From Laser Scan to Facilities Management: A Workflow Case Study

Aaron Maller
BIM Manager- The Beck Group

© 2012 Autodesk

Class Agenda (Why are we here?)

- *How do I use a Laser Scan to Build a Model?*
- *How and what data do I put in the model for use downstream?*
- *What are some unexpected issues I'm going to run in to?*
- *How do I get this information in to an FM program?*
  - *(What did I sign up for, and where is my easy button??)*

© 2012 Autodesk

Learning Objectives

At the end of this class, you will be able to:

- Work with Laser Scans, to build a model
- Populate a model with data for more than just Design
- Format the Data in a way that someone else can use it
- Know what to expect, and how to communicate what's possible, and what isnt…

© 2012 Autodesk

About your speaker

© 2012 Autodesk

Housekeeping and Twecklers alike

- @twiceroadsfool - Aaron Maller on Twitter
- @thebeckgroup -The Beck Group on Twitter

- #Mallerisms

- www.beckgroup.com
- www.facebook.com/beckgroup
- 204-303-6200

- www.MalleristicRevitation.blogspot.com
- www.RevitForum.org
- aaronmaller@Beckgroup.com
- 204-303-6285

© 2012 Autodesk

Aaron Maller

Native New Yorker (sorry!)

University at Buffalo, SA&P- Class of 2005

“Fell in to BIM”

-AutoCAD and ADT / ACA / 3DS Max

-Digital Project

-Vectorworks

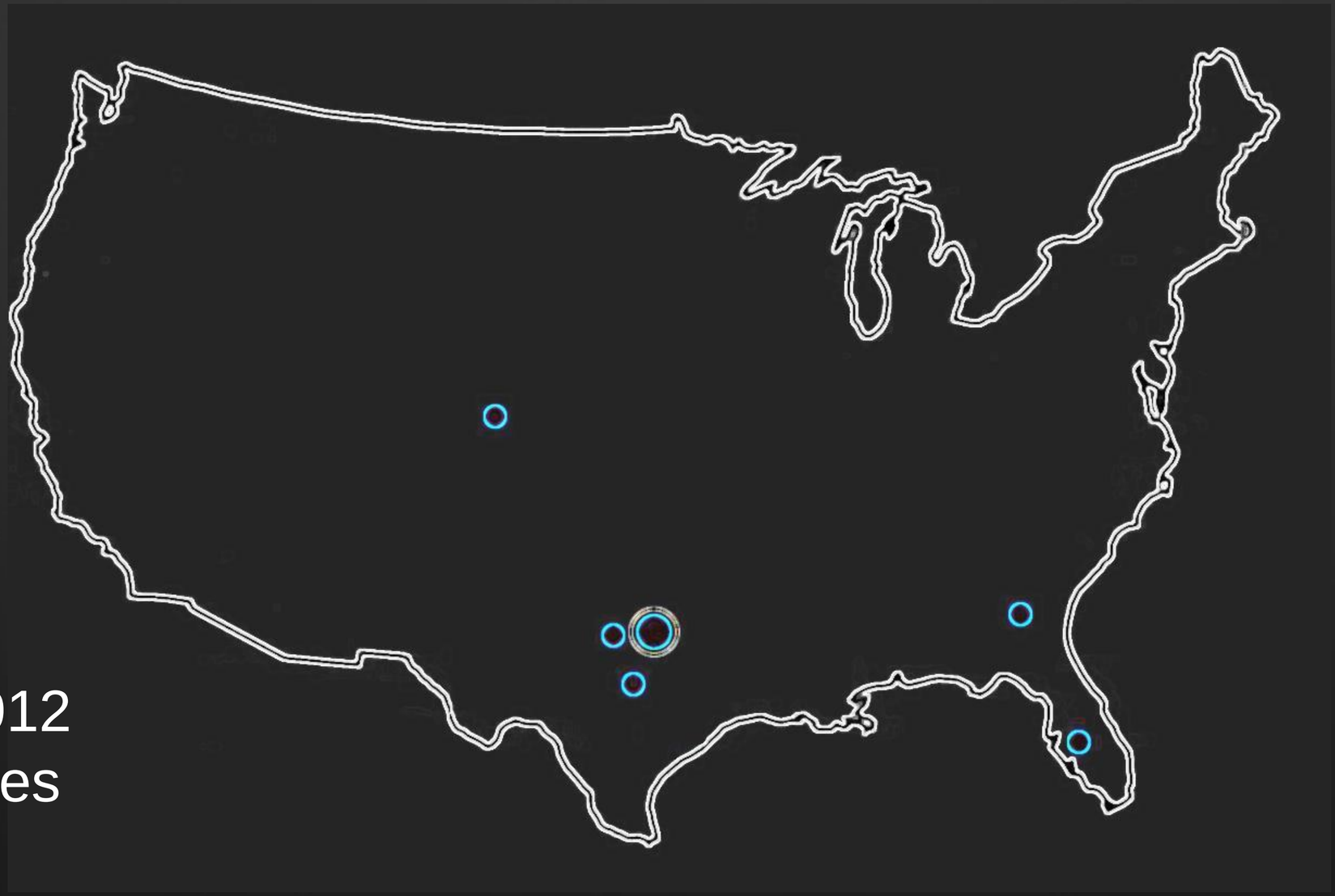
-ArchiCAD

-Revit (since version 8)

Implemented at 4 Revit firms since 2005

© 2012 Autodesk

The Beck Group



Founded in 1912
7 primary offices nationwide

Atlanta Austin **Dallas** Denver Ft. Worth Tampa

© 2012 Autodesk

Architecture Construction Development Technology Sustainability

© 2012 Autodesk

Architecture Construction Development Technology Sustainability

© 2012 Autodesk

Architecture Construction **Development** **Technology** **Sustainability**

© 2012 Autodesk

Project Introduction

- 3 buildings, largest was 10,000 Square Feet
- Limited Drawings, plus Laser scans to model from
- The goal: Complete the models, input asset data in to objects, load in to FM software for Client's evaluation

© 2012 Autodesk

Working with Laser Scans to Build Models

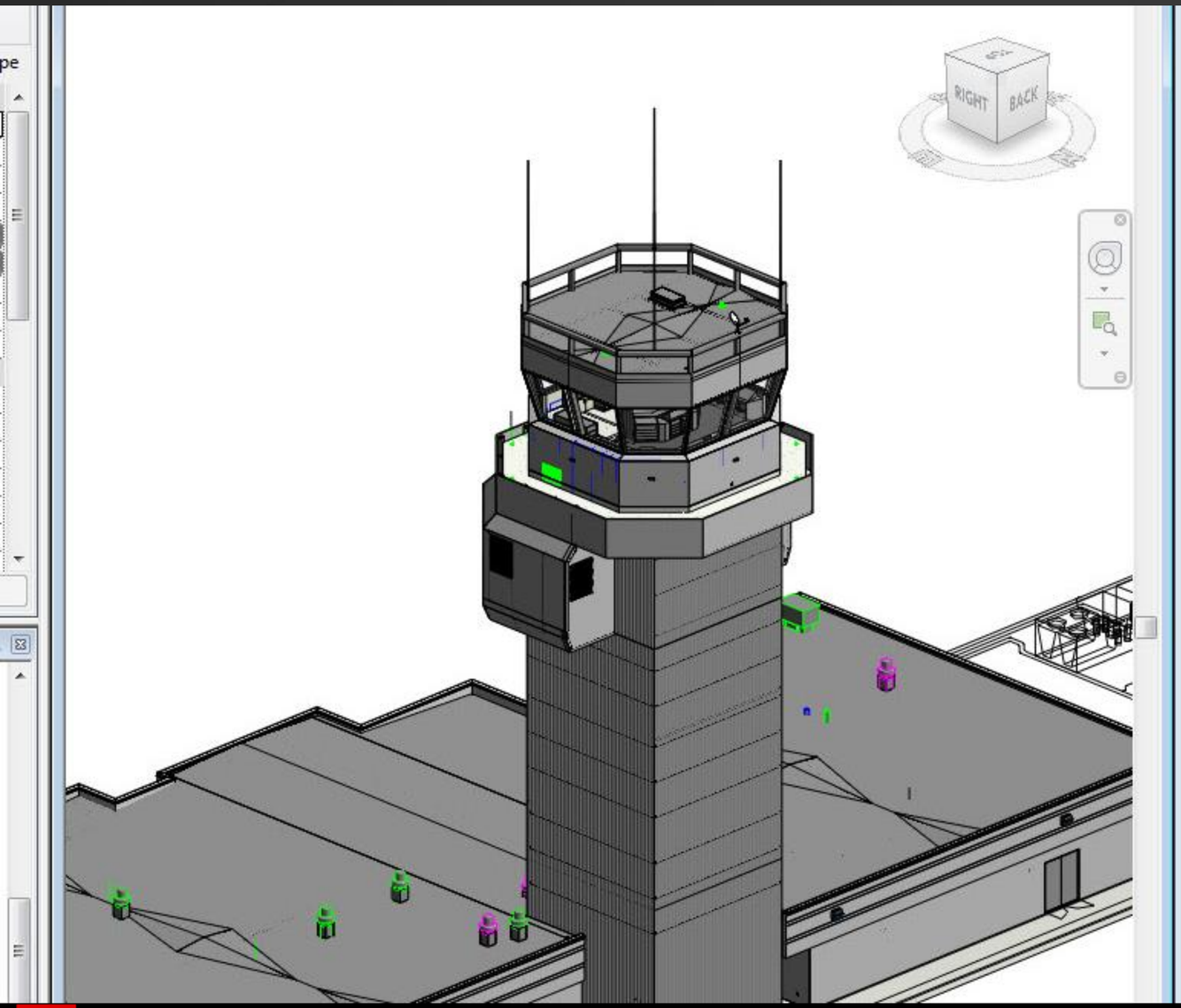
© 2012 Autodesk

Why are we using a Laser scan?

- It’s the only source of documentation
- Its to verify what we have for documentation
- What takes precedence / Whats the intended level of accuracy?
- **What is the purpose of the model?**
- What was asked for, and why? (*Who is hoping for an easy button?)*

© 2012 Autodesk

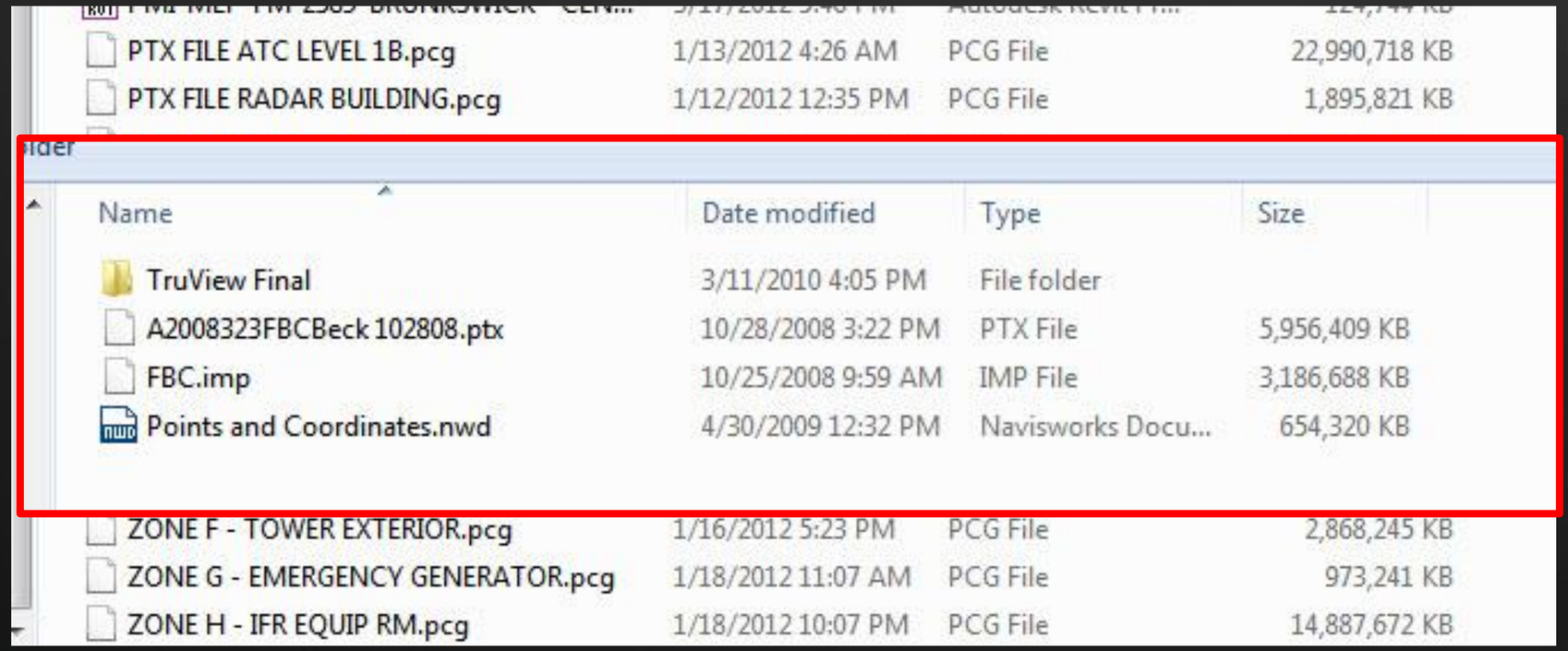
Why are we using a Laser scan?



