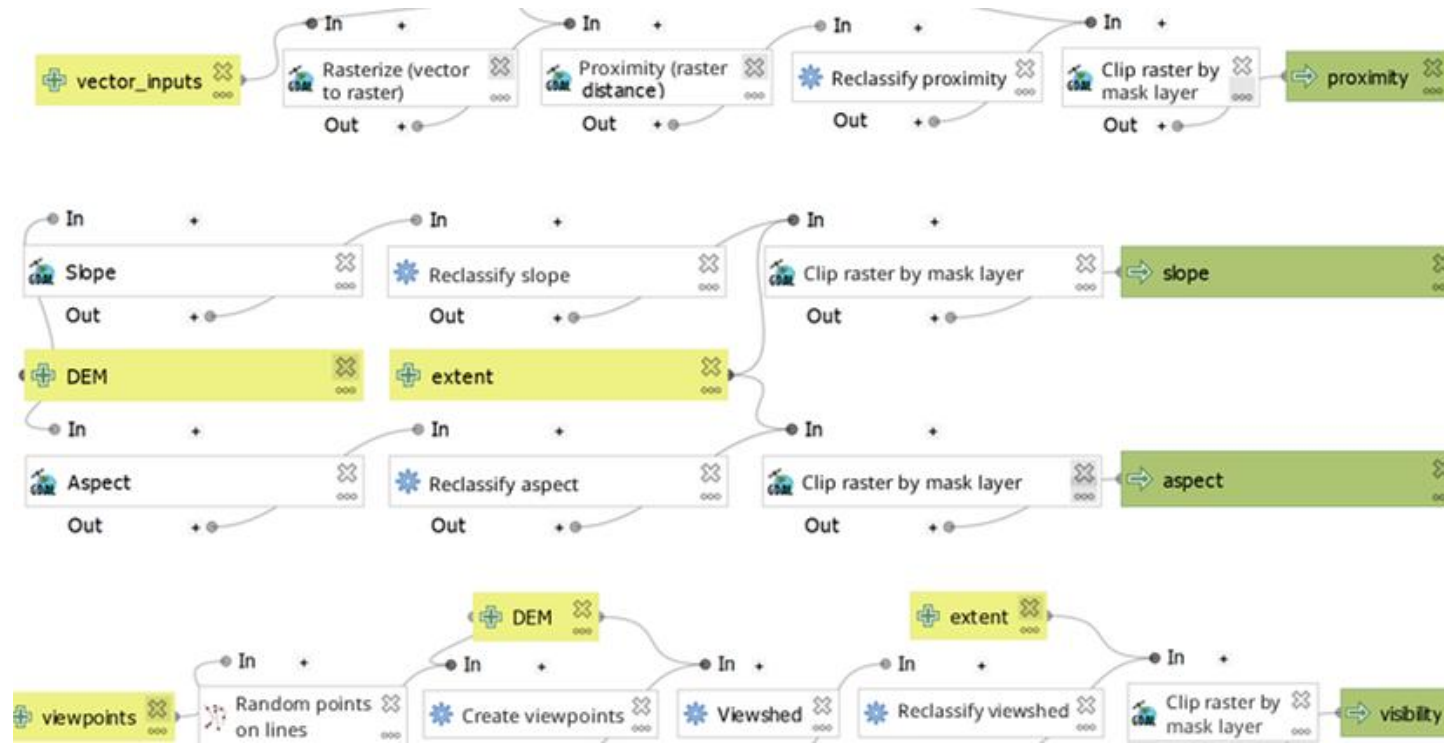




GRAPHICAL MODEL DESIGNER IN QGIS

Workshop at the QGIS User Conference, Laax 2026

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STRUCTURE OF **THIS WORKSHOP**

1. Introduction to the **QGIS Graphical Model Designer** — what it is, why to use it, and its main functionalities.
2. Practical **use case**: finding suitable locations for bee hives — **building a model step by step** using spatial criteria.
3. **What's new in the Model Designer?** — new and already implemented changes in QGIS 4 and how they affect existing workflows



LEARNING OBJECTIVES

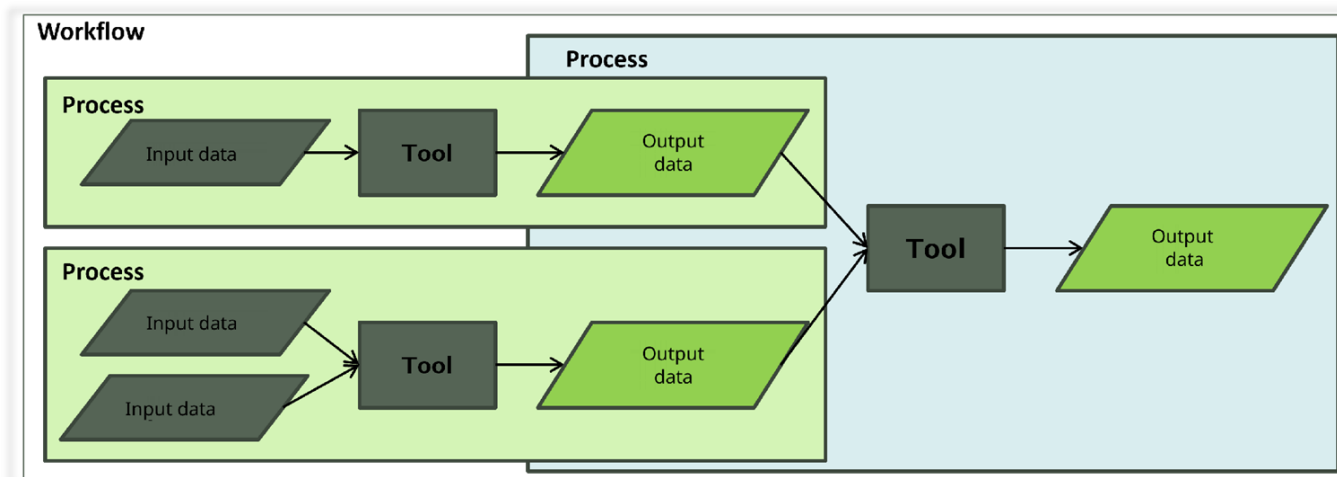
By the end of this workshop, you will be able to:

- ▶ Understand the **QGIS Graphical Model Designer** and use it appropriately.
- ▶ Represent various geodata processing workflows in the *Model Designer*.
- ▶ Create and use your own models as tools.
- ▶ Document tools with comments and help text so that other users can understand and use your tool.



