Chapter 2
Navigating Your Way to the Hybrid Cloud

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ABSTRACT

The authors believe that cloud computing systems should become hybrid in nature for organisations to realise the full business potential that the cloud offers: increased agility, velocity and innovation in business IT. Yet hybrid environments are complex to design, implement and run. To the organisations implementing them, these systems present many architectural challenges that must be solved if the resulting solution is to deliver desired business outcomes. This chapter defines the different types of hybrid cloud: those seen to date as well as those that will emerge in the near future. Using seven key business use cases as a framework, the authors propose a high-level architecture for hybrid cloud computing environments that is practically illustrated with real-world client examples.

INTRODUCTION

Many organisations that have begun to adopt cloud computing have run into problems when faced with systems and workloads that don’t easily move into the cloud paradigm. These organisations have tried to adopt a hybrid cloud approach according to the definition described by the National Institute of Standards and Technology (NIST) but fail because their environments don’t correspond to this model. The main challenge with both of these approaches is that they assume one or both of the systems being integrated are cloud-like in nature. There is also a seeming unwritten bias that assumes that cloud is “new” and hence “good,” whereas the more traditional systems are “old” and hence “bad.” By understanding the ways that these types of systems are used by businesses, an architecture for these hybrid cloud systems that cuts through these problems can be defined. Readers of this chapter will gain a better understanding of the challenges of hybrid cloud and be shown a hybrid cloud architecture that illustrates a solution.

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BACKGROUND

Whilst IT automation techniques for systems and software are well understood, cloud computing has made possible the extensive automation of the IT support processes for managing and administering information technology (IT) systems, thereby providing many unique benefits when compared to traditional IT models. Cloud services can automatically reconfigure infrastructure components to cope with rapidly changing workload demands. The time required to move a suite of computer programs to a state in which the users are able to use the systems can be dramatically reduced through automation. These are the primary advantages of cloud computing as a tool to support businesses. Additionally, cloud provides a new way of exposing business services to customers, partners and suppliers. These business services are presented as application programming interfaces (APIs). A new API economy is emerging in the cloud, where digital services are purchased and combined with additional data or programs to support business activities. The innovation potential of cloud computing allows new business patterns to emerge. These are explored in “The New Patterns of Innovation” (Parmar, McKenzie, Cohn & Gann, 2014).

Organisations want to build on their prior IT or cloud investments. To do this, they must eventually adopt an approach that is inherently hybrid in nature. In this section the authors explain the rationale for this belief.

To understand the different ways that organisations deliver cloud services to their customers and users requires the authors to first describe the differences in IT delivery for organisations whose IT is “born on the cloud” and those using “traditional IT“ delivery models.

The born-on-the-cloud model is typically found within newer, ”startup” type organisations that have developed their IT relatively recently and are using new or non-traditional approaches to create applications, deliver infrastructure and services, etc. Instead of owning any IT themselves, they may procure what they need, when they need it from a service provider. They likely develop applications in modern or emerging programming languages and are focused on the rapid delivery of minimum viable products using agile development approaches. They are also consumers of many different open source technologies, and they consume these services from wherever they deem most appropriate.

Organisations with born-on-the-cloud IT tend to operate in ways very different from those following a traditional IT approach, which is the approach that most readers would think of when business IT is mentioned. Though there are many ways that the traditional IT approach can be realised, these tend to be less agile and process-driven as well as use a much wider range of hardware, software and service components to deliver services. Organisations with traditional IT tend to use open source less often and most have relationships with a relatively small number of hardware and software vendors. Programming, if done at all, likely follows a waterfall delivery model and is supported by traditional project management methods.

These born-on-the-cloud and traditional IT approaches are not mutually exclusive; each delivers value to organisations. It is important to understand the differences in the architectural aspects of each approach, which are mainly related to how applications are designed, created and managed.

Traditional enterprise IT applications tend to be built on the assumption that they will be running on a resilient infrastructure platform. The way in which that resilience is delivered may vary—resilient server, high availability cluster, etc.—but the application itself isn’t devoting resources to how it’s going to recover from failures. If a disk fails, the underlying RAID array in a disk subsystem masks this from the application. If a network adapter fails, a second adapter is available to take over the network traffic,