

Kuwaiba Open Inventory User's Manual

Neotropic SAS

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System Version **1.0**

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- Kuwaiba uses third-party components with compatible open source licenses (LGPL, BSD-like, etc). You can find a complete list at the project’s web page.

Introduction

Kuwaiba sees an inventory system as a living entity, not growing only in terms of size, but also in structure and intelligence. The main reason is that business requirements change constantly and therefore, the application must be ready to respond to new scenarios. One of the key concepts that can help you unlock the potential of Kuwaiba is the **data model**. It provides a simplified representation of the network and the business from an operational point of view. It can be seen as the skeleton that supports the application, but a skeleton from which you can add, remove and change elements as you go. Later in this document you will be able to see what tools you can use to manage it. For now, just keep in mind that the better you design your data model and the more you get to know it, the more you will take advantage of the application.

Having said that, you will find four types of resources in a typical data model:

- **Physical:** Equipment, pipes, cables, fiber optics, facilities, parts and in general every physical asset from a port to a building.
- **Logical:** These are all the resources related to non-tangible technology assets. In this group fits timeslots, virtual circuits, VLANs, disk space, available bandwidth, etc.
- **Other Non-physical:** mostly software-related assets, such as licenses or virtual machines.
- **Administrative:** These are all those related to administrative tasks, human resources or commercial management. Customers, their services, SLAs (and related parameters like availability or throughput), sales and technical staff assigned to those services, vendors and states belong to this category.

The Kuwaiba desktop client is a set of views (trees, topologies, editors) that allow to put together these elements based on business rules and user-defined models. Kuwaiba extends the concept of **CMDDB** (Configuration Management Database, a place where you store objects that can hold configuration information or be subject to configuration themselves -so called Configuration Items- and their relationships) and enables you to perform network design tasks, support capacity management and provisioning workflows and assist field and customer service teams to improve response times.

Kuwaiba helps you model your network according to your needs, no matter if you're an ISP, a carrier or just a guy with a large (or small!) IT infrastructure to manage. It's open source, under active development and new models are added every release. You can contribute to the project by providing technical insight on a particular technology, testing, translating or just sending your feedback through forums¹ and mailing lists².

¹Forums <https://sourceforge.net/p/kuwaiba/discussion/>

²mailing lists <https://sourceforge.net/p/kuwaiba/mailman/>

Connection to the Server

The first thing you will see when opening the client is the window in the figure 1. The default user and password are **admin/kuwaiba**.

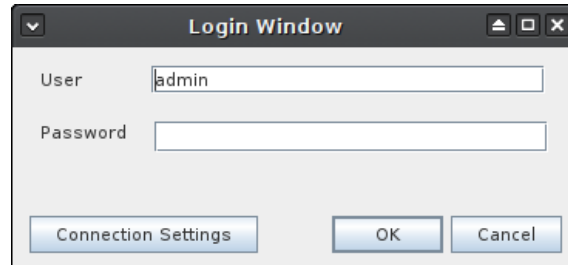


Figure 1: Authentication window

The default connection settings should be enough if the server is running on the same computer the client is. If that's not the case, open the Connection Settings window (figure 2).

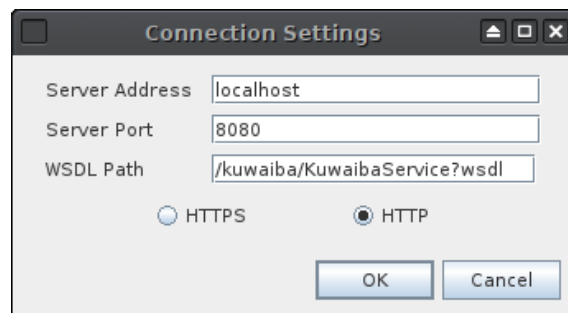


Figure 2: Connection Settings window

- **Server Address** Refers to the server IP address or canonical name.
- **Server Port** is the port Glassfish (the application server) is listening to.
- **WSDL Path** is the path within the application server the web service interface definition can be found. Usually this value should remain unchanged.
- Protocol is the transport protocol to be used. By default is HTTP, but is highly advisable to request your administrator to setup a secure connection, otherwise your credentials will be transmitted in plain text over the network.

