Beyond Design and Construction
Advancing BIM for Post Occupancy in Healthcare

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The Company assumes no obligation to update these forward-looking statements to reflect events that occur or circumstances that exist or change after the date on which they were made – September 25, 2014.
Integrating BIM post occupancy is not about Technology…

…this is a Process Discussion!
Agenda

- **Current Opportunity**
  Solving Process Inefficiencies

- **Role of BIM**
  Consistent INFORMATION Conduit

- **The Three Questions**
  Gauge Everything Against These

- **Opportunity Examples - Healthcare**
  Space Management
  Asset Management

- **Process Change**
  Putting it all Together

Courtesy of Mortenson Construction and RTKL Associates Inc.
“…ours is the only trillion dollar industry in the history of the world in which clients routinely demand the most inefficient processes creating the least value…”

Barbara White Bryson FAIA, AVP Facilities and Construction, Rice University in *The Owner’s Dilemma: Driving Success and Innovation in the Design and Construction Industry*
Collaboration (Noun)

1. act of *cooperating traitorously* with an enemy that is occupying your country

2. act of *working jointly*; “they worked either in collaboration or independently”

Source: Wordreference.com
Current Climate:
Process Inefficiencies - Traitorous Collaboration

Knowledge Sources

<table>
<thead>
<tr>
<th>Design</th>
<th>Cost</th>
<th>Construct</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$24B</td>
<td>$400B</td>
<td>$4T</td>
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</tbody>
</table>

Process Inefficiencies

Knowledge Sources

More

Less

$24B

$400B

~ $4T

Time

Early

Late
## Cost by Stakeholder / Phase

Composite Table: Using the Structure of Table 4-2 and the /sf Values from Tables 6-5 through 6-8

<table>
<thead>
<tr>
<th>Life Cycle Phase</th>
<th>Stakeholder Group</th>
<th>Cost Category ($/sf)</th>
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<tr>
<td></td>
<td>Owners and Operators</td>
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</tbody>
</table>

**One Time**

**Recurring**

**Total Value = $0.23 / sf / year**
Asset Management Operational Inefficiencies
Sandia National Labs Example / NIST Comparison

Four sites, ~ 1100 bldg, 7M GSF

- NM (Albuquerque)
- CA (Livermore)
- NV (Tonopah)
- HI (Kauai)

Sandia NM

- 891 Bldgs
- 6M GSF
- 8700 acres

Construction: $80 M / YR
Asset Management Operational Inefficiencies
Sandia National Labs Example / NIST Comparison

Sandia Labs: 6M GSF
@ $0.23/ existing SF/yr
NIST Study = ~$1.4M

O&M team “straw man” survey

Using BIM, if you could get all needed information in 5 minutes, how much time would that save?

Response: up to 2 hours per work order (WO)

60,000 Work Orders / Year
40% = 24,000
2 hrs/WO x $50/hr = $100/WO

Potential savings: $2.4 M / Year or $0.40 / sf

Courtesy Sandia National Labs and Birgitta Foster
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Courtesy of TME, Inc and Corgan Associates
Building Information Modeling

Definition

The creation and use of coordinated, internally consistent, **computable information** about a building project in design and construction.
Lifecycle Application – “What are the questions?”
Computable Building Information
Lifecycle Application – “What are the questions?”
Computable Building Information
Floor Finish
Lifecycle Application – “What are the questions?”
Computable Building Information

Square Footages
Better Data Integrity for Lifecycle
Automatic Coordination (Addresses Interoperability)

Bi-Directional Data Exchange
- Change it once
- Changes everywhere
- Graphical and Tabular Data Update Together

Support for Lifecycle Data
- Design Team begins Support for Lifecycle
- Support for Data Initiatives (i.e. COBie) starts here
Application of BIM: Process Inefficiencies – BIM as Conduit

Knowledge Sources

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<tr>
<td>Building Information Model as Catalyst to Process Change</td>
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More

Less

$24B  $400B  $4T

Knowledge

Early  Time  Late

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“BIM is the perfect complement to collaborative teams, especially ones that care about fluidity of information sharing and coordination rather than the sanctity of drawings.”

Barbara White Bryson FAIA, AVP Facilities and Construction, Rice University in *The Owner’s Dilemma: Driving Success and Innovation in the Design and Construction Industry*
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The Three Questions
Gauge Everything Against These

Who is going to use the data?
Understand The Problem!

