

Class ID: AS500850

## **ACC & Forge, our CDE backbone that integrates the hospital Data Management**

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### **Learning Objectives**

1. Implement a comprehensive common data environment (CDE)
2. Democratize access and production data for all project stakeholders while controlling data editing
3. Track the data life cycle during the Plan, Design, Build and Operational phases
4. Automate the Room sheets deliverables

### **Description**

This class will demonstrate the implementation of a powerful common data environment-using Autodesk Construction Cloud and BIM 360 platforms combined with an application developed in Autodesk Forge-for the management of hospital project data. The Grand Paris North Hospital project is intended to be the largest hospital in Paris, France, and was designed by Renzo Piano Building Workshop and Brunet Saunier Architecture. We'll use this project to explain the implementation of data workflows in order to build optimized circuits that involve all project stakeholders, planners, the owner, users, architects, and all the engineers' firms with Autodesk BIM Collaborate Pro and Autodesk Docs (design collaboration, model coordination, and issues management). More than 100 people! We'll show how a connected Autodesk Forge application will collect data from Autodesk Construction Cloud in order to push automation processes in data analysis and deliverables creation. We'll do a live demonstration of this real Autodesk Forge-based BIM data checker enabling data processes throughout the project lifecycle, from plan to operation.

## Speakers

### **Jacques Levy-Bencheton**

Architect partner / BIM Manager, BRUNET SAUNIER ARCHITECTURE

Jacques LEVY-BENCHETON is an Architect partner and BIM manager at Brunet Saunier Architecture practice. I joined Brunet Saunier Architecture practice in 1992. I'm in charge of implementation of new technologies and especially the development of BIM processes. I'm involved in a few European BIM organizations - among them: the European Architecture Executive Council led by Autodesk and comprising of some famous Architectural Practices in Europe. I have implemented digital models and BIM processes since 2005 in our firm. All our projects are studied and modelled in digital models and most of them are following a full BIM Process. On our two last hospital projects, we are working in coordination with the owners in order to prepare both the data base of their project and the as built digital models for the maintenance and facility management.

### **Mathieu Lalanne**

Mathieu LALANNE is the CEO of DB-Lab, a French company, certified Autodesk Forge integrator and Autodesk Service Provider, a renowned French player in the development of web-based solutions for BIM processes through customized solutions integrating Forge and DABOX, a Common Data Environment. Mathieu LALANNE is a French architect, specialist in 3D visualization and web development for BIM collaboration. After working as a 3D design and visualization specialist in an engineering office, and within his own architectural firm, Mathieu developed his first web application in 2015, the first version of DABOX, a web platform for BIM collaboration with the integration of Forge in its Beta version. Since 2017, Mathieu implements its expertise and know-how in data management and digital asset associated with all AEC project management skills to create own solutions to support the challenges of BIM managers, architects, engineers, construction companies.

### **Julien Drouet**

Sr. Technical Solutions Executive, Autodesk

## Implement a comprehensive common data environment

The purpose of the first learning objective is both to explain why implement a common Data environment and to showcase the development, so far of our own Common Data Environment (CDE) in accordance with our BIM approach.

### Question

What is the weakest point for a BIM Manager during the studies and construction of a building?

### Answer

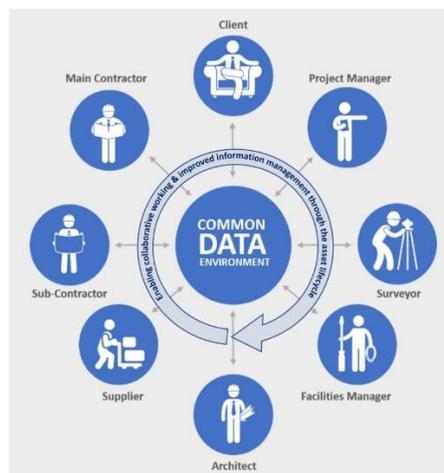
Without any doubts, the weakest point is communication.

