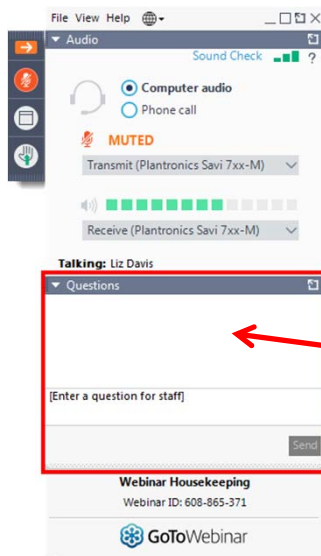




1

## How to Participate Today



- **Audio Modes**
  - Listen using Mic & Speakers
  - Or, select “Use Telephone” and dial the conference (please remember long distance phone charges apply).
- **Submit your questions using the Questions pane.**
- **A recording will be available for replay shortly after this webcast.**

2

Tony DeRosa



Senior Consultant

✉ [tony.derosa@bentley.com](mailto:tony.derosa@bentley.com)


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## Agenda

- About Bentley
- Bentley's Going Digital Strategies
- BIM is not CAD and the benefits of BIM
- Bentley and Going Digital
  - Understanding iModels, and PlantSight
- iTwin *Services* and *iModel.js*
- Connected Modeling and Connected Data Environment


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# Bentley and Going Digital

From Desktop to Web Services – Bentley's Strategy




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## What is the definition of “Going Digital”


- Going Digital consists of three main pillars
  - Digital Workflows
  - Digital Components
  - Digital Context



**DIGITAL  
WORKFLOWS**




**DIGITAL  
COMPONENTS**



**DIGITAL  
CONTEXT**

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## Digital Workflows for Design and Construction

- Ability to manage design and construction workflows
- Ability to undertake design and construction modeling simulations
- Ability to reuse digital components



## Digital Components

- Ability to develop, share, exchange, and consume digital information
- Ability to collaboratively develop, share, exchange, and consume digital components
- Ability to consume and reuse digital information



# Digital Context

- Ability to capture and reuse existing site conditions



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## Going Digital: Digital Context and Digital Components Span Infrastructure Project Delivery and Asset Performance

Information mobility is fundamental to realizing the benefits of "Going Digital"—reflecting the reuse of information throughout the design-build-operate lifecycle for infrastructure projects and assets, and, as important, it enables data generated by one software application to be used by another application for cross-discipline workflows.

