



A0597203 AI Business Applications

Introduction to Agentic AI

<https://www.knime.com/events/data-aware-agentic-ai-getting-started-course>

Learning Objectives

- Describe the building blocks of agentic AI
- Highlight the advantage of the autonomous nature of agentic AI to solve complex tasks
- Understand and list properties of tools
- Construct tools that follow the requirements of an agentic AI framework
- Understand the process of how an agent solves a task
- Implement agents in KNIME Analytics Platform with required inputs

Scenario 1

- Imagine you have three workflows:
 - One for sentiment analysis
 - One to pull customer data
 - One to draft a personalized email.
- You can combine these together to create a larger streamlined workflow to determine the sentiment from customer communication and respond accordingly in a personalized manner based on the information specific to that customer.

Scenario 2

- Say, you also have several other workflows - to pull the latest transactions, combine data sources, retrieve the latest exchange rates, generate personalized images...
- By combining these workflows, you have countless possibilities of what you can accomplish.
- However, that involves generating countless meta-workflows, or combinations of workflows, and that requires a tremendous amount of time and effort.
- Consequently such an approach may sound very impractical.
- But what if we can combine necessary workflows on the fly to accomplish whatever the task that is needed?

Agentic AI

- Agentic AI accomplishes this by combining and orchestrating different tools to complete a required task.
- Based on the input from the user, an AI agent identifies necessary tools, combines them in a correct order, monitors their executions, mediates their inputs and outputs, and formulates the final outcome the user can understand.
- In this chapter we will learn how agentic AI works by examining its building blocks.

Example Workflows



KNIME Learning Center

Download the example workflows

This course does not include exercises. To earn your microcredentials, you'll need to complete a knowledge check at the end.

You can, however, download the example workflows featured throughout the course and explore them to apply the knowledge you have acquired.

Download the **example workflows** from the KNIME Community Hub.

DOWNLOAD



Building Blocks of Agentic AI

- Agentic AI consists of a collection of tools specialized in different tasks, and an agent that calls them to accomplish the request by the user.
- There is a repository of tools available for the agent to use.
- The agent accesses these tools from the repository, combining them dynamically to accomplish the required process.
- In KNIME Analytics Platform, tools are workflows specialized for designated tasks. Such tools can be a modified version of an existing workflow, or constructed from scratch.
- These tools have the ability to receive input from an agent and return the output to the agent. A tool may be able to accomplish a particular task with or without using AI.

Tools

- Workflows specialized for different tasks. Tools can be called by an agent, with a mechanism to receive input from and to return output to an agent.
- We consider two classes of tools: classic tools – or simply tools, and intelligent tools:
 - Classic Tools (or simply Tools)
 - Perform a designated task without using AI
 - Examples: data aggregation, classification, numeric prediction, data transformation
 - Intelligent Tools
 - Perform a designated task using AI models
 - Examples: summarizing document, machine translation, sentiment analysis

Tool

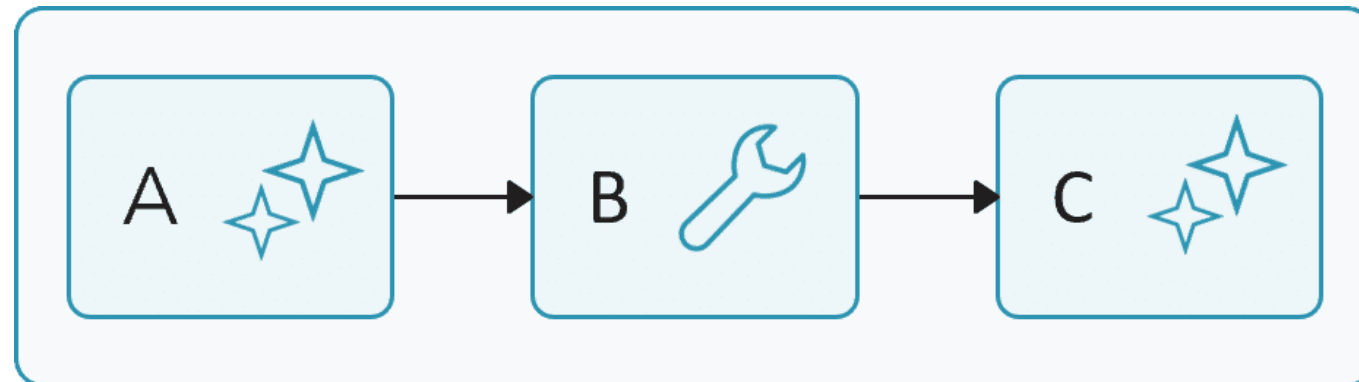


Tool



Workflow

- A series of tools, intelligent or otherwise, can be incorporated into a workflow to implement complex functionality. In such a framework, referred to as AI workflows, tools are connected to form meta-workflows. During the process the output from one tool is used as the input to another tool. For example, one intelligent tool identifies a customer from the information given in a prompt, then a tool retrieves all the support tickets associated with that customer, and finally an intelligent tool composes a summary of all the tickets to be sent by email.