© 2012 Autodesk

Who is responsible for the laser scan?

- Quality is a concern: Is it good enough? Is it ***too good?***
- Registration and coordinates- Are the Point clouds assembled correctly?

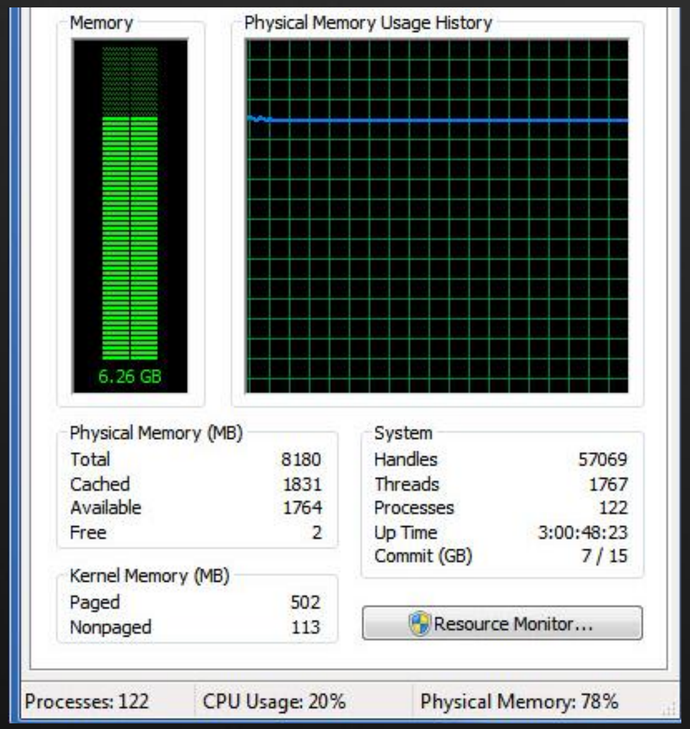


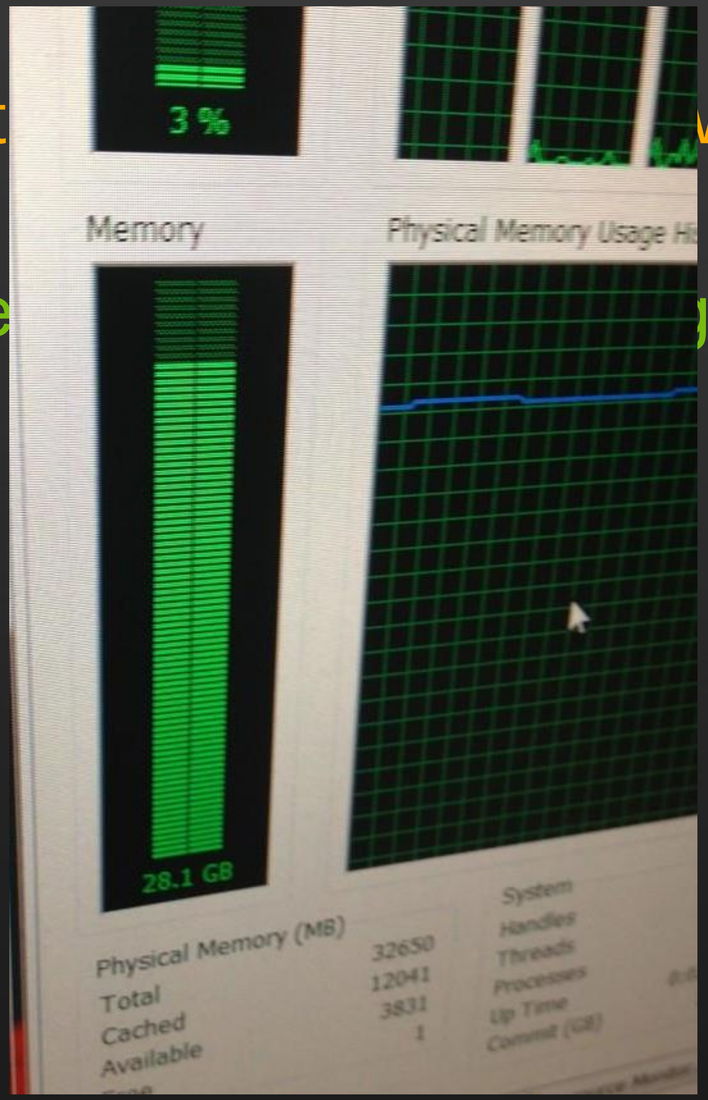
- 10k SF - 93.4GB
- (after compression)
- Was almost 250GB prior (yikes!!!)
- Full city block – 6GB (uncompressed)

© 2012 Autodesk

Who is responsible for the laser scan?

- Is the scan serving anot ws, etc)
- If so, who is “scaling the g?





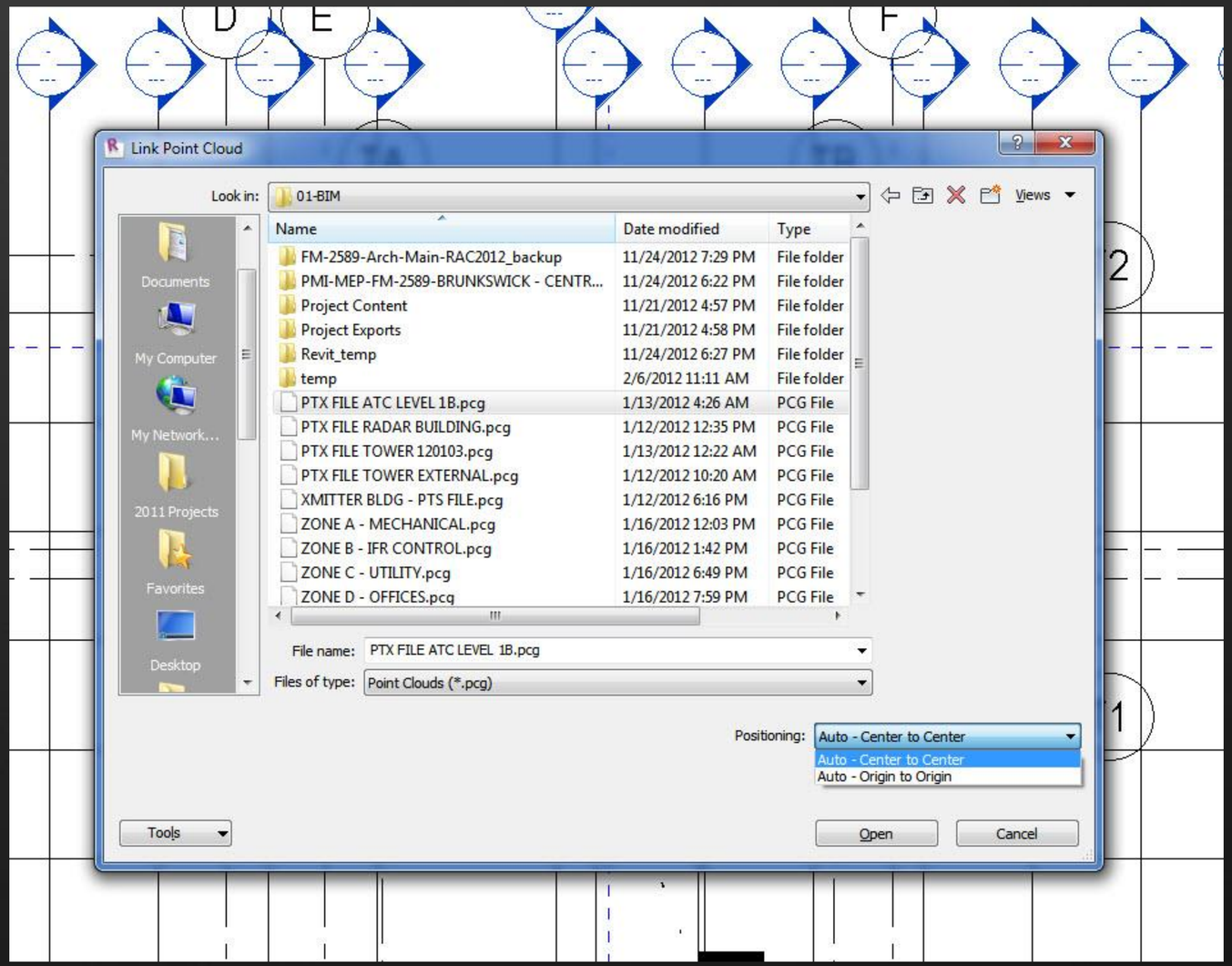
© 2012 Autodesk

(TruView Demonstration)

© 2012 Autodesk

Getting the scan in to Revit (2012)

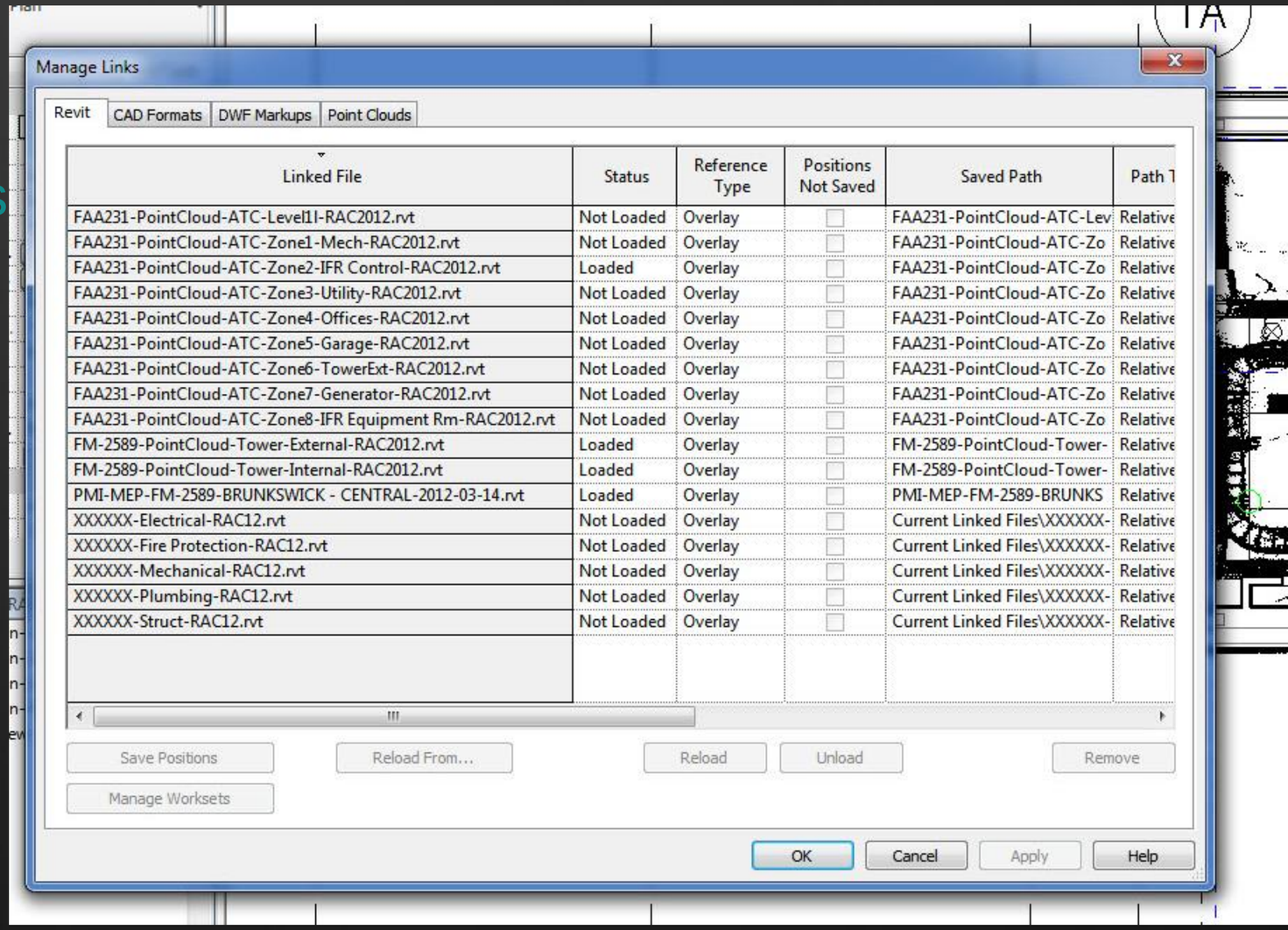
- Link Directly:
  - Center to Center
  - Origin to Origin
- Manage Links: Point Clouds