What data are you going to collect, and How?
Define the Solution!

How will it be maintained?
Ensure Integrity and Confidence.
Who is Going to Use the Data?

Understand the Problem.

- Efficiencies can be gained if data is easily accessible.
- Building Information Modeling has a role...

... BUT ......

- In Order to Integrate, you must understand the “Personas” that will use the data:
  - What their use-cases are.
  - Why they need the data.
  - How they use the data.

- When we learn this, then the problem will be understood.

Sample Persona Courtesy USC
Persona Development - USC

University HVAC Manager

Peter Smith

"The most important part of my job is keeping the customers happy at all hours of the day"

Age: 52
Current Job Experience: 7 yrs
Overall Experience: 25 years as HVAC installer/Engineer
Education: High School + Education on HVAC Systems
Goals:
• To maintain a good relationship with customers
• To find the simpler way to solve problems

University HVAC Maintenance Manager

Innovation: Having so many year experience, Peter still enjoys the hands-on work of being out in the field as well as taking care of his administrative duties back in the office. Even though Peter understands how the HVAC control system and mechanical equipment work, he still enjoys learning about new, time-efficient ways to solve problems. Afterall, the job isn’t as interesting when you’re not learning something new.

Customer Service: Peter enjoys keeping his customers happy. Peter takes time everyday to return phone calls, calm disgruntled customers, and be seen on the university campus. Peter will even gladly take phone calls during the night to make sure that everyone on campus is comfortable. To provide the best customer service, Peter needs to know about all of the problems that occur (e.g., temperature deviations, non-operating equipment, etc.) as soon as possible.

Role Description: Peter starts his day at a mandatory report meeting, where he discusses with his crew about the various HVAC problems around campus. Peter will make sure that the Priority 1 jobs (critical areas and non-operating equipment) jobs are addressed as soon as possible and the Priority 2 (hot/cold calls) jobs are addressed by the end of the day. For the next few hours, Peter will spend time at his computer issuing/closing work orders, calling customers, ordering parts, and other managerial tasks. In addition, Peter will use EBI to scan the buildings on campus to see if there are any temperature-related or mechanical problems with the HVAC systems. Next, Peter will visit with university personnel—maintaining a relationship with his customers is important to him. In the afternoon, Peter will help his crew who are out in the field by adjusting parameters in EBI, running to get equipment, or going into the field to do some hands-on work. In the late afternoon, Peter will look at the newest hot and cold calls to try to address the problems that have arose throughout the day. By the end of the day, Peter will have worked 9 to 12 hours.

Peter uses the following tools:
EBI: Peter uses EBI to navigate through university buildings and look up parameters associated with mechanical equipment (e.g., space temperature, flow rates, etc.). Peter finds this tool helpful and easy to navigate, but dislikes having to search for hidden points that are not shown within the graphics. To add to his frustration, some of the points do not have descriptive names. In addition, some of the buildings do not have a complete set of graphics.
FAMIS: Peter uses FAMIS to schedule work orders. Peter also uses FAMIS to access the backlog that he maintains, reopen/close work orders, and put notes on some work orders. He also oversees the assigning of work orders to his crew. Peter may have 100+ work orders in one week, so he appreciates that FAMIS is available to help him organize all of the problems. Even though Peter is content with the function of FAMIS, he would like to see it linked to EBI.
AISB: Peter uses AISB to order parts. This program interfaces to the stock room. In AISB, Peter is also able to approve P.O.s, requisitions, and materials that are needed. Peter finds this program unintuitive and difficult to use.

Peter’s needs:
Integrated software:
Peter would like to have his work orders integrated with the location of the problematic equipment, graphics of the equipment, equipment manuals, and information about how to fix the equipment. Currently, all of this information is distributed.
A spatial understanding of equipment location:
Currently, Peter’s crew have to find mechanical equipment (e.g., VAV boxes) by following the duct work and trial-and-error. Sometimes EBI has limited information about location, but Peter would like software that would tell him and his crew about the exact location and layout of the mechanical equipment.
Persona Development - USC
Commissioning Manager

Irene Gonzalez

“I help maintain the highest level of quality for university buildings”

Age: 32
Current Job Experience: 5 yrs
Overall Experience: 10 years as Engineer
Education: Bachelors Degree
Goals:
• To get valuable information regarding building systems to those who need it most
• Develop a standard process for project close-out to increase efficiency

Commissioning Manager

Innovation: Irene is an experienced engineer always looking to learn more about building systems. She is looking for new ways to make her job more efficient such as establishing process standards and utilizing technology.