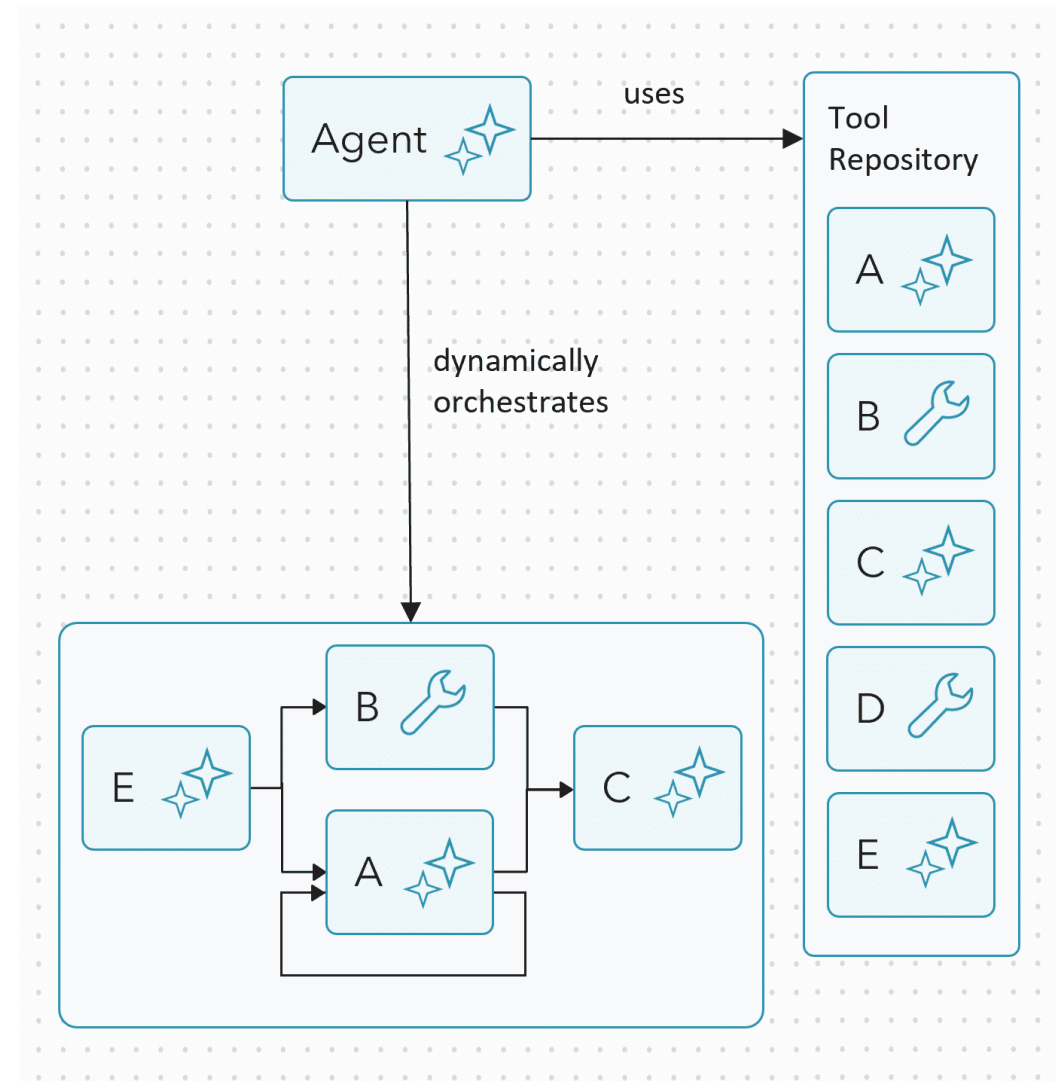


Agent

- The sequence of tools in an AI workflow is predetermined and fixed.
- To perform another task, an entirely new AI workflow needs to be constructed with a different sequence of tools.
- For example, an AI workflow to gather information about a product is different from an AI workflow to retrieve information about a customer.
- Rather than custom-building a combination of tools for each task, an intelligent agent can combine tools necessary to accomplish each task.
- An agent in agentic AI is an autonomous software system that is capable of perceiving its environment, reasoning about it, making decisions, and taking actions to achieve specific goals.
- In a more practical sense, an agent is able to decide to utilize one or more of the tools at its disposal to achieve its goal.

Agent

- Autonomous software system that can perceive its environment, reasoning about it, making decisions, and taking actions to achieve specific goals.
- It can combine tools at its disposal to achieve the goal to produce the desired outcome.



Understanding Properties of Tools

- In KNIME analytics platform, a tool is a workflow that the agent can call to perform a specific task during its reasoning process.
- Tools provide the agent with functionality it can use while thinking step-by-step about how to solve a problem.
- Tools can optionally receive data input from an agent or return a data output to an agent.
- In the following, we introduce two properties tools can have:
 - **Data-aware** tools are tools that access data or perform tasks on some data they receive from an agent. This can be, for example, a Tool that accesses and aggregates customer data from different data sources.
 - **Intelligent** tools are making use of Agentic AI. This can be, for example, a Tool that translates or summarizes a document or a Tool that predicts the sentiment of a message by means of calling a LLM.

Tool = KNIME Workflow

A tool is a KNIME workflow that performs a specific task. However, such workflows contain certain elements that are required to make the workflow a Tool usable by the agent

The screenshot displays the KNIME Tool configuration interface. At the top, a toolbar includes icons for saving, undo, redo, and buttons for 'Execute all', 'Cancel all', and 'Reset all'. The top right shows the tool name 'Local - Tool' and an 'Upload' button. The left sidebar contains navigation options: 'Info' (selected), 'Nodes', 'Explorer', 'K-AI', and 'Monitor'. The 'Info' panel shows the last update date as 'Jun 26, 2025' and a description: 'This tool takes an integer parameter as input. This parameter indicates the temperature in Celsius that the user wants to convert in Fahrenheit. The output of the workflow is provided with the tool output message.' Below this, sections for 'External resources' and 'Tags' both indicate that no links or tags have been added yet.

The main workspace is divided into four panels:

- Temperature Converter**: The title of the workflow, with a description: 'This tool takes an integer parameter as input. This parameter indicates the temperature in Celsius that the user wants to convert in Fahrenheit. The output of the workflow is provided with the tool output message.'
- Parameters**: A section for configuration nodes. It includes a 'Double Configuration' node, represented by a green icon with a red dot.
- Input data**: A section for input data tables. It includes a 'Workflow Input' node, represented by a green icon with a red dot.
- Message Output**: A section for the output message. It includes a 'Tool Message Output' node, represented by a green icon with a red dot.
- Output data**: A section for output data tables. It includes a 'Workflow Output' node, represented by a green icon with a red dot.

The central area of the workspace is currently empty, showing a large white rectangle.

Tool Description

Tool Description

Explains what the tool is doing

Temperature Converter

This tool takes an integer parameter as input. This parameter indicates the temperature in Celsius that the user wants to convert in Fahrenheit. The output of the workflow is a message.

Input data

Zero, one or more input data tables

Workflow Input

Output data

Zero, one or more output data tables

Workflow Output

Message Output

String message for the calling agent.

Tool Message Output

Parameters

The screenshot displays the Microsoft Power Automate interface for a workflow named 'Temperature Converter'. The interface is divided into several sections:

- Top Bar:** Contains icons for saving, undo, redo, and buttons for 'Execute all', 'Cancel all', and 'Reset all'. It also shows 'Local - Tool' and an 'Upload' button with a 90% zoom level.
- Left Sidebar:** Includes a navigation pane with 'Nodes', 'Explorer', 'K-AI', and 'Monitor'. Below this, there is an 'info' section with the text 'Last update: Jun 26, 2025'. Further down, there are sections for 'External resources' (with a plus icon and the text 'No links have been added yet') and 'Tags' (with the text 'No tags have been set yet').
- Main Canvas:** The central area where the workflow is built. It features a 'Parameters' section at the top, which is currently expanded to show a list of parameters. Below this, there are sections for 'Input data' and 'Output data', each with a plus icon and a description: 'Zero, one or more input data tables' and 'Zero, one or more output data tables' respectively. The 'Input data' section shows a 'Workflow Input' node, and the 'Output data' section shows a 'Workflow Output' node.
- Parameters Section:** A detailed view of the 'Parameters' section, showing a list of parameters that can be set by the agent. The parameters are listed in a table with columns for 'Name', 'Type', and 'Value'. The table is currently empty.

Data Input

Temperature Converter

This tool takes an integer parameter as input. This parameter indicates the temperature in Celsius that the user wants to convert in Fahrenheit. The output of the workflow is provided with the tool output message.

Parameters

Configuration nodes: the values that can be set by the agent.

Double Configuration

Input data

Zero, one or more input data tables

Workflow Input

Message Output

String message for the calling agent.

Message Output

Output data

Zero, one or more output data tables

Workflow Output

Data Input (optional)

The tool can receive data input from the agent

Data Output

The screenshot displays a workflow editor interface for a tool named "Temperature Converter". The interface includes a top toolbar with buttons for "Execute all", "Cancel all", and "Reset all", along with a "Local - Tool" dropdown and an "Upload" button. On the left, a sidebar contains sections for "Info" (last update: Jun 26, 2025), "Nodes", "Explorer", "K-AI", and "Monitor". The main workspace shows the tool's configuration, including a description, a "Parameters" section with a "Double Configuration" icon, an "Input data" section with a "Workflow Input" icon, and a "Message Output" section. A tooltip titled "Data Output (optional)" is overlaid on the "Workflow Output" icon, stating: "The tool can send a resulting data table back to the agent".

Temperature Converter

This tool takes an integer parameter as input. This parameter indicates the temperature in Celsius that the user wants to convert in Farenheit. The output of the workflow is provided with the tool output message.

Parameters

Configuration nodes: the values that can be set by the agent.

Double Configuration

Input data

Zero, one or more input data tables

Workflow Input

Message Output

Data Output (optional)

The tool can send a resulting data table back to the agent

Workflow Output

Tool Message Output

The screenshot displays a software interface for configuring a workflow tool. The main workspace is titled "Temperature Converter" and contains three primary configuration panels: "Parameters", "Input data", and "Output data".

