



ALAGAPPA UNIVERSITY
(Accredited with 'A+' Grade by NAAC (with CGPA: 3.64) in the Third Cycle and Graded
as category - I University by MHRD-UGC)
(A State University Established by the Government of Tamilnadu)



KARAIKUDI – 630 003

DIRECTORATE OF DISTANCE EDUCATION

M.Sc. (Computer Science)

Second Year – Third Semester

341 32

CLOUD COMPUTING

Copy Right Reserved

For Private Use only

Author:

Dr. C.Balakrishnan

Assistant Professor

Alagappa Institute of Skill Development

Alagappa University,

Karaikudi. 630 003.

“The Copyright shall be vested with Alagappa University”

All rights reserved. No part of this publication which is material protected by this copyright notice may be reproduced or transmitted or utilized or stored in any form or by any means now known or hereinafter invented, electronic, digital or mechanical, including photocopying, scanning, recording or by any information storage or retrieval system, without prior written permission from the Alagappa University, Karaikudi, Tamil Nadu.

Reviewer:

Mr. S. Balasubramanian

Assistant Professor in Computer Science

Directorate of Distance Education

Alagappa University

Karaikudi – 03.

CLOUD COMPUTING

SYLLABI-BOOK MAPPING TABLE

Syllabi		Mapping in Book
UNIT	BLOCK 1 : CLOUD COMPUTING BASICS	1-23
1	Introduction: History – Working with cloud computing – pros and cons of cloud computing – Benefits	1-11
2	Developing cloud services – pros and cons of cloud service development - types of cloud service development	12-17
3	Discovering cloud services development services and tools	18-23
BLOCK 2 : CLOUD COMPUTING FOR EVERYONE		24-40
4	Centralizing Email communications – collaborating to-do lists	24-29
5	Collaborating on household budgets - contact lists – communications across community	30-33
6	Collaborating on schedules - collaborating on group project and events – cloud computing for corporation	34-40
BLOCK 3 : CLOUD SERVICES		41-73
7	Exploring on-line calendar applications- Exploring online scheduling applications – Exploring online planning and task management	41-49
8	Collaborations with event management - contact management – project management – word processing and databases	50-69
9	Storing and sharing files and other online content	70-73
BLOCK 4: CLOUD COMPUTING ENVIRONMENT		74-83
10	Classification of cloud implementation – Amazon web services – IaaS – VMware vCloud – Google AppEngine – PaaS – Windows Azure Platform – SaaS/PaaS – Microsoft Live	74-79
11	Comparison of cloud computing platforms	80-83
BLOCK 5 : CLOUD VIRTUALIZATION TECHNOLOGY		84-98
12	Introduction: Virtualization Defined – Benefits – server virtualization	84-87
13	Hypervisor management software – Logical Partitioning – VIO Server – Virtual Infrastructure requirements	88-92
14	Cloud virtualization : Introduction – storage virtualization – Storage area networks – cloud server virtualization – virtualized Data Centre	93-98

CONTENTS

BLOCK I CLOUD COMPUTING BASICS **1-23**

UNIT 1 INTRODUCTION **1-11**

- 1.1 Introduction
- 1.2 Objectives
- 1.3 History
- 1.4 Working with cloud computing
- 1.5 Pros and Cons of cloud computing
- 1.6 Benefits
- 1.7 Answers to Check Your Progress Questions
- 1.8 Summary
- 1.9 Key Words
- 1.10 Self-Assessment Questions and Exercises
- 1.11 Further Readings

UNIT – 2 **12-17**

- 2.1 Introduction
- 2.2 Objectives
- 2.3 Developing cloud services
- 2.4 Pros and Cons of cloud service development
- 2.5 Types of cloud service development
- 2.6 Answers to Check Your Progress Questions
- 2.7 Summary
- 2.8 Key Words
- 2.9 Self-Assessment Questions and Exercises
- 2.10 Further Readings

UNIT – 3 **18-23**

- 3.1 Introduction
- 3.2 Objectives
- 3.3 Discovering cloud services development services and tools
- 3.4 Answers to Check Your Progress Questions
- 3.5 Summary
- 3.6 Key Words
- 3.7 Self-Assessment Questions and Exercises
- 3.8 Further Readings

BLOCK 2: CLOUD COMPUTING FOR EVERYONE **24-40**

UNIT – 4 **24-29**

- 4.1 Introduction
- 4.2 Objectives
- 4.3 Centralizing Email communications
- 4.4 Collaborating to-do lists
- 4.5 Answers to Check Your Progress Questions
- 4.6 Summary
- 4.7 Key Words
- 4.8 Self-Assessment Questions and Exercises
- 4.9 Further Readings

UNIT – 5	30-33
5.1 Introduction	
5.2 Objectives	
5.3 Collaborating on household budgets	
5.4 Contact lists	
5.5 Communications across community	
5.6 Answers to Check Your Progress Questions	
5.7 Summary	
5.8 Key Words	
5.9 Self-Assessment Questions and Exercises	
5.10 Further Readings	
UNIT – 6	34-40
6.1 Introduction	
6.2 Objectives	
6.3 Collaborating on schedules	
6.4 Collaborating on group project and events	
6.5 Cloud computing for corporation	
6.6 Answers to Check Your Progress Questions	
6.7 Summary	
6.8 Key Words	
6.9 Self-Assessment Questions and Exercises	
6.10 Further Readings	
BLOCK 3: CLOUD SERVICES	41-75
UNIT – 7	41-49
7.1 Introduction	
7.2 Objectives	
7.3 Exploring on-line calendar applications	
7.4 Exploring online scheduling applications	
7.5 Exploring online planning and task management	
7.6 Answers to Check Your Progress Questions	
7.7 Summary	
7.8 Key Words	
7.9 Self-Assessment Questions and Exercises	
7.10 Further Readings	
UNIT – 8	50-70
8.1 Introduction	
8.2 Objectives	
8.3 Collaborations with event management	
8.4 Contact management	
8.5 Project management	
8.6 Word processing and databases	
8.7 Answers to Check Your Progress Questions	
8.8 Summary	
8.9 Key Words	
8.10 Self-Assessment Questions and Exercises	
8.11 Further Readings	

UNIT – 9	71-73
9.1 Introduction	
9.2 Objectives	
9.3 Storing and sharing files and other online content	
9.4 Answers to Check Your Progress Questions	
9.5 Summary	
9.6 Key Words	
9.7 Self-Assessment Questions and Exercises	
9.8 Further Readings	
BLOCK 4: CLOUD COMPUTING ENVIRONMENT	74-86
UNIT – 10	74-79
10.1 Introduction	
10.2 Objectives	
10.3 Classification of cloud implementation	
10.4 Amazon web services	
10.5 IaaS	
10.6 VMware vCloud	
10.7 Google AppEngine	
10.8 PaaS	
10.9 Windows Azure Platform	
10.10 SaaS/PaaS	
10.11 Microsoft Live	
10.12 Answers to Check Your Progress Questions	
10.13 Summary	
10.14 Key Words	
10.15 Self-Assessment Questions and Exercises	
10.16 Further Readings	
UNIT – 11	80-83
11.1 Introduction	
11.2 Objectives	
11.3 Comparison of cloud computing platforms	
11.4 Answers to Check Your Progress Questions	
11.5 Summary	
11.6 Key Words	
11.7 Self-Assessment Questions and Exercises	
11.8 Further Readings	
BLOCK 5: CLOUD VIRTUALIZATION TECHNOLOGY	84-98
UNIT – 12 INTRODUCTION	84-87
12.1 Introduction	
12.2 Objectives	
12.3 Virtualization Defined	
12.4 Benefits	
12.5 Server virtualization	
12.6 Answers to Check Your Progress Questions	
12.7 Summary	
12.8 Key Words	
12.9 Self-Assessment Questions and Exercises	
12.10 Further Readings	

UNIT – 13**88-92**

- 13.1 Introduction
- 13.2 Objectives
- 13.3 Hypervisor management software
- 13.4 Logical Partitioning
- 13.5 VIO Server
- 13.6 Virtual Infrastructure requirements
- 13.7 Answers to Check Your Progress Questions
- 13.8 Summary
- 13.9 Key Words
- 13.10 Self-Assessment Questions and Exercises
- 13.11 Further Readings

UNIT – 14**93-98**

- 14.1 Introduction
- 14.2 Objectives
- 14.3 Introduction to Cloud Virtualization
- 14.4 Storage virtualization
- 14.5 Storage area networks
- 14.6 Cloud server virtualization
- 14.7 Virtualized data centre
- 14.8 Answers to Check Your Progress Questions
- 14.9 Summary
- 14.10 Key Words
- 14.11 Self-Assessment Questions and Exercises
- 14.12 Further Readings

BLOCK -I CLOUD COMPUTING BASICS

UNIT I

Cloud Computing Basics

Structure

- 1.1 Introduction
 - 1.2 Objectives
 - 1.3 History
 - 1.4 Working with cloud computing
 - 1.5 Pros and Cons of cloud computing
 - 1.6 Benefits
 - 1.7 Answers to Check Your Progress Questions
 - 1.8 Summary
 - 1.9 Key Words
 - 1.10 Self-Assessment Questions and Exercises
 - 1.11 Further Readings
-

NOTES

1.1 Introduction

Cloud Computing can be defined as delivering computing power(CPU, RAM, Network Speeds, Storage OS software) a service over a network (usually on the internet) rather than physically having the computing resources at the customer location. Cloud Computing providers offer their services according to different models, sometimes called layers. The 3 standard models are Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). As Cloud Computing is growing, the role of IT staff is consistently changing. The new roles of IT specialists are those of coordinator and broker. Cloud Computing allows companies to avoid or minimize fixed, IT infrastructure costs. Moreover, third-party clouds enable organizations to focus on their core businesses. Flexibility and scalability are other often-cited benefits of cloud computing.

1.2 Objectives

This chapter gives introduction to:

- Fundamentals of Cloud Computing
 - History
 - Advantages and disadvantages of Cloud Computing
 - Working with Cloud Computing
 - Benefits over Cloud Computing
-

1.3 History

In a world that sees new technological trends bloom and fade on almost a daily basis, one new trend promises more longevity. This trend is called cloud computing, and it will change the way you use your computer and the Internet.