Except for the password, the last successful settings will be saved upon clicking OK.

Important

If you are unsure if the server is reachable from your location, open a browser and type the address: **http://[server_address]:[server_port]/[wsdl_location]**

You should see a large XML document.

Troubleshooting

- For a **Can't contact backend** error, check the Administrator's Manual Troubleshooting section.

- If you get a **Connection refused** error, check the connection settings and verify that the server is reachable and there isn't a firewall blocking the traffic to it.

Once you are logged in, you will see only the dashboard page and a toolbar (figure 3).



Figure 3: Main toolbar

The toolbar contains the most frequently used tools. Here is an overview of what can you do with them:

	Search objects with the Query Manager
	Refresh the current view
	Refresh local cache
	Default view for an object. Also, the rack view for rack objects
	Create automation tasks (beta version)
	See the changes made to inventory and application objects
	Manage users and groups
	Change the data model
	Manage how objects can be created inside others
	Create new list types
	Freely design network topologies
	Main tree used to explore physical assets
	Create and manage objects that don't fit in the navigation tree
	Manage client, services and resources associated to them

Table 1: Toolbar items

Data Model Manager

One of the key features of Kuwaiba is that it is completely object-oriented³. It means that every business (Router, City, Port) and application (users, types) element is represented by an **Object** in the application and these objects are in turn product of an reality abstraction called **Class**. Likewise, every attribute is a **Field** in a class. The set of classes, attributes and relationships between them is called data model. There's a default data model, but you can customize it depending on your needs by adding, removing and modifying classes. To achieve this, use the Data Model Manager module (figure 4). The data model is represented as a tree because it's a hierarchical

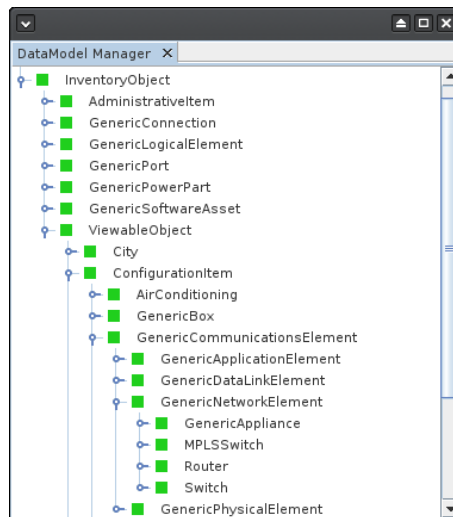


Figure 4: Part of the data model tree

structure. Technically, it's a class hierarchy⁴. The top of the hierarchy (**InventoryObject**) is the most general type of element in the data model and its subclasses represent all the possible elements that will be treated as inventory assets. As you dig deeper into the tree, the classes become more and more specialized and each level inherits the attributes of the parent classes. This kind of structure has two purposes: First, it helps you to organize your classes based on what characteristics they have in common. Secondly, as you will see later in this manual, you can apply operations over top level classes, and they will be propagated to all subclasses. Another root of the data model tree is **GenericObjectList**, and its subclasses are all possible list types (see more details on the subject in the chapter **List Type Manager**).

Important

The **Properties** window allows you to modify the attributes of a selected object in a tree, list or view. If not already open, it's available from the Windows → Properties menu.

The properties of a class can be edited by using the **Properties** window, selecting the class from the tree (see figure 5). The property sheet is divided in two sections:

- **General:** Contains the intrinsic properties of the class: **name** (can contain only letters and numbers with no special characters or blank spaces). The **display name** of the class, that's how it will be displayed everywhere else (useful for internationalization purposes, for example) and can contain any kind of UTF-8 character. A **description** (useful to document the data model). If the class is **abstract** (abstract classes cannot be instantiated, they're only used to give consistency to the data model). The attribute **countable** is not used currently,

³Object-oriented Programming https://en.wikipedia.org/wiki/Object-oriented_programming