- Parameters Panel:** Described as "Configuration nodes: the values that can be set by the agent," it includes a "Double Configuration" node icon.
- Input data Panel:** Described as "Zero, one or more input data tables," it features a "Workflow Input" node icon.
- Output data Panel:** Described as "Zero, one or more output data tables," it features a "Workflow Output" node icon.

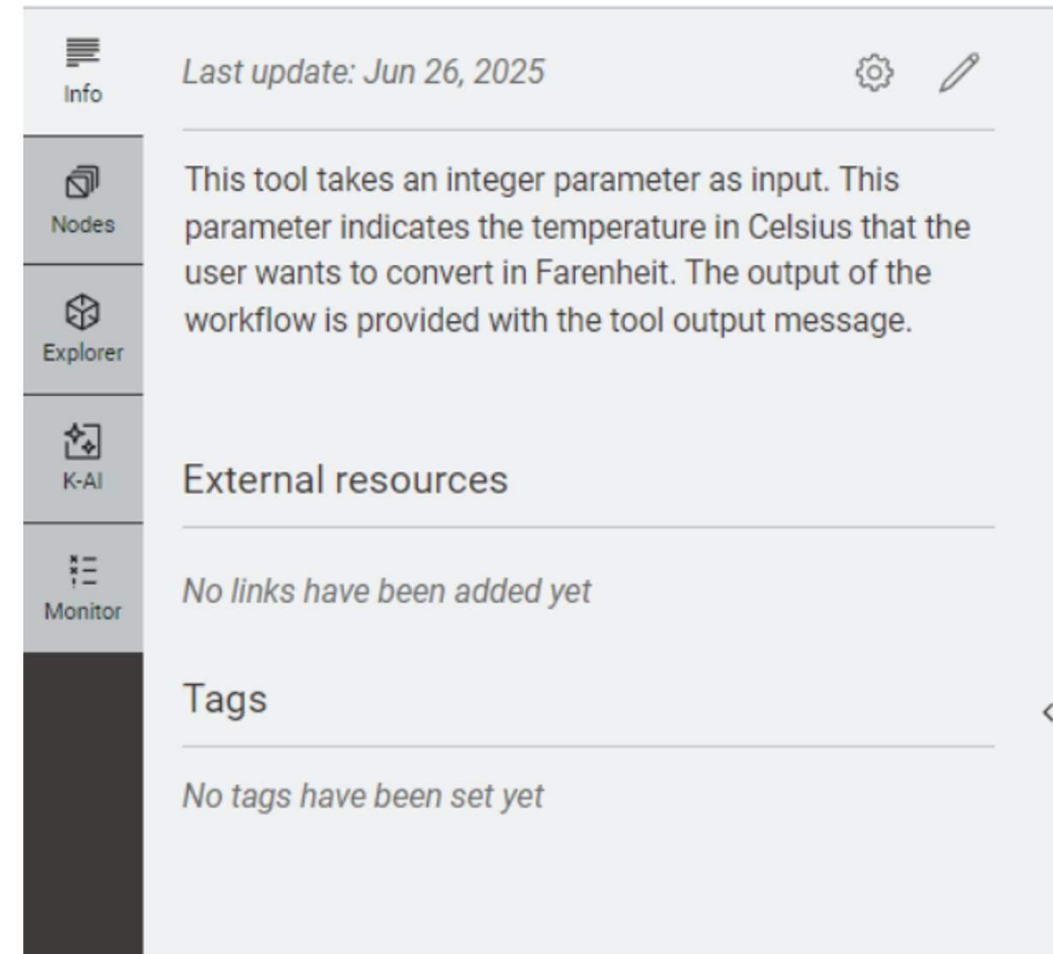
A central pop-up window titled "Tool Message Output" is overlaid on the workspace. It contains the text: "Provides optional feedback to the agent after a tool execution".

The left sidebar contains navigation options: "Info" (showing "Last update: Jun 26, 2025"), "Nodes", "Explorer", "K-AI" (with a "+" icon), and "Monitor" (showing "No links have been added yet" and "No tags have been set yet").

The top toolbar includes buttons for "Execute all", "Cancel all", "Reset all", "Local - Tool", "Upload", and a zoom level of "90%".

Tool Description

- The tool description explains as precisely as possible what task the tool is able to solve. It is defined in the workflow's Info field.
- The agent reads this description and decides when to use the tool. A well-written description allows the agent to reason effectively about the available options. You can also include some examples of usage, to enhance the description.
- The description should explain:
 - The task performed by the tool
 - The expected input data
 - The output produced
 - The configurations required
 - The types of question the tool is designed to answer



Tool Message Output

- The Tool Message Output node provides optional feedback to the agent after a tool execution.
- Include this node if textual output is needed for the agent to reason with after the tool call, omit it if no output is necessary.
- The node reads the first value from the first cell of its input table. This string becomes the content of the Tool Message returned to the agent. It is useful, for example, to return
 - A summary of the processed data (“The database contains data about 22 customers.”)
 - Short textual insights (“The average temperature is 22,5°C which is equivalent to 72.5°F.”)
 - Confirmation or intermediate results (“The email has been successfully sent to the recipient list.”)

The screenshot shows a 'Manually created table (Table)' window with 2 rows and 2 columns. The first row (Row0) contains the text 'The tool has been successfully executed' in the 'column1' field, which is highlighted with a dashed blue border. The second row (Row1) contains the text 'This cell is ignored' in the 'column1' field. The 'ignored' column contains the text 'This cell is ignored' for both rows. Below the table, a workflow diagram shows a 'Table Creator' node connected to a 'Tool Message Output' node. The 'Table Creator' node has a grid icon and a plus sign, and the 'Tool Message Output' node has a document icon with a plus sign. An arrow points from the 'Table Creator' node to the 'Tool Message Output' node. Below the 'Table Creator' node is the text 'Add comment'.

#	RowID	column1 String	ignored String
1	Row0	The tool has been successfully executed	This cell is ignored
2	Row1	This cell is ignored	This cell is ignored

Table Creator → Tool Message Output

Add comment

Parameters

- Parameters are values that can be set by the agent.
- Use Configuration nodes (such as String Configuration or Integer Configuration) to define adjustable parameters.
- For each parameter:
 - Provide a clear parameter name used as the variable name
 - Write a concise description explaining its purpose. The agent reads these definitions to determine which parameter values to set during tool execution

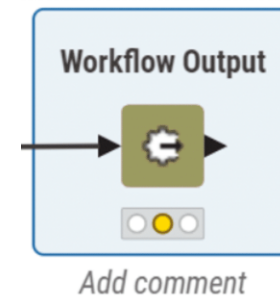
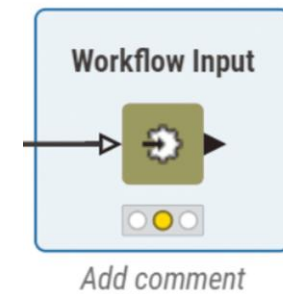
The screenshot shows a dialog box titled "Dialog - 3:1 - Double Configuration". It has three tabs: "Control", "Flow Variables", and "Job Manager Selection". The "Control" tab is selected. The dialog contains the following fields:

- Label:** "Temperature in Celsius"
- Description:** "This parameter indicates a temperature that the user wants to convert from Celsius into Farenheit."
- Parameter/Variable Name:** "temperature_C"
- Minimum:** A checkbox is unchecked, followed by a text box containing "0.0" and a spinner.
- Maximum:** A checkbox is unchecked, followed by a text box containing "1.0" and a spinner.
- Default Value:** A text box containing "0.0" and a spinner.

At the bottom of the dialog are four buttons: "OK", "Apply", "Cancel", and a help button (a circle with a question mark).