Cloud computing portends a major change in how we store information and run applications. Instead of running programs and data on an individual desktop computer, everything is hosted in the “cloud”—a nebulous assemblage of computers and servers accessed via the Internet. Cloud computing lets you access all your applications and documents from anywhere in the world, freeing you from the confines of the desktop and making it easier for group members in different locations to collaborate.

Cloud computing has as its antecedents both client/server computing and peer-to-peer distributed computing. It’s all a matter of how centralized storage facilitates collaboration and how multiple computers work together to increase computing power.

Self-Instructional Material

Client/Server Computing: Centralized Applications and Storage

In the antediluvian days of computing (pre-1980 or so), everything operated on the *client/server* model. All the software applications, all the data, and all the control resided on huge mainframe computers, otherwise known as *Servers*.

If a user wanted to access specific data or run a program, he had to connect to the mainframe, gain appropriate access, and then do his business while essentially “renting” the program or data from the server. Users connected to the server via a computer terminal, sometimes called a workstation or *client*. This computer was sometimes called a *dumb terminal* because it didn’t have a lot (if any!) memory, storage space, or processing power. It was merely a device that connected the user to and enabled him to use the mainframe computer.

The fact is, when multiple people are sharing a single computer, even if that computer is a huge mainframe, you have to wait your turn. Need to rerun a financial report? No problem—if you don’t mind waiting until this afternoon, or tomorrow morning. There isn’t always immediate access in a client/server environment, and seldom is there immediate gratification. So the client/server model, while providing similar centralized storage, differed from cloud computing in that it did not have a user-centric focus; with client/server computing, all the control rested with the mainframe—and with the guardians of that single computer. It was not a user-enabling environment.

Peer-to-Peer Computing: Sharing Resources

As you can imagine, accessing a client/server system was kind of a “hurry up and wait” experience. The server part of the system also created a huge bottleneck. All communications between computers had to go through the server first, however inefficient that might be.

The obvious need to connect one computer to another without first hitting the server led to the development of *peer-to-peer* (P2P) computing. P2P computing defines a network architecture in which each computer has equivalent capabilities and responsibilities. This is in contrast to the traditional client/server network architecture, in which one or more computers are dedicated to serving the others.

P2P was an equalizing concept. In the P2P environment, every computer is a client *and* a server; there are no masters and slaves. By recognizing all computers on the network as peers, P2P enables direct exchange of resources and services. There is no need for a central server, because any computer can function in that capacity when called on to do so.

P2P was also a decentralizing concept. Control is decentralized, with all computers functioning as equals. Content is also dispersed among the various peer computers. No centralized server is assigned to host the available resources and services.

That said, not every part of the Internet is P2P in nature. With the development of the World Wide Web came a shift away from P2P back to the client/server model. On the web, each website is served up by a group of computers, and sites' visitors use client software (web browsers) to access it. Almost all content is centralized, all control is centralized, and the clients have no autonomy or control in the process.

Distributed Computing: Providing More Computing Power

NOTES

One of the most important subsets of the P2P model is that of *distributed computing*, where idle PCs across a network or across the Internet are tapped to provide computing power for large, processor-intensive projects. It's a simple concept, all about *cycle sharing* between multiple computers.

A personal computer, running full-out 24 hours a day, 7 days a week, is capable of tremendous computing power. Most people don't use their computers 24/7, however, so a good portion of a computer's resources go unused. Distributed computing uses those resources.

For example, genetic research requires vast amounts of computing power. Left to traditional means, it might take years to solve essential mathematical problems. By connecting together thousands (or millions) of individual PCs, more power is applied to the problem, and the results are obtained that much sooner.

1.4 Working with Cloud Computing

Sun Microsystems's slogan is "The network is the computer," and that's as good as any to describe how cloud computing works. In essence, a network of computers functions as a single computer to serve data and applications to users over the Internet. The network exists in the "cloud" of IP addresses that we know as the Internet, offers massive computing power and storage capability, and enables wide scale group collaboration.

But that's the simple explanation. Let's take a look at how cloud computing works in more detail. The key to cloud computing is the "cloud"—a massive network of servers or even individual PCs interconnected in a grid. These computers run in parallel, combining the resources of each to generate supercomputing-like power.

The cloud is a collection of computers and servers that are publicly accessible via the Internet. This hardware is typically owned and operated by a third party on a consolidated basis in one or more data center locations. The machines can run any combination of operating systems;

As shown in Figure 1.1, individual users connect to the cloud from their own personal computers or portable devices, over the Internet. To these individual users, the cloud is seen as a single application, device, or document. The hardware in the cloud (and the operating system that manages the hardware connections) is invisible.

NOTES

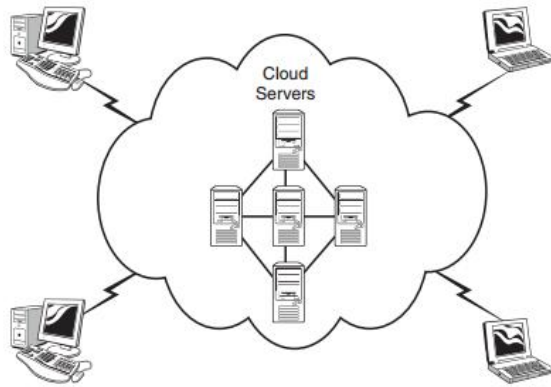


Figure 1.1 How users connect to the cloud

This cloud architecture is deceptively simple, although it does require some intelligent management to connect all those computers together and assign task processing to multitudes of users. As you can see in Figure 1.2, it all starts with the front-end interface seen by individual users. This is how users select a task or service (either starting an application or opening a document). The user's request then gets passed to the system management, which finds the correct resources and then calls the system's appropriate provisioning services.

These services carve out the necessary resources in the cloud, launch the appropriate web-application, and either creates or opens the requested document. After the web application is launched, the system's monitoring and metering functions track the usage of the cloud so that resources are apportioned and attributed to the proper user(s).

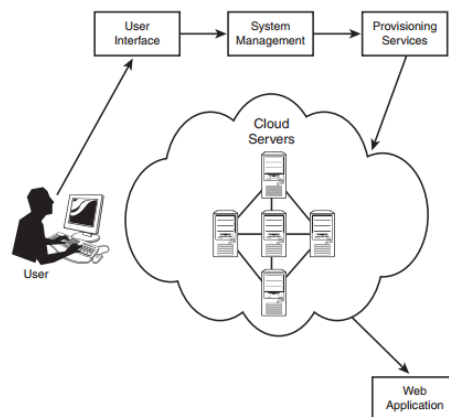


Figure 1.2 The architecture behind a cloud computing system

1.5 Pros and Cons of Cloud Computing

Cloud Computing: Advantages

Lower-Cost Computers for Users

The client computers in cloud computing can be lower priced, with smaller hard

disks, less memory, more efficient processors, and the like. In fact, a client computer in this scenario wouldn't even need a CD or DVD drive, because no software programs have to be loaded and no document files need to be saved

Improved Performance

Computers in a cloud computing system will boot up faster and run faster, because they'll have fewer programs and processes loaded into memory

Lower IT Infrastructure Costs

In a larger organization, the IT department could also see lower costs from the adoption of the cloud computing paradigm. Instead of investing in larger numbers of more powerful servers, the IT staff can use the computing power of the cloud to supplement or replace internal computing resources. Those companies that have peak needs no longer have to purchase equipment to handle the peaks (and then lay fallow the rest of the time); peak computing needs are easily handled by computers and servers in the cloud.

Fewer Maintenance Issues

Speaking of maintenance costs, cloud computing greatly reduces both hardware and software maintenance for organizations of all sizes. First, the hardware. With less hardware (fewer servers) necessary in the organization, maintenance costs are immediately lowered. As to software maintenance, remember that all cloud apps are based elsewhere, so there's no software on the organization's computers for the IT staff to maintain. It's that simple.

Lower Software Costs

As to the cost of that software, it's possible that some cloud computing companies will charge as much to "rent" their apps as traditional software companies charge for software purchases. However, early indications are that cloud services will be priced substantially lower than similar desktop software. In fact, many companies (such as Google) are offering their web-based applications for free—which to both individuals and large organizations is much more attractive than the high costs charged by Microsoft and similar desktop software suppliers.

Instant Software Updates

Another software-related advantage to cloud computing is that users are no longer faced with the choice between obsolete software and high upgrade costs. When the app is web-based, updates happen automatically and are available the next time the user logs in to the cloud. Whenever you access a web-based application, you're getting the latest version—without needing to pay for or download an upgrade.

Increased Computing Power

This is an obvious one. When you're tied into a cloud computing system, you have the power of the entire cloud at your disposal. You're no longer limited to what a single desktop PC can do, but can now perform supercomputing-like

NOTES

tasks utilizing the power of thousands of computers and servers. In other words, you can attempt greater tasks in the cloud than you can on your desktop.

Unlimited Storage Capacity

Similarly, the cloud offers virtually limitless storage capacity. Consider that when your desktop or laptop PC is running out of storage space. Your computer's 200GB hard drive is peanuts compared to the hundreds of petabytes (a million gigabytes) available in the cloud. Whatever you need to store, you can.

Increased Data Safety

And all that data you store in the cloud? It stays in the cloud—somewhere. Unlike desktop computing, where a hard disk crash can destroy all your valuable data, a computer crashing in the cloud doesn't affect the storage of your data. That's because data in the cloud is automatically duplicated, so nothing is ever lost. That also means if your personal computer crashes, all your data is still out there in the cloud, still accessible. In a world where few individual desktop PC users back up their data on a regular basis, cloud computing can keep data safe.

Improved Compatibility between Operating Systems

Ever try to get a Windows-based computer to talk to a Mac? Or a Linux machine to share data with a Windows PC? It can be frustrating. Not so with cloud computing. In the cloud, operating systems simply don't matter. You can connect your Windows computer to the cloud and share documents with computers running Apple's Mac OS, Linux, or UNIX. In the cloud, the data matters, not the operating system.

Cloud Computing: Disadvantages

That's not to say, of course, that cloud computing is without its disadvantages. There are a number of reasons why you might not want to adopt cloud computing for your particular needs. Let's examine a few of the risks related to cloud computing.

