





# Tutorial

CIP Test Suite - Console

| Tutorial       | Actifsource Tutorial – CIP Test Suite - Console                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required Time  | <ul style="list-style-type: none"> <li>• 30 Minutes</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Prerequisites  | <ul style="list-style-type: none"> <li>• Actifsource Tutorial – Installing Actifsource</li> <li>• Actifsource Tutorial – Simple Service</li> <li>• Actifsource Tutorial – CIP Statemachine - Lamp</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Goal           | <ul style="list-style-type: none"> <li>• Creating Unit Tests for a CIP Statemachine</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Topics covered | <ul style="list-style-type: none"> <li>• Setting up the code options</li> <li>• Setting up a CIP Test Suite</li> <li>• Generate the CIP Test Suite</li> <li>• Generate the CIP Test Suite Documentation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                             |
| Notation       | <ul style="list-style-type: none"> <li>•  To do</li> <li>•  Information</li> <li>• <b>Bold</b>: Terms from actifsource or other technologies and tools</li> <li>• <b><u>Bold underlined</u></b>: actifsource Resources</li> <li>• <u>Underlined</u>: User Resources</li> <li>• <i><u>UnderlinedItalics</u></i>: Resource Functions</li> <li>• <code>Monospaced</code>: User input</li> <li>• <i>Italics</i>: Important terms in current situation</li> </ul> |
| Disclaimer     | <p>The authors do not accept any liability arising out of the application or use of any information or equipment described herein. The information contained within this document is by its very nature incomplete. Therefore the authors accept no responsibility for the precise accuracy of the documentation contained herein. It should be used rather as a guide and starting point.</p>                                                                                                                                                                                                                                 |
| Contact        | <p><b>actifsource GmbH</b><br/> Täferenstrasse 37<br/> 5405 Baden-Dättwil<br/> Switzerland<br/> <a href="http://www.actifsource.com">www.actifsource.com</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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- Learn how to specify a CIPTestSuite model
  - Specify message events (input)
  - Specify message action expectations (output)
- Run the unit tests

## Setting up the CIP project

- Make sure to properly setup the lamp project as seen in the previous tutorial

**New CIP Project**

Create a new project resource.

Project name:

Project type:

| Name                                                                 | Description                                                                           |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> CIP_C_StateMachine               | Generates the CIP statemachine for the c programming language.                        |
| <input type="checkbox"/> CIP_C_StateMachine_Templates                | Generates the CIP templates (connector, cip shell) for the c programming language.    |
| <input checked="" type="checkbox"/> CIP_C_TestSuite_Console          | Generates a regressive test suite console application for the c programming language. |
| <input type="checkbox"/> CIP_HTML_StateMachine_Documentation         | Generates a CIP statemachine documentation in html.                                   |
| <input checked="" type="checkbox"/> CIP_HTML_TestSuite_Documentation | Generates a CIP test suite documentation in html.                                     |

Use default location

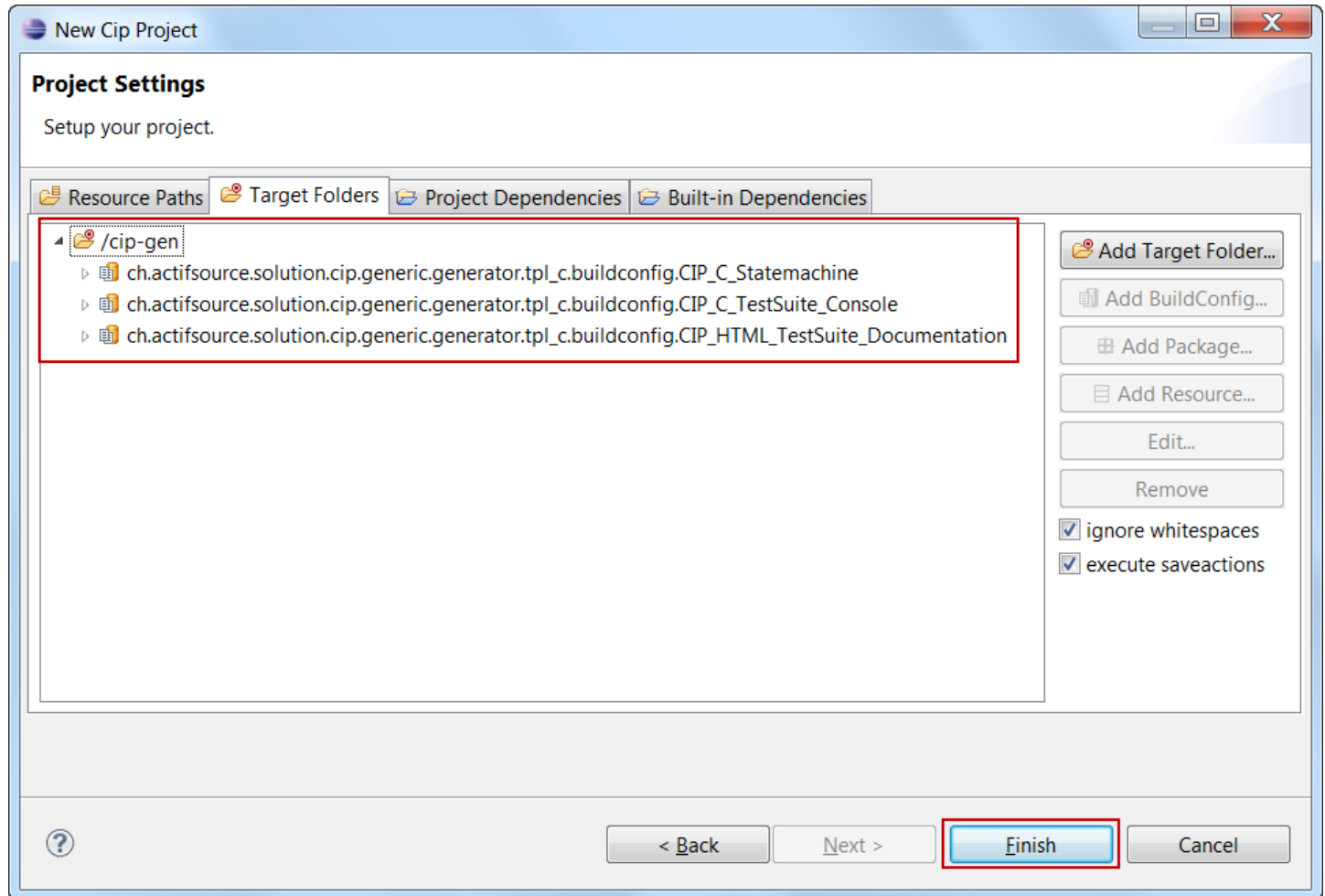
Location:

Working sets

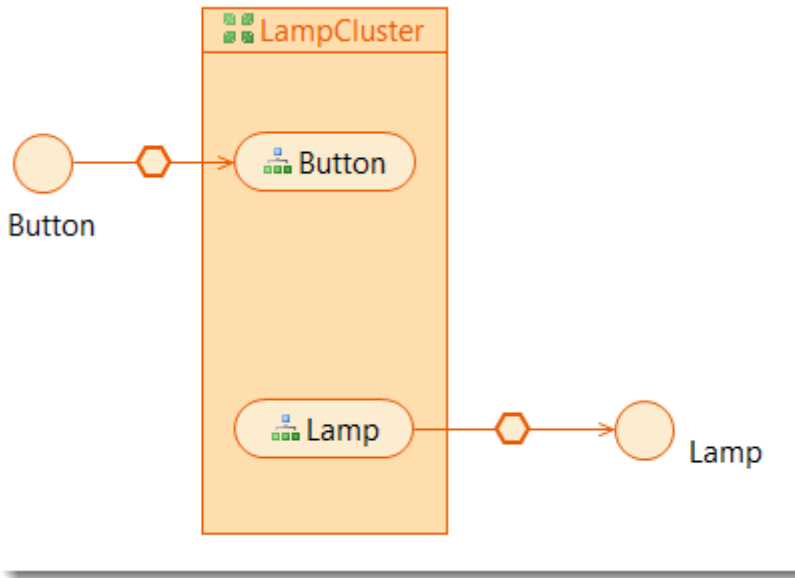
Add project to working sets

Working sets:

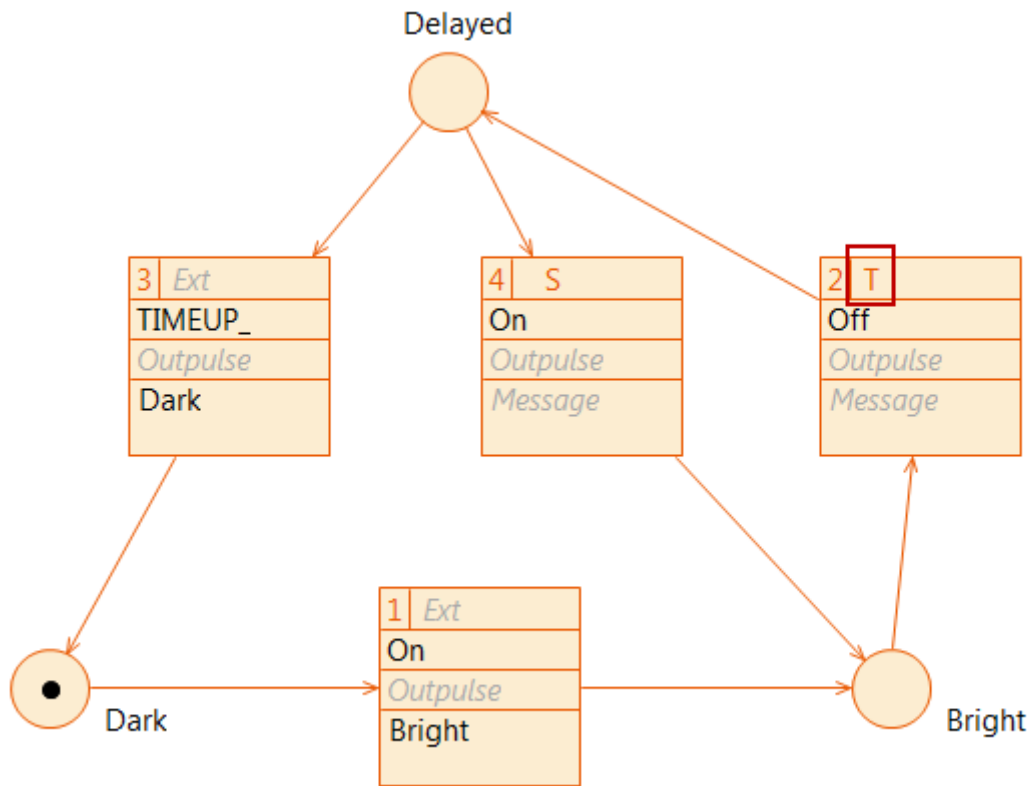
- ↵ Create a new **CIP Project** using the wizard
- ↵ Select **CIP C StateMachine** to generate a CIP state machine
- ↵ Select **CIP C TestSuite Console** to generate a console test suite
- ↵ Select **CIP HTML TestSuite Documentation** to generate a html documentation
- ↵ Click **Next>**



- ① The necessary build configs are automatically added to your target folder
- ① Note that you can add or remove build configs anytime to/from your target folders
- ↩ Click **Finish**



↪ Create the Lamp state machine as shown in the previous tutorial



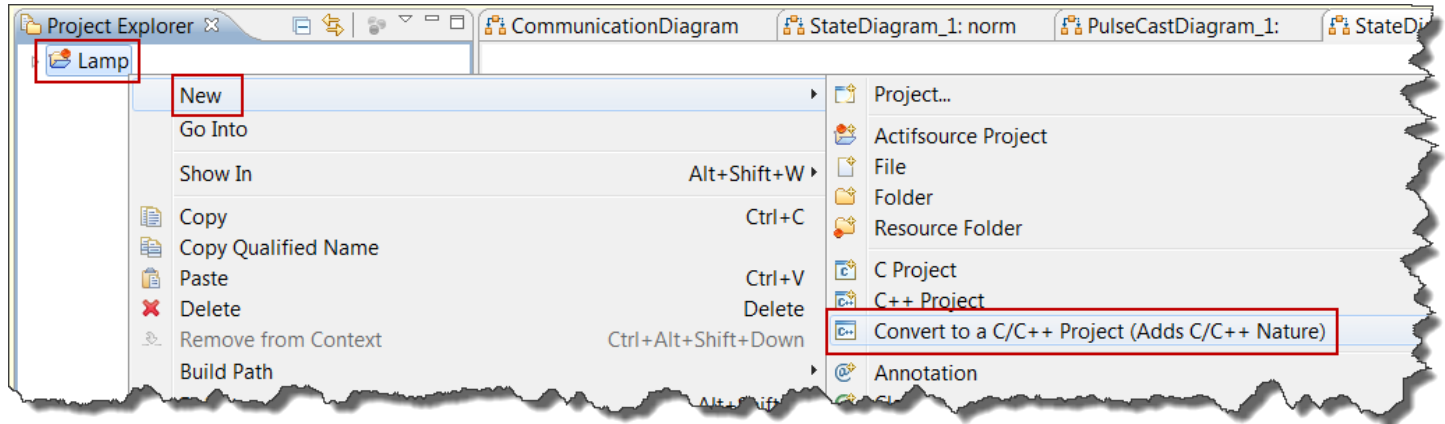
|             |                                                                             |
|-------------|-----------------------------------------------------------------------------|
| typeOf      | <b>ch.actifsource.solution.cip.generic.core.meta.process.DelayOperation</b> |
| <b>name</b> | <b>delay</b>                                                                |
| delayText   | 3                                                                           |