Data Input & Data Output (optional)







- Tools can optionally take input data or send a data output or both.
- Use the Workflow Input node to define the incoming data structure and the Workflow Output node to specify the result table the tool produces.
- The agent does not access raw data directly but can trigger tools that process and summarize data as needed.



Workflow Input

Parameter name

Description







B I U      

This tool takes as input a table with at least one column called Temperature and outputs the Average Temperature of that column.

Workflow Output

Parameter name

Description

B I U      

This tool outputs the average temperature calculated on the Temperature column. It adds a column called Average Temperature with the calculated value added to it.

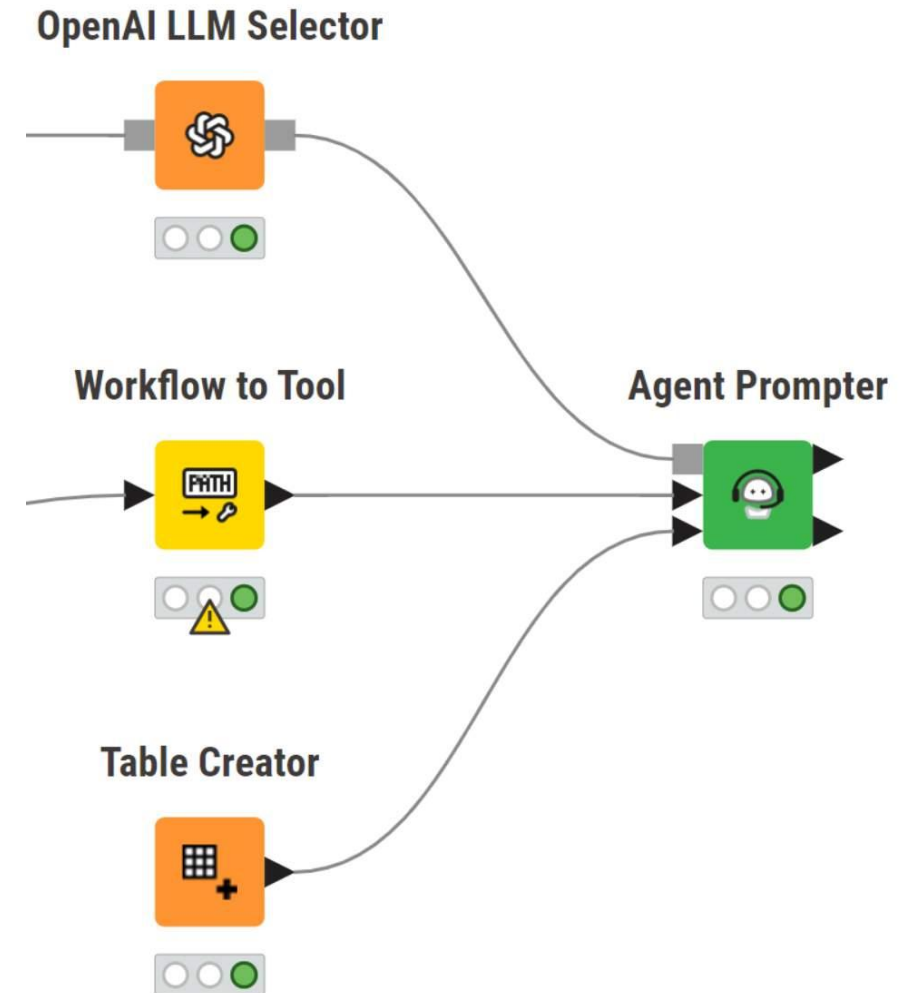
How Agents Work

- AI Agents work by a series of reasoning loop executions.
- In a way, agents are performing trials and errors until the required task is completed.
- Here are the steps in agents' execution:
 - The agent thinks about the task.
 - Chooses whether to call a tool.
 - Evaluates the result produced by the tool.
 - Decides if further steps are needed.
 - Continues until the task is completed.

