



Conversational AI with DevOps

Introduction

GenAI is revolutionising the DevOps lifecycle, enhancing productivity, speeding up code delivery, and increasing software development agility. It utilises Large Language Models (LLMs) to interpret natural language prompts into executable code, streamlining the development and operations process. Meanwhile, Conversational AI, through advanced chatbots or virtual assistants, improves user interactions with dynamic, context-aware responses. The integration of GenAI and Conversational AI in DevOps offers a transformative approach to automating and optimising various stages of software development and operations.

- **GenAI and Conversational AI Enhancements:** Accelerates every stage of the DevOps lifecycle, from planning to deployment and operations.
- **Productivity and Agility:** Empowers teams by translating natural language into executable code, fostering agility in software development.
- **Strategic Use Cases:** Identifying specific use cases for Conversational AI within DevOps is crucial for driving significant business value.
- **Automated Code Generation and Testing:** Automates routine tasks, allowing teams to focus on more complex problems.
- **Operational Efficiency:** Optimises deployment processes, improving efficiency and reducing time-to-market for new features and updates.



Intelligent Prompting in DevOps

Chain of Thought (CoT) prompting, a novel technique for Large Language Models (LLMs), enhances Conversational AI by guiding it to explain its reasoning process, rather than just providing direct answers. This method, particularly beneficial in DevOps, enables the creation of more reliable and efficient practices by facilitating the development of rules for infrastructure as code (IaC) templates, security compliance, and deployment workflows.

KPMG DevOps Value Chain augmented by Conversational AI

KPMG's DevOps Value Chain is a comprehensive framework designed to enhance collaboration, automation, and integration across software development and IT operations, aiming to improve speed, quality, and predictability of software delivery. By embedding Conversational AI into this value chain, organisations can further streamline workflows, automate interactions, and facilitate more efficient communication between development, operations, and other stakeholders. Conversational AI, through chatbots and virtual assistants, can provide immediate access to project updates, code deployment statuses, and operational metrics, as well as assist in troubleshooting and the execution of DevOps processes. This integration not only accelerates the feedback loop essential for agile development but also elevates the overall efficiency and effectiveness of the DevOps lifecycle.

Conversational AI with DevOps



Pre-Commit	Commit	Acceptance	Production	Post Production
Contextualised user story creation	Automated IaC Templates	Release Scheduling & Automation	Automated Deployment Triggers	Predictive Monitoring/ System Health checks
Predictive Planning	Build Trigger Recommendations	Automated Configuration management	Automated Rollback	Intelligent Alerting
Automated Design Documentation	Artifact Management	Automated Change Management	Automated Change Management	Automated Incident Response
Automated Code Generation & Reviews	Automated Test Case Generation	Compliance & Audit trails	Resource Optimisation	User Behavior Analysis
Bug Detection & Resolution	Synthetic Test Data Generation	IaC Predictive Analytics	Anomaly Detection & Alerts	Automated Troubleshooting
Automated Source Control Management	Automated Testing	Automate Risk Assessment	Release Notes Generation	Security Monitoring
Automated Change Impact Analysis	Predictive Build/test Metrics Analytics	Post Release Monitoring	Deployment Reports	Service Desk Integration



Compliance/Policy as Code



The integration of Conversational AI across various phases of the software development lifecycle revolutionises traditional practices, offering enhanced efficiency, quality, and user satisfaction. Below is a summary of its impact across different stages:

Plan

Conversational AI streamlines the planning phase by efficiently gathering and analysing stakeholder requirements through natural language processing. It prioritises project backlogs and user stories, ensuring critical elements like regulatory requirements and customer feedback are considered. This leads to more accurate and comprehensive planning, as demonstrated by a financial services company leveraging Conversational AI for regulatory analysis.

Code

In the coding phase, Conversational AI accelerates development by generating code snippets from descriptions and identifying bugs for higher code quality. It also performs change impact analysis to predict potential issues in related modules due to code modifications, as seen with AWS's automated IAM policy generation and Atlassian's AI integration in Bitbucket for source control management.

Build

Conversational AI enhances Continuous Integration (CI) processes by automating builds and managing build artifacts, as exemplified by Netflix and Google Cloud. It provides real-time build metrics, enabling teams to track performance and optimise accordingly, like Microsoft's use of Conversational AI in Azure DevOps.

Test

Automated test script generation and prioritisation of tests based on code changes are facilitated by Conversational AI, reducing manual efforts, and increasing coverage. LinkedIn's self-healing tests and Uber's AI-driven test prioritisation exemplify its capability to maintain robust test suites and identify critical issues swiftly.

