

# EB GUIDE tutorial

Adding a dynamic state machine

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# 1. Tutorial: Adding a dynamic state machine

**NOTE****Default window layout**

All instructions and screenshots of this user's guide use the default window layout. If you want to follow the instructions, we recommend to set the EB GUIDE Studio window to default layout by selecting **Layout > Reset to default layout**.

Dynamic state machines allow pop-ups during run-time. You use dynamic state machines for example to display error messages that overlay the regular display.

The following instructions guide you through the process of creating a dynamic state machine. The instructions show you how to model a dynamic state machine for volume control. For best results, work through the following steps in the order presented.

Approximate duration: 20 minutes.

**Adding events and datapool items**

The following instructions guide you through the process of adding events and datapool items. These events are used to change the volume afterwards. The purpose of the datapool item is to change the position of a graphical element in a later section.

Step 1

Go to the **Events** component and click **+**.

An event is added to the table.

Step 2

Rename the event to `Volume up`.

Step 3

Add an event, and rename it to `Volume down`.

Step 4

Add an event, and rename it to `Close volume control`.

Step 5

Go to the **Datapool** component and click **+**.

A menu expands.

Step 6

In the menu, click **Integer**.

A datapool item of type `Integer` is added.

Step 7

Rename the datapool item to `Volume indicator`.

You added three events and a datapool item.



### Adding a dynamic state machine and modeling the behavior

The following instructions guide you through the process of adding a dynamic state machine. The haptic dynamic state machine that you model is used to control the volume.

Prerequisite:

- You completed the previous instruction.

#### Step 1

In the **Navigation** component, go to **Dynamic state machines** and click **+**.

A menu expands.

#### Step 2

In the menu, click **Haptic dynamic state machine**.

A haptic dynamic state machine is added and displayed in the content area.

#### Step 3

Rename the dynamic state machine to `Volume control`.

#### Step 4

Drag an initial state from the **Toolbox** into the dynamic state machine.

#### Step 5

Drag a view state from the **Toolbox** into the dynamic state machine.

Along with the view state, a view is added to the EB GUIDE model.

#### Step 6

In the **Navigation** component, click the view state.

#### Step 7

Press the **F2** key, and rename the view state to `Volume`.

#### Step 8

Add a transition from the initial state to the `Volume` view state.



### Modeling a slider

The following instructions guide you through the process of modeling a horizontal slider indicator. The slider indicator shows the volume during run-time.

The slider indicator consists of two rectangles. One rectangle represents the background of the slider. The second rectangle indicates the volume.

Prerequisite:

- You completed the previous instruction.

#### Step 1

In the **Navigation** component, expand the `Volume` view state. Double-click the view.

The content area displays the view.

#### Step 2

Drag a rectangle from the **Toolbox** into the view.

#### Step 3

In the **Navigation** component, click the rectangle, and press the **F2** key.

#### Step 4

Rename the rectangle to `Slider background`.

#### Step 5

To change the appearance of `Slider background`, click the rectangle, and go to the **Properties** component.

##### Step 5.1

Enter 500 in the `width` text box.

##### Step 5.2

Enter 125 in the `x` text box.

##### Step 5.3

Enter 300 in the `y` text box.

#### Step 6

Drag a rectangle from the **Toolbox** into `Slider background` in the **Navigation** component.

The rectangle is added as a child widget to `Slider background`.

#### Step 7

In the **Navigation** component, click the rectangle, and press the **F2** key.

#### Step 8

Rename the rectangle to `Indicator`.

#### Step 9

To change the appearance of `Indicator`, click the rectangle, and go to the **Properties** component.

##### Step 9.1

Enter 40 in the `width` text box.

##### Step 9.2

Enter 80 in the `height` text box.

##### Step 9.3

Next to the `x` property, click the  button.

A menu expands.

Step 9.4

In the menu, click **Add link to datapool item**.


A dialog opens.

Step 9.5

From the list, select the `Volume indicator` datapool item.

Step 9.6

Click **Accept**.

The dialog closes. The  button is displayed next to the `x` property. The values of `x` and `Volume indicator` are now linked.

Step 9.7

Enter 10 in the `y` text box.

Step 9.8

Select black for the `fillColor` property.

You added two rectangles to the view. You changed the appearance of the rectangles.

Step 10

In the **Datapool** component, click the `Volume indicator` datapool item.

Step 11

In the `Value` text box enter 10.