☞ Set the timer delay to 3 ticks

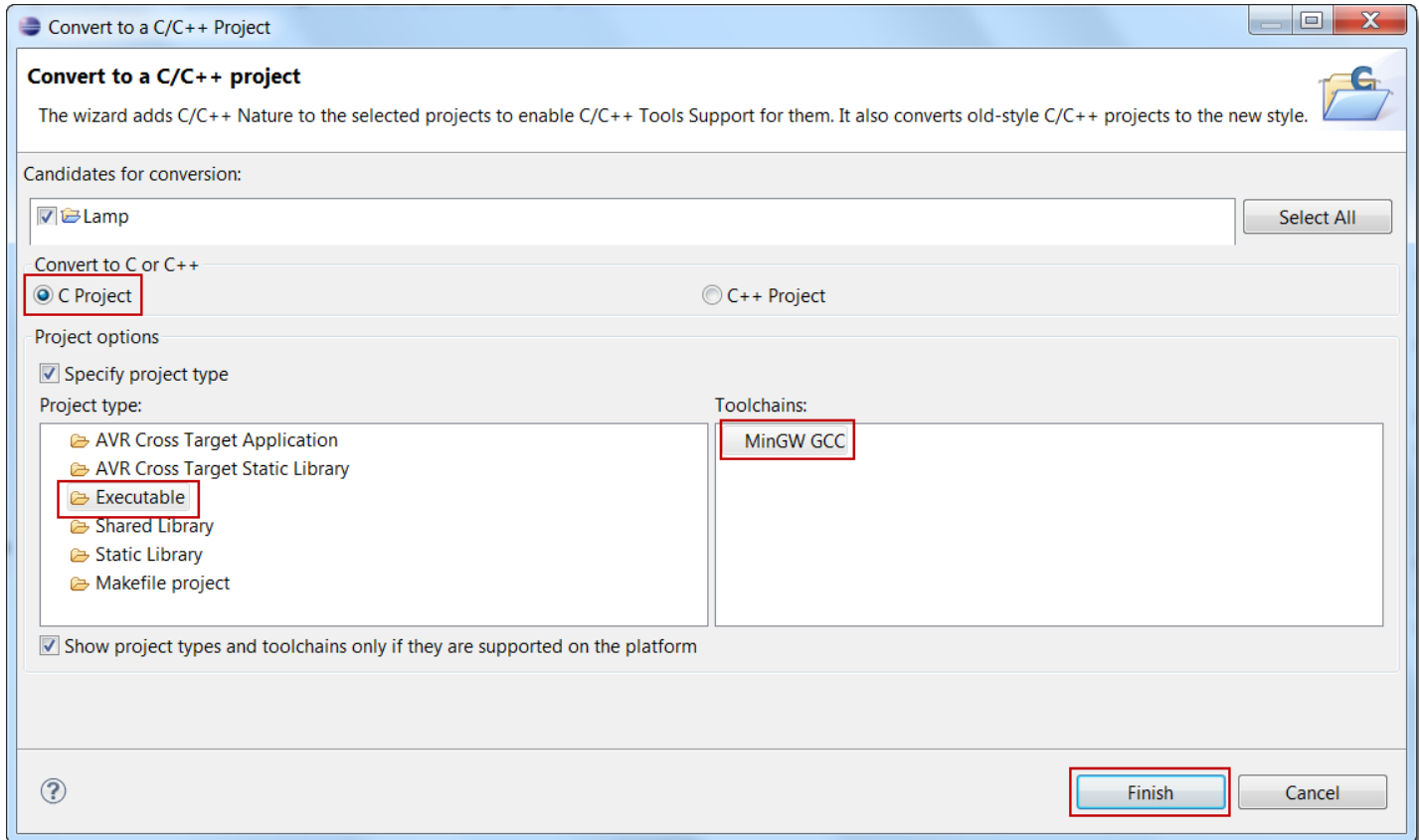


|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------|------|-----------------|--------|------------------------------------------------------------------------|---------|-----------------------------|-----------------|---|------------------|--|--------|----------------------------------------------------------------------|---------------|------------------------|----------------|----------------------|-------------|-----------------------|-------------------------|--|---------------|--|-------------|--|-----------|--|
| typeOf                  | <b>ch.actifsource.solution.cip.generic.core.meta.system.unit.Implementation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| name                    | <b>LampImplementation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| unit                    | <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.core.meta.system.unit.ImplementationUnit</b></td> </tr> <tr> <td>name</td> <td><b>LampUnit</b></td> </tr> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.core.meta.system.CipMachine</b></td> </tr> <tr> <td>cluster</td> <td>Lamp.LampSystem.LampCluster</td> </tr> <tr> <td>localBufferSize</td> <td>1</td> </tr> <tr> <td>optionalChannels</td> <td></td> </tr> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.core.meta.system.CipShell</b></td> </tr> <tr> <td>inputChannels</td> <td>Lamp.LampSystem.Button</td> </tr> <tr> <td>outputChannels</td> <td>Lamp.LampSystem.Lamp</td> </tr> <tr> <td>codeOptions</td> <td>Default_C_CodeOptions</td> </tr> <tr> <td>implementationAttribute</td> <td></td> </tr> <tr> <td>codeDirectory</td> <td></td> </tr> <tr> <td>includeText</td> <td></td> </tr> <tr> <td>initChain</td> <td></td> </tr> </table> | typeOf | <b>ch.actifsource.solution.cip.generic.core.meta.system.unit.ImplementationUnit</b> | name | <b>LampUnit</b> | typeOf | <b>ch.actifsource.solution.cip.generic.core.meta.system.CipMachine</b> | cluster | Lamp.LampSystem.LampCluster | localBufferSize | 1 | optionalChannels |  | typeOf | <b>ch.actifsource.solution.cip.generic.core.meta.system.CipShell</b> | inputChannels | Lamp.LampSystem.Button | outputChannels | Lamp.LampSystem.Lamp | codeOptions | Default_C_CodeOptions | implementationAttribute |  | codeDirectory |  | includeText |  | initChain |  |
| typeOf                  | <b>ch.actifsource.solution.cip.generic.core.meta.system.unit.ImplementationUnit</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| name                    | <b>LampUnit</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| typeOf                  | <b>ch.actifsource.solution.cip.generic.core.meta.system.CipMachine</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| cluster                 | Lamp.LampSystem.LampCluster                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| localBufferSize         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| optionalChannels        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| typeOf                  | <b>ch.actifsource.solution.cip.generic.core.meta.system.CipShell</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| inputChannels           | Lamp.LampSystem.Button                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| outputChannels          | Lamp.LampSystem.Lamp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| codeOptions             | Default_C_CodeOptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| implementationAttribute |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| codeDirectory           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| includeText             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| initChain               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| includeText             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |
| includeProtected        | false                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                                                     |      |                 |        |                                                                        |         |                             |                 |   |                  |  |        |                                                                      |               |                        |                |                      |             |                       |                         |  |               |  |             |  |           |  |

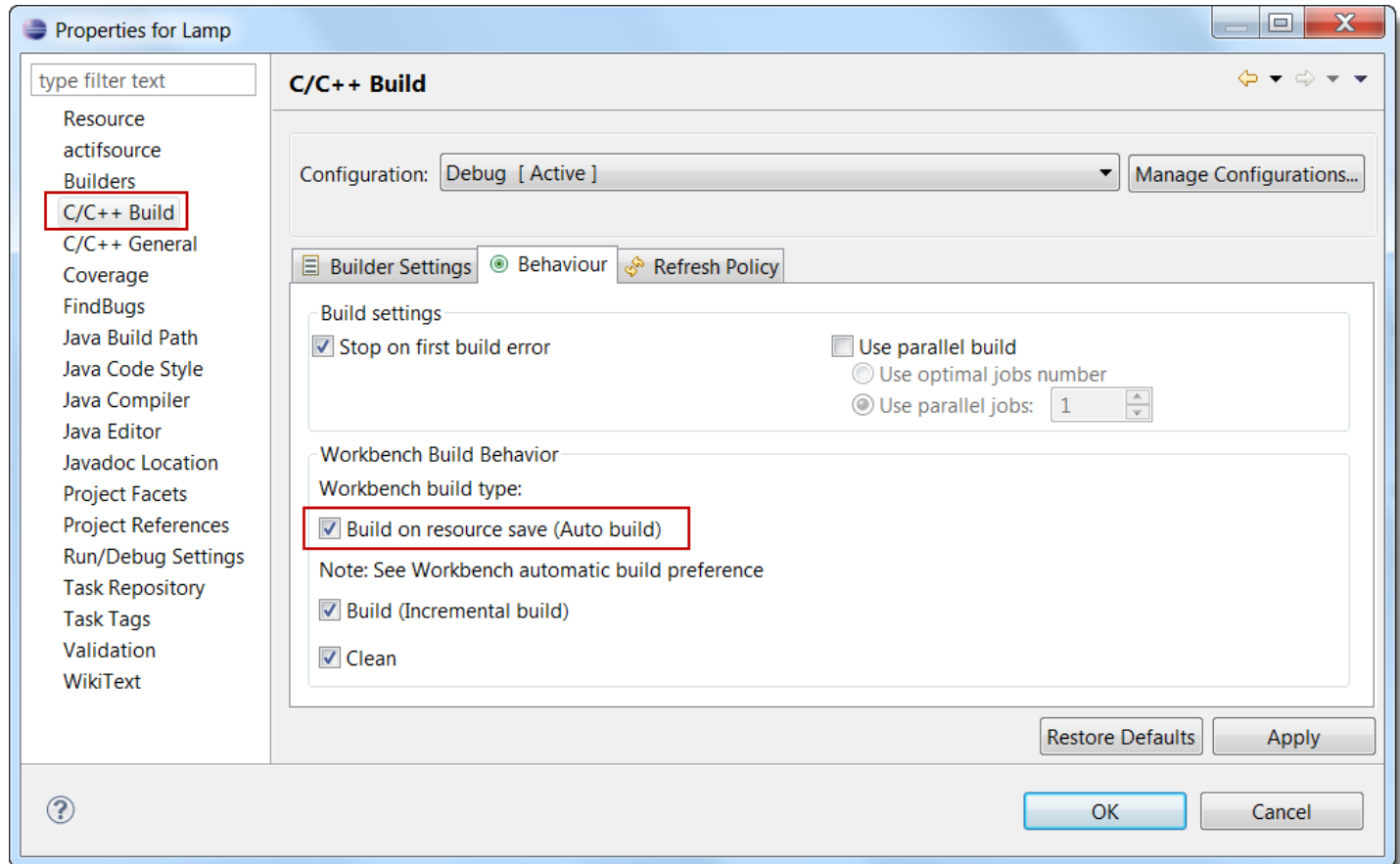
- ↗ Create a new **Implementation** in your **CIPSystem**
- ↗ Select the **LampCluster** in your **CipMachine**
- ↗ Select input and output channels
- ↗ Select **Default C CodeOptions**