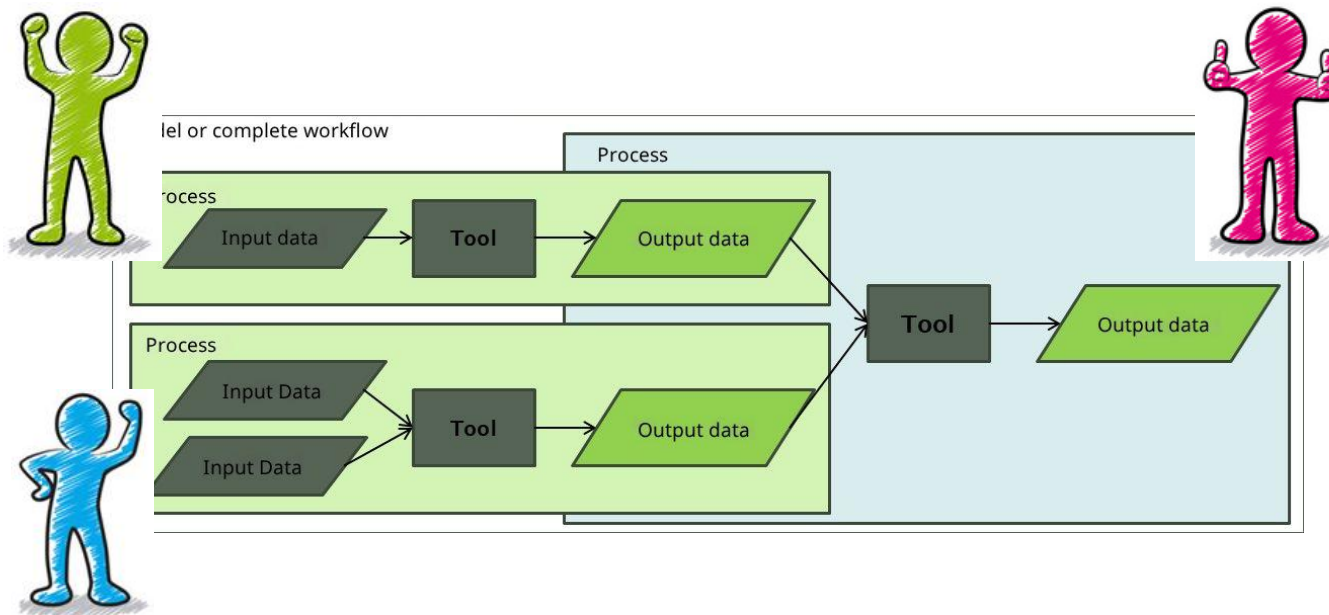
GEOPROCESSING MODEL

- ▶ Workflows in GIS typically involve many steps.
- ▶ Each step produces an intermediate result that is used in the next step.
- ▶ Problem: If the input data is changed or a parameter is adjusted, the entire workflow must be manually repeated.
- ▶ Solution: For more complex processes, QGIS includes a **graphical modeling tool** that supports **defining a workflow** and can automatically start the **entire process using one single call**.



BENEFITS OF A REUSABLE MODEL (=TOOL)

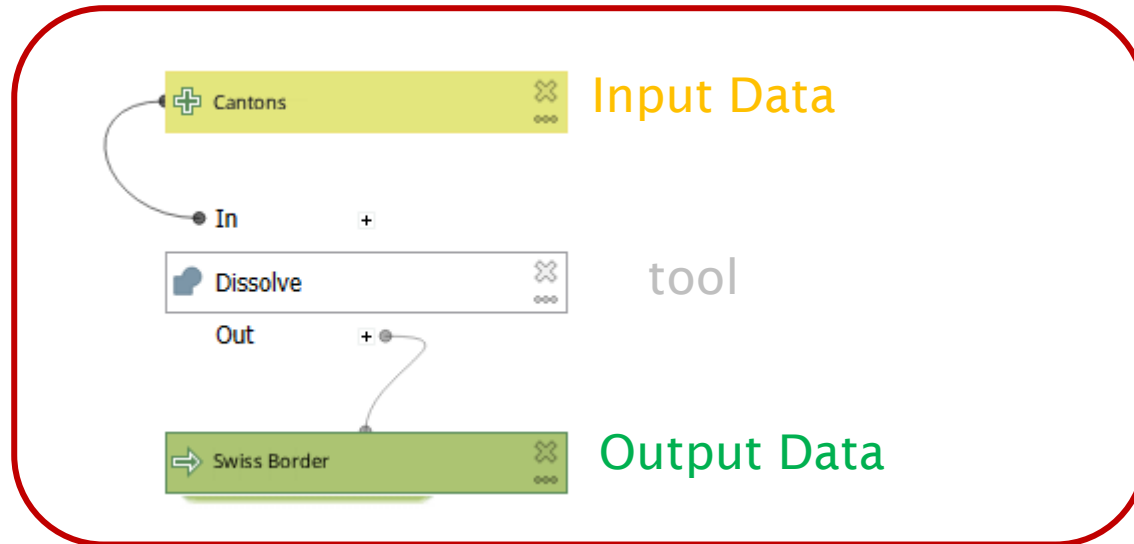
- ▶ Create a tool for **your own needs**
- ▶ **Automation** of data processing workflows
- ▶ Easy to use and reusable for other datasets
- ▶ Easy-to-read representation of geoprocessing workflows (**documentation**)
- ▶ Ability to distribute geoprocessing tasks among different people



