SOURCE

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 <u>Bold underlined</u>: actifsource Resources <u>Underlined</u>: User Resources <u>UnderlinedItalics</u>: Resource Functions Monospaced: User input Italics: Important terms in current situation 		
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Trademark	actifsource is a registered trademark of actifsource GmbH in Switzerland, the EU, USA, and China. Other names appearing on the site may be trademarks of their respective owners.		
Compatibility	Created with actifsource Version 5.8.5		

Overview

- 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

typeOf	Service		
name	Patient		
call [1]	typeOf	Call	
	name	Create	
	parameter [1]	typeOf	Parameter
		name	LastName
		type	String
	 parameter [2] 	FirstName	: Parameter
	returnType	int	
call [2]	Delete : Call		

Overview

- 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

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Þ.		2	public void Call.name(Parameter.type.name Parameter.name,) {	
		3	// TODO Implement Call.name Call here.		
		4	}		
		5			
		6	}		-
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• Fill in Protected Regions in your generated code



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Part I:

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

Create a new actifsource Project

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- ✤ Install actifsource as a plugin from <u>www.actifsource.com</u>
- ♥ Open the actifsource Perspective

Create a new actifsource Project

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

Create a new actifsource Project

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① Make sure the **actifsource Perspective** is activated

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♥ Create a new actifsource Project

Project Create a new project resource.	
Project name: com.actifsource.simpleservice	
✓ Use default location	
Location: C:\Projects\workspace_tutorial_simpleservice\com.actifsource.simpleservice	Browse
Working sets	
Add project to working sets	
Working sets:	Select
Sack Next > Finish	Cancel

- ♦ Choose the project's name com.actifsource.simpleservice
- ♥ Click Next

•	
Project Settings Setup your project.	
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<mark>⊘</mark> asrc	Edit Remove Image: Comparison of the second sec
?	< Back Next > Finish Cancel

- (i) In actifsource, artifacts are called Resources
- (i) **Resources** are placed in folders and files
- ① The default resource folder is called *asrc*

Project Settings Setup your project.	
😕 Resource Paths 🤗 Target Folders 🔁 Template Folders 🗁 Project Dependenc	ies 🔁 Built-in Dependencies
	🖉 Add Target Folder
	Add BuildConfig
	🗄 Add Package
	Add Resource
	Edit
	Remove
	execute saveactions
Back Next >	Finish Cancel

- Switch to the tab Target Folders
- ⇔ Click Add Target Folder...
- ① Note: Generated Code is placed in target folders
- ① Change project settings anytime using the project properties: Project/Properties/actifsource

Select a Target Folder	
🔁 com.actifsource.simpleservice	
Create folder	
ок	
ОК	Cancel

New Folder
Folder name: src
Advanced >>
OK Cancel

 \clubsuit Add a target folder named *src*

Project Settings Setup your project.	
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♥ Click Finish

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- () We have created a new actifsource Project named com.actifsource.simpleservice
- (i) Resource Folder *asrc* is where we place all **actifsource Resources**
- ① Target Folder *src* is where the generated code is placed

Part II: 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

Setup an Appropriate Package Structure

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- (i) In actifsource, Resources are organized within Packages
- ✤ Create a new Package in the resource folder asrc

Setup an Appropriate Package Structure

New Package	Wizard	
Actifsource Pa Create a new a	ckage ctifsource package in the selected resource folder.	
Resource Path:	/com.actifsource.simpleservice/asrc	Browse
Name:	com.actifsource.simpleservice.generic	Browse
?	Finish	Cancel

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

Create a new Diagram to Model the Generic Domain Model

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✤ Change the style for Package Presentation as you like

Create a new Diagram to Model the Generic Domain Model

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

Create a new Diagram to Model the Generic Domain Model

🖨 New Class Dia	agram Wizard	
Class Diagram Create a new er	mpty class diagram.	
Resource Path:	/com.actifsource.simpleservice/asrc	Browse
Package:	com.actifsource.simpleservice.generic	Browse
Name:	ServiceDesign	
		-
?	Finish	Cancel

