# SpinalZigBeeSystem
# Reference Guide

This guide was created in the context of the tutorial “ZigBee System” by SpinalCom. Its aim is to explain a system where the user can create a digital building and manage some ZigBee devices. This is taken as a starting point for the already mentioned tutorial.

It is assumed that the reader has already downloaded and ran the SpinalZigBeeSystem.

## Table of contents:

# Folder and files structure

You should have a project which contains at least this folders and files:

- browser-organs/
    - desk.html
    - lab.html
- models-manager/
    - is-sim/
    - models/

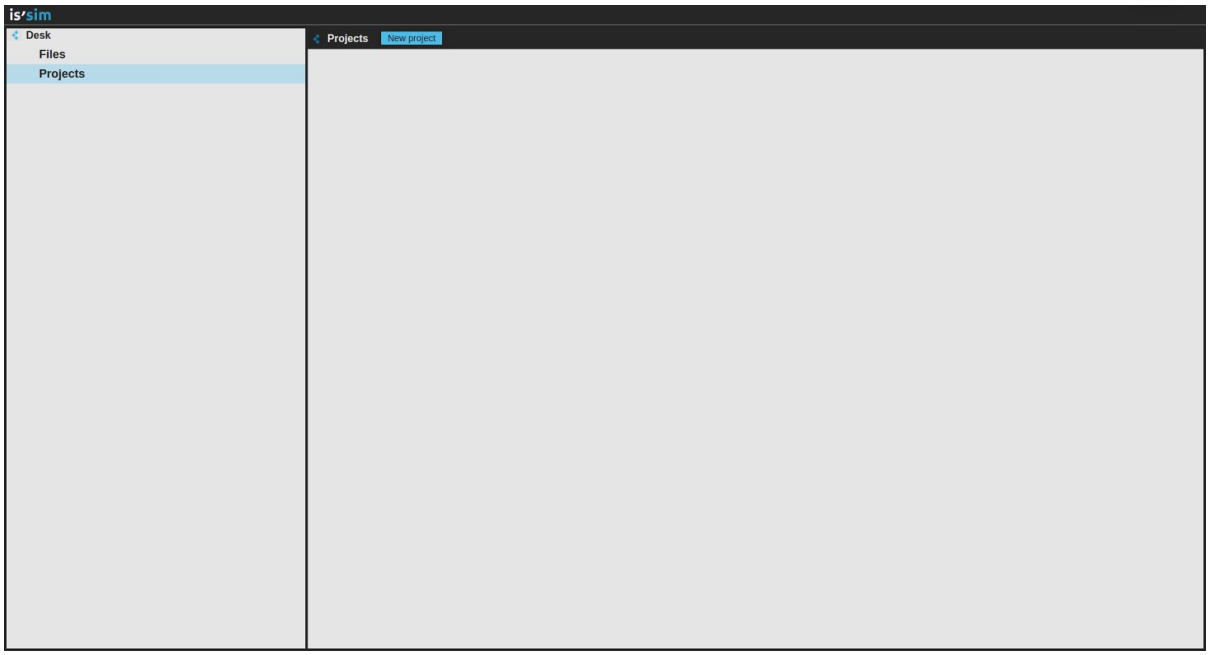
The files and folders under the “models-manager” are the structure of the data used by “is’sim” and the logic of “is’sim” itself. The files under “browser-organs” are the web access to “is’sim”.

# Usage of the Graphic Interface “is’sim”

## 1) Using the “Desk”

- After launching the SpinalHub, go to the following address to enter “is’sim”:

  http://localhost:8888/html/desk.html




In this window you will find the following:

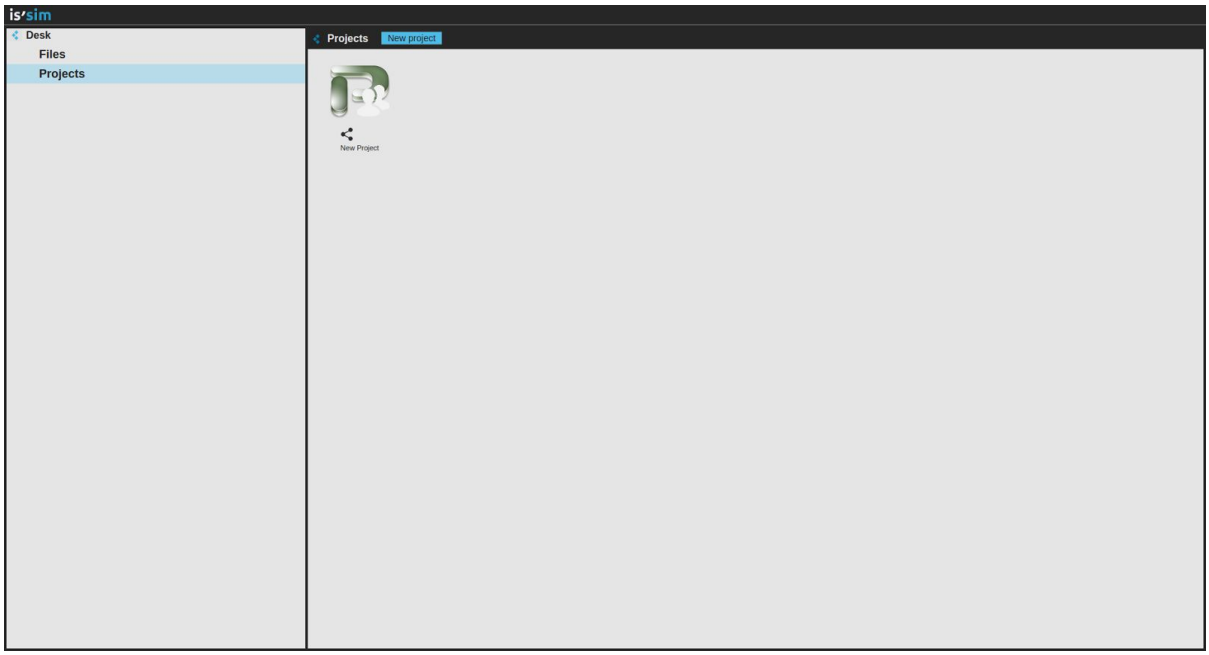
**Files:** Intern file system of the platform, from where one can upload files from the hard disk, create folders, save files from the environment…

**Projects:** Each project opens an unique working environment (a Lab).

## 2) Create and open a new project

From the Desk:

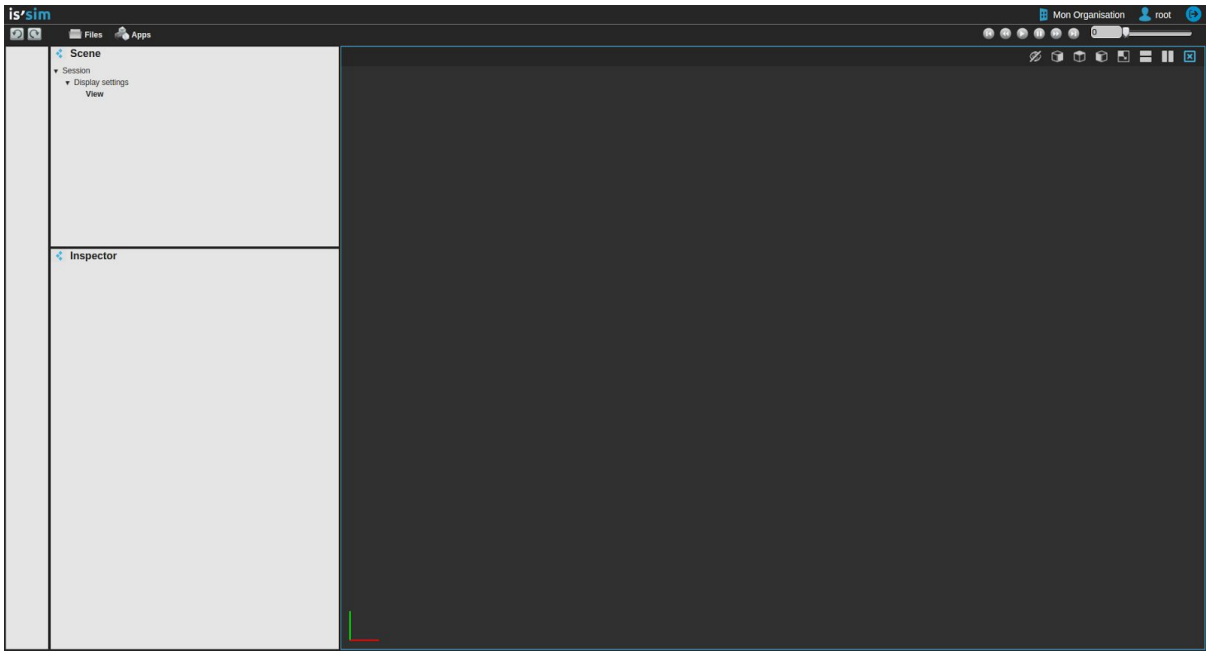
- Click on “Projects”
- Click on “New project”
- Give a name to the project



