

# Rule Chains

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## Overview

**Rule Chains** are a set of Rules combined together in sequence, where every **Rule** produces a fact that is both an Output of and can be consumed in Rules further down the Chain.

Rule Chains can be set up using more than one method. Deciding on the method that will be used is completely up to the preference of the Designer.

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## Why Rule Chains are Used

- Rule Chains can be used to build dynamic questionnaires, where Chained Rules govern if a follow-up question is asked or not.
  - Rule Chains can be used to help evaluate a specific rate or qualify a lead, diagnose a patient, approve an application, or generate an output for wherever business processes require dynamic decision making.
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## Steps for a Rule Chain Flow

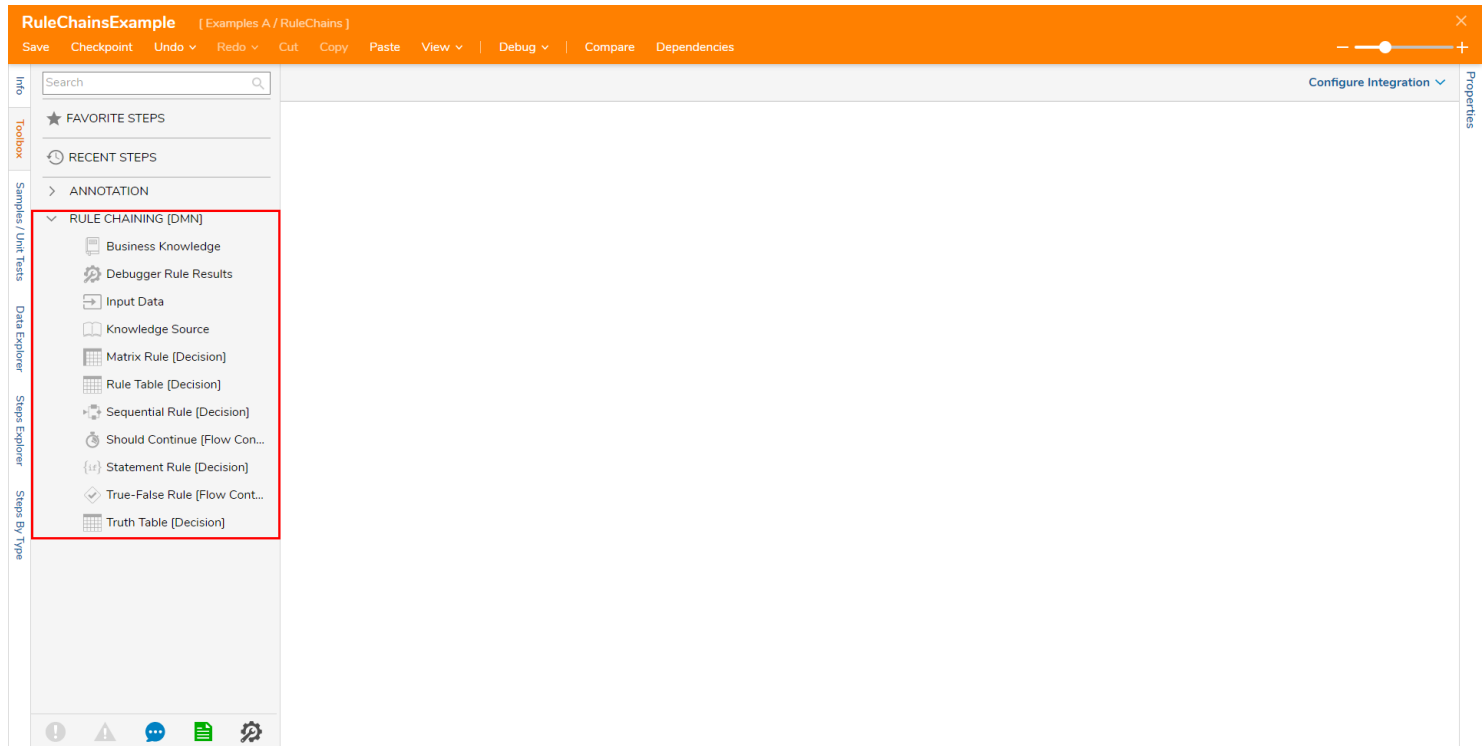
When building a **Rule Chain Flow**, there will be a limited **Toolbox** of steps to use:

- Business Knowledge
  - Debugger Rule Results
  - Input Data
  - Knowledge Source
  - [Matrix Rule](https://documentation.decisions.com/v7/docs/about-matrix-rules) (<https://documentation.decisions.com/v7/docs/about-matrix-rules>).
  - Should Continue [Flow Control]
  - [Statement Rule](https://documentation.decisions.com/docs/about-statement-rules) (<https://documentation.decisions.com/docs/about-statement-rules>).
  - [True-False Rule](https://documentation.decisions.com/v7/docs/truth-tables-rule-set) (<https://documentation.decisions.com/v7/docs/truth-tables-rule-set>). [Flow Control]
  - [Truth Table](https://documentation.decisions.com/v7/docs/about-truth-tables) (<https://documentation.decisions.com/v7/docs/about-truth-tables>).
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## Defining Data for the Rule Chain