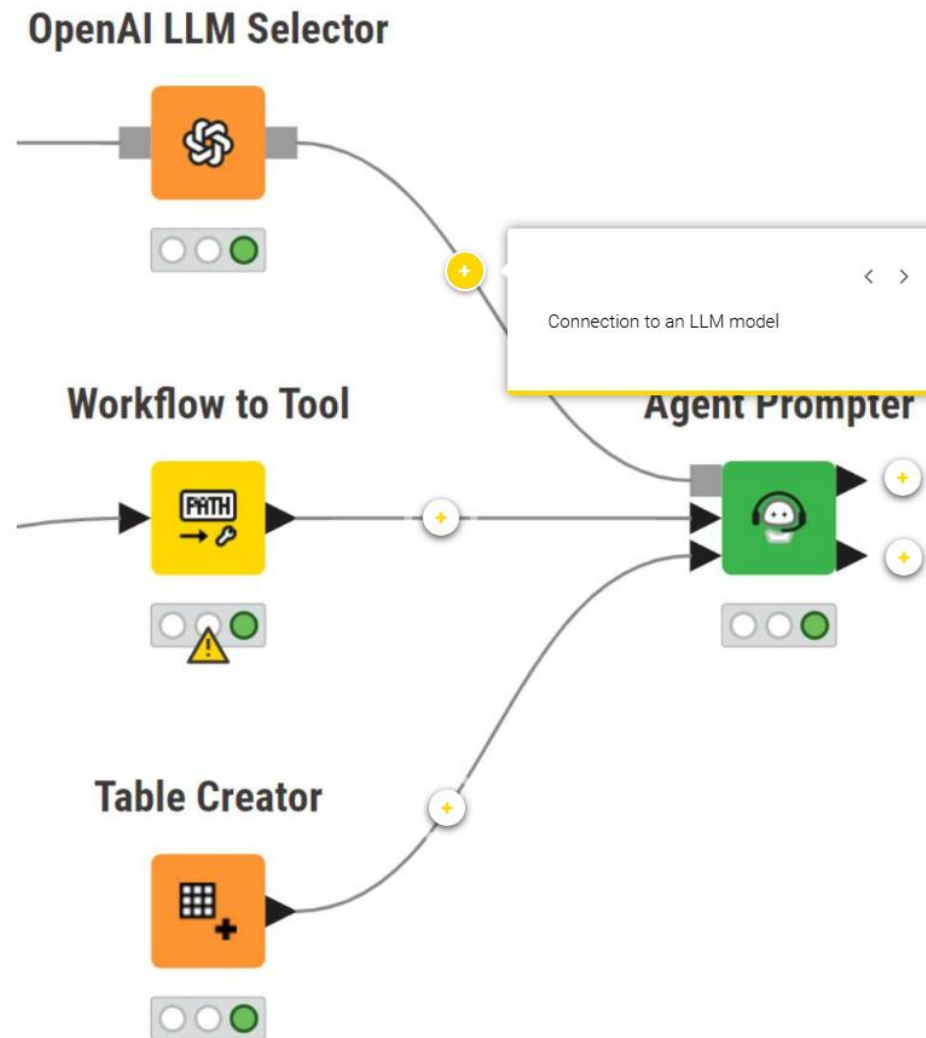


Agent Prompter

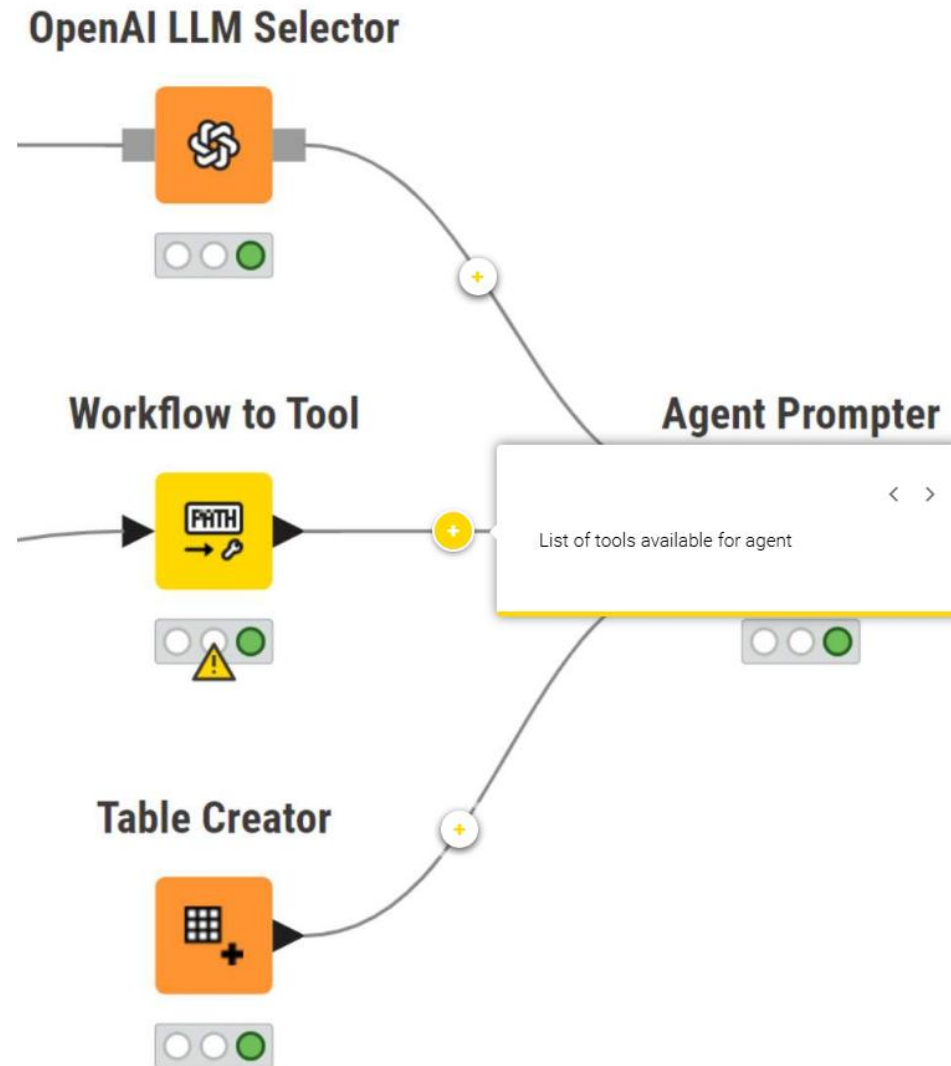
- In KNIME Analytics Platform, an AI agent is implemented by the Agent Prompter node, executing the loop described above.
- Here are the input and output ports of the Agent Prompter node.



