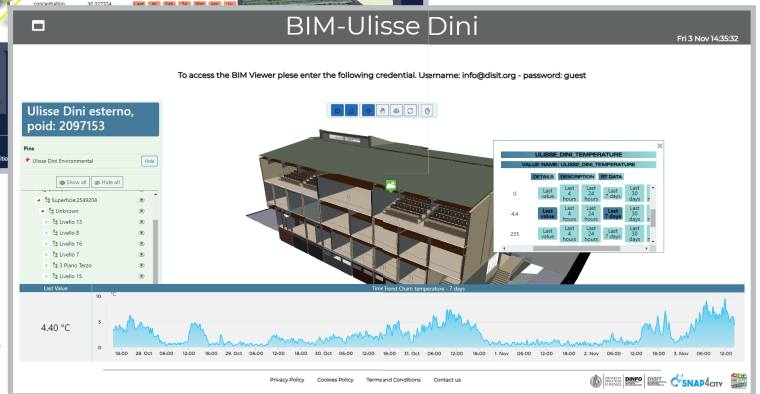
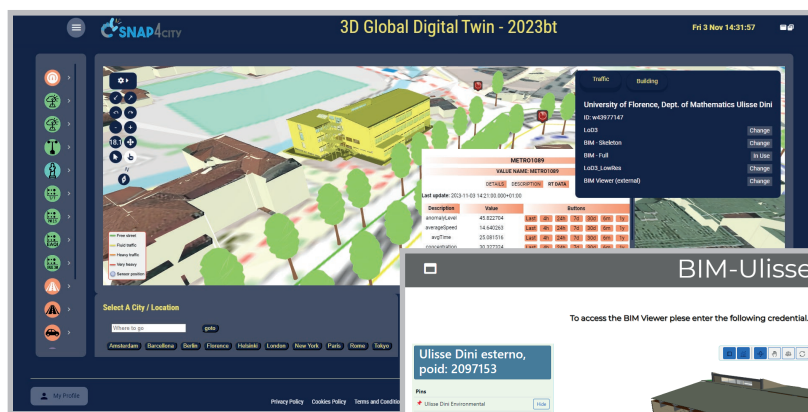




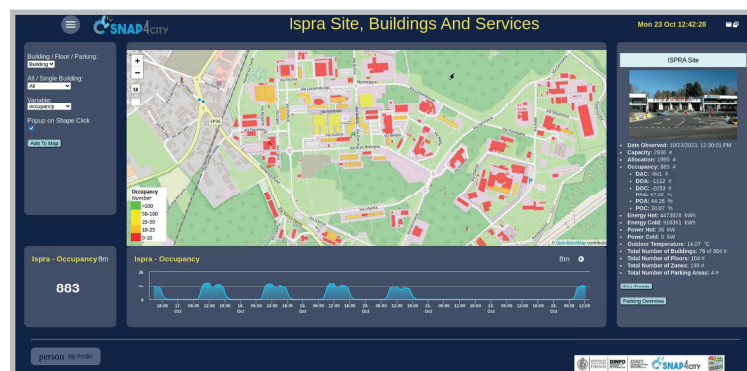
Snap4Building: monitoring, managing, controlling infrastructures

Snap4Building is a Digital Twin solution to monitor, control and manage distributed infrastructures such as: spread hotels, thematic parks, villages, university campus, touristic parks, vacation parks, industries parks, ports, camping, large villas, shopping centers, chemical plants, shops of chain, etc. They are infrastructures in which several buildings are managed by the same organization for energy, parking, logistic, presences, cleaning, air quality, departments, subareas, etc. The aim of management and control may imply the control and optimization of resources' consumption, the security and safety, etc. For the number of services provided and their high quality demand, and for the high number of people involved, most of these infrastructures can be regarded as critical infrastructures.



These complex distributed environments can be regarded as small cities. On the other hand, since they have a specific goals beyond the services of a city are for living and work, they present specific needs to be monitored as integrated infrastructures at global and local levels (global and local digital twins) with all their resources at the same time with all their details:

- 2D/3D representations of the whole set of buildings, their maps and the connection of them with all local and global details and data, including under ground infrastructures.
- 2D/3D representations of each single building in the context of the city/area, and their relationships.
- Structural information as a BIM modeling of each single building or subarea
- Entities (building, floors, rooms, parking, charging stations, gates, etc.) with their shapes and descriptors, and data monitoring the allocation to office, meeting, cafeteria, storage, stairs, elevator, etc.
- Data and measures performed for each Entity, and for the whole or group of them. Data and information can be related to commercial, administrative, documental, infrastructure, technical, energy, etc.



DIGITAL TWIN
SOLUTION
TO MONITOR
INFRASTRUCTURES

2D/3D
REPRESENTATION

STRUCTURAL
INFORMATION
AND DATA

Each Digital Twin of Entity (Building, floors, rooms, parking, etc.) realize the digital counterpart of the physical entities and thus the solution can compute e provide real time

- **information and indicators** regarding structure, allocation/designation, dispositions, real time data as heating, cooling, temperature, energy consumption, quality of air, allocation of people, presence of equipment, energy consumed or produced (for instance a specific area may contain some specific equipment with particular access and environmental control), sensors and actuators of the Entity, etc.
- **groupe in Zones** for monitoring, maintenance, and for supervision and control.

A relevant number of direct and indirect measures can be performed, as well as key performance indicators, KPI, can be computed in real time to manage the economy of each Entity, and from the data/KPI of the each of them the computation of the costs, resources, etc., and status of the whole infrastructure can be obtained in real time. This allows to report the global KPI in the main control dashboard also in correlation to their usage of humans and machineries. Moreover, a large number of events and alarms have to be managed, the maintenance teams may be scheduled for regular ordinary maintenance, and recalled in emergency when critical event occurs, and a fast recovery is needed to avoid seeing a strong increment of costs. The real time assessment of measures and KPI is exploited for activating alarms. Sending maintenance and/or rescue teams.



Snap4Building solution is based on Snap4City/Industry technologies and thus it exploits the integration with more than 190 protocols and formats, including the integration with:

- IoT data, protocol and formats of any kind: traffic, pollutant, environment, people flow, pax counters, etc.
- GIS data, satellite data, Open Street Maps
- Mobility and transport: GTFS from public transportation, parking status, vehicles position, fleet monitoring
- Routing and Multimodal touring
- Energy data: power energy controller, photovoltaic installations, recharging stations, etc.
- Security information and Video streams, such as VMS Milestone and AXIS cameras for security and supervision.

Moreover, Snap4Building can be connected with your data sources to keep the monitoring solution aligned to any change in the infrastructure due to restructuring and dynamic allocation of resources. Snap4Building can be customized according to data and environment taking modules and components from snap4City framework. The rendering on dashboards and Web Apps may include maps, time trends, stacked diagrams, origin destination flows, routing, energy heatmaps, temperature heatmap, pollutant heatmaps, video streams, pictures, forms, commands, people flow, etc.

The Snap4Building solution is based on Snap4City/Industry technology which is GDPR compliant, and passed the PEN Test and Vulnerability tests. It can be installed on premise, as well as on public or private clouds, in connection with Single Sign On, SSO, OpenID Connect, SAML/IAM, etc. and login compatible with SPID, European ID Card, EPSS, etc.

Extended version accessible from: <https://www.snap4city.org/970>
Contact: <https://www.snap4city.org>