



What does the Standard contain?

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Imagining Better Project Delivery Through Implementation of the NBIMS-US™

So let's get into the meat of this...



NBIMS-US™ Content

National BIM Standard-US™ Version 3

Summary & Wayfinding

Scope
Content Summary
Content Matrix
Implementation Guide

***Version 3 New Content**
**** Version 3 Revised Content**

Reference Standards

IFC2x3
XML
OmniClass Tables
Data Dictionary / IFD
BCF
LOD
US NCS® V5

Terms & Definitions

Information Exchanges

COBie + LCie
Design to SPV
Design to BEA
Design to QTO
BPie
Sparkie
HVACie
WSie

Practice Documents

Minimum BIM (+2nd Ed.)
BIM Project Execution Planning
MEP & FP Spatial Coordination Req's
Information Handover
BIM Project Planning Guide for Owners
Practical BIM Contract Req's
The Uses of BIM

When published, the basic structure of the NBIMS-US looks like this:

First you have the Introductory materials including Summaries, Wayfinding tools and Guidelines for implementation,

Next you have the four major parts of the actual standards content, including

Reference Standards

Terms & Definitions

Information Exchanges

And

Practice Documents

Let's take a closer look at the content of these four major sections.... As we do, you'll notice some sections are emphasized with colored text, to indicate content which was added or revised for version 3...



NBIMS-US™ Content... A Closer Look

Reference Standards

Foundation technologies, methods, and classifications

ISO 16739, Industry Foundation Classes (IFC 2x3)

- Open international data format for BIM

XML 1.0, 5th Edition

- Open international language for encoding and decoding data, in addition to IFC, that is web compatible

IFD / buildingSMART Data Dictionary

- Rationalization of concepts across markets, languages, and industry sectors

BIM Collaboration Format (BCF 1.0)

- Data exchange standard for issue management between models & platforms

Level of Development (LOD)

- Managing expectations of BIM data development

US National CAD Standard® (NCS)

- standards for BIM exported to CAD/Paper documentation

OmniClass Tables

- standardized classification of data

Table 11 – Construction Entities by Function

Table 12 – Construction Entities by Form

Table 13 – Spaces by Function

Table 21 - Elements

Table 22 – Work results

Table 23 - Products

Table 31 – Phases

Table 32 - Services

Table 33 – Disciplines

Table 34 – Organizational Roles

Table 36 - Information

Table 41 – Materials

Table 49 – Properties

***Version 3 New Content**

**** Version 3 Revised Content**

First, we have the Reference Standards. Think of these as the technical foundations, or building blocks that are utilized by other parts of the standards which specify means of data exchange and implementation methodologies. They are a collection of OPEN, INTERNATIONALLY recognized specifications for encapsulating information important to the implementation of BIM.

These reference standards include....

IFC, XML & the data dictionary – fundamental technologies used to encode, decode, and transmit data

BCF

Represents a standard for communication between BIM Models – using XML - Separates communication from the model

Allows for all parties involved to transfer critical information and viewpoints between individuals independent of the software being used

LOD

Developed jointly by AIA and AGC to guide model authors to define what their models can be relied on for allowing downstream users to understand usability and limitations of models they are receiving

Intent of this specification is to help explain LOD framework and standardize its use.

United States National CAD Standard® (NCS)

Also a product of the National Institute of Building Sciences' buildingSMART alliance™ Council

Industry is still heavily dependent on paper-centric and CAD format delivery methods

Intent not to force BIM users into a CAD workflow, merely to maintain stds when documents produced or exported to CAD

OmniClass provides a standardized means of organizing project information, classifying BIM objects, and establishing preferred designations for object naming



NBIMS-US™ Content... A Closer Look

Terms and Definitions

Formal rationalization and recognition of all terms in the various parts of the standard

Ensuring consistency and clarity, even between different sections. Including, but not limited to, such terms as...

Attribute	IFC Certification Procedure	Overview Map
BIM Implementation	Level of Development	Precision
BIM Life-Cycle Views	Level of Precision	Property
Building Information Modeling /	Life-cycle Assessment	Reliability
Model / Management	Life-cycle Costs	Service Life
Construction Delivery Method	Life-cycle Stages	Syntax
Cost – Avoidance	Metadata, Administrative	...
Data	Metadata, Structural	
Discipline	Object	

Terms and Definitions are meant to formally state and define the terminology used in the industry, especially in relation to BIM. By having an “official” dictionary, contract language can be clear, if properly referenced and all parties can recognize what is meant when ideas such as Metadata, and Life-cycle Costs are used, as well as the differences between concepts like Level of Development and Level of Precision or Detail...



