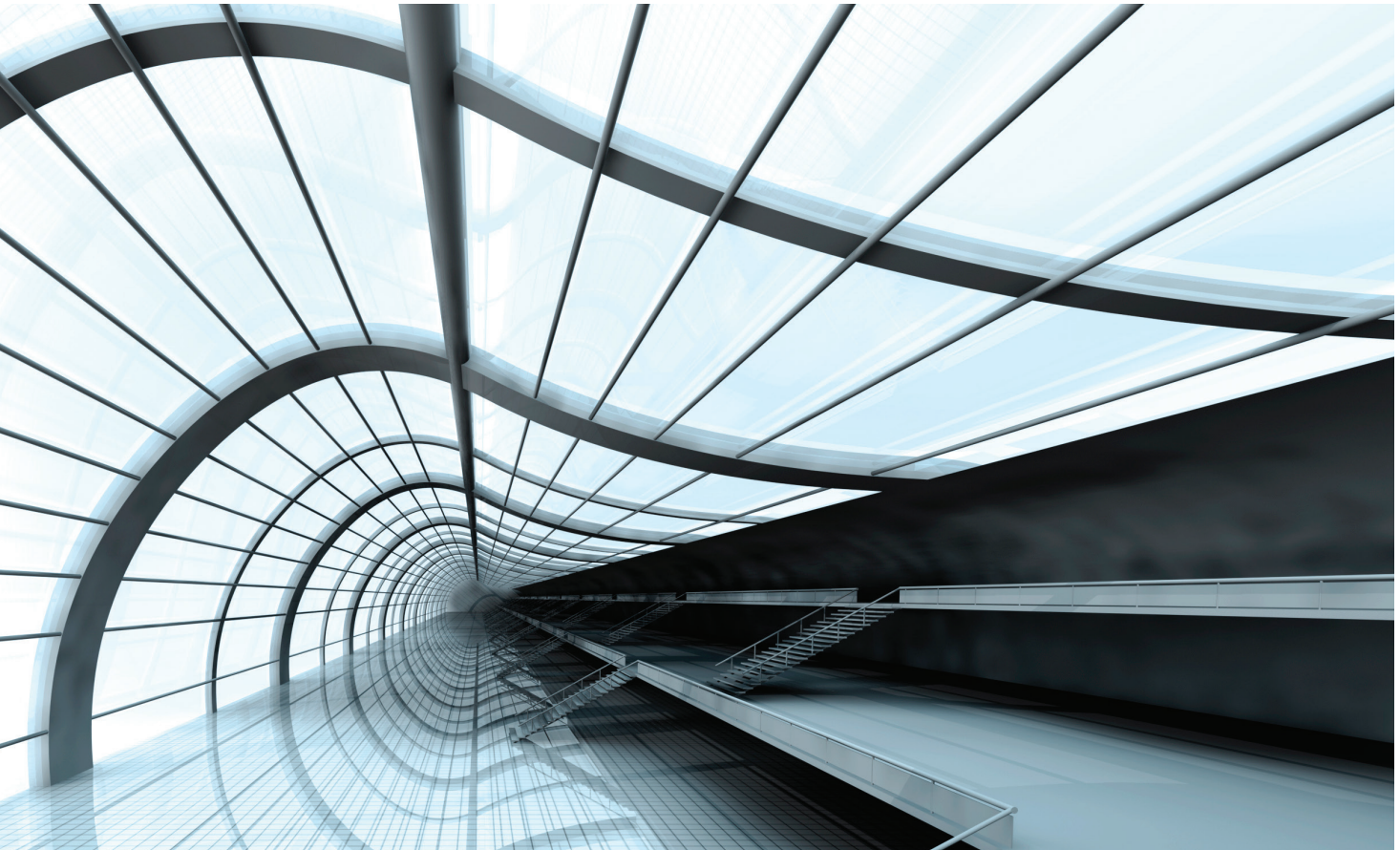


ARCHITECTURE, ENGINEERING
& CONSTRUCTION

END-TO-END COLLABORATION ENABLED BY BIM LEVEL 3

An industry approach based on best practices from manufacturing



SUMMARY

Industrialization techniques have been commonly used in Manufacturing industries for decades. Now the use of **Industrialized Construction** is expanding in the Architecture, Engineering & Construction industry to help improve planning, design, construction, and assembly for increased sustainability, optimized operations, lower costs, and greater safety.

With the growing adoption of **Building Information Modeling (BIM)**, companies can further benefit by implementing a **Building Lifecycle Management (BLM)** system. BLM puts into practice a BIM Level 3 approach that enables a highly efficient **Extended Collaboration** model based on Product Lifecycle Management (PLM) and Manufacturing industry best practices.

Dassault Systèmes **3DEXPERIENCE®** platform applications can be part of an integrated Extended Collaboration process, bringing together all project design and delivery elements for a productive workflow.

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EXECUTIVE OVERVIEW

The prevalence of waste and rework in the Design & Construction industry are symptoms of ineffective practices and fragmented data. As a result, the industry suffers from poor productivity, high risk, and low profitability.

Building Information Modeling (BIM) has started to expand the opportunities for project contributors to collaborate and use technology to improve efficiencies. More and more benefits are gained with each BIM Level of Maturity (Level 0 to 3). The most advanced state, **BIM Level 3**, is achieved when building data is fully “transactable” across project contributors, not locked in proprietary systems.

BIM Level 3 is required for **Extended Collaboration**, an end-to-end cooperative process designed to improve efficiency and reduce waste for designers, builders, and operators.

As a significant portion of most nations’ gross domestic product (GDP), the Construction industry has much to gain by applying lessons from more efficient manufacturing practices. In **Manufacturing industries**, Product Lifecycle Management (PLM) systems have been refined for decades, enabling Extended Collaboration principles to systematically reduce cost, improve sustainability, and maximize value.

