

Dynamics and Animations

Dynamics let you configure real-time changes on the object look, position, size, colors, the value the object reflects, user action to take when a user clicks, and more. That dynamic behavior is configured by creating links from the object properties to tags or other project runtime properties.

In some systems, the name "animation" is used to refer to those dynamic runtime changes; in FactoryStudio we elected to use the term "Dynamics" to make a clear distinction with the WPF animations features; WPF animations also refers to changes in the graphics object properties when running the displays, but using timers and other objects status to guide the animation, not the real-time database values.

When you double click on an object, or press the Dynamics button, or select it on the right-click context menu, a list of compatible dynamics that can be applied to the selected object is presented.

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| <i>Dynamics animations</i> | |
| Setting | Description |
| Action | Executes actions and commands triggered by the user interface. |
| Shine | Changes the object appearance dynamically. |
| TextIO | Text input and text output Dynamic. |
| HyperLink | Opens a hyperlink. |
| Security | Sets the object runtime permissions to execute actions. |
| FillColor | Changes the object fill color dynamically. |
| LineColor | Changes the object line color dynamically. |
| TextColor | Changes the object text color dynamically. |
| Bargraph | Bargraph dynamic. |
| Visibility | Changes the object visibility and opacity dynamically. |
| MoveDrag | Moves the object dynamically. |
| Scale | Changes the object size dynamically. |
| Rotate | Rotates the object dynamically. |
| Skew | Skews the object dynamically. |
| TextOutput | Text output dynamic. |

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Get, Apply, and Replace

After associating a dynamic with an object you can use the buttons Get and Apply to move dynamics settings configuration from one object to another. Select the object with the dynamics you want to use, and press Get. You can right click the dynamic name at the left panel, in order to enable or disable the ones that will be applied. Select one or more target objects and press Apply.

You can use the Replace button to change the Tags in the dynamics on the selected objects. The String button is used to change all strings at the selected objects.

Settings

The tables below present the detailed settings available for each type of dynamic.

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| <i>Action Dynamic configuration</i> | |
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| Setting | Description |
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| Action | Executes an action triggered by the user interface:. |
| Event | Choose one of the Mouse events. More than one event can be selected for each action. For example, you can set one action for <code>MouseButtonDown</code> and another action for <code>MouseButtonUp</code> . |
| Action | <p>Select an action for the given event:</p> <ul style="list-style-type: none"> • None—No action. • SetValue—Sets the value of the object. <ul style="list-style-type: none"> ◦ Object—The object that will receive the value. ◦ Value—The value that will be passed to the object. • Toggle—Toggles the object value. If the object current value is zero, the value will be 1. If the object current value is different from zero, the value will be 0. <ul style="list-style-type: none"> ◦ Object—The object that will be toggled. • OpenDisplay—Opens a display. <ul style="list-style-type: none"> ◦ Display—The name of the display that will be opened. • CloseDisplay—Closes a display. <ul style="list-style-type: none"> ◦ Display—The name of the display that will be closed. • OpenLayout—Opens a layout. <ul style="list-style-type: none"> ◦ Layout—The name of the layout that will be opened. • RunScript—Runs a script that is placed in the display <code>CodeBehind</code> tab. Do one of the following: <ul style="list-style-type: none"> ◦ Enter the new method name and click New. ◦ Select one of the existing methods in the <code>comboBox</code>. • RunExpressions—Runs the given expression. <ul style="list-style-type: none"> ◦ Expression—Enter the expression. For example: <code>Tag.a + 1</code>, or <code>Tag.a + Tag.b</code>, or <code>Math.Cos(Tag.angle) * Math.PI</code>. ◦ Result (optional)—Enter the tag or the property that will receive the expression value. |

Examples

Run Expressions Examples:

- Sum two values and pass the result to another tag.

Expression—`Tag.quantity1 + Tag.quantity2`.

Result—`Tag.totalQuantity`.

- Increment a tag.

