BOS, digital twin, IWMS: what are the differences? How to choose?

In the digital world applied to real estate, the concepts of **"BOS", "IWMS"** or **"digital twin"** are often used. These concepts sometimes overlap in communications, creating confusion about the use and functionality associated with these solutions.

A little decoding to help you see more clearly.

Origin and definition of concepts

The BOS

The BOS (Building Operating System) is a French concept introduced by the company Spinalcom in 2015. This concept is timidly emerging. It is used, for the moment, only in French-speaking Europe. In the Anglo-Saxon world, the terms "**Independent Data Layer**" or **"Integration Platform**" refer to the basic functionalities of a BOS.

A BOS is indeed an interoperability platform aimed at bringing together two worlds that have historically been very compartmentalized:

- **The world of building systems** (BMS[1], IoT, BMS1, etc.). These systems are linked to technical installations (e.g. heating, ventilation and air conditioning installations). They have their own integrators. Systems that control equipment are referred to generically as " operational **technology**" (**OT**). OT is very present in industry to operate production machines. In the world of construction, we speak more specifically of "**building automation system**" or "**building management system**" to refer to OT systems centralizing the control of building equipment. The development of IoT (Internet of Things) combined with the development of interoperability of building OT systems has given rise to the concept of **smart building**.
- **The world of information systems** (CMMS[2], IWMS, workplace experience applications, reservation systems, etc.). These systems are focused on sharing and managing information (rather than ordering equipment). They belong to the world of " **information technology** " (**IT**).

The BOS allows these two worlds, "IT" and "OT", to communicate: an alarm from the BMS can automatically generate an intervention request in a maintenance tool (CMMS or IWMS), or a "too hot" ticket initiated by an occupant can be automatically enriched by the temperature actually observed, thus making it possible to prioritise interventions.

To learn more about the BOS, you can read this article "5 things to know before choosing a BOS".

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[1] BMS or Building Management System refers to the computer system that helps manage the technical equipment of a building. The BMS will focus on heating and air conditioning or electricity, while the BMS will be able to manage the whole thing with other technical packages as well.

[2] Computerized maintenance management (CMMS) is a software intended for a company's maintenance departments to help it in its activities. An IWMS integrates the functionalities of a CMMS.

The IWMS

The Integrated Workplace Management System (IWMS) originates from the publications of Gartner, an American technology consulting and research firm famous for its "magic quadrants" that cover all IT areas. The concept was introduced in 2004 but the first IWMS date back to the 80s and 90s.

Gartner defines IWMS as a software platform used by real estate and workplace managers to manage space and asset allocation, drive energy consumption, capital projects, maintenance, and other portfolio costs using an integrated system. The IWMS also has functionalities that address occupants directly (request portal for example) to better channel the processes that will be taken care of by the support teams.

The digital twin

Of the 3 concepts, the digital twin is the only one that does not come from the real estate sector. The term was popularized by NASA, as part of its work on spacecraft. It was then a question of relying on a digital replica to predict failures or to prescribe actions in real time. A digital twin therefore relies on a 3D representation that it combines with sensor data and artificial intelligence to create a dynamic simulation that can be used to monitor, analyze, and optimize a building's performance.

However, it is important to put the definition of the concept into perspective by the reality of the solutions offered on the real estate market. There are therefore several levels:

- Level 1: the descriptive twin which corresponds, in reality, to the BIM model.
- Level 2: the informative twin which corresponds to the BIM model combined with a BOS or directly integrating data from different systems.
- Level 3: the predictive twin that will be able to trigger automatisms.
- Level 4: the complete twin who will be able to carry out simulations.
- Level 5: the autonomous twin who has the ability to learn and act on their own.

In the world of real estate, the solutions offered correspond to level 1 to 3 but the automations (level 3) are still developed specifically because of the heterogeneity of the systems encountered and the limited number of projects. Levels 1 and 2 can be covered by an IWMS (as long as they most often integrate BIM). However, the BOS will bring "OT" connectivity as standard.