© 2012 Autodesk

Getting the scan in to Revit (2012)

- Link Directly (in to RVT Link)
  - Revit coordinates to position scans
- Manage Links: RVT Links
  - In Linked File, PC under Manage Links: Point Clouds
- (2013)- Can Link Directly with Shared Coordinates



© 2012 Autodesk

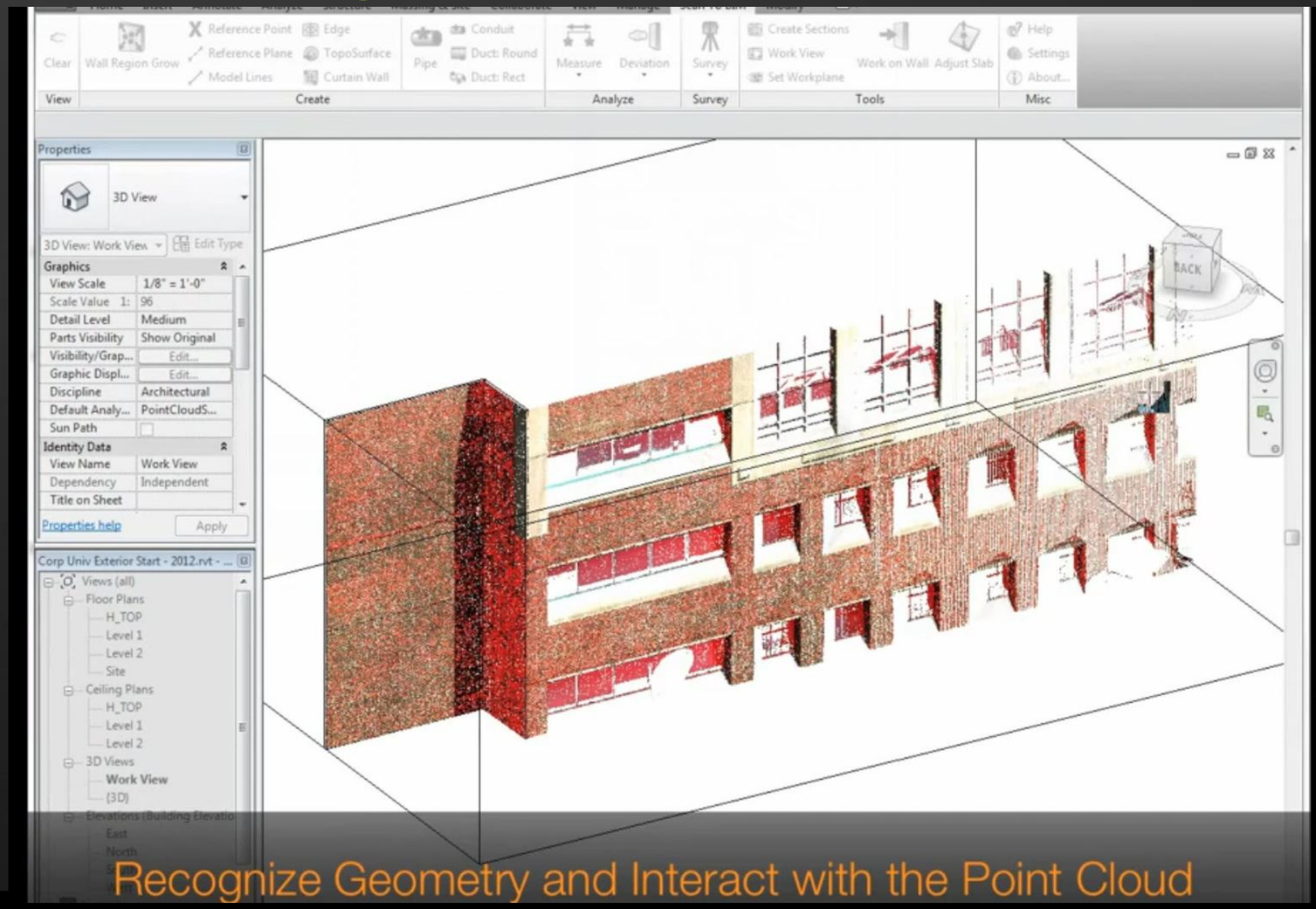
Modeling with the Laser Scan- Scan to BIM

- http://imaginit.com/software-solutions/building-architecture/scan-to-bim

- Point Cloud visualization alterations

- Measurements on the Cloud

- Modeling-
  - Walls, Curtain Walls (plus embedded), Pipes, Ducts, Topography



© 2012 Autodesk

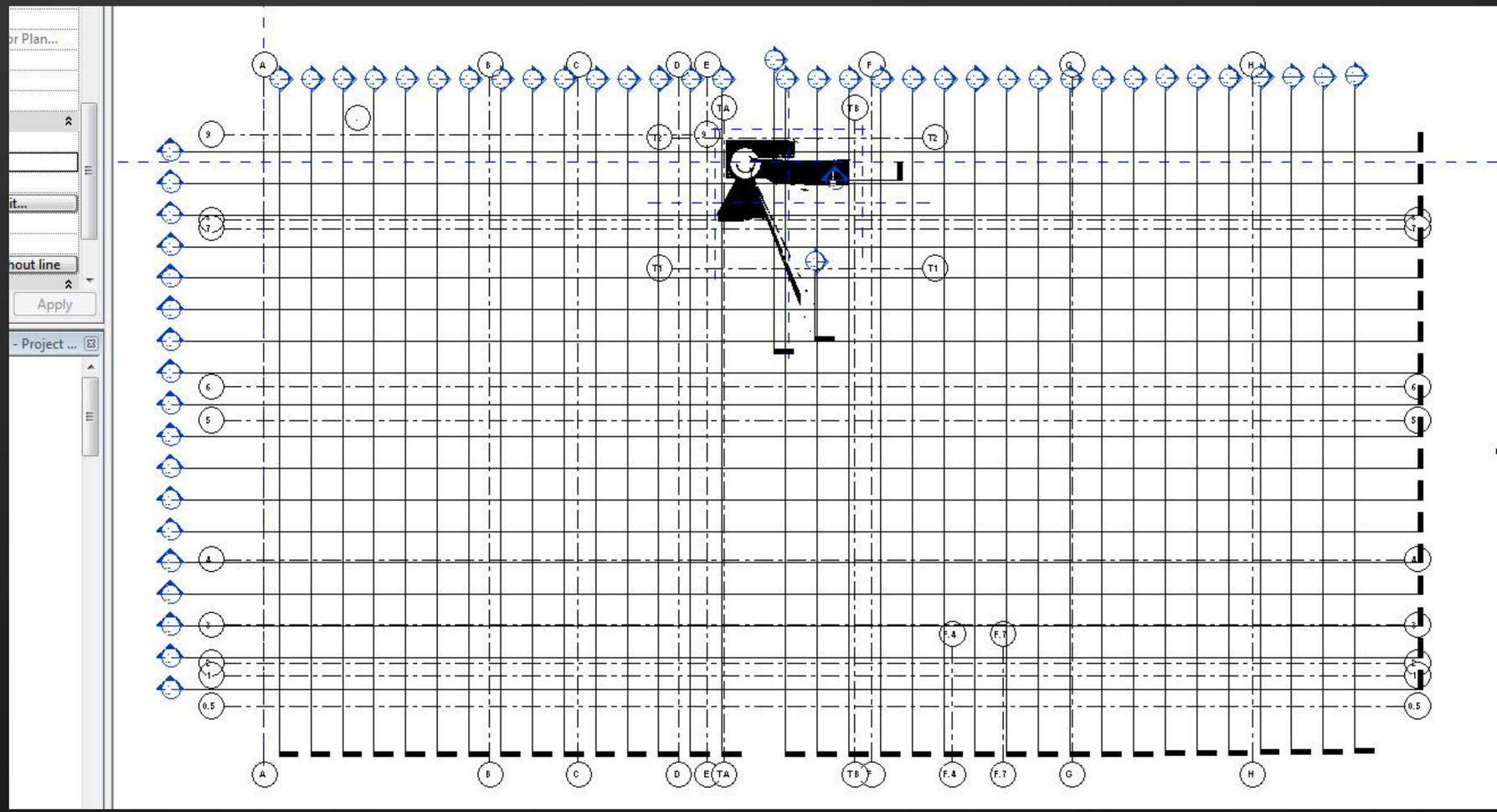
Modeling with the Laser Scan- Tracing

- Loading and Unloading
  - Depends on Memory and size of scans
- View Range and Section Boxes
  - Try to eliminate as much noise as you can
  - (Show Plan- Level 3/5, Section 20)
- (2013)- Can Link Directly with Shared Coordinates

© 2012 Autodesk

Modeling with the Laser Scan- Tracing

- Make a “View grid,” of shortened views.
- *** I link the Point Clouds in one phase early. With multiple Clouds, its easier to shut them all off with the Phase Selector. Reversing that to see ONLY the clouds works too.*
- *The game is “not to regenerate.” Panning, Zooming, moving, view depths, etc.*



© 2012 Autodesk

Putting Data inside the Model… What has to change about the model?

© 2012 Autodesk

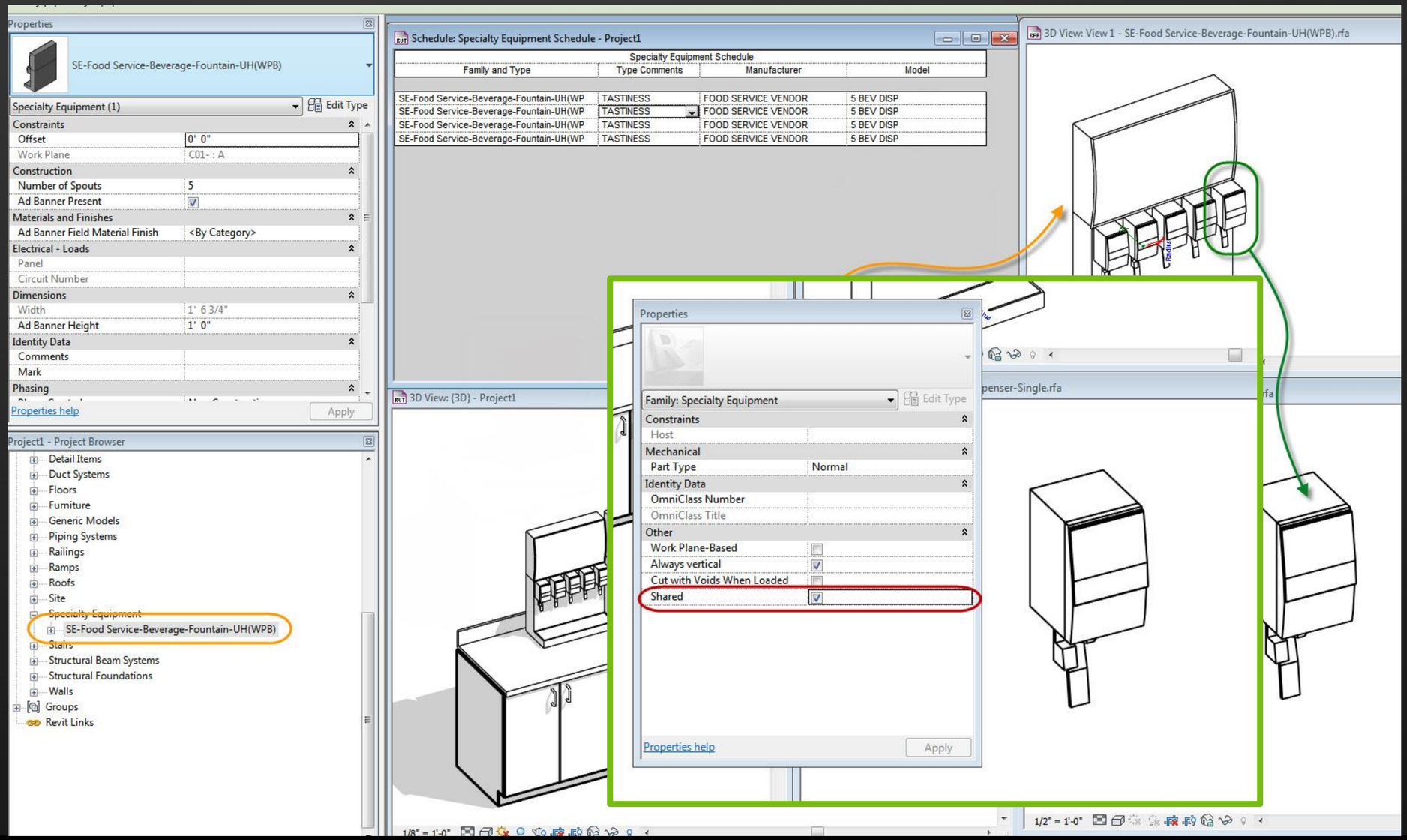
Recap- Shared Nested versus Nested Families