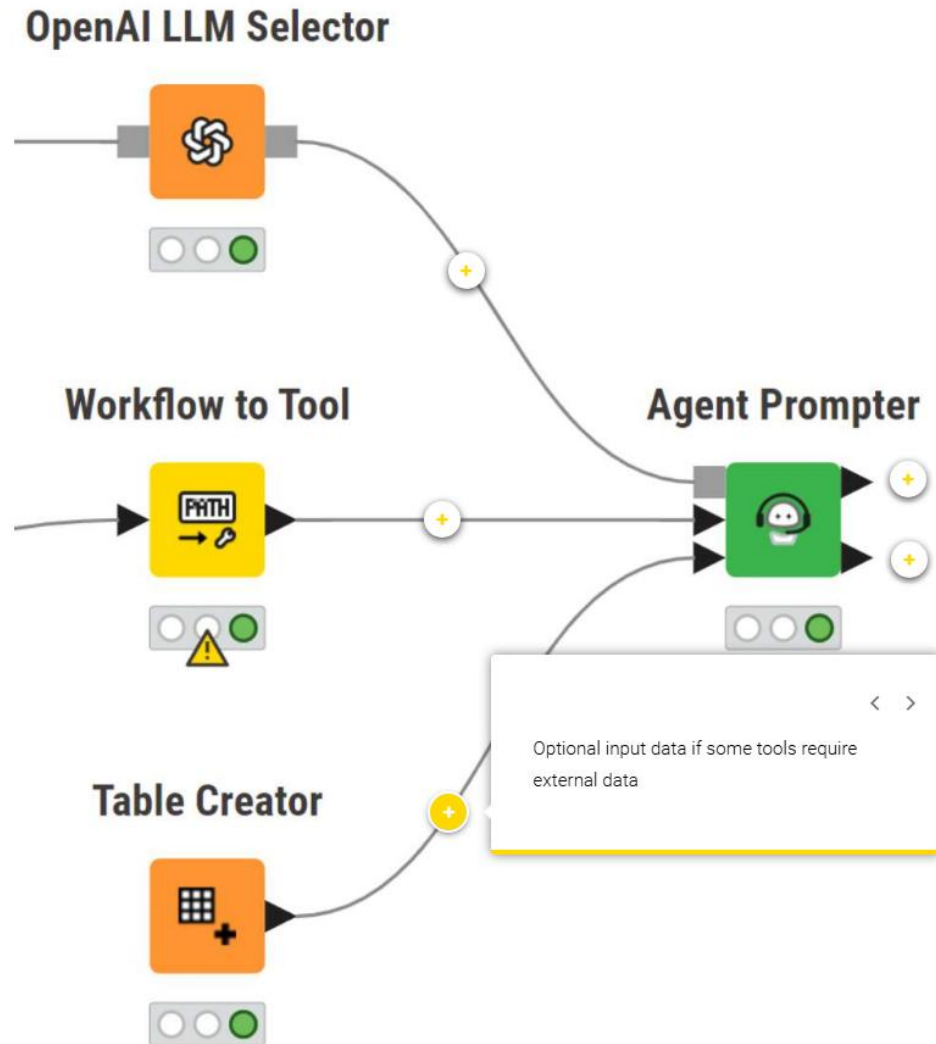
Connection to an LLM



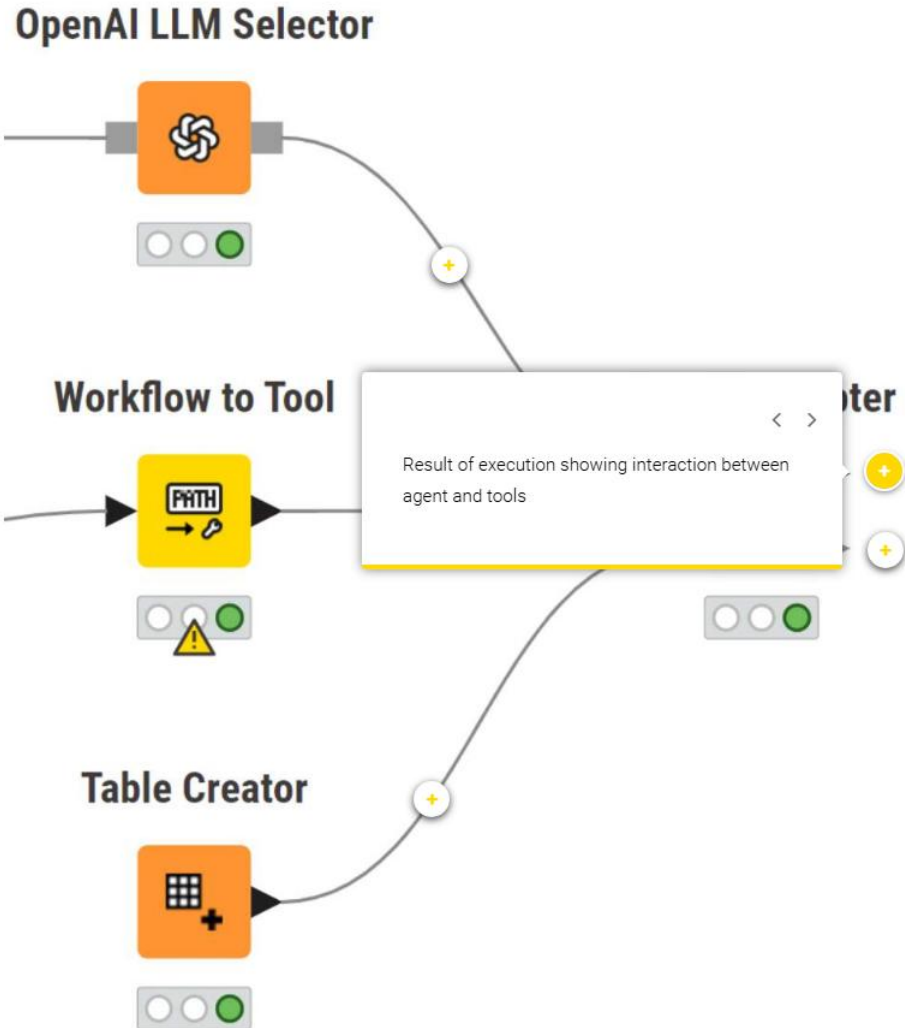
List of tools available to the agent



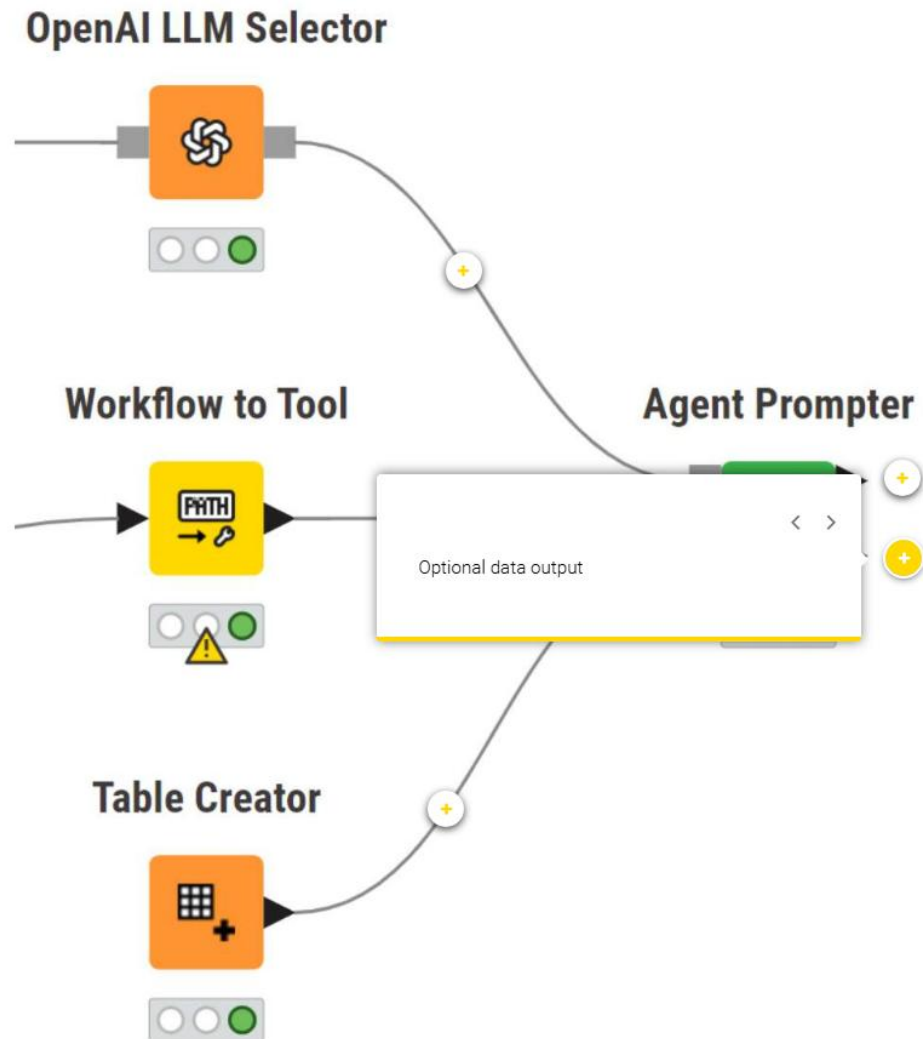
Optional input data



Result of execution



Optional data output



Configuration Panel

In the configuration panel, we supply the information necessary to execute the Agent Prompter node

Agent Prompter

System message

You are a virtual assistant to answer questions about the company. Respond to user queries by providing the most relevant information using the tools at your disposal. Please elaborate your response with a rationale how you got there.

User message

The input table contains some employeeIDs in the avzr column. Retrieve the rations for those employees.

Tool column

Tool

Conversation column name

Conversation

[Show advanced settings](#)

Discard

Apply and Execute

Apply

Agent Prompter

System message

System Message

Defines the agent's role, goals, and behavior

You are a virtual assistant
Respond to user queries
using the tools at your disposal
with a rationale how you got there.

with a rationale how you got there.

User message

User Message

The task or the question to solve

The input table contains
Retrieve the rations for those employees.

Tool column

Tool Column

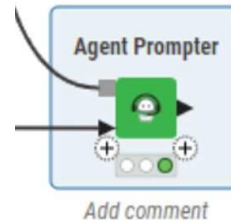
The column holding the tools the agent can use

Tool

Conversation column name

Example

- Here is an example of the Agent Prompter node in action.
- The user asks to book a table at a restaurant.



Dialog - 5:8 - Agent Prompter

System message

You are a restaurant assistant agent.

Always continue reasoning until the user's request has been fully handled.
Use your available tools to verify data and make decisions. Do not guess.

User message

Book a table for two people for the 2025.26.6

Conversation column name

Conversation

Tool column

Tool

[Show advanced settings](#)