Dassault Systèmes **3DEXPERIENCE** platform is widely adopted in Aerospace & Defense, Industrial Equipment, Automotive, and many other Manufacturing industries. The **3DEXPERIENCE** platform offers world-class **PLM applications** designed to unlock the value of BIM.

BIM data combined with PLM capabilities and processes create “**Building Lifecycle Management**” (BLM), which can increase construction predictability, long-term value for project owners, and profitability for project contributors. BLM solutions on the **3DEXPERIENCE** platform help enhance collaboration and outcomes for the Architecture, Engineering & Construction industry.

As a world leader in collaborative 3D technology, Dassault Systèmes advocates a universal understanding of BIM, BIM Levels, Extended Collaboration, and PLM principles to help reduce waste and costs, improve sustainability, and realize more value from construction processes.

MATURATION OF THE DESIGN & CONSTRUCTION INDUSTRY: BIM LEVELS AND COLLABORATION METHODS

Architecture, Engineering & Construction companies are under great pressure to build faster, create less waste, improve quality, and comply with environmental regulations. These conditions are forcing a change in the way the industry operates.

Industrialization of Construction

With traditional construction processes, projects are often over budget and behind schedule. “Industrialized construction” uses improved planning and data-driven simulation to move construction of structural elements off the job site, which lowers the chances that the countless complex interactions in the construction process will collide at the point of final assembly. This shift in construction delivery processes affords better quality control, optimized operations, lower labor costs, and greater safety.

Industrialization techniques have been common in Manufacturing industries for decades, but applying the concepts to the Design & Construction industry has the promise to be revolutionary.

Building Information Modeling (BIM)

BIM has been the Design & Construction industry’s answer to improve the flow of data through the building process, and, therefore, help to create efficiencies. Industrialized practices work well when design information is structured appropriately for downstream application by builders, fabricators, and operators. BIM data standards have been gradually maturing to meet this purpose.

Building owners and operators are driving the industry to achieve higher levels of BIM maturity by demanding process improvements and technological innovations that reduce costs, increase value from suppliers, and increase sustainability.

Definitions of Key Acronyms

BIM = Building Information Modeling

BLM = Building Lifecycle Management

DMU = Digital Mock-Up

PLM = Product Lifecycle Management

AN UPDATED BUILDING INFORMATION MODELING (BIM) MATURITY MODEL FROM COMPUTER-AIDED DESIGN TO BUILDING LIFECYCLE MANAGEMENT

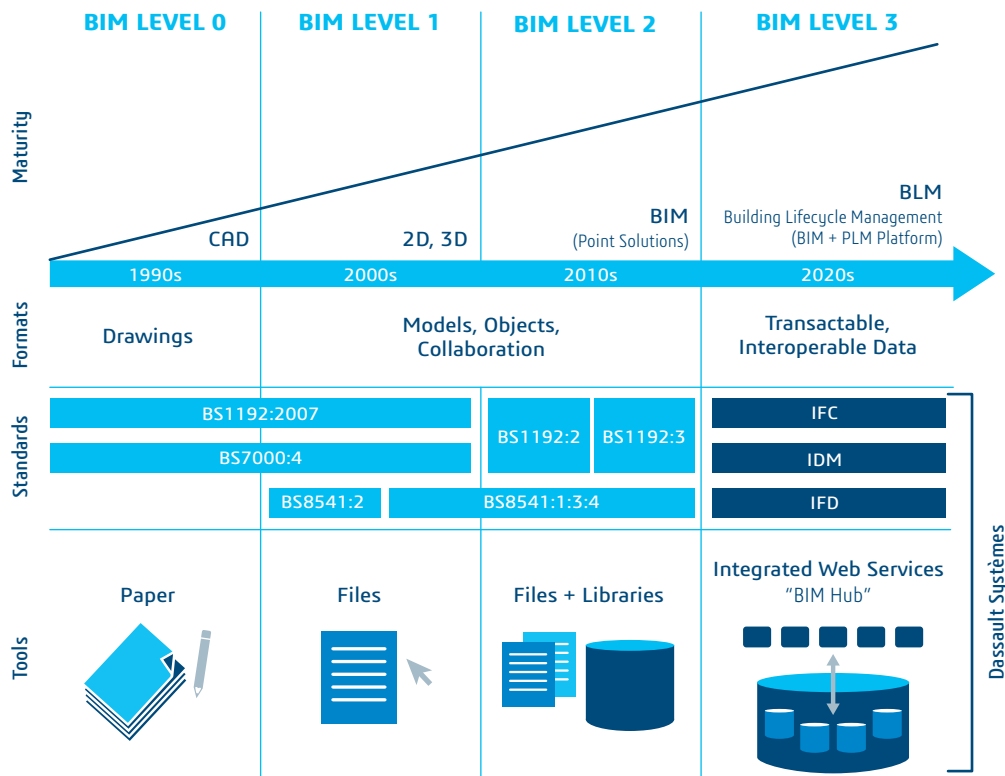


Figure 1
The BIM Maturity Model by Mark Bew and Mervyn Richards adapted to reflect BLM's relationship to Level 3.

Much of the industry is now moving from BIM Level 1 to Level 2, thanks in part to a directive by the U.K. government to adopt BIM practices by 2016. While some companies are trying to find efficiencies with BIM Level 2 processes, traditional workflows, and point solutions, industry innovators are rethinking collaboration and leveraging integrated BIM Level 3 technologies to become more competitive.

Construction teams that successfully adopt BIM Level 3 processes benefit from strategic advantages: they create less waste, deliver in less time, and produce a better outcome while retaining a healthy profit margin.

