

IBM Internet of Things



Revit to Maximo
Doug Wood
Doug.wood@us.ibm.com



Planning for COBie data exchange

Digital Handover will overwhelm the owner with data



Hand-over data
before BIM



Hand-over
data After BIM



What the owner wants for hand-over

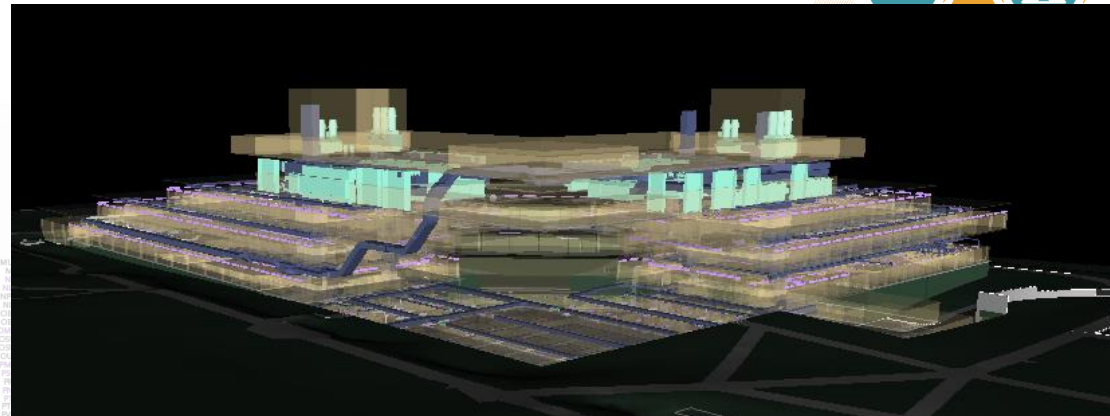
The model needs to be filtered when hand-over data is generated. Hand-over data should only include:

- All floors and spaces
- Only assets that have:
 - Significant capital cost
 - Maintenance requirements that require tracking
 - Regulatory requirements
- Product data for all included assets
- Attribute meaningful to the FM process

Project vs. Portfolio

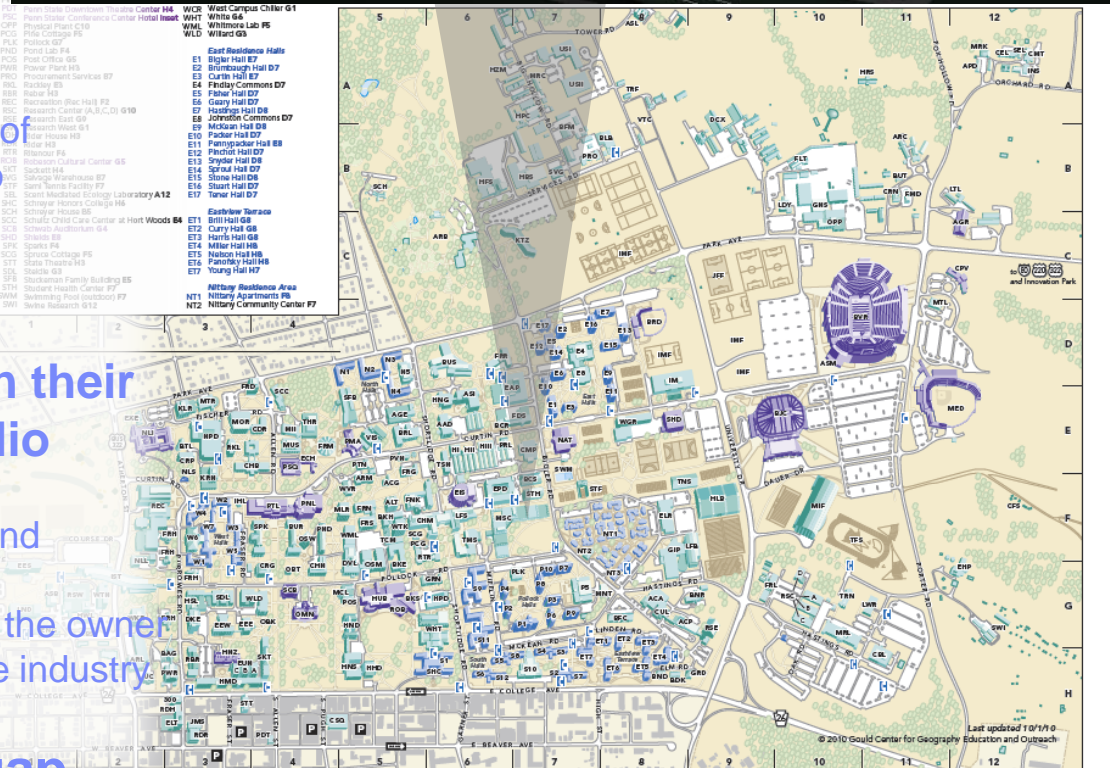


- The AEC Industry has a project centric view of buildings
 - Each project is unique with its own team contract approach, and data standards
- Owner has a portfolio centric view
 - Example:
 - Major US university has 1800+ building over 2000 sq ft
 - US government agencies have portfolios of buildings ranging from several hundred to tens of thousands
 - All those building exist together in the owners CAFM and IWMS systems
 - The Owner needs consistency in their CAFM system across the portfolio
 - If the owner has established standards for location/room names, equipment names and classification, the project should use them
 - If not, the project team needs to work with the owner to establish standards or select acceptable industry standards,
 - Hand-over has to bridge the gap



provide
2010-11

100 100 Building, The West
101 100 Building, The West
102 100 Building, The West
103 100 Building, The West
104 100 Building, The West
105 100 Building, The West
106 100 Building, The West
107 100 Building, The West
108 100 Building, The West
109 100 Building, The West
110 100 Building, The West
111 100 Building, The West
112 100 Building, The West
113 100 Building, The West
114 100 Building, The West
115 100 Building, The West
116 100 Building, The West
117 100 Building, The West
118 100 Building, The West
119 100 Building, The West
120 100 Building, The West
121 100 Building, The West
122 100 Building, The West
123 100 Building, The West
124 100 Building, The West
125 100 Building, The West
126 100 Building, The West
127 100 Building, The West
128 100 Building, The West
129 100 Building, The West
130 100 Building, The West
131 100 Building, The West
132 100 Building, The West
133 100 Building, The West
134 100 Building, The West
135 100 Building, The West
136 100 Building, The West
137 100 Building, The West
138 100 Building, The West
139 100 Building, The West
140 100 Building, The West
141 100 Building, The West
142 100 Building, The West
143 100 Building, The West
144 100 Building, The West
145 100 Building, The West
146 100 Building, The West
147 100 Building, The West
148 100 Building, The West
149 100 Building, The West
150 100 Building, The West
151 100 Building, The West
152 100 Building, The West
153 100 Building, The West
154 100 Building, The West
155 100 Building, The West
156 100 Building, The West
157 100 Building, The West
158 100 Building, The West
159 100 Building, The West
160 100 Building, The West
161 100 Building, The West
162 100 Building, The West
163 100 Building, The West
164 100 Building, The West
165 100 Building, The West
166 100 Building, The West
167 100 Building, The West
168 100 Building, The West
169 100 Building, The West
170 100 Building, The West
171 100 Building, The West
172 100 Building, The West
173 100 Building, The West
174 100 Building, The West
175 100 Building, The West
176 100 Building, The West
177 100 Building, The West
178 100 Building, The West
179 100 Building, The West
180 100 Building, The West
181 100 Building, The West
182 100 Building, The West
183 100 Building, The West
184 100 Building, The West
185 100 Building, The West
186 100 Building, The West
187 100 Building, The West
188 100 Building, The West
189 100 Building, The West
190 100 Building, The West
191 100 Building, The West
192 100 Building, The West
193 100 Building, The West
194 100 Building, The West
195 100 Building, The West
196 100 Building, The West
197 100 Building, The West
198 100 Building, The West
199 100 Building, The West
200 100 Building, The West



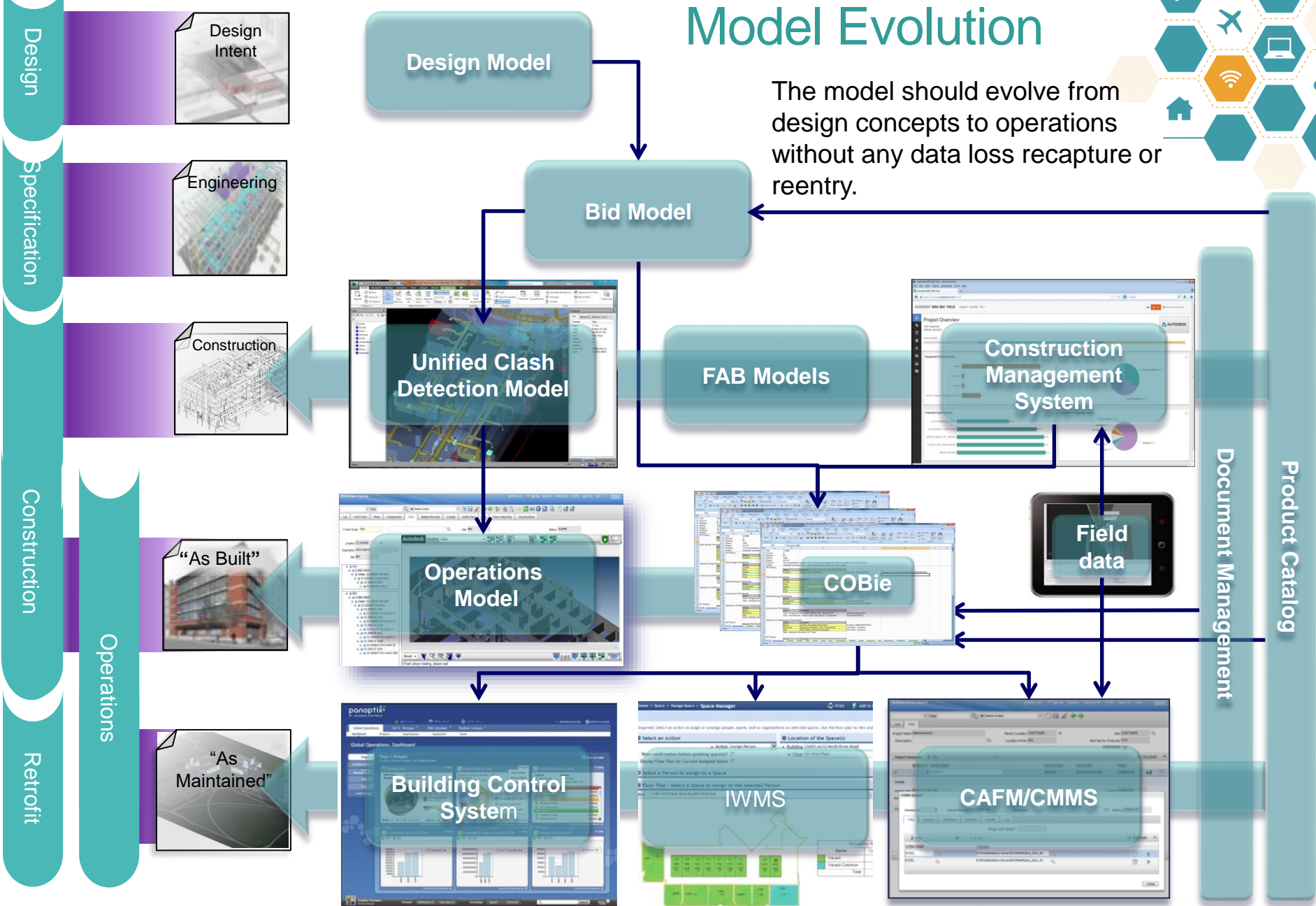
Agreements required for a successful Digital hand-off



- For which asset will data be provided?
- For each class of assets, What set of attributes are expected?
 - What classification hierarchy will be used?
 - Is hand-over data expected in a standard format such as COBie
 - How is Equipment named?
 - When is the data expected?
 - If there is to be more than one drop,
 - what data is required for each drop?
- Is digital product and maintenance documentation part of the Hand-over package?
 - If not, how are these files to be organized and delivered
 - What System will the owner use to store and manage these files?
- How and when are barcodes assigned?

