

Production Applications for eCognition
Architect 8

Creating a new Architect Application

DEEPER INSIGHTS
FASTER RESULTS
BETTER DECISIONS

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Imprint and Version

Document Version

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Table of Contents

Creating a new Architect Application	1
Imprint and Version	2
Legal Notes	2
Table of Contents	3
Introduction to this Module	6
Symbols at the side of the document	6
Lesson 1 Introduction to creating new Applications	7
1.1 How Rule Set and Application communicate	7
1.2 Creating a new, empty Action Library	8
1.3 About the structure in the Analysis Builder	9
1.4 The initial Rule Set	10
Lesson 2 The Action 'Create Image Objects'	11
2.1 Creating the Parameter set and Variable	11
2.1.1 Create the Variable 'scale'	11
2.1.2 Create the Parameter Set	12
2.2 Creating the first Action Group 'Segmentation'	13
2.3 Creating the Action Definition	14
2.3.1 General settings	15
2.3.2 Define the Parameter set	15
2.3.3 Define the Rule Set and Process	15
2.4 Adding a Widget Group to Action Definition	16
2.5 Adding Widgets to the Action	17
2.5.1 Add the text field to insert the Scale Parameter	17
2.5.2 Add the button to execute the Segmentation	18
2.6 Modifying and extending the Rule Set for 'Create Image Objects'	19
2.6.1 Substitute thresholds with Variable 'scale'	19
2.6.2 Add the Process to delete existing Levels	20
2.6.3 Add Processes to update and apply Parameter set from Action	21
2.6.4 Test the created Action 'Create Image Objects'	22
Lesson 3 The Action 'Classify Vegetation'	23
3.1 Creating the Parameter set and Variable	23
3.1.1 Creating the Variable 'ndvi_threshold'	23
3.1.2 Creating the Parameter Set	24
3.2 Creating the Action Group 'Classification'	24
3.3 Creating the Action Definition 'Classify Vegetation'	25
3.3.1 General settings	25
3.3.2 Define the Parameter set, Rule Set and Process to execute	26
3.4 Adding the Widget Group 'Classification' to the Action Definition	27
3.5 Adding the Widgets slider and button to the Action	27
3.5.1 Add the slider to set the Mean NDVI	27
3.5.2 Add the button to execute the classification	28
3.6 Modifying and extending the Rule Set for 'Classify Vegetation'	29
3.6.1 Substitute thresholds with Variable ndvi_threshold	29
3.6.2 Add the Process to un-classify 'Vegetation' Objects	29
3.6.3 Add Processes to update and apply Parameter set from Action	30
3.6.4 Test the created Action 'Create Image Objects'	31
Lesson 4 The Action 'Classify Water'	32
4.1 Creating the Parameter set and Variable 'rationir_threshold'	32
4.1.1 Creating the Variable 'rationir_threshold'	32
4.1.2 Creating the Parameter Set	33
4.2 Creating the Action Definition 'Classify Water'	33
4.2.1 General settings	33
4.2.2 Define the Parameter set, Rule Set and Process to execute	34
4.3 Adding a Widget Group 'Classification' to Action Definition	34
4.4 Adding Widgets slider and button to the Action	35

4.4.1	Add the slider to control the Ratio nir	35
4.4.2	Add the button to execute the classification	36
4.5	Modifying and extending the Rule Set for 'Classify Water'	37
4.5.1	Substitute thresholds with Variable 'rationir_threshold'	37
4.5.2	Add Processes to update and apply Parameter set from Action	37
4.5.3	Test the created Action 'Create Image Objects'	38
Lesson 5	The Action 'Manual Classification'	39
5.1	Create the Processes for 'Manual Classification'	39
5.2	Creating the Action Definition 'Manual Classification'	40
5.2.1	General settings	41
5.2.2	Define the Parameter set, Rule Set and Process to execute	41
5.3	Adding the Manual Classification buttons to the Action Definition	42
5.3.1	Add Widget Group 'Manual Classification'	42
5.3.2	Adding the manual classification buttons to the Action	42
5.3.3	Test the created Action 'Manual Classification'	44
Lesson 6	The Action 'Clutter Removal'	45
6.1	Creating the Parameter set and Class Variable 'input_class'	45
6.2	Creating the Action Definition 'Clutter Removal'	46
6.2.1	General settings	46
6.2.2	Define the Parameter set, Rule Set and Process to execute	47
6.3	Adding the Widget Group, drop-down list and button to the Action Definition	48
6.3.1	Adding the Widget Group	48
6.4	Adding Widgets to the Action	48
6.4.1	Add the drop-down list	48
6.4.2	Add the button	49
6.5	Modifying and extending the Rule Set for 'Clutter Removal'	50
6.5.1	Delete the Processes	50
6.5.2	Substitute thresholds with Variable	50
6.5.3	Add Processes to update and apply Parameter set from Action	50
6.5.4	Test the created Action 'Create Image Objects'	51
Lesson 7	The Action 'Merge Objects'	52
7.1	Creating the Parameter set	52
7.2	Creating a new Action Group 'Merge and Export'	53
7.3	Creating the Action Definition 'Merge Objects'	54
7.3.1	General settings	54
7.3.2	Define the Parameter set, Rule Set and Process to execute	54
7.4	Adding the Widget Group, drop-down list and button to the Action	55
7.4.1	Add the Widget Group 'Settings'	55
7.4.2	Add the drop-down list	55
7.4.3	Add the button	56
7.5	Modifying and extending the Rule Set for 'Merge Objects'	57
7.5.1	Delete the obsolete Processes	57
7.5.2	Substitute thresholds with Variable 'input_class'	57
7.5.3	Add Processes to update and apply Parameter set from Action	58
7.5.4	Test the created Action 'Merge Objects'	58
Lesson 8	The Action 'Export Vector Layer'	60
8.1	Creating the Parameter set and Variable 'smoothing'	60
8.1.1	Creating the Scene Variable 'smoothing'	60
8.1.2	Creating the Parameter Set	61
8.2	Creating the Action Definition 'Export Vector Layer'	61
8.2.1	General settings	61
8.2.2	Define the Parameter set, Rule Set and Process to execute	62
8.3	Adding the Widget Group, drop-down-list and checkbox to the Action Definition	63
8.3.1	Adding the Widget Group 'Export'	63
8.3.2	Adding Widgets check-box and button to the Action	63

8.4	Modifying and extending the Rule Set for 'Export'	65
8.4.1	Processes for smoothing switched off	65
8.4.2	Processes for smoothing switched on	65
8.4.3	Add Processes to update and apply Parameter set from Action	66
8.4.4	Test the created Action 'Export Vector Layer'	67

Introduction to this Module

This Module you will learn how create an Architect Application. You will create a new and empty Action Library, learn how to configure the Action in the Analysis Builder and how to set up variables and Parameter sets to connect the Rule Set with the Action.

This Module has eight Lessons:

Lesson 1 Introduction to creating new Applications

Lesson 2 The Action 'Create Image Objects'

Lesson 3 The Action 'Classify Vegetation'

Lesson 4 The Action 'Classify Water'

Lesson 5 The Action 'Manual Classification'

Lesson 6 The Action 'Clutter Removal'

Lesson 7 The Action 'Merge Objects'

Lesson 8 The Action 'Export Vector Layer'

Symbols at the side of the document

The symbols at the side of the document shall guide you through the exercises and help you to identify whether to read something or an action is needed or whether the screenshot is meant to be compared with settings in the software.

Introduction

If the side is hachured and 'Introduction' is added, this indicates that a text is giving a general introduction or methodology about the following chapter, method or exercise.

Information

If the side is hachured and 'Information' is added, this indicates that a text is giving information about the following exercise.



Action!

If this symbol is shown, you have to follow the numbered items in the text. If you just want to work through the exercises without reading the theory part, follow only this sign.



**Settings
Check**

If this symbol is shown, compare the settings shown in the screenshot with the settings in the according dialog box in the software.



**Rule Set
Check**

If this symbol is shown check the screenshot of the Process Tree with the content of the Process Tree in the software.



**Result
Check**

If this symbol is shown check the screenshot aside with the result in the software. It should look similar.

Lesson 1 Introduction to creating new Applications

This Lesson has the following chapters

- How Rule Set and Application communicate
- Creating a new, empty Action Library
- About the structure in the Analysis Builder
- The initial Rule Set

1.1 How Rule Set and Application communicate

To transfer the values set in the Action to the Rule Set the Action and the Rule Set have to **communicate** with each other. The actual connector between Action and Rule Set is the so called '**Parameter set**'. The Parameter set must be created and the Rule Set must be modified.

Four components are necessary:

- **A:** The configurations within the **Action**
- **B:** The so called '**Parameter set**' which contains all **variables** belonging to an Action
- **C:** The **Rule Set**, using **variables instead of fix thresholds**.

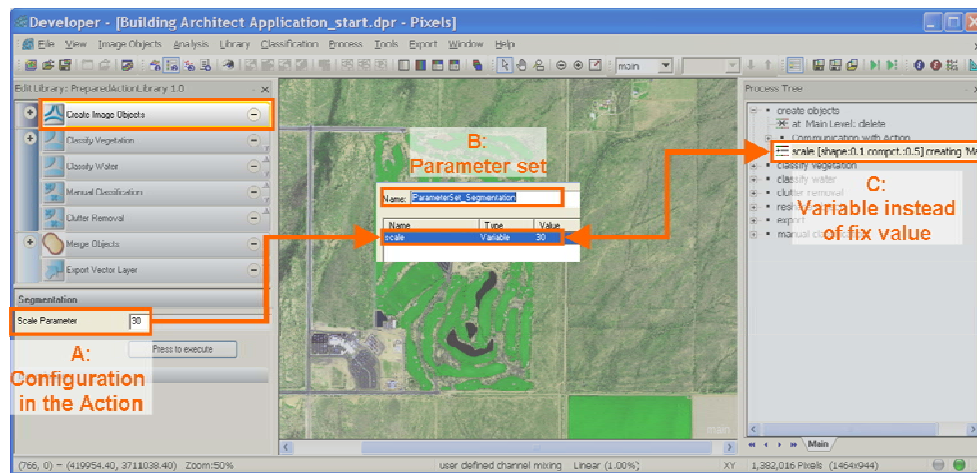


Figure 1: Components of an Architect Application: The Actions, the Parameter set, the Rule Set using Variables.

Introduction

- The Rules Set must also contain **specific algorithms** to **1 update** the parameter set and to **2 apply** the values of the parameter set to the Rule Set

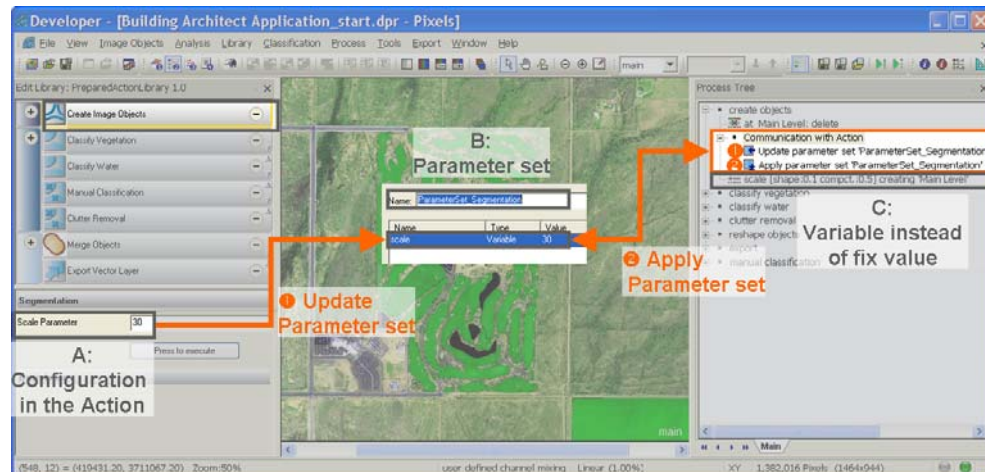


Figure 2: Communication between Rule Set and Actions.

The workflow to set up such an communication is:

- Create the Variable(s)** and the Parameter set
- Create the Action** with the widgets
- In the **Rule Set**, substitute the fixed values with the **Variable(s)**
- In the **Rule Set** add Processes to **update** and **apply** Parameter set

1.2 Creating a new, empty Action Library

Before wrapping a Rule Set as Actions, a new Action Library has to be created.

Preparation



Action!

- Start Definiens eCognition Developer.
- Switch to predefined view setting number 2 '**Configure Analysis**'.
- Open the project '**Exploring Architect Application.dpr**' in the folder '**...\WhatsNew_eCog8\Projects\Architekt**' at the location where the training data is stored.

Create a new Action Library

- To create an Action Library go to main menu '**Library**' and choose '**New Action Library**'.

The 'Create New Action Library' dialog box opens.

- Browse to '**...\WhatsNew_eCog8\Projects\Architekt** ', insert a name, e.g. My first Action Library.
- Click '**OK**'.

A folder with the name of the Action Library is created, if you start editing the Library a .dlx file will be saved inside.



Result Check

The Action Library is loaded to the Analysis Builder window. The Analysis Builder window changes its name to **'Edit Library: My first Action Library'**. As the editing mode is active, you can immediately start editing the action library.

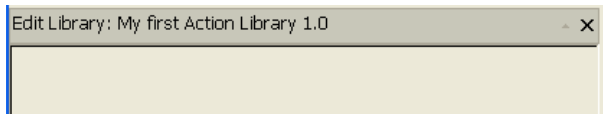


Figure 3: New created Action Library in the Analysis Builder.

1.3 About the structure in the Analysis Builder

The items in the Analysis Builder have to follow a certain **structure**. The components are structured in a **hierarchical way**: All four components must be added to the Analysis Builder according to this hierarchy.

Information

The top hierarchy builds the so called **'Action Group'**. Such an Action Group, can contain several **'Action Definitions'**. The Action Definition consist of a **'Widget Group'** and its **'Widgets'**. Widgets can be sliders, text boxes, check-boxes, buttons etc.

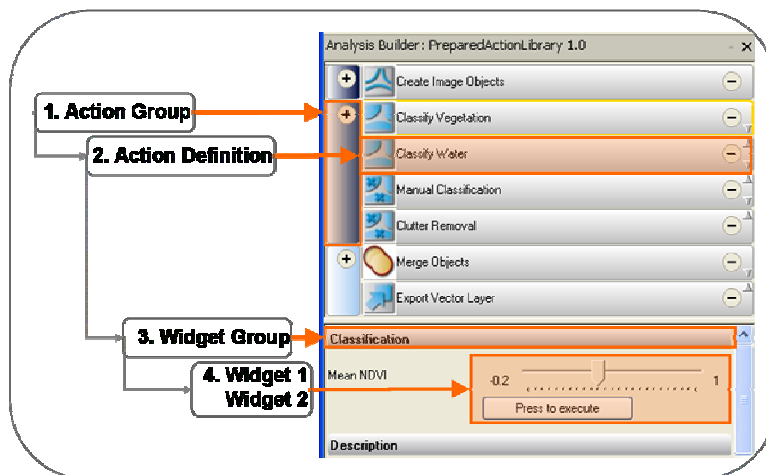


Figure 4: Schematic diagram to show the hierarchical structure in the Analysis Builder.

1.4 The initial Rule Set

Information

Before an Action can be created, the Rule Set has to be loaded.

The Rule Set that we will load initially, contains Processes to **segment, classify, reshape and export**. Nothing is configured or adapted in terms of usage with an Action yet. No **variables** are used yet and no **algorithms** for communication with the Action are applied.

The loaded Rule Set has six parts, later a seventh part will be added, the manual classification part:

- create objects
- classify vegetation
- classify water
- clutter removal
- reshape objects
- export

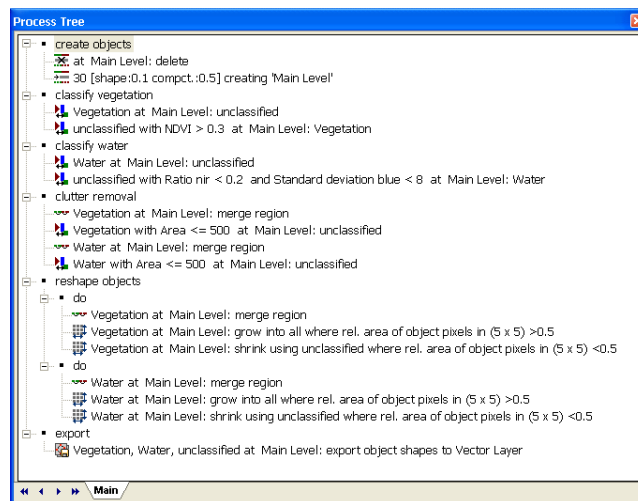


Figure 5: The initial Rule Set to be loaded.



Action!

1. In the main menu '**Process**' select '**Process Tree**'.
2. Right-click in the Process Tree and select '**RuleSet_start.dcp**' in the folder '**...\WhatsNew_eCog8\Projects\Architekt**'.

Note: General requirements to the Rule Set

In Rule Sets that should be used for actions, avoid to have identically named parent processes.

Lesson 2 The Action 'Create Image Objects'

This Lesson has the following chapters

- *Creating the Parameter set and Variable*
- *Creating the first Action Group 'Segmentation'*
- *Creating the Action Definition*
- *Adding a Widget Group to Action Definition*
- *Adding Widgets to the Action*
- *Modifying and extending the Rule Set for 'Create Image Objects'*

The Action 'Create Image Objects' will have a text field to insert a Scale Parameter for the Object creation and a button to execute the processing.