GEOPROCESSING WITH THE QGIS MODEL DESIGNER

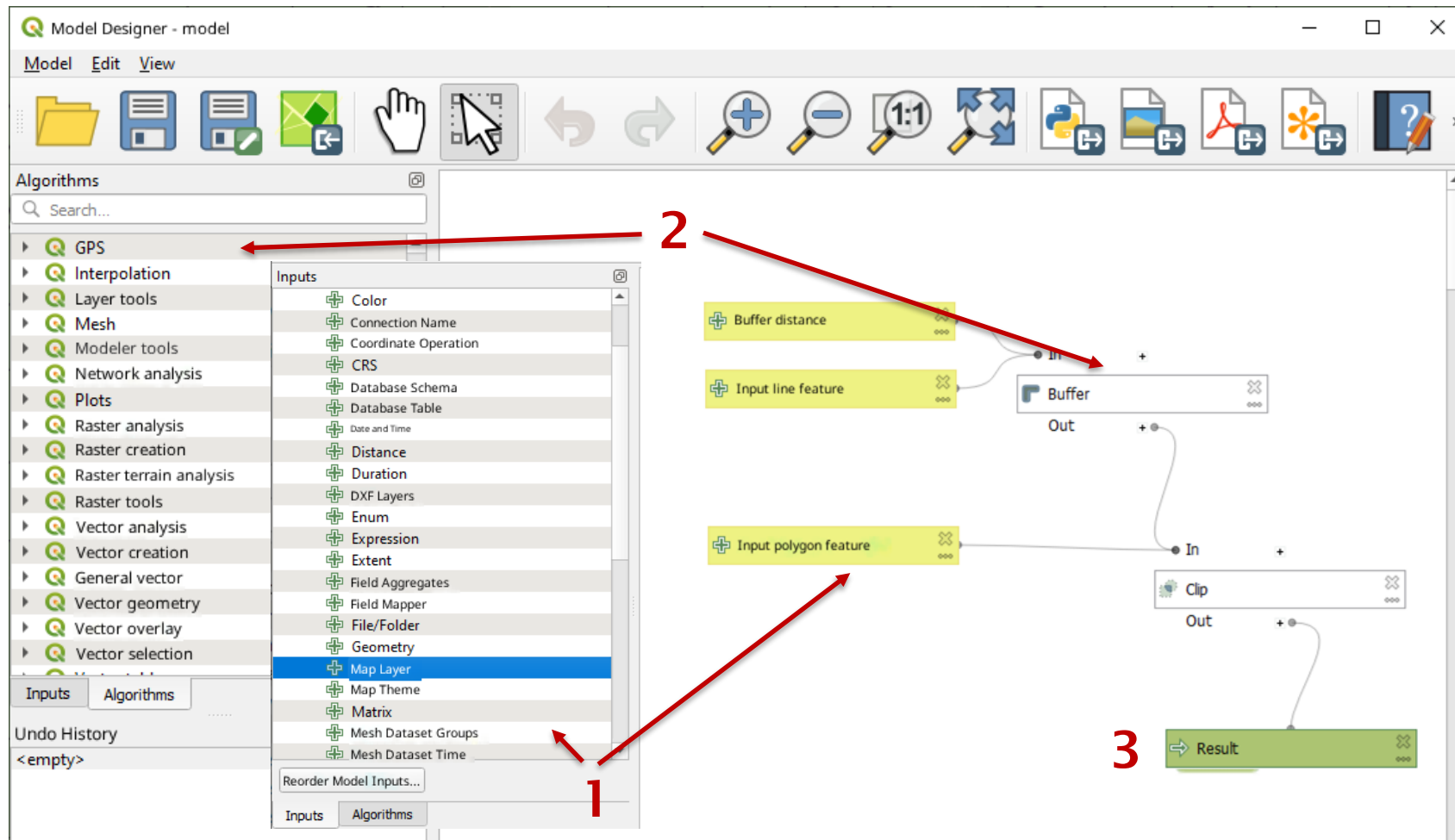
- ▶ QGIS Model Designer is an **interactive window** in QGIS for creating, editing, and managing models (= tools).
- ▶ The data and tools required for geoprocessing can be dragged and dropped into the model.
- ▶ By connecting data and tools, processing workflows are simulated or defined, thereby creating models.
- ▶ The so-called **graphical modeling** to a certain extent eliminates the need to write programming code.

Model with one process



GRAPHICAL MODELING INTERFACE IN QGIS

- Can be accessed from the Processing Menu (**Processing > Model Designer**)