Requires a Constant Internet Connection

Cloud computing is, quite simply, impossible if you can't connect to the Internet. Because you use the Internet to connect to both your applications and documents, if you don't have an Internet connection, you can't access anything, even your own documents. A dead Internet connection means no work, period—and in areas where Internet connections are few or inherently unreliable, this could be a deal breaker. When you're offline, cloud computing just doesn't work. This might be a more significant disadvantage than you might think. A lot of what's nice about portable computing becomes problematic when you're depending on web-based applications

NOTES

Doesn't Work Well with Low-Speed Connections

Similarly, a low-speed Internet connection, such as that found with dial-up services, makes cloud computing painful at best and often impossible. Web based apps often require a lot of bandwidth to download, as do large documents. In other words, cloud computing isn't for the slow or broadband-impaired.

Can Be Slow

Even on a fast connection, web-based applications can sometimes be slower than accessing a similar software program on your desktop PC. That's because everything about the program, from the interface to the document you're working on, has to be sent back and forth from your computer to the computers in the cloud. If the cloud servers happen to be backed up at that moment, or if the Internet is having a slow day, you won't get the instantaneous access you're used to with desktop apps.

Features Might Be Limited

This particular disadvantage is bound to change, but today many web-based applications simply aren't as full-featured as their desktop-based brethren. Compare, for example, the feature set of Google Presentations with that of Microsoft PowerPoint; there's just a lot more you can do with PowerPoint than you can with Google's web-based offering. The basics are similar, but the cloud application lacks many of PowerPoint's advanced features. So if you're an advanced user, you might not want to leap into the cloud computing waters just yet.

Stored Data Might Not Be Secure

With cloud computing, all your data is stored on the cloud. That's all well and good, but how secure is the cloud? Can other, unauthorized users gain access to your confidential data.

If the Cloud Loses Your Data, You're Screwed

I can't put it any more delicately. Theoretically, data stored in the cloud is unusually safe, replicated across multiple machines. But on the off chance that your data does go missing, you have no physical or local backup.

Questions to check your progress:

1. Define: Cloud Computing.
2. List any three benefits of Cloud Computing.
3. How P2P differs from Client/Server model?

NOTES

1.6 Benefits

Benefits from Cloud Computing

The ability to share and edit documents in real time between multiple users is one of the primary benefits of web-based applications; it makes collaborating easy and even fun.

Suppose, for example, that you're in charge of an upcoming presentation to the senior management of your company. You need to work with the heads of your company's various departments, which happen to be based in a half dozen locations. Given everyone's busy schedules, it's tough enough to schedule a group conference call. How in the world can all of you get together to create a cohesive presentation?

The solution, in this instance, is to use a web-based presentation program, such as Google Presentations. You and the department heads can access the main presentation document at your leisure. The changes one person makes are automatically visible when the other collaborators access the document. In fact, more than one of you can edit the document at the same time, with each of your changes happening in real time. Collaborating with a web-based application is both more convenient and faster than trying to assemble everyone's pieces into a single document managed by one member of the team.

Similarly, community groups and sports teams can use web-based calendars to alert their members of upcoming activities. If authorized, group or team members can add their own items to the calendar, helping the entire group plan around individual conflicts.

Road Warriors

Another prime candidate for cloud computing is the road warrior. When you work at one office today, at home the next day, and in another city the next, it's tough to keep track of all your documents and applications. You may end up with one version of a document on your work PC, another on your laptop, and a third on your home PC—and that's if you remember to copy that document and take it with you from one location to the next.

Far better, therefore, if you can access a single version of your document from any location. When you're in the office, you log in to your web-based app and access your stored document. Go home and use your web browser to access the very same app and document via the Internet. Travel to another city and the same application and document are still available to you.

With cloud computing, you don't have to remember which document is where, or to bring a copy of a document with you. You don't even have to worry about whether a particular application is installed on all your PCs. Because the apps and docs you use are stored on the web and accessible wherever you have an Internet connection, versioning and compatibility

NOTES

simply aren't issues. It's the same application and the same document wherever you go.

Cost-Conscious Users

Another group of users who should gravitate to cloud computing are those who are cost conscious. With cloud computing you can save money on both your hardware and software. Hardware-wise, there's no need to invest in large hard disks or super-fast CPUs. Because everything is stored and run from the web, you can cut costs by buying a less fully featured PC—without sacrificing anything in the way of performance.

You can save just as much—if not more—when it comes to software. Instead of laying out big bucks for the latest version of Microsoft Office, you can use Google's versions of these apps (Google Docs, Spreadsheets, and Presentations) for zero expenditure. That's right, these web-based applications—and many more from other companies—are completely free to use. When your budget is tight, free is a lot better than the hundreds or thousands of dollars you might spend otherwise.

Cost-Conscious IT Departments

Many corporate IT departments are also becoming enamored of the cloud computing model. Although they might appreciate the software savings we just discussed, for them bigger savings result from having to buy fewer central servers.

On a corporate network much of the computing takes place on the servers centrally located on the organization's network. When users need more computing power, more servers need to be purchased.

This need for more computing power becomes less of an issue when the organization embraces cloud computing. Instead of purchasing a new server, the IT staff just redirects the computing request out to the cloud. The servers that comprise the cloud have plenty of capacity to handle the organization's increased needs, without the IT staff having to spend a single dime on new hardware.

Users with Increasing Needs

Hardware-based cost savings also apply to individual computer users. Need more hard disk space to store all your digital photos and MP3 files? You could purchase a new external hard drive, or you could utilize lower-cost (or free) cloud storage instead.

Having trouble running the latest version of your favourite software program because it's power hungry? Abandon that power sapping program and use a less-demanding web-based app instead. Need more computing power to tackle a particularly vexing problem? Use the power of the cloud, where thousands

of computers are at your disposal.

1.7 Answers to Check Your Progress Questions

1. A nebulous assemblage of computers and servers accessed via the Internet.
2. Increased use of Computing power. Maximization of storage and efficiency. Lower the computing issues and maintenance
3. P2P computing defines a network architecture in which each computer has equivalent capabilities and responsibilities. This is in contrast to the traditional client/server network architecture, in which one or more computers are dedicated to serving the others.

1.8 Summary

- Cloud Computing is defined by its architecture and infrastructure (a grid of interconnected computers/servers functioning as a whole).
- Web 2.0 is defined by how the user sees/is serviced by the system.
- Developers and IT types might have a slightly different definition of cloud computing than that for an end user.
- Cloud Computing is all about horizontal scalability in the form of server capability.
- The technical challenge is developing operating systems and applications to manage this sort of on-the-fly scaling—while keeping the mechanics of it invisible to the end user.
- White boarding is where one or more users “draw” on a virtual whiteboard that is viewable by all the members of the group.
- The term cloud computing is a relatively recent one, it’s a means of describing Internet-based distributed computing and its associated applications.
- One of the primary benefits of cloud computing is a vast amount of computing power, achieved from relatively low-cost PCs and servers.

1.9 Key Words

- The term cloud computing is the “**cloud**” itself.
- Users connected to the server via a computer terminal, sometimes called a **workstation** or **client**. This computer was sometimes called a **dumb terminal**.
- To connect one computer to another without first hitting the server led to the development of **peer-to-peer (P2P)** computing.
- Real-time **whiteboarding** is also common, especially in corporate and education environments.
- Any **web-based** application or service offered via cloud computing is called a **cloud service**.

1.10 Self-Assessment Questions and Exercises

Short Answer Questions:

1. Define: Cloud Computing.
2. What is meant by Distributed Computing?
3. Define: Peer to Peer Computing.
4. List the benefits of Cloud Computing.

Long Answer Questions:

1. Explain the Cloud Computing architecture in detail.
2. Elaborate on the working of Cloud Computing.
3. State and explain the Pros and Cons of Cloud Computing.

1.11 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

Cloud Computing Basics

NOTES*Self-Instructional Material*

UNIT II

Structure

- 2.1 Introduction
- 2.2 Objectives
- 2.3 Developing cloud services
- 2.4 Pros and Cons of cloud service development
- 2.5 Types of cloud service development
- 2.6 Answers to Check Your Progress Questions
- 2.7 Summary
- 2.8 Key Words
- 2.9 Self-Assessment Questions and Exercises
- 2.10 Further Readings

2.1 Introduction

Cloud service is any **service** made available to businesses or corporates from a **cloud computing** provider's server. In other words, **cloud services** are professional **services** that support organizations in selecting, deploying and management various **cloud**-based resources. Cloud application development services aim to provide assistance with developing, migrating or otherwise working on applications in order to ensure that they run capably on cloud platforms. Cloud application development services are often presented along with certain benefits, such as reducing risk for IT implementation or decreasing time-to-market for applications.

2.2 Objectives

After reading this chapter, you can understand the:

- Basics of Cloud services
- Developing pattern of Cloud services
- Types of Cloud services

2.3 Developing cloud services

Most of us approach cloud computing from a user's perspective, focusing on those web-based applications that owe their existence to the cloud. But cloud computing also offers a lot to software developers, who can now develop web-based applications that take advantage of the power and reach of cloud computing.

To this end, many prominent companies including Amazon.com and Google are devoting significant resources to cloud services development tools.

Develop Web-Based Applications

The needs of a typical IT department are daunting: They must deliver adequate computing power and data storage to all users within the company. This must be done, of course, within a set budget, and there is the rub; to meet peak needs or to add capacity for new users can often send an IT budget soaring.

For most companies, it is not financially prudent to add capacity that will be used only a small percentage of the time. What the IT department needs is a way to increase capacity or add capabilities without investing in new servers and networking gear, or licensing new software. It is to this need that cloud computing speaks.

Cloud services, in the form of centralized web-based applications, also appeal

to the IT professional. One instance of an application hosted in the cloud is cheaper and easier to manage than individual copies of similar software installed on each user's desktop PC. Upgrading a cloud app only has to be done one time, where upgrading traditional software has to be done for each PC on which that software is installed. Then, of course, we have the promise of cloud-enabled collaboration, which just can't be done with traditional desktop apps.

The advantages of cloud services development are particularly notable to smaller businesses, who otherwise wouldn't have the budget or resources to develop large-scale applications. By hosting locally developed web applications within the cloud, the small business avoids the cost of purchasing expensive hardware to host similar software.