NBIMS-US™ Content... A Closer Look

Information Exchanges

Standardized means of exchanging BIM data regardless of project or software

COBie 2.4 + LCie

- Design-Procure-Fabricate data exchange to Owners & Operations for the lifecycle of a facility;
- LEAN operations business cases;
- "COBieLite"- Product Data XML for lifecycle app development

Design to Spatial Program Validation

- US GSA – Managing user requirements during design

Design to Building Energy Analysis

- US GSA – Managing resource requirements during design

Design to Quantity Takeoff for Cost Estimating

- US GSA – Managing quantities & costs during design

BPie – Building Programming Information Exchange

- Identifying and validating client requirements

Sparkie – Electrical Systems Information Exchange

- Representation of electrical components and systems

HVACie – HVAC Information Exchange

- Representation of HVAC components and systems

WSie – Water Systems Information Exchange

- Representation of plumbing components and systems

*Version 3 New Content

** Version 3 Revised Content

Next we have Information Exchanges which are meant to formalize the requirements of data exchange in a particular process, or subprocess of the Project Delivery and Operation.

COBie

Version 2 introduced COBie, the Construction Operations Building information exchange, created by the US Army Corp of Engineers. It captures data, through the Design, Procurement and Construction phases of a project, that is important to the Owner's operation of the facility for its remaining lifecycle. Being the first formal IE adopted in the NBIMS-US, it has already made an impact in the way BIM is used to deliver many public sector projects, as well as large private sector facilities, like hospitals and higher education buildings.

The United States General Services Administration has provided the specifications for data exchange developed with their experience as the US Government's landlord to hundreds of millions of square feet of facilities around the country and world.

Lifecycle Information Exchange for Product Data (LCie)

Defines COBieLite XML sub-schema for products and product type data exchanges throughout the facility life-cycle to be used for developing next generation of mobile and desktop applications for management of COBie data.

Building Programming Information Exchange

Deals with managing client's requirements (even as they evolve). Objective is to register client's needs in a computer interpretable format. Store information in a structured way, monitor changes and automate validation. Stimulate development of new tools to manage client needs

HVAC Information Exchange - *Specification and standardization for representation of HVAC systems*

By standardizing representation of information, interested parties may more easily obtain relevant information across different software systems.

Plumbing Information Exchange - *Specification and standardization for representation of Water Systems*

Extends the detail described in the IFC4 specification to cover plumbing practices in North America.

Electrical Information Exchange - *Specification and standardization for representation of Electrical systems*

Extends the detail described in the IFC4 specification to cover wiring practices in North America.



NBIMS-US™ Content... A Closer Look

Practice Documents

Proven, reliable methods for implementation of BIM-related workflows

Minimum BIM, 2nd Ed.

- Better describes the BIM Capability Maturity Model and its use

BIM Project Execution Planning Guide v2.1

- A structured approach for use of BIM on a project

BIM Project Execution Plan Content v2.1

- Supporting materials as part of the Guide

BIM Planning Guide For Owners

- Provides a structured approach for facility owners to plan adoption of BIM

Planning, Executing and Managing Information Handover

- Guidance on the transfer of project information from Design and Construction to the Owner

Mechanical, Electrical, Plumbing, and Fire Protection Systems (MEP) Spatial Coordination Requirements for Construction Installation Models and Deliverables

- Guidance to contractors/installers on optimal coordination methodology for BIM projects

Practical BIM Contract Requirements

- Requirements used by the USACE for BIM on design build projects

The Uses of BIM

- Defining a common language for the uses of BIM throughout lifecycle

***Version 3 New Content**

And finally, we have Standard Practices, which are formal, tested guidelines to implementing BIM technologies and processes, often referring back to the other sections of the Standard. These guidelines include

Minimum BIM, 2nd Edition

Descriptions and use of a Capability Maturity Model, that is, a series of metrics to determine the ability of a project delivery team, or individual members, to participate in BIM process and technologies

BIM Project Execution Planning Guides for Project Delivery Teams and Facility Owners

Provides a structured approach for project delivery teams to implement BIM workflows and technologies and guide facility owners to plan adoption of BIM in their organizations to manage future projects

The **Information Handover standard** works hand-in-hand with the previous COBie data exchange standard, giving all parties, during project delivery and operations, guidance on how to collect and transfer important information of lifecycle data.

The **MEP Coordination Requirements** address the fabrication and installation phases of MEP products and systems for a project which utilizes BIM

Practical BIM Contract Requirements are a set of tried, tested, and vetted documents and contract language by the US Army Corps of Engineers for Design Build Projects

Requirements used by the USACE for BIM on design build projects

Made up of 3 parts that work together - Contract Language - BIM Project Execution Plan - Minimum Modeling Matrix

Been in use since 2008, Over 600 facilities, consisting of over 25 Million SF built

And finally...

The Uses of BIM

Purpose is to define a common language, descriptions of concepts, workflows and organizational structures beyond just a simple glossary, for the uses of BIM so Teams can communicate the purposes for implementing BIM throughout lifecycle of a facility