Model Evolution

The model should evolve from design concepts to operations without any data loss recapture or reentry.



What is COBie?



Construction
Operations
Building
Information
exchange

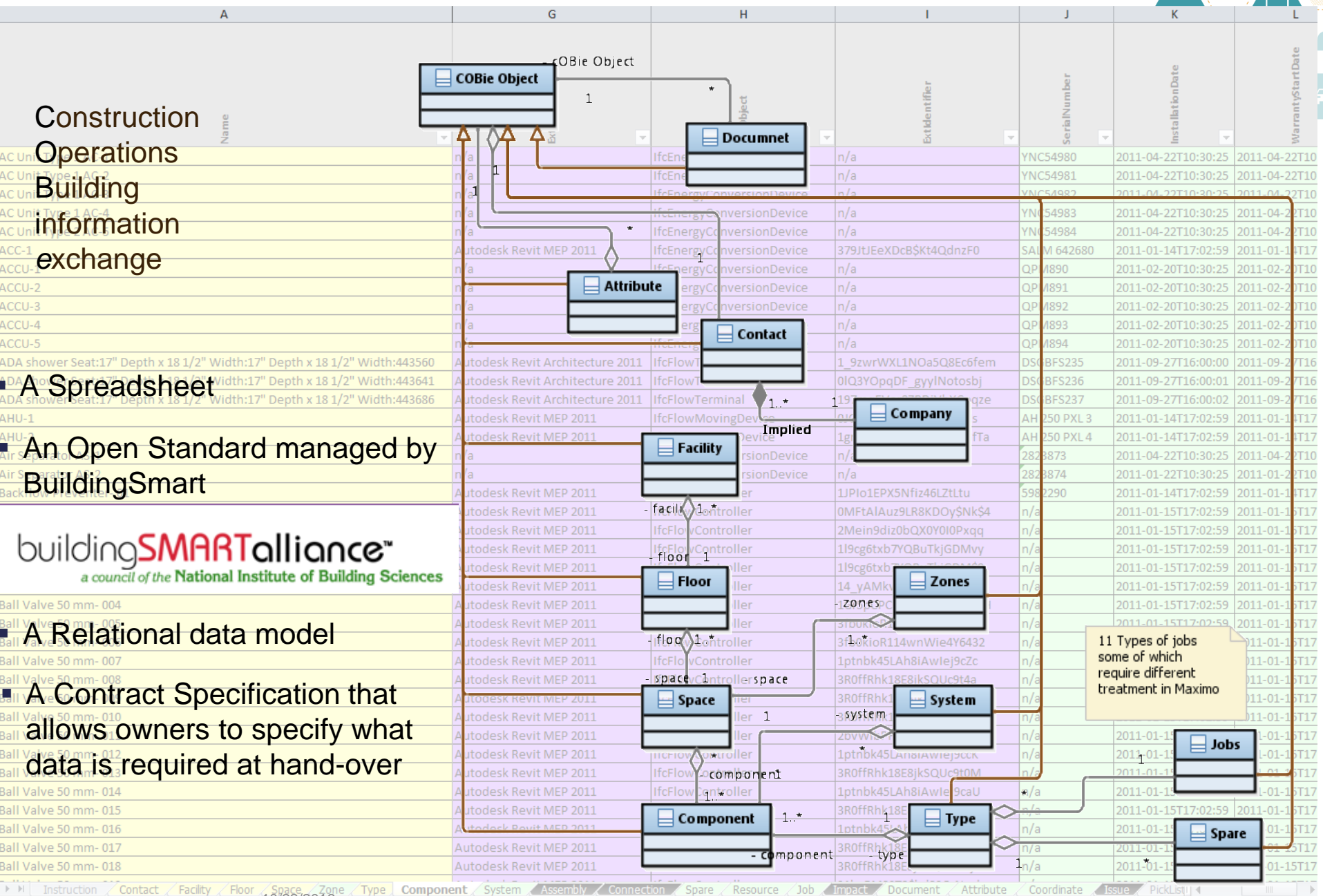
■ A Spreadsheet

■ An Open Standard managed by
BuildingSMART

buildingSMARTalliance™
a council of the National Institute of Building Sciences

■ A Relational data model

■ A Contract Specification that
allows owners to specify what
data is required at hand-over





COBie Structure

Facility: Single record describing Facility, Site, and Project

- Every COBie package must have exactly one Facility

Floor: Level or Floor,

- Implicitly reference Facility

Space: Rooms or other indoor or outdoor bounded spaces

- References Floor

Component: Any building element that is not a space.

- References Space and Type.

Type: Think Family. Describes characteristics common to many components

- References Contact

Zone: A collection of Spaces

System: A collection of Components

Job: A sequential set of steps describing a maintenance procedure

- References Space and Type.

Contact: Contact reference by email. May imply a company

Attributes: Properties- Name-value pairs

- Can reference any row on any other table

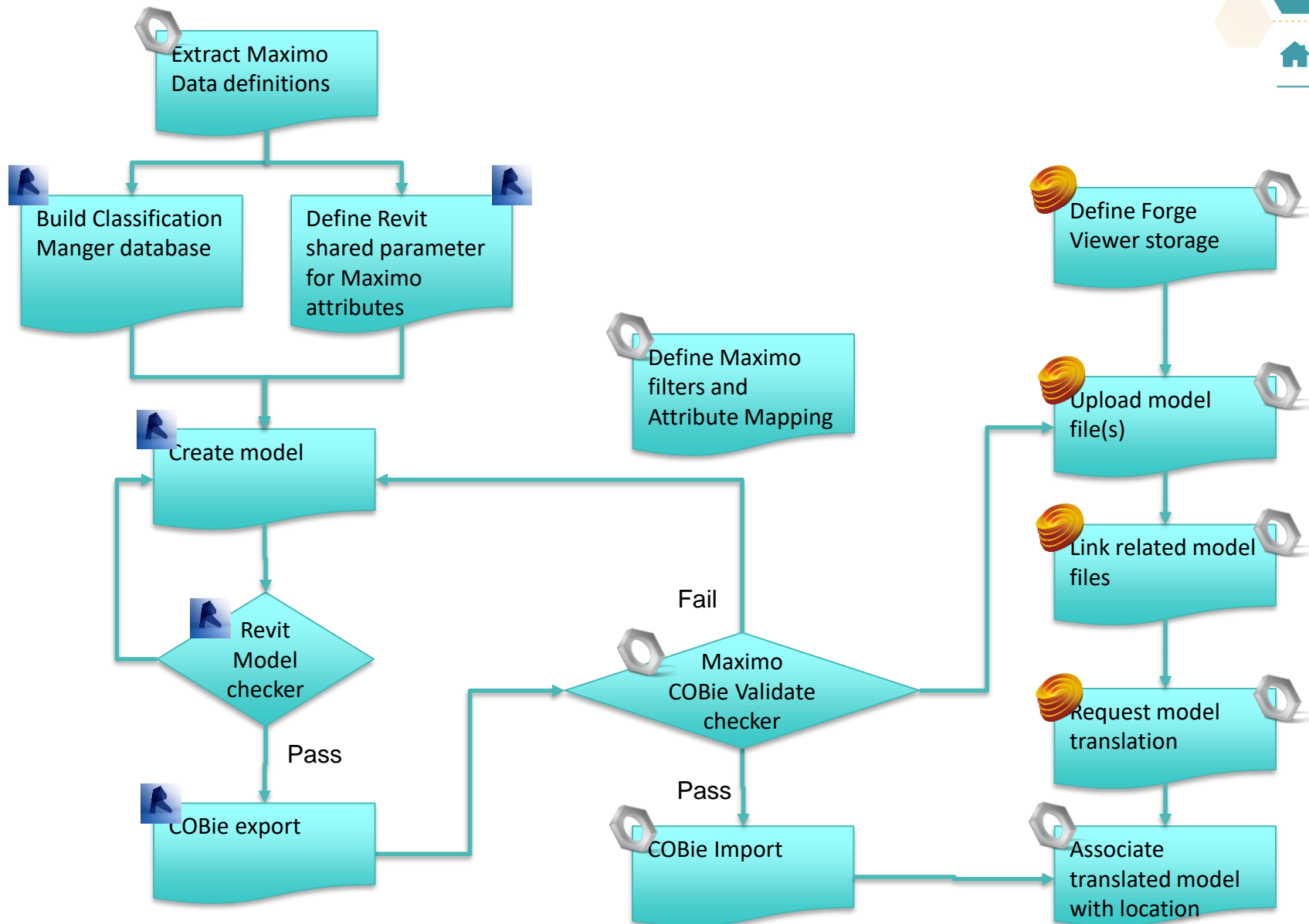
Document: References to files or URLs

- Can reference any row on any other table

Design models such as those done in Revit contain:

- Facility (Implied)
- Floor, Space, Component, Attributes
- Some Types
- May have system or zone