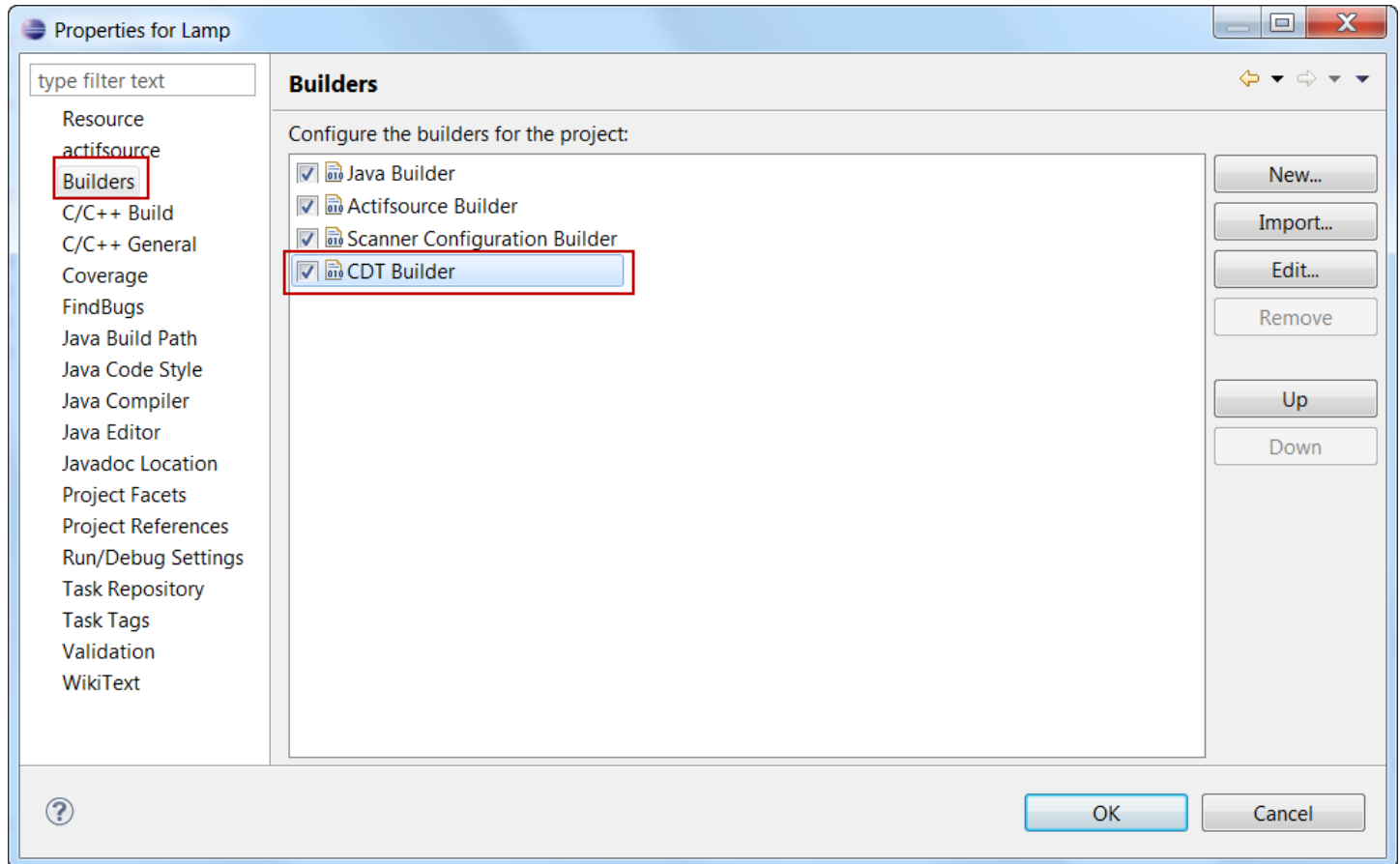
- ① Install the CDT (C/C++ development tool)
- ↪ Convert your project to a **C/C++ Project**



- ↶ Convert to **C Project**
- ↶ Create an **Executable**
- ↶ Click **Finish**



↪ To automatically compile choose *Build on resource save* in the project properties



- ↩ Rearrange the CDT Builder to the last position to make sure that the actifsource generator runs before compiling

# Setting up a CIP Test Suite

- Create a new **Resource** of type **CipTestSuite**
- Specify your test cases

|                    |                                                                   |
|--------------------|-------------------------------------------------------------------|
| typeOf             | <b>ch.actifsource.solution.cip.generic.testsuite.CipTestSuite</b> |
| <b>name</b>        | <b>LampSystem_TestSuite</b>                                       |
| cipSystem          | Lamp.LampSystem                                                   |
| implementationUnit | Lamp.LampSystem.LampImplementation.LampUnit                       |
| testCase           |                                                                   |

- ↪ Create a new **Resource** of type **CipTestSuite**
- ↪ Reference you CIP system and the implementation unit which shall be tested

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------|------|------------------|---------|---------------------------------------------------------------------------------------|--------|------|-------|-------|----------|------|------------|------|--------------------|--|------------------|--|
| typeOf             | <b>ch.actifsource.solution.cip.generic.testsuite.CipTestSuite</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| name               | <b>LampSystem_TestSuite</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| cipSystem          | Lamp.LampSystem                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| implementationUnit | Lamp.LampSystem.LampImplementation.LampUnit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| testCase           | <table><tr><td>typeOf</td><td><b>ch.actifsource.solution.cip.generic.testsuite.TestCase</b></td></tr><tr><td>name</td><td><b>LampOnOff</b></td></tr><tr><td>comment</td><td>This test case just switches the lamp on and off. Switching off works with a delay. &gt;</td></tr><tr><td>enable</td><td>true</td></tr><tr><td>trace</td><td>false</td></tr><tr><td>autoStep</td><td>true</td></tr><tr><td>autoTimeup</td><td>true</td></tr><tr><td><i>preTestCase</i></td><td></td></tr><tr><td><i>testEvent</i></td><td></td></tr></table> | typeOf | <b>ch.actifsource.solution.cip.generic.testsuite.TestCase</b> | name | <b>LampOnOff</b> | comment | This test case just switches the lamp on and off. Switching off works with a delay. > | enable | true | trace | false | autoStep | true | autoTimeup | true | <i>preTestCase</i> |  | <i>testEvent</i> |  |
| typeOf             | <b>ch.actifsource.solution.cip.generic.testsuite.TestCase</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| name               | <b>LampOnOff</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| comment            | This test case just switches the lamp on and off. Switching off works with a delay. >                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| enable             | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| trace              | false                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| autoStep           | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| autoTimeup         | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| <i>preTestCase</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |
| <i>testEvent</i>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                               |      |                  |         |                                                                                       |        |      |       |       |          |      |            |      |                    |  |                  |  |