⁴Class Hierarchy https://en.wikipedia.org/wiki/Class_hierarchy

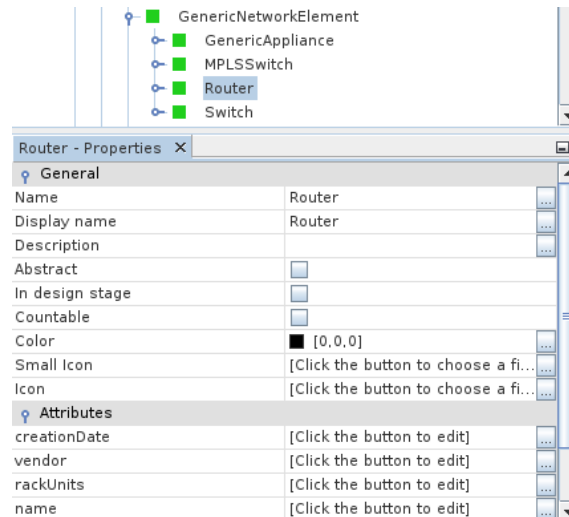


Figure 5: Properties of class **Router**

but it should be used to mark classes whose instances can have graphical representations, but they're not really part of the inventory, such as **Slots**. **In Design Stage** is just a way to mark a class as part of an ongoing data model intervention, and thus, classes with that attribute set to true can not be instantiated. **Color** is the color of the default square icon used to display the object in a tree or view. This icon will be used as long as the **Small Icon** attribute is null. **Small Icon** is the icon that will be used in trees and its size can't exceed 16x16 pixels. **Icon** is the icon used in views, and has a maximum size of 32x32 pixels.

Important

- All user-created classes are set In Design Stage = **true** by default. You won't be able to create objects of these classes until you set it to **false**.
- As a convention, all abstract classes have the prefix **Generic**. Note that a few core classes (like **InventoryObject** or **true**) are abstract are the exception to this rule. You, however, should try to follow this convention as much as possible.

- The second section contains the class fields (attributes). In the figure5, class Router has six attributes: name, state, conditions, vendor, serialNumber and creationDate. Click the button next to the attribute name to customize it (see figure 6).

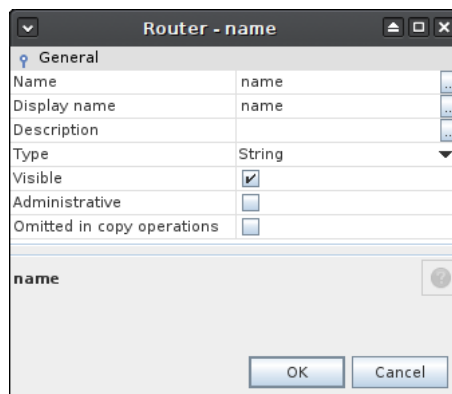


Figure 6: Properties of attribute **name** in class **Router**

In this window, you can modify the attribute's name, display name, description, type (the drop-down list will show you primitive types -String, Integer, Float, Long, etc- and all available non-abstract list types). When you change an attribute's type, all existing instances will be modified to reflect the change, which means that the values of the modified attribute will be converted to the new type if possible (say, from Integers to Strings). If the conversion is not possible, the new value will be set to null. You can also manage the attribute visibility. Attributes marked as "Administrative" will be shown in a separate tab in the object's property sheet. Sometimes, there are attributes that are used only for administrative purposes and might confuse the end user if mixed with the regular attributes. Finally, you can choose what attributes shouldn't be transferred from one object to another in a copy operation.

Important

- You may lose information when changing an attribute's type. make sure the conversion to the new type is possible before you do it.
- Although there's a Cancel button at the bottom of the window, it does not really work. When you perform a change, it's saved immediately.

You can also create and delete classes and attributes by right-clicking a class node (see figure 7) New subclasses inherit the parent class attributes. Classes with instances or subclasses can not

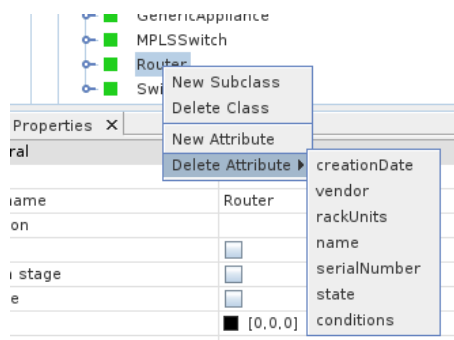


Figure 7: Class **Router** context menu

be deleted (this is a feature to avoid unintended loss of data). Also, attribute **name** can not be deleted.

