The open source solution for the Property & Facility Management
www.openmaint.org

www.openmaint.org
www.tecnoteca.com

TECNOTECA openMAINT

openMAINT [www.openmaint..org] is a product realized by Tecnoteca, Tecnoteca srl [www.tecnoteca.com] is maintainer of the openMAINT project

What is openMAINT

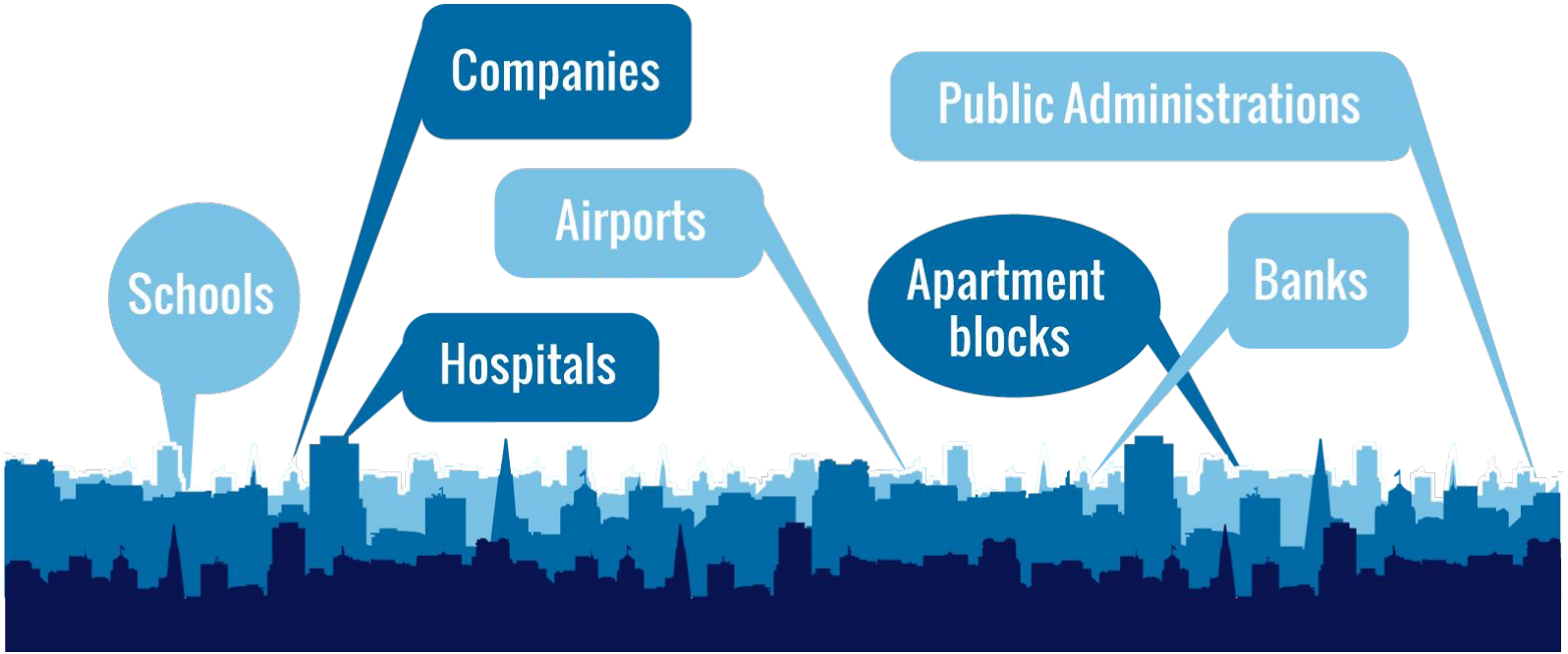
- *openMAINT* is an enterprise solution for the **Property & Facility Management**
- *openMAINT* manages **movable assets and the real estate**, and the related **maintaining**, **logistic** and **economic** activities
- *openMAINT* is a **ready-to-use** solution, configured with databases, processes, reports and dashboards
- *openMAINT* has been designed in order to **fit the environment in which it operates** and to be **gradually** activated according to the available resources
- *openMAINT* is **implemented on the asset management framework CMDBuild**, a product of which we are the official maintainer

Who needs openMAINT

openMAINT is useful to those who have to maintain the efficiency of their buildings, movable assets, plants, technological networks and urban infrastructures in the area:

- Local and central **Public Admnistrations**
- **Banks and Insurance companies**
- **Hospitals** and public and private **healthcare systems**
- **Schools and Universities**
- **Service companies**
- **Industrial companies** with production facilities
- **Transport infrastructures**

Who needs openMAINT



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Operator typologies

- **Direction**: result and cost analysis (reports / dashboards)
- **Supervisor**: definition and control of system policies
- **Asset manager**: management of movable assets and real estate
- **Call Center / Helpdesk**: management and acceptance of maintenance requests
- **Internal and external technician**: execution and registering of maintenance activities
- **Energy manager**: management and control of certifications and consumptions
- **Administrative staff**: management of economic data
- **Computer technicians**: technical management of the system

Why choose a Facility Management system

- because **non-maitenance costs** (plants shutdowns, services interruptions, lifetime of materials) are much higher than maintenance costs
- for a **higher return** of your real estate
- in order to manage better the **scheduled maintenance**
- in order to **optimize the staff commitment** (procedures definition and responsibilities management)
- for a higher **suppliers' control** (costs and quality of interventions)
- in order to avoid or **reduce printed materials**

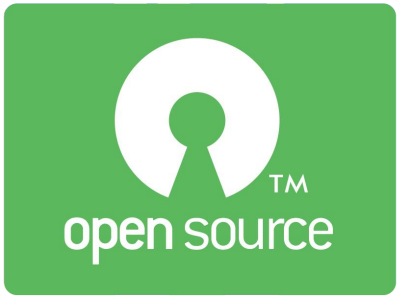
Why choose openMAINT

- because it is a **complete** and **solid** product, in both technology and functionality
- because it comes from specific **experiences in this sector**
- because it implements **Business Process Management** to draw workflows and assist operators in their activities
- because the operations are based on the concept of the **Maintenance Manual**, specific for every organization or just a part of it
- because it communicates with new **BIM building design tools**
  (Building Information Modeling)
- because it is a **native web** solution, which can be completely used through a standard browser

License

- ***openMAINT*** is released with **AGPL open source license** (Affero GPL): anyone can **freely** download, install and use it

- Thanks to ***openMAINT*** you will be able to realize a complete and economic Property & Facility Management



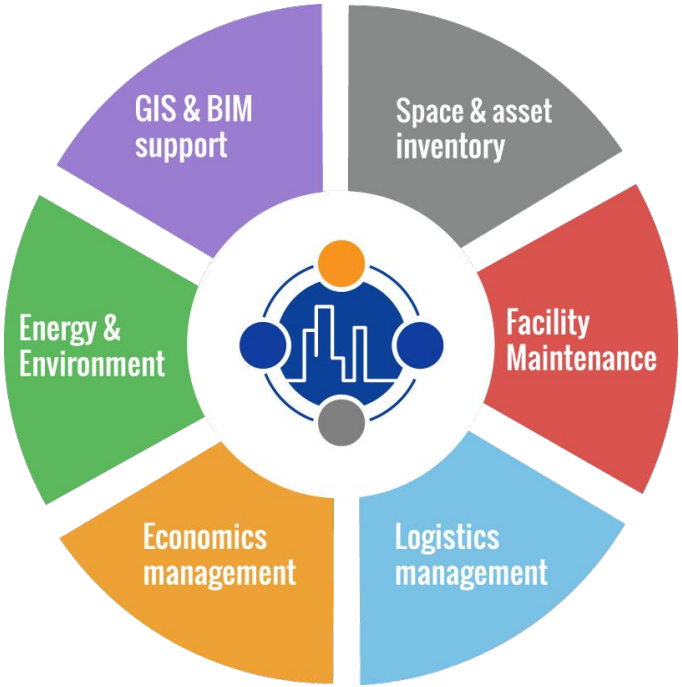
Support services

- Tecnoteca offers **certified support services** on ***openMAINT*** with specialized **technicians**, working remotely or at the Customer's seat

