National Institute of Building Sciences
Facilities Information Council
National BIM Standard
a buildingSMART™ initiative
International Alliance for Interoperability

OGC®
Open Geospatial Consortium

AEC/CAD/BIM: the User Perspective

Emerging Technology Summit IV
Melrose Hotel, Washington, DC

March 22, 2007

Dana K. “Deke” Smith RA
Chair, NIBS Facility Information Council and NBIMS Project Committee

CAD-GIS-BIM Thread

- Users are waiting for the software to provide them the capability
- Users need a confidence level in order to change to new software through demonstration, testing and validation
- Software vendors need demand in order to develop product
- Requirements must be identified in order to develop software
- Requirements for new business processes are hard to identify beyond current practice and capability of available software

- OWS-4, NBIMS, and buildingSMART are designed to facilitate substantial change in the capital facilities industry

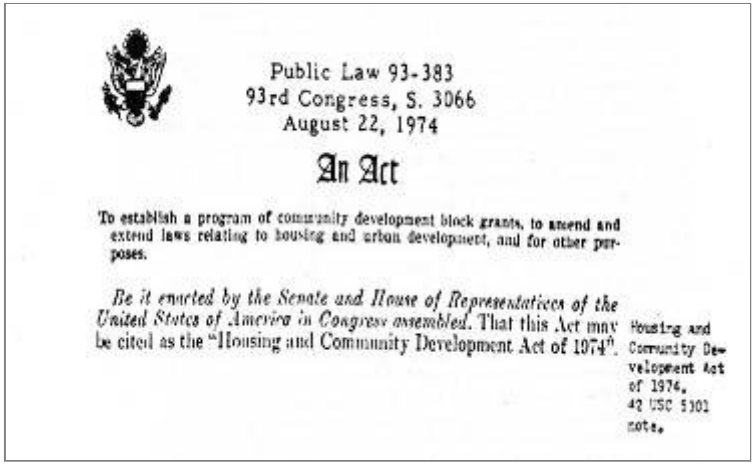
Why BIM? Why Now?

The opportunity now exists…

- to build a facility virtually
- to simulate its construction and operation prior to building it physically
- to work out problems and predict its performance
- to Coordinate the construction to reduce construction time and eliminate change orders
- to enter data once when it is created as part of the business process then retain it for use later in the lifecycle

- # Public Law 93-383, Sect. 809 (1974)

Congress directed NIBS to "exercise its functions and responsibilities in four general areas, relating to building regulations……."



Public Law 93-383
93rd Congress, S. 3066
August 22, 1974

An Act

To establish a program of community development block grants, to amend and extend laws relating to housing and urban development, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That this Act may be cited as the "Housing and Community Development Act of 1974".