Before a **Rule Chain** can be created, it needs **Data** to evaluate. There are two ways to get outside Data into the Rule Chain:

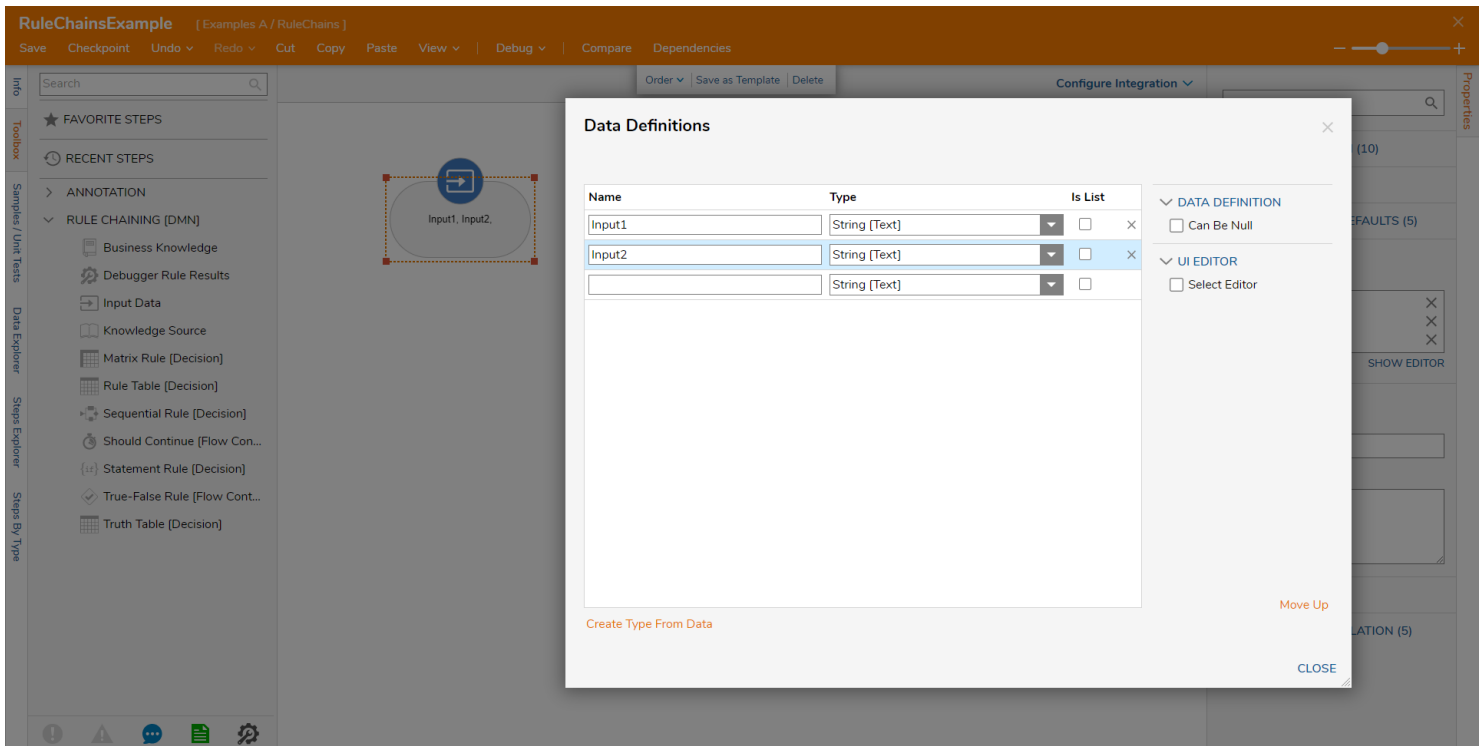
- 1 Define **Inputs** to be mapped into the Rule Chain
- 2 Define **Constant** Data that will only be used within the Rule Chain.



