

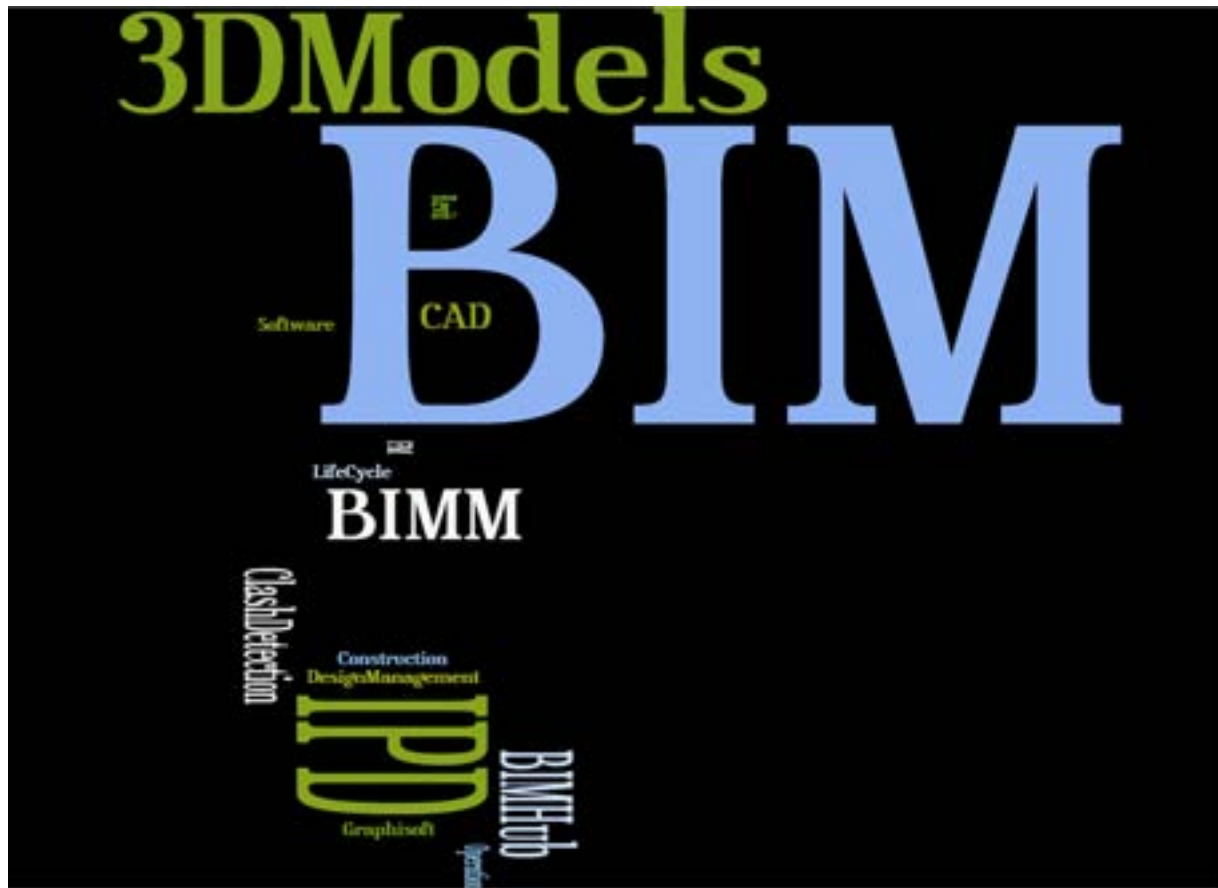
A Bentley Perspective on BIM

Neville Glanville

Building Industry Sales Director

What is BIM?

A Confusion of Technology Words & Aspirations



Mandate
Government Report
Projects
Low Carbon
BIM

Many Reports



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Amongst the common themes.....

- Supply chain integration throughout the Life Cycle
- Greater collaboration between clients and the supply chain
- A Unified Industry
- Short Term Thinking
- The Need for Innovation

Owners asking for BIM ... but what is BIM?



BIM describes an activity, not an object. To describe the result of a modeling activity, we use the term 'Building Information Model', or simply Building Model.

*Prof. Rafael Sacks
Technion University*

Owners asking for BIM ... but what is BIM?

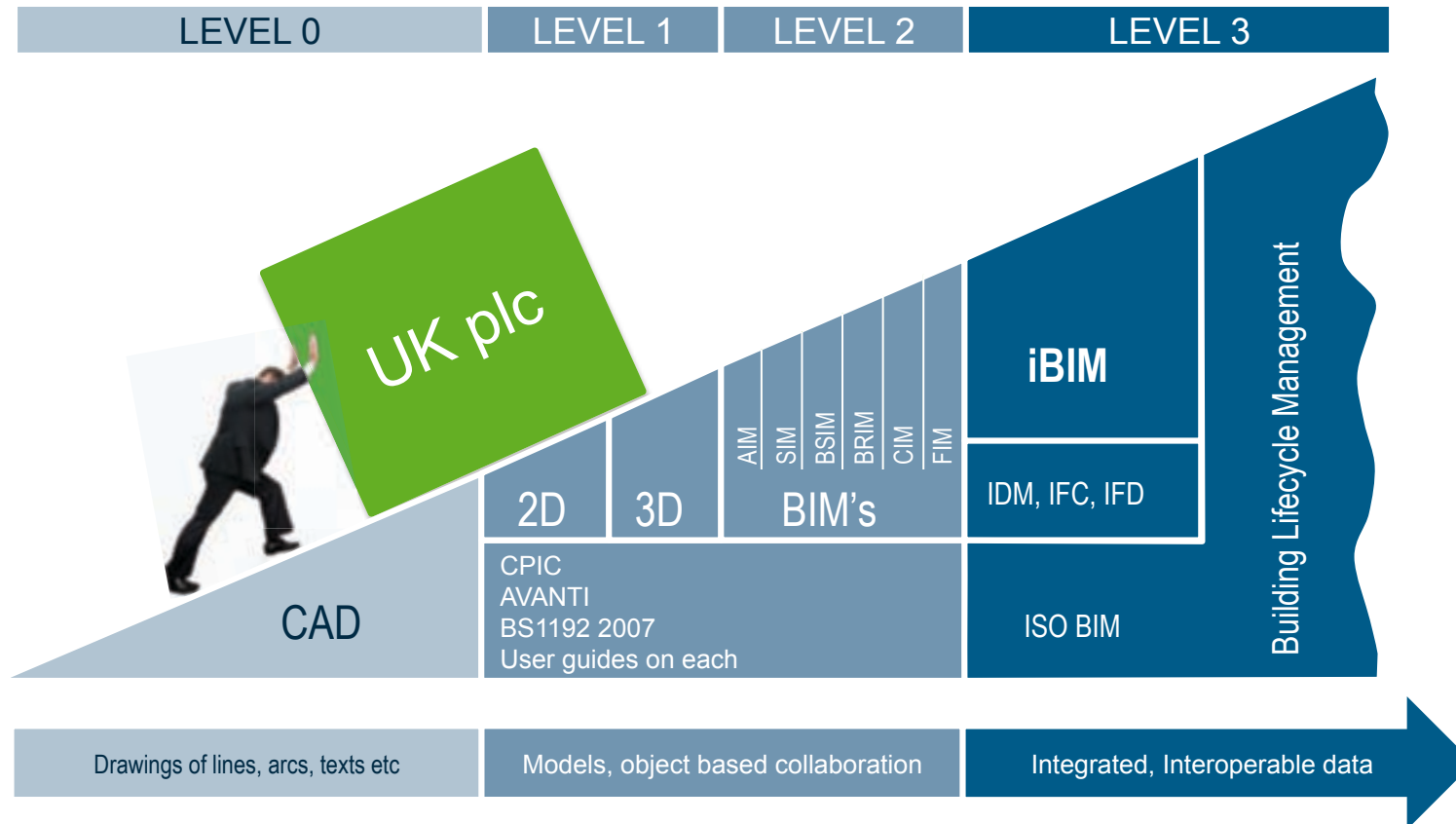


BIM “is the process of generating and managing building data during its life cycle”

(Automation in Construction 2006)



Industry Adoption of Technology



© Bew & Richards 2008

“Integrated Teams and Integrated Supply Chains are crucial to delivering the continuous performance improvements necessary in the construction industry today.”