Expression—`tagCounter + 1`.

Result—`tagCounter`.


- Increment a tag (0 - 10).

Expression—`If(tagCounter < 10,tagCounter + 1,0)`.

Result—`tagCounter`.

Shine Dynamic

| <i>Shine Dynamic configuration</i> | |
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| Setting | Description |
| Shine | Changes the object appearance dynamically. |
| IsMouseOver | Enter a tag that will receive the <code>OverValue</code> or the <code>NotOverValue</code> . |
| OverValue | The <code>IsMouseOver</code> value when the mouse is over the object. |
| NotOverValue | The <code>IsMouseOver</code> value when the mouse is not over the object. |
| Mouse Over Appearance | <p>The object appearance when the mouse is over it.</p> <ul style="list-style-type: none"> • Opacity—The object opacity (0 = transparent, 1 = opaque). • Scale—The object size (0.5 = half, 1 = the same size, 1.5 = one and a half, 2 = double size). • OuterGlow—Defines the <code>OuterGlow</code> color, the check box enables or disables it. • TextColor—Defines the text color, the check box enables or disables it. |

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| Mouse Not Over Appearance | <p>The object appearance when the mouse is Not over it:</p> <ul style="list-style-type: none"> • Opacity—The object opacity (0 = transparent, 1 = opaque). • Scale—The object size (0.5 = half, 1 = the same size, 1.5 = one and a half, 2 = double size). |
| Is Selected Appearance | <p>The object appearance when it is selected:</p> <ul style="list-style-type: none"> • IsSelected—Defines whether the object is selected. • Opacity—The object opacity (0 = transparent, 1 = opaque). • Scale—The object size (0.5 = half, 1 = the same size, 1.5 = one and a half, 2 = double size). |
| Scale Reference |  <p>Center</p> <p>Left</p> <p>Up</p> <p>Right</p> <p>Down</p> |
| ShowUid | Set to show the Uid of the object on hover |
| Tooltip | Set to show as a tooltip on hover |

Text I/O dynamic

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| <i>Text I/O Dynamic configuration</i> | |
| Setting | Description |
| TextIO | Text input and text output Dynamic. If text is a tag value or a property, it must be between curly brackets. For example: {Tag.analogInt1} |
| Binding Mode | <p>Associate an object with a tag:</p> <ul style="list-style-type: none"> • TwoWay—Input and output allowed. • InputOnly—Only input allowed (the current tag value is not shown, but new values can be entered). • OutputOnly—Only output allowed. |
| Object or Expression | Object (input) or Expression (output only) connected with the Text Box. |
| DesignModeCaption | <p>The value shown in design mode:</p> <ul style="list-style-type: none"> • ShowObjectNames—The content of the text field is shown exactly as it is. • ShowPlaceHolders—The characters ### are shown, the number of characters is defined by the MaxLength field. |
| Input Range | Defines the numeric range for the entered value. |
| MaxLength | Defines the maximum number of characters. |
| Format | Defines the text format for the field |

Hyperlink and Security dynamic

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| <i>Hyperlink Dynamic configuration</i> | |
| Setting | Description |
| HyperLink | Opens a hyperlink. |

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| HyperLinkType | Select the hyperlink type: <ul style="list-style-type: none"> • http • ftp • file • mailto • telnet |
| Url | Set the URL to open. |







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| <i>Security Dynamic configuration</i> | |
| Setting | Description |
| Security | Set the object runtime permissions. |
| Disable | Enter a tag, a property, or an expression returning a value. If the resulting value is: <ul style="list-style-type: none"> • Zero—Object will be enabled. • Greater than zero—Object will be disabled. For more information, see Configuring Expressions . |
| Verify Permissions | When selected, only the chosen permission groups can access the object. |
| Confirm Message | Shows a confirmation dialog before taking some action: <ul style="list-style-type: none"> • textBox—Enter the message that will appear in the dialog. • checkBox—Enables or Disables the Confirm Message. |
| Esign Required | Set if the Esign is required |

