COBie TOOLKIT USER GUIDE

VERSION: BETA 1.4.2

Release date: October 29, 2013

CONTENTS

WHAT'S NEW?

NEW FEATURES

- None

BUG FIXES

- COBieIDM and COBieIDM (No Proxy Objects) settings were filtering according to the BPie settings file.

KNOWN BUGS AND LIMITATIONS

- The Impacts and Issues spreadsheets are not yet populated from IFC imports.
- There are known issues with the COBie Coordinate Import and Export that may result in incorrect geometry. This issues may be addressed in a future release.
- The COBie html reports (excluding the design and construction QC reports) have a minimal amount of formatting and may not be practical for large models. The reports are provided as a baseline capability and spring-board for improvements.
- The COBie Lite export does not include the Coordinates or Impacts worksheets.
- The COBie Toolkit does not export all types of IfcProperty values that may be exported from an Ifc file into the COBie Attribute tab. However, the supported property types have been robust enough to support the 2013 COBie challenge event and typically work for the most commonly encountered Ifc files. These capabilities will be more robust in future bulds.
- Large models can be very memory intensive and users are encouraged to set Max Heap Size liberally (within the scope of available memory) when working with large files

DISCLAIMERS

- This software is provided with no warranty or technical support. If you have special support needs then a consultation agreement may be arranged on an incident-by-incident basis. Bug reporting is encouraged and will be considered, but bug fixes are not guaranteed.
- COBieToolkit uses some of the BiMServer.org client libraries and plugins found in the BiMServer product. The license under which the BIMserver.org software is released is a combination of Affero GPL, GPLv3 and/or LGPL (for binaries) from the GNU project. The different projects in our SVN repository are diffently licensed. More info on that can be found on their wiki.

PRE-REQUISITES

SOFTWARE

- A 64-bit operating system capable of running 64-bit Java JDKs/JREs
- Java 1.7 JDK SE or Java 7 JRE SE, 64-bit

HARDWARE

- A 64-bit processor capable of supporting software requirements
- At least 2 Gigabytes of available memory (not including whatever the operating system and other applications may consume) is recommended. Larger models (e.g. 100MB IFC file) are very memory intensive and can require Java JVM heap space of 2 – 4 gigabytes. Likewise, smaller models can require much less than 2 Gigabytes.

SKILLS AND KNOWLEDGE

- It is assumed that the user is familiar with IFC and COBie files.
- Novice IT skills may be required for optimizing JVM settings in the COBieToolkit starter – though default settings should work for most models.

COBie TOOLKIT DESCRIPTION

BACKGROUND

This software was initially developed to provide COBie/IFC import, export, and reporting capabilities to software vendors participating in the January 2013 COBie Challenge event – and their year of development work leading up to the event. Software vendors used the COBieToolkit to perform quality checks on COBie and IFC files exported by their software.

Initial development activities of the core import/export capabilities began as implementation of COBie serializer and deserializer plugins for the open source BiMServer (BiMServer.org). Distribution of these plugins was limited to use in running instances of BiMServer. Users that simply wanted to transform IFC files to COBie (or vice versa) had to run a full instance of BIM Server with many unnecessary features – e.g. BIM database, Web server, and management of project/subproject/revision hierarchies. However, the open source BiMServer code is flexible and it was possible to use their architectural foundation to use BiMServer plugins in a stand-alone desktop application. Thus the COBie Toolkit includes dependencies to the BiMServer.org client and plugin libraries to dispatch the COBie plugins, and the same COBie plugins may still be used in a running instance of BiMServer.

INTRODUCTION

Like BiMServer, the COBie toolkit supports imports of COBie spreadsheet XML files and IFC 2x3 TC1 STEP files, and these files may be exported to a variety of formats (e.g. ifc, ifcxml, COBie, html reports, json, etc). Before describing these features it is important to understand some high-level details about what is going on behind the scenes.

In the COBie Toolkit all incoming files are transformed (if necessary) to COBie data structures and finally to a target export format. The combination of a user's selected import/export options determines the amount of translation performed on the data. Data coming from a well-formed IFC file is relatively structured compared to the text data extracted from a well-formed COBie spreadsheet XML file. This differential necessitates filtering, reasoning, and aggregation when translating these data models.

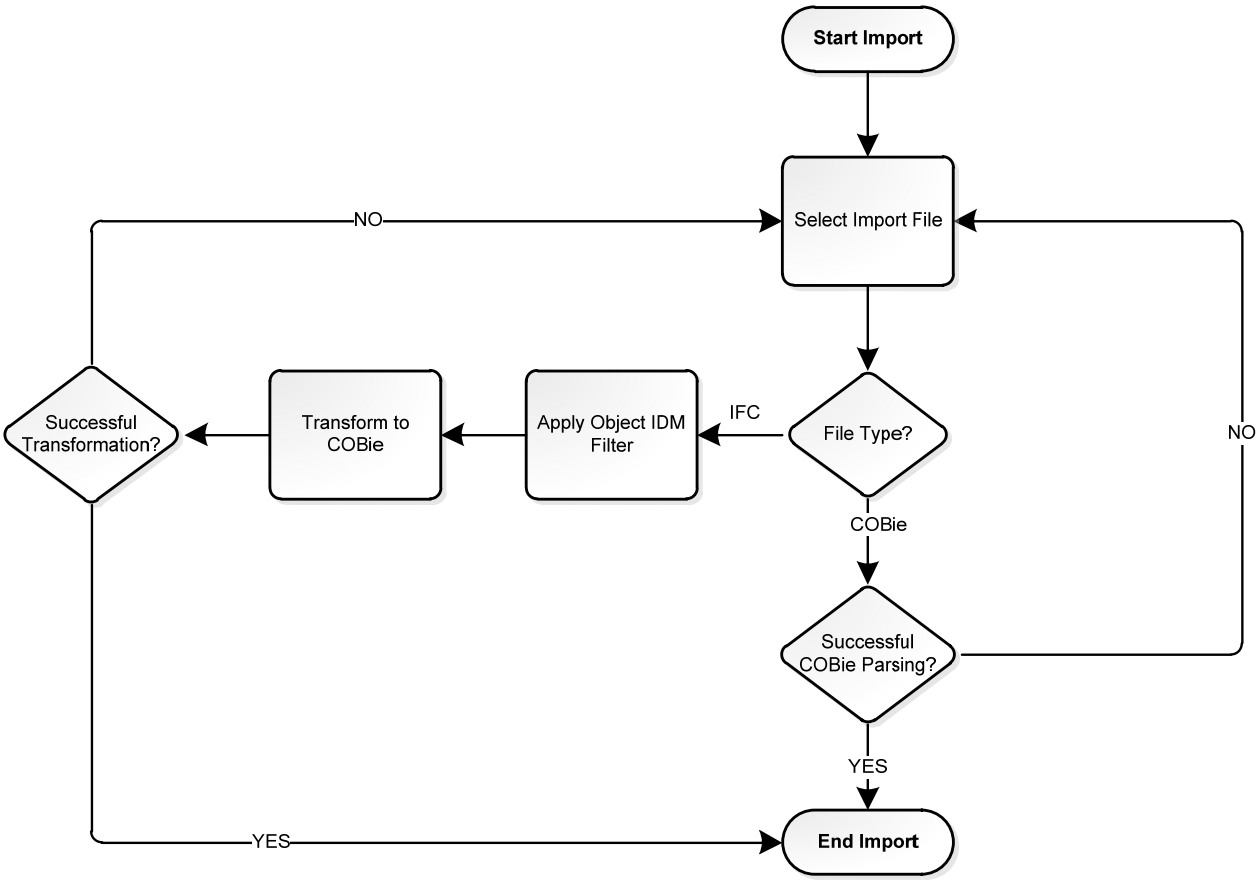


Figure 1: File Import Flowchart

Figure 1 illustrates the COBie Toolkit file import process. This process must be complete before a file is export, and the post condition of this process is that a BIM file is loaded into COBie data structures. This is a contrast to BiMServer which uses IFC data structures as the native BIM representation. The *Apply Object IDM Filter* process included in Figure 1 selectively excludes certain IFC entities from the incoming IFC model. COBie Toolkit provides for configuring these settings for specific needs.

