Tutorial

Simple Service

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Tutorial	Actifsource Tutorial – Simple Service
Required Time	• 70 Minutes
Prerequisites	• Actifsource Tutorial – Installing Actifsource
Goal	• Developing a generic domain model for a simple service infrastructure • Instantiating specific domain objects according to the generic domain • Writing code templates according to the generic domain • Generate code for every specific domain object
Topics covered	• Creating a new actifsource project • Working with Diagram Editor • Working with Resource Editor • Working with Template Editor • Generating Code
Notation	↳ To do ⓘ Information • **Bold**: Terms from actifsource or other technologies and tools • **Bold underlined**: actifsource Resources • Underlined: User Resources • *UnderlinedItalics*: Resource Functions • `Monospaced`: User input • *Italics*: Important terms in current situation
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Compatibility	Created with **actifsource** Version 5.8.5

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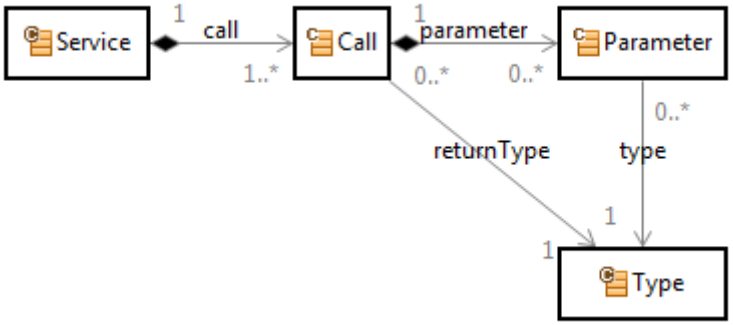
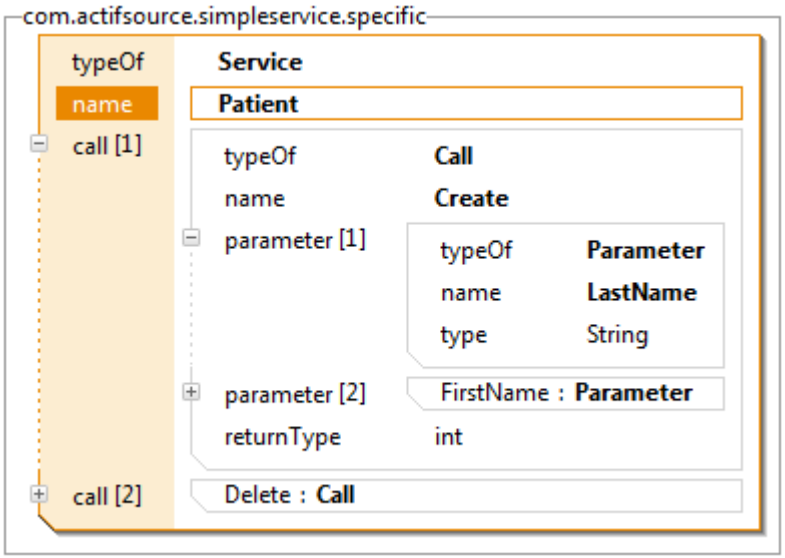
- Create a new actifsource Project
- Structure your models using *Packages*
- Create Domain Classes in a *Generic Domain Model* for a Simple Service Infrastructure consisting of Services, Service-Calls, Arguments and Types:



- Create a *Specific Domain Model* using your own domain-specific type system
- Use **Content Assist** to create new domain-specific types or insert existing domain-objects



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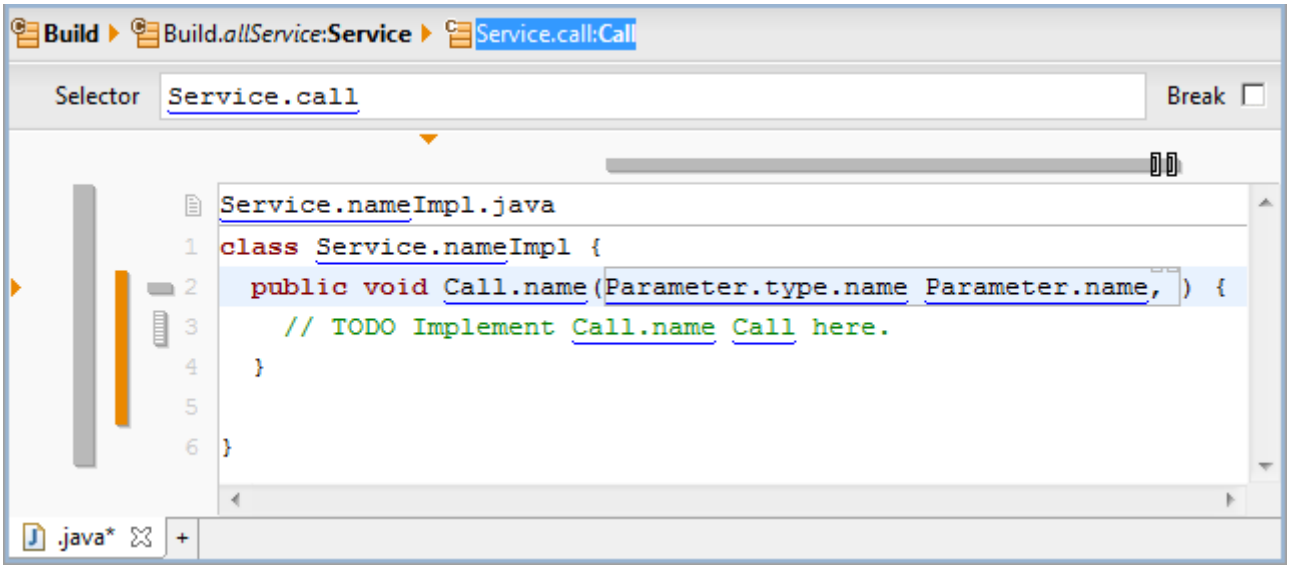
- Use *Code Templates* to generate *Specific Code*
- *Template Code* is always written in the context of the *Generic Domain Model*
- Learn how to add model-related *Contexts* in your *Code Templates*
- Learn how to insert model-related *Variables* using *Content Assist*



- Fill in Protected Regions in your generated code

```
class PatientImpl {
  public int Create(String LastName, String FirstName) {
    // Begin Protected Region [[859fc3ce-30e8-11df-afa7-8977f15a88e3]]
    // TODO Implement Create Call here.
    // End Protected Region   [[859fc3ce-30e8-11df-afa7-8977f15a88e3]]
  }

  public boolean Delete(int Id) {
    // Begin Protected Region [[4cd50ca0-30ec-11df-8fa1-0fcf44129cd6]]
    // TODO Implement Delete Call here.
    // End Protected Region   [[4cd50ca0-30ec-11df-8fa1-0fcf44129cd6]]
  }
```

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Part I: 5
Create a new actifsource Project

- Enable the actifsource perspective
- Create and setup a new actifsource project “SimpleService”
- Familiarize yourself with the basic structure of an actifsource project

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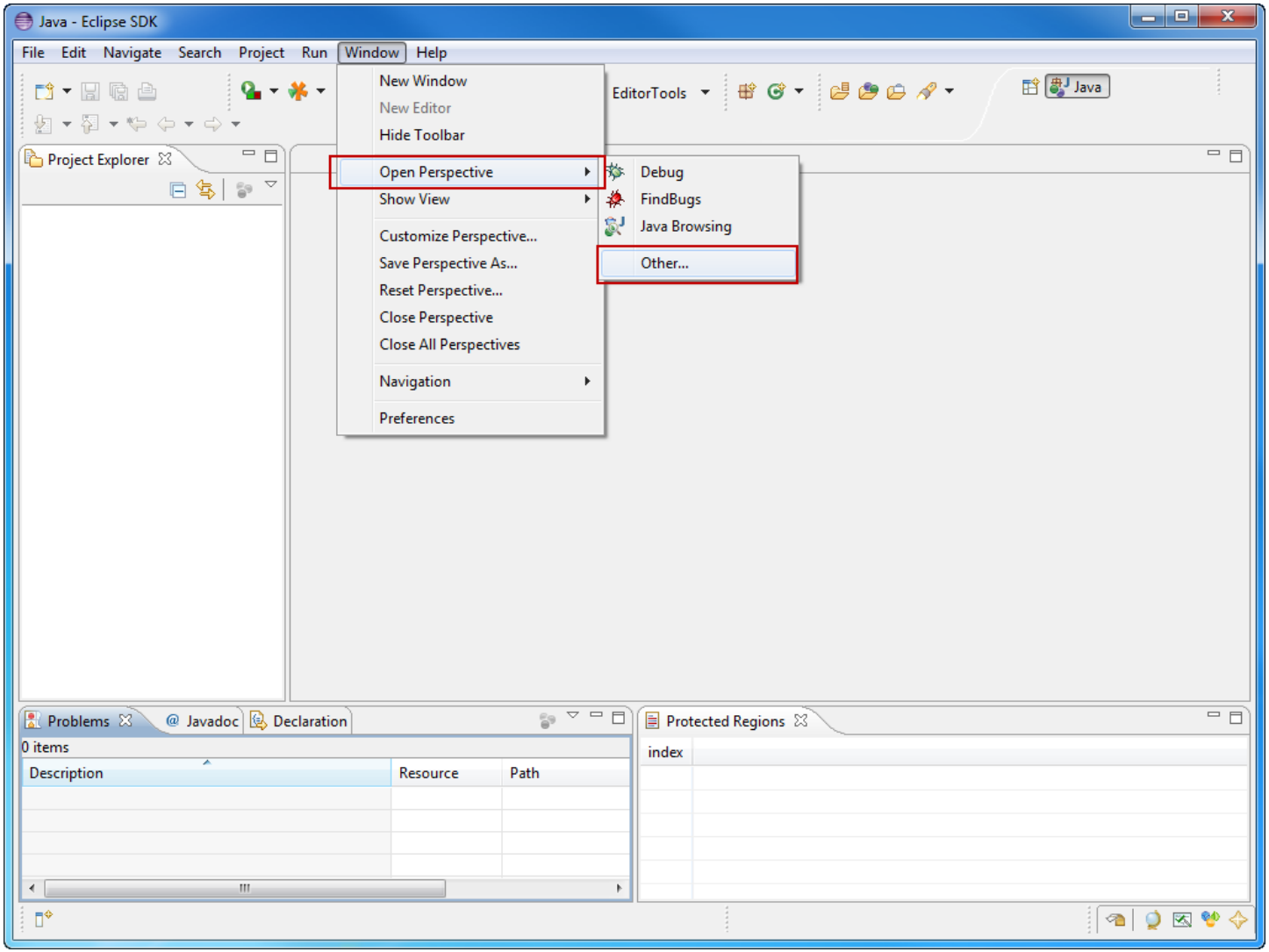
Create a new actifsource Project



- Install **actifsource** as a plugin from www.**actifsource**.com
- Open the **actifsource Perspective**

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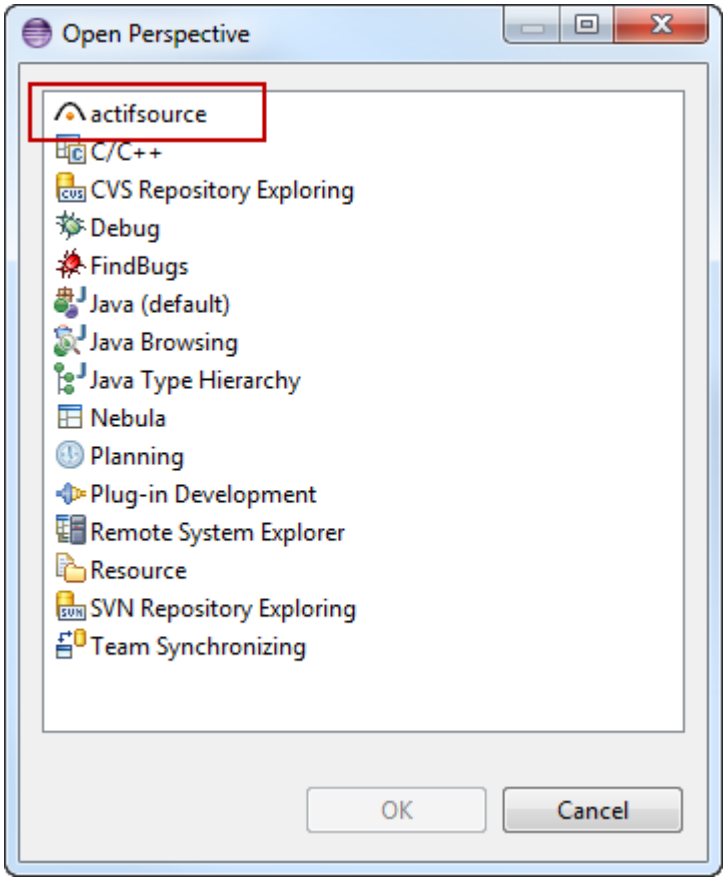

- In the Open Perspective dialog click on ***actifsource***
- Click *OK* to confirm.

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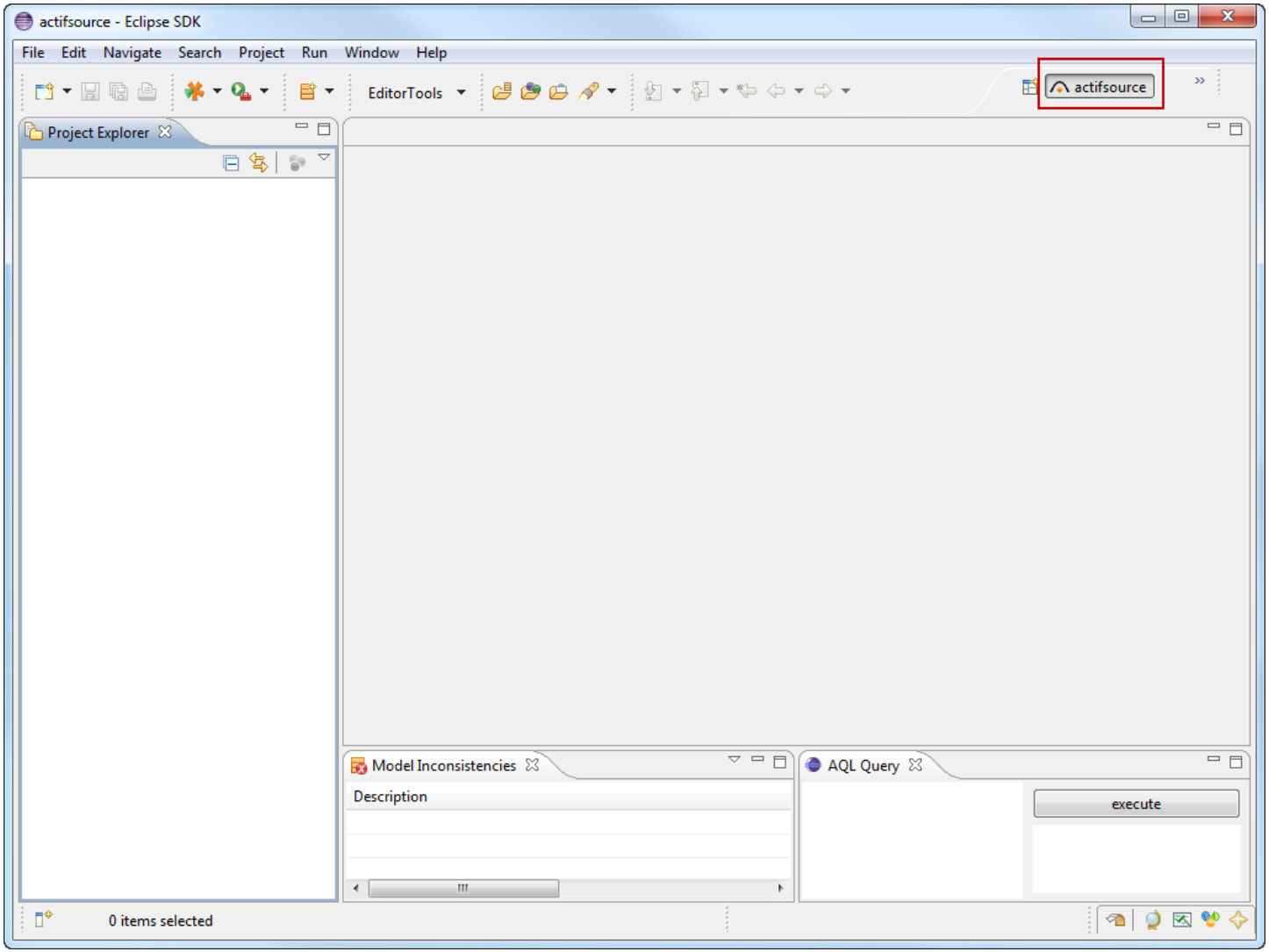
Create a new actifsource Project



ⓘ Make sure the **actifsource Perspective** is activated

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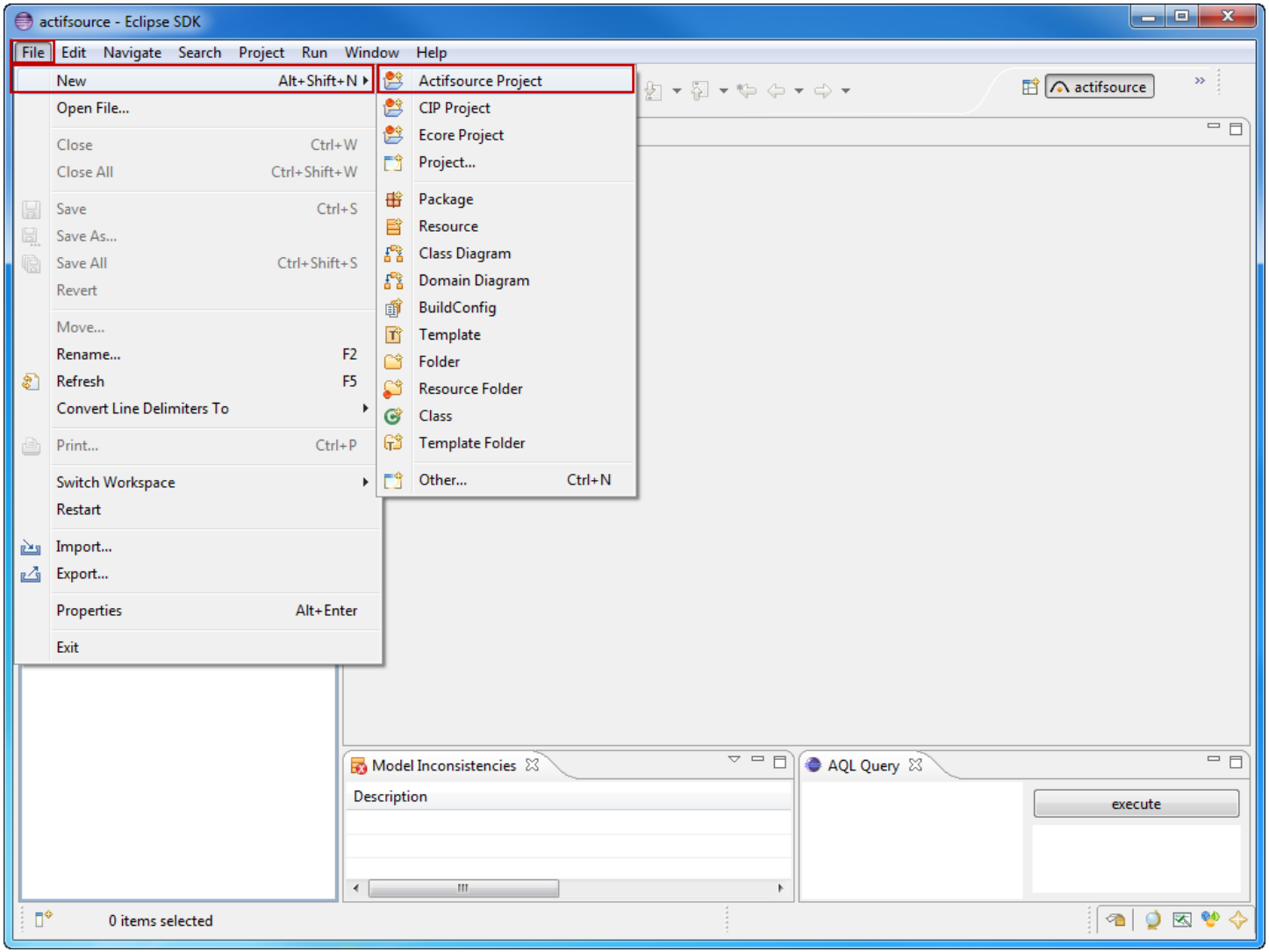
Create and Setup a new actifsource Project “SimpleService” 9



↳ Create a new **actifsource Project**

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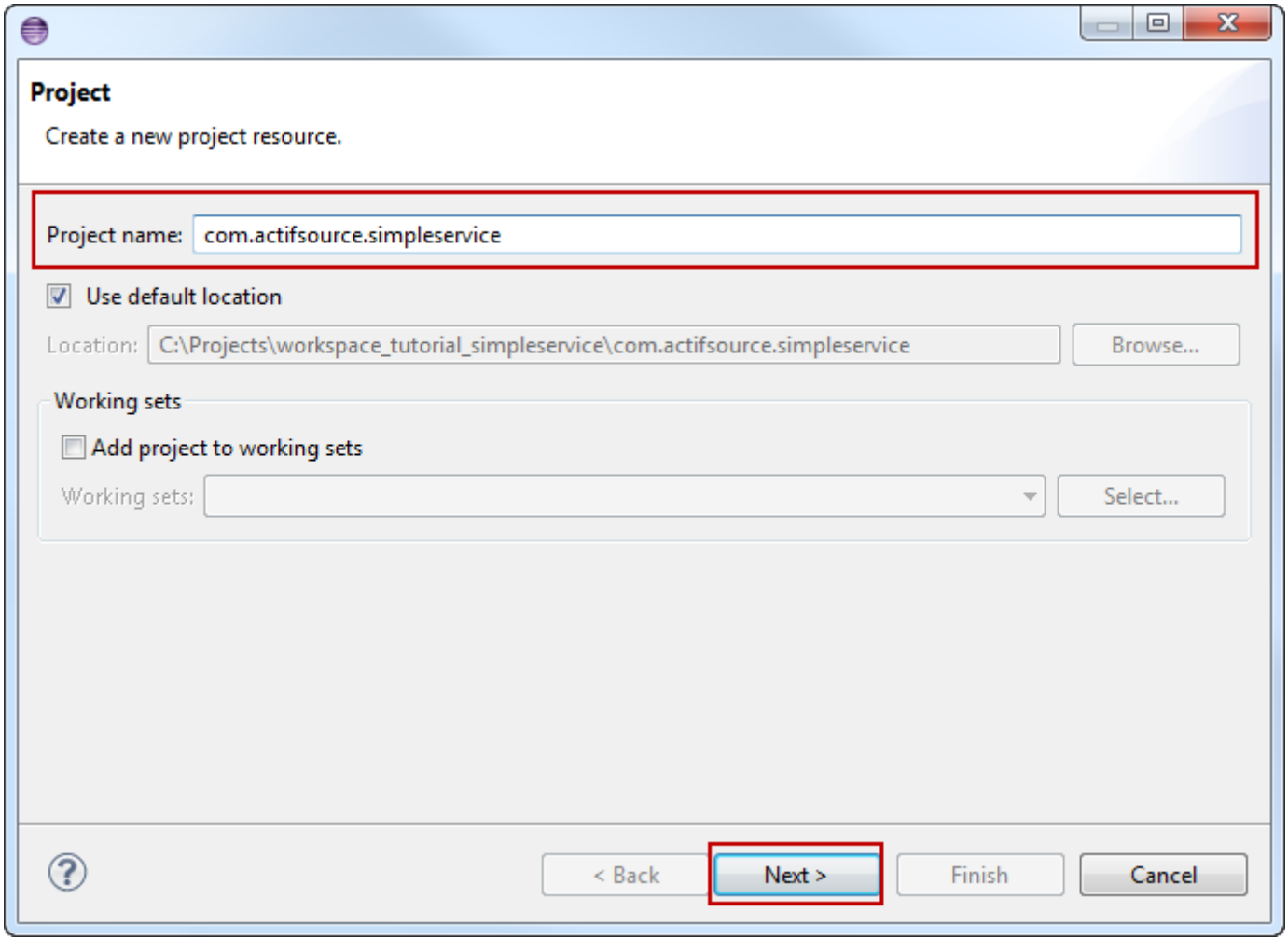

- Choose the project’s name com.actifsource.s`impleservice`
- Click *Next*

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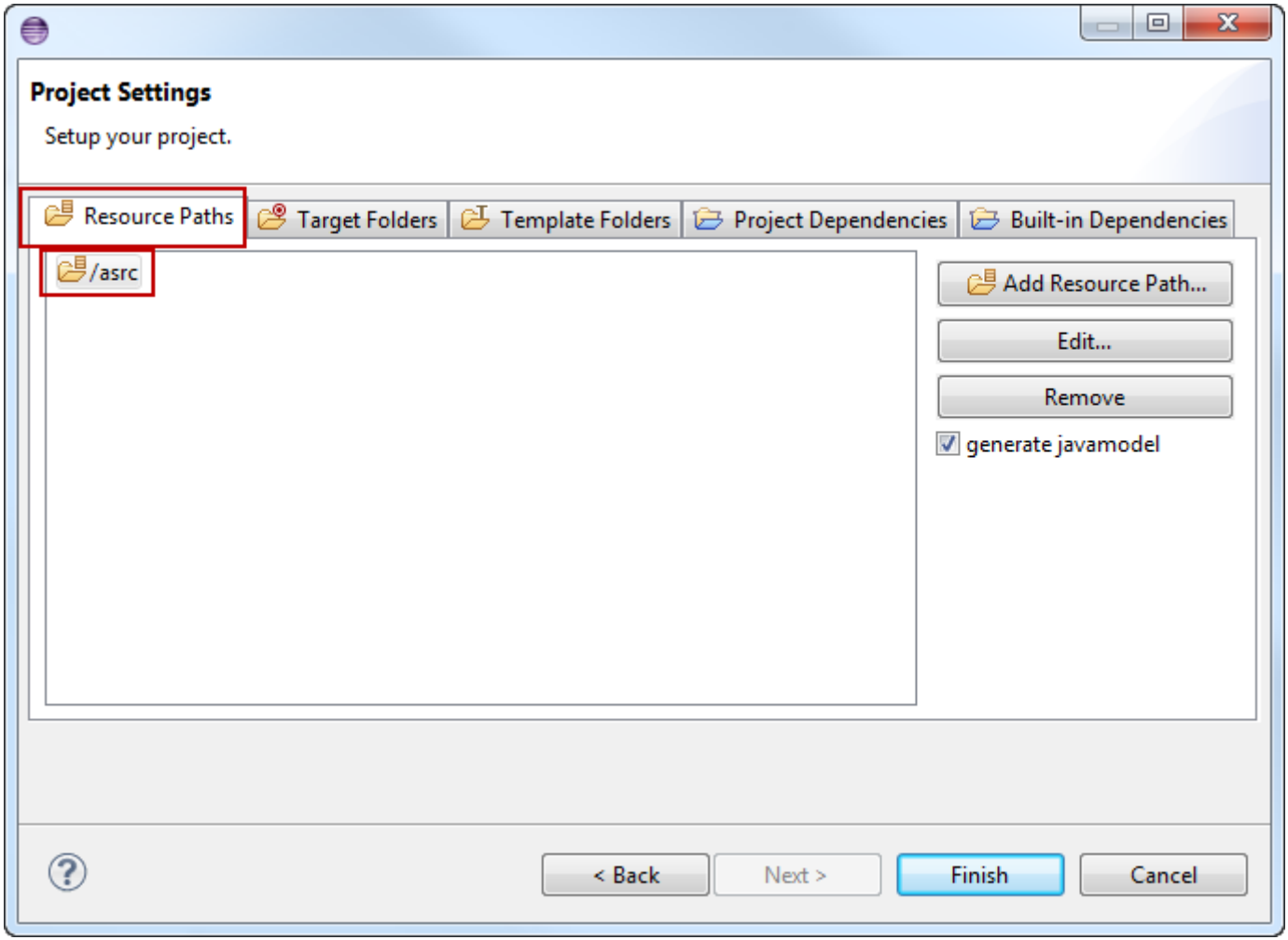

- ⓘ In **actifsource**, artifacts are called **Resources**
- ⓘ **Resources** are placed in folders and files
- ⓘ The default resource folder is called *asrc*