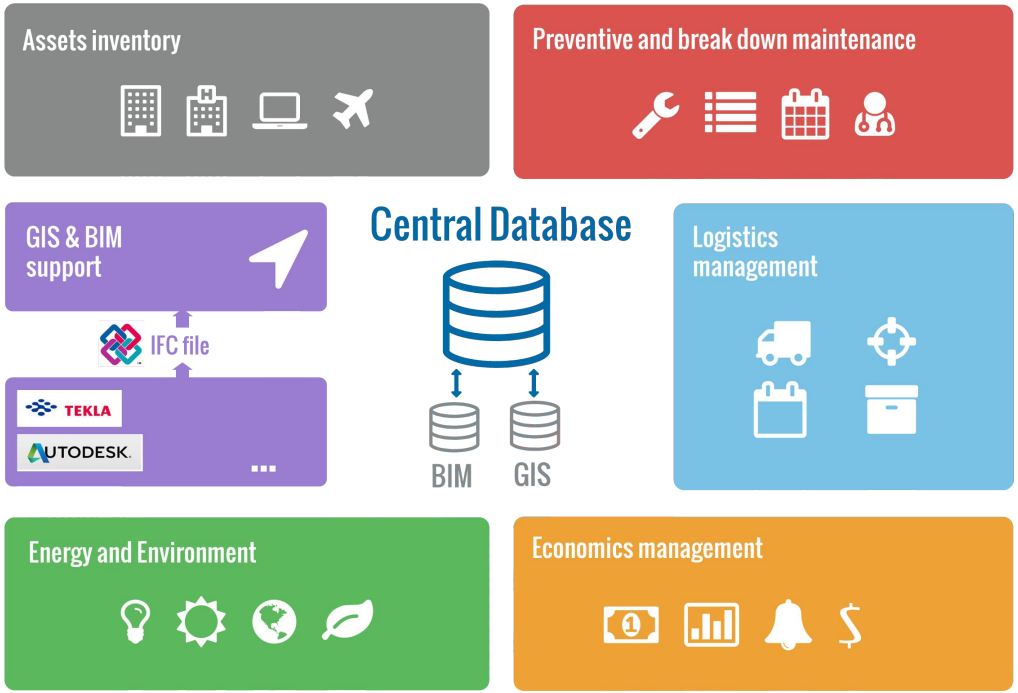
- Tecnoteca provide **training** services , **support** services to implement custom configurations, **maintenance** services with granted SLA

Functional areas of openMAINT

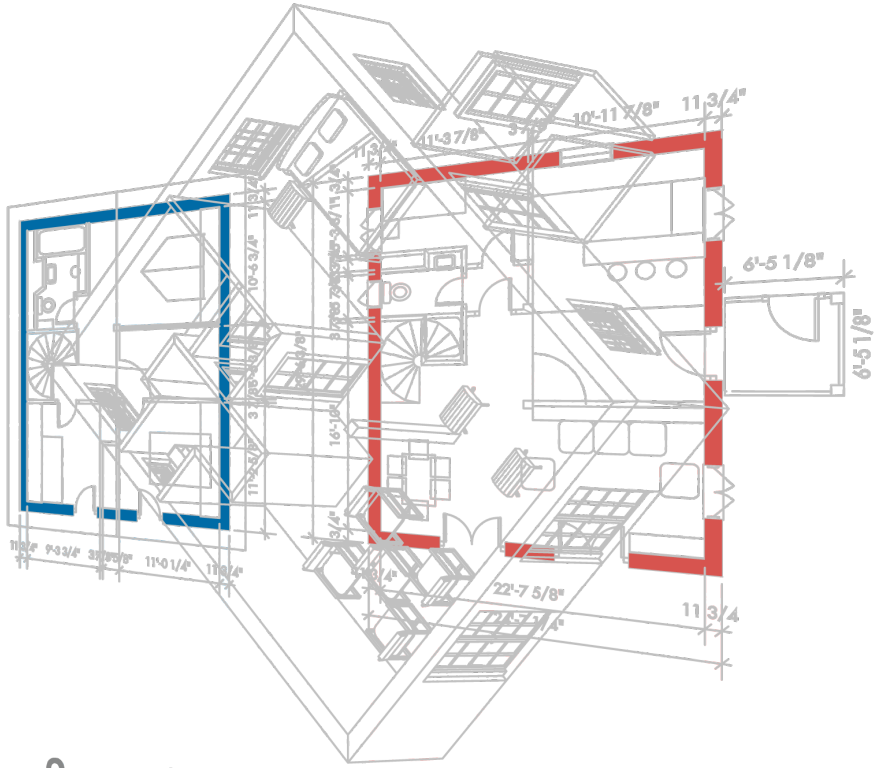
- Space & Asset Inventory
- Facility Maintenance
- Logistic Management
- Economic Management
- Energy & Environment
- GIS and BIM support



Functional areas of openMAINT



Space & Asset Inventory



Space & Asset Inventory

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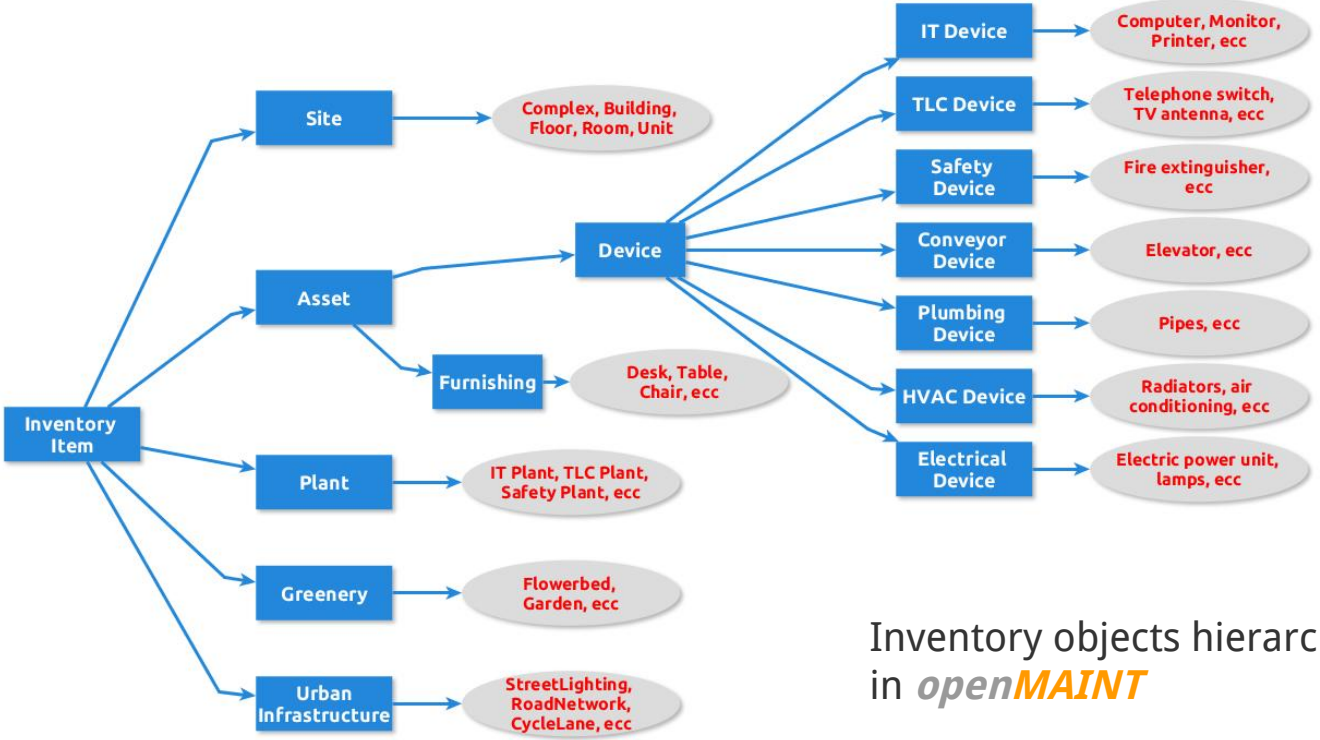
Space & Asset Inventory – Objects types

Each Property and Facility Management activity is based on the **concrete and detailed knowledge** of the managed real estate.

openMAINT helps you to manage every kind of object, including:

- **real estate** (complexes, buildings, floors, rooms)
- **plants** (electrical, plumbing / sanitation, HVAC, conveyor, safety, telecommunications, IT)
- **technical asset** and **furniture** items
- **external infrastructures** (lighting, parking areas, road networks, bycicle lanes, etc)
- **green areas** (gardens, parks, etc)