Assuming that the File Import process completes successfully, the user may export the loaded COBie data into a variety of formats including: Ifc2x3 tc1 STEP or IfcXML, .json, COBie spreadsheet, COBie Lite, COBie Design QC report, COBie Construction QC report, and other COBie html reports. COBie to IFC transformations are performed for export of IFC 2x3 tc1 artifacts: STEP, ifcXML, and .json before finally being converted to the target format. Figure 2 illustrates the COBie Toolkit file export process.

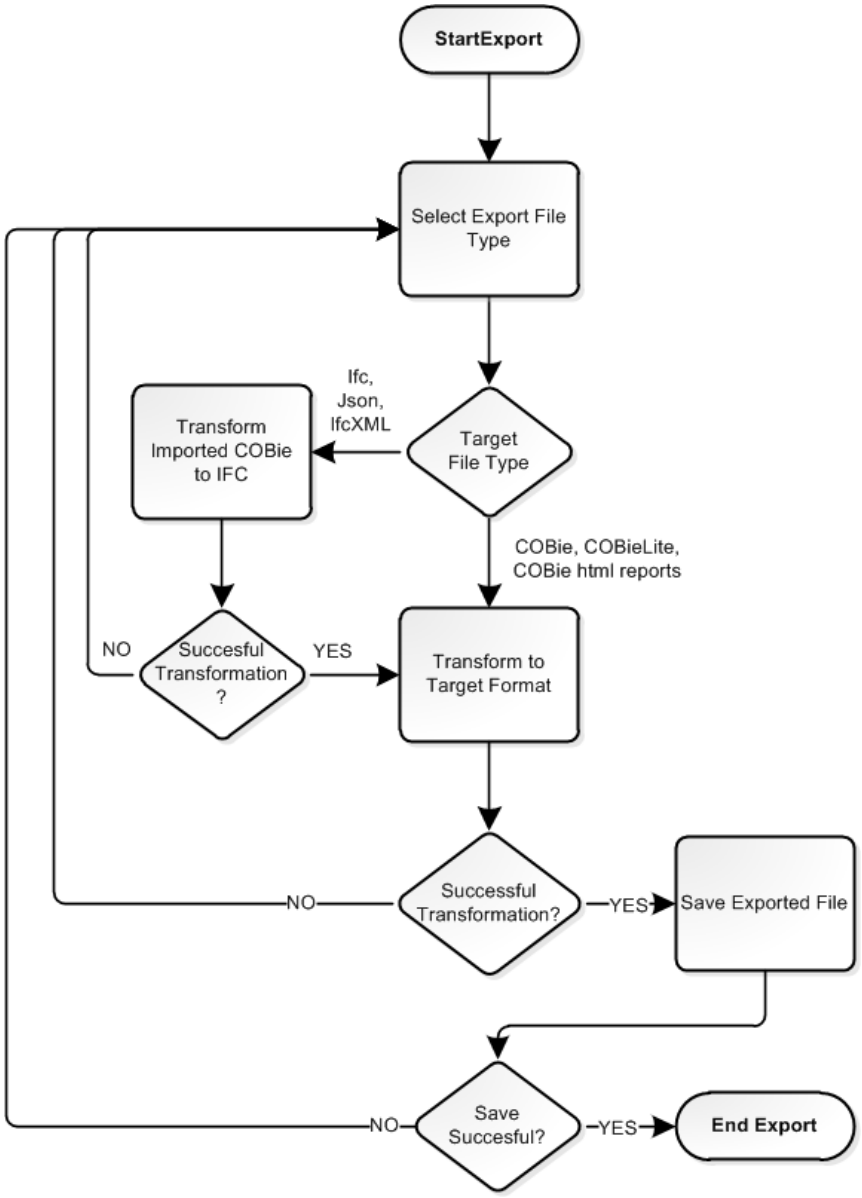


Figure 2: File Export Flowchart

COBie to/from IFC transformations are implemented according to the Schema tab of the COBie Responsibility Matrix document available on the building SMART alliance information exchanges Means and Methods page: http://www.buildingsmartalliance.org/index.php/projects/cobie

COBie EXPORT FORMATS

The COBie exports are handled by BiMServer plugins maintained by the developers of the COBie Toolkit. Descriptions of the supported COBie file exports are provided below.

- **COBie Spreadsheet XML (2003)**

This is the most common COBie artifact used by practitioners. This file begins as a blank COBie spreadsheet with only the column headings, color codings, and Instructions tab populated. All incoming data is transformed to COBie data structures that provide slots for the COBie spreadsheet columns. Thus, a transformation to the COBie Spreadsheet XML format is the most straight-forward and usually the fastest of all export processes.

- **COBIE Lite RC2 (XML)**
  COBie Lite is a new NIEM-conformant (National Information Exchange Model) XML format designed to support lightweight COBie information exchanges with Web Services. This format utilizes nesting to represent the relationships between entities instead of using the Sheet Name/Row Name references in the spreadsheet XML format.
  Duplicate naming of cross-referenced entities may result in the translation of duplicate Attributes, Documents, and Issues. Consider the following example: a COBie Type spreadsheet contains two rows with Name set to "Door Type A", the Document spreadsheet contains a row with Name=Installation Guide, SheetName=Type and RowName=Door Type. The corresponding COBieLite document will contain two Asset Types with Name=Door Type A and each with a nested instance of the Installation Guide Document.
  In a few instances some of the features of the SpreadsheetXML format are not supported, e.g. *Created By* and *Created On* fields. Also, some of the artifacts have different names, e.g. Components are now called Assets and Types are now called Asset Types. These changes were performed to make the schema more accessible and less ambiguous to a wider audience of users. For more information about COBieLite go to: http://buildingsmartalliance.org/index.php/projects/cobielite/
- **COBIE QC Reports**
  There are two COBie quality checking (QC) documents available: 1) COBie QC Report – Design Deliverable, and 2) COBie QC Report – Construction Deliverable. These documents present a summary of various checks performed on the COBie data: e.g. at least one Component for each Type, unique names for Types, at least one Floor, etc. These reports are delivered as .html documents and are produced using a chain of xml document transformations: a) quality checking ruleset file to .xslt file, b) transformation of imported cobie data to schematron validation report language (SVRL) using the quality checking .xslt, and c) transformation of the SVRL results to formatted .html.
  This is usually the slowest and most memory intensive export available in the toolkit where Steps b) and c) consuming the most substantial amount of time.
- **Other COBIE html reports:** There are four other .html reports available that summarize the imported COBie data:
  - COBie Spatial Decomposition Report: Summarizes the decomposition of Facility to Floors, and Spaces.
  - COBie Zone Report: Summarizes the decomposition of Facility, Floors, Zones, and Spaces
  - COBie System Report: Summarizes the decomposition of Systems to Components
  - COBie Room Data Sheet: Summarizes Types and Components indexed by Floors and Spaces containing

These reports offer a modest amount of formatting and are provided as a baseline reporting capability and a starting point for improvements.

IFC EXPORT FORMATS

The IFC Exports are handled by a combination of BiMServer plugins maintained by the BiMServer.org development team and COBie import plugins developed by the COBie Toolkit development team. Since all imported data is transformed to COBie, an IFC export requires a transformation from COBie to IFC that is implemented by the COBie Toolkit development team. Descriptions of the supported IFC file exports are provided below:

- **IFC STEP** (2x3 tc1): This is the most common deliverable format for IFC data and is based on the Ifc 2x3 technical compendium 1 schema.
- **ifcXML:** This format is based on the ISO 10303-28 version 2.0 specification of ifcXML.

- **json:** This is a Javascript Script Object Notation (json) export of the ifcXML data. This file may be useful as a Web application data source.