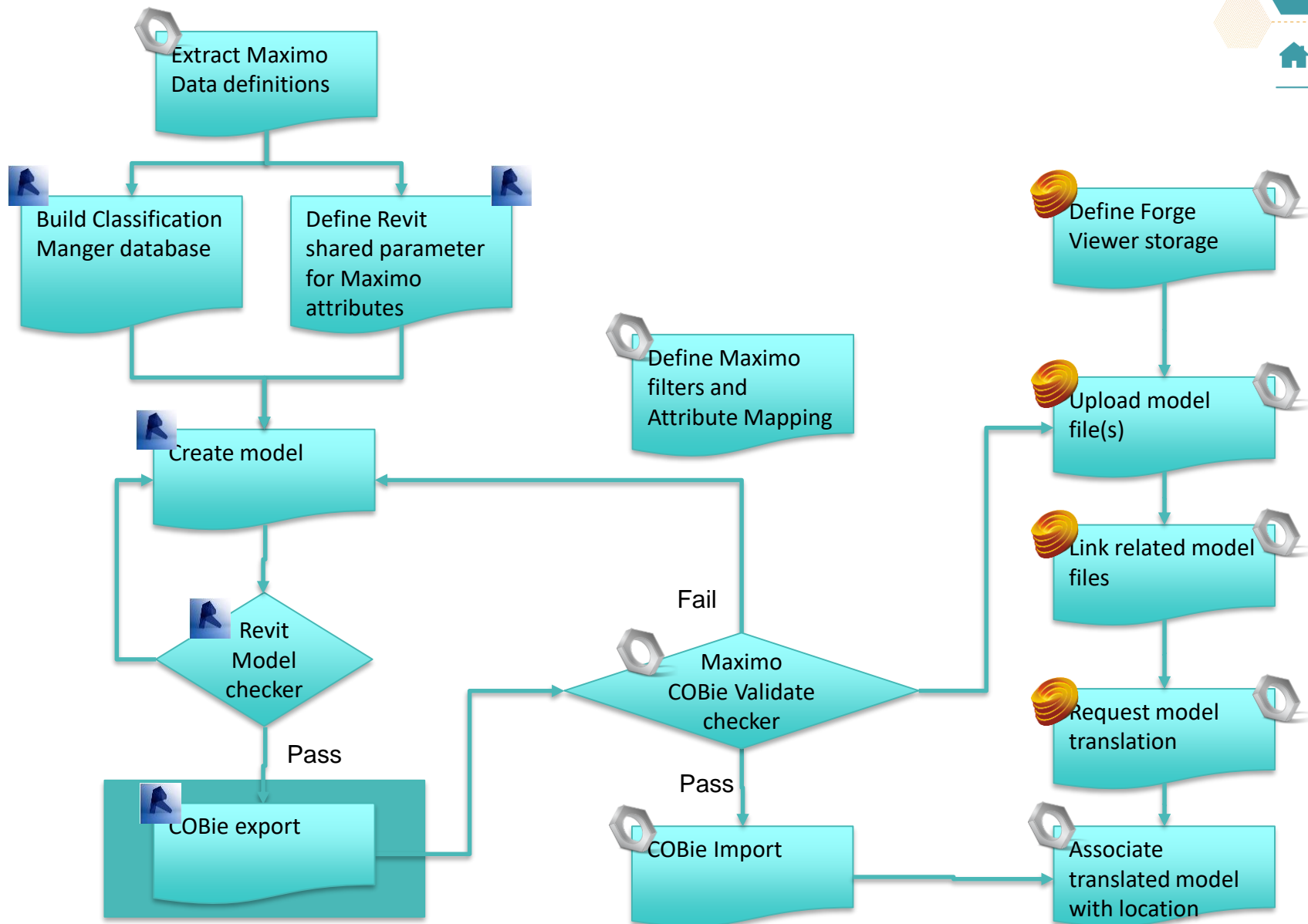
BIM data flow from Revit to Maximo





Data Export from Revit

Revit COBie Export



Get the right toolkit

<http://www.biminteroperabilitytools.com/>



BIM Interoperability Tools

Free add-ins for Autodesk Revit® to help architects, engineers, contractors and owners with their Building Information Modeling (BIM) workflows.



Autodesk
Model Checker
for Revit

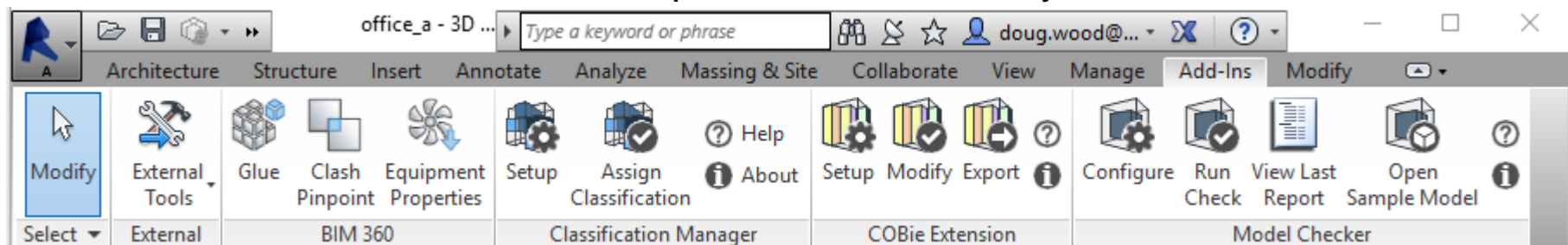
Autodesk
Model Checker Configurator
for Revit

Autodesk
COBie Extension
for Revit

Autodesk
Classification Manager
for Revit

Revit includes free add-in toolkits to validate that the model is COBie compliant, and to extract COBie data from the model

Version 2.0 icons are different from previous version so you can tell what is installed



Steps to Run COBie Export



Setup

☐ Contacts

- Create Contact

☐ Settings

- Specify ID formats: Space, Type, Component, System
- Select attributes for export



Modify

☐ Zone Manager: Create Zones

☐ Elements: Select Family, Type, and Elements to export

☐ Other Elements: Copy data to COBie schedules



Export

☐ Select sheets and run export

Contact setup

A company registry is build in the COBie toolkit contact tool. This list becomes the Contact table of the COBie file

| Parameter | Value |
|---------------------------|----------------|
| Electrical | |
| Voltage | 208.00 V |
| Load Classification | Cooling |
| Poles | 3 |
| Electrical - Loads | |
| Apparent Load | 1040.00 VA |
| Dimensions | |
| Width | 2.5000 |
| Length | 4.5000 |
| Height | 1.8000 |
| Dimension H | 3.8050 |
| Dimension G | 0.6950 |
| Dimension F | 2.4000 |
| Dimension E | 1.5000 |
| Dimension D | 1.5000 |
| Dimension A | 2400.0 |
| Condensate Radius | 10.0 mm |
| Condensate Diameter | 20.0 mm |
| Identity Data | |
| Manufacturer | sales@York.com |
| Assembly Code | |
| Type Image | |
| Keynote | |
| Model | |

Companies for the contact list are used for the Manufacture property in Revit type. The email from the contact definition is used as the value of the Manufacturer property

| A | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
|----------------------------|--------------|----------------|----------------|--------------------|------------|------------------|-----------|------------|--------------------------|-----------|----------------|-------------|------------|---------|
| Email | Phone | ExternalSystem | ExternalObject | ExternalIdentifier | Department | OrganizationCode | GivenName | FamilyName | Street | PostalBox | Town | StateRegion | PostalCode | Country |
| sales@cooperindustries.com | 770-486-4800 | n/a | n/a | n/a | sales | n/a | n/a | n/a | 1121 Highway 74 South | n/a | Peachtree City | GA | 30269 | USA |
| sales@dataaire.com | 714-921-6000 | n/a | n/a | n/a | sales | n/a | n/a | n/a | 230 W. Blue Ridge Avenue | n/a | Orange | CA | 92865-4225 | USA |
| sales@eaton.com | 412-893-3300 | n/a | n/a | n/a | sales | n/a | n/a | n/a | 1000 Cherrington Parkway | n/a | Moon Township | PA | 15108 | USA |

Room and Space – Typical use



COBie data for all files in the model are concatenated together to create a single COBie file. When elements with the same name appear in different model files, the name must be disambiguated before it is added to the COBie file

Revit category is added to space and room names to disambiguate them

| | |
|---------------------------|-------------------|
| Rooms (1) | |
| Edit Type | |
| Constraints | |
| Level | Level 1 |
| Upper Limit | Level 1 |
| Limit Offset | 2.5000 |
| Base Offset | 0.0000 |
| Dimensions | |
| Identity Data | |
| Number | 102 |
| Name | DUTY OFCR |
| OmniClass Table 13 Cat... | 13-15 11 34: A... |

| | |
|-------------------------|------------------|
| Spaces (1) | |
| Edit Type | |
| Constraints | |
| Electrical - Lighting | |
| Electrical - Loads | |
| Mechanical - Flow | |
| Dimensions | |
| Identity Data | |
| Number | 102 |
| Name | DUTY OFCR |
| Room Number | 102 |
| Room Name | DUTY OFCR |
| OmniClass Table 13 C... | 13-15 11 34: ... |

| Name | |
|-----------|--|
| Level 1 | |
| Level 2 | |
| T/FDN | |
| Roof | |
| Rooms_101 | |
| Rooms_102 | |
| Rooms_103 | |
| Rooms_104 | |
| Rooms_105 | |
| Spaces101 | |
| Spaces102 | |
| Spaces103 | |
| Spaces104 | |
| Spaces105 | |

| | |
|---|-------------|
| COBie Upload | |
| Session ID: | 8 |
| Description: | |
| Files Import/Update Options Faci | |
| Merge with previous import: Merge with existing | |
| Filter > 1 - | |
| COBie Sheet | File Name |
| EXCEL | Office.xlsx |

| Location | Description |
|-----------------------|-------------|
| 102 | 102 |
| IC-LEVEL 1-ROOMS_102 | Rooms_102 |
| IC-LEVEL 1-ROOMS_S102 | Rooms_S102 |
| IC-LEVEL 1-SPACES102 | Spaces102 |
| IC-LEVEL 1-SPACESS102 | SpacesS102 |

Two Maximo records are created for the same physical space

| | |
|-----------------|---|
| Space Name | |
| Field Separator | _ |
| Fields | |
| Revit Category | |
| Number | |

Room and Space setup – For Maximo



A separate COBie file is produced for each file in the model

| | | |
|---------------------------|-------------------|-----------|
| Rooms (1) | ▼ | Edit Type |
| Constraints | | |
| Level | Level 1 | |
| Upper Limit | Level 1 | |
| Limit Offset | 2.5000 | |
| Base Offset | 0.0000 | |
| Dimensions | | |
| Identity Data | | |
| Number | 102 | |
| Name | DUTY OFCR | |
| OmniClass Table 13 Cat... | 13-15 11 34: A... | |

| | |
|---------|-----|
| A | |
| Name | |
| Level 1 | |
| Level 2 | |
| T/FDN | |
| Roof | |
| 1 | |
| 2 | 101 |
| 3 | 102 |
| 4 | 103 |
| 5 | 104 |
| 6 | 105 |

Room and Space names match

| | | |
|-------------------------|------------------|-----------|
| Spaces (1) | ▼ | Edit Type |
| Constraints | | |
| Electrical - Lighting | | |
| Electrical - Loads | | |
| Mechanical - Flow | | |
| Dimensions | | |
| Identity Data | | |
| Number | 102 | |
| Name | DUTY OFCR | |
| Room Number | 102 | |
| Room Name | DUTY OFCR | |
| OmniClass Table 13 C... | 13-15 11 34: ... | |

| | |
|---------|-----|
| A | |
| Name | |
| Level 1 | |
| Level 2 | |
| T/FDN | |
| Roof | |
| 1 | |
| 2 | 101 |
| 3 | 102 |
| 4 | 103 |
| 5 | 104 |
| 6 | 105 |

COBie Upload

Session ID: 9

Description:

Files Import/Update Options

Merge with previous import:

Filter >

| COBie Sheet | File Name |
|-------------|-----------------|
| EXCEL | Office_a.xlsx |
| EXCEL | Office_mep.xlsx |

| Location | Description |
|----------------|-------------|
| IC-LEVEL 1 | Level 1 |
| IC-LEVEL 1-101 | 101 |
| IC-LEVEL 1-102 | 102 |
| IC-LEVEL 1-103 | 103 |
| IC-LEVEL 1-104 | 104 |

Rows with the same name in different files are merged on import into Maximo creating a single Maximo record

COBie Type name



Goal: To create an Identifier for COBie types that is both unique and human readable. How this is done depends on what data is in the model and what is desired in Maximo. A generally workable set of choices is displayed to the right. The Type Mark is expected to be unique. The other fields provide human readable information.