Cancel Ok

Example

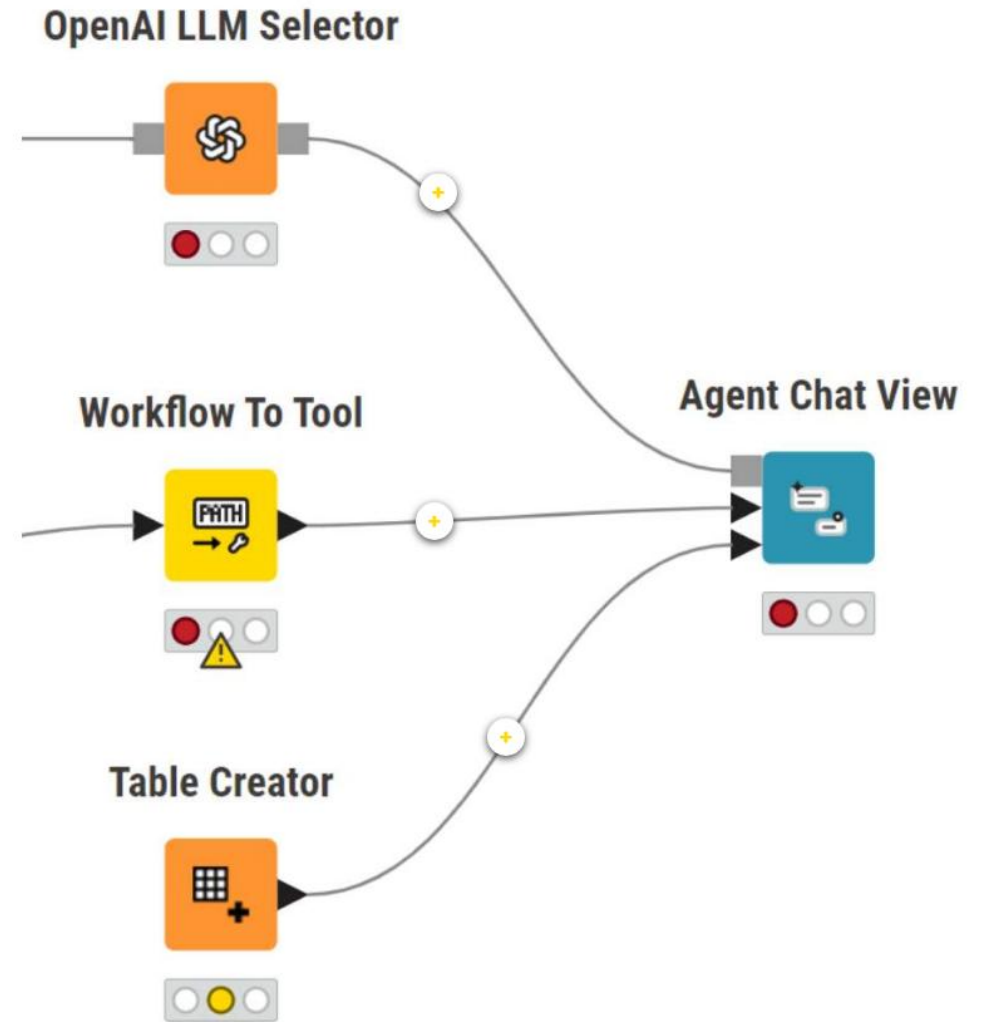
The Agent Prompter then outputs the conversation between the user, the agent, and the tool.



Conversation (Table)				
Rows: 5 Columns: 1				
<input type="checkbox"/>	#	RowID	Conversation	
<input type="checkbox"/>	1	Row0	User	
Data Tools Interface				
You have access to tools that can consume and produce data. The interaction with these tools is mediated via a data repository that keeps track of all available data items. The repository is represented as a map from IDs to data items.				
<input type="checkbox"/>	2	Row1	User	
Book a table for two people for the 2025.26.6				
<input type="checkbox"/>	3	Row2	AI	
table_availability				
configuration: booking_date-2: "2025-06-26T00:00:00+02:00[Europe/Berlin]" number_people-4: 2				
<input type="checkbox"/>	4	Row3	table_availability	
The booking for table T1 with 2 people, on 2025-06-26 was confirmed!				
<input type="checkbox"/>	5	Row4	AI	
The table for two people has been successfully booked for June 26, 2025.				

Example


While the Agent Prompter node takes a single prompt and returns the result, the Agent Chat View node provides an interactive chat interface for live agent conversations.



Example

You supply the information necessary to execute the Agent Chat View node in the configuration panel.


Agent Chat View

System message 

PERSISTENCE
You are an agent - please keep going until the user's query is completely resolved before ending your turn and yielding back to the

Tool column 

No value selected 

Initial message 

☐ Show tool calls and results 



[Show advanced settings](#)

Discard

Apply and Execute

Apply

Agent Chat View

System message  

PERSISTENCE


You are an agent - please
is completely

resolved before ending your turn and yielding back to the

System Message

Defines the agent's role, goals and behavior for the conversation





Tool column  

No value selected

Tool column

The column holding the tools the agent can use



Initial message  

Initial Message (optional)

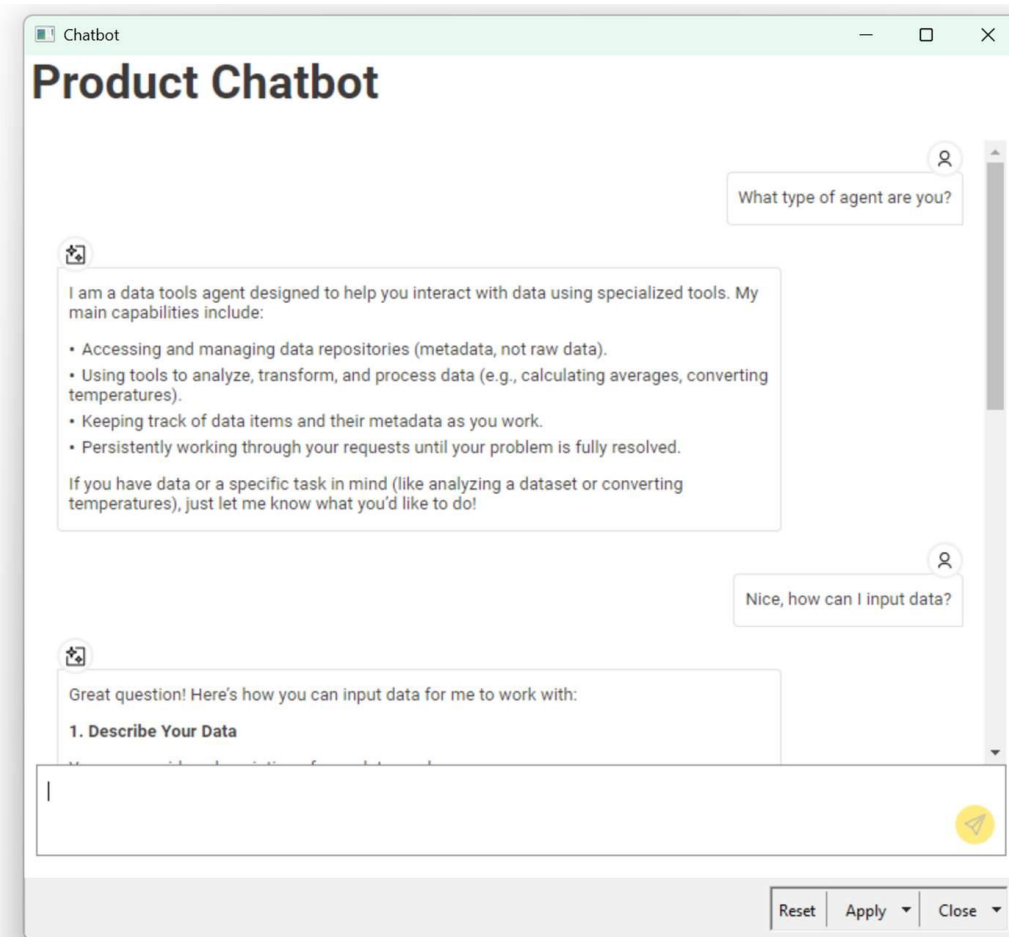
The initial instruction or question by the user



Example

- During execution, the node opens a chat interface where additional user inputs can be provided interactively.
- The agent reasons, selects tools, processes results, and generates responses in real time.
- This node can be embedded inside a component, allowing it to be deployed and shared via KNIME Business Hub, making the agent available as an interactive application to end users.

Chatbot



01 Simple Agent

This workflow demonstrates how to create an agent that is able to analyze product feedback and generate discount codes using two tools. Two solutions are showed:

- The **Agent Chat View** creates an interactive view where you can directly prompt the agent.
- The **Agent Prompter** prompts the agent with one user question and produces the conversation in output.

