AI Autonomous Email Agent Using n8n Workflow Automation Platform

AI Goal-Aware Autonomous Email Agent with Contextual Reasoning

GitHub Link : https://github.com/rutvikbarbhai/ai-autonomous-email-agent-n8n

1. What Problem I was Solving ?

As a final-year undergraduate navigating academic closure, internships, placements, sponsorships, and professional collaborations, I found myself spending excessive cognitive bandwidth parsing, prioritizing, and responding to emails. Existing solutions such as filters and auto-replies were stateless, reactive, and unaware of personal priorities. I wanted a system capable of reasoning over context, making goal-aligned decisions, and acting autonomously similar to a human executive assistant.

2. Why am I Proud of It?

I'm proud of this project because it addresses a real operational problem through a thoughtfully designed, end-to-end automation system. As a final-year undergraduate, I was managing a high volume of time-sensitive emails related to internships, placements, academic coordination, and collaborations, where the primary challenge was the cognitive overhead of interpreting intent, prioritizing relevance, and drafting context-aware responses.

Instead of building a rule-based filter or static auto-reply, I designed an autonomous AI-driven workflow that combines intent classification, contextual awareness, and execution. The system evaluates incoming emails using an LLM, cross-references calendar availability and goal alignment, and autonomously generates and sends responses.

What makes this project meaningful is that it functions as a decision-making system rather than a simple productivity tool. Building it required orchestrating multiple services, handling unstructured inputs, managing state through external context, and ensuring reliability in automated actions—closely mirroring real-world CRM and workflow automation scenarios.This project reflects my approach to engineering problems: understanding workflows deeply and building scalable, automation-first solutions that reduce manual effort while maintaining accuracy and control.

3. What Impact Did it Have ?

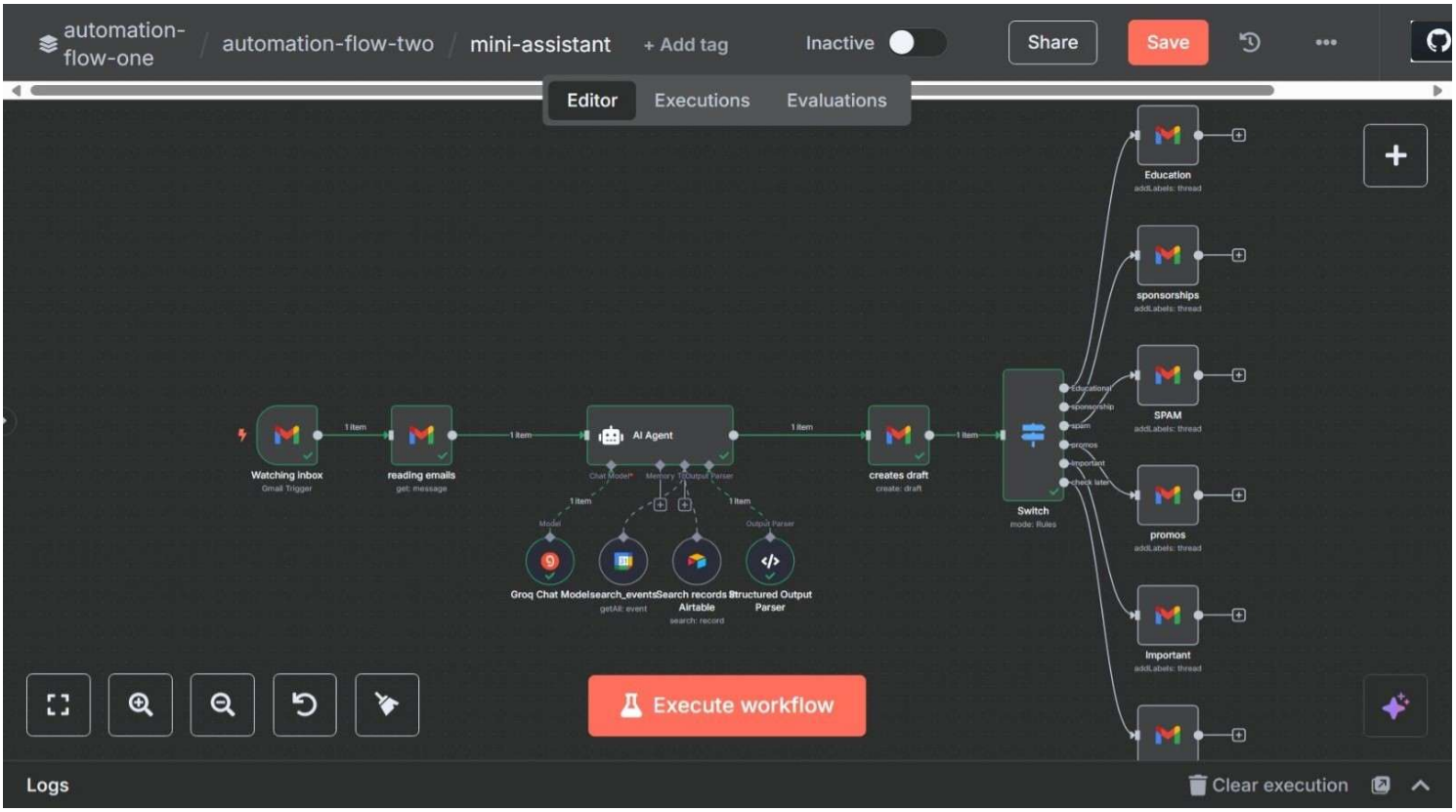
This system had a direct and measurable impact on how I managed high priority communication. It significantly reduced the time and mental effort spent triaging emails by automatically identifying intent, filtering noise, and handling responses that did not require manual judgment. As a result, I was able to focus on genuinely high-value conversations instead of repetitive coordination tasks.