Differences and complementarity

Everyone's playground

The BOS is designed for a specific site because it integrates with a building's own systems and equipment.

In the same way, as the name suggests, the digital twin is designed specifically for a building.

On the other hand, IWMS is intended to manage a portfolio of buildings, offering a global view. It does not allow direct control of the BMS, but some BMS information can be integrated into the IWMS.

The purpose of solutions

The purpose of the BOS is to ensure the interoperability of systems. This makes it particularly useful for use cases that rely on interactions between systems. Especially for working together building systems (BMS) and IT systems (e.g. room booking solution). Since its raison d'être is interoperability, the BOS needs other systems to make sense and provide value.

The purpose of a digital twin depends on the level you are aiming for (see levels above). But the original objective of the concept is the performance of the farm and simulation. Unlike the BOS, interoperability here is a prerequisite and not an end.

On the other hand, IWMS can stand on its own. It delivers value even when it's not integrated with another business solution. The purpose of the IWMS is to carry out the processes of a real estate department or the work environment: planning maintenance operations, re-invoicing occupancy to the various departments of the company, or identifying opportunities to optimize a real estate portfolio.

Point of attention regarding 3D modeling

3D graphing is a basic feature for an IWMS or digital twin, but it is optional to meet the main purposes of a BOS.

This feature is widely used but can still be decisive when it comes to choosing a solution. The ability to integrate with Autodesk Revit, the leading BIM modeling tool, is fundamental. Any changes to the source mockup must be reflected in the IWMS or digital twin, "seamless". The operation by importing or exporting files in IFC format is to be avoided because it is too time-consuming[3]. However, this operation is still too often widespread in market tools. Thanks to a strategic partnership with Autodesk, Archibus stands out for the best Revit integration on the market.

In short...

- BOS allows interoperability between, on the one hand, a building's systems (BMS, access control,...) and, on the other hand, IT (IWMS, CMMS,...).
- The IWMS supports the processes of a real estate department and a work environment department. It also includes a portal for occupants and a graphic representation (2D or 3D) to contextualize data on plans or models.
- The digital twin contextualizes dynamic data of a building (temperature, for example) in a 3D model. The most advanced twins make it possible to design automations to improve the performance of the building or even to carry out simulations.

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[3] Switching from a native format to IFC is equivalent to switching from a Word to a PDF (loss of information, a risk of making changes difficult).

The table below summarizes the key features:

I want a tool for...	Features such as...		
	... IWMS	... BOS	... Digital twin
... facilitate/digitize property management processes (maintenance, space management, rebilling to occupants, resource reservations, portfolio management and optimization, etc.)	+++	NA	NA
... cross-reference the data of my building (BMS, sensors,...) with the data of my information systems (IWMS, CMMS,...)	++	+++	+++
... create automations to improve the building's consumption or to carry out energy simulations.	NA	++	+++
... view a BIM model enriched with contextual data (occupancy, temperature, allocation of spaces by department,...)	+++	NA	+++

How to choose the right solutions on the market?

Publishers' communication often uses all or part of these concepts to promote their solutions. Understanding the original positioning of a solution often makes it possible to better anticipate the level of maturity that the solution will have on the different functionalities it offers. Indeed, we can assume a stronger maturity on the functionalities corresponding to the original positioning of a solution ("BOS", "IWMS" or "Digital Twin"), while the more recent functionalities within this solution and belonging to other families of solutions will probably be less "state of the art".

But beyond this key to interpretation, it is difficult to avoid the traps unless you surround yourself with the right people. Choosing a solution means investing and making a commitment with a publisher over a long period. As such, surrounding yourself with advice ("project management assistance") is important to secure the choice. Defining the need and writing specifications is never a waste of time. Not all solutions are created equal and some "details" that have not been identified can take the company in a very expensive direction.