

Customer Support Agent Automation

AI assisted email triage with controlled delivery and human review

Designed and developed by

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Role

Automation Developer | Workflow Engineer | Solution Architect

STATUS Active workflow configuration	SCOPE 4 workflows and 147 nodes	PROJECT TYPE Portfolio demonstration
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Executive Summary

This case study documents a four-workflow n8n customer support system that monitors Gmail, identifies and deduplicates incoming messages, retrieves relevant business context, creates structured AI-assisted drafts, and routes each response through either a narrow automatic-delivery policy or Telegram human review.

The system is designed to keep sensitive, uncertain, or ambiguous requests under human control. Reviewers can approve, reject, request a revised draft, or resolve a case-link decision. Scheduled recovery and a shared error workflow surface work that becomes stuck or fails unexpectedly.

The workflow exports verify the configured logic, integrations, safeguards, and recovery paths. They do not provide measured business outcomes or long-term production performance.

Business Problem

Customer support teams often work across email, order records, product information, policy documents, case history, and internal review channels. Manually assembling that context takes time, while sending an unsupported automatic answer can create a larger customer-service problem.

The workflow addresses five recurring operational risks:

- The same customer message may be processed more than once.
- A reply may be drafted without the order, product, policy, or case history needed to support it.
- Refunds, account changes, delivery problems, missing orders, fraud, and legal concerns require human judgment.
- Feedback may need multiple draft revisions without creating an endless loop.
- A ticket or delivery attempt may become stuck after an incomplete external action.

Solution Overview

The system separates intake, identity resolution, context retrieval, drafting, delivery decisions, human review, and recovery. This makes the response path easier to reason about and gives uncertain cases a clear owner.

Workflow	Trigger	Nodes	Responsibility
Customer Support Agent Optimized v3	Gmail every minute	57	Filters, deduplicates, resolves context, drafts, and routes replies
Telegram HIL Stable v3	Telegram message or callback	78	Approves, rejects, revises, and resolves case links
Support Ticket Recovery Monitor	Scheduled monitor	9	Surfaces stuck processing and uncertain automatic delivery
Support Automation Error Handler	n8n error event	3	Sends a workflow-failure alert to the reviewer

System Architecture

Gmail supplies incoming support messages. n8n coordinates validation, context retrieval, structured drafting, decision logic, delivery, and recovery. Google Sheets stores the support log, case memory, thread mappings, order context, product data, and FAQ content. OpenAI produces structured drafts. Telegram provides the human review interface, and Gmail sends approved or narrowly eligible replies.

Customer Support Workflow

The primary workflow starts with Gmail polling. It retrieves the full message, filters known automated senders and self-replies, and checks whether the message was already recorded. Known messages stop before another response is created.

For a new message, the workflow resolves its case identity using the current email thread, stored thread-to-case mappings, and related case candidates. Cross-thread matches are evaluated before a mapping is created. Ambiguous or unsafe matches remain subject to reviewer selection.

The classifier determines which context is necessary. Order, product, FAQ, and case-memory lookups run only when needed. The selected information is normalized into a compact prompt, and a structured-output parser checks that the AI response contains the expected answer and review decision before delivery routing begins.

