Design View of IFC in May 2007 – reference GSA publication, page 9 [link](#)



Interoperability Projects (2008+)

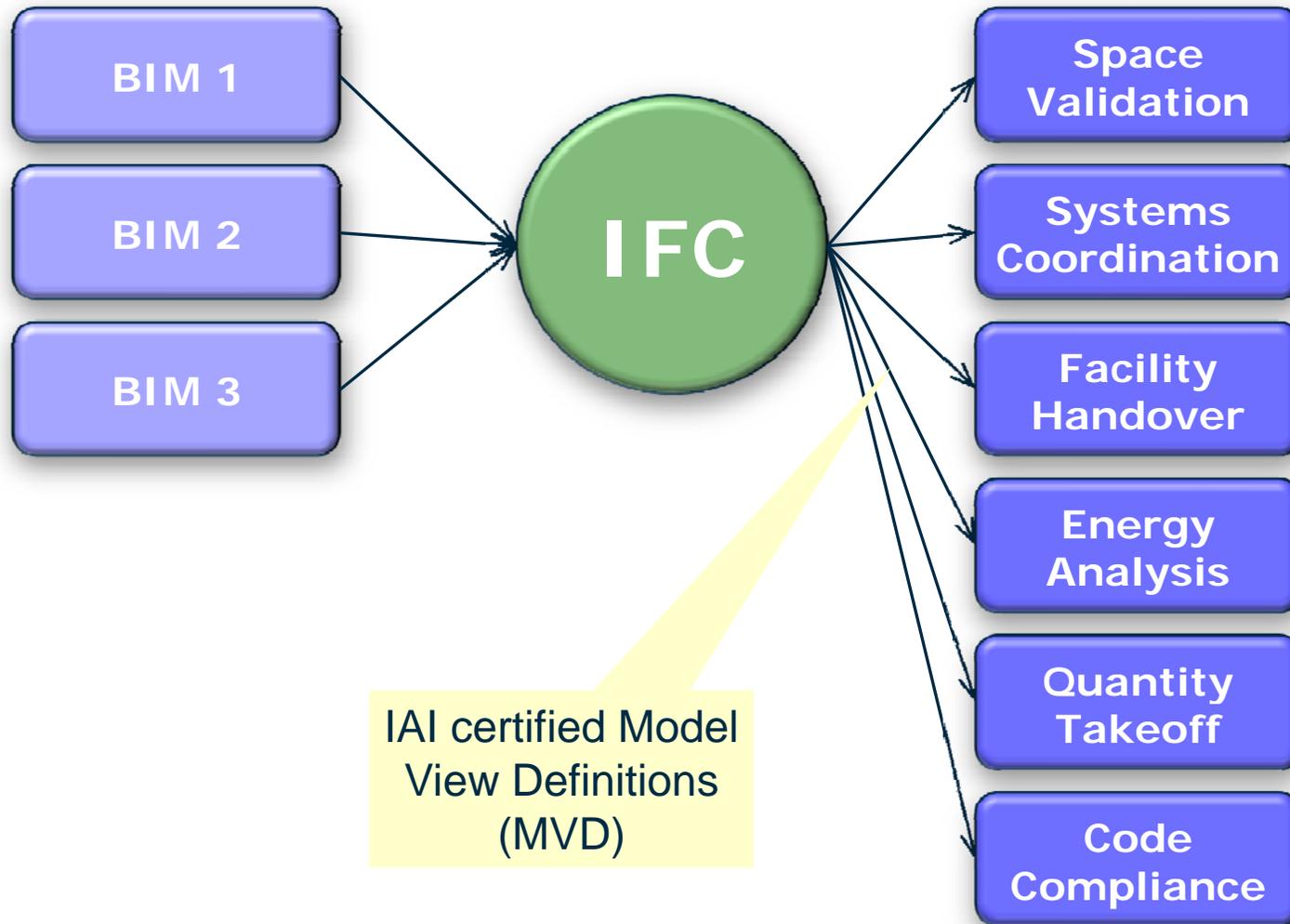
- buildingSMART/USACE > BIM Contracted Information Exchange - space coordination, clash detection, COBIE data exchange
- OGC > AECOO-1 Testbed - quantity take-off to support cost estimating (IFC), energy analysis for building energy performance and project collaboration for decision support (IFC)
- ICC > SMARTcodes - auto code checking of BIMs (IFC) for compliance with energy, egress and accessibility requirements (codes and standards)
- GSA > BIM Guide 05 - energy performance and operations
- AGC > AGCxml Project - set of XML schemas for the transactional data that is now commonly exchanged in paper documents

IFC Data Exchange

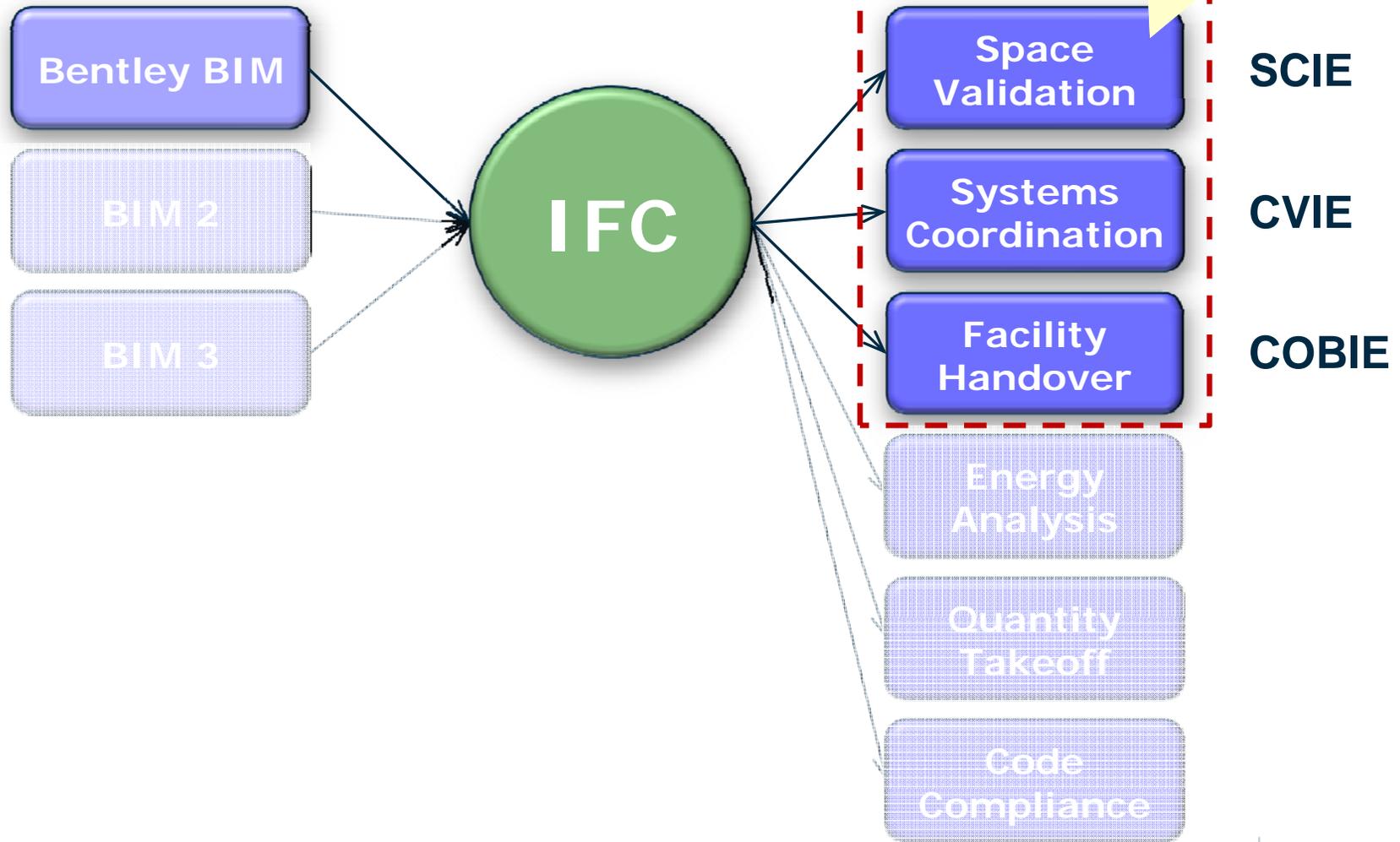
IFC

- Focused on downstream analysis and data repurposing where appropriate; many-to-many application data exchange
- <100% - any translation has potential for content loss (i.e. proprietary formats) and limits capability to reconstitute

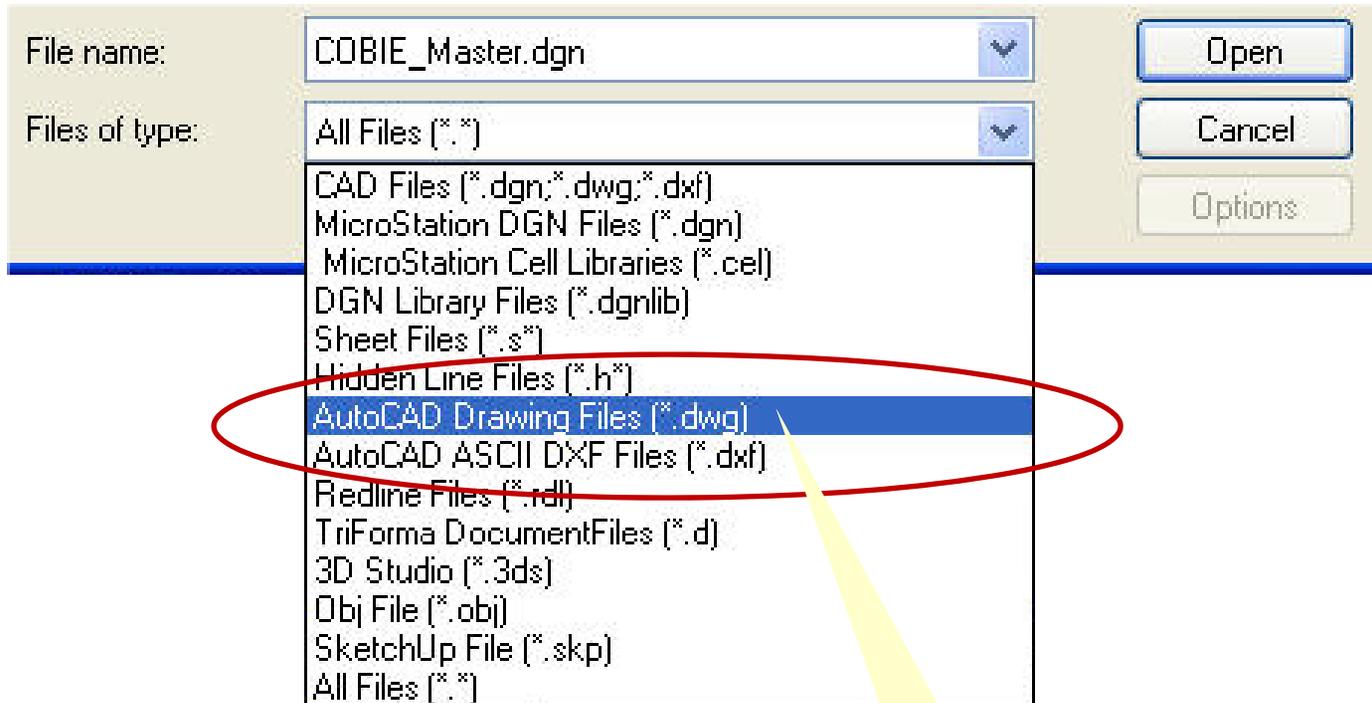
IFC Data Exchange



buildingSMART/USACE



Direct Data Exchange



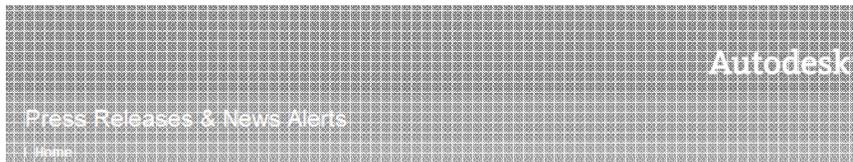
AEC Software Interoperability



Helio, Andrew [Logout] | United States [Change] | News | Bentley SELECT

CORPORATE

Autodesk and Bentley to Advance AEC Software Interoperability



08 July 2008

SAN RAFAEL, Calif. and EXTON, Pa. – At a joint press conference, Autodesk, Inc. (NASDAQ: ADSK) and Bentley Systems, Incorporated, two of the leading providers of design and infrastructure software, today announced an agreement to expand interoperability between their portfolios of architectural, engineering, and construction (AEC) software. Autodesk and Bentley will exchange software libraries, including Autodesk Revit/DWG, to improve the ability to read and write the companies' respective DWG and DGN formats in mixed environments with

Bentley PR
Ron Kuhfeld
Public Relations Manager
610-321-3493
[Contact Bentley PR](#)



[← \(Back to Press Release\)](#)

submit either DWG or DGN files. By improving fidelity of work shared between the two file formats, users will be able to focus on being creative and getting work done, rather than being constrained by file-compatibility considerations.

Interoperability has emerged as a critical issue for users of design and engineering software. A 2004 study by the U.S. National Institute of Standards and Technology found that users bear direct costs of almost \$16 billion annually from time wasted due to inadequate AEC software interoperability. By virtue of this agreement, and the interoperable offerings that it will enable, AEC firms will be free to employ software tools of choice from either Autodesk or Bentley to accept or submit either DWG or DGN files. By improving fidelity of work shared between the two file formats, users will be able to focus on being creative and getting work done, rather than being constrained by file-compatibility considerations.

Through supporting the reciprocal use of their available APIs, Autodesk and Bentley will enable AEC project teams to combine products from both providers within integrated workflows. For instance, a design team could use a mixture of Autodesk and Bentley software, such as Autodesk's Revit platform and Bentley's STAAD and RAM structural products, and simulate and analyze their designs or manage project information using Autodesk NavisWorks software or Bentley's ProjectWise.

Norbert Young, FAIA, president of McGraw-Hill Construction and former chairman of the International Alliance for Interoperability in North America, said, "This groundbreaking agreement directly addresses many of the critical issues detailed in the October 2007 McGraw-Hill Construction study on interoperability in the construction industry (http://construction.ecnext.com/mcgraw_hill/includes/SMRI.pdf). I applaud both companies for their foresight and leadership."

Added Patrick MacLeamy, FAIA, CEO of global architectural firm HOK and a founder and current chairman of the International Alliance for Interoperability (IAI), "As a longtime advocate of interoperability, I welcome this agreement as an important step toward enabling AEC information to be more broadly shared, increasing the value of BIM to our clients."

"Autodesk recognizes that many customers use our products in mixed environments, and this agreement will help to better support these firms," said Jay Ehalt, senior vice president, Autodesk AEC Solutions. "As part of our commitment to provide technology that improves productivity and efficiency across the AEC industry, we're pleased to enter into this agreement with Bentley Systems -- Autodesk's largest development partner -- and together help customers design, build, operate, and maintain the world's infrastructure."

"Bentley and Autodesk share a goal of enabling the creation and operations of better-performing infrastructure," said Greg Bentley, CEO of Bentley Systems. "Realizing that our mutual users bear unnecessary costs resulting from lack of interoperability, we came together to finally make information reuse the norm. By raising its sights beyond file format issues, the resource-constrained AEC community can better serve us all."

time wasted due to inadequate AEC software interoperability. By virtue of this agreement, and the interoperable offerings that it will enable, AEC firms will be free to employ software tools of choice from either Autodesk or Bentley to accept or submit either DWG or DGN files. By improving fidelity of work shared between the two file formats, users will be able to focus on being creative and getting work done, rather than being constrained by file-compatibility considerations.

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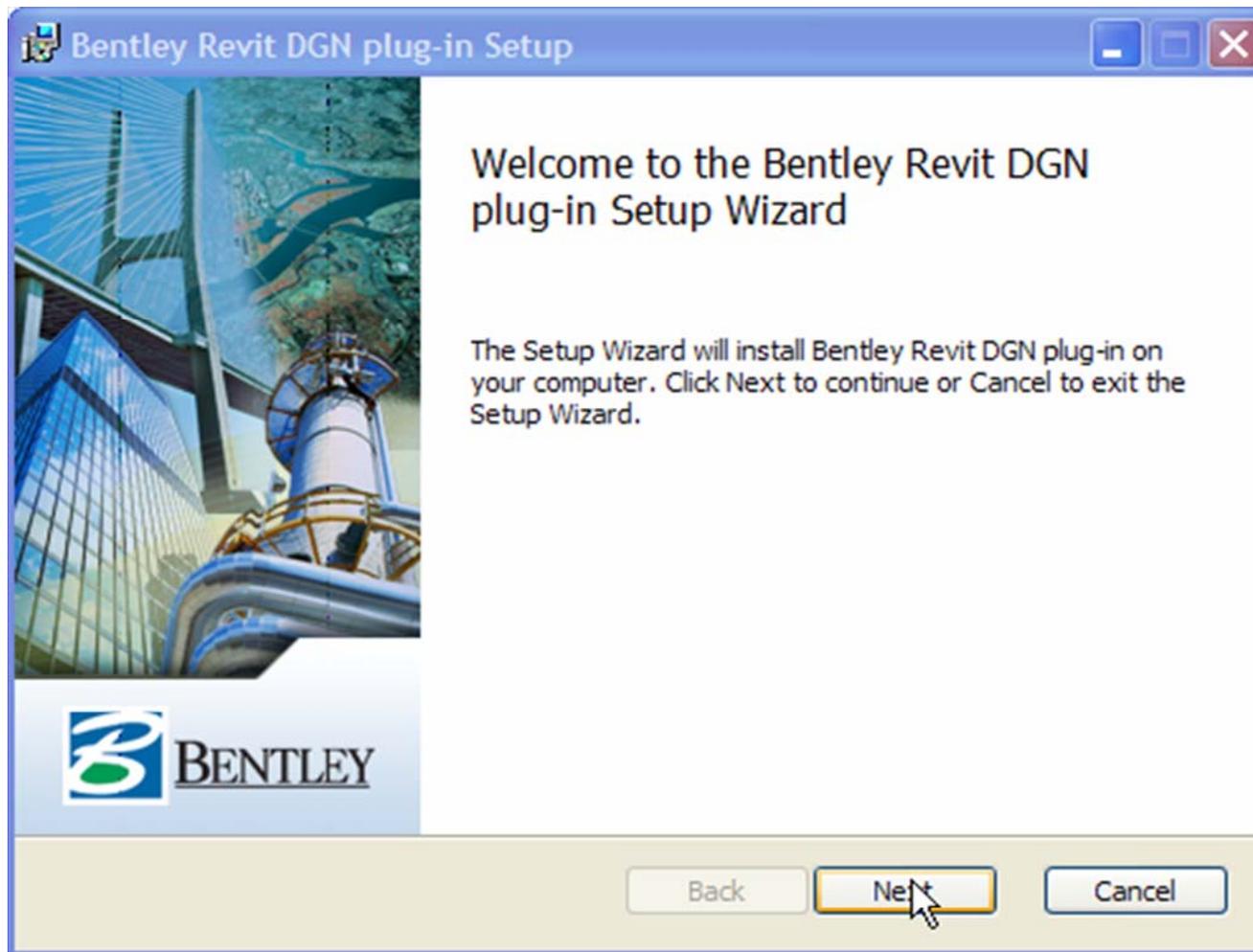


Direct Data Exchange

DIRECT

- “Gold” standard for data exchange - highest fidelity; support native file formats
- Effort justified with impact of largest number of users, impact on industry, user benefits
- Addresses the limitations of IFC

REVIT Plug-in for MicroStation



Introduction to Contracted Information Exchanges

Wednesday, July 23 (1 - 5pm)



Wednesday, 23 July 2008. 1:00pm– 5:45pm
Theme: Introduction to Contracted Information Exchanges

1:00pm	Welcome and Announcements <ul style="list-style-type: none">- U.S. Army, Corps of Engineers- Federal Facility Council- buildingSMART Alliance- buildingSMART International	James Dalton Kevin Lewis Peter Smeallie Bill Brodt
1:30pm	Information Exchange Requirements Process	Bill East
2:00pm	buildingSMART International <ul style="list-style-type: none">- Information Exchange Software Specification- Information Delivery and Model View Definitions- Industry Foundation Class Resources	Jeff Wix
2:30pm	Break	
3:00pm	BIM Vendors Process	Nick Nisbet
3:15pm	BIM Vendor Challenge (Attachment 1) <ul style="list-style-type: none">- Autodesk- Bentley- Onuma	Nick Nisbet
5:30pm	Agenda for Following Days and Wrap-Up	Bill East
5.45pm	Close	



Attachment 1 - BIM Vendors Challenge Description

BIM vendors will have already selected a model for demonstration and produced their COBIE file that was evaluated prior to the meeting.