In short, there's a lot to be gained by investing in cloud services development. A company that develops its own web-based applications gains functionality while reducing expenses. The combined power of the cloud is accompanied by lower software purchase and management costs.

2.4 Pros and Cons of cloud service development

The Pros and Cons of Cloud Service Development

Why would you choose to develop new applications using the cloud services model? There are several good reasons to do and a few reasons to be, perhaps, a bit more cautious

Advantages of Cloud Development

One of the underlying advantages of cloud development is that of economy of scale. By taking advantage of the infrastructure provided by a cloud computing vendor, a developer can offer better, cheaper, and more reliable applications than is possible within a single enterprise. The application can utilize the full resources of the cloud, if needed—without requiring a company to invest in similar physical resources.

Speaking of cost, because cloud services follow the one-to-many model, cost is significantly reduced over individual desktop program deployment. Instead of purchasing or licensing physical copies of software programs (one for each desktop), cloud applications are typically "rented," priced on a per-user basis.

IT departments like cloud applications because all management activities are managed from a central location rather than from individual sites or workstations. This enables IT staff to access applications remotely via the web. There's also the advantage of quickly outfitting users with the software they need (known as "rapid provisioning), and adding more computing resources as more users tax the system (automatic scaling).

For developers, it's also easier to upgrade a cloud application than with traditional

NOTES

desktop software. With a cloud service, a single change affects every user running the application, which greatly reduces the developer's workload.

Disadvantages of Cloud Development

Perhaps the biggest perceived disadvantage of cloud development is the same one that plagues all web-based applications: Is it secure? Web-based applications have long been considered potential security risks. For this reason, many businesses prefer to keep their applications, data, and IT operations under their own control.

That said, there have been few instances of data loss with cloud-hosted applications and storage. It could even be argued that a large cloud hosting operation is likely to have better data security and redundancy tools than the average enterprise. In any case, however, even the perceived security danger from hosting critical data and services offsite might discourage some companies from going this route.

Another potential disadvantage is what happens if the cloud computing host goes offline. Although most companies say this isn't possible, it has happened. Amazon's EC2 service suffered a massive outage on February 15, 2008, that wiped out some customer application data. For clients expecting a safe and secure platform, having that platform go down and your data disappear is a somewhat rude awakening. And, if a company relies on a third-party cloud platform to host all of its data with no other physical backup, that data can be at risk.

Questions to check your progress:

1. What are the reasons for developing the cloud computing services?
2. List any two advantages & disadvantages of Cloud computing Services.
3. What are the types in cloud service development?

2.5 Types of cloud service development

Types of Cloud Service Development

The concept of cloud services development encompasses several different types of development. Let's look at the different ways a company can use cloud computing to develop its own business applications.

Infrastructure as a Service (IaaS):

IaaS is a cloud computing model where virtualized infrastructure is offered to, and managed for, businesses by external cloud providers. With IaaS, companies can outsource for storages, servers, data center space and cloud networking components connected through the internet, offering similar functionality as that of an on-premises infrastructure. Some examples of the wide usage of IaaS are

automated, policy-driven operations such as backup, recovery, monitoring, clustering, internal networking, website hosting, etc.

The service provider is responsible for building the servers and storage, networking firewalls/ security, and the physical data center. Some key players offering IaaS are Amazon EC2, Microsoft Azure, Google Cloud Platform, GoGrid, Rackspace, DigitalOcean among others.

Platform as a Service (PaaS)

PaaS builds on IaaS. Here, cloud vendors deliver computing resources, both cloud software and hardware infrastructure components like middleware and operating systems, required to develop and test applications. The PaaS environment enables cloud users (accessing them via a webpage) to install and host data sets, development tools and business analytics applications, apart from building and maintaining necessary hardware. Some key players offering PaaS are Bluemix, CloudBees, Salesforce.com, Google App Engine, Heroku, AWS, Microsoft Azure, OpenShift, Oracle Cloud, SAP and OpenShift.

In this PaaS, the development environment is offered as a service. The developer uses the “building blocks” of the vendor’s development environment to create his own custom application. It’s kind of like creating an application using Legos; building the app is made easier by use of these predefined blocks of code, even if the resulting app is somewhat constrained by the types of code blocks available.

Software as a Service (SaaS)

Software as a service, or SaaS, is probably the most common type of cloud service development. With SaaS, a single application is delivered to thousands of users from the vendor’s servers. Customers don’t pay for owning the software; rather, they pay for using it. Users access an application via an API accessible over the web.

Each organization served by the vendor is called a tenant, and this type of arrangement is called a multitenant architecture. The vendor’s servers are *virtually partitioned* so that each organization works with a customized virtual application instance.

For customers, SaaS requires no upfront investment in servers or software licensing. For the application developer, there is only one application to maintain for multiple clients. Many different types of companies are developing applications using the SaaS model. Perhaps the best-known SaaS applications are those offered by Google to its consumer base.

SaaS is special in that it incorporates both IaaS and PaaS. Here, the cloud service provider delivers the entire software suite as a pay-per-use model. SaaS lets users easily access software applications -- such as emails -- over the internet. Most common examples of SaaS are Microsoft Office 360, AppDynamics, Adobe

NOTES

Creative Cloud, Google G Suite, Zoho, Salesforce, Marketo, Oracle CRM, Pardot Marketing Automation, and SAP Business ByDesign.

Other Services

The Cloud Computing also offers Storage, Database, Information, Process, Application, Integration, Security, Management, Testing-as-a-service

Web Services

A web service is an application that operates over a network—typically, over the Internet. Most typically, a web service is an API that can be accessed over the Internet. The service is then executed on a remote system that hosts the requested services. This type of web API lets developers exploit shared functionality over the Internet, rather than deliver their own full-blown applications.

A good example of web services are the “mashups” created by users of the Google Maps API. With these custom apps, the data that feeds the map is provided by the developer, where the engine that creates the map itself is provided by Google.

The developer doesn’t have to code or serve a map application; all he has to do is hook into Google’s web API. As you might suspect, the advantages of web services include faster (and lower-cost) application development, leaner applications, and reduced storage and bandwidth demands.

On-Demand Computing

As the name implies, on-demand computing packages computer resources (processing, storage, and so forth) as a metered service similar to that of a public utility. In this model, customers pay for as much or as little processing and storage as they need.

Companies that have large demand peaks followed by much lower normal usage periods particularly benefit from utility computing. The company pays more for their peak usage, of course, but their bills rapidly decline when the peak ends and normal usage patterns resume.

Clients of on-demand computing services essentially use these services as offsite virtual servers. Instead of investing in their own physical infrastructure, a company operates on a pay-as-you-go plan with a cloud services provider. On-demand computing itself is not a new concept, but has acquired new life thanks to cloud computing.

2.6 Answers to Check Your Progress Questions

Increase capacity or add capabilities without investing in new servers and networking gear, or licensing new software.

- Advantages: Economy of scale, without requiring a company to invest in similar physical resources
- Disadvantage: Expecting a safe and secure platform, few instances of data loss with cloud-hosted applications and storage

- IaaS (Infrastructure-as-a-Service), PaaS(Platform-as-a-Service), SaaS(Software-as-a-Service)

2.7 Summary

- Cloud services, in the form of centralized web-based applications, also appeal to the IT professional.
- Advantages of cloud development are that of economy of scale.
- Disadvantage of cloud development is the same one that plagues all web-based applications:
- SaaS, is probably the most common type of cloud service development.
- Each organization served by the vendor is called a tenant, and this type of arrangement is called a multitenant architecture.
- A web service is an application that operates over a network typically, over the Internet

NOTES

2.8 Key Words

- Each organization served by the vendor is called a tenant, and this type of arrangement is called a multitenant architecture.
- The advantage of quickly outfitting users with the software is known as rapid provisioning.
- Peak computing needs are easily handled by computers and servers in the cloud.
- The ability to share and edit documents in real time between multiple users is one of the primary benefits of web-based applications.

2.9 Self-Assessment Questions and Exercises

Short Answer Questions:

1. Define: SaaS
2. Define: PaaS
3. What is meant by web services?

Long Answer Questions:

1. Why develop web based application?
2. Pros and cons of cloud service development?
3. Details about the types of Cloud service

2.10 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

UNIT III

Structure

- 3.1 Introduction
- 3.2 Objectives
- 3.3 Discovering cloud services development services and tools
- 3.4 Answers to Check Your Progress Questions
- 3.5 Summary
- 3.6 Key Words
- 3.7 Self-Assessment Questions and Exercises
- 3.8 Further Readings

3.1 Introduction

Cloud computing is at an early stage of its development. This can be seen by observing the large number of small and start-up companies offering cloud development tools. In a more established industry, the smaller players eventually fall by the wayside as larger companies take centre stage. Cloud services development services and tools are offered by a variety of companies, both large and small. The most basic offerings provide cloud-based hosting for applications developed from scratch. The more fully featured offerings include development tools and pre-built applications that developers can use as the building blocks for their own unique web-based applications.

3.2 Objectives

This chapter illustrates about:

- Cloud services
- Development services
- Tools for development

3.3 Discovering cloud services development services and tools

Cloud Services Development Services and Tools

As you're aware, cloud computing is at an early stage of its development. This can be seen by observing the large number of small and start-up companies offering cloud development tools. In a more established industry, the smaller players eventually fall by the wayside as larger companies take center stage. That said, cloud services development services and tools are offered by a variety of companies, both large and small. The most basic offerings provide cloud-based hosting for applications developed from scratch. The more fully featured offerings include development tools and pre-built applications that developers can use as the building blocks for their own unique web-based applications. So let's settle back and take a look at who is offering what in terms of cloud service development. It's an interesting mix of companies and services.