Release

Conversational AI automates the DevOps release process, manages canary releases, and streamlines ITSM processes like incident and change management. Shopify's automated release pipelines and Etsy's controlled canary releases demonstrate its ability to ensure consistent and reliable deployments, while ServiceNow's AI detects incidents for improved service reliability.

Deploy

Automation of deployment tasks, management of configuration files, and performance of health checks are achieved through Conversational AI, ensuring swift and error-free releases. Facebook's deployment automation and Netflix's health checks on streaming services highlight its effectiveness in orchestrating deployments and ensuring system stability.

Operate & Optimise

Service virtualisation, real-time analysis of usage metrics, smart alert notifications, and continuous monitoring of system performance are enhanced by Conversational AI. CA Technologies' use of Conversational AI for service virtualisation and Slack's analysis of user engagement metrics showcase its ability to simulate complex systems for testing, optimise platforms based on user behaviour, and improve incident response times.

To summarise, Conversational AI significantly transforms the software development lifecycle by automating and optimising tasks across planning, coding, building, testing, releasing, deploying, operating, and optimising phases. Its application leads to faster development cycles, improved code quality, efficient testing and deployment processes, and enhanced system performance and reliability, ultimately driving better business outcomes and user experiences.



Conversational AI with DevOps – Risks & Mitigation

- **Security and Privacy Risks:** Use encryption for data in transit and at rest, implement strict data access control policies, ensure secure API integrations, and conduct regular security audits
- **Biases in the model & hallucination –** Use diverse and representative datasets to minimise biases in AI models. Regularly monitor performance for any signs of bias and adjust models accordingly. KPMG Trusted AI framework can assist in reducing the biasness in the system.
- **Data Quality and Integrity:** Ensure robust data validation and verification processes, utilising reliable data sources
- **Overreliance on AI models:** Design systems with redundancy and ensure human oversight in critical workflows. Implement fallback mechanism to handle critical scenarios to ensure continuity of operations
- **Compliance and Regulatory Challenges:** Organisations need to stay informed and design AI systems with compliance and ethical considerations in mind. Maintain comprehensive documentation of processes leveraging Conversational AI and decision making for transparency

Call to Action

Organisations looking to stay at the forefront of technological innovation and operational efficiency should strongly consider integrating Conversational AI within their DevOps practices. This integration not only streamlines workflows and enhances communication but also significantly improves the speed and quality of software delivery. To embark on this transformative journey, organisations should:

- **Evaluate Current Processes:** Conduct a thorough assessment of your existing DevOps practices to identify areas where Conversational AI can add the most value.
- **Start Small and Scale:** Begin with pilot projects to demonstrate the value of Conversational AI within your DevOps cycle, then gradually scale up based on success and learnings.
- **Prioritise Security and Compliance:** Ensure that integrating Conversational AI adheres to the highest standards of security and regulatory compliance, protecting both your data and your customers' privacy.
- **Invest in Training and Change Management:** Prepare your team for a smooth transition by investing in training programs that cover both the technical aspects of Conversational AI and the change management strategies necessary for successful adoption.
- **Partner with Experts:** Consider partnering with technology providers and consultants who specialise in Conversational AI and DevOps integration to leverage their expertise and insights.
- **Foster Continuous Improvement:** Use feedback loops and continuous learning to refine and enhance the integration of Conversational AI in your DevOps practices over time.

By taking proactive steps towards integrating Conversational AI with DevOps, organisations can unlock new levels of efficiency, agility, and innovation, positioning themselves as leaders in the digital transformation era.



How KPMG can help >>

KPMG leverages its deep expertise in both Conversational AI and DevOps to help organisations streamline their operations, enhance efficiency, and foster innovation. Our approach encompasses strategic planning, custom solution development, seamless integration, robust security and compliance frameworks, comprehensive training, and ongoing optimisation. By doing so, we ensure that Conversational AI tools not only fit perfectly within your DevOps environment but also drive tangible business outcomes.



KPMG has demonstrated its prowess in this domain through several successful deployments:

BidGPT: Developed to automate and optimise the bidding process, BidGPT utilises Conversational AI to interpret complex bidding scenarios and suggest optimal strategies, significantly reducing manual effort and improving accuracy.

KPMG Ava: Our in-house virtual assistant, Ava, uses Conversational AI to provide KPMG teams with instant access to a wealth of knowledge, facilitating quicker decision-making and enhancing productivity across various projects.

Large Beverage Company: KPMG has implemented Conversational AI solution using ChatGPT integrated with ServiceNow Chat and revolutionised HR processes, improving employee engagement through instant, interactive communication channels for HR inquiries and support. Accuracy of results has been improved from 60% manual to 99% when done via conversational AI.

Through these examples, KPMG showcases its ability to not only deploy Conversational AI solutions but also ensure they deliver strategic value, align with business goals, and enhance the overall DevOps cycle..



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