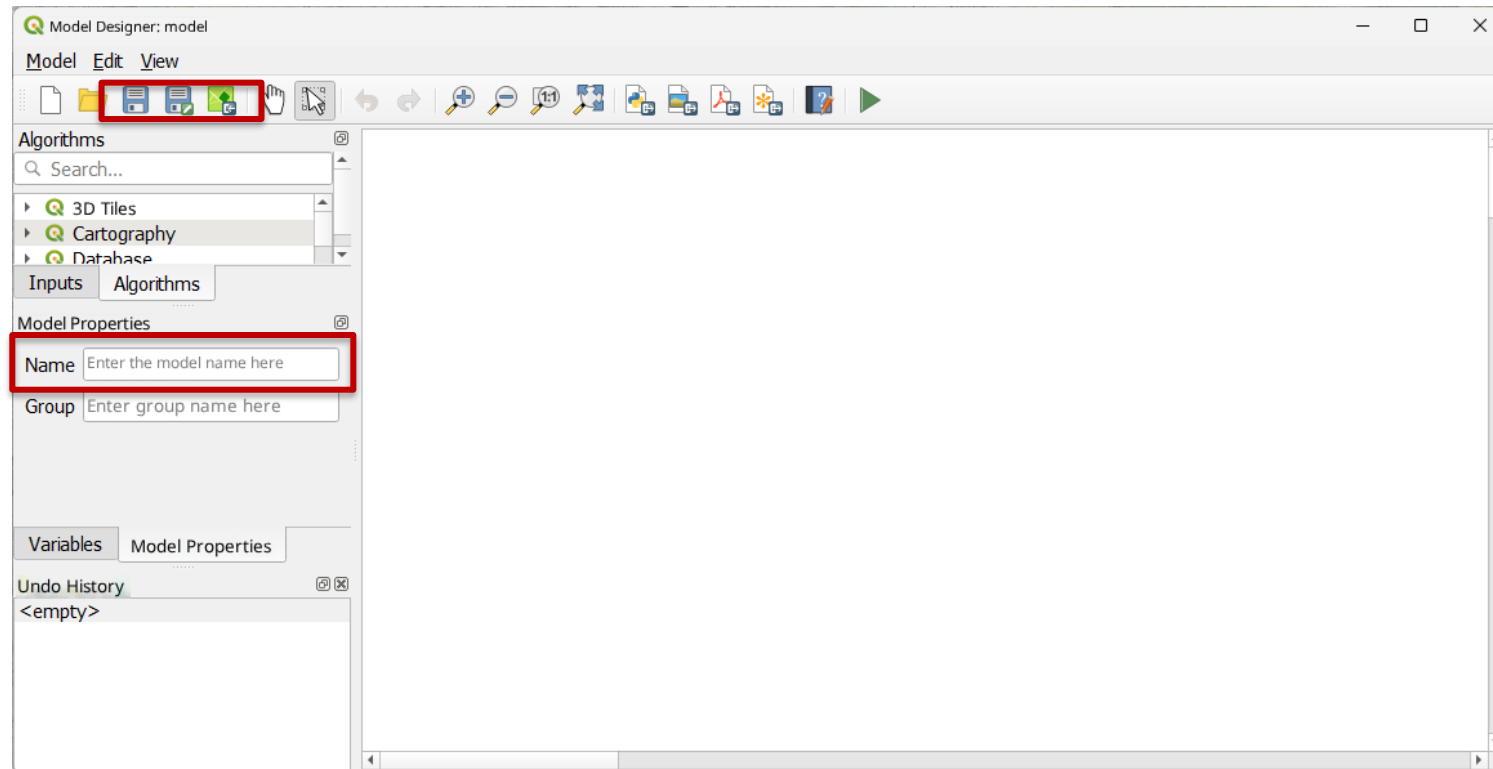
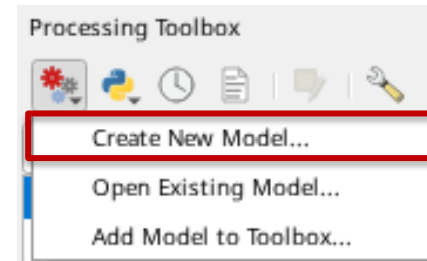


- 1) **Inputs** = Input layers or parameters that are fed into the model
- 2) **Algorithms / Toolbox** = Tools applied to the input layers and intermediate results
- 3) **Result (possibly multiple)**

→ The model fields are linked by connecting lines that indicate which elements belong together.

START A NEW MODEL

- 1) Start a new graphical model
- 2) **Name** and save the model

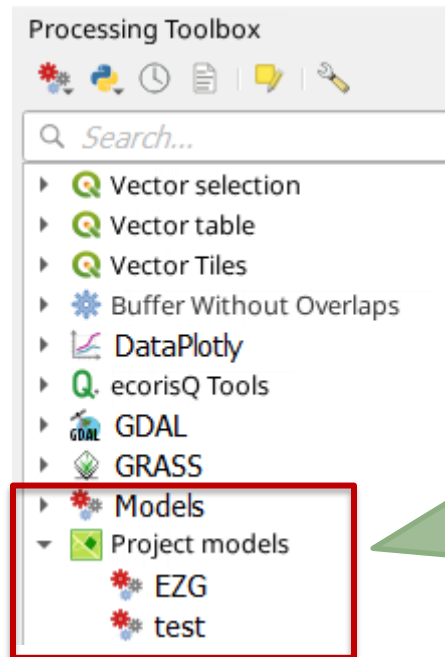


- A model can **be saved** within the QGIS project 
- By default, models are saved in the **Profile folder** (*Settings > User Profiles > Open Active Profile Folder*, then in the respective profile under *Processing >  Models*)