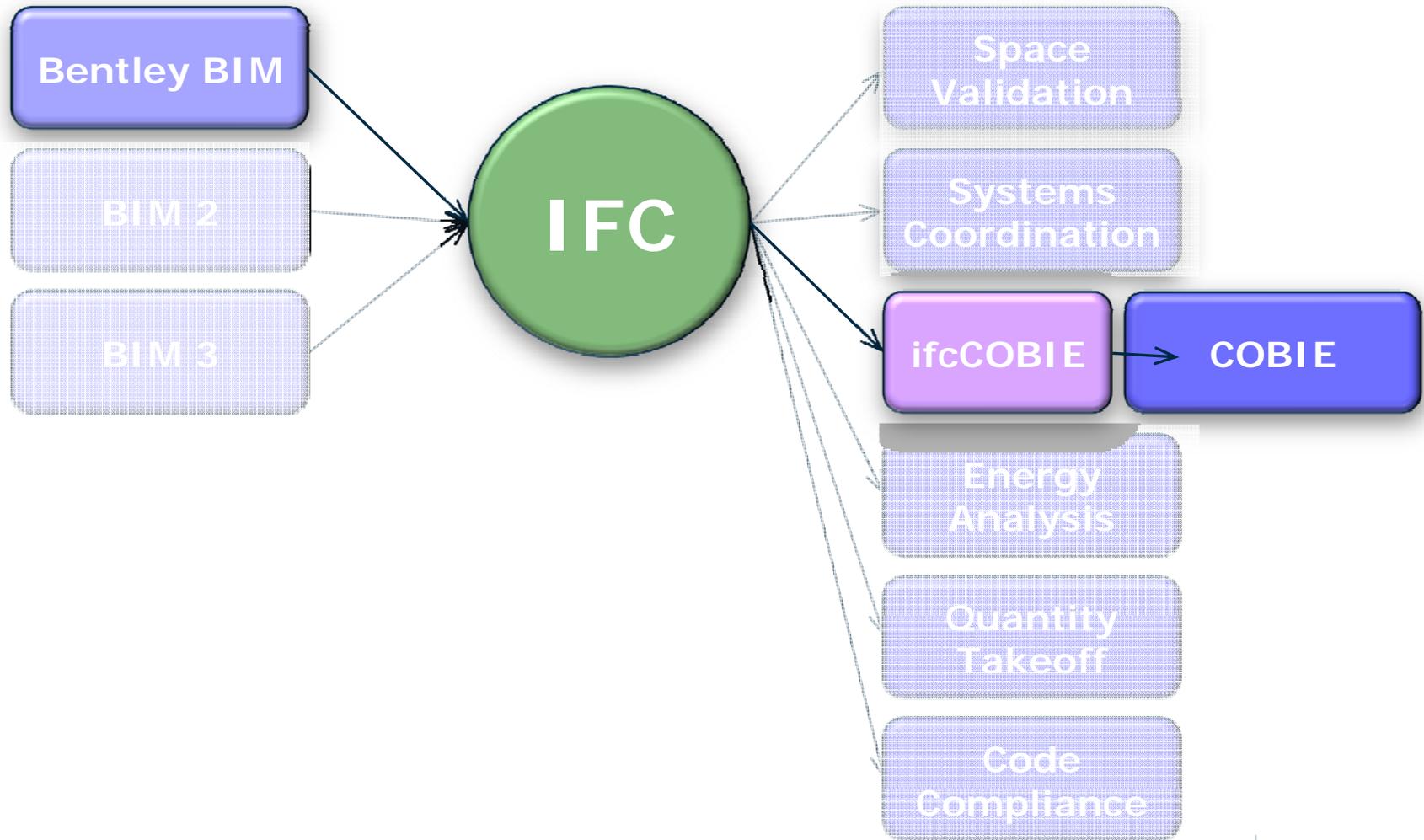
- (1) The vendor will view/fly through their selected model, highlighting facilities used to capture contractually required data (live)
- (2) Vendor will be asked that at least one of each of the following changes be made (live)
 - (a) name of room
 - (b) name of equipment
 - (c) type of equipment for given component
 - (d) move equipment from one room to another
- (3) The vendor will export COBIE or IFC data from their application (live)
- (4) IFC-COBIE translator produces the spreadsheet version of the data set (using pre-processed file)
- (5) COBIE Spreadsheet will be reviewed (using pre-processed file)
 - (a) by inspection to identify any issues of interest
 - (b) using the web-based checking application to further validate the data
- (6) The vendor will discuss the results of the evaluation (using pre-processed file)

Vendor Challenge

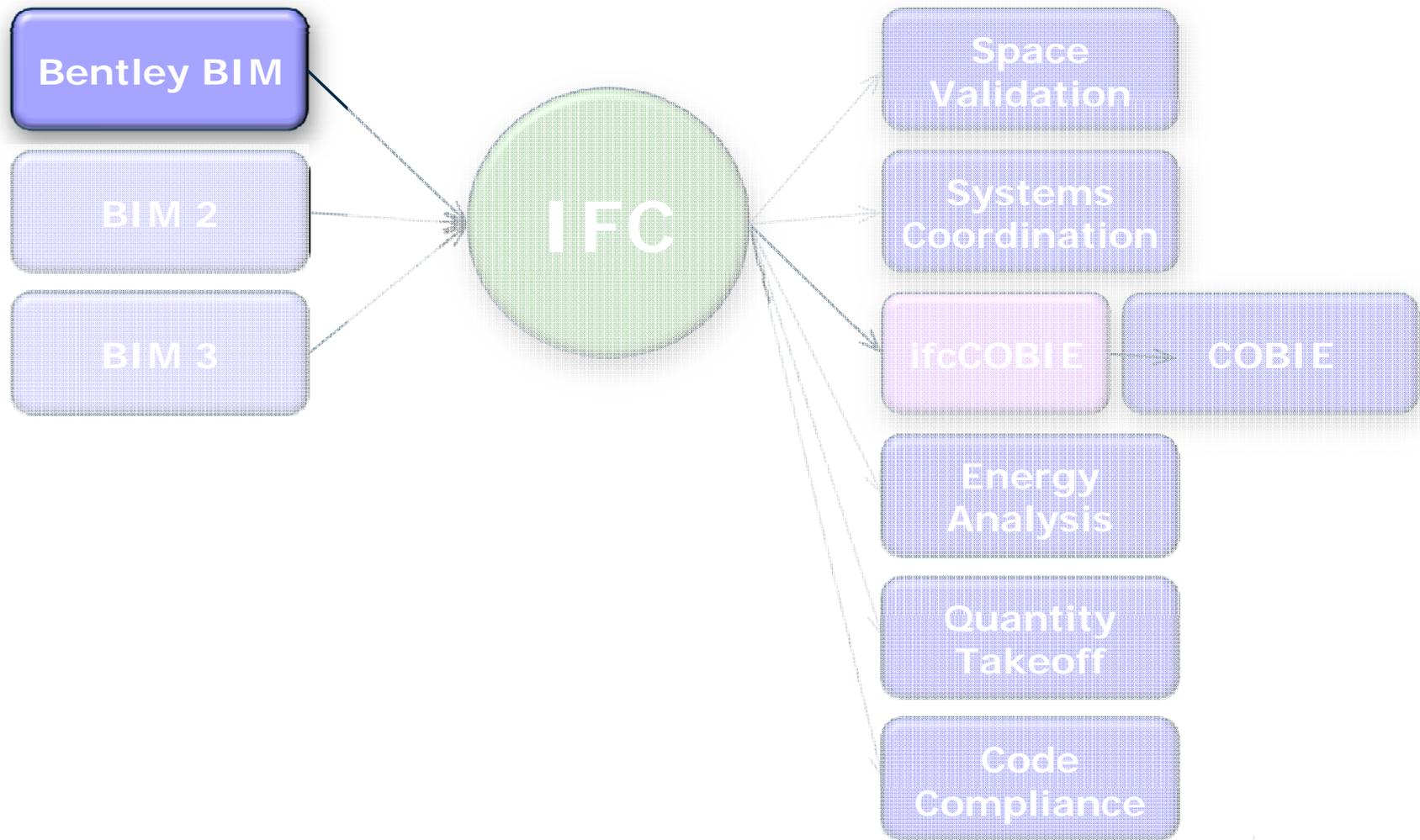
- Bentley's commitment, industry observations
- How to create a BIM with data rich components
- Live demo showing process
- How to export IFC and import to COBIE Excel Workbook



BIM > IFC > ifcCOBIE > COBIE



BIM (multidisciplinary)



BIM Platform

“Industry” solutions

BIM

	■ BUILDING	■ PLANT	■ CIVIL	■ GEOSPATIAL
O&M	Bentley® Facilities™	ProjectWise® LifeCycle Server™	ARPS™ ROW™ LDM™ Optram™ SUPERLOAD®	Bentley® GeoWeb Publisher Bentley® Geospatial Server
APPLICATIONS	Bentley® Architecture™ Bentley® Structural™ RAM™ STAAD™ Bentley® Building Mechanical Systems™ Bentley® Building Electrical Systems™ Speedikon® ProSteel™ Hevacomp® Tas®	PlantSpace® AutoPLANT® AutoPIPE™ AXSYS™ PlantWise™ Design++™ promis*e® OpenPlant PowerPID™ ConstructSIM™ OpSim™	GEOPAK® InRoads® Bentley® Rail™ Bentley® MX™ Bentley® Rebar™ RM Bridge™ LEAP™	Bentley® Map™ Descartes™ I/RAS B™ Bentley® Electric™ Bentley® Water™ Bentley® Sewer™ Bentley® Copper™ Bentley® Fiber™ Bentley® Coax™ Bentley® Inside Plant™ CADscript™ sisNET™ Haestad Methods® Solutions Bentley® Expert Designer™
POWER PRODUCTS			PowerSurvey™ PowerCivil™ PowerRebar™	PowerMap™ PowerMap Field™
PLATFORM	MicroStation® GenerativeComponents® MicroStation® PowerDraft® Bentley® View™ Bentley® Redline™			Authoring graphics/data
	ProjectWise® ProjectWise® StartPoint™ ProjectWise® Navigator™ ProjectWise® InterPlot™ ProjectWise® Integration Server™			Collaboration

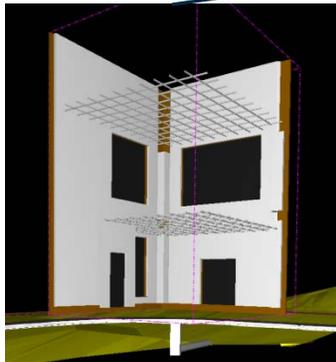
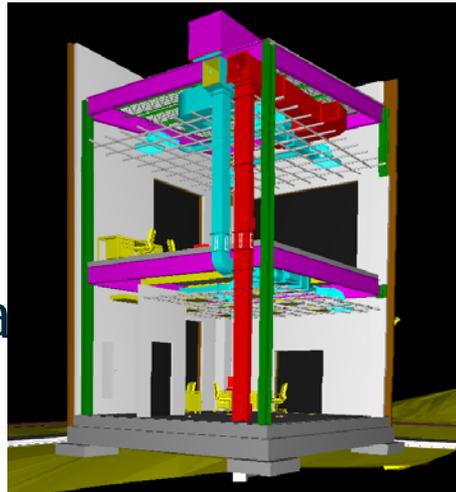
“Platform”



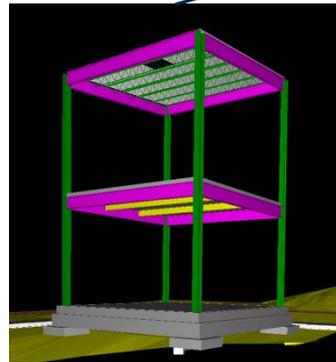
Multidisciplinary BIM Collaboration

Bentley BIM

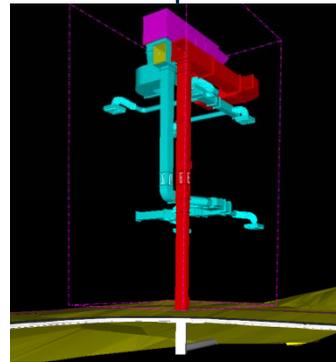
- Disconnected disciplines support
- BIM collaboration per discipline
- Large scale support, scalability



ARCH



STRUCT



MECH



ELEC



FM



BIM - Intelligent Objects > IFC

BIM information required for COBIE

TriForma Element Info

Compound Cell <>

- Linear Element
- Shape Element
- Shape Element
- Cell
- Shape Element
- Surface Element

More Info

Apply Reset

DataGroup Data

Identification

Quantities

Attributes

Drawing Symbols

DataGroup Name: SqCeilingDiffuser

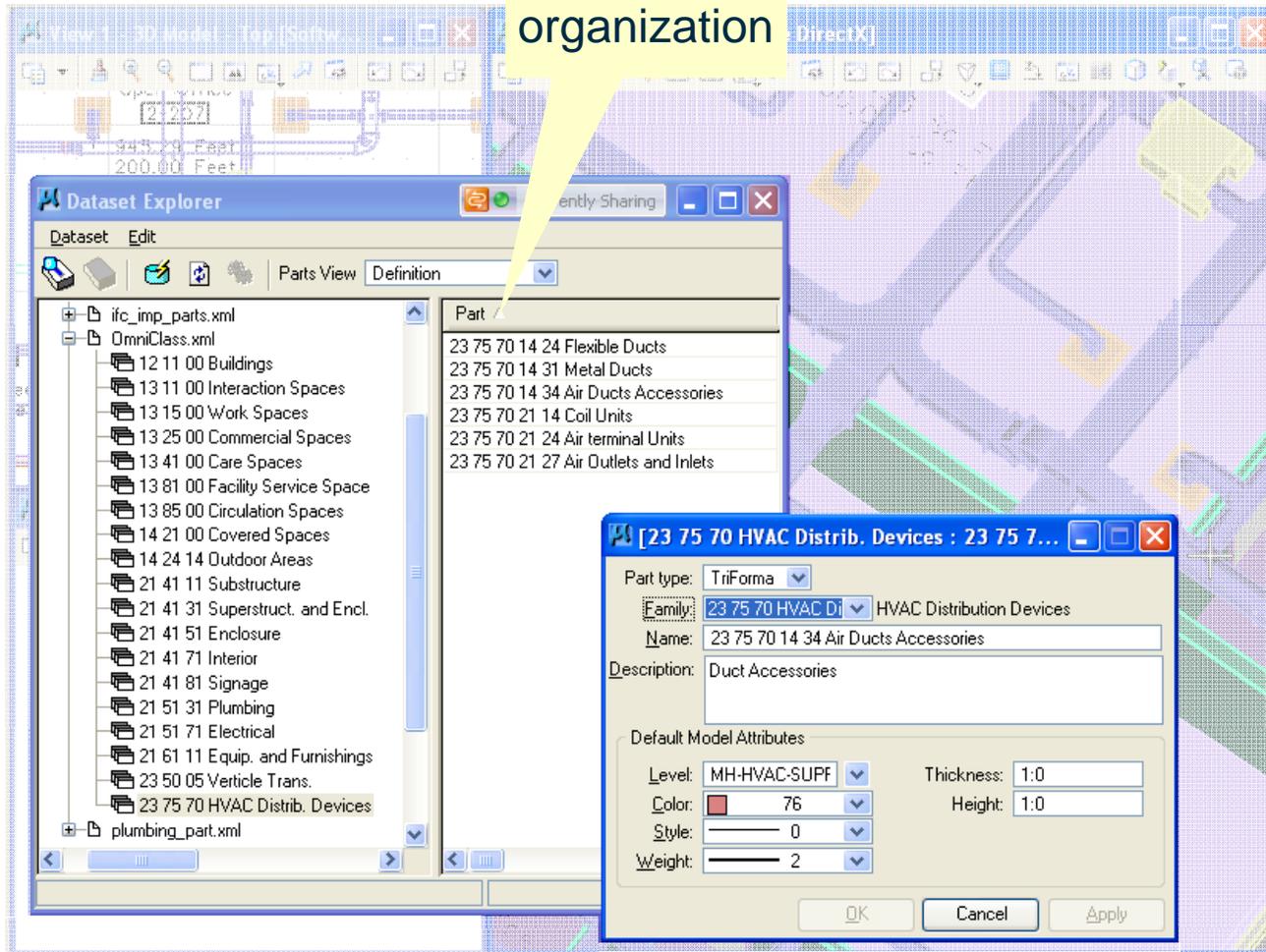
DataGroup Catalog Name: Square Diffuser Top

Property	Value
Grill Type	6-rect Slots
Grill Width	24.000000
Grill Depth	24.000000
Grill Thickness	0.500000
Box Height	2.500000
Box Width	22.000000
Box Depth	22.000000
Box Border	1.000000
Box Top Width	22.000000
Box Top Depth	22.000000

Family: Duct
Part: Supply-New
Descr: Duct Supply Definition
[MH-HVAC-SUPPLY-NEW]
Render Mat:
Group:

OmniClass

OmniClass
organization

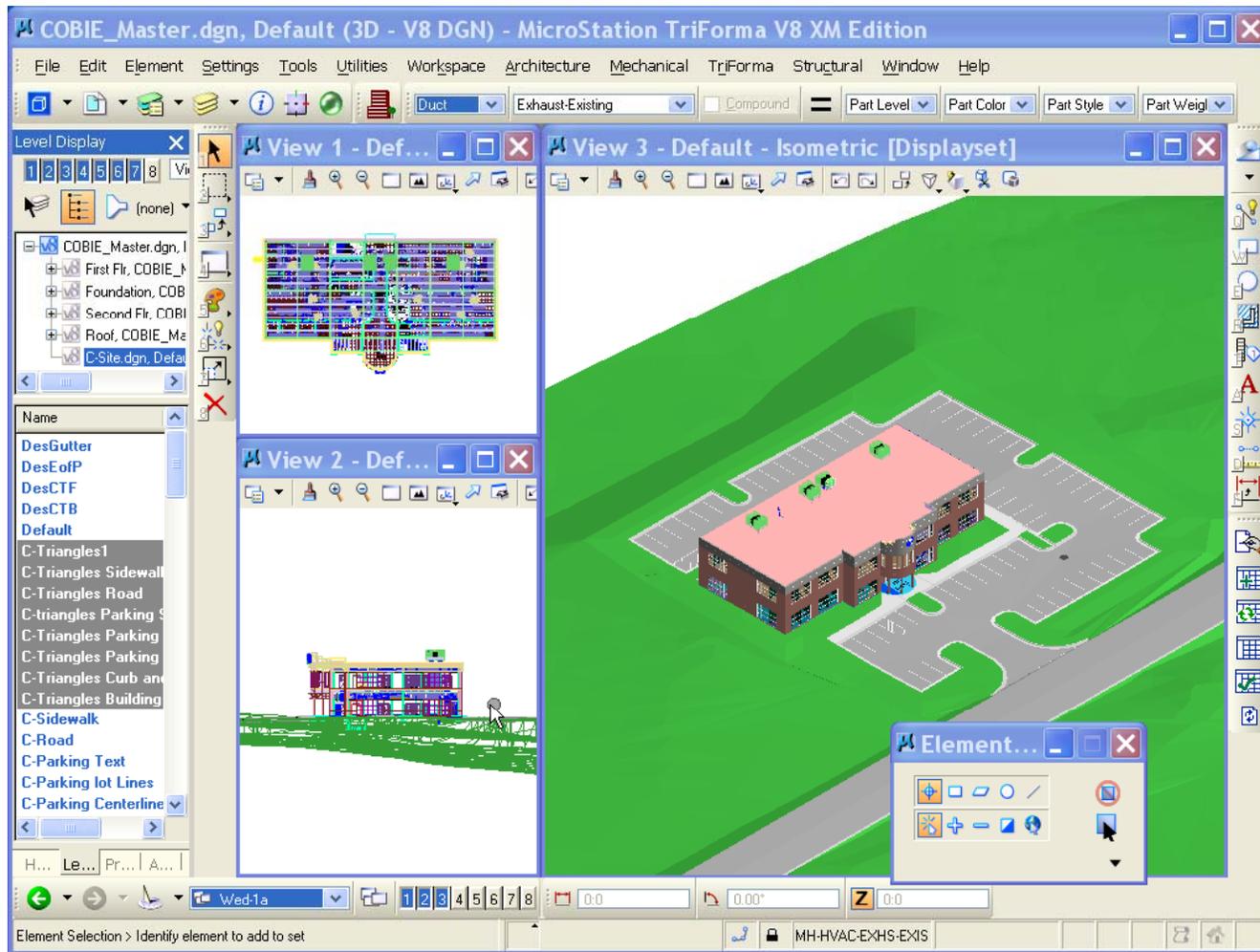


Vendor Challenge

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BIM - Design and Managing Data

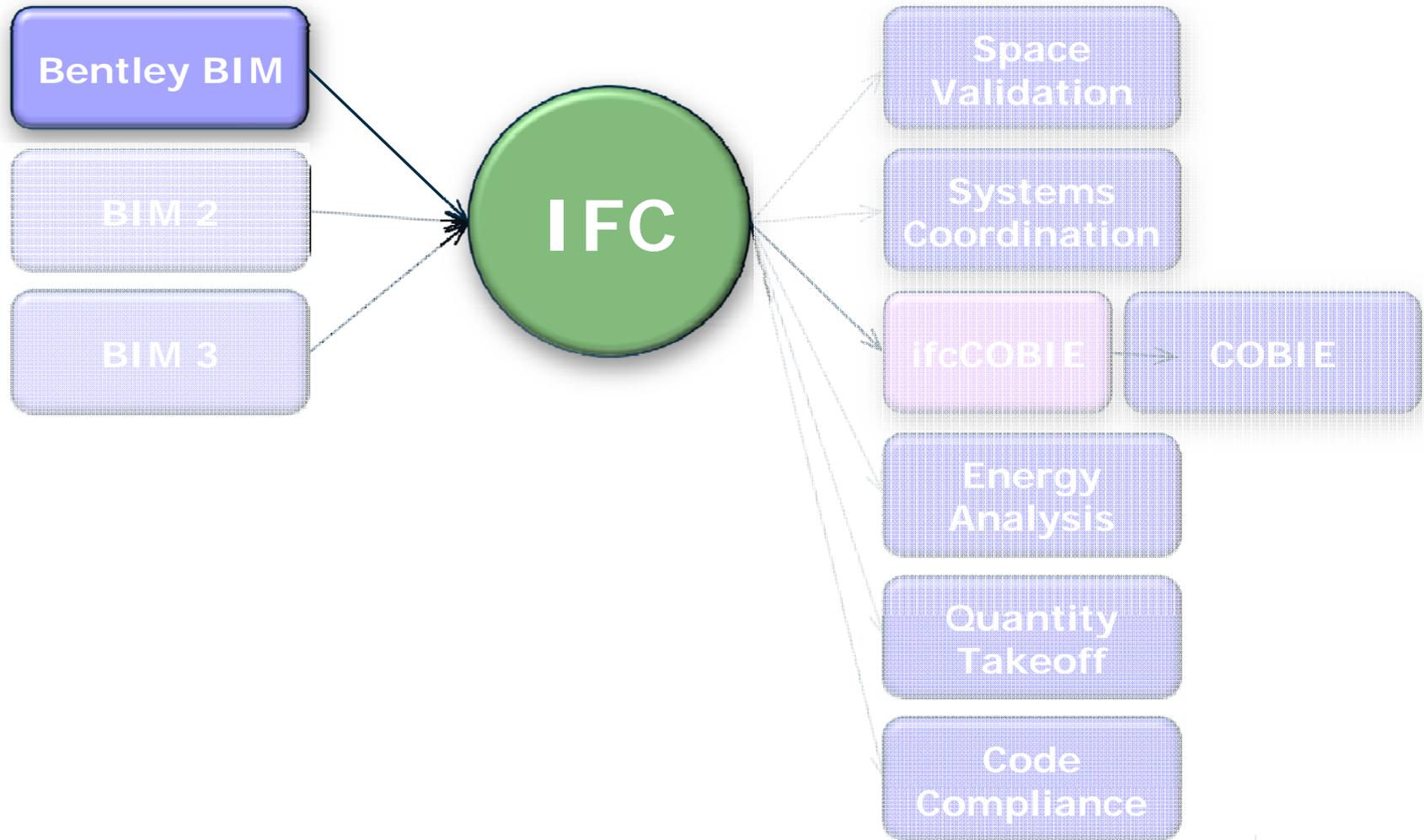


Vendor Challenge

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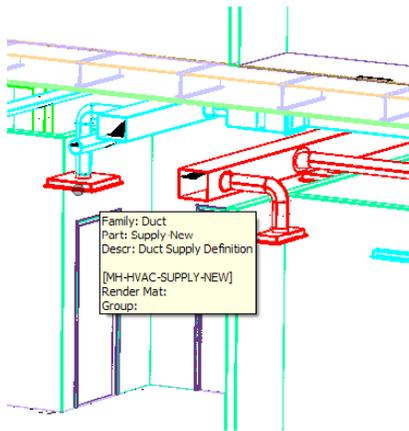


BIM > IFC > ifcCOBIE > COBIE



BIM Components > IFC Descriptions

BIM components



Map custom Triforma dataset to IFC dataset

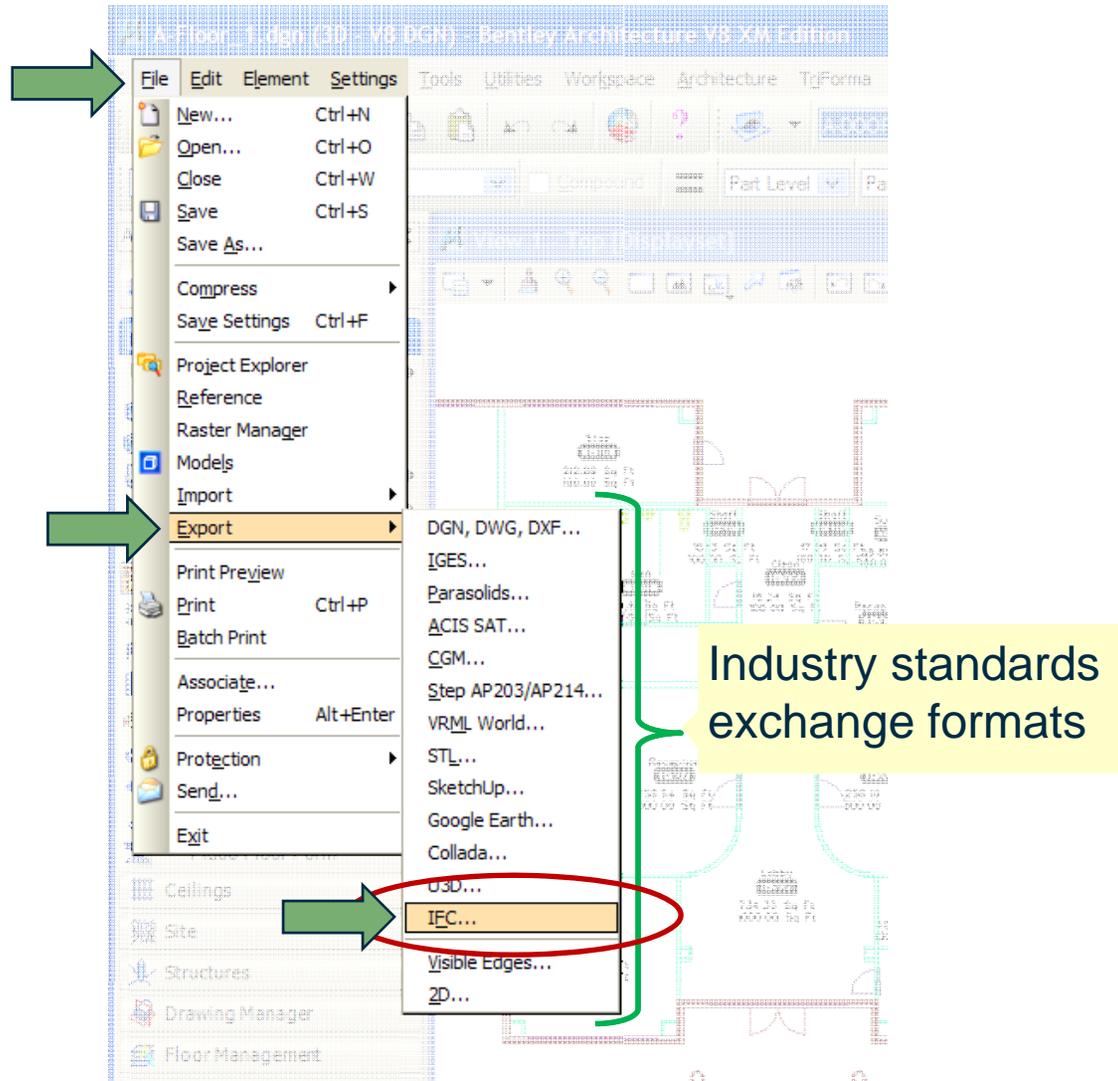
Family-Part List		IFC Entities
12 11 00 Buildings	*	IfcBeam
12 11 00 Buildings	12 11 14 - Mid-Rise ...	IfcBuilding
13 11 00 Interaction Spaces	*	IfcBuildingElementProxy
13 11 00 Interaction Spaces	13 11 11 32 - Recep...	IfcBuildingStorey
13 11 00 Interaction Spaces	13 11 21 17 - Confe...	IfcColumn
13 15 00 Work Spaces	*	IfcControlElement
13 15 00 Work Spaces	13 15 11 34 17 - O...	IfcController
13 15 00 Work Spaces	13 15 11 34 11 - Office	IfcCovering
13 15 00 Work Spaces	13 15 11 34 21 - Mai...	IfcCurtainWall
13 15 00 Work Spaces	13 15 21 17 - Closet	IfcDistributionElement
13 25 00 Commercial Spaces	*	IfcDistributionFlowElement
13 41 00 Care Spaces	*	IfcDoor
		IfcFlowController
		IfcFlowFitting
		IfcFlowSegment

Refresh
Load
Save...
Add
Delete
Clear

Family	Part	IFC Entity
21 41 11 Substructure	21 41 11 17 11 - Slab on Grade	IfcSlab
21 41 31 Superstruct. and Encl	21 41 31 17 11 - Roof Framing	IfcBeam
21 41 31 Superstruct. and Encl	21 41 31 11 21 - Structural Fl	IfcBeam
21 41 51 Enclosure	21 41 51 13 21 - Exterior Door	IfcDoor
21 41 71 Interior	21 41 71 12 21 - Interior Door	IfcDoor
21 51 31 Plumbing	21 51 31 11 14 - Plumbing Fxt	IfcFlowTerminal
21 51 51 HVAC	*	IfcFlowSegment
21 41 71 Interior	21 41 71 11 31 - Interior Part	IfcWallStandardCase
21 41 71 Interior	21 41 71 12 11 - Transparent O	IfcWindow
21 41 51 Enclosure	21 41 51 13 11 - Transparent O	IfcWindow

IFC descriptions

Creating an IFC File



IFC Project Information

TriForma IFC Export

Output | Comment | Settings

IFC File: <-

IFC File Info

System	<input type="text" value="Bentley Architecture"/>
Author	<input type="text" value="Bill East"/>
Organization	<input type="text" value="USACE"/>
Authorization	<input type="text" value="Keith Bentley"/>

Use Schema: ▼

TriForma IFC Export

Output | Comment | Settings

Project

Building

Site

Modifying Person

Given Name

Family Name

Organization

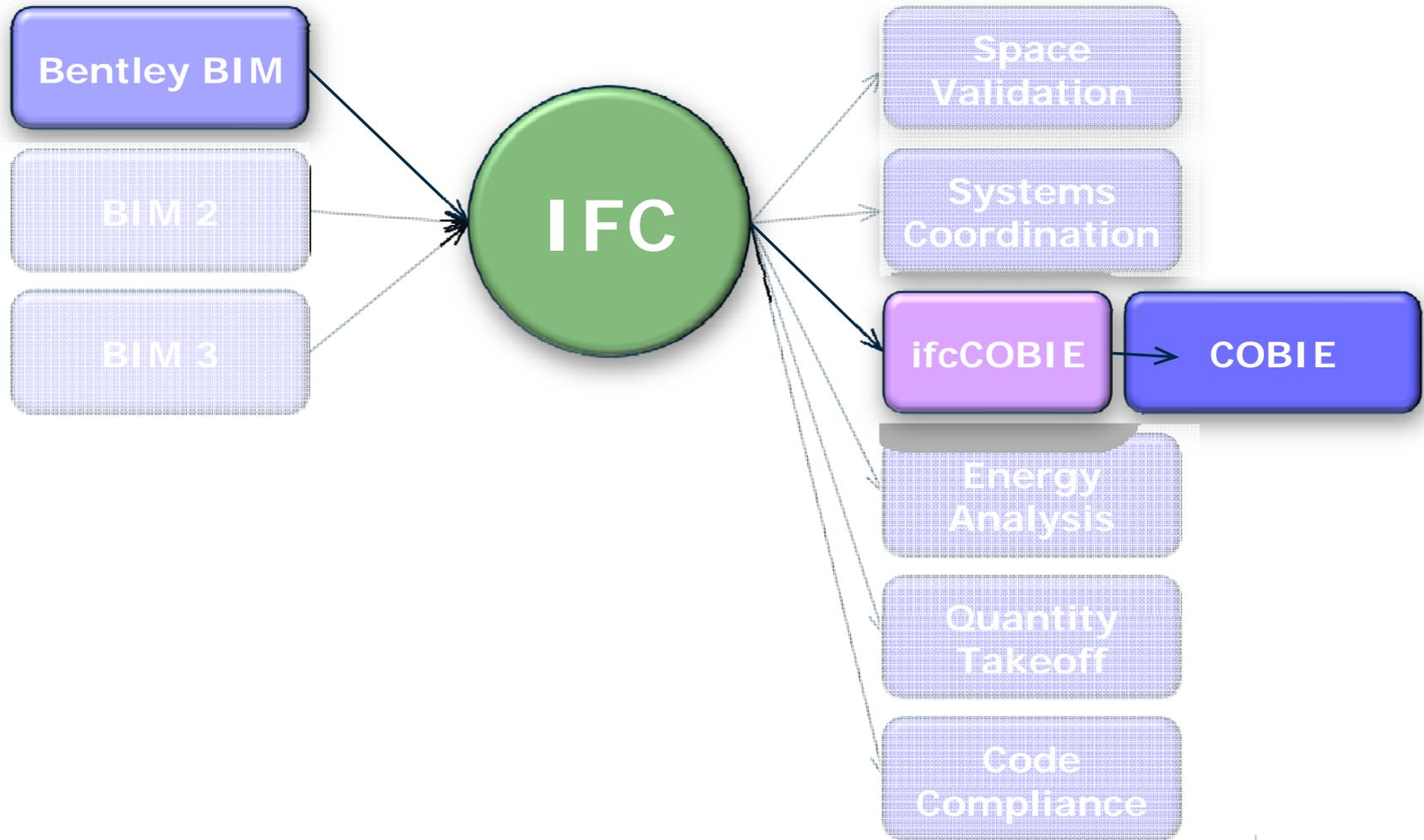
Id

Middle Names

Prefix Titles

Suffix Titles

BIM > IFC > ifcCOBIE > COBIE



COBIE Spreadsheet Checker

Page 1 of 17

COBIE July 2008 File Checker

Version 0.8 (21-Jul-08)
 Testing conducted on file 'test.xml'

Objective: Shows how COBIE data files may be checked for consistency use a rule-based checker.
Status: Evaluates consistency of COBIE designer worksheets.

Report Contents: Based on user selections the results presented in this report refer to all COBIE designer Worksheets. The output below DOES NOT show the imported data set in addition to the rule checks.