Before setting up the actual Action in the Analysis Builder the **Parameter set** and **Variable** have to be created. Then the **Action Group 'Segmentation'** is created and the **Action Definition 'Create Image Objects'** is created and configured.

In the Action Definition it is defined which Rule Set to use. It also has to be defined that the new created Parameter set and Variable are used.

After the Action Definition is configured, a **Widget Group** is added and two widgets, a **text box** and a **button**.

Information

2.1 Creating the Parameter set and Variable

This Chapter has the following Sub-Chapters

- *Create the Variable 'scale'*
- *Create the Parameter Set*

You can either create the Parameter set during setting up the Action and it's widgets, or before hand. In this exercise the Parameter set and Variable will be created before hand.

Information

2.1.1 Create the Variable 'scale'

For Actions a Scene Variable has to be created, substituting the fixed values in a Rule Set. In this exercise the **Scale Parameter of the Multiresolution Segmentation** shall be controlled by the Variable.

Information

1. In the main menu '**Process**' select '**V=Manage Variables...**'.

The 'Manage Variables' dialog box opens. Here you can add, edit, and delete all kinds of Variables.

**Action!**

2. Make sure that the '**Scene**' tab is selected.

3. Click the '**Add...**' button.

The 'Create Scene Variable' dialog box opens.

4. In the 'Name' field insert '**scale**' and Confirm with '**OK**'.

The Scene Variable is created.

5. **Close** the 'Manage Variables' dialog box.

The variable is now ready to be used in the Action and in the Rule Set.



Result Check

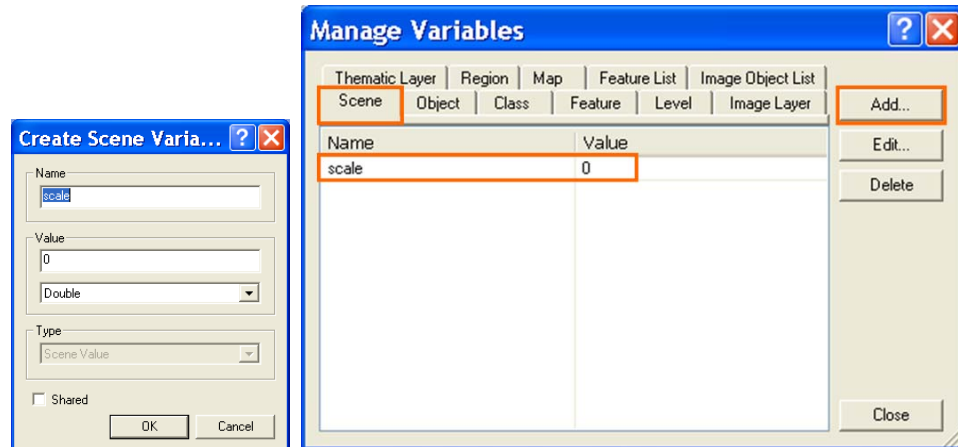


Figure 6: Left: 'Create Scene Variable' dialog box; Right: 'Manage Variables' dialog box with Variable 'scale' added.

2.1.2 Create the Parameter Set



Action!

1. In the main menu '**Process**' select '**P=Manage Parameter Set...**'.

The '**Manage Parameter Set**' dialog box opens. Here you can add, edit, save load, update and apply Parameter sets.

2. Click in the '**Add...**' button.

The '**Select variable for parameter set**' dialog box opens.

3. **Double-click** on the Scene Variable '**scale**' to move it to the 'Selected' window and confirm with 'OK'.

The dialog box '**Edit Parameter Set**' opens, the Variable is added to the Parameter set.

4. In the field 'Name' insert '**ParameterSet_Create Image Objects**'.

5. Confirm with '**OK**'.

The Parameter set is created and added in the **Manage Parameter Set dialog** box. Now it can be addressed with the Action and applied to the Rule Set..



Result Check

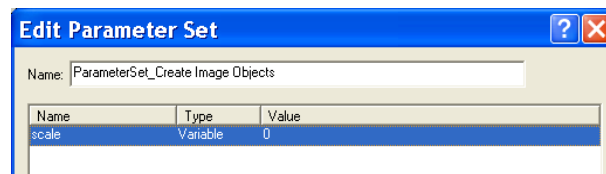


Figure 7: 'Edit Parameter Set' dialog box with Parameter set defined and Variable 'scale' added.

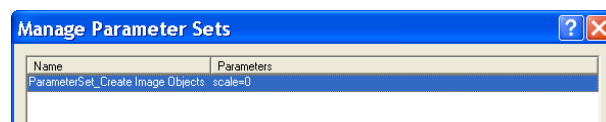


Figure 8: 'Manage Parameter Set' dialog box showing Parameter set 'ParameterSet_Create Image Objects'.

2.2 Creating the first Action Group 'Segmentation'

All Actions are sorted in Action Groups. Even if there is only one Action, it has to be assigned to an Action Group. Therefore the first thing to do in an empty Action Library is to add an Action Group.

1. **Right-click** anywhere in the **upper part** of the Analysis Builder and select '**Add Group**'  **Add Group**.

The 'Edit Group' dialog box opens.

2. In the field 'Name' insert '**Segmentation**'.
3. Keep **ID: A**.
4. Choose a **color** for your Group, e.g. a very dark blue.
5. Confirm with 'OK'.

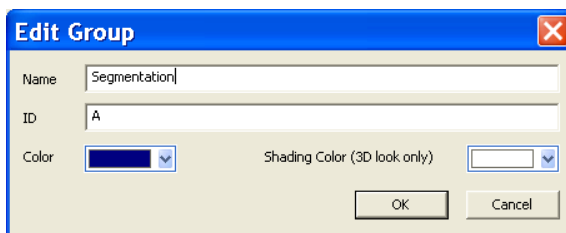


Figure 9: 'Edit Group' dialog box with settings to create 'Segmentation' Group.

The Group is added to the Analysis Builder. The link '**Add Segmentation**' inserted automatically. This link leads to the 'Add Actions' dialog box.

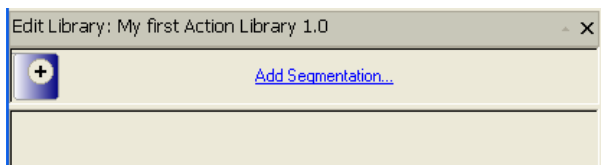


Figure 10: Analysis Builder with added Action Group 'Segmentation'.

Information



Action!



Settings Check



Result Check

2.3 Creating the Action Definition

This Chapter has the following Sub-Chapters

- *General settings*
- *Define the Parameter set*
- *Define the Rule Set and Process*

Information

The first Action named 'Create Image Objects' will be created and configured.

The Action will be connected to the created Parameter set and Variable.

This Action is pointing to the 'create objects' Parent Process, which contains the **Multiresolution Segmentation** Process. The Rule Set is currently in its original state, the Rule Set itself will be **modified in a later step** (substitute fix thresholds, add Processes to update an apply Parameter sets).

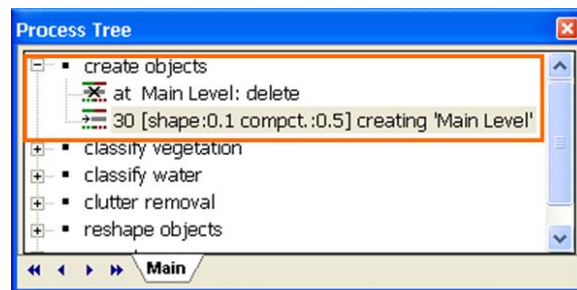


Figure 11: Process Tree with initially loaded Processes to create Image Objects.



Action!

1. In the **Analysis Builder** click in the Group '**Segmentation**' to make it active.
2. **Right-click** in it an select '**Add Action Definition**'.



Settings Check

The 'Action Definition' dialog box opens.

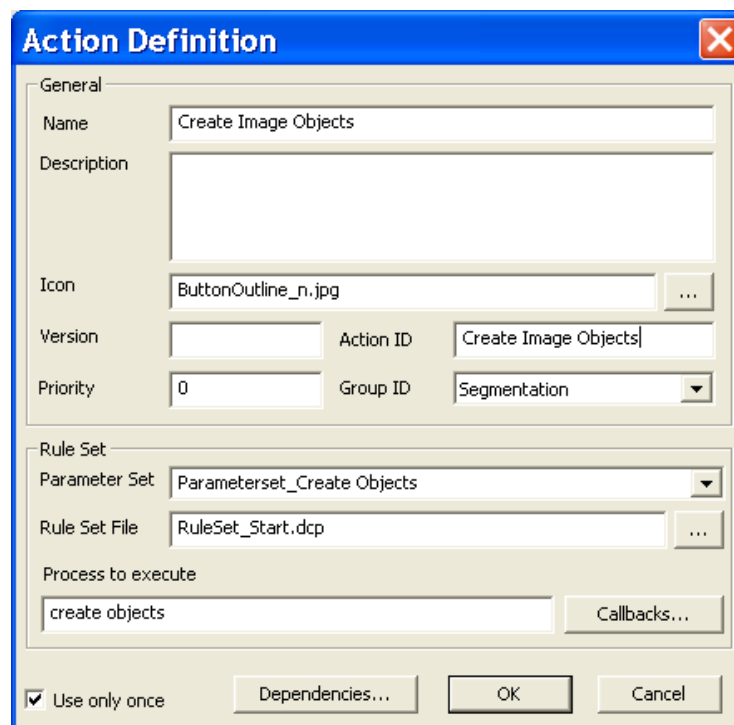


Figure 12: Action Definition for 'Create Image Objects'.

2.3.1 General settings

1. Insert '**Create Image Objects**' as name of the new Action.
2. In the 'Description' field details about the Action can be inserted.
3. Click on the '...' button next to the '**Icon**' field and browse to '\\WhatsNew_eCog8\Projects\Architekt\Icons. Select '**Button_Outline_n.jpg**'.
4. The field **Action ID** has automatically the same name as specified in the 'Name' field.
5. The **Group ID** reflects the current group the action belongs to. To move it select another group from the drop-down list box.
6. Switch on the '**Use only once**' check box at the lower left part of the dialog-box. This is checked to avoid that the Action is added another time to the Analysis Builder.



Action!

2.3.2 Define the Parameter set

The Parameter Set combo box offers all parameter sets listed in the Manage Parameter Sets dialog box. If none is existing, it has to be created. This can be done by simply typing in the name of the Parameter set.

In our example, the Parameter set already exists and can be selected from the drop-down list.

7. Select '**Parameterset_Create Image Objects**' from the drop-down list of the field 'Parameter Set'.

Information



Action!

2.3.3 Define the Rule Set and Process

8. Click on the '...' button next to the '**Rule Set File**' field and browse to '\\WhatsNew_eCog8\Projects\Architekt\Icons. Select '**RuleSet_Start.dcp**'
9. In the field '**Process to execute**' the name and the path of the process to be executed must be exactly specified, here '**create objects**'.

Note:

If you need to point to Sub-Processes, use / (**slash marks**) to indicate hierarchy in the process tree. Example: 'Vegetation Classification/Classify Trees' will execute the Process 'Classify Trees' which is a Child Process of the 'Vegetation Classification' Process group.

10. Confirm with **OK**.

The Action 'Create Image Objects' is added to the Action Library.

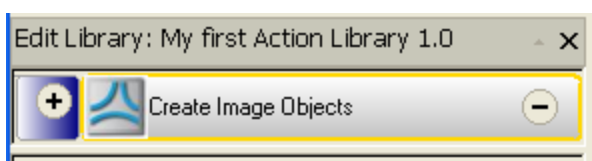


Figure 13: Analysis Builder with Action 'Create Image Objects' added.

2.4 Adding a Widget Group to Action Definition

Information

To add widgets to the Action Definition, first a Widget Group must be added. You have to structure the related widgets then in this Group in the lower pane of the Analysis Builder window.



Action!

1. Select the Action Definition '**Create Image Objects**' in the upper pane of the Analysis Builder window.
2. **Right-click** the background of the lower pane and select '**Add Group**'.

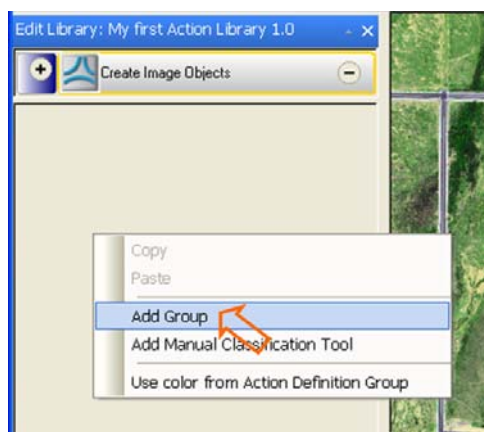


Figure 14: Context menu to Add a Widget Group.

The '**Group Properties**' window opens.



3. Insert the name '**Segmentation**' confirm with 'OK'.

Two bars have been added to the Action, '**Segmentation**' and '**Description**'.



Result Check

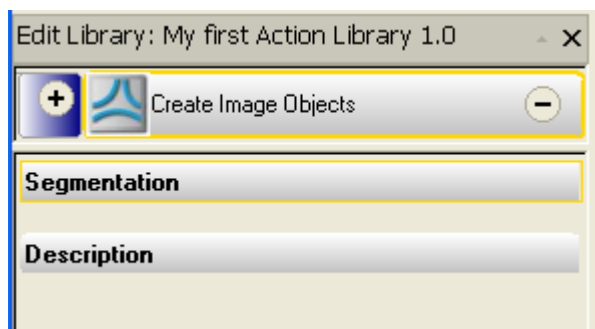


Figure 15: Analysis Builder with Action 'Create Image Objects' and Widget Group 'Segmentation' added.

2.5 Adding Widgets to the Action

This Chapter has the following Sub-Chapters

- Add the text field to insert the Scale Parameter
- Add the button to execute the Segmentation

Two widgets are needed for the Action to create the Image Objects. One **text field** to insert the value for the scale parameter, one **button to execute** the processing.

You can add the following widgets to an action description:

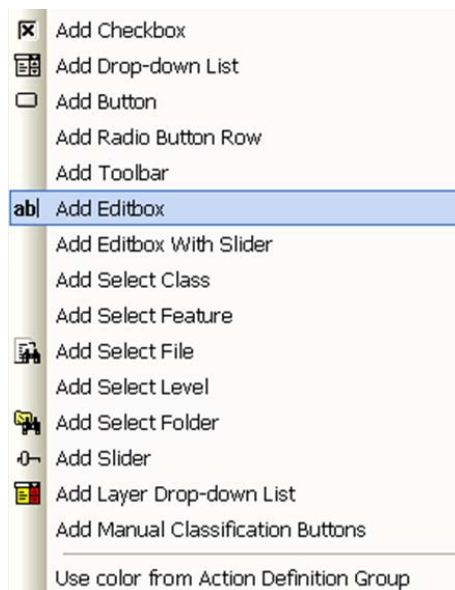


Figure 16: Available Widgets.

Information

2.5.1 Add the text field to insert the Scale Parameter

For this Action, 'Add Editbox' to insert the value for the scale parameter is chosen.

1. **Right-click** on the '**Segmentation**' Group and select '**Add Editbox**' from the menu. The 'Widget Configuration' dialog box opens.

Information



Action!



Settings Check

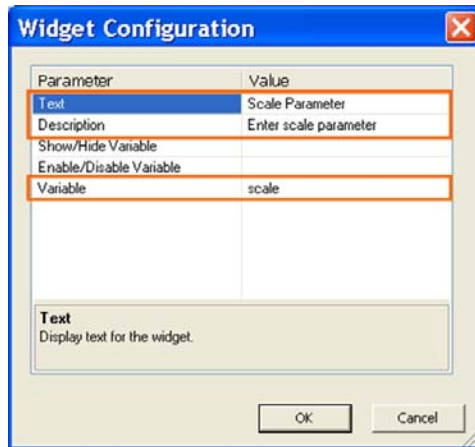


Figure 17: Widget Configuration for text box 'Scale Parameter'.



Action!

2. In the field '**Text**' enter '**Scale Parameter**'.
3. In the field '**Description**' insert '**Enter scale parameter**'.
4. In the field '**Variable**' choose '**scale**' from the drop-down list.
5. Confirm with 'OK'.



Result Check

The text box is added to the Analysis Builder. If you hover your mouse over it the description will appear in the lower part.

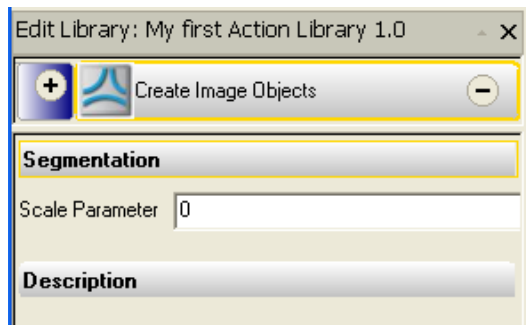


Figure 18: Analysis Builder with Action 'Create Image Objects' and text field to insert the Scale Parameter added.

2.5.2 Add the button to execute the Segmentation



Action!

1. Again **right-click** on the '**Segmentation**' Group and select '**Add Button**' from the menu.

The 'Widget Configuration' dialog box opens.

2. Delete the content of the field '**Text**'. And the content of the field '**Description**'.
3. In the field '**Process on press**' insert '**create objects**'.
4. In the field '**Button text**' insert '**Press to execute**'.
5. Confirm with 'OK'.