Type

Specify properties for the COBie type spreadsheet.

Name

☒ Field Separator

Fields

| | | |
|-------------------------------------|----------------|---|
| <input checked="" type="checkbox"/> | Revit Category | ↕ |
| <input checked="" type="checkbox"/> | Family | ↕ |
| <input checked="" type="checkbox"/> | Type | ↕ |
| <input checked="" type="checkbox"/> | Type Mark | ↕ |

Preview

MyCategory_MyFamily_MyType_123

COBie Type name becomes the Maximo Product Name

Making Revit Families Room Aware

The screenshot displays the Revit Family Editor interface. The Properties panel on the left is expanded, showing the 'Room Calculation Point' checkbox checked and circled in red. The 3D model in the center shows a mechanical unit with a green dashed line indicating the room calculation point, which is also circled in red. The text 'Some families may need to be made "Room Aware" to properly associate with a Room or Space' is overlaid on the model.

Properties

Family: Mechanical Equipment Edit Type

Constraints

Host

Mechanical

Part Type Normal

Dimensions

Round Connector Dimension Use Radius

Identity Data

OmniClass Number 23.75.70.21.24.14

OmniClass Title Variable Volume ...

Other

Work Plane-Based ☐

Always vertical ☒

Cut with Voids When Loaded ☐

Shared ☐

Room Calculation Point ☒

Properties help Apply

Project Browser - M_VAV Unit - Sin... Properties

1: 20

Click to select, TAB for alternates, CTRL adds, SHIFT unselects.

Some families may need to be made "Room Aware" to properly associate with a Room or Space

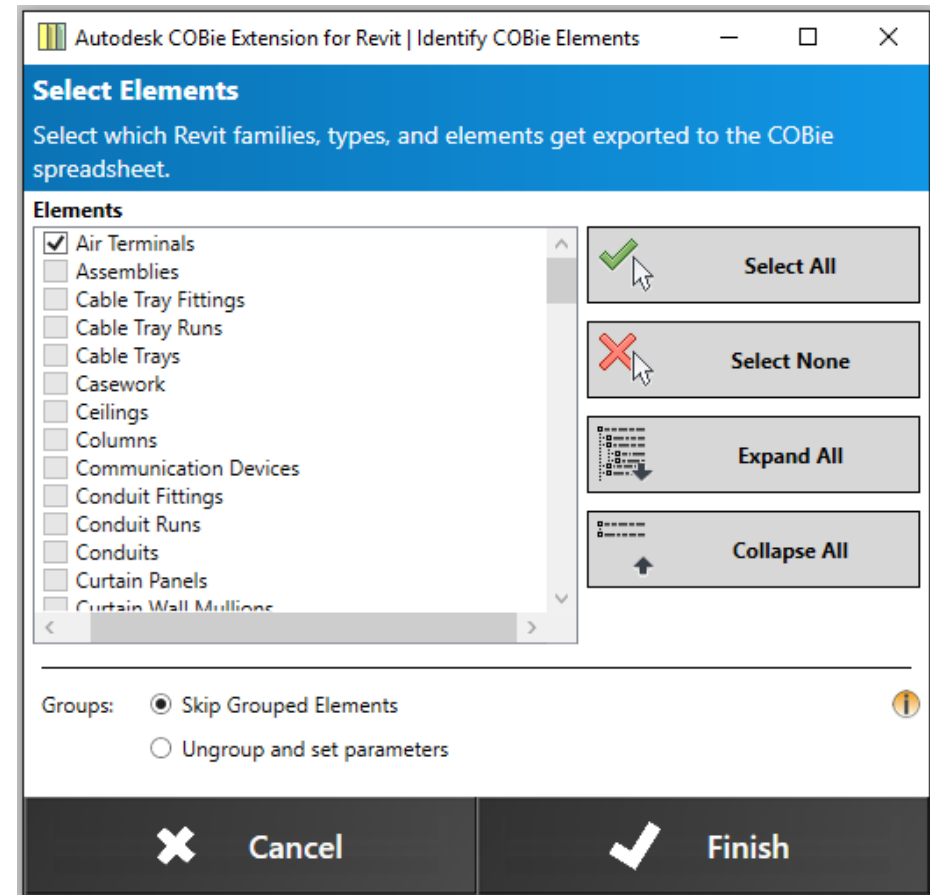
Select Elements



Select by family and type what is exported

Recommendation:

- If you are getting your COBie from someone else, err on the side of caution and request anything you might want, then filter at the Maximo import
- If you are doing your own import, then its worth spending some time fine tuning this and working with the import filters
- When new elements are added to the model, by default they are not included in the COBie data even if the top level family is check for the element. It is best to review this tab anytime the model has been modified since the last COBie export

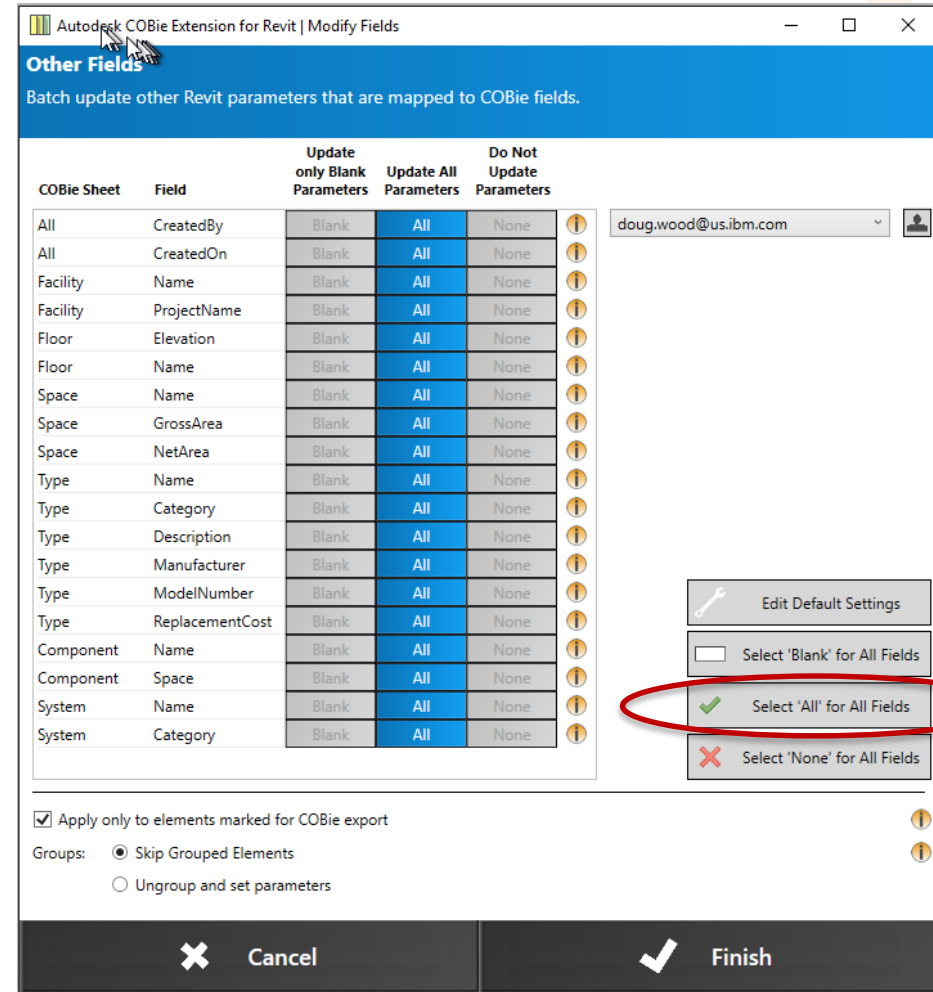


Other Fields

The COBie toolkit uses several instance and type parameter prefixed with COBie to store data before generating the COBie spreadsheet. Some of these field are copied directly from Revit properties, some are calculated, and some must be entered by the modeler. This step updates the copied and calculated field. It is possible to manually override the copied and calculated fields. The toolkit provides several options for updating these fields to prevent overwriting of manual overrides.

Best practice is to not override any values provide by the toolkit. Instead to insure that the necessary data in the model is provided so the toolkit generated the needed values.

If this is followed, then each time an updated COBie spreadsheet is to be generated, this screen must be visited and “Select All” clicked to cause all fields to be updated



The dialog box is titled "Autodesk COBie Extension for Revit | Modify Fields". It has a blue header bar with the text "Other Fields" and a subtitle "Batch update other Revit parameters that are mapped to COBie fields." Below the header is a table with columns: "COBie Sheet", "Field", "Update only Blank Parameters", "Update All Parameters", "Do Not Update Parameters", and a column of yellow warning icons. The table lists 20 rows of parameters. To the right of the table is a dropdown menu showing "doug.wood@us.ibm.com" and a user icon. Below the table are three buttons: "Edit Default Settings", "Select 'Blank' for All Fields", and "Select 'All' for All Fields". The "Select 'All' for All Fields" button is circled in red. Below these buttons is a checkbox "Apply only to elements marked for COBie export" which is checked. Below that are two radio buttons: "Skip Grouped Elements" (selected) and "Ungroup and set parameters". At the bottom are two large buttons: "Cancel" and "Finish".

| COBie Sheet | Field | Update only Blank Parameters | Update All Parameters | Do Not Update Parameters | |
|-------------|-----------------|------------------------------|-----------------------|--------------------------|---|
| All | CreatedBy | Blank | All | None | ! |
| All | CreatedOn | Blank | All | None | ! |
| Facility | Name | Blank | All | None | ! |
| Facility | ProjectName | Blank | All | None | ! |
| Floor | Elevation | Blank | All | None | ! |
| Floor | Name | Blank | All | None | ! |
| Space | Name | Blank | All | None | ! |
| Space | GrossArea | Blank | All | None | ! |
| Space | NetArea | Blank | All | None | ! |
| Type | Name | Blank | All | None | ! |
| Type | Category | Blank | All | None | ! |
| Type | Description | Blank | All | None | ! |
| Type | Manufacturer | Blank | All | None | ! |
| Type | ModelNumber | Blank | All | None | ! |
| Type | ReplacementCost | Blank | All | None | ! |
| Component | Name | Blank | All | None | ! |
| Component | Space | Blank | All | None | ! |
| System | Name | Blank | All | None | ! |
| System | Category | Blank | All | None | ! |

Apply only to elements marked for COBie export ☒

Groups: ☒ Skip Grouped Elements ☐ Ungroup and set parameters

Cancel Finish

COBie Export



For Maximo, always select “create new” allow Maximo to merge the COBie file from linked models


Autodesk COBie Extension for Revit | Export


Export
Choose your final options and then export to a COBie spreadsheet.