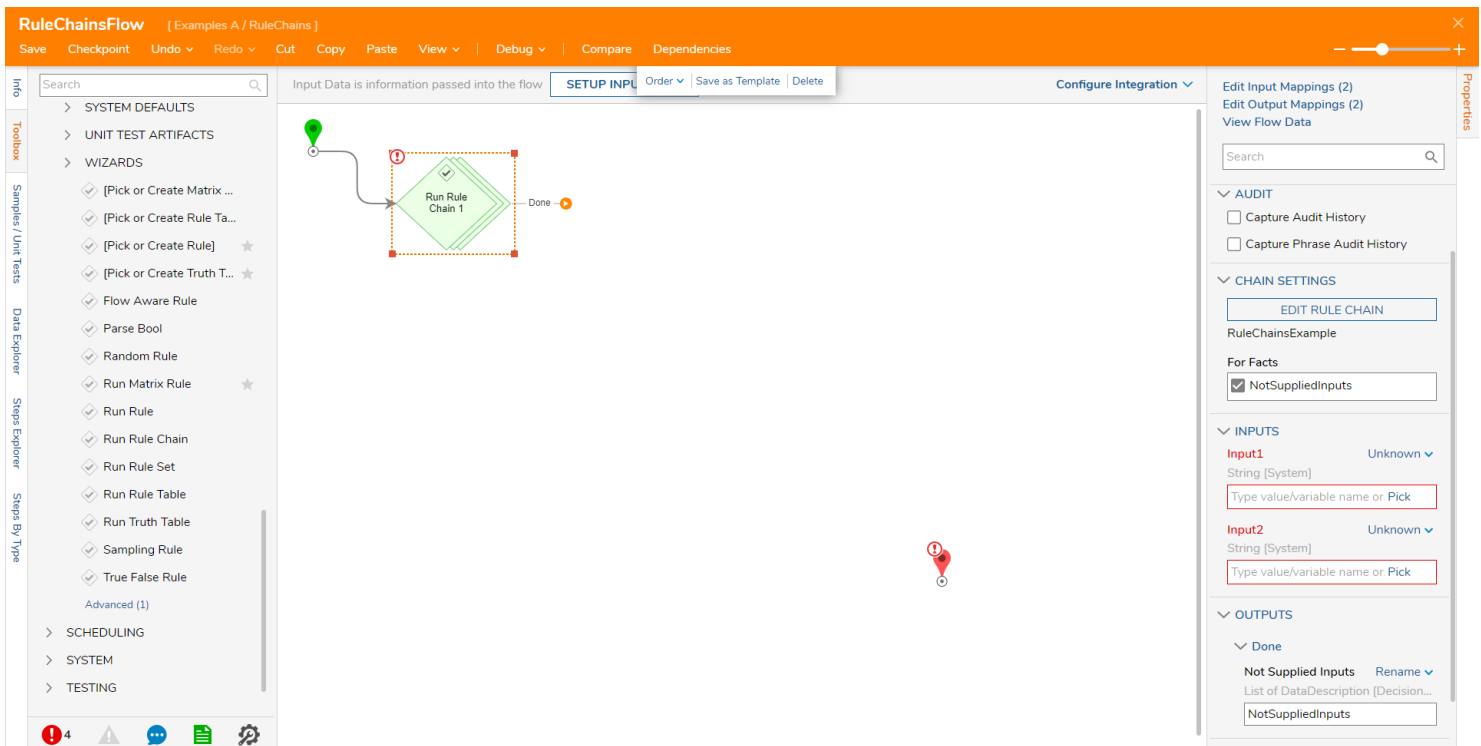
## Data Specific steps

### Input Data

**Input Data** steps allow for the custom definition of the **Data Members** needed as Inputs for the Rules in the Chain. Input Data steps can also have unlimited paths coming in and out of them.



Defining the Inputs will expose Input variables on the Rule Chain, similar to a Start step in a Flow.



## No Supplied Input Data

Two things happen when **Data** is not supplied to an Input.

- 1 All steps connected to a **Null Input** Data step do not execute.  
Input Data steps create a dependency on all connected steps.
- 2 The **Rule Chain** itself outputs a list of **Inputs** without Data Supply as **DataDescription[]**.