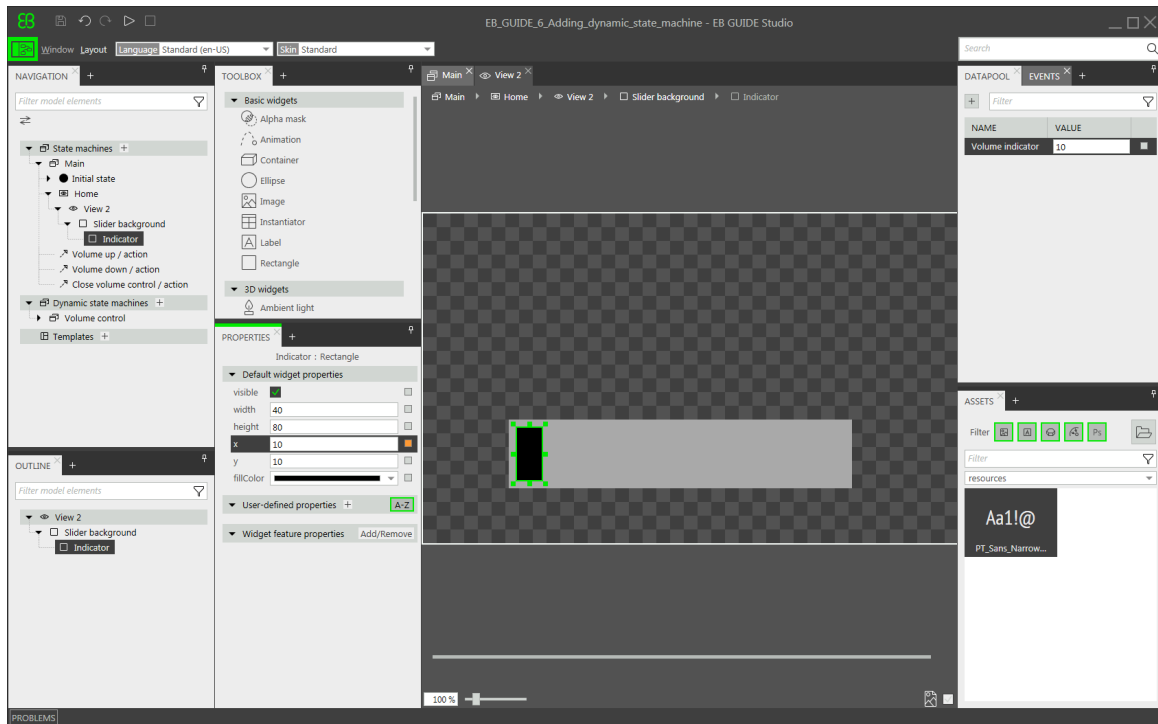


Figure 1. Appearance of `View 1` with two rectangles

In the content area, the `Indicator` rectangle changes the position.

The `Volume indicator datapool` item controls the `x` position of the `Indicator` rectangle.



### Adding states to the **Main** state machine

In the following instructions, you add an initial state and a view state to the **Main** state machine. You use the view state to run the dynamic state machine in parallel to other state machines.

Prerequisite:

- You completed the previous instruction.

#### Step 1

In the **Navigation** component, double-click **Main**.

The **Main** state machine is displayed in the content area.

#### Step 2

Drag an initial state from the **Toolbox** into the state machine.

#### Step 3

Drag a view state from the **Toolbox** into the state machine.

Along with the view state, a view is added to the EB GUIDE model.

#### Step 4

Rename the view state to `Home`.

#### Step 5

In the content area, click the initial state.

#### Step 6

Add a transition from the initial state to the `Home` view state.

#### Step 7

In the **Navigation** component, click **Main**.

#### Step 8

In the **Properties** component, select the `Dynamic state machine list` check box.

With these steps done, you can use EB GUIDE Script functions that are related to dynamic state machines.

You added an initial state and a view state to the **Main** state machine. The haptic dynamic state machine runs in parallel to the **Main** state machine.



### Adding internal transitions to the **Main** state machine

In the following instruction, you add internal transitions. You use the internal transitions to start (push) and stop (pop) the dynamic state machine during run-time.

Prerequisite:

- You completed the previous instruction.

#### Step 1

In the **Navigation** component, click the **Main** state machine.

#### Step 2

In the **Properties** component, go to **Internal transitions**, and click **Add**.

An internal transition is added to the state machine. The internal transition is visible in the **Navigation** component.

#### Step 3

Add two more internal transitions.

#### Step 4

In the **Navigation** component, click the first internal transition.

##### Step 4.1

Go to the **Properties** component.

##### Step 4.2

In the **Trigger** combo box, select `Volume up`.

##### Step 4.3

Next to the **Action** property, click **Add**.

##### Step 4.4

Enter the following EB GUIDE Script:

```
function ()
{
  dp:"Volume indicator" = dp:"Volume indicator" + 20
  f:pushDynamicStateMachine(popup_stack:Main, sm:"Volume control", 0)
}
```

##### Step 4.5

Click **Accept**.

The action is added to the transition. In the **Navigation** component, the internal transition is renamed to `Volume up`.