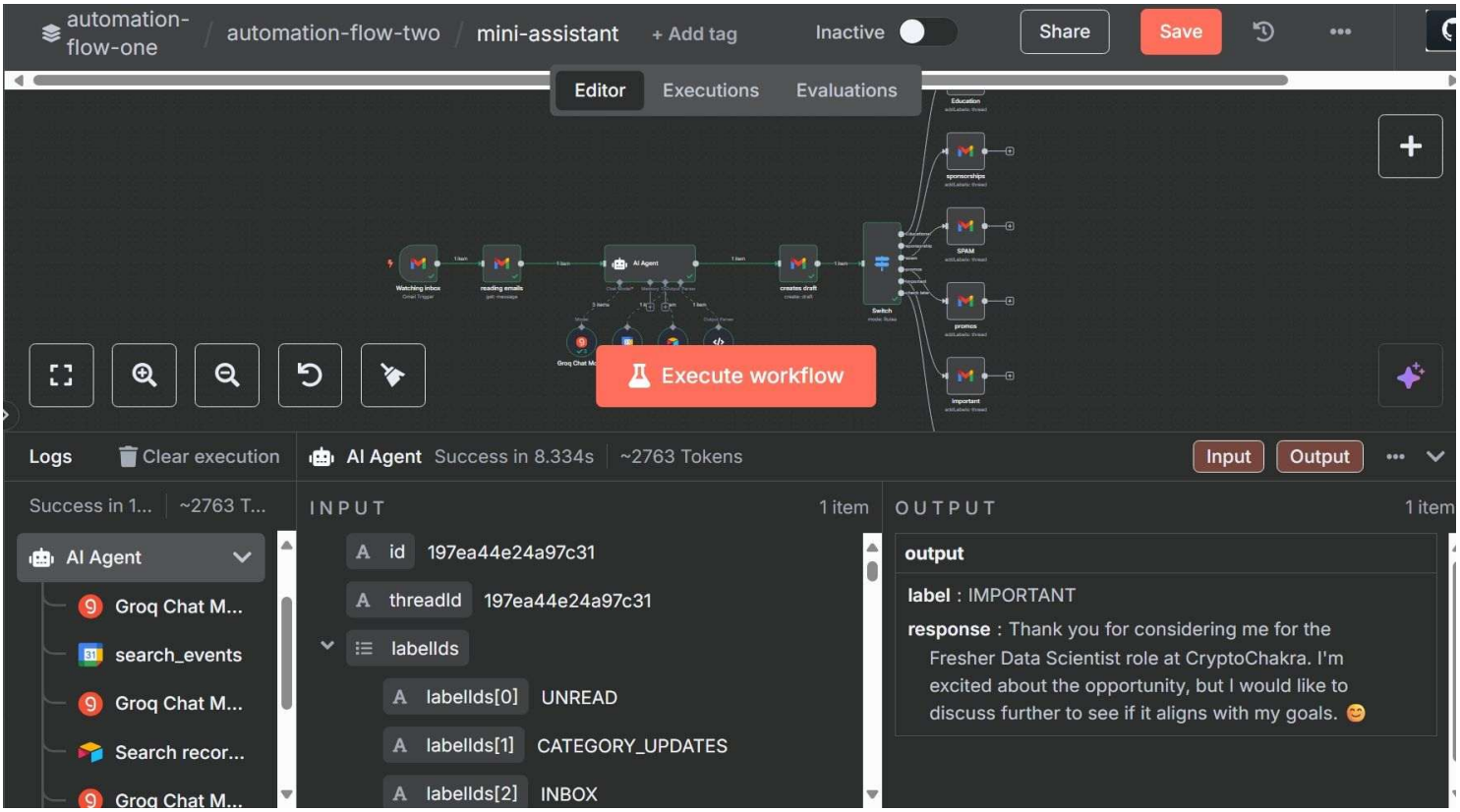
From a reliability perspective, the agent ensured faster and more consistent responses to time-sensitive emails, reducing missed opportunities and delays caused by manual backlog. It also improved prioritization by aligning responses with real-time availability and long-term goals, rather than treating all emails equally.