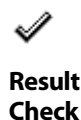
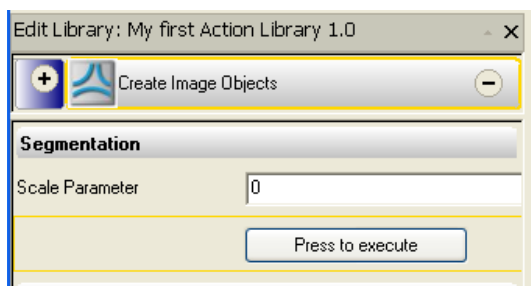


Figure 19: Analysis Builder with Action 'Create Image Objects' and button to execute added.

2.6 Modifying and extending the Rule Set for 'Create Image Objects'

This Chapter has the following Sub-Chapters

- *Substitute thresholds with Variable 'scale'*
- *Add the Process to delete existing Levels*
- *Add Processes to update and apply Parameter set from Action*
- *Test the created Action 'Create Image Objects'*

Now that the Action Definition is configured and added to the Analysis Builder, the Rule Set must be modified and extended so that it can communicate with the Action and miss-processing is avoided.

Information

For the current Action,

- the fix threshold will be substituted by the created **Variable 'scale'**,
- a Process to **delete eventually existing Levels** will be added
- two Processes will be added, one to **update the Parameter set** from whatever is set in the action and one Process to **apply** these values to the Rule set

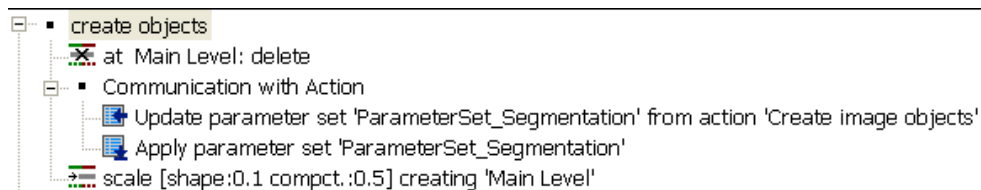


Figure 20: Processes for Action 'Create Image Objects'.

2.6.1 Substitute thresholds with Variable 'scale'

1. In the Process Tree **double-click** on the Process **'30 [shape:0.1 compct.:0.5] creating 'Main Level''** to open it.
2. In the field 'Scale parameter' select the Variable **'scale'** from the **drop-down list**.
3. Confirm with 'OK'.



Action!



**Settings
Check**

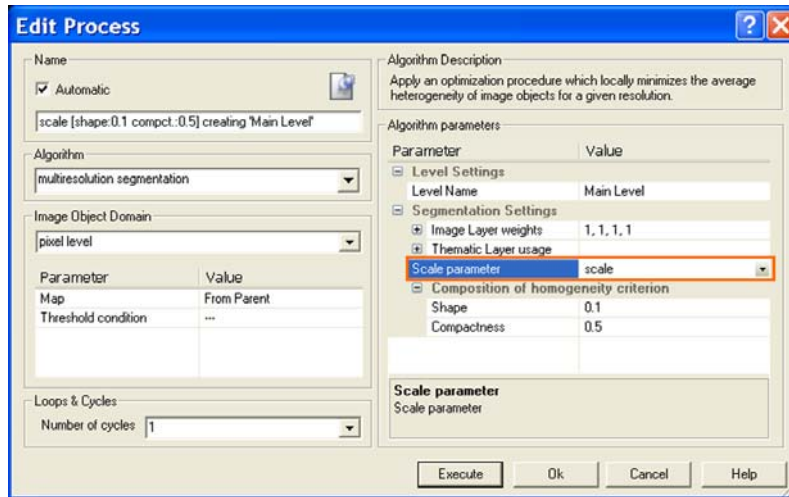


Figure 21: Process settings for Multiresolution Segmentation using the Scene Variable 'scale'.

2.6.2 Add the Process to delete existing Levels



4. In the Process Tree add a Process using 'delete Level' algorithm and define 'Main Level' in the Image Object Domain.



**Rule Set
Check**

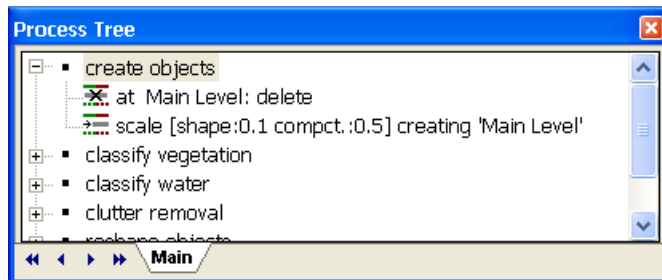


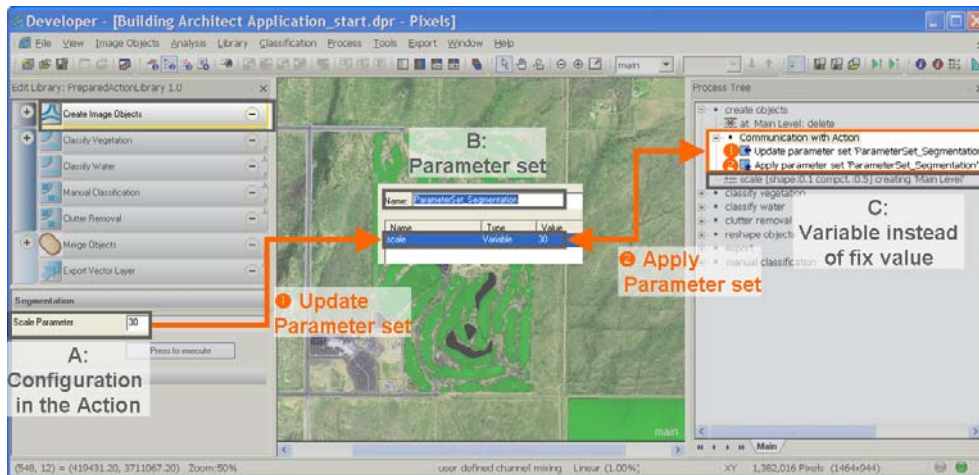
Figure 22: Initial Processes.

2.6.3 Add Processes to update and apply Parameter set from Action

Two Processes have to be added to set up the communication with the Action.

- 1 Update Parameter set from Action
- 2 Apply Parameter set

Information



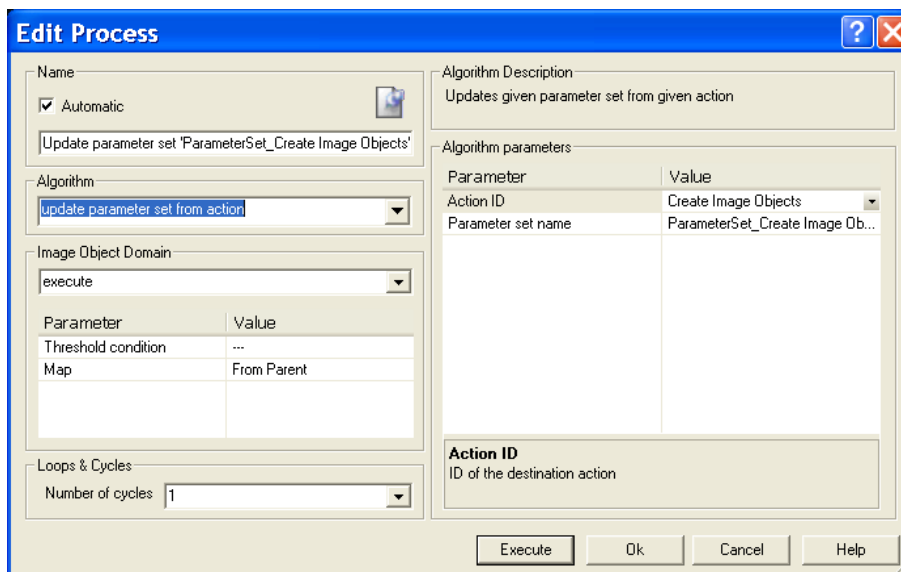
1. Append a new **Parent Process** underneath 'at Main Level: delete'.
2. Enter the name '**Communication with Action**'.

Add Processes to update Parameter set from Action 1

3. Insert a Child Process and select the algorithm '**update parameter set from action**' from the '**Parameter set operations**' category of the Process list.
4. In the field '**Action ID**' select '**Create Image Objects**' from the drop-down list.
5. In the field '**Parameter set name**' select '**ParameterSet_Create Image Objects**' from the drop-down list.



Action!



Settings Check

Figure 23: Process settings for updating parameter from 'Create Image Objects' using Parameter set 'ParameterSet_Create Image Objects'.



Action!



Settings Check

Add Processes to apply Parameter to Rule Set 2

1. Append a new **Process**, and select the algorithm '**apply parameter set**' from the '**Parameter set operations**' category of the Process list.
2. In the field '**Parameter set name**' select '**ParameterSet_Create Image Objects**' from the drop-down list.

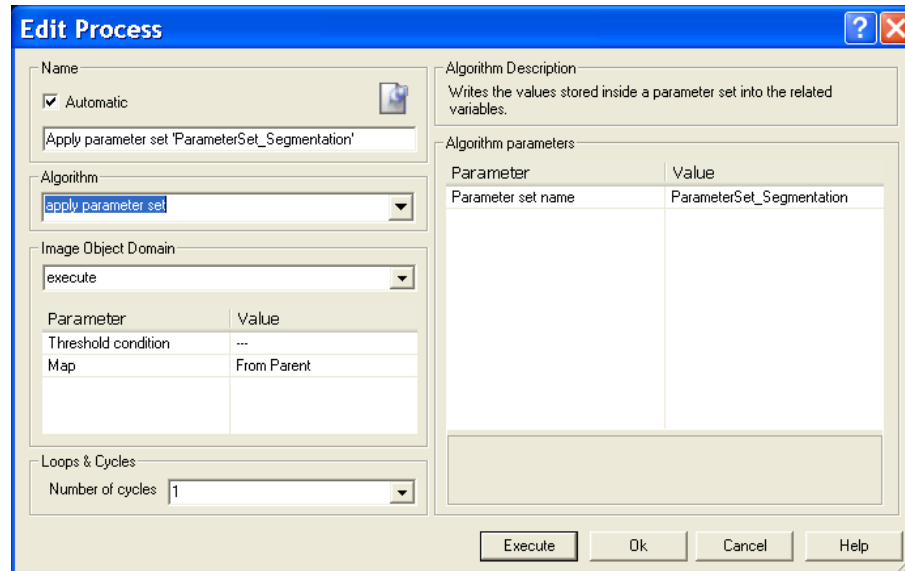


Figure 24: Process settings for applying Parameter set 'ParameterSet_Create Image Objects' to the Rule Set.

2.6.4 Test the created Action 'Create Image Objects'

Information

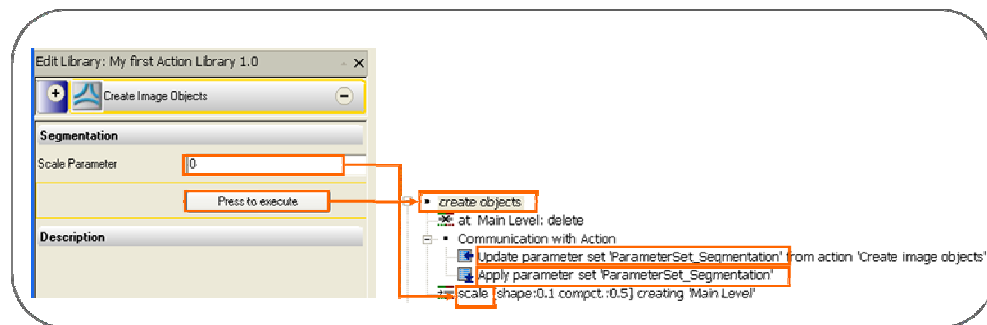


Figure 25: The text-box sets the value to the Variable 'scale', which is used in the Rule Set. The button executes the complete 'create objects' sequence.



Action!

1. Save the Rule Set in the 'My first Action Library' folder. Don't rename it.
2. Go to the main menu 'Library' and de-select 'Edit Action Library'.

The editing mode is switched of. The Library is saved automatically.

3. Enter a Scale Parameter in the action and execute the process by hitting the 'Press to execute' button.

Lesson 3 The Action 'Classify Vegetation'

This Lesson has the following chapters

- Creating the Parameter set and Variable
- Creating the Action Group 'Classification'
- Creating the Action Definition 'Classify Vegetation'
- Adding the Widget Group 'Classification' to the Action Definition
- Adding the Widgets slider and button to the Action
- Modifying and extending the Rule Set for 'Classify Vegetation'

Similar to the creation of the Action 'Create Image Objects', now the next Action is defined 'Classify Vegetation'. Again first the **Parameter set** and **Variable** are created.

Then a new **Action Group 'Classification'** is created and the **Action Definition 'Classify Vegetation'** configured and added. In the Action Definition the Rule Set to use is defined and the created Parameter set and Variable.

After the Action Definition is configured, a **Widget Group** and two widgets are added, a **slider** to set the threshold for classifying vegetation with the **mean of NDVI** and a **button**.

Information

3.1 Creating the Parameter set and Variable

This Chapter has the following Sub-Chapters

- Creating the Variable 'ndvi_threshold'
- Creating the Parameter Set

3.1.1 Creating the Variable 'ndvi_threshold'

For Actions a Scene Variable has to be created, substituting the fixed values in a Rule Set. In this exercise the threshold condition in the 'assign class' Process shall be controlled by the Variable.

 unclassified with NDVI > ndvi_threshold at Main Level: Vegetation

Figure 26: Process using the Variable 'ndvi_threshold'.

1. In the main menu '**Process**' select '**V=Manage Variables...**'.

The 'Manage Variables' dialog box opens. Here you can add, edit, and delete all kinds of Variables.

2. Make sure that the '**Scene**' tab is selected.

Information



Action!

3. Click the '**Add...**' button.

The 'Create Scene Variable' dialog box opens.

4. In the 'Name' field insert '**ndvi_threshold**' and Confirm with '**OK**'.

The Scene Variable is created.

5. **Close** the 'Manage Variables' dialog box.

The variable is now ready to be used in the Action and in the Rule Set.

3.1.2 Creating the Parameter Set



Action!

1. In the main menu '**Process**' select '**P=Manage Parameter Set...**'.

The '**Manage Parameter Set**' dialog box opens. Here you can add, edit, save load, update and apply Parameter sets.

2. Click in the '**Add...**' button.

The '**Select variable for parameter set**' dialog box opens.

3. **Double-click** on the Scene Variable '**ndvi_threshold**' to move it to the 'Selected' window and confirm with 'OK'.

The dialog box '**Edit Parameter Set**' opens, the Variable is added to the Parameter set.

4. In the field 'Name' insert '**ParameterSet_Classify Vegetation**' and confirm with '**OK**'.

The Parameter set is created and added in the **Manage Parameter Set dialog** box. Now it can be addressed with the Action and applied to the Rule Set..



Result Check

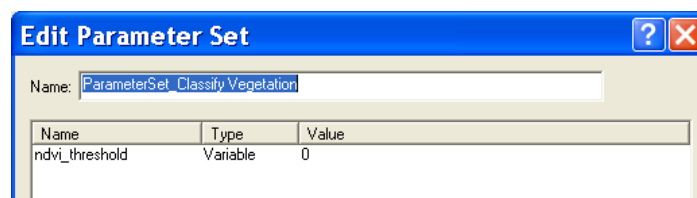


Figure 27: Parameter set 'ParameterSet_Classify Vegetation' created, containing Variable 'ndvi_threshold'.

3.2 Creating the Action Group 'Classification'

Information

The Action Library will contain several Actions for classification. They all will be grouped in the 'Classification' Action Group.



Action!

1. **Right-click** anywhere in the **upper part** of the Analysis Builder and select '**Add Group**'  **Add Group**.

The 'Edit Group' dialog box opens.

2. In the field 'Name' insert '**Classification**'.
3. Keep **ID: B**.
4. Choose a **color** for your Group, e.g. a mid dark blue.

5. Confirm with 'OK'.

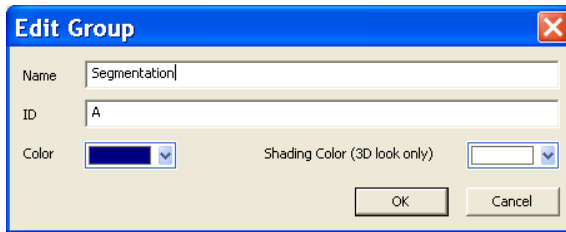


Figure 28: Settings for Action Group 'Segmentation'.



The Group is added to the Analysis Builder. The link '**Add Classification**' inserted automatically. This link leads to the 'Add Actions' dialog box.

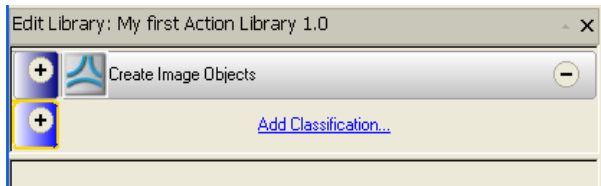


Figure 29: Analysis Builder with Action Group 'Classification' added.



3.3 Creating the Action Definition 'Classify Vegetation'

This Chapter has the following Sub-Chapters

- *General settings*
- *Define the Parameter set, Rule Set and Process to execute*

The Action named 'Classify Vegetation' will be created and configured.