- ↪ Create a new **TestCase** called LampOnOff
- ↪ Make sure to properly comment all resources via the **comment** attribute.



|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------|---------------|-----------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------|--------------|-----------------------------|------------------|--|-------|--|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------|---------------|-----------------------------|-------------------|--|-------|--|
| typeOf            | <b>ch.actifsource.solution.cip.generic.testsuite.TestCase</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| name              | <b>LampOnOff</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| comment           | This test case just switches the lamp on and off. Switching off works with a delay. →                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| enable            | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| trace             | false                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| autoStep          | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| autoTimeup        | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| preTestCase       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| testEvent         | <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.MessageEvent</b></td> </tr> <tr> <td>comment</td> <td>Switches the light on.</td> </tr> <tr> <td>eventMessage</td> <td> <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b></td> </tr> <tr> <td>inputMessage</td> <td>Lamp.LampSystem.Button.Push</td> </tr> <tr> <td>inputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table> </td> </tr> <tr> <td>actionMessage</td> <td> <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b></td> </tr> <tr> <td>outputMessage</td> <td>Lamp.LampSystem.Lamp.Bright</td> </tr> <tr> <td>outputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table> </td> </tr> </table> | typeOf | <b>ch.actifsource.solution.cip.generic.testsuite.MessageEvent</b>  | comment       | Switches the light on.      | eventMessage      | <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b></td> </tr> <tr> <td>inputMessage</td> <td>Lamp.LampSystem.Button.Push</td> </tr> <tr> <td>inputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table> | typeOf | <b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b> | inputMessage | Lamp.LampSystem.Button.Push | inputMessageData |  | index |  | actionMessage | <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b></td> </tr> <tr> <td>outputMessage</td> <td>Lamp.LampSystem.Lamp.Bright</td> </tr> <tr> <td>outputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table> | typeOf | <b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b> | outputMessage | Lamp.LampSystem.Lamp.Bright | outputMessageData |  | index |  |
| typeOf            | <b>ch.actifsource.solution.cip.generic.testsuite.MessageEvent</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| comment           | Switches the light on.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| eventMessage      | <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b></td> </tr> <tr> <td>inputMessage</td> <td>Lamp.LampSystem.Button.Push</td> </tr> <tr> <td>inputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | typeOf | <b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b>  | inputMessage  | Lamp.LampSystem.Button.Push | inputMessageData  |                                                                                                                                                                                                                                                                                            | index  |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| typeOf            | <b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| inputMessage      | Lamp.LampSystem.Button.Push                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| inputMessageData  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| index             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| actionMessage     | <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b></td> </tr> <tr> <td>outputMessage</td> <td>Lamp.LampSystem.Lamp.Bright</td> </tr> <tr> <td>outputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | typeOf | <b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b> | outputMessage | Lamp.LampSystem.Lamp.Bright | outputMessageData |                                                                                                                                                                                                                                                                                            | index  |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| typeOf            | <b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| outputMessage     | Lamp.LampSystem.Lamp.Bright                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| outputMessageData |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |
| index             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                                    |               |                             |                   |                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                             |                  |  |       |  |               |                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                             |                   |  |       |  |

- ↪ Define the first test event of type **MessageEvent**
- ↪ First define the event message which is sent to the CIP machine
- ↪ Let's switch on the light by pressing the button
  - Select event message Button.Push
  - Define the expected action message Lamp.Bright

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------|--------------|-------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------|--------------|--------------------------------|------------------|--|-------|--|---------------|--|
| typeof           | <b>ch.actifsource.solution.cip.generic.testsuite.TestCase</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| name             | <b>LampOnOff</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| comment          | This test case just switches the lamp on and off. Switching off works with a delay.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| enable           | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| trace            | false                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| autoStep         | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| autoTimeout      | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| preTestCase      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| testEvent[1]     | Button_Push : <b>MessageEvent</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| testEvent[2]     | <table border="1"> <tr> <td>typeof</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.MessageEvent</b></td> </tr> <tr> <td>comment</td> <td>Switching the light off is delayed for 3 ticks.</td> </tr> <tr> <td>eventMessage</td> <td> <table border="1"> <tr> <td>typeof</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b></td> </tr> <tr> <td>inputMessage</td> <td>Lamp.LampSystem.Button.Release</td> </tr> <tr> <td>inputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table> </td> </tr> <tr> <td>actionMessage</td> <td></td> </tr> </table> | typeof | <b>ch.actifsource.solution.cip.generic.testsuite.MessageEvent</b> | comment      | Switching the light off is delayed for 3 ticks. | eventMessage     | <table border="1"> <tr> <td>typeof</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b></td> </tr> <tr> <td>inputMessage</td> <td>Lamp.LampSystem.Button.Release</td> </tr> <tr> <td>inputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table> | typeof | <b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b> | inputMessage | Lamp.LampSystem.Button.Release | inputMessageData |  | index |  | actionMessage |  |
| typeof           | <b>ch.actifsource.solution.cip.generic.testsuite.MessageEvent</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| comment          | Switching the light off is delayed for 3 ticks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| eventMessage     | <table border="1"> <tr> <td>typeof</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b></td> </tr> <tr> <td>inputMessage</td> <td>Lamp.LampSystem.Button.Release</td> </tr> <tr> <td>inputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table>                                                                                                                                                                                                                                                                                                                | typeof | <b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b> | inputMessage | Lamp.LampSystem.Button.Release                  | inputMessageData |                                                                                                                                                                                                                                                                                               | index  |                                                                   |              |                                |                  |  |       |  |               |  |
| typeof           | <b>ch.actifsource.solution.cip.generic.testsuite.EventMessage</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| inputMessage     | Lamp.LampSystem.Button.Release                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| inputMessageData |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| index            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |
| actionMessage    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                   |              |                                                 |                  |                                                                                                                                                                                                                                                                                               |        |                                                                   |              |                                |                  |  |       |  |               |  |