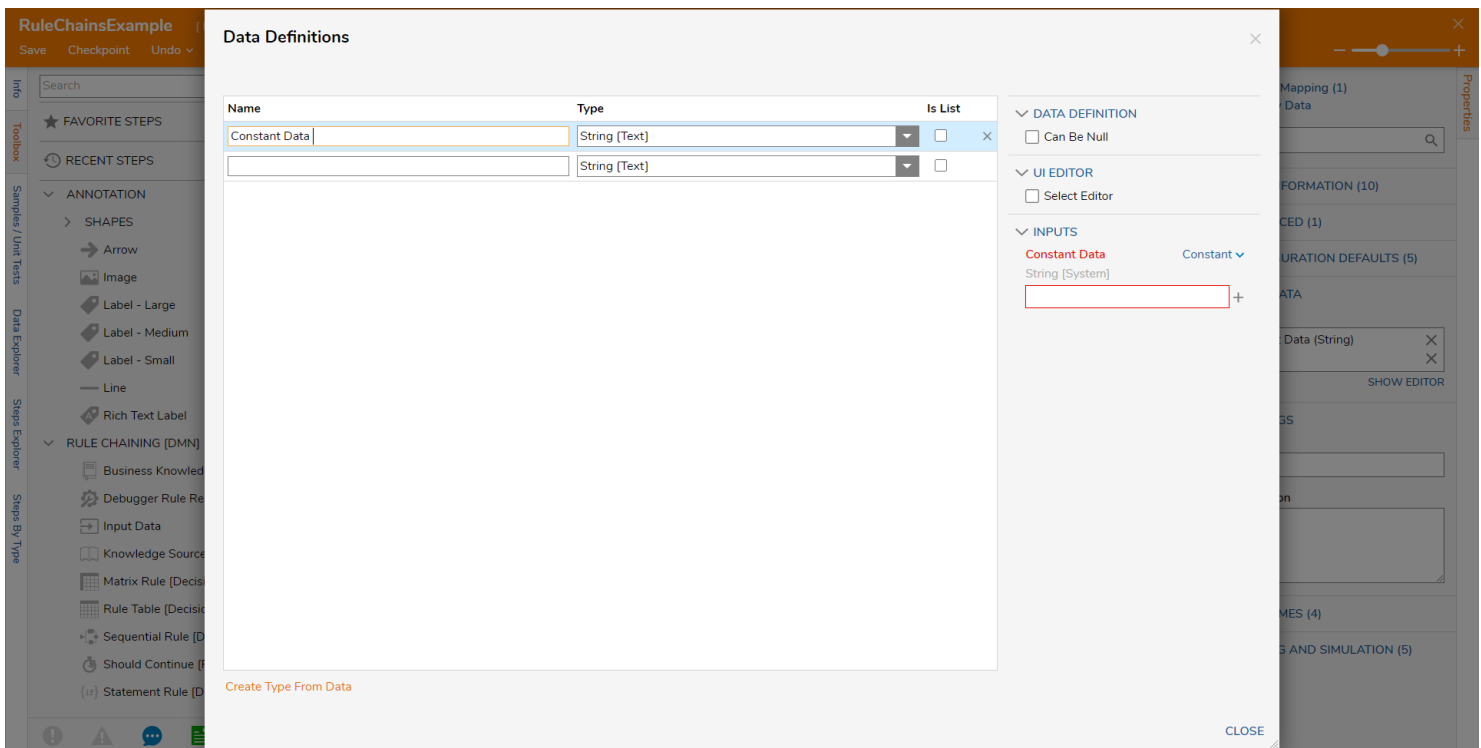
This list can be used outside of the Rule Chain to determine why certain facts were not produced by the Rule Chain.

## Business Knowledge and Knowledge Source

These steps allow for the creation of **Constant** data within the **Rule Chain**. The declared Data is passed into all connected steps as available input data.

No mapping outside of the Rule Chain is required.

The screenshot displays the RuleChainsExample application interface. The main workspace shows a rule chain diagram with an input node labeled "Input1, Input2" connected to a step node labeled "Step 1". The "Step 1" node is highlighted with a red dashed border. The left sidebar contains a "TOOLBOX" with various step types, including "Business Knowledge" and "Knowledge Source", both of which are highlighted with red boxes. The right sidebar shows the "Properties" panel for "Step 1", with the "Data" field set to "Constant Data (String)".



## Adding Rules to a Rule Chain

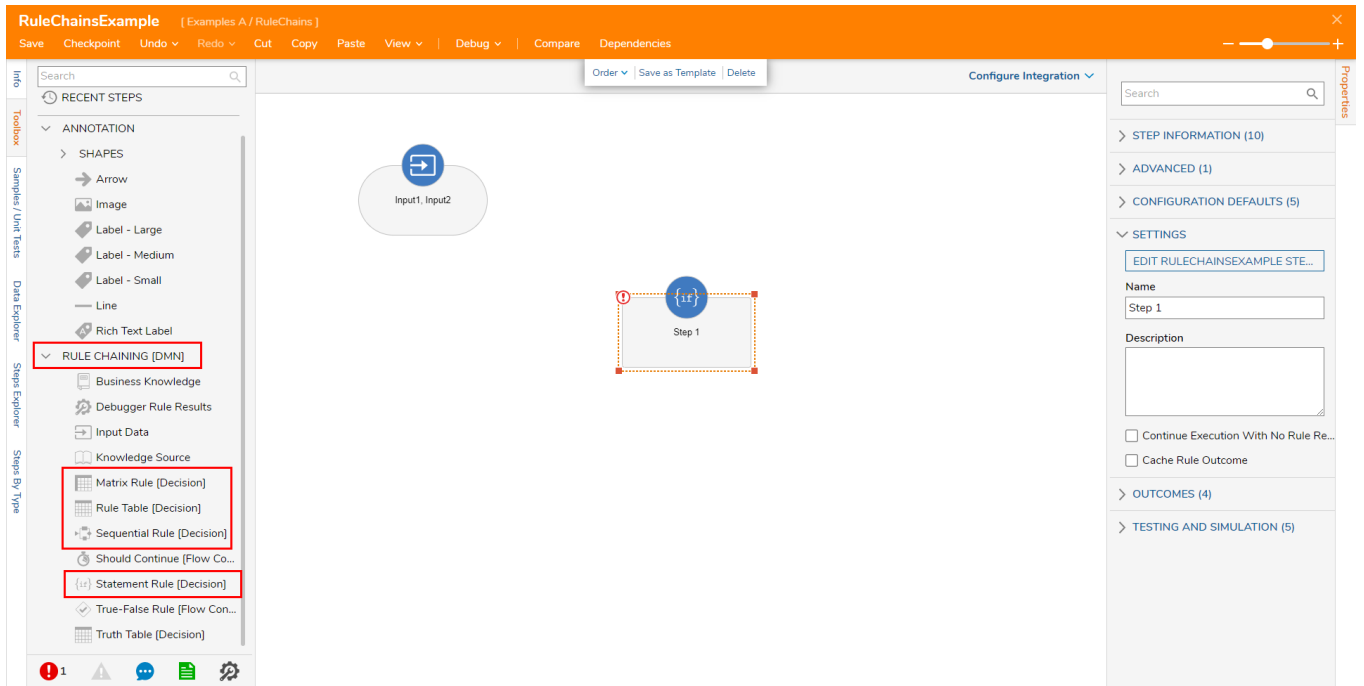
The various types of Decisions Rules may be used in Rule Chains via the Rule steps.