Customer Service: Irene looks to make sure that the O&M staff has all the information they need to manage and maintain the new buildings on campus. By ensuring that all the appropriate documents have been delivered to the university after construction, Irene works extremely hard to make sure that all of her customers have access to vital building information.

Role Description: Irene is responsible for overseeing the commissioning and close-out process for campus construction projects. She establishes, maintains, and enforces standards in order to protect university assets. As the commissioning manager, Irene typically manages 3rd party commissioning agents for new capital construction projects. She reviews startup and testing procedures, submittals, and action reports in addition to developing project punch lists and organizing training for Operations & Maintenance staff. As a facilitator of project close-out, Irene reviews all close-out documentation including MEP equipment, furniture, fixtures, materials, and finishes to ensure completeness and accuracy. Irene creates a master equipment list using schedules in the construction documents to track required information that should be received from the contractor. She is responsible for ensuring all contractually required information is delivered but not responsible for archiving those documents in Meridian or entering equipment information in Fams.

Irene uses the following tools:

EBI: Irene uses EBI as a basic user to oversee 3rd party commissioning. The commissioning authority typically uses EBI as a tool for the commissioning process to read live sensor data and check system responses.

Fams: Irene uses Fams to print out building equipment lists as a cross-check to her own master equipment list. As a basic, read-only user she is only familiar with very specific options within the system. Most of the information that Irene has is not in Fams.

Excel: Irene keeps her master equipment list in an excel spreadsheet as an organizational tool for checking close-out documents. Each project is unique and Irene is still working to define a standard process to verify if the university has received complete and accurate information.

Irene’s needs:

Project Close-Out Tool: Irene currently uses spreadsheets to track master equipment lists, managing all of the information herself. A system with established standards and processes would allow Irene to leverage the work of contractors and consultants to help compile the valuable information for Operations & Maintenance.

Standard Process: Irene is still working to document a standard close-out procedure for consultants, contractors, and university project managers. Once a standard process is developed it will empower project managers to be the first line of defense to ensure the university is receiving all the necessary information, allowing Irene to be the final stamp of approval.
Persona Development - USC
Energy Management Administrator

James Conroy

“IT is important that the system is reliable and always stays running”

Age: 40
Current Job Experience: 6 yrs
Overall Experience:
20 years as energy management technician

Education:
Associates Degree

Goals:
• To decrease university energy consumption by optimizing building system performance
• To always be improving the current energy management system

Energy Management Administrator

Innovation: James is a tech-savvy person who is always looking for ways to improve the quality of information delivered to his customers. While the size of the energy management system is always expanding, James takes advantage of any tools that can help increase efficiency in supplying end users with valuable information.

Customer Service: James mostly works with shop and administrative personnel to help maintain the Honeywell EBI system. He understands that by keeping his customers satisfied, the energy management system can be continually improved to be more reliable and detailed.

Role Description: James is the administrator of the university’s Honeywell energy management system that monitors and controls building system performance. He is responsible for creating and maintaining the sensors and technology infrastructure in addition to the background programming that allows users to interface with the energy management system. James manages nearly 8,000 graphics that display live data such as room temperature, filter static pressure, and fan speed. Each day James finds errors in the system that need to be fixed on the fly while he navigates the system to assist HVAC technicians and other customers. For new construction projects, James works with the control contractor to integrate the installed system into Honeywell Enterprise Building Integrator. James is also responsible for calculating billing amounts for university provided utilities such as the central chilled water service. Working with historical performance data, he manually converts chiller ton/hrs to dollars each month for FMS’s accounting department.

James uses the following tools:

EBI: James is the most advanced user of EBI. He works with controls contractors to connect newly installed controls to the EBI system to ensure the new controls are accessible from EBI. He does the back-end programming in addition to the user graphics that allow for easy navigation to pertinent information.

Meridian: James typically uses Meridian to look for construction documentation that show system layouts to troubleshoot problems or as a basis to create graphics within EBI.

James needs:

Chilled Water Billing Tool: James currently exports data from EBI to manually calculate billing amounts for 35 buildings on campus. Using historical performance data for the month, it takes James 3 days to convert ton/hrs or BTUs to dollar amounts that can be charged to the customers. A tool that automatically outputs monthly billing totals would save James countless hours of repeat work each month.