Processing '01-Contact' Worksheet Check

*Data file display suppressed per user request for non-verbose output.
 (2 XML records found (include column header), 1 possible COBIE records were analyzed as below.)*

Letter	Column Name	Rule Description	Rule		
			Pass/Fail	Errors Found	Offending Records
A	ContactID	record ID's must be numeric	Pass	-	-
A	ContactID	record ID's must be increasing	Pass	-	-
A	ContactID	record ID's must be unique	Pass	-	-
B	ContactRole	Every contact must be identified by their role on the project	Pass	-	-
F	GivenName	The name of each contact must be provided (or n/a)	Pass	-	-
G	FamilyName	The name of each contact must be provided (or n/a)	Pass	-	-
G	FamilyName	People may not be listed more than once (unless updated)	Pass	-	-
H	OfficeName	The name of each contact's office must be provided.	Pass	-	-
K	AddressStreet	The street address for each contact's office must be provided (or n/a)	Pass	-	-

<http://127.0.0.1/report/cobie/> 7/21/2008

Validates Excel Workbook format

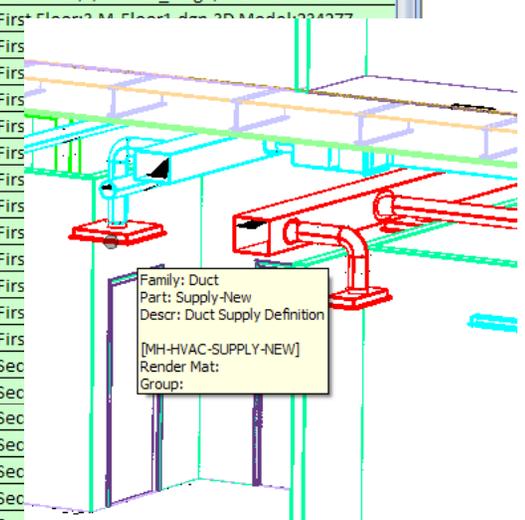
COBIE



COBIE 07-Component Worksheet

BIM components organized by OmniClass

1	ComponentID	SpaceID	RegisterID	ComponentName	ComponentDescription
50	49	6	49	21 51 31 Plumbing--21 51 31 11 14 - Plumbing Fixtures	1,COBIE_Master.dgn,1 - First Floor;1,A-Floor_1.dgn,First Floor:92322
51	50	6	49	21 51 31 Plumbing--21 51 31 11 14 - Plumbing Fixtures	1,COBIE_Master.dgn,1 - First Floor;1,A-Floor_1.dgn,First Floor:92862
52	51	7	49	21 51 31 Plumbing--21 51 31 11 14 - Plumbing Fixtures	1,COBIE_Master.dgn,1 - First Floor;1,A-Floor_1.dgn,First Floor:93402
53	52	6	50	21 51 31 Plumbing--21 51 31 11 14 - Plumbing Fixtures	1,COBIE_Master.dgn,1 - First Floor;1,A-Floor_1.dgn,First Floor:92020
99	98	27	55	23 75 70 HVAC Distrib. Devices--23 75 70 21 24 Air terminal Units	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:135179
100	99	27	55	23 75 70 HVAC Distrib. Devices--23 75 70 21 24 Air terminal Units	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:171083
101	100	23	55	23 75 70 HVAC Distrib. Devices--23 75 70 21 24 Air terminal Units	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:169068
124	123	23	56	23 75 70 HVAC Distrib. Devices--23 75 70 14 34 Air Ducts Accessories	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:135179
125	124	31	56	23 75 70 HVAC Distrib. Devices--23 75 70 14 34 Air Ducts Accessories	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:171083
126	125	34	56	23 75 70 HVAC Distrib. Devices--23 75 70 14 34 Air Ducts Accessories	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:169068
146	145	24	57	23 75 70 HVAC Distrib. Devices--23 75 70 21 27 Air Outlets and Inlets	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:135179
147	146	24	57	23 75 70 HVAC Distrib. Devices--23 75 70 21 27 Air Outlets and Inlets	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:171083
148	147	24	57	23 75 70 HVAC Distrib. Devices--23 75 70 21 27 Air Outlets and Inlets	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:169068
181	180	7	57	23 75 70 HVAC Distrib. Devices--23 75 70 21 27 Air Outlets and Inlets	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:135179
332	331	27	58	23 60 30 General Pipework--23 60 30 11 00 CHWS	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:171083
333	332	23	58	23 60 30 General Pipework--23 60 30 11 00 CHWS	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:169068
334	333	23	58	23 60 30 General Pipework--23 60 30 11 00 CHWS	1,COBIE_Master.dgn,1 - First Floor;2,M-Roof.dgn,3D Model:135179
441	440	52	98	21 51 31 Plumbing--21 51 31 11 14 - Plumbing Fixtures	3,COBIE_Master.dgn,2 - Second Floor;2,M-Roof.dgn,3D Model:135179
442	441	52	98	21 51 31 Plumbing--21 51 31 11 14 - Plumbing Fixtures	3,COBIE_Master.dgn,2 - Second Floor;2,M-Roof.dgn,3D Model:171083
443	442	53	98	21 51 31 Plumbing--21 51 31 11 14 - Plumbing Fixtures	3,COBIE_Master.dgn,2 - Second Floor;2,M-Roof.dgn,3D Model:169068
444	443	38	99	21 61 11 Equip. and Furnishings--21 61 11 21 61 Office Equip. & Furn.	3,COBIE_Master.dgn,2 - Second Floor;2,M-Roof.dgn,3D Model:135179
445	444	38	100	21 61 11 Equip. and Furnishings--21 61 11 21 61 Office Equip. & Furn.	3,COBIE_Master.dgn,2 - Second Floor;2,M-Roof.dgn,3D Model:171083
446	445	38	101	21 61 11 Equip. and Furnishings--21 61 11 21 61 Office Equip. & Furn.	3,COBIE_Master.dgn,2 - Second Floor;2,M-Roof.dgn,3D Model:169068
458	457	70	113	23 75 70 HVAC Distrib. Devices--23 75 70 21 14 Coil Units	4,COBIE_Master.dgn,3 - Roof Floor;2,M-Roof.dgn,3D Model:135179
459	458	70	113	23 75 70 HVAC Distrib. Devices--23 75 70 21 14 Coil Units	4,COBIE_Master.dgn,3 - Roof Floor;2,M-Roof.dgn,3D Model:171083
460	459	70	113	23 75 70 HVAC Distrib. Devices--23 75 70 21 14 Coil Units	4,COBIE_Master.dgn,3 - Roof Floor;2,M-Roof.dgn,3D Model:169068
461	460	70	113	23 75 70 HVAC Distrib. Devices--23 75 70 21 14 Coil Units	4,COBIE_Master.dgn,3 - Roof Floor;2,M-Roof.dgn,3D Model:135179



Spatial Compliance Information Exchanges

Thursday, July 24 (8 - 10am)

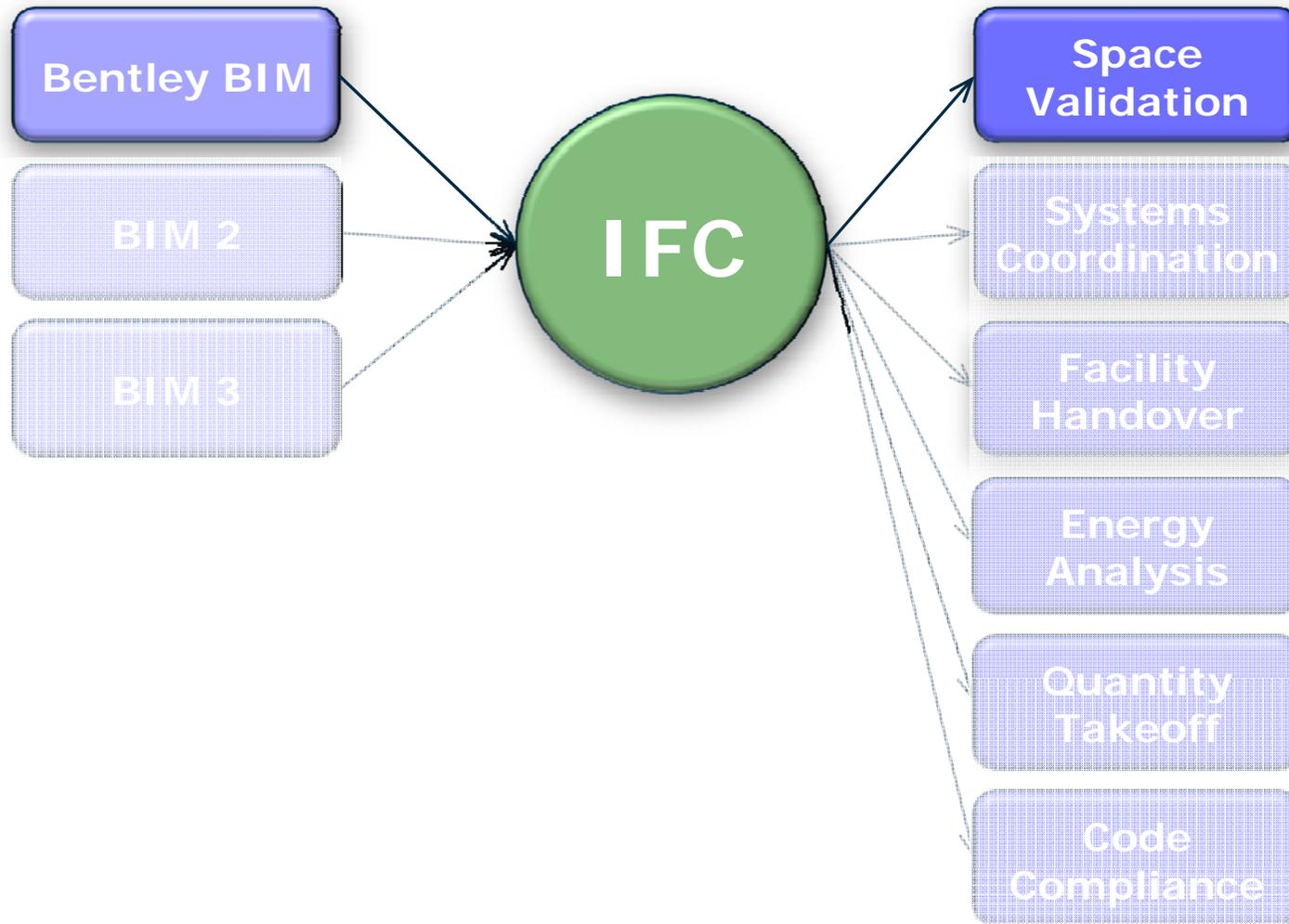


Thursday, 24 July 2008. 8:00am-10:30am
Theme: Spatial Compliance Information Exchange

8:00am	Introduction, Summary and Agenda	Bill East
8:15am	Spatial Compliance Information Exchange (SCIE) <ul style="list-style-type: none">- Business case- Draft specifications	Bill East
8:45am	Verification of Spatial Compliance Information Exchanges <ul style="list-style-type: none">- Definition of SCIE rules used to check- Presentation of SCIE verification results	Nick Nisbet
9:15am	Presentations of design tools supporting SCIE <ul style="list-style-type: none">- Autodesk- Bentley- Onuma	BIM Vendors



BIM > Space Validation

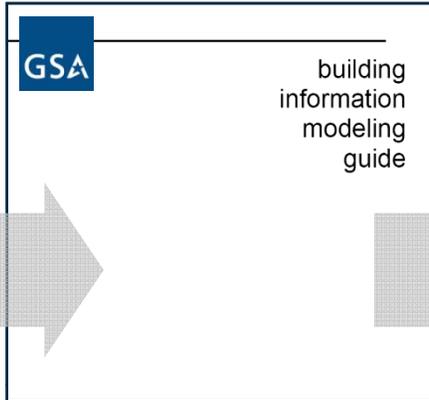


GSA Building Program Space Validation



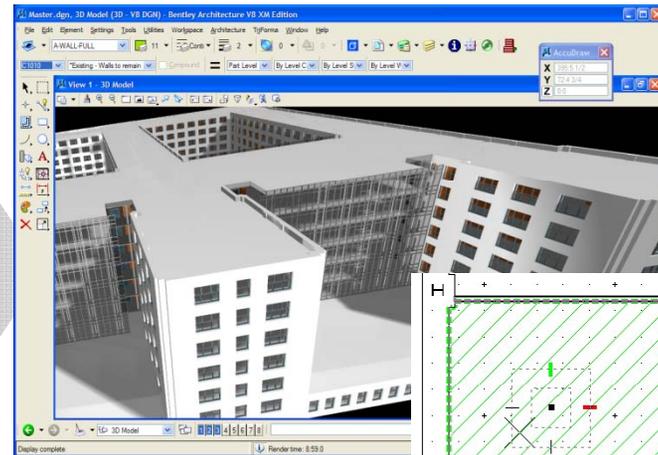
project program requirements

building program space requirements



building information modeling guide

project deliverable requirements, standards



Bentley Architecture building and space modeling

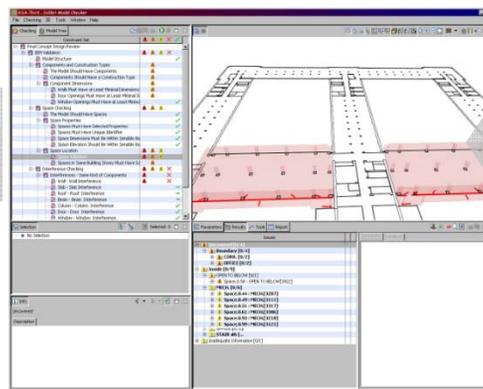


CORR. 3102 576.51 Sq Ft 100.00 Sq Ft

CORR. 3103 195.95 Sq Ft 100.00 Sq Ft

- design review
- net
 - gross
 - useable
 - circulation
 - office
 - mechanical

validating space "program requirements" versus "designed"