GETTING STARTED WITH THE COBie Toolkit

Please refer to Appendix A for a tutorial on importing, exporting/reporting, and comparing files. This tutorial also provides examples of known differences that may occur between a source COBie file and one that is produced from an IFC export round-trip back to COBie.

CONFIGURABLE OPTIONS

Java Virtual Machine Settings

The distributed .jar file is an executive Java archive file. When it starts a window appears that includes configurable settings for the Java Virtual Machine (JVM) that will be dispatched to run the COBie Toolkit. Figure 3 illustrates the COBie Toolkit Starter window.

There are four configuration options included in the COBie Toolkit Starter application:

- JVM: This is the directory path of the Java installation that will be used to run the COBie Toolkit. If your computer has multiple Java installations then it is important to make sure you are selecting the recommended Java installation (64-bit Java 7 JRE or Java 1.7 JDK). The first time you start the COBie Toolkit the JVM field is populated as "default," and this value represents the default Java_Home configured on your operating systems. Often if you have multiple Java installations on your operating system, the default may point to an incompatible version (e.g. 1.6).
- Memory Options
    - Max Heap Size: This is the most significant of the memory options as it determines the maximum size models that could be loaded for processing. The default setting is 1024m (1GB), but for detailed mechanical-electrical-plumbing models a more robust setting may be required (2048m-4096m). The maximum amount of heap space you may allocate will depend on how much memory (RAM) is installed in your computer and how much is available for allocation. On a Microsoft Windows machine you may find this information in the Performance tab of Windows Task Manager. Figure 4 provides an example illustration of a task manager reporting 8181 MB of total memory (8 GB) and 4841 MB (> 4GB) of available memory.
    - Max Perm Size: This is the maximum size of the "Permanent Generation" of a JVM. In a nutshell, this is memory that is used to store metadata about the loaded Java classes and data structures. The default setting is 256 MB and should not need to be changed. However, advanced users may appreciate the option if they are adding a substantial number of additional plugins.
    - Stack Size: This is the default stack size for individual threads operating in the JVM. Stack size is used to store Object data in nested method calls – among other purposes. The default 1024k setting should not require modification, but is provided for advanced users that are comfortable optimizing JVM performance.

  More information about Java Virtual Machine settings may be found at:
  http://www.oracle.com/technetwork/java/javase/tech/vmoptions-jsp-140102.html

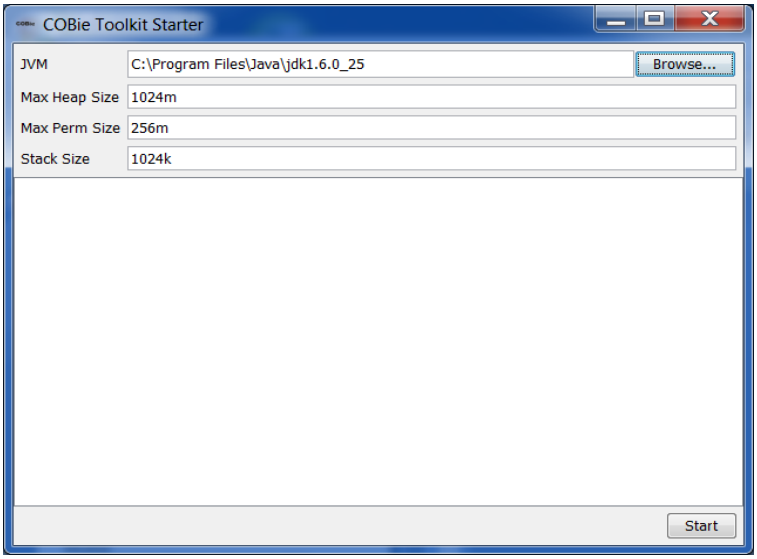


Figure 3: JVM options for COBie Toolkit

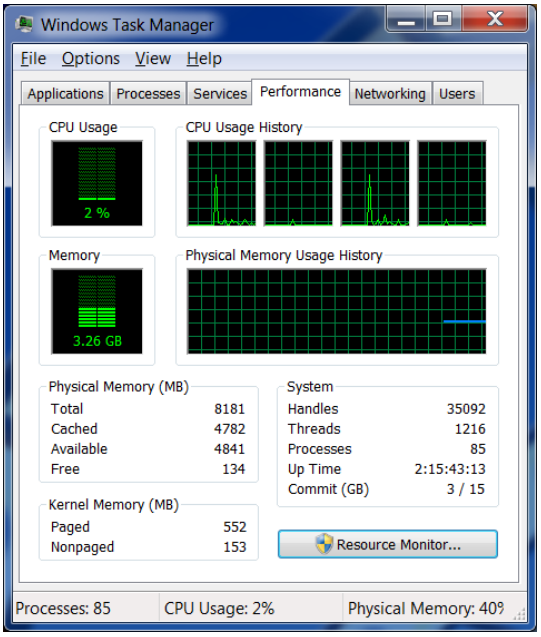


Figure 4: Determining how much memory is available for JVM heap size via Windows Task Manager

COBie Spreadsheet Row Limit

Some software applications that consume SpreadsheetXML files may be restricted to only load a maximum number of rows. In consideration of this limitation the COBie Toolkit allows the user to select a maximum number of rows that may be exported in a single COBie worksheet (Figure 5). This option may be accessed through the Options→COBie Spreadsheet Export on the top left of the COBie Toolkit window.

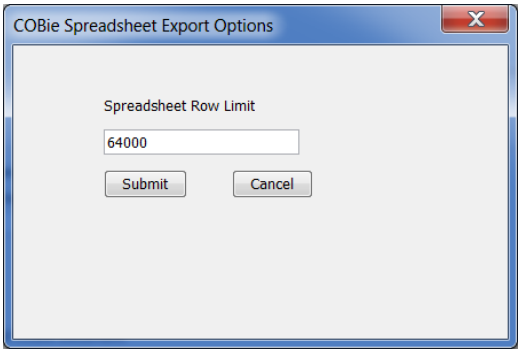


Figure 5: Spreadsheet Row Limit

OBJECT IDM (EXCLUSION OF IFC ENTITIES)

Typical Facility Management Handover COBie files that are derived from IFC models should not include information about certain products such as walls, slabs, or generally anything that facility operators would not track as an asset. To facilitate this deliverable requirement there are configuration options that specify a list of IFC entities that will be ignored when an IFC model is transformed to a COBie flie.