Space & Asset Inventory – Objects hierarchy



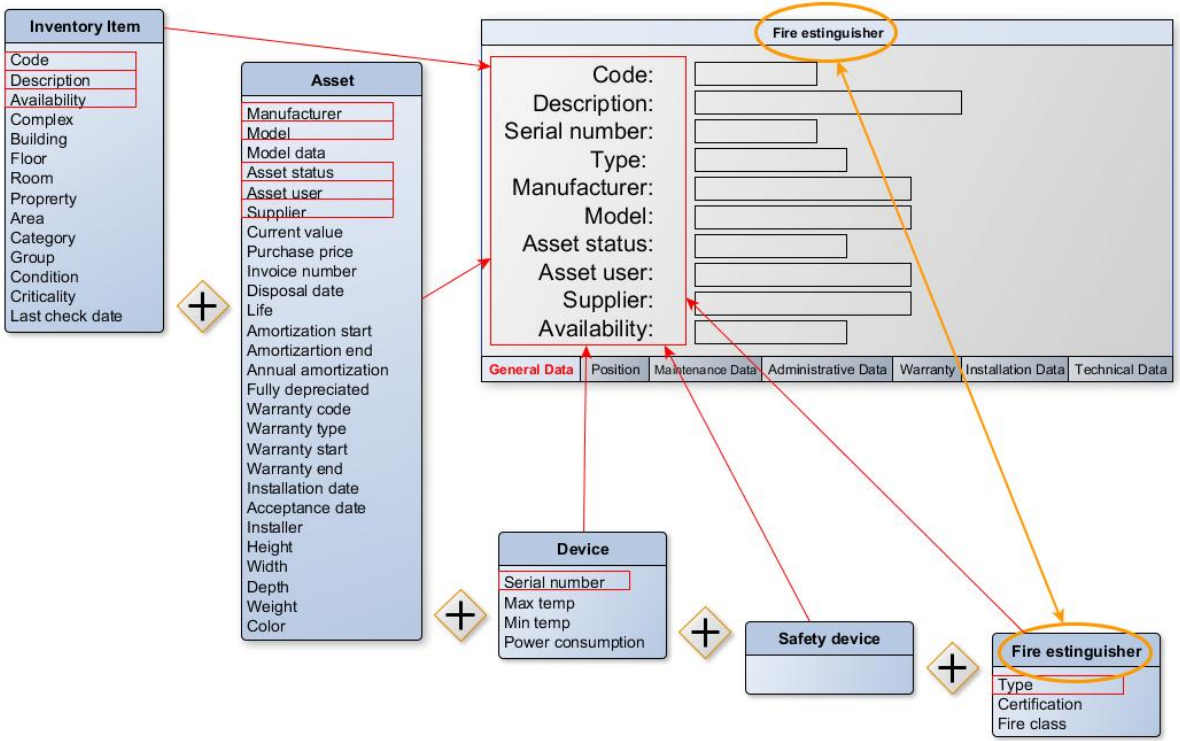
Inventory objects hierarchy in *openMAINT*

Space & Asset Inventory – Information contents

For each inventory object, ***openMAINT*** manages both predefined standard information and information customized by each user:

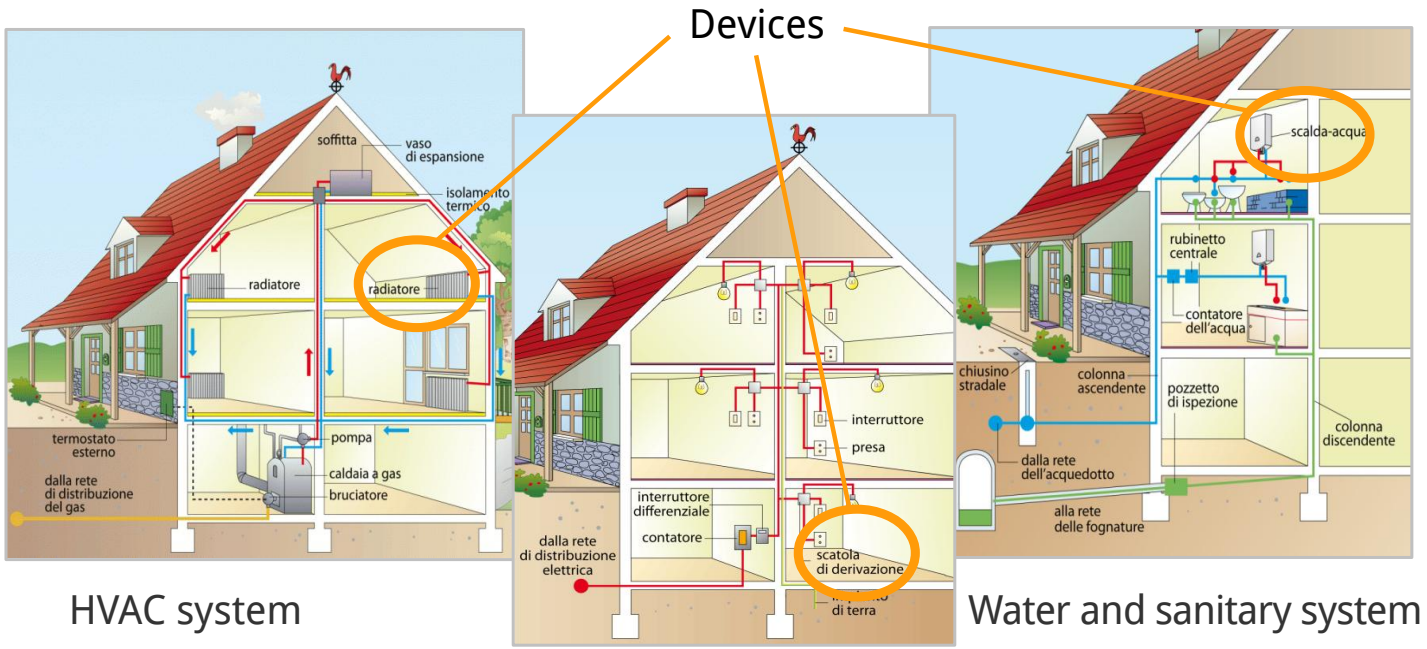
- **identifying data**: codes, descriptions and other identification / localisation elements, etc
- **technical data**: physical and performance features, consistency (size, surface, volumes), preservation status, etc
- **functional data**: purposes, operational procedures, rules, standards, technical referent, etc
- **administrative data**: rental agreement and purchase agreements, supply contracts, legal status, depreciation and amortization, maintenance contracts, etc

Space & Asset Inventory – Data cards



Data cards structure in *openMAINT*

Space & Asset Inventory – Plants and devices



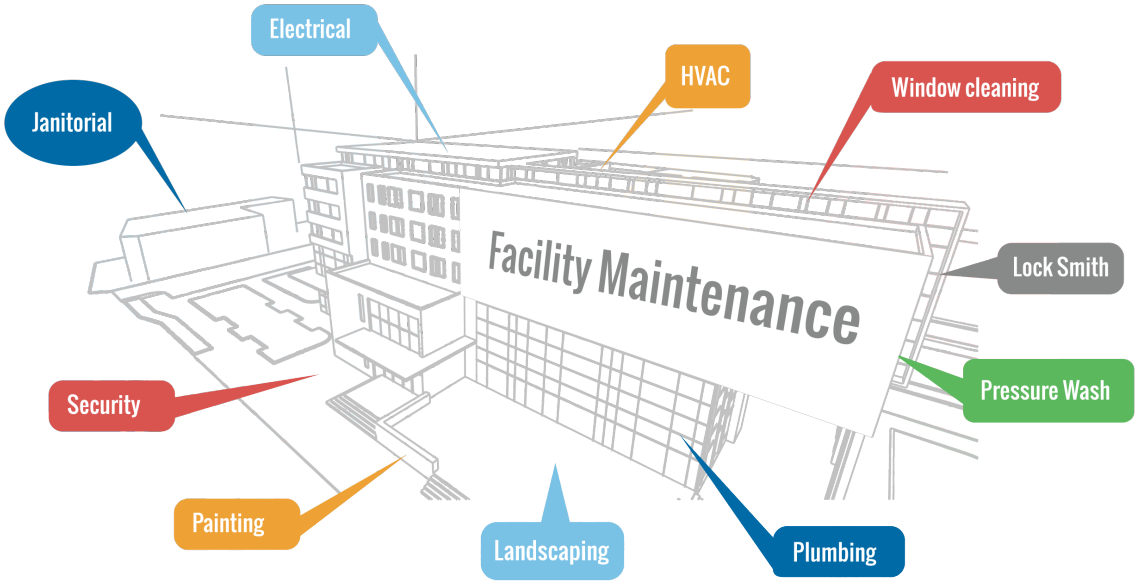
HVAC system

Electrical system

Water and sanitary system

Images from the book TECHNOLOGY of Professor Gianni Arduino

Facility Maintenance



Facility Maintenance – Maintenance Manual

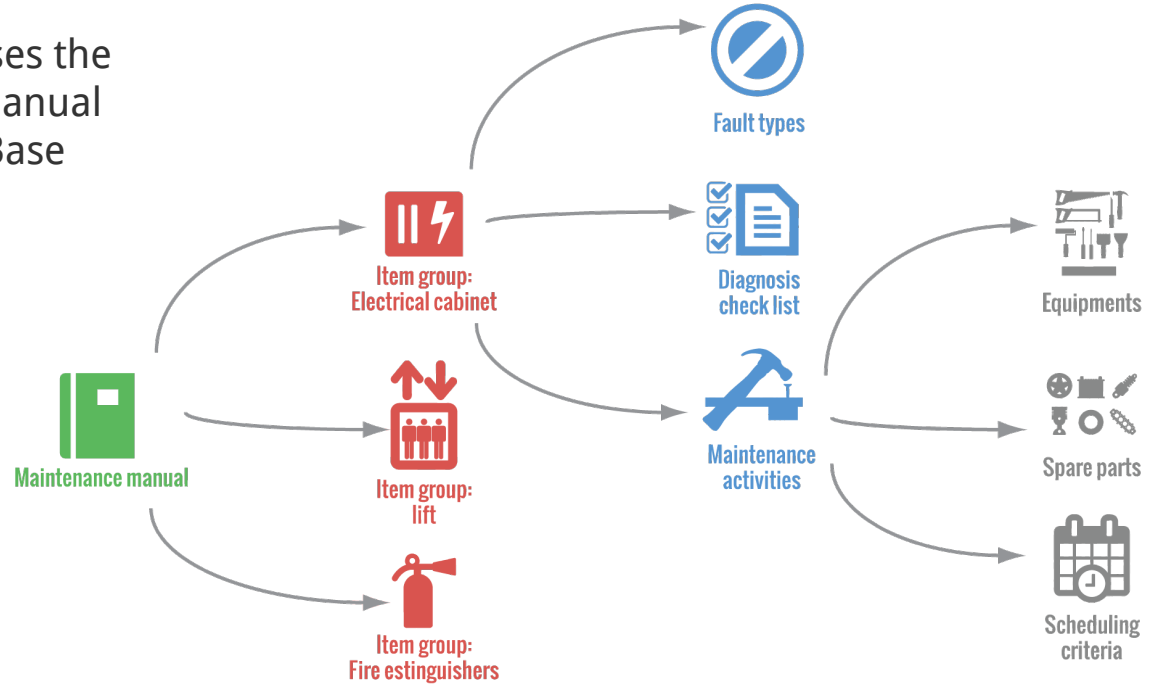
openMAINT uses the **Maintenance Manual** as a knowledge base to manage the maintenance activities in a **customized** way for each organisation and in a **differentiated** way for every object typology.