Select Worksheets


- ☒ Contact
- ☒ Facility
- ☒ Floor
- ☒ Space
- ☒ Zone
- ☒ Type
- ☒ Component
- ☒ System
- ☒ Attribute
- ☐ Coordinate



Choose an Action

☒ Create New 

☐ Append Existing 

Export to a File



 Cancel  Export

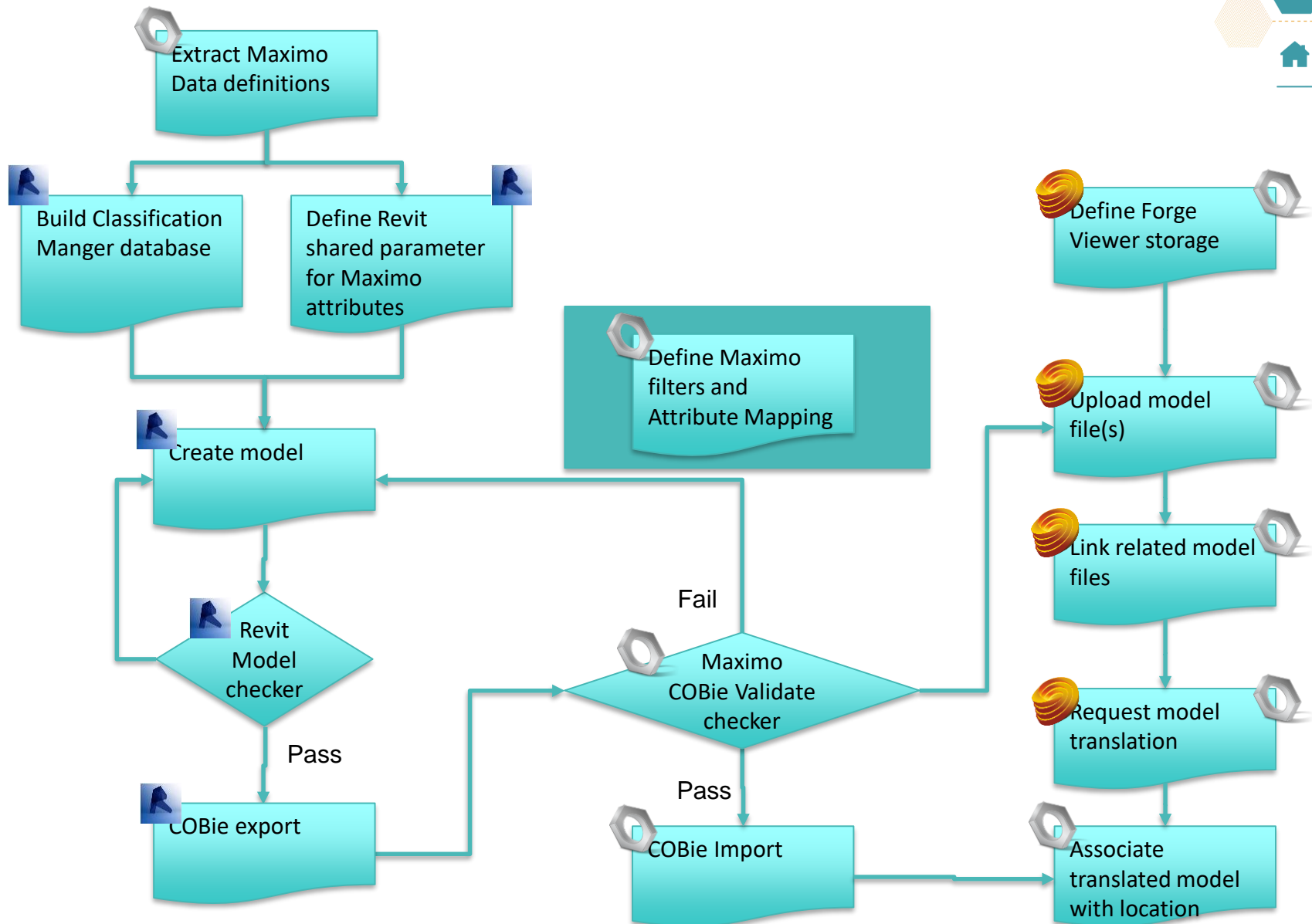
Maximo does not support the Coordinate table

Note: There are performance issue with the Excel interface. Writing large COBie data sets can take days to complete. Most of the data is attributes. Some careful though about what attributes are actually needed can improve export performance.



Data Import into Maximo

Maximo Model Validation



Define filters



Import Filters

Filter > 1 - 4 of 4

| Filter Name | Site | Organization |
|-----------------|-------|--------------|
| Design Attribut | | |
| CO-Types | COBIE | PUBLIC |
| CO-Floor | COBIE | PUBLIC |
| CO-Room | COBIE | |

Site: COBIE Organization: PUBLIC

Filter Name: CO-Types Filter type: EXCLUDE

Description: Asset types filtered on COBie office

COBie table the filter applies to

| COBie Table | Filter | Expression type |
|-------------|-------------------|-----------------|
| COMPONENT | Duplex Receptacle | SUBSTRING |
| COMPONENT | Lighting Switch | SUBSTRING |
| TYPE | 1220 x 1500 | EXACT |
| TYPE | 1000 x 2000 | EXACT |
| TYPE | 4000 x 1000 | EXACT |

Filter string

Filter Type

- Substring
- Exact Match
- Regular Expression

Filter either specifies what is included or what is excluded

New Row

New Row

Save Close

Filters provide control over what COBie data is imported.

- Filters are applied to the name field of the specified COBie table
- Filters stack. For exclude, if an item matches any filter it is excluded. For include, if an item matches any filter it is included
- Filters cascade.
 - Excluding a type excludes all components that reference the type.
 - Excluding a space excludes all components that reference it
 - Excluding a floor excludes all spaces, and therefore all components that reference it

Define Attribute Maps

There are two types of Attribute Map

- Mapping COBie attributes to fields in a Maximo table (Mbo). This is particularly useful when tables have been extended with custom fields that need to be populated with COBie data
- Overriding the attribute type name matching provided by the import. This is useful when the parameter names in the model don't conform to the enterprise standards

The image displays two screenshots of the Maximo web interface, illustrating how to define attribute maps.

Top Screenshot: Map Attributes to Specifications

This screen is used to specify the Maximo attribute types that are used to create specifications from COBie attributes. It includes a filter bar and a table with columns: Map Name, Site, Organization, and Common Attri.

Callouts for this screen:

- Override the import attribute name matching:** Points to the 'Common Attri' field.
- Maximo attribute type:** Points to the 'Map to Specification' column header.
- COBie Attribute name:** Points to the 'Map from Attribute' column header.

Bottom Screenshot: Map Attributes to Fields

This screen is used to specify the attributes that are copied from COBie files to Maximo fields. It includes a filter bar and a table with columns: Map Name, Site, Organization, and Installation Date.

Callouts for this screen:

- Mbo name and field:** Points to the 'Map to Table' column header.
- COBie Attribute name:** Points to the 'Map from Attribute' column header.
- Populate custom Mbo fields with COBie data:** Points to the 'Map to Attribute' column header.

Both screenshots include 'Save' and 'Close' buttons at the bottom right.

Add Attribute Maps to the Project



IBM Projects MAXADMIN

Find Project ID

List View Project Mappings

Project Name: Barton Keep B and B Organization: EAGLENA

Attribute Field Maps

1 - 1 of 1

| Attribute Map Name | Description |
|--------------------|----------------------------------|
| Installation Date | Map Installation Date for assets |

Site: Organization: Filter 1 - 1 of 1

Map Name: Installation Date

Description: Map Installation Date for assets

Map to Table Map to Attribute Map from Attribute

| ASSET | EQ6 | InstallationDate |
|-------|-----|------------------|
|-------|-----|------------------|

New Row

Attribute Specifications

1 - 1 of 1

| Type Map Name | Description |
|------------------|---|
| Common Attribute | Attribute types that are common in BIM data a |

Site: Organization: Filter 1 - 3 of 3

Map Name: Common Attribute

Description: Attribute types that are common in BIM data and colide with s

Map to Specification Specification Description Map from Attribute

| BLDGMATERIAL | Building Material | Material |
|--------------|---------------------------------|---------------|
| BLDGMATERIAL | Building Material | Body Material |
| ROOM AREA | Make area specific to buildings | AREA |

New Row

Field Map selected from library

Specification Map selected from library

Specification and Field maps are create independently of an import project in a reusable library then associated with projects and session

Session map can over ride project map. Session maps should be used sparingly. They are only intended to address project compliance issues.