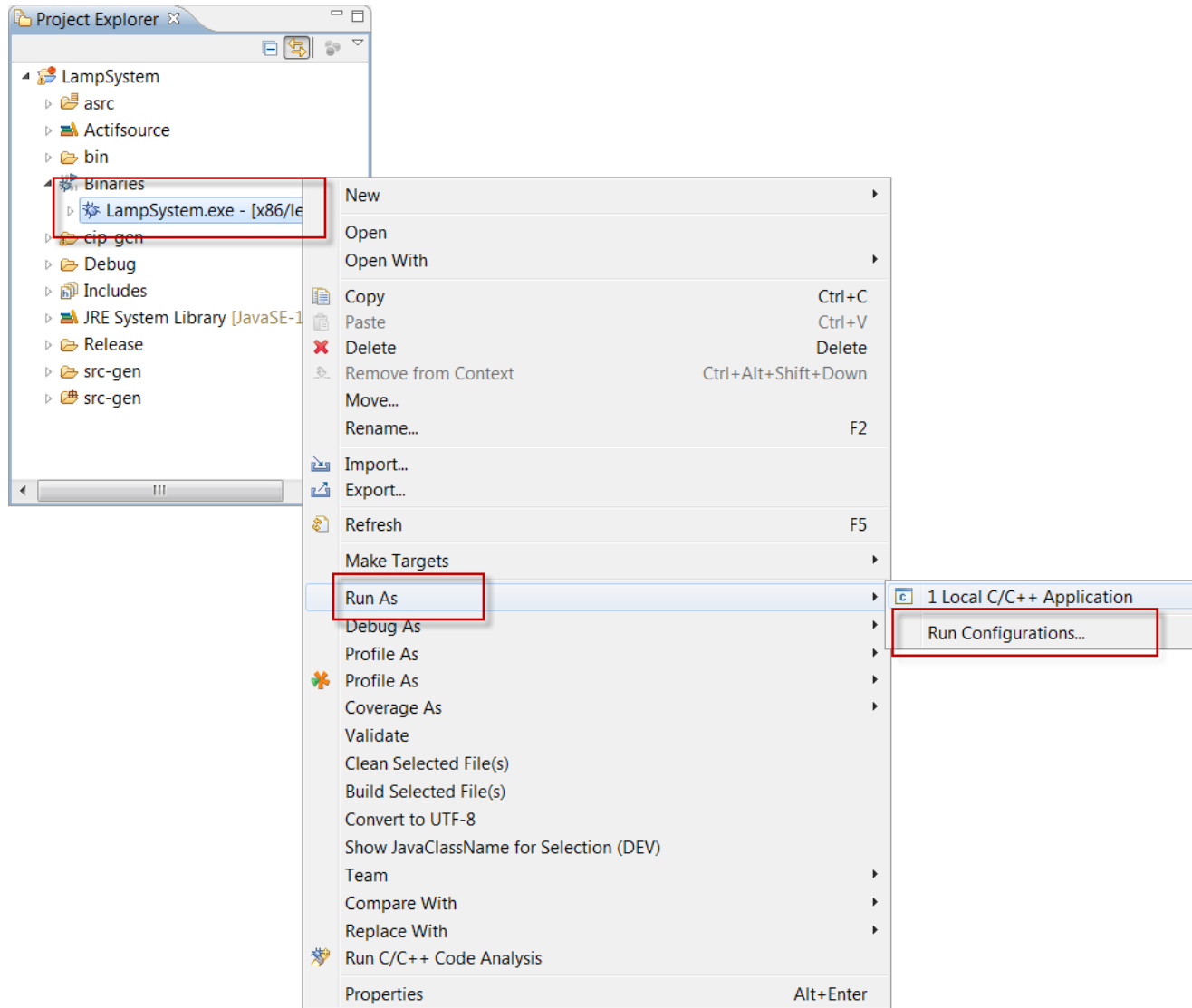
- ↪ Define the second test event of type **MessageEvent**
- ↪ First define the event message which is sent to the CIP machine
- ↪ Let's activate the switch off delay by pressing the button
  - Select event message Button.Release
- ⓘ Since switching off is delayed, we do not expect the light to be switched off

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------|---------------|------------------------------------------|-------------------|---|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------|---------------|---------------------------|-------------------|--|-------|--|
| typeOf            | <b>ch.actifsource.solution.cip.generic.testsuite.TestCase</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| name              | <b>LampOnOff</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| comment           | This test case just switches the lamp on and off. Switching off works with a delay. ▶                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| enable            | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| trace             | false                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| autoStep          | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| autoTimeup        | true                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| preTestCase       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| testEvent[1]      | Button_Push : <b>MessageEvent</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| testEvent[2]      | Button_Release : <b>MessageEvent</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| testEvent[3]      | <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.TickEvent</b></td> </tr> <tr> <td>comment</td> <td>The light is switched off after 3 ticks.</td> </tr> <tr> <td>tickCount</td> <td>3</td> </tr> <tr> <td>actionMessage</td> <td> <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b></td> </tr> <tr> <td>outputMessage</td> <td>Lamp.LampSystem.Lamp.Dark</td> </tr> <tr> <td>outputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table> </td> </tr> </table> | typeOf | <b>ch.actifsource.solution.cip.generic.testsuite.TickEvent</b>     | comment       | The light is switched off after 3 ticks. | tickCount         | 3 | actionMessage | <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b></td> </tr> <tr> <td>outputMessage</td> <td>Lamp.LampSystem.Lamp.Dark</td> </tr> <tr> <td>outputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table> | typeOf | <b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b> | outputMessage | Lamp.LampSystem.Lamp.Dark | outputMessageData |  | index |  |
| typeOf            | <b>ch.actifsource.solution.cip.generic.testsuite.TickEvent</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| comment           | The light is switched off after 3 ticks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| tickCount         | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| actionMessage     | <table border="1"> <tr> <td>typeOf</td> <td><b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b></td> </tr> <tr> <td>outputMessage</td> <td>Lamp.LampSystem.Lamp.Dark</td> </tr> <tr> <td>outputMessageData</td> <td></td> </tr> <tr> <td>index</td> <td></td> </tr> </table>                                                                                                                                                                                                                                                                                                    | typeOf | <b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b> | outputMessage | Lamp.LampSystem.Lamp.Dark                | outputMessageData |   | index         |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| typeOf            | <b>ch.actifsource.solution.cip.generic.testsuite.ActionMessage</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| outputMessage     | Lamp.LampSystem.Lamp.Dark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| outputMessageData |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |
| index             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                    |               |                                          |                   |   |               |                                                                                                                                                                                                                                                                                             |        |                                                                    |               |                           |                   |  |       |  |

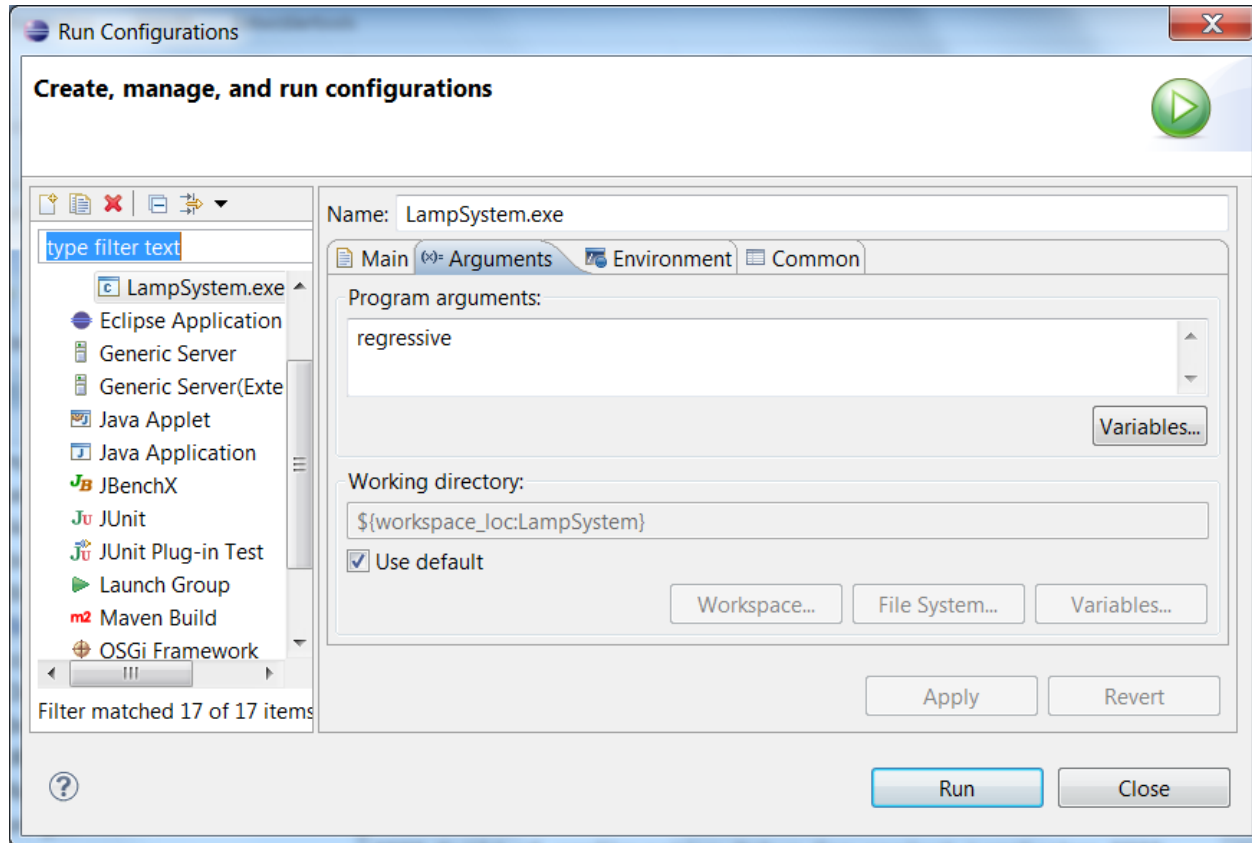
- ↪ Define the third test event of type **TickEvent**
- ↪ Define the number of ticks to time up the delay
  - 3 ticks in this example
  - Define the expected action message **Lamp.Dark**
- ① The light is expected to be switched off after 3 ticks