BIM Level 2 vs. Level 3

In 2013, the U.K. government mandated that all government projects utilize BIM Level 2 by 2016 in order to reduce information ambiguity. While BIM Level 2 has indeed brought significant benefits to architects, Level 2 tools tend to focus on *design coordination* problems, and do not maintain much of a role in *construction processes*.

Models produced using Level 2 point solutions are ultimately exported and imported into disconnected systems. **This handoff can create unintended consequences:** data silos, errors, version control problems, and rework. Data produced by the design team at the beginning of the project does not flow seamlessly through to the rest of the project delivery. Architects ultimately miss the opportunity to adjust for means and methods,¹ lose control of their design intent, and are pulled into a reactive process of responding to Requests for Information (RFIs).

Under Level 2, with no integrated system to leverage BIM data, builders and suppliers are removed from fully collaborating on the model and are left to absorb the cost of rework.

BIM Level 3 is the only approach that fully connects the data chain from start to finish, helping to create end-to-end efficiencies. In a Level 3 system, BIM data is not converted into files and emailed or sent via FTP sites to various parties. A Single Source of Truth is established, stored

[Jump to page 7 to learn more about BLM.](#)

¹ Means and methods are often thought to contain hidden legal dangers for architects. As a result, design teams may be wary of working closely with builders and systems manufacturers. Any legal objections are neutralized when cross-team collaboration is formalized and traceable in a closed system.

in a database on the cloud, and accessible by all project contributors through web services.² BIM Level 3 allows data to be transactable for construction, fabrication, and even facility management purposes, enabling open collaboration and building lifecycle management.

A robust Product Lifecycle Management³ (PLM) system creates an efficient environment for coordinating complex Architecture, Engineering & Construction data. **Adding BIM data to a PLM system creates a Building Lifecycle Management (BLM) system, which enables BIM Level 3.**

BIM + PLM = BLM

Status Quo: Siloed Collaboration with BIM Level 2

Construction project contributors can be categorized into teams:

- Design Team: Architects, engineers, and special consultants
- Supply Team: Building product manufacturers, fabricators, and suppliers
- Construction Team: General contractors, sub-contractors, and trades
- Operations Team: Owners, operators, and facility managers

Feedback loops, task management, design coordination, and other limited collaborative elements certainly exist *within* each team; however, the ambiguity, rework, and RFIs that persist between teams are symptomatic of broken collaboration across the extended project delivery team.

Research by the U.K. Construction Industry Council indicates the benefits sought by owners—reduced costs, increased value, increased sustainability—are not achievable by BIM Level 2 only. The inherent handoffs and rework processes prevent integration among the teams and lock value within silos.

TRADITIONAL DESIGN, CONSTRUCTION, AND OPERATIONS PROCESS BIM LEVEL 2 BENEFITS ARE LOCKED IN SILOS

- No Data Integration
- No Document Continuity
- No Process Simulation

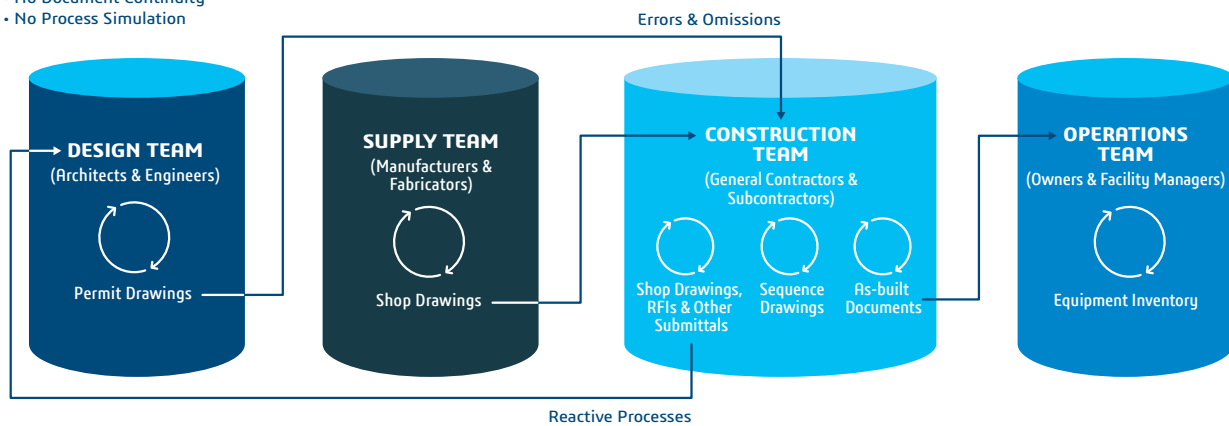


Figure 2
Collaboration on documentation and deliverables exists within each silo, but a lack of collaboration between teams causes errors, rework, RFIs, and inefficiencies.

Siloed Collaboration: Weaknesses of a Broken Process

In a BIM Level 2 framework, construction projects suffer from a **lack of data integration, disconnected documents, and insufficient data for process simulation**—three root causes of unforeseen project delivery issues.

² The Industry Foundation Classes (IFC) data model enables this interoperability.

³ The traditional Product Lifecycle Management term commonly becomes Project Lifecycle Management when applied to Architecture, Engineering & Construction.

No Data Integration

Siloed collaborative approaches require data to be exported and files to be exchanged. Exchanging files is an inadequate solution, creating massive version control problems as multiple parties provide key data at various points in the process.

Because there is not a Single Source of Truth mechanism, contributors are missing meaningful, contextualized data that would help them make better decisions. Architects make decisions based on design intent, but are missing construction and manufacturing data that could impact the end result. Contractors receive incomplete, ambiguous design information that causes RFIs and change orders.

No Document Continuity

The design team creates permit drawings. The systems manufacturers and fabricators then redesign the drawings for their own purposes. The construction team, in turn, creates sequence documents based on top-down estimates, and spends significant resources processing RFIs, submittals, and change orders.

