Multiplexer Element

The element allows you to join two data flows into a single data flow, i.e. to join messages from two input ports into concatenated messages and send them to the output. The concatenation approach is determined by the *Multiplexing rule* parameter.

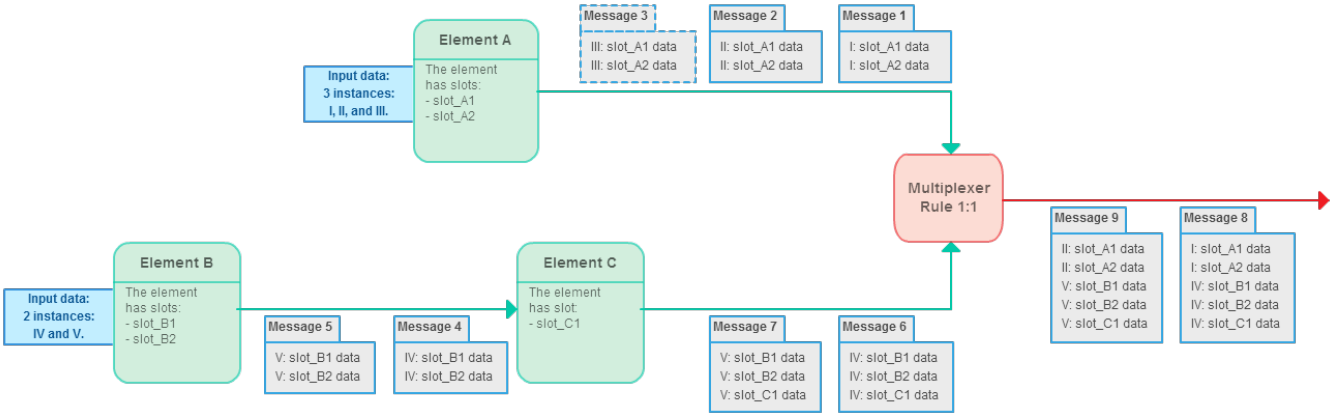
There are the following multiplexing rules:

- 1 to 1
- 1 to many

Rule: 1 to 1

This rule means that the multiplexer gets one message from the first input port and one message from the second input port, joins them into a single message, and transfers it to the output. This procedure is repeated while there are available messages in both input ports.

See *an example workflow* below:



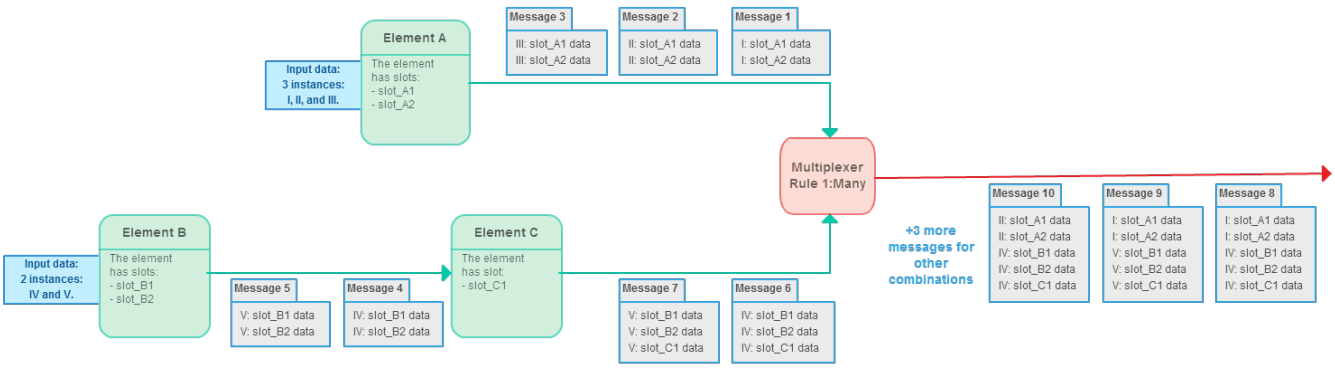
As you can see:

- There are elements **A**, **B**, **C**, and the Multiplexer.
- **A** and **B** are data readers.
- **A** gets three data objects as input. These objects are denoted as **I**, **II**, and **III**. **A** has two slots, so the input data objects may also have various data. For example, this may be "Sequence" and "Set of annotations" slots, and the data are read from three GenBank files.
- **B** gets two data objects as input. These objects are denoted as **IV** and **V**. **B** also has two slots in this example.
- **C** gets messages in the workflow from **B**. It has one output slot. For example, this may be a "Set of annotations" slot, i.e. additional annotations were calculated for input objects **IV** and **V**.
- Now in the Multiplexer element we have three messages from **A**, that correspond to the three input objects **I**, **II**, and **III**. And we have two messages from **B** and **C** elements, that correspond to the two input objects **IV** and **V** with additional information, calculated in **C**.
- The multiplexing rule is "1 to 1". This means that we only take into account messages that have a pair. Thus, "Message 3" is ignored in this case. However, the multiplexer concatenates the other messages. "Message 1" is concatenated with "Message 6", and "Message 8" is produced. "Message 2" is concatenated with "Message 7", and "Message 9" is produced.

Rule: 1 to many

This rule means that the multiplexer gets one message from the first input port, joins it with each message from the second input port, and transfers the joined messages to the output. This procedure is repeated for each message from the first input port.

See *an example workflow* below:



As you can see the conditions are the same as in the first "1 to 1" case, described above:

- As on the first image there are elements **A**, **B**, **C**, and the Multiplexer.
- **A** and **B** are data readers.
- **A** gets three data objects as input. These objects are denoted as **I**, **II**, and **III**. **A** has two slots.
- **B** gets two data objects as input. These objects are denoted as **IV** and **V**. **B** has two slots.
- **C** gets messages in the workflow from **B**. It has one output slot.
- The Multiplexer element receives three messages from **A** and two messages from **C**.

However, the multiplexing is done so that each message from **A** is concatenated from each message from **C**. As a result the following messages are produced:

- "Message 1" + "Message 6" = "Message 8"
- "Message 1" + "Message 7" = "Message 9"
- "Message 2" + "Message 6" = "Message 10"
- "Message 2" + "Message 7" = "Message 11"
- "Message 3" + "Message 6" = "Message 12"
- "Message 3" + "Message 7" = "Message 13"

Element type: multiplexer

Parameters

Parameter	Description	Default value	Parameter in Workflow File	Type
Multiplexing rule	Available values are: • 1 to 1 • 1 to many See the detailed description of the values above.	1 to 1	**multiplexing-rule**	*string*

Input/Output Ports

The *Multiplexer* element has ports, but it has not slots.

The element has 2 input port:

1. The first input port:
   - **Name in GUI:** *First input port*
   - **Name in Workflow File:** input-data-1
2. The second input port:
   - **Name in GUI:** *Second input port*
   - **Name in Workflow File:** input-data-2

The element has 1 output port:

- **Name in GUI:** *Multiplexed output*
- **Name in Workflow File:** output-data

Element in Samples

The element is used in the following workflow samples:

- Find Substrings in Sequences
- Merge Sequences and Annotations
- Search for TFBS