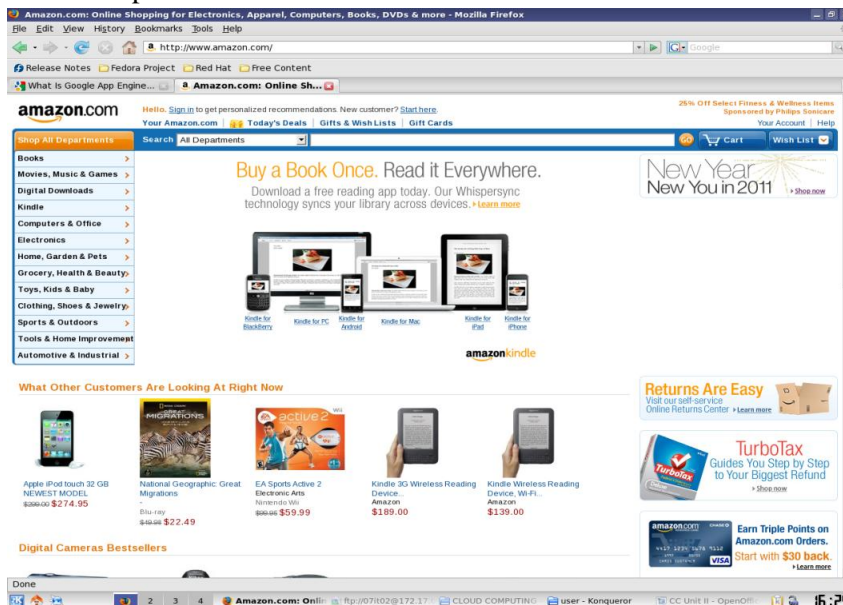
Amazon

Amazon, one of the largest retailers on the Internet, is also one of the primary providers of cloud development services. Think of it this way: Amazon has spent a lot of time and money setting up a multitude of servers to service its popular website, and is making those vast hardware resources available for all developers to use.

The service in question is called the Elastic Compute Cloud, also known as EC2. This is a commercial web service that allows developers and companies to rent capacity on Amazon's proprietary cloud of servers which happens to be one of the biggest server farms in the world. EC2 enables scalable deployment of applications by letting customers request a set number of virtual machines, onto which they can load any application of their choice.

Thus, customers can create, launch, and terminate server instances on demand, creating a truly "elastic" operation. Amazon's service lets customers choose from three sizes of virtual servers: Small, which offers the equivalent of a system with 1.7GB of memory, 160GB of storage, and one virtual 32-bit core processor Large, which offers the equivalent of a system with 7.5GB of memory, 850GB of storage, and two 64-bit virtual core processors Extra large, which offers the equivalent of a system with 15GB of memory, 1.7TB of storage, and four virtual 64-bit core processors In other words, you pick the size and power you want for your virtual server, and Amazon does the rest. EC2 is just part of Amazon's Web Services (AWS) set of offerings, which provides developers with direct access to Amazon's software and machines.

NOTES



By tapping into the computing power that Amazon has already constructed, developers can build reliable, powerful, and low-cost web-based applications. Amazon provides the cloud (and access to it), and developers provide the rest.

Google App Engine

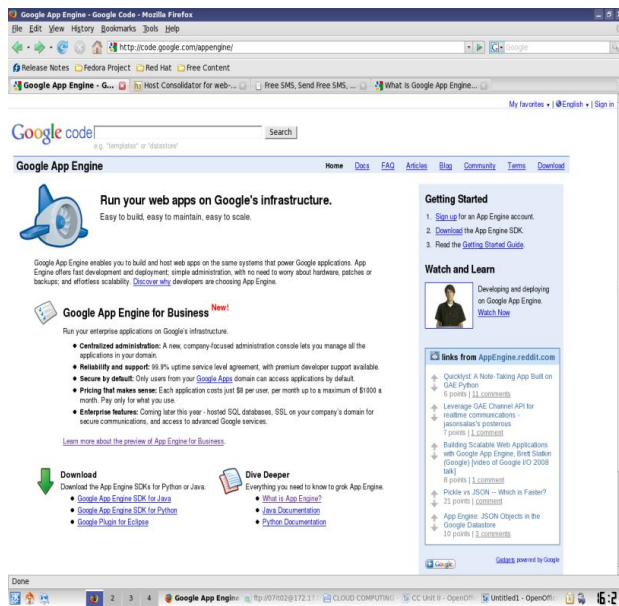
Google is a leader in web-based applications, so it's not surprising that the company also offers cloud development services. These services come in the form of the Google App Engine, which enables developers to build their own web applications utilizing the same infrastructure that powers Google's powerful applications.

The Google App Engine provides a fully integrated application environment. Using Google's development tools and computing cloud, App Engine applications are easy to build, easy to maintain, and easy to scale.

As you might suspect, Google offers a robust cloud development environment. It includes the following features:

- Dynamic web serving
- Full support for all common web technologies
- Persistent storage with queries, sorting, and transactions
- Automatic scaling and load balancing
- APIs for authenticating users and sending email using Google Accounts

NOTES



IBM

It's not surprising, given the company's strength in enterprise-level computer hardware, that IBM is offering a cloud computing solution. The company is targeting small- and medium-sized businesses with a suite of cloud-based on demand services via its Blue Cloud initiative.

Blue Cloud is a series of cloud computing offerings that enables enterprises to distribute their computing needs across a globally accessible resource grid. One such offering is the Express Advantage suite, which includes data backup and recovery, email continuity and archiving, and data security functionality some of the more data-intensive processes handled by a typical IT department.

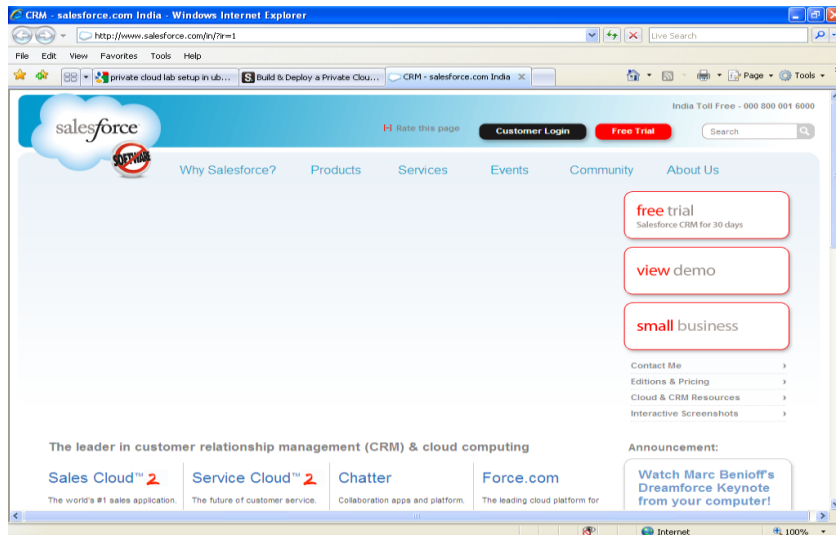


Self-Instructional Material

Salesforce.com

Salesforce.com is probably best known for its sales management SaaS, but it's also a leader in cloud computing development. The company's cloud computing architecture is dubbed Force.com. The platform as a service is entirely on-demand, running across the Internet. Salesforce provides its own Force.com API and developer's toolkit. Pricing is on a per log-in basis.

NOTES



Supplementing Force.com is AppExchange, a directory of web-based applications. Developers can use AppExchange applications uploaded by others, share their own applications in the directory, or publish private applications accessible only by authorized companies or clients. Many applications in the AppExchange library are free, and others can be purchased or licensed from the original developers.

Questions to check your progress:

1. Name the tools for developing cloud services
2. What are the three sizes of virtual servers offer by the amzon?
3. What is meant by Blue Cloud?

Other Cloud Services Development Tools

Amazon, Google, IBM, and Salesforce.com aren't the only companies offering tools for cloud services developers. There are also a number of smaller companies working in this space that developers should evaluate, and that end users may eventually become familiar with. These companies include the following:

- 3tera (www.3tera.com), which offers the AppLogic grid operating system and Cloudware architecture for on-demand computing.
- 10gen (www.10gen.com), which provides a platform for developers to build scalable web-based applications.
- Cohesive Flexible Technologies (www.cohesiveft.com), which offers the Elastic Server On-Demand virtual server platform.

- Joyent (www.joyent.com), which delivers the Accelerator scalable ondemand infrastructure for web application developers, as well as the Connector suite of easy-to-use web applications for small businesses.
- Mosso (www.mosso.com), which provides an enterprise-level cloud hosting service with automatic scaling.

3.4 Answers to Check Your Progress Questions

- Amazon, Google App Engine, IBM
- Small, which offers the equivalent of a system with 1.7GB of memory, 160GB of storage, and one virtual 32-bit core processor. Large, which offers the equivalent of a system with 7.5GB of memory, 850GB of storage, and two 64-bit virtual core processors. Extra large, which offers the equivalent of a system with 15GB of memory, 1.7TB of storage, and four virtual 64-bit core processors
- Blue Cloud is a series of cloud computing offerings that enables enterprises to distribute their computing needs across a globally accessible resource grid.

3.5 Summary

- The service in question is called the Elastic Compute Cloud, also known as **EC2**.
- **Google** provides a fully featured local development environment that simulates the **Google App Engine** on any desktop computer.
- **Blue Cloud** is a series of cloud computing offerings that enables enterprises to distribute their computing needs across a globally accessible resource grid.
- **Salesforce.com** is probably best known for its sales management **SaaS**, but it's also a leader in cloud computing development.

3.6 Key Words

- **Cloud services** development services and tools are offered by a variety of companies, both large and small.
- The more fully featured offerings include development tools and pre-built applications that **developers** can use as the building blocks for their own unique **web-based applications**.
- **EC2** enables scalable deployment of applications by letting customers request a set number of **virtual machines**, onto which they can load any application of their choice.

3.7 Self-Assessment Questions and Exercises

Short Answer Questions:

1. What is meant by cloud development service?
2. Write some features in Google's App Engine
3. What is meant by EC2?

Long Answer Questions:

1. Describe the concept of discovering cloud services development tools
2. Write short note on the following Cloud Services Development Tools

NOTES

Self-Instructional Material

- a. Amazon
 - b. Google App Engine
 - c. IBM
 - d. Salesforce.com
3. Explain the significances of cloud service development tools.

3.8 Further Readings

- Michael Miller, *Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online*, Que Publishing, August 2008.
- Haley Beard, *Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs*, Emereo Pty Limited, July 2008.