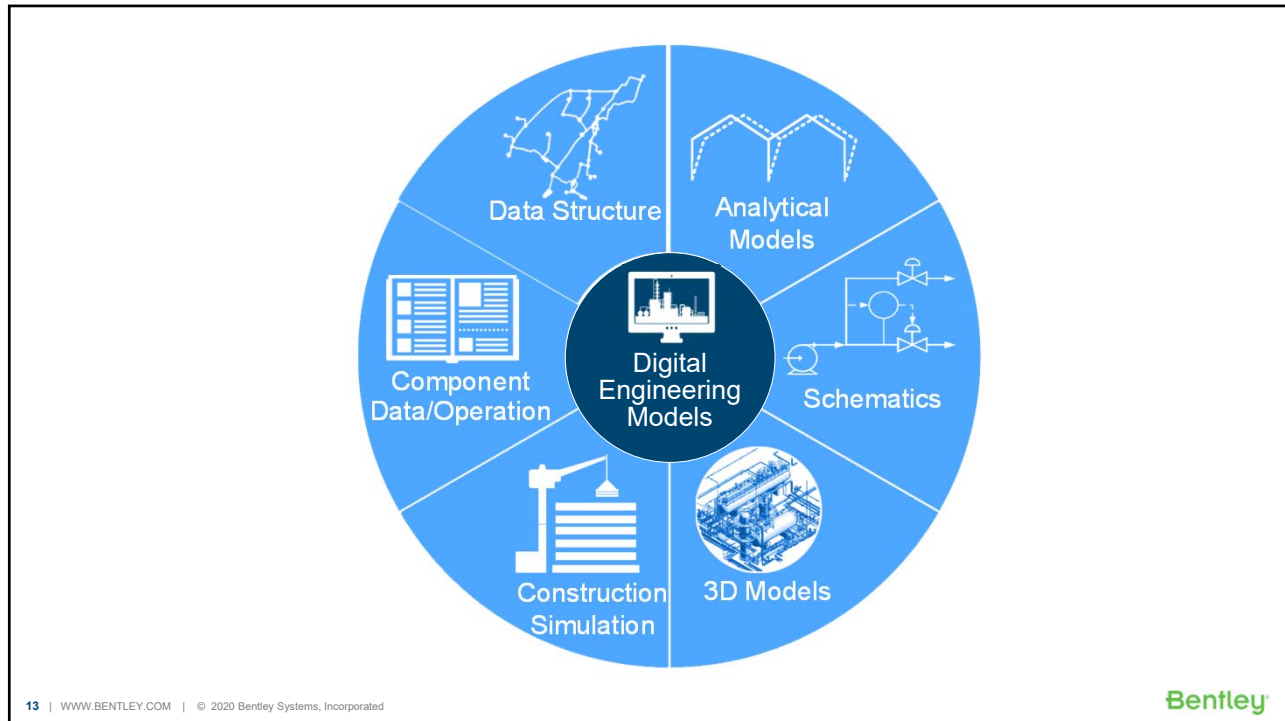
Planning
Design
Construction
Operations

Digital Context		<p style="font-size: 8px; text-align: center;">                     Haskel Engineering Corporation Limited, PowerDiva                      Application of BIM Strategy for Electrical Design &amp; Asset Performance                      Shanghai City, Guangdong, China                 </p>		<p style="font-size: 8px; text-align: center;">                     Pennsylvania State University                      Department of Architectural Engineering                      Virtual Power Grid Campus 1 University Park, Pennsylvania, United States                 </p>	Digital Context
<p style="font-size: 8px;">During project delivery, the practice of industrializing BIM can improve predictability, performance, and outcomes by using—and reusing—readymade digital components from concept to completion, adding more engineering content earlier in the design process, for better, more informed design decisions. Applying industrial UAVs to continuously survey existing conditions of a project and provide engineering-ready digital context throughout planning, design, and construction, the BIM process can be further industrialized, by automating both surveying and construction workflows, and providing visibility into the path of construction, virtually.</p>					
<p style="font-size: 8px;">Digital engineering models represent an accumulated intelligence—the "digital DNA"—developed throughout the design/engineering process. Leveraging digital DNA in both construction and operations is made possible by aligning that data in a connected data environment (CDE) to be securely accessible for reuse by relevant stakeholders. The digital components and digital context within the CDE can be geo-coordinated for immersive visibility into project delivery and asset performance, leading to more informed decision making and improved outcomes.</p>					
Digital Components					Digital Components
<div style="display: flex; justify-content: space-around; font-weight: bold; color: white; background-color: #f4a460; padding: 5px;"> <span style="width: 45%;">Industrializing BIM</span> <span style="width: 45%;">Leveraging Digital DNA</span> </div>					

