

RAHUL KUMAR SINGH

Senior Network Engineer II · Network Automation & AI

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01 PROFILE

Senior Network Engineer II at Microsoft building production-grade AI systems for Azure ExpressRoute — the global private backbone connecting enterprises to Azure datacenters. Nine years on the same product, evolving from BGP and routing specialist to AI platform engineer: shipping autonomous diagnostic agents, MCP-based diagnostic tooling, and telemetry-intelligence platforms that collapse 30–90 minute investigations into 1–3 minutes. Specializes in turning a decade of institutional ops knowledge into executable, agent-callable workflows.

10–30× FASTER INVESTIGATIONS	200+ AI DIAGNOSTIC TOOLS SHIPPED	9 yrs INFRASTRUCTURE AT SCALE
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02 SELECTED PROJECTS

Network Investigation Agentic Platform · **Flagship** *AI Agents · MCP · FastAPI · React · TypeScript · 2025*

An AI-native operational intelligence workspace consolidating network diagnostics, telemetry intelligence, incident management, and AI agents into a single surface. Compresses 30–90 minute investigations into 1–3 minutes by chaining MCP tool calls behind a unified conversational UI. 100K+ LoC full-stack system spanning 19 telemetry clusters — the operational backbone for the ExpressRoute on-call team.

Autonomous Diagnostic Agent *GPT-5 · Claude Opus · MCP · 2025*

Production AI agent that runs senior-grade network diagnostics on its own — routes between database clusters, chains diagnostic workflows, correlates Kusto telemetry, and writes structured triage summaries matching human expert output, with no human-in-the-loop steps required.

AI-Native Operational Tooling Platform *MCP · Python · FastAPI · 2025*

200+ Model Context Protocol diagnostic tools across every operational domain — routing, telemetry, incident management, customer state, topology — organized into a structured, AI-callable hierarchy that turns institutional ops knowledge into agent-usable workflows.

Operational Intelligence Dashboards *React · TypeScript · Chakra UI · Chart.js · 2025*

A suite of dashboards giving infrastructure engineers a single pane of glass for risk posture, SLA adherence, network topology, incident quality, and executive-grade summaries.

Conversational Operations Bot *AI Bots · Serverless · Adaptive Cards · 2024*

AI bot embedded in internal collaboration tools — multi-turn conversations, change-request automation, and HTML-rendered diagnostics — bringing triage capability directly into the chat surface engineers already live in.

Enterprise Network Automation *Python · BGP · Network · 2018–2024*

Nearly a decade of automation for a global enterprise WAN — device configuration validation, fleet upgrades, customer maintenance alerting, topology visualization, and metadata pipelines.

03 EXPERIENCE

Senior Network Engineer II · Network Automation & AI Jan 2026 – Present

Microsoft — Azure ExpressRoute

- ▶ Lead network automation and AI engineering for Azure ExpressRoute — Microsoft's global private connectivity service linking enterprises to Azure datacenters across 60+ peering locations worldwide.
- ▶ Ship AI-native operational tooling, autonomous diagnostic agents, and MCP-based diagnostic platforms; drive cross-team adoption across the ExpressRoute on-call rotation.
- ▶ Architect agentic systems that compress senior-engineer diagnostic workflows into autonomous AI runs, freeing the on-call rotation from repetitive triage and accelerating customer-facing RCAs.
- ▶ Define internal standards for agent reliability, long-context evaluation, and safe autonomous operation in production network infrastructure.

Senior Network Engineer / AI Platform Engineer Jul 2018 – Jan 2026

LTIMindtree Ltd. — Client: Microsoft Azure ExpressRoute

NETWORK ENGINEERING

- ▶ Operated Microsoft's global Azure ExpressRoute WAN spanning hundreds of Cisco ASR 1006/1009, NCS 5500, Juniper MX10003 and PTX1000 routers — BGP and route-reflector troubleshooting, MACsec key rotations, FastPath rollouts, and ExpressRoute Direct customer onboardings.
- ▶ Led a 400+ router code-upgrade campaign with zero customer impact across Junos and IOS-XE, eliminating weeks of manual change windows.
- ▶ Owned Sev-1 RCA, presented findings to leadership and enterprise customers, and authored SOPs and MOPs adopted as team-wide standards.
- ▶ Acted as SPOC for client-side technical escalations; coordinated with Cisco and Juniper Global TAC on bug-fix escalations and hardware RMAs.
- ▶ Mentored junior network engineers across the ExpressRoute on-call rotation; managed shift planning in the absence of the team lead.