- 🗞 Name your Diagram ServiceDesign
- ♥ Click Finish

Add Generic Classes



- (i) 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

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

Own Relations

New Relation Wize	ard	
Create New Relation	on ion	
Name:	call	
Relation Type:	C → DecoratingRelation - ch.actifsource.core C → OwnRelation - ch.actifsource.core SubRelation - ch.actifsource.core C → UseRelation - ch.actifsource.core	
Subject Cardinality:	ch.actifsource.core.Cardinality0_N	-
Object Cardinality:	ch.actifsource.core.Cardinality1_1	▼
?	Finish	Cancel

- (i) actifsource distinguishes basically <u>OwnRelation</u> and <u>UseRelation</u>, all other relation types based upon them.
- ① Owned resources live within the context of their owner
- ① Used resources have their own lifetime and are referenced only
- ① A <u>Call</u> is owned by <u>Service</u> because no <u>Call</u> must exist without its <u>Service</u>
- ① Default name *call* is fine here
- Select the <u>OwnRelation</u>

Own Relations



Summer the set of the

Use Relations



① <u>Type</u> is used by <u>Parameter</u> because types have their own lifetime independent from referencing parameters

Insert a <u>UseRelation</u> between <u>Parameter</u> and <u>Type</u>

Service Content of the service of th

Use Relations



- ① <u>Call</u> should support a return type
- Insert a <u>UseRelation</u> between <u>Call</u> and <u>Type</u>

Service Contraction - chartifsource.core

Use Relations

New Relation Wize	ard	
Create New Relation	on 🔓	
Name:	returnType	
Relation Type:	C DecoratingRelation - ch.actifsource.core C OwnRelation - ch.actifsource.core C SubRelation - ch.actifsource.core C UseRelation - ch.actifsource.core	
Subject Cardinality:	ch.actifsource.core.Cardinality1_1	-
Object Cardinality:	ch.actifsource.core.Cardinality0_N	•
?	Finish	Cancel

- ♥ Name the relation returnType
- ♦ Choose **<u>SubjectCardinality</u>** 1..1 since we always want a return type in this example
- ⇔ Click Ok

Adjust Cardinalities



- ① 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 <u>subjectCardinality</u> of the <u>call</u> Relation

Adjust Cardinalities

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1 U							

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

Adjust Cardinalities

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- ♥ Choose <u>subjectCardinality</u> <u>Cardinality1_1</u> for the relations <u>type</u> and <u>returnType</u>

Part III: Create a Specific Domain Model

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

Create a Package to Store Specific Domain Objects



Screate a new Package specific in simpleservice

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	EanguageSyntaxStyle - ch.actifsource.template.syntaxstyle.generic	
	StyledElement - ch.actifsource.template.syntaxstyle.generic	
	BuildConfig - ch.actifsource.generator	
	Eardinality - ch.actifsource.core	
	e Class - ch.actifsource.core	
	Color - ch.actifsource.core	
	Enum - ch.actifsource.core	
	FunctionSpace - ch.actifsource.core.selector.type	
	Literal - ch.actifsource.core	
	MetaModel - ch.actifsource.core.selector.type	
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- ✤ Select the Package specific
- ♥ Use the New Resource Tool to create a <u>Resource</u> of type <u>Service</u>

New Resource			
Actifsource Re Creates a new a			
Resource Path:	/com.actifsource.simpleservice/asrc		Browse
Namespace:	com.actifsource.simpleservice.specific		Browse
OwnRelation:			Browse
Туре:	com.actifsource.simpleservice.generic.Service		Browse
Name:	Patient		
Modifiers:	Abstract Final		
SuperClass:	ch.actifsource.core.NamedResource		Browse
?	Finish	Ca	ancel

- ♦ Name the <u>Service</u> Patient
- ♥ Click Finish
- (i) Note: Being Subclass of <u>NamedResource</u> provides <u>Patient</u> with an <u>Attribute name</u>

actifsource - com.actifsource.simpleservice/asrc/com/a	ctifsource/simpleservice/specific/2267cf52-15fb-11e3-a9c5-cdb1b5ad	leecf.asr - Eclipse SDK
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- ① The Resource Patient of type Service has been created
- ① The validator constantly checks all resources against the model
- ③ Since we decided a <u>Service</u> must have 1..N <u>Call</u> resources by selecting the <u>subjectCardinality</u> <u>Cardinality1_N</u>, the validator detects the incorrect subject cardinality and flags an error

