CATIA Software Producer

On this page:

The CATIA Software Producer allows you to generate and build code from a UML or SysML model. You can generate code, for example, from the UML Class structure, UML State Machine, or SysML Blocks. The code generation and building are executed via the **3D**EXPERIENCE platform.

Key concepts and capabilities

CATIA Software Producer offers the following generation capabilities:

- Generating C++ classes from UML structured classes
- Generating C and C++ code from UML behaviors
- Generating target dependent middleware code including AUTOSAR classic and adaptive
- Generating and compiling code for FMU
- Generating code from a model persisted as a file, or in TeamWorkCloud or in the 3DEXPERIENCE Platform.
- Generate code containing traceability information establishing the relation from the model items to the code.

> more information about the Software Production Engineering application, see Software Production Engineering.

CATIA Software Producer uses the concept of target configuration to guide the user in configuring the code generation process.

Prerequisites

- The CATIA Software Producer Client plugin is installed in your modeling tool. Learn more about how to download the installation files.
- The **3D**EXPERIENCE platform is on the cloud.
- You have the Software Production Engineer Role. It will give you permission to use the service.

Before starting to work on code generation, first, you have to **connect to 3DEXPERIENCE** by entering the URL of the Software Producer cloud server. After that, you will be able to log in with your regular identifiers.

> information about how to authenticate with the **3D**EXPERIENCE platform, see Authentication with **3D**EXPERIENCE platform.

If you start working with CATIA Software Producer for the first time in your project, a dialog will open to configure the local workspace path which will host generated resources.
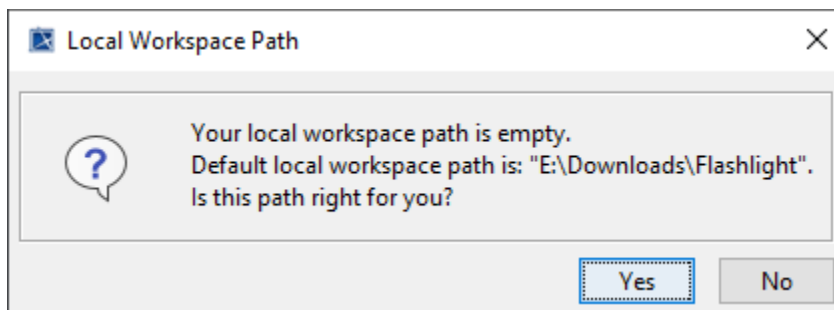
## Configuring the code generator

The principle

The generated code is composed of a behavior part and a middleware part. It is identified as a target. The behavior part is relative to the behavior of your application (such as State Machine) whereas the middleware part is target-specific and is generated from the architecture of your application (such as IBD).
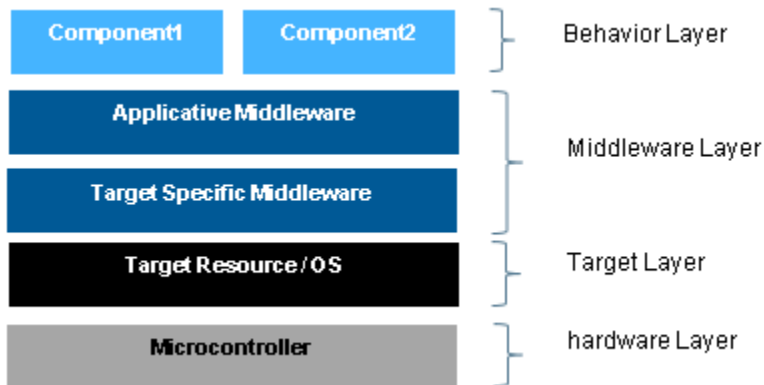
As the code is composed of multiple entities, multiple configurations are required. You will be guided in the configuration through multiple dialogs to create the target configuration.