NOTES

BLOCK-II CLOUD COMPUTING FOR EVERYONE

UNIT IV

Structure

- 4.1 Introduction
- 4.2 Objectives
- 4.3 Centralizing Email communications
- 4.4 Collaborating to-do lists
- 4.5 Cloud Computing for Corporates
- 4.6 Answers to Check Your Progress Questions
- 4.7 Summary
- 4.8 Key Words
- 4.9 Self-Assessment Questions and Exercises
- 4.10 Further Readings

4.1 Introduction

The public cloud is defined as computing services offered by third-party providers over the public Internet, making them available to anyone who wants to use or purchase them. They may be free or sold on-demand, allowing customers to pay only per usage for the CPU cycles, storage or bandwidth they consume. Unlike private clouds, public clouds can save companies from the expensive costs of having to purchase, manage and maintain on-premises hardware and application infrastructure - the cloud service provider is held responsible for all management and maintenance of the system. Public clouds can also be deployed faster than on-premises infrastructures and with an almost infinitely scalable platform. Every employee of a company can use the same application from any office or branch using their device of choice as long as they can access the Internet. While security concerns have been raised over public cloud environments, when implemented correctly, the public cloud can be as secure as the most effectively managed private cloud implementation if the provider uses proper security methods, such as intrusion detection and prevention systems (IDPS). A public cloud is a platform that uses the standard cloud computing model to make resources, such as virtual machines (VMs), applications or storage, available to users remotely. Public cloud services may be free or offered through a variety of subscription or on-demand pricing schemes, including a pay-per-usage model.

4.2 Objectives

This chapter gives introduction about:

- Public cloud
- Centralization of E-mail communication and other services of cloud

4.3 Centralizing Email communications

We'll start our tour of cloud computing for families by examining how a typical family can use cloud-based tools to help improve communications between family members. That's right, computing in the cloud can help families improve their communications skills!

NOTES

Self-Instructional Material

The key here is to enable anywhere/anytime access to email. Pre cloud computing, your email access was via a single computer, which also stored all your email messages. For this purpose, you probably used a program like Microsoft Outlook or Outlook Express, installed on your home computer. If you wanted to check your home email from work, it took a bit of juggling and perhaps the use of your ISP's email access web page. That web page was never in sync with the messages on your home PC, of course, which is just the start of the problems with trying to communicate in this fashion.

A better approach is to use a web-based email service, such as Google's Gmail (mail.google.com), Microsoft's Windows Live Hotmail (mail.live.com), or Yahoo! Mail (mail.yahoo.com). These services place your email inbox in the cloud; you can access it from any computer connected to the Internet. The messages you receive are stored on the web, as are the messages you send, so nothing depends on a single PC. The joy of using web-based email is that it doesn't matter what PC you use, your messages are always where they should be and they're always in sync. It's easy to check your home email from work, or from anywhere you happen to be in a coffeehouse, at a hotel, or even in an airport terminal. Use your work PC, your home PC, your notebook PC, or a friend's PC, it doesn't matter; your messages are in the cloud, not on any of those PCs.

The main benefits of centralized e-mail communication service are:

- It reduces the need for organizations to invest in and maintain their own on-premises IT resources;
- It enables scalability to meet workload and user demands; and
- There are fewer wasted resources because customers only pay for what they use.

Questions to check your progress:

1. How the cloud computing help to improve family communication skill?
2. Name the web based email services.

Communicating Across the Community

One of the key components of any community collaboration is communication. Many community activities are undertaken by people in their spare time—outside of normal work and home activities. Therefore, they might be communicating during office hours on their work computer, after hours on their home computer, or during any spare moment. Programs can be accessed from any computer connected to the Internet. You use your web browser to send and view email messages hosted on the web. You can send and receive messages at work, at home, or from wherever you happen to be. Everything you send and receive is stored in the cloud, accessible from anywhere at any time.

Collaborating on Schedules

It comes to coordinating multiple individuals or families in a community activity; you have your work cut out for you. Whether it's a youth sports team, community

NOTES

organization, school event, or some community event, trying to line up who's free and who's not on a given evening takes a lot of effort—unless, that is, you're using web-based scheduling tools. One of the most common community activities: youth sports. whatever the sport, there's a lot of activities that need to be scheduled—practices, home games, away games, team meetings, you name it. Multiply the number of players (and coaches) on each team times the number of events, and you see the complexity; it gets even worse if you're trying to manage events for an entire league.

Communicating Across the Community

One of the key components of any community collaboration is communication. This isn't as easy as it sounds, because many community activities are undertaken by people in their spare time—outside of normal work and home activities. Therefore, they might be communicating during office hours on their work computer, after hours on their home computer, or during any spare moment wherever they may happen to be. That makes using traditional desktop email, such as Microsoft Outlook or Windows Mail, problematic. The better solution when communication on community issues is to use a web-based email program, such as Gmail (mail.google.com), Microsoft Windows Live Hotmail (mail.live.com), or Yahoo! Mail (mail.yahoo.com). These programs can be accessed from any computer connected to the Internet. You use your web browser to send and view email messages hosted on the web. You can send and receive messages at work, at home, or from wherever you happen to be. Everything you send and receive is stored in the cloud, accessible from anywhere at any time.

4.4 Collaborating to-do lists

A grocery list is just one type of to-do list. If you have a lot of household chores and repairs, it's likely that you have a larger to-do list for your household. And, if your household is like mine, that list grows every day!

You and your spouse can collaborate on your to-do list by using a web-based word processing application, as we just discussed, or you can use a dedicated web based planning program.

These applications, such as Zoho Planner (planner.zoho.com) let you create multiple to-do lists on the web, which you and your spouse can both add to from any computer, at any time. You can even set email reminders to refresh your memory when a task is due. Add your tasks one at a time, and then mark them off as they're completed. If these applications are too advanced for your needs, consider using a simpler web-based to-do list application.

These applications, such as Remember the Milk (www.rememberthemilk.com) and Ta-da List (www.tadalist.com), operate more like a simple notepad-based list. Some even let you add tasks via email or access the list when you're on the go with your mobile phone.

4.5 Cloud Computing for Corporates

Companies large and small recognize the cost savings and productivity enhancements of using web-based tools to manage projects, collaborate on

NOTES

documents and presentations, manage enterprise wide contacts and schedules, and the like.

Managing Schedules

Better way is web-based scheduling. Everyone places his or her schedule in the cloud, which then enables the meeting's organizer to easily see who's available when. The cloud-based app finds the best time for all involved and schedules the meeting. No more emails, no more phone calls; it all happens automatically, in the cloud.

Web-based scheduling programs let you schedule both in-person meetings and teleconferences with attendees from multiple locations. You're not limited to just those people located in your office; you can work with the schedules of people around the country and even in different firms.

Managing Contact Lists

Salespeople have to deal with lots and lots of contacts. Not only is their address book full, they need to know when to contact certain clients, when follow-up calls are necessary, what the boss needs them to do today, and the like. The solution, of course, is a web-based contact management or customer resource management (CRM) application. These programs are tailored to the needs of a busy salesperson and come complete with features such as activity scheduling, appointment reminders, email templates, and the like. Among the most popular of these applications are BigContacts (www.bigcontacts.com), Highrise (www.highrisehq.com), and the market leading Salesforce.com (www.salesforce.com).

Managing Projects

Most companies at one point or another have at least one big project going on—the type of project that involves multiple employees from multiple departments and perhaps multiple locations. Projects of this type have tons of individual pieces and parts, each of which dependent on the completion of a previous task. Many project management applications include additional functions useful in the management of group projects. These features may include group to-do lists, web-based file sharing, message boards, time and cost tracking, and so on. And the most robust of these apps lets you manage multiple projects simultaneously; users can schedule their time across multiple projects and make sure they're not doing two things at once.

Collaborating on Presentations

Every company today sees more than its fair share of PowerPoint presentations. The problem with producing a large presentation is that you often need input from more than one person, department, or office. cloud computing makes collaborating on presentations a whole lot easier. By creating a single presentation document, you don't have to worry about consolidating information from multiple

NOTES

documents. The most-used web-based presentation program today is Google Presentations, part of the Google Docs suite (docs.google.com). This application includes a lot of PowerPoint-like features, and can even import and export files in PowerPoint's format.

Presenting on the Road

Here's an added benefit in presenting from the cloud: You can give your presentation anywhere without taking it with you. That's right, you don't have to bother loading a huge PowerPoint file onto your notebook PC's hard disk. Instead, when you get to your destination, connect your notebook to the Internet, open your web-based presentation, and give that presentation in real time to your local audience. In fact, you don't even have to take your notebook with you. You can use any computer at the host location to access and launch your presentation. Some of these applications include additional features that add functionality to remote presentations. For example, Zoho Show includes integration with Zoho Chat, which lets you have real-time text-based interaction with interested participants. It's like adding a chat room to your presentation; participants ask you questions and you respond, in real time, during the course of the presentation.

Web-based applications such as Cisco's WebEx (www.webex.com) and Microsoft Office Live Meeting (office.microsoft.com/en-us/livemeeting/). These are hosted applications that let you stage live meetings and presentations—called web conferences—over the Internet. All group members log onto a designated website and then view the presenter's presentation or participate in real-time audio and video discussions.

4.5 Answers to Check Your Progress Questions

- The Cloud computing helps to enable anywhere/anytime access to email. Pre cloud computing, user can access email via a single computer, which also stored all the users email messages.
 - Google's Gmail (mail.google.com), Microsoft's Windows Live Hotmail (mail.live.com), or Yahoo! Mail (mail.yahoo.com).
-

4.6 Summary

- Using cloud-based tools to help improve communications between family members.
 - Some of these programs, such as MyEvents (www.myevents.com) are targeted at home users and ideal for holiday card lists; other programs, such as Highrise (www.highrisehq.com) will manage your holiday card list and do a lot more.
-

4.7 Key Words

- A better approach is to use a web-based email service, such as Gmail, **Windows Live Hotmail** or **Yahoo! Mail**.
- A grocery list is just one type of **to-do list**.

NOTES

4.8 Self-Assessment Questions and Exercises

Short answer questions:

1. Advantages of web-based email?
2. What are the benefits of using To-Do list?
3. What is the name of web based email services of Google, Yahoo and Microsoft?

