In this chapter we give an overview of the cloud computing infrastructure at Amazon, Google, and

Microsoft as ofmid-2012. These cloud service providers support one or more of the three cloud computing

delivery models discussed in Section 1.4: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service

(PaaS), and Software-as-a-Service (SaaS). Amazon is a pioneer in IaaS, Google’s efforts are focused

on SaaS and PaaS delivery models, and Microsoft is involved in PaaS.

Private clouds are an alternative to public clouds. Open-source cloud computing platforms such as

Eucalyptus [269], OpenNebula, Nimbus, and OpenStack can be used as a control infrastructure for

a private cloud. We continue our discussion of the cloud infrastructure with an overview of service

level agreements (SLAs) and the responsibility sharing between users and cloud service providers,

followed by a brief discussion of software licensing, energy consumption, and ecological impact of

cloud computing. We conclude with a section covering user experiences with current systems.

Several other IT companies are also involved in cloud computing. IBM offers a cloud computing platform,

IBMSmartCloud, which includes servers, storage, and virtualization components for building private

and hybrid cloud computing environments. In October 2012 it was announced that IBM had teamed

up with AT&T to give customers access to IBM’s cloud infrastructure over AT&T’s secure private lines.

In 2011 HP announced plans to enter the cloud computing club. Oracle announced its entry to enterprise

computing in the early 2012. The Oracle Cloud is based on Java, SQL standards, and software

systems such as Exadata, Exalogic, WebLogic, and Oracle Database. Oracle plans to offer application

and platform services. Some of these services are Fusion HCM (Human Capital Management), Fusion

CRM (Customer Relation Management), and Oracle Social Network; the platform services are based

on Java and SQL.