To configure the code generator

1. Do one of the following:
   - In the open SysML diagram:
      a. Select the element you want to generate. If you do not select any particular element in the diagram, the entire diagram view is selected as the generation input.

      b. In the diagram toolbar, click the Configure Target button.
   - In the Containment tree:
      a. Select the element you want to generate.
      b. From the selected element's shortcut menu, select **Software Code Generation** and click **Configure Target**.
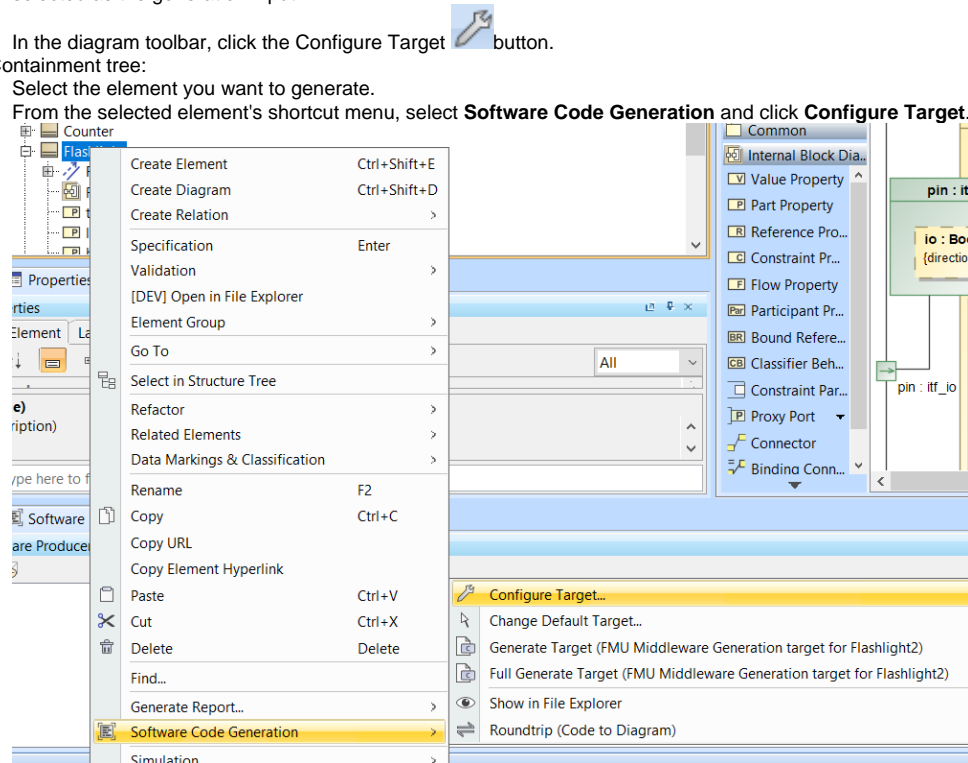
2. In the open **Generator Details** dialog, configure the target of your generation:

a. Select the operation in charge of the target you expect. For example, the target can be C code, C++ code or an FMU.

b. (optional) Check and specify the download location if you want the results saved on your local file system. The generated files will be downloaded under this location, in a folder named after the configuration name.

3. Click the **OK** button.

If the operation you selected (for example FMU Target Build) requires additional operations to be executed, additional dialogs open to configure them.

Once the end of the configuration process is reached, i.e. you have fully configured your target, under the Configuration package you will find:
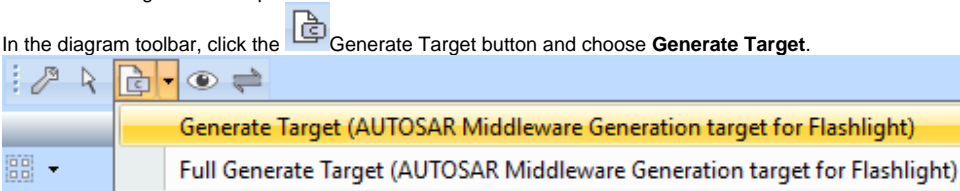
- **The Generator Configurations package**[1]: this is where classes are created to save common properties of generators (parameters especially).
- **The Target Configurations package**[1]: this is where packages are created to save the flow of a target. Within this package, classes are created to save specific properties for each SPO (download options, input, and generator mapping).

