Technology Stack

✅ Technology Stack for Streamlined Ticket Assignment

1) Ticket Intake Layer

Centralizes incoming requests from different channels.

Purpose	Recommended Tech
Email ingestion	Gmail API / Microsoft Graph
Messaging	Slack API / MS Teams API
Forms / Web	React / Next.js
Phone/Voice	Twilio / Amazon Connect
Social / Chat	Zendesk Channels / Intercom / Freshdesk

Many teams use **Zendesk / Freshdesk / ServiceNow** as the main ticketing entry point.

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2) Ticket Management System

Core service that stores ticket metadata, status, priority, and ownership.

Option	Notes
Zendesk	Easy automation & routing
Freshdesk	Cost-friendly, good integrations
ServiceNow	Enterprise workflows
Jira Service Management	Strong dev-ops ties
Custom	For bespoke workflows

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3) Automation & Routing Engine

Automatically assigns tickets based on rules, workload, and priority.

Tool	Notes
In-platform automation (Zendesk macros, Freshdesk workflows, ServiceNow Flow)	Fast to implement
No-code automation (Zapier, Make)	Medium complexity
Custom rule engine (Node.js, Python)	Flexible
AI routing models (Python, HuggingFace, OpenAI)	Smart routing

Features

- ✅ Skills-based routing
- ✅ Priority scoring
- ✅ Auto-triage based on category / sentiment / topic
- ✅ Load balancing

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4) Data Processing & AI Models

For categorization, urgency scoring, customer sentiment, and intent detection.

Purpose	Tech
Ticket classification	Python + NLP (SpaCy, HuggingFace)
AI intent & sentiment	OpenAI / Amazon Comprehend
Keyword extraction	Python NLP
Recommendation	ML models trained on historical ticket resolution

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5) Backend & API Layer

Intermediary between the support UI and automation logic.

Tech	Notes
Node.js / Express	Fast for integration

Tech	Notes
Python (FastAPI)	Great for ML-heavy apps
Java / Spring Boot	Enterprise
GraphQL	Flexible queries
REST	Easy integration

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6) Databases & Storage

Store tickets, routing logs, and agent workloads.

Type	Tech
Operational DB	PostgreSQL / MySQL
Search engine	Elasticsearch / OpenSearch
NoSQL	MongoDB
Object storage	S3 / GCS

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7) Notification & Messaging

Keeps agents and users updated.

Channel	Tools
Email	SendGrid
SMS	Twilio
Chat	Slack API
Push	Firebase

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8) Observability & Analytics

Monitor ticket volume, SLA compliance, agent performance.

Purpose	Tools
Metrics	Prometheus, Datadog
Dashboards	Grafana, Power BI, Looker
Logs	ELK Stack

🧠 Example Architecture Flow

1. Ticket arrives via web/email/chat
2. Ticket management system stores it
3. NLP microservice analyzes ticket
    - Categorization
    - Sentiment
    - Priority scoring
4. Assignment engine decides routing based on:
    - Agent skills
    - Current workload
    - Business logic
    - SLAs
5. Notification is sent to assigned agent
6. Resolution + feedback is collected
7. Analytics reports quality and efficiency

🔁 Automation Techniques

1) Rule-based

- If category = billing → assign to billing team
- If high severity → auto-escalate

2) Machine Learning–based

- NLP classifier predicts category
- Prioritizes based on customer language
- Suggests most skilled available agent

3) Hybrid

Rule-based + AI predictions

📦 Example Minimal Stack

Layer	Technology
Ticketing	Freshdesk
Backend	Node.js
Routing Logic	Python (FastAPI)
DB	PostgreSQL
Notifications	Slack + SendGrid
NLP	OpenAI

🚀 Example Enterprise Stack

Layer	Technology
Ticketing	ServiceNow
Routing	Custom + AWS Lambda
Workflow	ServiceNow Flow / Kafka
ML	AWS Sagemaker
DB	Aurora + Elasticsearch
Messaging	Slack + Twilio

Layer	Technology
Dashboards	Power BI

✅ Resulting Benefits

- ✅ Reduced manual ticket triage
- ✅ Faster response & resolution time
- ✅ Better agent workload balancing
- ✅ Improved customer satisfaction
- ✅ Consistent SLA compliance