- In Project-

Only "Parent Family" Appears. Only "Parent" Schedules and can be Tagged

"Child" familes definition Lives in Parent, NOT In Project.

2 Parents with same Child (haha)can have Different definitions



© 2012 Autodesk

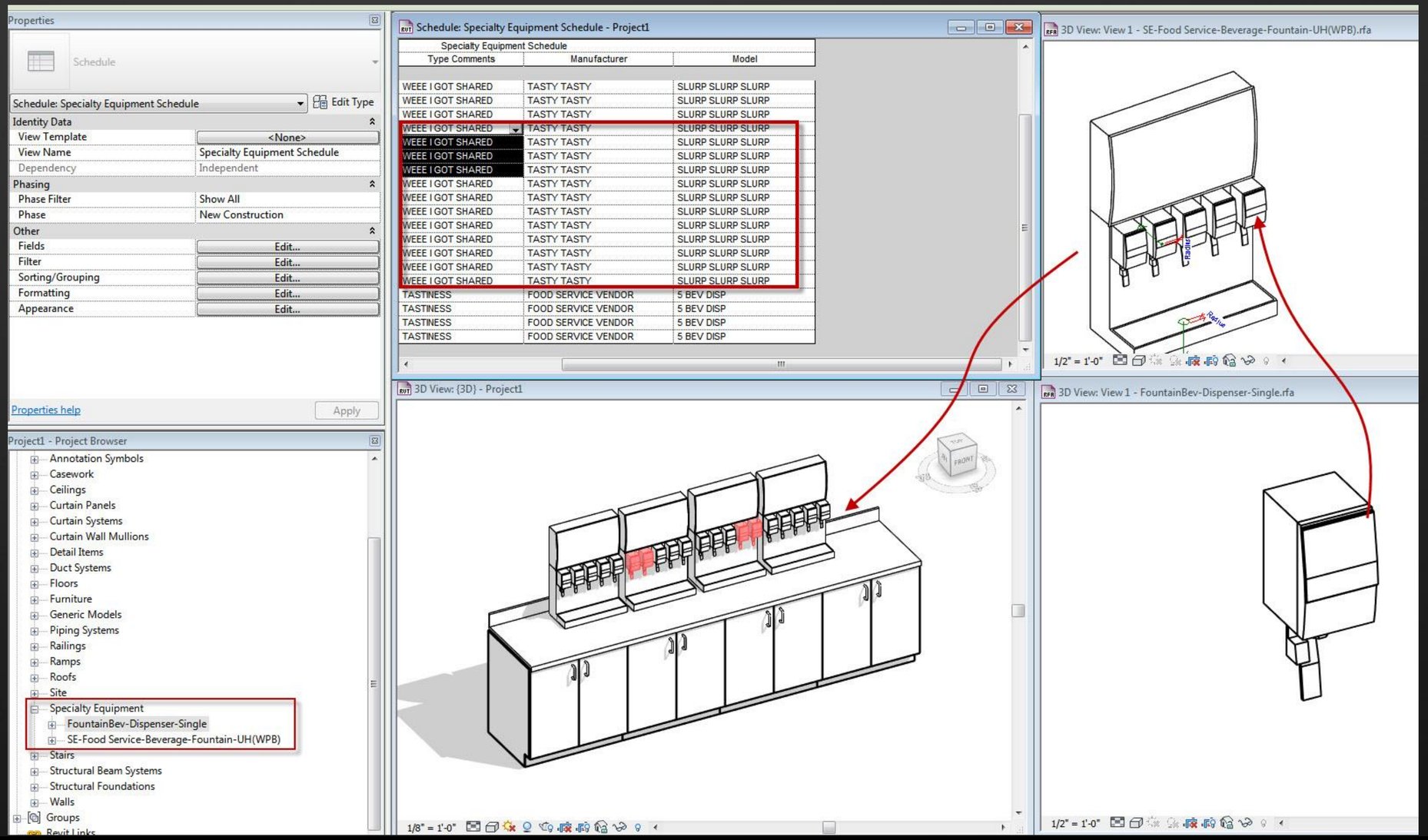
Recap- Shared Nested versus Nested Families

- In Project-

All Families appear Appears. All families schedule and tag, and have Identity Data

"Child" families definition Lives in Project, NOT In Parent .

2 Parents with same Child must have the same definition (its driven in project)



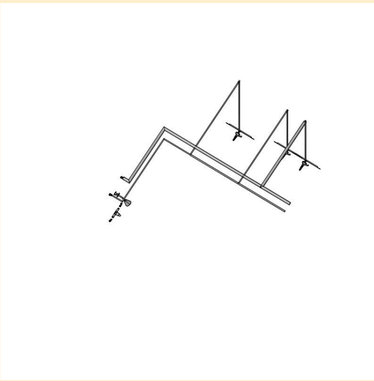
© 2012 Autodesk

So uh… Why don’t I just share all of them?

Unshared → Parameters Controlled by Parent Family, local definition

Parent Family 1

Nested Family 1



Instance Properties

Type Properties

Project

Nesting things for “Revit Convenience”

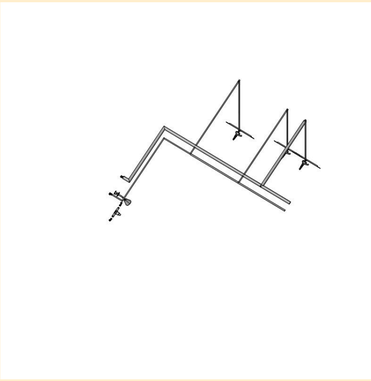
© 2012 Autodesk

So uh… Why don’t I just share all of them?

Shared → **Parameters Controlled by BOTH, plus Global definition**

Parent Family 1

Nested Family 1



Instance Properties

Type Properties

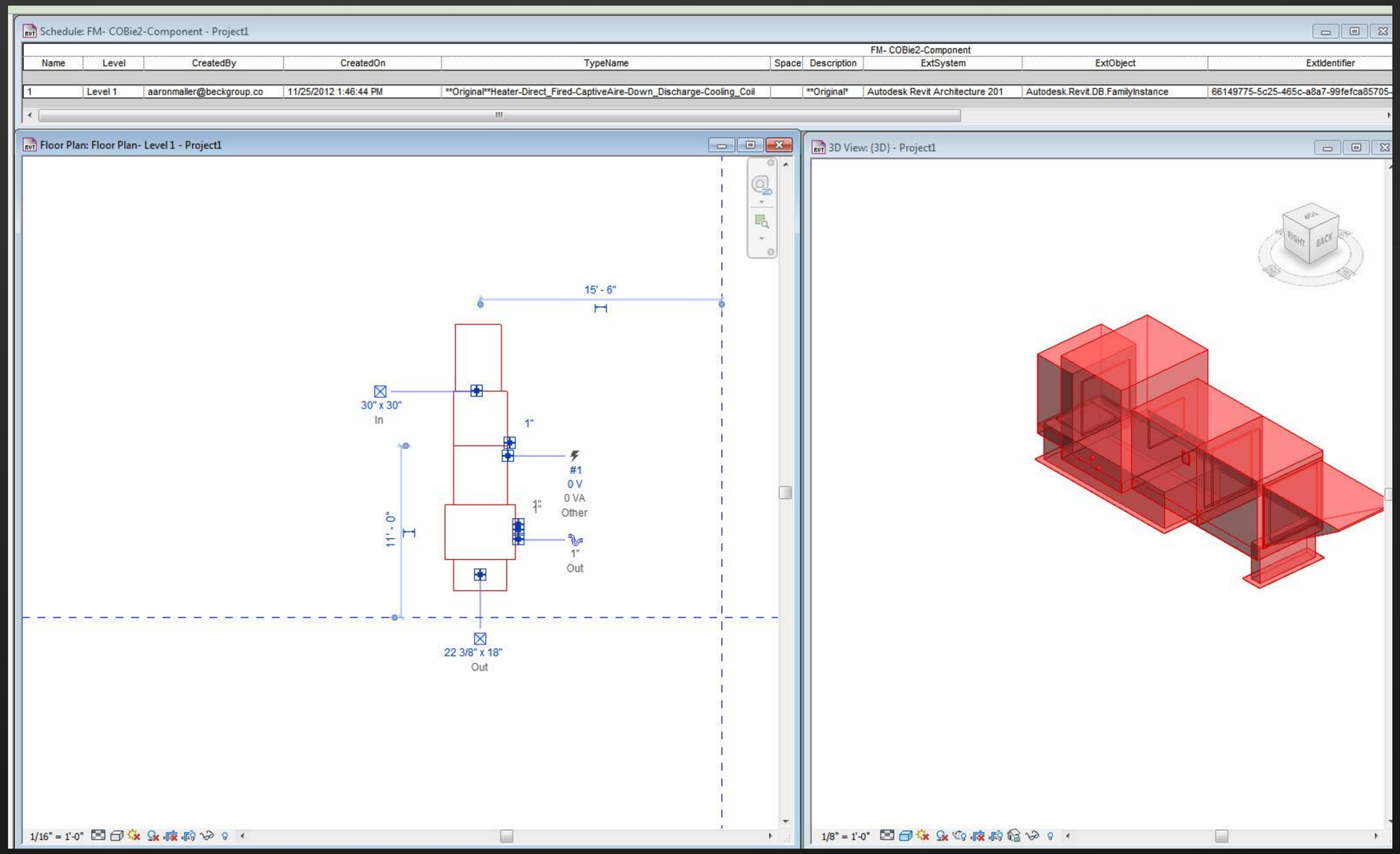
Project

Nesting things for “real association”