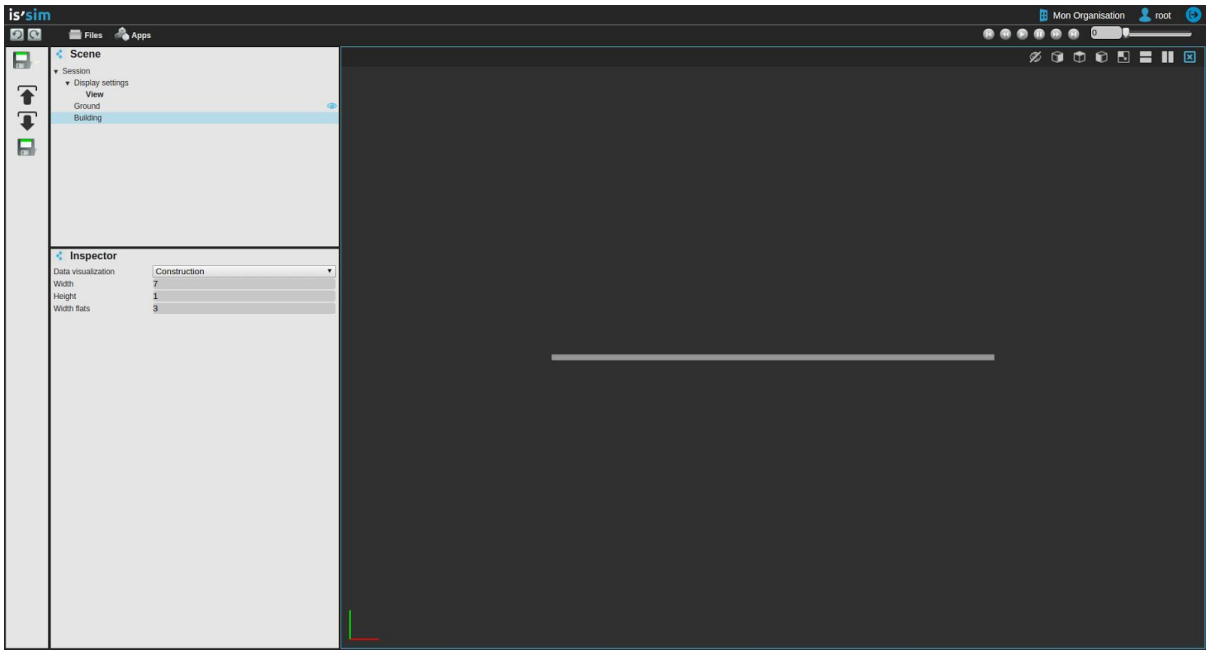

- Double click on the created project

## 3) Attach an application to the project

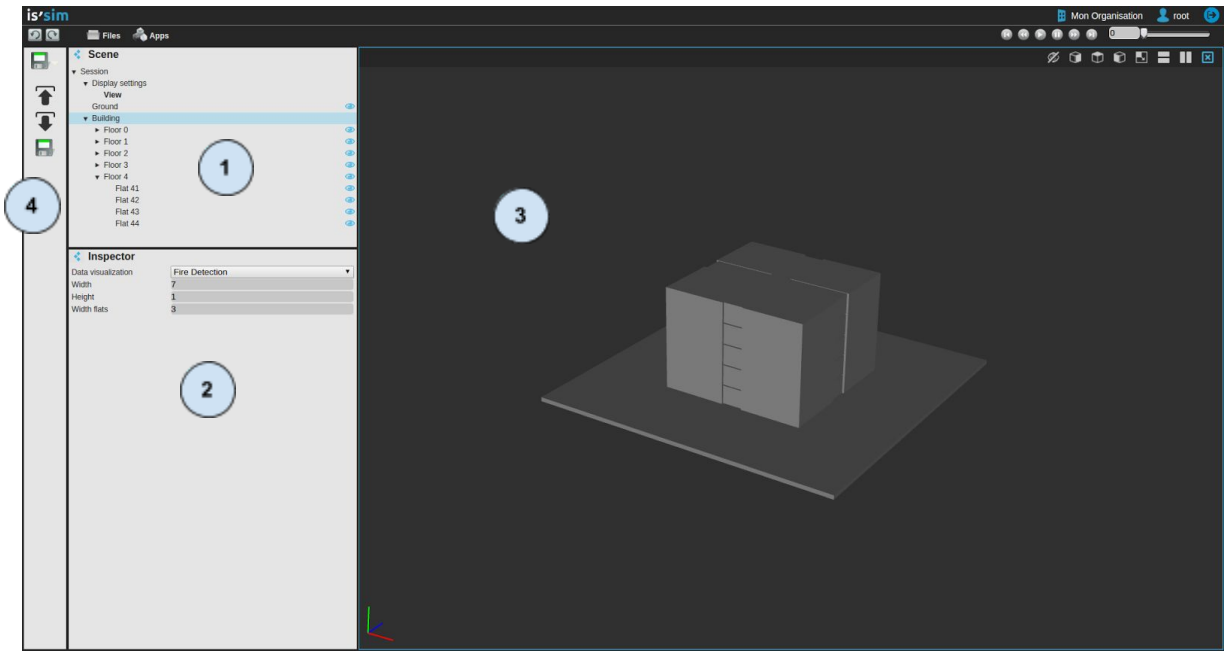
In the Lab:




- Click on “Apps”
- Click on “Smart Building” to add the “Smart Building” application
- Click on “ZigBee Network” to add the “ZigBee Network” application
- Close the popup



# 4) Using the Lab environment




1. Scene panel: contains the data described in a tree view. The root of the tree is the active session, that contains as children an object “Display settings” to generate the 3D view (not used here), and the objects added by the application “Intelligent Building”: “Ground”, “Building” and “eTeam”.
   You can open or close the tree with the arrows, select an object by clicking over it; and show or hide the objects in the 3D panel by clicking on the eye.

2. Inspector panel: contains the editable attributes of the selected item of the tree. The attributes are the data that belongs to the selcted item in form of values, dropdown menu, etc.

3. 3D panel: displays the visible objects of the tree (the ones with the blue eye on the Scene panel). There are buttons at the top of the panel to hide everything, change the view point, re-center the view, divide the view, etc. Moreover, you can zoom with the scroll wheel, rotate the view by holding the left mouse button and move the view by holding down the scroll wheel.