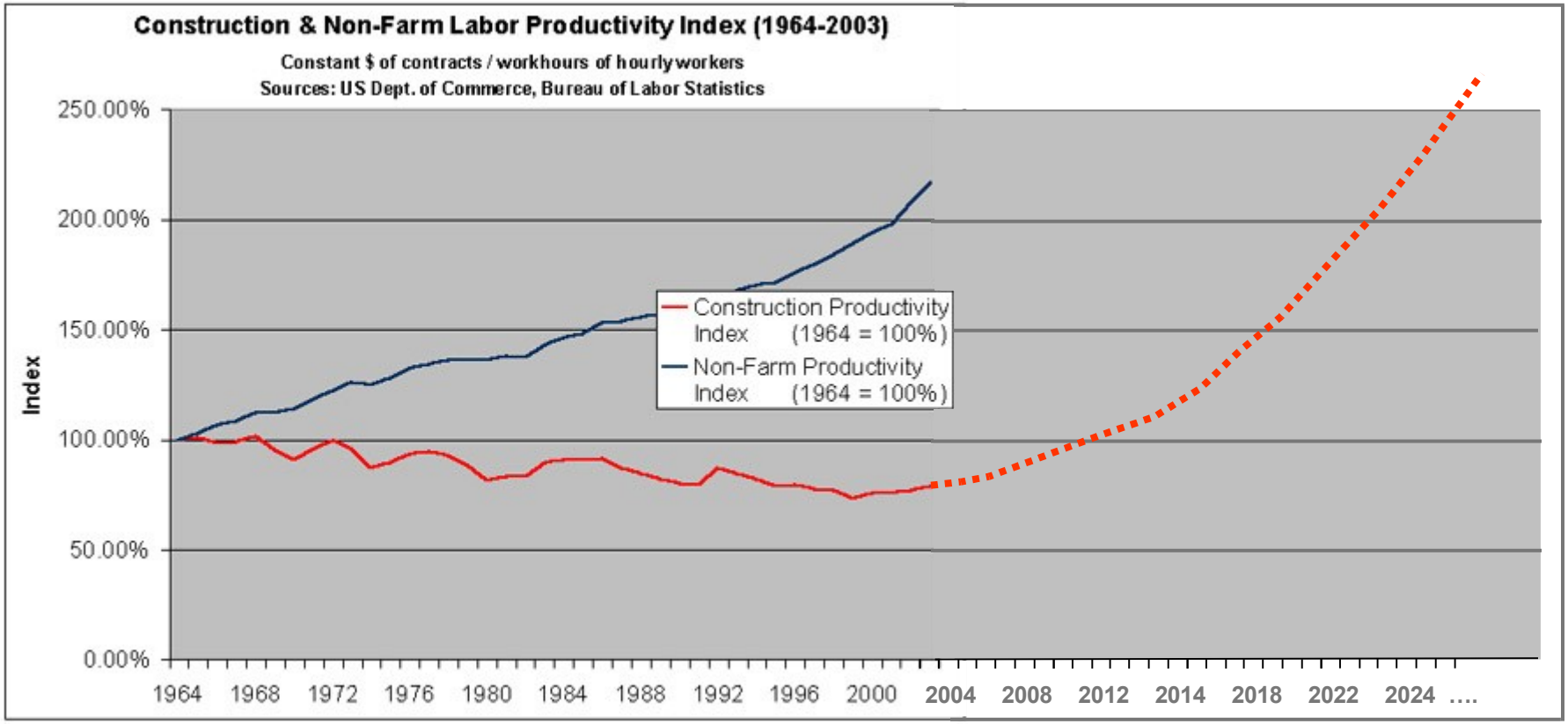
Housing and Community Development Act of 1974, 42 USC 5301 note.

1. Develop & maintain performance criteria for maintenance of life, safety, health, and public welfare for the built environment.
2. Evaluate building technology to meet the above criteria.
3. Conduct related and needed investigations
4. Assemble, store, and disseminate technical data and related information

NIBS acts as a non-threatening open forum host for capital facilities industry collaboration and a recognized consensus process

Reversing the Trend

- buildingSMART™ Goal - Turn a stagnant or declining productivity curve to an exponentially improving one



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The buildingSMART™ Initiative