Long answer questions:

1. Write short notes on email communication and web based email services
2. Describe the collaborating to-do list benefits and the web based applications for to-do list.

4.9 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

NOTES

UNIT V

Structure

- 5.1 Introduction
- 5.2 Objectives
- 5.3 Collaborating on household budgets
- 5.4 Contact lists
- 5.5 Communications across community
- 5.6 Answers to Check Your Progress Questions
- 5.7 Summary
- 5.8 Key Words
- 5.9 Self-Assessment Questions and Exercises
- 5.10 Further Readings

NOTES

5.1 Introduction

The cloud has long been thought of as that bit of magical server space that is normally reserved for businesses and tech-savvy early adopters. In reality, the cloud can also offer busy families a variety of helpful and time-saving resources that are easy to employ and quick to update. For example, it's a great way to store, share, and collaborate.

5.2 Objectives

This chapter briefs about:

- Cloud computing for family
- Managing the services for the family

5.3 Collaborating on household budgets

If you're like me, you don't like surprises especially financial ones. I like to keep a rather tight cash flow budget for my family, so that I know what's coming in and what's going out on a weekly basis. Problems occur when my wife has a big expense that I didn't know about and didn't budget for.

You can minimize these types of unwelcome surprises by collaborating with your spouse on your household budget. This is easy enough to do when you use a web-based spreadsheet program, such as Google Spreadsheets (part of the Google Docs suite, at docs.google.com), to create your budget; you and your spouse can then enter budget items separately, when it's convenient for both of you.

Remember an upcoming expenditure while you're sitting in a meeting at work? Just go online and add the expense to your web-based budget. Find out about a necessary repair when you're watching TV? Just walk over to your home PC, log in to the web-based spreadsheet, and enter that expense. Budgets get a lot easier when you can update them anytime and anywhere and when both spouses can do so.

Of course, budget collaboration can also be interactive. Perhaps you see a new flat-screen TV in your future, and enter that item into your web-based budget.

Self-Instructional Material

Your spouse might disagree about the item's importance or cost. She can just as easily go online and lower the budget for that item or delete it completely!

So just because you can put together a budget online doesn't mean you still don't have to talk about it. Remember that collaboration sometimes involves compromise.

5.4 Contact lists

You have your friends, your spouse has her friends, and both of you have business contacts and acquaintances that you need to keep track of even if you only reach out to them once a year or so. If your family is like mine, this describes the list we use for our annual holiday cards, which for us approaches a hundred names long.

Managing your family's contact list isn't always easy. Yes, you have your most-contacted contacts stored in Microsoft Outlook or some similar program, but that list of names exists only on one computer. Your contacts are on your PC, your spouse's contacts are on her PC, and your lists of work contacts are probably on your work computers. How do you merge and manage all these names in time to address and mail your cards before the holidays?

A good solution for managing contacts from multiple family members is to use a web-based program for contact management. There are few different ways to approach this.

First, you can use your web-based email program (Gmail, Yahoo! Mail, and so on) as a contact management program. All of these programs let you create and store complete information about your contacts—email address, postal address, phone number, and so forth. The only problem with using this approach, however, is that both you and your spouse have to use the same email program and the same email address. So, it might not work for you.

A more robust and individualized solution is to use a dedicated web-based contact management program. Some of these programs, such as MyEvents (www.myevents.com) are targeted at home users and ideal for holiday card lists; other programs, such as Highrise (www.highrisehq.com) will manage your holiday card list and do a lot more. These latter programs include the robust customer resource management (CRM) features needed for business and sales force management.

Questions to check your progress:

1. Name the web based program for collaborating on household budgets.
2. What are the benefits of using contact list?

Whichever type of program you decide to use (or, perhaps, you just use a web based spreadsheet program, with one row per contact), you need to authorize

NOTES

access for both you and your spouse. This way you can both import your existing Outlook or Windows Address Book contacts, as well as add new names when and where they come up. Maybe you meet somebody new when you're on a business trip, or your spouse runs into an old friend at the local coffeehouse. All either of you need to do is log onto your web-based application from wherever you are and add the new person's name and contact info. Then, when it comes holiday time, one of you accesses the main list and prints it out or uses it to print mailing labels.

5.5 Communications across community

Alliteration aside, one of the key components of any community collaboration is communication. This isn't as easy as it sounds, because many community activities are undertaken by people in their spare time outside of normal work and home activities. Therefore, they might be communicating during office hours on their work computer, after hours on their home computer, or during any spare moment wherever they may happen to be. That makes using traditional desktop email, such as Microsoft Outlook or Windows Mail, problematic.

The better solution when communication on community issues is to use a web-based email program, such as Gmail (mail.google.com), Microsoft Windows Live Hotmail (mail.live.com), or Yahoo! Mail (mail.yahoo.com). These programs can be accessed from any computer connected to the Internet. You use your web browser to send and view email messages hosted on the web. You can send and receive messages at work, at home, or from wherever you happen to be. Everything you send and receive is stored in the cloud, accessible from anywhere at any time. Some community activists go so far as to create a unique web-based email account just for their community communications. This way they don't confuse personal emails from those involving their community activities.

5.6 Answers to Check Your Progress Questions

- Google Spreadsheets (part of the Google Docs suite, at docs.google.com).
- A good solution for managing contacts from multiple family members is to use a web-based program for contact management. There are few different ways to approach this. A more robust and individualized solution is to use a dedicated web-based contact management program.

5.7 Summary

- A web-based **spreadsheet** program, such as Google Spreadsheets (part of the Google Docs suite, at docs.google.com), to create **budget** it's convenient them.
- A web-based program for **contact management** is used to managing the multiple family member contacts.
- Managing family's contact list isn't always easy.
- The better solution when communication on community issues is to use a **web-based email** program, such as **Gmail** (mail.google.com), Microsoft

NOTES

Windows **Live Hotmail** (mail.live.com), or **Yahoo! Mail** (mail.yahoo.com).

5.8 Key Words

- Customer Resource Management (**CRM**) is one of the features for business and sales force management.

NOTES

5.9 Self-Assessment Questions and Exercises

Short Answer questions:

1. How to manage the household budgets using web based programs?
2. Name the web based contact management tool.
3. List out the benefits of communication across community using web based application?

Long Answer questions:

1. Describe the process of managing household budgets
2. Short notes on
 - a. MyEvents
 - b. Highrise
3. Describe the process of communication across communities

5.10 Further Readings

- Michael Miller, *Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online*, Que Publishing, August 2008.
- Haley Beard, *Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs*, Emereo Pty Limited, July 2008.

UNIT VI

Structure

- 6.1 Introduction
- 6.2 Objectives
- 6.3 Collaborating on schedules
- 6.4 Collaborating on group project and events
- 6.5 Cloud computing for corporation
- 6.6 Answers to Check Your Progress Questions
- 6.7 Summary
- 6.8 Key Words
- 6.9 Self-Assessment Questions and Exercises
- 6.10 Further Readings

NOTES

6.1 Introduction

Cloud computing saves businesses time and money by boosting efficiency, improving cooperation and advancing development. In Corporate sector use cloud computing to access information anywhere with any compatible device. Instead of storing information on your computer or a server in your office, cloud computing stores information on the web. It works by making information available from a central web-based hub that gives anyone with proper credentials access from any location with an internet connection. Cloud computing also syncs data for all devices connected to the cloud, keeping them updated with real-time information.

6.2 Objectives

This chapter will impart the concepts of:

- Cloud computing for Scheduling
- Managing projects and events
- Cloud computing for Corporate Sector

6.3 Collaborating on schedules

Collaborating on Schedules

When it comes to coordinating multiple individuals or families in a community activity, you have your work cut out for you. Whether it's a youth sports team, community organization, school event, or some community event, trying to line up who's free and who's not on a given evening takes a lot of effort unless, that is, you're using web-based scheduling tools.

Sports Team Schedules

Here's one of the most common community activities: youth sports. Maybe your son is on an intramural football team, or your daughter is into youth soccer. Whatever the age, whatever the sport, there's a lot of activities that need to be scheduled practices, home games, away games, team meetings, you name it.

Multiply the number of players (and coaches) on each team times the number of events, and you see the complexity; it gets even worse if you're trying to manage events for an entire league.

Self-Instructional Material

How best, then, to juggle all the schedules of so many people and events? The best way is to use a web-based calendar tool, such as Google Calendar (calendar.google.com), Yahoo! Calendar (calendar.yahoo.com), or Calendar Hub (www.calendarhub.com). Just create a public calendar and provide the URL to all the team members. After you add all your team activities to the calendar, team members simply have to log in to see what's coming up this week and next.

NOTES



Figure 6.1 The Lakeville Baseball Association uses League Athletics to manage its activities on the web

Also good are dedicated sports team website builders. These sites offer tools designed specifically for sports teams, including home pages complete with schedule, roster, player profiles, box scores, and the like. Most of these services even design your site using your team colors and logo. There are several of these web-based applications, including eteemz (www.eteemz.com), League Athletics (www.leagueathletics.com), LeagueLineup (www.leaguelineup.com), and TeamSnap (www.teamsnap.com). Figure 6.1 shows a typical League Athletics site, for the Lakeville (Minnesota) Baseball Association.

School Schedules

Web-based calendars are also ideal for keeping track of various school schedules. Whether it's homework assignments for a particular class or a school wide events schedule, it's easy for a teacher or school to post that schedule on a web-based calendar. Make the calendar public (but make sure only authorized personnel can post new events), and then provide the calendar's URL to all students and parents. Assuming that all families have Internet access (it helps to check this first), there should be no excuse for missed homework or absence from key events.

Community Group Schedules

Any community group can benefit from organizing their activities via a web based calendar. Want to schedule practices for a community theatre production? Announce meetings for your local school board? Organize bingo nights for your church? Any and all of these group activities can easily be managed online, in the cloud, using a web-based calendar.



Figure 6.2 Searching for local events online with Zvents.

Event Schedules and Management

You can also use web-based calendars to post dates and schedules for specific public events, such as school plays, or for all events in a given community. Although any web-based calendar program can do this job, as well, some event-specific applications are worth noting.