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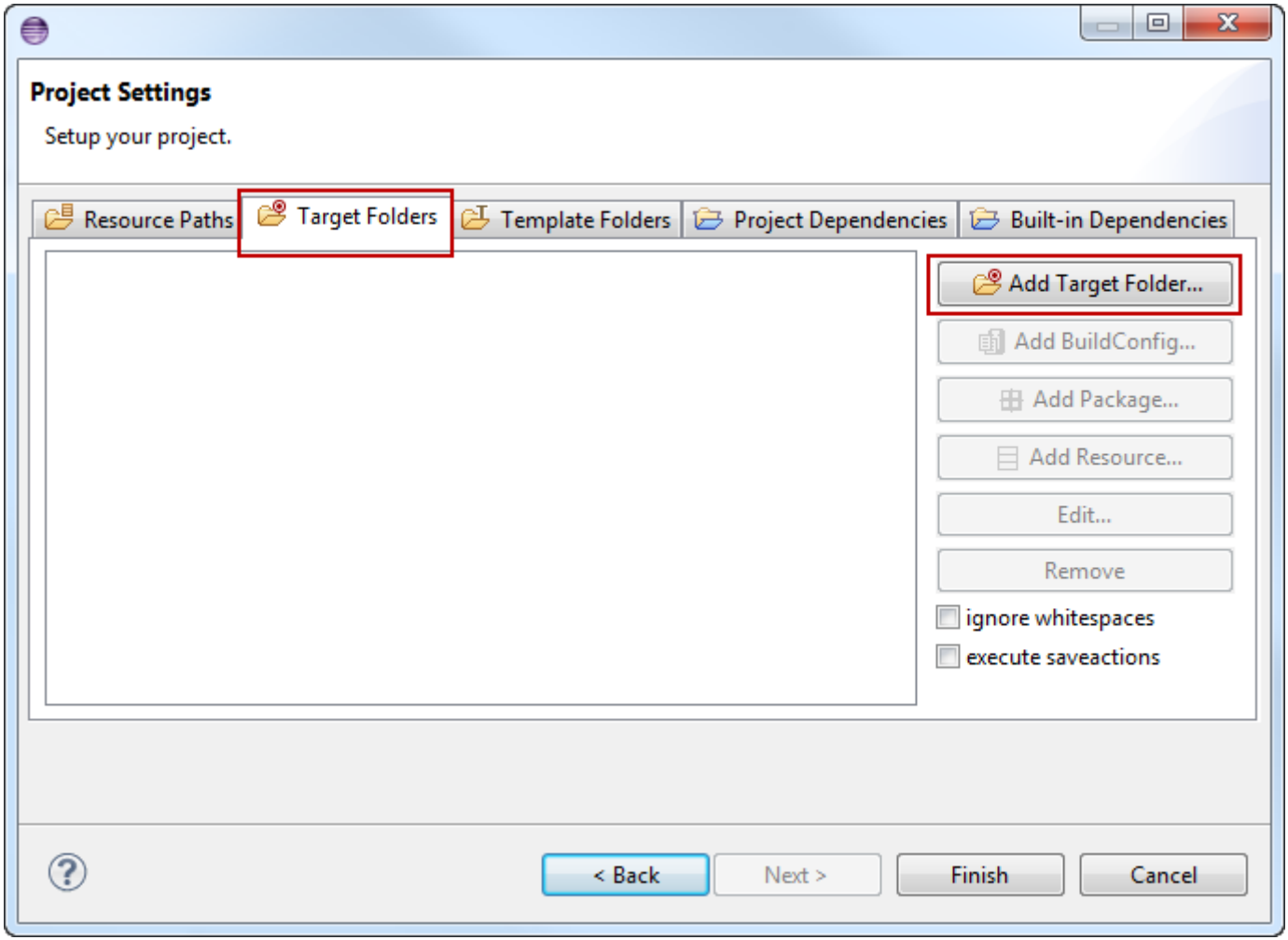

- Switch to the tab *Target Folders*
- Click *Add Target Folder…*
- ⓘ Note: Generated Code is placed in target folders
- ⓘ Change project settings anytime using the project properties: Project/Properties/actifsource

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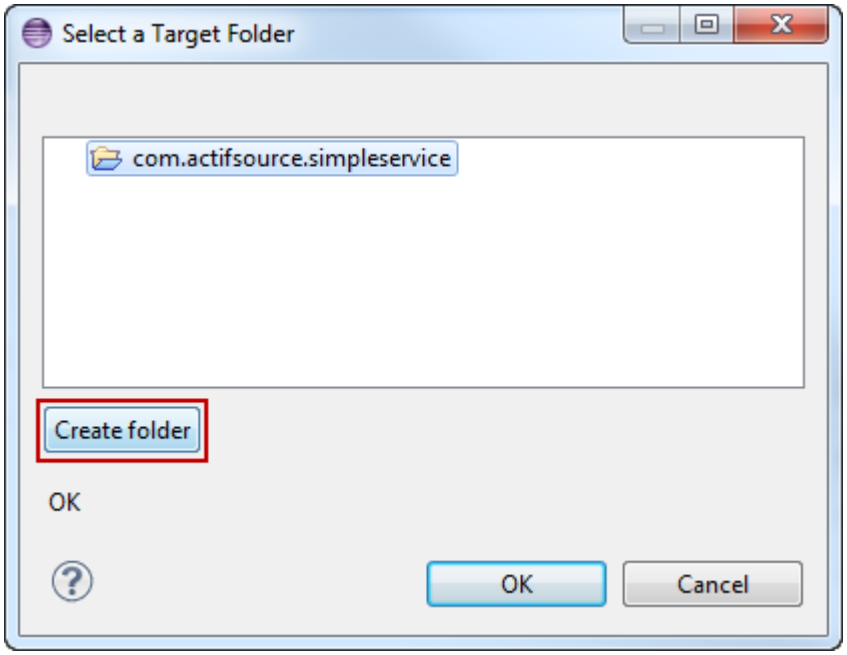

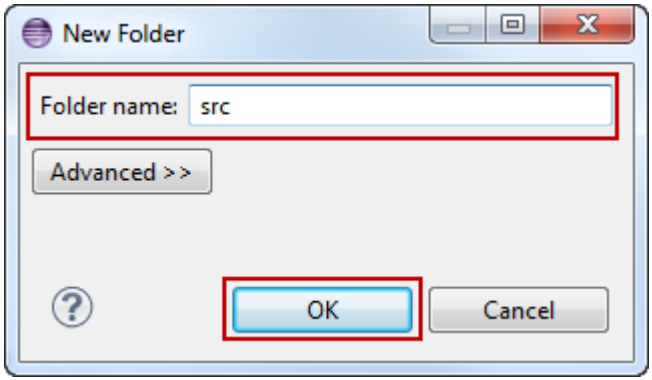

↳ Add a target folder named *src*

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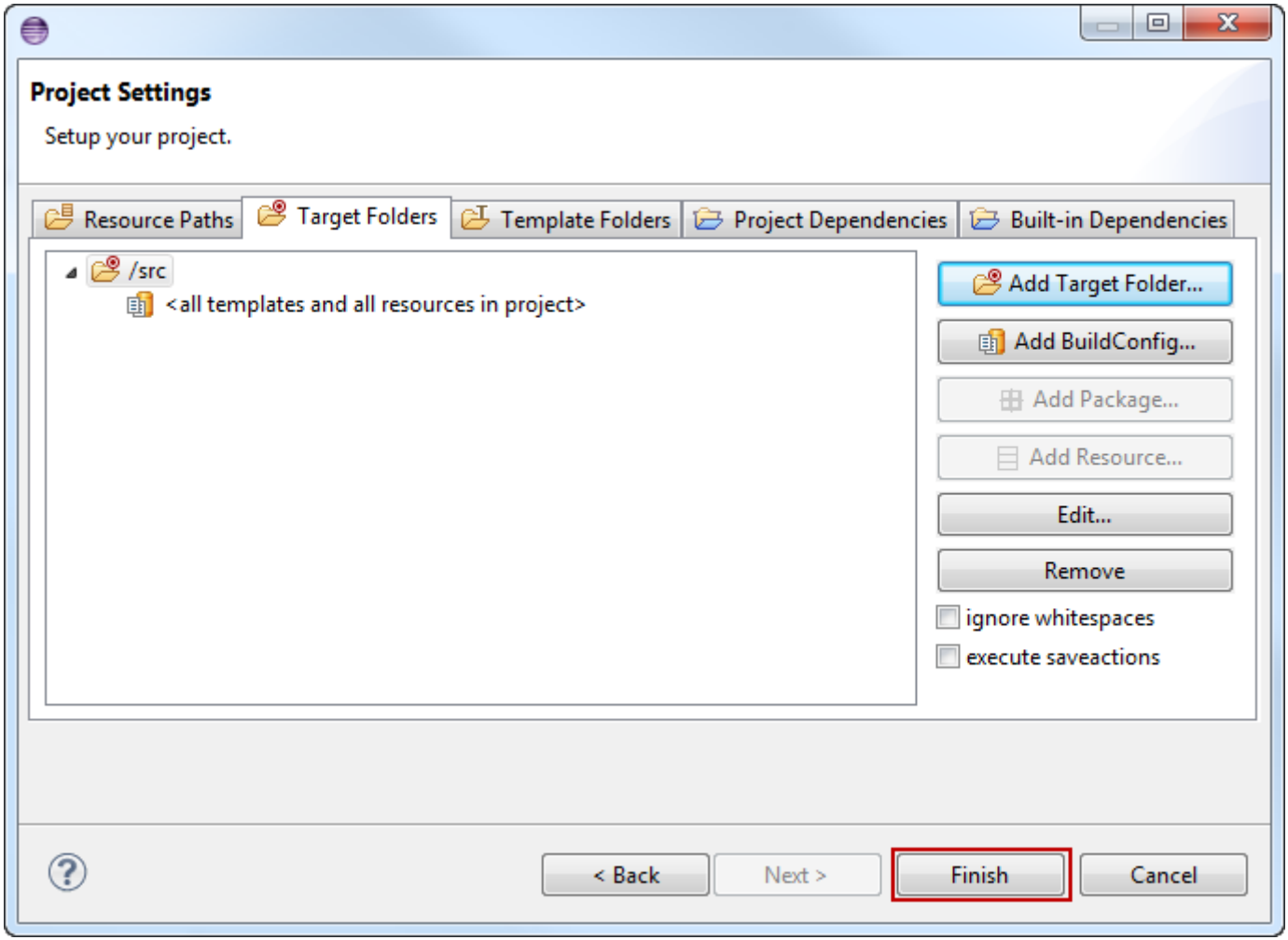

↳ Click *Finish*

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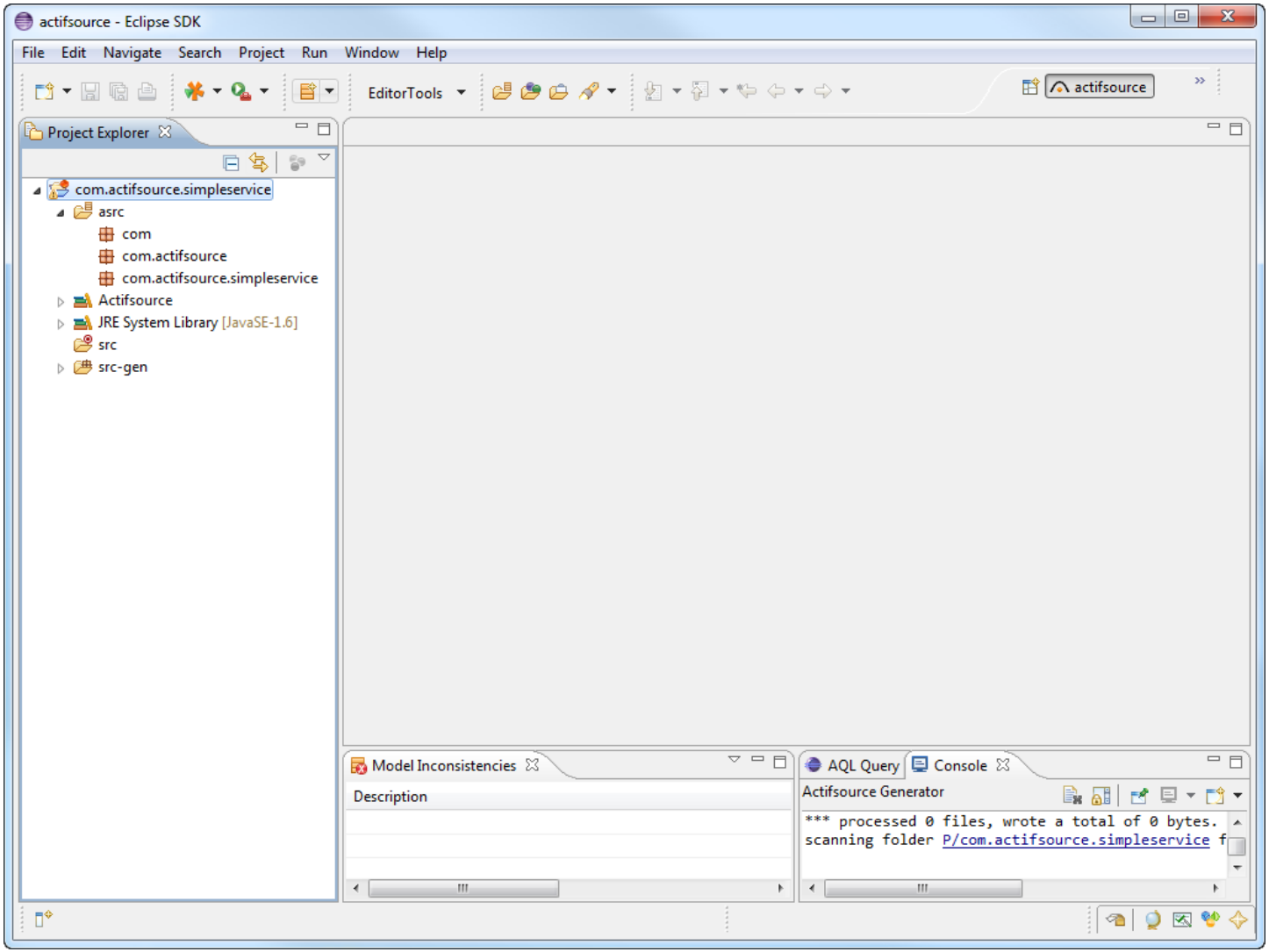
Create and Setup a new actifsource Project “SimpleService” 15



- ⓘ We have created a new **actifsource Project** named com.actifsource.simpleservice
- ⓘ Resource Folder *asrc* is where we place all **actifsource Resources**
- ⓘ **Target Folder** *src* is where the generated code is placed

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Part II: 16
Create a Generic Domain Model

- Setup an appropriate package structure
- Create a new diagram to model the generic domain model using generic classes and relations

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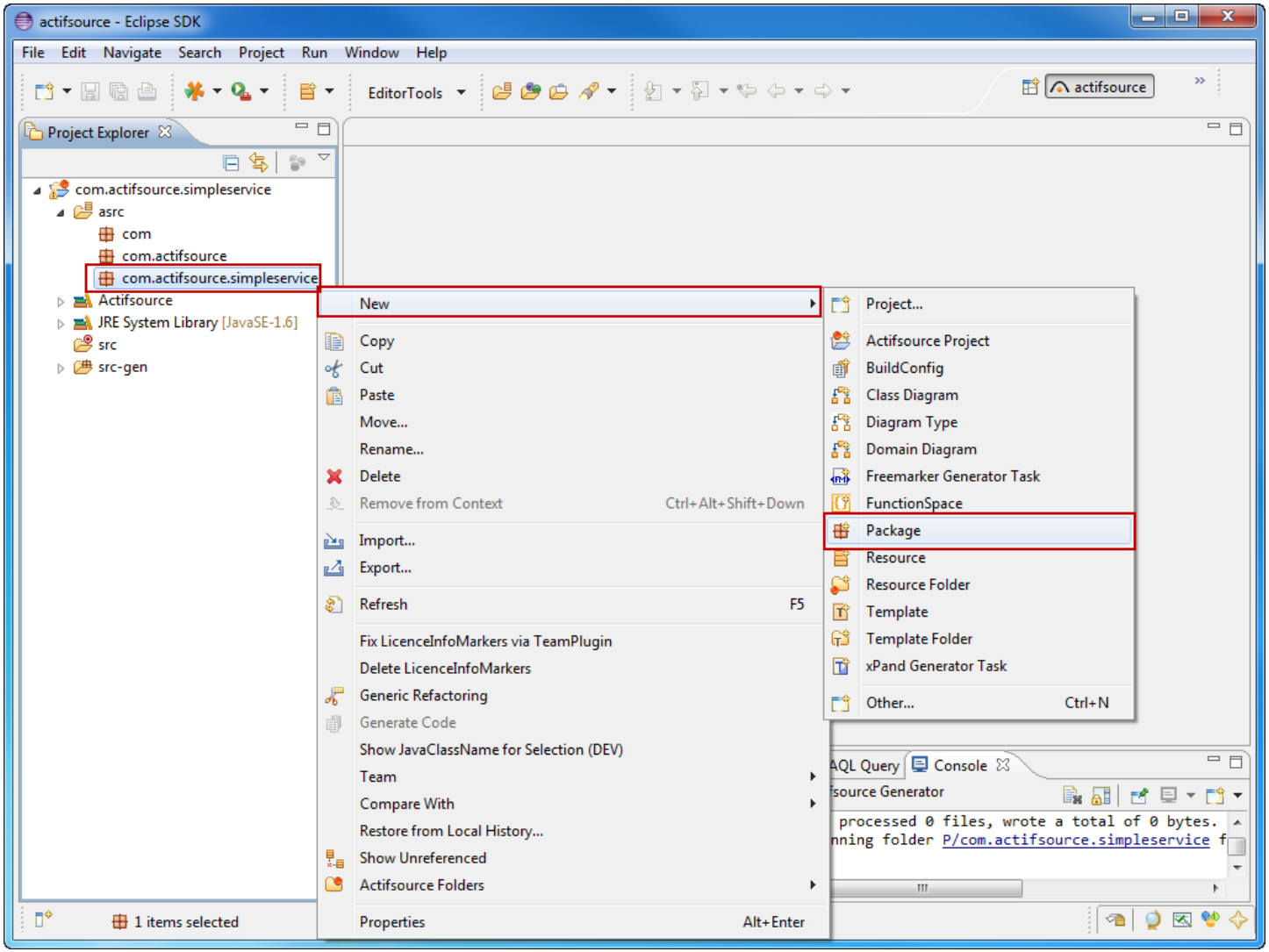

ⓘ In **actifsource**, **Resources** are organized within **Packages**

↳ Create a new **Package** in the resource folder *asrc*

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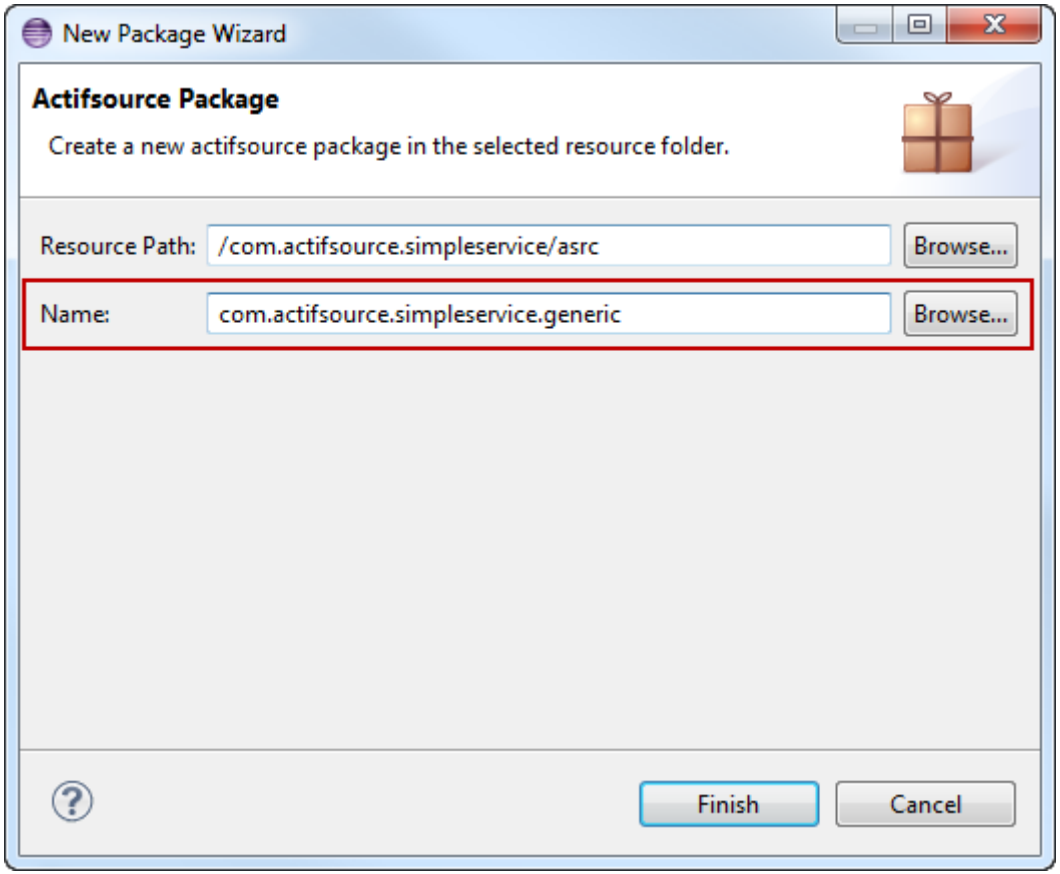

- Name your package `com.actifsource.simpleservice.generic` as shown above
- Click *Finish*

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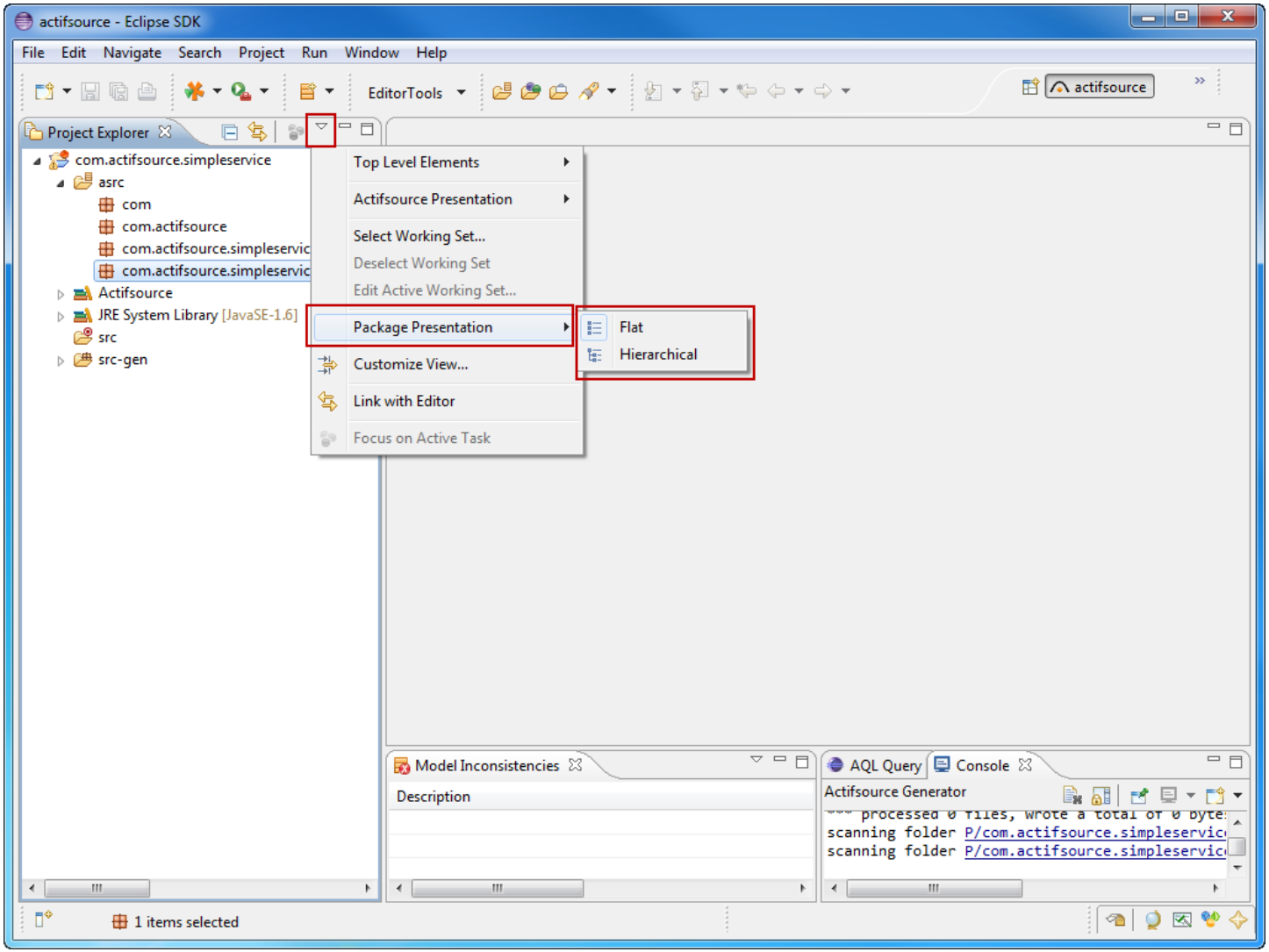

↳ Change the style for **Package Presentation** as you like

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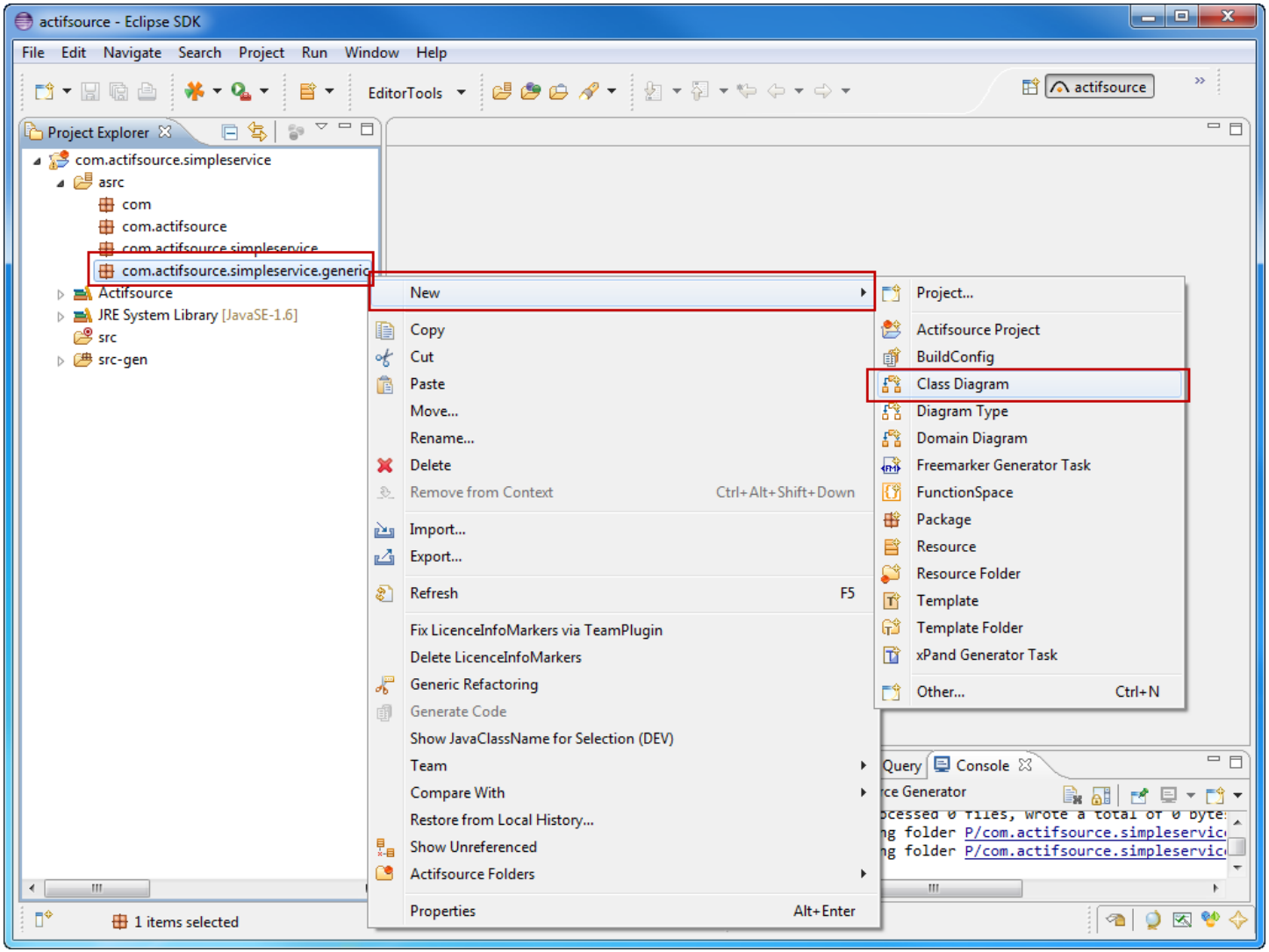
Create a new Diagram to Model the Generic Domain Model 20



- Start with a **Class Diagram** of your generic domain model
- Create a new **Class Diagram** in the **Package** *generic*

