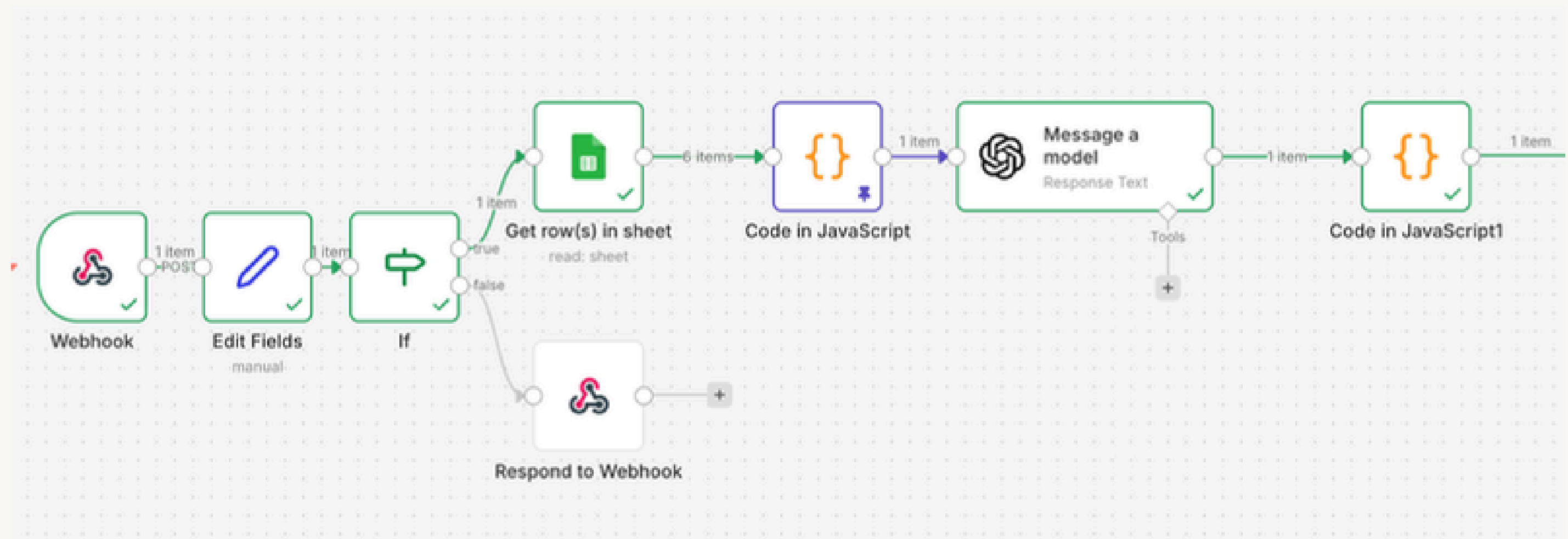


AI RAG Chatbot with Intent Classification & Lead Scoring



Built with n8n + OpenAI + Google Sheets



April Atkinson

"Architecture & Workflow Design Project"



Problem

- Chatbots often return unstructured text
- No deterministic validation
- No intent classification
- No lead prioritization
- No structured API response

I built a structured RAG workflow that transforms raw user input into validated, classified, and scored business output.



Design Principles

- Deterministic before probabilistic
- Structured contracts over free text
- Validation before model invocation
- Retrieval before reasoning



System Architecture

Interface Layer

- Webhook

Control Layer

- Schema normalization
- Validation guardrail

Retrieval Layer

- Knowledge lookup
- Context aggregation

Reasoning Layer

- Structured LLM output

Delivery Layer

- JSON parsing
- API response

Separated deterministic logic from probabilistic reasoning.

Validation and retrieval occur before model invocation to minimize hallucination and maximize control.