### Solution

The best way to address the communication issues is to adopt a Common Data Environment.

### What is the CDE?

- A central repository where life cycle project information is housed.
- The support of all the tools needed to implement efficiently the project's workflows.
- It is not limited to Digital Models created in a BIM environment.



Ref: Stefan Mordue AECOM UK Limited

### Why a CDE?

Avoid: Errors, Redundancy, Rework, missed deadlines, Cost overruns, Litigation

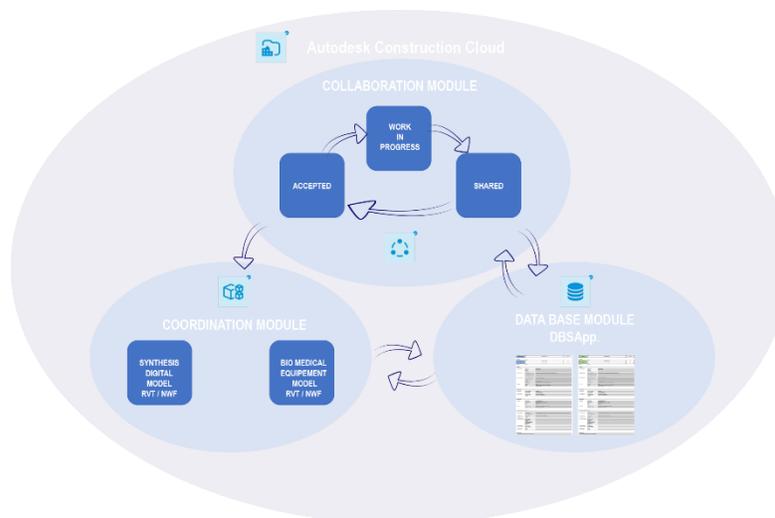
Increase: Quality, Control

## What advantages do I get using a CDE?

- Shared information should result in coordinated data which will, in turn, reduce both time and costs on your project.
- Project team members can all use the CDE to generate the documents or views they need, confident that they are using the latest assets.
- Spatial coordination is inherent in the idea of using a centralized model.
- Production information should be right first time assuming that contributors adhere to processes for sharing information...

## Brunet Saunier Architecture Common Data Environment Purposes:

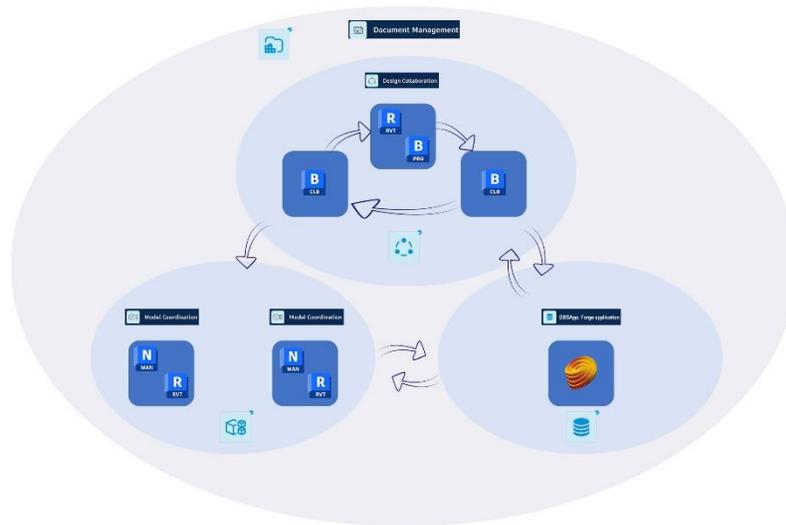
- Increase collaboration between 100 actors in Design Phase
- For :
  - BIM Models Production
  - Coordination and Issues management
  - Data management
- BSA CDE consists of three interconnected modules.
  - Collaboration
  - Coordination
  - Data Management



## BIM 360 / ACC

We have chosen BIM 360 and from now on Autodesk Construction Cloud to support our CDE. The main reason is to be availed of all the tools integrated to these Autodesk Platforms in order to achieve all the different workflows we need to perform during our project studies and construction.

