Chapter 4
Cloud Service Models: Features and Framework

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ABSTRACT

Cloud computing has revolutionized the way businesses access and utilize computational resources, providing unparalleled cost efficiency, scalability, and flexibility. Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) comprise the three primary cloud service models; this chapter offers a thorough examination of each. We explore the characteristics, use cases, advantages, and disadvantages of each model, emphasizing the varying degrees of control and responsibility that cloud providers and consumers share. In addition, the chapter delves into significant future trends, such as the increased integration of Artificial Intelligence functionalities, the paramount importance of robust cloud security measures, the convergence of edge and cloud computing, advancements in resource optimization, and the increasing adoption of cloud-native and serverless

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architectures. It is imperative for organizations to comprehend these models and emergent trends in order to effectively leverage the transformative power of the evolving cloud landscape.

1.0 INTRODUCTION TO CLOUD SERVICE MODELS

Cloud computing has revolutionized the way we access and use computing resources (Ajaz et al., 2024). Cloud services enable users to access remote resources over the Internet rather than relying on local hardware and software (Ajil & Kumar, 2024). This adaptability and expandability have transformed many domains, affecting both businesses and individuals. This paradigm revolves around certain service models that define the level of abstraction and control available to users. At the core of cloud computing are its service models, which delineate the varying degrees of control and responsibility that are shared between the cloud provider and the consumer. It is essential to comprehend these models in order to make well-informed decisions regarding cloud migration, as each model provides a distinctive combination of customisation and convenience.

The three principal cloud service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) will be examined in this chapter. Each cloud service model offers unique advantages and limitations, as shown in Figure 1. While Table 1 compares the fundamental characteristics of the three service models. IaaS is the most fundamental service level, encompassing virtualized computer resources such as servers, storage, and networking (Vieira et al., 2024). IaaS users have substantial control over the core infrastructure, allowing them to modify the environment to their needs. This adaptability is critical for enterprises that require high levels of control and personalization, especially those managing complex IT infrastructures or developing resource-intensive apps (Stupar & Huljenic, 2023).

PaaS expands on IaaS, allowing developers to build, run, and manage apps without worrying about the underlying infrastructure (Yang et al., 2024). PaaS solutions often include operating systems, programming language execution environments, databases, and other essential development tools. This abstraction simplifies the development process, shortens time-to-market for new apps, and reduces the operational strain on development teams. SaaS paradigm delivers programs over the Internet, requiring minimal user interaction with the underlying infrastructure. SaaS applications are accessed via web browsers or specialized clients, with the service provider managing all software and data. This model provides the highest level of abstraction, making it ideal for customers who prioritize simplicity and low maintenance. SaaS solutions are common in various fields, including email,