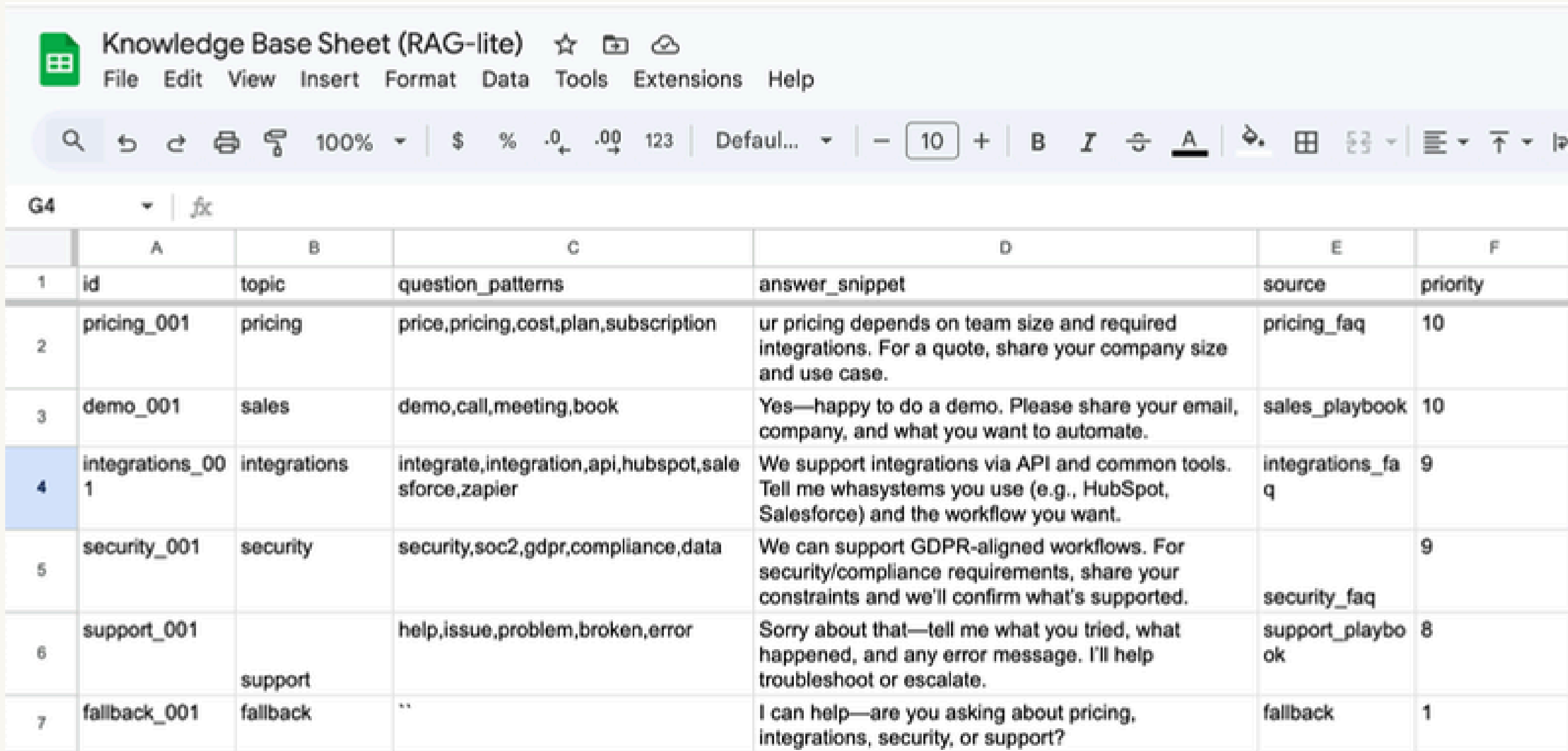


RAG-lite Knowledge Retrieval

- Google Sheets as structured knowledge base
- Topic + keyword matching
- Relevance ranking
- Context aggregation before LLM call

Instead of sending raw questions to the LLM, relevant knowledge snippets are injected as structured context.