The three modules based on BIM 360 allow the establishment of a virtuous circle allowing to close the loop of tasks to be carried out on our Common Data Environment for the realization of our hospital projects.



## Software and tools used on our Common data Environment.



Collaborate PRO  
Collaborate

Document management  
Design Collaboration  
Model Coordination

Revit  
Navisworks  
Forge

## Challenge

After widely deploying BIM for the realization of complex hospital projects and achieving the objectives of collaboration and coordination around the digital model, Jacques Lévy-Bencheon, partner, architect, and BIM Manager, at the French architecture firm of Brunet Saunier Architecture, sought to go further in the optimization of its processes and the quality of its projects.

This next step consists in questioning the value of the data according to the project phases and the expected deliverables, how to optimize its use.

The primary interest is identified early in the design phase. Hospitals are complex buildings, and the Brunet Saunier firm seeks to ensure that its customers' requirements are met in their projected designs.

In practice, a hospital project begins with the production of a multitude of requirements directly related to the quality of care and health services, in the programming phase. From the very beginning of the project, this information is translated into functional and technical programmatic elements. The program, provided by the client, details each space and all its characteristics. These hospitals contain an average of 7000 spaces, each space associated with about 150 parameters. This adds up to approximately 1 million pieces of data to be managed during the programming, design, construction, and operations phases, often simply stemming from an Excel file.

In view of the exponential amount of data produced and its evolution during the different phases of the project, data control is becoming a major factor. Ensuring its uniqueness, reliability and traceability is a prerequisite for optimizing processes during the design-build phases and its use in the operation and maintenance of buildings.

The construction of a data management system at the scale of a hospital complex represents a real opportunity for increased and facilitated collaboration between stakeholders while ensuring the much sought-after traceability of information throughout the life cycle of the buildings.

However, there are great challenges related to the management of this data, its production process must be facilitated (can it be managed outside the digital model?), its integrity validated and certified throughout to allow its sharing and reuse by all project stakeholders, the responsibilities being, of course, identified.

The agency has designed about a hundred hospitals, thirty of which have been built. The decision to build such a management system was made possible thanks to Brunet Saunier Architecture's expertise in data typologies and their production process. The approach adopted to make the project effective was not to think of a complete system from the outset, but to identify the first expected benefits in order to be able to initiate the process.

After having identified the data production tools (Excel, Revit) and a hosting platform (BIM360), the analysis was focused on data exchange between the program and project phases with the identification of a chain of responsibilities of the actors involved.

The study of the new Great Paris North University Hospital in Paris presented the perfect opportunity to initiate this approach, which is intended to be generalized to all hospital projects of the Brunet Saunier Architecture firm.



*HUSOGPN, Paris, France - Design by RPBW, BSA, INGEROP*



*Revit model – Collaborate PRO*

## **Project Goals**

The main challenge for Brunet Saunier Architecture is to guarantee the quality of its projects, one of the aspects of which is respecting, if not exceeding, the requirements formulated by the client. Automatically managing data at the programming and design phase of the project with direct access to results is a convincing way to prove the quality level, and value of the design.

The objectives of the Brunet Saunier Architecture agency can be appreciated on two levels, internally and externally.

On the internal level, the BSA agency seeks to optimize the production of its data with mass data processing and to automate the production of design deliverables such as the supply of data sheets for each room (6-sided sheets).

On the external level, the idea is to allow external partners, such as the client, or contractors, intervening during the design phase, to easily access this data, while integrating it into a reliable validation process.

Ultimately, the Brunet Saunier Architecture firm is committed to a process of transparency and responsibility with controlled management of BIM information in order to increase the excellence of its projects.