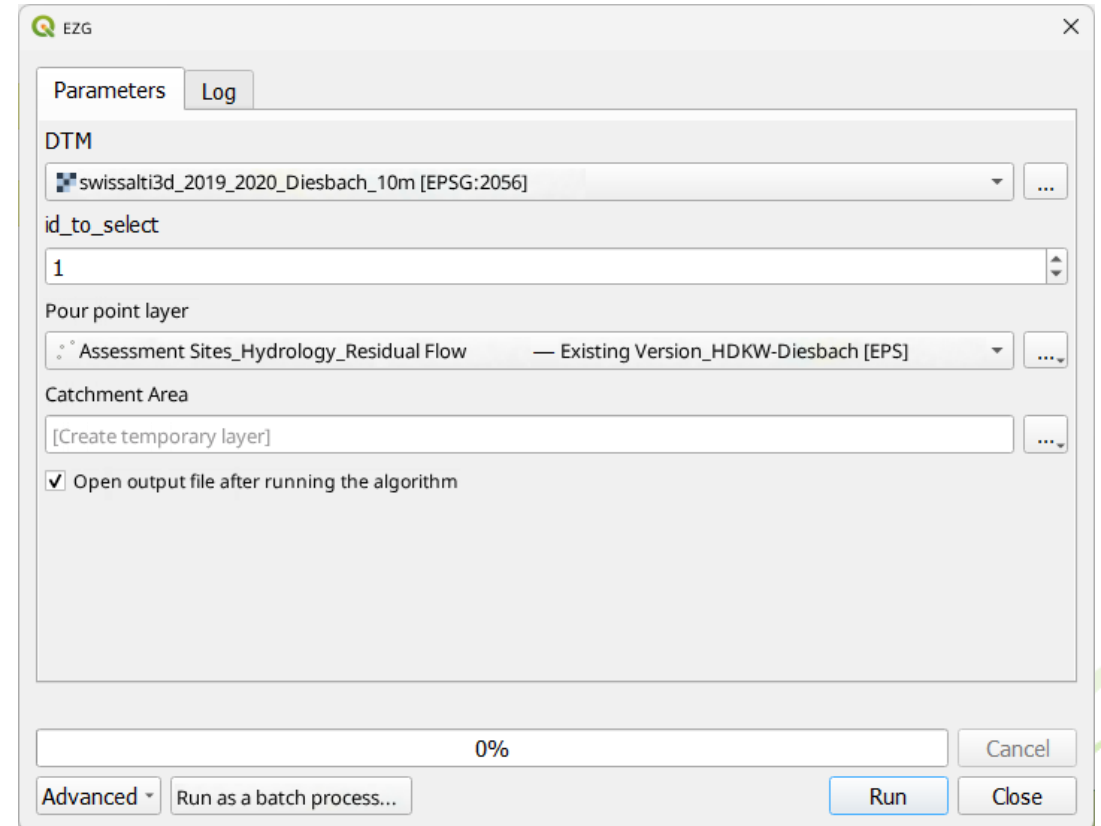


SHARING AND RUNNING MODELS

- ▶ Graphical models are saved as so-called **model3 files** and can, for example, be sent via email.
- ▶ The model can later be run from the Processing Toolbox just like a “normal” QGIS tool.



Models saved in the project are located under *Project models*, while models saved in the profile folder are located under *Models*



MODELING INTERFACE

Models can also be exported as Python scripts and further edited

The screenshot displays the QGIS Model Designer interface for a model named 'Watershed'. The interface includes a menu bar with 'Model' and 'Edit View' tabs, a toolbar with icons for various actions, and a main workspace showing a workflow diagram. The workflow starts with a 'TM' (Topographic Map) input, followed by 'Fill Sinks (Planchon/Darboux, 2001)', 'Upslope Area', 'Polygonize (raster to vector)', and 'Dissolve', finally outputting 'Watershed basin'. The 'Model Properties' panel on the left shows the model name 'Watershed' and a group name field. The 'Undo History' panel at the bottom shows the current state as '<empty>'. A red circle highlights the 'Run' button in the toolbar.

Model Designer: Watershed

Model Edit View

Validate Model
Run Model...
Run Selected Steps...
Reorder Model Inputs...
Reorder Output Layers...
New Model...
Open Model...
Save Model
Save Model as...
Save Model in Project
Edit Model Help...
Export
Close

F5
Shift+F5
Ctrl+O
Ctrl+S
Ctrl+Shift+S

The model can be validated (checked for validity)

Run the model

The order of the inputs and outputs for the input form can be defined or changed as desired

Watershed basin

MODELING INTERFACE

Model Designer: Watershed

Model Edit View

Algorithms

Search...

3D Tiles

Cartography

Database

File tools

GPS

Interpolation

Layer tools

Mesh

Modeler tools

Network analysis

Plots

Inputs Algorithms

Model Properties

Name Watershed

Group Enter group name here

Variables Model Properties

Undo History

<empty>

Pour point layer

DTM

id_to_select

Fill Sinks (Planchon/Darbox, 2001)

Upslope Area

Polygonize (raster to vector)

Dissolve

Watershed basin

- For each element, **right-clicking** provides the option to **edit**, remove, or **comment on**.
- For algorithms, intermediate results can also be displayed as layers if they are available in the cache.
- Under *View Log*, any error messages for the algorithm are displayed.

Run from Here...

Remove

Edit...

Add Comment...

Deactivate

View Output Layers

View Log...

INPUT DATA AND INPUT PARAMETERS IN THE MODEL

Raster conversion - Polygonize (raster to vector)

Properties Comments

Description Polygonize (raster to vector)

Show advanced parameters

Input layer

Using algorithm output "Upslope Area" from the "Upslope Area" algorithm

Value

Pre-calculated value

Model Input

☒ Algorithm Output

Use 8-connectedness

123 No

Vectorized

[Enter name if this is a final result]

Dependencies

0 dependencies selected

OK Cancel Help

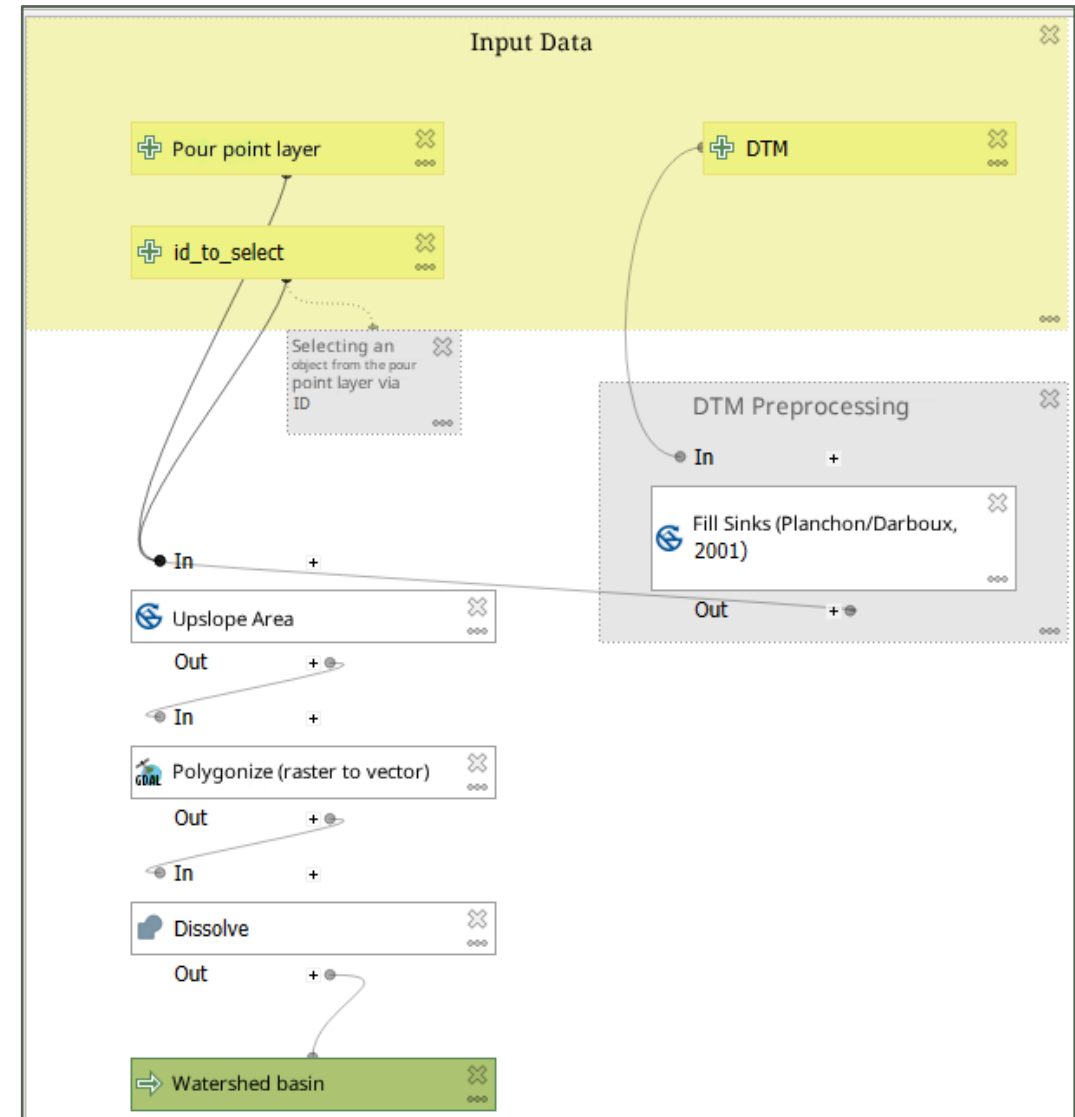
For each tool, a distinction is always made between the following for inputs and parameters:

- a) A **fixed value** (*Value*)
- b) An **expression** (*Pre-calculated Value*)
- c) An **input layer** or **parameter** (*Model Input*)
- d) An intermediate result, i.e., an **output from a previous tool** (*Algorithm Output*)

Whenever a result (including an intermediate result) is to be output (i.e., a layer is generated), a **name for the output** must be entered

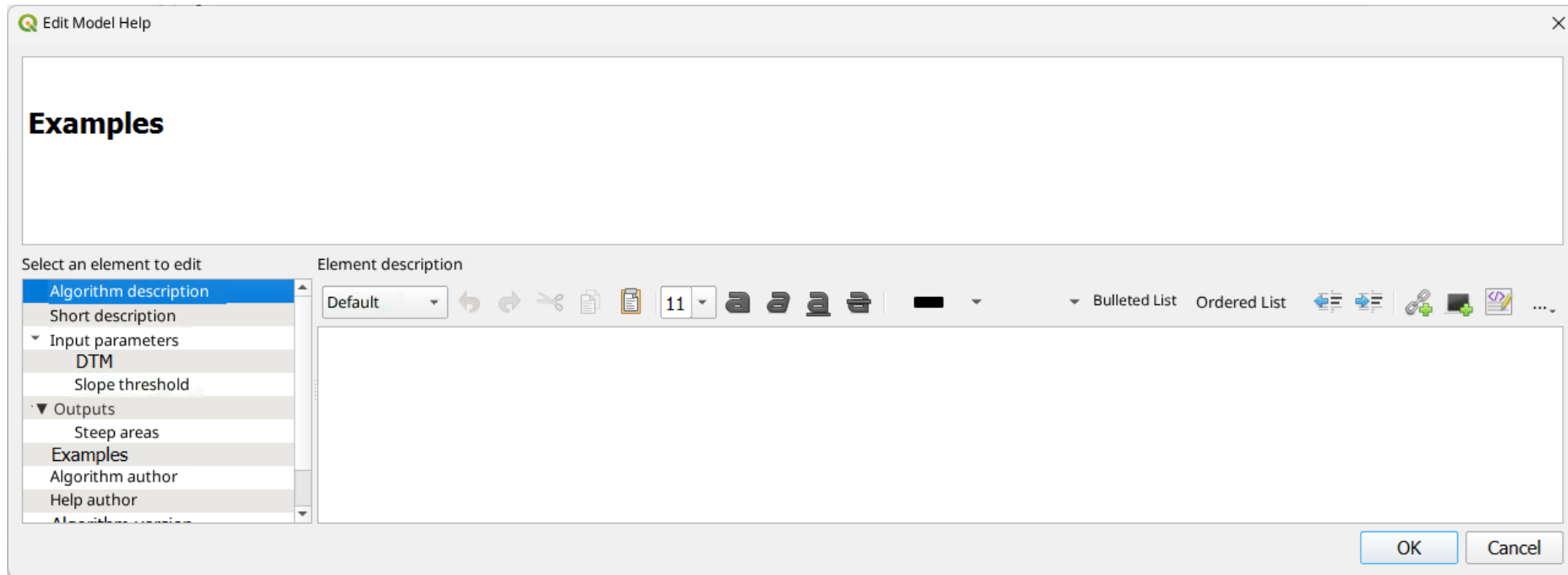
MODEL LAYOUT

- ▶ Under *Edit* > *Add Group Box* you can **add colored boxes** for grouping .
- ▶ Under *Edit* , you can also, for example, cut, copy, or **align** ; to select multiple elements, press the Shift key
- ▶ Under *View* , you can use *Enable Snapping* to enable automatic snapping when placing objects