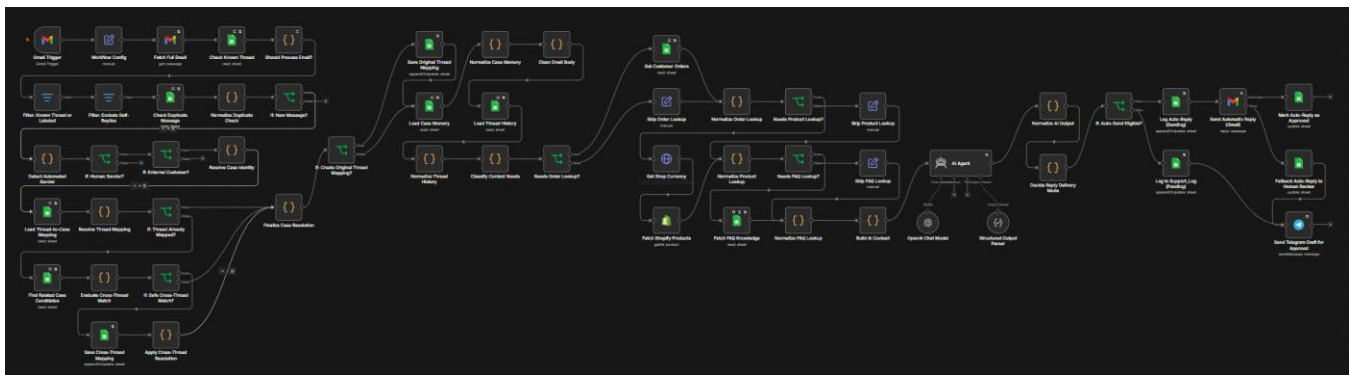


Figure 1 Customer support workflow from Gmail intake through context retrieval and controlled delivery

HOW A MESSAGE MOVES THROUGH THE SYSTEM

1. Receive the Gmail message and retrieve its complete content.
2. Reject automated or internal messages and stop known duplicates.
3. Resolve the customer, thread, and case relationship.
4. Load only the order, product, FAQ, and case history needed for the request.
5. Generate and normalize a structured AI-assisted draft.
6. Apply the delivery policy and either send or request human review.
7. Record the final state and update case memory after the decision.

Controlled Reply Delivery

Automatic delivery is deliberately narrow. Courtesy acknowledgements and responses that can be checked against retrieved FAQ, order, product, or policy facts may continue automatically when the configured checks pass.

Refunds, account changes, replacements, damaged or missing orders, fraud, legal concerns, unsuccessful lookups, uncertain case matches, and explicit escalation decisions are routed to a person. Invalid or incomplete AI output also stops before delivery.