The Action will be connected to the created Parameter set and Variable.

This Action is pointing to the 'classify vegetation' Parent Process, which contains the **classification** Process.

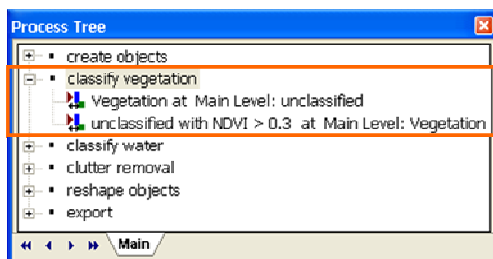
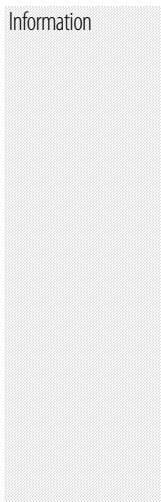


Figure 30: Initial Processes.



1. Right-click anywhere in the 'Classification' Action Group'



3.3.1 General settings

Action!

2. Insert '**Classify Vegetation**' as name of the new Action.
3. Click on the '...' button next to the '**Icon**' field and browse to '\\WhatsNew_eCog8\Projects\Architekt\Icons. Select '**ButtonClassification_n.jpg**'.

4. The field **Action ID** has automatically the same name as specified in the 'Name' field.
5. The **Group ID** reflects the current group the action belongs to. To move it select another group from the drop-down list box.
6. Switch on the '**Use only once**' check box at the lower left part of the dialog-box. This is checked to avoid that the Action is added another time to the Analysis Builder.



Settings Check

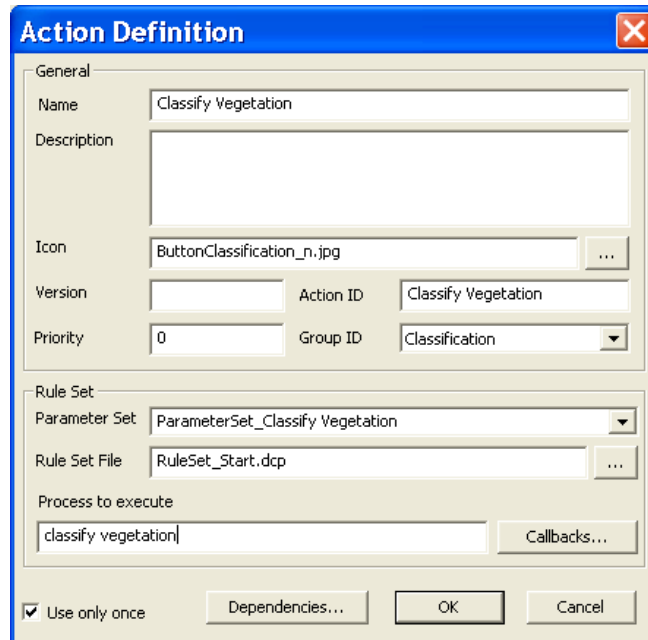


Figure 31: Action Definition for 'Classify Vegetation'.

3.3.2 Define the Parameter set, Rule Set and Process to execute

Information

Select the Parameter set from the drop-down list.



Action!

1. Select '**Parameterset_Classify Vegetation**' from the drop-down list of the field 'Parameter Set'.
2. Click on the '...' button next to the '**Rule Set File**' field and browse to '\WhatsNew_eCog8\Projects\Architekt\Icons. Select '**RuleSet_Start.dcp**'
3. In the field '**Process to execute**' the name and the path of the process to be executed must be exactly specified, here '**classify vegetation**'.
4. Confirm with **OK**.



Result Check

The Action 'Classify Vegetation' is added to the Action Library.

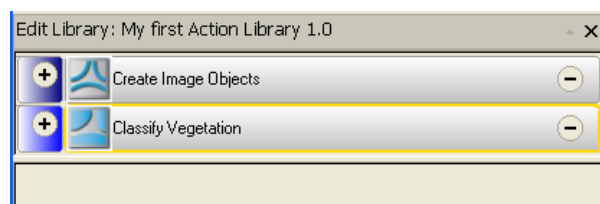


Figure 32: Analysis Builder with Action 'Classify Vegetation' added.

3.4 Adding the Widget Group 'Classification' to the Action Definition

One Widget Group 'Classification' will be added.

1. Select the Action Definition in the upper pane of the Analysis Builder window.
2. **Right-click** the background of the lower pane and select '**Add Group**'.

The '**Group Properties**' window opens.

3. Insert the name '**Classification**' confirm with 'OK'.

Two bars have been added to the Action, '**Classification**' and '**Description**'.

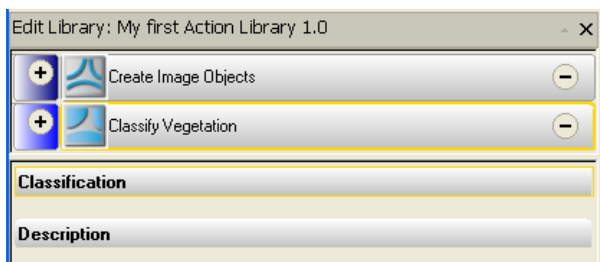


Figure 33: Analysis Builder with Action 'Classify Vegetation' and Widget Group 'Classification' added.

Information



Action!



Result Check

3.5 Adding the Widgets slider and button to the Action

This Chapter has the following Sub-Chapters

- Add the slider to set the Mean NDVI
- Add the button to execute the classification

Two widgets will be added, a **slider** to set the threshold for classifying vegetation with the **mean of NDVI** and a **button**.

Information

3.5.1 Add the slider to set the Mean NDVI

1. **Right-click** on the '**Classification**' Group and select '**Add Slider**'  Add Slider from the menu.

The 'Widget Configuration' dialog box opens.

2. In the field '**Text**' enter '**Mean NDVI**'.
3. In the field '**Description**' insert '**Define the NDVI value for Vegetation classification**'.
4. In the field '**Variable**' choose '**ndvi_threshold**' from the drop-down list.

With the Maximum and Minimum Value fields, you define the extend of the slider. For NDVI the upper value is 1, here in this example, the lowest NDVI values are about -0.2.



Action!

5. In the field '**Maximum Value**' enter the maximum value for the slider, here: **1**.
6. In the field '**Minimum Value**' enter the minimum value for the slider, here: **-0.2**.

The field 'Tick Frequency' defines which distance the tick marks of the slider have.

7. In the field '**Tick Frequency**' enter the value **0.05**.

The field 'Jump Value' controls how detailed you can move the slider.

8. In the field '**Jump Value**' enter the value **0.05**.

9. Confirm with 'OK'.

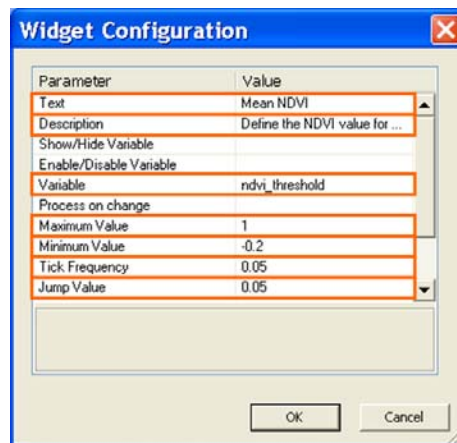


Figure 34: Widget Configuration for slider 'Mean NDVI'.

The slider is added to the Analysis Builder.

3.5.2 Add the button to execute the classification



Action!

1. Again **right-click** on the '**Segmentation**' Group and select '**Add Button**' from the menu.

The 'Widget Configuration' dialog box opens.

2. Delete the content of the field '**Text**'. And the content of the field '**Description**'.
3. In the field '**Process on press**' insert '**classify vegetation**'.
4. In the field '**Button text**' insert '**Press to execute**'.
5. Confirm with 'OK'.

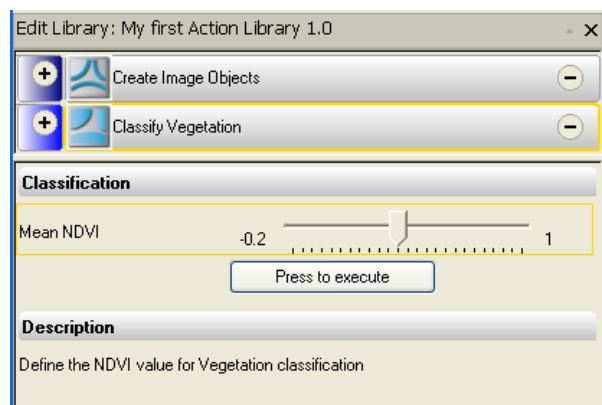


Figure 35: Analysis Builder with Action 'Classify Vegetation', slider to control NDVI and button to execute added.

3.6 Modifying and extending the Rule Set for 'Classify Vegetation'

This Chapter has the following Sub-Chapters

- *Substitute thresholds with Variable ndvi_threshold*
- *Add the Process to un-classify 'Vegetation' Objects*
- *Add Processes to update and apply Parameter set from Action*
- *Test the created Action 'Create Image Objects'*

Now that the Action Definition is configured and added to the Analysis Builder, the Rule Set must be modified and extended so that it can **communicate** with the Action.

For the current Action,

- the fix threshold will be substituted by the created **Variable 'ndvi_threshold'**,
- a Process to **delete eventually classified 'Vegetation'** Objects will be added
- two Processes will be added, one to **update the Parameter set** from whatever is set in the action and one Process to **apply** these values to the Rule set

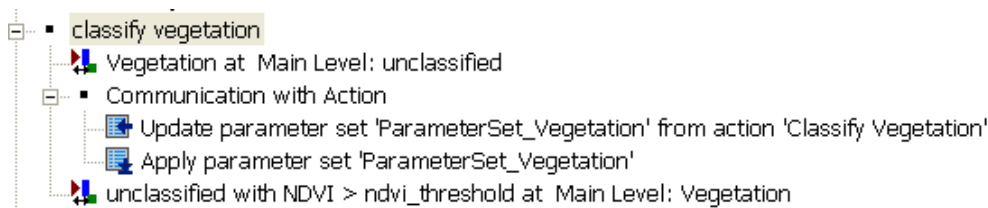


Figure 36: Processes for Action 'Classify Vegetation'.

Information

3.6.1 Substitute thresholds with Variable ndvi_threshold

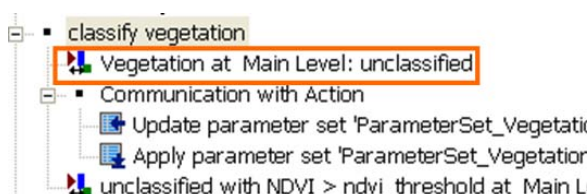
1. In the Process Tree **double-click** on the Process '**unclassified with NDVI > ndvi_threshold at Main Level: Vegetation**' to open it.
2. In the field 'Scale parameter' select the Variable '**ndvi_threshold**' from the **drop-down list**.
3. Confirm with 'OK'.



Action!

3.6.2 Add the Process to un-classify 'Vegetation' Objects

4. In the Process Tree add a Process using 'assign class' algorithm and define 'Vegetation' in the Image Object Domain. Set 'Active Class' to 'unclassified'



Rule Set Check

Figure 37: Process to un-classify 'Vegetation' Objects.

3.6.3 Add Processes to update and apply Parameter set from Action

Information

Two Processes have to be added to set up the communication with the Action.

- 1 Update Parameter set from Action
- 2 Apply Parameter set

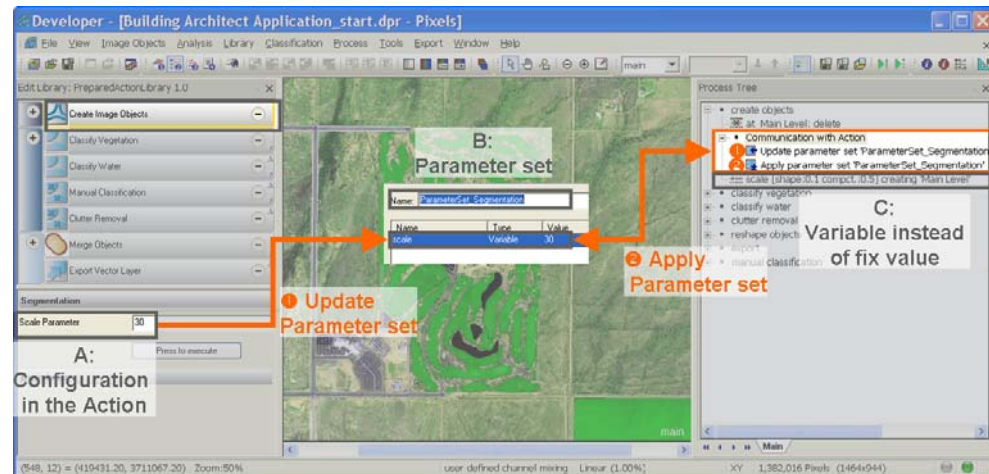


Figure 38: Two communication steps: Update the Parameter set from Action, Apply the Parameter set to the Rule Set.



Action!

1. Append a new **Parent Process** underneath 'at Main Level: delete'.
2. Enter the name '**Communication with Action**'.

Add Processes to update Parameter set from Action 1

3. Insert a Child Process and select the algorithm '**update parameter set from action**' from the '**Parameter set operations**' category of the Process list.
4. In the field '**Action ID**' select '**Classify Vegetation**' from the drop-down list.
5. In the field '**Parameter set name**' select '**ParameterSet_Classify Vegetation**' from the drop-down list.

Add Processes to apply Parameter to Rule Set 2

6. Append a new **Process**, and select the algorithm '**apply parameter set**' from the '**Parameter set operations**' category of the Process list.
7. In the field '**Parameter set name**' select '**ParameterSet_Classify Vegetation**' from the drop-down list.



Rule Set Check

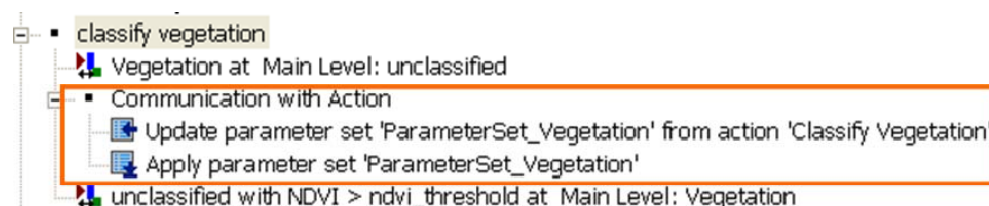
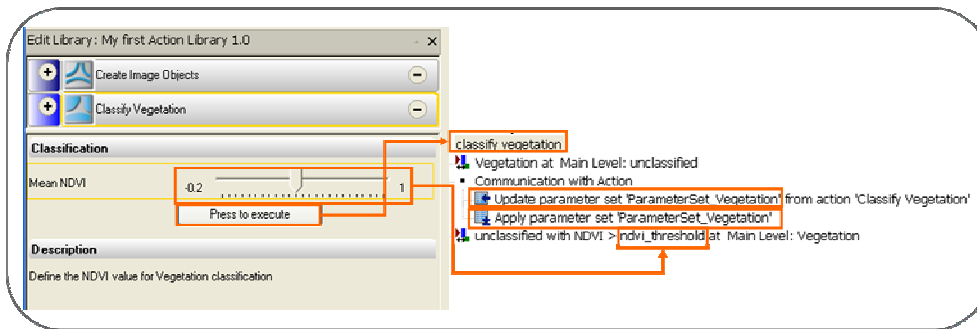


Figure 39: Processes to update and apply Parameter sets for r Action 'Classify Vegetation'.

3.6.4 Test the created Action 'Create Image Objects'



Information

Figure 40: The Slider sets the value to the Variable 'ndvi_threshold', which is used in the Rule Set. The button executes the complete 'classify vegetation' sequence.

1. Save the Rule Set in the 'My first Action Library' folder. Don't rename it.
2. Go to the main menu 'Library' and de-select 'Edit Action Library'.



The editing mode is switched of. The Library is saved automatically.

Action!

3. Set a value with the slider in the action and execute the process by hitting the 'Press to execute' button.

Lesson 4 The Action 'Classify Water'

This Lesson has the following chapters

- *Creating the Parameter set and Variable 'rationir_threshold'*
- *Creating the Action Definition 'Classify Water'*
- *Adding a Widget Group 'Classification' to Action Definition*
- *Adding Widgets slider and button to the Action*
- *Modifying and extending the Rule Set for 'Classify Water'*

Information

Very similar to the creation of the Action 'Classify Vegetation', now the next Action is defined 'Classify Water'. Again first the **Parameter set** and **Variable** are created.

The Action will be added to the existing **Action Group 'Classification'**. The **Action Definition 'Classify Water'** will be configured and added. In the Action Definition the Rule Set to use is defined and the created Parameter set and Variable.

After the Action Definition is configured, a **Widget Group** and two widgets are added, similar to Action 'Classify Vegetation'. A **slider** to set the threshold for classifying vegetation is inserted, but this time using the with the **ratio of nir** and a **button**.

4.1 Creating the Parameter set and Variable 'rationir_threshold'

This Chapter has the following Sub-Chapters

- *Creating the Variable 'rationir_threshold'*
- *Creating the Parameter Set*

4.1.1 Creating the Variable 'rationir_threshold'

Information

Also for this Actions a Scene Variable has to be created, substituting the fixed values in a Rule Set. In this exercise the threshold condition in the 'assign class' Process shall be controlled by the Variable.