© 2012 Autodesk

Changing Content for Facilities Use

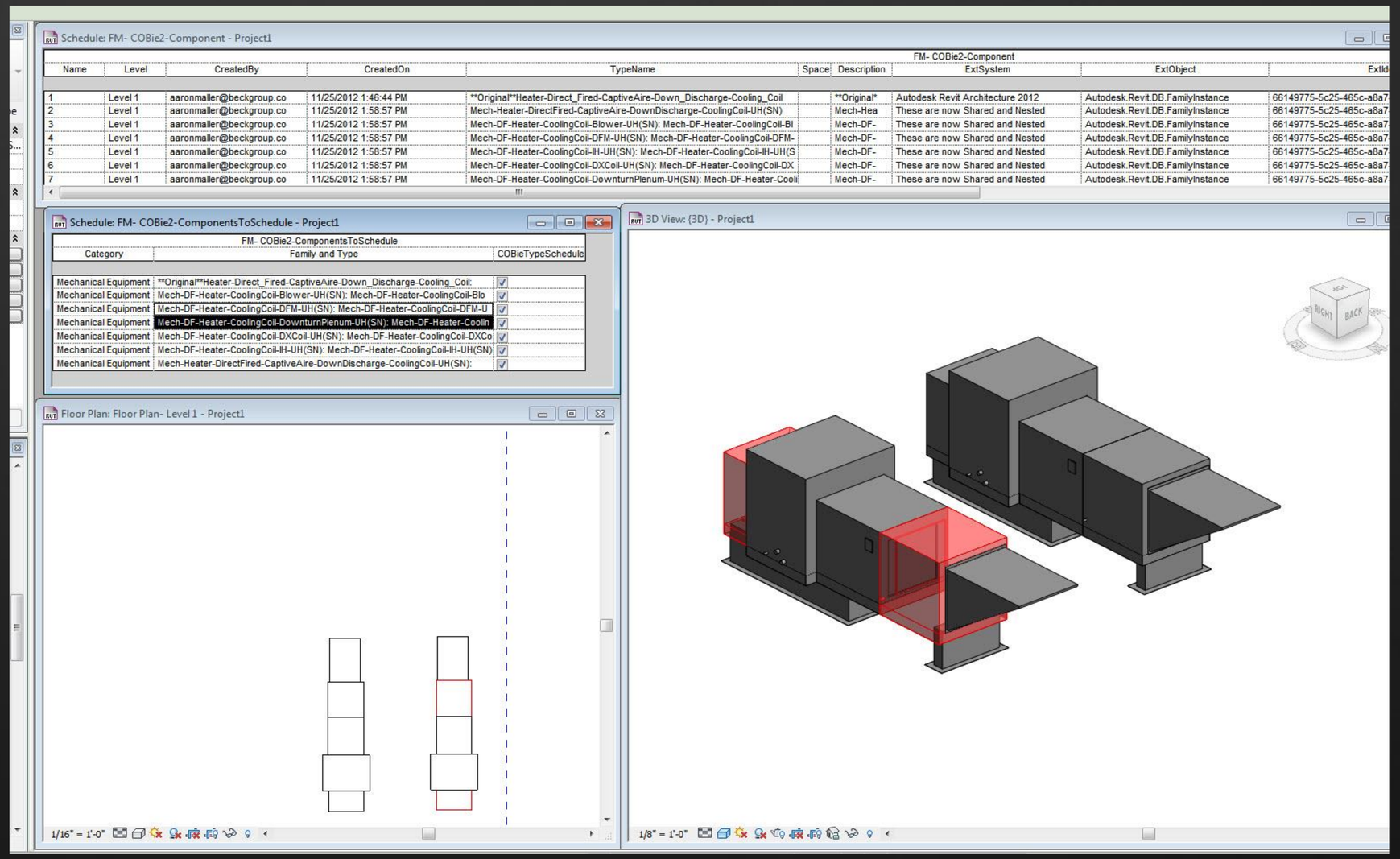
- CaptiveAire unit (Autodesk Seek).
- *Built with Nested Components (unshared). Done so they SubFamily Type parameters can be nested to the parent*
- *Allows for many options in Design and Documentation*



© 2012 Autodesk

Changing Content for Facilities Use

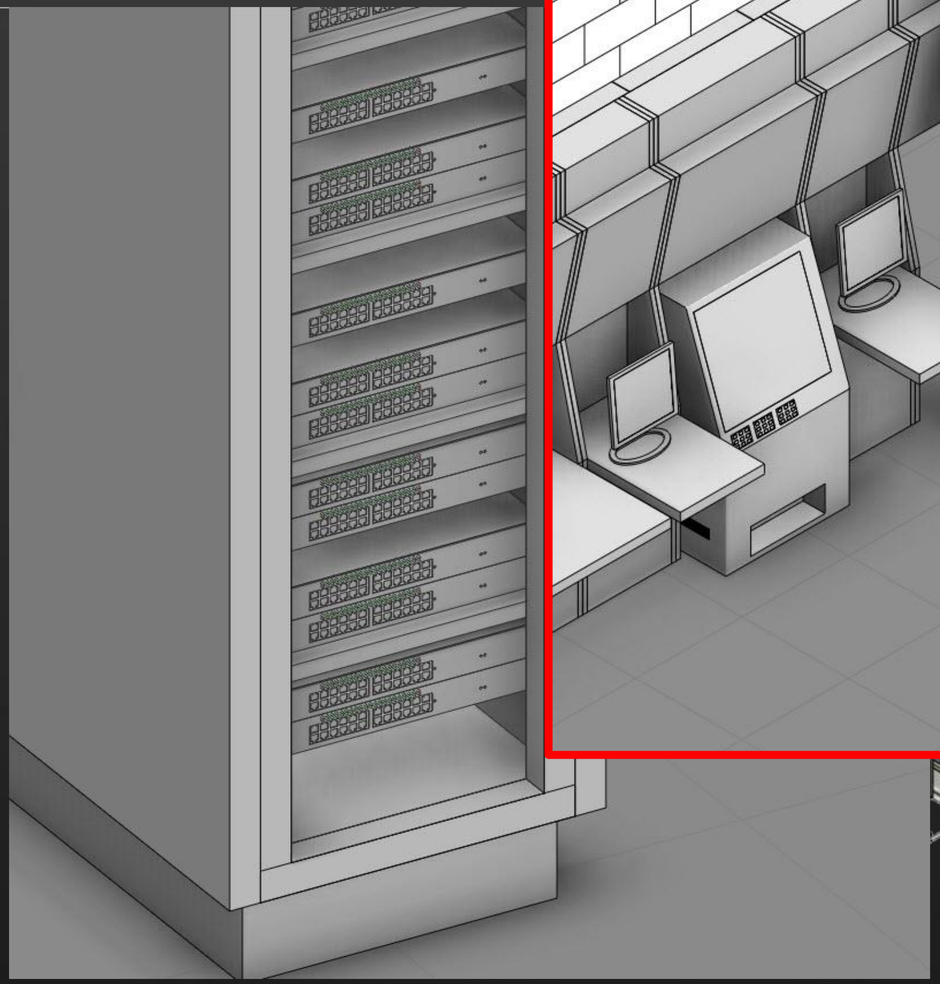
- *Modified to have all Nested (important) parts Shared.*
- Loses its ability to be parametric, where Type Properties were linked to Parent Family.
- All Nested Parts now schedule as unique Assets.

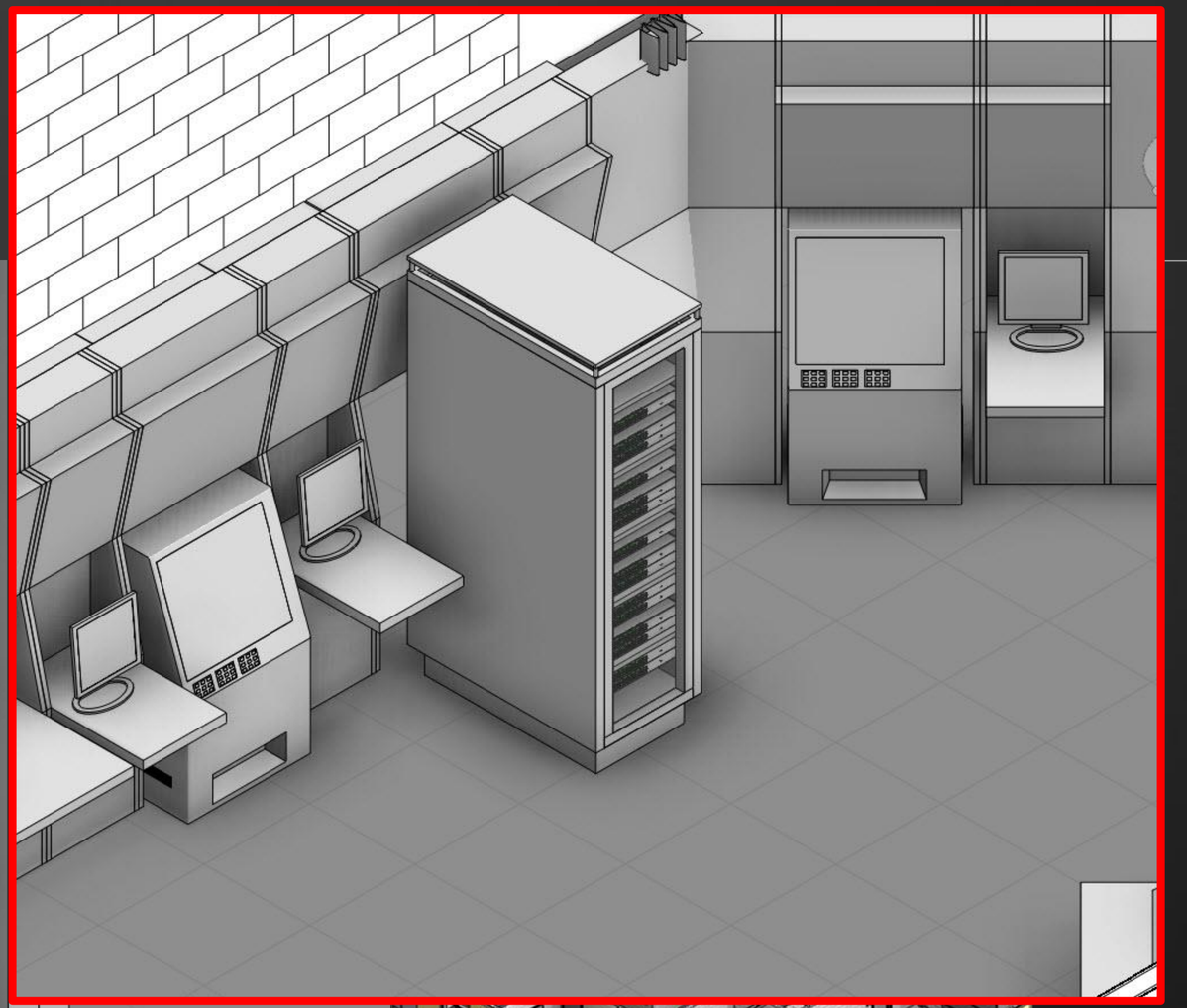


© 2012 Autodesk

Content for this Project

- Wherever an item was deemed “trackable asset” it became its own family (Shared and Nested)
- More important to have right *number* and locations of families, than to have over detailed models.