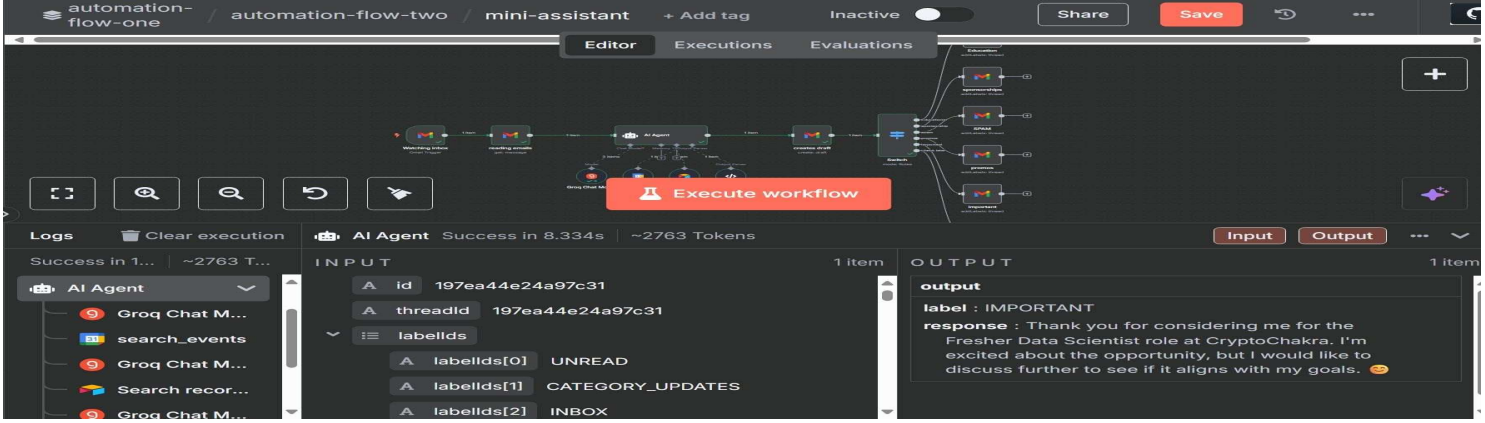
Beyond personal productivity, the project gave me hands-on experience designing and validating an autonomous, event-driven workflow under real usage conditions. This helped me understand the practical trade-offs involved in automation, trust, and control—insights that are directly applicable to building scalable CRM and workflow automation systems in a production environment.