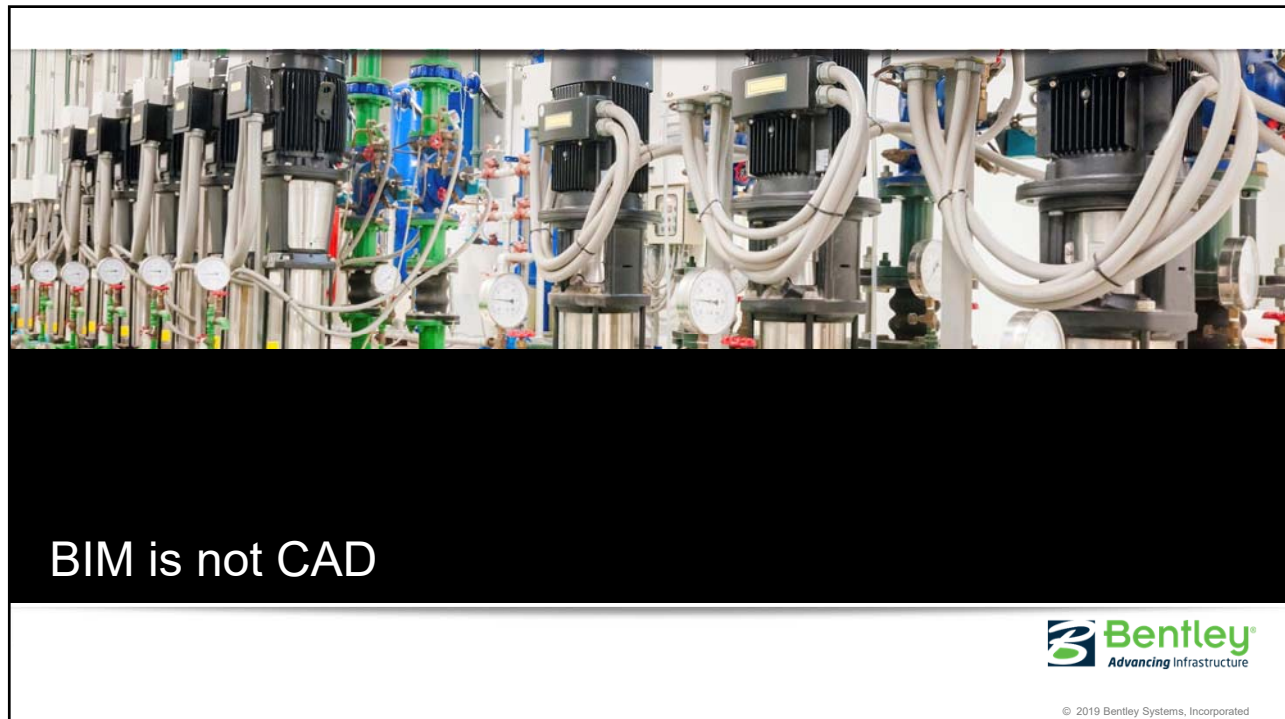
Project Delivery

Asset Performance

12

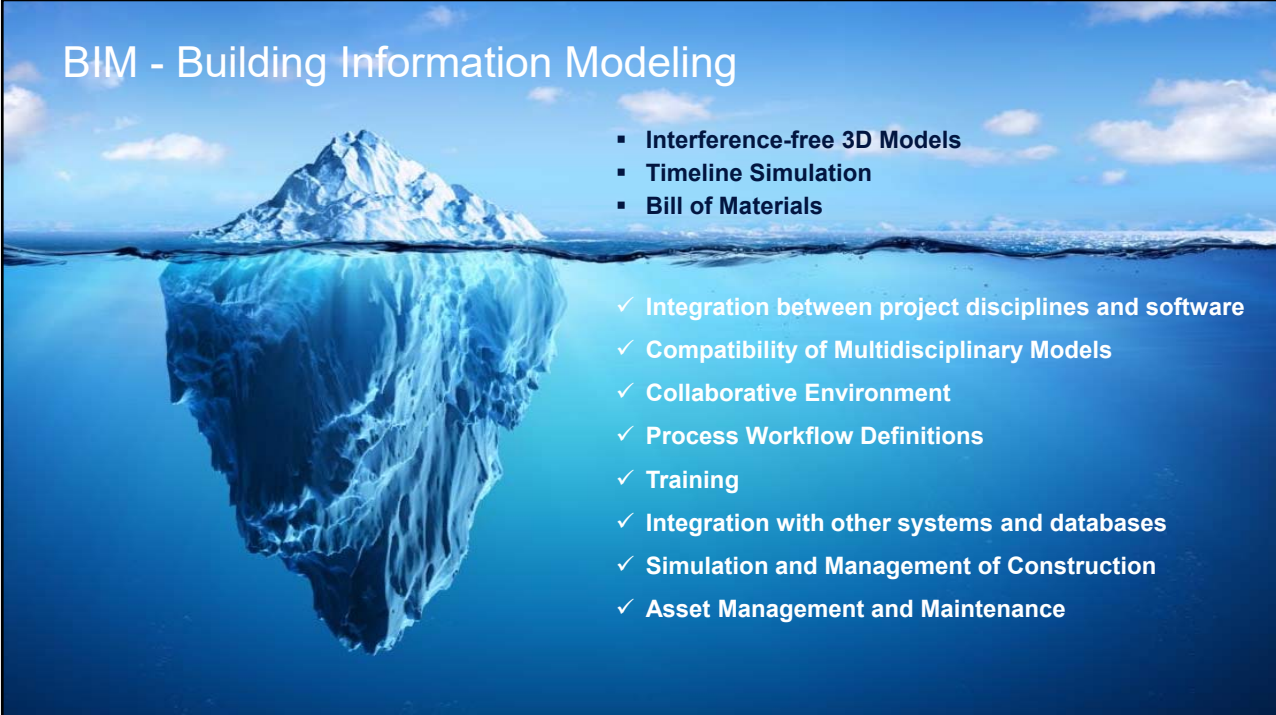


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## BIM - Building Information Modeling




- Interference-free 3D Models
- Timeline Simulation
- Bill of Materials

- ✓ Integration between project disciplines and software
- ✓ Compatibility of Multidisciplinary Models
- ✓ Collaborative Environment
- ✓ Process Workflow Definitions
- ✓ Training
- ✓ Integration with other systems and databases
- ✓ Simulation and Management of Construction
- ✓ Asset Management and Maintenance

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## What BIM is NOT...

- BIM is not only Software!
- Its not a recipe
- Its not only about making “3D” smart
- Its not only about building a library of objects
- Its not only to estimate cost
- It is not for simulating timelines
- Its not only for Architecture or Buildings
- Its not only delivering files
  - Example: IFC - IFC does not support any BIM workflow



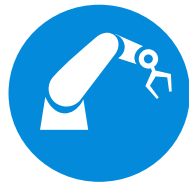
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# The Three Pillars of BIM



**Technologies**



**Processes**

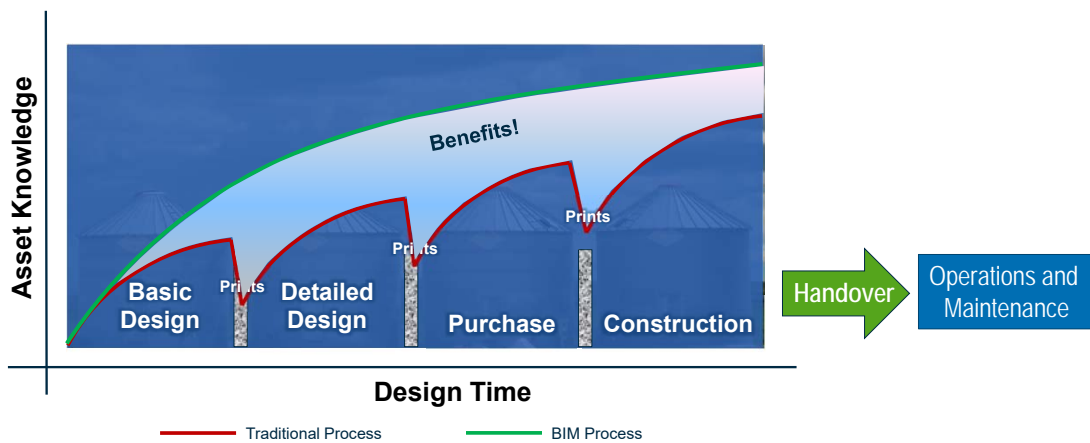
- BIM EXECUTION PLAN
- BIM MANDATE
- IMPLEMENTATION MANUAL
- ETC...