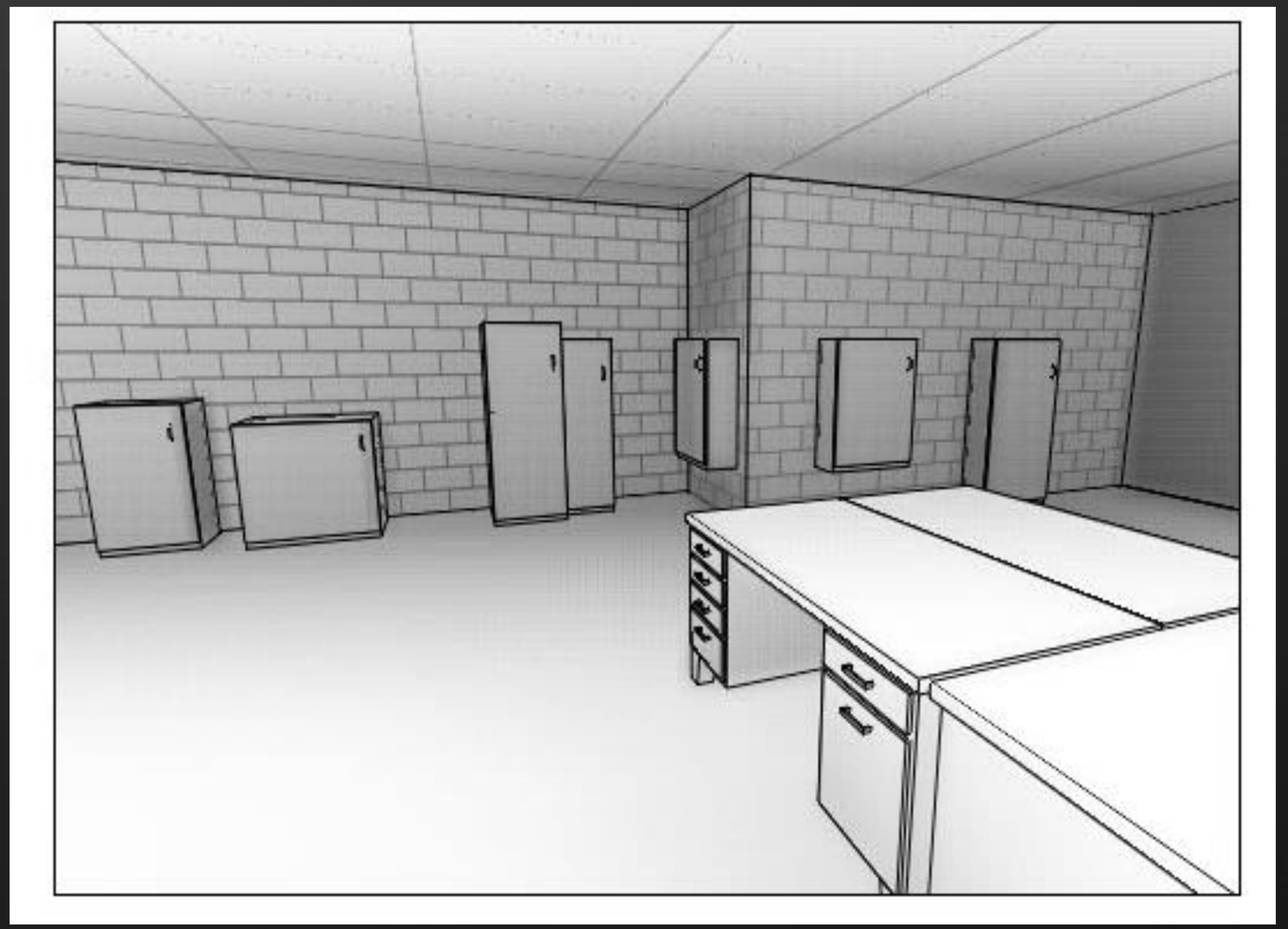




© 2012 Autodesk

Content for this Project

- Repurposed Millwork Content



© 2012 Autodesk

Putting Data in to the Model

© 2012 Autodesk

Data Standards…. OMGFail.

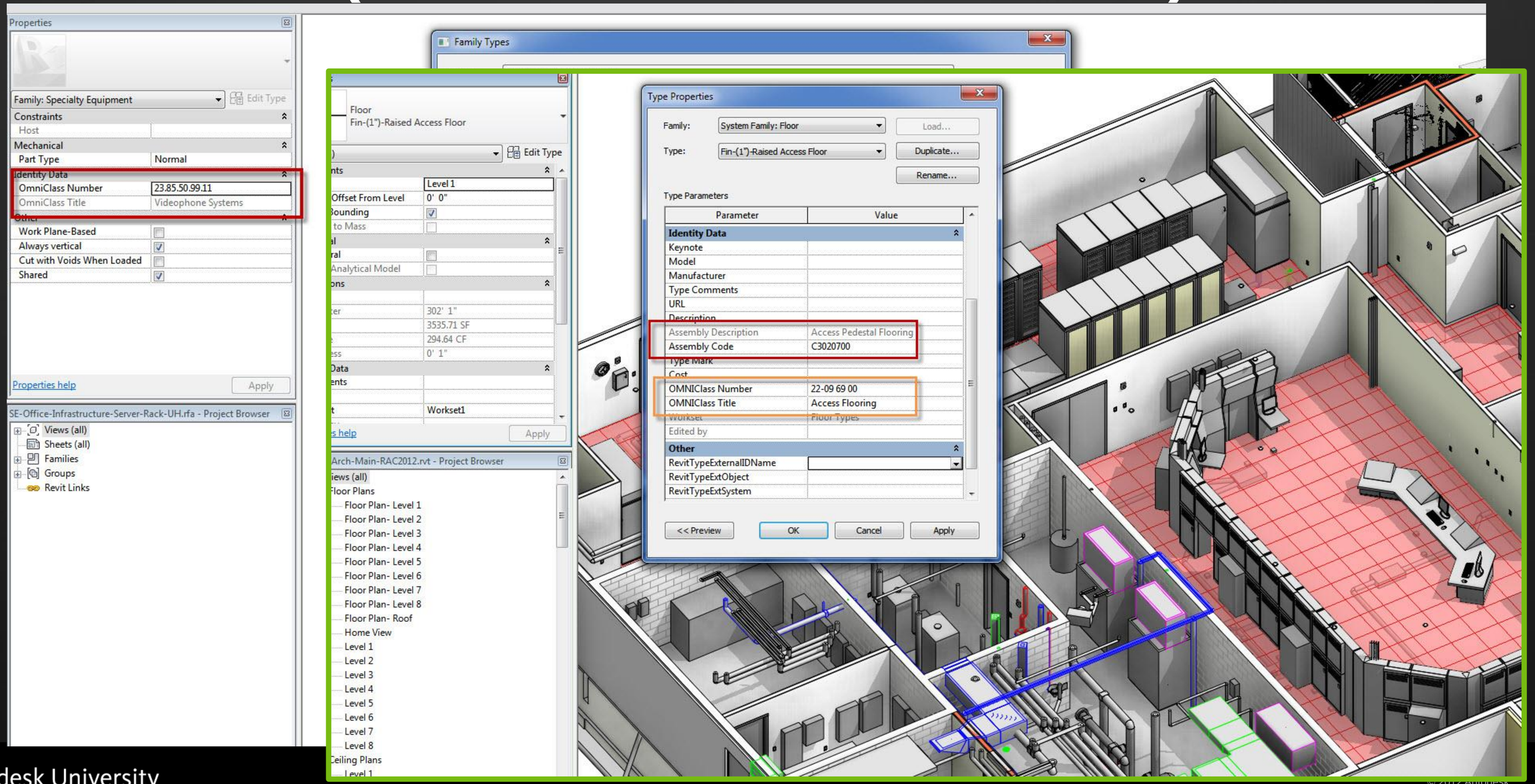
- OmniClass: http://www.omniclass.org/
- (Uniformat): http://uniformat.com/index.php/background
- (MasterFormat): http://www.masterformat.com/
- COBie: (**Construction Operations Building Information Exchange**) **h**ttp://www.wbdg.org/resources/cobie.php

- Client Specific (or Client Amended)

Where do you put all of the data?

© 2012 Autodesk

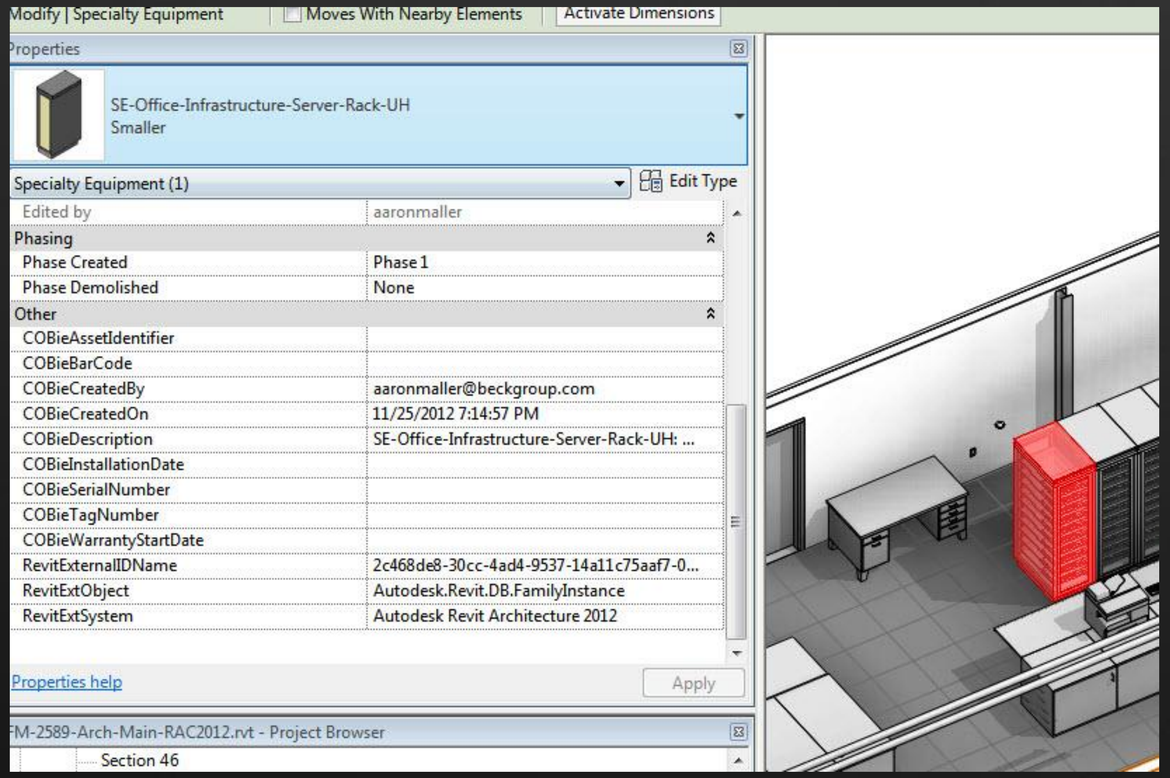
Parameters (Hardcoded versus created)

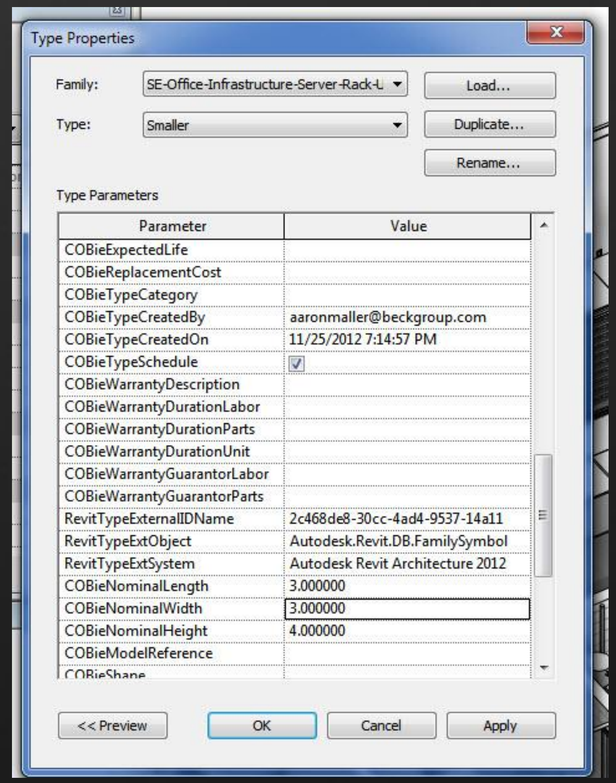


© 2012 Autodesk

COBie Data parameters and app

- http://usa.autodesk.com/adsk/servlet/oc/offer/form?siteID=123112&id=18070390
  - Download Link for the App and the Shared Parameters
  - SP's and COBie schedules also in the Datasets for this class





© 2012 Autodesk

Handy uses of the Adsk COBie App / COBie parameters

- Your Clients Naming convention probably isnt the same as yours.

