



FROM REACTIVE TO PREDICTIVE: TRANSFORMING OIL AND GAS APPLICATION SUPPORT WITH AI

Abstract

In an industry where application downtime impacts safety, production, and compliance, oil and gas application support still operates like back-office IT—reactive, ticket-driven, and disconnected from operational reality. As digital platforms become mission-critical, the industry needs application support that is predictive, intelligent, and built for always-on operations.

This paper explains why application support in the high-risk, high-velocity oil and gas industry must evolve from reactive to predictive. It also outlines how modern solutions can elevate application support into a strategic operational capability powered by artificial intelligence (AI), to improve throughput, reduce downtime, and improve scalability.

Introduction

Most oil and gas operators run some of the most complex application landscapes in the world. Their technology ecosystems comprise legacy systems, enterprise resource planning (ERP) platforms, engineering tools, vendor software, and cloud-native solutions. These applications are production-critical assets, supporting a globally distributed, 24/7 workforce. They directly impact safety, uptime, regulatory compliance, and operational efficiency.

For most oil and gas operators, application support workflows focus on ensuring stability rather than enabling speed. The underlying operating models are

designed for production environments and do not align with today's operational complexities. For instance, when incidents surface in Houston, the North Sea, or offshore Asia, support models relying on manual triage, siloed tools, and follow-the-sun handoffs are unable to scale or respond in time.

Energy enterprises contend with rapid production schedules, strict regulatory requirements, rising safety concerns, and increasing demand for greater output. In this context, using a traditional, ticket-driven model for application support is increasingly inefficient and risky.



Challenges of Traditional Application Support Models

In practice, application support in the oil and gas industry is often fragmented across vendors, regions, and tools. It is also often disconnected from operations, engineering, and production teams. Support models tend to emphasize service level agreements (SLAs) rather than outcomes. Limited visibility into upstream warning signals makes such models reactive rather than preventive.

Reactive application support models pose significant challenges for safety and production-critical environments. They delay incident detection, slow down response to operational anomalies, and increase unplanned downtime. They also compromise the ability to scale digital initiatives effectively. This leads to production losses, higher risk exposure, and rising support costs with diminishing

returns. While industry studies quantify the cost of unplanned downtime in hundreds of thousands of dollars per hour¹, the reality is that reactive support delays detection, slows recovery, and amplifies operational risk in environments where minutes matter.

Thus, the need of the hour is preventive, intelligent application support models that can manage upstream, midstream, or downstream operations across complex global application landscapes. Such models will ensure safety and regulatory compliance across geographies. They also deliver continuous enhancements without destabilizing core systems and scale application support as digital adoption accelerates.



Key Considerations

Rising application complexity is outpacing traditional support models. Further, critical operational areas like safety and production increasingly rely on digital platforms. Hence, the first step for oil and gas operators is to recognize what ails current application support models:

- Raising tickets is a lagging indicator, not a proxy for application health.
- Human intervention is no longer the fastest or safest way to resolve incidents.
- Deferring system enhancements increasingly creates operational debt instead of stability.

In the current always-on, globally distributed oil and gas industry, these limitations increase operational and safety risks while affecting production outcomes.

Across multiple oil and gas engagements, Infosys has observed a clear link between production reliability and AI-enabled application support. In fact, early AI adoption has been shown to deliver outsized impact in support and operations.

The way forward lies in transforming application support from a reactive cost center to a strategic, AI-powered operational capability. Delaying this decision increases both technical and operational debt.



Transforming Application Support with AI

According to Infosys AI Business Value Radar 2025, enterprise AI is moving decisively from experimentation to scale, with over 50% of AI use cases now delivering partial or full business value².

An AI-first approach to application support and enhancement can help enterprises leverage new ways of working that include:

- Predicting and resolving issues before users raise tickets
- Making applications self-healing and continuously optimized
- Prioritizing enhancements based on business impact
- Shifting support teams from firefighting to strategic value creation

The foundational shift lies in the mindset towards AI. Instead of treating AI as an add-on, enterprises must embed intelligence directly into how applications are run. This allows AI to predict incidents, accelerate diagnosis, guide resolution, and continuously learn from operational signals.

Here are three ways oil and gas enterprises can apply AI responsibly across complex, global application ecosystems and adopt AI-native application support models:

- **Use an AI foundry or factory:** Such setups allow oil and gas enterprises to incubate AI technologies by first testing different use cases across upstream, downstream, and midstream operations. They can also develop patterns and document learnings. Once proven successful, the AI technology or platform can then be scaled across the enterprise at lower risk while meeting expected outcomes³.