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[1]You can change the default name of those packages in the **Environment Options** > **CATIA Software Producer Client General Properties** > **Configura tion section**

> The configurations are saved in the model via the "CATIA – Embedded Software Profile" (*EmbeddedSoftwareProfile.mdzip*) profile.

Executing the code generator

To execute the code generator

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1. Do one of the following:
   - In the open SysML diagram:
     a. Select the element you want to generate. If you do not select any particular element in the diagram, the entire diagram view is selected as the generation input.

     b. In the diagram toolbar, click the Generate Target button and choose **Generate Target**.

   - In the Containment tree:
     a. Select the element you want to generate.
     b. From the selected element's shortcut menu, select **Software Code Generation** and click **Generate Target**.
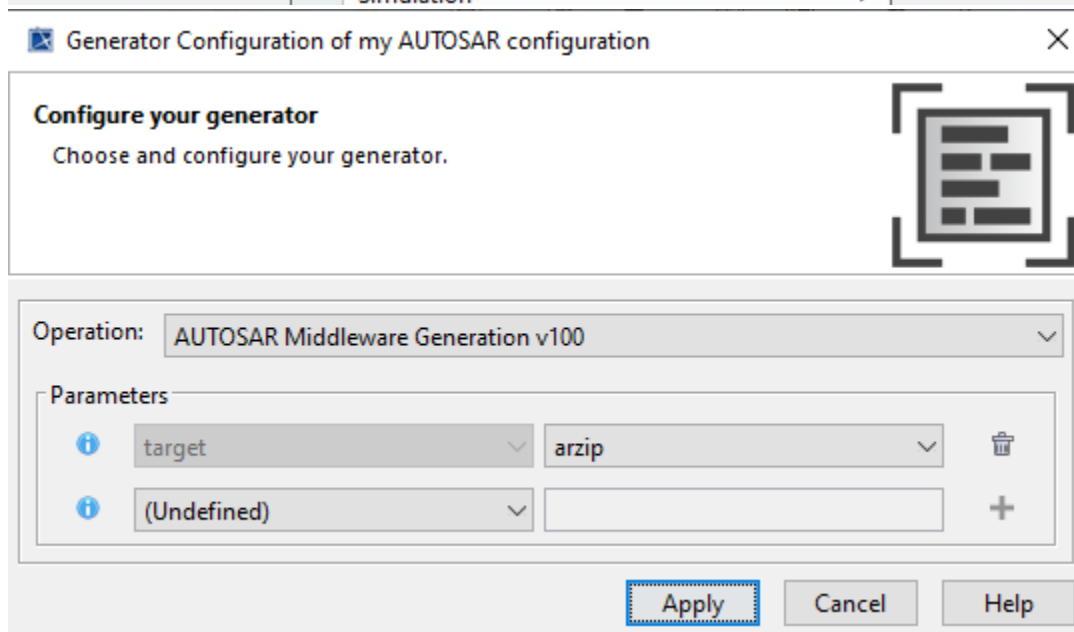
The target will be generated based on your configuration:

- If you click **Generate Target**, the generation will be performed for the modified elements in the model.
- If you click **Full Generate Target**, the generation will be fully performed.

Edit or change your configuration

To edit generator configuration properties

1. In the Containment tree, right-click a Class element of the needed generator configuration.
2. In the shortcut menu, click **Software Code Generation** and select **Edit Configuration**.
3. In the open **Generation Configuration** dialog, make your changes.
4. Click **Apply** and then **Close**.