# Running the CIP Test Suite

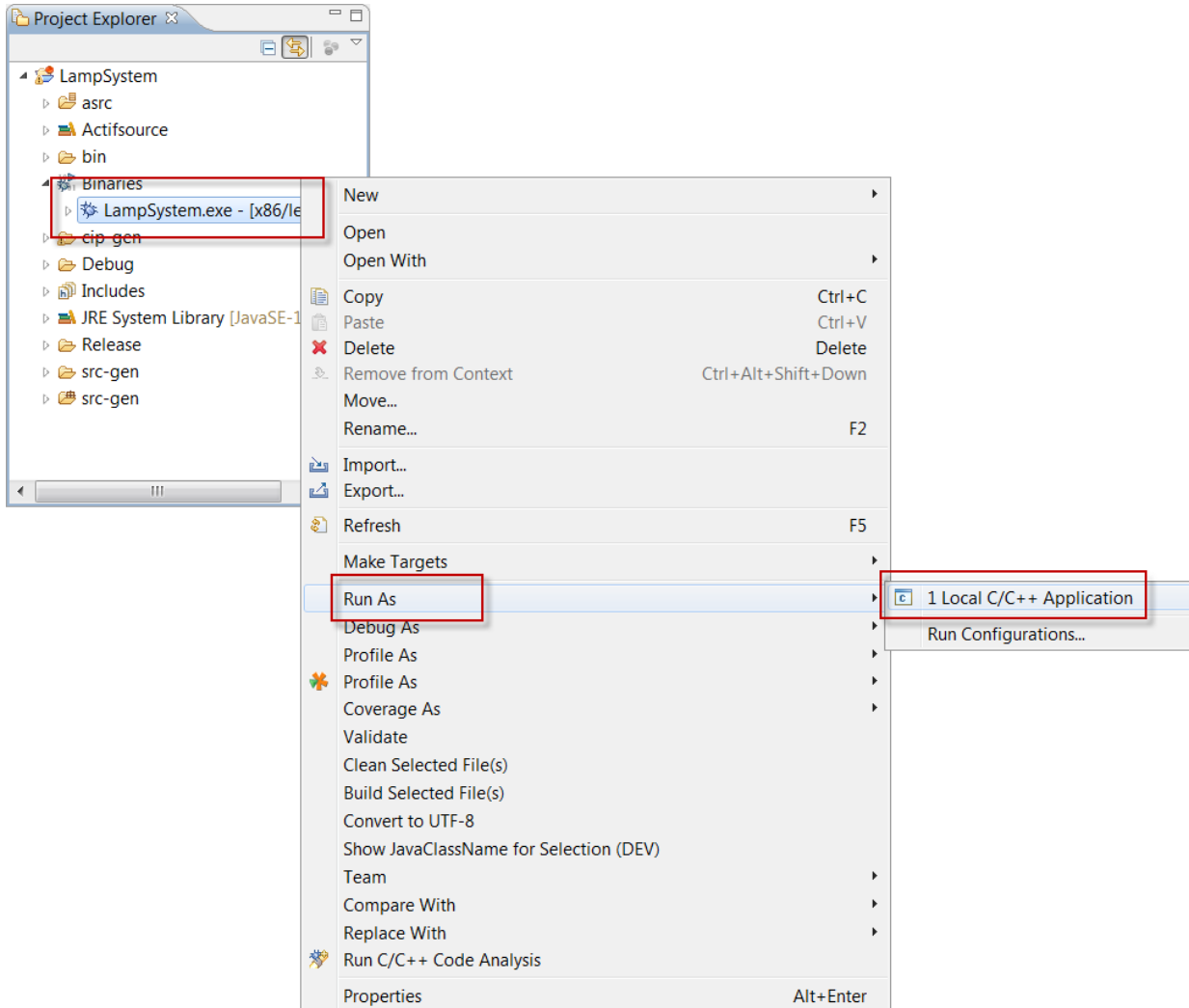
- In the second part we want to generate an executable which can run the previously defined test cases
- Make sure to install the CDT (C/C++ Development Tool) and mingw for C language support



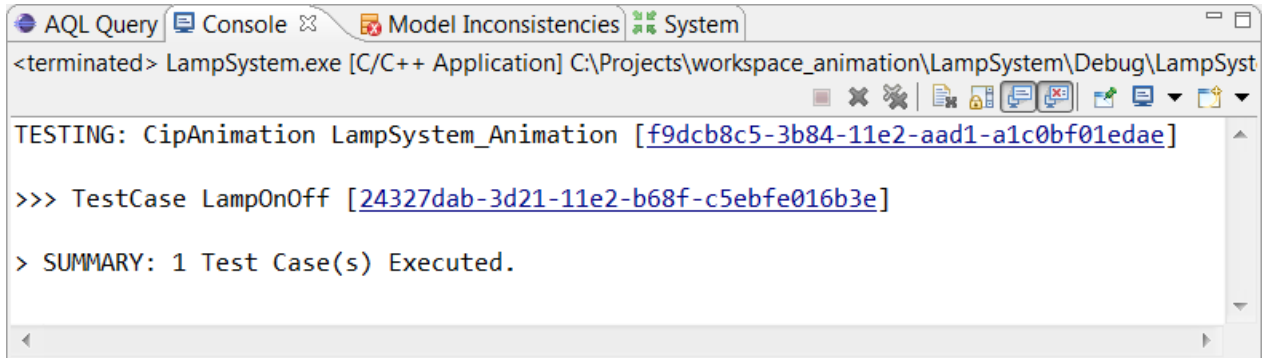
- ① Your lamp system should have been generated by now
- ↶ Select your executable and run configuration



- ✎ Select the command line options
  - Select `regressive` to automatically run test cases
  - Select `manual` to manually stimulate the event



➤ Run the Local C/C++ Application

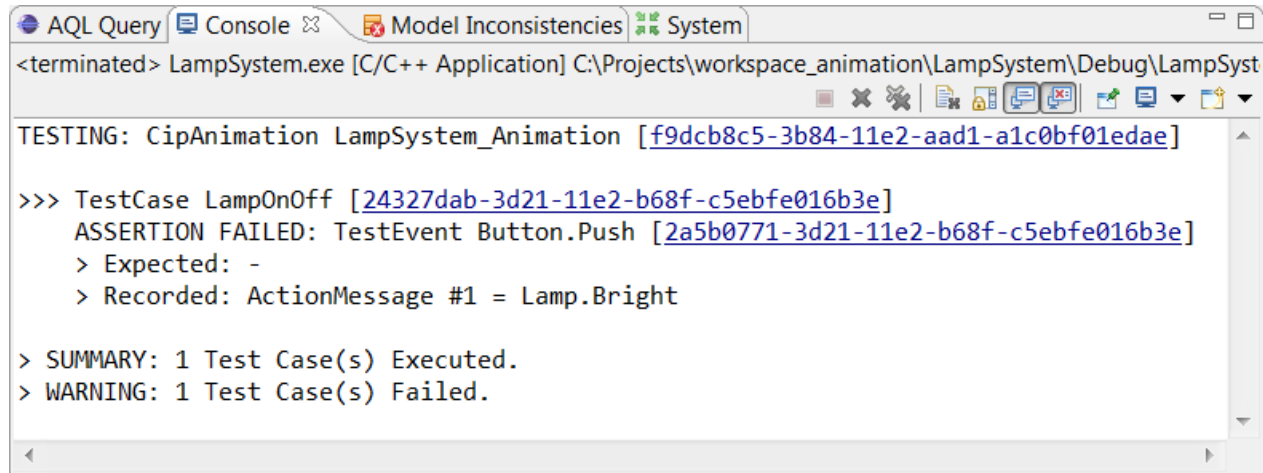


The screenshot shows a console window with the following content:

```
<terminated> LampSystem.exe [C/C++ Application] C:\Projects\workspace_animation\LampSystem\Debug\LampSyst  
TESTING: CipAnimation LampSystem_Animation [f9dcb8c5-3b84-11e2-aad1-a1c0bf01edae]  
>>> TestCase LampOnOff [24327dab-3d21-11e2-b68f-c5ebfe016b3e]  
> SUMMARY: 1 Test Case(s) Executed.
```