## Decisions Rule Steps

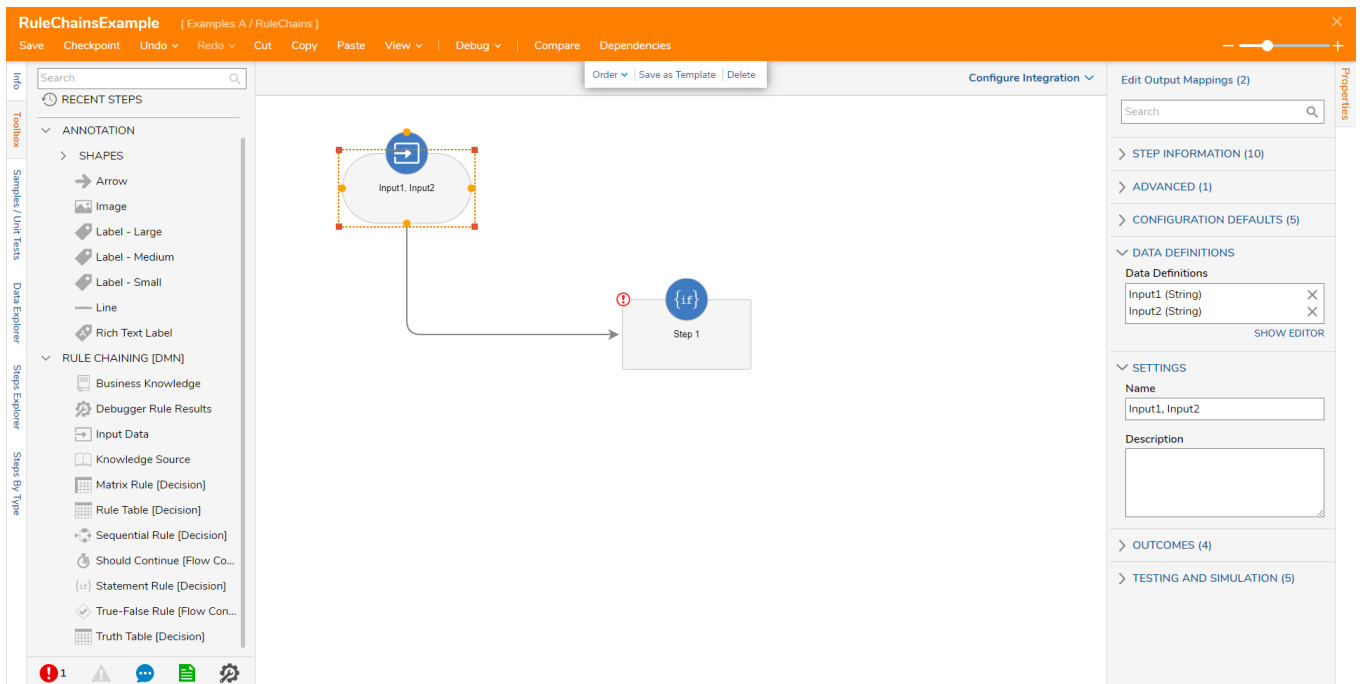
Note: these steps do not require mapping.

By design, Data is automatically mapped into connected Rule steps. To use Rule steps in a Rule Chain:

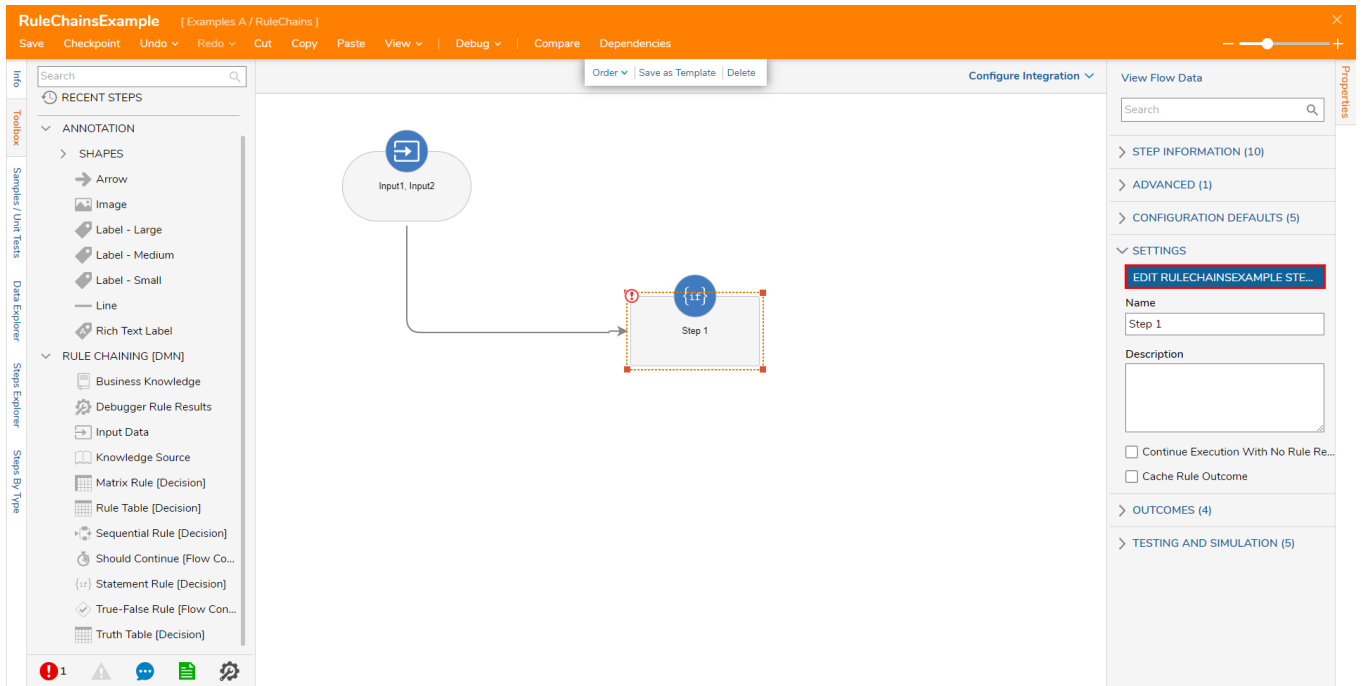
- 1 From the **Rule Chain Designer**, add the desired **Rule** step from **Toolbox > RULE CHAINING [DMN]** to the workspace.



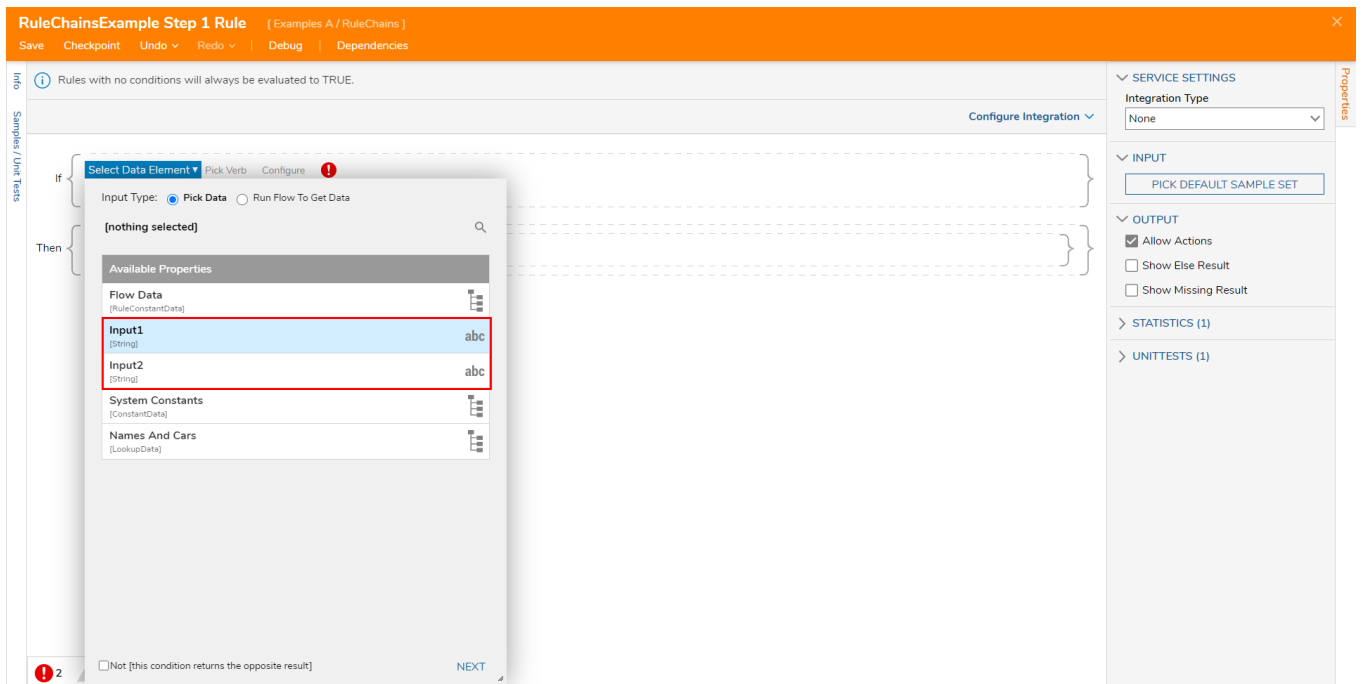
2 Drag out one of the connection points from the **Input Data** to the Rule step.