Accelerating Change published by the Strategic Forum



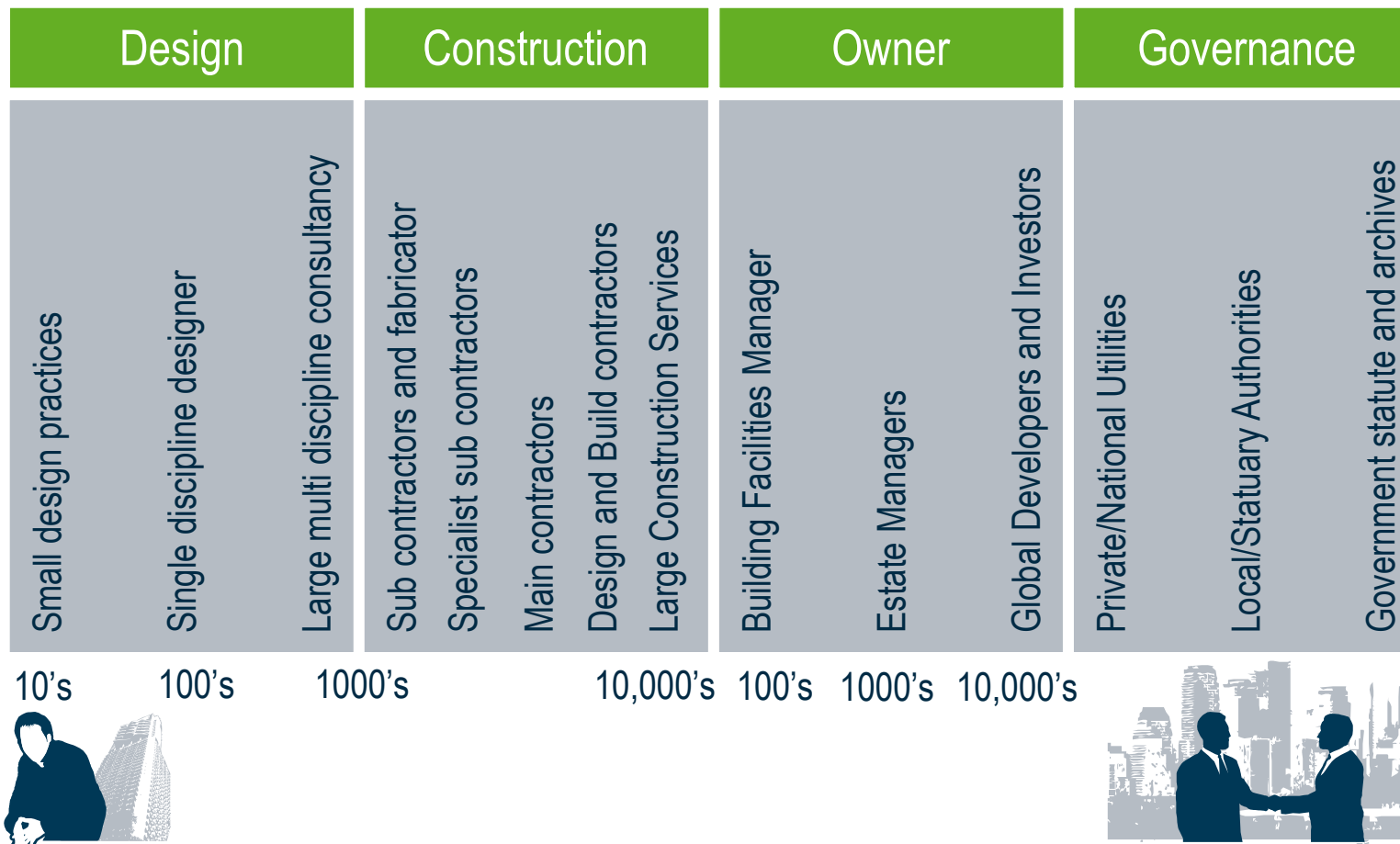
Sir Michael Latham



Sir John Egan

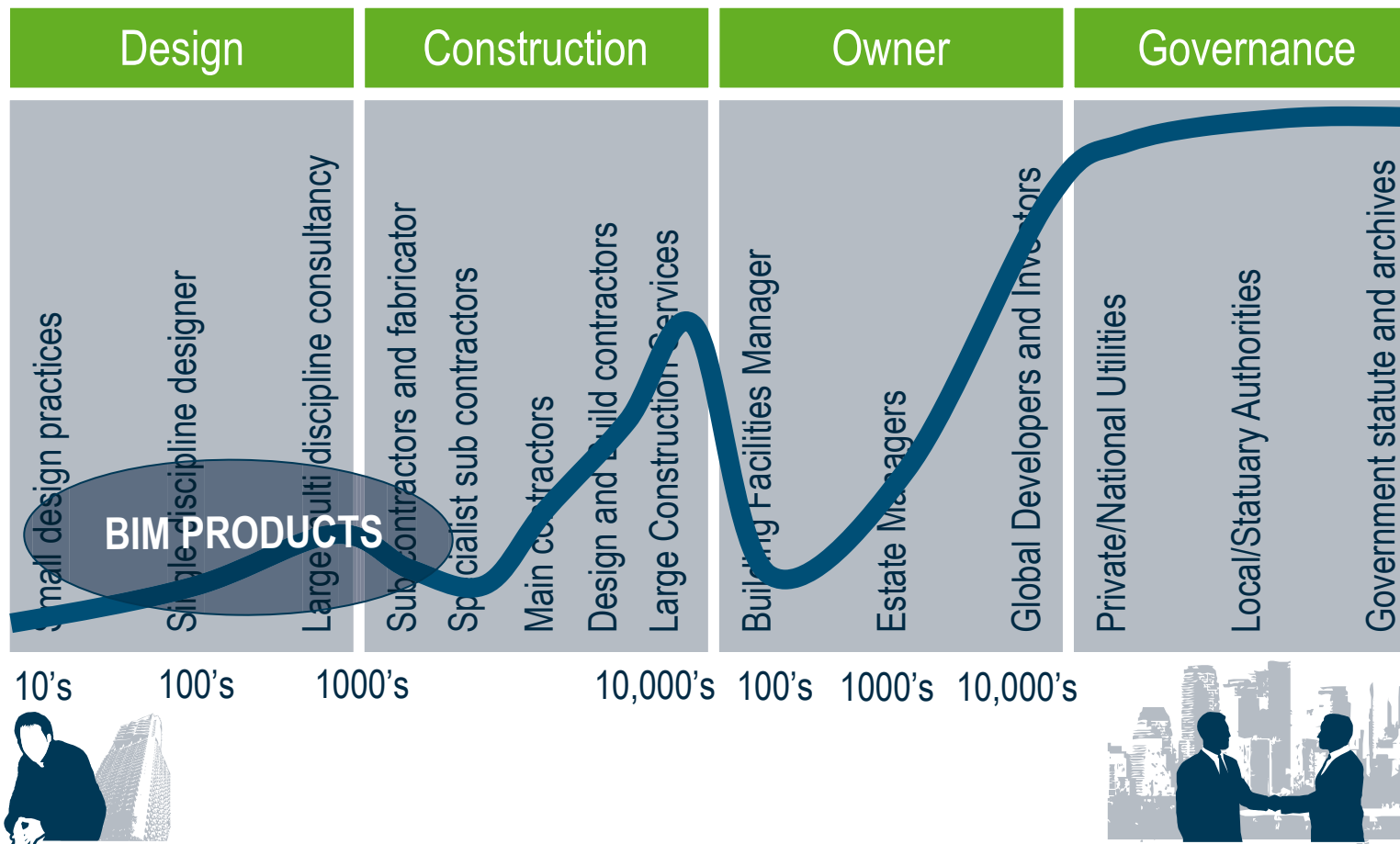
Understanding the User Eco-system

- There is a broad set of participants on a construction project.

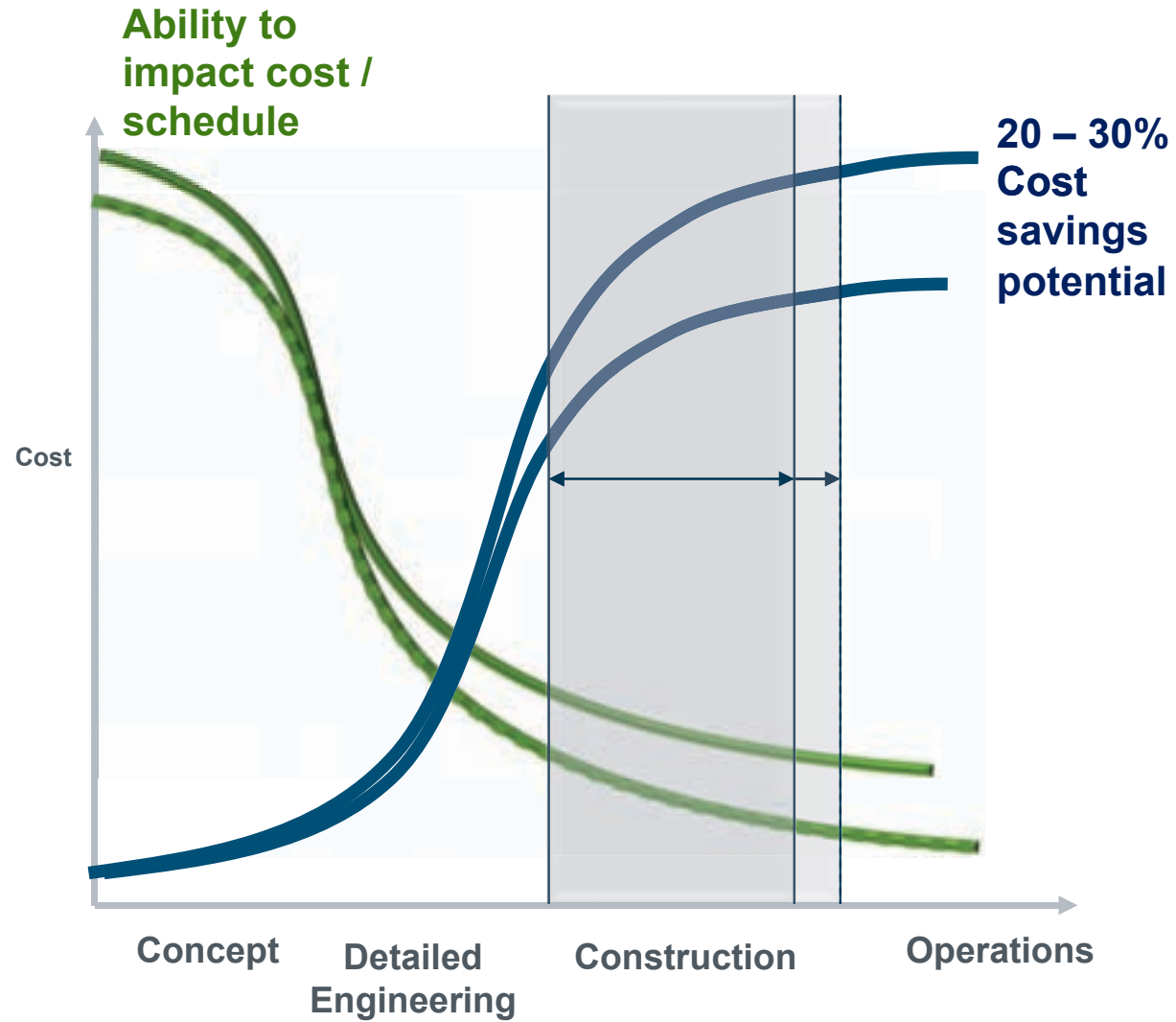


Power of Influence

- Each organisation can influence other within the supply chain.