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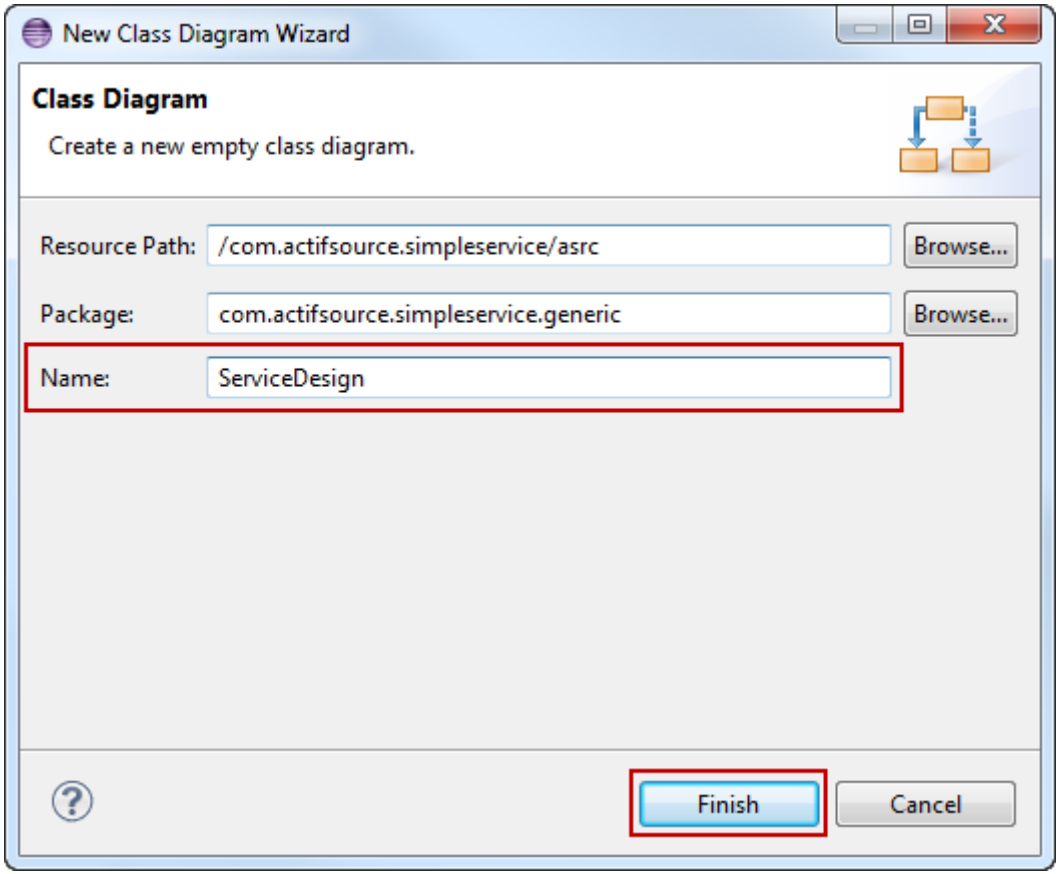

- Name your **Diagram** `ServiceDesign`
- Click *Finish*

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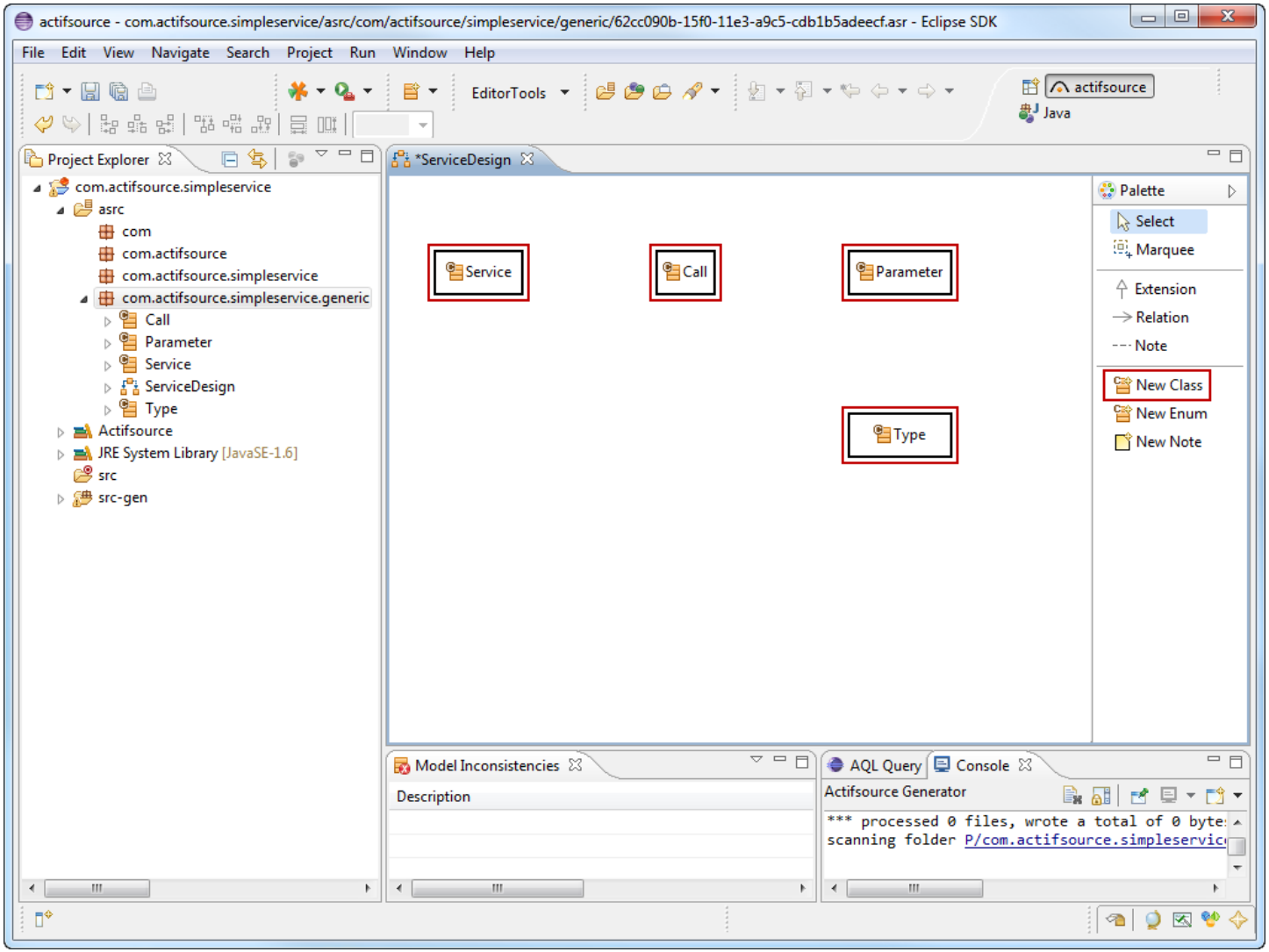

ⓘ The **Diagram** *ServiceDesign* is opened in the **Diagram Editor**

↳ Insert the following **Classes** using the *New Class* Tool from the *Palette:* `Service`, `Call`, `Parameter` and `Type`

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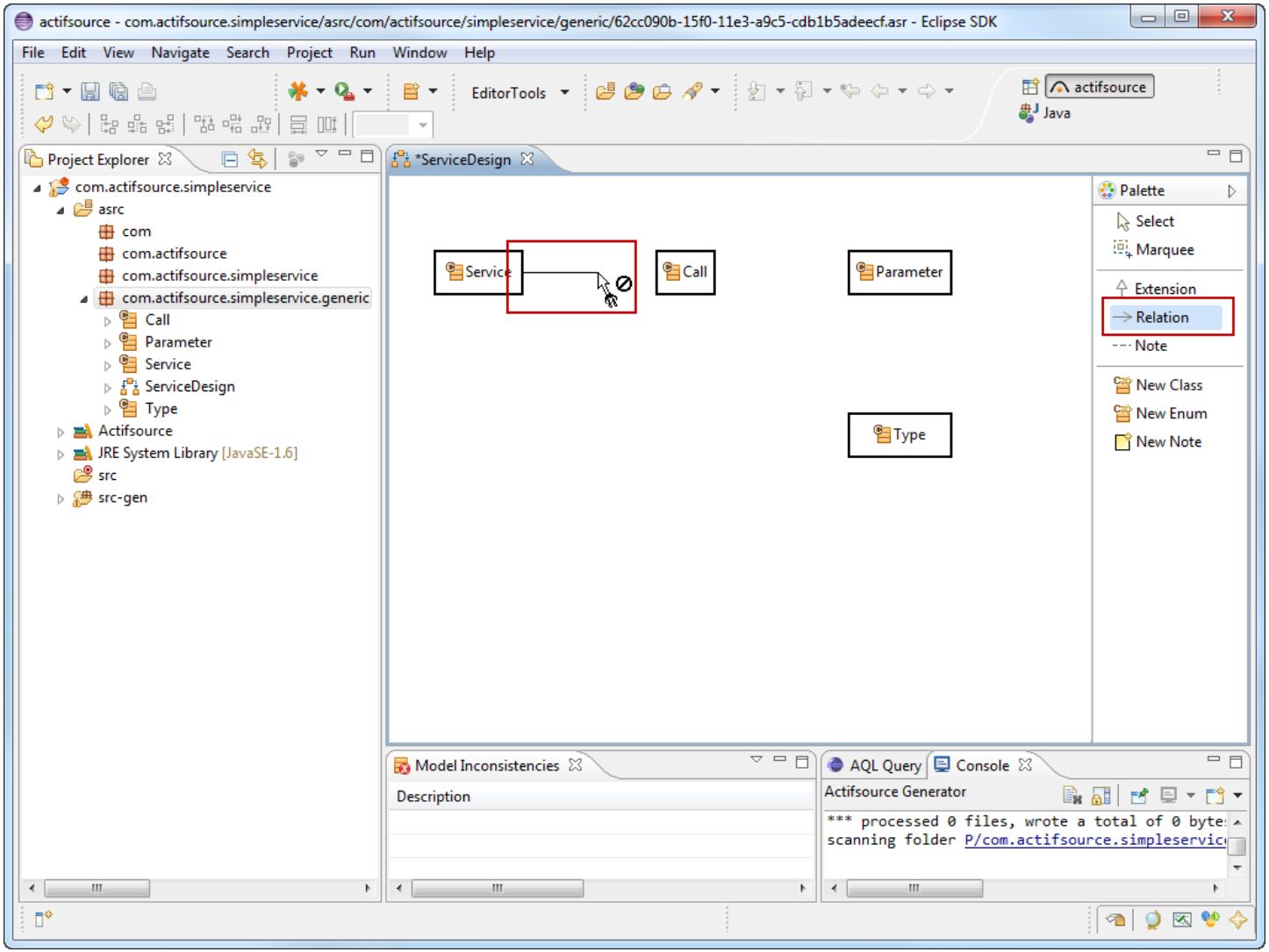
Add Generic Relations



- Specify the **Relations** between your **Classes** using the *Relation* Tool from the *Palette on the right*
- First, link Service and Call by clicking on Service and then on Call in the diagram

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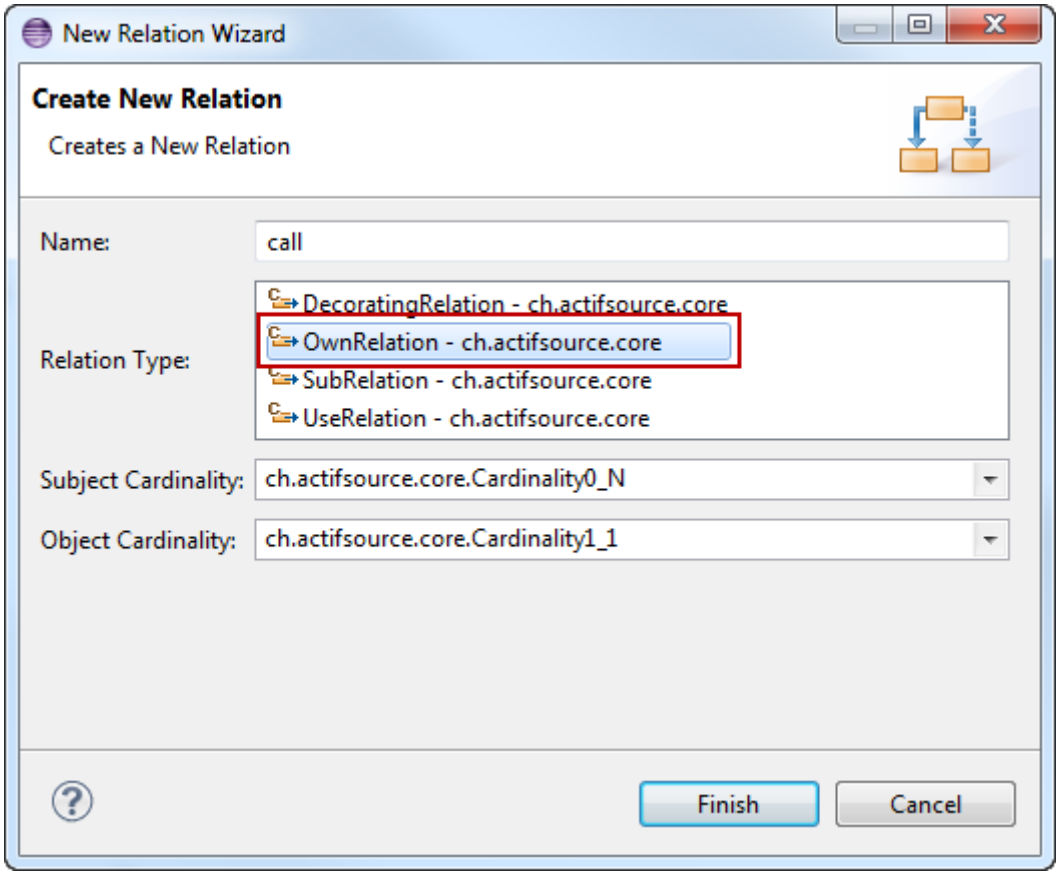
Own Relations



- ⓘ **actifsource** distinguishes basically **OwnRelation** and **UseRelation**, all other relation types based upon them.
- ⓘ Owned resources live within the context of their owner
- ⓘ Used resources have their own lifetime and are referenced only
- ⓘ A Call is owned by Service because no Call must exist without its Service
- ⓘ Default name *call* is fine here
- ↳ Select the **OwnRelation**

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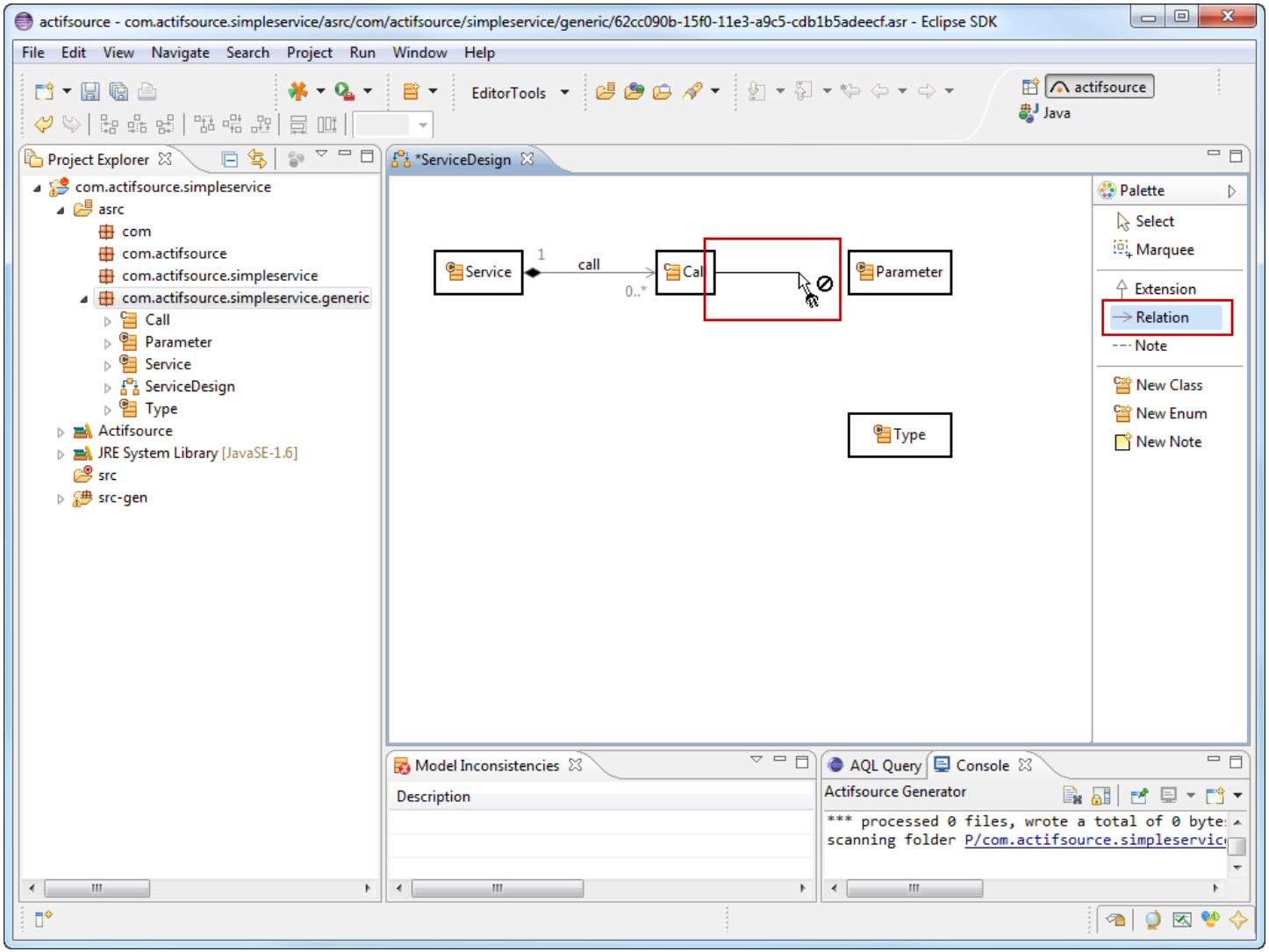

↳ Insert another **OwnRelation** between Call and Parameter

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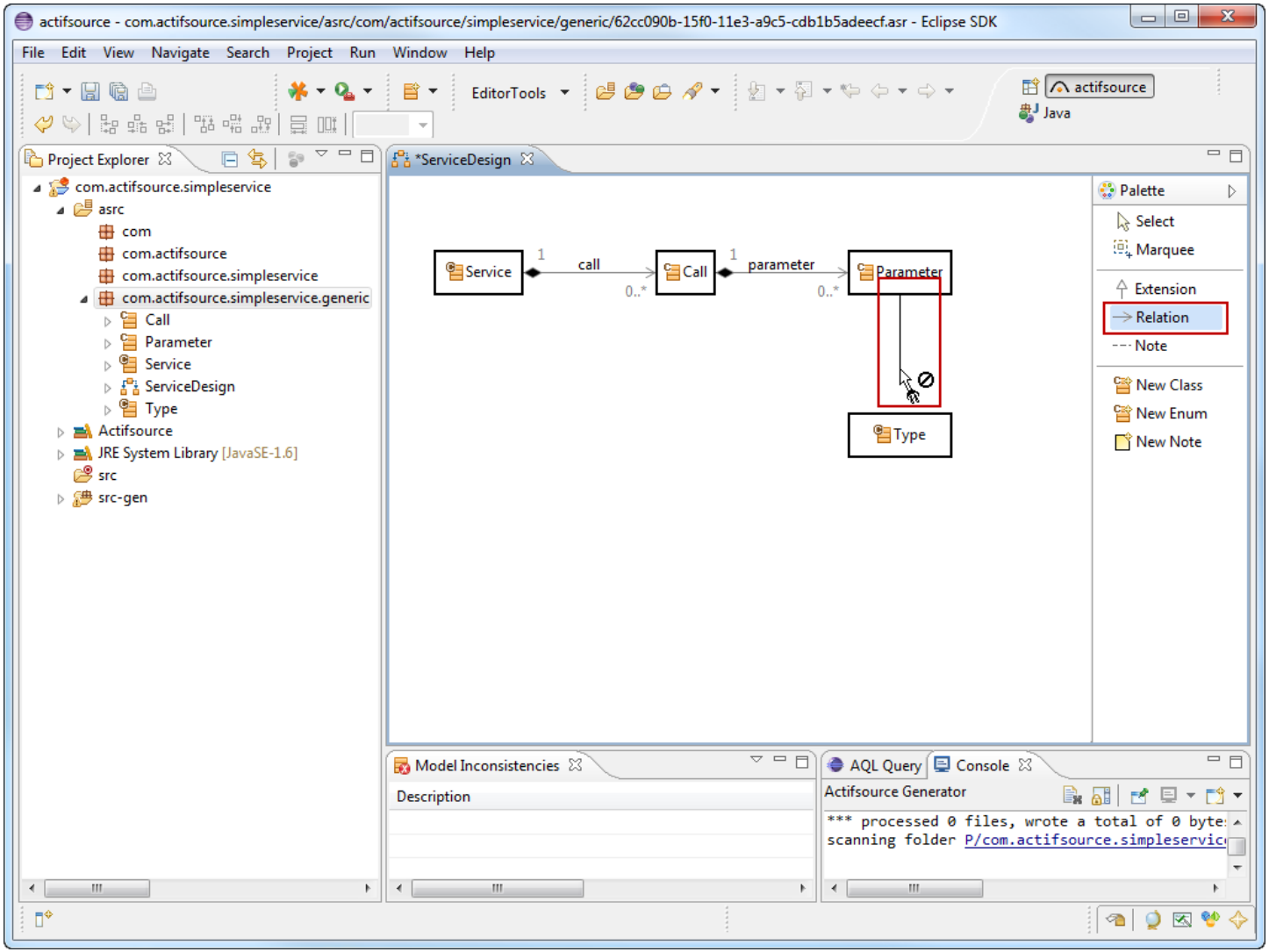
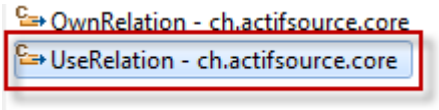
Use Relations



ⓘ Type is used by Parameter because types have their own lifetime independent from referencing parameters

↳ Insert a **UseRelation** between Parameter and Type



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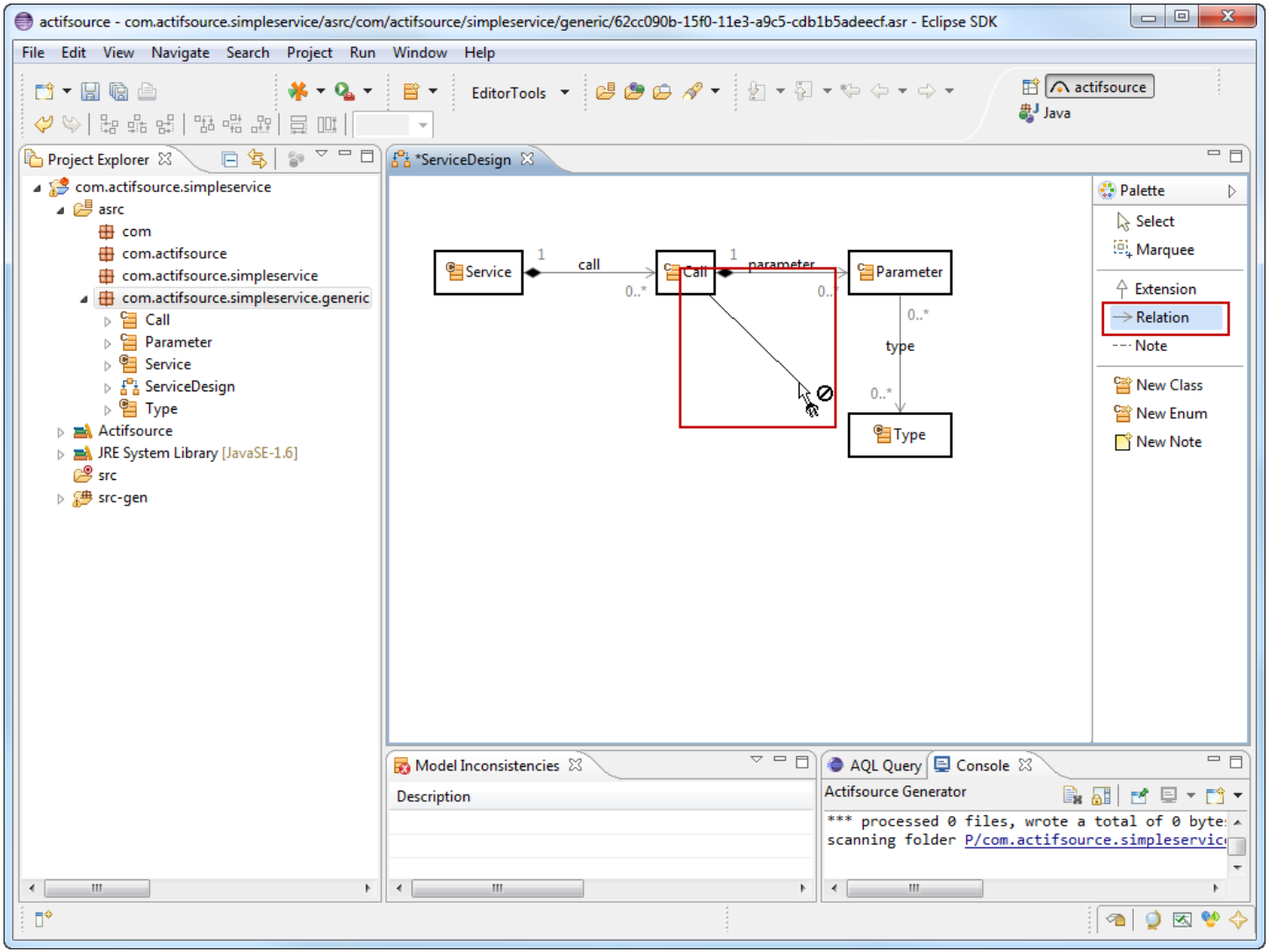
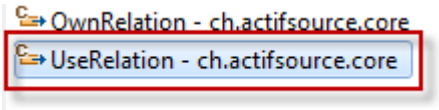
Use Relations



ⓘ Call should support a return type

↳ Insert a **UseRelation** between Call and Type



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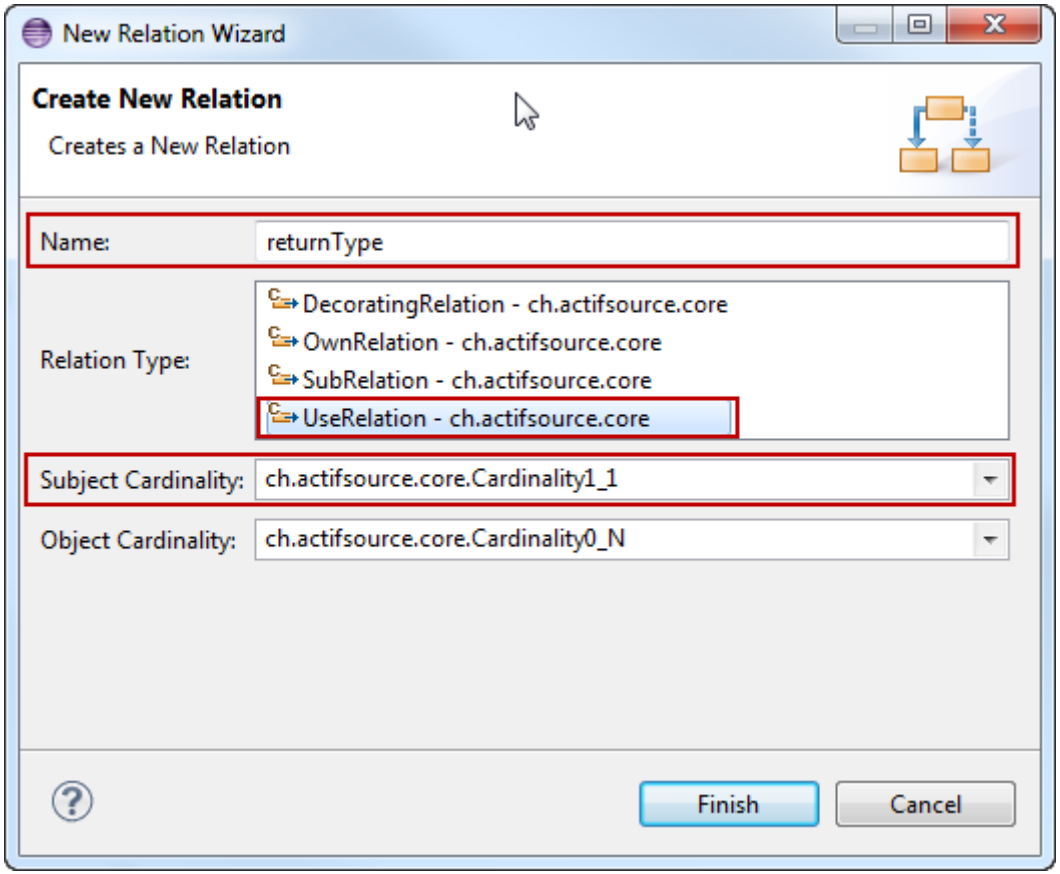

- Name the relation `returnType`
- Choose **SubjectCardinality** 1..1 since we always want a return type in this example
- Click *Ok*