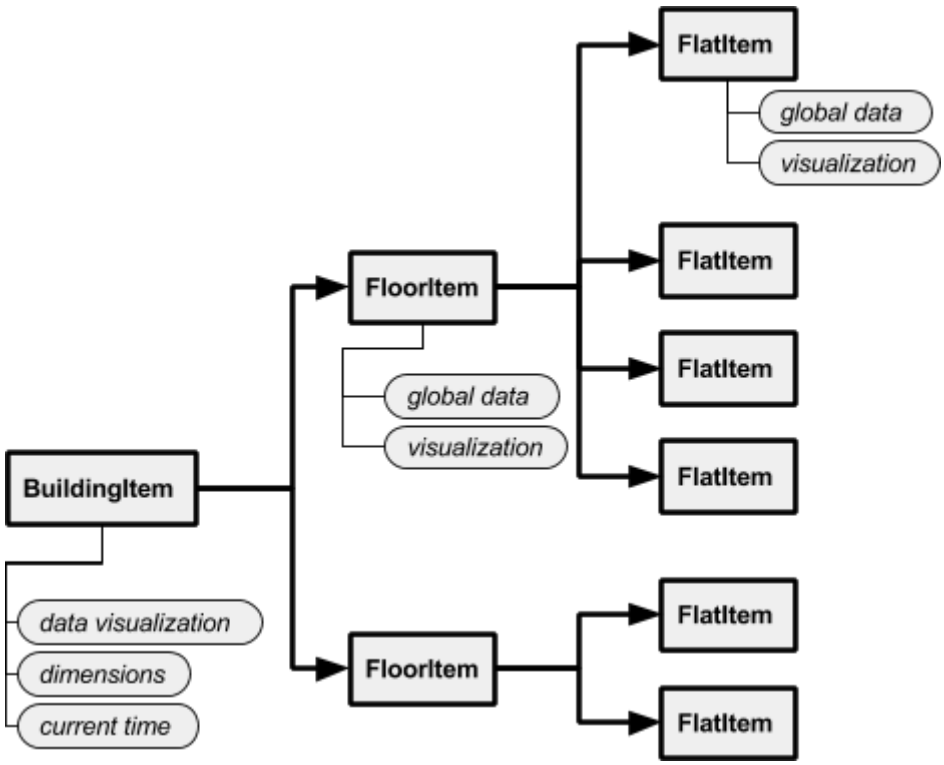
4. Contextual menu: contains buttons associated to the selected item of the tree, to perfom actions to the respective object (add children, save, modify attributes, etc.).

# 5) Application “Smart Building”

This application adds two objects to the tree of the Scene panel:

- **Ground**: Object that representates the floor: a smple flat parallelepiped
- **Building**: Object that representates the intelligent building, divided in floors containing each some flats, and a zone between them that representates the common spaces (corridors, etc.).

To describe the tree of data, we can take into account an example of a building of 2 floors, with 4 flats each.




**Building Item**: Root of the tree, contains all of the data relative to whole building.
Attributes:

- data visualization: choice of data to show, from these three available options: “Selection” (highlight the floor or flat selected from the tree in the Scene panel), “Construction” (progress of the construction of the building) and “Fire detection” (display the parts of the building in fire).
- dimensions: dimensions of the floors of the building (width, height)

**Floor Item**: Child of BuildingItem, models a flat of the building, and contains the relative data to the floor (common spaces).
Attributes:

- global data: general data relative to the floor: progess of construction, fire detection.

- visualization: display options of the floor (automatically modified in function of the global data, but they can also be modified manually)

**Flat Item**: Child of FloorItem, models one flat of the corresponding floor, and contains the data relative to an unique flat.
Attributes:
- global data: general data relative to a flat: progess of construction, fire detection.
- visualization: display options of the flat (automatically modified in function of the global data, but they can also be modified manually)

### Manipulation of Building Item

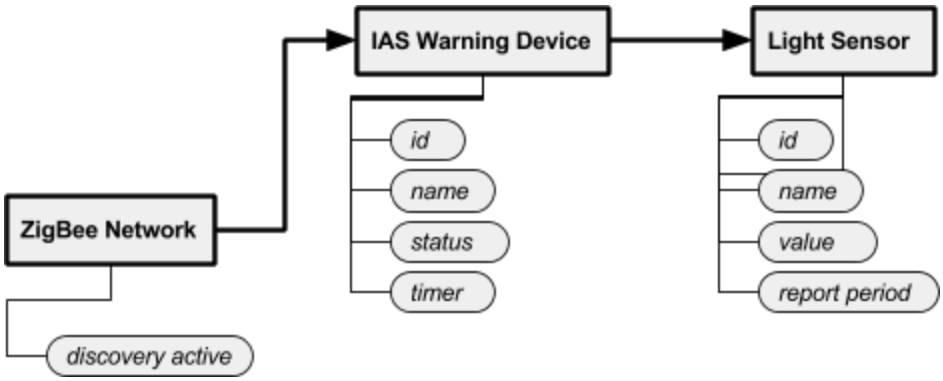
After inserting the Building Item in the Scene panel, you can make the following actions:

- **Add/remove floors**: select the building, then click over the arrows in the contextual menu.
- **Modify how the building is displayed**: in the attribute “data visualization” of the building, you can choose from the dropdown menu to highlight the selected item, to show the progress of the construction, and to show the presence or not of fire.
- **Modify the dimensions of the building**: modify the values of other attribues of the building. These modification will be taken into account when new floors are added.
- **Modify the data of a floor/flat**: Change the values of the attributes “Construction”, “Fire detection” and “Current data”.
- **Modify manually the display of a floor/flat:** Change the attribute “visualization”: view style (surface, contour) and color.
- **Open the tree of data in a graph view**: select an item in the Scene panel and then click in the button “View graph representation” from the contextual menu.
- **Display the daily data of the floor, flat of building**: Select a flat and click on the button “Display daily charts” or “Display business charts” from the contextual menu.

## 6) Application “ZigBee Network”

This application adds one object to the tree of the Scene panel:
- **Zigbee Network**: Root item of the ZigBee network, where its children are either ZigBee routers or ZigBee physical devices.

To describe the tree of data, we can take into account an example of a ZigBee network of 2 physical devices, a router (containing an IAS Warning Device) that has an end device (containing a Light Sensor).




**ZigBee Network Item**: Root of the tree, contains all of the devices successfully discovered in the ZigBee network.
Attributes:

- discovery active: states weather the discovery is currently executing or not.

**ZigBee Thing Item** (e.g. IAS Warning Device and Light Sensor):
Attributes:

- IEEE address: the physical device unique identifier
- network address: the address assigned to the physical device by the network
- type: states to which of the following categories does the physical device belongs to:
  - 0: coordinator
  - 1: router
  - 2: end device
  - 3: unknown
- list of devices and list of clusters: ZigBee devices and clusters identified.