#### Step 5

In the **Navigation** component, click the second internal transition.

##### Step 5.1

Go to the **Properties** component.

##### Step 5.2

In the **Trigger** combo box, select `Volume down`.

### Step 5.3

Next to the **Action** property, click **Add**.

### Step 5.4

Enter the following EB GUIDE Script:

```
function()
{
  dp:"Volume indicator" = dp:"Volume indicator" - 20
  f:pushDynamicStateMachine(popup_stack:Main, sm:"Volume control", 0)
}
```

### Step 5.5

Click **Accept**.

The action is added to the transition. In the **Navigation** component, the internal transition is renamed to `Volume down`.

## Step 6

In the **Navigation** component, click the third internal transition.

### Step 6.1

Go to the **Properties** component.

### Step 6.2

In the **Trigger** combo box, select `Close volume control`.

### Step 6.3

Next to the **Action** property, click **Add**.

### Step 6.4

Enter the following EB GUIDE Script:

```
function()
{
  f:popDynamicStateMachine(popup_stack:Main, sm:"Volume control")
}
```

### Step 6.5

Click **Accept**.

The action is added to the transition. In the **Navigation** component, the internal transition is renamed to `Close volume control`.

You added three internal transitions which start and stop the dynamic state machine. Furthermore, the internal transitions `Volume up` and `Volume down` change the position of the `Indicator` rectangle.



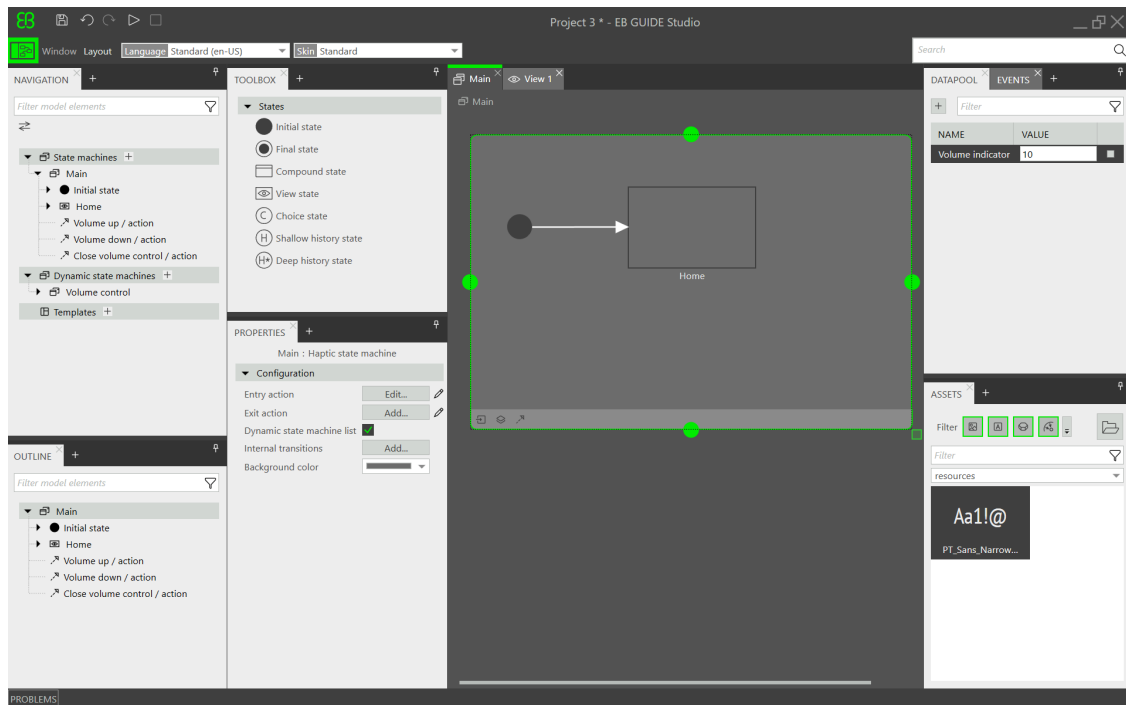


Figure 2. EB GUIDE model with all model elements



## Starting the simulation and testing the EB GUIDE model


### Prerequisite:

- You completed the previous instruction.

To start the simulation, click  in the command area.

The simulation and EB GUIDE Monitor start. The EB GUIDE model displays the `Home` view state.

#### Step 1

In EB GUIDE Monitor in the **Events** component, select the `Volume up` event and click  to fire the event.

The dynamic state machine is started and shows the slider indicator. The dynamic state machine overlays the `Home` view state.

When you fire the events `Volume up` or `Volume down` the black `Indicator` rectangle moves. If you fire the event `Close volume control`, the slider disappears from the view.

If you add additional states to the **Main** state machine, the `Volume control` dynamic state machine will overlay the other states as well.