The improvement of the processes to achieve the described objectives requires the development of a solution that allows:

- Uniqueness of the data
- Data reliability
- Traceability of changes
- Commitment from each stakeholder of their responsibility

It is therefore a question of creating a database specific to the hospital field and exploiting this data by implementing functionalities that will strengthen the collaboration of the actors while allowing the automation of tasks.

The solution is deployed for program management and the design phase. The ambition is to ensure data integrity during the construction, and operation and maintenance phase of buildings in order to facilitate maintenance operations and improve the functioning of health and care services.

## Solutions

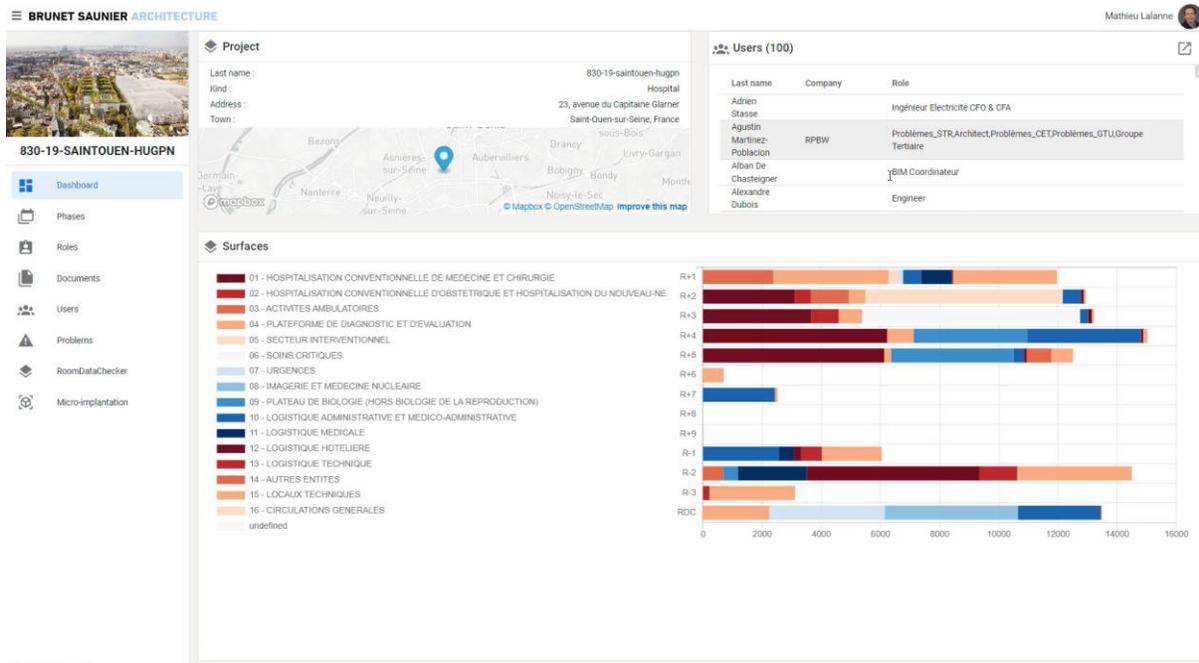
Brunet Saunier Architecture has been using Autodesk Revit for the production of its BIM models since 2005. Model coordination is managed through BIM Collaborate, with BIM Docs used for collaboration between all stakeholders, including model review.

BIM360 docs is therefore the platform for centralizing all project data.

Autodesk has largely anticipated future needs by making available to Forge developers a set of web services accessible via APIs that allow the visualization and processing of the data.

DB-Lab, Forge integrator certified by Autodesk and Service Provider, proposed to design, and implement a Brunet Saunier Architecture proprietary web platform connected to their BIM360 space.

The Data Management API, a service to access the data present on the Autodesk Construction Cloud platforms and the BIM360 API for access to project management data have been implemented. These APIs offer the ability to interact with data via queries from a third-party application and provide the opportunity to build your own business platform based on Autodesk Construction Cloud data servers.