Enhance Economic Impact

Improve Quality of Life

Support Business Practice

Provide Visualization

Support Real Property Community

Educate Practitioners & Users

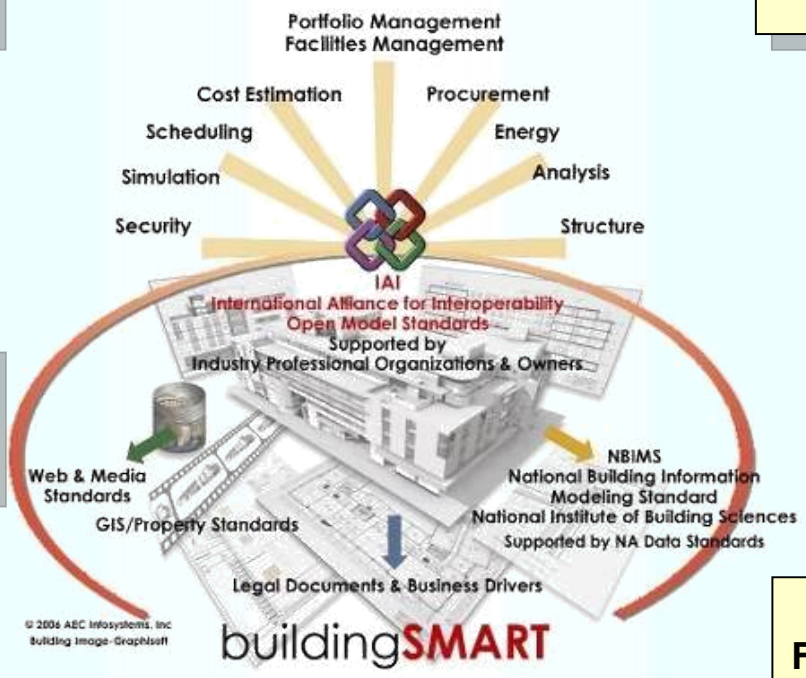
Improve Environment

Empower Users

Foster Alliances & Standards

Promote Research & Development

STAKEHOLDERS



Foundation of Construction Information in the US
Supporting Productivity Transformation

Definition of BIM

- A Building Information Model (BIM) is a digital representation of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its lifecycle from inception onward.

- A basic premise of BIM is collaboration by different stakeholders at different phases of the life cycle of a facility to insert, extract, update or modify information in the BIM to support and reflect the roles of that stakeholder. The BIM is a shared digital representation founded on open standards for interoperability.

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Some of the Groups Supporting NBIMS

What does BIM do?

- Reduces Cycle Time
  - Better Communication
  - Better management of delivery times
  - Quicker assembly of larger parts
- Reduces lifecycle cost
  - Less waste because of less re-work
  - True value engineering performed
  - Significantly reduced number of change orders
- Improved and sustainable product quality
  - Some parts assembled off-site with higher quality control
  - More sustainable product
  - More energy efficient
- Provides complete product visualization prior to physical construction
  - Allows for analysis and simulation