Important It's highly recommended **NOT** to rename abstract core classes, as some of them are used internally to support many features and renaming them may turn the system unstable.

Containment Manager

Another key concept in Kuwaiba is containment. It consists of the ability to define what kind of objects can be created within others. For example, a **Country** can be inside a **Continent**, but can't be inside a **Rack**. A **Port** is usually within a **Board**, and not inside a **City**. These business rules can be defined using the Containment Manager.

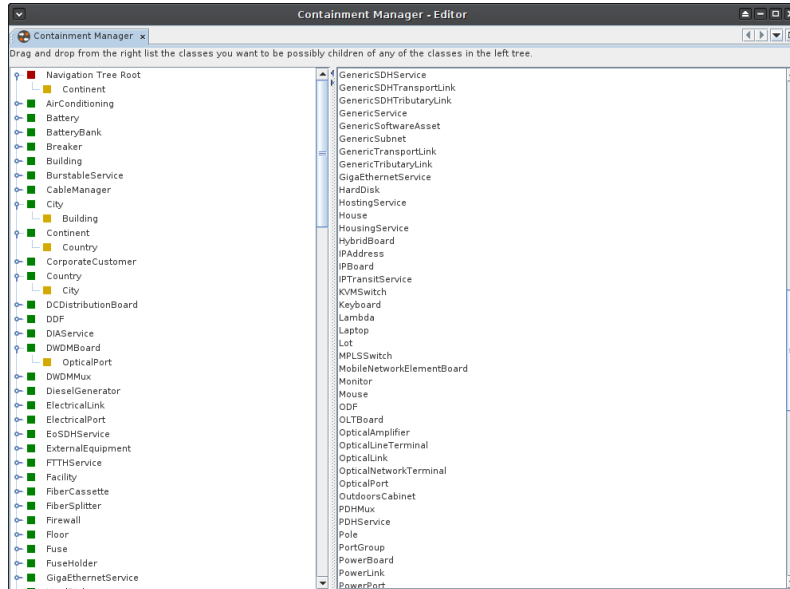


Figure 8: Containment Manager main window. Zoom in the image to see the details

The main window is divided in two panels (see figure 8, zoom in the image to see the details). The one on the left is a tree that holds all the classes plus the **Navigation Tree Root**. The children of the left-side tree node are the possible classes that can be contained. In the figure 8 there are five nodes expanded: **City**, that has one node inside: **Building**. That means that below a given city, you will only be able to add **Building** objects. Likewise, inside a **Continent** you can only create instances of **Country**, and inside those instances, only objects of class **City**. Under the root of the Navigation Tree, only instances of **Continent** are to be created. Finally, only **OpticalPorts** are supported under **DWDMBoards**. If for your operation Continents are not relevant, or if your routers do not have boards, but only ports, simplify the hierarchy as much as you want to meet your needs. To remove a possible children class, just right-click on it and select “Remove”, and instances from that class will no longer be available to be added under the parent class, though the objects created already will remain linked to the respective parent objects.

Important

- To avoid adding one by one many classes to a parent, you can use the flexibility of the data model as a hierarchical structure. For example, a **Rack** may contain within many types of equipment (routers, DDFs, switches, battery banks, etc). Instead of adding one by one each of these classes, you can add a common super class and all of them will be added automatically. For this example a common super class for most of those classes could be **GenericCommunicationsElement**.
- To search for a particular class, just select any node in the desired side of the panel and type the first letters of the class name. If there are many occurrences of the term, jump from one to another using the F3 key.
- The changes are applied immediately, however, if you happen to not see them reflected, press the Refresh Cache button in the main toolbar (see table 1).