Project Dashboard

This web platform is a common data environment specific to the management of hospital rooms data, with a data dictionary associated with a NoSQL database (MongoDB) to ensure the uniqueness and traceability of each rooms' data throughout their lifecycle.

The BSA web platform allows to communicate with the data present in BIM360 Docs and presents a tool, called RoomDataChecker, dedicated to room data management:

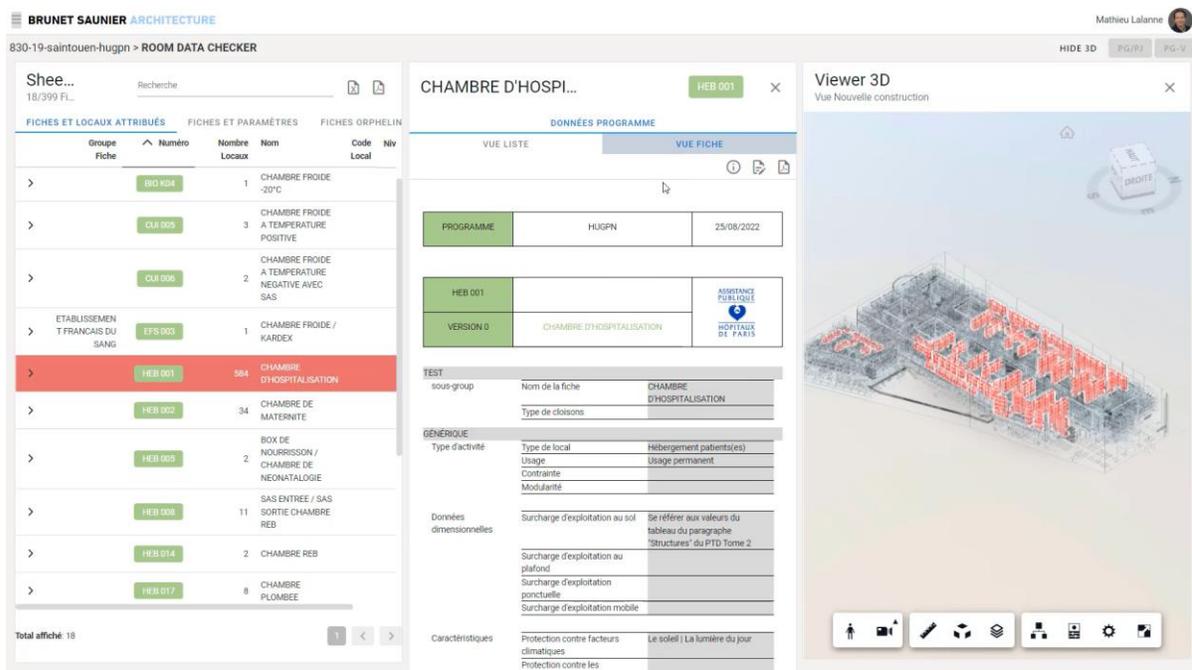
- Input data: direct import of rooms from Revit files (and Excel files in the future)
- Restructured data: spatial tree, rooms listings, areas compared, data compared, ...
- Output data: room sheets, Excel reports, PDF files, Re-import to Revit
- Templates/Customization of sheets

The key points of the development of this data checker are:

- Ensure traceability of the initial program
- Optimize parameter updates
- Manage and transfer access rights to user settings
- Ensure traceability of the modification
- Update numerical models with the latest database update in a bi-directional way
- Automate processes
- Ensuring the life cycle of data at the room level
- Ensuring intuitive visualization of room's data based on the 3D model

The data checker has four uses:

- The co-production of the data from the room sheet
- Automatic comparison of project data with program data
- The edition of the deliverable "room sheet" including the 3D view of the associated room
- Data reporting