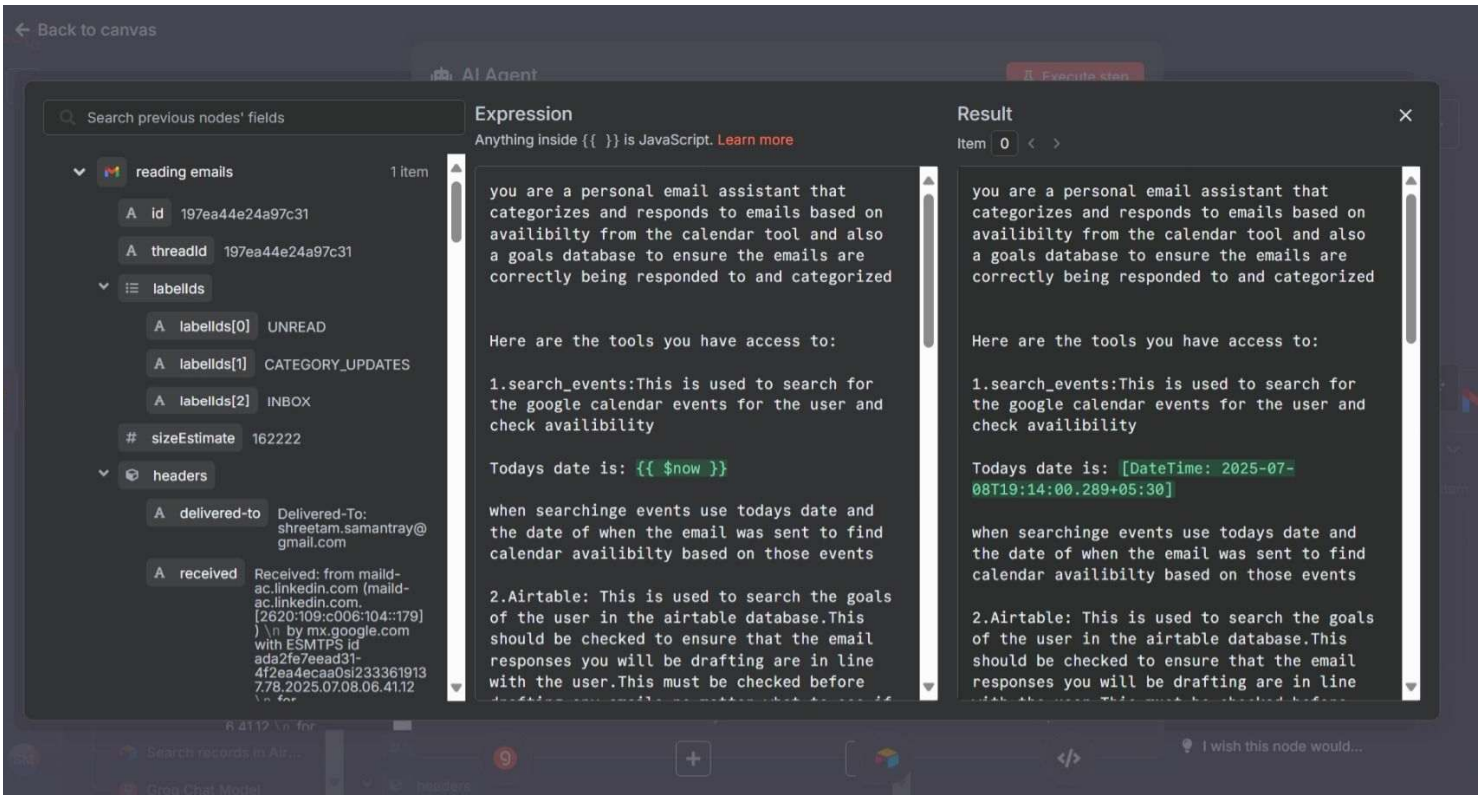
4. Walk Through a Workflow of the Project