Connect EBI with Operational: A large portion of time is spent converting floor plans to EBI graphics. A tool that streamlines this process would help make the EBI graphics more reliable and complete as well as increasing efficiency.

Persona Courtesy University of Southern California, not for Distribution or Reuse
Will Brown

“Ensuring that customers can rely on the quality of our work is paramount”

Age: 40
Current Job Experience: 5 yrs
Overall Experience: 15 years as CAD drafter
Education: Bachelors Degree
Goals:
- To create and maintain accurate building floor plans
- To learn new technologies that improve efficiency and help better meet our customers’ needs

CAD Project Specialist

Innovation: Will is an expert technologist. Having worked as a CAD drafter for many years, he is accustomed to being in a production type position. Steadily evolving customer needs drive Will to find more effective ways to use technology to meet these demands. He’s always learning more about the responsibilities of his customers and improving the quality of the Operational floor plans that he provides.

Customer Service: Will tries to rise above his customers’ expectations at every opportunity. He strives to find ways to show customers how technology can help produce useful, quality drawings. Incorporating his various needs into existing approaches, Will can leverage in place processes to meet developing customer needs.

Role Description: Will’s main responsibility is to create and maintain floor plans for campus buildings. The Operational (or as-built) floor plans are created in AutoCAD or Revit from field measurements. He typically starts a project by being notified of a new building, recent remodel, or inaccuracy in existing drawings. After gathering important information such as existing floor plans, assigned room numbers, and any other building areas of focus, Will visits the site to measure the building. The field verifications are used to update the existing floor plan to reflect current conditions. These updated floor plans are then published so they can be utilized by various university constituents.

Will uses the following tools:
- **AutoCAD**: Will uses AutoCAD to create the floor plans. From AutoCAD, he publishes a variety of floor plans including basic architectural plans with rooms numbers, types, and areas, telecom plans that include data port location and grid numbers, and thematic space plans that hatch various rooms by Owner Group.
- **Meridian**: Will uses Meridian to manage the master floor plan files for all of the buildings that USC owns or operates. He is considered a Power User that is responsible for maintaining data quality and completeness.
- **AISB**: Will uses AISB to verify room numbers and types in addition to cross-referencing the reported space areas with the output from the floor plan. As a read-only user of AISB, Will has trouble navigating the system or finding the information he needs.
- **Famis**: Will uses Famis as an alternative to AISB to check space data. Although the data is not maintained in Famis, it is downloaded weekly from AISB in order to interface with FamisCAD.
- **FamisCAD**: Will uses FamisCAD to generate thematic floor plans based on space data that resides in Famis (but downloaded from AISB). Thematic floor plans that are typically published include hatching rooms by Owner Group or annotating rooms with employee information. In addition, FamisCAD helps Will synchronize the space data with the Operational floor plans.

Will’s needs:

Persona Courtesy University of Southern California, not for Distribution or Reuse
What data are you going to collect, and How?

Define the Solution!

- What data are we going to collect?
  - Move thinking from “As-Built” to “As Maintained”
  - Understanding the end user allows targeting of specific data to capture.
    - Asset Data (Make, Model, Serial Number, etc.)
    - Space Data (Room Attributes, Finish Attributes, etc.)
    - Other Use Cases and Personas
  - Typically the amount of data to be captured will decrease

Model courtesy of DesignGroup and the National Audubon Society
What data are you going to collect, and How?

Define the Solution!

- How are you going to capture the data?
  - When is the data available in the process? (Design? Construction? Commissioning?)
  - What stakeholder can best capture that data?
  - How do we aggregate the data?

- How do we transfer that data downstream?
  - Standard Formats? (COBie, IFC, etc.)
  - Vendor Supplied Direct Integrations?
How will the Data be Maintained?
Ensure Integrity and Confidence!

- If the information can’t be maintained, why capture it at all?
- Non-current data risks the perceived integrity of the entire system.

Separate Graphical Data and Attribution

- **Graphical Data** – Does the model need updating?
- **Attribution** – Do other systems manage this better?
The Importance of the Process Discussion

Why You Need a Plan

“Stay with me for a minute, because in step C, things get a bit delicate.”
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Courtesy of Mortenson Construction and RTKL Associates Inc.
Why Now?