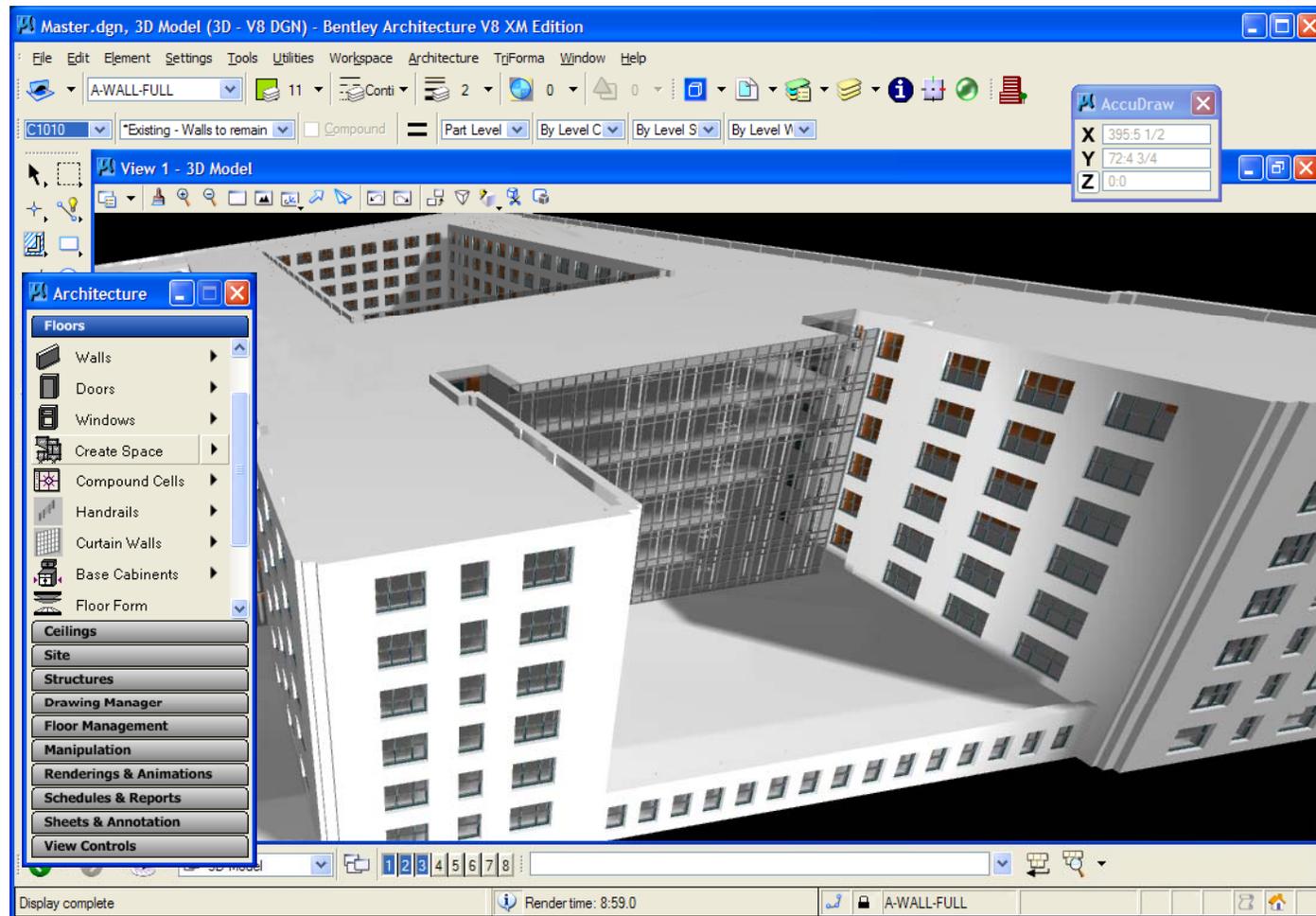
model and space analysis



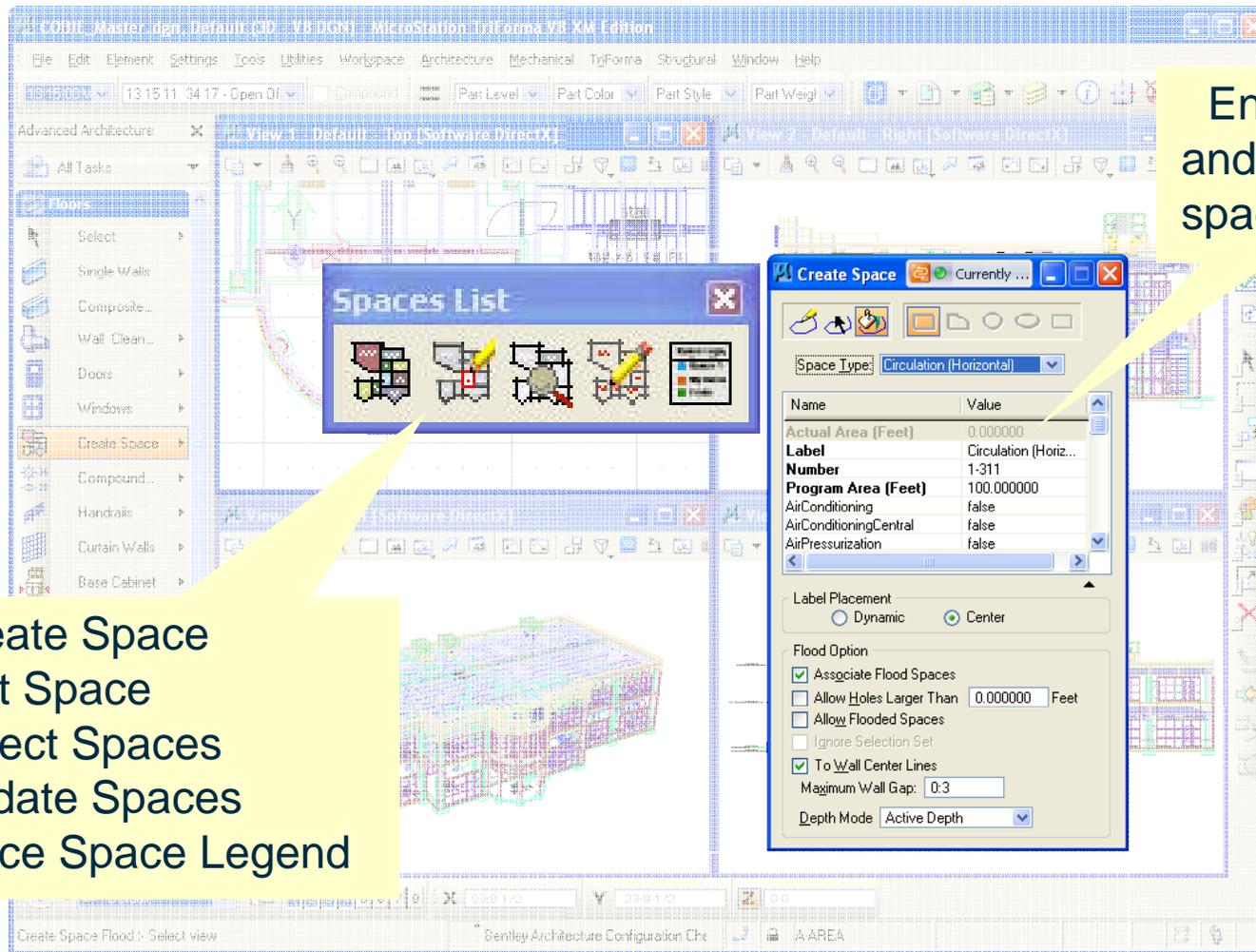
IFC – BIM data exchange



GSA Building Program Spatial Validation

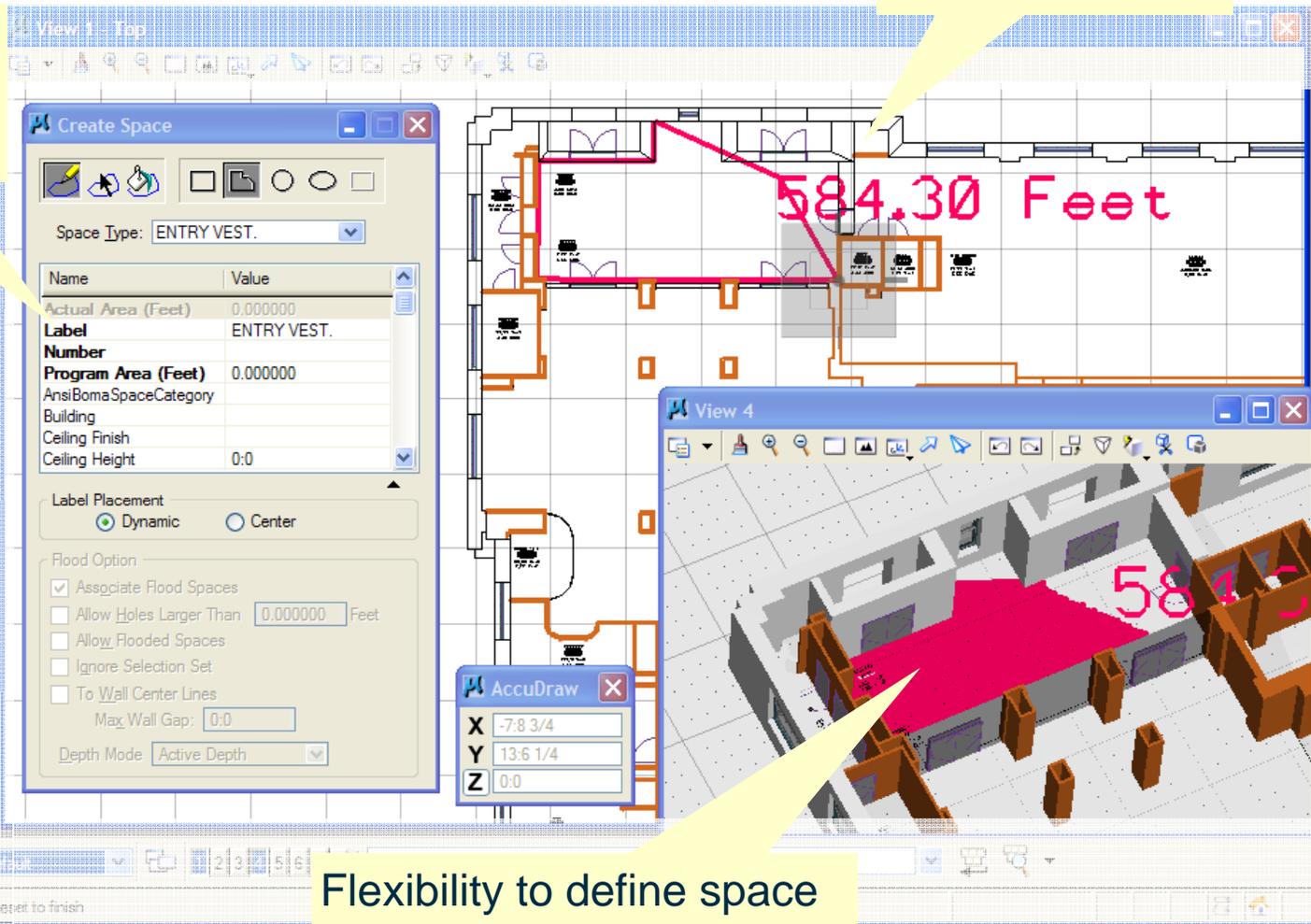


Create and Manage Space



Creating Spaces

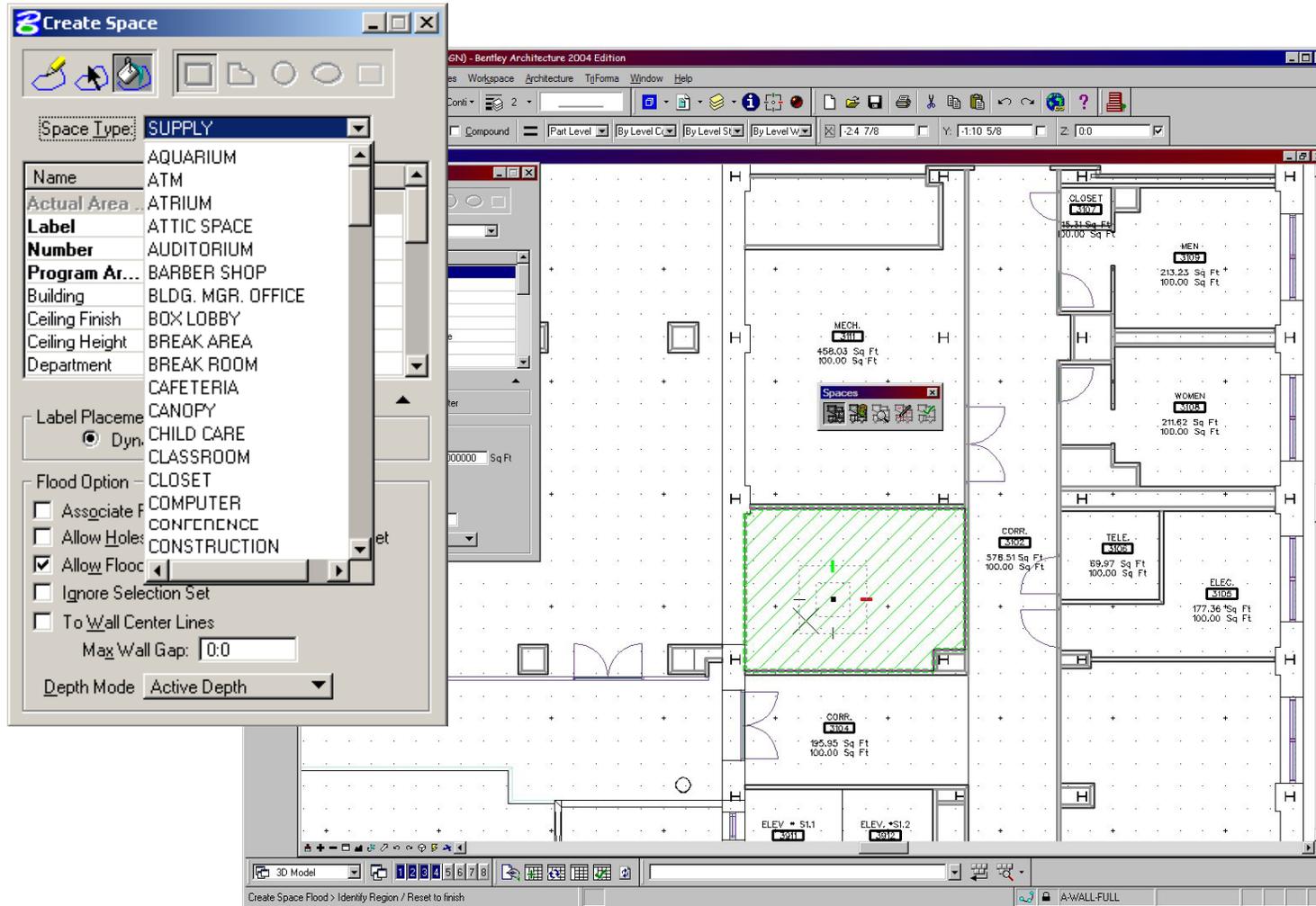
Interactive data entry for space attributes



Dynamic readout during drawing space boundary

Flexibility to define space using multiple views

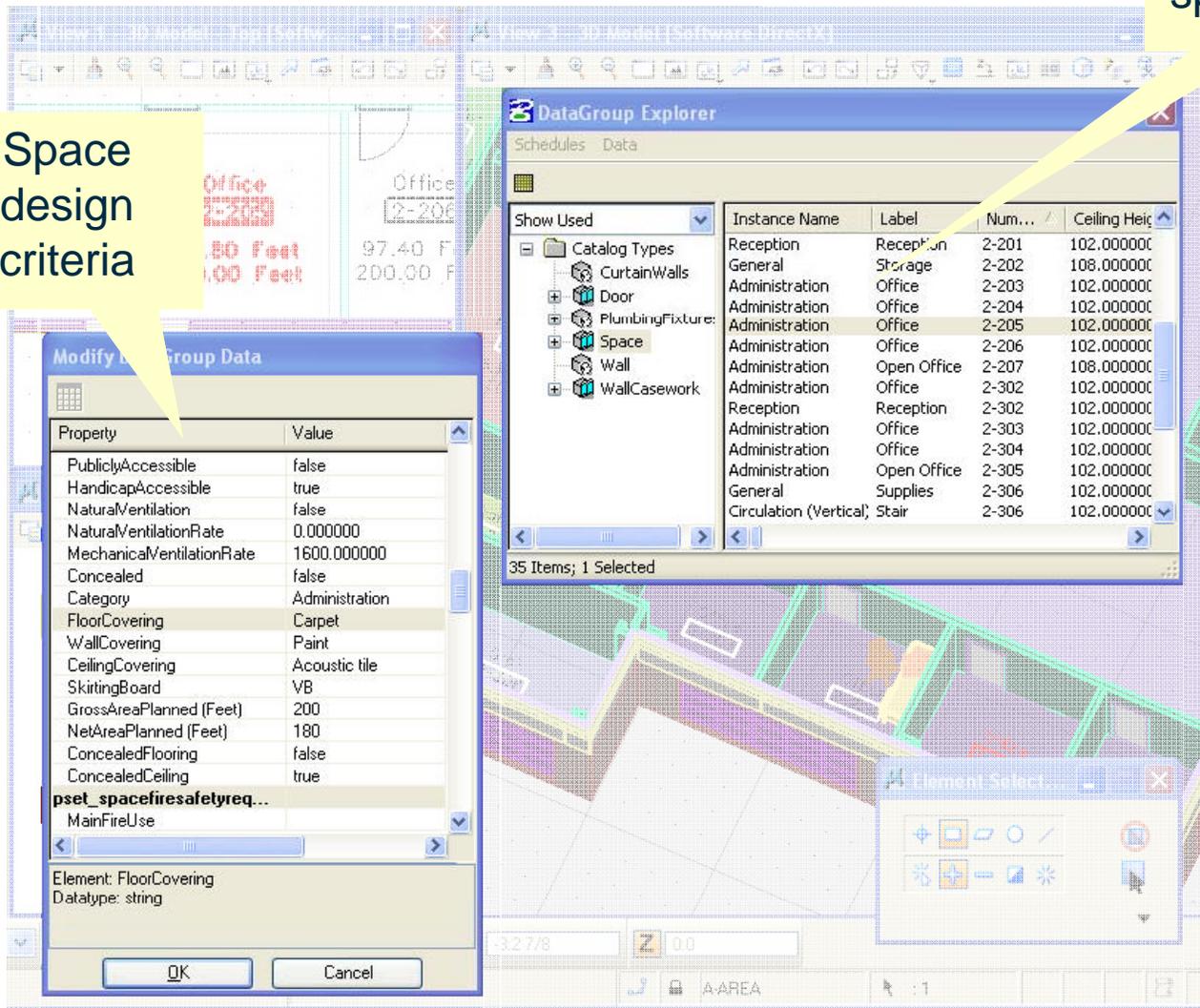
Create Space



Defining Space Requirements

Managing space data

Space design criteria



Space Labels

Project control for labeling space with specific space attributes

The screenshot displays the Bentley software interface with a 'RoomLabel - Top' view. A yellow callout box points to the 'Manage DataGroup Annotation Cells' dialog box, which is used for configuring space labels. The dialog box includes the following fields and options:

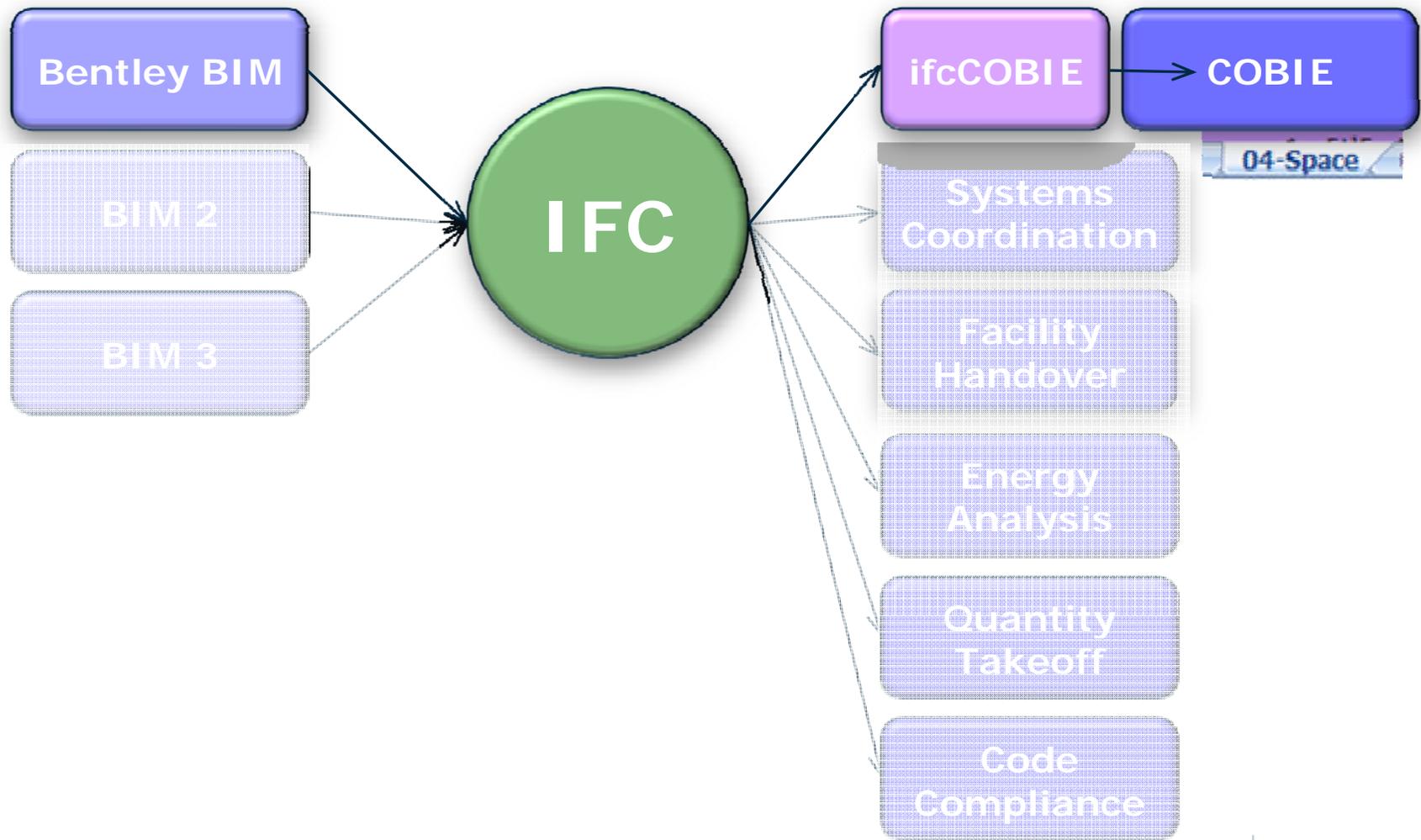
- Current Library: Space\TriFoma\GSA\cell\annotation.cel
- Current Annotation Cell: RoomLabel
- Description: (empty text field)
- Type: Space
- DataGroup Information list:
 - Actual Area
 - AnsiBomaSpaceCategory
 - Building
 - Ceiling Finish
 - Ceiling Height
 - Concealed
 - Department
 - East Base Finish
- Length: 21
- Format: String
- Accuracy: 0
- Buttons: Place Text, Close

In the center of the interface, the following text is displayed:

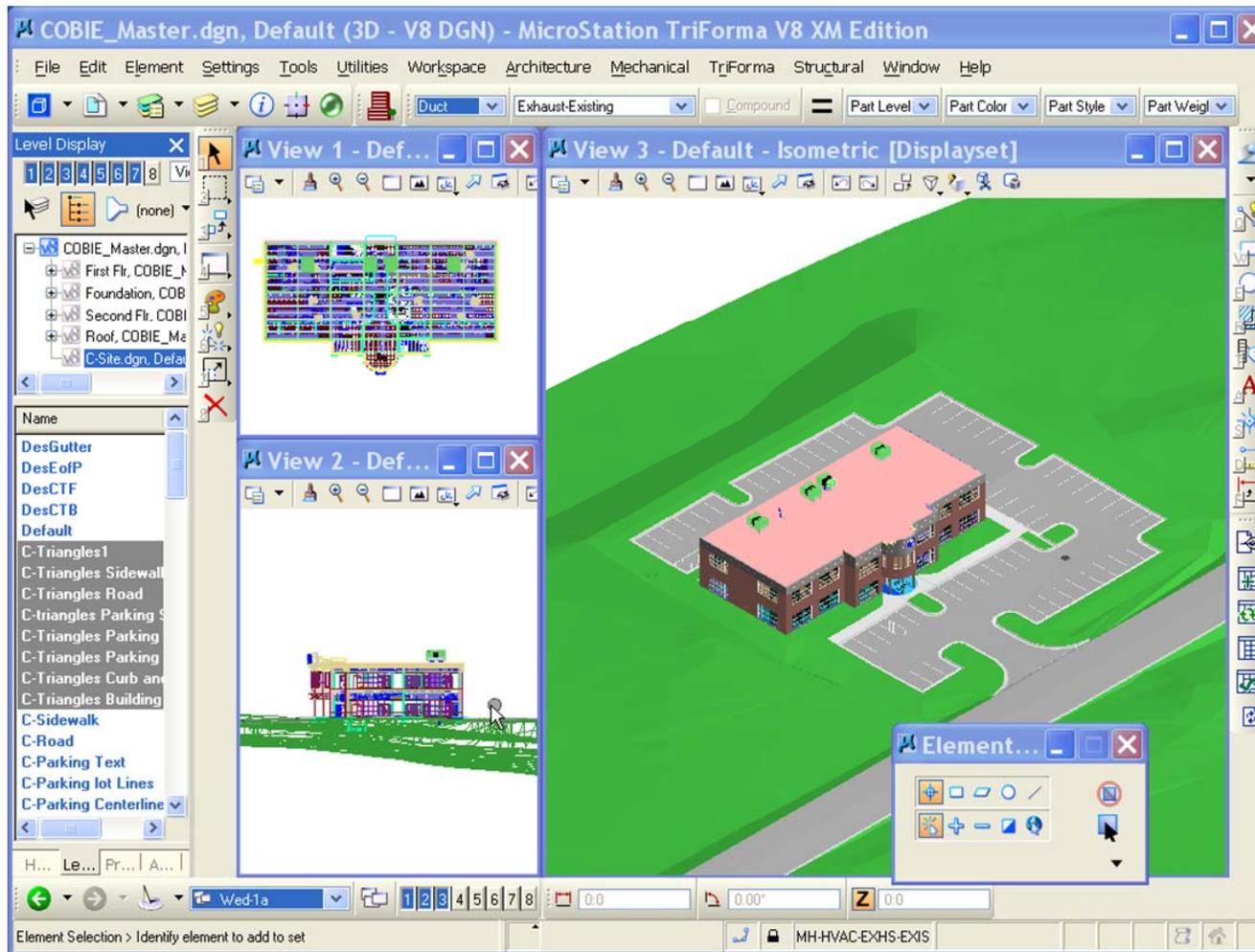
Label
123
Actual Area
Program Area
Occupant Organization Name
GSASpaceCategory
GSASpaceType

A yellow arrow points from the 'GSASpaceCategory' text to the 'AnsiBomaSpaceCategory' option in the dialog box's list. A 'Keynotes' window is also visible at the bottom of the interface.