The Potential Return is Substantial



Bentley assumptions

- There will always be different file formats
 - Revit, Rhino, Maya, 3DS, Graphisoft, ADT, Autocad, Sketch up, Nemetschek, Catia
- Each industry (discipline) has it's own workflow
- The data is more important than the software
- Work to support industry standards (IFC, PDF, ISO 15926, BS1192,)
- Open, not closed systems!

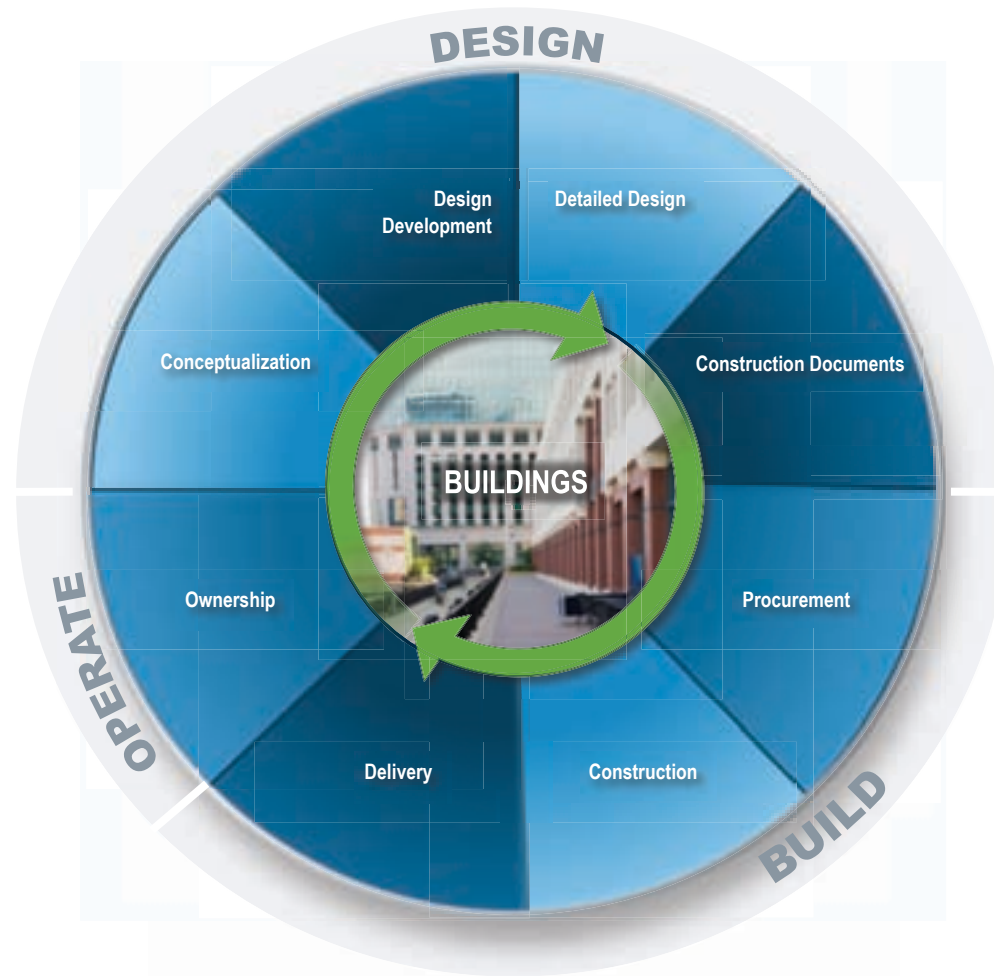


Building Information Modeling

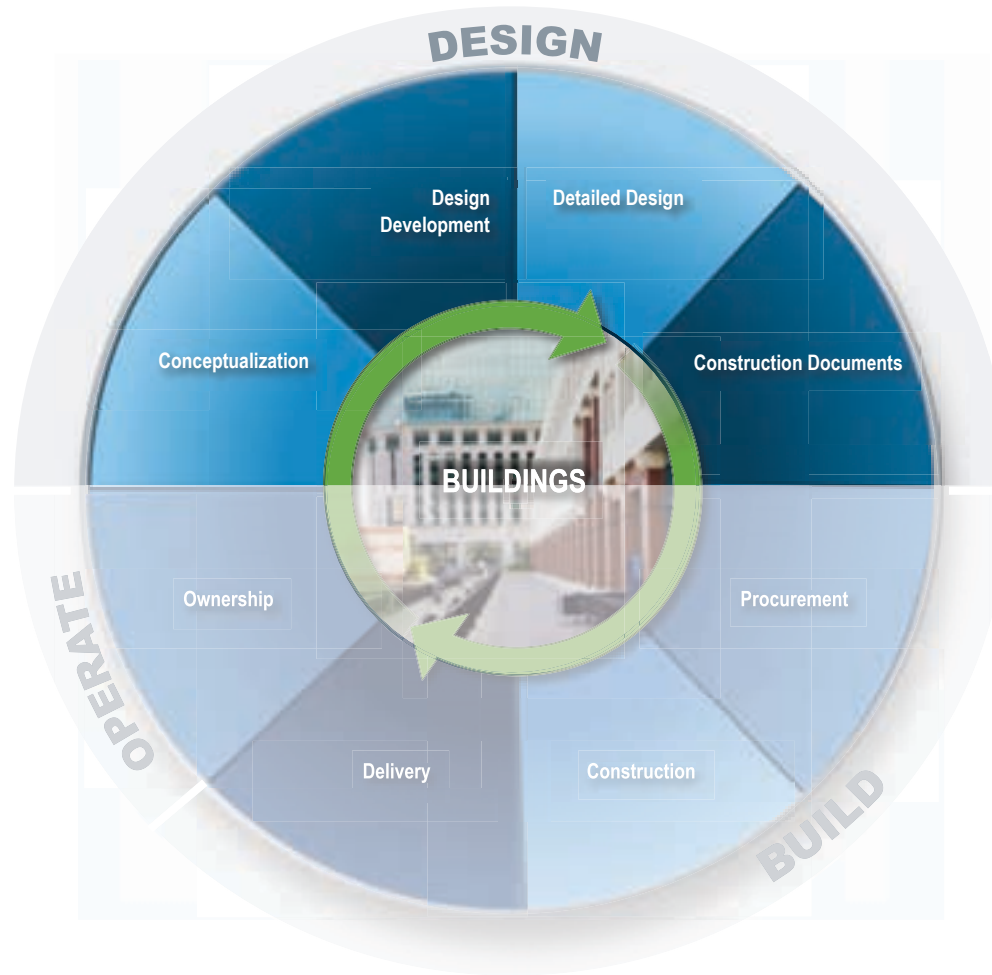


Building Information Management

Building Industry Lifecycle



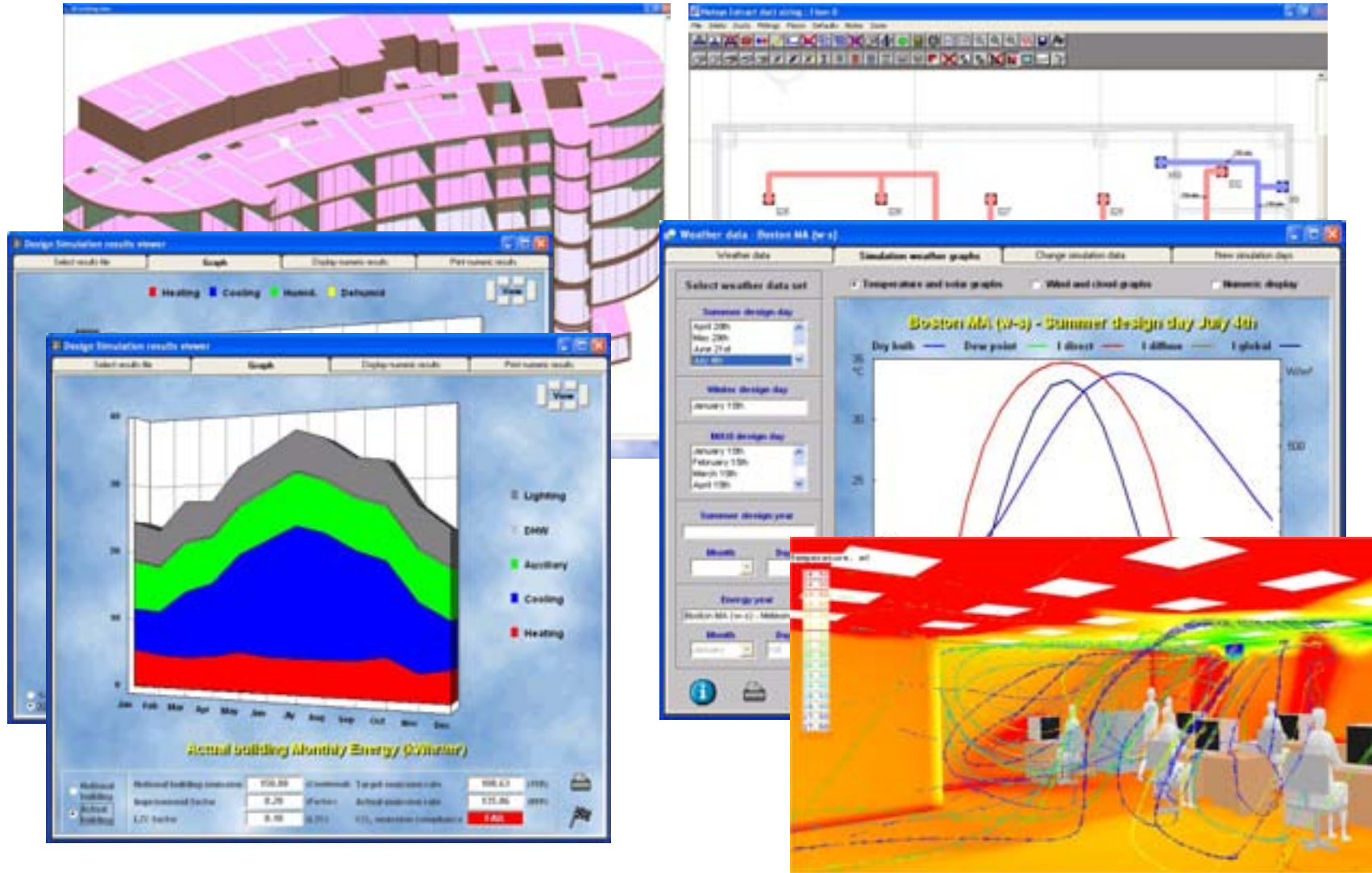
Building Industry Lifecycle



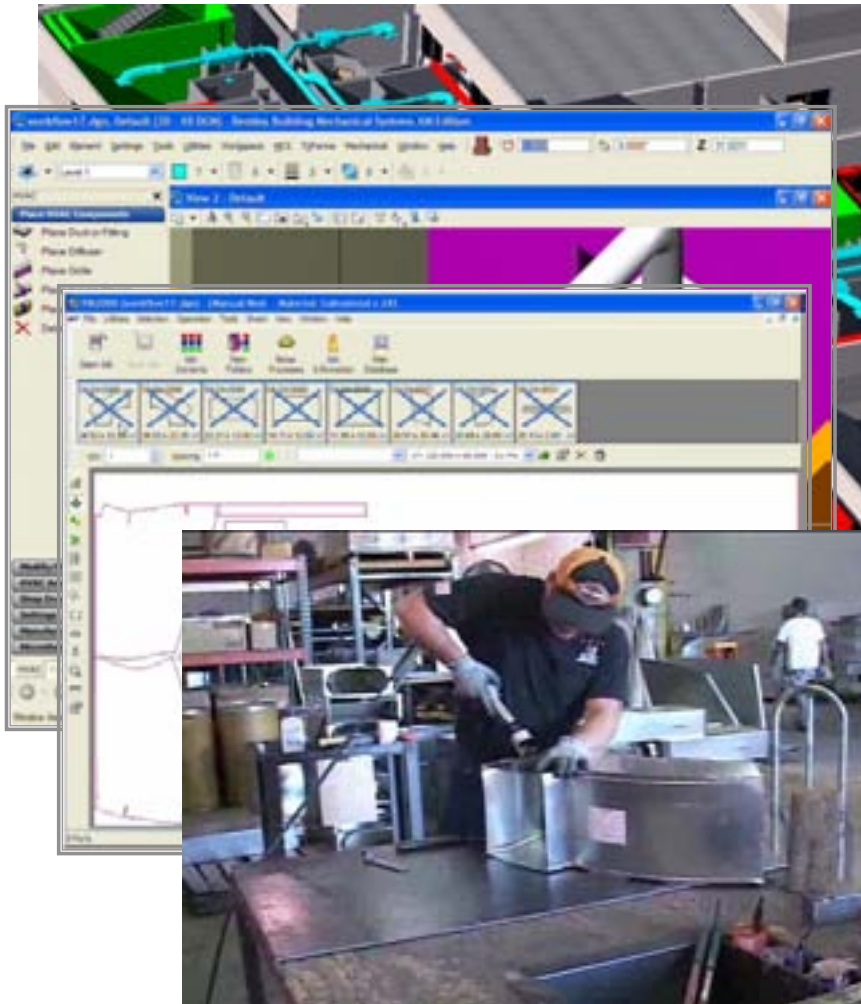
Benefits of BIM for Design

- Design in 3D
- Fully coordinated model
- Automatically generate 2D documentation which is fully coordinated
- Automatically generate schedules
- Ability to clash check against other discipline models
- Perform cost analysis against design brief
- Improved ability to coordinate and share

Design & Analysis Applications