Navigation Tree

This module presents in a tree fashion the physical objects of your inventory organized according to the containment hierarchy defined with the tool described in the previous chapter (see **Containment Manager**). Just like the Data Model Manager, the Properties window will display

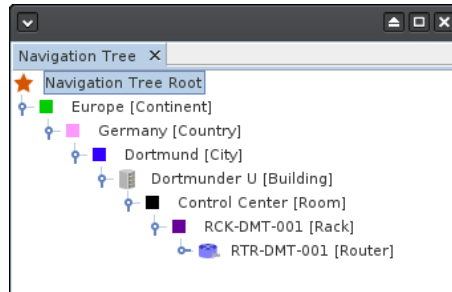


Figure 9: Navigation tree showing objects with default and user-defined icons

the attributes of the object selected in the Navigation Tree. These attributes match the visible attributes defined in the **Containment Manager**. Every change is automatically committed to

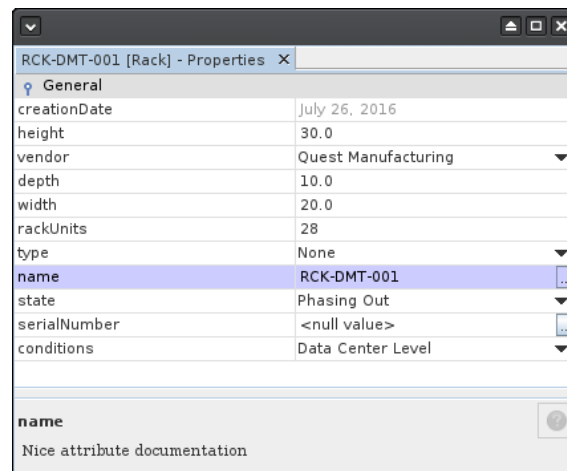


Figure 10: Properties of a selected **Rack** object

the database once you hit the Enter key. When editing dates, you need to select another attribute to commit the changes instead of pressing Enter. In the **Containment Manager** you can also configure what labels will be displayed instead of the actual names of the attributes and the help string in the lowest part of the window.

Every node has a set of actions, some will be active for all objects, some depend on the type of element that is selected. In the figure 11 you can see the actions enabled for a **Rack** object.

- **New Object:** The list of object types that can be contained for the selected element type according to the configured Containment Hierarchy. In this case, a **Rack** can only contain **Routers**.
- **Copy:** A plain copy operation.
- **Paste:** A plain paste operation. You can only paste objects where it is allowed according to the configured Containment Hierarchy.
- **Update:** Update the node information. Useful when a changed has made to the object from a external source (e.g. another user) or if you create a new list type affecting one of the

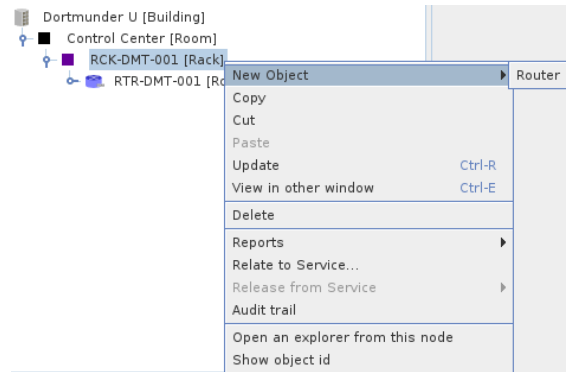


Figure 11: Properties of a selected **Rack** object

attributes of the selected element. In this case, if you, for example, create an instance of **EquipmentVendor** (this will add a new entry to the **vendor** attribute list)

- **Delete:** Deletes the object. This will fail if the object has an incoming relationship, for example, a **Port** connected to a cable.
- **Reports:** The reports associated with this class. In this case, **Rack** has a report called **Rack Usage**. If no reports are associated, the option will appear grayed out.
- **Relate to service:** All inventory objects can be associated to an existing service. See more details in the chapter Service Manager.
- **Release from Service:** Removes the association between an object(resource) and a service. If the object is not related to any service, this option will appear grayed out.
- **Audit Trail:** This will display all the audit trail entries for the selected object, that is, all the changes made to the it.
- **Open an Explorer from this Node:** Opens a navigation tree whose root node will be the selected object. Useful when you want to explore an object with a many containment levels below.
- **Show Object Id:** Shows the database id of the selected object. Useful for troubleshooting purposes. It will also show the object's complete containment structure.