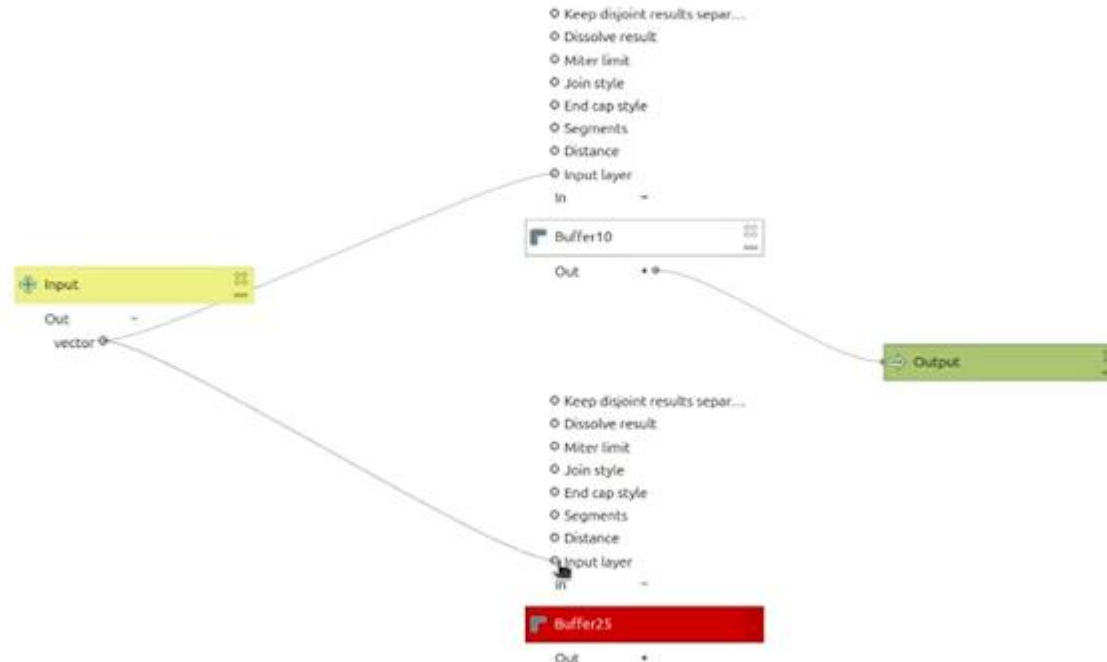
MODEL DOCUMENTATION AND HELP

- In the Model Designer, you can use *Model > Edit Model Help* to create a **help text** for your model (similar to the help text for the built-in QGIS tools)



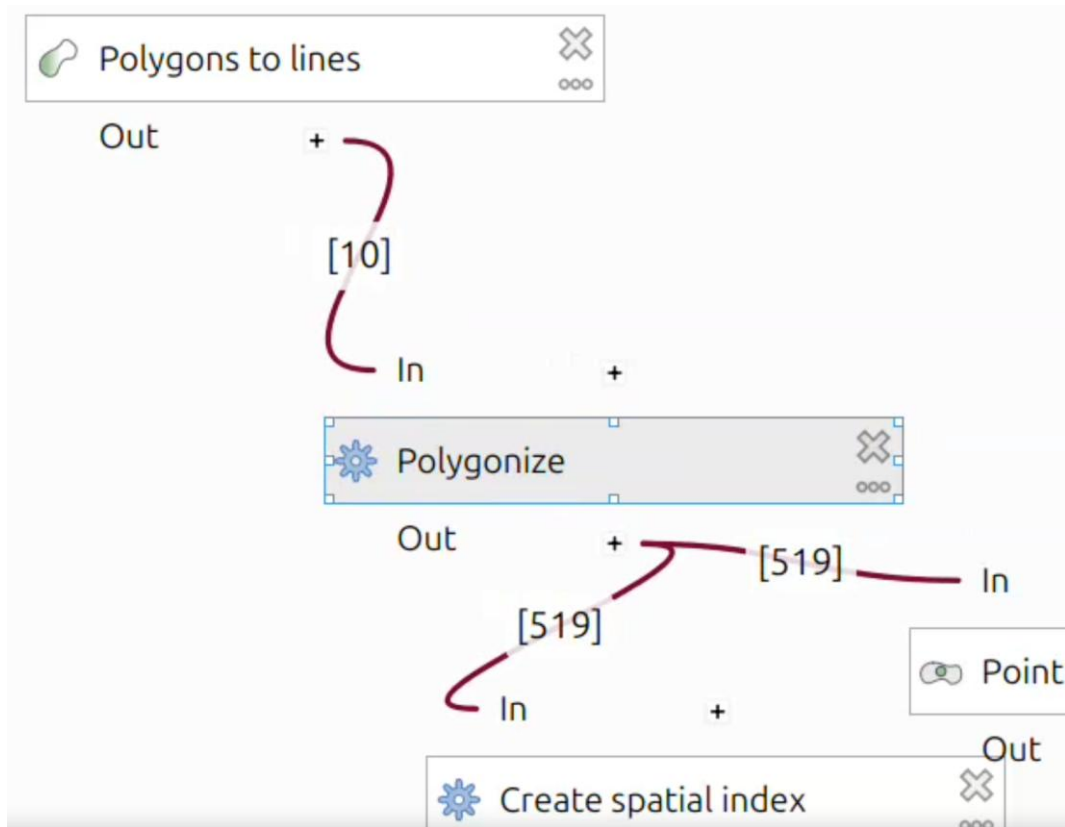
WHAT'S NEW IN MODEL DESIGNER?

- drag and drop support in the model designer(QGIS 3.44)