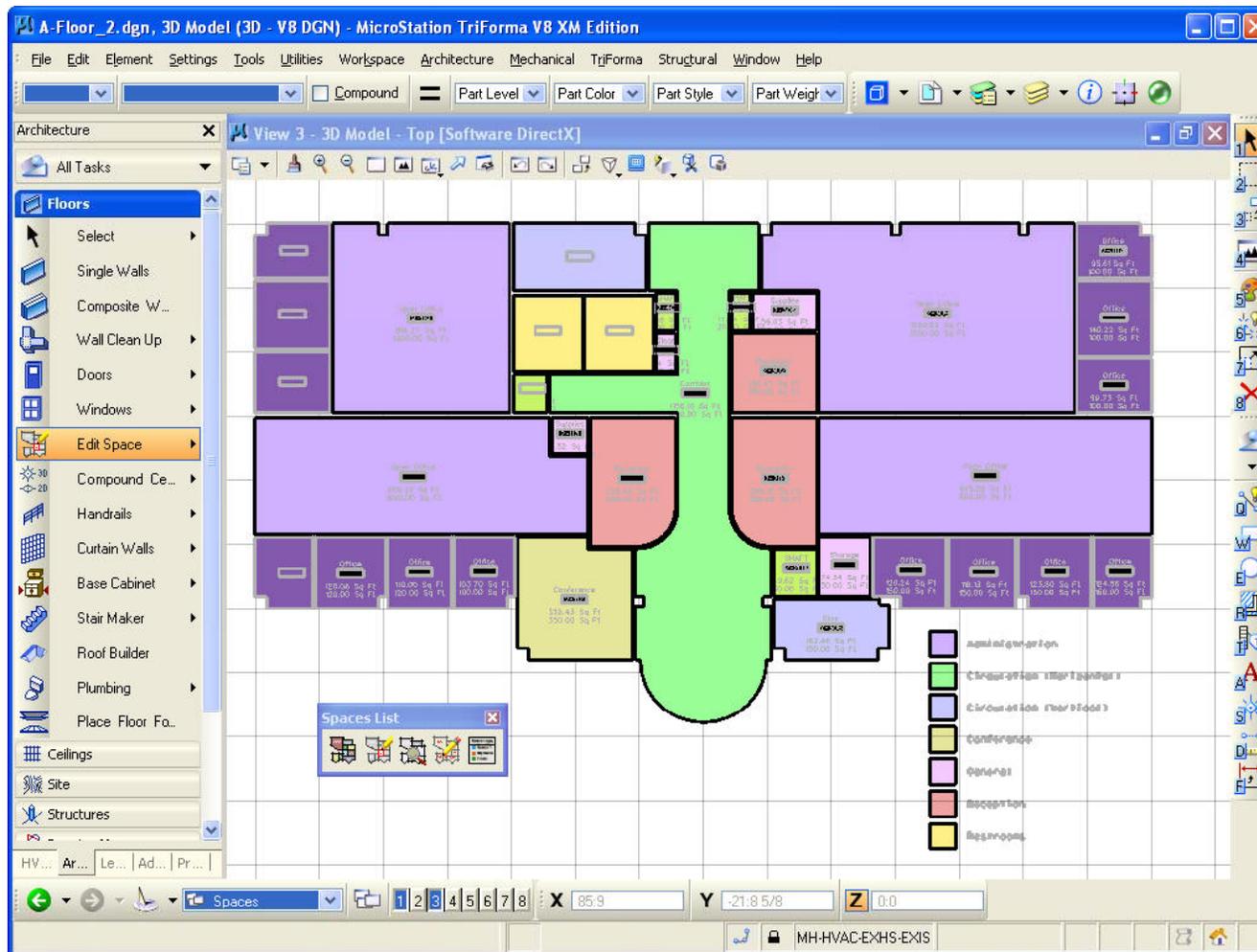
BIM > IFC > ifcCOBIE > COBIE "Space"



BIM - Design and Managing Data



Visualizing Space Definitions



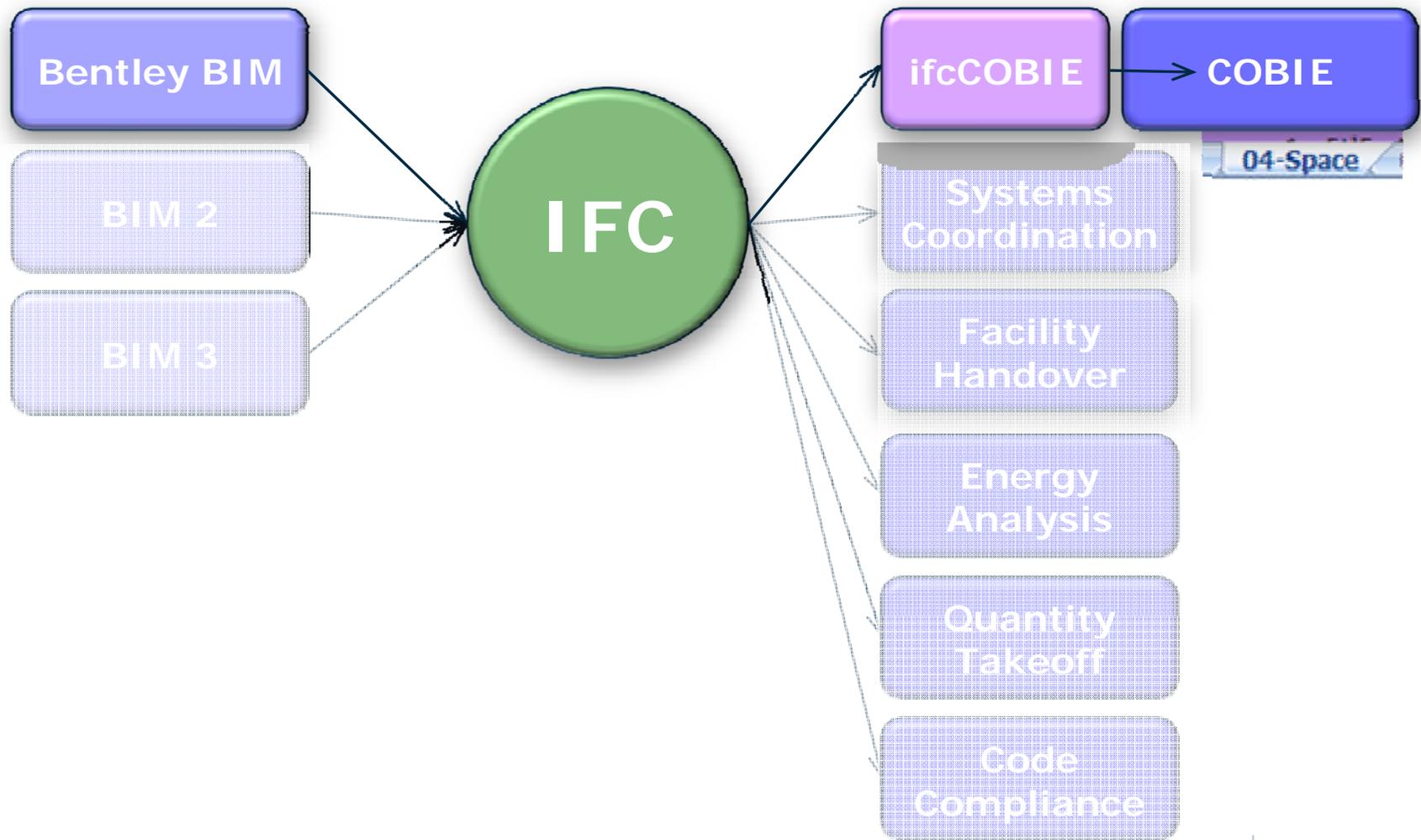
Space Reports

The screenshot shows the Bentley DataGroup Explorer interface. On the left, a tree view displays a hierarchy of building elements including BaseCases, Beam, Building, Ceiling, Column, CurtainWalls, Door, Floor, Flooring, Footing, HandRails, Member, Opening, PlumbingF, Project, Ramp, Roof, Shelving, Site, Slab, Space, Sample Space Schedule, and Stairs. The 'Space' element is selected. A context menu is open over the 'Space' element, showing options like 'Export', 'Export All Instances', 'Working Units', and 'Copy To Clipboard'. In the foreground, a spreadsheet window titled 'spaceScheduleTemplate.xls' displays a 'Space Schedule' report. The report includes a Bentley logo and a table with columns for Label, Number, Program Area, Actual Area, Height, and North Finish (Base and Wall). The table lists 24 rows of space data, including Clean, Conference, Corridor, Elec, Lobby, Men, Office, Reception, and Shaft.

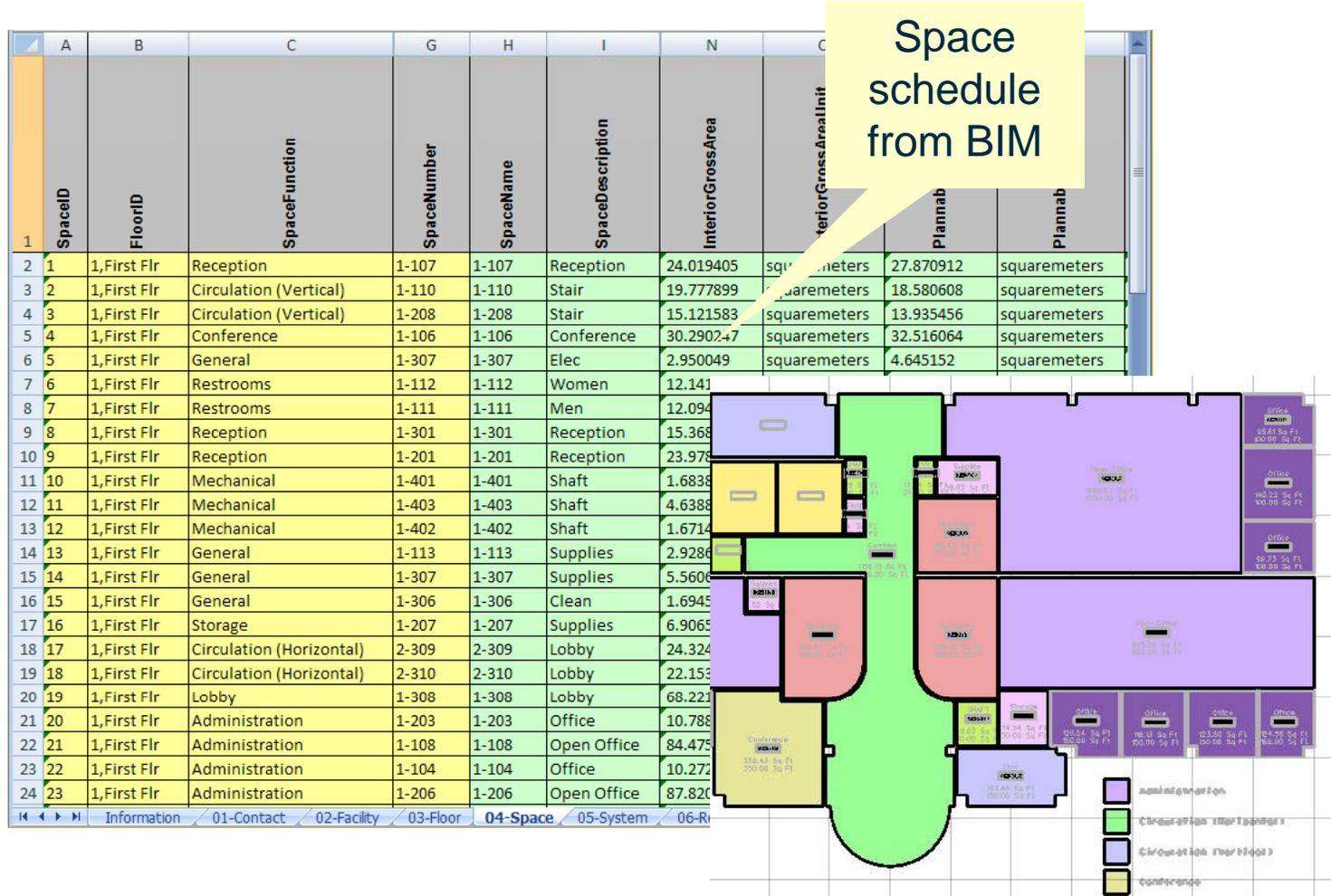
Label	Number	Program Area	Actual Area	Height	North Finish	
					Base	Wall
Clean	2-309	100.00 (Feet)	18.24 (Feet)	Vinyl	Drywall-Painted	Paint-Flat
Clean	1-306	100.00 (Feet)	18.24 (Feet)		Drywall-Painted	Paint-Flat
Conference	1-106	400.00 (Feet)	326.04 (Feet)	Carpet	Drywall-Painted	Vinyl
Conference	2-112	400.00 (Feet)	328.43 (Feet)	Carpet	2x4 Acoustic	Vinyl
Corridor	2-310	100.00 (Feet)	1156.10 (Feet)	Vinyl	2x2 Acoustic	Vinyl
Elec	1-307	100.00 (Feet)	31.75 (Feet)		Drywall-Painted	Paint-Flat
Elec	2-308	100.00 (Feet)	31.50 (Feet)	Vinyl	Drywall-Painted	Paint-Flat
Lobby	1-308	1000.00 (Feet)	734.33 (Feet)	Vinyl	2x2 Acoustic	Vinyl
Men	2-312	300.00 (Feet)	130.19 (Feet)	Ceramic Tile	Drywall-Painted	Ceramic Tile
Men	1-111	300.00 (Feet)	130.19 (Feet)	Ceramic Tile	Drywall-Painted	Ceramic Tile
Office	2-304	200.00 (Feet)	95.61 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	2-203	200.00 (Feet)	120.24 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	1-204	200.00 (Feet)	123.80 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	2-108	200.00 (Feet)	127.21 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	1-203	200.00 (Feet)	116.13 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	1-304	200.00 (Feet)	99.73 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	1-302	200.00 (Feet)	95.61 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	1-103	200.00 (Feet)	95.55 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	2-107	200.00 (Feet)	112.74 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	1-202	200.00 (Feet)	120.24 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss
Office	2-109	200.00 (Feet)	95.61 (Feet)	Carpet	2x4 Acoustic	Paint-Semi-Gloss



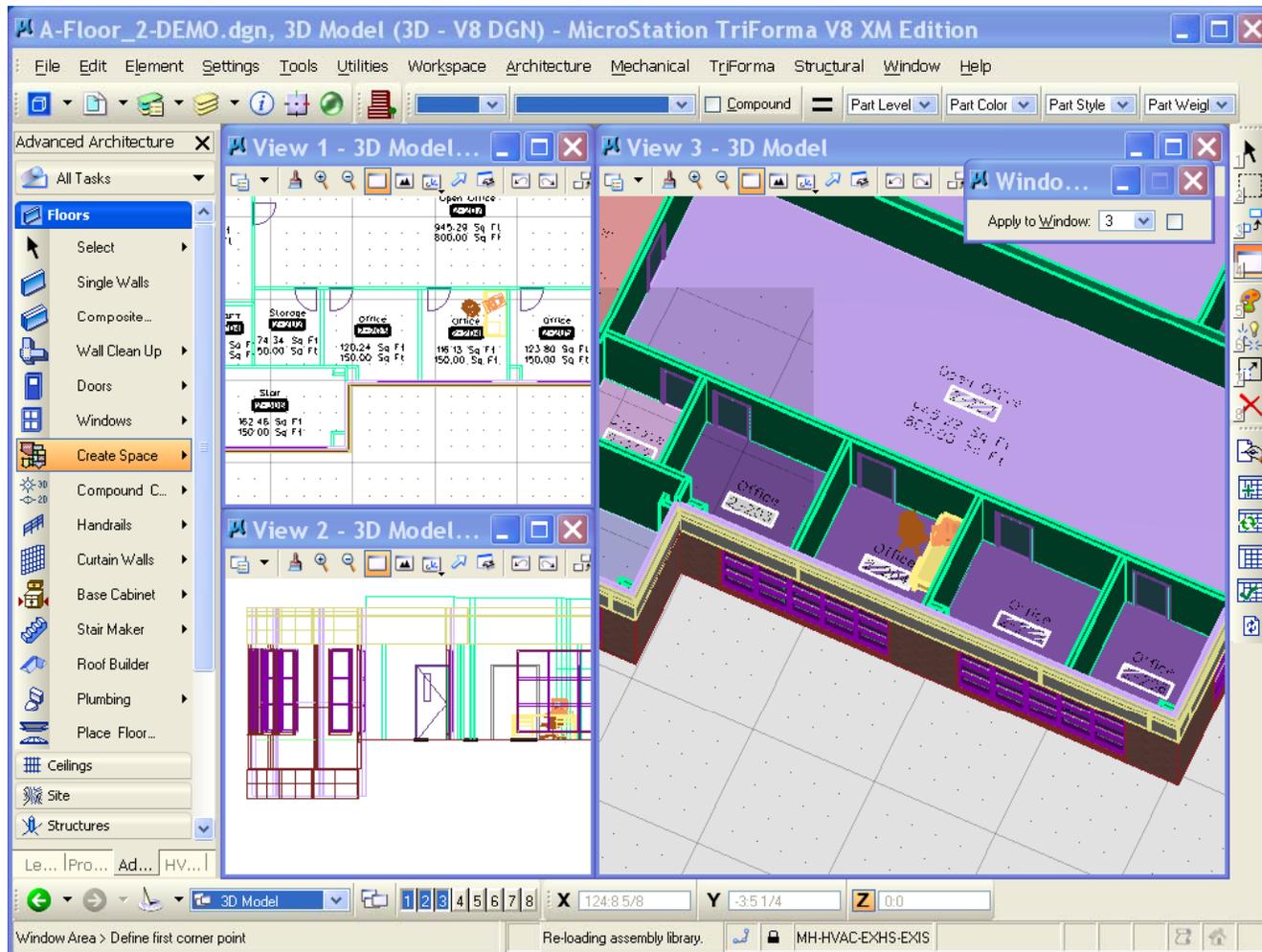
BIM > IFC > ifcCOBIE > COBIE



COBIE 04-Space Worksheet



BIM - Managing Space



Coordination View Information Exchange

Thursday, July 24 (11am - 1pm)