Permit Drawings ≠ Shop Drawings ≠ Sequence Drawings

The differences between the drawings required at various stages in the process create vast productivity challenges. Ultimately, the project delivery process resolves most document inconsistencies, but by then the changes are costly and disruptive.

No Process Simulation

An animated 3D model (also known as a 4D model) is an insufficient imitation of how a project is built. Process-based means and methods cannot be represented accurately without adequate process information and integrated design data.

Most of the considerable waste that occurs during a construction project happens within the project delivery phase, when steep material and labor costs are incurred. Without a bottom-up simulation process to predict points of conflict and sub-optimal work sequences, a project team is making an educated guess at how the building will come together.

The inherent limitations of the siloed collaboration model that persists with BIM Level 2 are preventing the industry from moving forward.

Barriers to Effective Collaboration

Change is difficult, and a number of obstacles have stood in the way of the industry evolving its practice of collaboration.

Definitions

Each team has traditionally defined “collaboration” differently, focusing on its individual need:

- The Design Team tends to think of collaboration as working on a single BIM model.
- The Supply Team tends to think of collaboration as a review of shop drawings or other supplier-produced documents.
- The Construction Team tends to think of collaboration as using a structured project management system.

Legal Implications

Contractual relationships and interactions between parties can create indemnity insurance issues. Insurance objections and legal concerns are occasionally raised when parties are unfamiliar with modern collaboration technologies. Reliable governance and traceable workflows create accountability and mitigate legal risks.

Point Solutions

Standard industry tools facilitate coordination *within* each team, but unfortunately, not effectively across teams. End-to-end collaboration is made impractical with a patchwork of proprietary systems, causing version control problems and opportunities for human error.

Point solution providers position BIM Level 2 tools as collaborative, despite the evidence that they offer limited collaboration support for project contributors outside their application suite.

These challenges—varying definitions of collaboration, presumed legal implications, and insufficient point solutions—contribute to the difficulty of inter-team cooperation, reinforce silos, and cause massive inefficiencies.

ADAPTING MANUFACTURING INDUSTRY BEST PRACTICES FOR DESIGN & CONSTRUCTION

Extended Collaboration Enabled by BIM Level 3

An Extended Collaboration model synchronizes productive interactions between designers, suppliers, and builders. Extended Collaboration proactively addresses errors and omissions, reduces rework, enables predictive process simulations to reduce risk, resolves issues in real-time to drastically reduce RFIs, and improves quality and safety.

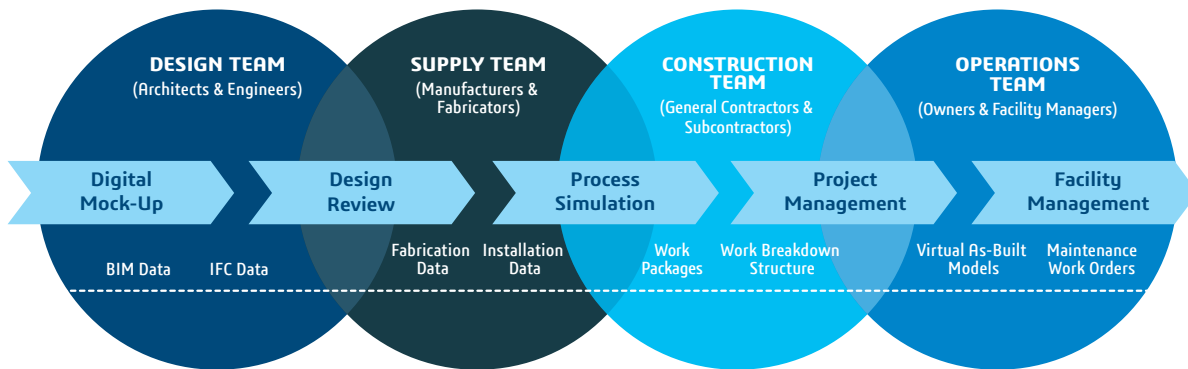
Extended Collaboration improves project outcomes.

Innovative projects delivered by industry-leading design and construction teams have shown that collaboratively planning a building's structural, façade, HVAC, electric, and interior systems can provide significant productivity gains over siloed processes, which depend on RFIs to reconcile issues. A full-spectrum collaborative workflow ties all parties together (owners, designers, contractors, suppliers), such that each discipline can provide relevant data in the context of other disciplines' data.

Extended Collaboration in design, construction, and operations is made possible by BIM Level 3, where liberated data is transactable among authorized project contributors during each design, construction, and operations phase.

BIM Level 3 creates an environment where Extended Collaboration is possible.

EXTENDED COLLABORATION MODEL FOR DESIGN, CONSTRUCTION, AND OPERATIONS BIM LEVEL 3 BENEFITS ARE REALIZED THROUGHOUT THE BUILDING LIFECYCLE



The following processes make up the Extended Collaboration model, based on proven Manufacturing industry best practices:

Digital Mock-Up

More than: 3D Models, BIM Models

Contributors: Owner, Design Team

The Digital Mock-Up (DMU) process takes a data-rich, model-based approach and produces a representation of all systems within a building. A DMU sets the stage for a clear manufacturing context in which the team can make better design decisions based on the overall project.

Figure 3

High performance teams apply efficient processes proven in Manufacturing industries, leveraging integrated data to support the entire building lifecycle.

Design Review

More than: Shop Drawing Review

Contributors: Design Team, Supply Team

In a Design Review, parties use the DMU to compare detailed, coordinated BIM data on a single platform. For example, a BIM model from the architect, a BIM model from the structural fabricator, a piping model from the systems designer, and so on, are checked to ensure they fit together. This is an integrated system review that is more than a shop drawing review.