Action!

1. Open the **'Manage Variables'** dialog box.
2. Add the Scene Variable **'rationir_threshold'**.
3. **Close** the 'Manage Variables' dialog box.

The variable is now ready to be used in the Action and in the Rule Set.

4.1.2 Creating the Parameter Set

1. Open the '**Manage Parameter Set**' dialog box.
2. Click in the '**Add...**' button.



Action!

The '**Select variable for parameter set**' dialog box opens.

3. **Double-click** on the Scene Variable '**rationir_threshold**' to move it to the 'Selected' window and confirm with 'OK'.

The dialog box '**Edit Parameter Set**' opens, the Variable is added to the Parameter set.

4. In the field 'Name' insert '**ParameterSet_Classify Water**' and confirm with 'OK'.

4.2 Creating the Action Definition 'Classify Water'

This Chapter has the following Sub-Chapters

- *General settings*
- *Define the Parameter set, Rule Set and Process to execute*

The creation of an Action Group is obsolete here, the Action will be added to the existing Action Group 'Classification'.

The Action will be connected to the created Parameter set and Variable.

This Action is pointing to the 'classify water' Parent Process, which contains the **classification** Process.

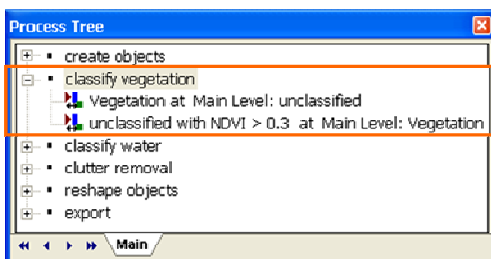


Figure 41: Process Tree with initial 'classify vegetation' Processes.

Information

1. Make sure that the **Action Library is set to editing mode**. If not, go to main menu 'Library' and select 'Edit Action Library'.
2. Right-click on the Action 'Classify Vegetation' and select 'Add Action Definition'.



Action!

4.2.1 General settings

1. Insert '**Classify Water**' as name of the new Action.
2. Insert the '**Icon**' '**ButtonClassification_n.jpg**'.
3. Switch on the '**Use only once**' check box at the lower left part of the dialog-box.. This is checked to avoid that the Action is added another time to the Analysis Builder.

4.2.2 Define the Parameter set, Rule Set and Process to execute

Select the Parameter set from the drop-down list.

4. Select '**Parameterset_Classify Water**' from the drop-down list of the field 'Parameter Set'.
5. Select '**RuleSet_Start.dcp**'
6. In the field '**Process to execute**' enter '**classify vegetation**'.
7. Confirm with **OK**.



Settings Check

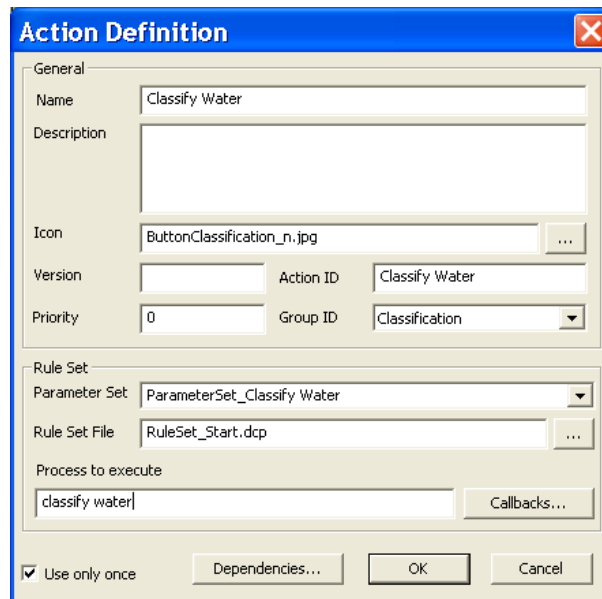


Figure 42: Action Definition for 'Classify Water'.



Result Check

The Action 'Classify Vegetation' is added to the Action Library.

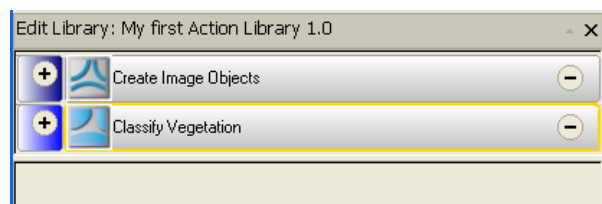


Figure 43: Analysis Builder with Action 'Classify Water' added.

4.3 Adding a Widget Group 'Classification' to Action Definition

Information



Action!

Same as for the Action 'Classify Vegetation' one Widget Group 'Classification' will be added.

1. Select the Action Definition in the upper pane of the Analysis Builder window.
2. **Right-click** the background of the lower pane and select '**Add Group**'.

The '**Group Properties**' window opens.

3. Insert the name '**Classification**' confirm with 'OK'.

4.4 Adding Widgets slider and button to the Action

This Chapter has the following Sub-Chapters

- Add the slider to control the Ratio nir
- Add the button to execute the classification

Two widgets will be added, a **slider** to set the threshold for classifying water with the **ratio nir** and a **button**.

Information

4.4.1 Add the slider to control the Ratio nir

1. **Right-click** on the '**Classification**' Group and select '**Add Slider**'  Add Slider from the menu.



Action!

The 'Widget Configuration' dialog box opens.

2. In the field '**Text**' enter '**Ratio nir**'.
3. In the field '**Description**' insert '**Define the ratio nir value for Water classification**'.
4. In the field '**Variable**' choose '**rationir_threshold**' from the drop-down list.

For 'ratio nir' the upper value is 1, the lower value is 0.

5. In the field '**Maximum Value**' enter the maximum value for the slider, here: **1**.
6. In the field '**Minimum Value**' enter the minimum value for the slider, here: **0**.

The field 'Tick Frequency' defines which distance the tick marks of the slider have.

7. In the field '**Tick Frequency**' enter the value **0.05**.

The field 'Jump Value' controls how detailed you can move the slider.

8. In the field '**Jump Value**' enter the value **0.05**.
9. Confirm with 'OK'.

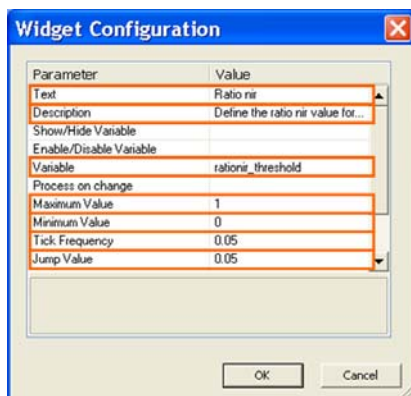


Figure 44: Widget Configuration for slider 'Ratio nir'.



Settings Check

The slider is added to the Analysis Builder.

4.4.2 Add the button to execute the classification



Action!

1. Again **right-click** on the '**Segmentation**' Group and select '**Add Button**' from the menu.

The 'Widget Configuration' dialog box opens.

2. Delete the content of the field '**Text**'. And the content of the field '**Description**'.
3. In the field '**Process on press**' insert '**classify water**'.
4. In the field '**Button text**' insert '**Press to execute**'.
5. Confirm with 'OK'.



Result Check

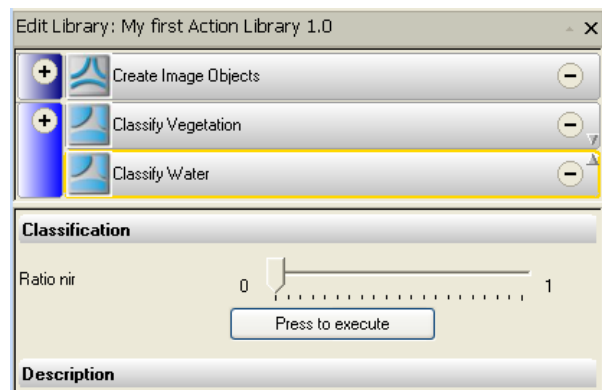


Figure 45: Analysis Builder with Action 'Classify Water', slider to control Ratio nir and button to execute added.

4.5 Modifying and extending the Rule Set for 'Classify Water'

This Chapter has the following Sub-Chapters

- *Substitute thresholds with Variable 'rationir_threshold'*
- *Add Processes to update and apply Parameter set from Action*
- *Test the created Action 'Create Image Objects'*

Now that the Action Definition is configured and added to the Analysis Builder, the Rule Set must be modified and extended so that it can **communicate** with the Action and avoids miss-processing.

In the current example,

- the fix threshold will be substituted by the created **Variable 'rationir_threshold'**,
- a Process to **delete eventually classified 'Vegetation'** Objects will be added
- two Processes will be added, one to **update the Parameter set** from whatever is set in the action and one Process to **apply** these values to the Rule set

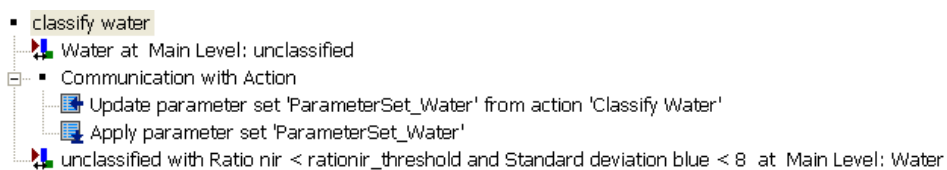


Figure 46: Processes for Action 'Classify Water'.

Information

4.5.1 Substitute thresholds with Variable 'rationir_threshold'

1. In the Process Tree **double-click** on the Process '**unclassified with Ratio nir < rationir_threshold and Standard deviation blue < 8 at Main Level: Water**' to open it.
2. In the field 'Scale parameter' select the Variable '**rationir_thresold**' from the **drop-down list**.
3. Confirm with 'OK'.



Action!

4.5.2 Add Processes to update and apply Parameter set from Action

Same as for action 'Classify Vegetation', two Processes have to be added to set up the communication with the Action.

4. Append a new **Parent Process** underneath 'at Main Level: delete'.
5. Enter the name '**Communication with Action**'.

Information



Action!

Add Processes to update Parameter set from Action

6. Insert a Child Process and select the algorithm '**update parameter set from action**' from the '**Parameter set operations**' category of the Process list.
7. In the field '**Action ID**' select '**Classify Water**' from the drop-down list.
8. In the field '**Parameter set name**' select '**ParameterSet_Classify Water**' from the drop-down list.

Add Processes to apply Parameter to Rule Set

9. Append a new **Process**, and select the algorithm '**apply parameter set**' from the '**Parameter set operations**' category of the Process list.
10. In the field '**Parameter set name**' select '**ParameterSet_Classify Water**' from the drop-down list.



Rule Set Check

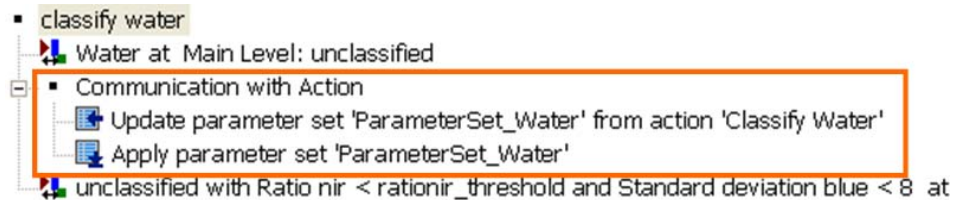


Figure 47: Processes to update and apply Parameter set.

4.5.3 Test the created Action 'Create Image Objects'

Information

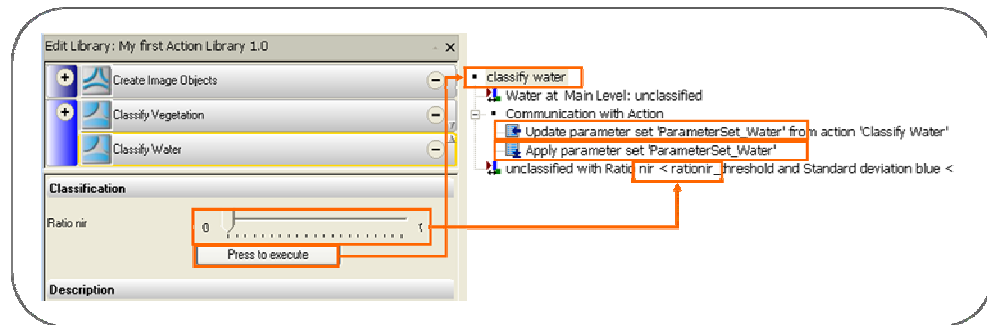


Figure 48: The Slider sets the value to the Variable 'rationir_threshold', which is used in the Rule Set. The button executes the complete 'classify water' sequence.



Action!

1. Save the Rule Set in the 'My first Action Library' folder. Don't rename it.
2. Go to the main menu 'Library' and de-select 'Edit Action Library'.

The editing mode is switched of. The Library is saved automatically.

3. Set a value with the slider in the action an execute the process by hitting the 'Press to execute' button.

Lesson 5 The Action 'Manual Classification'

This Lesson has the following chapters

- *Create the Processes for 'Manual Classification'*
- *Creating the Action Definition 'Manual Classification'*
- *Adding the Manual Classification buttons to the Action Definition*

In the Analysis Builder you have the possibility to add a manual editing step. To do so, you need to add an Action Definition and add the Widget '**Manual Classification Buttons**'.

In the Rule Set specific **algorithms** have to be applied which **activates the manual classification mode** and at the same time define the class, to be classified.

The Action Definition requires that a Process is assigned to it. The Processes for manual classification does not exist yet. In opposite to the other Actions added until now, the **Processes have to be created first**, before the Action Definition is configured.

Another particularity of this Action is that actually **no Parameter set** or Variables are used in the Processes. Nonetheless the Action Definition requires a Parameter set. A "**dummy**" **Parameter set** will be created directly in the Action Definition.

Information

5.1 Create the Processes for 'Manual Classification'

A parent Process and two Child Processes are added to the Rule Set. The algorithm 'manual classification' is used in the Child Processes to activate the **manual classification for the two classes 'Vegetation' and 'Water'**.

1. Underneath 'classify water' append a **new Process** and name it '**manual classification**'.
2. Insert a **Child Process** and select the algorithm '**manual classification**' from the Interactive operations category of the Process list.
3. In the Parameter section select for the field 'Class' **Vegetation**'.
4. Confirm with OK.

Information



Action!



Settings Check

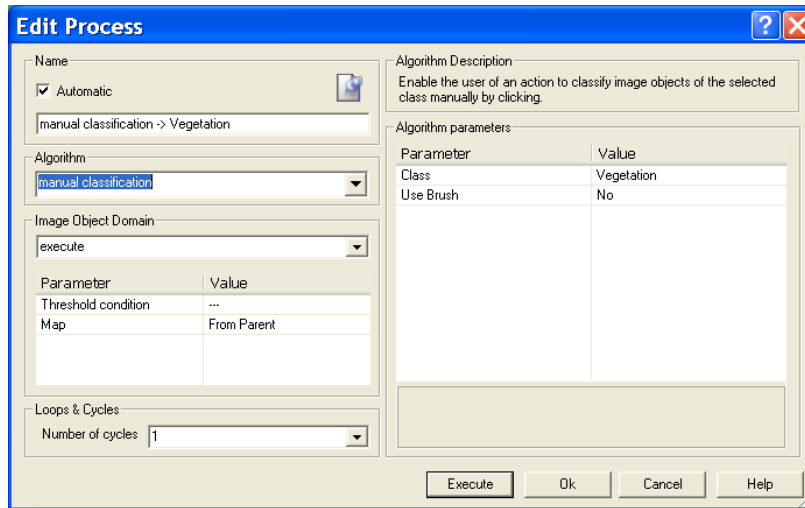


Figure 49: Process settings to activate the manual classification of 'Vegetation'.

The Process added to the Rule Set will activate the manual classification mode for the class 'Vegetation'.



Action!

5. Append again a **Process** and select the algorithm '**manual classification**'.
6. In the Parameter section select for the field 'Class' **Water**'.
7. Confirm with OK.

The Process added to the Rule Set will activate the manual classification mode for the class 'Vegetation'.



Rule Set Check

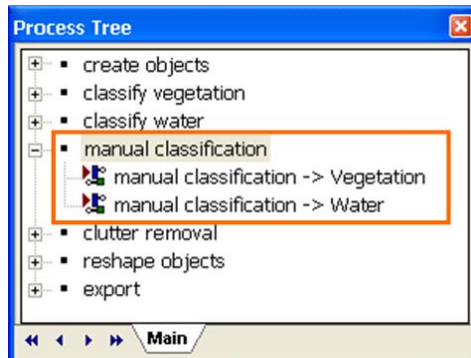


Figure 50: Processes for manual classification of 'Vegetation' and 'Water'.

5.2 Creating the Action Definition 'Manual Classification'

This Chapter has the following Sub-Chapters

- *General settings*
- *Define the Parameter set, Rule Set and Process to execute*

Information

The creation of an Action Group is obsolete too; the Action will be added to the existing Action Group 'Classification'.

This Action is pointing to the 'manual classification' Parent Process, which was just created before.

1. Make sure that the **Action Library is set to editing mode**. If not, go to main menu 'Library' and select 'Edit Action Library'.
2. Right-click on the Action 'Classify Water' and select 'Add Action Definition'.



Action!