Import COBie Data

Session Number: 9 Status: NEW

Description: Upload Time:

Files Options Filters Advanced Log Records

Specification Map Name: Field Map Name:

Common Attrib Installation Date

Defaults

Classification:

Service Address: Ship to Address:

Bill to Address: GL Account:

Save Import Cancel

Map COBie systems to Maximo Systems



BIM Projects MAXADMIN

Find Project ID

List View Project **Mappings**

Project Name: Barton Keep B and B Site: VF Organization: EAGLENA

Attribute Field Maps Filter > 1 - 1 of 1

| Attribute Map Name | Description |
|--------------------|----------------------------------|
| Installation Date | Map Installation Date for assets |

New Row

Filter > 1 - 1 of 1

es that are common in BIM data a

New Row

System Mappings Filter > 1 - 5 of 5

| Map from COBie System | Connect to Maximo System | Network? | Connection Location |
|--|--------------------------|--------------------------|---------------------|
| Electrical Circuits_Power_Panel - Gen2 | | <input type="checkbox"/> | |
| Electrical Circuits_Power_Panel 2-4 | | <input type="checkbox"/> | |
| Switch System_Switch System (Bakeing are) | | <input type="checkbox"/> | |
| Switch System_Switch System (Stair Scones) | | <input type="checkbox"/> | |
| BK-Gigabit Ethernet | INTERNET | <input type="checkbox"/> | VALLEY FOR |

New Row

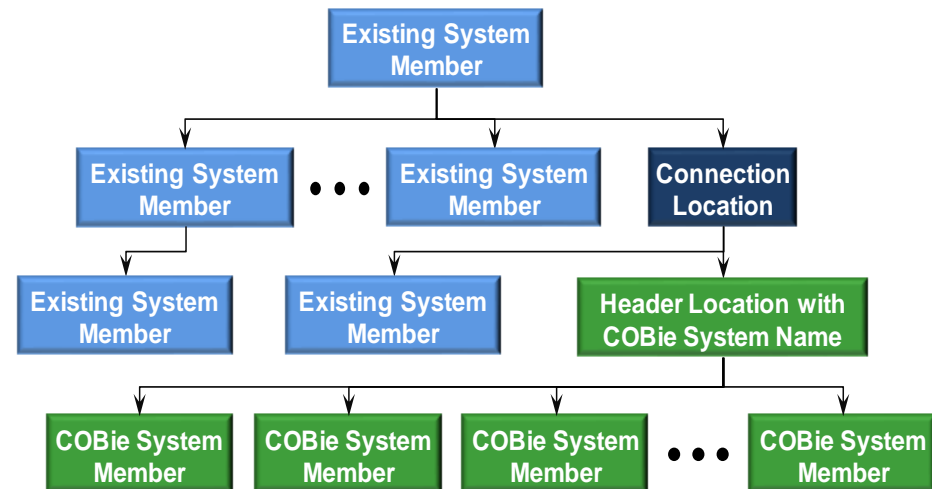
List of all systems in the model generated by validate or individual system names manually entered

Maximo system to which Model system is to be appended

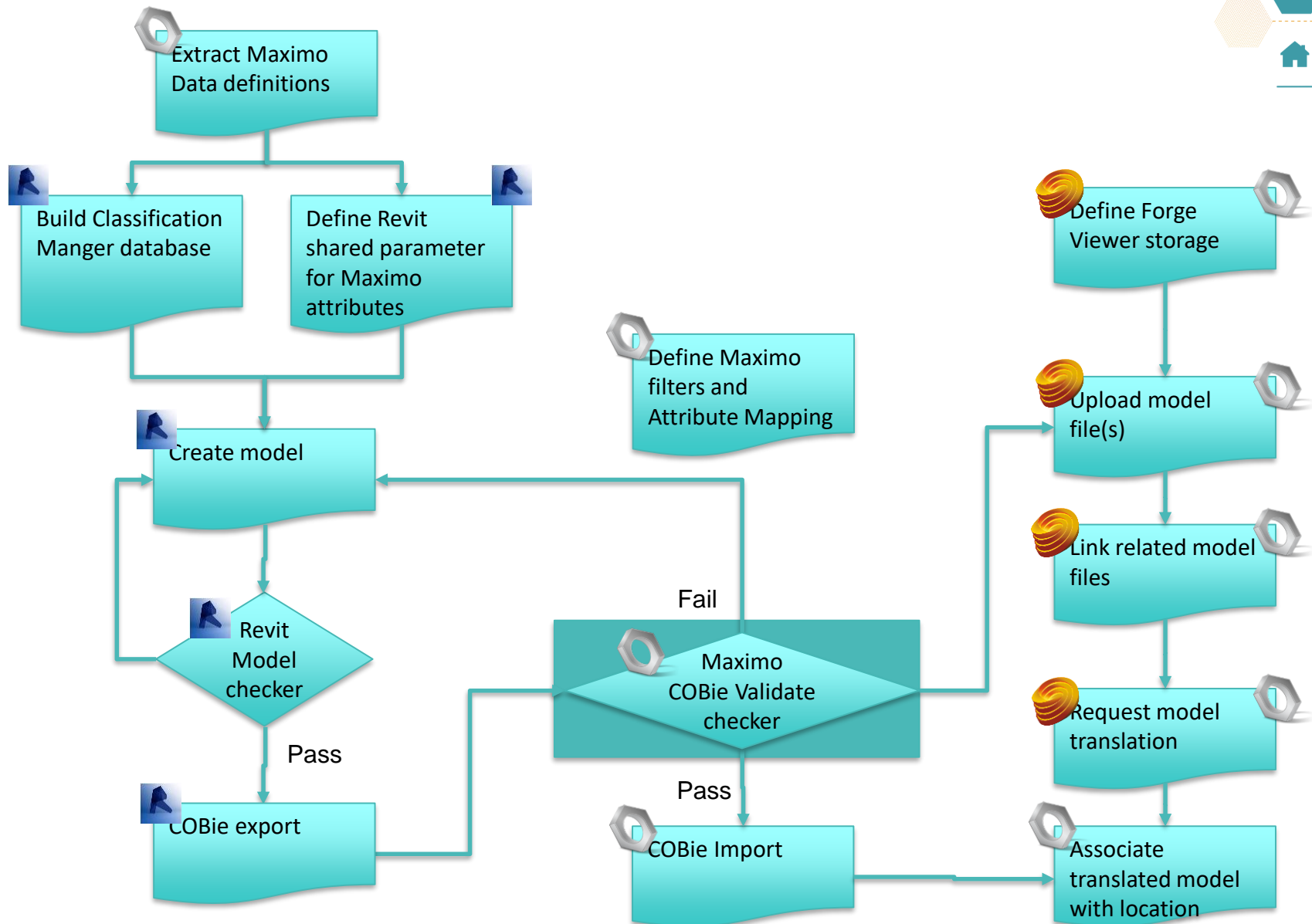
Location where model system is appended

BIM models typically have a large number of small flat systems. For example: Each electrical circuit is a system. Maximo typically has a small number of large deep systems. For example: The electrical grid for a site. The system map allows systems from a COBie file to be appended to an existing Maximo system at a specified point instead of creating a new Maximo system.

The list of all systems in a model may be extracted by running a validate session



Maximo Model Validation



Model Validation – Create Import Project



BIM Projects MAXADMIN

Find Project ID

List View Project Mappings

Project Name: Executive Briefing Center

Description:

Parent Location: VALLEY FORGE

Location Prefix: EBC

Item Set for Products: SET1

Organization: EAGLENA

Site: VF

Attachments

Unique human readable project name

This will be the parent location for the location tree created by the import starting with a location for the Facility

A value that uniquely identifies the building in Maximo. Used as a prefix for auto-generated values for Location and AssetNum

Site used for imported data

Project Sessions 1 of 1

| Session Number | Facility Name | Session Type | Upload Time | Status |
|----------------|---------------------------|--------------|------------------|----------|
| 4 | Executive Briefing Center | MERGE | 9/16/16 12:35 AM | COMPLETE |

New Session

Model Validation – Create Validate Session



BIM Projects MAXADMIN

Find Project ID

List View Project Mappings

Project Name: Executive Briefing Center

Description:

Parent Location: VALLEY FORCE

Location Prefix: EBC

Item Set for Products: SET1

Organization: EAGLENA

Site: VF

[Attachments](#)

Project Sessions Filter 0 - 0 of 0

| Session Number | Facility Name | Session Type | Upload Time | Status |
|-------------------------------|---------------|--------------|-------------|--------|
| There are no rows to display. | | | | |

Select Session Type

Session Type:

☐ Validate

☒ Import

☐ Merge

OK Cancel

Select Session

Create a new session for any import or export activity

Model Validation – Merging Models



Validate COBie Data

Session Number: Status:

Description: Upload Time:

Files Options Filters Advanced Log Records

Merge with existing data:

COBie File Format **File Name**

| | |
|-------|-------------------------------|
| EXCEL | ExecutiveBriefingCenterr.xlsx |
|-------|-------------------------------|

New Row

Save Validate Cancel

If model data is to be add to or overloaded on existing Maximo data for the facility, then a Merge session should be used.

For a Merge session to work, the location and assetnum field values generated by the import need to match the values of the Maximo records they are to be merged with. There are several strategies to accomplish this. Careful use of both the COBie toolkit ID generation setting and the Maximo COBie import ID generation settings can help, but there will usually be some amount of manually work

Once the merge is complete, the Maximo records are linked to the model and subsequent import and updates will automatically match against the data. The linking also allows the viewer to be used for these records

Model Validation – Sample validate messages



ATTRIBUTE:SYSTEM:Mechanical Supply Air 1:Number of Elements is a duplicate

COMPONENT:Mechanical Equipment_41_593090 is missing a reference to SPACE

The reference in TYPE:Plumbing Fixtures_M_Grab Bars_8370-001420 to CONTACT:Bradley Corporation cannot be resolved

Validate ATTRIBUTE TYPE ==> Supply Air Inlet Diameter

Warning: ATTRIBUTE TYPE Supply Air Inlet Diameter Invalid units HVAC_DUCT_SIZE. Units must be defined in Maximo before they can be imported

Validate ATTRIBUTE TYPE ==> Lighting - Dwelling Unit Connected

Warning: ATTRIBUTE TYPE Lighting - Dwelling Unit Connected Invalid units ELECTRICAL_APPARENT_POWER. Units must be defined in Maximo before they can be imported

Validate CONTACT ==> doug.wood@us.ibm.com

Warning: Item CONTACT:doug.wood@us.ibm.com - Category Software Architect not found. Categories must be a valid Maximo classification