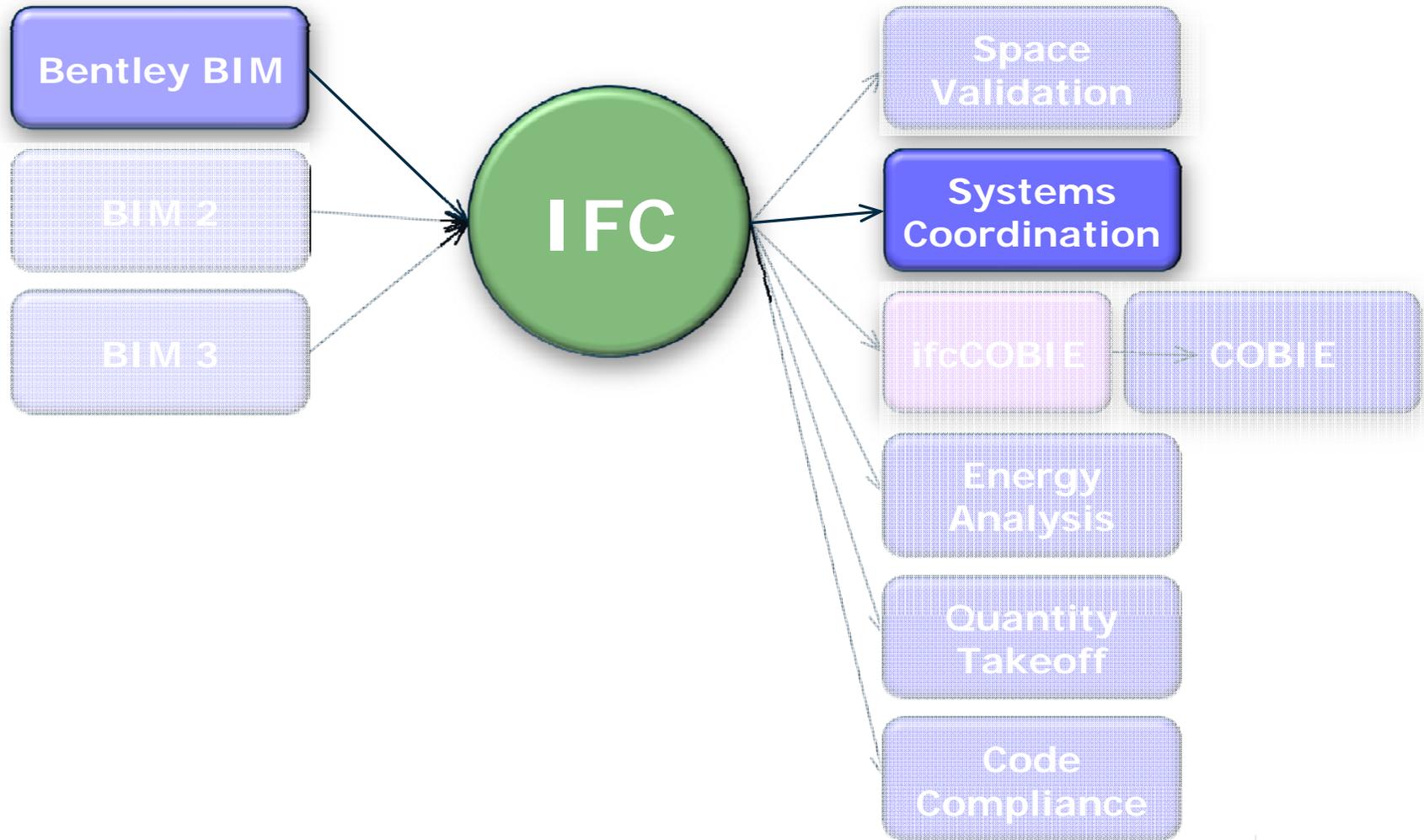


Thursday, 24 July 2008. 10:30am-1:00pm
Theme: Coordination View Information Exchange

10:30am	Presentation: Coordination View Information Exchange (CVIE) - Business case - Draft specifications	Bill East
10:45am	Formal requirements: Definition of CVIE compliance rules - Design Coordination - Operability Review	Nick Nisbet
11:00am	Demonstrations of clash detection - Bentley - Autodesk - Solibri	BIM Vendors
12:30pm	Review of Validation reports for CVIE compliance	Nick Nisbet
12:45pm	3 rd party Service Providers/consultants	
1:00pm	Lunch	

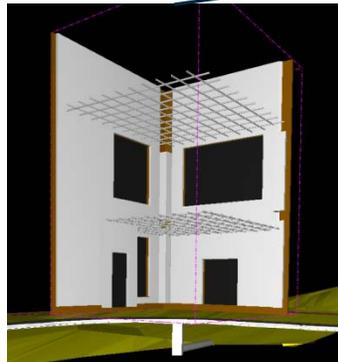
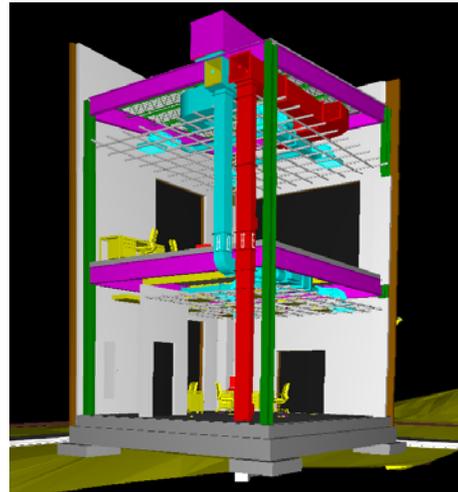


BIM > IFC > Clash Detection

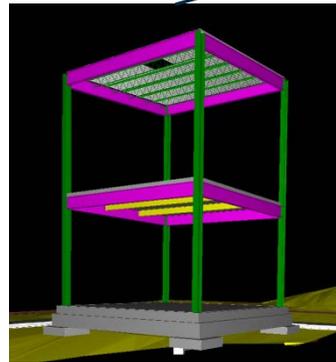


Multidisciplinary BIM Collaboration

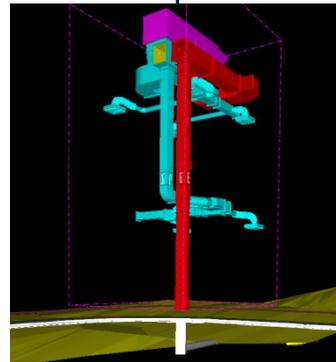
Bentley BIM



ARCH



STRUCT



MECH



ELEC



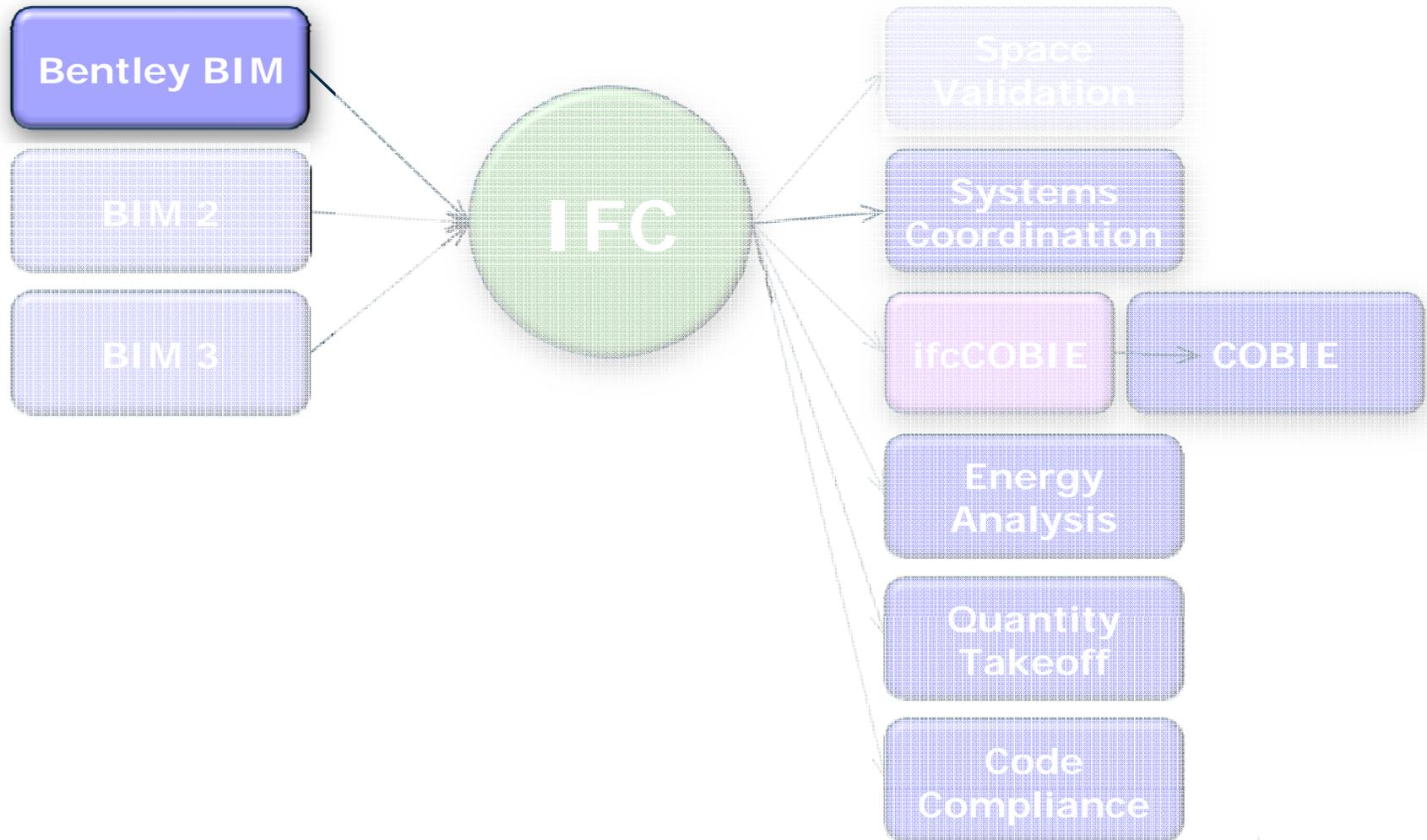
FM



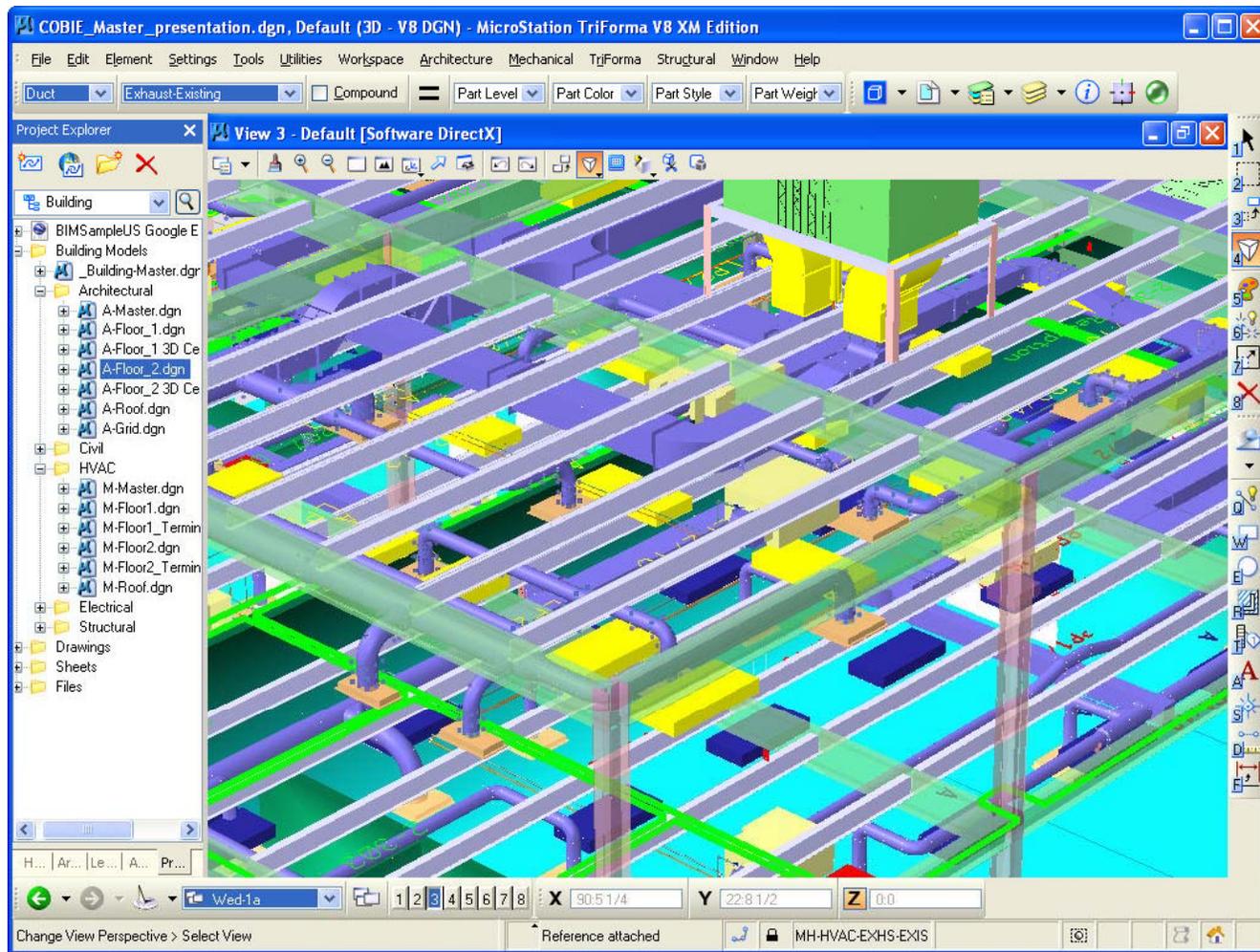
Workflow – levels of collaboration

- “Designer” clash detection
 - individual discipline to others, designer can resolve
- “Team” clash detection
 - multidisciplinary, requires help from others
- “Project” clash detection
 - data aggregated from many design sources (not all data from the same BIM authoring platform)

BIM (multidisciplinary)



BIM (Arch, Struct, Mech, Elec)



“Designer” Clash Detection

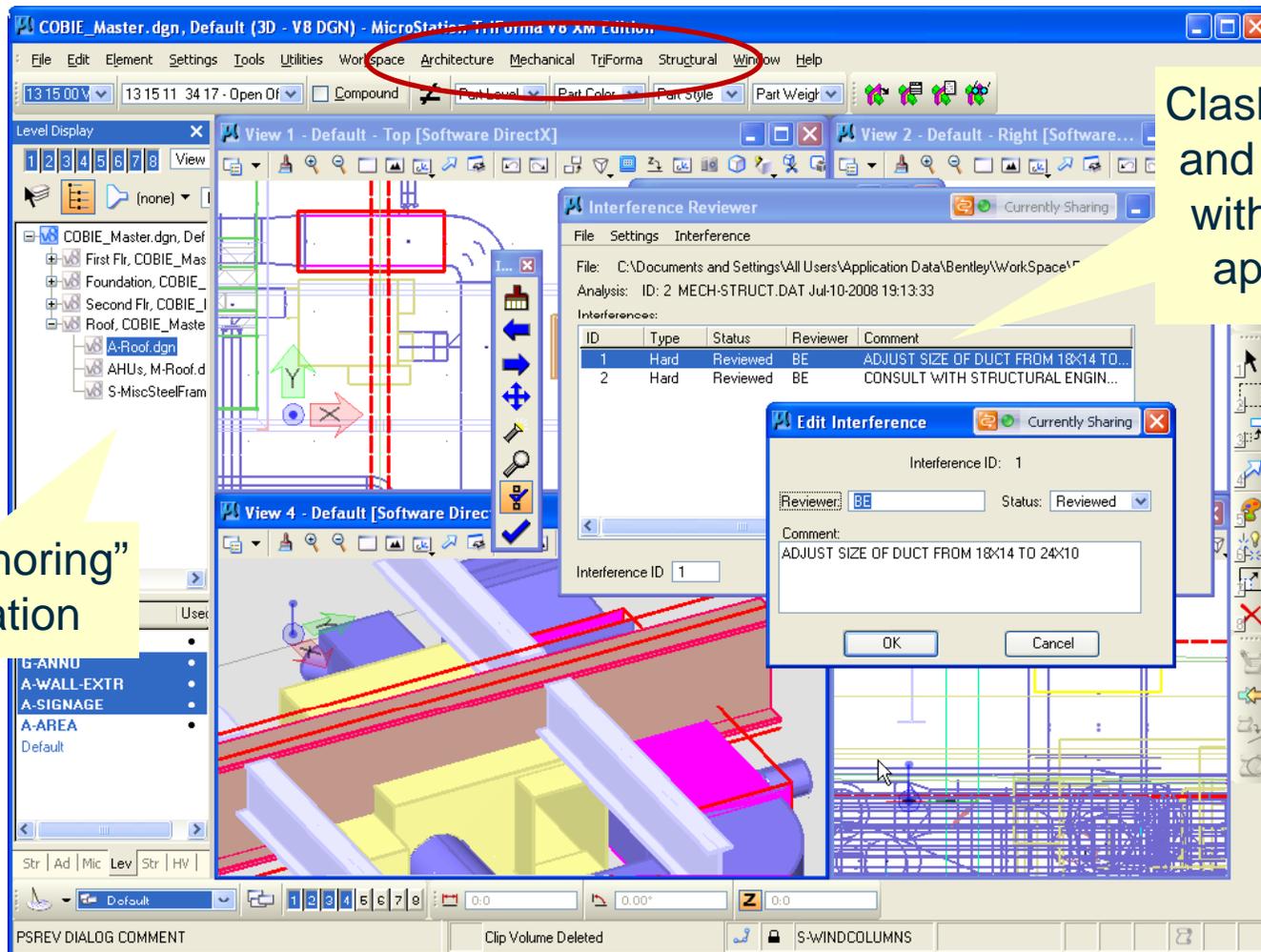
User = Design Architect/Engineer

Benefits

- Identify design issues during natural design process
- Provides opportunity for issue to be resolved by designer before promoting to project team
- Early identification of issue
- Non-disruptive workflow



“Designer” – BIM Design Suite



Clash detection and resolution within design application

BIM “authoring” application



“Team” Clash Detection

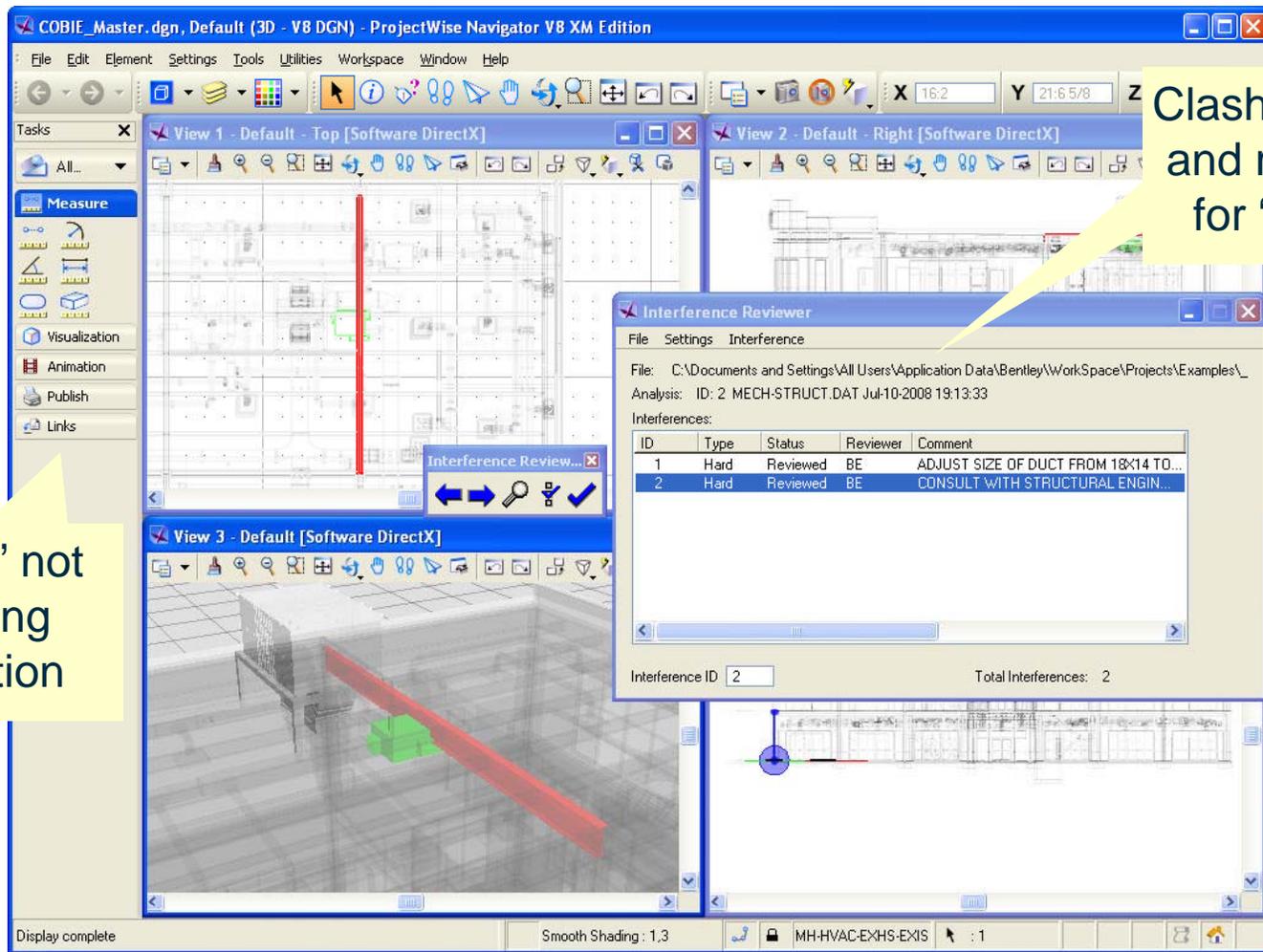
User = Project Manager, Design Team Leader

Benefits

- Easy to use BIM “review” tool
- Aggregate data beyond immediate team
- Resolve issues between design disciplines
- Save time, no translation of data required (all data same BIM format/platform)



“Team” - ProjectWise Navigator



Clash detection and resolution for “project”

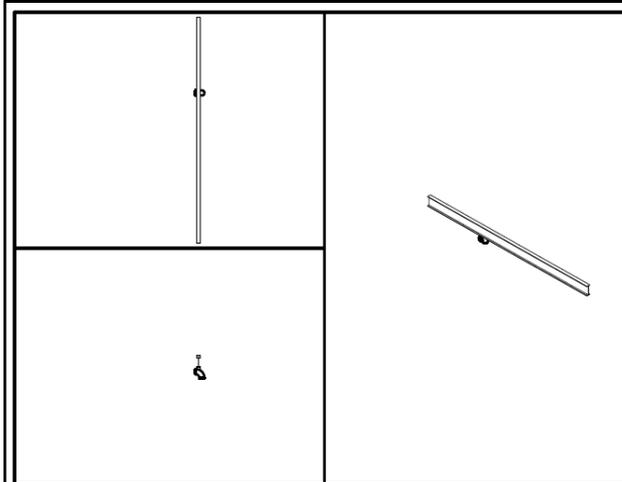
“Review” not authoring application



Clash Detection Report

BuildingSmart SCIE Demo

Bentley Systems Inc.