5.2.1 General settings

1. Insert '**Manual Classification**' as name of the new Action.
2. Insert the '**Icon**' '**ButtonSamples_n.jpg**'.
3. Switch on the '**Use only once**' check box at the lower left part of the dialog-box.

The screenshot shows the 'Action Definition' dialog box with the following fields and settings:

- General**
 - Name: Manual Classification
 - Description: (empty)
 - Icon: ButtonSamples_n.jpg
 - Version: (empty)
 - Action ID: Manual Classification
 - Priority: 0
 - Group ID: Classification
- Rule Set**
 - Parameter Set: Parameterset_Manual Classification
 - Rule Set File: RuleSet_Start.dcp
 - Process to execute: manual classification
- Use only once
- Buttons: Dependencies..., OK, Cancel



Settings Check

Figure 51: Action Definition for 'Manual Classification'.

5.2.2 Define the Parameter set, Rule Set and Process to execute

As no Parameter set was created before, it is created now directly in the Action Definition by simply typing in the name.

1. In the field 'Parameter Set' type in '**Parameterset_Manual Classification**'.

After closing the Action Definition the Parameter set will be created.

2. Select '**RuleSet_Start.dcp**'
3. In the field '**Process to execute**' enter '**manual classification**'.
4. Confirm with **OK**.

The Action is added to the Action Library.

Information



Action!

5.3 Adding the Manual Classification buttons to the Action Definition

This Chapter has the following Sub-Chapters

- Add Widget Group 'Manual Classification'
- Adding the manual classification buttons to the Action
- Test the created Action 'Manual Classification'

Information

5.3.1 Add Widget Group 'Manual Classification'



Action!

Same as for the Action 'Classify Vegetation' one Widget Group 'Classification' will be added.

1. Select the Action Definition in the upper pane of the Analysis Builder window.
2. **Right-click** the background of the lower pane and select '**Add Group**'.
3. Insert the name '**Manual Classification**' confirm with 'OK'.

Information

5.3.2 Adding the manual classification buttons to the Action



Action!

As soon as you select a class for the first button an additional section for the second button is added.

1. **Right-click** on the '**Classification**' Group and select '**Add Manual Classification Buttons**' from the menu.

Definition of button 1

2. In the field 'Class' select '**Vegetation**' from the drop-down list
3. In the field '**Description**' enter '**Click to manually classify Vegetation**'.
4. In the field '**Process path**' enter exactly '**manual classification/manual classification -> Vegetation**'.



Rule Set Check

Here a Sub-Processes has to be defined, there fore / (**slash marks**) is used to indicate hierarchy in the process tree.

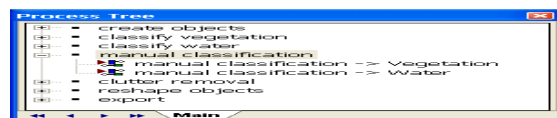
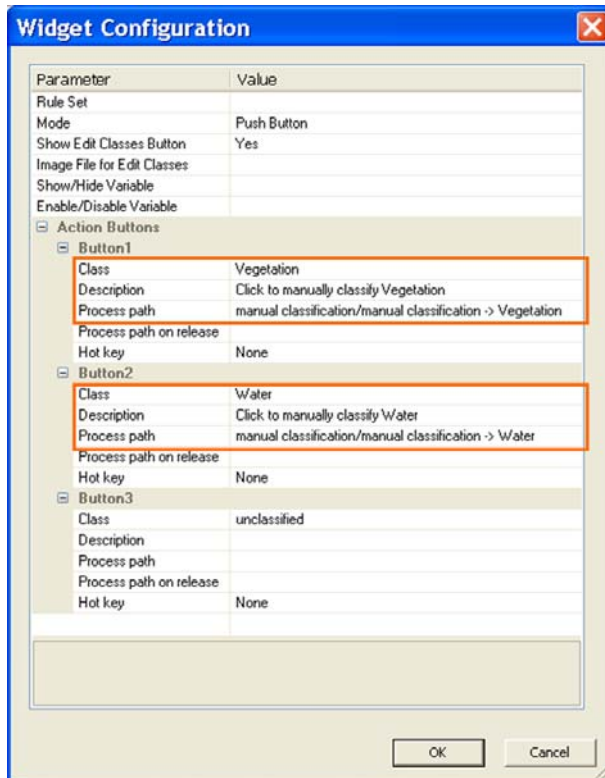


Figure 52: Processes for Action 'Manual Classification'.

Definition of button 2

5. In the field 'Class' select '**Water**' from the drop-down list
6. In the field '**Description**' enter '**Click to manually classify Vegetation**'.
7. In the field '**Process path**' enter exactly '**manual classification/manual classification -> Water**'.

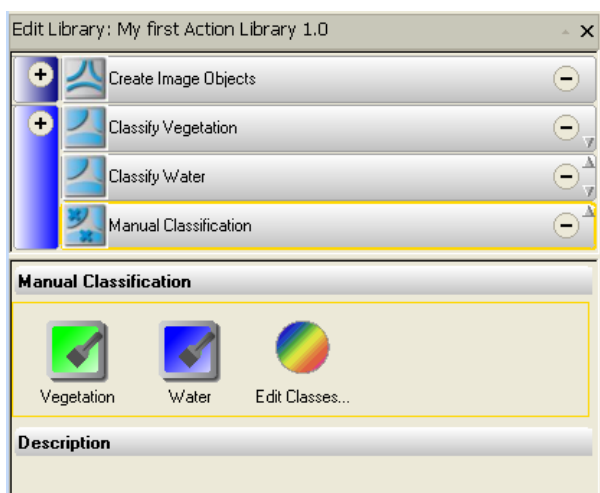


**Settings
Check**

Figure 53: Widget Configuration for manual classification buttons.

8. Confirm with **OK**.

The two buttons to manually classify and the 'Edit Class' button are added to the Action.



**Result
Check**

Figure 54: Analysis Builder with manual classification buttons added.

5.3.3 Test the created Action 'Manual Classification'



Action!

1. Save the Rule Set in the 'My first Action Library' folder. Don't rename it.
2. Go to the main menu 'Library' and de-select 'Edit Action Library'.

The editing mode is switched of. The Library is saved automatically.

Information

The 'Edit Classes' button

With this button the colors and naming can be changed. As soon as a color is changed, also the manual classification button color is changing.



Action!

3. Click on the '**Edit Classes**' button.

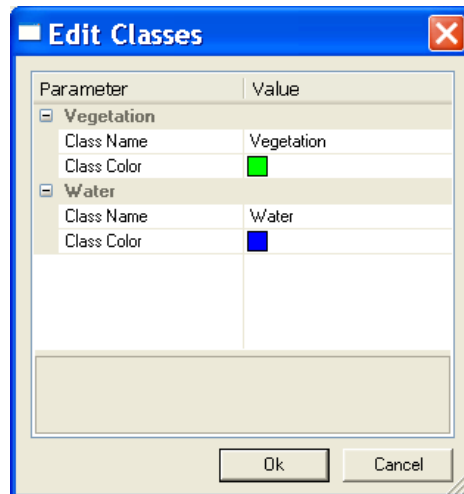


Figure 55: 'Edit Classes' menu from button 'Edit Classes'.



Action!

Classifying manually

4. Click on the '**Vegetation**' button to classify 'Vegetation' Objects.
5. Click on the '**Water**' button to classify 'Water' Objects.

Lesson 6 The Action 'Clutter Removal'

This Lesson has the following chapters

- *Creating the Parameter set and Class Variable 'input_class'*
- *Creating the Action Definition 'Clutter Removal'*
- *Adding the Widget Group, drop-down list and button to the Action Definition*
- *Adding Widgets to the Action*
- *Modifying and extending the Rule Set for 'Clutter Removal'*

The Action is merging Object of a class and de-classifying those too small.

In the original Rule Set two procedures have been set up, one for 'Vegetation' and one for 'Water' Objects.

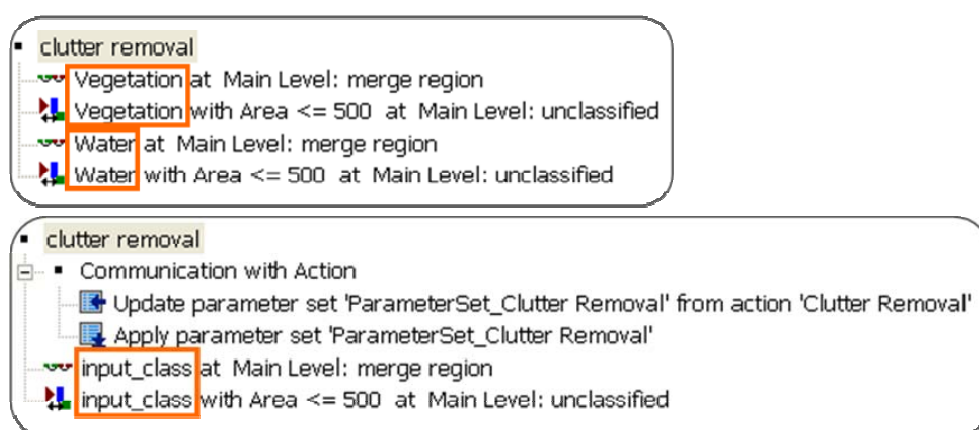


Figure 56: Above: initial Processes for clutter removal; Below: Processes using Class Variable 'input_class'.

The trick to simplify now the communication between the Action and the Rule Set is to use a so called '**Class Variable**'. The Variable will be used **instead of a fix Class name**. What ever class is set in the Action, it will be used in the Rule Set then.

Two widgets will be added, one **drop-down list** to select the class and one **button** to execute.

6.1 Creating the Parameter set and Class Variable 'input_class'

Creating the Class Variable

For this Action a Class Variable has to be created, substituting the fixed classes in the Rule Set.

Information

Information



1. Open the 'Manage Variables' dialog box.
2. Change to the tab 'Class'.
3. Add the Class Variable 'input_class' and assign it a white color.
4. **Close** the 'Manage Variables' dialog box.

Action!

The variable is now ready to be used in the Action and in the Rule Set.



Result Check

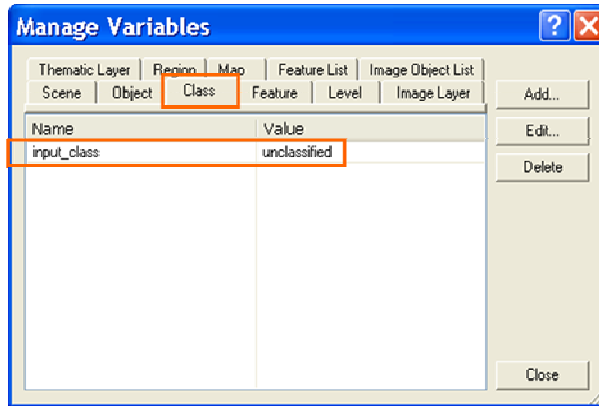


Figure 57: 'Class' tab of 'Manage Variables' dialog box with Variable 'input_class'.

Creating the Parameter Set



1. Open the '**Manage Parameter Set**' dialog box.
2. Click in the '**Add...**' button.

Action!

The '**Select variable for parameter set**' dialog box opens.

3. **Double-click** on the Class Variable '**input_class**' to move it to the 'Selected' window and confirm with 'OK'.

The dialog box '**Edit Parameter Set**' opens, the Variable is added to the Parameter set.

4. In the field 'Name' insert '**ParameterSet_Clutter Removal** and confirm with 'OK'.

6.2 Creating the Action Definition 'Clutter Removal'

Information

The creation of an Action Group is here again obsolete, the Action will be added to the existing Action Group 'Classification'.

The Action will be connected to the created Parameter set and Class Variable.

This Action is pointing to the 'clutter removal' Parent Process, which contains the **merging and de-classification** Processes.



Action!

1. Make sure that the **Action Library is set to editing mode**. If not, go to main menu 'Library' and select 'Edit Action Library'.
2. Right-click on the Action 'Manual Classification' and select 'Add Action Definition'.

6.2.1 General settings

1. Insert '**Clutter Removal**' as name of the new Action.

2. Insert the **'Icon' 'ButtonSamples_n.jpg'**.
3. Switch on the **'Use only once'** check box at the lower left part of the dialog-box.

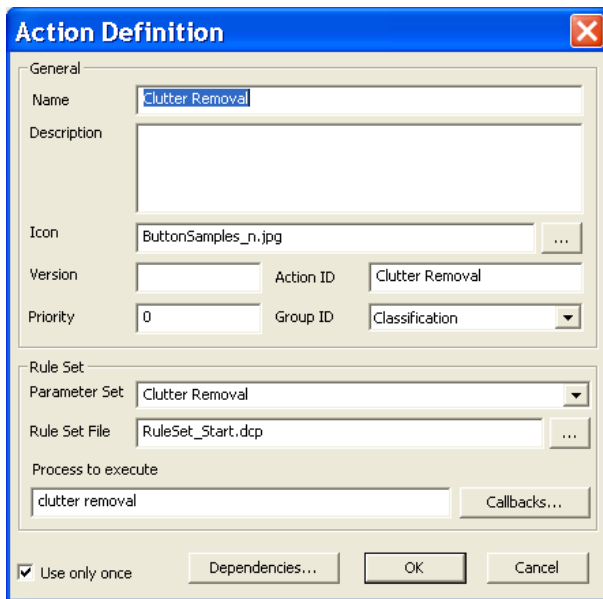


Figure 58: Action Definition for 'Clutter Removal'.

6.2.2 Define the Parameter set, Rule Set and Process to execute

Select the Parameter set from the drop-down list.

4. Select **'Parameterset_Clutter Removal'** from the drop-down list of the field 'Parameter Set'.
5. Select **'RuleSet_Start.dcp'**
6. In the field **'Process to execute'** enter **'clutter removal'**.
7. Confirm with **OK**.

The Action 'Clutter Removal' is added to the Action Library.

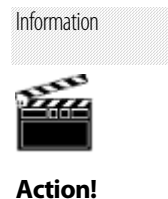
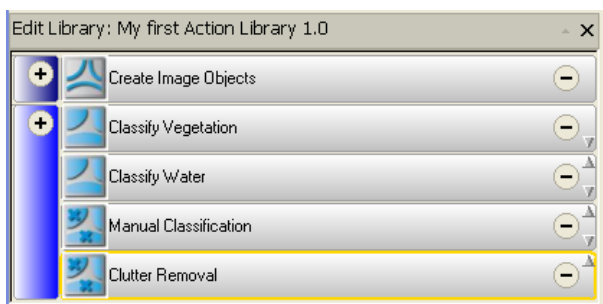


Figure 59: Analysis Builder with Action 'Clutter Removal' added.

6.3 Adding the Widget Group, drop-down list and button to the Action Definition



Action!

6.3.1 Adding the Widget Group

1. Select the Action Definition in the upper pane of the Analysis Builder window.
2. **Right-click** the background of the lower pane and select '**Add Group**'.

The '**Group Properties**' window opens.

3. Insert the name '**Settings**' confirm with 'OK'.

Information

6.4 Adding Widgets to the Action

Two widgets will be added, one **drop-down list** to select the class and one **button** to execute.



Action!

6.4.1 Add the drop-down list

1. **Right-click** on the '**Settings**' Group and select '**Add Select Class**' from the menu.

The 'Widget Configuration' dialog box opens.

2. In the field '**Text**' enter '**Select Class**'.
3. In the field '**Variable**' choose '**input class**' from the drop-down list.
4. Click In the field next to '**Available classes**' and select '**Vegetation**' and '**Water**'.

These classes will be layer available in the drop-down list of the Action.

5. In the field 'Description' enter '**Select a class to be generalized**'.
6. Confirm with 'OK'.



Settings Check

Parameter	Value
Text	Setelct Class
Variable	input_class
Available classes	Vegetation, Water
Process on selection change	
Dependency handling	none
Allow create new class	No
Description	Select a class to be generalized
Show/Hide Variable	
Enable/Disable Variable	

Figure 60: Widget Configuration for drop-down list 'Select Class'.

The drop-down list is added to the Analysis Builder.

6.4.2 Add the button

1. Again **right-click** on the '**Settings**' Group and select '**Add Button**' from the menu.

The 'Widget Configuration' dialog box opens.

2. Delete the content of the field '**Text**'. And the content of the field '**Description**'.
3. In the field '**Process on press**' insert '**clutter removal**'.
4. In the field '**Button text**' insert '**Press to execute**'.
5. Confirm with 'OK'.



Action!



**Result
Check**

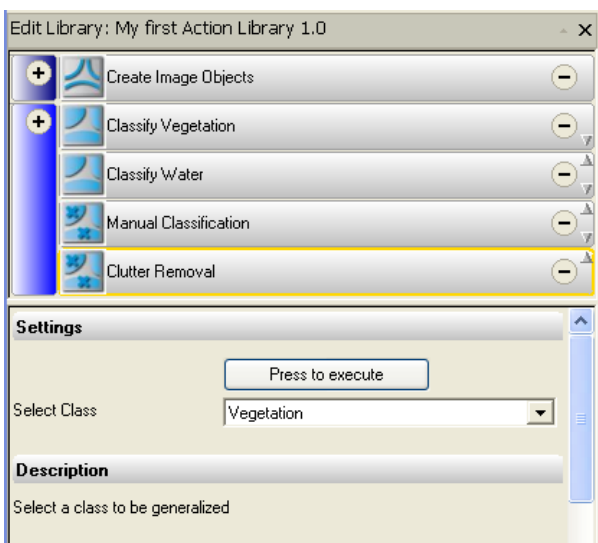


Figure 61: Analysis Builder with Action 'Clutter Removal', drop-down list to select class and button to execute added.