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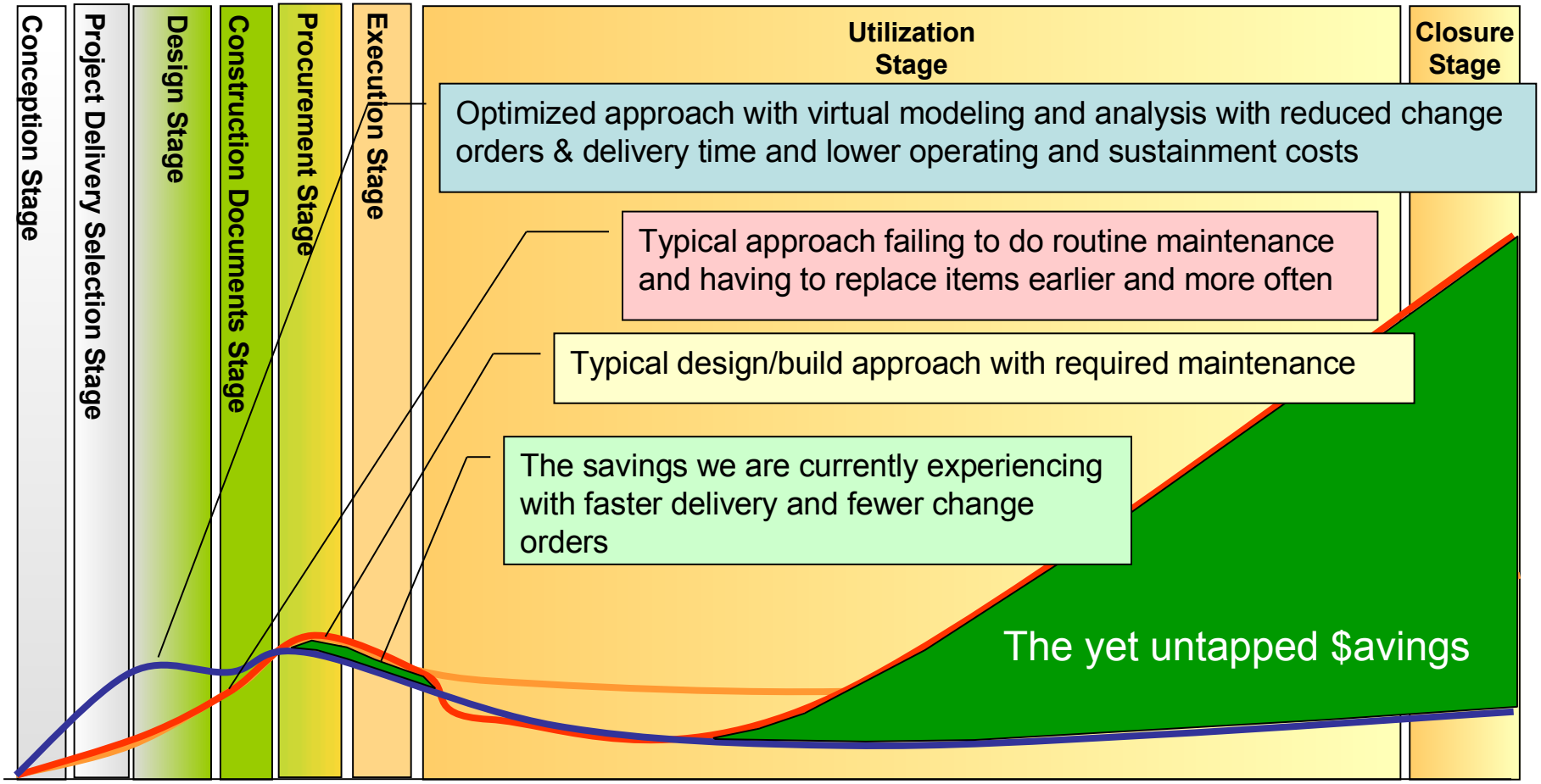
BIM Project Savings Curve



IAI "BuildingSMART" model supports lifecycle data

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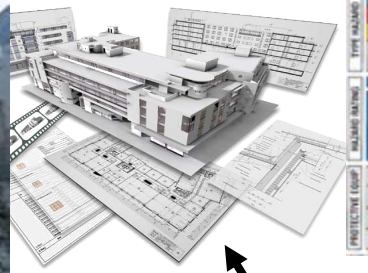
Who Benefits From BIM Implementation?



Building Information Model (BIM)

Facility Information Views

- Owners
- Planners
- Realtors
- Appraisers
- Mortgage Bankers
- Designers
- Engineers
- Cost & Quantity Estimators
- Specifiers
- Contracts & Lawyers
- Construction Contractors
- Sub-Contractors
- Fabricators
- Code Officials
- Zoning
- Facility Managers
- Maintenance & Sustainment
- Renovation & Restoration
- Disposal & Recycling
- Scoping, Testing, Simulation
- Safety & Occupational Health
- Environmental & NEPA
- Plant Operations
- Energy, LEED
- Space & Security
- Network Managers
- CIO's
- Risk Management
- Occupant Support
- First Responders
- Disaster Recovery
- Continuation of Operations Plans