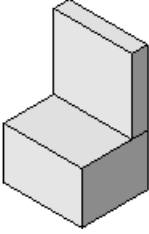





**People**




# Traditional Process vs BIM Process



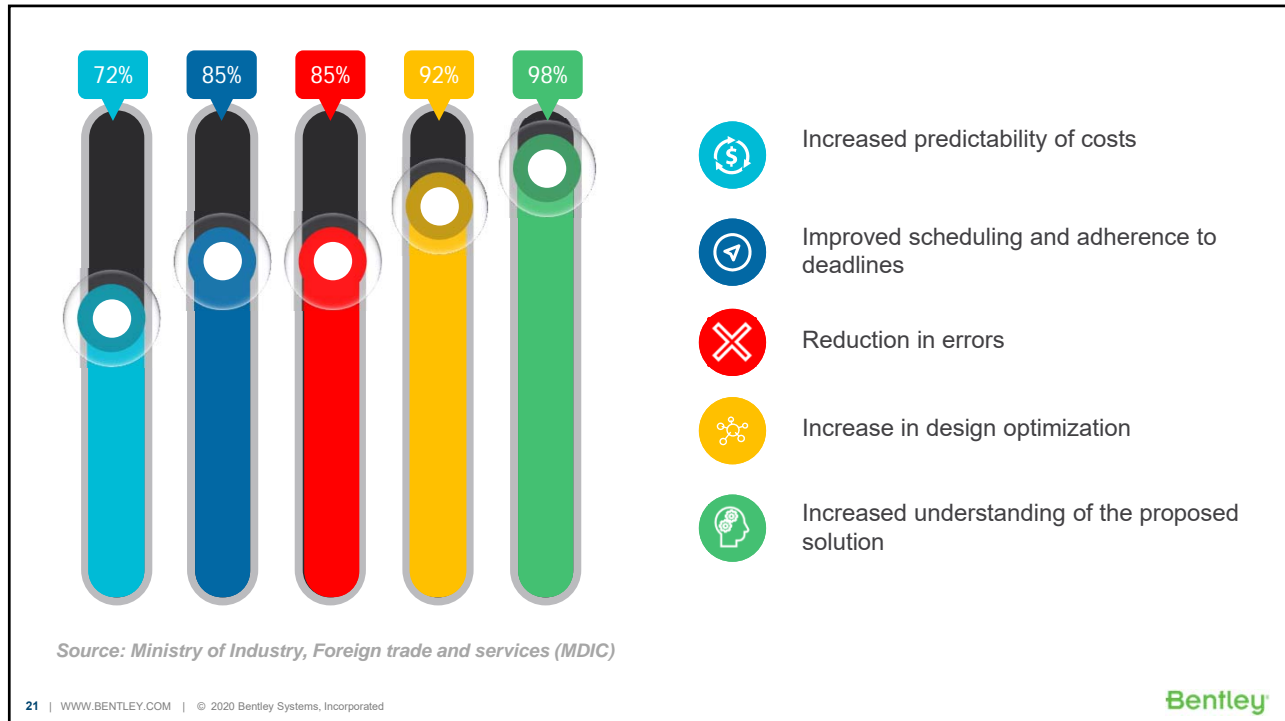
<p><b>LOD</b></p>					
<p><b>LOI</b></p>	<p>Chair</p>	<p>Chair # C001 H=38 in L=27 in</p>	<p>Chair # C001 H=38 in L=27 in Type=Reclining</p>	<p>Chair # C001 H=38 in L=27 in Type=Reclining Material=Leather Weight=5 lbs.</p>	<p>Chair # C001 H=39 in L=27 in Type=Reclining Material=Synthetic Leather Weight=5 lbs. Supplier=US Chairs Backrest=Height Adjustment Recline=Backrest Only Caster Size=2 in</p>

## Level of Detail/Level of Information 2D to BIM

- **LOD 100:** Conceptual design with schematics or simple geometry
- **LOD 200:** Approximate geometry with TAGs, attributes and basic properties
- **LOD 300:** Precise geometry and quantities for cost estimating, including important attributes, properties, and specifications
- **LOD 400:** Manufacturing: Precise models for manufacturing including all attributes, dimensions, and properties for acquisition, fabrication, and installation
- **LOD 500:** As-Built: Accurate representation of reality – The Digital Twin



**Chair # C001**  
H=39 in  
L=27 in  
Type=Reclining  
Material=Leather  
Weight=5 lbs.  
Supplier=US Chairs  
Backrest=Height Adjustment  
Recline=Backrest Only  
Caster Size=2 in



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# Bentley and Going Digital

Making sense of Dark Data with iModels, and PlantSight

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## The Difference Between BIM and Digital Twins

- BIM is all about static 3D Models yet lacks digital context
  - Every piece of infrastructure is located somewhere on the planet. Digital Twins provide Digital Context
- Second – BIM lacks the dimension of time
  - Digital Twins bring in the element of time



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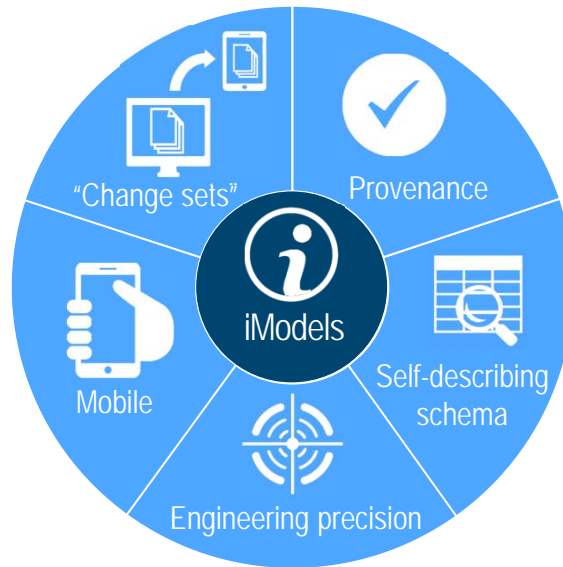
PlantSight

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- ✓ Model Centric
- ✓ Work In Progress Design
- ✓ Change Management
- ✓ Data Insights

