

Architecture del projecte BIM

2019 - Actualitat

Horizon Shaper

2024

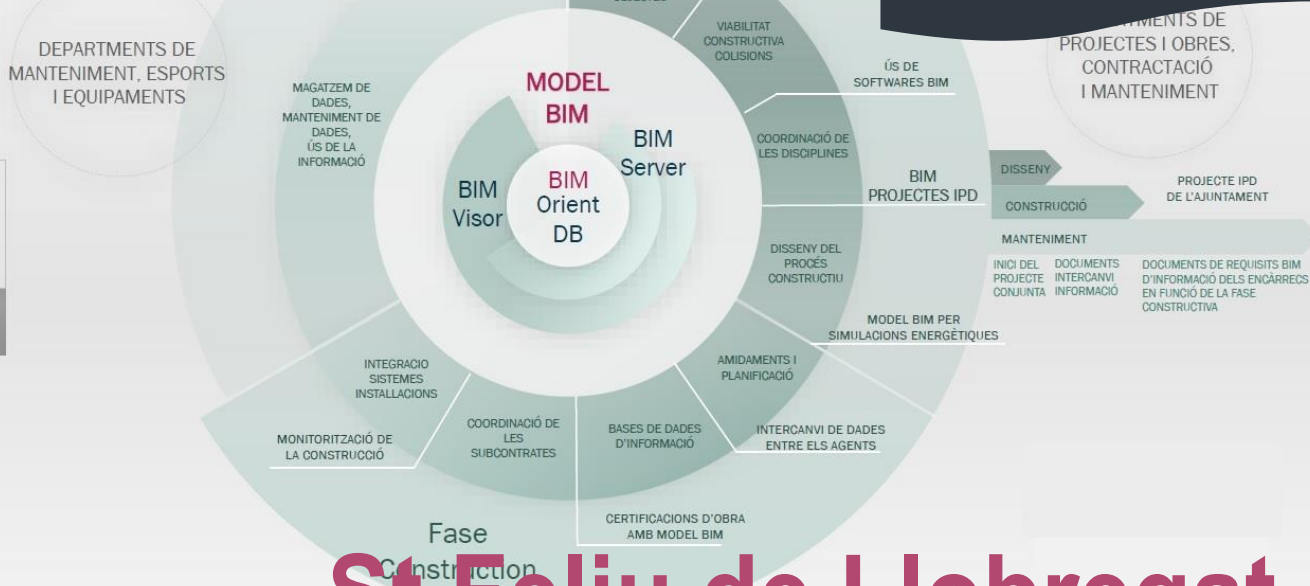
DEPARTAMENTS DE MANTENIMENT, ESPORTS I EQUIPAMENTS

Fase, Facility Management

DATA CONSUMPTION DATA GENERATION

API WEB GESTIÓ INTEGRAL ACTIUS BIM (BIMROCKET)

BIMROCKET



St Feliu de Llobregat

Digital twins in Sant Feliu de Llobregat

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DURATION

Ongoing since 2019

POPULATION 2024

45,956 (Growth rate 0.57%)

URA SCOPE

STRATEGY. Shared Vision

TOPICS

SUSTAINABILITY
EFFICIENCY
DIGITAL TWINS
BIM (BUILDING INFORMATION MODELING)

MAIN ACTORS

Ajuntament Sant Feliu de Llobregat

Sant Feliu de Llobregat, just 10 kilometres from Barcelona, is a city focused on community, innovation, and sustainability. It has emerged as a leader in smart city initiatives within the Metropolitan Area of Barcelona.

The story began with an ambitious dream: to transform Sant Feliu into a smart city powered by open-source technology. Drawing inspiration from Barcelona's pioneering *Sentilo* platform, the city started its journey by integrating an open-source sensor and actuator network. But this was just the foundation. Over time, Sant Feliu added layers of intelligence, creating a sophisticated platform for data processing and analytics. The city council developed their own AI-enabled IoT system, allowing the application of expert rules for urban governance. This innovation was made freely accessible to the global community, with its source code, Brain4it, hosted on GitHub.

