Application: 6170

Next-Gen Self-Healing Architecture: AI-Powered Framework for Autonomous Infrastructure Resiliency
by Venkatesan Thirumalai

Page: General Information

Provide information about the company to be considered for the award. If you will be nominating an individual, specify the nominee's employer.

Name of Organization/Company

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Page: Entry Information

Entry Title

Next-Gen Self-Healing Architecture: AI-Powered Framework for Autonomous Infrastructure Resiliency by Venkatesan Thirumalai

Category

D03. Technical Innovation of the Year - Architectural Technology

Technical Innovation of the Year Submission Format

Written Answers

a. Briefly describe the organization that achieved the nominated technical innovation: its history and past performance (up to 200 words). Required

As an Infrastructure Architect focused on Automation & Resiliency at a leading global financial institution, I spearheaded the design and deployment of a Self-Healing Infrastructure Events platform—an architectural innovation that redefines enterprise-scale system recovery.

In response to increasing infrastructure complexity and demanding uptime SLAs, I architected an event-driven framework that fuses real-time telemetry, AI-based anomaly detection and modular automation into a fully autonomous remediation pipeline. This platform intelligently identifies, correlates, and resolves over 80% of infrastructure issues without manual intervention—cutting resolution time by 60% and reducing recovery effort by 70%, while consistently delivering 99.99% uptime.

What sets this innovation apart is its adaptive, self-learning architecture. It continuously improves through feedback loops, applies predictive modeling to prevent recurring failures, and leverages 125+ independent Python-based codes with workflow models for scalable, policy-compliant recovery actions. Orchestrated via realtime monitoring tool, ticketing tool and with Automation pipelines and built from the ground up, the system represents a fundamental shift from reactive incident response to proactive infrastructure resilience.

Now adopted as a strategic blueprint across business units, this platform has transformed operational continuity and efficiency. It showcases a leap not just in technical design—but in redefining how infrastructure should behave in a digital-first, always-on world.

b. Outline the nominated technical innovation. Be sure to describe it in terms that someone with limited knowledge of the technology can understand and appreciate (up to 250 words). Required

The nominated innovation is a Self-Healing Infrastructure Events platform—a breakthrough system that enables large-scale IT environments to detect and resolve technical issues automatically, without human intervention. This innovation transforms how complex infrastructure is managed, offering speed, intelligence, and resilience that traditional methods cannot match.

In conventional environments, when a server, application, or system fails, alerts are triggered and engineers must manually investigate the problem, determine a fix, and apply it. This process is slow, reactive, and heavily reliant on human availability. Delays in resolution can lead to downtime, lost revenue, and customer dissatisfaction—especially in enterprises managing thousands of interconnected systems.

To solve this, I designed an AI-powered, event-driven platform that monitors systems in real time, identifies anomalies or early signs of failure, and launches automated recovery actions instantly. It functions like a digital immune system—able to detect, diagnose, and heal issues proactively. The platform continuously learns from previous incidents using machine learning, becoming smarter and more accurate over time.

Built with modular automation and real-time telemetry, the platform now autonomously resolves over 80% of infrastructure incidents—reducing incident recovery time by 60% and minimizing manual effort by 70%. It ensures 99.99% uptime across critical services and frees up engineering teams to focus on innovation instead of firefighting.

Today, this innovation serves as a blueprint for next-generation infrastructure across the organization, ushering in a new era of self-managing, intelligent systems that redefine operational excellence.

c. Explain why the technical innovation you have highlighted is unique or significant (up to 250 words). Required

The Self-Healing Infrastructure Events platform is not just a technical enhancement—it represents a paradigm shift in how enterprise systems operate, recover, and evolve. Unlike traditional infrastructure tools that depend on human intervention to respond to failures, this platform introduces autonomous resilience: a system that senses problems, decides how to fix them, and executes recovery—entirely on its own.

What makes this innovation unique is its cognitive design. It blends AI-powered anomaly detection, real-time telemetry, and event-driven automation into a continuously learning system. With each incident, it becomes smarter—adjusting thresholds, improving diagnostics, and adapting remediation actions dynamically. It doesn't follow static rules—it evolves.

Its significance in how it redefines operational continuity. In environments where even seconds of downtime can cost millions, this platform reduces incident recovery time by 60%, automates over 80% of infrastructure fixes, and consistently delivers 99.99% uptime—without human oversight.

Designed with modular microservices and containerized playbooks, it's scalable, reusable, and future-proof. It has been adopted as a core architecture for autonomous operations, serving as a living blueprint for self-managing infrastructure across the enterprise.

In a world moving rapidly toward intelligent systems, this innovation doesn't just respond to change—it anticipates it. It's a strategic leap toward infrastructure that thinks, heals, and adapts—on its own.

"This isn't just automation—it's infrastructure that thinks, learns, and heals itself. We didn't build a tool. We built a digital nervous system that protects the enterprise in real time."
— Infrastructure Architect, Automation & Resiliency Lead

d. Reference any attachments of supporting materials throughout this nomination and how they provide evidence of the claims you have made in this nomination (up to 250 words). Optional

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Enhanced Metrics Table – Before vs. After
This outlines measurable improvements across key operational areas: a 60% reduction in Mean Time to Resolution (MTTR), a 70% drop in manual recovery effort, and a jump in automated resolution rate from 10% to 82%. These metrics directly validate the claims of improved uptime, cost efficiency, and system autonomy.

Architecture Diagram – AI-Powered Self-Healing Framework
A layered technical diagram that illustrates the full end-to-end system—from telemetry ingestion and AI-based anomaly detection to automated recovery pipelines and governance controls. This diagram supports the claim that the innovation is modular, scalable, and built from the ground up for autonomy.

Self-Healing Workflow Flowchart
A simplified visual showing how the system processes alerts, diagnoses root causes, and executes remediation without human input. This reinforces how incidents are resolved automatically and continuously improved through embedded feedback loops.

Sample Recovery Log (Simulated)
A realistic example of how the system identifies an infrastructure issue and applies automated resolution, confirming operational autonomy.

Executive Endorsement
A leadership quote affirming the innovation's enterprise-wide adoption and strategic significance.

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