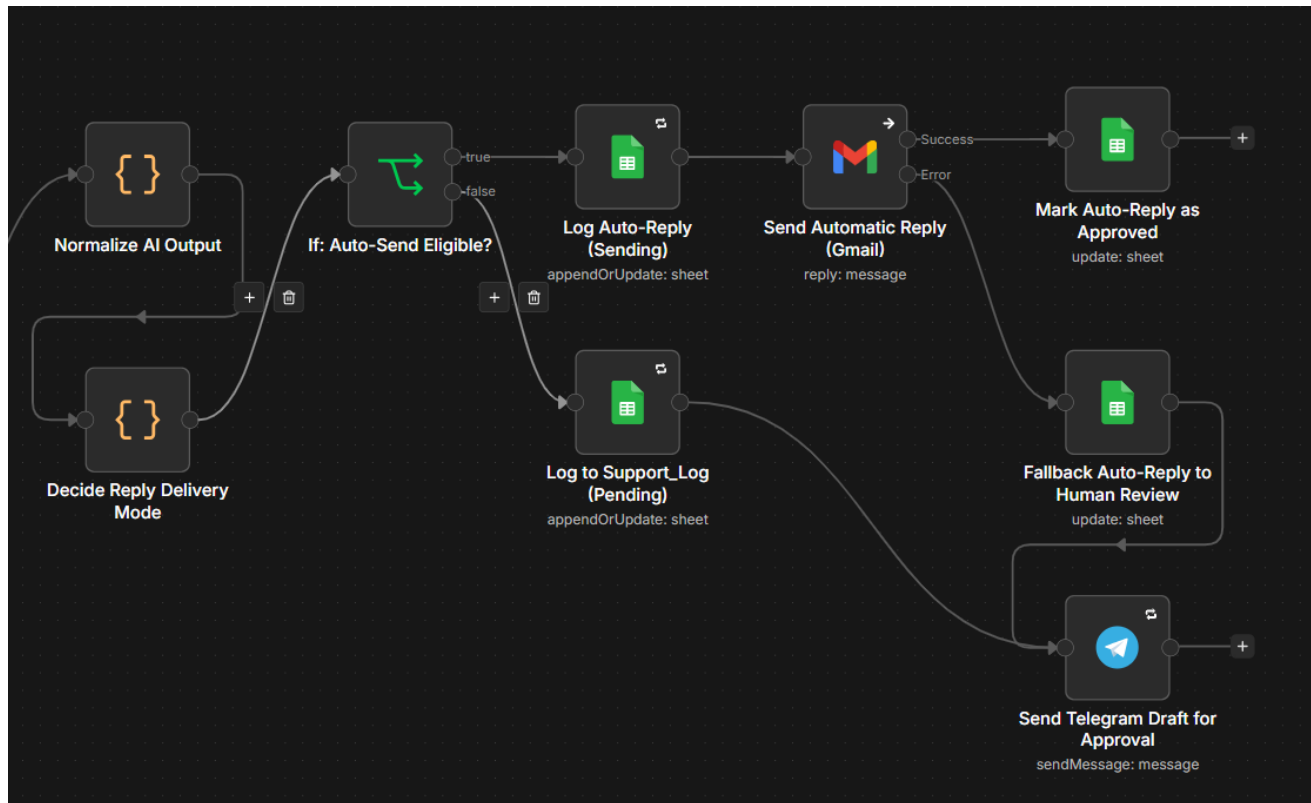


Figure 2 Delivery gate separating narrowly eligible automatic replies from Telegram review

WHY THE DELIVERY GATE MATTERS

The AI model proposes language, but workflow rules decide whether that language may leave the system automatically. This keeps high-risk requests under reviewer control and makes automatic delivery an explicit, inspectable branch rather than a model-only decision.

If an automatic Gmail send reports an error, the ticket falls back to human review. The recovery monitor also treats an extended automatic-sending state as uncertain instead of assuming the message was never delivered.

Human Review and Redrafting

Drafts requiring judgment are logged and sent to an authorized Telegram reviewer with the customer question, proposed response, and reason for review. The reviewer can approve, reject, suggest changes, or resolve an ambiguous case link.

When the reviewer requests changes, the feedback is captured and used for another structured drafting cycle. Redrafting is capped at three iterations. This gives the reviewer useful control without allowing an unbounded loop.

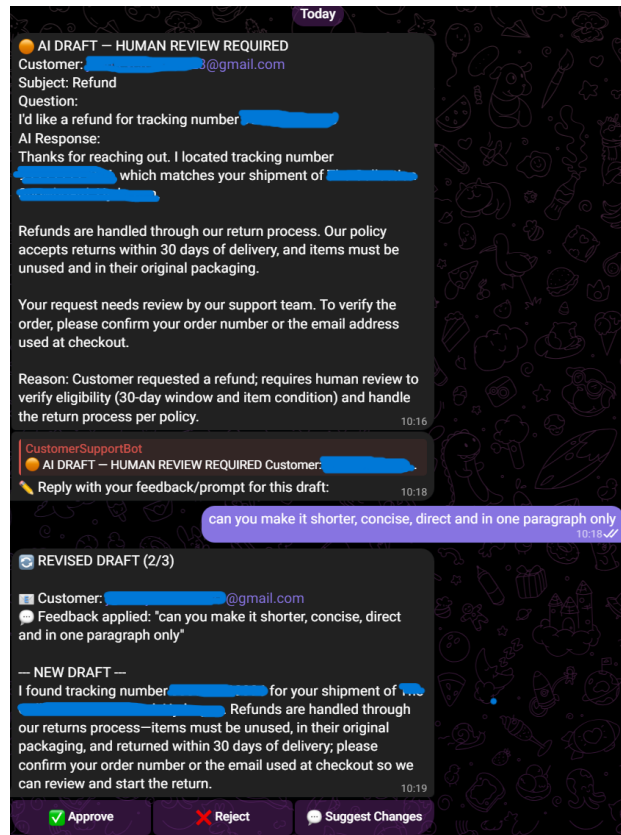


Figure 3 Sanitized Telegram review showing feedback and a revised support draft

After approval, Gmail sends the response and the workflow records the decision, updates the Telegram message, and commits approved case memory. Rejection follows a separate state and memory path. Failures during approval or redrafting generate reviewer alerts rather than disappearing silently.