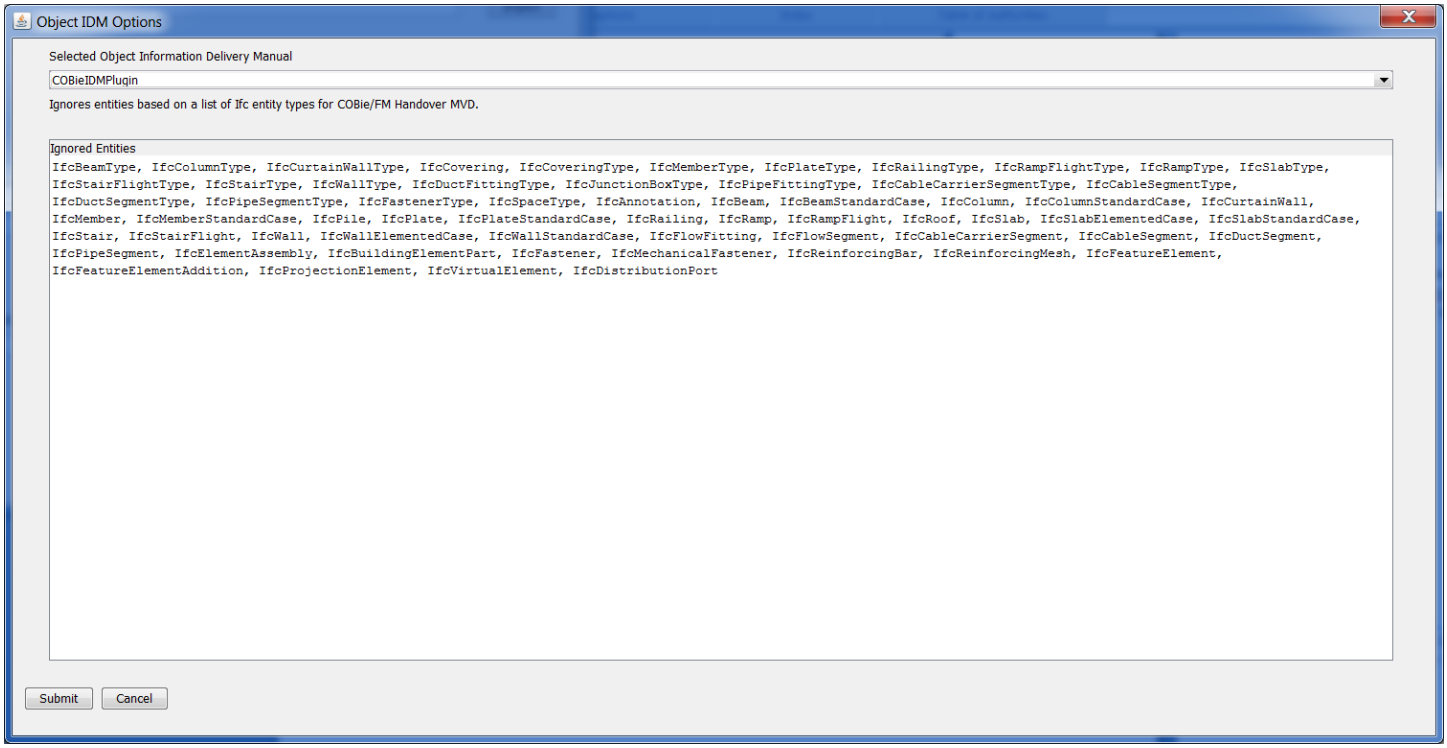


Figure 6: Object IDM Options

These Object IDM (Information Delivery Manual) Options may be accessed from the Options→Object IDM (ignored entities) link on the COBie Toolkit Window. Figure 6 illustrates the Object IDM Options window with a drop down list (top) to select the active

Object IDM Plugin, and a text area that lists the Ifc entities that the selected IDM plugin ignores. The available options are COBieIDMPlugin, COBieIDMPlugin (no proxy objects), BPieIDMPlugin (Building Programming information exchange[1]), BAMieIDMPlugin (Building Automation Modeling information exchange[2]), and none (loads all entities). Lists of ignored entities for each Object IDM are provided in Appendix B.

TROUBLESHOOTING COMMON ISSUES

While this software does not include a guarantee for technical support, this section provides descriptions of common issues that users face when using the toolkit.

Issue	**Resolution**
Could not start COBie Toolkit due to "Could not create the Java virtual machine. Invalid maximum heap size, The specified size exceeds the maximum representable size.	• If allocating more than 1GB of heap size, make sure you are using a 64-bit version of Java • Make sure you are using JRE 7 or JDK 1.7 SE
Out of memory exception with references to heap or stack size	• If loading a large IFC file, make sure you have allocated sufficient heap size. As a rule of thumb, you may determine an approximate heap size by multiplying the size of the IFC file by 7[3]. Estimates for COBie models will be less, but an approximate multiplication factor has not yet been determined.
Error importing COBie Spreadsheet file	• Make sure you are importing a Spreadsheet XML file. The COBie toolkit does not support .xls or .xlsx files. You may save a .xls or .xlsx file as a Spreadsheet XML (2003) file in Microsoft Excel or other spreadsheet software applications.
COBie file is missing Types and Components	• Check the ObjectIDM settings and review the list of ignored entities. Select the ObjectIDM setting most appropriate for your COBie deliverable.
COBie file is missing Attributes	• Review the COBie Responsibility Matrix for attribute exclusion rules). Future releases may provide configurable attribute exclusion rules.

[1] http://www.buildingsmartalliance.org/index.php/projects/activeprojects/31
[2] http://www.buildingsmartalliance.org/index.php/projects/activeprojects/180
[3] http://support.bimserver.org/bimserver/topics/poll_largest_model_deserialized

APPENDIX A: GETTING STARTED WITH THE COBie TOOLKIT

In this section you will:

- Learn how to import and export COBie and IFC files
- Learn how to generate COBie QC files
- Learn how to run a COBie compare report
- Learn about expected differences that occur in a COBie→IFC→COBie round trip

The following procedures will be executed:

1. Start COBie Toolkit
2. Import COBie File
3. Export Design QC File
4. Export IFC File
5. Import IFC File
6. Export COBie File (Completing Round Trip)
7. Run Compare Report

PREPARATION

1. Download the Clinic Design COBie file:
2. http://projects.buildingsmartalliance.org/files/?artifact_id=5574
3. Unzip the Clinic Design COBie File to a directory
4. Open the extracted .xlsx file in Excel
5. Save as Spreadsheet XML (2003)

STEP 1: START COBIE TOOLKIT

1A: Start the .jar File

1. Save the downloaded COBieToolkit.jar file in an empty directory
2. Double-click the downloaded .jar file

Possible Issues:

- Operating System Java options not configured properly – see Java documentation

1B: Acknowledge Java Warning (if starting from a 32-bit java installation)

1. Review the Warning illustrated in Figure 7
2. Click OK

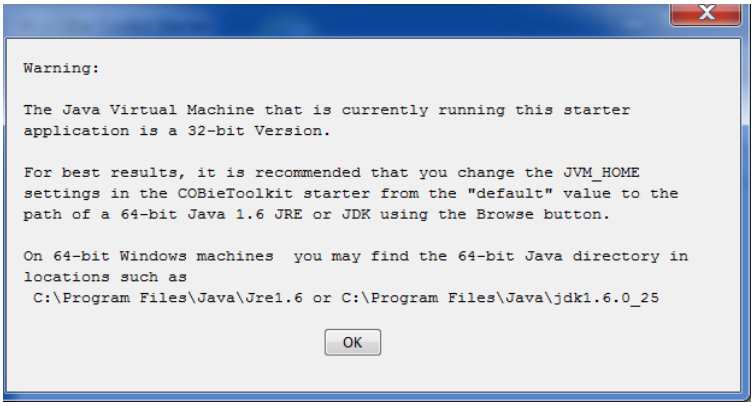


Figure 7: Java version startup warning

1C: Configure JVM settings and Start application

1. Review the settings in the COBie Toolkit Starter (see Figure 8). Make sure that:
    a. JVM is referencing a 64-bit version of Java 6 or JDK 1.6 (recommended)
    b. Max. Heap Size is 1024m or greater (recommended)
    c. Max Perm Size is 256m
    d. Stack Size is 1024k
2. Click the Start Button, and after initialization (see Figure 9) the COBie Toolkit window will appear