Google Sheets as structured knowledge base



Knowledge Base Sheet (RAG-lite) ☆ 📁 ☁

File Edit View Insert Format Data Tools Extensions Help

100% | \$ % .0+ .00 123 | Default... | - 10 + | B I ⌂ A | 🎨 📐 📏 | 📊 📈 📉 | 🔍

	A	B	C	D	E	F
1	id	topic	question_patterns	answer_snippet	source	priority
2	pricing_001	pricing	price,pricing,cost,plan,subscription	ur pricing depends on team size and required integrations. For a quote, share your company size and use case.	pricing_faq	10
3	demo_001	sales	demo,call,meeting,book	Yes—happy to do a demo. Please share your email, company, and what you want to automate.	sales_playbook	10
4	integrations_001	integrations	integrate,integration,api,hubspot,salesforce,zapier	We support integrations via API and common tools. Tell me what systems you use (e.g., HubSpot, Salesforce) and the workflow you want.	integrations_faq	9
5	security_001	security	security,soc2,gdpr,compliance,data	We can support GDPR-aligned workflows. For security/compliance requirements, share your constraints and we'll confirm what's supported.	security_faq	9
6	support_001	support	help,issue,problem,broken,error	Sorry about that—tell me what you tried, what happened, and any error message. I'll help troubleshoot or escalate.	support_playbook	8
7	fallback_001	fallback	""	I can help—are you asking about pricing, integrations, security, or support?	fallback	1

[link](#)

Code in JavaScript

main.js

Get results in sheet

The fields below come from the test successfully execution. [Execute mode](#) to refresh them.

row_number

id

topic

question_patterns

answer_snippet

score

topic

Get Fields

Workflow

Variables and context

Parameters

Settings

Mode

Run (once for all items)

Language

JavaScript

JavaScript

Code

Run in

```
14 context.scored = context.topicFor || {}
15 ...new [obj,
16   score: scoreflow(new, userMessage)
17 ]});
18
19 // Sort by score
20 scored.sort((a, b) => b.score - a.score);
21
22 // Take top 3 matches
23 export topicMatches = scored.slice(0, 3);
24
25 // Build context string
26 export context = topicMatches
27   .filter((r => r.score > 0)
28   .map(r => `Topic: ${r.topic} / Answer: ${r.answer_snippet}`)
29   .join("\n\n");
30
31 // Return single structured object
32 return {
33   [obj]: {
34     user_message: userMessage,
35     watched_topics: topicMatches.map(r => r.topic),
36     context: context,
37     kb_hits: topicMatches
38   }
39 }
```

Type & for a list of [special vars/methods](#). Debug by using console.log() statements and viewing their output in the browser console.

This data is passed for test executions. [Debug](#)

Schema

Topic

JSON

Save

Schema

Topic

JSON

Save

JSON

```
{
  "user_message": "do you integrate with Hubspot?",
  "watched_topics": [
    "integrations",
    "pricing",
    "sales"
  ],
  "context": "Topic: integrations/answer: We support integrations via API and common tools. Tell us whenever you use (e.g., Hubspot, Salesforce) and the workflow you want./topic: pricing/answer: or pricing depends on team size and required integrations. For a quote, share your company size and use case./topic: sales/answer: We're happy to do a demo. Please share your email, company, and what you want to automate.",
  "kb_hits": [
    {
      "row_number": 1,
      "id": "integrations_API",
      "topic": "integrations",
      "question_patterns": "Integrate, integration, api, hubspot, salesforce, zapier",
      "answer_snippet": "We support integrations via API and common tools. Tell us whenever you use (e.g., Hubspot, Salesforce) and the workflow you want.",
      "source": "Integrations_API",
      "priority": 0,
      "score": 10
    },
    {
      "row_number": 2,
      "id": "pricing_API",
      "topic": "pricing",
      "question_patterns": "price, pricing, cost, plan, subscription",
      "answer_snippet": "or pricing depends on team size and required integrations. For a quote, share your company size and use case.",
      "source": "pricing_API",
      "priority": 10,
      "score": 10
    },
    {
      "row_number": 3,
      "id": "demo_API",
      "topic": "sales",
      "question_patterns": "demo, call, meeting, team",
      "answer_snippet": "We're happy to do a demo. Please share your email, company, and what you want to automate.",
      "source": "sales_playbook",
      "priority": 10,
      "score": 10
    }
  ]
}
```



Structured LLM Output

```
{  
  "answer": "...",  
  "follow_up_question": "...",  
  "intent": "integration inquiry",  
  "lead_score": 7  
}
```

- Forced JSON output format
- Intent classification
- Lead scoring
- Deterministic downstream automation

Parameters

Settings

Execute step

Credential to connect with

Openid account

Resource

Test

Operation

Message a Model

Model

From test - GPT-4o-beta

Messages

Type

Text

Role

System

Prompt

You are a helpful Good website assistant.