3 Select the Rule step then click the EDIT button.



4 Define the Rule as usual by utilizing the connected Input Data as the Rule Inputs.



## Outputting Data within the Rule Chain

Rule steps, just like in a Flow, evaluate data and Output a result within the Rule Chain. If the rule evaluates True, the result data can be used by other connected steps in the Rule Chain.

The screenshot below represents a Statement Rule that Outputs a String value.

**RuleChainsExample Step 1 Rule** [ Examples A / RuleChains ]

Save Checkpoint Undo Redo Debug Dependencies

Info Rules with no conditions will always be evaluated to TRUE.

Configure Integration

If { Select Data Element Pick Verb Configure }  
 Add

Then { Result { Fact A } }  
 Add

Properties

SERVICE SETTINGS  
 Integration Type: None

INPUT  
 PICK DEFAULT SAMPLE SET

OUTPUT  
 Allow Actions  
 Show Else Result  
 Show Missing Result

STATISTICS (1)  
 UNITTESTS (1)

**Note:**

By default, connected Rules only execute if the Rule produces a result.

To change this behavior, in the Rule Chain Designer, toggle **Continue Execution With No Rule Result**.

**RuleChainsExample** [ Examples A / RuleChains ]

Save Checkpoint Undo Redo Cut Copy Paste View Debug Compare Dependencies

Order Save as Template Delete

Configure Integration

View Flow Data

RECENT STEPS

TOOLBOX

- ANNOTATION
  - SHAPES
    - Arrow
    - Image
    - Label - Large
    - Label - Medium
    - Label - Small
    - Line
    - Rich Text Label
  - RULE CHAINING [DMN]
    - Business Knowledge
    - Debugger Rule Results
    - Input Data
    - Knowledge Source
    - Matrix Rule [Decision]
    - Rule Table [Decision]
    - Sequential Rule [Decision]
    - Should Continue [Flow Co...]
    - Statement Rule [Decision]
    - True-False Rule [Flow Con...]
    - Truth Table [Decision]

Diagram: Input, Input2 → Step 1

Properties

STEP INFORMATION (10)  
 ADVANCED (1)  
 CONFIGURATION DEFAULTS (5)

SETTINGS  
 EDIT RULECHAINSEXAMPLE STE...  
 Name: Step 1  
 Description: [ ]  
 Continue Execution With No Rule Re...  
 Cache Rule Outcome

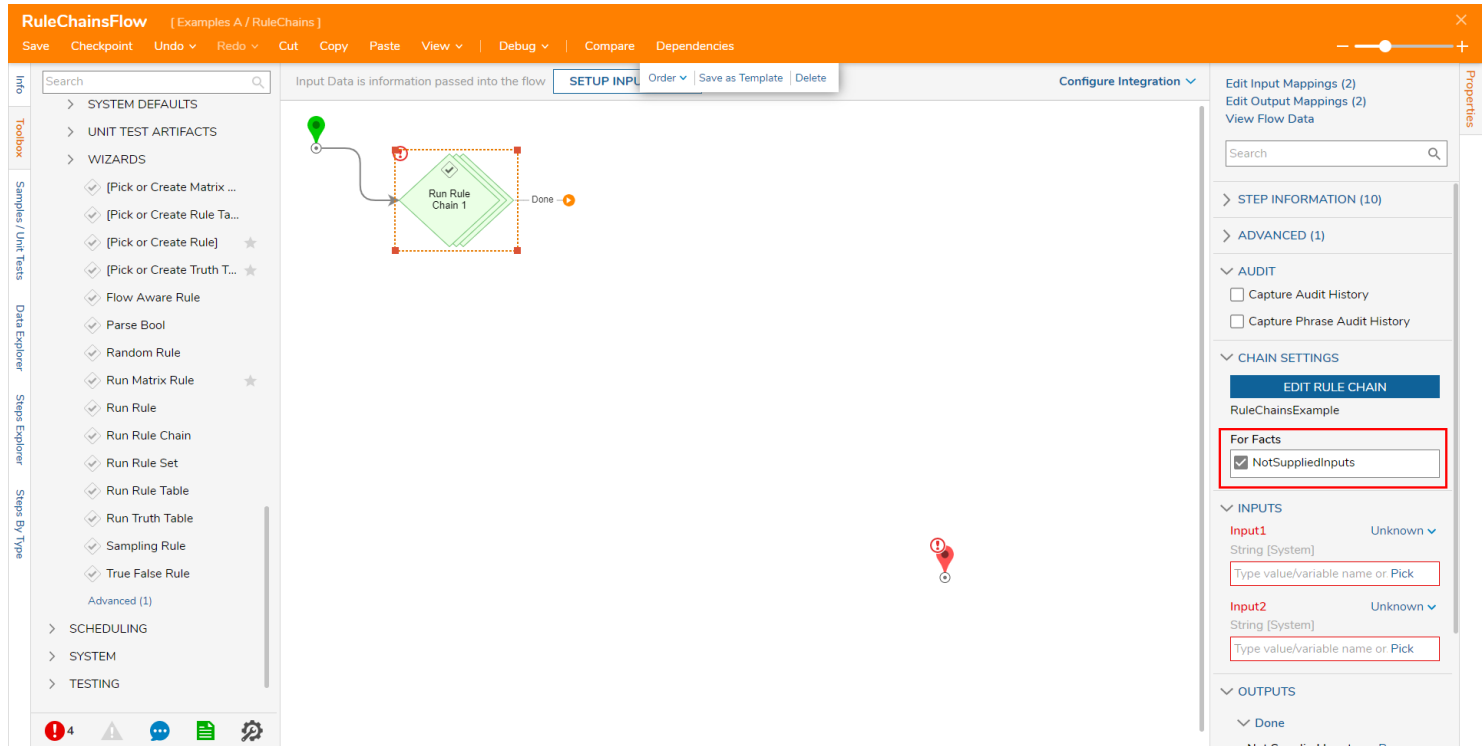
OUTCOMES (4)  
 TESTING AND SIMULATION (5)