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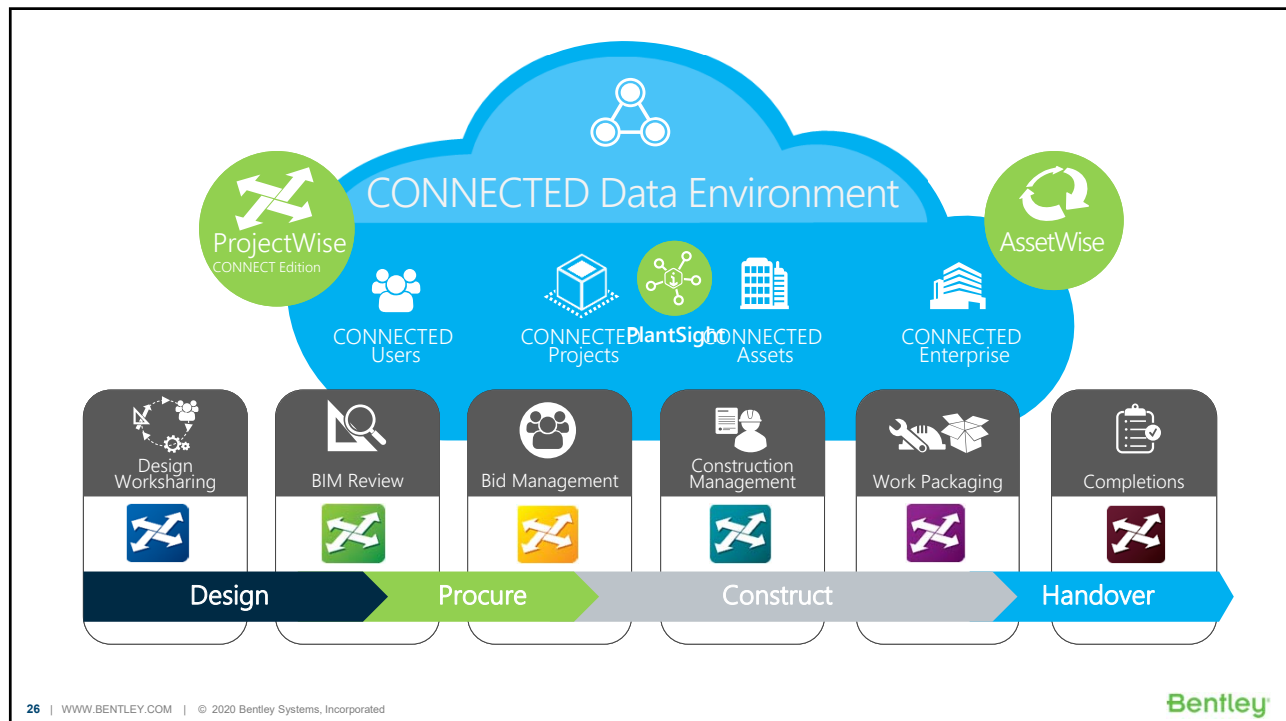
## Interoperability With iModels



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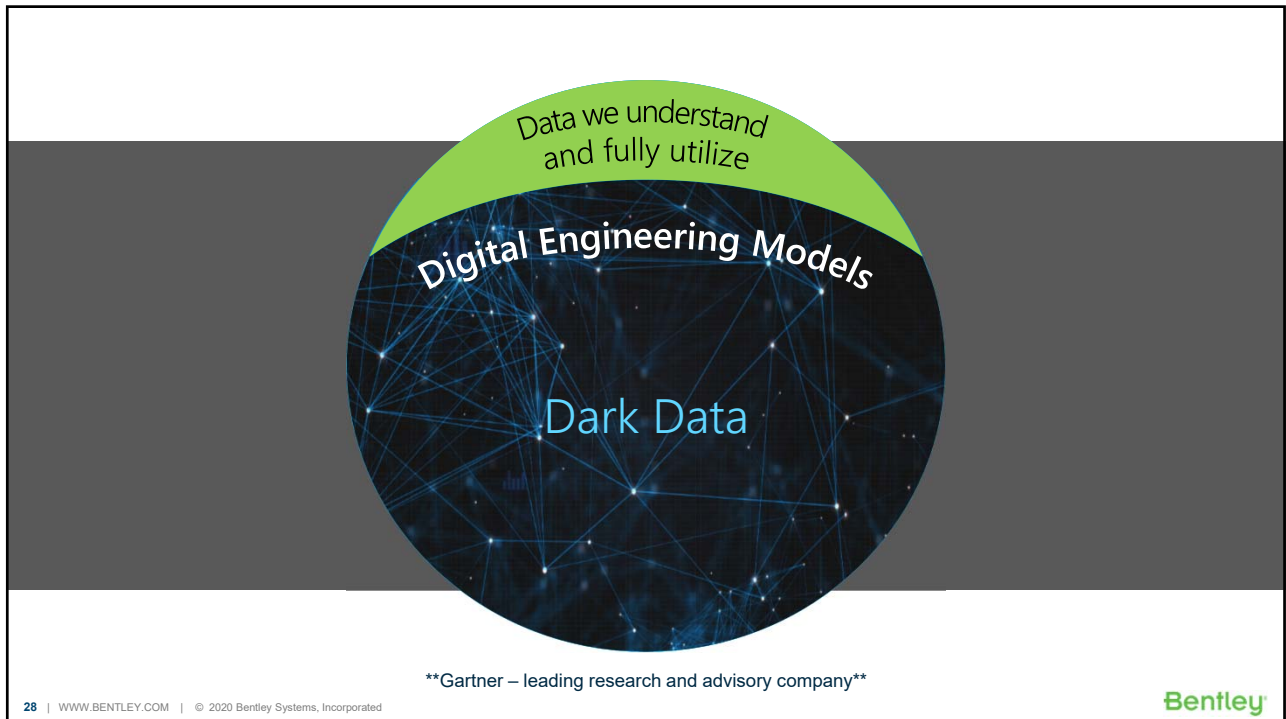