- ↖ The test out can be found in the console
- ⓘ Note that you can directly link back from the console output in the corresponding model by clicking on the blue GUID links



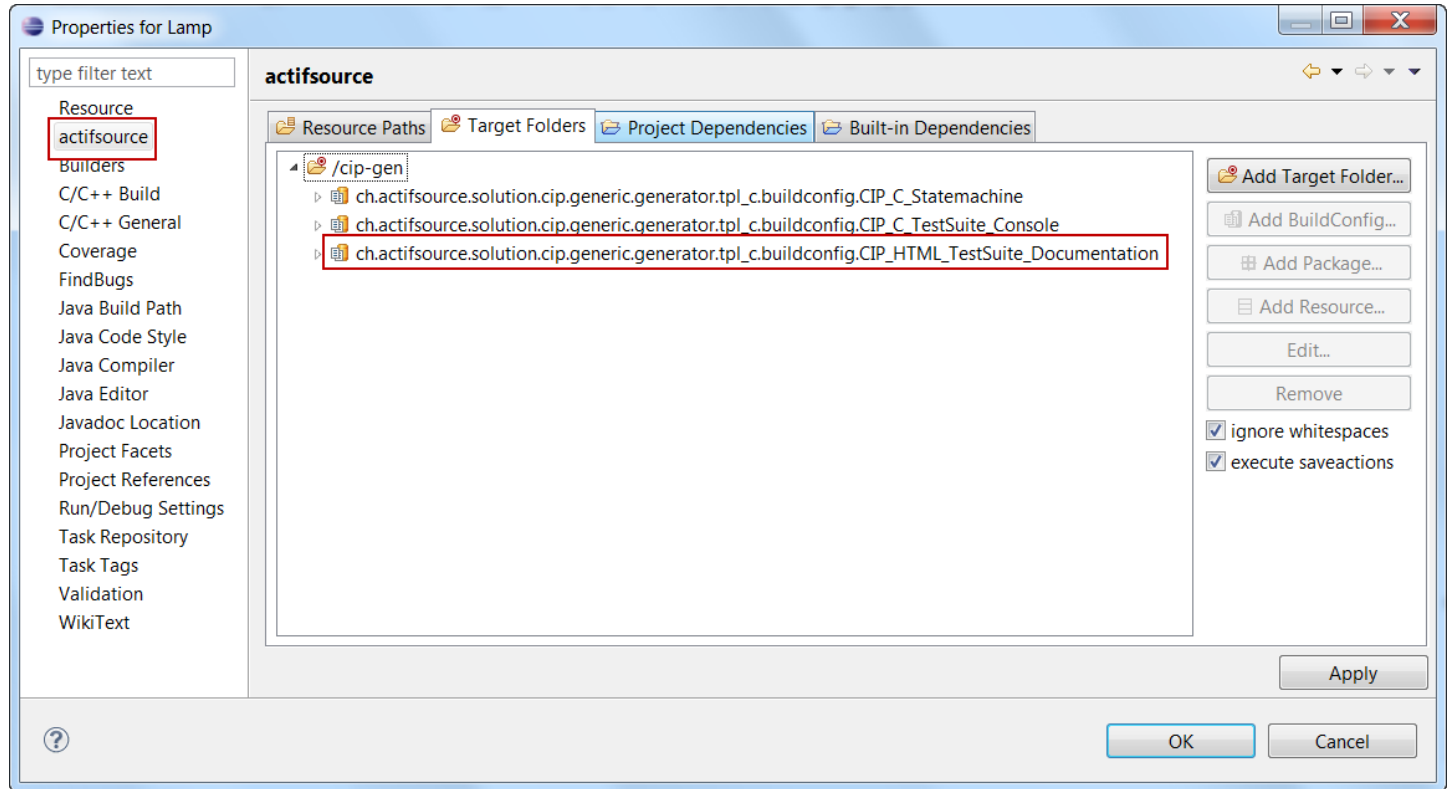


```
<terminated> LampSystem.exe [C/C++ Application] C:\Projects\workspace_animation\LampSystem\Debug\LampSyst
TESTING: CipAnimation LampSystem_Animation [f9dcb8c5-3b84-11e2-aad1-a1c0bf01edae]
>>> TestCase LampOnOff [24327dab-3d21-11e2-b68f-c5ebfe016b3e]
      ASSERTION FAILED: TestEvent Button.Push [2a5b0771-3d21-11e2-b68f-c5ebfe016b3e]
      > Expected: -
      > Recorded: ActionMessage #1 = Lamp.Bright
> SUMMARY: 1 Test Case(s) Executed.
> WARNING: 1 Test Case(s) Failed.
```

- ↩ Delete the expectation Lamp.Bright in your first test event and run the test again
- ↩ Link back to the model by clicking the GUID link next to the assertion failure
- ↩ Correct your test model

## Generate the CIP Test Suite Documentation

- Last but not least we want to generate the test suite documentation
- The documentation can be used for communication and to ensure quality
- Make sure to define a new test case any time a problem in your state machine has been corrected



- ① The documentation is generated because of the **BuildConfig CIP\_HTML\_TestSuite\_Documentation**
- ① A file `LampSystem_TestSuite_Documentation.html` is generated in your target folder

## Test Cases

|                               |                                                                                     |
|-------------------------------|-------------------------------------------------------------------------------------|
| <b>LampOnOff</b>              | This test case just switches the lamp on and off. Switching off works with a delay. |
| > <b>Button.Push(void)</b>    | Switches the light on,<br>Lamp.Bright(void)                                         |
| > <b>Button.Release(void)</b> | Switching the light off is delayed for 3 ticks.                                     |
| > <b>TICK_ #3</b>             | The light is switched off after 3 ticks.<br>Lamp.Dark(void)                         |

- ① Use the generated documentation to ensure quality and communicate with your team mates.

## LampSystem

|                   |                                                              |
|-------------------|--------------------------------------------------------------|
| <b>LampSystem</b> | A lamp system with delayed switch off.                       |
| Lamp              | The lamp cluster contains the button and the lamp processes. |

## Event Channels

|                      |                                          |
|----------------------|------------------------------------------|
| <b>Button</b>        | The button switches the lamp on and off. |
| Button.Push(void)    | Switches the lamp on.                    |
| Button.Release(void) | Switches the lamp off.                   |

|                   |  |
|-------------------|--|
| <b>Input</b>      |  |
| Input.Hello(void) |  |
| Input.World(void) |  |

## Action Channels

|                   |                                    |
|-------------------|------------------------------------|
| <b>Lamp</b>       | The lamp is either dark or bright. |
| Lamp.Dark(void)   | The lamp is switched off.          |
| Lamp.Bright(void) | The lamp is switched on.           |

|                         |  |
|-------------------------|--|
| <b>Output</b>           |  |
| Output.Holdrio(void)    |  |
| Output.Holderadio(void) |  |

① Klick on messages in the test cases to link back to the system information