Validate FACILITY ==> BSA Office

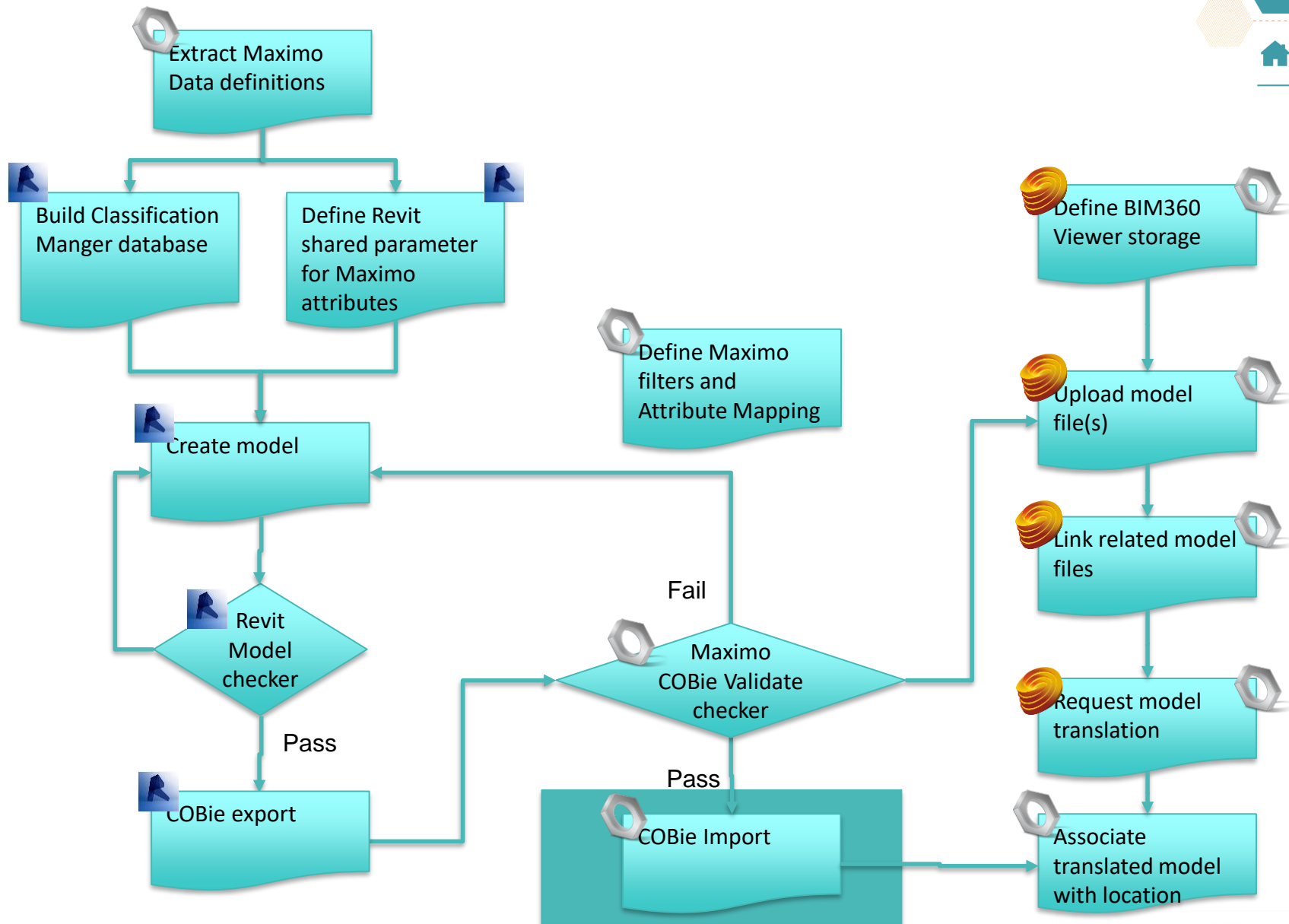
Validate FLOOR ==> Level 1

Validate SPACE ==> 104

Validate COMPONENT ==> Lighting Devices_646165

Validate SYSTEM ==> Switch System

Maximo Model Validation



COBie Upload

The screenshot displays the 'Building Model Import/Export' application interface. At the top, the title bar shows 'MAXADMIN' and various navigation icons. Below the title bar, there's a search bar with 'Find Project ID' and a 'Select Action' dropdown. The main content area shows a table of import sessions. A modal dialog titled 'Select new session type' is open, allowing the user to choose between 'Validate', 'Import' (selected), and 'Update'. The background interface includes a table with columns for Session ID, Facility Name, Session Type, Upload Time, and Status. The table shows one session for 'BSA Office' with a status of 'COMPLETE'. Below the table, there are sections for 'Details' (Upload Time, Imported By) and 'Facility description' (Facility Location ID, Facility Name, Linear Units, Volume Units, Area Units, Currency Units). A 'New Row' button is located at the bottom right of the table area.

Building Model Import/Export

MAXADMIN

Query Find Project ID Select Action

Site: INTERCON

Attachments

Import sessions Filter 1 - 1 of 1

| Session ID | Facility Name | Session Type | Upload Time | Status |
|------------|---------------|--------------|------------------|----------|
| 1 | BSA Office | | 3/14/16 10:03 PM | COMPLETE |

Details

Upload Time: 3/14/16 10:03 PM

Imported By: MAXADMIN

Facility description

Facility Location ID: BSO00000000 Facility Name: BSA Office

Linear Units: Volume Units:

Area Units: Currency Units:

OK Cancel

New Row

Importing COBie files



Import COBie Data

Session Number: Status: COMPLETE

Description: Upload Time: 9/16/16 12:31 AM

Files Options Filters Advanced Log Records

Merge with previous import:

Filter > 1 - 3 of 3

| COBie File Format | File Name |
|-------------------|---------------------------|
| EXCEL | Barton Keep.xlsx |
| EXCEL | Barton Keep MEP.xlsx |
| EXCEL | Barton Keep Products.xlsx |

Select Tables to Import

| Facility? | Component? | Contacts? |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Floor? | Type? | Documents? |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Space? | System? | Attributes? |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Zone? | Job? | Resource? |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Assembly? | Spares? |
| | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Close

Add filters here

Specify the attribute map here

COBie files from linked models are merged here

Select table to import

COBie Log Record



COBie Upload

Session ID:

Status:

Description:

Upload Time:

Files

Options

Filters

Facility

Advanced

Log

Logging Level:

Percentage of Import Complete:

Number of Errors:

Refresh

Updates the % complete and the # of errors.

Log:

Loading files...

File c:/bim/import/COBie/BuildingSmart Office/12/Office_Architectural.xlsx loaded

File c:/bim/import/COBie/BuildingSmart Office/12/Office_MEP.xlsx loaded

2338 items to process

Match: Item ATTRIBUTE TYPE:AREA - Area Matched to an existing record

Match: Item ATTRIBUTE TYPE:ASSEMBLYPLACE - AssemblyPlace Matched to an existing record

Match: Item ATTRIBUTE TYPE:ASSETACCOUNTINGTYPE - AssetAccountingType Matched to an existing record

Match: Item ATTRIBUTE TYPE:BASE OFFSET - Base Offset Matched to an existing record

Match: Item ATTRIBUTE TYPE:CATEGORY CODE - Category Code Matched to an existing record

Match: Item ATTRIBUTE TYPE:CATEGORY DESCRIPTION - Category Description Matched to an existing record

Match: Item ATTRIBUTE TYPE:CIRCULATIONZONENAME - CirculationZoneName Matched to an existing record

Match: Item ATTRIBUTE TYPE:CLIENT NAME - Client Name Matched to an existing record

Match: Item ATTRIBUTE TYPE:COLOR - Color Matched to an existing record

Match: Item ATTRIBUTE TYPE:COMPUTATION HEIGHT - Computation Height Matched to an existing record

Match: Item ATTRIBUTE TYPE:CONSTRUCTIONTYPE - ConstructionType Matched to an existing record

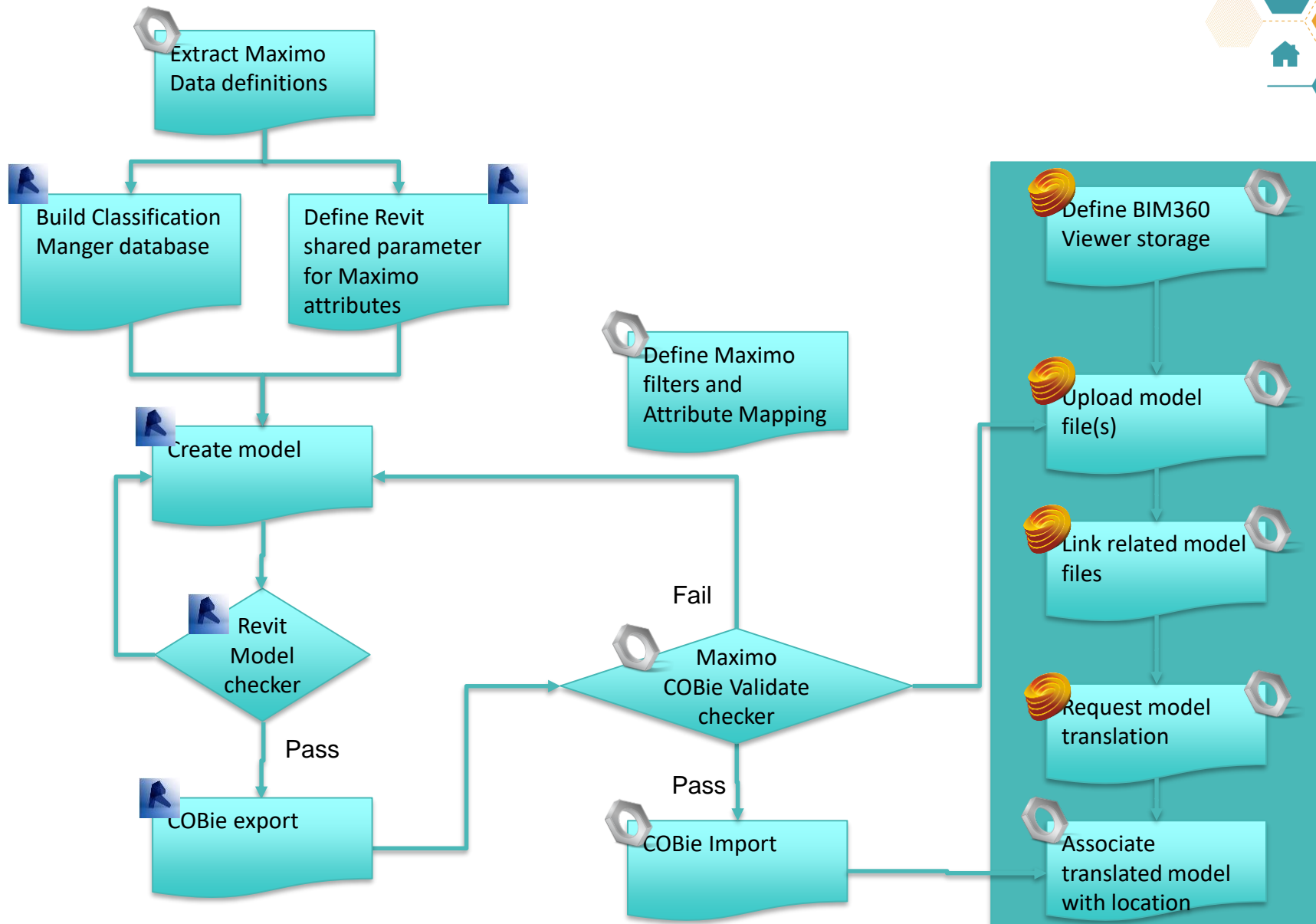
Match: Item ATTRIBUTE TYPE:COUNTER THICKNESS - Counter Thickness Matched to an existing record

Close

Once started, all of the COBie processes such as the import show here run in the background.

- Both the dialog and the browser can be closed and returned to at a later time
- The log is stored in the database providing a permanent record of the import

Maximo Model Validation



Creating storage containers

The screenshot shows the 'Manage Building Models' interface with a 'Create Storage' dialog box open. The dialog box contains the following fields and options:

- Site:** [Empty field]
- Organization:** PUBLIC
- * Storage Container Name:** interconnect
- Append Service Key?:** ☒
- * Retention policy:** objects retained unit
- Description:** Model for InterConnect and other public demos

Callouts provide additional information:

- Apply Maximo security to access to the container from Maximo** (points to the Organization field)
- Determines how long model files stored in this container are retained** (points to the Retention policy dropdown)
- Automatically append BIM360 Application key to insure uniqueness of the container name** (points to the Append Service Key? checkbox)

Model upload – Select storage container



Manage Building Models

MAXADMIN

Query Find Model ID Select Action

Advanced Search Save Query Bookmarks

BIM Models Filter 0 - 0 of 0

Model ID Location Title Description

Upload Model

Site: INTERCON Organization: PUBLIC

* Storage Container Name:

Description: BuildingSmart sample Office model - Revit - Arch

Model Name:

Also Register Viewable?