The most complicated systems—those that tend to cause errors—are coordinated using Design Review at the beginning of an Extended Collaboration process and continuously resolved throughout. This approach reduces the number of issues that must be formally clarified by RFIs and submittals during project delivery.

Design Review is an iterative process and establishes a Single Source of Truth as the baseline for comparing and managing changes across multidisciplinary teams.

Process Simulation

More than: 4D Animations, Top-down Schedules

Contributors: Supply Team, Construction Team

Construction is a process. Much of what happens in construction happens *around* the building itself, for example, logistics, equipment, crew optimization, truck queuing, etc. Process Simulation enables project teams to make knowledgeable construction means and methods decisions, and helps produce an optimized work breakdown for construction.

Such bottom-up simulations can reveal even minor integration errors, illustrate which processes are the most cost- and time-effective, demonstrate how prefabrication will affect a project, and generate highly accurate sequence data.

Project Management

More than: Scheduling, Project Coordination, Document Management

Contributors: Construction Team, Operations Team

In the Project Management phase, the DMU containing the source BIM data is tied to resources, tasks, issues, and documentation needed to complete the project. More than just scheduling and site coordination, Project Management synchronizes BIM data with Enterprise Resource Planning (ERP) systems to accurately monitor the project status versus the detailed plan, issue invoices based on milestones, track labor costs, and manage purchased materials.

The current, as-built data model used to deliver the facility is shared with the Operations team.

Facility Management

More than: Operations Manuals, Equipment Lists, As-Built Drawings

Contributors: Operations Team

Facility managers and owners benefit from having a virtual building for streamlining maintenance and operations. BIM data is synchronized with facility management systems to create a living data set with a history.

The integration helps ensure that equipment is maintained and operated for maximum energy efficiency and optimal performance, to reduce time spent searching for key facility information, and to simulate scenarios for facility reuse and alterations (moves, adds, and changes). Compounding, long-term benefits of BLM-enabled processes are often reaped in the Facility Management stage.

When BIM data is unlocked from a proprietary system, it becomes available for use in the five Extended Collaboration processes: Digital Mock-Up, Design Review, Process Simulation, Project Management, and Facility Management.

A BLM system (using BIM data within a PLM system) manages information and formalizes Extended Collaboration with built-in governance, traceability, electronic approvals, and version control, holding all parties accountable.

Collaboration in Manufacturing

Dassault Systèmes PLM technologies have enabled Extended Collaboration processes for decades in highly efficient Manufacturing industries, such as Aerospace, Automotive, and Consumer Packaged Goods.

Jump to page 8 for a DMU example in Aerospace.

Collaboration Styles

Unstructured collaboration is common during design iterations and is useful in collecting feedback early in the building process. It tends to be open, informal, and organic.

Structured collaboration is often more formal, employing project governance systems and electronic approval controls. It is typically utilized in phases of a project when financial stakes are higher.

Both structured and unstructured styles of collaboration can be formalized through a BLM system and support an effective Extended Collaboration process.

OUTCOMES OF A BUILDING LIFECYCLE MANAGEMENT SYSTEM

To realize the benefits of BIM Level 3 and Extended Collaboration, industry leaders are embracing Building Lifecycle Management (BLM).

Benefits of BLM

The core benefits of employing BLM are improved productivity, sustainability, and quality, and reduced waste, risk, and cost. These advantages are achieved through BLM's ability to eliminate rework, reduce RFIs, centralize data, contextualize information, and more accurately predict outcomes.

Improve Productivity

Centrally managed data helps remove **version control** issues, chances for **human error**, and even the need to manage files. With all users accessing a single live database via web services, **rework** (e.g., redundant drawings) and **iterations can be** drastically reduced.

As users proactively resolve issues in real-time using a BLM system, inefficient **RFIs**, **submittals**, and **change orders** can be reduced or eliminated.

Increase Quality and Value from Suppliers

Designers can make **better decisions** within a richer data context and maintain **greater control** over the quality of the finished product with BLM.

Collaborating in a BLM environment can help construction firms and building systems manufacturers develop a greater understanding of project requirements. With reliable data, builders and suppliers can improve coordination, execute more quickly, and accurately realize the design intent.

BLM also offers built-in governance and traceability, improving **accountability** across the disciplines.

Reduce Waste, Risk, and Cost

Regular cost overruns of 15 to 30 percent and standard risk margins of 20 percent or more illustrate the expected waste caused by traditional construction processes. By contrast, repetitive manufacturing processes typically yield only 2 to 3 percent waste.

BLM is designed to reduce waste by more accurately predicting **outcomes**, identifying potential **points of conflict**, and optimizing **processes**.

By the same methods, BLM also reduces risk to the project schedule, worker safety, and overall construction budget.

Gain a Competitive Advantage

The potential opportunity for Architecture, Engineering & Construction firms to gain a competitive advantage is to embrace BIM Level 3 early, before the market calls for further mandates.

Getting ahead of the curve with a BLM system enables a team to become more efficient than competitors, deliver higher quality, gain the loyalties of owners and design partners, and retain a healthier profit margin.

Example: Manufactured Systems

Manufactured systems such as curtain walls and façades are often the most complicated and costly elements of a construction project. The façade often accounts for 15 percent of a construction budget.

Façade models traditionally do not include data on the fabrication process, but manufacturing time can be reduced significantly—by up to 50 percent—if the fabrication process is defined in the design stage. Close collaboration between the designer and the façade manufacturer is enabled with transactable BIM data and a BLM system.

When designers work with building product manufacturers to ensure the design intent is realized and improve supply chain efficiency, the entire project benefits.

Transactable BIM Data on a World-Class PLM System

Dassault Systèmes Industry Solution Experiences for Building Lifecycle Management makes BIM data transactable on a world-class PLM system.