Design & Analysis Applications



3D Luminaire Distribution, Variable View [122.43C]

Visual Lighting Interface

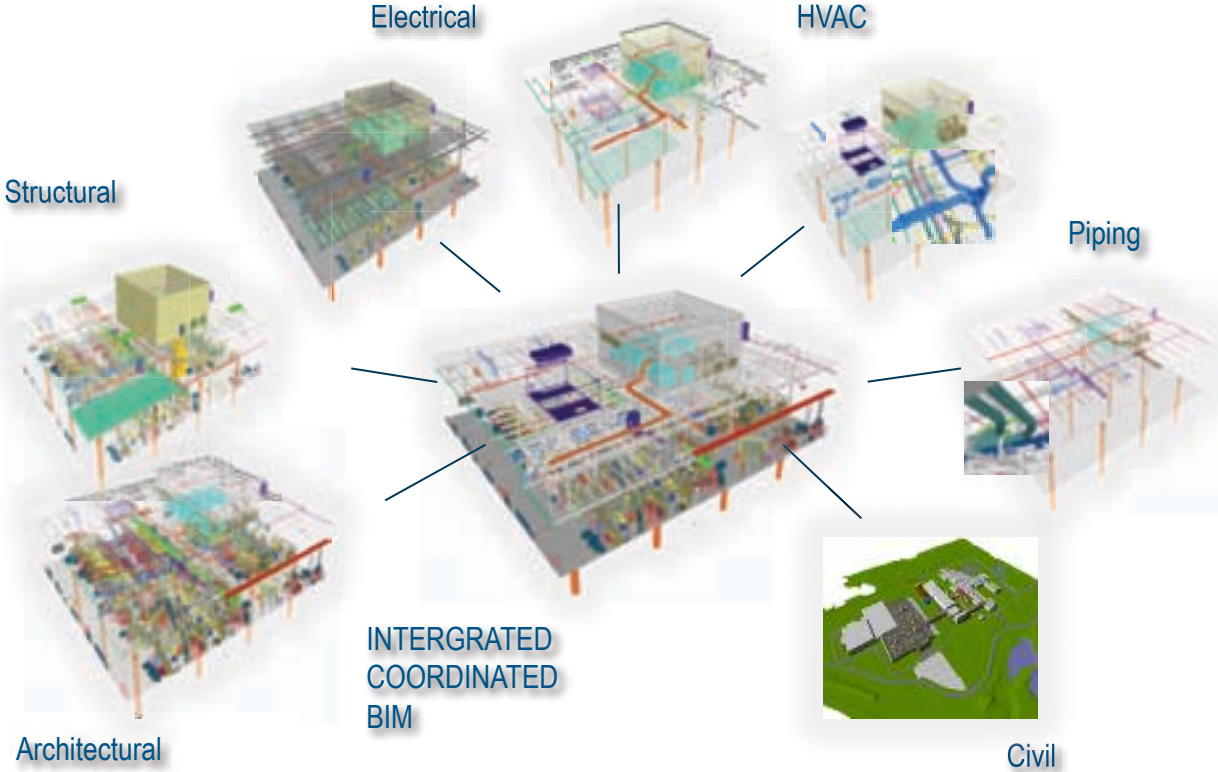
View 2 - Electrical Model - Right Isometric

| Distribution | Circuit | Item | Quantity | Cable Type | Length Tot Cable | Length Lead | | | |
|--------------|---------|-------------------|----------|---------------------|------------------|-------------|------|------|------|
| DB-3 | 00-3-1R | SWITCH, 2 GANG | 1.00 | | | 0.00 | | | |
| | | LUMINAIRE, Type B | 3.00 | | | 0.46 | | | |
| | | | | Single Core 3x1x1.5 | 11.82 | 21.27 | 8.46 | 6.00 | 8.39 |
| | 00-3-1Y | SWITCH, 2 GANG | 1.00 | | | 0.00 | | | |
| | 00-3-1B | | | | | | | | |
| | 00-3-2R | | | | | | | | |
| | 00-3-2Y | | | | | | | | |
| | Total | | | | | | | | |
| | Balance | | | | | | | | |

What is a BIM model?

Single model?

Federated model?



Centralized vs Federated

20th Century
(Centralized)



“The Mother of All Databases”

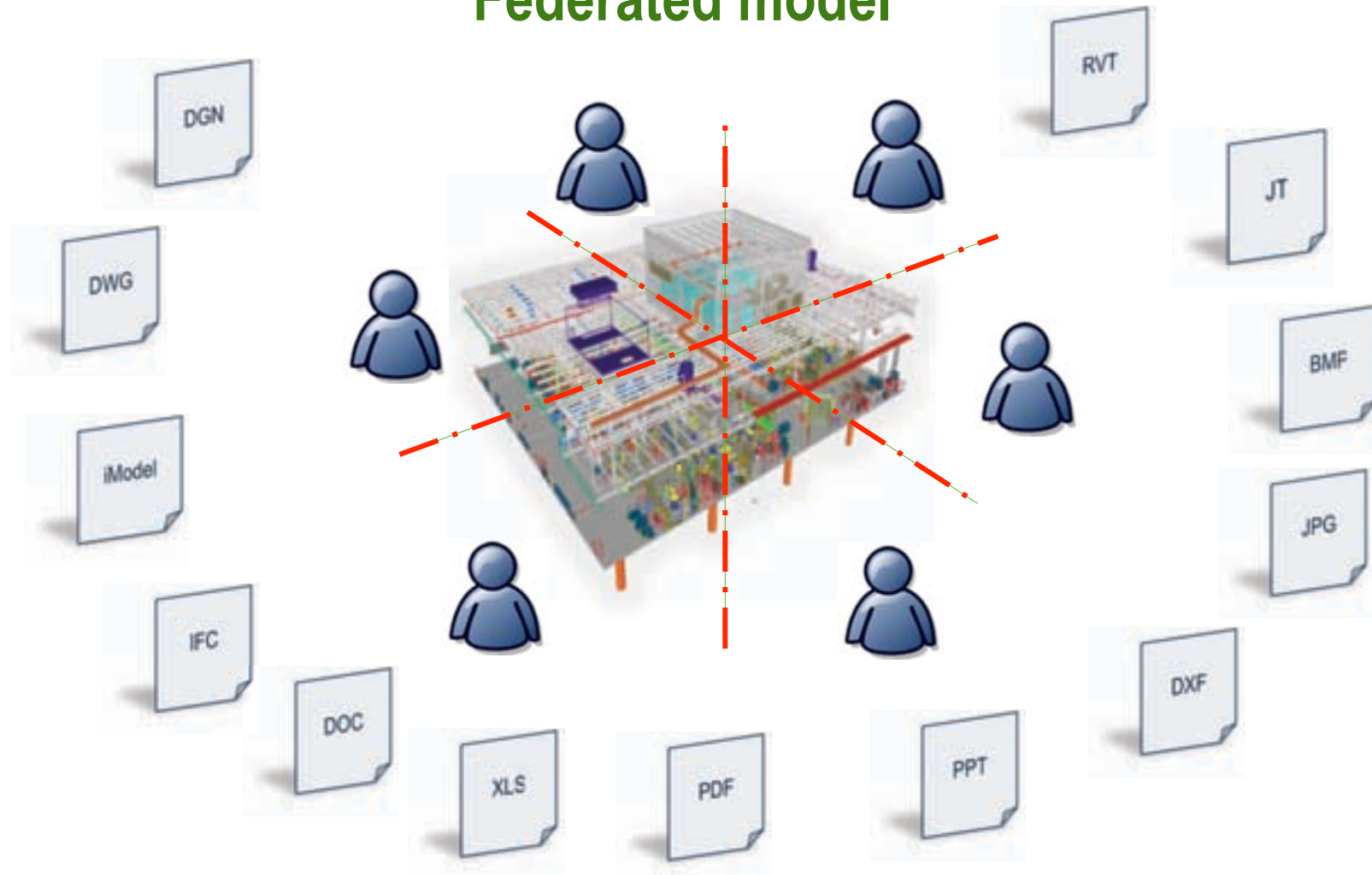
?? ? ? ? ? ? ?
(Federated)