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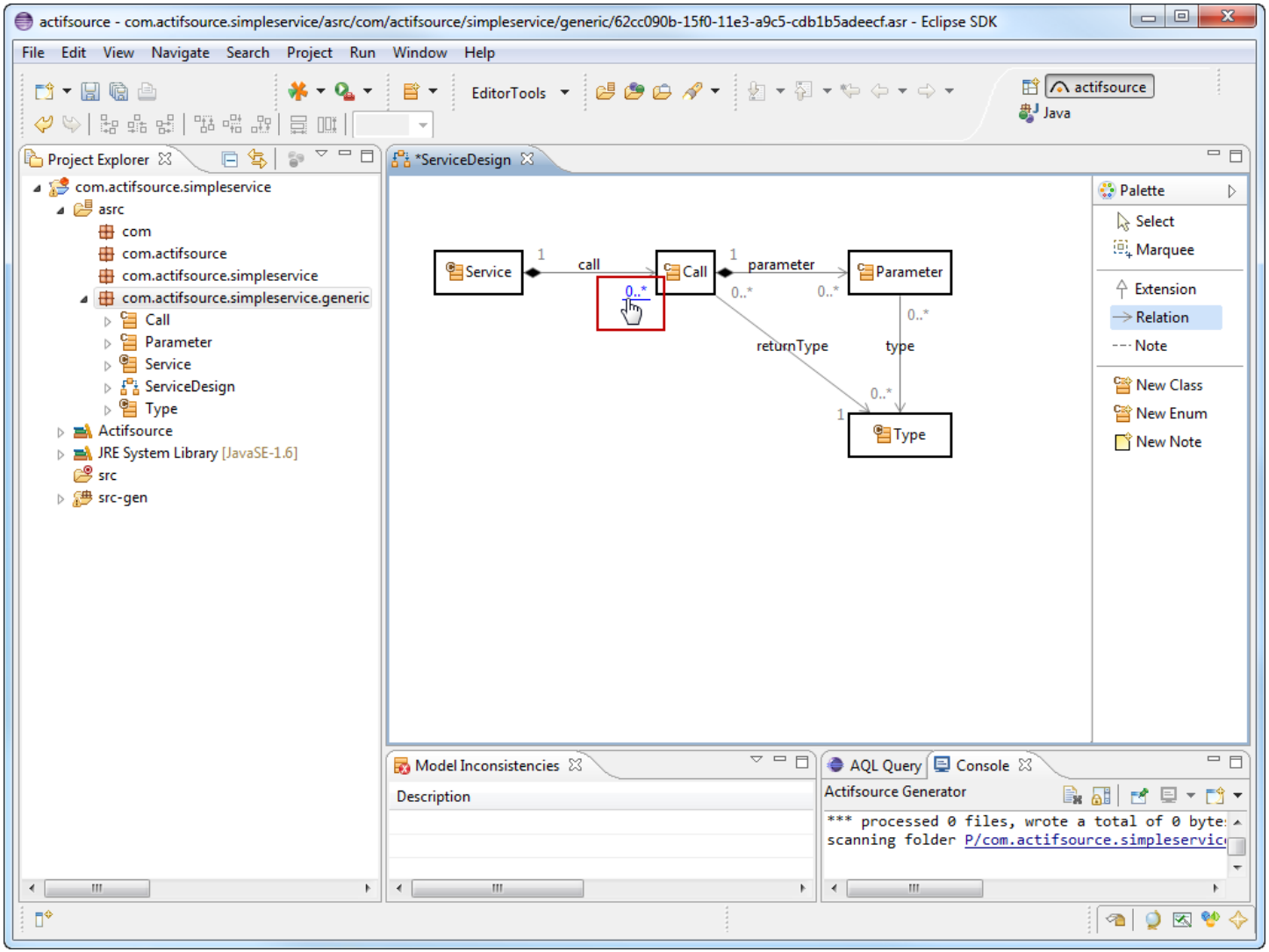

ⓘ You can open the **actifsource Resource Editor** on any **actifsource** resource by left-clicking on the desired resource while holding down the Ctrl-Key (Ctrl+ Left-Click)

ⓘ Use the Cmd-Key on Apple computers

↳ Adjust the **subjectCardinality** of the call Relation

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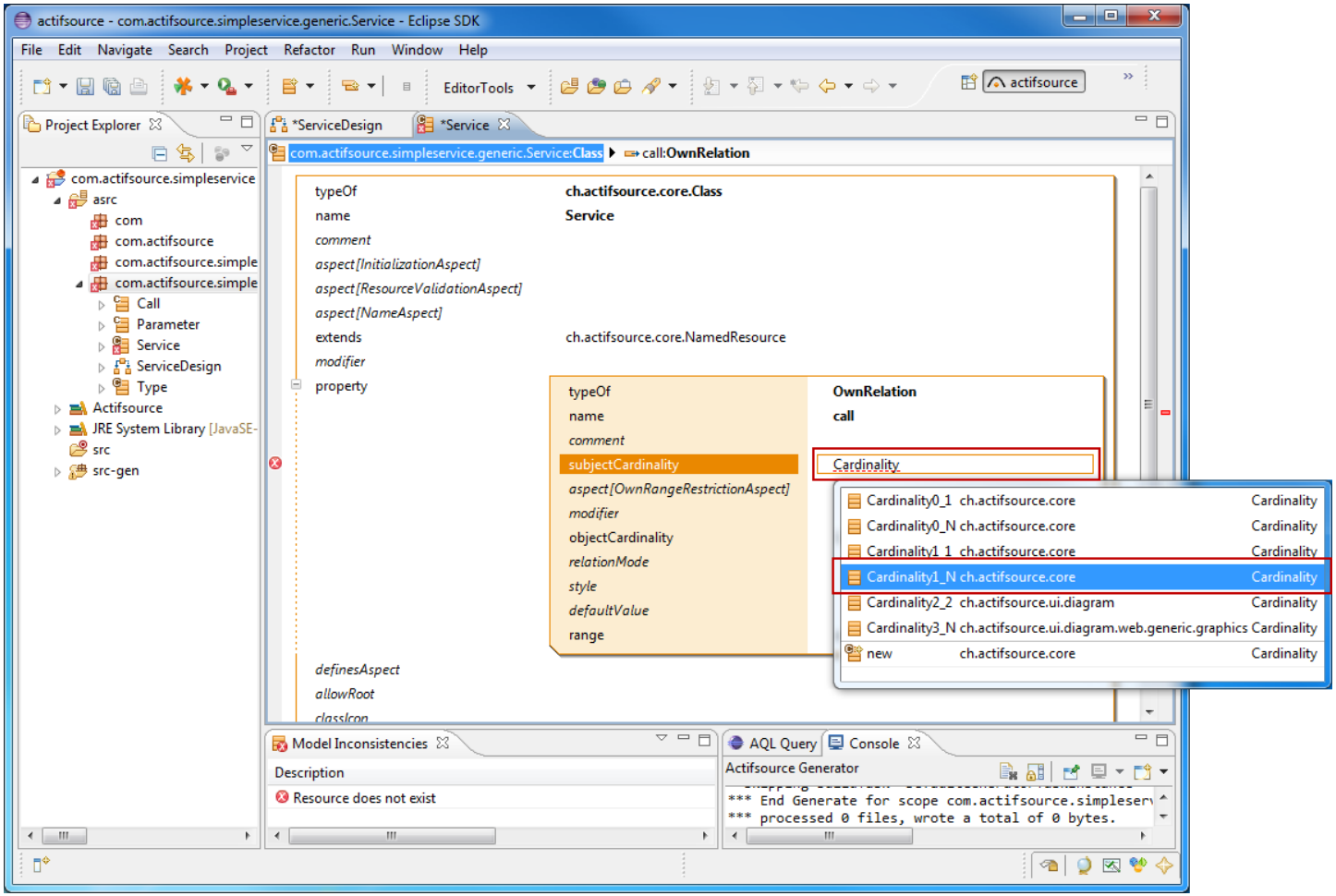
Adjust Cardinalities



- Change the **subjectCardinality** from **Cardinality0_N** to **Cardinality1_N**
- Use **Content Assist** (Ctrl+Space) and select the desired **Cardinality**

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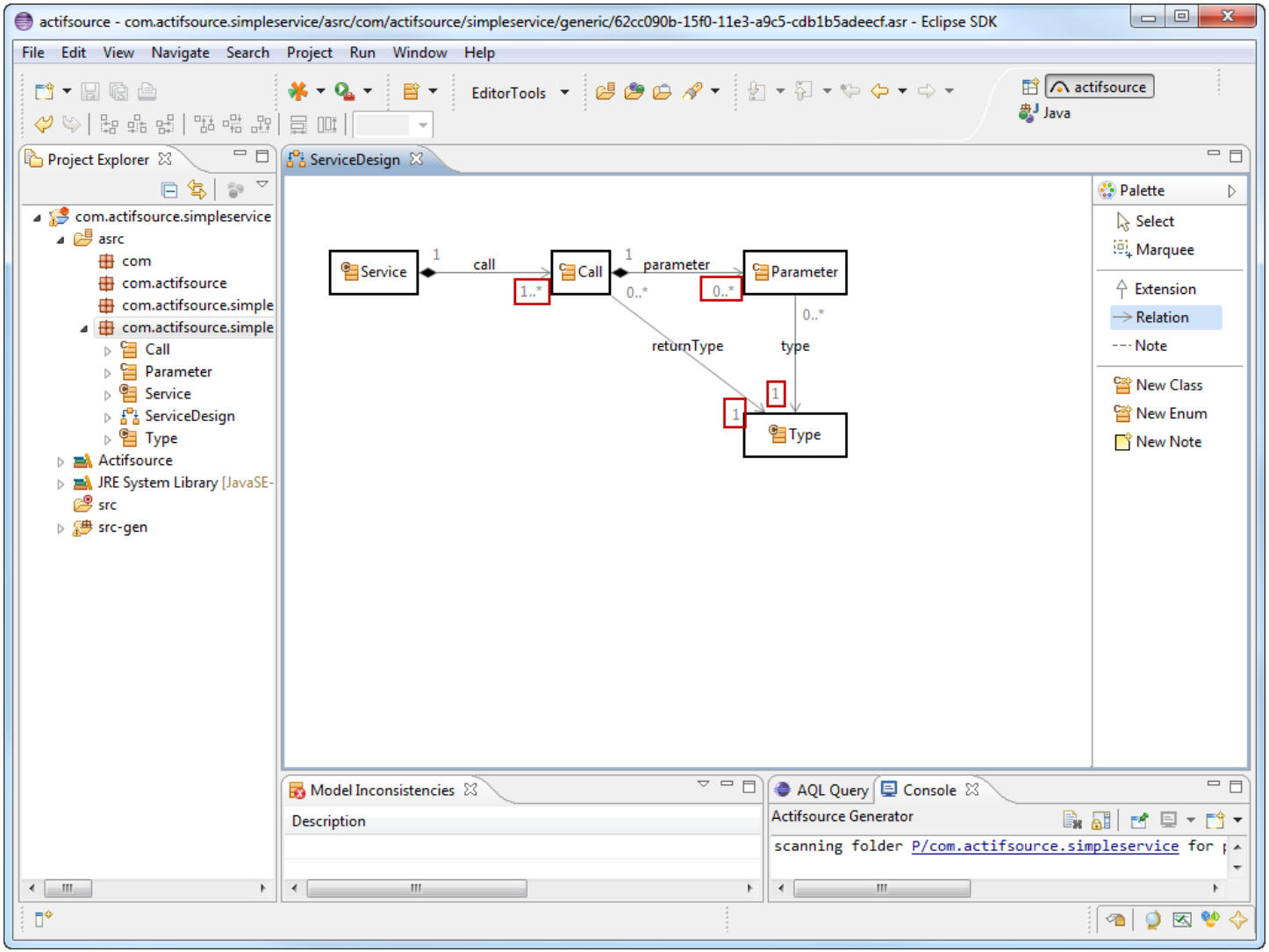

- Make sure to change all marked cardinalities as shown above
- Choose **subjectCardinality** **Cardinality1_1** for the relations type and returnType

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Part III: 32
Create a Specific Domain Model

- Create a package to store specific classes
- Create specific domain objects based on the generic domain model

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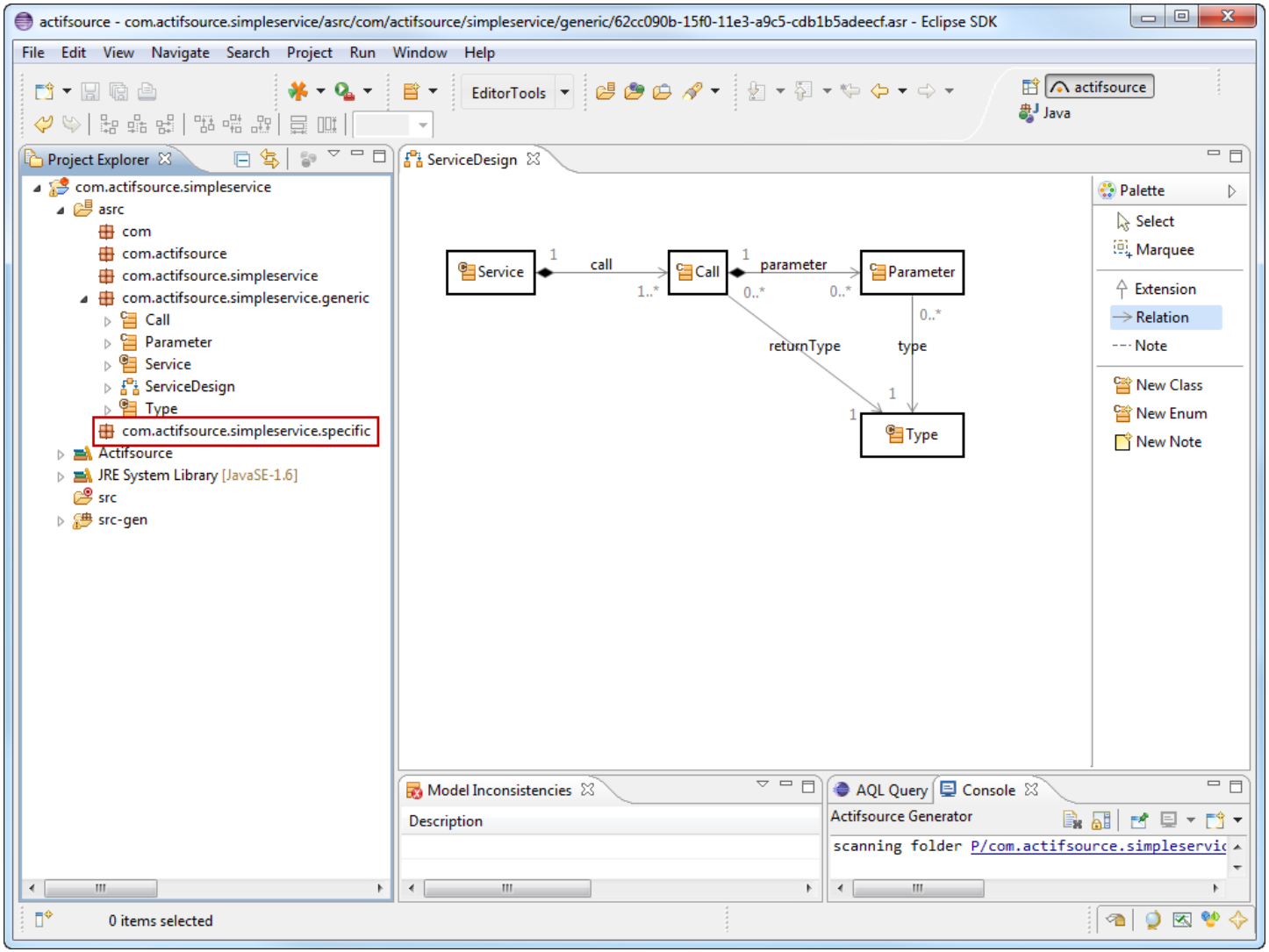
Create a Package to Store Specific Domain Objects 33



↳ Create a new **Package** `specific` in *simpleservice*

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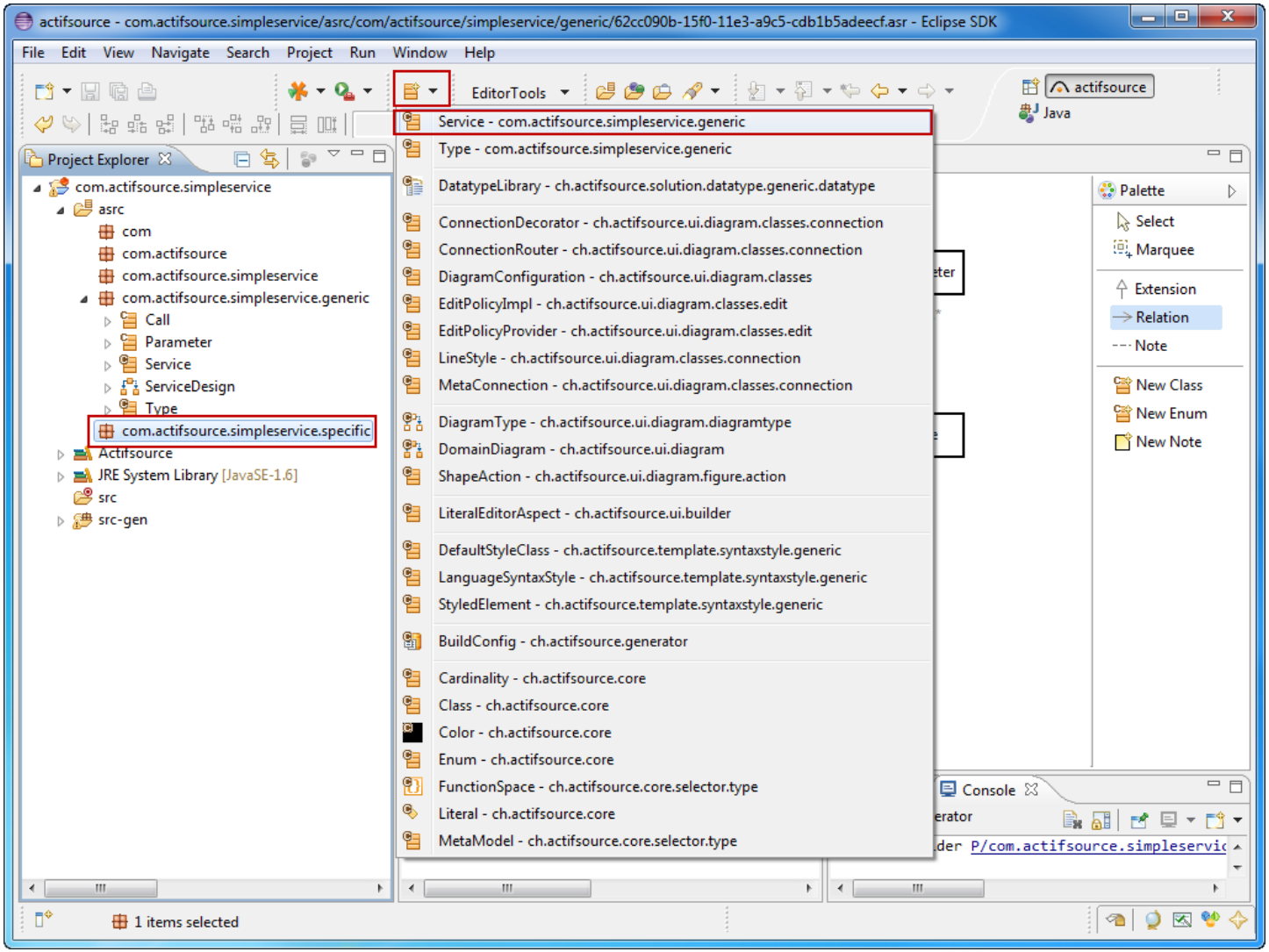

- Select the **Package** *specific*
- Use the **New Resource** Tool to create a **Resource** of type Service

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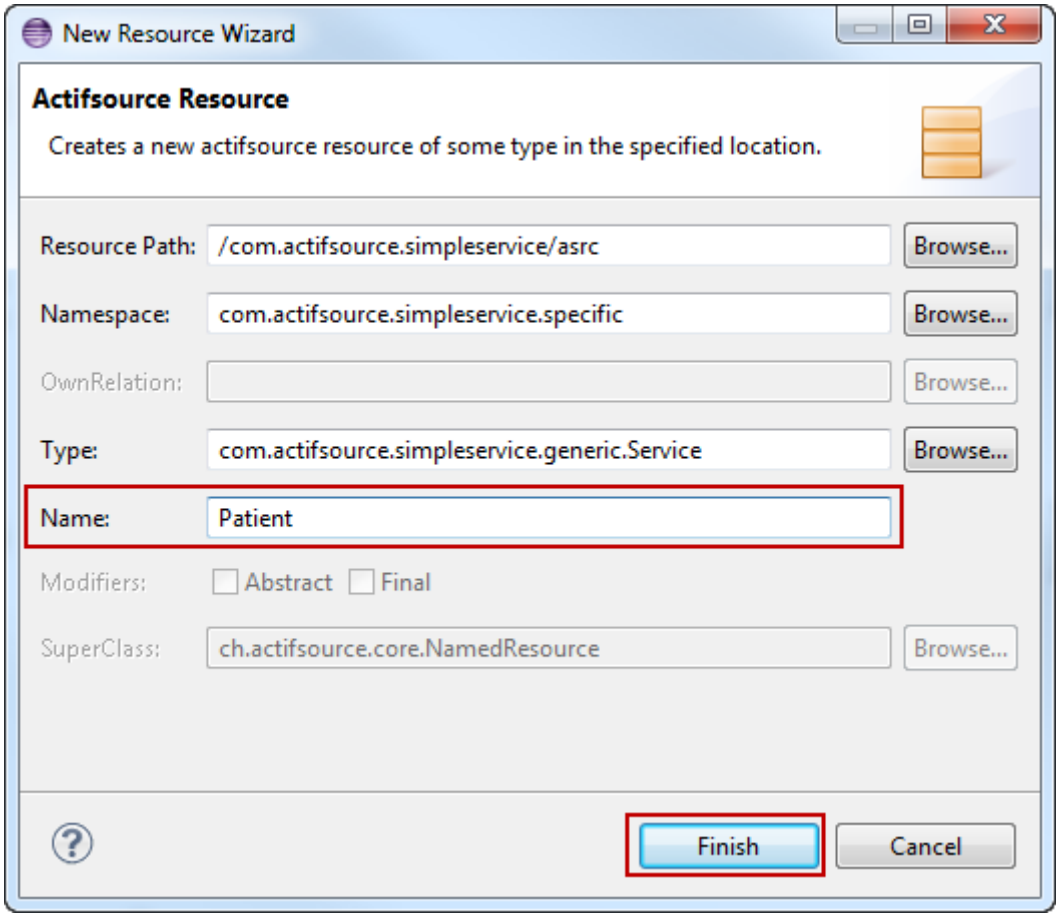

- Name the Service `Patient`
- Click *Finish*
- ⓘ Note: Being **Subclass** of **NamedResource** provides Patient with an **Attribute** **name**

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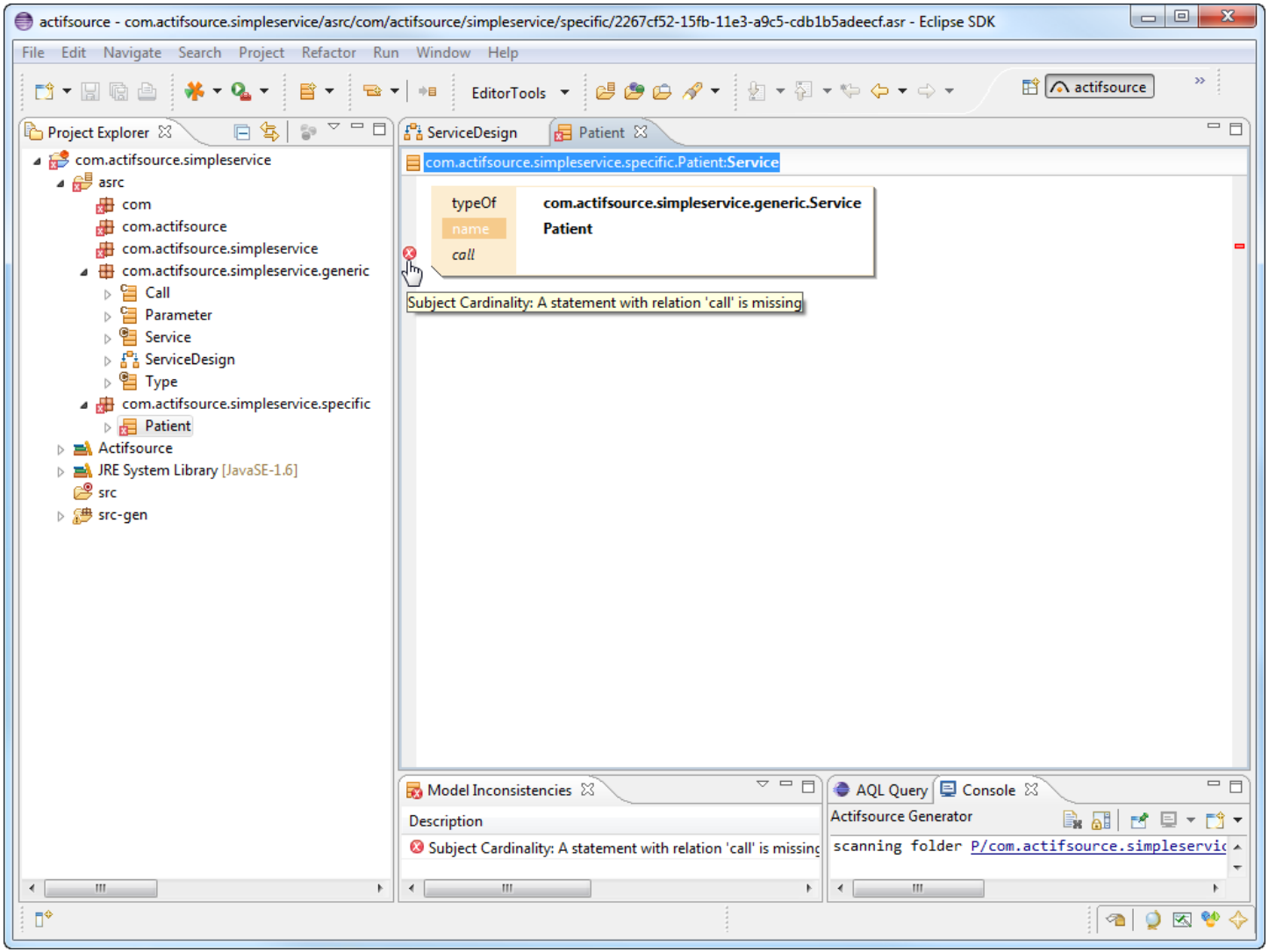

- ⓘ The **Resource** Patient of type Service has been created
- ⓘ The validator constantly checks all resources against the model
- ⓘ Since we decided a Service must have 1..N Call resources by selecting the **subjectCardinality Cardinality1_N,** the validator detects the incorrect subject cardinality and flags an error

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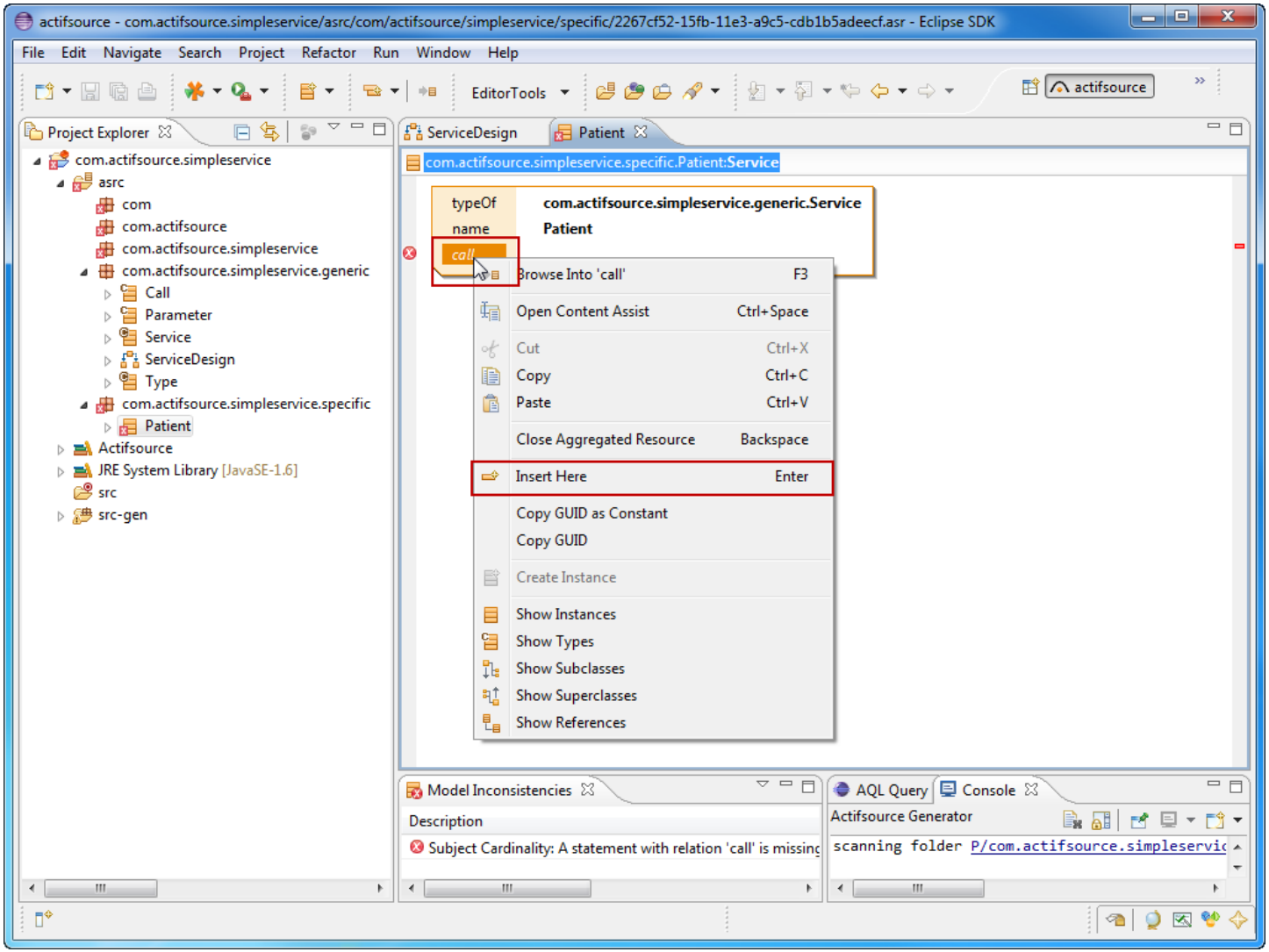

- Use the context menu on the **Relation** call to explore your options
- Press *Enter* to create a **Resource** of type Call for the Patient Service