Relations

- Configurations
  - Generator Configurations
    - my AUTOSAR configuration
      - Param
      - SysML IBD
  - Target Config
    - AUTOSAR
      - Relatio
      - my AU
      - SysML
- Functions
- MD Customizatio
- MD Customizatio
- MD Customizatio
- Requirements
- SimConfig
- Structure
  - Relations
  - Structure
  - Button

	Create Element	Ctrl+Shift+E
	Create Diagram	Ctrl+Shift+D
	Create Relation	>
	Specification	Enter
	Validation	>
	[DEV] Open in File Explorer	
	Element Group	>
	Go To	>
	Select in Structure Tree	
	Refactor	>
	Related Elements	>
	Data Markings & Classification	>
	Rename	F2
	Copy	Ctrl+C
	Copy URL	
	Copy Element Hyperlink	
	Paste	Ctrl+V
	Cut	Ctrl+X
	Delete	Delete
	Find...	
	Generate Report...	>
	Software Code Generation	>	Edit Configuration...
	Simulation	>

[...mdzip]

[...points.mdzip]

Properties / Do

properties

Element | Language p

Tags «Generator Config

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:ration

:urations::Generator Configu

Generator Configuration of my AUTOSAR configuration   ✕

Configure your generator

Choose and configure your generator.

Operation: | AUTOSAR Middleware Generation v100 | ⌄ |

Parameters

| ⓘ | target | ⌄ | arzip | ⌄ | 🗑 |
| ⓘ | (Undefined) | ⌄ | | | + |

Apply   Cancel   Help

If you have configured multiple targets for the same input, you might want to change the default one (which was created last).

To change the default target configuration

1. Do one of the following:
    - In the diagram toolbar, click the [ ] Change Default Target button.
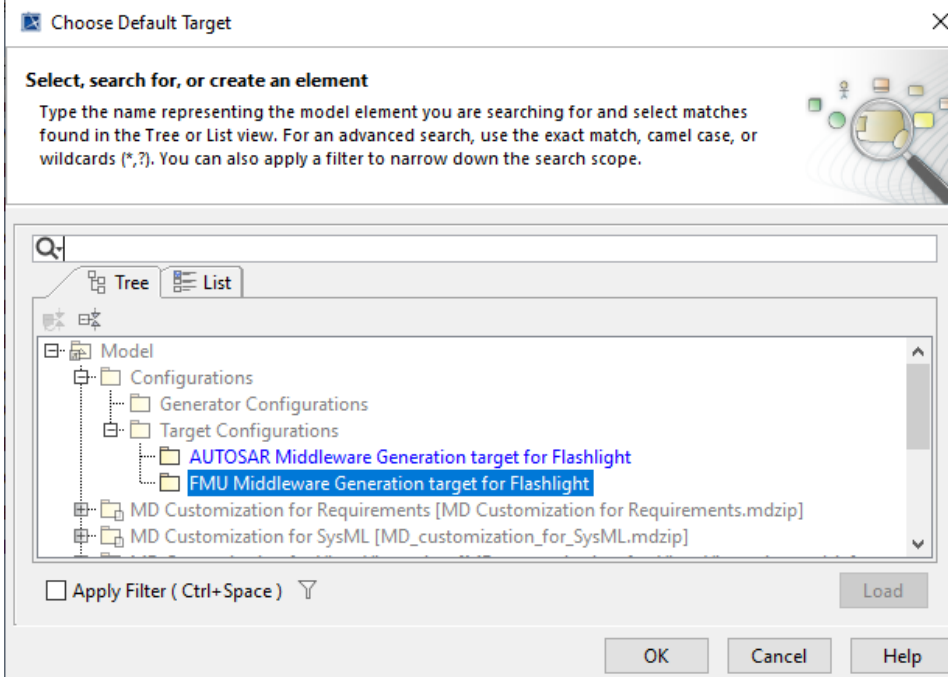   - In the selected element's shortcut menu, click **Software Code Generation** > **Change Default Target**.
2. Select the target you want to use.