For each maintenance object you can register and increase, over time, informations on:

- **activities types**
- **required tools**
- **necessary spare parts**
- **possible damages** and related solutions
- **diagnostic checklists**

Facility Maintenance – Maintenance Manual

openMAINT uses the Maintenance Manual as Knowledge Base



Facility Maintenance – Scheduled maintenance

openMAINT manages the **scheduled maintenance** above those criteria written in the Maintenance Manual and using the same workorders management worflow of the breakdown maintenance:

- **check of** scheduling criteria, with time criteria and threshold criteria
- generation of the **calendar** for the required period
- production of the **workorders**

The available scheduling criteria include the necessary options to work **flexibly** and **in a very simple way** for operators.

Facility Maintenance – Scheduled maintenance

The scheduled maintenance in *openMAINT*

Scheduled maintenance with time criteria and threshold criteria

Periodic generation of the scheduled maintenance calendar

Automatic generation of the next start workorders

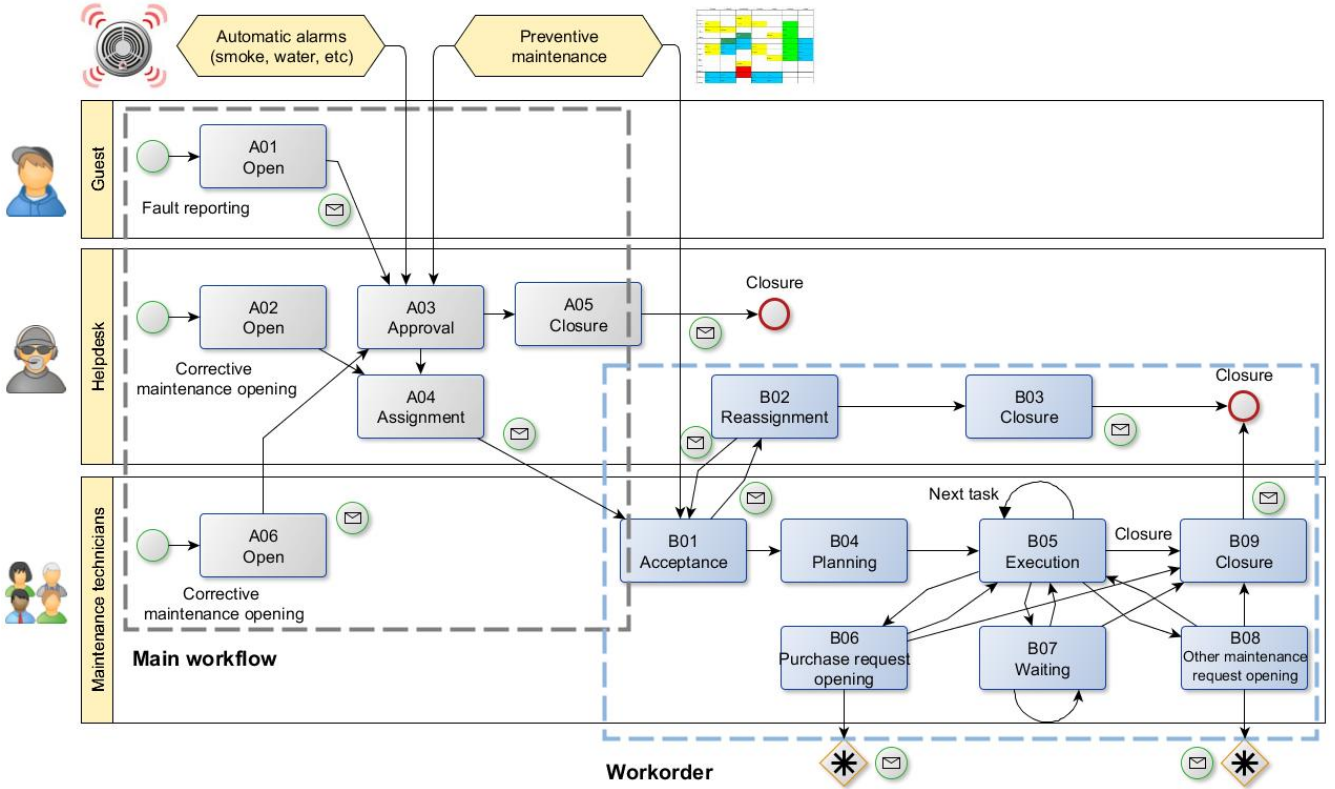
Facility Maintenance – Workflow

openMAINT manages the **maintenance** with the following flow:

- **open** the request **through various channels**, including a self service portal, any automatic warning systems, and - obviously - the scheduled maintenance scheduler
- check and **approve** the request by help desk / call center operators
- forward **the working order** to the expert team / supplier
- **take charge** or reassign
- **plan and execute** the intervention, by referring the knowledge base recorded in the system and with any suspensions / linked requests
- record the **activities report**, also from tablets or smartphones

Facility Maintenance – Workflow

The breakdown maintenance in *openMAINT*

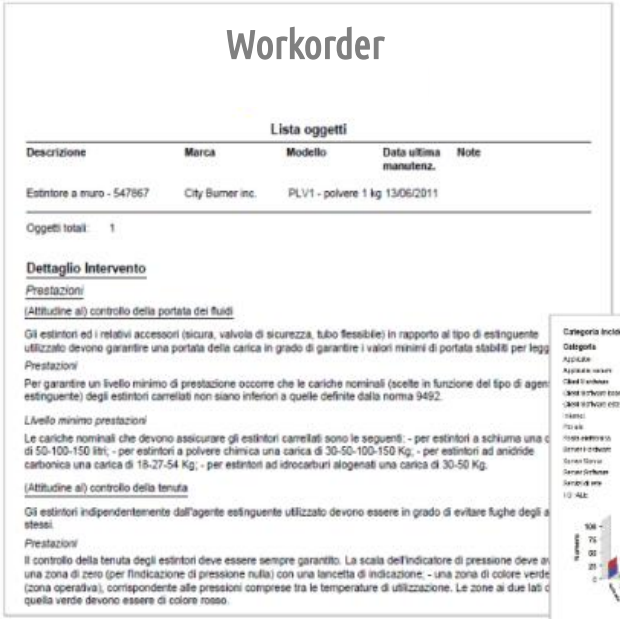


Facility Maintenance – Other functionalities

openMAINT includes **other features** to manage the maintenance:

- checks and automatic notifications upon **SLA and KPI**
- collection and record of **user feedbacks**
- continuing increasing of the **knowledge base**, available to operators
- several types of **reports**
- several types of **dashboards**
- automatic interaction with the **purchase order** workflows and material receipt
- purchasing association on **cost centers**

Facility Maintenance – Other functionalities



Workorder

Lista oggetti

Descrizione	Marca	Modello	Data ultima manutenz.	Note
Estintore a muro - 547867	City Burner inc.	PLV1 - polvere 1 kg	13/06/2011	

Oggetti totali: 1

Dettaglio Intervento

Prestazioni

(Attitudine al) controllo della portata dei fluidi

Gli estintori ed i relativi accessori (sicura, valvola di sicurezza, tubo flessibile) in rapporto al tipo di estinguente utilizzato devono garantire una portata della carica in grado di garantire i valori minimi di portata stabiliti per legg

Prestazioni

Per garantire un livello minimo di prestazione occorre che le cariche nominali (scelte in funzione del tipo di agen estinguente) degli estintori carrellati non siano inferiori a quelle definite dalla norma 9492.

Livello minimo prestazioni

Le cariche nominali che devono assicurare gli estintori carrellati sono le seguenti: - per estintori a schiuma una c di 50-100-150 litri; - per estintori a polvere chimica una carica di 30-50-100-150 Kg; - per estintori ad anidride carbonica una carica di 18-27-54 Kg; - per estintori ad idrocarburi alogenati una carica di 30-50 Kg.