Jump to page 9 to learn about **3DEXPERIENCE** features and functionalities.

No Need to Abandon Current Tools

3DEXPERIENCE platform applications work with native data from a range of vendors.

Jump to page 10 to learn about information federated in a Common Data Environment.

Learn more about Façade Design for Fabrication from Dassault Systèmes, a purpose-built Industry Solution Experience for the façade design process: www.3ds.com/aec

Example: Identifying Conflicts Between Fabrication Models

During the Design Review process, modeled fabrication detail of a structure designed in CATIA® is imported and integrated with a pipe model created in a different system. BIM data from a range of systems are reconciled within the BLM environment, where issues are identified and tagged for follow-up.

FABRICATION MODELS OF MULTIPLE BUILDING SYSTEMS IN A SINGLE ENVIRONMENT

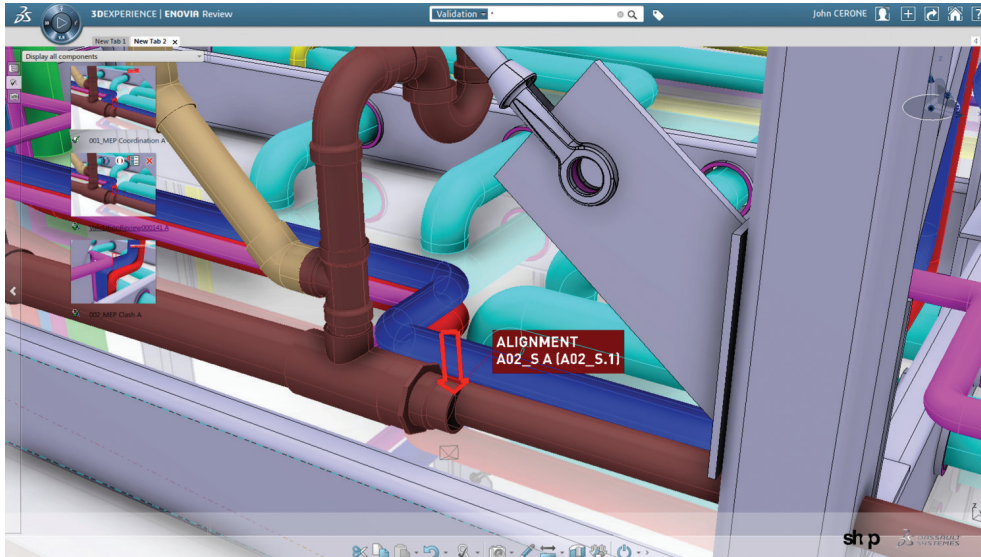
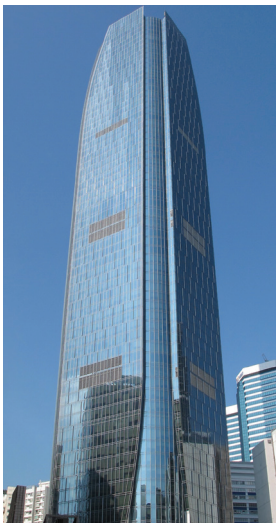


Figure 4
Image courtesy of
SHoP Construction.

Case Study: Swire Properties One Island East Success Story



Swire Properties Ltd. applied BIM Level 3 processes and technologies for its One Island East tower in Hong Kong. The 70-story, 1.75 million square foot project was delivered on time and with zero cost overruns.

3D clash detection became a primary vehicle for enhancing the coordination process. Over 2,000 issues were identified and resolved prior to tender, but the One Island East project team issued just 140 RFIs, a 93 percent reduction from traditional 2D drafting processes.

This project won the 2008 AIA Technology and Practice Award.

BIM Level 3 Project Outcomes

- 70 stories
- 1.75 million sq ft
- On schedule: 24 months
- On budget: \$450 million
- Greater than 2,000 clash issues proactively addressed
- 140 RFIs: Greater than 90 percent reduction vs. similar projects

Figure 5
One Island East, Hong Kong
Wikimedia Commons image
courtesy of WiNG.

Manufacturing Industries Have Blazed the Trail

Manufacturing companies and their technology partners have been refining PLM for decades, and investing heavily in advanced systems. Case in point, the first plane ever built without a physical prototype, the Boeing 777, was mocked up using a Dassault Systèmes application in 1994.

With today's BIM data standards, proven PLM practices and technologies are now readily available for Architecture, Engineering & Construction to leverage—in the form of BLM.

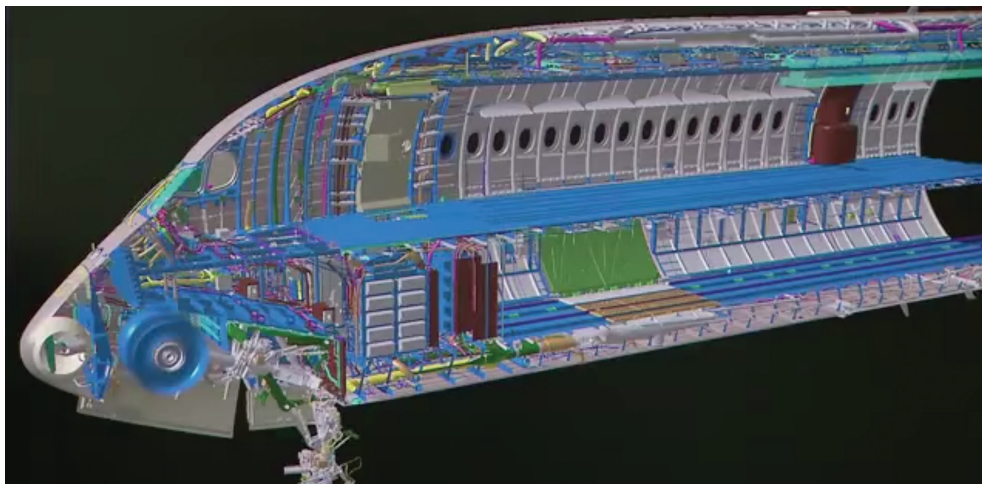


Figure 6
Digital Mock-Up
Process at Airbus.