3. Click **OK**.

Local workspace of the software producer

Under the local workspace, you can find the generated files, if you have selected the download option and left the default location (as seen above) in the configurations. You can also find some other files under an "etc" folder:

- <Local_workspace_path>
    - <componentA_name>
        - <configuration1_name>
        - <configuration2_name>
    - <componentB_name>
        - <configuration3_name>
        - <configuration4_name>
    - etc
        - operations
            - json[3]
        - backup[2]
        - logs
            - log[4]

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[1]You can change the root of the local workspace path in the project options.

[2]By default, a backup of your downloaded files is saved in this folder so that in case something wrong happens with the download of new files, you can still reach your previous files. You can disable this option in the **Project Options**

[3]SPO Report files are rotated by size and date so that you might see multiple report files here.

[4]Log files are rotated by size and date so that you might see multiple log files here.

RoundTrip

The **roundtrip** action is a feature available for State Machines and Opaque Behaviors. Using the roundtrip action, you can add the modification you made in the code in between BEG_USER_CODE / END_USER_CODE tags (in files commonly named <ComponentName>_usr.c), back into the model and synchronize the file on the workspace on the cloud.

```
26
29    static void on_Effect(STATEMACHINE *instance) {
30        /* BEG_USER_CODE(Effect_2022x_1ad00ce_1659687813473_879953_3794) do not remove */
31
32        _basic_Button_Send_Off(&(instance->on_Effect_Button_Send_Off));
33
34        /* END_USER_CODE(Effect_2022x_1ad00ce_1659687813473_879953_3794) do not remove */
35    }
36
```
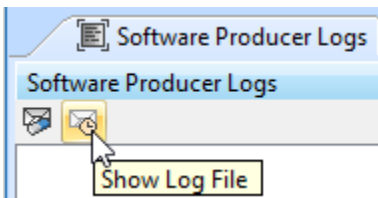
Views

Software Producer Logs

In the Software Producer Log panel, you can see the messages of the running SPO.
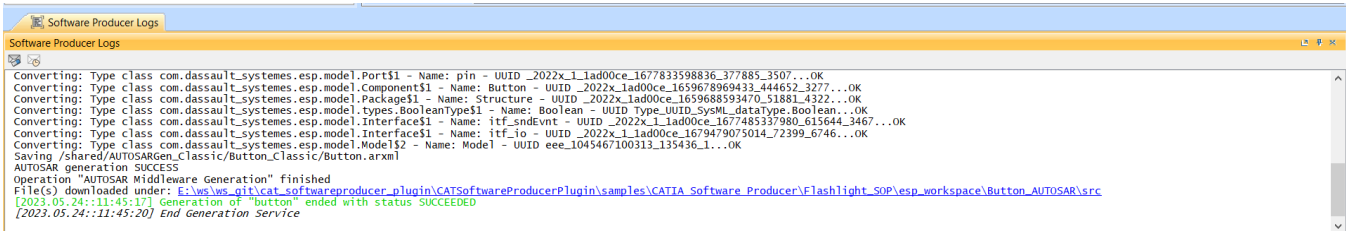
This information is saved in the log file next to your project files. To open the log file location quickly, in the **Software Producer Logs** window, click the **Show Log File** button. Each project has its own log file.


A log file for general Software Producer messages not related to a specific project is stored next to the modeling tool log file.

At the bottom right corner of the modeling tool, in the progress bar, you can see whether the generation is running. After the generation is completed, the notification is displayed in case of failure or always if the verbose mode is activated (**Environment Options** > **CATIA Software Producer Client General Properties** > **Notifications** section).