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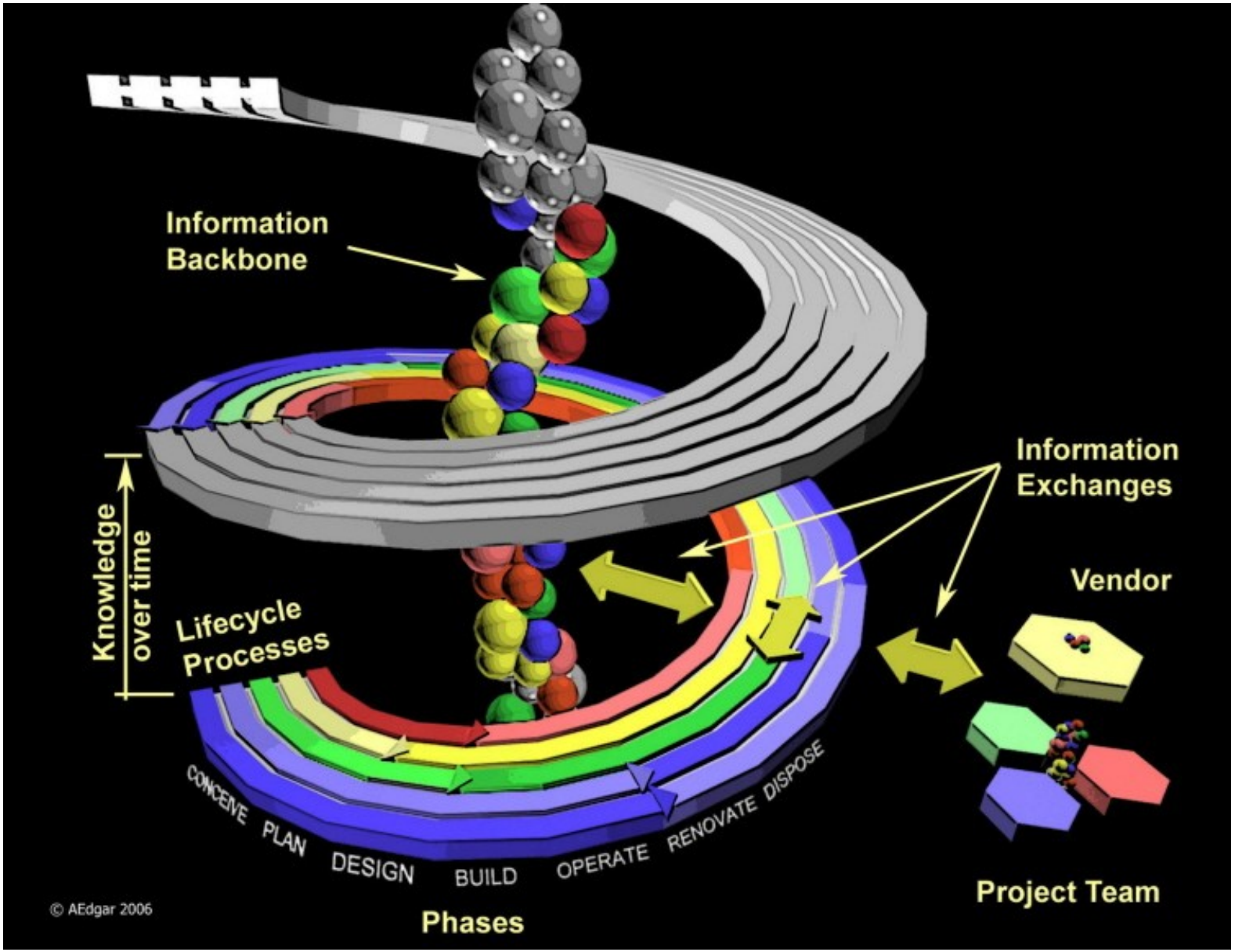
BIM Development Helix



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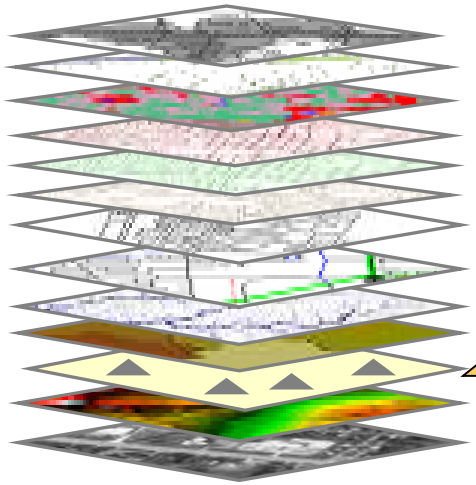
Aggregated World View