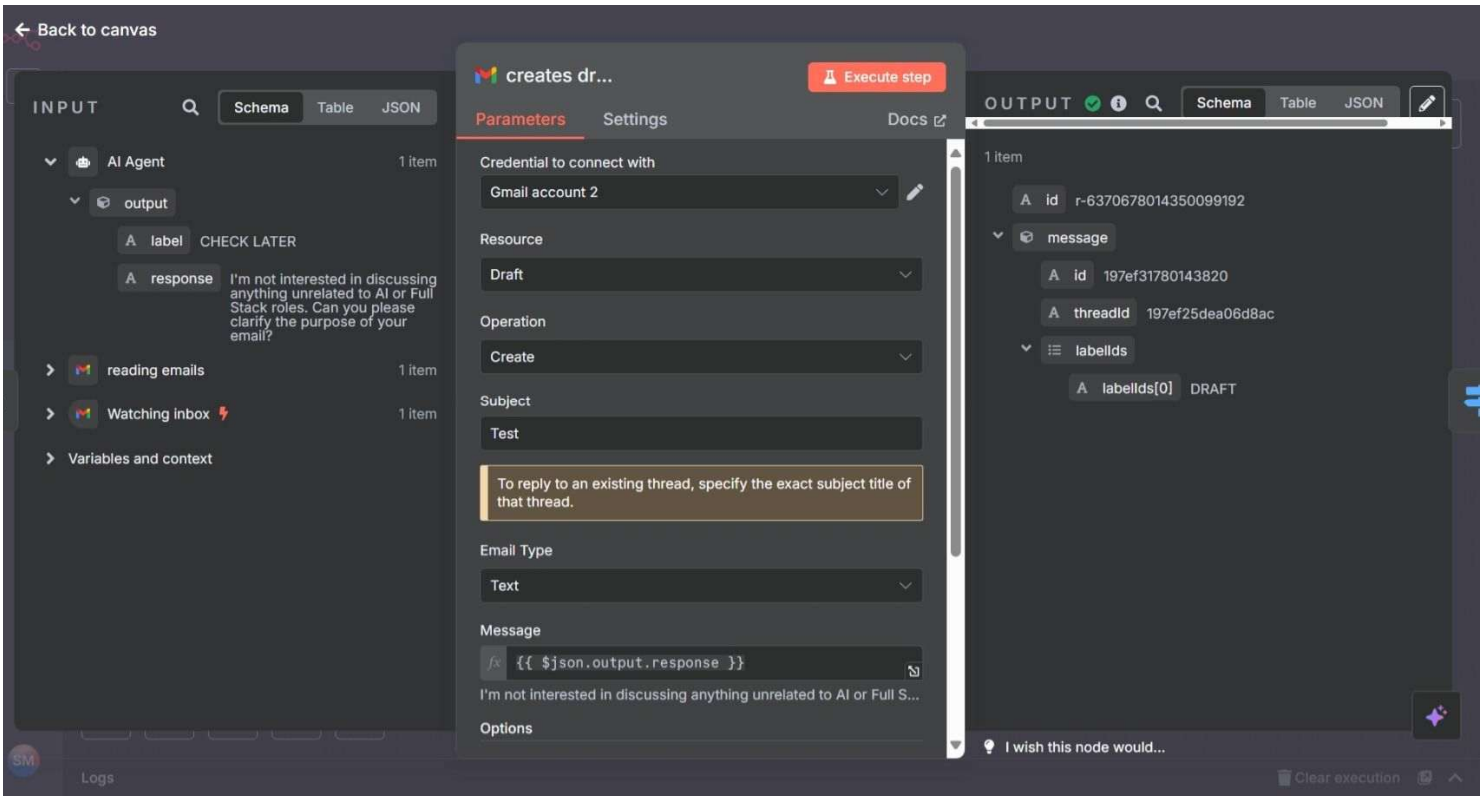
Workflow Visualization






automation-flow-one
automation-flow-two
mini-assistant
+ Add tag
Inactive
Share
Save
Editor
Executions
Evaluations
Execute workflow
Logs
Clear execution
AI Agent
Success in 8.334s
~2763 Tokens
Input
Output
INPUT
1 item
id 197ea44e24a97c31
threadId 197ea44e24a97c31
labelIds
labelIds[0] UNREAD
labelIds[1] CATEGORY_UPDATES
labelIds[2] INBOX
OUTPUT
1 item
output
label : IMPORTANT
response : Thank you for considering me for the Fresher Data Scientist role at CryptoChakra. I'm excited about the opportunity, but I would like to discuss further to see if it aligns with my goals.


