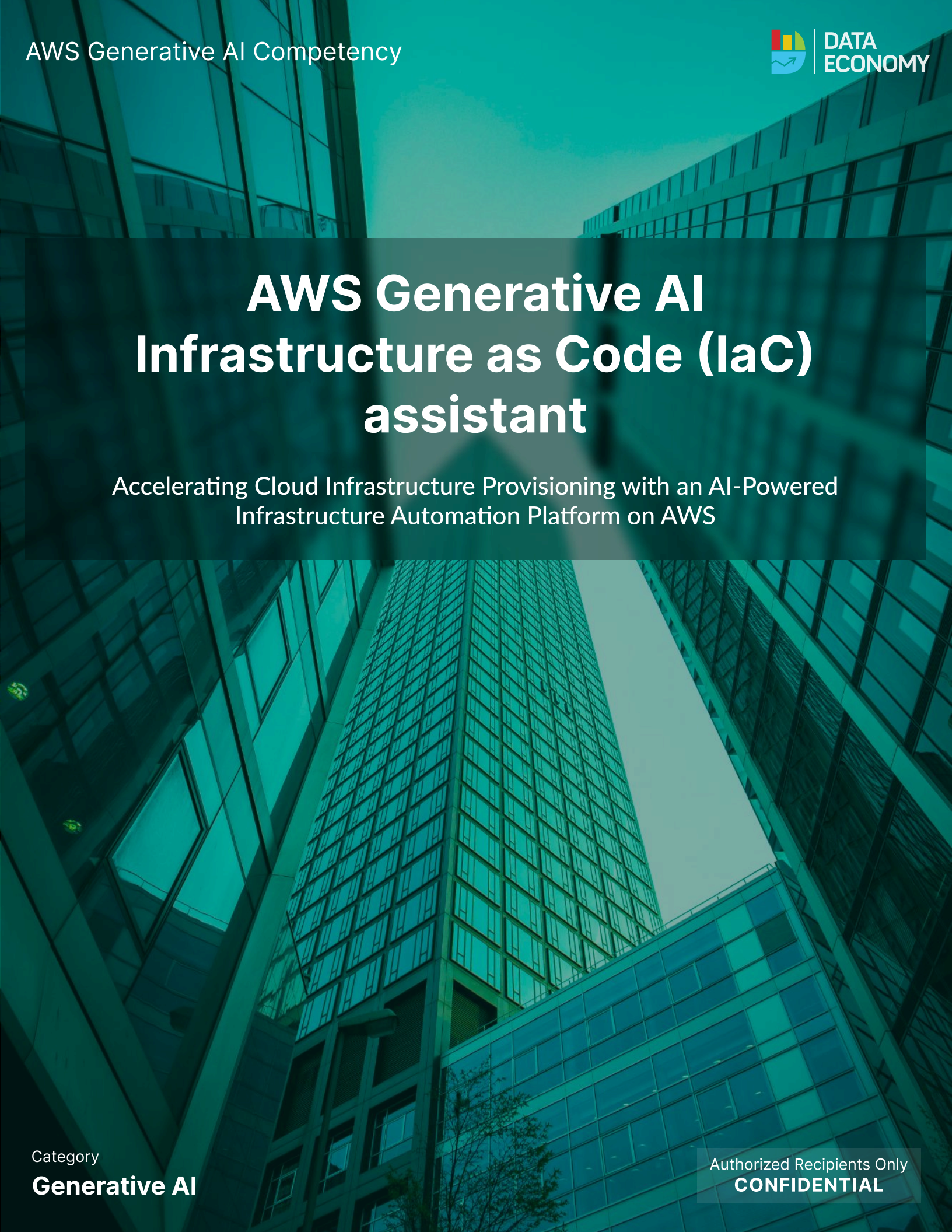
AWS Generative AI Competency

DATA ECONOMY

AWS Generative AI Infrastructure as Code (IaC) assistant

Accelerating Cloud Infrastructure Provisioning with an AI-Powered Infrastructure Automation Platform on AWS



Category

Generative AI

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About the Customer

The customer is a leading global financial services organization providing investment servicing, investment management, data analytics, and financial technology solutions to institutional investors worldwide. Operating across multiple regions and supporting complex enterprise-scale cloud environments, the organization manages critical infrastructure platforms that require high levels of governance, operational consistency, security, and regulatory compliance.