- Theatre / World
  - Country
    - Installation / Region
      - State / Province
        - County
          - City
            - Site
              - Natural Asset
                - Air / Space
                - Underground
                - Water / Sea
              - Real Property Asset
                - Land / Parcel
                - Facility / Built
                  - Building
                    - System
                      - Sub-Systems
                        - Components
                      - Space
                        - Level
                          - Room
                      - Overlay
                  - Structure
                    - System
                      - Sub-Systems
                        - Components
                      - Space
                        - Level
                          - Room
                      - Overlay
                  - Linear Structure
                    - Node
                    - Segment



IAI-IFC Usage

OSCRE

National Institute of BUILDING SCIENCES

GSA

buildingSMART International Alliance for Interoperability

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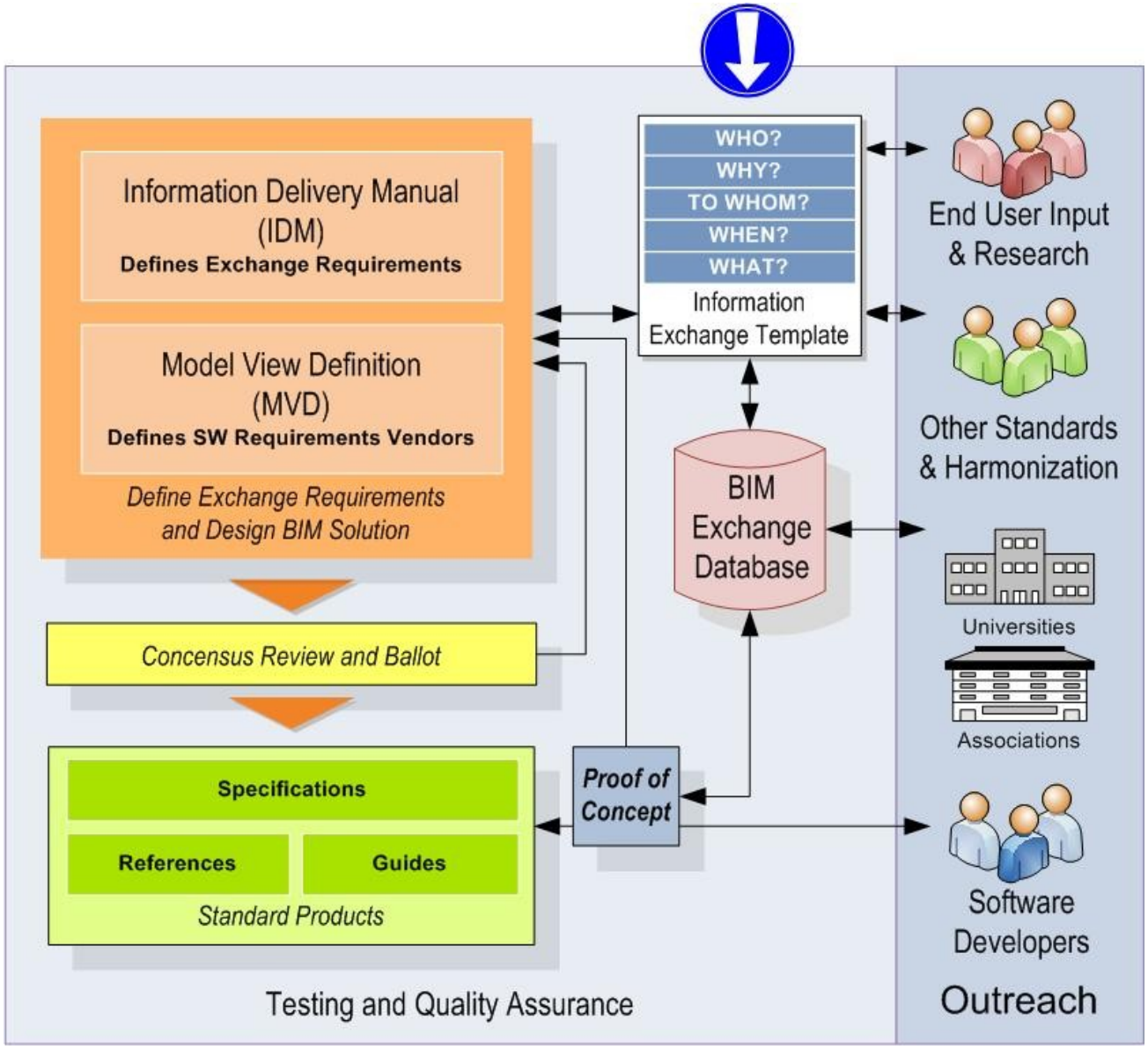
NBIMS Relationships