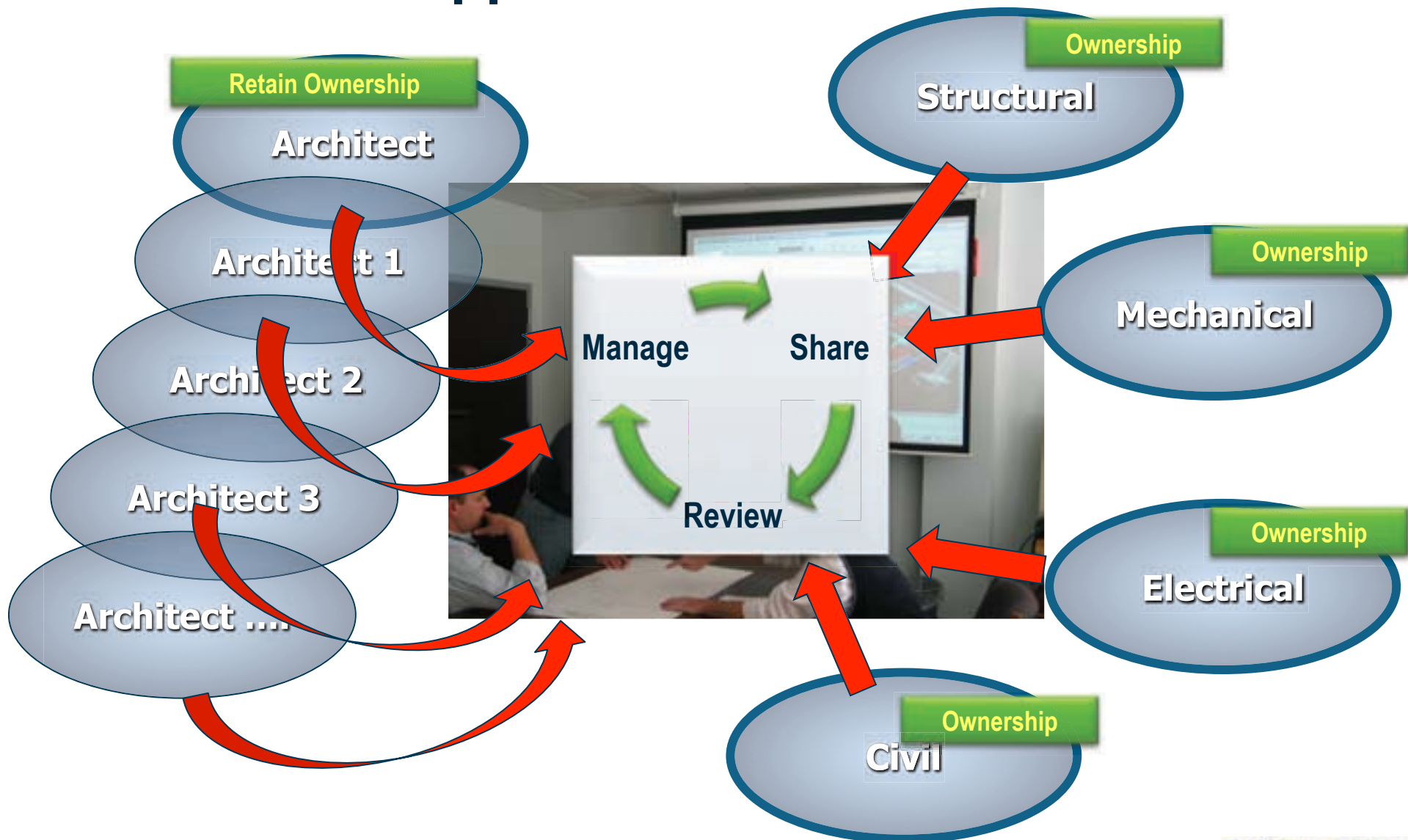
Index and Search

BIM in a Project Context

Federated model



Federated Approach



Big BIM or Little BIM?

- Little BIM is the discipline based approach with varying degrees of integration within a building.



Architectural



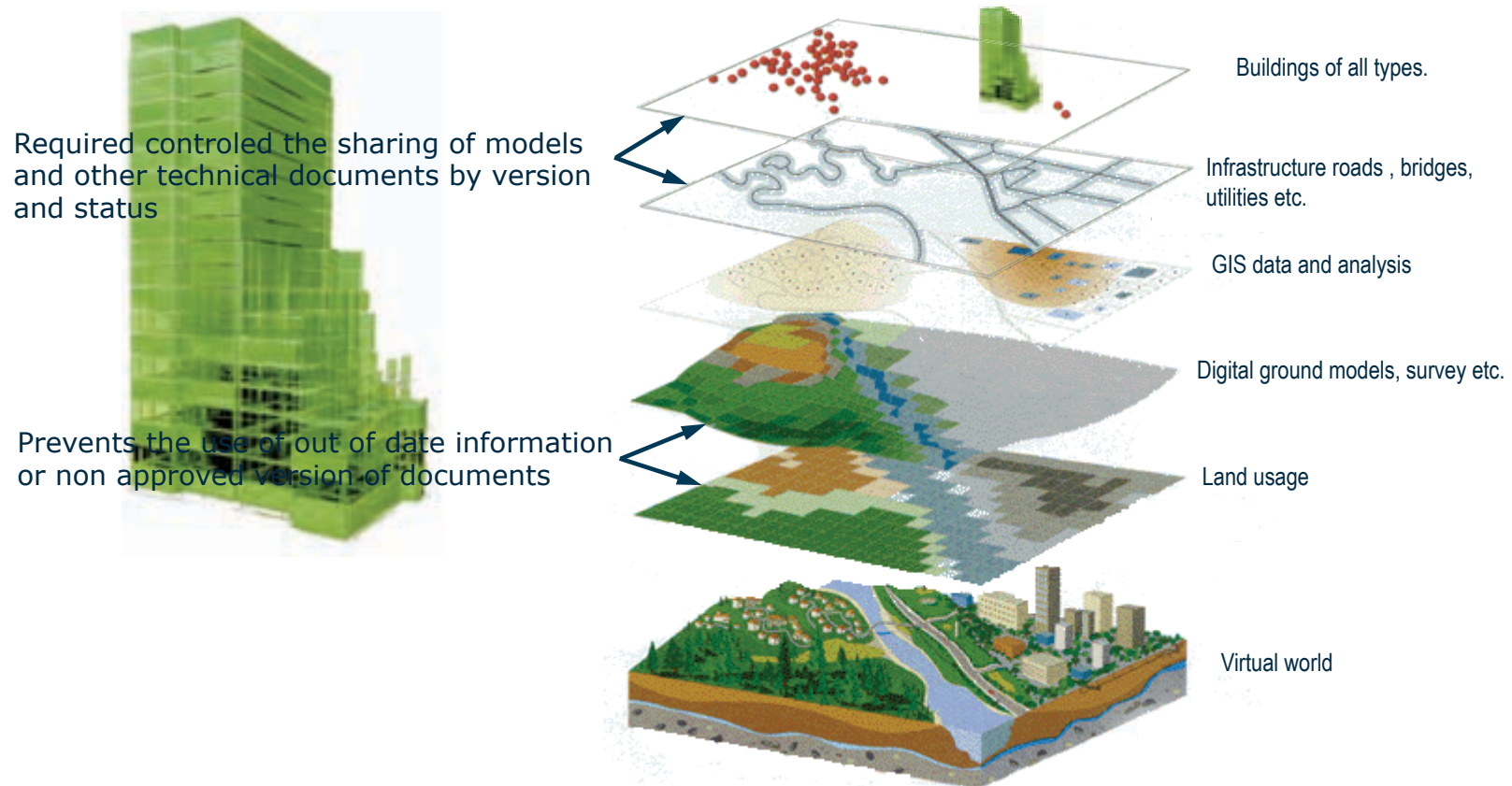
Structural



MEP

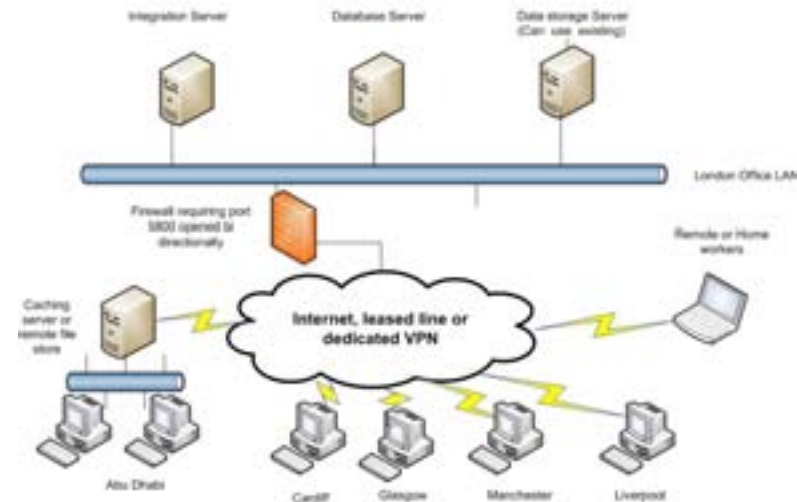
Big BIM or Little BIM?