As part of its cloud modernization and platform engineering initiatives, the customer sought to improve the efficiency and scalability of infrastructure provisioning processes across its AWS environments. The organization aimed to reduce the manual effort associated with Infrastructure-as-Code (IaC) development, strengthen governance controls, improve deployment consistency, and accelerate infrastructure delivery through intelligent automation. To achieve these objectives, the customer partnered with DataEconomy to implement an AI-powered Infrastructure-as-Code Assistant built on AWS, enabling automated Terraform generation, validation, and deployment workflows while maintaining alignment with enterprise engineering standards and operational governance requirements.

Customer Challenge

The customer was facing operational and engineering challenges associated with infrastructure provisioning, validation, and governance across its AWS environments. Existing infrastructure request and deployment processes relied heavily on manual coordination between application teams, cloud engineering teams, and operational stakeholders, resulting in delays, inconsistencies, and increased operational overhead.

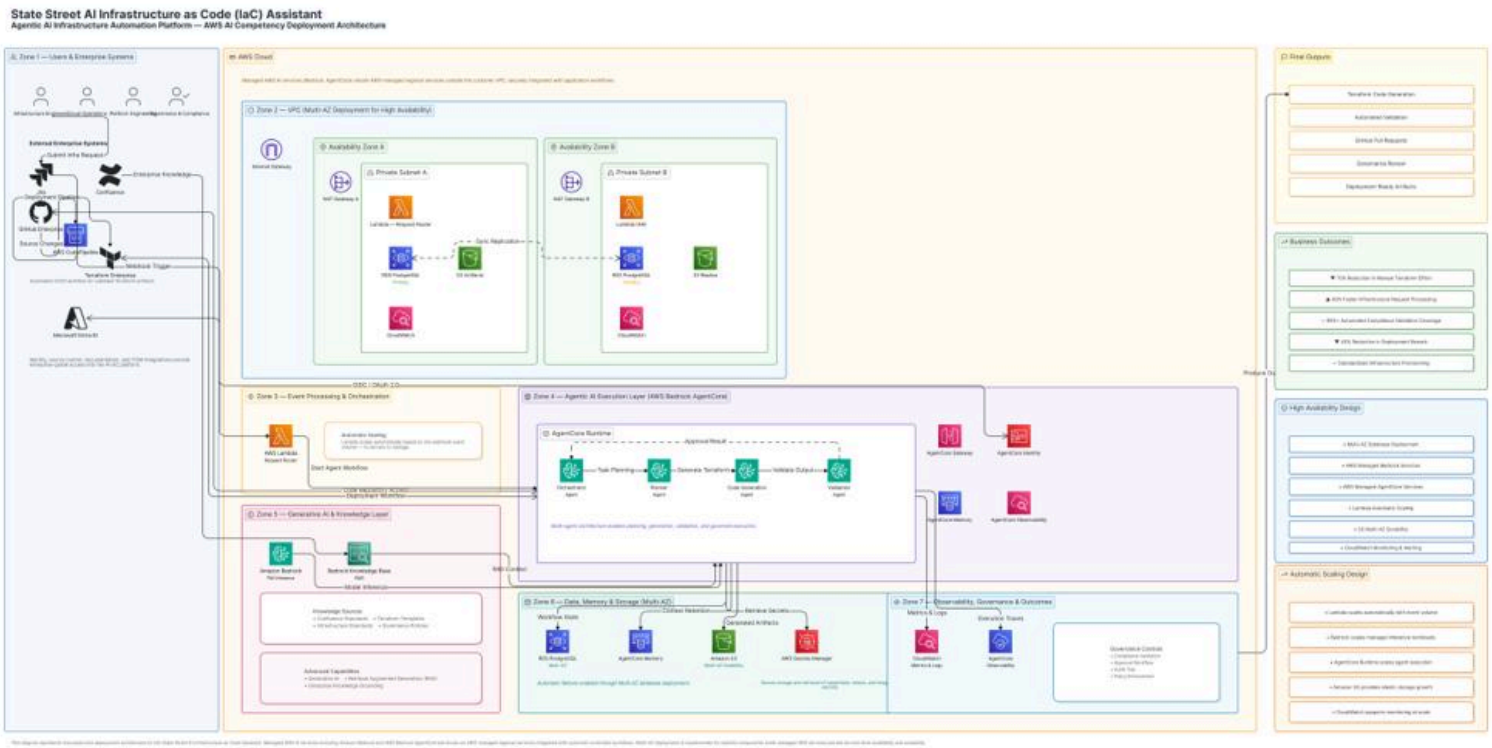
Application teams required a faster and more standardized approach for provisioning infrastructure while ensuring compliance with enterprise engineering standards, security requirements, and governance policies. Manual Infrastructure-as-Code (IaC) development introduced challenges related to inconsistent Terraform implementations, dependency management, validation complexity, and limited traceability across infrastructure lifecycle activities.