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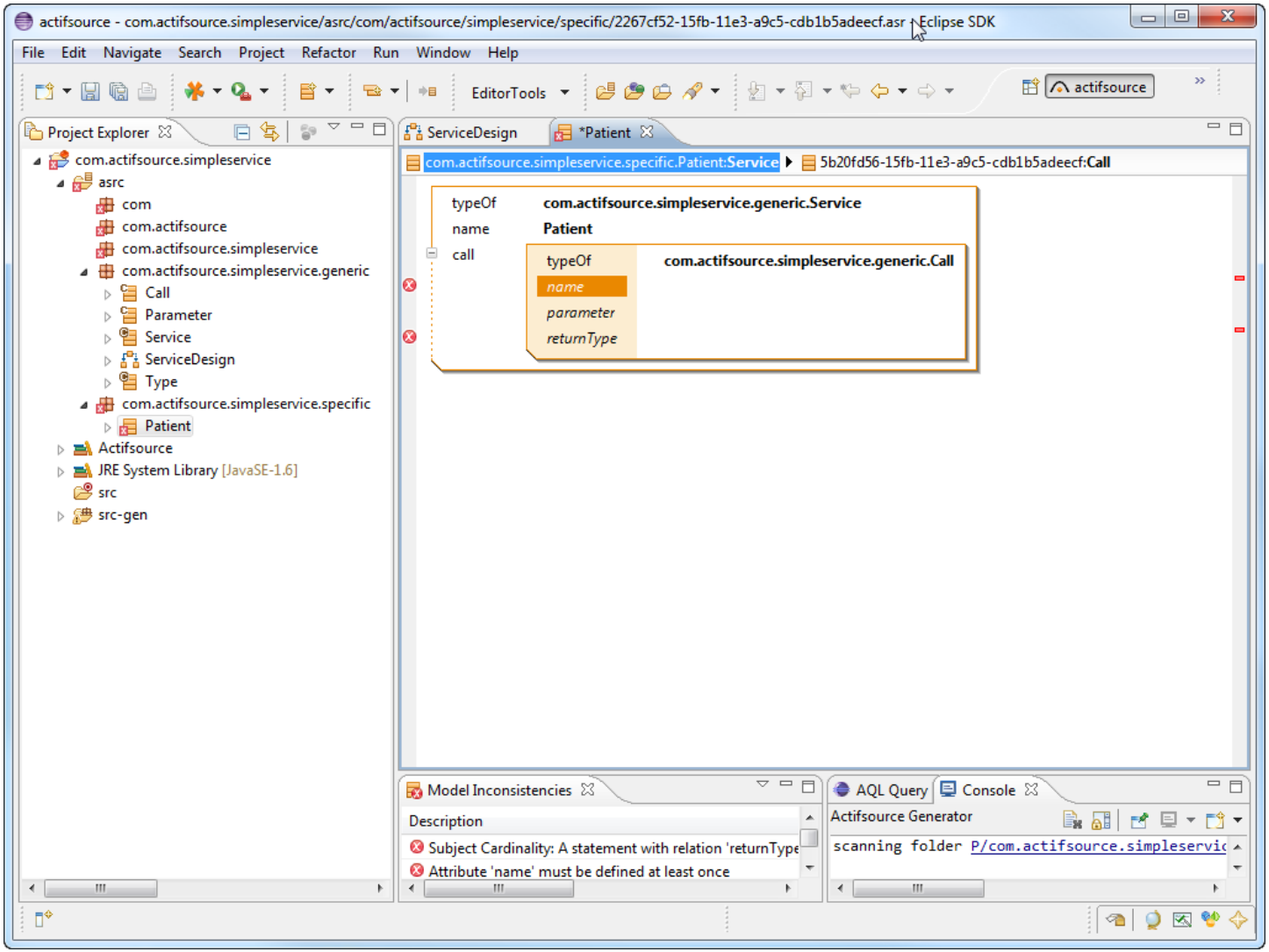

ⓘ The validator tells you that the created Call is missing a **name** and the returnType

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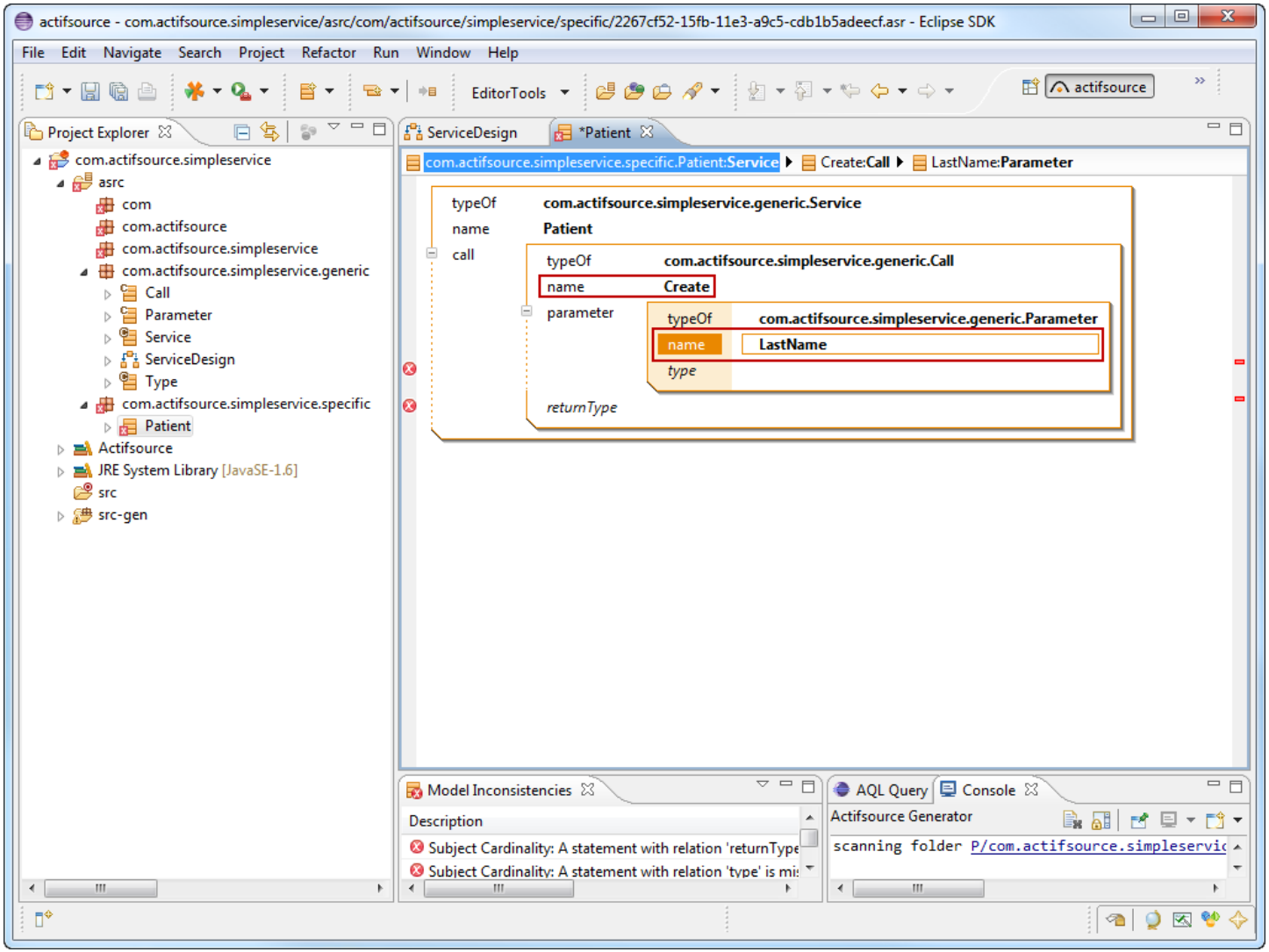

- Enter the name `Create` by pressing *enter* on ***name*** or use the context menu
- Enter a new Parameter by pressing *enter* on parameter or use the context menu
- Enter the name `LastName` of the created Parameter
- ⓘ Type and returnType are still missing

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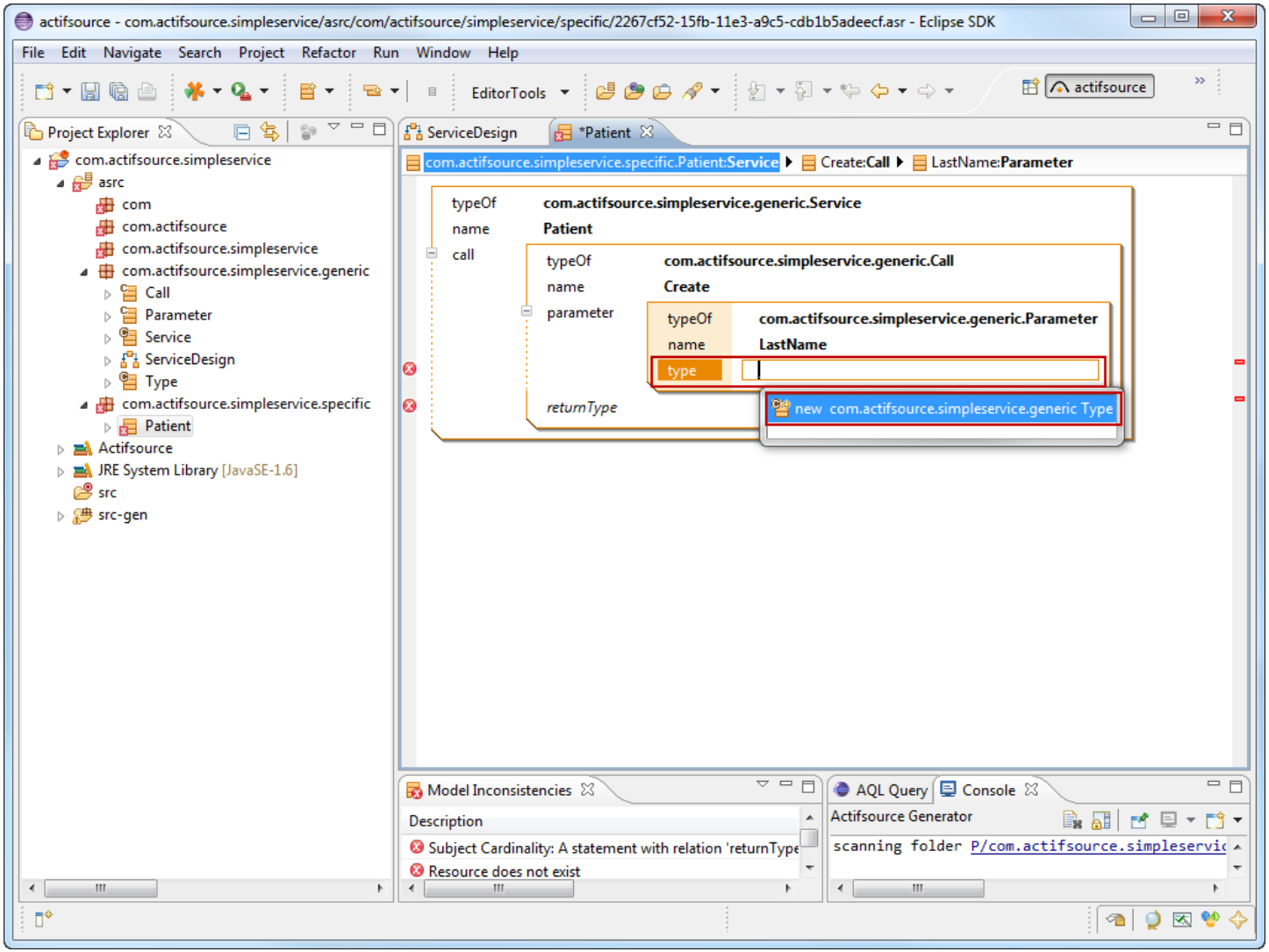

- ⓘ So far there is no **Resource** of type Type
- ⓘ Type of Parameter *LastName* shall be String
- ↳ Activate **Content Assist** (Ctrl+Space) to insert a **Resource** of type Type
- ↳ Create a new Type String using **Content Assist** (Ctrl+Space)

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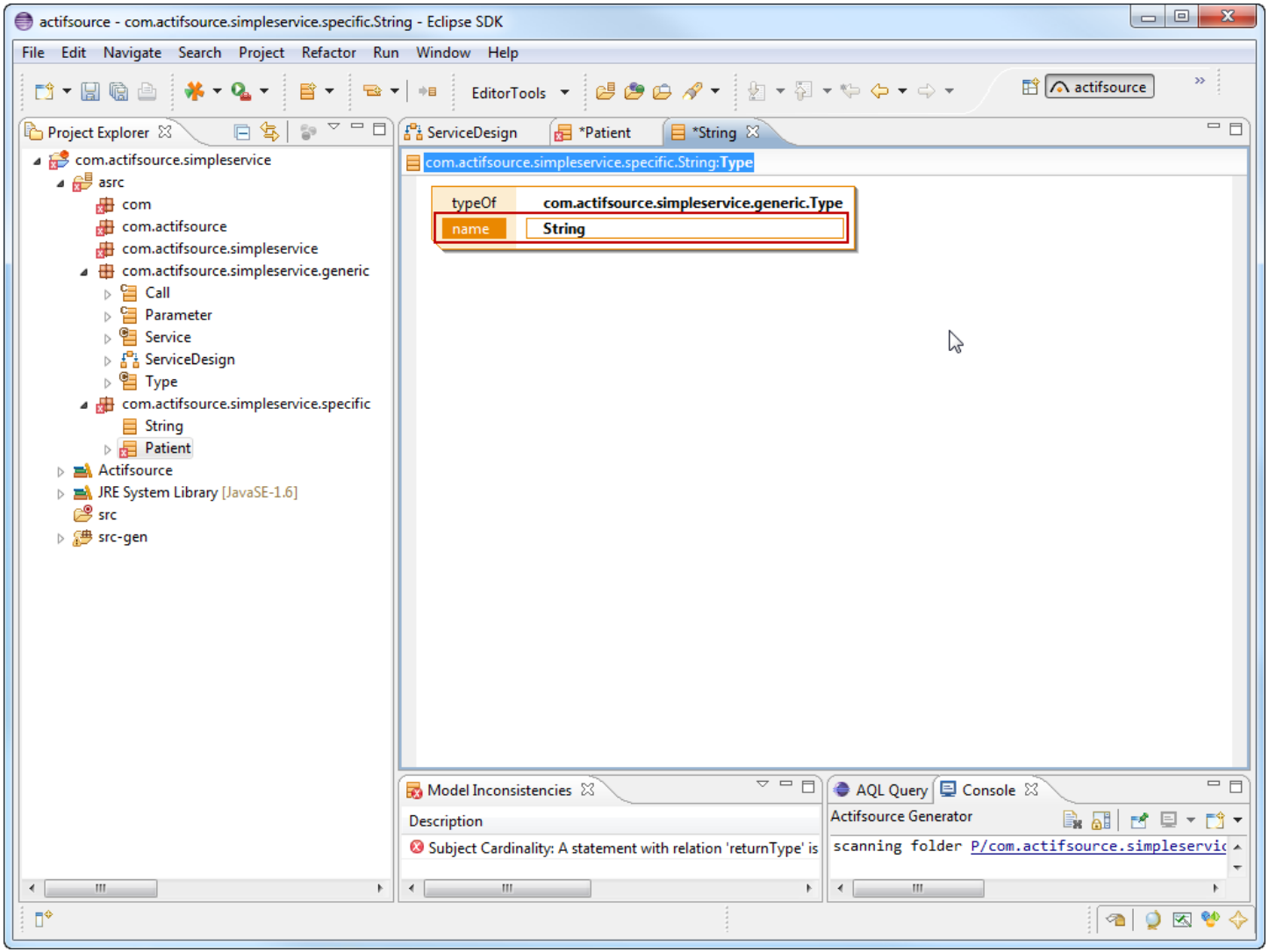

- Name the new Type `String`
- Switch back to the Service Patient by clicking the *Patient* Tab or by pressing Alt+Left to navigate to the last edit location

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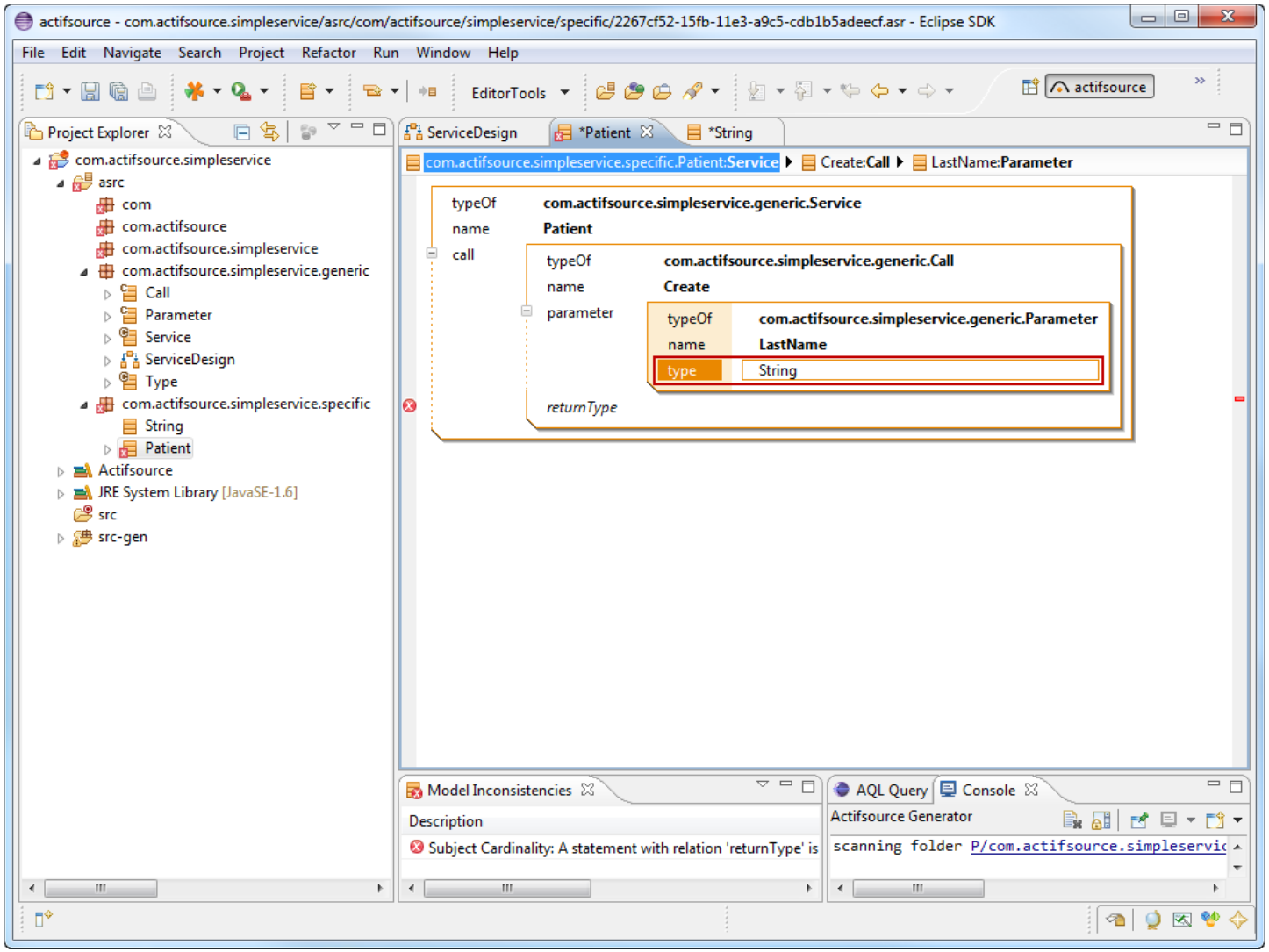

ⓘ The created Type String is inserted automatically

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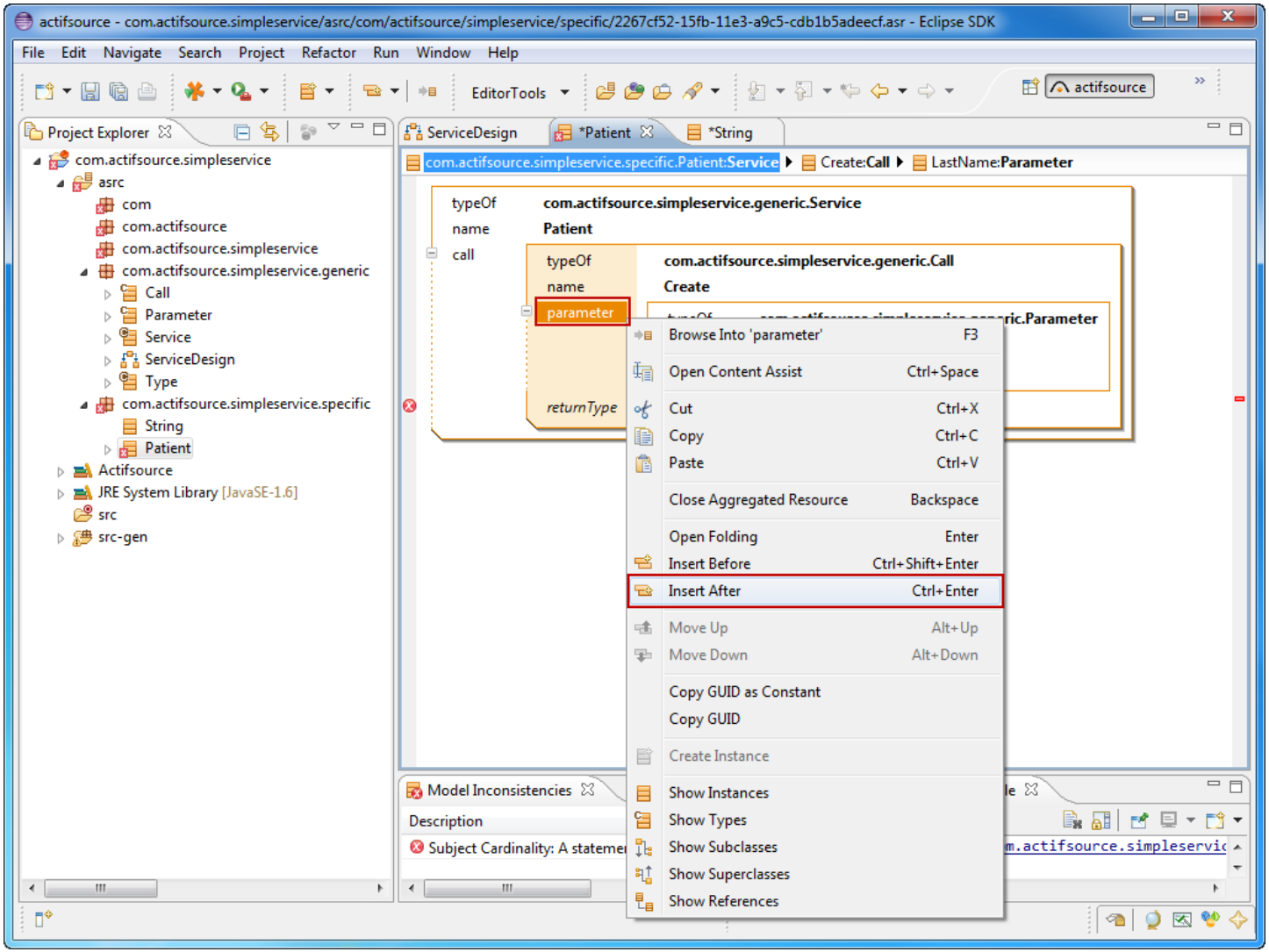

- Select *parameter*
- Insert a new Parameter using *Insert After* (Ctrl+Enter) or *Insert Before* (Alt+Shift+Enter)
- ⓘ You may rearrange the resources as you see fit using *Move Up* (Alt+Up) or *Move Down* (Alt+Down)

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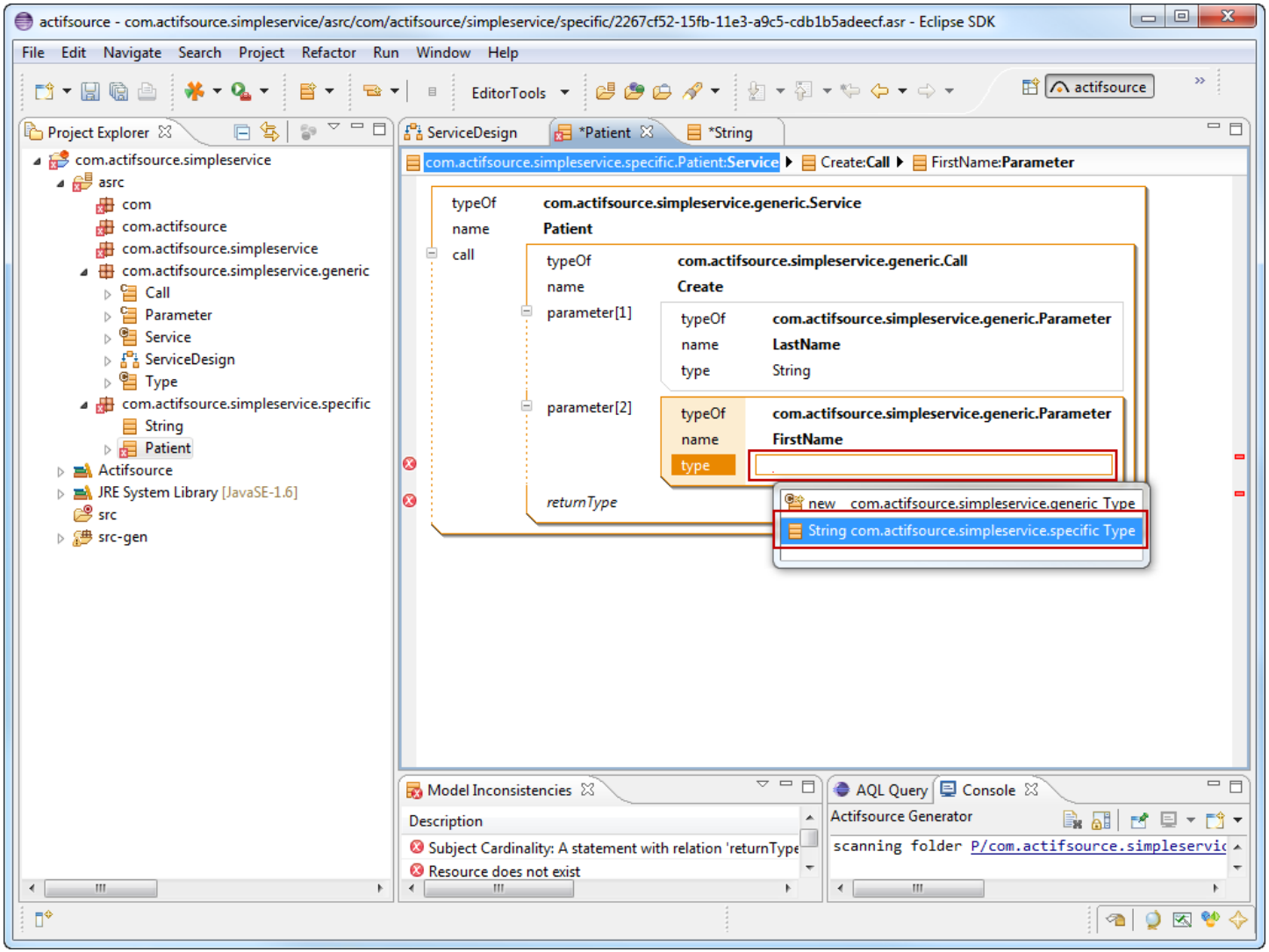

- Name the Parameter `FirstName`
- Insert the already created Type String using **Content Assist** (Ctrl+Space)

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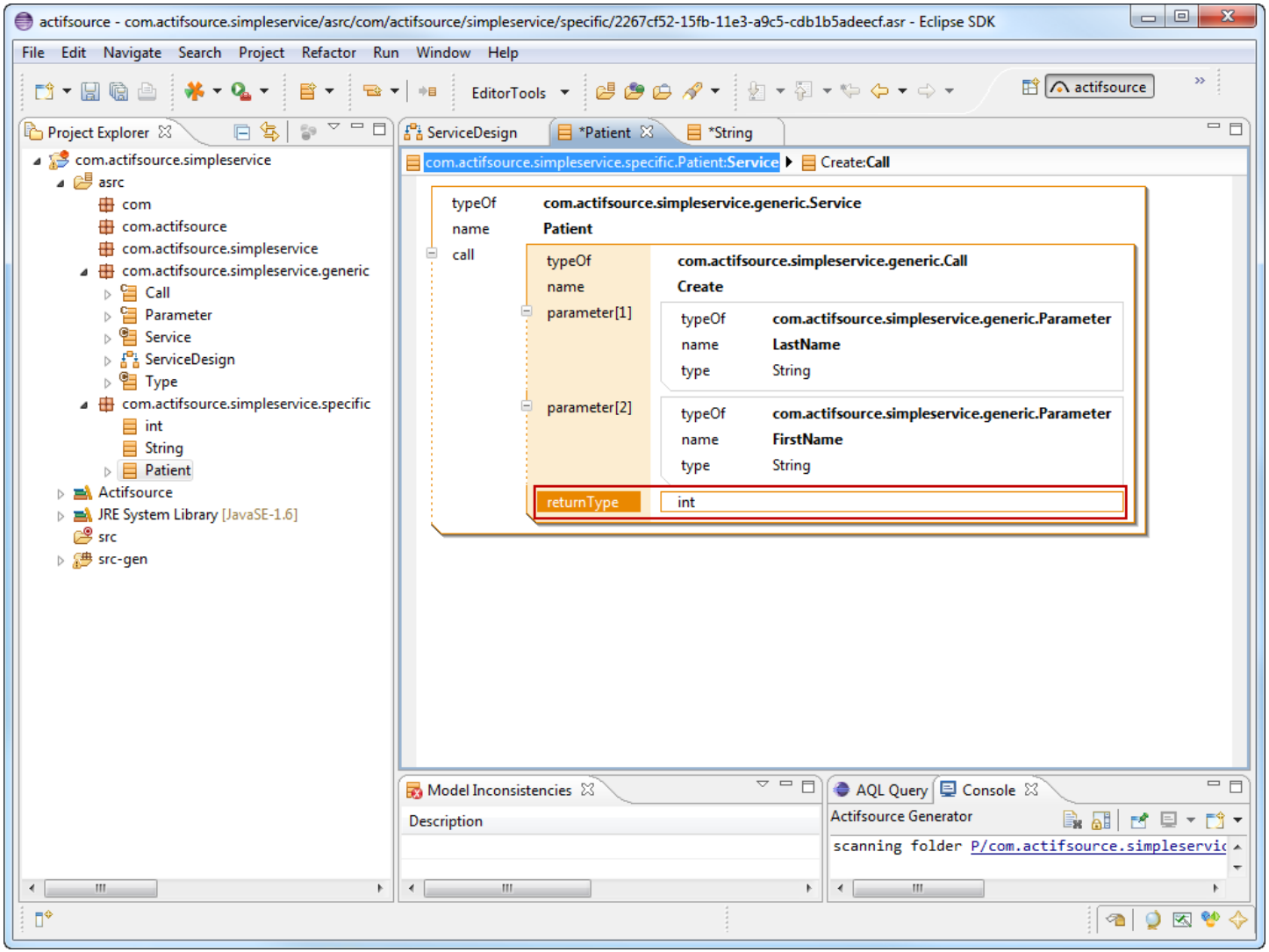