- **Leverage AI tools:** Tools like AI assistants can help oil and gas operators process lengthy reports containing diverse information, such as well logs, images, plots, and tables. Through predictive insights and early warnings, operators can anticipate real-time operational challenges and take pre-emptive action. Users also benefit from instant access to information, allowing them to better plan their work schedules, minimize delays as well as errors, and improve overall productivity⁴.
- **Implement AI-native platforms:** Modular and composable enterprise platforms can bring together AI agents, services, interoperable data models, and out-of-the-box applications⁵. One example is Infosys Topaz Fabric, which provides AI-powered modular services on top of existing environments. Pre-integrated with leading enterprise, business, and data platforms, it ensures faster deployment and seamless interoperability across the application environment⁶. Infosys Topaz Fabric acts as the execution layer of Infosys Topaz. It provides reusable AI agents, observability hooks, and automation services that integrate seamlessly with existing oil and gas application landscapes, including ERP, subsurface platforms, and cloud-native systems.

Platforms such as Infosys Topaz play a central role in transforming application support by industrializing AI across the application lifecycle—covering support, enhancement, and continuous optimization. Built on a responsible-by-design AI framework, Infosys Topaz brings together AI agents, data platforms, and domain models to move application support from experimentation to scale.

Benefits and Real-world Stories

Some of the measurable outcomes of AI-native application support models are reduced incidents, quicker resolution, improved uptime, and lower total cost of ownership (TCO).

The final result is a shift from reactive application support to predictive, insight-driven operations, and from static enhancement backlogs to continuous improvement. Here are two recent examples of how AI-native apps have helped transform oil and gas operations:

- **Upstream operations:** Geoscientists often struggle to make timely, effective decisions due to significant time spent sifting through unorganized data across legacy systems, databases, and textual reports. For a global energy data analytics firm, overwhelming data volume and complexity made it difficult to extract actionable insights. Infosys developed an AI assistant that analyzes textual data, historical well data, surface drilling parameters, formation data, casing depth, and equipment data. By enabling rapid access to both structured and unstructured subsurface insights, the solution significantly reduced the time geoscientists spent searching and correlating data. This allowed them

to focus on interpretation and decision-making during critical drilling and planning cycles².

- **Downstream operations:** Third-party services used by oil and gas companies are governed by complex contracts with strict regulations, durations, and business rules. For a US-based refinery, misalignment between invoices and contractual terms was resulting in payment delays, financial discrepancies, and increased costs. The challenge lay in manual validation of invoices against voluminous timesheets and third-party documents. Infosys implemented a computer vision-based solution to extract business rules from contracts and automatically validate these against invoices, delivering savings of nearly US \$6 million through automated invoice validation and reduced payment discrepancies². With this solution, finance teams can now automate invoice auditing and minimize disputes.

The above examples demonstrate that AI and automation, when embedded into application operations, deliver clear outcomes of higher support throughput and faster turnaround.



Conclusion

With Infosys Topaz, oil and gas operators can standardize AI-led support patterns, embed intelligence into run operations, and continuously learn from production signals. The platform ensures that AI-driven support becomes repeatable, governable, and enterprise-grade rather than bespoke.

For oil and gas enterprises, application support is no longer a back-office IT function. It is a frontline operational capability that directly impacts uptime, safety, production, and compliance. Therefore, support models must evolve from reactive issue resolution into proactive, AI-native,

self-healing systems. Composable and modular platforms, such as Infosys Topaz Fabric, leverage AI agents and services-as-software, enabling energy companies to effectively adopt predictive, insight-led execution.

An AI-first approach to application support and enhancement will enable oil and gas enterprises to industrialize intelligence, rather than experiment with it, turning application support into a strategic advantage. In today's environment, AI-native support is the new baseline for reliability, resilience, and value creation.

About the Author



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Makarand Nargund is an Associate Vice President at Infosys with over two decades of experience in the oil and gas industry, specializing in large-scale application support, modernization, and run operations. Having dedicated much of his career to the applications space, he works closely with energy enterprises to improve reliability, resilience, and business outcomes across complex, production-critical environments. Today, Makarand focuses on helping clients industrialize AI-led application operations using Infosys Topaz, shifting support from reactive execution to predictive, value-driven performance.

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