Select Model File

Cancel OK

Select Value

Filter 1 - 1 of 1

| Storage Container Name | Retention policy | Site | Organization |
|------------------------|------------------|------|--------------|
| interconnect | until removed | | PUBLIC |

Cancel

Upload Model Link to Model

Close

The Storage Container list is filtered by the site and organization selected on the Upload Model dialog

Model upload – Specifying the model file



The screenshot shows the 'Manage Building Models' interface with the 'Upload Model' dialog box open. The dialog box contains the following fields and options:

- Site:** INTERCON
- Organization:** PUBLIC
- Storage Container Name:** interconnect
- Description:** BuildingSmart sample Office model - Revit - Arch
- Model Name:** office_a.rvt
- Select Model File:** A button to select the model file.
- Also Register Viewable?:** A checkbox that is currently unchecked.
- Buttons:** Cancel, OK, Upload Model, Link to Model, Close.

A callout box points to the 'Also Register Viewable?' checkbox with the text:

Automatically register for viewable translation eliminating that step.
Can't be used for linked model

Model upload – Background processing



Manage Models

Filter > 1 - 1 of 1

| Model Name | Storage Container Name | Site | Organization | Online |
|--------------|------------------------|----------|--------------|--------------------------|
| office_a.rvt | interconnect | INTERCON | PUBLIC | <input type="checkbox"/> |

Model Name: office_a.rvt
Description: BuildingSmart sample Office model - Revit - Arch
Content-type:
Model URN:
Last error:

Storage Container Name: interconnect
Sha-1:
URL:

Site: INTERCON
Object size:

Organization: PUBLIC

Upload History

Filter > 1 - 1 of 1

| Upload Time | Status |
|-----------------|---------|
| 3/14/16 1:53 PM | WORKING |

Main Log

Status: WORKING
Imported By: MAXADMIN

Percentage of Upload Complete: 11
Upload Time: 3/14/16 1:53 PM

Refresh

Linked Model Files

Filter > 0 - 0 of 0

| Model Name |
|------------|
|------------|

Close

The model is uploaded from the Maximo server to the Autodesk cloud in the background. Progress is displayed on the Manage Models dialog

Model upload – Defining links



The screenshot displays the 'Manage Building Models' interface. The main table lists models with columns for Model Name, Storage Container Name, Site, Organization, and Online? status. The models listed are office_a.rvt, office_s.rvt, and office_mep.rvt, all under the 'interconnect' storage container, 'INTERCON' site, and 'PUBLIC' organization.

A 'Select Value' dialog is open, showing a filtered list of models based on the selected site and organization. The dialog shows the same three models: office_mep.rvt and office_s.rvt, both under 'INTERCON' and 'PUBLIC'.

A 'Link' dialog is also open, showing fields for Site (INTERCON), Organization (PUBLIC), Model Name, and Child Model URN. The Model Name field is empty, and the Child Model URN field is also empty.

Two callouts provide additional information:

- The list of files available to link is filtered by the site and org of the master model** (pointing to the 'Select Value' dialog).
- For a link to function, the upload filename must be the same as the base filename in the link within Revit** (pointing to the 'Link' dialog).

Model Registration



The screenshot displays the 'Manage Building Models' application interface. The main window has a header with a home icon, a menu icon, the title 'Manage Building Models', the user 'MAXADMIN', and various system icons. Below the header is a toolbar with a 'Query' dropdown, a 'Find Model ID' search bar, a 'Select Action' dropdown, and icons for saving, editing, and navigating. The main content area is divided into two panes. The left pane, titled 'BIM Models', contains a table with columns 'Model ID', 'Location', 'Title', 'Description', and 'Viewer'. Below the table is a message: 'To find records, use the filter fields and then press Enter. For more search options, use the Advanced Search button. To enter a new record, select the Insert icon in the toolbar.' The right pane, titled 'Manage Viewable Models', contains a table with columns 'Model Name', 'Site', 'Organization', and 'Online?'. Below the table is a message: 'There are no rows to display.' and buttons for 'Register Viewable', 'Link to Viewable', and 'Close'. A modal dialog titled 'Register Model as Viewable' is open in the center. It contains fields for 'Site' (with value 'INTERCON'), 'Organization' (with value 'PUBLIC'), 'Model Name' (with a search icon), and 'Description' (with a search icon). At the bottom are 'Cancel' and 'OK' buttons. Another modal dialog titled 'Select Value' is open in the bottom left. It contains a table with columns 'Model Name', 'Site', and 'Organization'. The table has three rows: 'office_a.rvt' with 'INTERCON' and 'PUBLIC', 'office_mep.rvt' with 'INTERCON' and 'PUBLIC', and 'office_s.rvt' with 'INTERCON' and 'PUBLIC'. At the bottom is a 'Cancel' button.

Manage Building Models

MAXADMIN

Query Find Model ID Select Action

Advanced Search Save Query Bookmarks

BIM Models Filter 0 - 0 of 0

| Model ID | Location | Title | Description | Viewer |
|----------|----------|-------|-------------|--------|
|----------|----------|-------|-------------|--------|

To find records, use the filter fields and then press Enter.
For more search options, use the Advanced Search button.
To enter a new record, select the Insert icon in the toolbar.

Manage Viewable Models Filter 0 - 0 of 0

| Model Name | Site | Organization | Online? |
|------------|------|--------------|---------|
|------------|------|--------------|---------|

There are no rows to display.

Register Viewable Link to Viewable Close

Register Model as Viewable

Site: INTERCON Organization: PUBLIC

* Model Name: Description:

Cancel OK

Select Value Filter 1 - 3 of 3

| Model Name | Site | Organization |
|----------------|----------|--------------|
| office_a.rvt | INTERCON | PUBLIC |
| office_mep.rvt | INTERCON | PUBLIC |
| office_s.rvt | INTERCON | PUBLIC |

Cancel

Model Registration – Monitoring Progress



Manage Building Models

MAXADMIN

Query Find Model ID Select Action

Advanced Search Save Query Bookmarks

BIM Models Filter

Model ID Location

Model Name Site Organization Online?

office_a_rvt INTERCON PUBLIC

Main Details

Model Name: office_a_rvt Site: INTERCON Organization: PUBLIC

Description: BuildingSmart sample Office model - Revit - Arch

Model URN: urn:adsk.objects:os.object:interconnect2s23v1a2uihpnjq2njjj

Base 64 encoded URN: urn:dXJuOmFkc2sub2JqZWV0czpvcy5vYmplY3Q6aW50ZX

Progress: 0% complete Status: pending Percentage of Translation Successful: 0%

Started At: Mon Mar 14 18:54:46 UTC 2016 Has Thumbnail? N

GUID: dXJuOmFkc2sub2JqZWV0czpvcy5vYmplY3Q6aW50ZXJjb2

Last error:

Refresh

Register Viewable Link to Viewable

Close

Translation progress can be monitored from the Mange Viewable Models dialog

Associate Model with a location



Manage Building Models MAXADMIN

Query Find Model ID Select Action

List View Building Models View Map

Location: BSO00000000 **Title:** BSa Office - Li **Description:** BuildingSmart sample Office model - Revit - Arch **Site:** INTERCON

Priority: 2 **Attachments:**

Formatted Address: 1090 Vermont Ave NW #700, Washington, DC 20005, USA **Latitude:** **Longitude:**

Model Name: office_a.rvt **ID Attribute:** Guid

URL: urn:dXJuOmFkc2sub2JqZWNoZcpvcy5vYmplY3Q6aW50ZXJjb25uZWNoMnMyM3YxYTJ1aWhwbmpxMm5sampppeHlrcWFhb2luankvb2ZmaWNIX2EucnZ0

Select Value

Filter > 1 - 1 of 1

| Model Name | Description |
|--------------|--|
| office_a.rvt | BuildingSmart sample Office model - Revit - Arch |

Cancel



Find Model ID

List View Building Models 3D View Map

Location: BSC00000000 Title: BuildingSmart Description: BuildingSmart Clinic - Architectural Revit model Site: VF

M_VAV UNIT - SINGLE DUCT [569858]

Constraints

| | |
|--------|-----------------|
| Level | Level 2 |
| Host | Level : Level 2 |
| Offset | 3.440 m |

Electrical - Loads

| | |
|----------------|--|
| Panel | |
| Circuit Number | |

Mechanical

| | |
|--------------------------|---------------|
| Supply Air Pressure Drop | 19.900 pascal |
| Custom | |

Asset : BSC000004080

Basic Information

| | |
|--------------|------------------------------|
| Asset | BSC000004080 |
| Type | FACILITIES |
| Description | VAV-AHU2-RR |
| Item Set | SET1 |
| Location | BSC000004080 |
| Organization | EAGLENA |
| Site | VF |
| Status | OPERATING |

Details

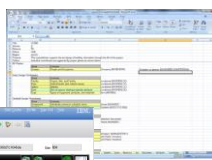
1 of 1

vav

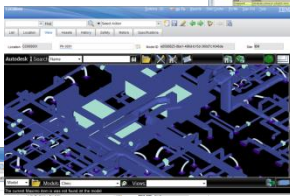


Building Information Model Extensions for Maximo

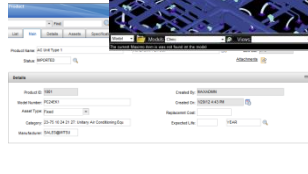
What's Included?



COBie data import



3D BIM Viewer



Maximo extensions for BIM data

| COBie to Maximo Mapping | |
|-------------------------|--|
| COBie | Maximo Import location |
| Facility | Location and COBie import project |
| Floor | Location |
| Space | Location |
| Component | Location and Asset |
| System | System (Category configurable) |
| Zone | System (Category configurable) |
| Type | Product (New for COBie support), Item |
| Attribute | Specifications for: Location, Asset, Product, Item |
| Contact | Person, Company, Company Contact |
| Document | Attachment |
| Job | Job Plan, InvVendor, PM, ProductJob (New) |
| Resource | Toolitem, Job Plan Tools |
| Spare | Product parts (New) |

Available on the ISM Library <http://www.ibm.com/software/ismlibrary?NavCode=1TW10MA44>.

- ### Standards
- IFC <http://www.iai-tech.org/ifc/IFC2x4/beta3/html/index.htm>
 - gbXML <http://www.gbxml.org/>
 - COBie <http://www.wbdg.org/resources/cobie.php>
 - OMNIClass <http://www.omniclass.org/>

COBie Certified

<http://buildingsmartalliance.org/index.php/newsevents/proceedings/cobie2011challenge>

| | |
|---|---|
| Marketing POC name: Kawon Park phone: 978-899-4581 email: kpark@us.ibm.com | Technical POC name: Doug Wood email: Doug.wood@us.ibm.com |
|---|---|