AI PLATFORM ENGINEERING

- ▶ Architected an AI-native operational intelligence platform — **a 100K+ LoC full-stack system** (FastAPI + React + TypeScript) integrating GPT-5 and Claude Opus agents with 200+ MCP tools across 19 telemetry clusters. Collapsed 30–90 minute investigations into 1–3 minutes.
- ▶ Built a production autonomous diagnostic agent performing senior-grade network triage end-to-end: routing between database clusters, chaining BGP and telemetry workflows, correlating Kusto query results, and emitting structured RCA summaries.
- ▶ Designed device-validation automation that verifies live configs against the golden baseline across the entire router fleet, eliminating manual audits.
- ▶ Built a Python ICM Triage Looper integrated with the ICM incident API, auto-alerting the on-call team on new incident triggers and cutting acknowledgement latency.
- ▶ Created customer-and-partner maintenance notification automation that improved comms consistency and reduced manual workload for change managers.
- ▶ Built a conversational ops bot embedded in internal chat tools, bringing diagnostics and change-request workflows into the surface engineers already use.

Infrastructure Management Engineer Mar 2017 – Jun 2018

LTIMindtree Ltd. — Client: Microsoft (WWISDM)

- ▶ Built monitoring and alerting automation for Microsoft's worldwide infrastructure (WWISDM): SCOM alert pipelines, Windows Server 2012 health checks, and BizTalk order-failure analysis.
- ▶ Wrote PowerShell automation that auto-populated incident workspaces with diagnostic context, removing repetitive data entry for the on-call team.
- ▶ Authored Python detectors for unauthorized MSBATCH database changes, surfacing discrepancies before they impacted downstream Microsoft systems.
- ▶ Built an ASP.NET dashboard for server-health and SLA tracking, giving leadership a single view of operational quality across the estate.
- ▶ Trained and mentored 10+ junior engineers on triage workflows, diagnostic patterns, and operational ownership.

04 TECHNICAL SKILLS

AI & Agentic Systems · Production AI Agents, Model Context Protocol (MCP), GPT-5, Claude Opus, Prompt Engineering, Long-Context Evaluation, Agent Reliability Patterns, Autonomous Diagnostic Workflows

Backend & Platforms · Python, FastAPI, Serverless, REST APIs, Workflow Orchestration

Frontend · React, TypeScript, Chakra UI, Chart.js

Networking & Routing · BGP, OSPF, Route-Maps, MACsec, FastPath, ExpressRoute Direct, Azure WAN, DHCP / DNS / NAT, VPN, QoS

Cloud · Microsoft Azure, Azure ExpressRoute, Azure WAN Topology

Hardware Platforms · Cisco ASR 1006 / 1009, Cisco NCS 5500, Juniper MX10003, Juniper PTX1000

Telemetry & Diagnostics · Kusto (KQL), Wireshark, ICM, Telemetry Pipelines, RCA Tooling

Automation & DevOps · Python, PowerShell, YAML, Cisco ZTP, Git, CI / CD

Other Languages · C++, JavaScript

Operations · Incident & Change Management, RCA, SOP / MOP Authoring, SLA Monitoring, On-call Leadership

05 RECOGNITION

- ▶ **“Unstoppable” Award** — extraordinary contributions to team operations and Sev-1 incident response, recognized by leadership.
- ▶ **“On the Spot” Award** — operational efficiency and delivery under pressure on the ExpressRoute on-call rotation.
- ▶ **“Best Performer of the Year”** — recognised by LTIMindtree for automation initiatives that elevated team-wide productivity.

06 WRITING

- ▶ **From Hours to Seconds** — lessons from shipping production AI agents for infrastructure operations. *Nov 2025.*
- ▶ **Why MCP is the Missing Piece for Enterprise AI Tooling** — a structural argument for AI-callable operational hierarchies. *Aug 2025.*
- ▶ **Operational Intelligence** — encoding institutional knowledge into AI workflows. *May 2025.*

07 EDUCATION

B.Tech, Computer Science & Engineering CGPA 7.2

Bhubaneswar Engineering College

08 BEYOND WORK

- ▶ Rated 2000+ on Lichess; competitive chess player.
- ▶ Reads long-context eval harnesses, agent reliability patterns, and operations-culture writing.
- ▶ Active in online competitive gaming and mathematical problem-solving.
- ▶ Languages: English, Hindi, Odia, Bengali.