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

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① The validator tells you that the created <u>Call</u> is missing a <u>name</u> and the <u>returnType</u>

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- ♥ Enter the name Create by pressing *enter* on <u>name</u> or use the context menu
- ♥ Enter a new <u>Parameter</u> by pressing *enter* on <u>parameter</u> or use the context menu
- ♥ Enter the name LastName of the created Parameter
- ① <u>Type</u> and <u>returnType</u> are still missing

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- (i) So far there is no **<u>Resource</u>** of type <u>Type</u>
- ① Type of <u>Parameter</u> LastName shall be <u>String</u>
- ♦ Activate Content Assist (Ctrl+Space) to insert a <u>Resource</u> of type <u>Type</u>
- ✤ Create a new <u>Type</u> String using **Content Assist** (Ctrl+Space)

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

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① The created <u>Type String</u> is inserted automatically

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- ♦ Select parameter
- ♥ Insert a new <u>Parameter</u> using *Insert After* (Ctrl+Enter) or *Insert Before* (Alt+Shift+Enter)
- (i) 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 <u>Parameter</u> FirstName
- ✤ Insert the already created <u>Type String</u> using **Content Assist** (Ctrl+Space)

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- ✤ For <u>returnType</u> create a new <u>Type int</u> using **Content Assist** (Ctrl+Space)
- ① The validator reports no more *Model Inconsistencies*

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

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- ♦ Edit the <u>Call Delete</u> as shown above
- ✤ Insert <u>Parameter Id</u> of <u>Type int</u>
- ✤ Insert <u>returnType</u> boolean

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- ① New resources are created in the same **Package** as they are referenced
- Screate 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
- (i) Notice that types can still be located by Ctrl+Mouse-Left-Click on any type in the Resource Editor

Part IV:

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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- (i) Code Templates are also <u>Resources</u> in actifsource
- (i) Like any <u>Resource</u>, a <u>Template</u> is located in a Package
- ♦ Create a new Package template in simpleservice

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- ① Let's write template code for any <u>Service</u>
- ✤ Select the <u>Resource</u> Service
- ✤ Choose New Template from the context menu

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- ↔ Choose the **Package** *template* using **Content Assist** (Ctrl+Space)
- (i) 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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- (i) Note: The Actifsource Template Editor is a text editor
- Writing a template for <u>Service</u> means that any specific information on services comes from the specific domain model
- ① The generic filename must contain a **Variable** to be unique for any specific <u>Service</u>



- Place the cursor on the Filename Line
- Use Content Assist (Ctrl+Space) to insert a Variable
- ♦ Choose the <u>Resource</u> Service

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

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- ♦ Add the postfix Impl to the file name
- b Add the language extension . java to the file name
- V Save the file \rightarrow a new file in your **Target Folder** src is created
- ① Note that syntax highlighting is automatically activated based on the file extension

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- ① The orange bar on the left hand side is called **main context**
- ① 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 P
- ₿ Or use Copy/Paste (Ctrl+C/Ctrl+V) to copy the class name from file name
- ₿ Save the file (Ctrl+S) \rightarrow Generated code can be found in the target folder src

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- ① Let's create a function for every <u>Call</u> in the <u>Service</u>
- Place the cursor in the class body
- ى Use the tool Insert Line Context (Alt+Insert) from the tool bar



- ① A new Line Context has been created
- ① All text in the Sub Context shall be generated for every <u>Resource</u> of type <u>Call</u> in this <u>Service</u>
- Attach the Sub Context to the Parent Context using the Selector
- Structure 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



- Solution Write a function in the Call Context as shown above
- The context grows as used
- ③ Save the file (Ctrl+S). The generated file should contain a class and its methods. Tip: Add another Service/Call.



- ① 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



- Write a parameter list in the <u>Parameter</u> 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
- ① Note that all text in the Parameter Context shall be generated
- ① For that reason, there is a superfluous comma at the end of the last Parameter



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



- ① 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



- ① 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



- 🖖 Write any text in the **Protected Context**, e.g. a TODO comment
- ① Note that Call is translated in Call. Tip: Rename Call to ServiceCall to find out why this makes sense
- Solution Write specific code within the *Protected Regions* of the generated files
- ① 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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