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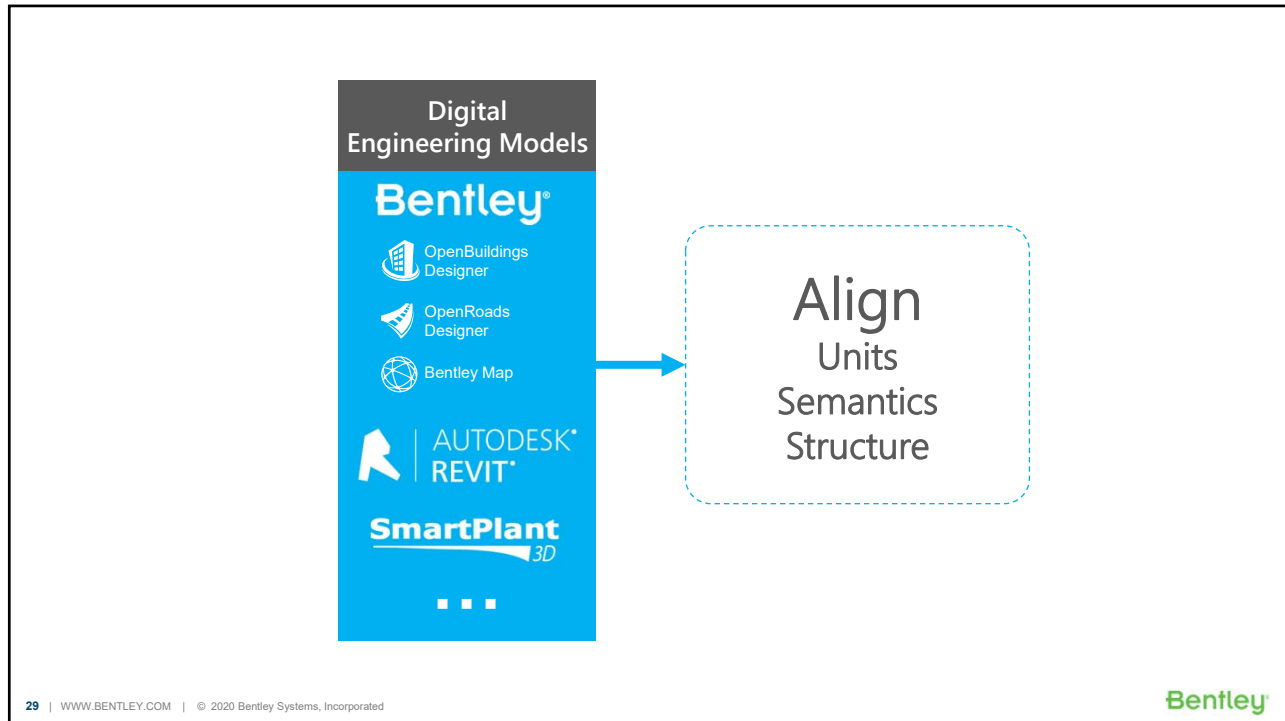


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# ALIGNMENT


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The slide features the word 'ALIGNMENT' in a large, bold, dark grey sans-serif font, centered on a white background. The Bentley logo is in the bottom right corner.

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Change



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**ACCOUNTABILITY**

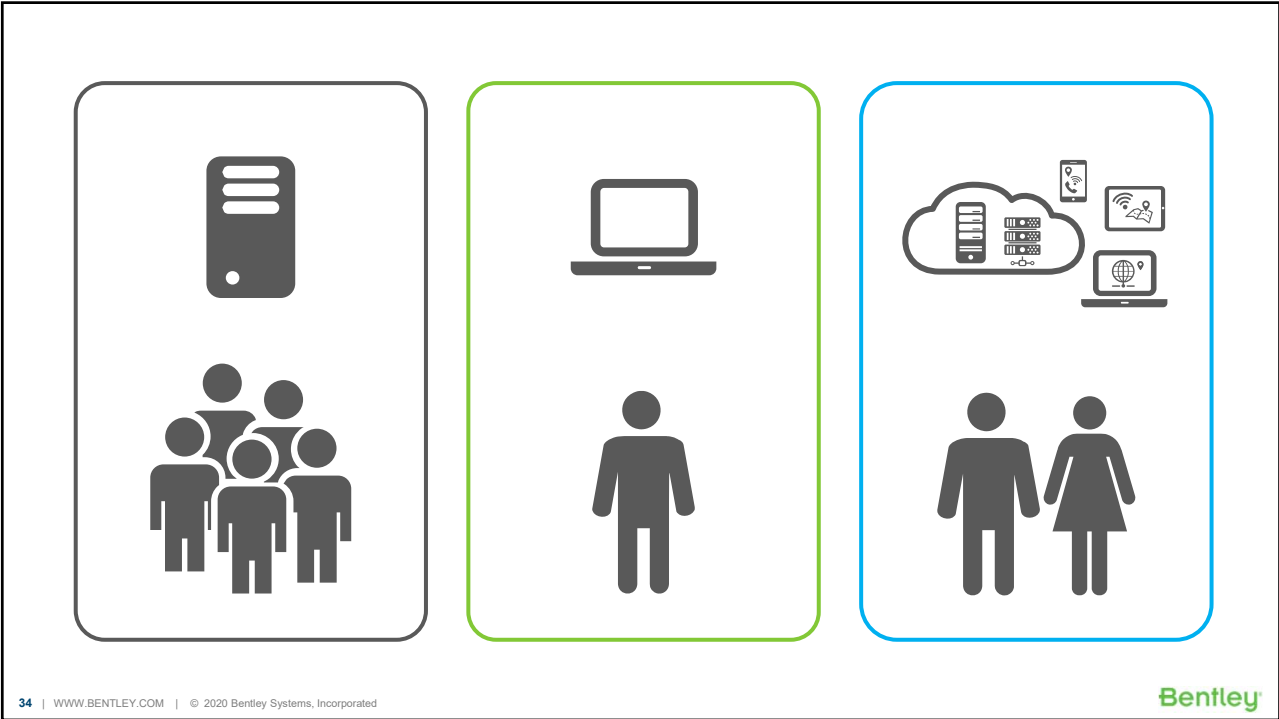
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**ALIGNMENT**  
**ACCOUNTABILITY**  $\Delta$   
**ACCESSIBILITY**