# Outputting Data within the Flow

When the **Rule Chain** is called in a **Flow** as a step, the result data of the rules are **Output** by the entire Rule Chain step.

These are referred to as the Facts that the Rule Chain step is able to produce.



## Forward Chaining

By default, all **Facts** are checked and the **Rule Chain** attempts to collect them all. In other words, when the Rule Chain executes it goes down every path.

## Backward Chaining

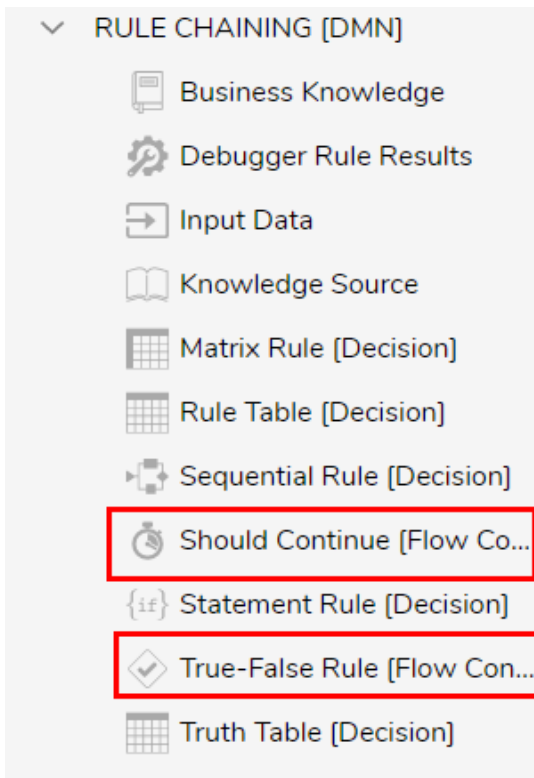
Alternatively, **Facts** can be deselected on the **Rule Chain** step. This means the paths that were required to gather these Facts are no longer executed.

If the path also included **Input Data** steps, those **Inputs** would also no longer be exposed as a parameter on the Rule Chain step.

## Adding Flow Controls to a Rule Chain

**Flow Control** steps in a **Rule Chain** help route which paths execute in the chain.

Note that Flow Controls do not return Data or produce Facts.



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## Should Continue

The **Should Continue** step helps to create a typical **If/Then Statement Rule**.

*Should Continue steps can have unlimited paths coming in and out of them.*

If the **Rule** evaluates **True**, then all paths coming out of the Should Continue step will execute. Alternatively, if the Rule evaluates **False**, then paths coming out of the Should Continue step no longer execute.

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## True-False Rule

The **True-False Rule** step also allows for the creation of an **If/Then Statement Rule** that does not return **Data**. The step can have unlimited paths coming in, but only a **True** and **False** path is available coming from the step.

If the **Rule** evaluates **True**, only the True path is taken. If the rule evaluates False, only the False path is taken.

[Suggest Edit](https://support.decisions.com/decisions/Primary/?FlowId=9597616f-1a34-11ec-849b-fcaa1494bd8e&&sessionId=NS-4953dc26-2096-11ec-8b9b-00155d0a3509&ForceFormat=true&Location=Center&Chrome=Off&DocumentUrl=https://documentation.decisions.com/docs/rule-chaining&DocumentTitle=) (<https://support.decisions.com/decisions/Primary/?FlowId=9597616f-1a34-11ec-849b-fcaa1494bd8e&&sessionId=NS-4953dc26-2096-11ec-8b9b-00155d0a3509&ForceFormat=true&Location=Center&Chrome=Off&DocumentUrl=https://documentation.decisions.com/docs/rule-chaining&DocumentTitle=>).