Fill, Line and Text Color Dynamic

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| <i>Fill, Line and Text Color Dynamic configuration</i> | |
| Setting | Description |
| FillColor | Changes the object fill color dynamically. |
| Expression | the value used for the FillColor dynamic. |
| Change Color | <ul style="list-style-type: none"> • UsingLimits—The resulting color is determined when the value is equal or higher than one of the limits. • AbsoluteValue—The color will be the expression value. The value must be a valid color name or hexadecimal color. For example: "White" or "#FFFFFF" <p>Example</p> <p>Limits:</p> <p>1 - Red</p> <p>10 - Blue</p> <p>When the value is 0, the object will have its own color (fill color dynamic will not do anything)</p> <p>When the value is 1 to 9, the object will have the red color.</p> <p>When the value is greater than 10, the object will have the blue color.</p> |
| Bad Quality | Select color when the related tag quality is bad |
| Undefined Quality | Select color when the related tag quality is undefined |
| LineColor | Changes the object line color dynamically:. |
| Expression | the value used for the LineColor dynamic. |

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| Change Color | <ul style="list-style-type: none"> UsingLimits—The resulting color is determined when the value is equal or higher than one of the limits. AbsoluteValue—The color will be the expression value. The value must be a valid color name or hexadecimal color. For example: "White" or "#FFFFFF" <p>Example</p> <p>Limits:</p> <p>1 - Red</p> <p>10 - Blue</p> <p>When the value is 0, the object will have its own color (fill color dynamic will not do anything)</p> <p>When the value is 1 to 9, the object will have the red color.</p> <p>When the value is greater than 10, the object will have the blue color.</p> |
| TextColor | Changes the object text color dynamically:. |
| Expression | the value used for the TextColor dynamic. |
| Change Color | <ul style="list-style-type: none"> UsingLimits—The resulting color is determined when the value is equal or higher than one of the limits. AbsoluteValue—The color will be the expression value. The value must be a valid color name or hexadecimal color. For example: "White" or "#FFFFFF" <p>Example</p> <p>Limits:</p> <p>1 - Red</p> <p>10 - Blue</p> <p>When the value is 0, the object will have its own color (fill color dynamic will not do anything)</p> <p>When the value is 1 to 9, the object will have the red color.</p> <p>When the value is greater than 10, the object will have the blue color.</p> |

Bargraph Dynamic

| <i>Bargraph Dynamic configuration</i> | |
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| Setting | Description |
| Bargraph | Bargraph dynamic. |
| Expression | the value used for the bargraph dynamic. |
| Value Range | The minimum and maximum values that will correspond to the minimum and maximum fill percentage. |
| Fill (%) | The minimum and maximum bargraph fill percentage. |
| Bar Color | The bar graph color. |
| Orientation | <p>The bar graph orientation:</p> <div>  to up </div> <div>  horizontal center </div> <div>  to down </div> <div>  to right </div> <div>  vertical center </div> <div>  to left </div> |

Visibility Dynamic

| <i>Visibility Dynamic configuration</i> | |
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| Setting | Description |
| Visibility | Changes the object visibility and opacity dynamically. |






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| Visible | Enter a tag, a property, or an expression returning a value. If the resulting value is: <ul style="list-style-type: none"> Zero - Object will be visible. Greater than zero - Object will be hidden. For more information, see Configuring Expressions . |
| Hide when security is enabled | Hides the component when security is enabled for the current user |
| Opacity | <ul style="list-style-type: none"> Expression—The value used to set the opacity. Range—The minimum and maximum values that will correspond to the minimum and maximum opacity. Opacity—The minimum and maximum opacity (0 - invisible, 0.5 - a bit transparent, 1 - opaque). |