- Big BIM the total integration of the building with the environment that surrounds it referred to as the federated approach.

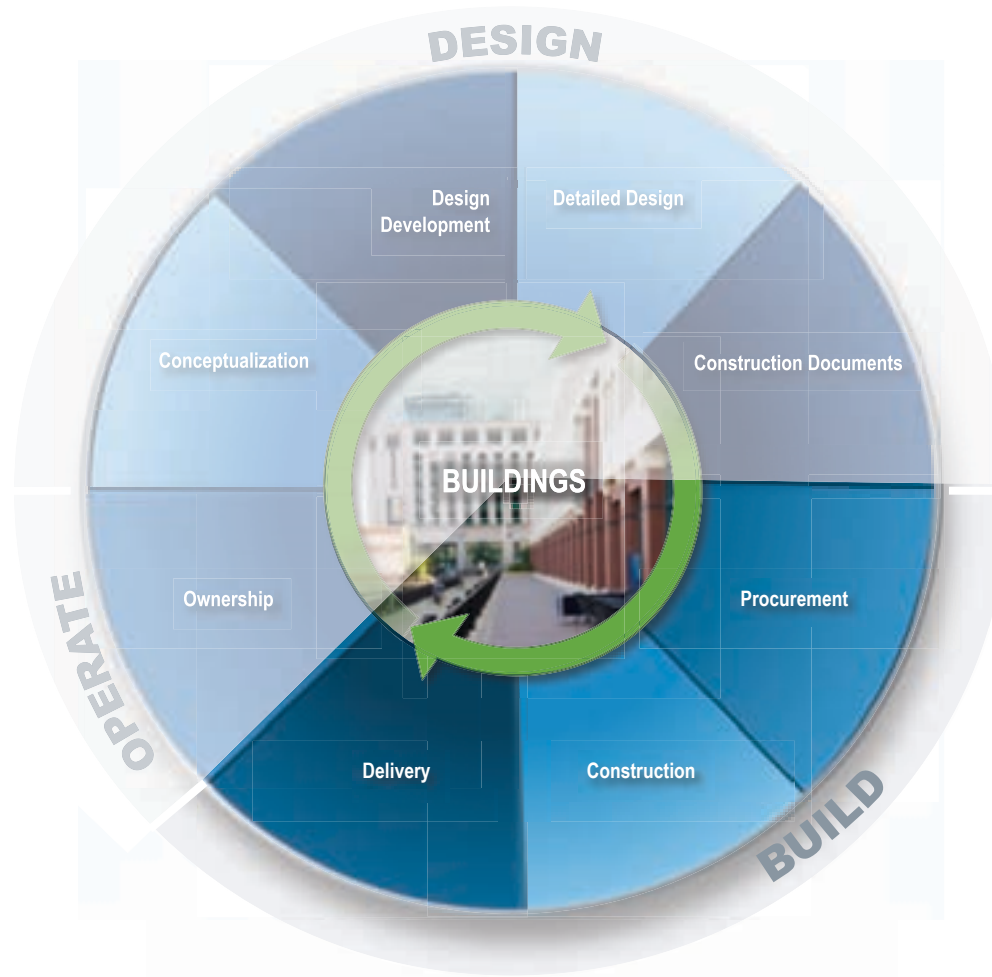


Managing the Information

- Connecting the project team
- “Single Source of Truth”
- Know where to find the information
- Support BS1192
- Only transfer the changes
- Version control
- Document issue



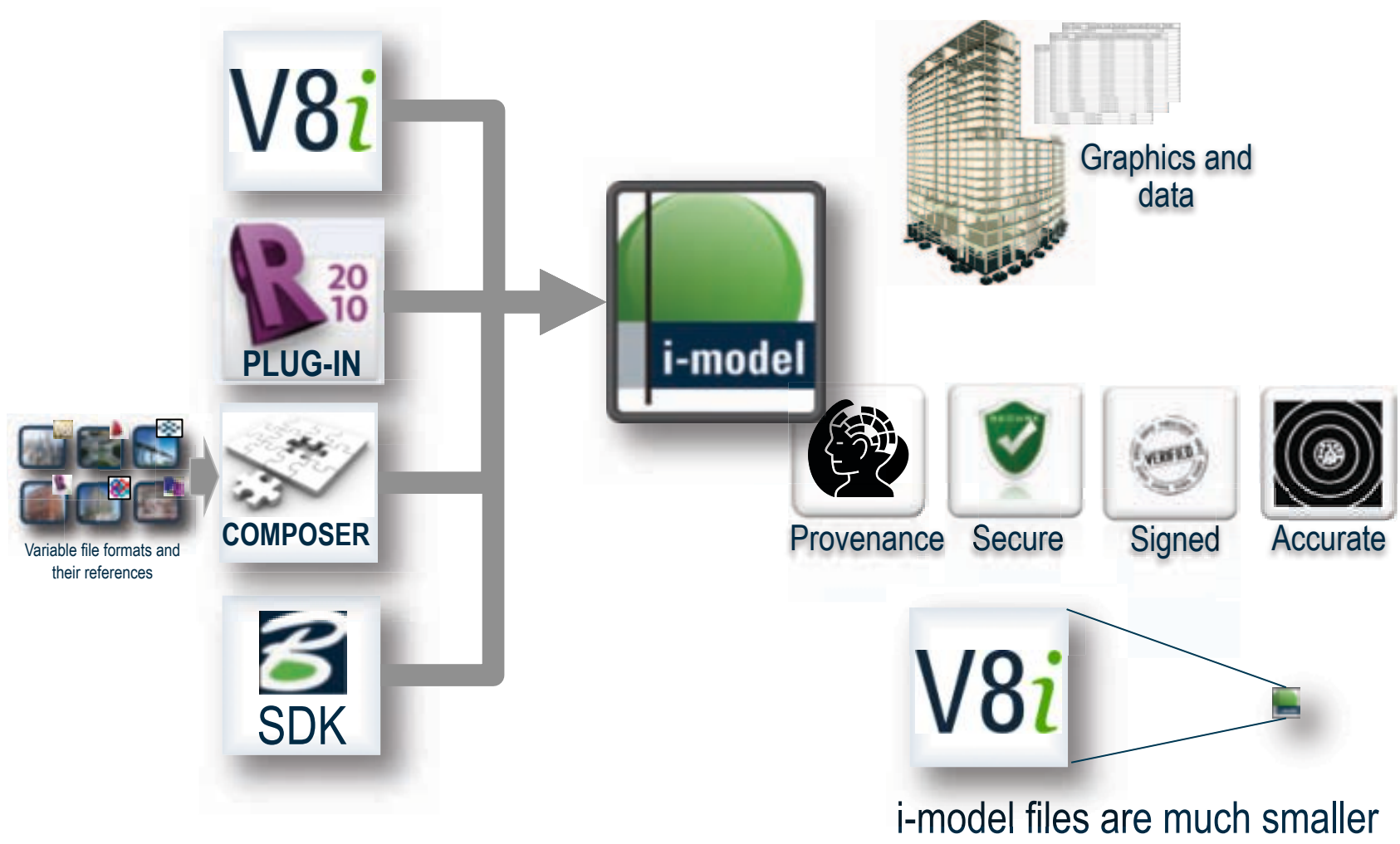
Building Industry Lifecycle



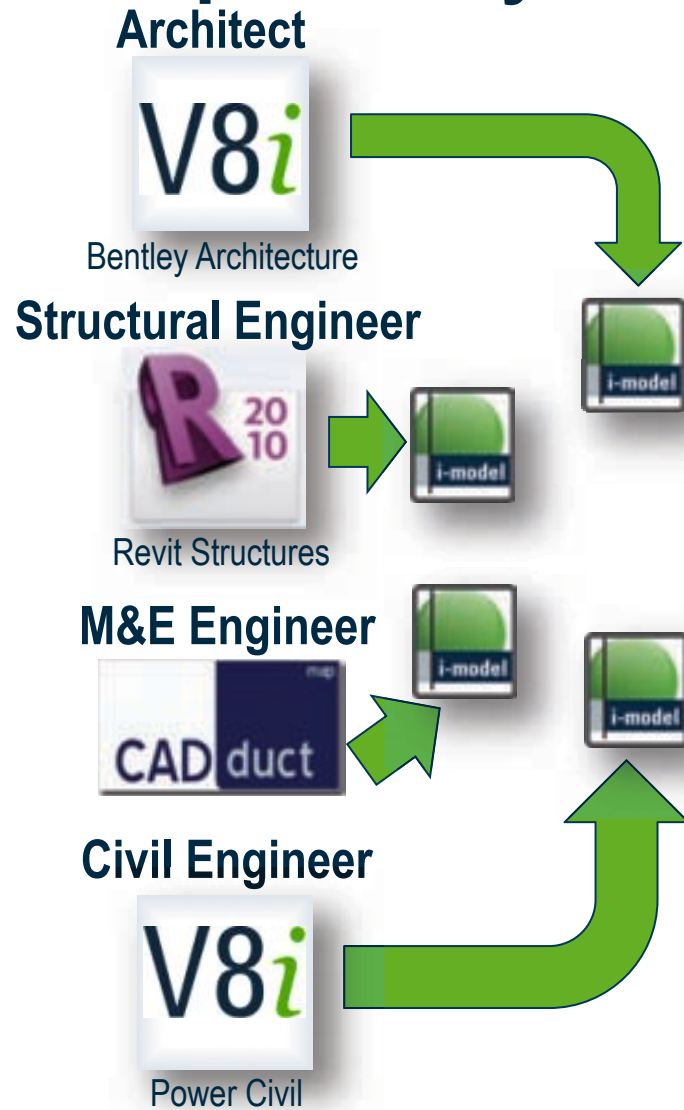
Benefits of BIM for Construction

- Fully coordinate 3D design data
- Ability to resolve clashes between different disciplines before getting to site
- Provides review markup and collaboration workflow
- Ability to link to project planning workflow, task scheduling and construction simulation (4D)
- Ability to extract quantity data and feed into cost estimation workflow (5D)
- Leads to full asset or 'as built' model (6D)