Validation Results

When an operation produces a report, the plugin reads it and opens it in a **Validation Result** window if any element has a diagnostic associated.
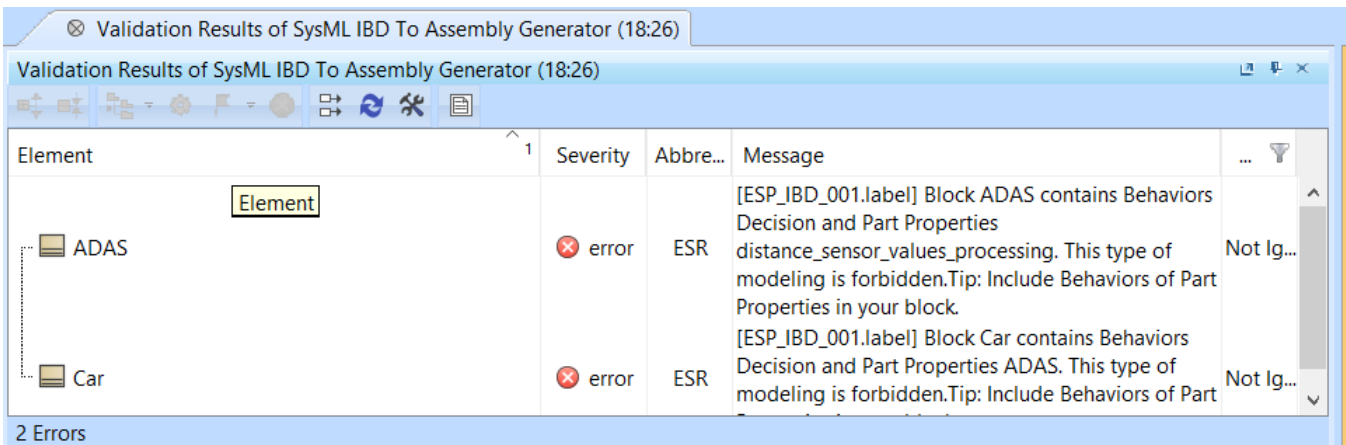
A diagnostic is associated with a rule consisting of a severity, message, and source.

You can navigate to the source in the Containment tree. If you need to show more details concerning the rule or open the full report, right-click the appropriate lines of the table.

You can turn off the **Validation Results** window's opening after the operation produces a report.

To turn the validation report off

1. In the modeling tool main menu, click **Options** and select **Project**.
2. Set the **Show Validation Report** property to *false*.

Diagrams and Containment tree

The following commands are available from the diagrams toolbar or from the shortcut menu of the supported elements in the Containment tree:

Button	Description
Configure Target	Configure the code generators according to the first operation you selected (this first operation will be your final target). You can manage the parameters of the generators here, as well as the download options.
Change Default Target	You can change the target selected for the current element.
Code Generation	Generates the code for the selected elements in, for example, the State Machine or Internal Block Definition diagrams. If the entire diagram is selected, the code is generated for the whole content. The generation result is downloaded to your machine if you select the download option. By default, the classic generation is triggered, but you can select the full generation to generate code in all circumstances.
Show in File Explorer	Open a location in your file system wherein the Software Production Operation results file is stored.
Roundtrip	The changes made in the generated code are applied in the State Machine diagram or Opaque Behavior.

Options

You can **deactivate the Software Production Operation** you do not need.

To deactivate the Software Production Operation

1. In the main menu, click **Options** > **Environment**. The **Environment Options** dialog opens.
2. In the dialog, go to **CATIA Software Producer Client** > **Operations**.
3. Select the needed operation and click **Change activation status.**

You can switch projects (or even shut down your computer, saving your work first) while waiting for the generation result as it is running on the cloud and as the widget keeps the IDs of the cloud assets in the record files located in <local workspace path>\etc\operations\spoRecordFile.json (you will have access to it if you need it, for example, for the debugging purpose). When you come back, another dialog will tell you that operations were running while you were away and will propose you inspect the result and download it.

Additional Information

A workspace is automatically created on our cloud servers for each of your projects using the widget. This workspace gathers the assets needed for the generation. A cloud workspace is automatically deleted after 30 days of inactivity. You can also delete it manually in the **Environment Options** dialog. If you delete the workspace, all the components will have to be regenerated on the cloud on your next session because you will not be able to push any files to a workspace through the plugin.

Sample project

The sample project Flashlight_SOP.mdzip is located in *<modeling_tool_installation_directory>\samples\CATIA Software Producer*. You can also open the Flashlight_SOP sample project from the modeling tool's Welcome screen, Samples tab.