↳ For returnType create a new Type int using **Content Assist** (Ctrl+Space)

ⓘ The validator reports no more *Model Inconsistencies*

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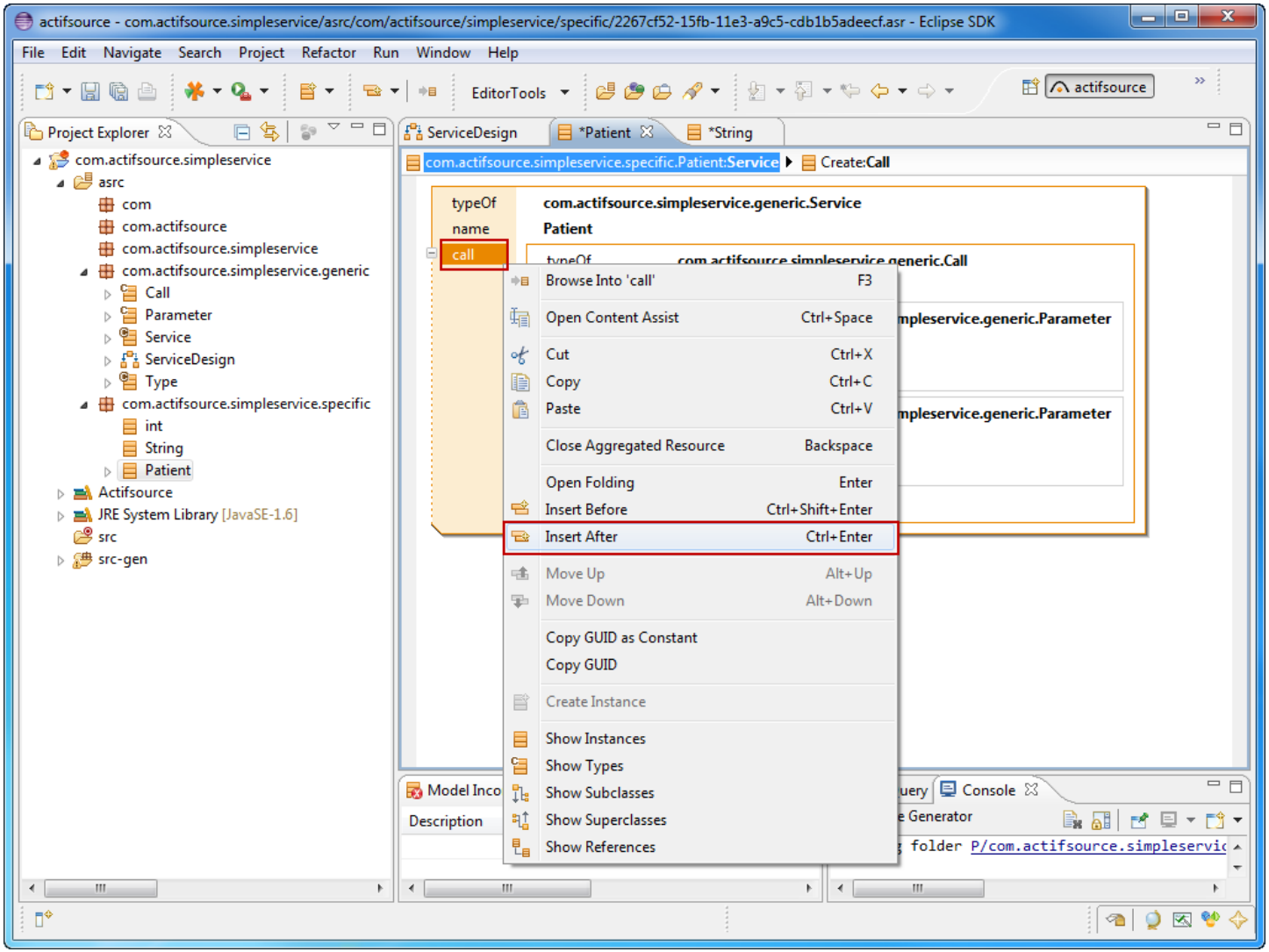

- Select call
- Insert a new Call using *Insert After* (Ctrl+Enter) or *Insert Before* (Alt+Shift+Enter)
- You may rearrange the resources using *Move Up* (Alt+Up) or *Move Down* (Alt+Down)

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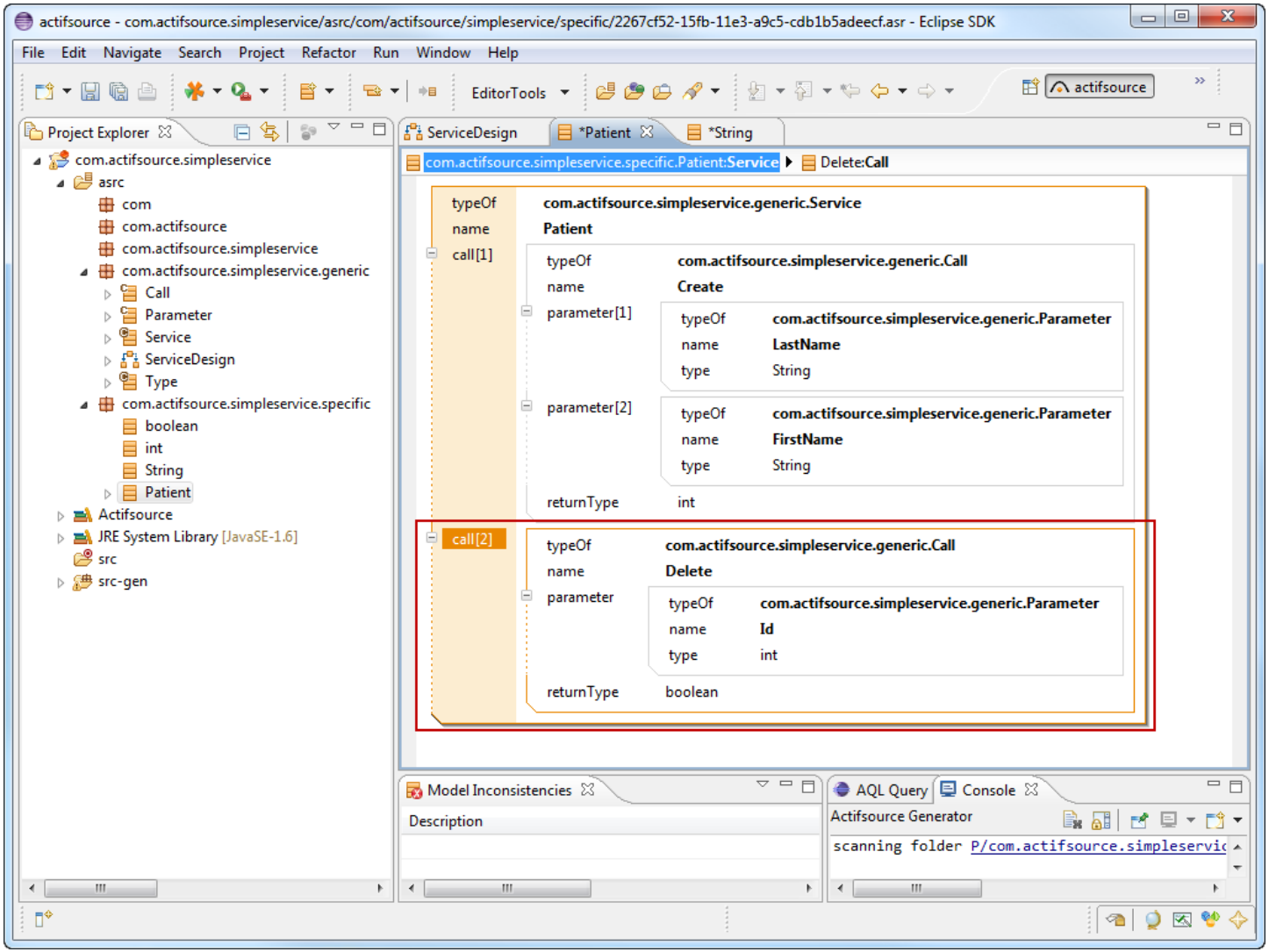

- Edit the Call Delete as shown above
- Insert Parameter Id of Type int
- Insert returnType boolean

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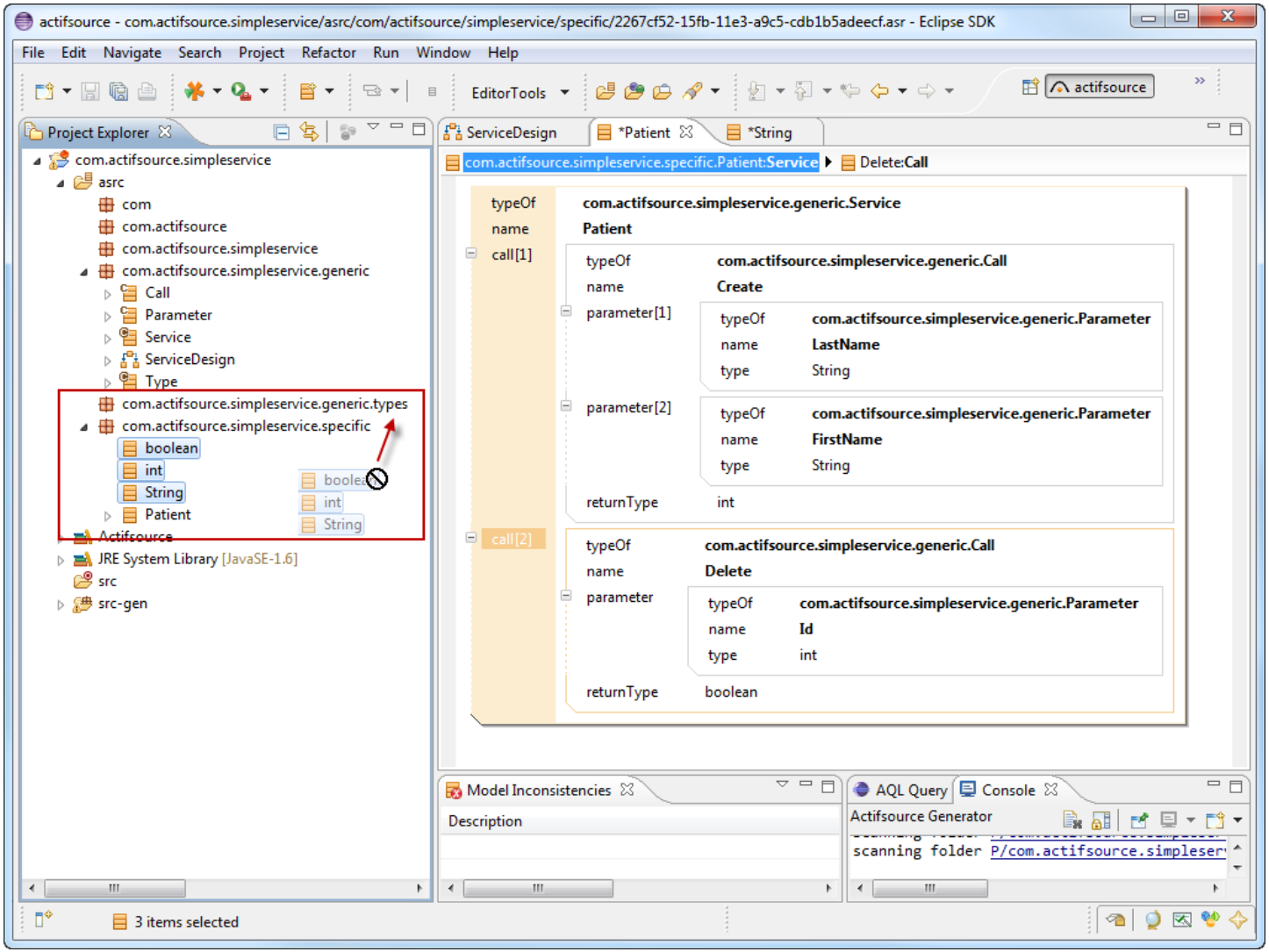

ⓘ New resources are created in the same **Package** as they are referenced

↳ Create a new **Package** `types` in *generic*

↳ Move the Types boolean, int and String into the **Package** *types* using drag & drop

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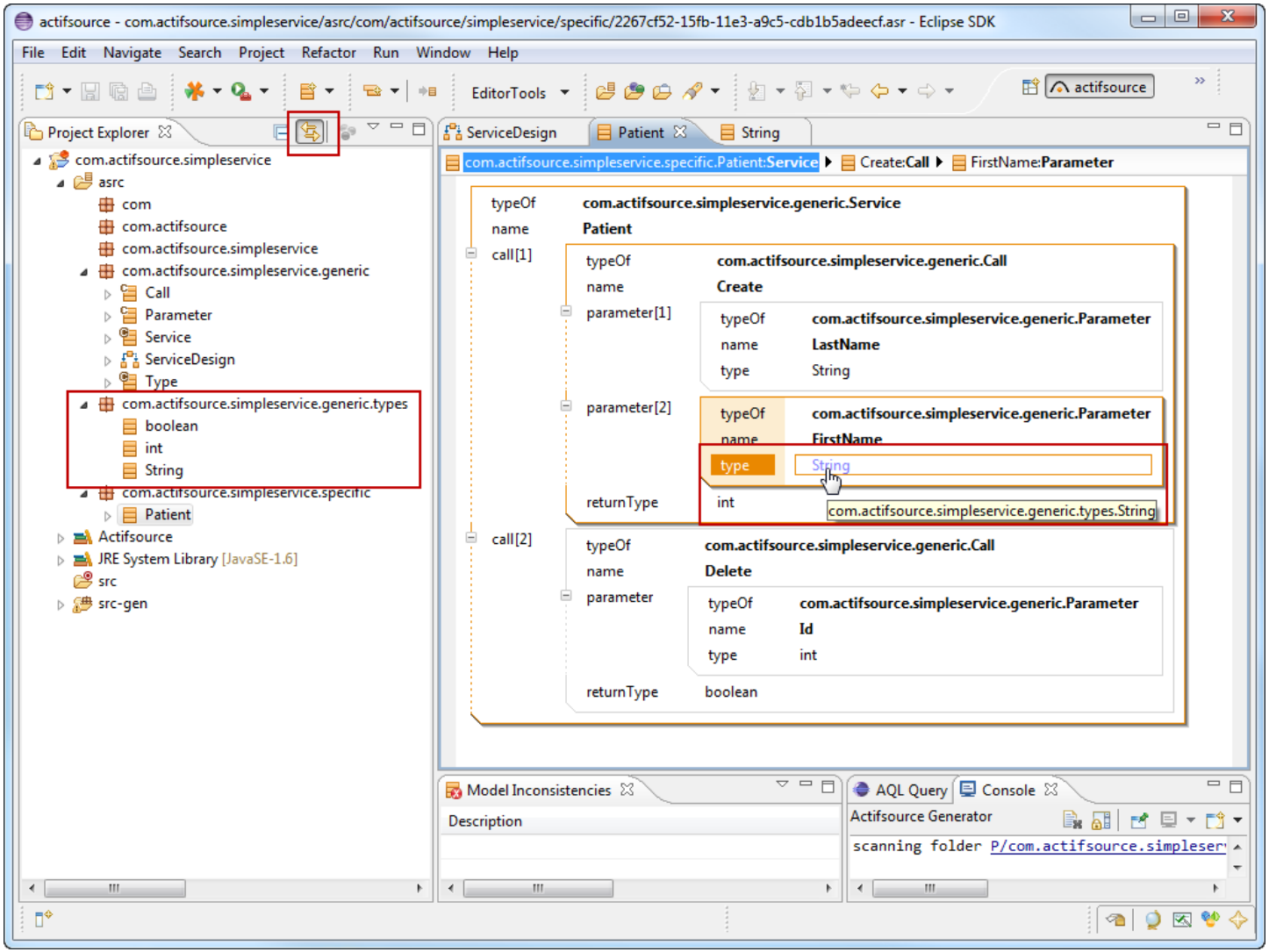

↳ Activate **Link with Editor** to link the **Project Explorer** with the editor

ⓘ Notice that types can still be located by Ctrl+Mouse-Left-Click on any type in the **Resource Editor**

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Part IV: 50
Use Code Templates to Generate Specific Code

- Create a generator template
- Enable Java functions for templates
- Write generic code based on the generic domain model and generate code on the fly

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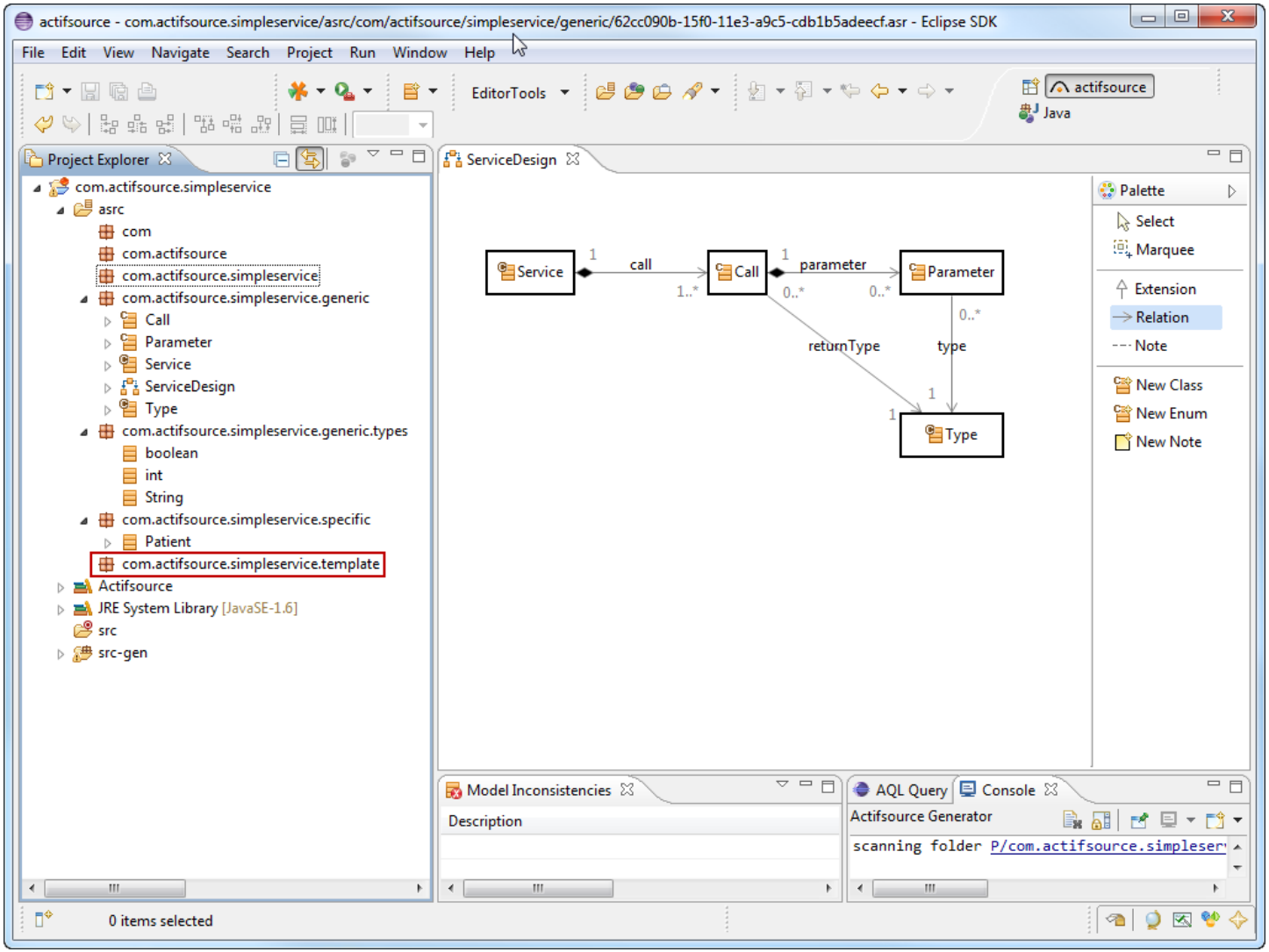

- ⓘ **Code Templates** are also **Resources** in **actifsource**
- ⓘ Like any **Resource**, a **Template** is located in a **Package**
- ↳ Create a new **Package** `template` in *simpleservice*

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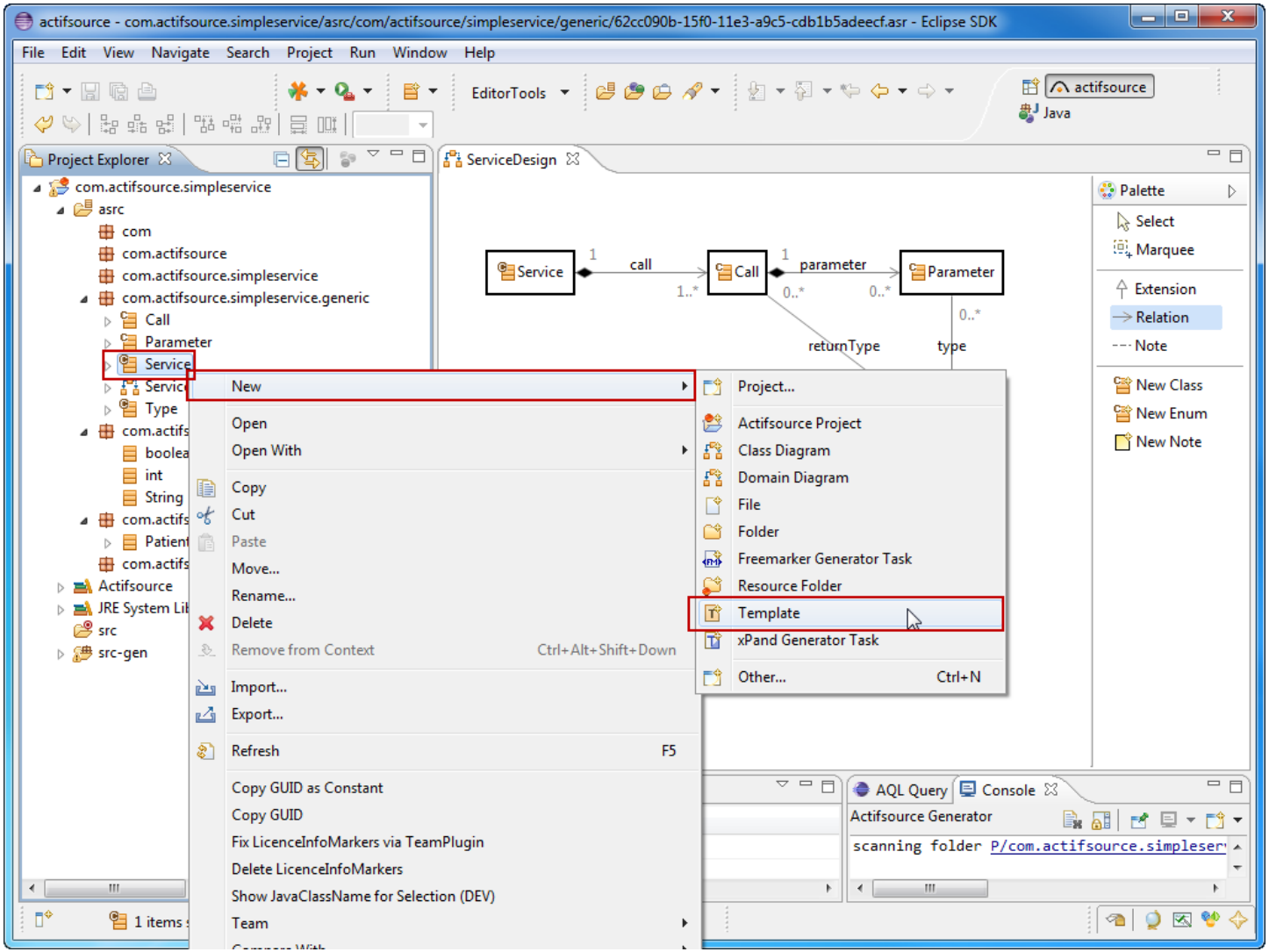

- ⓘ Let's write template code for any Service
- ↳ Select the **Resource** Service
- ↳ Choose *New Template* from the context menu

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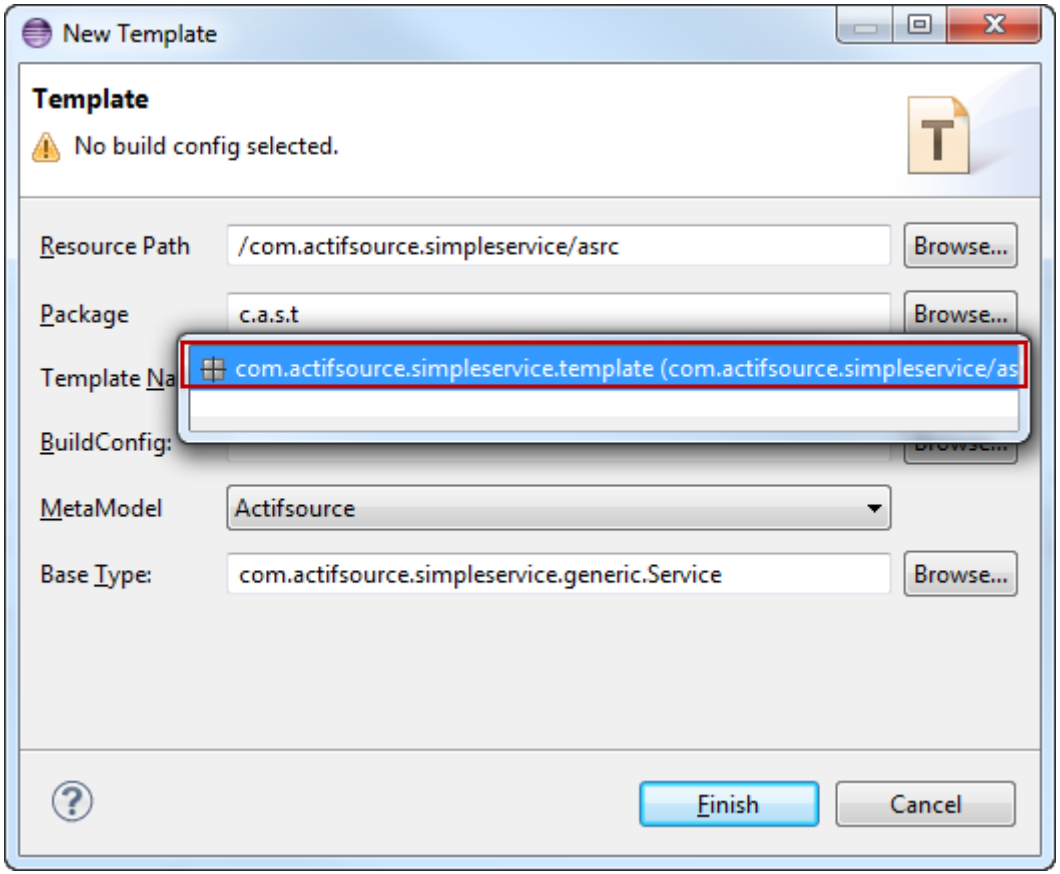

↳ Choose the **Package** *template* using **Content Assist** (Ctrl+Space)