- *Use the COBie AssetID and AssetIDType parameters for these things*
- *Make tags (if you need FM/O&M drawings) that reference these parameters*

- *In some cases I've seen Client Mandated names mean the same name for Different Families*

- *The app is a free way to get the EID or GUID inside Revit Parameters (not a huge value add, since most API apps don’t need it, but its handy for those than don’t write API well yet (me…)*

© 2012 Autodesk

Real Purpose of COBie parameters

Get External Data | Connections | Sort & Filter | Data Tools | Outline

F21 | SE-Office-Computing-Part-Mouse-UH: SE-Office-Computing-Part-Mouse-UH

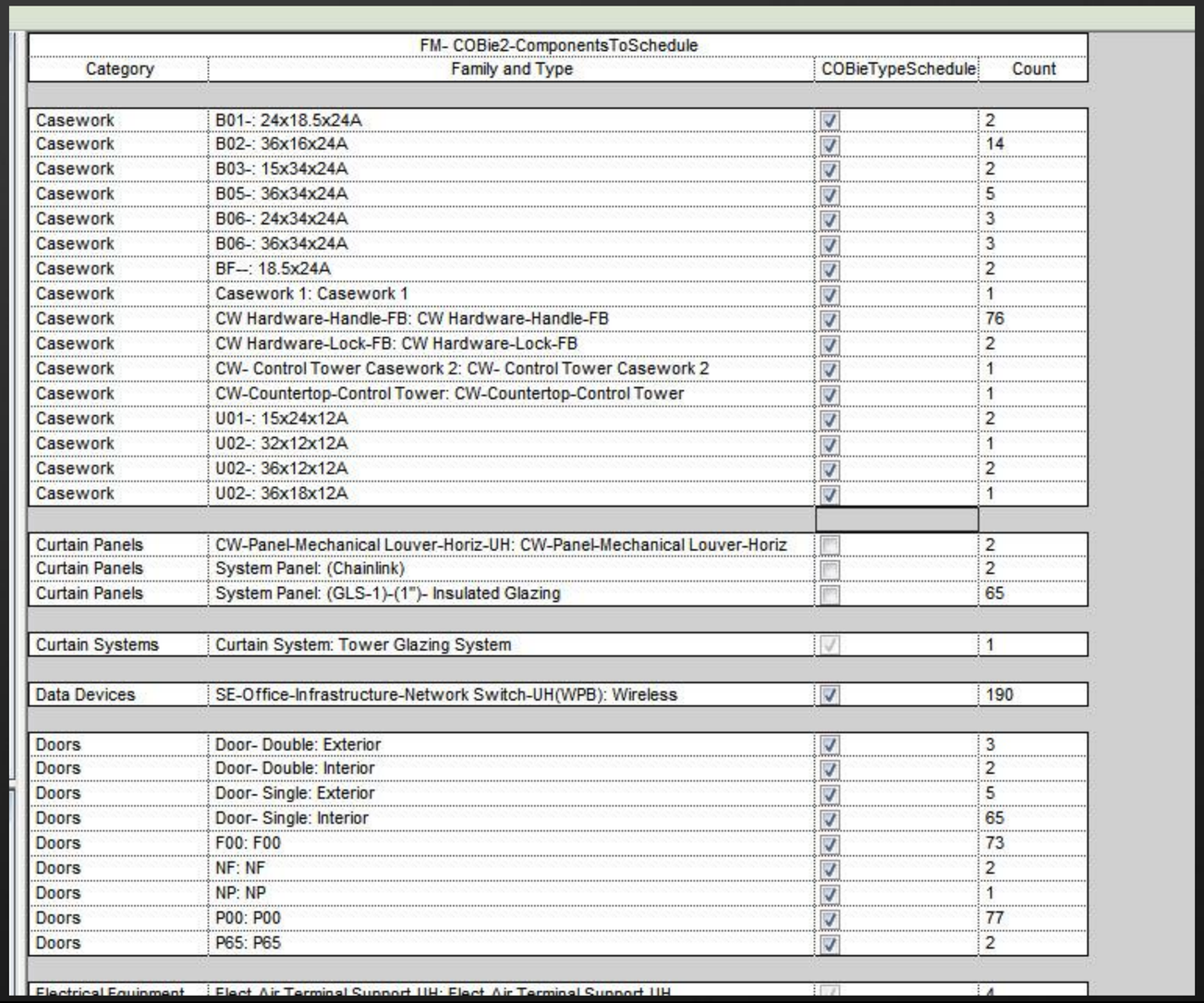
	A	B	C	D	E	F	G	H	I
1	Name	CreatedBy	CreatedOn	TypeName	SpaceNames	Description	ExtSystem	ExtObject	ExtIdentifier
13		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Computing-Part-Mouse-UH: SE-Office-Computing-Part-Mouse-UH	127	SE-Office-Computing-Part-Mouse-UH: SE-Office-Computing-Part-Mouse-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
14		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Computing-PC Station-UH(WPB): SE-Office-Computing-PC Station-UH(WPB)	127	SE-Office-Computing-PC Station-UH(WPB): SE-Office-Computing-PC Station-UH(WPB)	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
15		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Computing-Part-Monitor-UH: SE-Office-Computing-Part-Monitor-UH	127	SE-Office-Computing-Part-Monitor-UH: SE-Office-Computing-Part-Monitor-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
16		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Computing-Part-Keyboard-UH: SE-Office-Computing-Part-Keyboard-UH	127	SE-Office-Computing-Part-Keyboard-UH: SE-Office-Computing-Part-Keyboard-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
17		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Computing-Part-Mouse-UH: SE-Office-Computing-Part-Mouse-UH	127	SE-Office-Computing-Part-Mouse-UH: SE-Office-Computing-Part-Mouse-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
18		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Computing-PC Station-UH(WPB): SE-Office-Computing-PC Station-UH(WPB)	127	SE-Office-Computing-PC Station-UH(WPB): SE-Office-Computing-PC Station-UH(WPB)	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
19		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Computing-Part-Monitor-UH: SE-Office-Computing-Part-Monitor-UH	127	SE-Office-Computing-Part-Monitor-UH: SE-Office-Computing-Part-Monitor-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
20		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Computing-Part-Keyboard-UH: SE-Office-Computing-Part-Keyboard-UH	127	SE-Office-Computing-Part-Keyboard-UH: SE-Office-Computing-Part-Keyboard-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
21		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Computing-Part-Mouse-UH: SE-Office-Computing-Part-Mouse-UH	127	SE-Office-Computing-Part-Mouse-UH: SE-Office-Computing-Part-Mouse-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
22		aaronmaller@beckgroup.com	2012-11-25T19:14:57	Furn-Desk-UH: 5-0x2-6	131	Furn-Desk-UH: 5-0x2-6	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
23		aaronmaller@beckgroup.com	2012-11-25T19:14:57	Furn-Desk-UH: 5-0x2-6	131	Furn-Desk-UH: 5-0x2-6	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
24		aaronmaller@beckgroup.com	2012-11-25T19:14:57	Furn-Desk-UH: 5-0x2-6	131	Furn-Desk-UH: 5-0x2-6	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
25		aaronmaller@beckgroup.com	2012-11-25T19:14:57	Furn-Desk-UH: 5-0x2-6	131	Furn-Desk-UH: 5-0x2-6	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
26		aaronmaller@beckgroup.com	2012-11-25T19:14:57	Furn-Bookcase-UH: 1'4"Dx6'H-6 shelves	131	Furn-Bookcase-UH: 1'4"Dx6'H-6 shelves	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
27		aaronmaller@beckgroup.com	2012-11-25T19:14:57	Furn-Bookcase-UH: 1'4"Dx6'H-6 shelves	131	Furn-Bookcase-UH: 1'4"Dx6'H-6 shelves	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
28		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Office-Board-Whiteboard-FB(behind): SE-Office-Board-Whiteboard-FB(behind)	131	SE-Office-Board-Whiteboard-FB(behind): SE-Office-Board-Whiteboard-FB(behind)	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
29		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
30		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
31		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
32		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
33		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
34		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
35		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
36		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
37		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
38		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
39		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
40		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
41		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
42		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
43		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
44		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
45		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
46		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
47		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
48		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
49		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
50		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
51		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
52		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
53		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
54		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
55		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
56		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
57		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
58		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
59		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
60		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
61		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
62		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
63		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
64		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
65		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
66		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	149	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
67		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	147	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
68		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	147	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8
69		aaronmaller@beckgroup.com	2012-11-25T19:14:57	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	147	SE-Restroom Acc-Locker-Single-UH: SE-Restroom Acc-Locker-Single-UH	Autodesk Revit Architecture 2012	Autodesk.Revit.DB.FamilyInstance	062e5062-d9d3-493f-973d-8

© 2012 Autodesk

The COBie “Do I count” parameter

- COBie App only populates things Marked Yes.
- Use this in your Revit Schedules, in leiu of *other parameters* we use for the same purpose

(That’s sort of the trick with COBie)



FM- COBie2-ComponentsToSchedule

Category	Family and Type	COBieTypeSchedule	Count
Casework	B01-: 24x18.5x24A	☑	2
Casework	B02-: 36x16x24A	☑	14
Casework	B03-: 15x34x24A	☑	2
Casework	B05-: 36x34x24A	☑	5
Casework	B06-: 24x34x24A	☑	3
Casework	B06-: 36x34x24A	☑	3
Casework	BF—: 18.5x24A	☑	2
Casework	Casework 1: Casework 1	☑	1
Casework	CW Hardware-Handle-FB: CW Hardware-Handle-FB	☑	76
Casework	CW Hardware-Lock-FB: CW Hardware-Lock-FB	☑	2
Casework	CW- Control Tower Casework 2: CW- Control Tower Casework 2	☑	1
Casework	CW-Countertop-Control Tower: CW-Countertop-Control Tower	☑	1
Casework	U01-: 15x24x12A	☑	2
Casework	U02-: 32x12x12A	☑	1
Casework	U02-: 36x12x12A	☑	2
Casework	U02-: 36x18x12A	☑	1
Curtain Panels	CW-Panel-Mechanical Louver-Horiz-UH: CW-Panel-Mechanical Louver-Horiz	☐	2
Curtain Panels	System Panel: (Chainlink)	☐	2
Curtain Panels	System Panel: (GLS-1)-(1")- Insulated Glazing	☐	65
Curtain Systems	Curtain System: Tower Glazing System	☑	1
Data Devices	SE-Office-Infrastructure-Network Switch-UH(WPB): Wireless	☑	190
Doors	Door- Double: Exterior	☑	3
Doors	Door- Double: Interior	☑	2
Doors	Door- Single: Exterior	☑	5
Doors	Door- Single: Interior	☑	65
Doors	F00: F00	☑	73
Doors	NF: NF	☑	2
Doors	NP: NP	☑	1
Doors	P00: P00	☑	77
Doors	P65: P65	☑	2
Electrical Equipment	Elect-Air Terminal Support-UH: Elect-Air Terminal Support-UH	☑	4

© 2012 Autodesk

Revit “Placement tools” and data

- Right now FM/O&M data is stored just like all other data:
  - Instances
  - Types

- There are three Revit Items that are (right now) going to let you down:
  - Model Groups (Instances don’t get “instance” data, they get “copied” data
    - Need to be ungrouped
  - Stacked Walls (the nested walls don’t get Identity Data at all)
    - Need to be “Broken Up
  - Multiple Instances of Linked Files
    - Need to be Bound

© 2012 Autodesk

Putting the model in the FM tool!

- This is probably the part youre hoping for the easy button on…..

So I hope you don’t get disappointed

- Unfortch… Different FM tools will use the model differently

© 2012 Autodesk

Putting the model in the FM tool!

- Some downstream tools will use a DWF export
- Some (Ecodomus) will use a Navisworks Export
- In addition, they may also require the COBie Exports (schedule export to text, import to Excel; or a Database Export)

© 2012 Autodesk

The “gotchas” of exporting models

- Can they see what you see?
  - DWF and item transparancy: Sounds silly, but if they cant touch it… they cant touch it!
- Translations:
  - IFC, did you look at it? Does it look like your project still?
- Navisworks:
  - Did you try to export Nested Links? Did you get Legend Views in your model?