Opportunity (Noun)

1. an amount of time or a situation in which something can be done
2. a favorable juncture of circumstances
3. a good chance for advancement or progress

Source: Merriam Webster Online
The Building Lifecycle
“an amount of time or a situation in which something can be done”
The Building Lifecycle
“a favorable juncture of circumstances”
Graphic / Attribute Data Importance
“a good chance for advancement or progress”

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Application – Space Management
Medicare/Medicaid Space Reporting
Form CMS-2552-10

- Recovery of facility costs requires **detailed spatial data**
- **Massive effort** to gather accurate space and allocation data
- Need to work with CMS auditors to **defend spatial data**
- Need to show not just current allocations but document changes since previous report
  - Changes in space inventory
  - Changes in space allocations
Annual Space Reporting Equation - Simplified
Where BIM-Based Space Management Fits – Form CMS-2552-10

Facility Costs \times \% \ of \ Medicare/\ Medicaid \ Allowable \times \% \ of \ Space \ Occupied \ by \ the \ Dept = Facility \ Costs \ Allocated \ for \ that \ Dept
Annual Space Reporting Equation - Simplified
Where BIM-Based Space Management Fits – Form CMS-2552-10

FORM CMS-2552-10

WORKSHEET B, PART I - COST ALLOCATION - GENERAL SERVICE COSTS AND WORKSHEET B-1 - COST ALLOCATION - STATISTICAL BASIS

Base cost data on an approved method of cost finding and on the accrual basis of accounting except where government institutions operate on a cash basis of accounting. (See 42 CFR 413.24(a)). Cost data based on such basis of accounting is acceptable subject to appropriate treatment of capital expenditures. Cost finding is the process of recasting the data derived from the accounts ordinarily

Simplified Cost Allocation Methodology

As an alternative approach to the cost finding methods identified in CMS Pub. 15-1, §2306, the provider may request a simplified cost allocation methodology. This methodology reduces the number of statistical bases a provider maintains. It may result in reducing Medicare reimbursement. A comparison is recommended if the possible loss reimbursement is surpassed by the reduced costs of maintaining voluminous statistics. The following statistical bases must be used for purposes of allocating overhead cost centers. There can be no deviation of the prescribed statistics and it must be utilized for all the following cost centers.

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<th>Buildings and Fixtures</th>
<th>Square Footage</th>
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<td>Dietary**</td>
<td>Patient Days</td>
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<tr>
<td>Social Service</td>
<td>Patient Days</td>
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Value Proposition – Space Management

The Value of BIM is:

- Building Information Models inherently understand space boundaries, eliminating the polylining process.
- BIM is also able to use the space classification to understand boundary positions.
- The effects of penetrations on space calculations is automatic based on model geometry.
- Space can be easily scheduled and quantified inside the model.
- Simple export or direct connections extend the value proposition.
Space Management - The Three Questions

How did we do?

- Who is going to use the data?
  - Space Managers, Space Planners
  - Reimbursement Analysts

- What data are you going to collect, and How?
  - Area plans define and calculate square footage.
  - Department and Other Attribution as Required
  - Data collected through modeling process.

- How will it be maintained?
  - Model Drives Square Footage
  - Space Management System Drives Attribution
Carolina HealthCare System’s BIM pilot produced these metrics: Using [Traditional] software, CHS could polyline at a rate of 5,000 square feet per hour.

In contrast, the rate to produce a facility model in [BIM] software products departmental boundaries was 10,000 square feet per hour—twice the rate of 2D CAD-based methods.

Meghan Ruffo, BIM Manager
Carolinas Healthcare System
Application – Asset Management
Value Proposition – Asset Management

- Hospitals are rich in assets, but there are (2) types of Assets
- **Fixed Building Assets** (Air Handlers, VAV, Pumps, Etc.)
- **Medical / Mobile Assets** (MRI, CT, IV Pumps, Crash Carts, Etc.)

- We are speaking specifically about the **Fixed Building Assets**.
- Some of this could apply to **Medical Assets**, but that conversation is more complex
Value Proposition – Asset Management

- The Value of BIM is:
  - Assisting in the field collection of data about those assets
  - Reducing the amount of time spent in populating the databases
  - Providing a platform for the visualization of asset locations
  - Reducing regulatory concerns from not having the data current and continuous from installation
  - Further reducing regulatory concerns from life safety inspections (JCAHO - Joint Commission on Accreditation of Healthcare Organizations)
Equipment records created in Revit in Design Model is then updated from data collected in BIM 360 Field.