MoveDrag Dynamics






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| <i>MoveDrag Dynamic configuration</i> | |
| Setting | Description |
| MoveDrag | Moves the object dynamically. |
| BindingMode | <ul style="list-style-type: none"> TwoWay—Input moving and output moving. InputOnly—Input moving only. The object does not move when the object value changes. OutputOnly—Output moving only. The object does not move with user interaction. |
| Horizontal Move | <ul style="list-style-type: none"> Expression with the horizontal move reference. Range—The minimum and maximum values that will correspond to the minimum and maximum horizontal position. Position—The minimum and maximum horizontal position. |
| Vertical Move | <ul style="list-style-type: none"> Expression with the vertical move range. Range—The minimum and maximum values that will correspond to the minimum and maximum vertical position. Position—The minimum and maximum vertical position. |
| Use previous object for position reference | Reference the current object position based on the directly previous object |

Scale Dynamic

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| <i>Scale Dynamic configuration</i> | |
| Setting | Description |
| Scale | Changes the object size dynamically. |
| Width Scale | <ul style="list-style-type: none"> Object—the value used for the width scaling. Range—The minimum and maximum values that will correspond to the minimum and maximum width scale percentage. Scale (%)—The minimum and maximum width scaling percentage. |
| Height Scale | <ul style="list-style-type: none"> Object—the value used for the height scaling. Range—The minimum and maximum values that will correspond to the minimum and maximum height scale percentage. Scale (%)—The minimum and maximum height scaling percentage. |






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| Scale Reference: | <div>  Center </div> <div>  Left </div> <div>  Up </div> <div>  Right </div> <div>  Down </div> |
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Rotate Dynamic

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| <i>Rotate Dynamic configuration</i> | |
| Setting | Description |
| Rotate | Rotates the object dynamically. |
| Expression | the value used for the rotation. |
| Value Range | The minimum and maximum values that will correspond to the minimum and maximum angle. For example: 0 to 100 |
| Angle | The minimum and maximum rotation angle. For example: 0 to 360 |
| RPM | Number of rotations per minute, that value can be defined on Expression. |
| Center Reference | <p>Clockwise – Check if you want Clockwise.</p> <div>  Center </div> <div>  Left </div> <div>  Up </div> <div>  Right </div> <div>  Down </div> <p>Offset X – Defines the distance of the center of the Rotation in X axis. Offset Y – Defines the distance of the center of the Rotation in Y axis.</p> |
| ON/OFF | Enter with the object property that will turn ON/OFF the Rotation Dynamic |

Skew Dynamic

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| <i>Skew Dynamic configuration</i> | |
| Setting | Description |
| Skew | Skews the object dynamically. |
| X-axis Skew | <ul style="list-style-type: none"> ObjectValue— the value used for the X-axis skewing. Range—The minimum and maximum values that will correspond to the minimum and maximum X-axis skewing angle. For example: 0 to 100. Skew (°)— The minimum and maximum X-axis skewing angle. For example: 0 to 180°. |

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| Y axis skew | <ul style="list-style-type: none"> ObjectValue— the value used for the Y-axis skewing. Range—The minimum and maximum values that will correspond to the minimum and maximum Y-axis skewing angle. For example: 0 to 100. Skew (°)— The minimum and maximum Y-axis skewing angle. For example: 0 to 180°. |
| Skew Reference | <div>  Center </div> <div>  Left </div> <div>  Up </div> <div>  Right </div> <div>  Down </div> |

TextOutput Dynamic

| <i>Table 15: TextOutput Dynamic configuration</i> | |
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| Setting | Description |
| TextOutput | Text output dynamic. |
| Expression | Indicates the text that will be shown in the object. |
| Localizable | Indicates whether the text must be translated when the dictionary changes. |
| DesignModeCaption | <ul style="list-style-type: none"> The value shown in design mode: ShowObjectNames—The content of the text field is shown exactly as it is. ShowPlaceHolders—The characters ### are shown, the number of characters is defined by the MaxLength field. |
| MaxLength | Defines the maximum number of characters. |
| Format | Specify the format of the field |