iModel 2.0 Platform

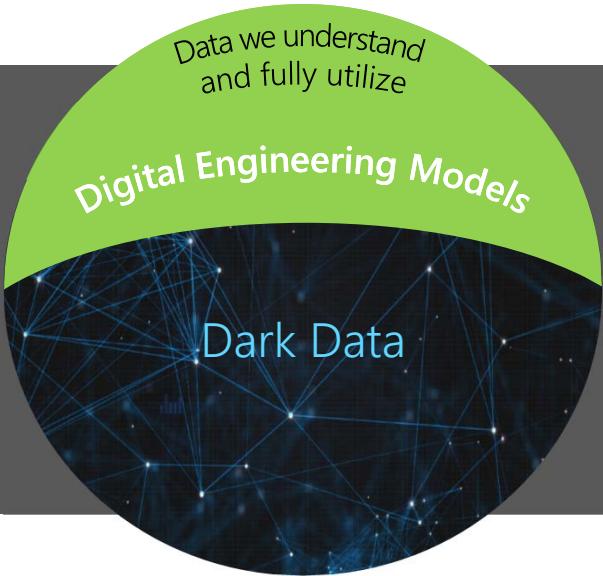


Cloud

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Data we understand and fully utilize

**Digital Engineering Models**

Dark Data

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## The Difference Between BIM and Digital Twins

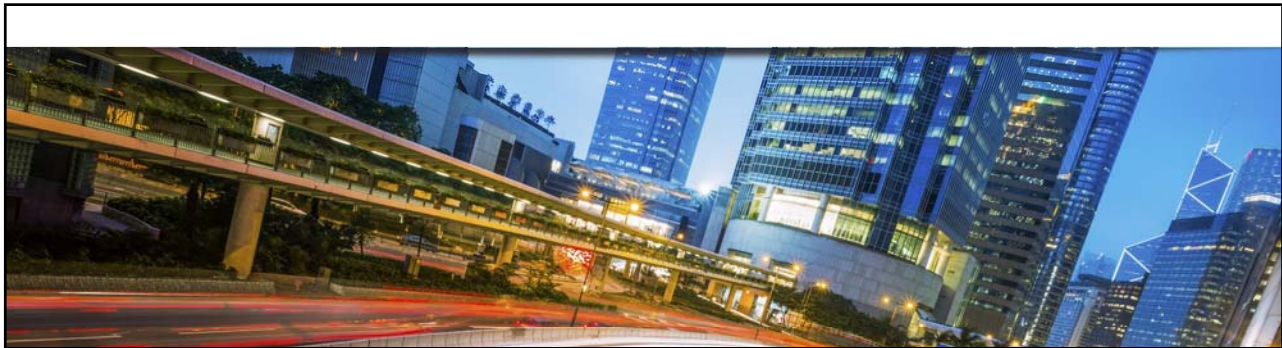
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## iTwin Services and iModel.js

iTwin Services – Powered by iModelHub

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Advancing Infrastructure

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## Digital Twins

- What we know today about Digital Twins
  - They are not always reliable
  - The digital twin is outdated in the time it takes you to read this line.
  - To be reliable, they must synchronize reflections of both an asset's physical reality and its "virtuality" (engineering data)
- The Problem today...
  - The evolving 3D physical reality is too difficult to capture digitally and keep-up-to-date
  - Corresponding as-operated engineering information tends to be unavailable or at best, dated.
  - Engineering data is typically an assortment of inaccessible "dark data"

## iTwin Services from Bentley

- Enables project digital twins and performance digital twins
- Take advantage of reality modeling, PlantSight, Connected Data Environment (CDE), and web-visibility technologies, where...
  - Reality Modeling:
    - Captured, and maintained through continuous surveys
    - Using Bentley's reality modeling software providing "reality meshes"
  - PlantSight:
    - Overcomes the hurdles through automated digital alignment and synchronization based on change ledgers.
    - Corresponds to the CDE's project workflows (ProjectWise) or configuration management (AssetWise)
  - Web Visibility – iModel.js
    - Designed for web-based visualization
    - Teams can develop custom applications to connect their digital twin for specific use cases
    - Open source ecosystem


## Project Digital Twins with ProjectWise CONNECT Edition

- User can instantiate cloud-provisioned iTwin Services
- Can be done without disruption to current ProjectWise workflows
- PlantSight transparently creates and maintains the iModel (a distributed database)
  - It includes its change ledger
  - And is updated at each deliverable-in-progress check-in state
  - For every update to engineering information, “information bridge” processing puts into place digital alignment of the iModels components


















