Attribute

An attribute is a named property of a [Class](#) that describes a range of values that can be held by the instances of that Class. You can specify attribute properties in the attribute's Specification window. Specifying attribute properties include changing the name, defining the type, converting the attribute to a port, etc. In the same window, you can find the description of each property. Descriptions are presented in the description area of the Specification window at the bottom of the Specification window.

> ✅ **More information**
>
> - For more information about the Specification window usage, see [Specification window](#).
> - For more information about specifying property values, see [Editing Property Values](#).

New Attribute

To create a new attribute

There are quite a few ways to create a new attribute, so do one of the following:

- In the **Containment tree**, right-click a Class element, from the [shortcut menu](#), select **Create Element** and then click **Property**, name it and press **Enter**.
- In the Class's Specification window, click **Attributes** on the left side of the window and then click the Create button. The **Attribute** Specification window opens. Type a desired name, then click **Close**. You will see the change directly on your Class symbol.
- On the diagram pane, click the Class shape, press the **Ctrl+Alt+A** shortcut keys and type the Attribute's name and press **Enter**.
- On the diagram pane, click the Class shape and then click the **Create Property**, which is the white-circled plus on the side of the Class block, name your attribute and press **Enter**.
- On the diagram pane, click the Class shape, then click the **Create Element** button, which the black-circled plus on the side of the Class block. From the popped-up menu, select the **Property** command, name your attribute and press **Enter**.
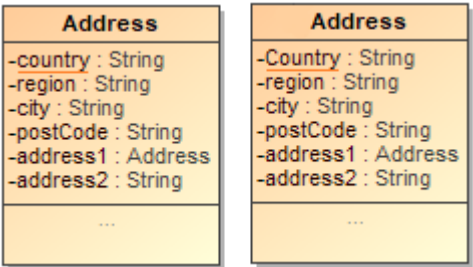
Attribute Name

The attribute's name must be unique in the Class scope. Nevertheless, do one of the following instructions to change the attribute's name.

> ⊘ **Warning**
>
> Illegal characters for attribute names are **( ) [ ] { } ! @ # % ; ', ; : ' " ?**

Example of changing the attribute name from 'country' to 'Country'
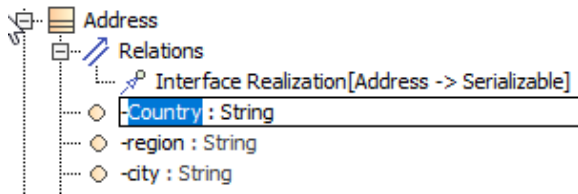
To change an attribute name

- Click the Attribute in the selected Class on the diagram pane or in the **Browser** tree. Type a new name.

- Click on the Class block, double-click on the Attribute, and on the **Attribute** Specification window, change the name and click **Close**.
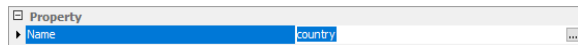
Attribute Type

> ⚠ **Attribute Type**
>
> The attribute's type can be any of these: Class, Interface, or Primitive Class, such as *int* or *double*. You are allowed to define the attribute's type.

To define the type of an attribute

- Do one of the following:
  - Open the Specification window of an Attribute in your Class block, by right-clicking on the Attribute, and click on the cell of the **Type** property value. Then click the [...] button. In the opened window, select the type. Click **OK**.
  - On the diagram pane, right-click the Attribute, and then point to **Type**. In the opened list, select the type or point to **New** to create a new type.
  - On the Class shape, click the Attribute, and then on the smart manipulator toolbar, click the ⬛T button. In the opened list, select the desired type.
  - On the Class shape, click the Attribute, and then click the Attribute the second time. After the Attribute name, type a colon ":" and then type in the name of the new attribute type. Click **Enter** or click anywhere on the diagram. The type is now created and assigned.

> ✅ **Colon**
>
> Type the colon ":" , press **Ctrl+Space** or **Ctrl+Backspace**, and then in the open list, select the **type**.

- In the Containment tree, select an element and drag it to the Attribute on the diagram.

Additional Information About Attribute Type

To add additional information about the type of an attribute

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1. Open the **Attribute** Specification window, by right-clicking on the Attribute.
2. In the top right corner of the window, select **Expert** in the **Properties** drop-down menu.
3. In the **Type Modifier** list, select a particular sign in the:
   a. & - one class has a reference to other model elements.
   b. * - one class has a pointer to other model elements.
   c. [] - one class has an array of other model elements.

Attribute Visibility

Visibility Name	Function
Public '+'	An attribute can be accessed by any other elements.
Package '~'	An attribute can be accessed by elements from the same package.
Protected '#'	An attribute can be accessed from the inside of the selected class and classes derived from that class.
Private '-'	An attribute can be accessed only from inside of that class.

ⓘ **Visibility**

The attribute visibility is shown at the attribute signature.

To set the attribute visibility

Do one of the following:

- Type '+', '~', '-', or '#' visibility marks just before an Attribute name directly on a diagram.
- Open the Attribute Specification window. From the **Visibility** drop-down list, select the desired item: public, package, protected, or private.

Attribute Scope

To set an attribute scope

1. Open the Attribute Specification window.
2. In the top right corner of the window, select **Expert** in the **Properties** drop-down menu.
3. Select the **Is Static** check box to *true.*

Attribute Multiplicity

To set the attribute multiplicity

1. Open the Attribute Specification window.
2. In the top right corner of the window, select **Expert** in the **Properties** drop-down menu.
3. Select or set the multiplicity value for the **Multiplicity** field.

Attribute Changeability

The attribute changeability controls the access by operations on the class on the opposite end.

Name	Function
Is Read Only	When *false* - no restrictions on modifications. When *true* - the value can not be altered after the object is instantiated and its values initialized. No additional values can be added to a set.

To set the attribute changeability

1. Open the Attribute Specification window.
2. In the top right corner of the window, select **Expert** in the **Properties** drop-down menu.

3. Select the **Is Read Only** check box to *true*.

Convert Attribute To Association

> ⚠️ **Converting an Attribute**
>
> Keep in mind a few things about an attribute when converting it to an association:
>
> - the attribute has to have a **type** specified, and
> - the attribute is **not** a member end of some association.

To convert an attribute to an association

1. On a diagram pane, select a Class with an Attribute, or select an Attribute itself.
2. From the Class's or Attribute's shortcut menu, select the **Refactor** command, then **Convert To**, and **Association**.
3. On the diagram pane, the Attribute is represented as an **association** with a **role**.
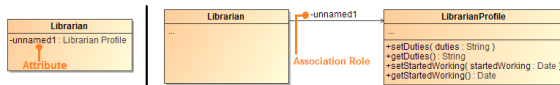
> ✅ **Logitics**
>
> You can move attributes back to the class by dragging and dropping them on the class shape.

Convert Attribute To Port

To convert to a port

1. Right-click an Attribute or multiple Attributes.
2. On their shortcut menu, click **Refactor** > **Convert To** > **Port**.