Airbus and its partners collaborate around a virtual model of an airplane. The model provides a Single Version of the Truth for 3D information and all data related to the designed airplane and its usage throughout its lifecycle. Watch the video: youtu.be/WBbA9uKP-mA

Unfounded Insurance Concerns

Most objections to a collaboration platform that enables the open exchange of data within the Design & Construction industry are due to a fear of litigation or increased cost of insurance.

In fact, traceability is a primary feature of a BLM system. All outcomes can be traced back to causes. A BLM system offers even more transparency and accountability than the accepted BIM Level 2 practices of exporting, transferring, and versioning the source data.

ARCHITECTURE, ENGINEERING & CONSTRUCTION SOLUTIONS ON THE 3DEXPERIENCE PLATFORM

Dassault Systèmes **3DEXPERIENCE** platform is a BUSINESS EXPERIENCE PLATFORM. It provides software solutions for every organization in a company to help create value and differentiating consumer experiences. With a single, easy-to-use interface, it powers INDUSTRY SOLUTION EXPERIENCES—based on 3D design, analysis, simulation, and intelligence software in a new class of collaborative, interactive environment. It is available on premise and on a public or private cloud.

The **3DEXPERIENCE** platform with Industry Solution Experiences for Architecture, Engineering & Construction is the preeminent Building Lifecycle Management system to help foster BIM Level 3, unlock the value of BIM data, and enable highly efficient, collaborative design and construction processes.

3DEXPERIENCE FEATURE SET

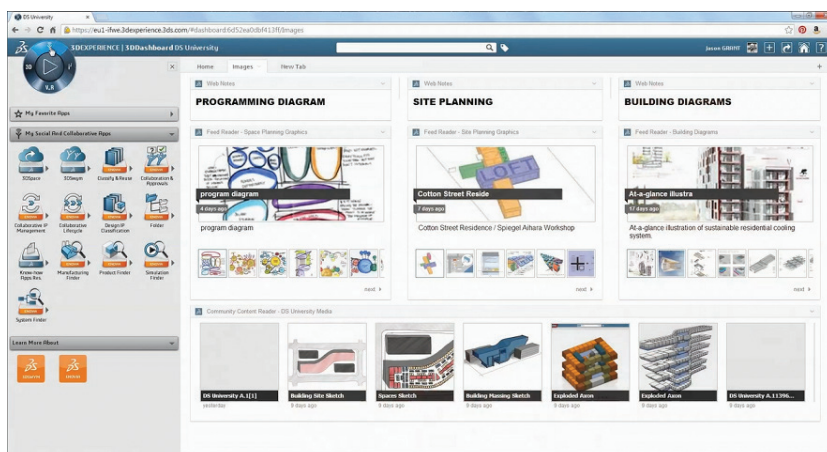


Figure 7
The **3DEXPERIENCE**
platform dashboard.

Full Visibility of Actual Data Across the Building Lifecycle

- Automates the control of increasing levels of data across the lifecycle of the asset
- Allows current data to be seen in context of the entire project, even through facility management and operations

Federated Data Using Standard Protocols, Common Data Environment

- Handles and integrates native data from different sources, e.g., Autodesk® (Revit®, Inventor®, AutoCAD®), Bentley®, Dassault Systèmes® (CATIA®, SOLIDWORKS®), Rhinoceros®, Tekla®, etc.
- Converts BIM data via IFC; Reads/writes IFC to a database in a cloud, accessible through web services
- Centralizes data in a Common Data Environment (CDE), offering a Single Source of Truth
- Supports the BIM protocol of “Work in Progress > Share > Publish > Record” processes

Versioning of Data

- Displays only the latest version of data
- Previous versions are available to view, if required, to understand changes
- Removes the need for file transfer or management systems

Change Management

- Tracks and controls changes in any part of the building lifecycle
- Ensures every project stakeholder and contributor is included and consulted

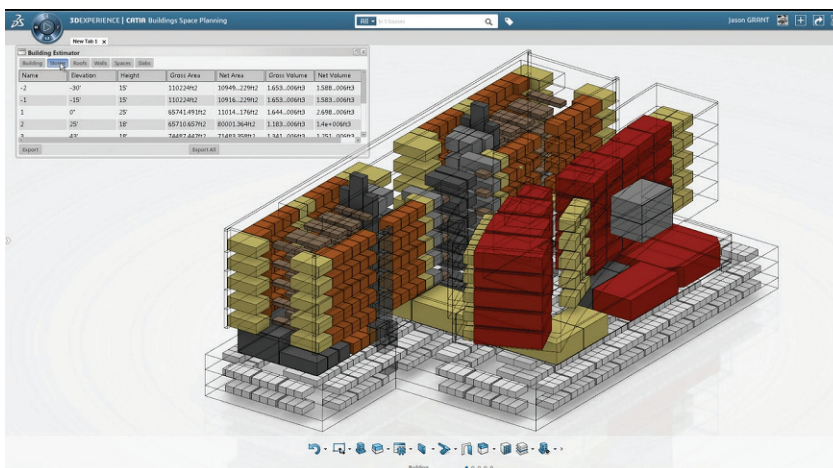


Figure 8
Evaluating building requirements and project costs with 3DEXPERIENCE platform applications.