The customer also required the ability to automate infrastructure validation and testing workflows before deployment. Existing processes lacked an intelligent mechanism to generate Terraform code from business requirements, validate generated configurations against enterprise standards, execute sandbox testing, and provide automated reporting and remediation insights. Additionally, the organization needed tighter integration between cloud automation workflows and enterprise platforms such as Jira, GitHub Enterprise, Confluence, Terraform Enterprise, and AWS operational services. The absence of centralized orchestration and AI-driven automation limited operational scalability and increased the effort required to maintain governance, auditability, and deployment consistency across teams.

To address these challenges, the customer sought a scalable AI-powered infrastructure automation solution capable of streamlining Terraform code generation, enforcing enterprise compliance standards, automating validation workflows, improving operational efficiency, and accelerating infrastructure delivery across AWS environments.

Partner Solution

To modernize infrastructure provisioning and improve operational efficiency, DataEconomy designed and implemented an AI-powered Infrastructure-as-Code (IaC) Assistant on AWS. The solution leveraged Generative AI, agent-based orchestration, Retrieval Augmented Generation (RAG), and AWS-native services to establish an end-to-end infrastructure automation platform capable of streamlining Terraform generation, validation, governance, and deployment workflows.



The platform was built around a multi-agent architecture running on AWS Bedrock AgentCore, where specialized AI agents collaborate to automate infrastructure lifecycle activities. Infrastructure requests submitted through Jira trigger an orchestration workflow that enables AI agents to analyze requirements, generate implementation plans, create Terraform code, validate generated infrastructure against enterprise standards, and coordinate deployment readiness activities. This approach enables infrastructure teams to accelerate provisioning while maintaining consistency, governance, and traceability across AWS environments.

Solution Highlights

AI Agent Orchestration	• Orchestrator, Planner, Code Generation, and Validation Agents running on AWS Bedrock AgentCore
Infrastructure Automation	• Automated Terraform generation from Jira-based infrastructure requests
Infrastructure Automation	• Amazon Bedrock Knowledge Bases and RAG framework grounded on enterprise documentation, governance policies, Terraform templates, and engineering standards
Compliance & Governance	• Automated validation against enterprise policies, security standards, and infrastructure best practices
Testing & Verification	• Sandbox-based validation workflows to verify infrastructure configurations before deployment
Enterprise Integrations	• Jira, GitHub Enterprise, Confluence, Terraform Enterprise, and AWS services integrated into a unified workflow
Traceability & Auditability	• Automated capture of workflow metadata, validation results, operational state information, and audit records