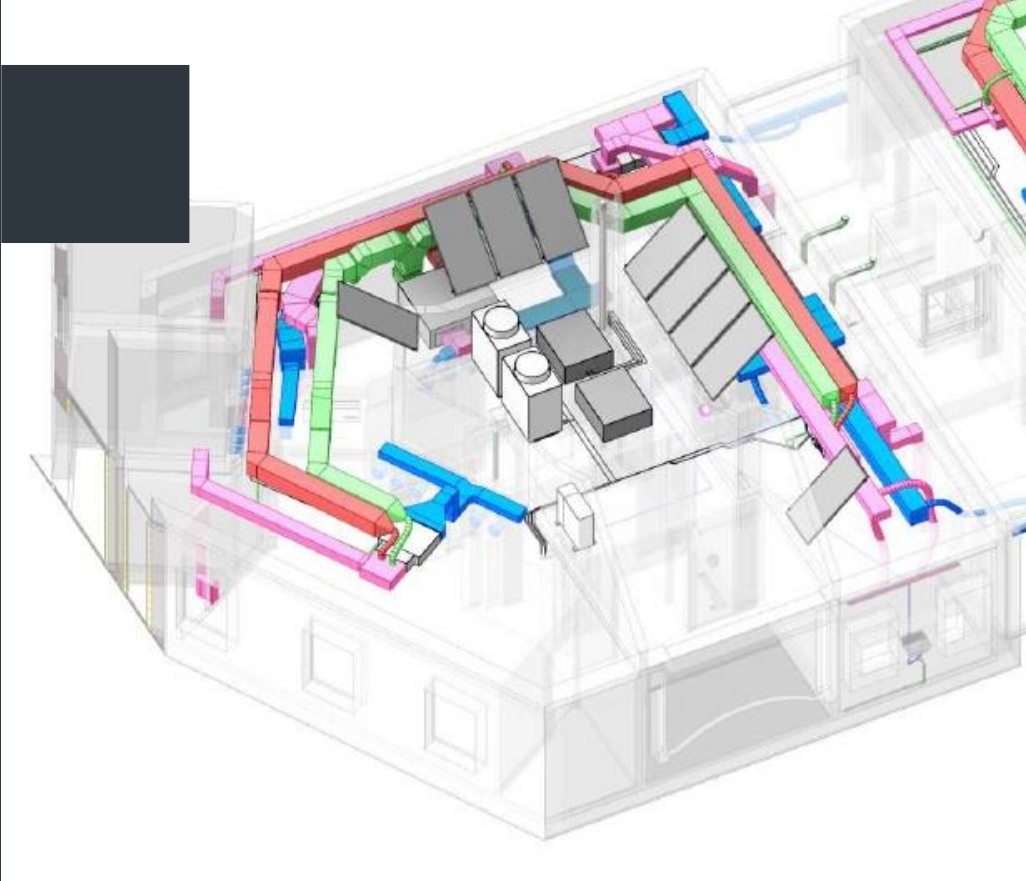
Then, in 2019, the city council took another bold step: embracing Building Information Modelling (BIM). This strategy aimed to combine BIM with cutting-edge technologies like big data, business intelligence, and artificial intelligence to revolutionize how the city managed its territory. The result was BIMROCKET, an open-source platform that enabled Sant Feliu to oversee its urban landscape like never before

With features like IFC model viewing and editing and a robust OrientDB database, BIMROCKET became an indispensable tool in the city's smart city arsenal. True to its open-source ethos, Sant Feliu shared the BIMROCKET code with the world, inviting collaboration and innovation.

The city council didn't stop at theory—they brought their vision to life. They developed BIM models for 15 key infrastructures, two of which are now fully realized digital twins. Among these is the crown jewel: the City Hall building. By embedding sensor technology within its BIM model, the council could regulate real-world systems, such as lighting. Using the Brain4it expert system integrated into BIMROCKET, they established energy-saving rules for lighting management. Through this system, they could monitor and control electricity usage, turning lights on and off efficiently—all from the BIMROCKET web application.