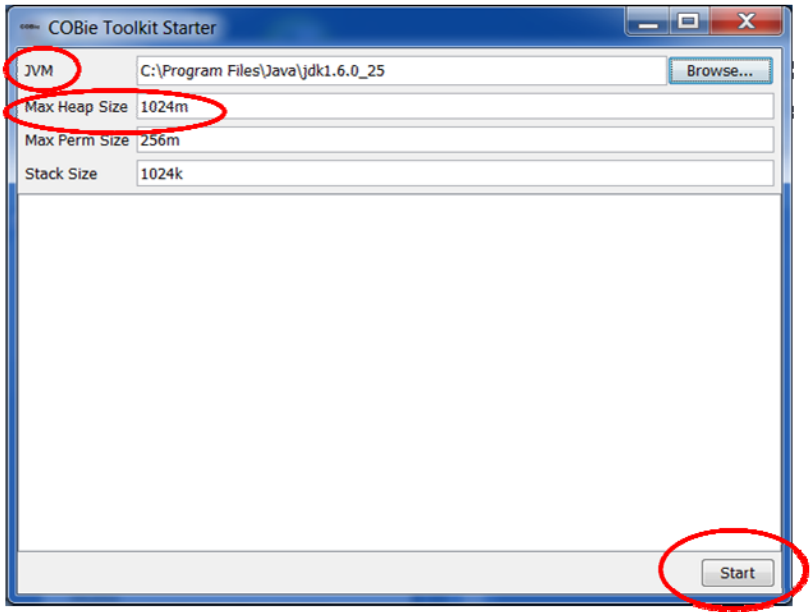


Figure 8: COBie Toolkit Starter Window JVM Settings

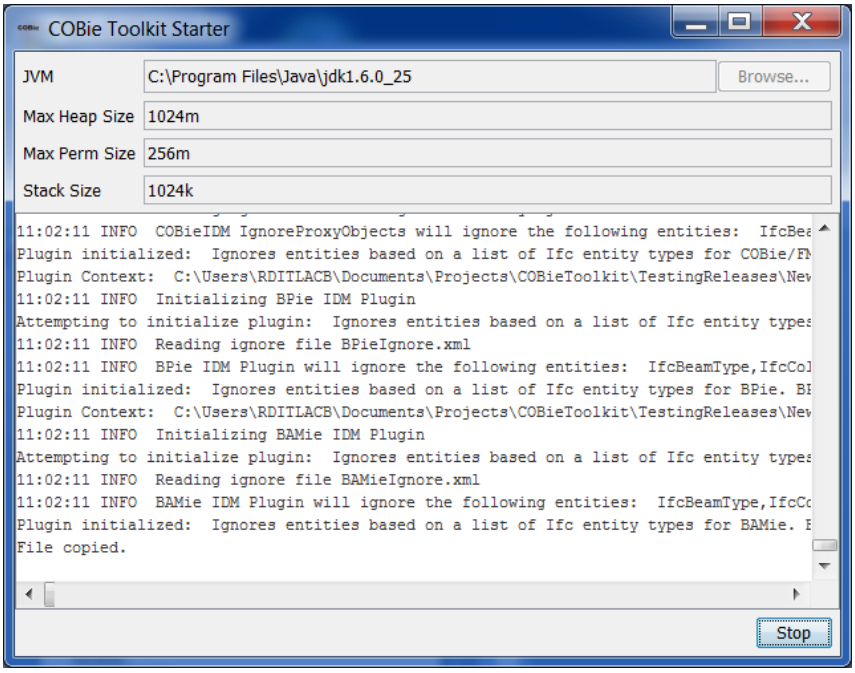


Figure 9: COBie Toolkit Starter Window After Start Button Click

STEP 2: IMPORT COBIE FILE

1. Click the Import button under the Import/Export/Report Heading
2. Select COBie as filetype and the Clinic Design File(spreadsheetXML) file
3. Observe the progress bar until a message is displayed – File Loaded as COBie (see Figure 10)

Possible Issues:

- Error occurs and COBie is not loaded: make sure that you are selecting the correct file type when browsing to your COBie file.

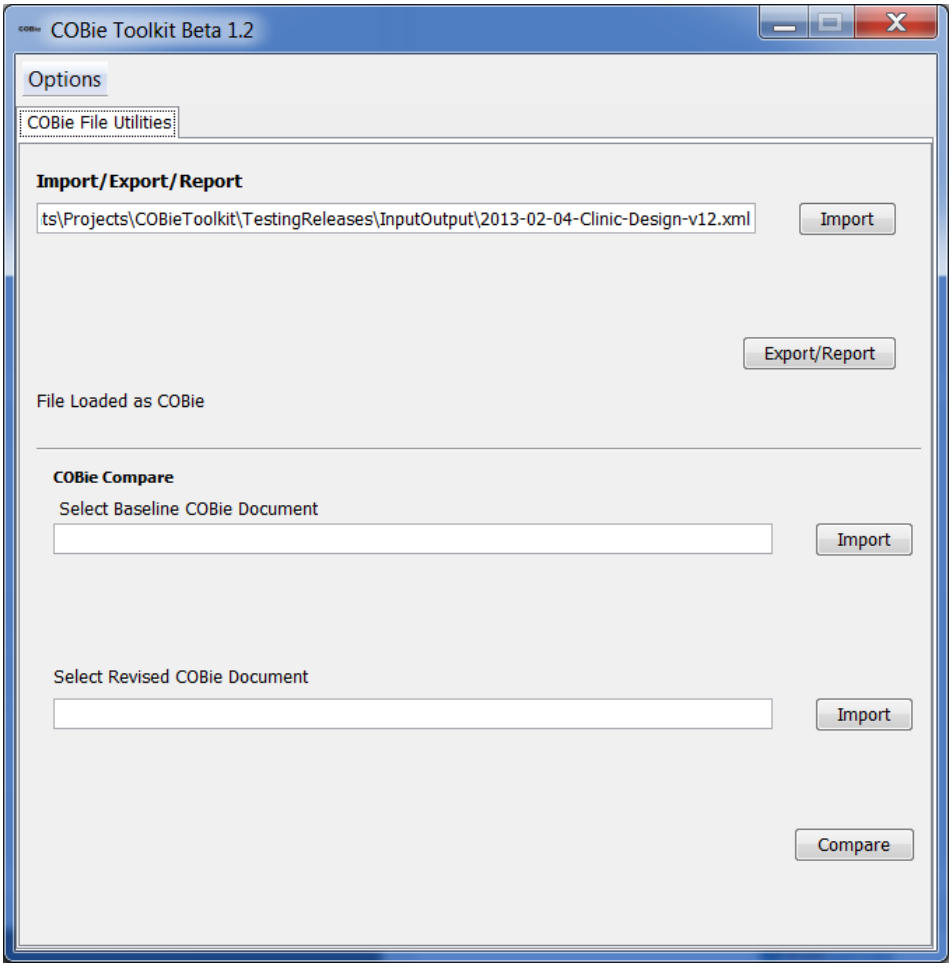


Figure 10: COBie Toolkit Window after COBie Import

STEP 3: EXPORT DESIGN QC FILE

Disclaimer:

- This step will take 2-3 minutes to execute – QC exports are the slowest –Figure 11 provides a reference on execution time

1. Click the *Export/Repor*t button, select the COBie QC Report – Design Deliverable option in the filetype menu, and enter a filename for your exported IFC, select your save location and click "Save"
2. Observe Progress until progress bar indicates "Done"

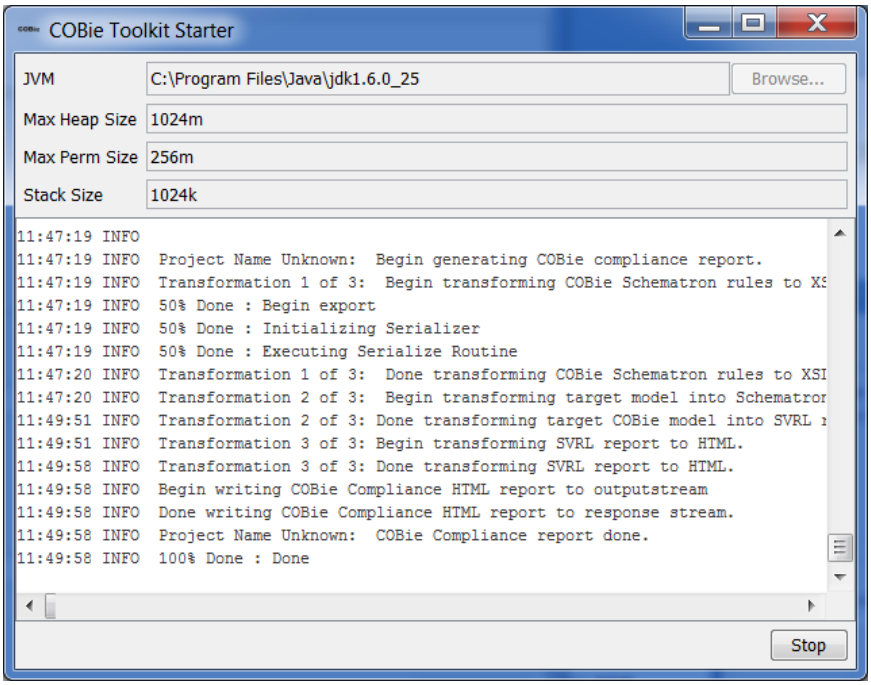


Figure 11: COBie Toolkit Starter Log of Design QC Report (Timing Reference)

STEP 4: EXPORT IFC FILE

1. Click the Import button under the Import/Export/Report Heading
2. Select COBie as filetype and the Clinic Design File(spreadsheetXML) file
3. Observe the progress bar until a message is displayed – File Loaded as COBie

Possible Issues:

- Error occurs and COBie is not loaded: make sure that you are selecting the correct file type when browsing to your COBie file.