Reviewer Decisions and Case Linking

The Telegram workflow is more than an approval button. It separates approval, rejection, revision, case-link review, case selection, and fallback behavior into distinct branches. This creates a visible record of the reviewer decision and the next expected state.

When a message could relate to another thread, the workflow prepares safe case choices. A reviewer can select the correct case, store the human-selected mapping, load the chosen case memory, and generate a linked-case redraft using the confirmed context.

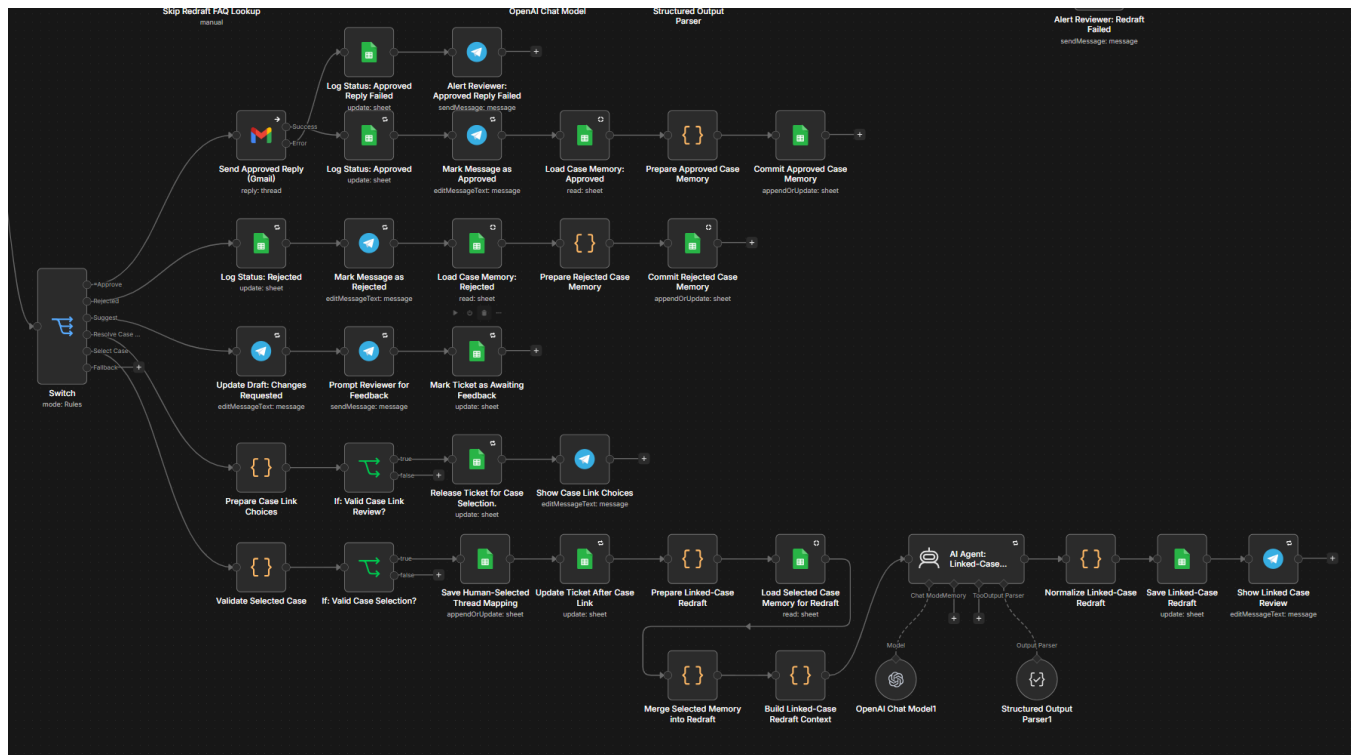


Figure 4 Human review branches for approval rejection feedback and case linking

CASE MEMORY

Approved and rejected outcomes update case memory through separate paths. The main workflow can later retrieve that history when another message belongs to the same customer issue. This supports continuity without allowing an uncertain automatic link to overwrite the case relationship.