Type

Text

Role

User

Prompt

user: good site:

`{{user.user_message}}`

/:

Greeting:

`{{user.greeting}}`

Your questions: do you integrate with Hubspot? Contentful? Tapscout integrations Answer: We support Integrations w

Add Message

Empty Output

Connect your own custom url back to this node or the canvas

Built-in Tools

No properties

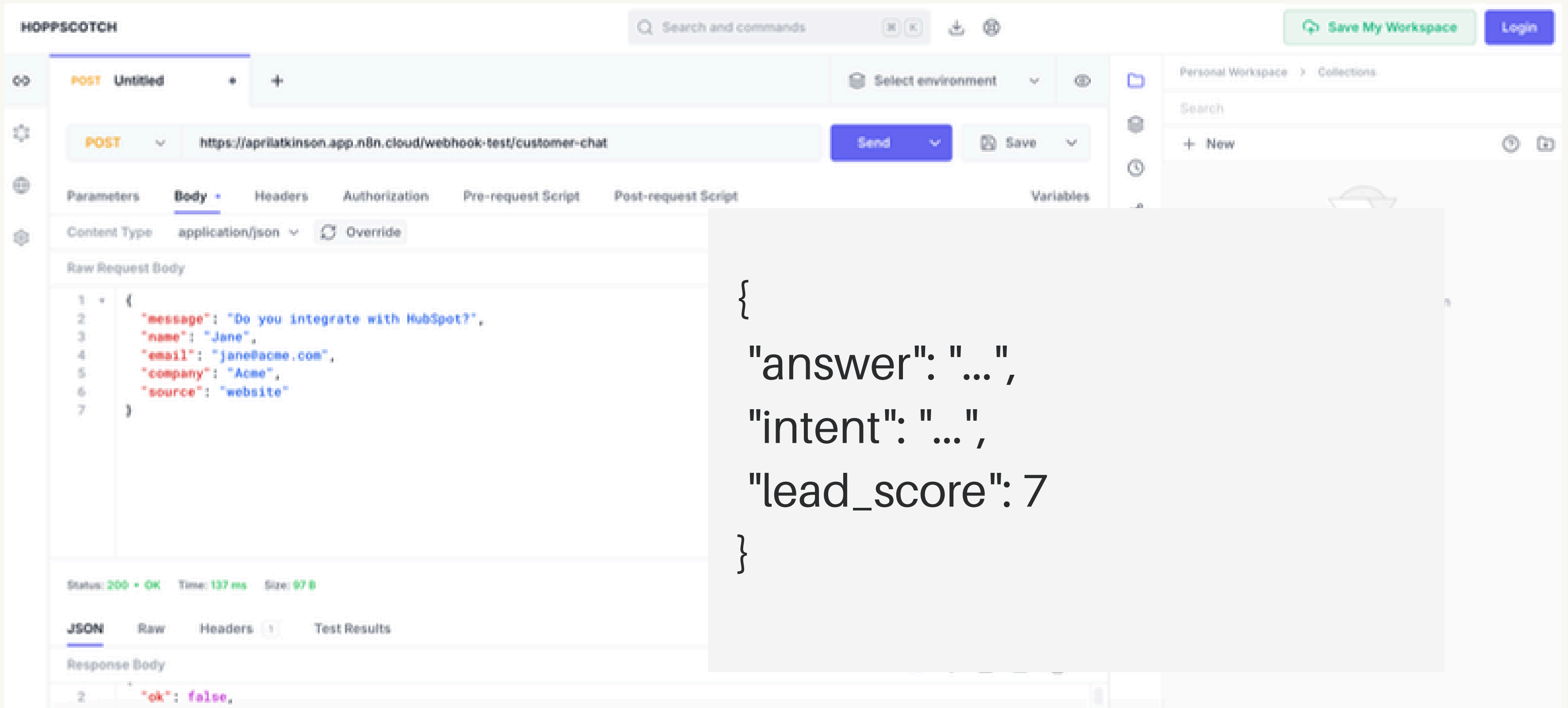
Add Built-in Tool

Options

Tools

```
{
  "id": "req_8c760d179427100000ba02700000baad1427c5ac007f",
  "object": "response",
  "created_at": 177347614,
  "status": "completed",
  "background": false,
  "billing": {
    "paper": "developer"
  },
  "completed_at": 177347619,
  "frequency_penalty": 0,
  "incomplete_details": null,
  "instructions": null,
  "max_output_tokens": null,
  "max_tool_calls": null,
  "model": "gpt-4.1-mini-2025-04-14",
  "output": [
    {
      "id": "req_8c760d179427100000ba02700000baad1427c5ac007f",
      "type": "message",
      "status": "completed",
      "content": [
        {
          "type": "output_text",
          "annotations": [
            ],
            "logprobs": [
            ],
            "text": "[{ \"name\": \"We support integrations via API and custom tools, including Hubble. Please share more about your workflow needs with Hubble so we can assist you better.\", \"url\": \"Follow_up_questions\"} What you describe the specific workflows you want to automate with Hubble integration?\", \"url\": \"Integrations_examples\"}, { \"text_score\": \"Full\"}]"
        ]
      ],
      "role": "assistant"
    }
  ],
  "parallel_tool_calls": true,
  "presence_penalty": 0,
  "previous_response_id": null,
  "prompt_caching": null,
  "prompt_cache_retrieval": null,
  "reasoning": {
    "effort": null,
    "summary": null
  },
  "safety_identifier": null,
  "service_tier": "default",
  "store": true,
  "temperature": 0,
  "text": [
    {
      "format": {
        "type": "text"
      }
    }
  ],
  "tool_calling": "auto"
```

Production-Ready API Response (test)



The screenshot displays the Hoppscotch web application interface. At the top, there's a search bar and buttons for 'Save My Workspace' and 'Login'. The main area shows a POST request configuration for the URL 'https://aprilatkinson.app.n8n.cloud/webhook-test/customer-chat'. The 'Body' tab is selected, showing a JSON payload. Below the request, the 'Response Body' tab is active, displaying the received JSON response. A large, semi-transparent overlay on the right side of the interface shows the full JSON response structure.