STEP 5: IMPORT IFC FILE

1. Click the Import button and select Ifc STEP file type, browse to the location of the ifc file saved in Step 4, and click the "Chose COBie File" button
2. Observe Progress Until done

STEP 6: EXPORT COBIE FILE (COMPLETING ROUND TRIP)

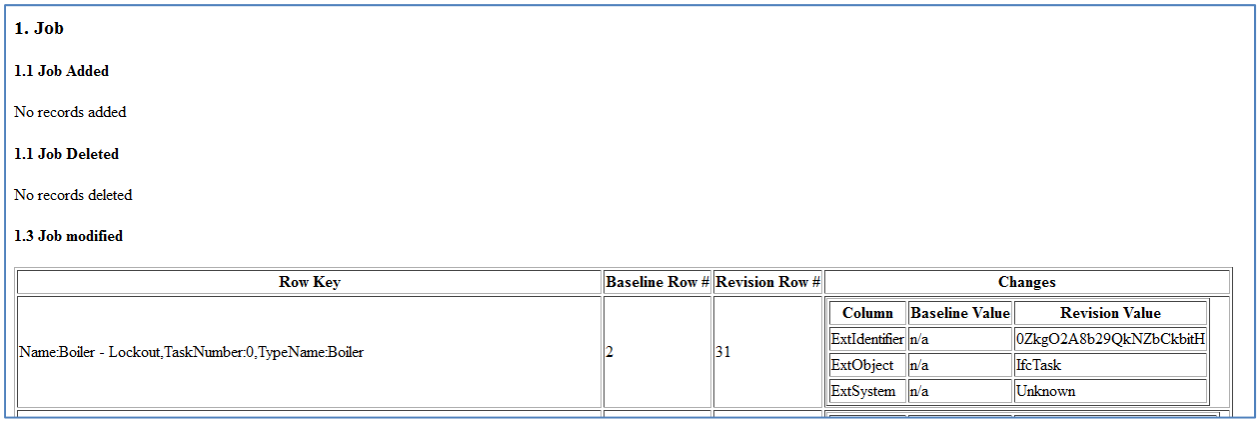
1. Click the Export/Report button, select the COBie SpreadsheetXML option in the filetype menu, and enter a filename for your exported COBie, select your save location and click "Save"
2. Observe Progress until progress bar indicates "Done"

STEP 7: RUN COBIE COMPARE REPORT

1. Click the Import button directly under the “Select Baseline COBie Document” sub-heading of the COBie Compare heading
2. Select the original COBie file that was imported in Step 2
3. Wait until the file is loaded
4. Click the Import button directly under the “Select Revised COBie Document” sub-heading of “COBie Compare” Heading of the window
5. Select the COBie file that was exported in Step 6
6. Wait until the file is loaded
7. Click the “Compare” button, choose a save location, and Click Save
8. View the resulting html in a Web browser

EXPECTED DIFFERENCES OBSERVED IN COMPARE REPORT

1. The Clinic Handover file will have blanks in some of the “Ext” fields. Those rows were entered directly into the COBie file, and it is not appropriate to populate those fields (See Figure 12).



1. Job

1.1 Job Added

No records added

1.1 Job Deleted

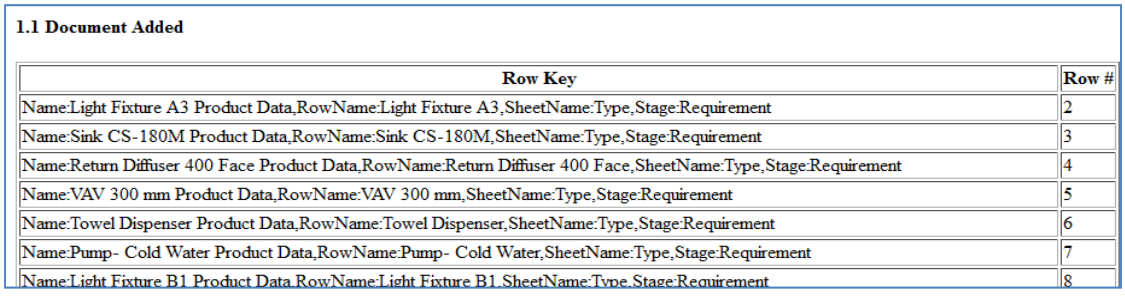
No records deleted

1.3 Job modified

Row Key	Baseline Row #	Revision Row #	Changes
Name:Boiler - Lockout,TaskNumber:0,TypeName:Boiler	2	31	Column / Baseline Value / Revision Value ExtIdentifier / n/a / 0ZkgO2A8b29QkNZbCkbitH ExtObject / n/a / IfcTask ExtSystem / n/a / Unknown

Figure 12: COBie Compare - Ext Column Differences

2. All Types in the Clinic Handover file without a Document reference are automatically assigned an empty placeholder Document (see Figure 13).



1.1 Document Added

Row Key	Row #
Name:Light Fixture A3 Product Data,RowName:Light Fixture A3,SheetName:Type,Stage:Requirement	2
Name:Sink CS-180M Product Data,RowName:Sink CS-180M,SheetName:Type,Stage:Requirement	3
Name:Return Diffuser 400 Face Product Data,RowName:Return Diffuser 400 Face,SheetName:Type,Stage:Requirement	4
Name:VAV 300 mm Product Data,RowName:VAV 300 mm,SheetName:Type,Stage:Requirement	5
Name:Towel Dispenser Product Data,RowName:Towel Dispenser,SheetName:Type,Stage:Requirement	6
Name:Pump- Cold Water Product Data,RowName:Pump- Cold Water,SheetName:Type,Stage:Requirement	7
Name:Light Fixture B1 Product Data,RowName:Light Fixture B1,SheetName:Type,Stage:Requirement	8

Figure 13: COBie Compare - Default Type Documents

3. Facility and other sheets that reference units of measure: when a provided unit of measure string is “close enough” to the keywords of an established unit of measure term (e.g. Dollars vs United States dollar(USD) then it may be mapped to a

specific known IfcUnit of measure instance. In such instances, the text will likely be different as the known instance of the unit of measure has a target name (see Figure 14).

2.3 Facility modified

Row Key	Baseline Row #	Revision Row #	Changes

Column	Baseline Value	Revision Value
Name:PN 0001	2	2
CurrencyUnit	Dollars	United States dollar (USD)
VolumeUnits	cubicmeters	cubic meters
SiteDescription	n/a	Medical-Dental Clinic
AreaMeasurement	Autodesk Revit Architecture 2011 BIM Area	Autodesk Revit Architecture 2011
AreaUnits	squaremeters	square meters

Figure 14: COBie Compare - Units of Measure

4. In Ifc timestamps are expressed in seconds since midnight Jan 1 1970. In the Java Calendar, timestamps are expressed in milliseconds since midnight Jan 1 1970. In some instances the conversion presents round off errors (see Figure 15).

			Column	Baseline Value	Revision Value
Name:DirecDigitalControl-DDC-Panel	24	14	ExtIdentifier	n/a	3kqEairFrEthSeFPVx2IB7
			CreatedOn	2013-02-26T15:16:46	2013-02-26T15:14:56
			ExtSystem	n/a	Unknown

Figure 15: COBie Compare - Created On Timestamps

5. IfcPersonAndOrganization objects do not inherit IfcRoot and do not have Global Ids (external identifier) or IfcOwnerHistory (Created By). Thus the "createdby" value of the COBie spreadsheet cannot be imported into the IFC. This data is lost and replaced by the IfcPersonAndOrganization associated with the most recent changes. Also, from IFC the OrganizationCode is set to the same value as Company if no OrganizationCode may be derived from IfcOrganization.Id (see Figure 16).

