Azure and Online Services are, respectively, PaaS and SaaS cloud platforms from Microsoft. Windows

Azure is an operating system,SQLAzure is a cloud-based version of theSQLServer, and AzureAppFabric

(formerly .NET Services) is a collection of services for cloud applications.

Windows Azure has three core components (see Figure 3.3): Compute, which provides a computation

environment; Storage for scalable storage; and Fabric Controller, which deploys, manages, and monitors

applications; it interconnects nodes consisting of servers, high-speed connections, and switches.

The Content Delivery Network (CDN) maintains cache copies of data to speed up computations. The

Connect subsystem supports IP connections between the users and their applications running on Windows

Azure. The API interface to Windows Azure is built on REST, HTTP, and XML. The platform

includes five services: Live Services, SQL Azure, AppFabric, SharePoint, and Dynamics CRM. A client

library and tools are also provided for developing cloud applications in Visual Studio.

The computations carried out by an application are implemented as one or more roles; an application

typically runs multiple instances of a role.We can distinguish (i)Web role instances used to createWeb

applications; (ii) Worker role instances used to run Windows-based code; and (iii) VM role instances

that run a user-provided Windows Server 2008 R2 image.

Scaling, load balancing, memory management, and reliability are ensured by a fabric controller,

a distributed application replicated across a group of machines that owns all of the resources in its

environment – computers, switches, load balancers – and it is aware of everyWindows Azure application.

The fabric controller decides where new applications should run; it chooses the physical servers to

optimize utilization using configuration information uploaded with each Windows Azure application.

The configuration information is an XML-based description of how many Web role instances, how

manyWorker role instances, and what other resources the application needs. The fabric controller uses

this configuration file to determine how many VMs to create.

Blobs, tables, queues, and drives are used as scalable storage.Ablob contains binary data; a container

consists of one or more blobs. Blobs can be up to a terabyte and they may have associated metadata

(e.g., the information about where a JPEG photograph was taken). Blobs allow a Windows Azure role

instance to interact with persistent storage as though it were a local NTFS6 file system. Queues enable

Web role instances to communicate asynchronously with Worker role instances.

The Microsoft Azure platform currently does not provide or support any distributed parallel computing

frameworks, such as MapReduce, Dryad, or MPI, other than the support for implementing basic

queue-based job scheduling [148].