**BRUNET SAUNIER ARCHITECTURE** Mathieu Lalanne

830-19-saintouen-huggn > ROOM DATA CHECKER

Shee... 18/399 FL... Recherche

FICHES ET LOCAUX ATTRIBUES FICHES ET PARAMETRES FICHES ORPHELIN

Groupe Fiche	Numero	Nombre Locaux	Nom	Code Local	Niv
HEB 004	1		CHAMBRE FROIDE -20°C		
CLU 005	3		CHAMBRE FROIDE A TEMPERATURE POSITIVE		
CLU 006	2		CHAMBRE FROIDE A TEMPERATURE NEGATIVE AVEC SAS		
ETABLISSEMENT FRANCAIS DU SANG					
EFIS 003	1		CHAMBRE FROIDE / KARDEX		
HEB 001	584		CHAMBRE D'HOSPITALISATION		
HEB 002	34		CHAMBRE DE MATERNITE		
HEB 005	2		BOX DE NOURRISSON / CHAMBRE DE NEONATOLOGIE		
HEB 008	11		SAS ENTREE / SAS SORTIE CHAMBRE REB		
HEB 014	2		CHAMBRE REB		
HEB 017	8		CHAMBRE PLOMBEE		

Total affiché: 18

**CHAMBRE D'HOSPITALISATION** HEB 001

DONNÉES PROGRAMME

VUE LISTE VUE FICHE

PROGRAMME	HUGPN	25/08/2022
HEB 001		ASSISTANCE PUBLIQUE
VERSION 0	CHAMBRE D'HOSPITALISATION	HÔPITAL DE PARIS

TEST

sous-group	Nom de la fiche	CHAMBRE D'HOSPITALISATION
	Type de cloisons	

GÉNÉRIQUE

Type d'activité	Type de local	Hébergement patient(s)
	Usage	Usage permanent
	Contrainte	
	Modularité	

Données dimensionnelles

Surcharge d'exploitation au sol	Se référer aux valeurs du tableau du paragraphe 'Structures' du PTD Tome 2
Surcharge d'exploitation au plafond	
Surcharge d'exploitation ponctuelle	
Surcharge d'exploitation mobile	

Caractéristiques

Protection contre facteurs climatiques	Le soleil / La lumière du jour
Protection contre les	

Viewer 3D

Vue Nouvelle construction

3D model of a hospital building with a red room highlighted.

## **Business outcomes**

The RoomDataChecker extends and reinforces the BIM processes already deployed by Brunet Saunier Architecture on hospital projects.

The Brunet Saunier Architecture web platform is an extension and a link to their BIM 360 space. Each contributor logs in from their Autodesk account, with rights and access previously specified in BIM360.

The qualitative contributions are:

- Easier access to data: the application allows intuitive visualization of the data of each room previously referenced without opening the model.
- The traceability of the information of each room
- Continuity of the data life cycle ensured by versioning
- Identification of responsibilities
- Ensuring that program requirements are met

The quantitative inputs targeted are:

- The control of the progress of information production from a dashboard
- Mass modification and validation of sample room data
- Automatic integration of information into the digital model
- Automatic editing of deliverables such as rooms' sheets

The time saving for data management is about 50%.

## **Conclusion**

The French Brunet Saunier Architecture agency, a pioneer in the deployment of BIM, has been able to increase its competitiveness and build large-scale hospitals throughout Europe.

Aware of the importance of data management and the technological changes to come, the Brunet Saunier Architecture agency sought a partner capable of supporting its ambitions and implementing the envisaged solutions. DB-Lab was chosen because of its ability to understand the needs of the Brunet Saunier Architecture agency and to explain the technological conditions for the realization of the solution, thanks to its technological expertise but also its in-depth knowledge of the construction sector and BIM processes.

The solution was built in stages with bimonthly reviews. The method consisted in identifying the development phases to allow the agency to carry out tests and suggest improvements as the platform was implemented.

This solution is the result of a committed, transparent collaboration that builds lasting trust between the partners.

The construction of a solid web platform dedicated to the data management of BIM projects, in the continuity of Autodesk solutions, makes it possible to consider future transformations, to demystify the complexity of hospitals by facilitating the management of information and to build buildings to meet the sensitive challenges of the health sector.