Object #1 Information

App =
Form Type =
ID =
Part = 21 41 31 11 21 - Structural Floors Girders
Family = 21 41 31 Superstruct. and Encl.

Object #2 Information

Interference Information

Number = 83
Type = Soft
Status = Detected
Point = X - 138'-7 1/2", Y - 49'-3 9/16", Z - 25'-9 9/16"
Object 1 Commodity =
Object 2 Commodity =
Object 1 File = ...jects*Examples*_COBIE*Files*S-SteelFraming-02.jsm
Object 2 File = ...Space*Projects*Examples*_COBIE*Files*M-Floor2.jsm
Date First Detected = Jul-21-2008 18:32:28
Last Date Detected = Jul-21-2008 22:08:22
Reviewer =
Comment =

C:*Documents and Settings*All Users*Application Data*Bentley*WorkSpace*Projects*Examples*_COBIE*Files*BENTLEY_SCIE_soft.10F



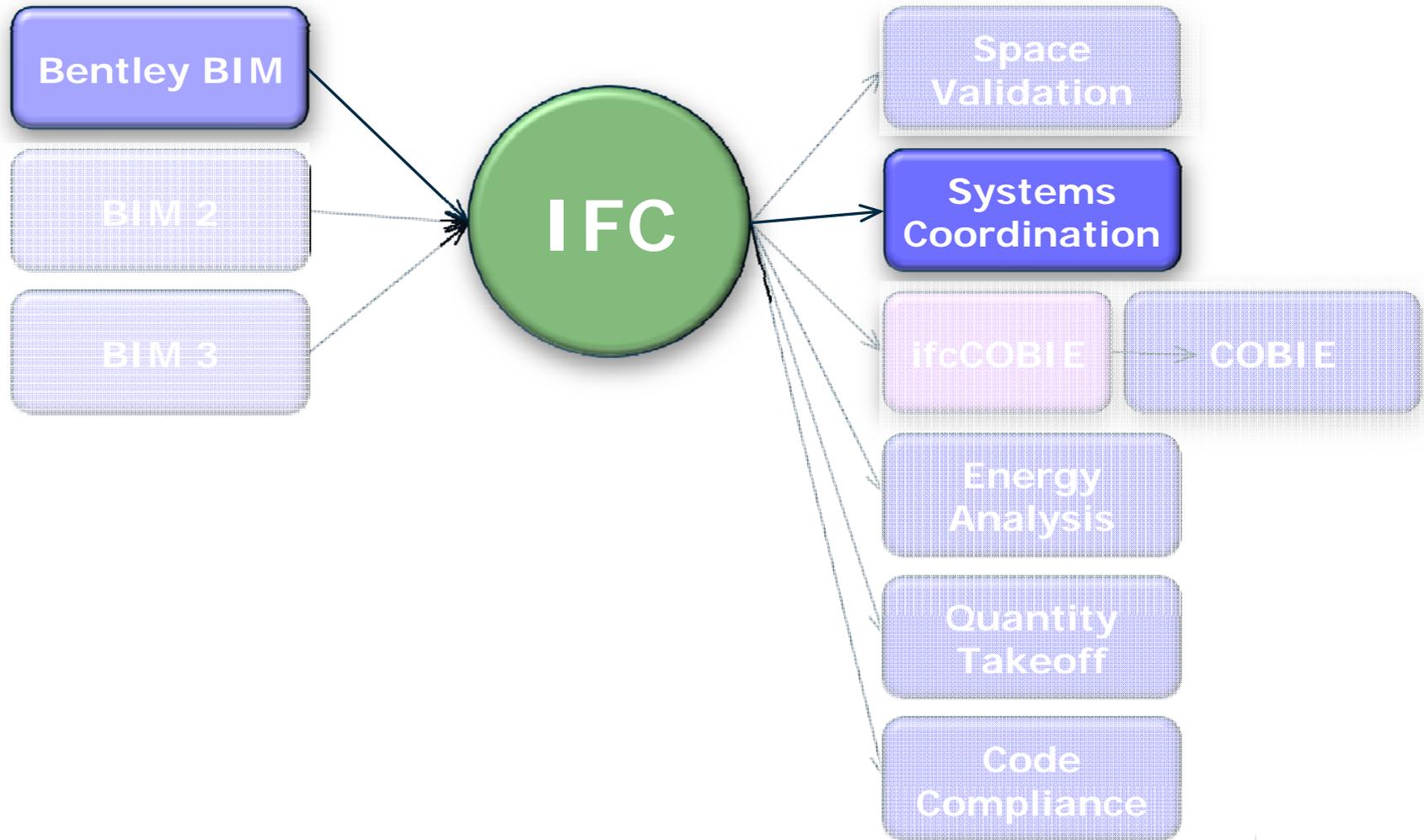
“Project” Clash Detection

User = Independent Consultant, Owner

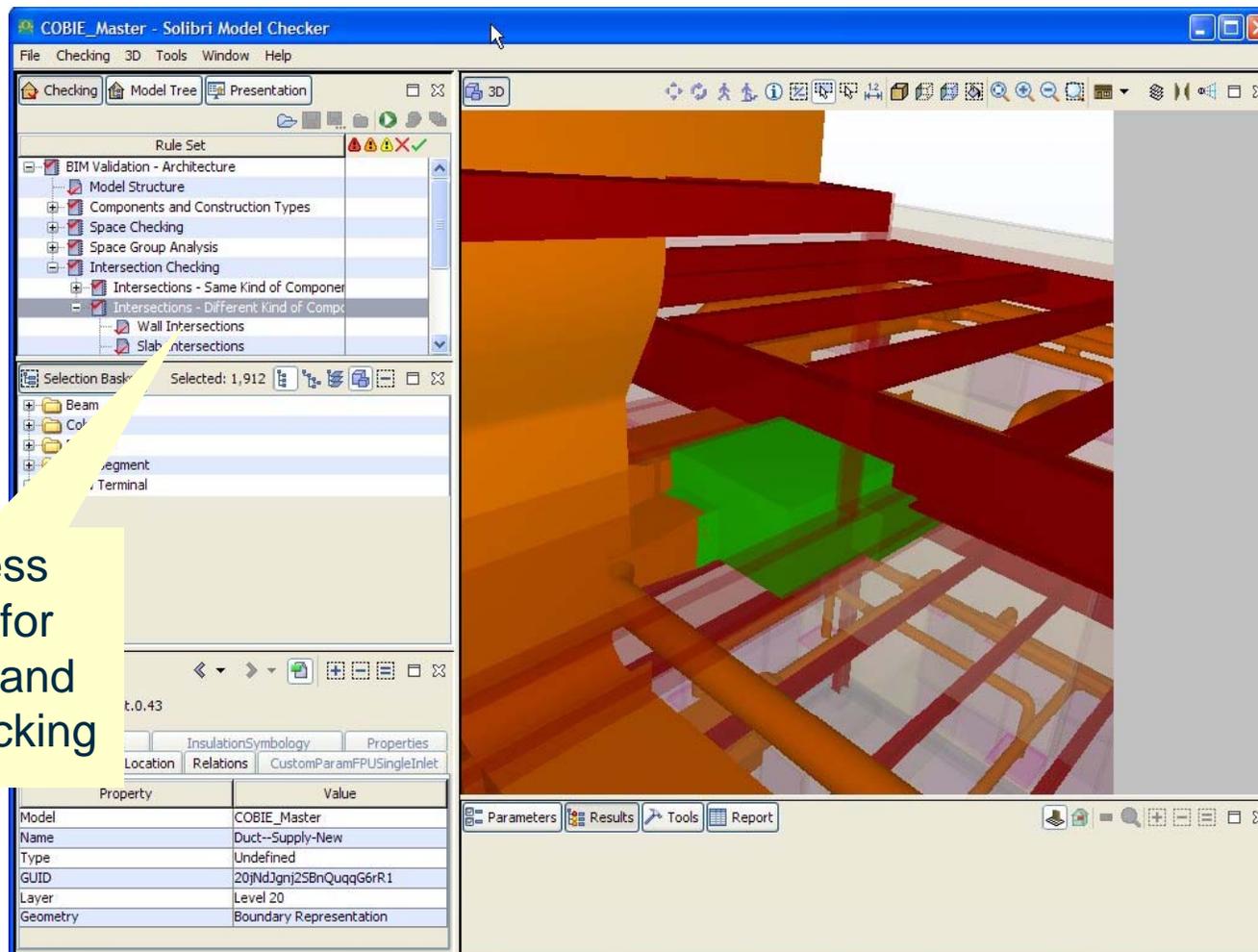
Benefits

- Aggregate data from multiple design sources (data from multiple BIM formats)

BIM > IFC > "Project" Clash Detection

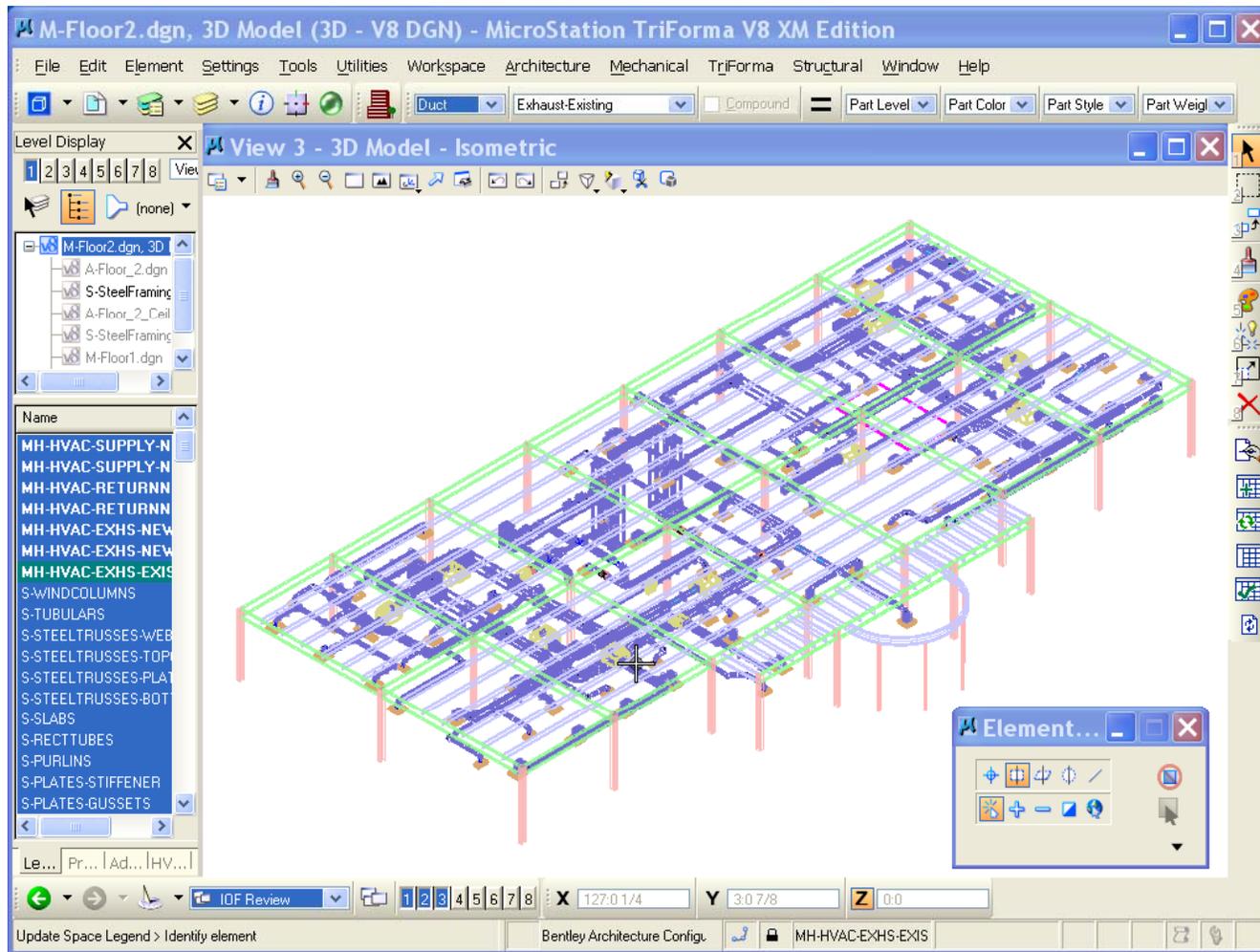


Bentley BIM > IFC > Solibri Model Checker



Business
“rules” for
graphic and
data checking

Design Clash Detection



Construction Operations Building Information Exchanges

Thursday, July 24 (2 - 5pm)



Thursday, 24 July 2008. 2:00pm-5:00pm
Theme: Construction-Operations Building Information Exchange

2:30pm	Introductions and reprise of previous sessions - Introduction to COBIE - Business case - Draft specifications	Bill East Bill East
2:45pm	COBIE Designer Data Pilot Test	Bill East
3:00pm	Break	
3:30pm	Demonstration of mapping and formal requirements - IFC to COBIE spreadsheet - COBIE spreadsheet to IFC - Definition of COBIE compliance rules - Translator software	Nick Nisbet
4:15pm	3 rd party Service Providers/Consultants	
4:30pm	Recap of BIM Vendor implementation of COBIE	
5:00pm	Adjourn	

Construction Operations Building Information Exchanges

Friday, July 24 (8am - 1pm)



Friday, 25 July 2008. 8:00am-1:00pm

Theme: Construction-Operations Building Information Exchange

8:00pm	Introduction to COBIE - Business case: Maintenance management and federal agencies - Design stage requirements - Operational and Asset management requirements	Bill East
8:30am	USACE Strategic Plan for Adoption of Open BIM Standards - Major General Merdith W. B. (Bo) Temple - Deputy Commanding General, Military and International Operations	
9:00am	Formal requirements - Definition of COBIE compliance rules.	Nick Nisbet
9:30am	Break	
10:00am	Demonstration of mapping - IFC to COBIE spreadsheet - COBIE spreadsheet to IFC	Nick Nisbet
10:20am	CMMS Vendor Challenge (Attachment 2) - IBM Maximo - Project Blueprint - TMA	Nick Nisbet
12:30pm	Attendee discussion	All
12.45pm	Conclusion: Follow-up and actions	Bill East
1.00pm	Close	



Attachment 2 - CMMS Vendors Challenge Description

CMMS vendors will have already selected a model for demonstration and produced their COBIE file that was evaluated prior to the meeting.

- (1) Vendors may start by showing (live)
 - a. A manually produced COBIE spreadsheet
 - b. A COBIE spreadsheet produced by a BIM vendor
 - c. An IFC model produced by a BIM vendor
- (2) The COBIE-IFC application or IFC-COBIE application may be used (using pre-processed file)
- (3) Vendor will demonstrate the import process highlighting (live)
 - a. Modules or options used
 - b. Any pre-configuration required
- (4) Vendor will review the imported data to show (live)
 - a. Spatial hierarchy
 - b. Component/Asset/Equipment/Type lists
- (5) Vendors should demonstrate other aspects of the application such as develop a work order, serviced request or other report (live)

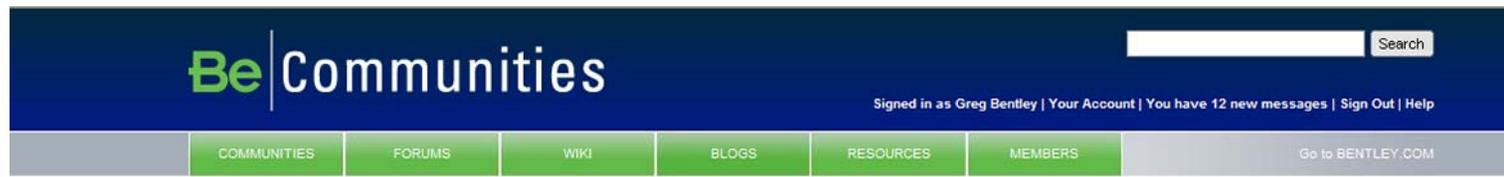
About Bentley

Bentley is the global leader dedicated to providing comprehensive software solutions for sustaining infrastructure. Architects, engineers, constructors, and owner-operators are indispensable in improving our world and our quality of life; the company's mission is to improve the performance of their projects and of the assets they design, build, and operate. Bentley sustains the infrastructure professions by helping to leverage information technology, learning, best practices, and global collaboration – and by promoting careers devoted to this crucial work.

Founded in 1984, Bentley has more than 2,800 colleagues, offices in more than 50 countries, annual revenues surpassing \$500 million, and since 1993, has invested more than \$1 billion in research, development, and acquisitions. Nearly 90 percent of the Engineering News-Record Top Design Firms are Bentley subscribers, and a 2008 Daratech study ranked Bentley as the world's #2 provider of geospatial software solutions.



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AECO Interoperability

Architects...Engineers...Contractors...Owners... working as one.

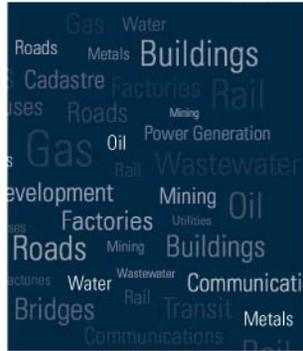
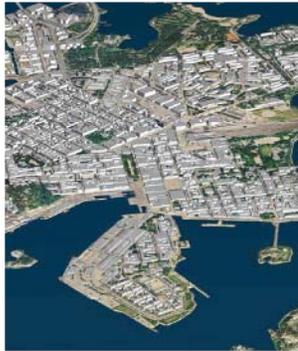
Passionate about identifying and defining requirements for business interoperability and the resultant benefits...

data requirements, workflows, liability, accelerating understanding...

fact or fiction, key concepts, real-world examples...

join the debate!





Thank you!

Andy Smith, AIA
andy.smith@bentley.com