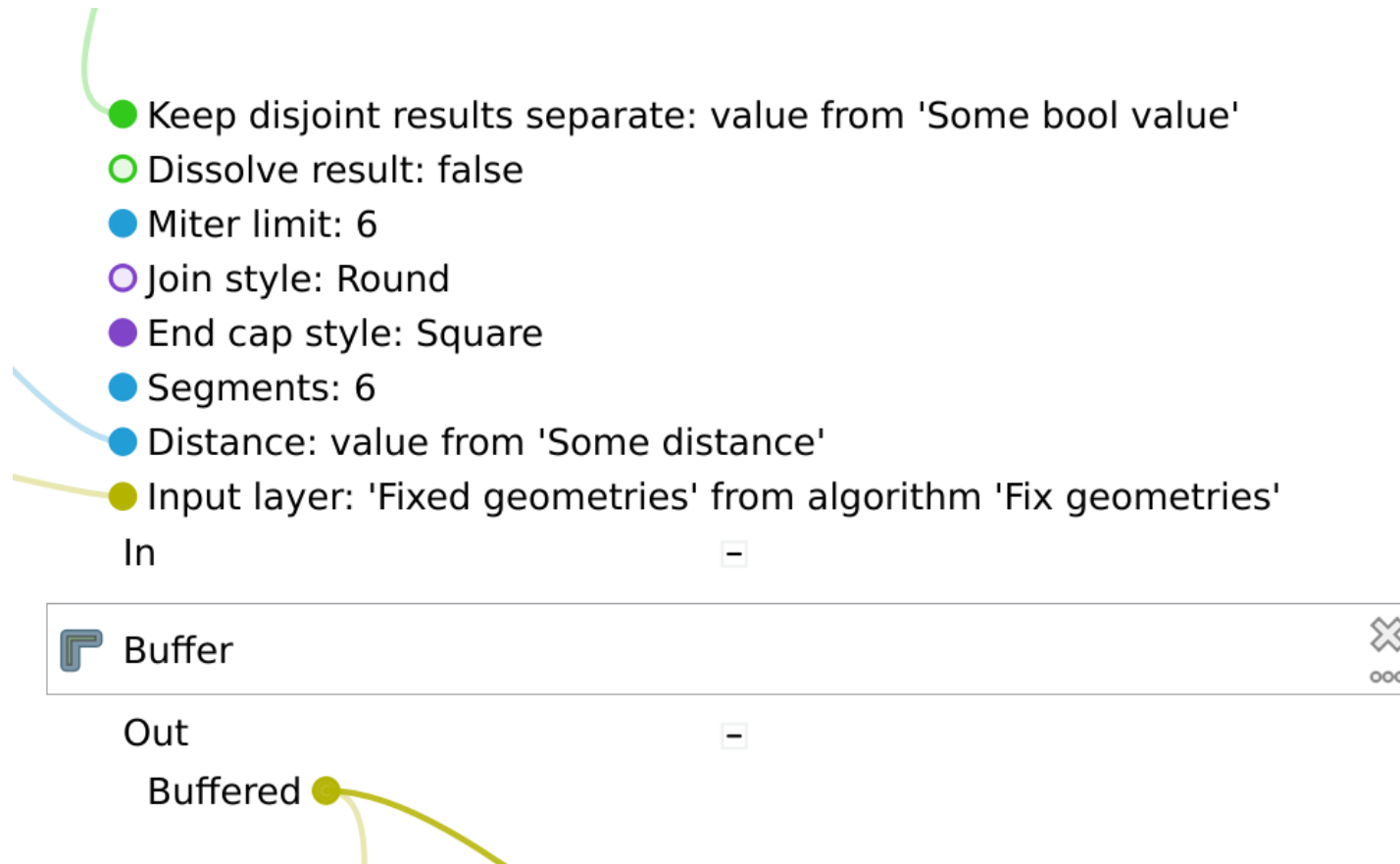
WHAT'S NEW IN MODEL DESIGNER?

- Show the feature count flowing through a model (QGIS 4.0)



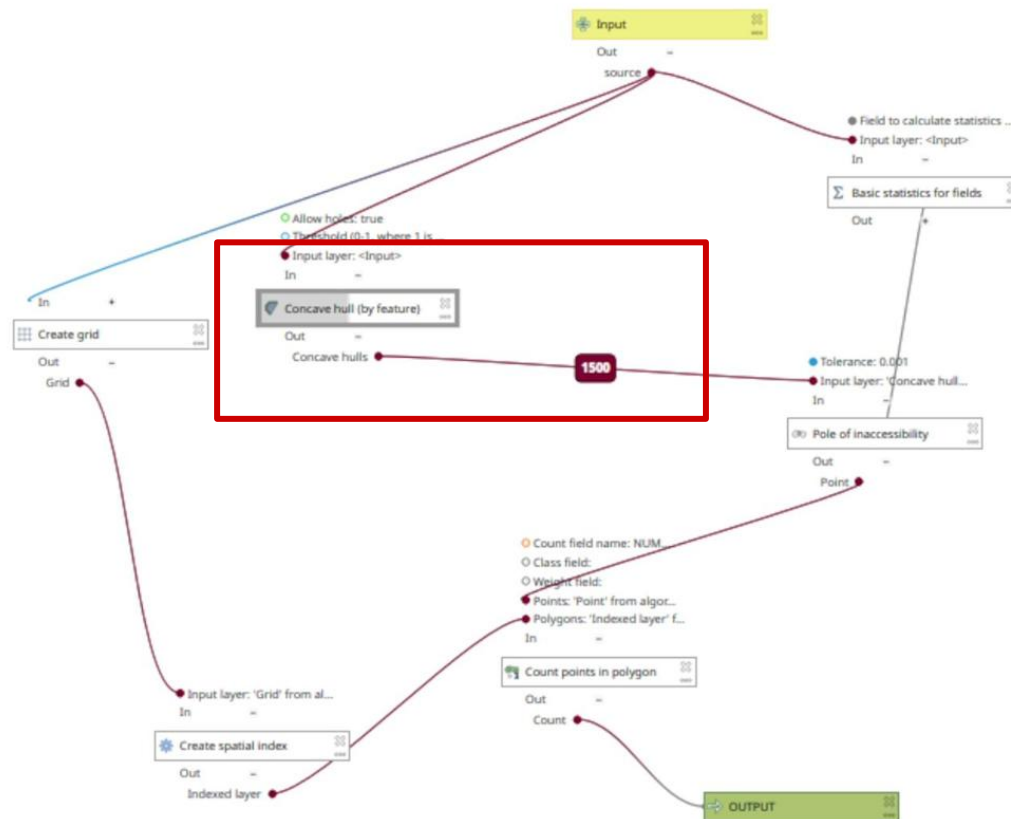
WHAT'S NEW IN MODEL DESIGNER?

► Color coded sockets (QGIS 4.0)



WHAT'S NEW IN MODEL DESIGNER?

- Dynamic reporting (QGIS 4.2)



<https://qgis.org/project/visual-changelogs/visualchangelog42/#feature-dynamically-show-child-step-feature-counts-as-model-progresses>

WHAT'S NEW IN MODEL DESIGNER?

► Processing “Autocomplete”



<https://github.com/qgis/QGIS/pull/67117>



WHAT'S NEW IN MODEL DESIGNER?

- ▶ And more to come in QGIS 4.x series
- ▶ More UX improvements : Insert in-between algorithms, melt etc...
- ▶ Performance improvements
- ▶ Improved backward compatibility
- ▶ Data viewer inside the model designer
- ▶ Bug fixes

