

# Chapter 12

## Harnessing AI for Data-Driven Compliance and Security in Cloud Environments: A Blue-Green Infrastructure Approach

**Deepak Shivrambhai Antiya**

 <https://orcid.org/0009-0007-5239-037X>

*Oracle, USA*

### **ABSTRACT**

*As cloud environments become integral to infrastructure projects, maintaining security and regulatory compliance is paramount, particularly in blue-green deployments that prioritize continuous delivery and reduced downtime. This paper explores the integration of Artificial Intelligence (AI) to enhance data-driven compliance and security measures in cloud-based blue-green infrastructure projects. AI can identify vulnerabilities, enforce compliance, and predict risks by analyzing massive datasets in real-time, enabling more secure and resilient deployments. Through a review of current practices and case studies, this paper demonstrates how AI can streamline compliance audits, detect anomalies, automate security policies, and ensure adherence to industry standards in blue-green environments. The findings offer a blueprint for leveraging AI to meet evolving regulatory requirements and mitigate security threats in dynamic cloud infrastructures.*

DOI: 10.4018/979-8-3693-8069-7.ch012

## INTRODUCTION

As modern enterprises increasingly migrate to cloud-based infrastructure, the need for continuous delivery, scalability, and resilience has become essential for sustaining competitive advantages. Blue-green deployment strategies have emerged as a preferred approach to achieve minimal downtime during system updates and maintenance. These environments, characterized by having two identical production environments (blue and green), allow seamless transitions between systems while reducing risks of failures during deployment. However, with this flexibility comes the growing challenge of ensuring security and compliance, particularly in sectors subject to stringent regulatory requirements.

In this context, Artificial Intelligence (AI) offers transformative capabilities to manage and automate compliance and security measures in cloud environments, especially in blue-green infrastructure. By processing large volumes of data in real-time and detecting security anomalies early, AI enables more proactive and efficient governance of cloud infrastructure. This paper aims to explore the role of AI in enhancing both compliance and security in blue-green cloud environments, providing insights into its practical applications, potential benefits, and challenges. Blue-green infrastructure is a deployment technique that uses two parallel production environments—one labeled “blue” and the other “green.” The concept involves routing live traffic to one environment (say, blue) while deploying updates or new features to the other (green). Once updates are verified, traffic is shifted seamlessly from blue to green, minimizing downtime and reducing risks associated with software rollouts. If any issues arise with the green environment, it is possible to switch back to the blue environment, ensuring service continuity.

This method enhances system reliability, supports continuous integration and delivery (CI/CD), and allows developers to innovate rapidly without disrupting users. However, the complexity of managing these environments grows as more systems become distributed, leading to an increased attack surface. Consequently, security and compliance challenges—particularly in highly regulated industries like finance and healthcare—become critical considerations.

The current body of literature showcases significant strides in technology, sustainability, and urban planning across multiple sectors, reflecting the dynamic interplay of innovations aimed at addressing global challenges. Beyer et al. (2023) emphasize a shift toward decentralized, cloud-integrated spatial data infrastructures, which offer public authorities a more efficient approach to managing large-scale spatial data. This aligns with the frameworks laid out by Kim and Choi (2021), who discuss planning instruments for climate-smart cities that integrate spatial, green, and digital technologies to foster urban resilience and sustainability.

24 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: [www.igi-global.com/chapter/harnessing-ai-for-data-driven-compliance-and-security-in-cloud-environments/364201](http://www.igi-global.com/chapter/harnessing-ai-for-data-driven-compliance-and-security-in-cloud-environments/364201)

## Related Content

---

### School Districts Stumbled on Data Privacy

Irene Chen (2012). *Cases on Educational Technology Integration in Urban Schools* (pp. 12-15).

[www.irma-international.org/chapter/school-districts-stumbled-data-privacy/61699](http://www.irma-international.org/chapter/school-districts-stumbled-data-privacy/61699)

### A Short Comment on Surveillance and Security in the E-Planned City

Lucas Melgaço and Nelson Arteaga Botello (2013). *International Journal of E-Planning Research* (pp. 75-78).

[www.irma-international.org/article/a-short-comment-on-surveillance-and-security-in-the-e-planned-city/105135](http://www.irma-international.org/article/a-short-comment-on-surveillance-and-security-in-the-e-planned-city/105135)

### Analysis of Housing for Rent in Borderlands: A Case Study Approach From the Iberian Peninsula

Jacinto Garrido Velarde, Betina Cavaco de São Pedro and Consuelo Mora (2020). *Cross-Border Cooperation (CBC) Strategies for Sustainable Development* (pp. 115-131).

[www.irma-international.org/chapter/analysis-of-housing-for-rent-in-borderlands/248895](http://www.irma-international.org/chapter/analysis-of-housing-for-rent-in-borderlands/248895)

### Improving Urban Planning Information, Transparency and Participation in Public Administrations

Beatriz Santos (2019). *Smart Cities and Smart Spaces: Concepts, Methodologies, Tools, and Applications* (pp. 936-955).

[www.irma-international.org/chapter/improving-urban-planning-information-transparency-and-participation-in-public-administrations/211327](http://www.irma-international.org/chapter/improving-urban-planning-information-transparency-and-participation-in-public-administrations/211327)

### Development Trends of PISA 2012 and PISA 2018 Financial Literacy Achievements in Latvia

Linda Mihno (2022). *International Journal of Smart Education and Urban Society* (pp. 1-10).

[www.irma-international.org/article/development-trends-of-pisa-2012-and-pisa-2018-financial-literacy-achievements-in-latvia/297064](http://www.irma-international.org/article/development-trends-of-pisa-2012-and-pisa-2018-financial-literacy-achievements-in-latvia/297064)