```
{  
  "answer": "...",  
  "intent": "...",  
  "lead_score": 7  
}
```

<https://hoppscotch.io/>

HOPPSCOTCH

Search and commands

POST Untitled

https://aprilatkinson.app.n8n.cloud/webhook-test/customer-chat

Send Save

Parameters Body Headers Authorization Pre-request Script Post-request Script Variables

Content Type application/json Override

Raw Request Body

```
1 {
2   "message": "Do you integrate with HubSpot?",
3   "name": "Jane",
4   "email": "jane@acme.com",
5   "company": "Acme",
6   "source": "website"
7 }
```

Status: 200 OK Time: 5877 ms Size: 71 B

JSON Raw Headers 2 Test Results

Response Body

OUTPUT



Schema

Table

JSON



1 item

```
[
  {
    "user_message": "do you integrate with hubspot?",
    "matched_topics": [
      "integrations",
      "pricing",
      "sales"
    ],
    "context": "Topic: integrations\nAnswer: We support integrations via API and common tools. Tell me whasystems you use (e.g., HubSpot, Salesforce) and the workflow you want.\n\nTopic: pricing\nAnswer: ur pricing depends on team size and required integrations. For a quote, share your company size and use case.\n\nTopic: sales\nAnswer: Yes-happy to do a demo. Please share your email, company, and what you want to automate.",
    "kb_hits": [
      {
        "row_number": 4,
        "id": "integrations_001",
        "topic": "integrations",
        "question_patterns": "integrate,integration,api,hubspot,salesforce,zapier",
        "answer_snippet": "We support integrations via API and common tools. Tell me whasystems you use (e.g., HubSpot, Salesforce) and the workflow you want.",
        "source": "integrations_faq",
        "priority": 9,
        "score": 13
      },
      {
        "row_number": 2,
        "id": "pricing_001",
        "topic": "pricing"
```

Potential Expansion

- Vector search instead of keyword matching
- Supabase logging
- Multi-intent routing
- Guardrail / compliance layer
- Conversation memory

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➤ **Thank you!**