To ensure generated infrastructure aligned with organizational requirements, the platform incorporated Amazon Bedrock Knowledge Bases and a Retrieval Augmented Generation (RAG) framework built on enterprise infrastructure standards, Terraform module templates, governance policies, security requirements, and engineering best practices. This enabled AI agents to generate standardized and compliant Terraform modules while maintaining consistency across environments.
The solution automated the complete infrastructure lifecycle by integrating with Jira for request intake, GitHub Enterprise for source control and pull request management, Confluence for knowledge retrieval, and Terraform Enterprise for infrastructure execution workflows. Generated Terraform code was automatically validated through testing and sandbox execution processes before being committed to source repositories through pull request automation, improving deployment reliability and reducing manual effort.

AWS Services Utilized

Amazon Bedrock	• Generative AI-powered reasoning, planning, and Terraform code generation
AWS Bedrock AgentCore	• Agent orchestration, runtime execution, memory, and observability s
Amazon Bedrock Knowledge Bases	• Enterprise knowledge retrieval and RAG implementation
Amazon S3	• Storage of artifacts, validation outputs, documents, and logs
Amazon RDS	• Workflow metadata, audit information, and operational state management t
AWS Lambda	• Event-driven automation and integration workflows
AWS Secrets Manager	• Secure credential and token management
AWS IAM	• Identity and access management
Amazon CloudWatch	• Monitoring, logging, metrics, and operational visibility
Amazon ECR	• Container image repository for agent services

Results and Benefits

The AI-powered Infrastructure-as-Code Assistant enabled the customer to establish a standardized, automated, and scalable infrastructure provisioning framework across AWS environments.

By leveraging Generative AI and automated Terraform workflows, the solution reduced the manual effort associated with infrastructure request handling, code generation, validation, and deployment activities. Application teams gained the ability to submit infrastructure requirements through structured workflows and automatically generate standardized Terraform code aligned with enterprise engineering standards.

The implementation strengthened governance and operational traceability by integrating validation workflows, policy checks, pull request automation, audit tracking, and centralized reporting into the infrastructure provisioning lifecycle. Automated validation and sandbox testing improved deployment consistency and reduced the operational complexity associated with manual infrastructure verification processes.

Key business and operational benefits included:

- Improved standardization of Terraform infrastructure generation across AWS environments.
- Reduced manual effort associated with infrastructure provisioning and validation workflows.
- Enhanced governance, compliance validation, and operational traceability throughout the infrastructure lifecycle.
- Faster infrastructure request processing through AI-assisted automation and workflow orchestration.
- Improved deployment reliability through automated sandbox validation and policy enforcement.
- Centralized operational monitoring, logging, and workflow visibility using AWS-native observability services.
- Established a scalable foundation for future AI-assisted cloud operations and infrastructure automation initiatives.

About the Partner

DataEconomy is a data, analytics, cloud, and AI consulting organization that helps enterprises modernize technology platforms and accelerate digital transformation through AWS-native solutions. As an AWS Partner, DataEconomy specializes in cloud modernization, platform engineering, data and analytics, Generative AI, automation, and operational excellence initiatives. For this engagement, DataEconomy provided architecture implementation, AI engineering, platform integration, infrastructure automation, governance enablement, and operational readiness services to deliver an AI-powered Infrastructure-as-Code Assistant on AWS. The solution combined Generative AI, agent-based orchestration, enterprise knowledge retrieval, automation frameworks, and AWS-native services to streamline infrastructure delivery while improving governance, compliance, and operational efficiency.

DataEconomy's expertise in cloud engineering, AI-driven automation, and AWS services enabled the customer to establish a scalable foundation for intelligent infrastructure operations and future platform modernization initiatives.