5.3 Contact modified

Row Key	Baseline Row #	Revision Row #	Changes

Column	Baseline Value	Revision Value
Email:bill.east@us.army.mil	2	3
ExternalSystem	n/a	Unknown
OrganizationCode	n/a	Engineer Research and Development Center
ExternalObject	n/a	IfcPersonAndOrganization
ExternalIdentifier	n/a	bill.east@us.army.mil
CreatedBy	bill.east@us.army.mil	mariangelica.carrasquillo@usace.army.mil
CreatedOn	2012-10-30T17:03:03	2013-02-25T11:59:38

Figure 16: COBie Compare - Contact ext columns

6. Some differences are not visually obvious. Trailing spaces are trimmed from strings. Characters that are not in the 0-127 ASCII set are removed from imports/exports: this is a temporary work-around for character encoding issues (see Figure 17).

Baseline Value
ARMSTRONG CEILING TILE - CIRRUS TEGULAR; COLOR: WHITE; SERIES #534 GRID-15/16" EXPOSED TEE GRID SYSTEM-WHITE; SIZE: 2"x2"x3/4"

Revision Value
ARMSTRONG CEILING TILE - CIRRUS TEGULAR; COLOR: WHITE; SERIES #534 GRID-15/16" EXPOSED TEE GRID SYSTEM-WHITE; SIZE: 2""x2""x3/4"

Figure 17: COBie Compare - Encoding Issues

7. Attributes: If the provided value for an enumerated type is n/a or blank, it will be assigned a value of UNSET, and if the associated enumeration does not contain UNSET then it is appended to the enumeration. Similarly, if a specified value is not present in an allowed values/enumeration then it is appended to the enumeration (see Figure 18).

Name:AirHandlerConstruction,RowName:AHU,SheetName:Type	5797	9412

Column	Baseline Value	
AllowedValues	manufactureditem , constructedonsite , other , notknown , unset	n
ExtIdentifier	Pset_UnitaryEquipmentTypeAirHandler	1
ExtObject	IfcPropertyEnumeratedValue	I

Revision Value
manufactureditem,constructedonsite,other,notknown,unset,Factory Fabricated Perforated Panel Double Wall Discharge Air Plenum
115g$gj31F_hegn0741qwz
Pset_UnitaryEquipmentTypeAirHandler

Figure 18: COBie Compare - Appending Attribute Allowed Values

8. Only Space Coordinates are exported to COBie. Coordinate export has known bugs and currently produces incorrect bounding box values. This may be corrected in a future release.

APPENDIX B: OBJECT IDM IGNORED ENTITY LISTS

COBie IDM PLUGIN

IfcAnnotation
IfcBeam
IfcBeamStandardCase
IfcBeamType
IfcBuildingElementPart
IfcCableCarrierSegment
IfcCableCarrierSegmentType
IfcCableSegment
IfcCableSegmentType
IfcColumn
IfcColumnStandardCase
IfcColumnType
IfcCovering
IfcCoveringType
IfcCurtainWall
IfcCurtainWallType
IfcDistributionPort
IfcDuctFittingType
IfcDuctSegment
IfcDuctSegmentType
IfcElementAssembly
IfcFastener
IfcFastenerType
IfcFeatureElement
IfcFeatureElementAddition
IfcFeatureElementSubtraction
IfcFlowFitting
IfcFlowFittingType
IfcFlowSegment
IfcFlowSegmentType
IfcFooting
IfcJunctionBoxType
IfcMechanicalFastener
IfcMember
IfcMemberStandardCase
IfcMemberType
IfcOpeningElement
IfcOpeningStandardCase
IfcPile
IfcPipeFittingType
IfcPipeSegment
IfcPipeSegmentType
IfcPlate
IfcPlateStandardCase
IfcPlateType
IfcProjectionElement
IfcRailing
IfcRailingType
IfcRamp
IfcRampFlight
IfcRampFlightType
IfcRampType
IfcReinforcingBar
IfcReinforcingMesh
IfcRoof
IfcSlab
IfcSlabElementedCase
IfcSlabStandardCase
IfcSlabType
IfcSpaceType
IfcStair
IfcStairFlight
IfcStairFlightType
IfcStairType
IfcStructuralAction
IfcStructuralActivity
IfcStructuralConnection
IfcStructuralCurveAction
IfcStructuralCurveConnection
IfcStructuralCurveMember
IfcStructuralCurveMemberVarying
IfcStructuralCurveReaction
IfcStructuralItem
IfcStructuralLinearAction
IfcStructuralMember
IfcStructuralPlanarAction
IfcStructuralPointAction
IfcStructuralPointConnection
IfcStructuralPointReaction
IfcStructuralReaction
IfcStructuralSurfaceAction
IfcStructuralSurfaceConnection
IfcStructuralSurfaceMember
IfcStructuralSurfaceMemberVarying
IfcStructuralSurfaceReaction
IfcSurfaceFeature
IfcVirtualElement
IfcVoidingFeature
IfcWall
IfcWallElementedCase
IfcWallStandardCase
IfcWallType

COBie IDM IGNORE PROXY OBJECTS

IfcAnnotation
IfcBeam
IfcBeamStandardCase
IfcBeamType
IfcBuildingElementPart
IfcBuildingElementProxy
IfcBuildingElementProxyType
IfcCableCarrierSegment
IfcCableCarrierSegmentType
IfcCableSegment
IfcCableSegmentType
IfcColumn
IfcColumnStandardCase
IfcColumnType
IfcCovering

IfcCoveringType
IfcCurtainWall
IfcCurtainWallType
IfcDistributionPort
IfcDuctFittingType
IfcDuctSegment
IfcDuctSegmentType
IfcElementAssembly
IfcFastener
IfcFastenerType
IfcFeatureElement
IfcFeatureElementAddition
IfcFeatureElementSubtraction
IfcFlowFitting
IfcFlowFittingType
IfcFlowSegment
IfcFlowSegmentType
IfcFooting
IfcJunctionBoxType
IfcMechanicalFastener
IfcMember
IfcMemberStandardCase
IfcMemberType
IfcOpeningElement
IfcOpeningStandardCase
IfcPile
IfcPipeFittingType
IfcPipeSegment
IfcPipeSegmentType
IfcPlate
IfcPlateStandardCase
IfcPlateType
IfcProjectionElement
IfcRailing
IfcRailingType
IfcRamp
IfcRampFlight
IfcRampFlightType
IfcRampType
IfcReinforcingBar
IfcReinforcingMesh
IfcRoof
IfcSlab
IfcSlabElementedCase
IfcSlabStandardCase
IfcSlabType
IfcSpaceType
IfcStair
IfcStairFlight
IfcStairFlightType
IfcStairType
IfcStructuralAction
IfcStructuralActivity
IfcStructuralConnection
IfcStructuralCurveAction
IfcStructuralCurveConnection
IfcStructuralCurveMember
IfcStructuralCurveMemberVarying
IfcStructuralCurveReaction
IfcStructuralItem
IfcStructuralLinearAction
IfcStructuralMember
IfcStructuralPlanarAction
IfcStructuralPointAction
IfcStructuralPointConnection
IfcStructuralPointReaction
IfcStructuralReaction
IfcStructuralSurfaceAction
IfcStructuralSurfaceConnection
IfcStructuralSurfaceMember
IfcStructuralSurfaceMemberVarying
IfcStructuralSurfaceReaction
IfcSurfaceFeature
IfcVirtualElement
IfcVoidingFeature
IfcWall
IfcWallElementedCase
IfcWallStandardCase
IfcWallType