Information

6.5 Modifying and extending the Rule Set for 'Clutter Removal'

The Rule Set must be modified and extended so that it can **communicate** with the Action.

In the current Action,

- One '**merge region**' Process and one classification Process can be **deleted**
- the fix classes will be substituted by the created Class **Variable 'input_class'**,
- a Process to **delete eventually classified** Objects will be added
- two Processes will be added, one to **update the Parameter set** from whatever is set in the action and one Process to **apply** these values to the Rule set

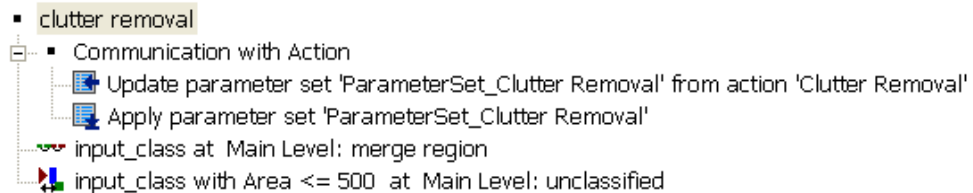


Figure 62: Processes for Action 'Clutter Removal'.



Action!

6.5.1 Delete the Processes

1. Delete the Processes '**Vegetation at Main Level: merge region**' and '**Vegetation with Area <= 500 at Main Level: unclassified**'.

6.5.2 Substitute thresholds with Variable

1. In the Process Tree **double-click** on the Process '**Water at Main Level: merge region**' to open it.
2. In the Image Object Domain change the **Class Filter** to '**input_class**'.
3. Confirm with 'OK'.
4. **Double-click** on the Process '**Water with Area <= 500 at Main Level: unclassified**' to open it.
5. In the Image Object Domain change the **Class Filter** to '**input_class**'.
6. Confirm with 'OK'.

6.5.3 Add Processes to update and apply Parameter set from Action

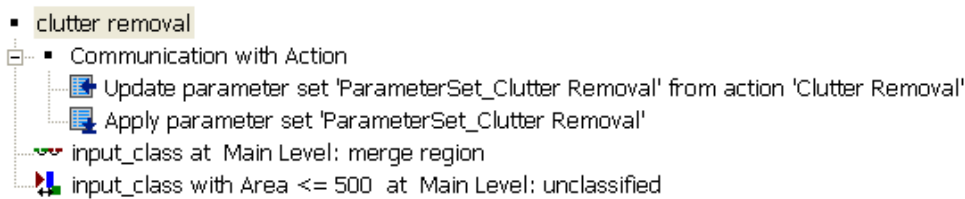
1. Append a new **Parent Process** above '**at Main Level: delete**'.
2. Enter the name '**Communication with Action**'.

Add Processes to update Parameter set from Action

3. Insert a Child Process and select the algorithm '**update parameter set from action**' from the '**Parameter set operations**' category of the Process list.
4. In the field '**Action ID**' select '**Clutter Removal**' from the drop-down list.
5. In the field '**Parameter set name**' select '**ParameterSet_Clutter Removal**' from the drop-down list.

Add Processes to apply Parameter to Rule Set

6. Append a new **Process**, and select the algorithm '**apply parameter set**' from the '**Parameter set operations**' category of the Process list.
7. In the field '**Parameter set name**' select '**ParameterSet_Clutter Removal**' from the drop-down list.



Rule Set Check

Figure 63: Processes for Action 'Clutter Removal'.

6.5.4 Test the created Action 'Create Image Objects'

Information

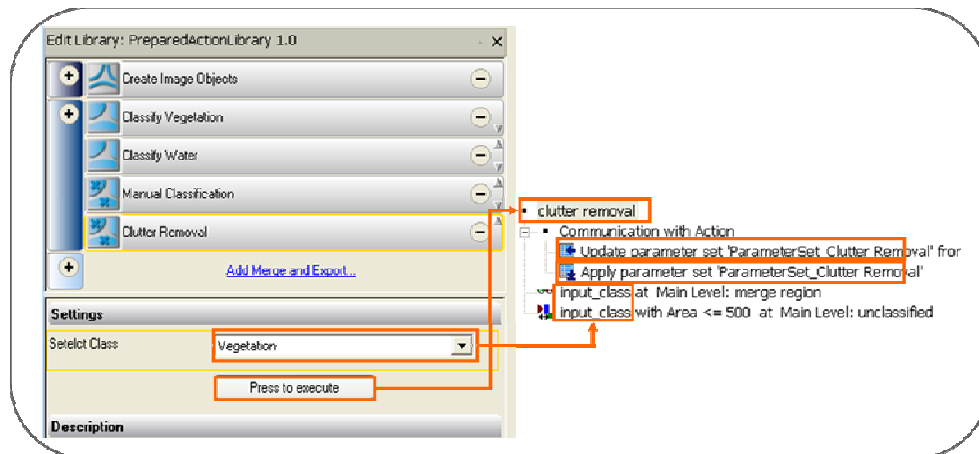


Figure 64: The text box selects the class for the Variable 'input_class', which is used in the Rule Set. The button executes the complete 'clutter removal' sequence.

1. Save the Rule Set in the 'My first Action Library' folder. Don't rename it.
2. Go to the main menu 'Library' and de-select 'Edit Action Library'.



The editing mode is switched off. The Library is saved automatically.

Action!

3. Choose a class from the drop-down list in the action and execute the process by hitting the 'Press to execute' button.

Lesson 7 The Action 'Merge Objects'

This Lesson has the following chapters

- *Creating the Parameter set*
- *Creating a new Action Group 'Merge and Export'*
- *Creating the Action Definition 'Merge Objects'*
- *Adding the Widget Group, drop-down list and button to the Action*
- *Modifying and extending the Rule Set for 'Merge Objects'*

Information

The Action is merging and reshaping Object of a class.

Similar to the 'clutter removal', in the original Rule Set two procedures have been set up, one for 'Vegetation' and one for 'Water' Objects.

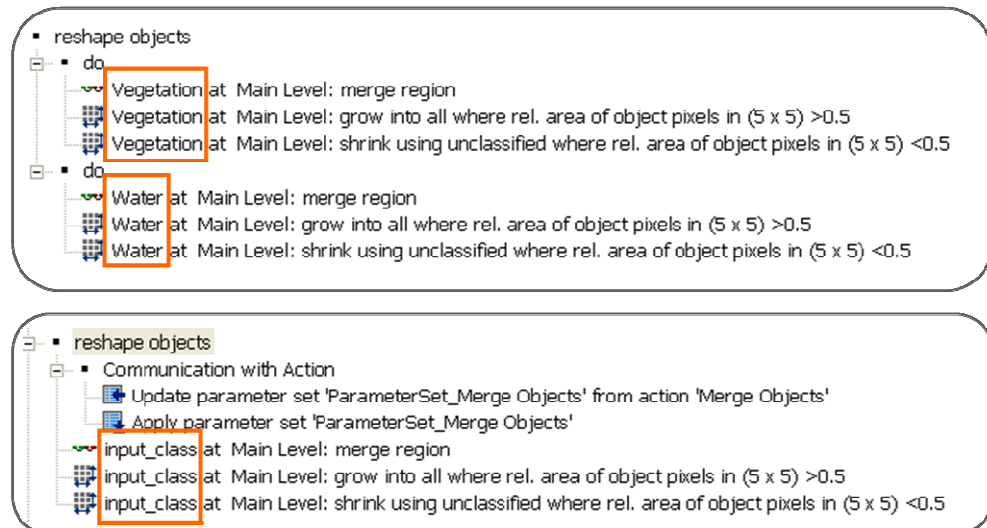


Figure 65: Above: Initial Processes to reshape 'Vegetation' and 'Water'; Below: Processes using Class Variable 'input_class'.

Again the trick to simplify the communication between the Action and the Rule Set is to use a **'Class Variable'**. The Variable will be used **instead of the fix Class name**. What ever class is set in the Action, will be used in the Rule Set then.

Two widgets will be added, one **drop-down list** to select the class and one **button** to execute.

7.1 Creating the Parameter set

Information

For this Action a Class Variable has to be created, substituting the fixed classes in the Rule Set, similar to the Action 'Clutter Removal'. The Class Variable **already exists**, it was created for the Action 'Clutter Removal' and is also used in this Action.

1. Open the '**Manage Parameter Set**' dialog box.
2. Click in the '**Add...**' button.

The '**Select variable for parameter set**' dialog box opens.

3. **Double-click** on the Class Variable '**input_class**' to move it to the 'Selected' window and confirm with 'OK'.

The dialog box '**Edit Parameter Set**' opens, the Variable is added to the Parameter set.

4. In the field 'Name' insert '**ParameterSet_Merge Objects** and confirm with 'OK'.

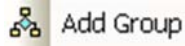


Action!

7.2 Creating a new Action Group 'Merge and Export'

This Action is part of the new Action Group 'Merge and Export.

1. **Right-click** anywhere in the **Action Group 'Classification** select '**Add Group**'



The 'Edit Group' dialog box opens.

2. In the field 'Name' insert '**Merge and Export**'.
3. Keep **ID: C**.
4. Choose a **color** for your Group, e.g. a light blue.
5. Confirm with 'OK'.

The Group is added to the Analysis Builder. The link '**Add Merge and Export**' inserted automatically. This link leads to the 'Add Actions' dialog box .

Information



Action!



Result Check

Figure 66: Analysis Builder with Action Group 'Merge and Export' added.

7.3 Creating the Action Definition 'Merge Objects'

This Chapter has the following Sub-Chapters

- *General settings*
- *Define the Parameter set, Rule Set and Process to execute*

Information

The Action will be connected to the created Parameter set and Class Variable.

This Action is pointing to the 'reshape objects' Parent Process, which contains the **merging and de-classification** Processes.



Action!

1. Make sure that the **Action Library is set to editing mode**. If not, go to main menu 'Library' and select 'Edit Action Library'.
1. In the **Analysis Builder** right-click in the Group '**Merge and Export**', select 'Add Action Definition' from the menu.

7.3.1 General settings

1. Insert '**Merge Objects**' as name of the new Action.
2. Insert the '**Icon**' '**ButtonMerge.jpg**'.
3. Switch on the '**Use only once**' check box at the lower left part of the dialog-box.



Settings Check

Figure 67: Action Definition for 'Merge Objects'.

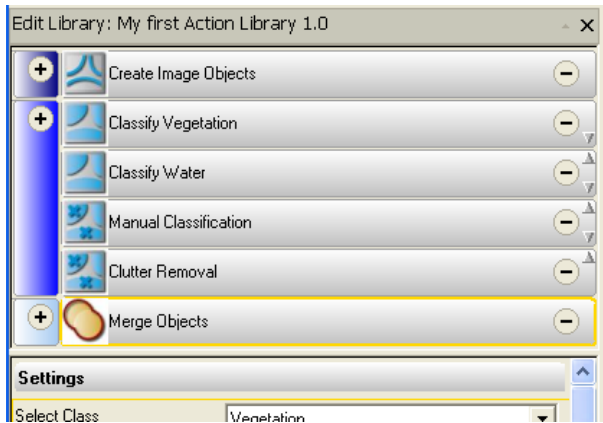
7.3.2 Define the Parameter set, Rule Set and Process to execute

Information

Select the Parameter set from the drop-down list.

4. Select '**ParameterSet_Merge Objects**' from the drop-down list of the field 'Parameter Set'.
5. Select '**RuleSet_Start.dcp**'
6. In the field '**Process to execute**' enter '**reshape objects**'.
7. Confirm with **OK**.

The Action 'Merge Objects' is added to the Action Library.



**Result
Check**

Figure 68: Analysis Builder with Action 'Merge Objects'.

7.4 Adding the Widget Group, drop-down list and button to the Action

This Chapter has the following Sub-Chapters

- Add the Widget Group 'Settings'
- Add the drop-down list
- Add the button

7.4.1 Add the Widget Group 'Settings'

1. Select the Action Definition in the upper pane of the Analysis Builder window.
2. **Right-click** the background of the lower pane and select '**Add Group**'.



Action!

The '**Group Properties**' window opens.

3. Insert the name '**Settings**' confirm with 'OK'.

Two widgets will be added, one **drop-down list** to select the class and one **button** to execute.

7.4.2 Add the drop-down list

1. **Right-click** on the '**Settings**' Group and select '**Add Select Class**' from the menu. The 'Widget Configuration' dialog box opens.
2. In the field '**Text**' enter '**Select Class**'.

3. In the field **'Variable'** choose **'input class'** from the drop-down list.
4. Click In the field next to **'Available classes'** and select **'Vegetation'** and **'Water'**.
These classes will be layer available in the drop-down list of the Action.
5. In the field 'Description' enter **'Select class to be merged'**.
6. Confirm with 'OK'.



**Settings
Check**

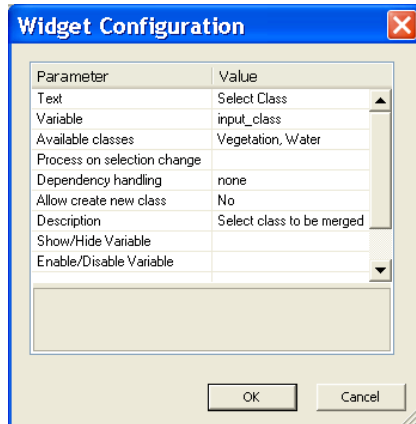


Figure 69: Widget Configuration for drop-down list 'Select Class'.

The drop-down list is added to the Analysis Builder.

7.4.3 Add the button



Action!

1. Again **right-click** on the **'Settings'** Group and select **'Add Button'** from the menu.
The 'Widget Configuration' dialog box opens.
2. Delete the content of the field **'Text'** . And the content of the field **'Description'**.
3. In the field **'Process on press'** insert 'reshape objects'.
4. In the field **'Button text'** insert **'Press to execute'**.
5. Confirm with 'OK'.



**Result
Check**

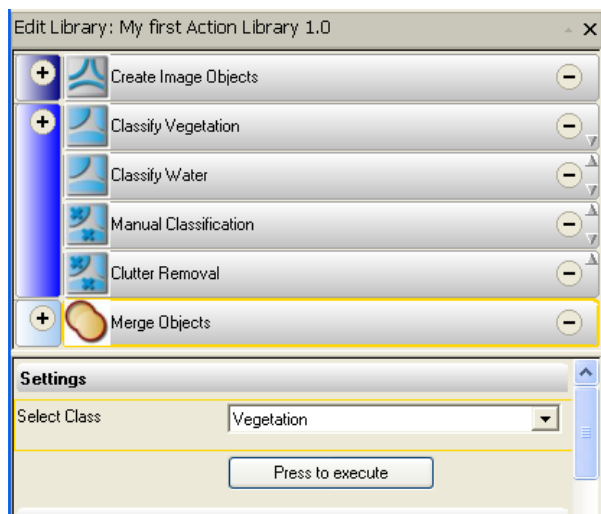


Figure 70: Analysis Builder with Action 'Create Image Objects', drop-down list to select the class and button to execute added.

7.5 Modifying and extending the Rule Set for 'Merge Objects'

This Chapter has the following Sub-Chapters

- Delete the obsolete Processes
- Substitute thresholds with Variable 'input_class'
- Add Processes to update and apply Parameter set from Action
- Test the created Action 'Merge Objects'

The Rule Set must be modified and extended so that it can **communicate** with the Action and avoids miss-processing.

In the current example,

- One sequence to reshape Objects can be **deleted**
- the fix classes will be substituted by the created Class **Variable 'input_class'**,
- two Processes will be added, one to **update the Parameter set** from whatever is set in the action and one Process to **apply** these values to the Rule set



Figure 71: Processes for Action 'Merge Objects'.

Information

7.5.1 Delete the obsolete Processes

1. Delete the first Processes sequence 'do'.
2. Make all Processes direct Child Processes of '**reshape objects**'.



Action!

7.5.2 Substitute thresholds with Variable 'input_class'

1. In the Process Tree **double-click** on the Process '**Vegetation at Main Level: merge region**' to open it.
2. In the Image Object Domain change the **Class Filter** to '**input_class**'.
3. Confirm with 'OK'.
4. Repeat the same for the two other Processes.

7.5.3 Add Processes to update and apply Parameter set from Action

1. Append a new **Parent Process** above 'input_class at Main Level: merge region'.
2. Enter the name '**Communication with Action**'.

Add Processes to update Parameter set from Action

3. Insert a Child Process and select the algorithm '**update parameter set from action**' from the '**Parameter set operations**' category of the Process list.
4. In the field '**Action ID**' select '**Merge Objects**' from the drop-down list.
5. In the field '**Parameter set name**' select '**ParameterSet_Merge Objects**' from the drop-down list.

Add Processes to apply Parameter to Rule Set

6. Append a new **Process**, and select the algorithm '**apply parameter set**' from the '**Parameter set operations**' category of the Process list.
7. In the field '**Parameter set name**' select '**ParameterSet_Merge Objects**' from the drop-down list.



Rule Set Check

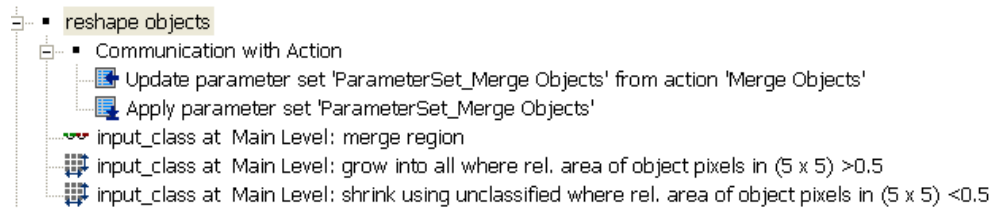


Figure 72: Processes for Action 'Merge Objects'.