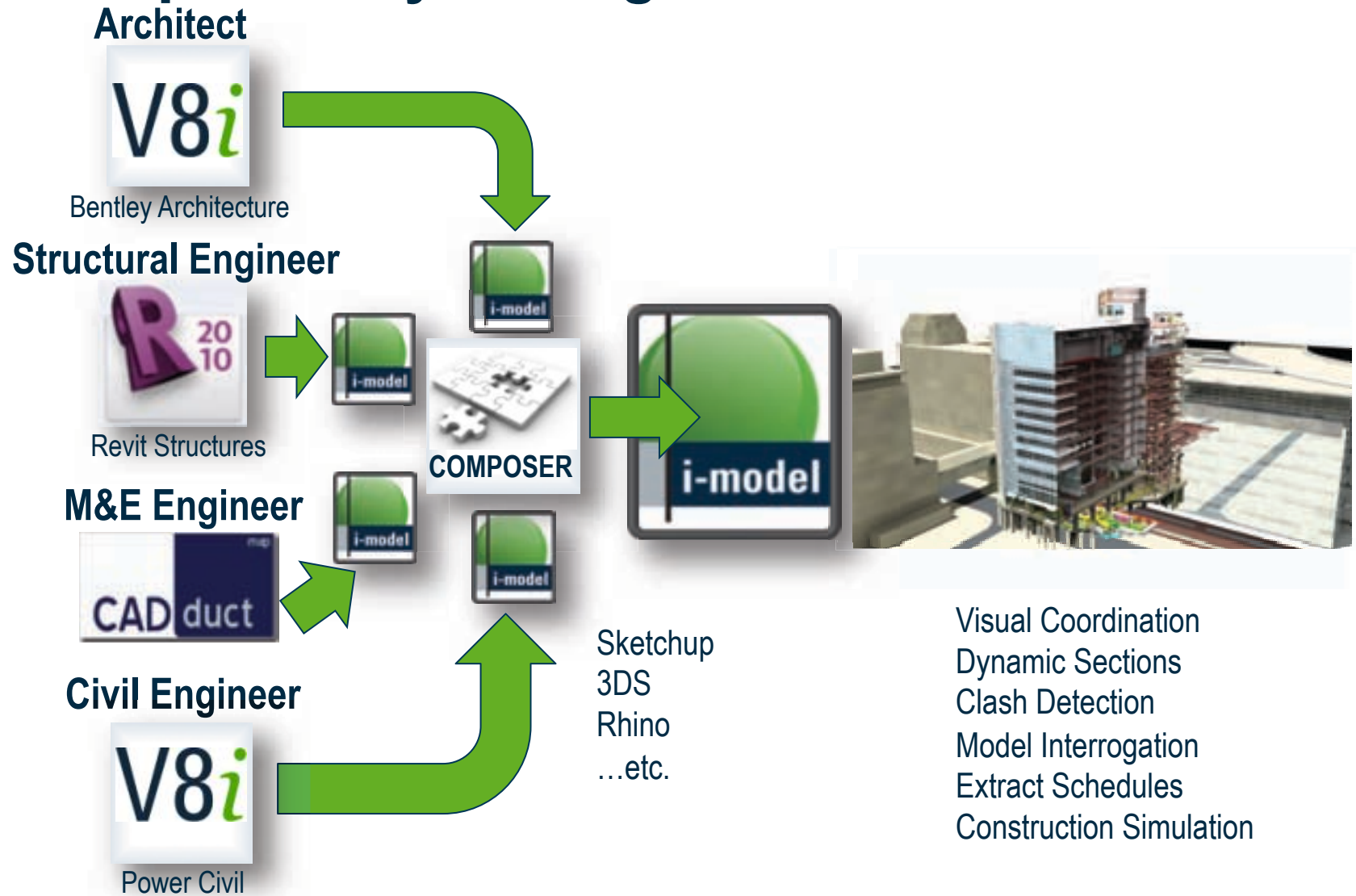
Interoperability through i-models



Interoperability through i-models



Interoperability through i-models



Mobile Apps



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Bills of Quantities

| BURJ DUBAI DEVELOPMENT THE DUBAI MALL : MAIN CONTRACT JOINT VENTURE: DBB/AGCCC | | | | | | |
|---|----------------------------|-----------------|------------------|----------------|------|------------------------|
| Area Location: SUB-STRUCTURE | | | | | | |
| Building No: | FOUNDATIONS | QSI | 3 | Volume Code | | |
| Bill Description: | BLDG00111:GHEE..AL..AL..00 | Date Submitted: | 8-Oct-09 | | | |
| Plan Drawing Title: | Isolation Joints-COLUMNS | Drawn By No.: | TF1051E | | | |
| | S.P.C-01.04 & 07 REV. 4 | 0909 | 3-5-9 | | | |
| S.No | Member Mark | Description | Location From To | COLUMN No. No. | QTY | Remarks |
| 14 | C-108-00X-010 | | U18 U18 | | 3.00 | COLU200 00109 1 |
| 15 | C-110-00X-010 | | U16 U16 | | 3.00 | COLU200 00107 1 |
| 16 | C-104-00X-010 | | U16 U16 | | 2.00 | COLU200 00114 1.2 |
| 17 | C-104-00X-010 | | U16 U16 | | 2.00 | COLU200 00119 1.2 |
| 18 | C-104-00X-010 | | U17 U17 | | 2.00 | COLU200 00171 1.2 |
| 19 | C-108-00X-010 | | U18 U18 | | 2.00 | COLU200 00170 1 |
| 20 | C-107-00X-010 | | U17 U17 | | 3.00 | COLU200 00170 1 |
| 21 | C-109-00X-010 | | U18 U18 | | 2.00 | COLU200 00181 1.2 |
| 22 | C-110-00X-010 | | U16 U16 | | 2.00 | COLU200 00207 1.400000 |
| 23 | C-110-00X-010 | | U18 U18 | | 2.00 | COLU200 00207 1.2 |
| 24 | C-111-00X-010 | | W11 W11 | | 2.00 | COLU200 00207 1.400000 |
| 25 | C-108-00X-010 | | W10 W10 | | 4.00 | COLU200 00207 1.2 |

Benefits of BIM for the QS

- No need to measure drawings
- Saves time
- Be involved earlier
- Project model has structured data (Uniclass & BS1192)
- Extract quantity data direct from design model or iModel.
- Reduce RFI's
- Utilise Navigator markup workflow for improved communication

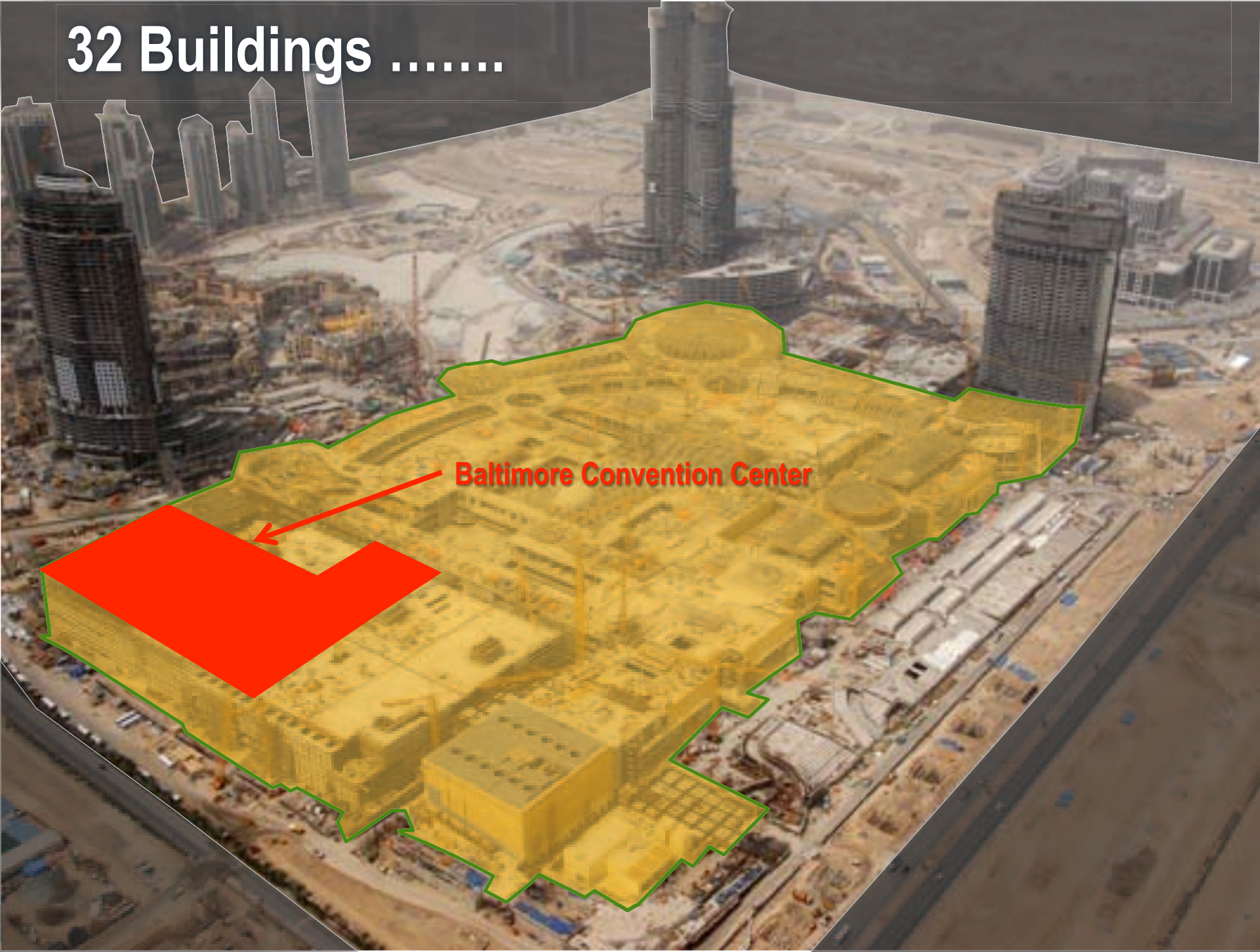
BIM Based Quantity Surveying

?? ? ? ? ? ? ? ? ? ? ? ? ? ? ?