ⓘ You might use just the first letters to select your packages

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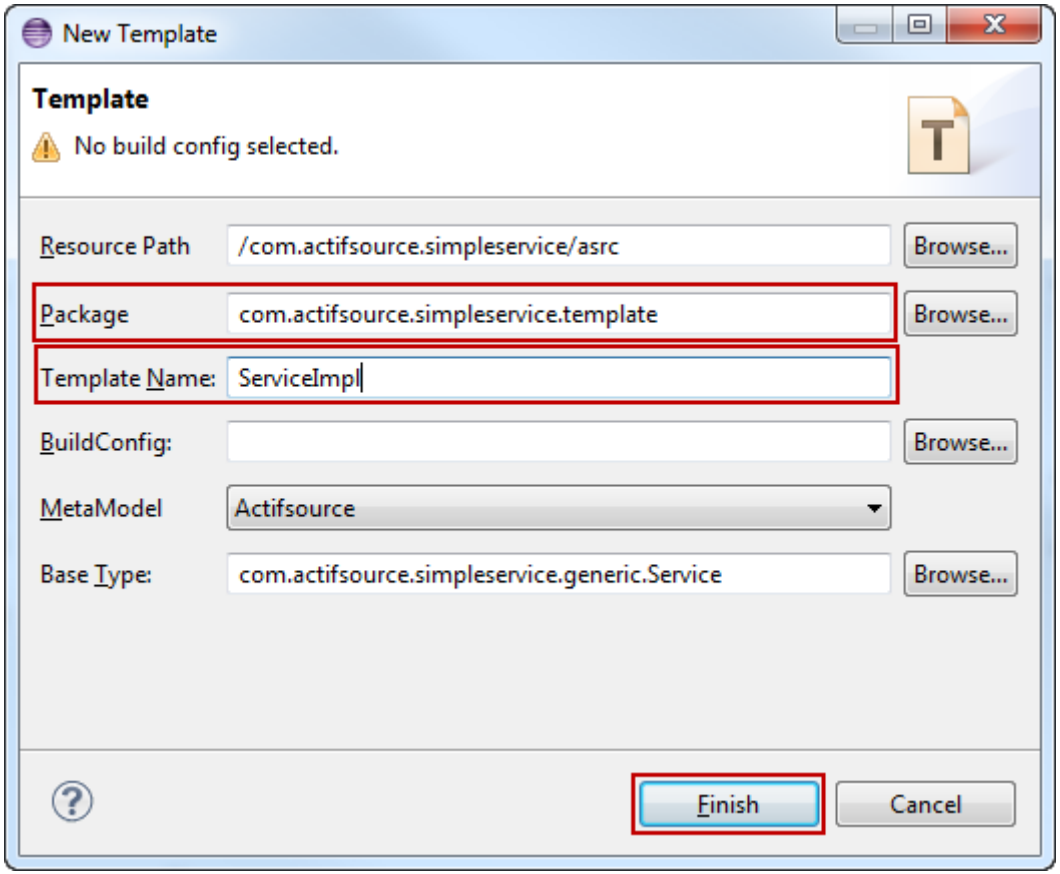

- Name the template `ServiceImpl`
- Click *Finish*

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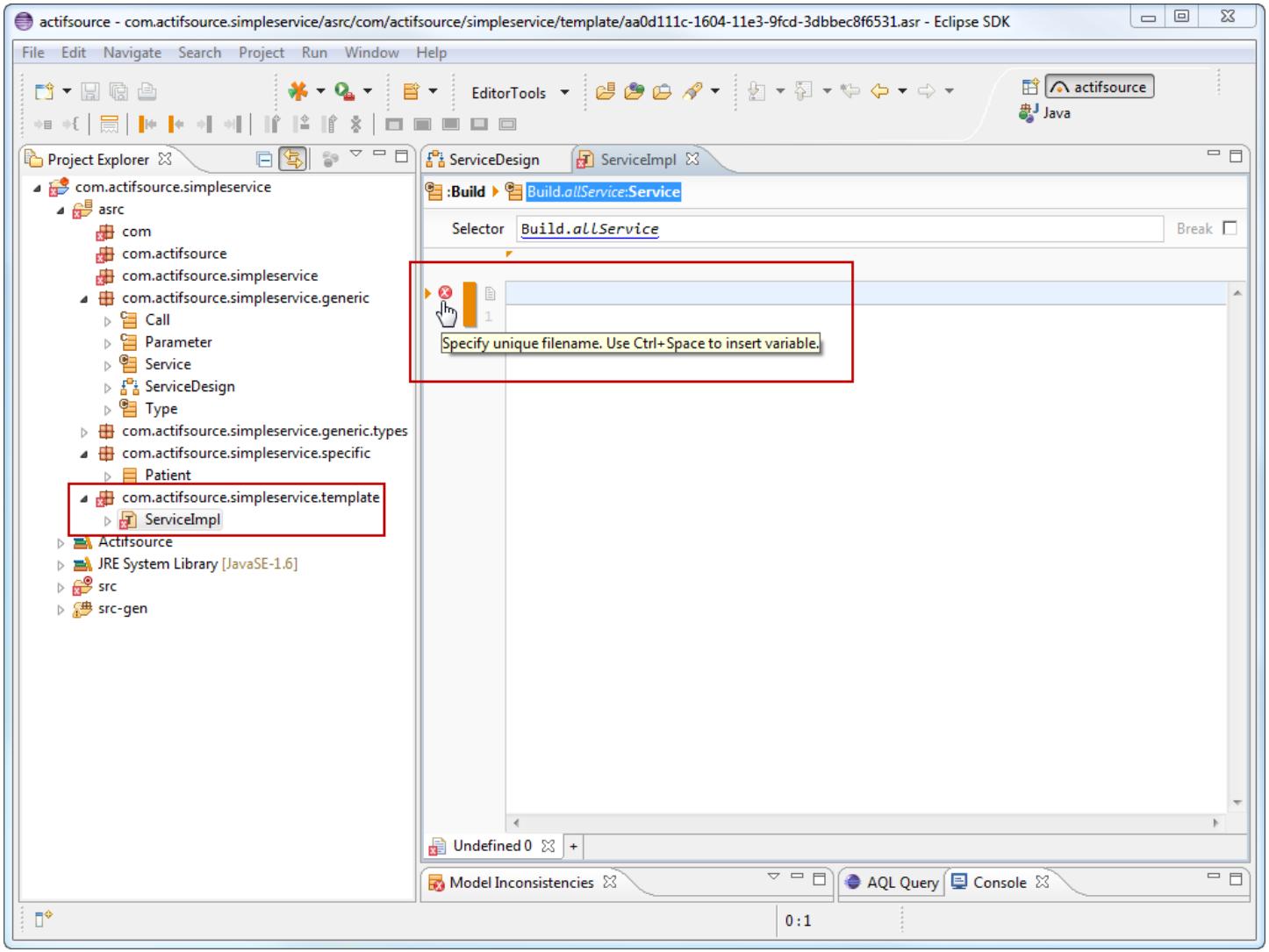

- ⓘ Note: The **Actifsource Template Editor** is a text editor
- ⓘ Writing a template for Service means that any specific information on services comes from the specific domain model
- ⓘ The generic filename must contain a **Variable** to be unique for any specific Service

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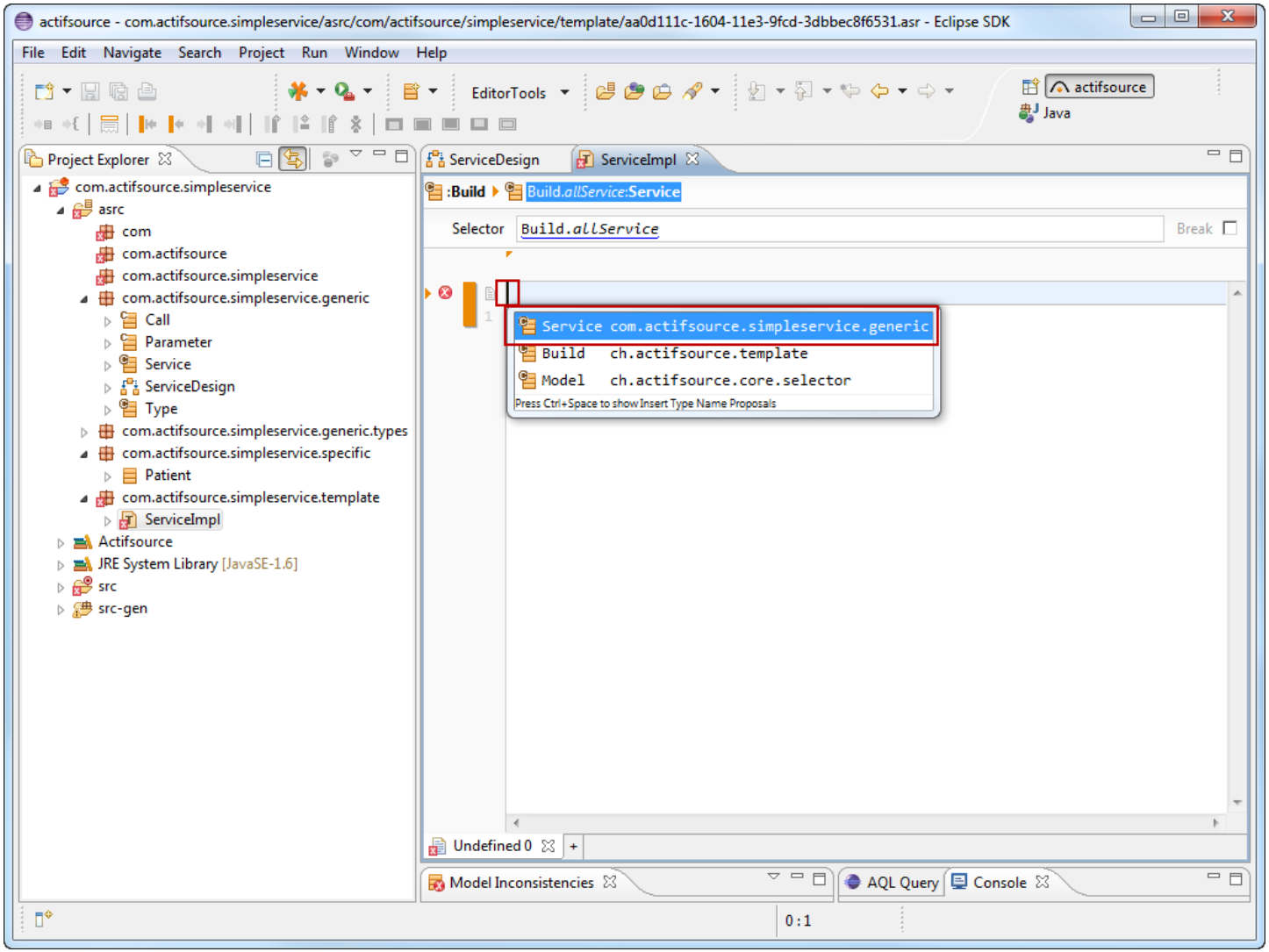

- Place the cursor on the **Filename Line**
- Use **Content Assist** (Ctrl+Space) to insert a **Variable**
- Choose the **Resource** Service

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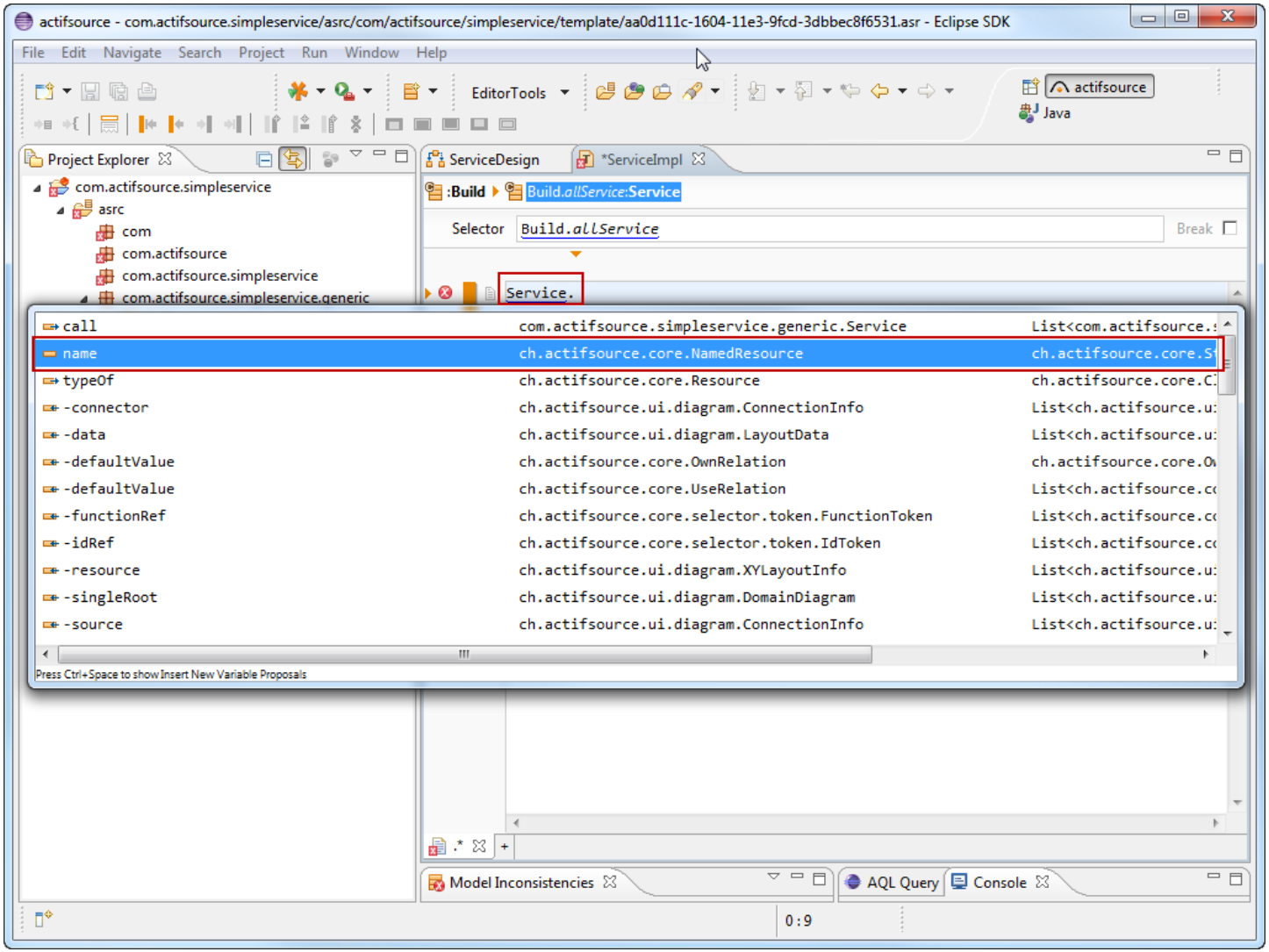

- Press '. ' (dot) after Service
- **Content Assist** opens automatically.
- Press Ctrl+Space to reopen **Content Assist** manually
- Select the **Attribut name** for Service

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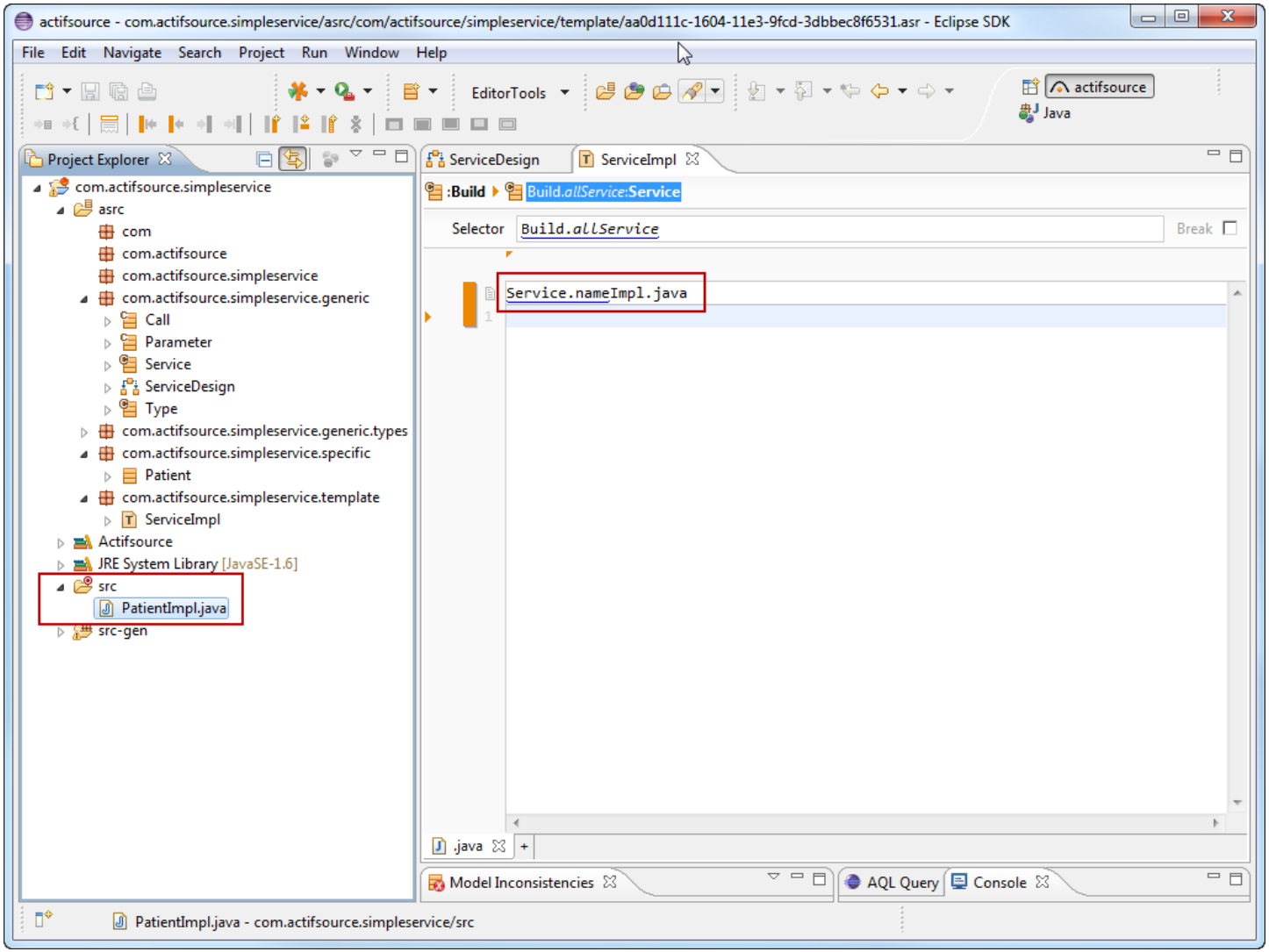

- Add the postfix `Impl` to the file name
- Add the language extension `.java` to the file name
- Save the file → a new file in your **Target Folder** src is created
- ⓘ Note that syntax highlighting is automatically activated based on the file extension

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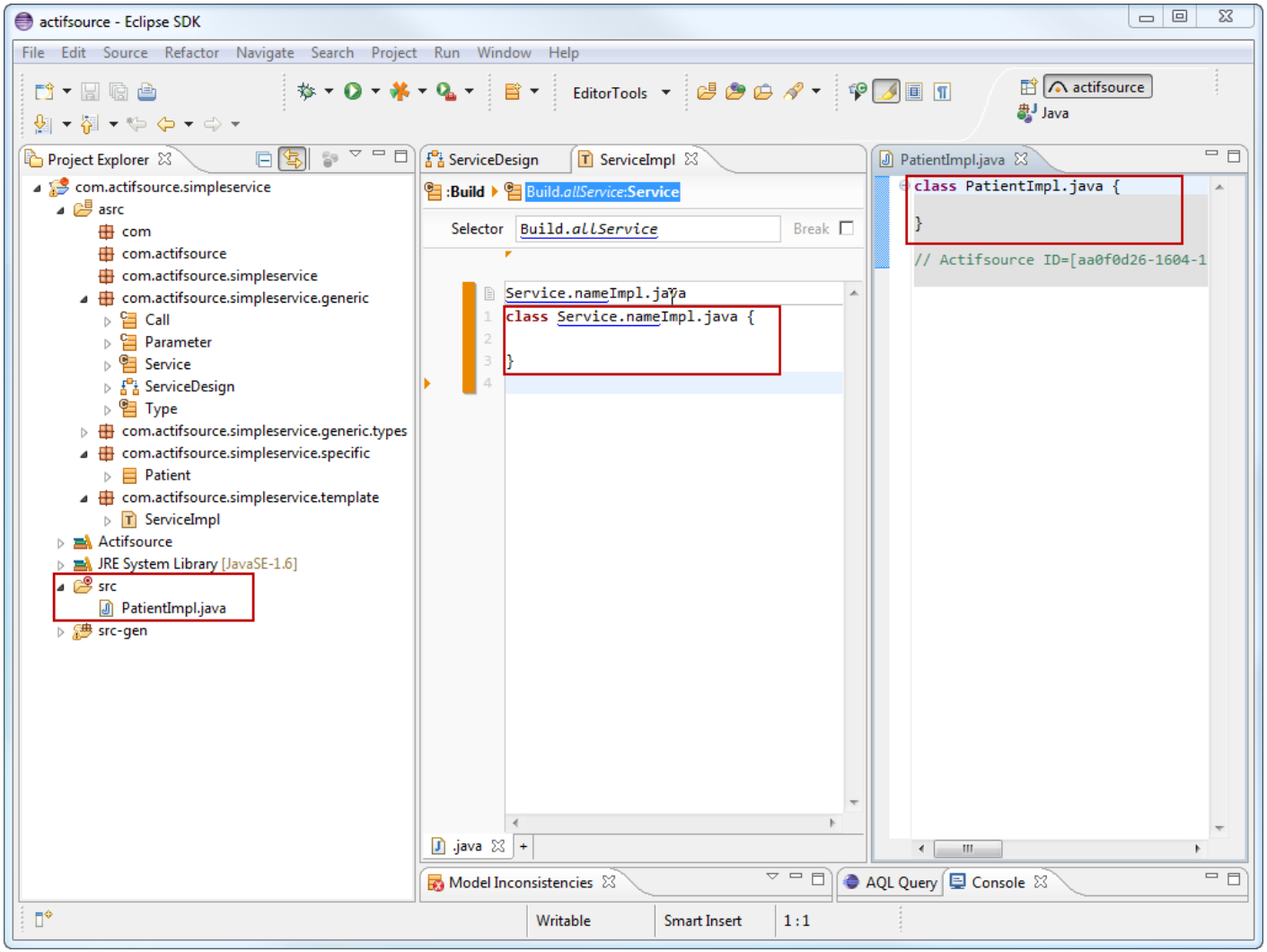

- ⓘ The orange bar on the left hand side is called **main context**
- ⓘ All text in the **main context** is generated for every specific **Resource** of type Service
- ↳ Write a Java Class as shown above. Make sure the class name contains the **Variable** Service.**name**
- ↳ Use **Content Assist** (Ctrl+Space) to insert the **Variable**
- ↳ Or use Copy/Paste (Ctrl+C/Ctrl+V) to copy the class name from file name
- ↳ Save the file (Ctrl+S) → Generated code can be found in the target folder *src*

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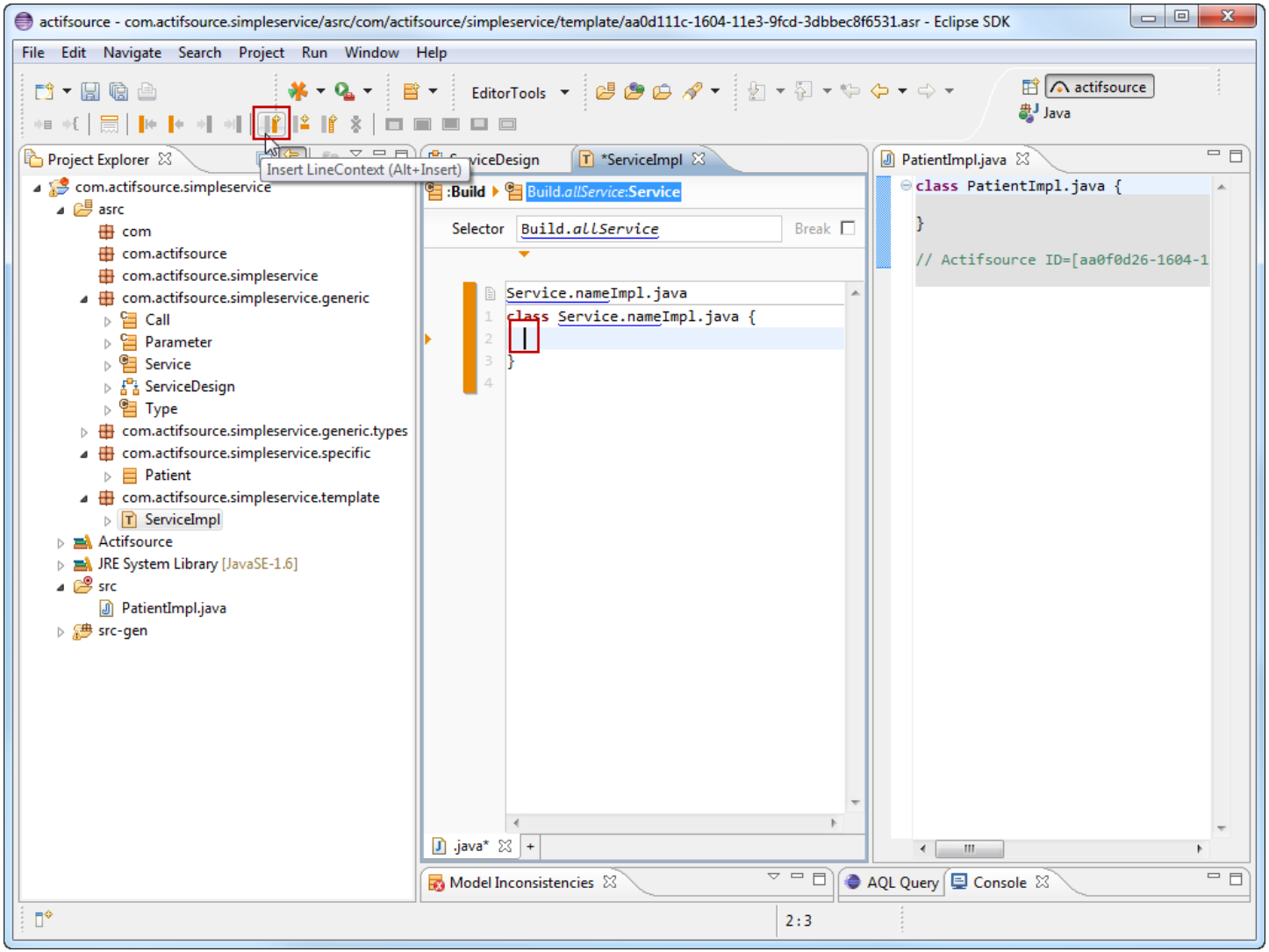

ⓘ Let's create a function for every Call in the Service

↳ Place the cursor in the class body

↳ Use the tool **Insert Line Context** (Alt+Insert) from the tool bar

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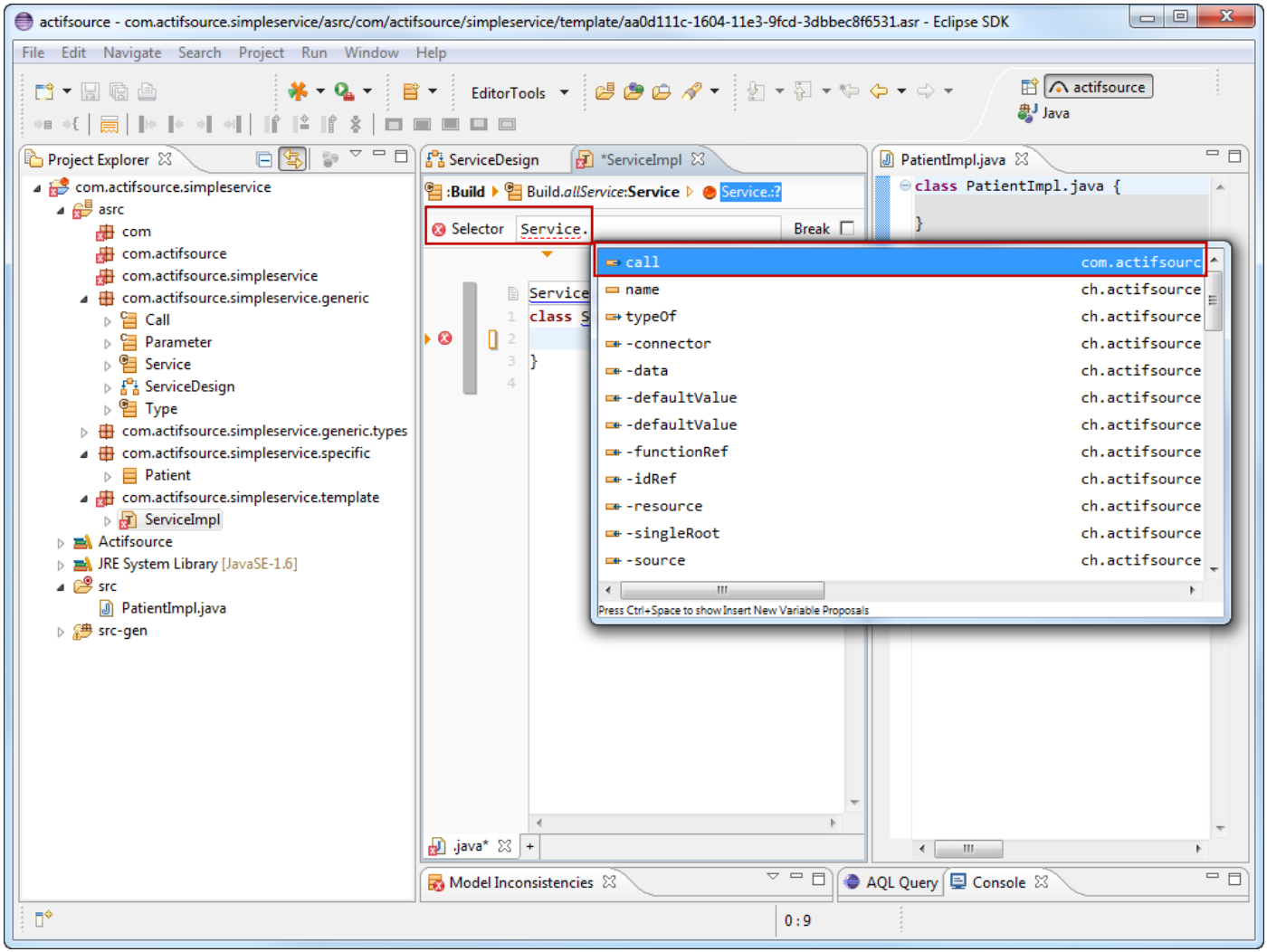