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# iModel.js SDK


Portable	On-Premise / Cloud	Web	Mobile
  	  	  	   
<p>Multi Platform</p>   	<p>iModel Bridges</p> 		

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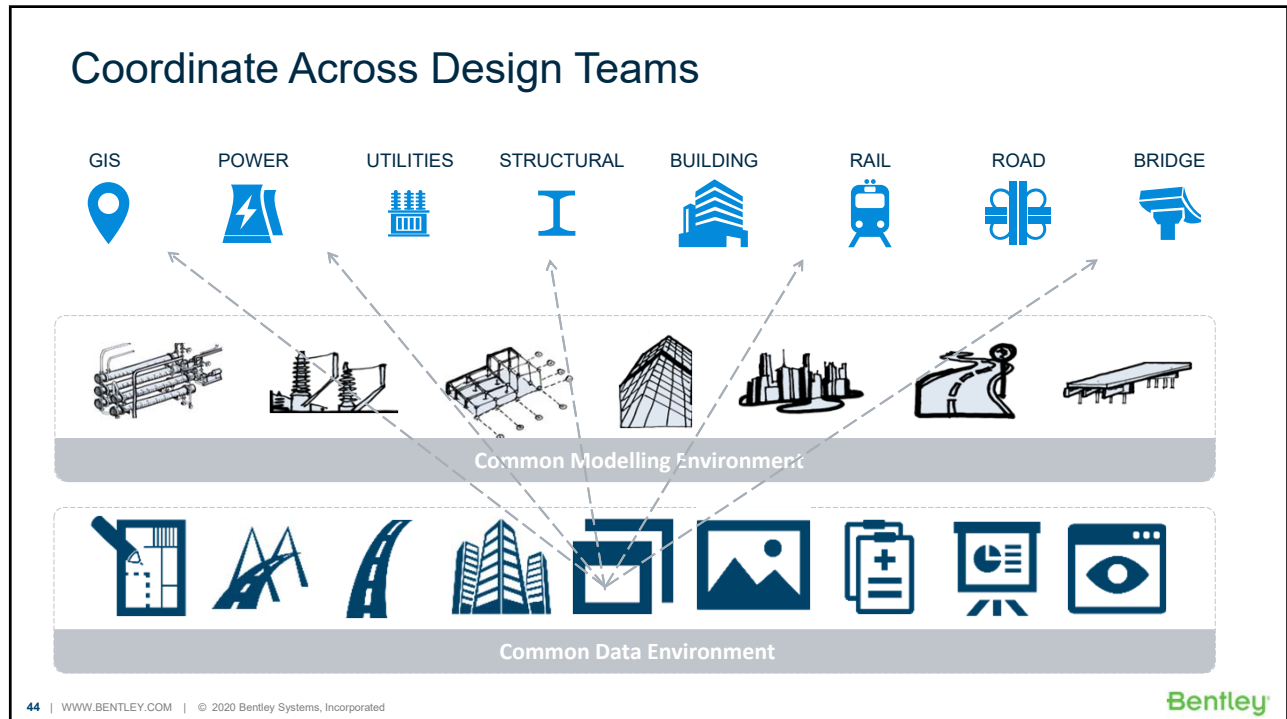


## Common Modeling and Data Environments

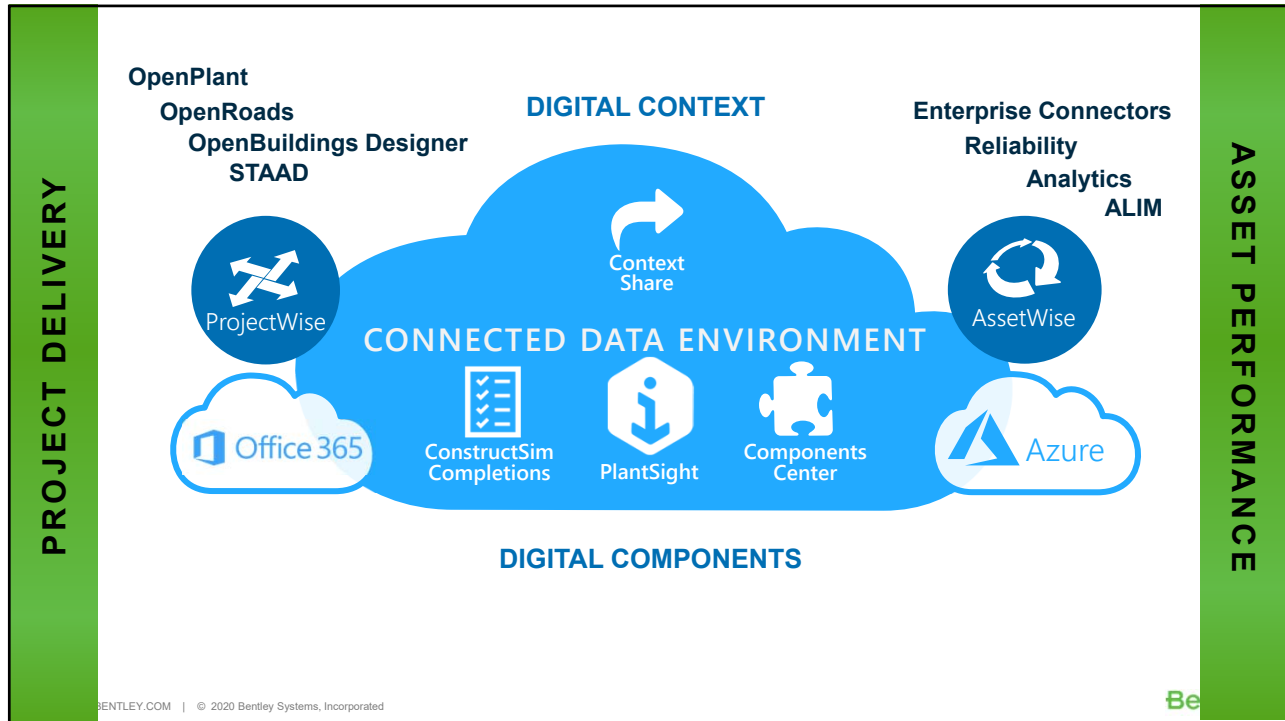


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**ACCELERATE**

**Achieving Success with Digital Plant Design Workflows with Abbas Ali of Bentley and Shaun Severin of Brown and Caldwell**

*November 12th at 10:30 AM EDT*

A photograph of two women, one in a blue shirt and one in a striped shirt, looking at a computer monitor in a dimly lit office setting. The image is partially obscured by a white geometric shape.

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