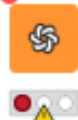
Set up the **OpenAI API key**, authenticate, and **select** the LLM

Credentials Configuration



Add your credentials here

OpenAI Authenticator



Authenticate

OpenAI LLM Selector



Select the model

Agent Chat View



Execute and chat in the node view

List the tools in the **Tools-message** folder

List Files/Folders



Tools-messages

Workflow to Tool



Agent Prompter



Execute and get conversation in output

Questions for the agent

The LLM behind the agent is able to reply to generic questions. For example, try

- *How do you count to 10 in Dutch?*
- *What is the currency used in Switzerland?*

The tools are able to perform some specific operations on user feedback. For example

- *Generate a discount code for the product mentioned in the following user feedback: "I loved the LK-887 vacuum cleaner!"*

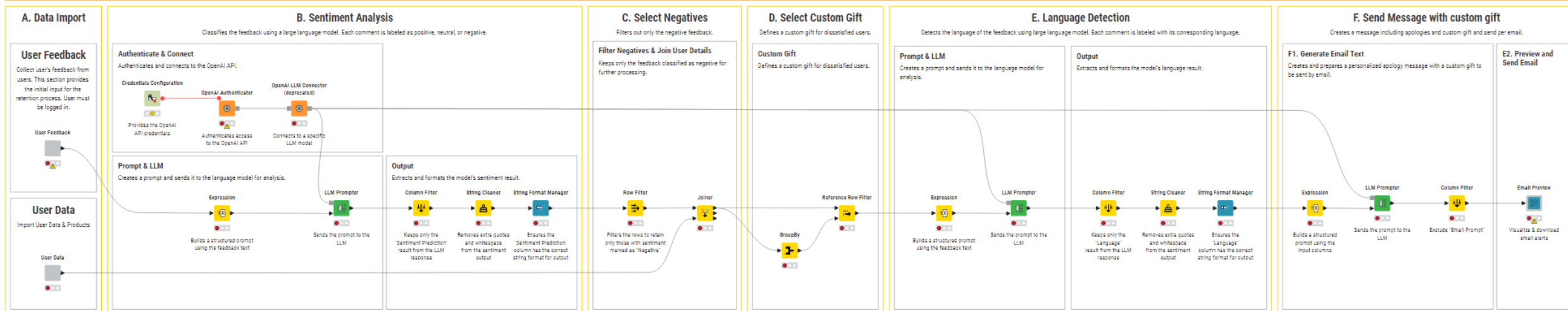


Part of 4 Steps to AI Agents, Article and Samples

Step 1: Customer Retention Workflow

This workflow identifies unsatisfied users through automated analysis and responds with an apology email, including a custom gift.

1. Collect user feedback.
2. Analyze sentiment.
3. Identify users with negative feedback.
4. Generate a custom gift.
5. Detect the language.
6. Prepare and send a personalized follow up email.

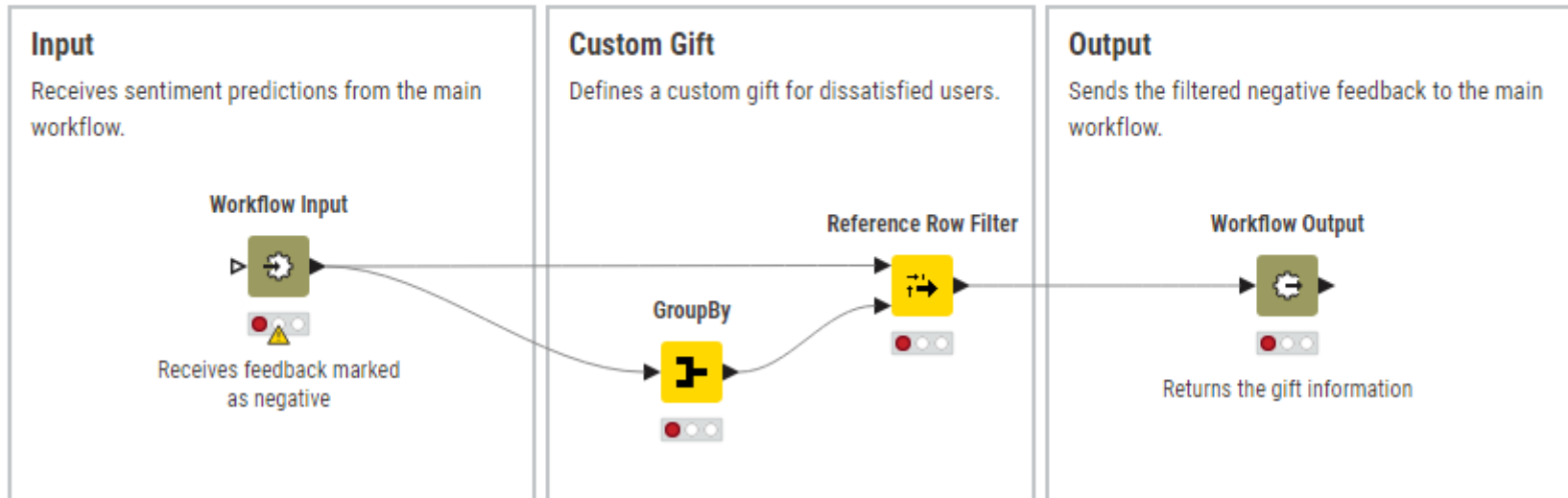


<https://www.knime.com/blog/build-an-ai-agent-in-4-steps>

Part of 4 Steps to AI Agents, Article and Samples

Step 2: Build a Tool - Select Custom Gift

This tool defines a custom gift for dissatisfied users.

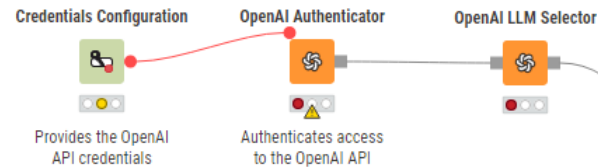


Part of 4 Steps to AI Agents, Article and Samples

Step 3: AI Agentic Framework - Test Tools

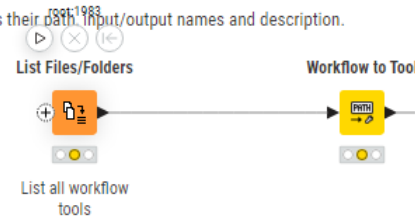
Authenticate & Connect

Authenticates and connects to the OpenAI API.



Tool list

Scans the folder of tools, extracts their path, input/output names and description.

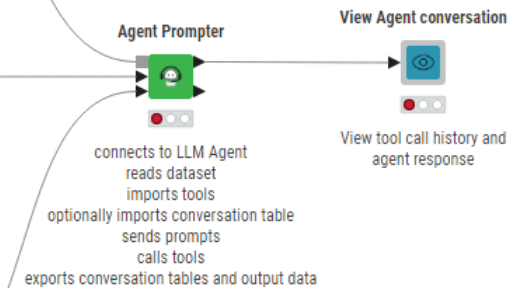
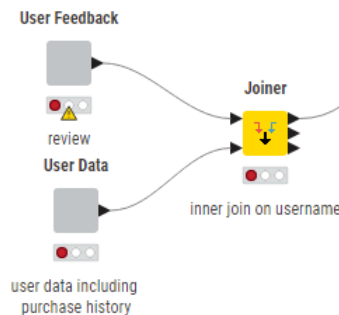


User Feedback & User Data

This section provides the initial input for the retention process.

User Feedback: Collects or simulates feedback from users.

User Data: Extracts customer data

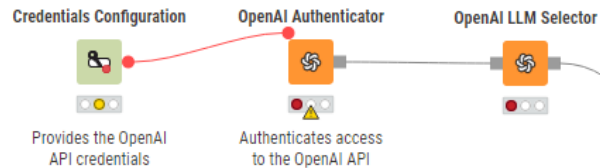


Part of 4 Steps to AI Agents, Article and Samples

Step 4: AI Agentic System

Authenticate & Connect

Authenticates and connects to the OpenAI API.



Tool list

Scans the folder of tools, extracts their path, input/output names and description.



User Feedback & User Data

This section provides the initial input for the retention process.

User Feedback: Collects or simulates feedback from users.

User Data: Extracts customer data