(Attitudine al) controllo della tenuta

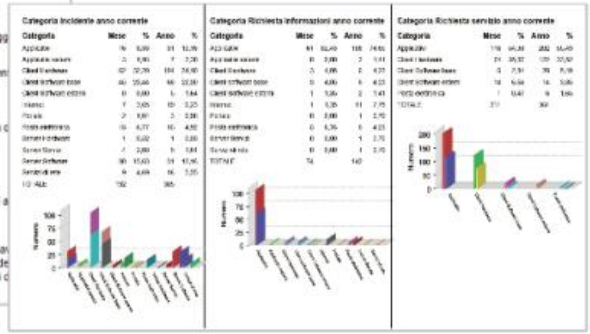
Gli estintori indipendentemente dall'agente estinguente utilizzato devono essere in grado di evitare fughe degli a stessi.

Prestazioni

Il controllo della tenuta degli estintori deve essere sempre garantito. La scala dell'indicatore di pressione deve a una zona di zero (per l'indicazione di pressione nulla) con una lancetta di indicazione; - una zona di colore verde (zona operativa), corrispondente alle pressioni comprese tra le temperature di utilizzazione. Le zone ai due lati quella verde devono essere di colore rosso.

Workorder
for the activities support

Statistical reports



Logistic Management

Logistic Management – Asset movement

openMAINT provides a workflow for the **asset movement**, which manages its whole lifecycle, also with authorization steps and using mobile devices:

- positioning / assignment with withdrawal from warehouse
- movement of assets in use
- pick up of assets in use in order to repair or disposal them
- final disposal

Another workflow helps to **move in a massive mode** assets and workplaces in case of partial or global seat changes.

Logistic Management – Spare parts store

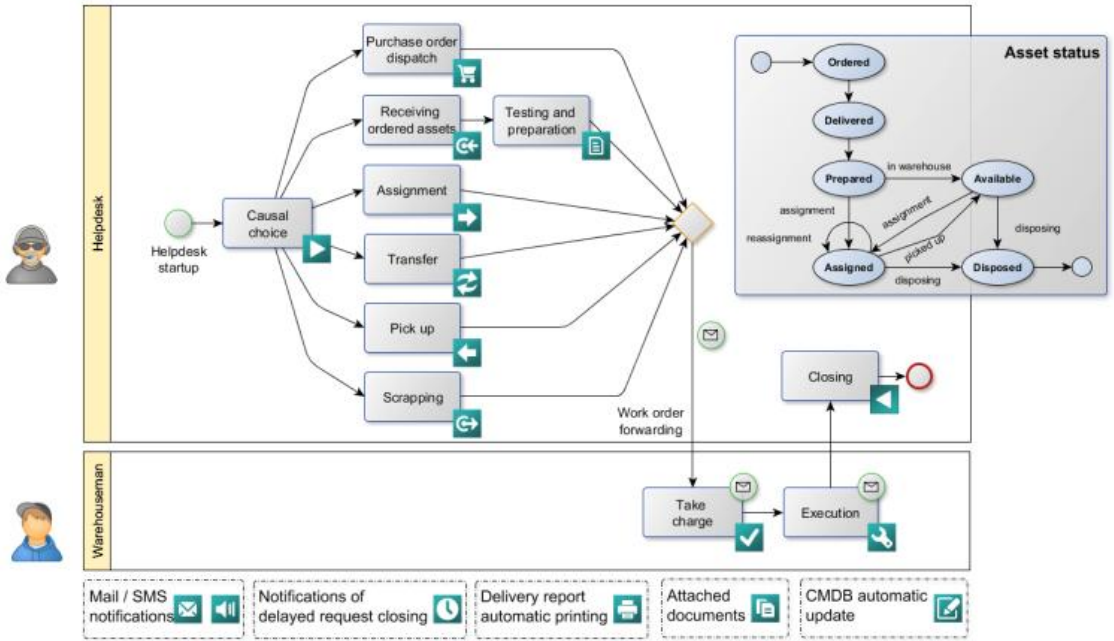
openMAINT has a workflow for the **movement of spare parts and consumables**, which can be activated in different ways:

- by receiving new materials against a purchase order
- during a maintenance workorder
- for movements among stores or year-end inventory corrections

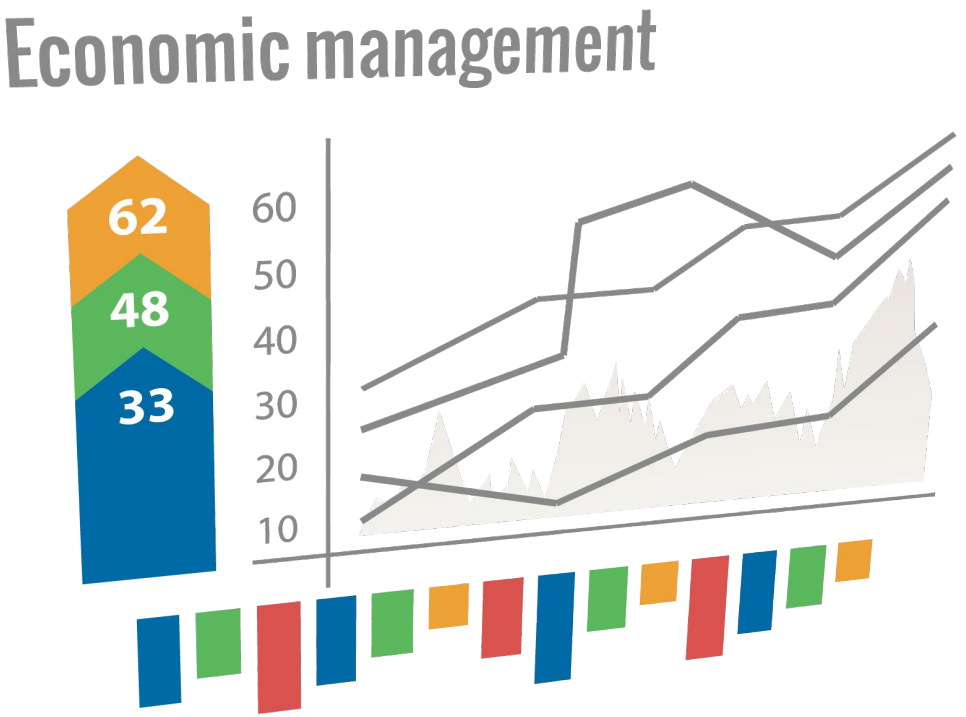
Other custom workflows (room booking, orders / projects management, business travel management, etc.) can be analysed and configured by using the editor and the workflow engine integrated in CMDBuild, the framework which *openMAINT* is based on.

Logistic Management – Asset movement

The asset movement workflow in *openMAINT*



Economic management



Economic management – Features

In *openMAINT* the module for the economic management includes the following main features:

- **basic data management**: Departments, Suppliers with contact persons and maintenance teams, Customers, other data
- annual **budget** management on two levels: budget centers, budget items
- **contracts** management: utilities, rental, sale
- **purchase request**
- **purchase order** (related to the request)
- **purchase invoice** (related to the order)

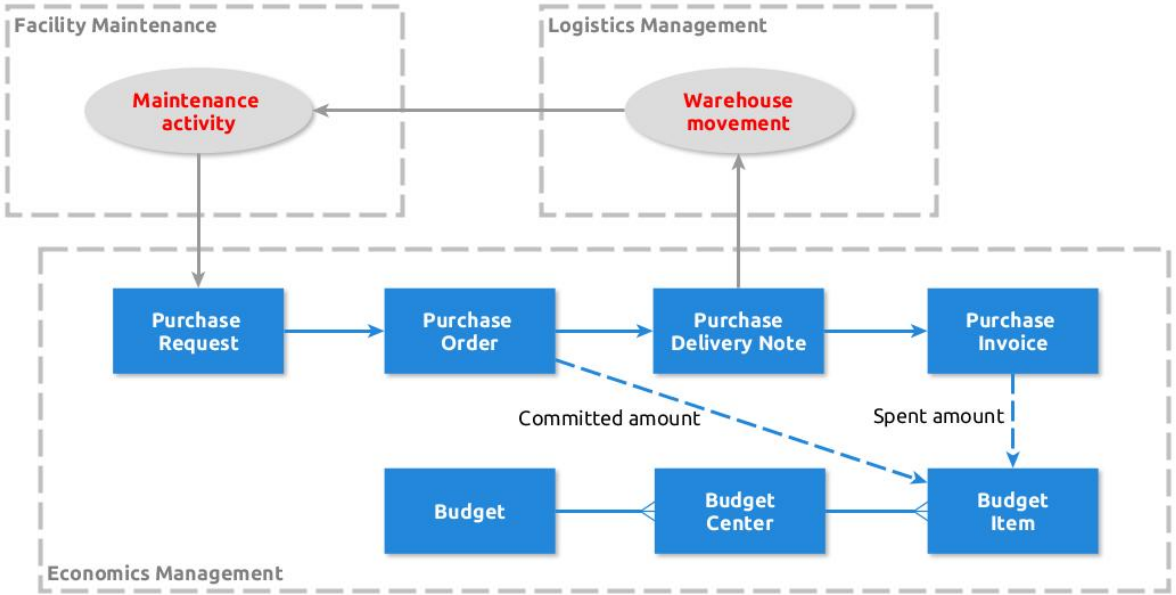
Economic management – Features

In *openMAINT* other functionalities can be configurated and activated:

- **automatisms among the modules**: purchase request starting from the maintenance workflow and its suspension, restart of the maintenance workflow when the wares arrive
- **scheduler management** with automatic notifications (contracts deadlines, advance notice for the activities with service suspensions, etc)
- **signalling of events** of interest (requests for purchases that exceed the budget, delay the fulfillment of purchase orders, etc)
- **connectors** for the data synchronization with external ERP systems - if any - (with custom implementation activities)
- **reports and dashboards**

Economic management – Features

Interactions among the modules of *openMAINT*



Energy & Environment

Energy & Environment – Certifications

The **energy / environmental control** is very important for the real estate management, also considering the higher and higher costs and the more and more limiting rules.

openMAINT has been arranged to record the available environmental certifications:

- **environmental certifications**
- **emissions** (atmospheric emissions, wastewater, etc)
- **urban and special waste**
- other environmental **impacts** (asbestos, etc)

Datacards can be modified or improved so that they can contain all information provided by the relevant **national rules**.

Energy & Environment – Periodical consumptions

Periodical consumptions have to be registered on the base of the received bills and invoices.

openMAINT allows to:

- record the **consumption records** of each counter (electricity, gas, water)
- record the **costs** related to each counter
- combine consumptions and costs to the related **building** or **property**

The gathered data are registered into *openMAINT* so that they will be analysed and compared with the previous series and will produce **corrective / improving actions**.

Energy & Environment – Automatic control units

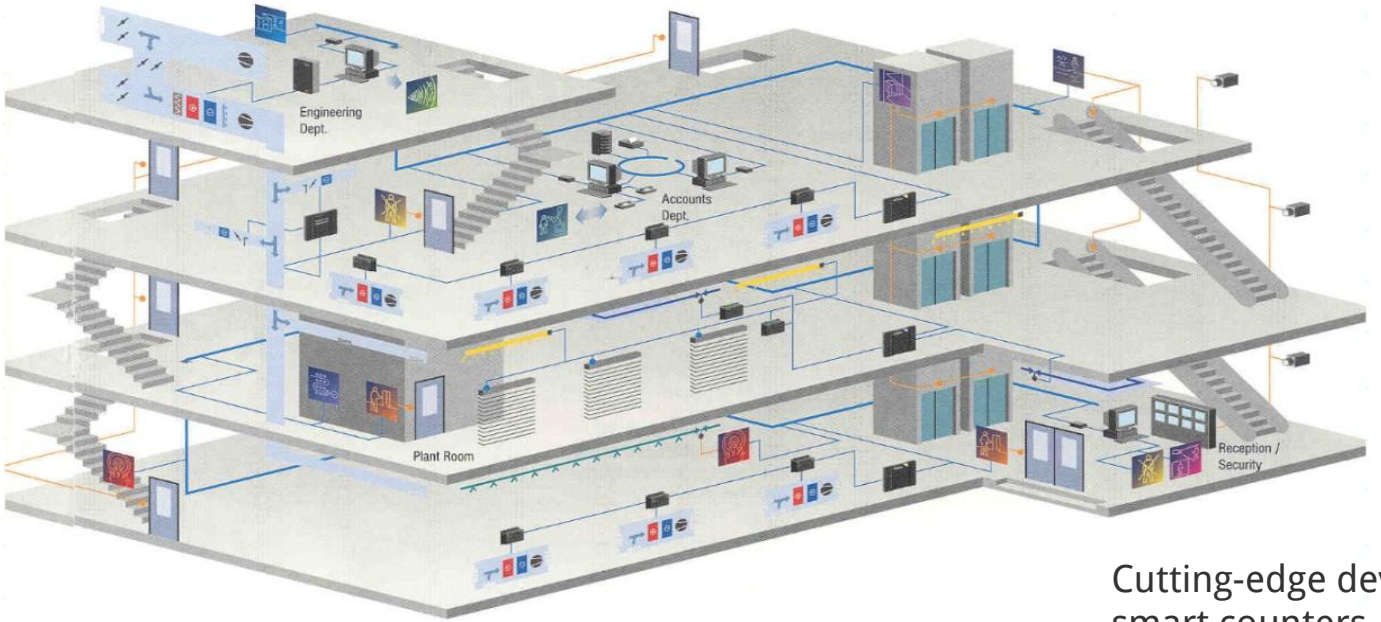
Nowadays there are more and more latest generation "smart" devices (control units, interfaces, gateways, sensors grids) able to **communicate with computer systems**.

If any, there is the possibility to configure (with some custom implementation activities) **connectors** that:

- **gather and record** the available data, also when **disaggregated** in the plants parts or in the single device
- **send** starting and stopping orders on the base of rules defined in *openMAINT*

We monitor open source projects that can help to interface standard devices with computer systems, by using **common standard protocols**.

Energy & Environment – Automatic control units



Cutting-edge devices and smart counters

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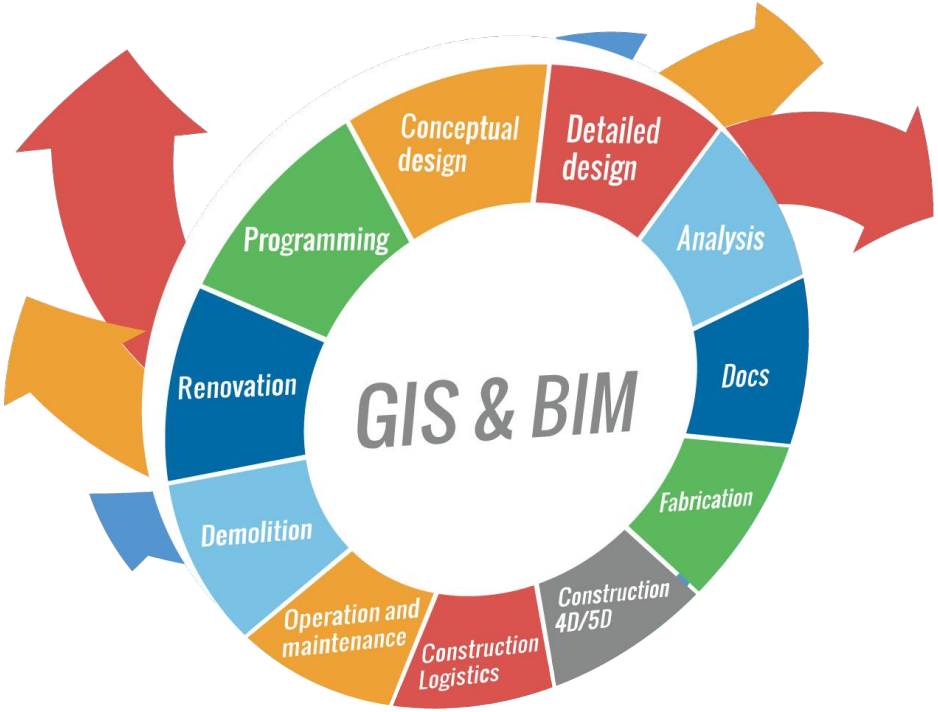
GIS & BIM


Conceptual design
Detailed design
Analysis
Docs
Fabrication
Construction 4D/5D
Construction Logistics
Operation and maintenance
Demolition
Renovation
Programming
GIS & BIM

GIS & BIM – 2D georeferences

openMAINT allows to **georeference** buildings and infrastructures on the **territory** with online maps such as OpenStreetMap and Google Maps.

You can also georeference the assets onto the **plans** of buildings, produced by external tools (i.e. Autodesk AutoCAD) and manually imported into openMAINT, in order to:

- graphically **show** the location of the asset, with automatic zoom on its location
- define and graphically **modify** the position or the polygonal associated to a card
- **query** the information associated to the elements represented on the map
- move through the **navigation tree** among the objects represented on the map
- operate on the list of **layers** represented on the map

GIS & BIM – 3D georeferences

openMAINT also supports the newest **BIM** extensions (Building Information Modeling), already used in several of the most popular **3D CAD architectural softwares**.

Who uses this tool typology will be able to:

- **automatically synchronize in both directions** the model managed inside the 3D CAD design tools with the one stored in *openMAINT*, by using the open-standard format IFC (Industry Foundation Classes),
- view realistically the building rooms and the related assets through an **interactive viewer** for 3D models, integrated in *openMAINT*

The Mathematics and Computer Science Departments of the **University of Udine** contributed to the realization of such features.