Sant Feliu de Llobregat's journey is a testament to what's possible when vision meets technology. With its open-source platforms and commitment to community-centric innovation, this small city has positioned itself as a trailblazer in smart city development, proving that the future of urban governance is not just about technology but about creating public value for everyone.





Impact

Managing 15 BIM-modelled infrastructures has revolutionized urban management in Sant Feliu de Llobregat. These models streamline incident analysis, such as distinguishing water leaks from capillarity through precise humidity measurements.

The **BIM Requirements Guide**, aligned with the 2019–2023 Municipal Action Plan and the SDGs of the 2030 Agenda, mandates integrating power and consumption data into the models. This allows the city to analyse energy use and implement targeted measures to reduce consumption, driving sustainability efforts. The City Hall building exemplifies the practical benefits of BIM integration. Equipped with sensors and linked to its BIM model, lighting systems are managed in real-time using the **Brain4it expert system**, minimizing electricity consumption while ensuring functionality. Monitoring and adjustments are seamlessly performed through the **BIMROCKET** platform.

During the City Hall's renovation, BIM enabled precise energy efficiency calculations, meeting strict grant deadlines and securing European Regional Development Fund (ERDF) financing. Without BIM, achieving this level of detail and speed would have been nearly impossible. Additionally, the energy certification process was conducted remotely, leveraging virtual inspections and intrinsic data—saving time and resources.

The integration of BIM across municipal infrastructures in Sant Feliu de Llobregat represents a paradigm shift in urban governance. These models provide unparalleled precision in managing resources, analysing incidents, and promoting sustainability. By incorporating sensor technology and open-source platforms like BIMROCKET, the city has not only reduced energy consumption but also streamlined complex administrative processes, such as grant applications and certifications. Sant Feliu's innovative approach demonstrates how BIM can bridge the gap between technology and environmental stewardship. It highlights the potential for municipalities to meet global sustainability goals while optimizing public resources and improving service delivery. As other cities look for sustainable urban solutions, Sant Feliu's experience stands as a powerful example of what can be achieved through bold vision and technological adoption.

Challenge

Sant Feliu de Llobregat faces several interconnected needs and challenges as it strives for sustainability, efficiency, and an improved quality of life for its citizens.

Efficient resource management is critical to reducing waste, controlling energy consumption, and conserving water. However, integrating real-time monitoring and analytics through advanced systems, such as sensors, requires robust infrastructure and technical expertise.

Rising energy costs and environmental concerns drive the need to minimize electricity and fuel usage. Implementing automation, like occupancy-based lighting systems, presents challenges in ensuring scalability, interoperability, and reliability.

Modernizing workflows for urban design, construction, and infrastructure management is essential for efficiency. Transitioning from traditional methods to digital systems like BIM necessitates stakeholder alignment and the adoption of new methodologies.

To comply with global frameworks like the UN Sustainable Development Goals (SDGs), cities must balance innovation with budget constraints while demonstrating measurable environmental and social progress.

City staff and stakeholders must develop the skills to leverage advanced technologies. Delivering effective training and ongoing support is crucial to sustaining progress.

Solution Proposed

Sant Feliu de Llobregat's **Digital Twins Plan** focuses on managing urban infrastructure with a strong emphasis on energy efficiency and conservation. Central to this initiative is the **BIM Implementation Plan** and the **BIM Requirements Guide**, developed in compliance with ISO 19650 standards. These documents define roles, responsibilities, and information requirements for project participants, ensuring a structured approach to asset modelling and management. They provide a clear roadmap for the design, construction, and operation of infrastructure while promoting collaboration among stakeholders.

The city has established a dedicated **BIM Office**, consisting of three experts, to oversee the application of the BIM methodology throughout an asset's lifecycle. This office is responsible for maintaining quality, managing interdepartmental collaboration, and driving innovation.

Currently, Sant Feliu has developed BIM models for 13 municipal facilities, two streets, and a square in both native and open IFC formats. Sensors have been integrated into two facilities to simulate real-time monitoring and automated actions. For example, lighting control systems now optimize energy use by simulating and automating actions such as switching lights on based on occupancy. These initiatives not only reduce energy consumption but also improve urban efficiency, offering a replicable model for sustainable city management.

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