Attribute Data

Graphic Data

Data combined from various sources to produce output

BIM and Asset Management – BIM 360 Platform
High Level Workflow Utilizing the Cloud

Open Standards (COBie) or Direct Integration Output

Data Captured in the Field at the Right Time by the Correct Stakeholder.
Transferring Data Downstream
Multiple Options Once Data is Collected

- Once data is collected, there are multiple options for moving it downstream
- Simple Import and Export can support many use cases
- Richer data transfer can be achieved using open data formats such as COBie
- As a prototype, Autodesk is exploring direct integrations with CMMS Partners to enable bi-directional data exchange
Advanced Workflows – **Direct Integration**

**Asset Creation** – Publish assets from BIM into CMMS (key data to support building maintenance)

**Asset Visualization** – Integrated visualization to support service request and work order management

**Asset Reconciliation** – Informing the original BIM of the changes present in the CMMS
Asset Management - The Three Questions

How did we do?

- Who is going to use the data?
  - Maintenance Personnel
  - Asset Manager, Maintenance Supervisor

- What data are you going to collect, and How?
  - Simplified geometry derived from model.
  - Detailed attribution captured through cloud processes during design, construction and commissioning

- How will it be maintained?
  - Attribution moved into Asset Management System and managed there.
  - Simplified geometry requires little to no updating, can be updated by engineer or constructor.
[BIM and CMMS] integration: Bi-directional integration of BIM Data into the owner’s FM system, heavy involvement with database hierarchy and FM staff.

This process eliminated two (2) years’ worth of work to populate their FM database that drives building maintenance.
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  Consistent INFORMATION Conduit

- The Three Questions
  Gauge Everything Against These

- Opportunity Examples - Healthcare
  Space Management
  Asset Management

- Process Change
  Putting it all Together
Putting it all Together.

Start with this Thought

THINK

THINK

THINK

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Not for Distribution
Putting it all Together

Process Transformation Components

Who is going to use the data?

- Persona Development - End User Understanding

What data are you going to collect, and How?

- BIM Project Execution Plan
- Model Development Specification
- Model / Data QA/QC Tools
- Data Collection and Transfer Format

How will it be maintained?

- Data Maintenance Plan
- Vendor Integration Support
Deliverable Standards
Industry Examples and Resources

Organizational Guidelines (Process / Data / Execution)

- AIA E203/G202 – Digital Practice Documents
- AGC BIMForum LOD Specification
  http://bimforum.org/loD/
- COBie (Whole Building Design Guide)
  http://www.wbdg.org/resources/cobie.php
- National BIM Standard™
  http://www.nationalbimstandard.org/
- Penn State Planning Guide for Facilities Owners PDF
  http://bim.psu.edu/
- Penn State BIM Project Execution Planning Guide PDF
  http://bim.psu.edu/
Autodesk Tools Supporting Integration
COBie Toolkit for Autodesk Revit

http://www.autodesk.com/campaigns/interoperability
COBie Defined
Construction Operations Building Information Exchange

- What is COBie?
  - Construction Operations Building Information Exchange
  - Capture and delivery of information about facility assets required by facilities, operations and maintenance
  - Internationally recognized data exchange format
  - Format for delivering construction handover data for systems used in the operate and maintain lifecycle systems.
  - Exchange building systems information from design & construction with building owners
From Revit to COBie

All about the “I” in BIM
COBie Toolkit for Autodesk Revit

Intuitive Workflow

**Setup**
Establish project contacts, and use a setup wizard to configure the default parameters for mapping Revit model data to the COBie data structure.

**Modify**
Manage the relationship between Revit Rooms and Spaces and COBie Zones, specify which families, types, and elements are exported, and perform batch operations on the current model.

**Export**
Configure the COBie export by specifying the worksheets to include, creation method, template, and export location.
COBie Toolkit for Autodesk Revit Task Overview

Setup

Manage Contacts
Create and manage complete contact records for each of projects COBie Contacts.

Default Settings
Efficiently configure an Autodesk Revit model for COBie using an intuitive step-by-step wizard.
COBie Toolkit for Autodesk Revit Task Overview

Modify

**Zone Management**
Utilize the intuitive Zone Manager to organize Revit Rooms and Spaces into COBie Zones.

**Element Selection**
Precisely control which family types, families, and even elements are included within COBie exports.