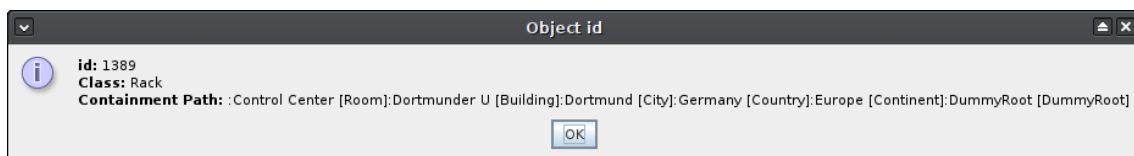


Figure 12: Object id action on the selected **Rack** object

Important

- Remember that you can always open the Properties window by selecting the main menu option Windows → Properties.
- You can change the name of an object in-line by pressing F2 on a selected node.

Relationship and Special Children Explorer

Apart from the main navigation tree, there are also two explorers that are very useful to navigate through domain-specific models. Both explorers are located in the Tools → Navigation menu.

- **Relationship Explorer:** Allows to see the special relationships of the selected object. When an object makes part of a domain-specific model (SDH, Physical Connections, MPLS, Software Licensing, etc) there are special bounds to other objects called **relationships** they have names documented on model-basis, and they can be seen using this explorer. In the figure 13, it is depicted an **OpticalPort** with two relationships, one called **endpointA** used in the Physical Connections model and it indicates that this port is the endpoint to a physical connection, probably a fiber optic. It also has a relationship called **uses**, which makes part of the Service management model. It indicates that the service called PDH Service-01 uses that port as a resource.

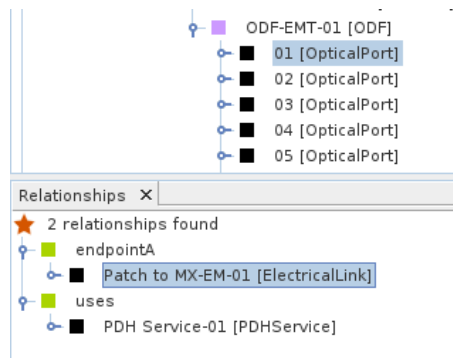


Figure 13: Special relationships of the selected **OpticalPort** object

- **Special Children Explorer:** The special children are children as in the containment hierarchy concept, but used in domain-specific models, which gives them particular behavior depending on the situation (that is, they can't be handled as simple objects in the navigation tree, because, for example, deleting them may require to perform other tasks but just removing the object from the database as they make part of a complex workflow). This is the case of the cables inside a conduit connecting two buildings. You can find more details about this scenario in the chapter **Physical Connections**.

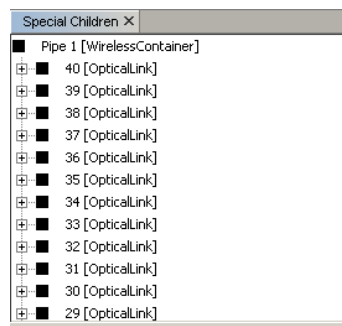


Figure 14: Fibers inside a container between two buildings

Default and Rack Views

Default View

A view is a graphical representation of an object. There are many types of views, because an object has different perspectives, for example, a service object may have a view showing all the resources associated to it, a second view showing how all those resources are connected and a third showing statistics about such service. All instances (objects) of subclasses of **ViewableObject** have a default view that displays the direct children of the selected node. Most objects, except logical and administrative assets and a few physical ones such as slots and ports are subclasses of **ViewableObject**. To access a default view, just open the Default View window (see Toolbar items) and select a node in the navigation tree.