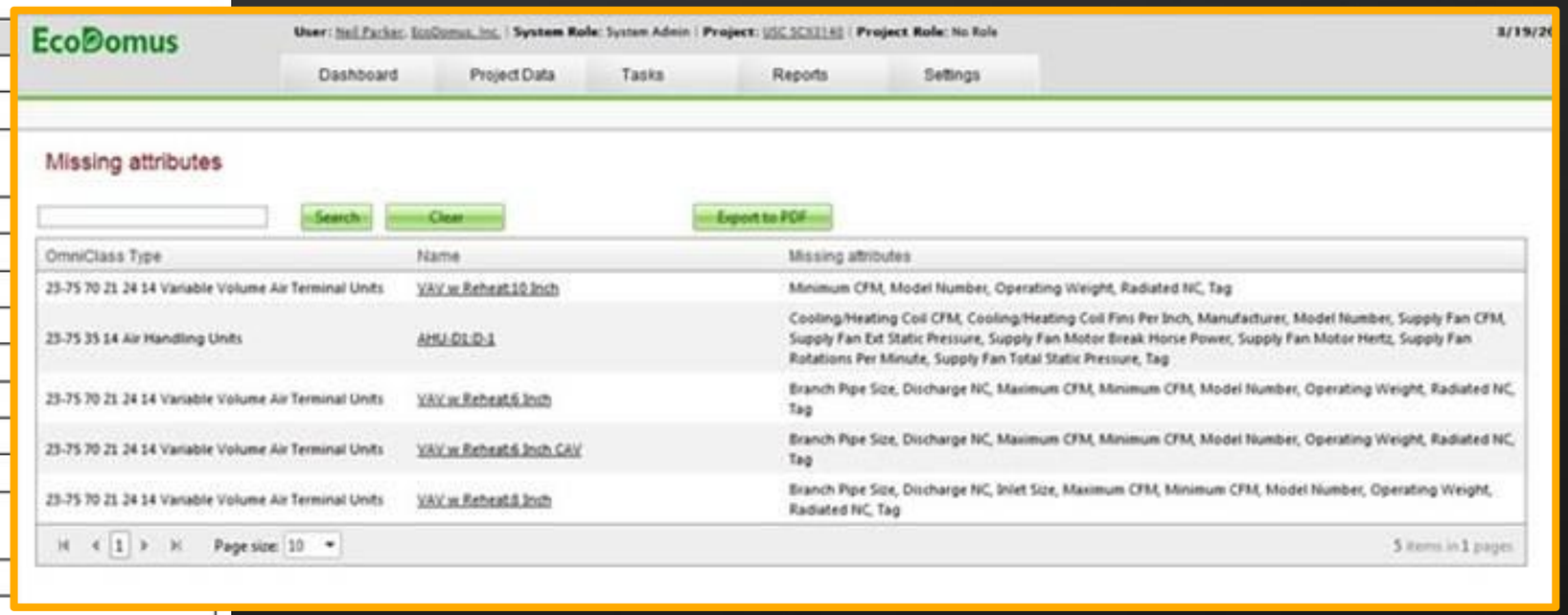
© 2012 Autodesk

The “gotchas” of exporting models

- Model Review:
  - What's realistic, and who is setting those standards?

Combined_Nov17_2012	Time: 2011-11-19 14:50:22 Application: Autodesk Revit Architecture 2012 IFC: IFC2X3

GST/IDFGeneratorRuleSetV8.2	Acc	Rej	Maj	Nor	Min
BasicRules				x	
1 - Unique GUID	OK				
1 - Model Structure (relations to building and building story)				x	
2 - Required Components				x	
2 - Check for orphaned doors or windows				x	
3 - Storey Elevations	OK				
Space Checking			x	x	x
1 - The Model Must Have Spaces				x	
1 - Space Validation			x	x	x
1 - SpaceBoundary check			x		
2 - Internal walls must bound at least two spaces	OK				
3 - Spaces Must Have a Type, a Name and Number				x	
Geometric rules			x	x	x
2 - Allowed Profiles for columns				x	x
2- Wall Validation				x	

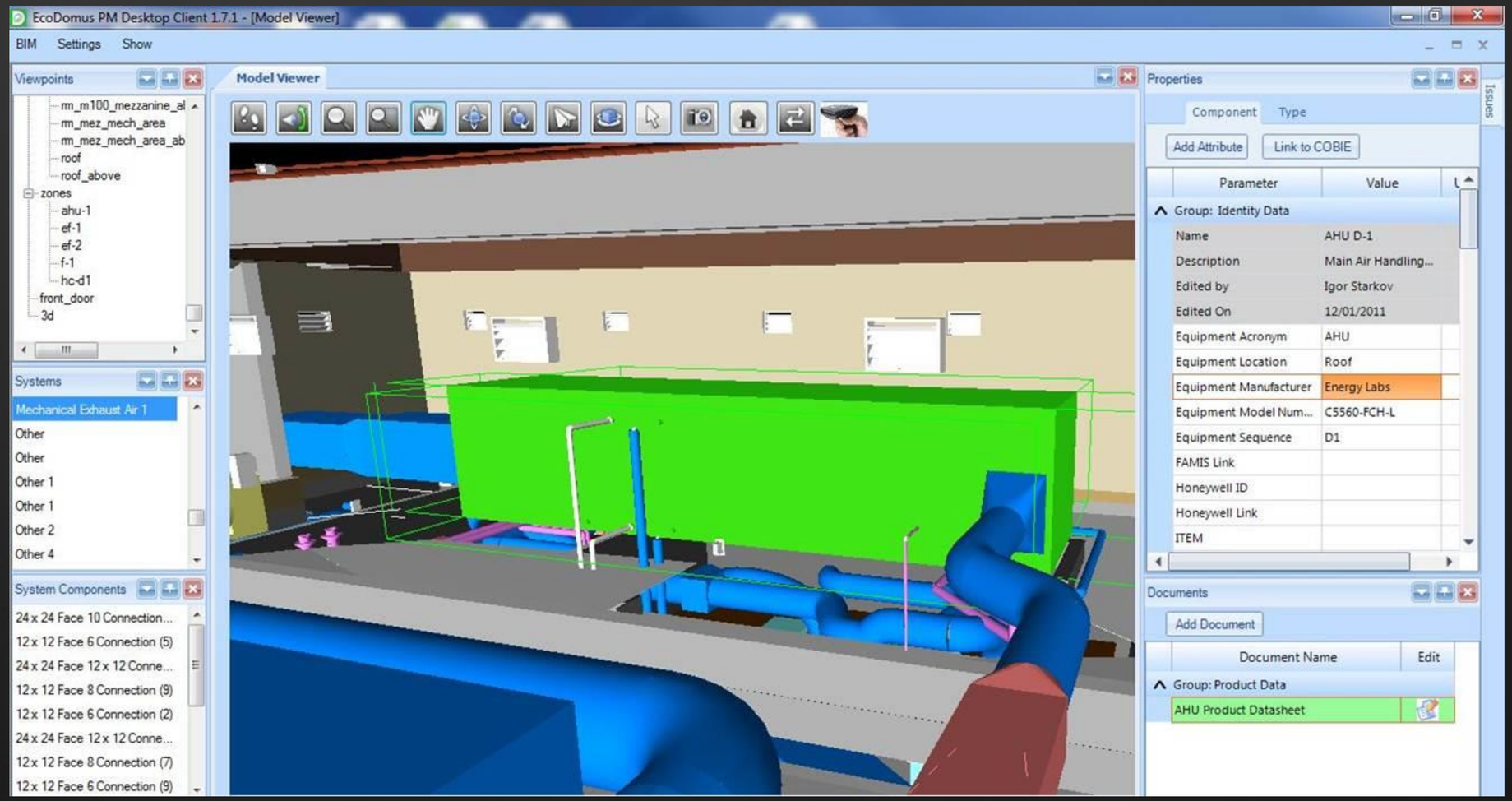


© 2012 Autodesk

What happens in the FM Software that relates to CMMS?

- Components:

- From the Model:
  - *What are they*
  - ***Where are they***
  - *What are they doing*
  - ***What are they connected to?***



© 2012 Autodesk

What happens in the FM Software that relates to CMMS?

- From the FM Tool:
  - *Work backwards from Space*
  - ***Find the Systems***
  - *Find the pieces*
  - ***Find the data***

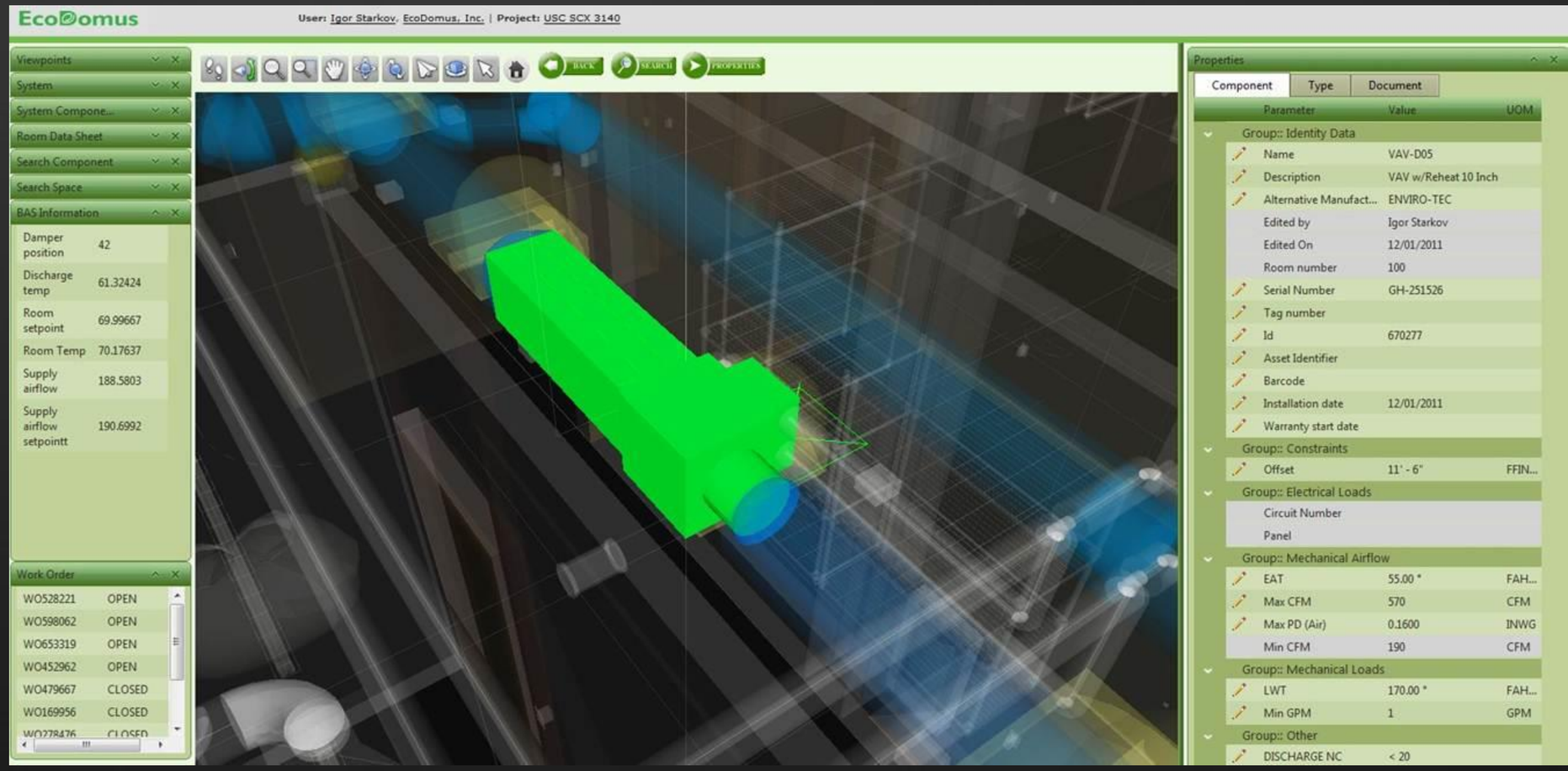
© 2012 Autodesk

What happens in the FM Software that relates to CMMS?

- Components:

- From the Model:
  - *What are they*
  - ***Where are they***
  - *What are they doing*
  - ***What are they connected to?***

- From the FM Tool:
  - *Work backwards from Space*
  - ***Find the Systems***
  - *Find the pieces*
  - ***Find the data***



- What's already been worked on, and what could be our problem?

© 2012 Autodesk

Monday Morning Quarterbacking

© 2012 Autodesk

What didn’t go well?

- Time to convert Point Clouds to PCG from native file format
  - Order of magnitude more time than expected, due to file sizes. (Lesson learned)
- Data Associations *(ask how the downstream software works)*
  - Space association from System Browser, not from FamilyInstance
- Model Review:
  - If you're building a true as-built, you cant always correct “Revit warnings.”

© 2012 Autodesk

Aaron Maller- BIM Manager- The Beck Group (Dallas, TX)
aaronmaller@beckgroup.com
www.malleristicrevitation.blogspot.com
www.twitter.com/twiceroadsfool
www.twitter.com/thebeckgroup
www.RevitForum.org

Autodesk, AutoCAD* [*if/when mentioned in the pertinent material, followed by an alphabetical list of all other trademarks mentioned in the material] are registered trademarks or trademarks of Autodesk, Inc., and/or its subsidiaries and/or affiliates in the USA and/or other countries. All other brand names, product names, or trademarks belong to their respective holders. Autodesk reserves the right to alter product and services offerings, and specifications and pricing at any time without notice, and is not responsible for typographical or graphical errors that may appear in this document. © 2011 Autodesk, Inc. All rights reserved.