Reliability and Recovery

The support system combines duplicate checks, explicit status transitions, retry settings, recovery thresholds, and error alerts. Its goal is not to pretend every external side effect is perfectly knowable; it makes uncertainty visible and returns the decision to a reviewer when necessary.

Scenario	Implemented control	Result
Duplicate incoming email	Message lookup and new-message decision	Known messages stop before another response
Sensitive or unsupported request	Controlled delivery policy	Draft enters Telegram human review
Ambiguous case relationship	Candidate evaluation and reviewer selection	No automatic case link is forced
Repeated revision request	Maximum three redraft iterations	Reviewer receives a limit notice
Processing state exceeds ten minutes	Scheduled recovery monitor	Ticket becomes recovery required and reviewer is alerted
Automatic sending exceeds five minutes	Uncertain-send recovery path	Ticket returns to human review
Linked workflow fails	Shared n8n error workflow	Reviewer receives a failure alert

Security and Privacy

- Gmail, Telegram, Google Sheets, OpenAI, and related service nodes use named n8n credential references rather than visible secret values in the workflow canvas.
- Telegram review actions include an authorization check before reviewer commands are accepted.
- Customer context is retrieved conditionally, reducing unnecessary exposure of order, product, and FAQ information.
- High-risk requests are routed to human review instead of relying on unrestricted automatic delivery.
- Published screenshots must hide customer identity, order information, account identifiers, private links, and credential details.

OPERATIONAL LIMITS

The exports show the configured controls but do not prove long-term unattended operation. Gmail polling is configured around small batches, and external-send reconciliation should be tested carefully before expanding automatic delivery. Data retention, access reviews, and measured service targets should be defined for a production deployment.

Technology and Data Responsibilities

Layer	Technology	Responsibility
Workflow orchestration	n8n	Triggers, routing, context retrieval, waits, status transitions, and recovery
Customer communication	Gmail	Incoming support messages and approved outgoing replies
Human review	Telegram	Approval, rejection, feedback, case selection, and alerts
Operational records	Google Sheets	Support log, case memory, thread mapping, orders, products, and FAQ content
AI-assisted drafting	OpenAI	Structured initial drafts and controlled redrafts
Custom logic	JavaScript code nodes	Normalization, classification, matching, validation, and delivery decisions

Verified Implementation Highlights

- Four connected support workflows containing 147 nodes in the supplied latest matching exports.
- Gmail intake with automated-sender filtering, duplicate detection, and thread or case resolution.
- Conditional order, product, FAQ, and memory retrieval before structured AI-assisted drafting.
- A narrow automatic-delivery policy with human-review fallbacks for sensitive and uncertain requests.
- Telegram approval, rejection, feedback, capped redrafting, and manual case-link resolution.
- Scheduled recovery for stuck processing and uncertain automatic sends.
- A shared error workflow that alerts the reviewer when linked support workflows fail.

Evidence Boundaries

The workflow exports verify triggers, nodes, connections, field mappings, conditional lookups, structured-output handling, authorization gates, recovery paths, and configured external actions. The sanitized Telegram screenshot demonstrates reviewer feedback and a revised draft.

The evidence does not establish production volume, response-time improvement, labor savings, automatic-delivery success rate, customer satisfaction, or revenue impact. Those results should be added only after controlled execution history and measurable operating data are available.

My Contribution

I designed the workflow architecture, configured the service integrations, built the message and case-resolution logic, implemented the structured drafting and delivery policy, created the Telegram review experience, and added recovery and error-handling paths.

This project demonstrates a practical approach to AI-assisted support: automate the repeatable work, make delivery rules inspectable, and keep a person responsible for sensitive or uncertain decisions.