**Batch Update**
Ensure every item within a Revit model includes accurate data for essential COBie fields.
COBie Toolkit for Autodesk Revit Task Overview

Export

Select Worksheets

Tailor COBie exports to specific project requirements while maintaining alignment with COBie Deliverable requirements.

Export Action

Easily start COBie projects by creating a new spreadsheet, or keep existing spreadsheets up-to-date with an append option.
COBie Toolkit for Autodesk Revit

**Feature Summary**

**Distraction-Free Workflow**
Facilitate the export of COBie data without leaving the Autodesk Revit application.

**Dynamic Zone Management**
Innovative Zone Manager dynamically manages separate Revit Rooms and Spaces as COBie Zones.

**Effortless Parameter Mapping**
COBie fields are pre-mapped to the correct Revit Type and Instance parameters.

**Flexible Export Options**
Maintain full control over every piece of data exported from Revit to a COBie spreadsheet.
Autodesk Tools Supporting Integration
Revit Model Checker (Coming Soon)

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Overview of the Revit Model Checker

Background

- Originally developed for the U.S. Army Corps of Engineers (USACE)
  - Created version 1.0 in November 2011
  - Currently working on version 4.0

- Goal was to create an add-in for Revit that would:
  - **Reduce** the amount of time USACE would spend reviewing submitted Revit models
  - **Create** something that aligned with USACE BIM Requirements (UBR)
  - **Integrate** Inside of Revit for Simplified Workflows
Overview of the Revit Model Checker

Creating Model Checkers for Others

- The success of the USACE version highlighted a need...
  - Many owners / agencies are creating or already have their own BIM Requirements
  - Checking compliance to these requirements is challenging

- Autodesk Ecosystem Business Development is working on.
  - An easily distributable, royalty free model checker shell
  - A model checker configuration authoring tool
  - Coming Soon...
Model Checker Feature Overview

Apply Proven Best Practices

Achieve your submittal goals by establishing BIM Requirements tailored to your organization, and based on proven best practices.

Experienced-based insights help ensure submitted models achieve your business goals.

Design teams save time by applying industry best practices they are already familiar with.
Model Checker Feature Overview

**Infinitely Scalable**

From a single standard to many, there is no limit to the number of model checks that can be configured to support your BIM Requirements.

Every configuration perfectly aligns with the sections of your BIM Requirements, and include an unlimited number of model checks.

Use any number of configurations, each tailored to the specific requirements of the organizations you submit to.
Easily Deployable

Install the Model Checker add-in for Revit in less than a minute with the flexibility to deploy standards across your network.

- Lightweight installer allows the Model Checker add-in for Revit to be highly portable and quick to install.
- Share an unlimited number of standards across your enterprise with versatile network deployment options.
Model Checker Feature Overview

Contextual Model Requirements

The complete text of your BIM Requirements accompanies all model checks, significantly reducing the need for printed hardcopies.

1. Each module directly aligns with your BIM requirements.
2. Designers can remain focused on design.
Model Checker Feature Overview

**Instant Feedback**

Project teams can check alignment with BIM requirements throughout the design process.

- Revit models originate in accordance with your BIM requirements.

- Teams spend less time reworking models to align with BIM requirements, and instead spend more time designing.
Model Checker Feature Overview

Direct Model Integration

Check reports are tied to specific model elements, letting teams instantly locate & identify failures.

Failures are identified within the same Revit views teams will use to correct issues.

Problems are more quickly resolved since design teams spend less time searching for documented issues.
Revit Model Checker Summary

BIM Requirements
Define what Revit models submitted to your organization should include.

Consultant Pre-Check
Models originate in alignment with your BIM requirements.

Project Based Level of Detail
Teams can configure project-based requirements, allowing the checker to scale to any Project Execution Plan.

Automatic Model Checks
Spend minutes, not hours verifying models submitted by consultants comply with your BIM requirements.
Stop and Breathe......
Key Take-Aways

• This is a Process Discussion
• Talk to the final consumers, learn their needs.
• Ask the Three Questions on Everything
  o Who is going to use the data
  o What data are you going to collect, and How?
  o How will it be maintained?
• Be willing to say “No”.
• Be Descriptive and not Prescriptive
“Who holds responsibility for thousands of decisions and will bear the most direct impact of those decisions? The answer...is, of course, the owner.”

Barbara White Bryson FAIA, AVP Facilities and Construction, Rice University in The Owner’s Dilemma: Driving Success and Innovation in the Design and Construction Industry
Questions?
Thank You