Information

7.5.4 Test the created Action 'Merge Objects'

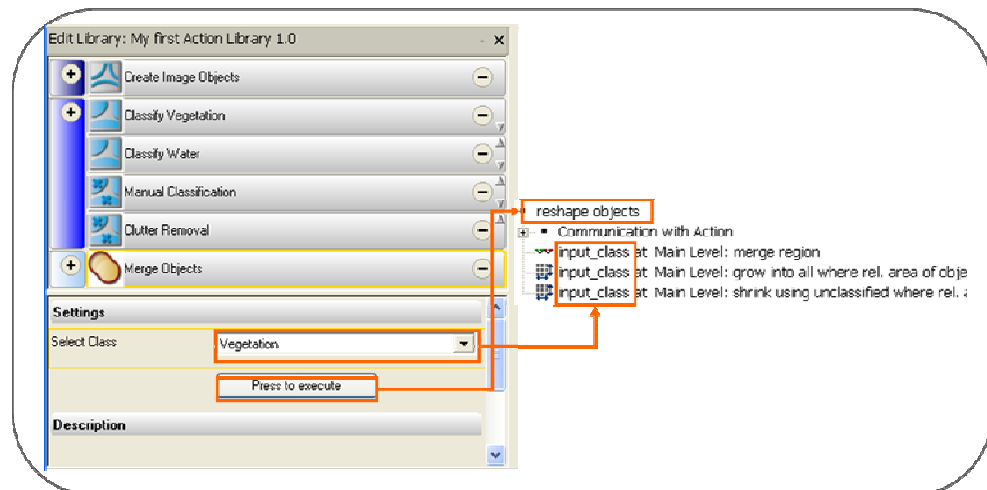


Figure 73: The drop-down list to sets the class for the Variable 'input_class', which is used in the Rule Set. The button executes the complete 'classify vegetation' sequence.



1. Save the Rule Set in the 'My first Action Library' folder. Don't rename it.
2. Go to the main menu 'Library' and de-select 'Edit Action Library'.

Action!

The editing mode is switched of. The Library is saved automatically.

3. Choose a class from the drop-down list in the action an execute the process by hitting the 'Press to execute' button.

Lesson 8 The Action 'Export Vector Layer'

This Lesson has the following chapters

- Creating the Parameter set and Variable 'smoothing'
- Creating the Action Definition 'Export Vector Layer'
- Adding the Widget Group, drop-down-list and checkbox to the Action Definition
- Modifying and extending the Rule Set for 'Export'

Information

The Action 'Export Vector Layer' shall contain the choice to export the vectors either **smoothed or un-smoothed**. This is activated or deactivated with a **checkbox**.

In terms of the Rule Set this means two processes must be available

- one only being executed if the check-box is switched on
- the other only executed if the check-box is switched off

Which Process is used is controlled by a **Scene Variable 'smoothing'**, which is added to the **Threshold condition in a Parent Process** above the actual export Process



Figure 74: Processes for Action 'Export Vector Layer, using Variable 'smoothing' as condition for execution.

8.1 Creating the Parameter set and Variable 'smoothing'

This Chapter has the following Sub-Chapters

- Creating the Scene Variable 'smoothing'
- Creating the Parameter Set

8.1.1 Creating the Scene Variable 'smoothing'



Action!

1. Open the 'Manage Variables' dialog box.
2. Add the Scene Variable **'smoothing'**.
3. **Close** the 'Manage Variables' dialog box.

The variable is now ready to be used in the Action and in the Rule Set.

8.1.2 Creating the Parameter Set

1. Open the '**Manage Parameter Set**' dialog box.
2. Click in the '**Add...**' button.



The '**Select variable for parameter set**' dialog box opens.

3. **Double-click** on the Scene Variable '**smoothing**' to move it to the 'Selected' window and confirm with 'OK'.

Action!

The dialog box '**Edit Parameter Set**' opens, the Variable is added to the Parameter set.

4. In the field 'Name' insert '**ParameterSet_Export Vector Layer**' and confirm with 'OK'.

8.2 Creating the Action Definition 'Export Vector Layer'

This Chapter has the following Sub-Chapters

- *Adding the Widget Group 'Export'*
- *Adding Widgets check-box and button to the Action*

The creation of an Action Group is here again obsolete, the Action will be added to the existing Action Group 'Merge and Export'.

The Action will be connected to the created Parameter set and Scene Variable.

This Action is pointing to the 'export' Parent Process.

1. Make sure that the **Action Library is set to editing mode**. If not, go to main menu 'Library' and select 'Edit Action Library'.
2. Right-click on the Action 'Merge Objects' and select 'Add Action Definition'.

Information



Action!

8.2.1 General settings

1. Insert '**Export Vector Layer**' as name of the new Action.
2. Insert the '**Icon**' '**ButtonZoomToFit_n.jpg**'.
3. Switch on the '**Use only once**' check box at the lower left part of the dialog-box.



Settings Check

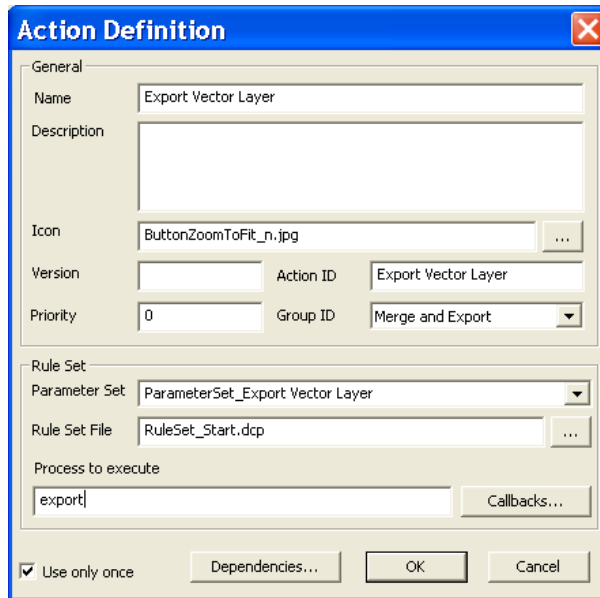


Figure 75: Action Definition for 'Export Vector Layer'.

8.2.2 Define the Parameter set, Rule Set and Process to execute

Information

Select the Parameter set from the drop-down list.



Action!

1. Select '**Parameterset_Export Vector Layer**' from the drop-down list of the field 'Parameter Set'.
2. Select '**RuleSet_Start.dcp**'
3. In the field '**Process to execute**' enter '**clutter removal**'.
4. Confirm with **OK**.

The Action 'Export Vector Layer' is added to the Action Library.



Result Check

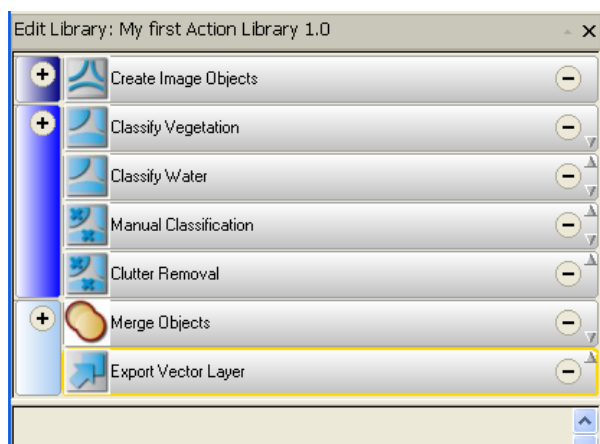


Figure 76: Analysis Builder with Action 'Export Vector Layer' added.

8.3 Adding the Widget Group, drop-down-list and checkbox to the Action Definition

This Chapter has the following Sub-Chapters

- *Adding the Widget Group 'Export'*
- *Adding Widgets check-box and button to the Action*

8.3.1 Adding the Widget Group 'Export'

1. Select the Action Definition in the upper pane of the Analysis Builder window.
 2. **Right-click** the background of the lower pane and select '**Add Group**'.
- The '**Group Properties**' window opens.
3. Insert the name '**Export**' confirm with 'OK'.



Action!

8.3.2 Adding Widgets check-box and button to the Action

Two widgets will be added, one **check-box** to switch on and off smoothing and one **button** to execute.

Information

Add the check-box to switch on or off smoothing

1. **Right-click** on the '**Export**' Widget Group and select '**Add Checkbox**'
- Add Checkbox from the menu.
- The 'Widget Configuration' dialog box opens.
2. In the field '**Text**' enter '**Smoothing**'.
 3. In the field 'Description' enter '**Check if you want a smoothed vector export**'.
 4. In the field '**Variable**' choose '**smoothing**' from the drop-down list.
 5. Keep '**Value Checked**' = 1
 6. Keep '**Value Unchecked**' = 0
 7. Confirm with 'OK'.



Action!



**Settings
Check**

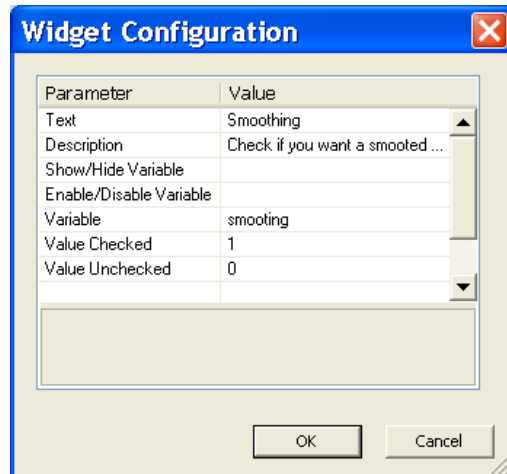


Figure 77: Widget Configuration for check-box 'Smoothing'.

The check-box list is added to the Analysis Builder.

Add the button to execute the export



Action!

1. Again **right-click** on the '**Export**' Group and select '**Add Button**' from the menu. The 'Widget Configuration' dialog box opens.
2. Delete the content of the field '**Text**'. And the content of the field '**Description**'.
3. In the field '**Process on press**' insert '**export**'.
4. In the field '**Button text**' insert '**Press to execute**'.
5. Confirm with 'OK'.



**Result
Check**

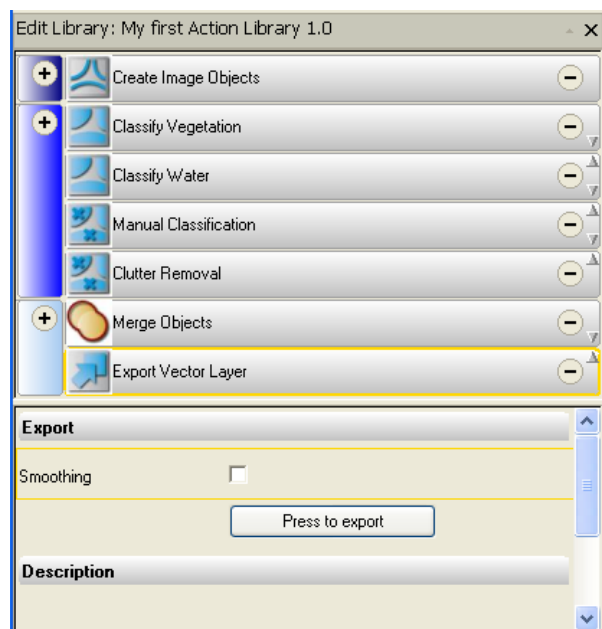


Figure 78: Analysis Builder with Action 'Export Vector Layer', check-box to switch on or off smoothing and button to execute added.

8.4 Modifying and extending the Rule Set for 'Export'

This Chapter has the following Sub-Chapters

- Processes for smoothing switched off
- Processes for smoothing switched on
- Add Processes to update and apply Parameter set from Action
- Test the created Action 'Export Vector Layer'

In the Rule Set this two processes must be available

- one only being executed if the check-box is switched on,
- the other only executed if the check-box is switched off.

Which Process is used is controlled by a **Scene Variable 'smoothing'**, which is added to the **Threshold condition in a Parent Process** over the actual export Process.



Figure 79: Processes for Action 'Export Vector Layer, using Variable 'smoothing' as condition for execution.

Information

8.4.1 Processes for smoothing switched off

1. Insert a Child Process in the 'export' sequence.
2. In the Image Object Domain set the 'Threshold condition' to **Scene Variable 'smoothing' = 0**.
3. Make the Process **'Vegetation, Water, unclassified at Main Level: export object shapes to Vector Layer'** a Child Process of it.



Action!



Rule Set Check

Figure 80: Processes Variable 'smoothing' is 0 (smoothing check-box switched off).

8.4.2 Processes for smoothing switched on

1. Append a Process in parallel to **'if smoothing = 0'**.
2. In the Image Object Domain set the Threshold condition to **Scene Variable 'smoothing' = 1**.

3. **Copy and Paste** the Process 'Vegetation, Water, unclassified at Main Level: export object shapes to Vector Layer' and make it a **Child Process of 'if smoothing = 1'**.
4. Open the Process 'Vegetation, Water, unclassified at Main Level: export object shapes to Vector Layer' and set the field '**Export Type**' to '**Smoothed**'.
5. Change the 'Export item name' to '**Vector Layer smoothed**'.



Rule Set Check

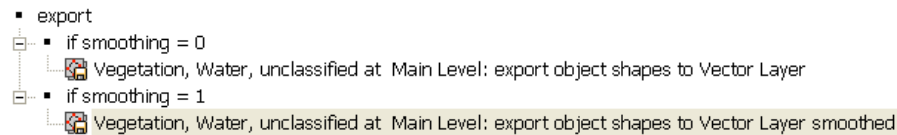


Figure 81: Processes Variable 'smoothing' is 0 (smoothing check-box switched off). And Processes Variable 'smoothing' is 1 (smoothing check-box switched on).

8.4.3 Add Processes to update and apply Parameter set from Action



Action!

1. Append a new **Parent Process** above '**if smoothing = 0**'.
2. Enter the name '**Communication with Action**'.

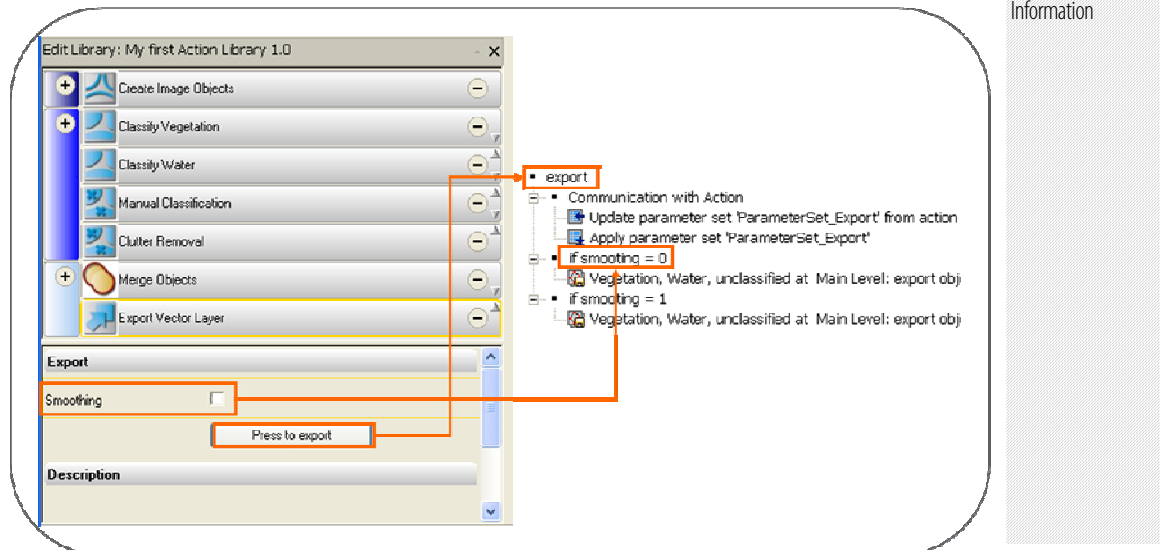
Add Processes to update Parameter set from Action

3. Insert a Child Process and select the algorithm '**update parameter set from action**' from the '**Parameter set operations**' category of the Process list.
4. In the field '**Action ID**' select '**Export Vector Layer**' from the drop-down list.
5. In the field '**Parameter set name**' select '**ParameterSet_Export Vector Layer**' from the drop-down list.

Add Processes to apply Parameter to Rule Set

6. Append a new **Process**, and select the algorithm '**apply parameter set**' from the '**Parameter set operations**' category of the Process list.
7. In the field '**Parameter set name**' select '**ParameterSet_Export Vector Layer**'.

8.4.4 Test the created Action 'Export Vector Layer'



Information

Figure 82: The check-box sets the value (0 or 1) to the Variable 'smoothing', which is used in the Rule Set. The button executes the complete 'export' sequence.

1. Save the Rule Set in the 'My first Action Library' folder. Don't rename it.
2. Go to the main menu 'Library' and de-select 'Edit Action Library'.

The editing mode is switched off. The Library is saved automatically.

3. Switch on or off the check box 'Smoothing' and execute the process by hitting the 'Press to execute' button.

One time the smoothed vector layer is exported with smoothed outlines, one time not smoothed.



Action!