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1 Chapter 5.2

NBIMS Testing Strategy		Business Process Identification Best Practice	Technical Development Pilot Test	Consensus	Technical Validation	Operational Testing
Description		Information exchange and business process workflow modeling	Testing the business processes developed in a controlled market test	Using a formal and recognized process to obtain industry acceptance of the proposed best practice	Taking proven business processes to industry for consensus to become a standard practice	Testing the product with various vendor products to ensure reliability and repeatability on a continuing basis
Return On Investment	Business case	NIBS	NA	NIBS	NA	NA
NBIMS	Version 1 - Part 1	NIBS	NA	NA	NA	NA
	Version 1 - Part 2	NIBS	OGC TB	NIBS	OGC TB	OGC TB
	Ver. 2 & Future versions	NIBS	OGC TB	NIBS	OGC TB	OGC TB
BIM	NBIMS Compliance	NA	OGC TB	NA	OGC TB	OGC TB

- Now that the standard exists we need to test and validate the theory

OWS-5 Test Bed

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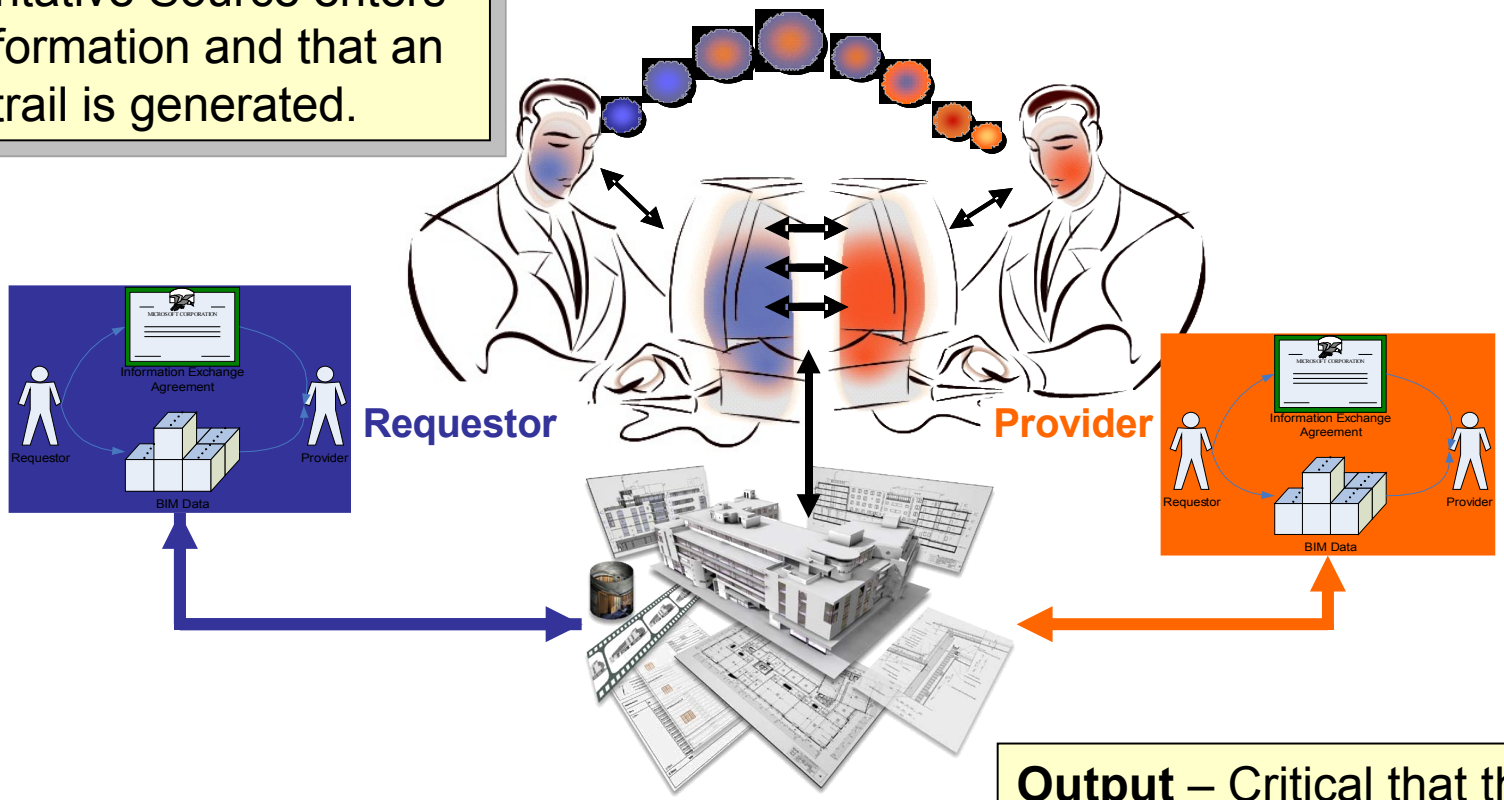
Information Assurance/Digital Rights Management

Input – Critical that the authoritative Source enters the information and that an audit trail is generated.



Output – Critical that the person accessing the information has the rights to see and manipulate the data.

Recommendation: Server based BIM with an IA Manager

Significance of OWS-4

- Standards-based Web Service architecture and technologies tested against GSA and DOD business cases:
  - Provided feedback to IAI International IFC work
  - Compliment National BIM Standard development activity

- Demonstrated Role of CAD-GIS-BIM in a regional emergency event
  - BIM, Geospatial, and real time (sensor) integration / fusion
  - Will help those who do not see the interrationships

Linking CAD-GIS-BIM

Closing - NBIMS and OWS-5

- OWS-5 will offer an opportunity to test the theories, concepts and relationships identified in NBIMS Version 1, Part 1
- NBIMS requires testing a complex relationship of standards in order to be accepted
- NBIMS needs the feedback to validate the approach for the entire capital facilities industry

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Currently Proposed Topics for OWS-5

- BIM and CityGML - query and catalog/registry, metadata
- LEED Energy Rating workflow
- CityGML visualization in Google Earth
- 3D query, 3d building model view links to construction drawings
- KML, Web3D and X3D Earth - Web Terrain Service and CityGML linkages
- Further integration of BIM tools with OGC's Web Services stack: Web Feature Service and Sensor Web Enablement Services
- Others?

We invite your direct participation In the review

http://www.facilityinformationcouncil.org/bim/publications.php

Review period open until May 21, 2007

Post your comments to:
http://nbimsdoc.opengeospatial.org/

Thank You

- Deke Smith
- DKS Information Consulting, LLC
- Deke@dksic.net
- Office (703) 481-9573
- Cell (703) 909-9670

For more information:

- http://www.nibs.org
- http://www.facilityinformationcouncil.org/bim/index.php