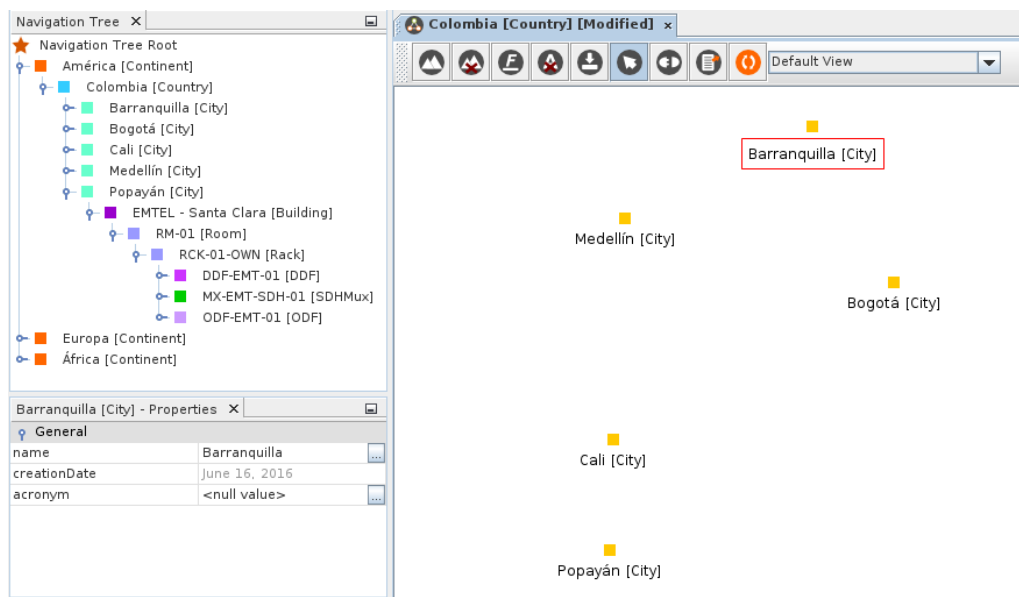


Figure 15: Default view of the selected **Country** object

In the default view, you can move and connect the nodes, add a background and export the view. It is particularly useful at Room and City levels, because it will allow you to see how the children elements are located geographically (e.g. buildings) or in an enclosed space (racks in a data center as seen in figure 16).

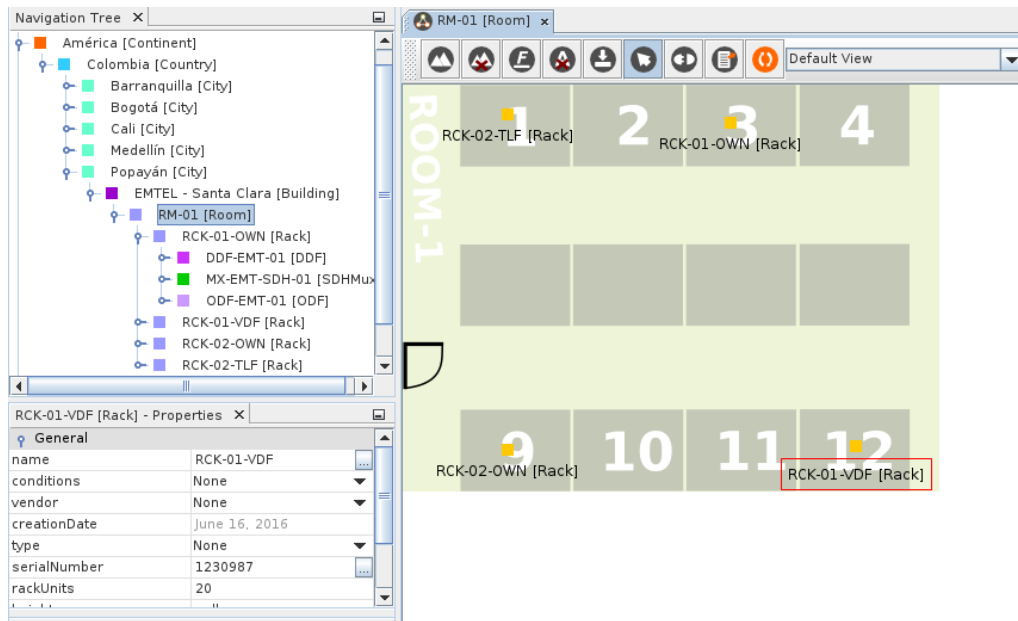


Figure 16: Default view of the selected **Room** object

Physical Connections

List Type Manager

Audit Trail

Service Manager