BPie

IfcBeamType
IfcCableCarrierSegmentType
IfcCableSegmentType
IfcColumnType
IfcCovering
IfcCoveringType
IfcCurtainWallType
IfcDuctFittingType
IfcDuctSegmentType
IfcFastenerType
IfcJunctionBoxType
IfcMemberType
IfcPipeFittingType
IfcPipeSegmentType
IfcPlateType
IfcRailingType
IfcRampFlightType
IfcRampType
IfcSlabType
IfcStairFlightType
IfcStairType
IfcWallType

BAMIE

IfcProjectionElement
IfcRailing
IfcRailingType
IfcRamp
IfcRampFlight
IfcRampFlightType
IfcRampType
IfcReinforcingBar
IfcReinforcingMesh
IfcRoof
IfcSlab
IfcSlabElementedCase
IfcSlabStandardCase
IfcSlabType
IfcSpaceType
IfcStair
IfcStairFlight
IfcStairFlightType
IfcStairType
IfcStructuralAction
IfcStructuralActivity
IfcStructuralConnection
IfcStructuralCurveAction
IfcStructuralCurveConnection
IfcStructuralCurveMember
IfcStructuralCurveMemberVarying
IfcStructuralCurveReaction
IfcStructuralItem
IfcStructuralLinearAction
IfcStructuralMember
IfcStructuralPlanarAction
IfcStructuralPointAction
IfcStructuralPointConnection
IfcStructuralPointReaction
IfcStructuralReaction
IfcStructuralSurfaceAction
IfcStructuralSurfaceConnection
IfcStructuralSurfaceMember
IfcStructuralSurfaceMemberVarying
IfcStructuralSurfaceReaction
IfcSurfaceFeature
IfcVirtualElement
IfcVoidingFeature
IfcWall
IfcWallElementedCase
IfcWallStandardCase
IfcWallType
IfcProjectionElement
IfcRailing
IfcRailingType
IfcRamp
IfcRampFlight
IfcRampFlightType
IfcRampType
IfcReinforcingBar
IfcReinforcingMesh
IfcRoof
IfcSlab
IfcSlabElementedCase

APPENDIX C: VERSION HISTORY

VERSION 1.4.1

NEW FEATURES

- None

BUG FIXES

- Component SerialNumber and Barcode were not exporting from COBie to IFC

KNOWN BUGS AND LIMITATIONS

- The Impacts and Issues spreadsheets are not yet populated from IFC imports.
- There are known issues with the COBie Coordinate Import and Export that may result in incorrect geometry. This issues may be addressed in a future release.
- The COBie html reports (excluding the design and construction QC reports) have a minimal amount of formatting and may not be practical for large models. The reports are provided as a baseline capability and spring-board for improvements.
- The COBie Lite export does not include the Coordinates or Impacts worksheets.
- The COBie Toolkit does not export all types of IfcProperty values that may be exported from an Ifc file into the COBie Attribute tab. However, the supported property types have been robust enough to support the 2013 COBie challenge event and typically work for the most commonly encountered Ifc files. These capabilities will be more robust in future bulds.
- Large models can be very memory intensive and users are encouraged to set Max Heap Size liberally (within the scope of available memory) when working with large files

DISCLAIMERS

- This software is provided with no warranty or technical support. If you have special support needs then a consultation agreement may be arranged on an incident-by-incident basis. Bug reporting is encouraged and will be considered, but bug fixes are not guaranteed.
- COBieToolkit uses some of the BiMServer.org client libraries and plugins found in the BiMServer product. The license under which the BIMserver.org software is released is a combination of Affero GPL, GPLv3 and/or LGPL (for binaries) from the GNU project. The different projects in our SVN repository are diffently licensed. More info on that can be found on their wiki.

VERSION 1.4

NEW FEATURES

- Updated to work with Java 7

- Updated checking reports to NBIMS v03 COBie ballot
- Optimized checking reports
- New SQLite Serializer (experimental)
- COBieLite export updated for RC4 per the COBie NBIMS v03 ballot

BUG FIXES

- CreatedOn values not being checked on COBie Import
- Incorrect rule names in QC report
- Room Data, Zone, System, and Spatial Decomposition reports were blank

KNOWN BUGS AND LIMITATIONS

- The Impacts and Issues spreadsheets are not yet populated from IFC imports.
- There are known issues with the COBie Coordinate Import and Export that may result in incorrect geometry. This issues may be addressed in a future release.
- The COBie html reports (excluding the design and construction QC reports) have a minimal amount of formatting and may not be practical for large models. The reports are provided as a baseline capability and spring-board for improvements.
- The COBie Lite export does not include the Coordinates or Impacts worksheets.
- The COBie Toolkit does not export all types of IfcProperty values that may be exported from an Ifc file into the COBie Attribute tab. However, the supported property types have been robust enough to support the 2013 COBie challenge event and typically work for the most commonly encountered Ifc files. These capabilities will be more robust in future bulds.
- Large models can be very memory intensive and users are encouraged to set Max Heap Size liberally (within the scope of available memory) when working with large files

VERSION 1.3

NEW FEATURES

- Updated to support export of COBieLite Release Candidate 2 xml files
- COBie import accepts import of dates in a variety of string representations – previously only dates with format yyyy-mm-ddTHH:mm:ss were accepted

BUG FIXES

- Various corrections to address changes in the COBie Responsibility Matrix(v16)
- Unhandled Exceptions break COBie Import when a COBie worksheet is missing
- Floor.extObject was not being set to “IfcSite” when IfcBuildingStorey.ObjectType=”Site” or “IfcSite”
- Spare Key was incorrectly set to “Name” in the QC tools and has been updated to “Name, Category, TypeName”
- QC reports crash when some columns are absent

- Spreadsheet Row limit was bound by Excel 2003 limits. Spreadsheet XML dependency (Xelem) was recompiled to accommodate Excel 2007 specs (1,048,576 rows)

KNOWN BUGS AND LIMITATIONS

- The Impacts and Issues spreadsheets are not yet populated from IFC imports.
- There are known compatibility issues with Java 7 JRE (or 1.7 JDK). The application works best with a 64-bit version of Java 1.6 JRE or JDK 1.6.0.25 (or a higher 1.6 JDK revision).
- There are known issues with the COBie Coordinate Import and Export that may result in incorrect geometry. This issues may be addressed in a future release.
- The COBie html reports (excluding the design and construction QC reports) have a minimal amount of formatting and may not be practical for large models. The reports are provided as a baseline capability and spring-board for improvements.
- The COBie Lite export does not include the Coordinates or Impacts worksheets. However, the schema is designed to store 2D polygon definitions for Space boundaries.
- The COBie Toolkit does not export all types of IfcProperty values that may be exported from an Ifc file into the COBie Attribute tab. However, the supported property types have been robust enough to support the 2013 COBie challenge event and typically work for the most commonly encountered Ifc files. These capabilities will be more robust in future bulds.

VERSION 1.2

NEW FEATURES

- New COBieLite XML RC2 Export. For more information about COBieLite XML visit: http://buildingsmartalliance.org/index.php/projects/cobielite/
- jSon IFC export added
- Single .jar distribution – previous distributions required additional directories

BUG FIXES

- IFCINTEGER values were not being handled properly in Attribute export
- Category column imports were not parsed correctly if a comma was part of the name token
- Attribute units of measure were not populated with the default project units if no unit was assigned to the IfcProperty value
- IfcReferenceValue, IfcCalendarDate representations of fields such as Component.WarrantyStartDate and Component.InstallationDate were not recognized
- Incorrect string output of IfcDerivedUnit exponents in Attribute worksheet
- COBie to IFC transformation incorrectly placed Space.UsableHeight in a COBie_Pset_Space property set instead of qto_SpaceBaseQuantities
- Compare panel was not initializing file dialog with last directory imported/exported from/to
- Various untracked bugs fixed during the months leading up to the January 2013 COBie Challenge event

VERSION 1.1

NEW FEATURES

- Updated BiMServer code base

VERSION 1.0

NEW FEATURES

- Everything is new