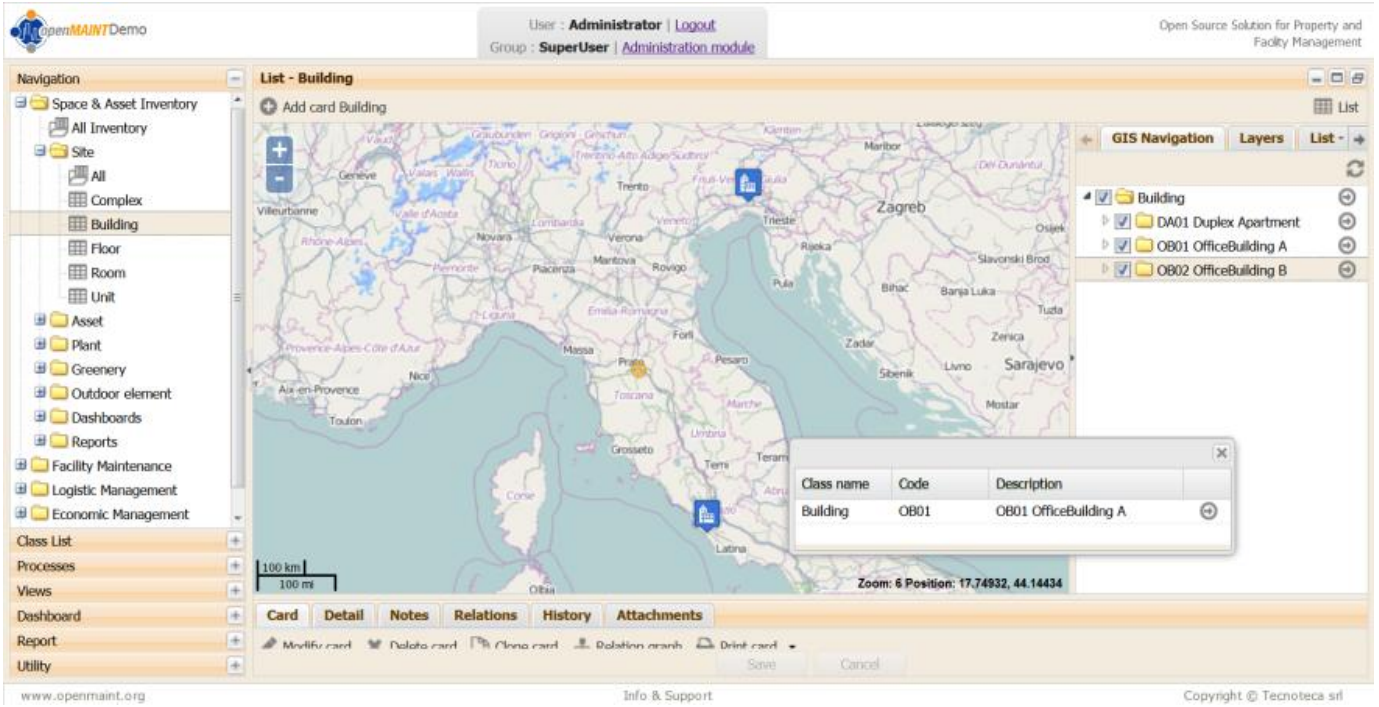
GIS & BIM – BIM methodology

The **BIM** methodology (Building Information Modeling) is based on an **integrated process** for the creation, management and updating of the data associated to a building during its whole **lifecycle**:

- it allows to **optimize** aspects like maintenance, energy efficiency, accessibility, security, etc.
- it improves the **quality** and reduces the management **costs** (an average value of 20%)
- it is widely adopted and **required by national legislation** in many countries (USA, UK, Nordic countries, China, etc)
- it is **supported by several** CAD architectural products (Autodesk Revit, Graphisoft ArchiCAD, Nemetschek Allplan, Bentley, etc.)

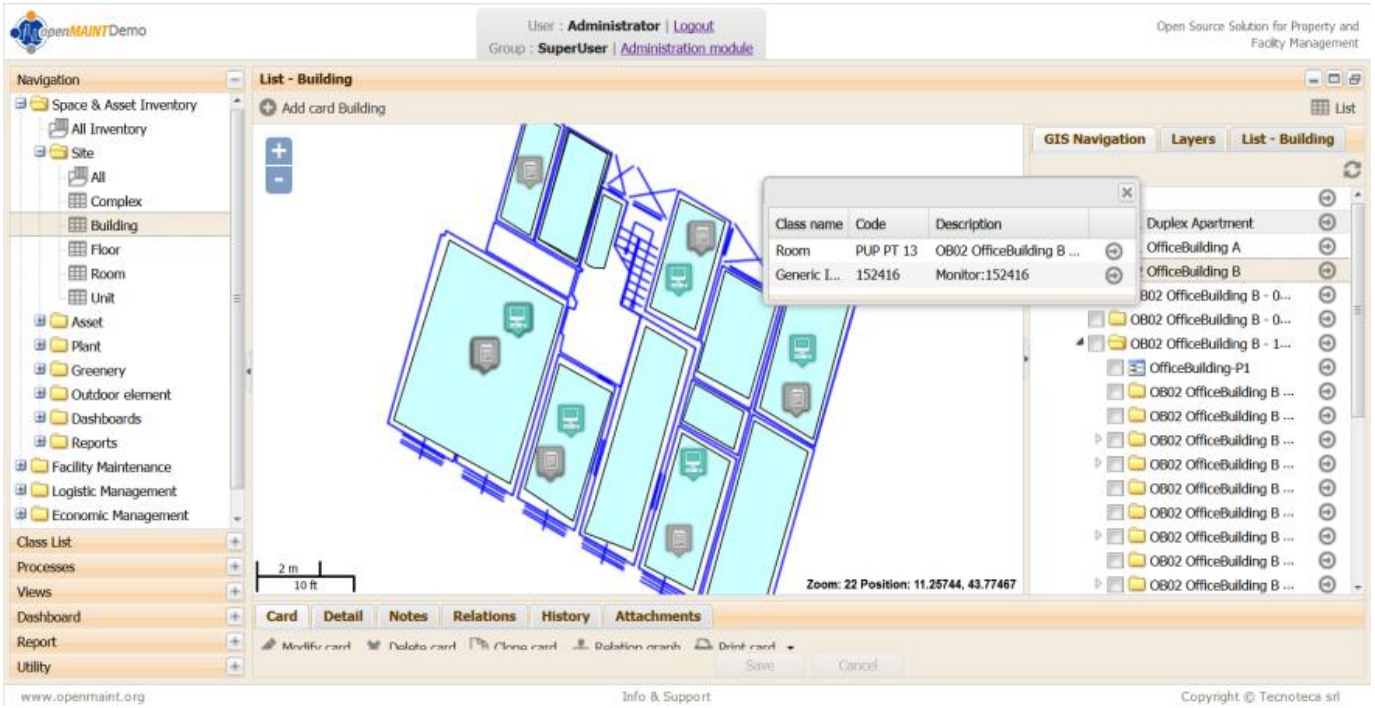
GIS & BIM – 2D georeferences on the territory