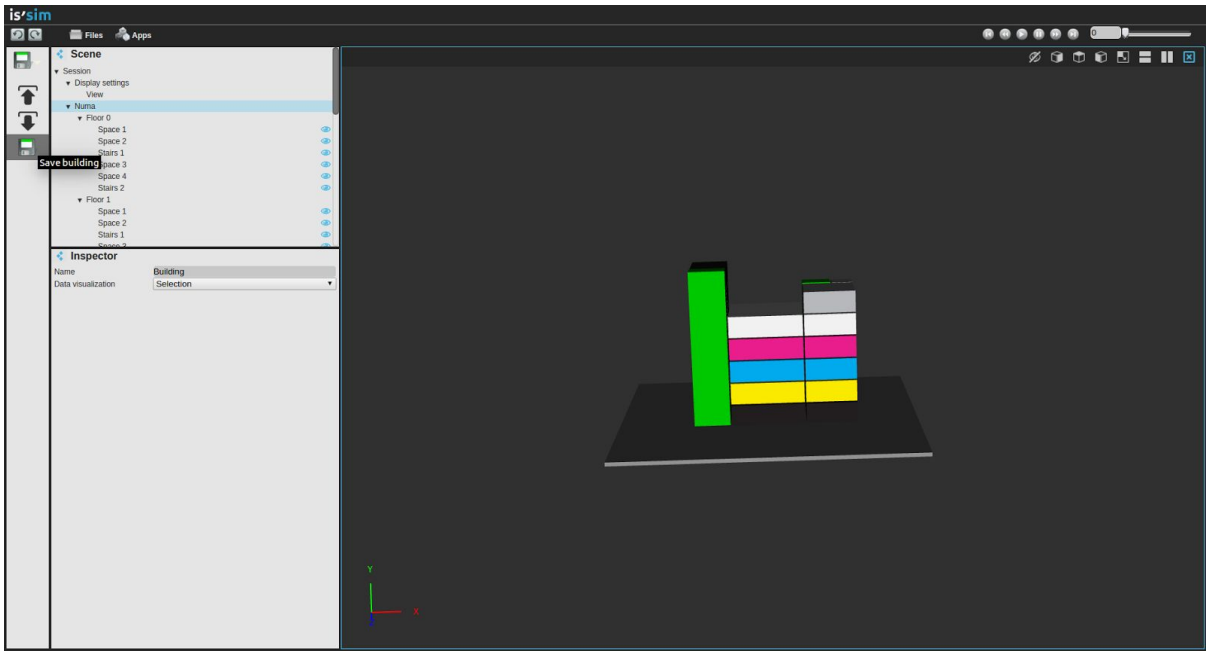
### Manipulation of ZigBee Network Item

After inserting the ZigBee Network Item in the Scene panel, you can make the following actions:

- **Add ZigBee physical devices**: select the ZigBee Network item, and then click the “search” icon in the contextual menu.

## 7) Saving the Building and Network

To save the Building, it’s just a matter of clicking on the “Save Building” icon from the contextual menu. The same applies for saving the Zigbee Network (click on “Save ZigBee Network” icon).
In the tutorial we explain more deeply how this is done and its importance when creating an IoT solution.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Files
Apps
Scene
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Display settings
View
Numa
Floor 0
Space 1
Space 2
Stairs 1
Space 3
Space 4
Stairs 2
Floor 1
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Stairs 1
Save building
Inspector
Name
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Data visualization
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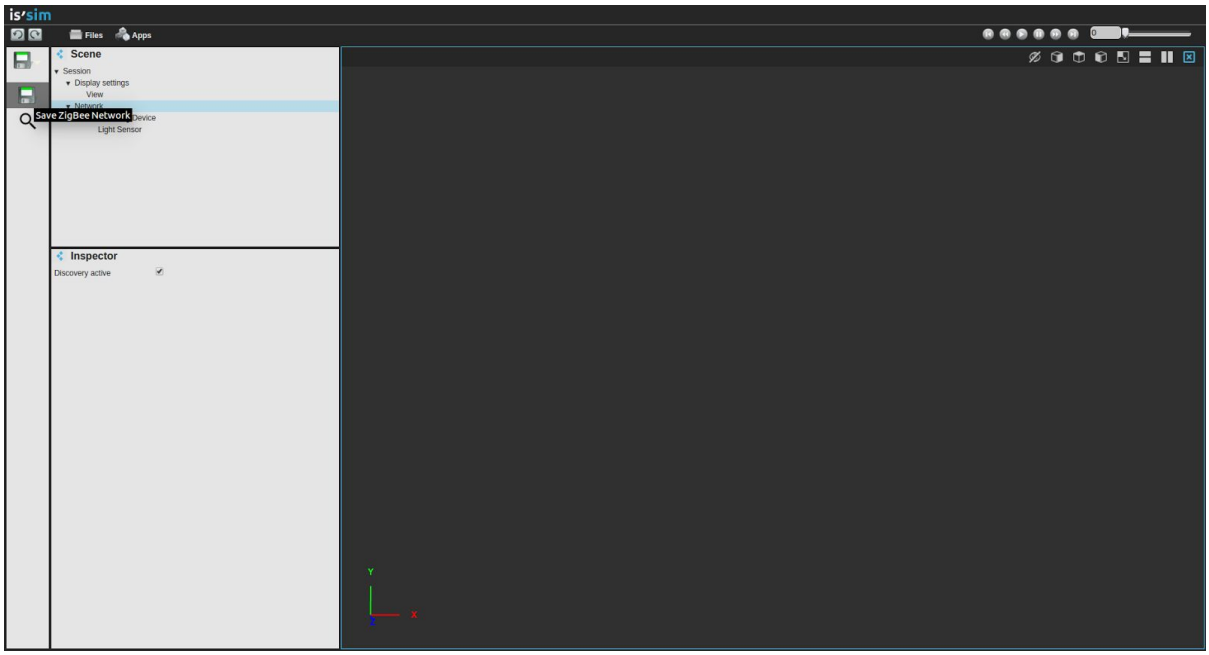
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