Plan of Work, Collaboration Process Map

- Integrates and supports the recognized Plans of Work (PoW) and Royal Institute of British Architects (RIBA) stages, with built-in client decision points
- Ensures the completeness of data drops by using integrated approval and workflow processes

Standard BIM Templates

- Creates and stores standard templates required for BIM process, e.g., Prequalification Questionnaire and Model Production and Delivery Table (MPDT)

Extended Collaboration

- Enables seamless collaboration between owners, architects, engineers, building product manufacturers, fabricators, general contractors, subcontractors, and facility managers via portal technology
- Supports data integration for end-to-end information flow

User-Based Permissions and Role-Specific Access

- Restricts access to authorized, defined users based on role within or outside the organization for any type of data, to protect company-specific Intellectual Property (IP)
- Manages which users are permitted to take what actions within the system

Full Traceability

- Holds a fully traceable record in the CDE of exactly who has done what, when, and why

Compliance

- Makes compliance possible with local standards such as COBie and PAS1192

Performance Management

- Reports on productivity, profit margin, and KPIs vs. baselines, past projects, or industry averages
- Provides an online business dashboard

Universal Access on the Cloud

- Operates seamlessly and intuitively via a web browser
- Enables real-time collaboration among participants

Open Standards

- Allows continued use of existing vendors and data assets
- Enables future flexibility and data portability

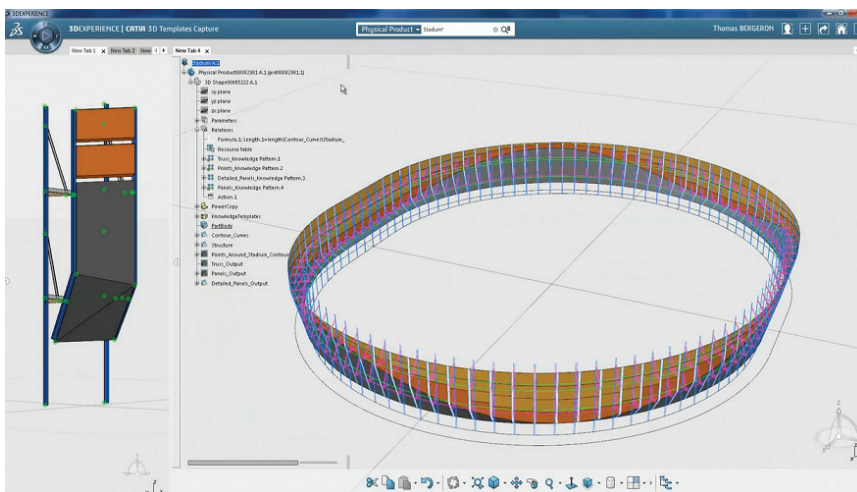


Figure 9
A façade design in progress using **3DEXPERIENCE** platform applications.

IMPLEMENTING A BLM SYSTEM TO ACHIEVE BIM LEVEL 3

Now that the Design & Construction industry has embraced 3D and BIM data, it is ready to transform the way people collaborate on projects. A BLM system connects supply chain participants, supports the construction process, and solves deep-rooted productivity problems.

To fix a problem, change the process.

Measured Implementation

Migrating from BIM Level 2 to Level 3 is most successful as a deliberately paced progression. An organization cannot expect to adopt a full BLM system in a single pass, which would cause a painful disruption and loss of productivity.

An assessment of the level of maturity of an organization's BIM adoption will set a baseline. One new process (e.g., Digital Mock-Up) can be introduced and honed, and the extended project team can then gradually adopt increasingly advanced processes.

BLM can enable Extended Collaboration, enhanced Process Simulation, and other BIM Level 3 processes, but will not replace all systems. Therefore, an organization can and should leverage what it has already implemented. Existing investments in solutions such as project management tools should not be tossed aside.

Customer-Driven Deployment

There is no single implementation formula that fits all firms. Each unique BLM deployment should be driven by the organization's priorities. The Dassault Systèmes approach is to perform an initial Value Assessment to establish the resources required and predict the expected ROI of an implementation.

Each initiative consists of two parts: technology and training.

Technology hardware and software may range in scope based on organizational requirements. A "light" implementation may be hosted on a public or private cloud, or dedicated hardware may be implemented on premise.

Training may involve bringing process and technology experts on site to work alongside staff, facilitate workshops, and ensure the understanding and skillful adoption of new workflows.

Case Study: SHoP Construction's Implementation Path

SHoP Construction (SC) is a renowned detailing, engineering, and construction services firm based in New York City. SC selected Dassault Systèmes technology to enable BIM Level 3 in the following stages:

2011–2012: SC developed a Level 400 workflow using CATIA v5 for the Barclays Center, simulating delivery and installation processes.

2013: **3DEXPERIENCE** on the Cloud was implemented for design-manufacturing collaboration on the 87 Dikeman project.

2014: SC adopted deliverables-based program management to control processes and milestones.

2015: Implementation of advanced Process Simulation using DELMIA® is underway.

With each project, SC takes the opportunity to improve its processes and test supporting technologies.



SC

Contact us for a consultation. Our experts can help you design the most effective BIM Level 3 deployment strategy for your organization.

www.3ds.com/how-to-buy/contact-sales

Figure 10
Image courtesy of
SHoP Construction.

ABOUT DASSAULT SYSTÈMES

Transactable BIM data on a world-class PLM system:
Building Lifecycle Management powered by the **3DEXPERIENCE** platform

Dassault Systèmes, the **3DEXPERIENCE** Company, is the world leader in 3D Design, Digital Mock-Up (3D-DMU), and Product Lifecycle Management (3D-PLM).

Dassault Systèmes **3DEXPERIENCE** platform offers robust PLM applications that leverage BIM data for the Architecture, Engineering & Construction industry. Cloud solutions and process implementation support are also available.

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