Return on Innovation through improved project predictability



32 Buildings



Baltimore Convention Center

Problem: “How much concrete, exactly?”

- 32 Buildings
 - 360 spreadsheets per average building
 - 1,000 pages per average report
 - **32,000 spreadsheet pages**
-

- ***Every Month, for over 3 years!***
- Over **1,100,000 QS Report spreadsheets** needed during project construction...
- ...with no errors.

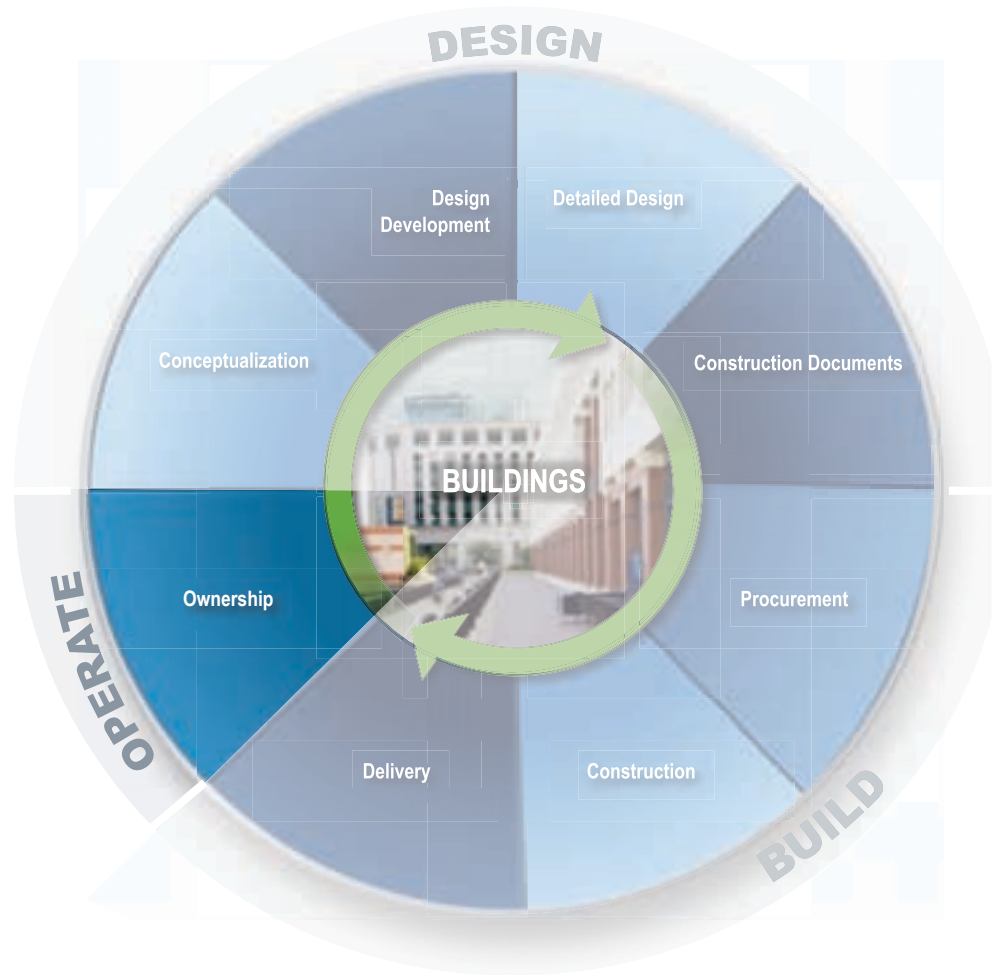


Solution: Automated BIM Based QS

- With BIM QS methods and tools:
- New QS team profile:
 - 2 QS Engineers full-time, on-site
 - 8 BIM Staff full time, on-site
 - 15 fewer staff required!
- **30 Man-Years** work saved
- QS team savings: **\$7,000,000 US**



Building Industry Lifecycle





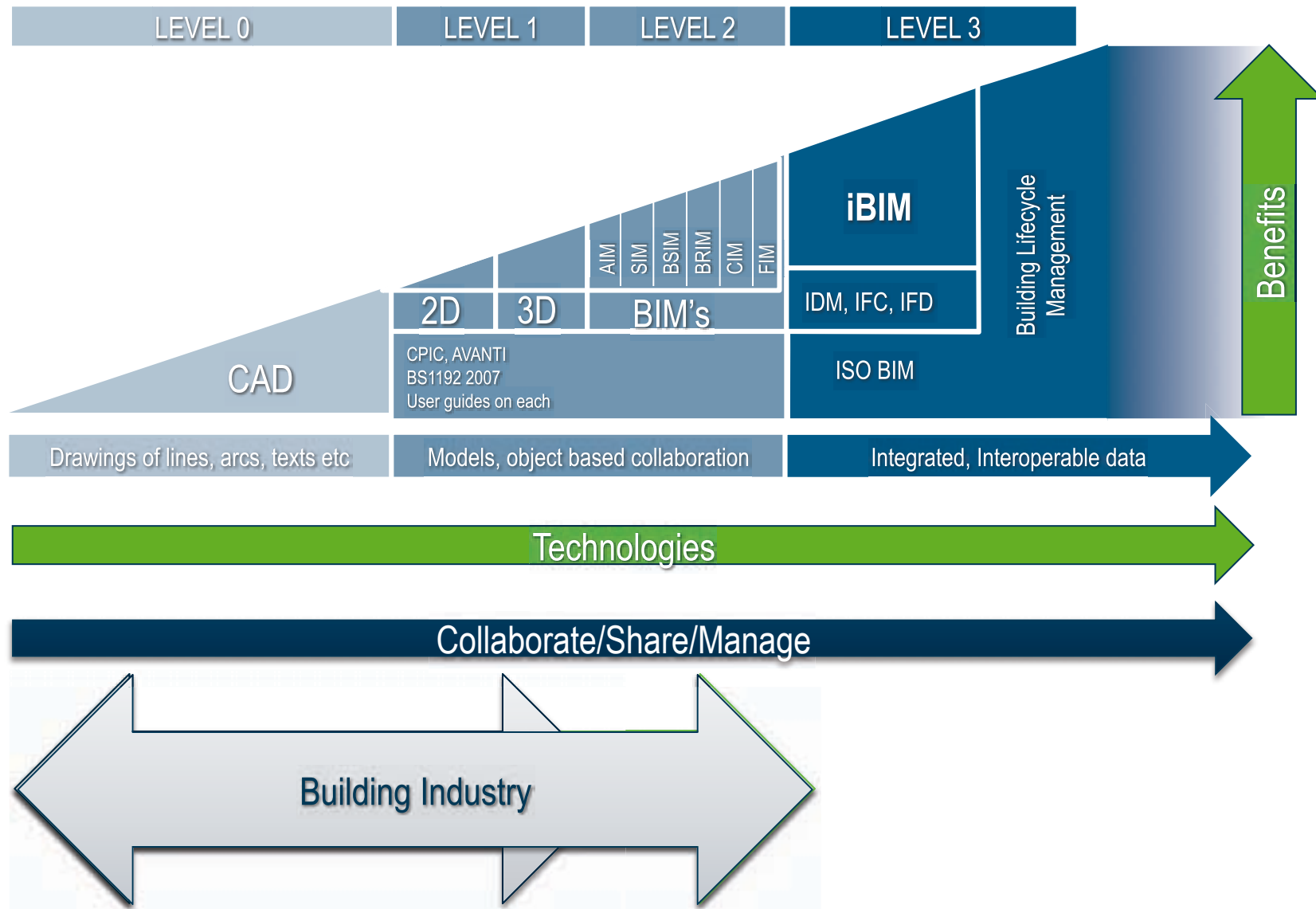
Benefits of BIM for Owner/Operator

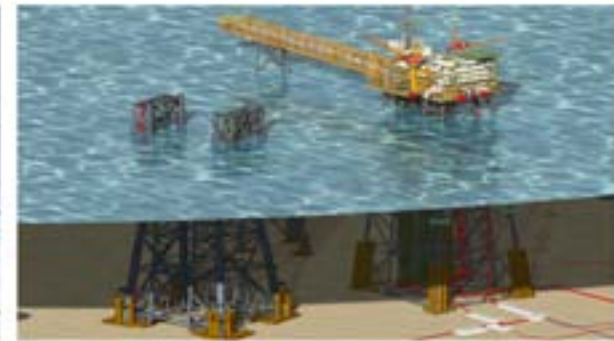
- Full asset model
- Reduced risk of delays and cost
- Improved supply chain delivery
- Better control
- Ensure compliance
- Leverage all project data
- Basis for asset management and FM

Commitment to Interoperability



- 'Interoperability Platform' White Paper
 - Embrace existing applications
 - Synchronize project information
 - Generate integrated views of project information
 - Create dynamic deliverables
 - Utilize powerful client applications for extracting value from project information
 - www.bentley.com/interoperability





A Bentley Perspective on BIM

Thank you!