Back to canvas
Search previous nodes' fields
reading emails 1 item
id 197ea44e24a97c31
threadId 197ea44e24a97c31
labelIds
labelIds[0] UNREAD
labelIds[1] CATEGORY_UPDATES
labelIds[2] INBOX
sizeEstimate 162222
headers
delivered-to Delivered-To: shreetam.samantray@gmail.com
received Received: from maild-ac.linkedin.com (maild-ac.linkedin.com. [2620:109:c006:104::179]) by mx.google.com with ESMTPS id ada2fe7eead31-4f2ea4ecaa0si2333619137.78.2025.07.08.06.41.12
Expression
Anything inside {{ }} is JavaScript. Learn more
you are a personal email assistant that categorizes and responds to emails based on availibilty from the calendar tool and also a goals database to ensure the emails are correctly being responded to and categorized
Here are the tools you have access to:
1.search_events:This is used to search for the google calendar events for the user and check availibility
Todays date is: {{ $now }}
when searchinge events use todays date and the date of when the email was sent to find calendar availibilty based on those events
2.Airtable: This is used to search the goals of the user in the airtable database.This should be checked to ensure that the email responses you will be drafting are in line with the user.This must be checked before
Result
Item 0
you are a personal email assistant that categorizes and responds to emails based on availibilty from the calendar tool and also a goals database to ensure the emails are correctly being responded to and categorized
Here are the tools you have access to:
1.search_events:This is used to search for the google calendar events for the user and check availibility
Todays date is: [DateTime: 2025-07-08T19:14:00.289+05:30]
when searchinge events use todays date and the date of when the email was sent to find calendar availibilty based on those events
2.Airtable: This is used to search the goals of the user in the airtable database.This should be checked to ensure that the email responses you will be drafting are in line
I wish this node would...


Back to canvas
INPUT
Schema
Table
JSON
AI Agent 1 item
output
label CHECK LATER
response I'm not interested in discussing anything unrelated to AI or Full Stack roles. Can you please clarify the purpose of your email?
reading emails 1 item
Watching inbox 1 item
Variables and context
creates dr...
Execute step
Parameters
Settings
Docs
Credential to connect with
Gmail account 2
Resource
Draft
Operation
Create
Subject
Test
To reply to an existing thread, specify the exact subject title of that thread.
Email Type
Text
Message
{{ $json.output.response }}
I'm not interested in discussing anything unrelated to AI or Full S...
Options
OUTPUT
Schema
Table
JSON
1 item
id r-6370678014350099192
message
id 197ef31780143820
threadId 197ef25dea06d8ac
labelIds
labelIds[0] DRAFT
I wish this node would...
Logs
Clear execution

5. Step-by-Step Workflow Walkthrough

• **1. Inbox Trigger (Gmail – Watching Inbox)**
• The workflow is initiated using the **Gmail Trigger** node, which continuously watches the inbox for new incoming emails.This acts as the event source and ensures the system is fully event-driven rather than batch-based.
• **Output:**
• Message ID
• Thread ID
• Basic email metadata

2. Email Retrieval (Gmail – Reading Emails)
Once triggered, the workflow fetches the **full email content** using the message ID:

- Subject
- Sender
- Body (plain text / HTML)

This step ensures the downstream AI has complete semantic context instead of partial headers.

3. AI Decision Engine (AI Agent Node)
This is the core intelligence layer of the system.
It combines:

- **Groq LLaMA 3 70B** for intent classification and response reasoning
- **Airtable** as a lightweight memory store for goals and preferences
- **Structured Output Parser** to convert free-text LLM output into deterministic JSON

The agent performs:

- Semantic intent classification (Education, Sponsorship, Important, Spam, Promotions)
- Priority assessment
- Context-aware reasoning based on stored goals and historical data

4. Draft Generation (Gmail – Create Draft)
Based on the AI agent's decision:

- A professional, context-aware reply is generated
- The reply is created as a Gmail draft (or directly sent, depending on configuration)

This preserves control while still enabling full automation.

5. Routing Logic (Switch Node)
A **Switch node** routes the email based on the classified intent.
Conditions include:

- Educational
- Sponsorship
- Spam
- Promotions
- Important

Each path represents a distinct automation branch.

6. Action Execution (Gmail – Labelling)
For each branch, the workflow applies the appropriate Gmail label:

- **Education**
- **Sponsorships**
- **Spam**
- **Promos**
- **Important**

This ensures inbox hygiene, traceability, and easy auditing of automated decisions.