- ⓘ A new **Line Context** has been created
- ⓘ All text in the **Sub Context** shall be generated for every **Resource** of type Call in this Service
- ↳ Attach the **Sub Context** to the **Parent Context** using the **Selector**
- ↳ The given **Selector** must therefore navigate from Service to Call using Service.call
- ↳ Use **Content Assist** (Ctrl+Space) to specify the **Selector**
- ↳ Press *Enter* in the **Selector** to return to code

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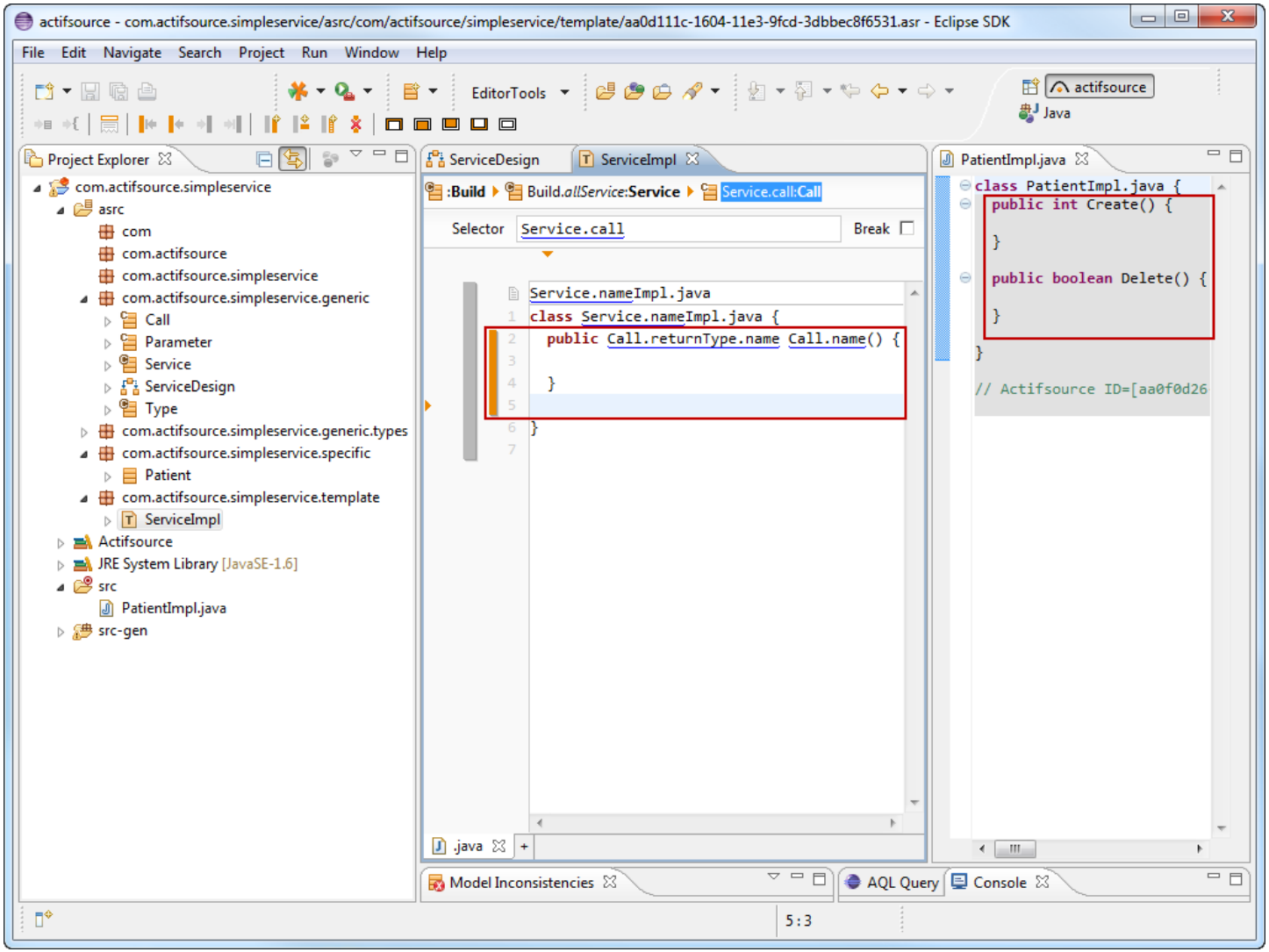
Write Generic Code Based on the Generic Domain Model 62



- ↳ Write a function in the Call **Context** as shown above
- ⓘ The context grows as used
- ⓘ Save the file (Ctrl+S). The generated file should contain a class and its methods. Tip: Add another Service/Call.

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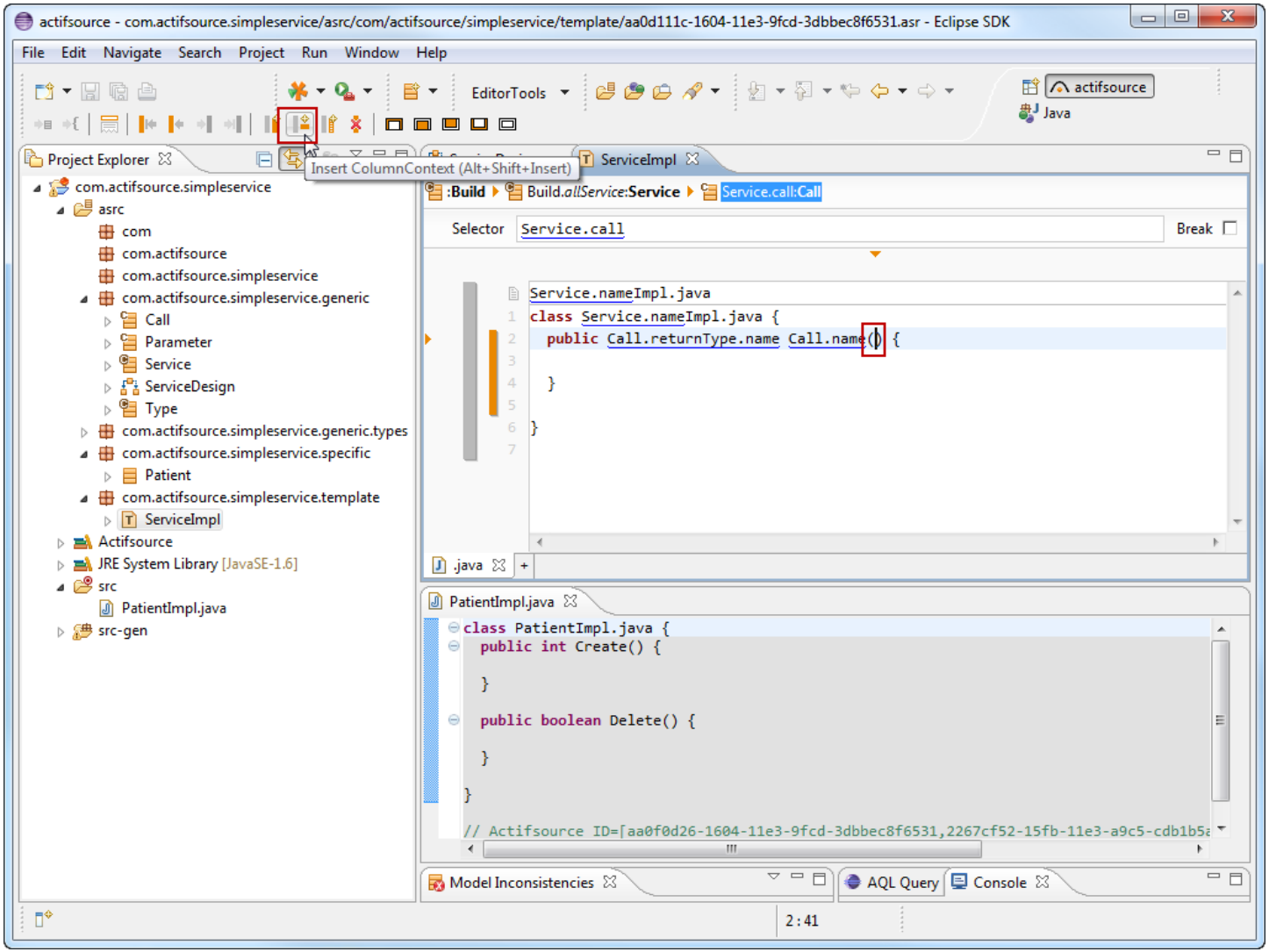

ⓘ Let's create a Java parameter for every Parameter in the Call

↳ Place cursor between the brackets

↳ Use the tool **Insert Column Context** (Alt+Shift+Insert) from the tool bar

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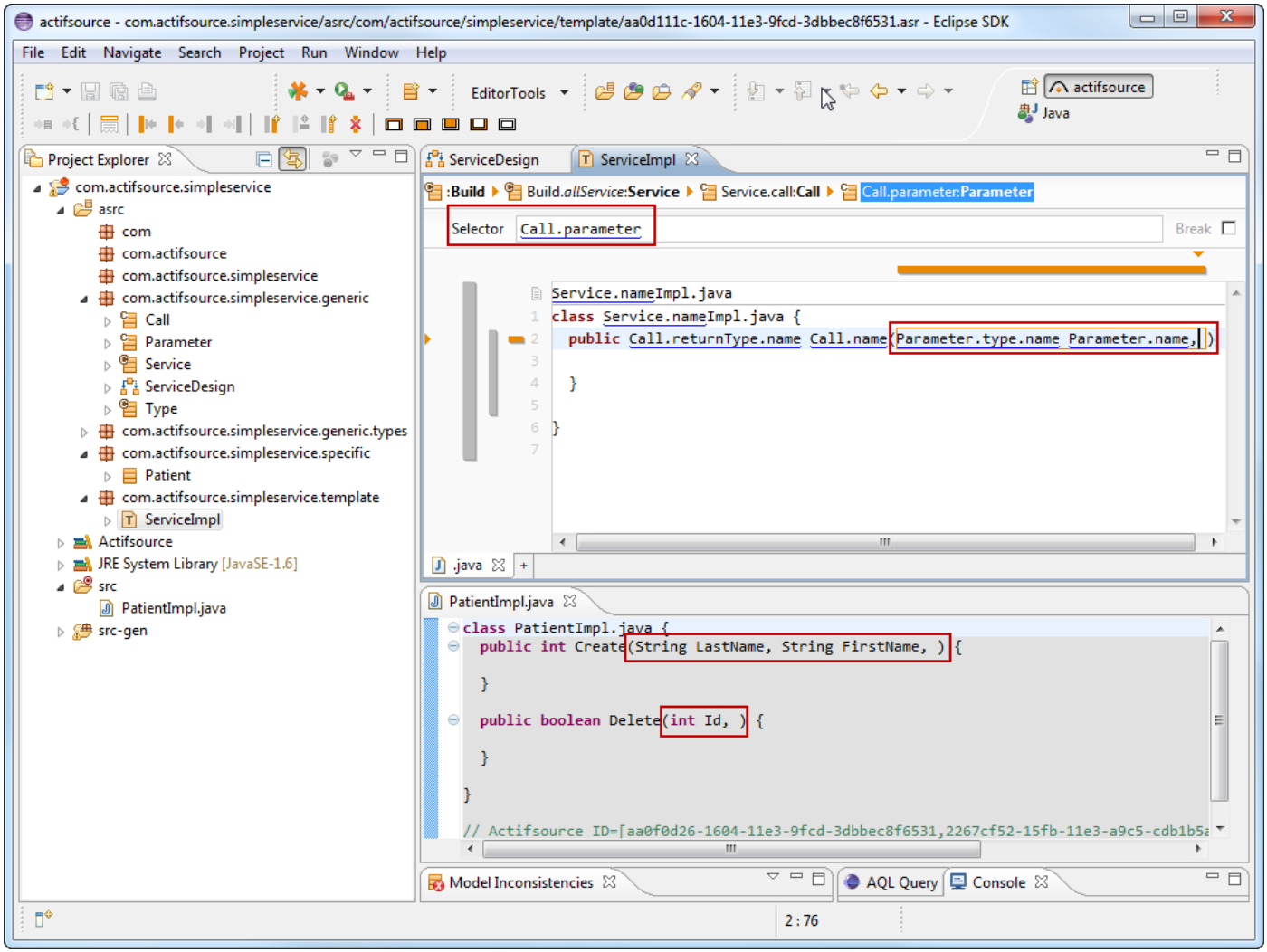
Write Generic Code Based on the Generic Domain Model 64



- ↳ Write a parameter list in the Parameter **Context** as shown above
- ↳ Don't forget the ', ' (Comma) at the end
- ↳ Save the file (Ctrl+S). The generated file should contain a Java class , its methods and parameters
- ⓘ Note that all text in the Parameter **Context** shall be generated
- ⓘ For that reason, there is a superfluous comma at the end of the last Parameter

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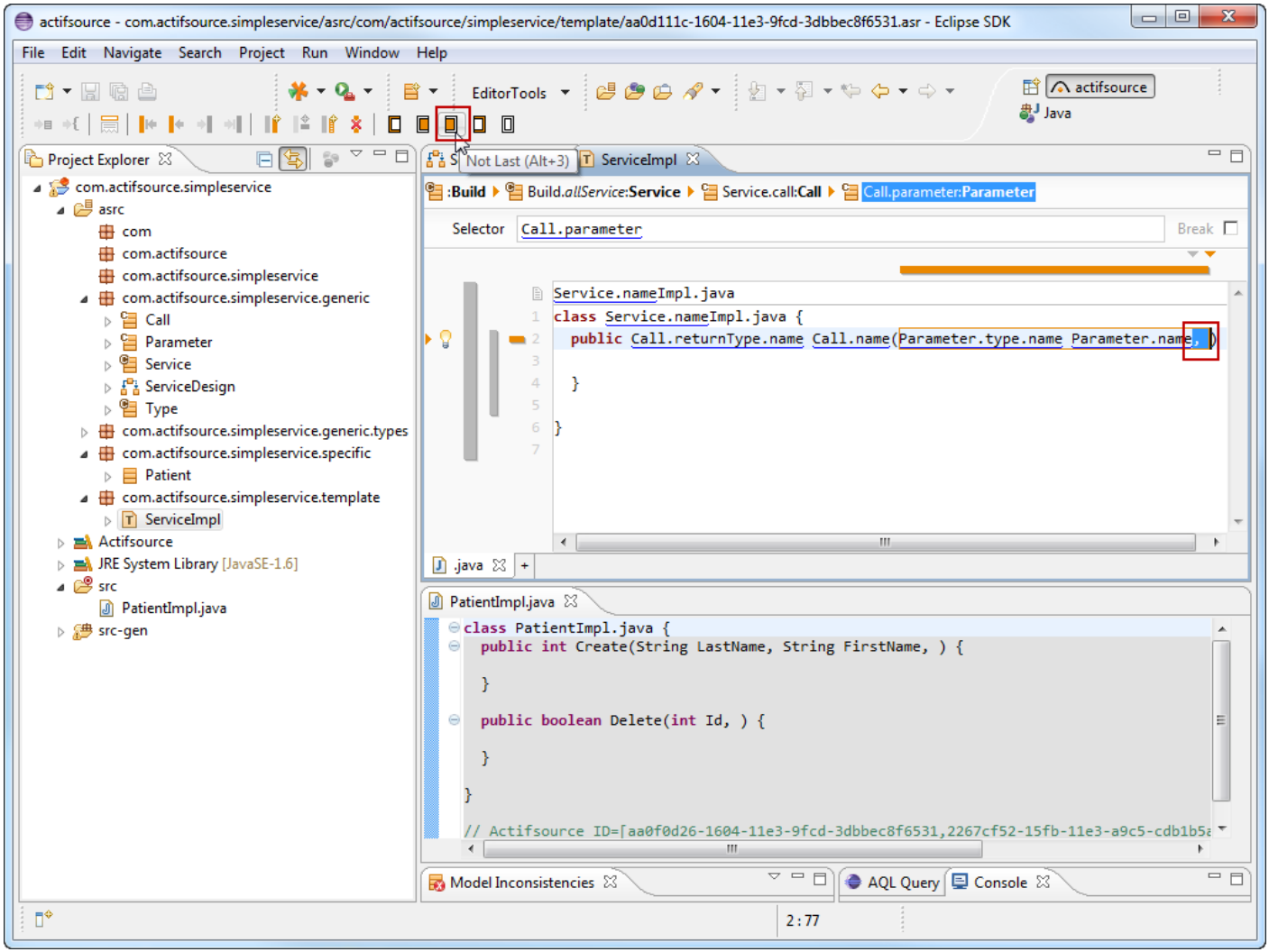

- ⓘ Single characters, but even lines, can be marked with **Attributes**
- ⓘ **First** (Alt+1) → Applied for the first iteration of the **Context**
- ⓘ **Not First** (Alt+2) → Applied for any iterations of the **Context** but the first
- ⓘ **Not Last** (Alt+3) → Applied for any iterations of the **Context** but the last
- ⓘ **Last** (Alt+4) → Applied for the last iteration of the **Context**
- ⓘ **Empty** (Alt+5) → Applied if **Context** is never iterated

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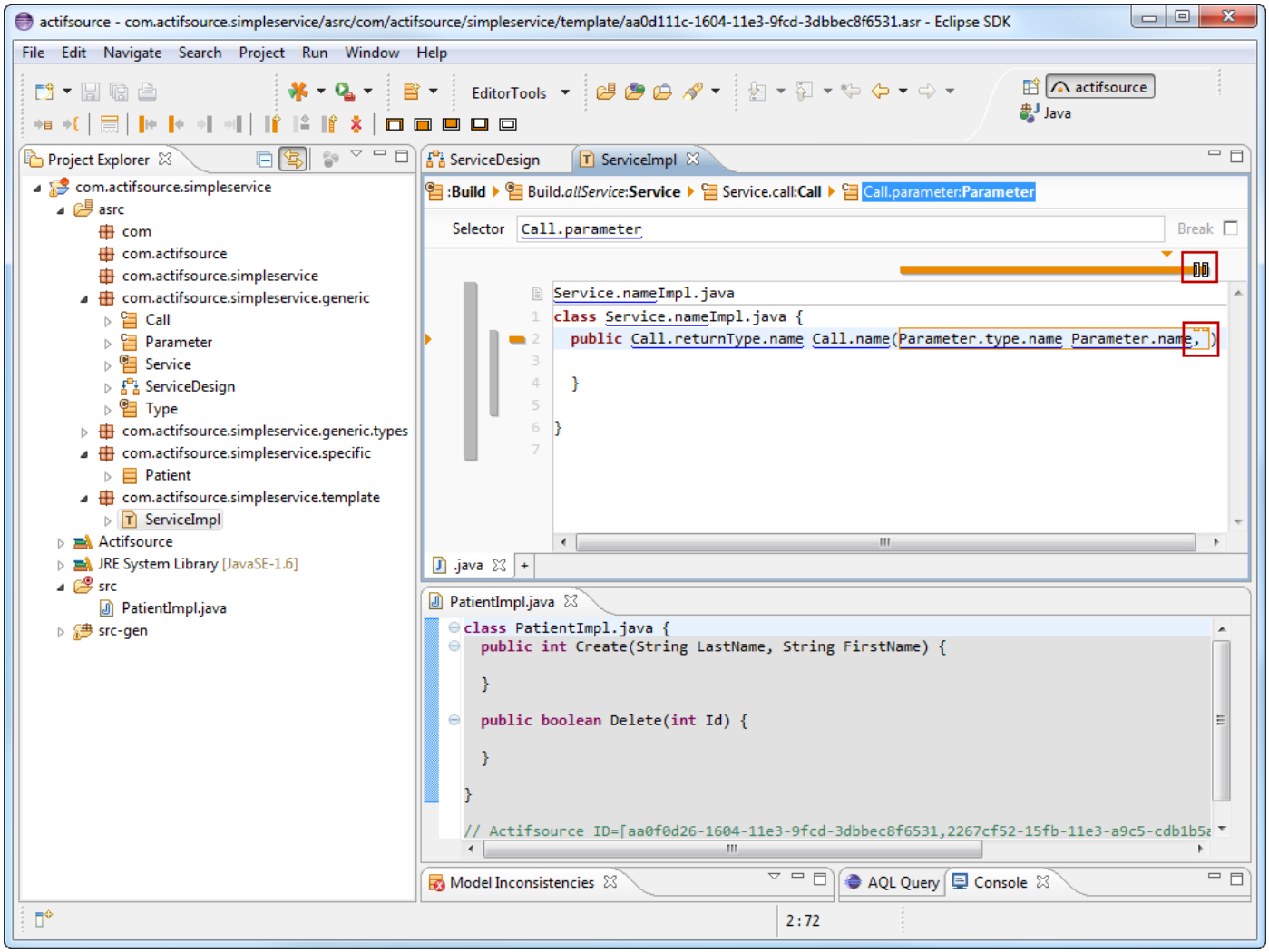

ⓘ The comma has to be written after each Parameter except *after the last one*

↳ Select both the comma and the following space

↳ Choose **Not Last** (Alt+3) from the tool bar

↳ Save the file (Ctrl+S). The generated file should contain a class , its methods and parameters

ⓘ No superfluous comma is generated this time

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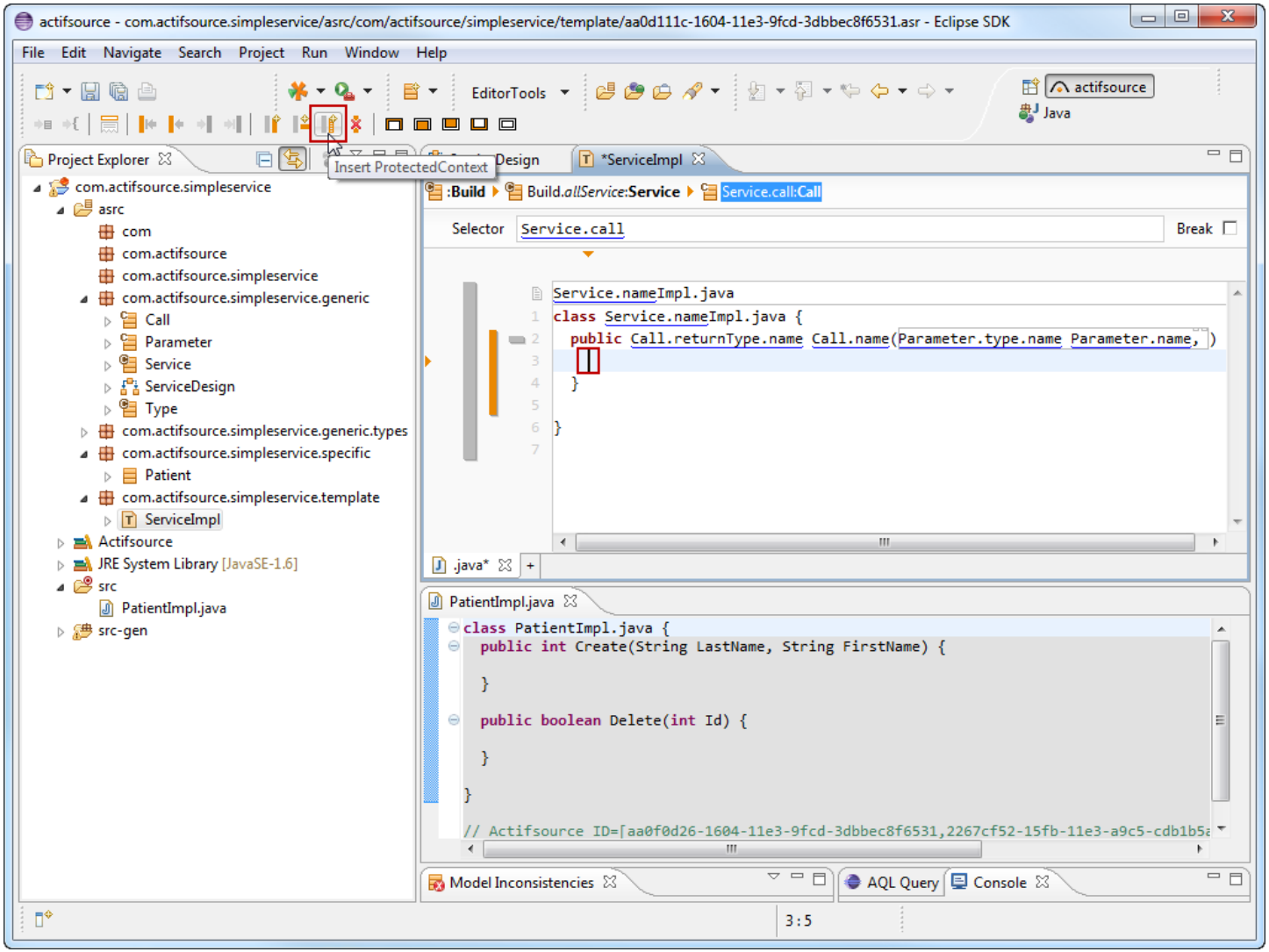

ⓘ Let's write specific code for the generated functions

↳ Place cursor in the function body

↳ Insert a **Protected Context** in the function body with the tool shown above

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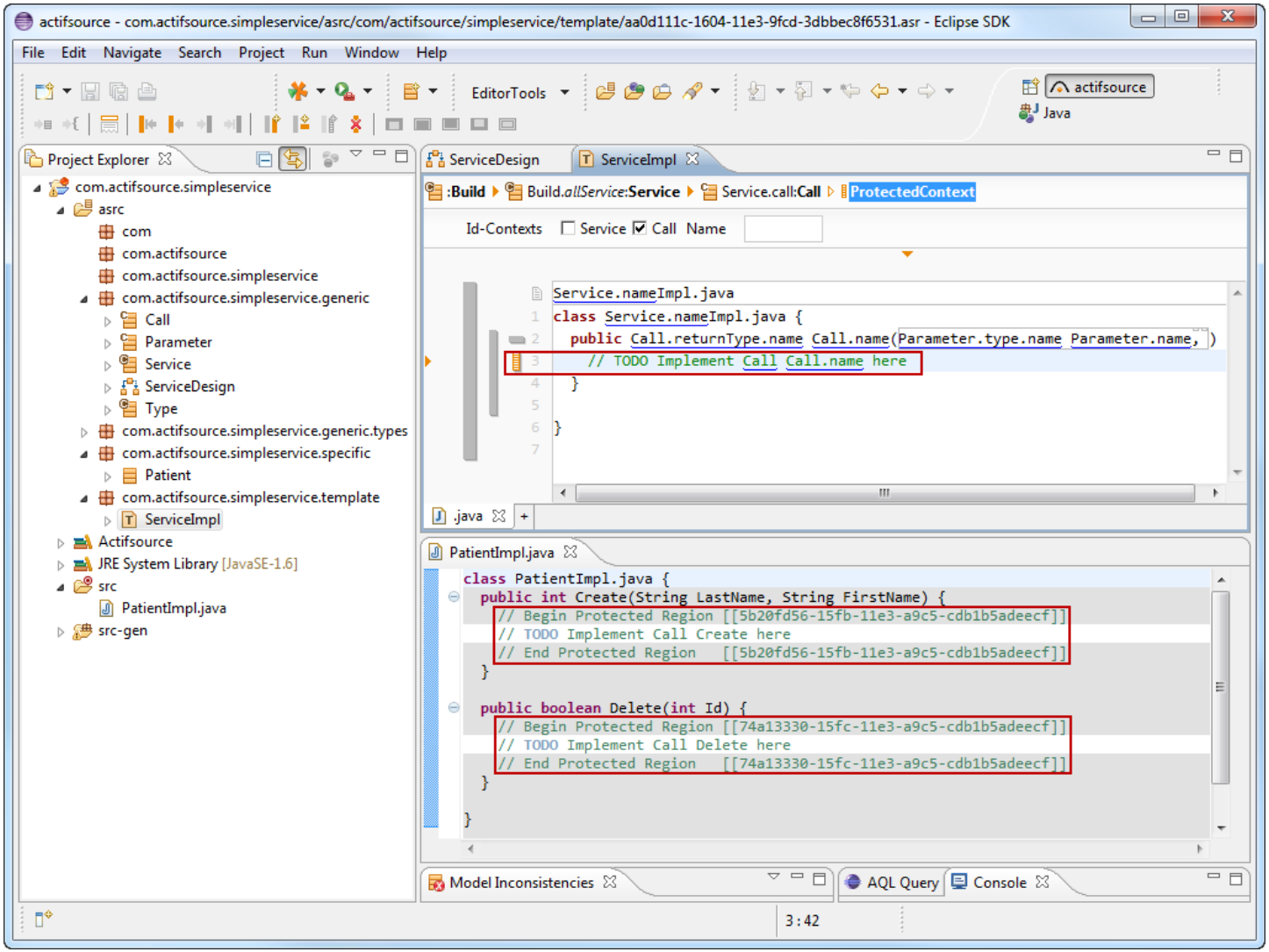

- Write any text in the **Protected Context**, e.g. a TODO comment
- Note that Call is translated in `Call`. Tip: Rename Call to ServiceCall to find out why this makes sense
- Write specific code within the *Protected Regions* of the generated files
- Warning: You must not delete the Tags **Begin Protected Region** and **End Protected Region**
- Tip: Alter the template code. Save the template. See what happens with the **Protected Regions**

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