Georeference
on the territory



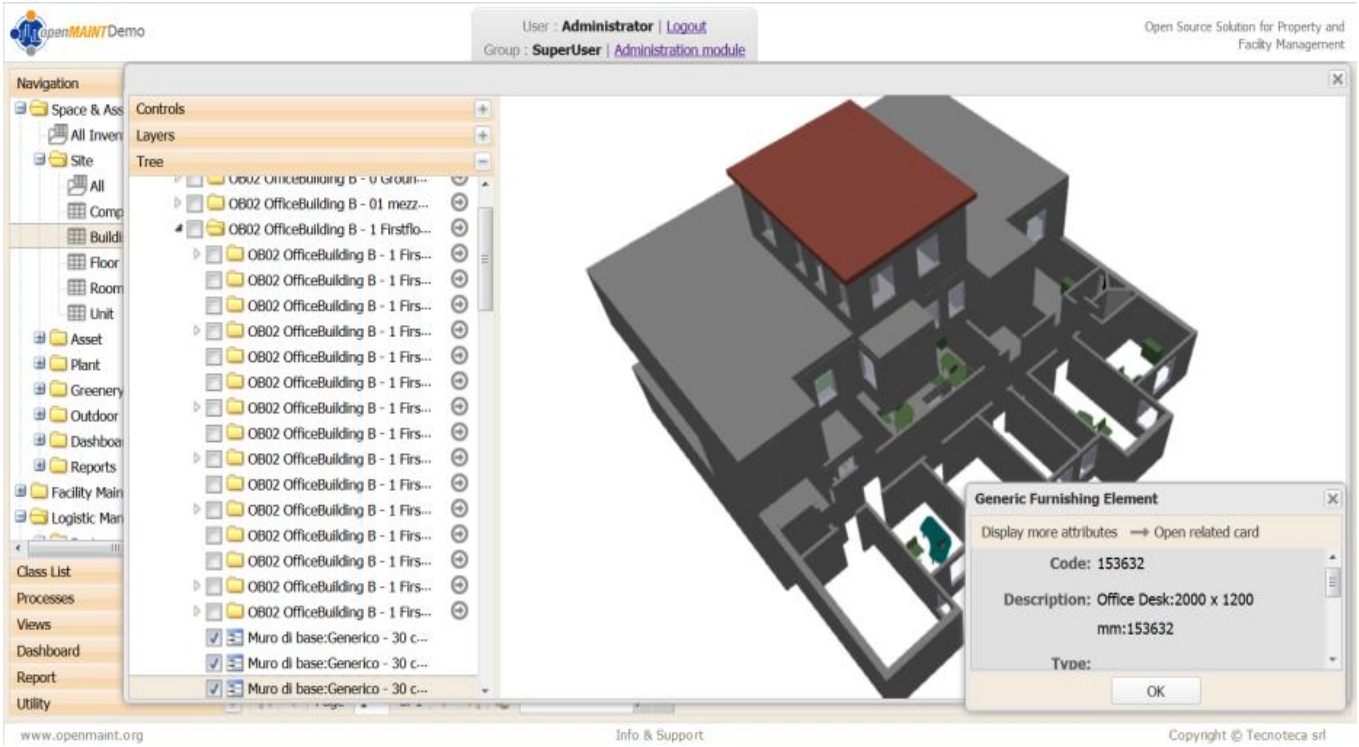
GIS & BIM – Georeferences on 2D plans

Georeference
on 2D plans



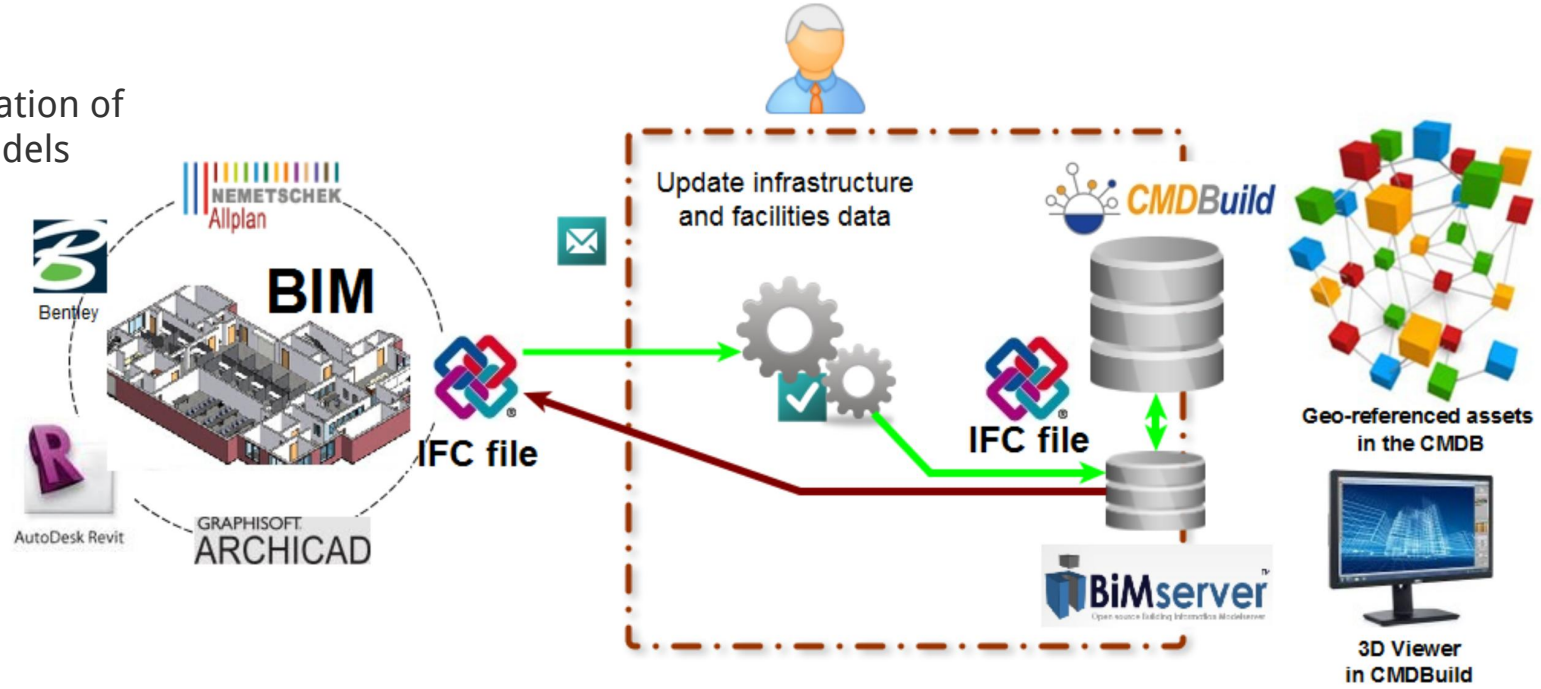
GIS & BIM – 3D BIM georeferences

Georeference
on 3D BIM models



GIS & BIM – 3D BIM synchronization

Automatic synchronization of 3D BIM models



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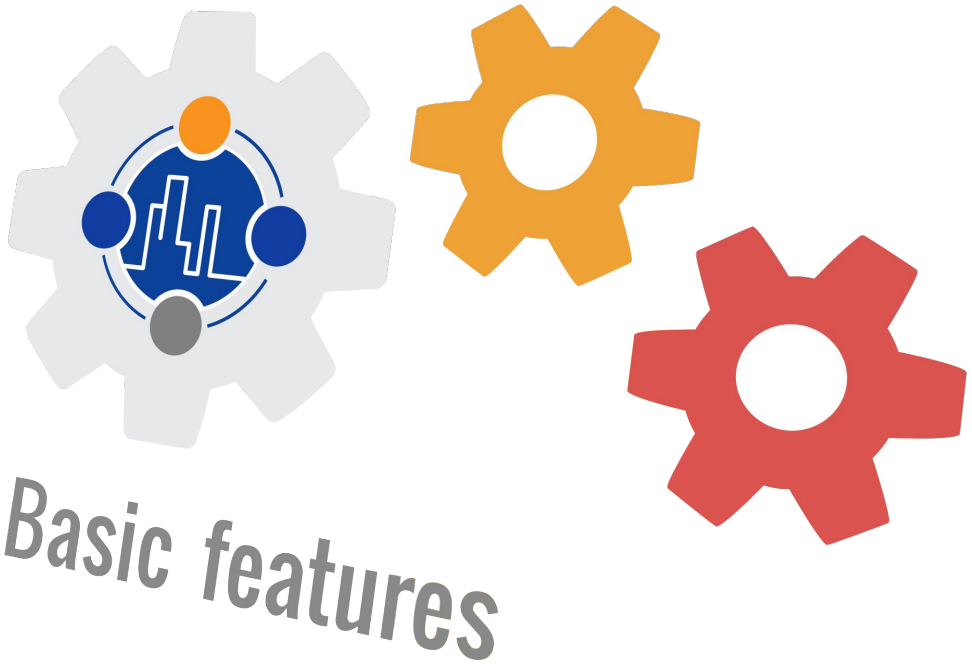
Basic features



Basic features – Data management

openMAINT acquires from CMDBuild, the framework on which it is implemented, the following **features** for the **data management**:

- fully web based **user interface**
- **navigation** among data by following the **relations**, both in a textual and in a graphical way
- complete history of the changes on any datacard (**versioning**)
- fast and/or specific **search** on any attribute
- **filters and views** for a custom access to data
- functions based on collaborative **workflows**
- **document archive** to attach every type of file at every type of card
- **reports** and **dashboards**

Basic features – System configuration

openMAINT acquires from CMDBuild the following **features** for the **system configuration** (Administration Module):

- **data model** customization: new typologies of objects, new attributes, new relations
- definition of **filters** and configuration of **views**
- possibility of **configuring custom workflows** through a visual editor
- possibility of **configuring custom reports** through a visual editor
- possibility of **configuring custom dashboards**
- **granular profiling** for users, groups and permissions
- interoperability with other applications / external systems through **webservices** and **connectors**
- **task manager** for the configuration of automatic activities

Technical features

Technical features – Architecture

openMAINT is **based on CMDBuild**, the asset management system developed and maintained by Tecnoteca. From this framework it acquires basic functionalities and technical features.

- **Service Oriented Architecture (SOA)**, organized in components and services, which cooperate also with external tools through **webservice**
- **Ajax user interface** (Ext JS frameworks) which grants an intuitive use of the application, ergonomic interaction, high response speed
- components in the server realized with **Java Enterprise environment** , which is solid, scalable and widely used by great firms for the development of web enterprise applications
- **PostgreSQL database**: the most mature, safe and complete open source database

Technical features - Components

openMAINT uses only open source and high tech components:

- PostgreSQL **database**
- Enhydra Shark **workflow engine**
- JasperReports **report engine**
- Quartz **scheduler**
- Alfresco **document system**
- Liferay **intranet portal**
- **PostGIS**, **GeoServer** and **OpenLayers** for the GIS functionalities support
- **BIMServer** and **BIMsurfer** for the BIM functionalities support

Technical features - Components

The main components of the system

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Thank you for your attention

www.openmaint.org
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