For example, Zvents (zvents.com) is a web search engine for local events. Upload your event schedule into the Zvents database, and then anyone in your area can find out what's happening in the coming days and weeks. Figure 6.2 shows a typical Zvents community home page. Users can also search for events by type, location, and date. Also interesting is the suite of event management software from ServiceU (www.serviceu.com). Included in this suite is the EventU application, which offers event, resource, and facility scheduling for organizations small or large.

6.3 Collaborating on group project and events

Collaborating on Group Projects and Events

Community groups often have a lot on their plates. Someone has to schedule the next fundraiser, someone else needs to print up flyers, someone else is in charge of recruiting new members...there's just a lot of stuff to do!

Collaborating on Task Management

For managing more complex tasks, a simple to-do list application might not cut the mustard. Instead, consider using a web-based task management application that lets you manage the multiple pieces and parts of large projects.

Basic task management can be accomplished with applications such as HiTask

NOTES

(www.hitask.com) and Zoho Planner (planner.zoho.com). For the most complicated projects, consider using a dedicated project management application, such as Basecamp (www.basecamp.com) or Goplan (www.goplan.com). Whichever option you choose, you must break your project down into all its component tasks, set a due date for each, and then assign each task to a specific group member. Group members can then access the application online from their own computers and update the project with their own individual progress.

NOTES

Collaborating on Event Management

When you're putting on a big event such as a concert or conference, you have a whole new set of challenges to face. Not only do you have to manage the tasks involved with putting together the event, you also have to handle attendee registration, event marketing, ticket sales, and the like. It's a massive effort made somewhat easier by web-based event management tools. With web-based event management applications, the cloud hosts everything you need to schedule and market your events, as well as handle registration, payment, and other important tasks. For example, you can create an online event calendar so that attendees can learn about and sign up for future events via the web; offer web-based event registration and payment; manage requests for hotel rooms, airline flights, and car rentals; and check in attendees live onsite via a notebook PC with Internet connection. Most of these apps also offer detailed task and budget management functions.

These are very robust applications, capable of handling every last detail over the web. Some of the most popular of these apps include Cvent (www.cvent.com), RegOnline (www.regonline.com), and ViewCentral (www.rmkr.com/viewcentral). Unlike some other web-based apps, these aren't free; you have to pay for the power you need to manage the details of your particular event.

We briefly mentioned event marketing in the previous section. That's because most event management applications also handle basic event marketing. But when it comes to promoting your community events, you want to go beyond the basics to more creative forms of marketing. For example, you may want to create a brochure or flyer to announce your event. Fine and dandy, but everybody in the group (including all the community bigwigs) wants input on the final piece. This may have been difficult in pre cloud days, but now you can use a web-based application such as Google Docs (docs.google.com) to create your piece and make it available online for everyone to see and comment on. (Just remember to dole out read-only authorization to these interested parties; you don't want everybody in the group going online and making changes to what you've just created!)

Naturally, you can also use web-based local search sites, such as Zvents (www.zvents.com), to post announcements of your community events. You may even want to use cloud-based social media sites, such as Facebook and MySpace, to promote your event online. And, after the event, you can post

Self-Instructional Material

pictures of the event on community photo-sharing sites, such as Flickr (www.flickr.com). It's all possible because of the cloud!

Questions to check your progress:

1. List the web based schedule tools.
2. What is meant by event schedules?
3. Examples of task management applications.

6.4 Cloud computing for corporation

Businesses have been some of the earlier adopters of cloud computing. Companies large and small recognize the cost savings and productivity enhancements of using web-based tools to manage projects collaborate on documents and presentations, manage enterprise wide contacts and schedules, and the like. Cloud computing lets companies do more with limited budgets.

In addition, web-based applications have proven a boon for telecommuters and road warriors. Instead of being tied to documents and applications hosted on their office desktops, workers can now access what they need from any location in the office, at home, or on the road.

With all that in mind, let's look at some of the many ways that companies and their employees can use cloud computing

Managing Schedules

If you work in a large company, you know what a hassle it is to schedule even simple meetings. One person is free on Tuesday at 9:00, but another is out of the office, and yet other attendee is already booked for that time slot. Plus, you're not even sure which meeting room is free at that time. You end up sending a flurry of emails back and forth, trying to find the one spot in everybody's schedules that is free. There has to be a better way.

That better way is web-based scheduling. Everyone places his or her schedule in the cloud, which then enables the meeting's organizer to easily see who's available when. The cloud-based app finds the best time for all involved and schedules the meeting. No more emails, no more phone calls; it all happens automatically, in the cloud.

Here's how it works. Let's suppose you need to schedule a meeting sometime next week with a dozen different attendees. You punch in the details of the meeting and the desired attendees, and the scheduling app finds the first available timeslot when all attendees are free.

Managing Contact Lists

Salespeople have to deal with lots and lots of contacts. Not only is their address book full, they need to know when to contact certain clients, when follow-up calls are necessary, what the boss needs them to do today, and the

like. This is difficult to do from a simple desktop contact management program, such as Microsoft Outlook, which merely acts as a storehouse for names and contact info. It's also difficult to do when you're on the road and need access to all your contacts.

The solution, of course, is a web-based contact management or customer resource management (CRM) application. These programs are tailored to the needs of a busy salesperson and come complete with features such as activity scheduling, appointment reminders, email templates, and the like.

Managing Projects

Most companies at one point or another have at least one big project going on the type of project that involves multiple employees from multiple departments and perhaps multiple locations. Projects of this type have tons of individual pieces and parts, each of which dependent on the completion of a previous task. Keeping track of all the individual tasks who's doing what and when can take a gargantuan effort.

That effort is made easier with the use of a web-based project management application. Project members can log in from any location to access the project's master file; they can add or delete tasks, mark tasks as complete, enter detailed billing information for individual tasks, and so forth. And because the project is hosted in the cloud, every team member sees the same Gantt or PERT chart and the same list of tasks, instantly updated when any other member makes an edit.

Collaborating on Reports

Fortunately, online collaboration is one of the chief benefits of cloud computing. Instead of emailing Microsoft Word documents across the company, opt instead for a web-based word processing program, such as Google Docs (docs.google.com) or Zoho Writer (writer.zoho.com). With one of these applications, everyone contributing to the report can access the same master document, online and in real time. When someone from one department adds his section to the document, all the other staffers immediately see the update.

Collaborating on Marketing Materials

Marketing is another area that benefits from cloud-enabled collaboration. Putting together a catalog requires data from several different departments. For example, effective direct mail campaign benefits from marketing, sales, and fulfillment input. Online PR needs participation from marketing, product, and technical staff.

The marketing materials themselves can be created using web-based word processing applications. This puts the draft materials on the web, for everyone on the team (including appropriate senior management) to see, comment on, and even contribute to. After everyone's had his or her say, you can finalize the document and send it to your printer or website.

NOTES

6.5 Answers to Check Your Progress Questions

- Sports team, community organization, School event, Some community event
- Upload an event schedule into the web based program, and then anyone in that area can find out what's happening in the coming days and weeks.
- HiTask , Zoho Planner, Basecamp , Goplan

NOTES

6.6 Summary

- The best way is to use a web-based calendar tool, such as Google Calendar (calendar.google.com), Yahoo! Calendar (calendar.yahoo.com), or Calendar Hub (www.calendarhub.com).
- Web-based calendars are also ideal for keeping track of various school schedules.
- Web-based task management application that lets you manage the multiple pieces and parts of large projects.
- Task management can be accomplished with applications such as HiTask (www.hitask.com) and Zoho Planner (planner.zoho.com).
- Use web-based local search sites, such as Zvents (www.zvents.com), to post announcements of community events.
- Web-based applications have proven a boon for telecommuters and road warriors.

6.7 Key Words

- **Web-based calendar** tool is a best way to juggle all the schedules of so many people and events
- **Zvents** (zvents.com) is a web search engine for local events.
- Online collaboration is one of the chief benefits of **cloud computing**.

6.8 Self-Assessment Questions and Exercises

Short Answer questions:

1. Define: Schedule
2. How the School Schedules are help the studens and Parents?
3. Name of the web based event marketing sites.

Long Answer questions:

1. Explain the Collaborating on schedules.
2. Describe about the Collaborating on group project and events process.
3. Elaborate on Cloud computing for corporation sectors.

6.9 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

Self-Instructional Material

BLOCK – III CLOUD SERVICES

UNIT VII

Cloud Services

Structure

- 7.1 Introduction
 - 7.2 Objectives
 - 7.3 Exploring on-line calendar applications
 - 7.4 Exploring online scheduling applications
 - 7.5 Exploring online planning and task management
 - 7.6 Answers to Check Your Progress Questions
 - 7.7 Summary
 - 7.8 Key Words
 - 7.9 Self-Assessment Questions and Exercises
 - 7.10 Further Readings
-

NOTES

7.1 Introduction

Cloud management strategy usually involves many tasks including performance monitoring, security and management, and initiating failure recovery and possibility plans. With cloud computing growing more complex and a wide variety of private, hybrid, and public cloud-based systems and infrastructure already in use, a company's collection of cloud management tools needs to be just as flexible and scalable as its cloud computing strategy.

7.2 Objectives

After reading this chapter, you will be able to understand:

- Online Calendar
 - Online Scheduling
 - Online Task management
-

7.3 Exploring on-line calendar applications

Exploring Online Calendar Applications

Most computer users today have embraced keeping their schedules on their PCs. Not that the old-fashioned wall-hanging calendar is dead, it's just that it's a whole lot easier to track appointments and events electronically; the computer does all the busywork for you.

The problem, however, with using calendar software (such as Microsoft Outlook or Windows Calendar) is that all your appointments have to reside on a single computer. If you keep a personal calendar on your home PC, you can't reference it from work or when you're traveling. That limits the calculator program's usefulness.

That's why, instead of using a calendar that's wedded to a single computer, many users are moving to web-based calendars. A web-based calendar service stores your calendars on the Internet, where they can be accessed from any computer that has an Internet connection.

Google Calendar

The most popular web-based calendar today, no doubt due to its association with the web's most-used search engine, is Google Calendar (calendar.google.com).

Self-Instructional Material

Google Calendar is free, full featured, and easy to use. It lets you create both personal and shared calendars, which makes it ideal for tracking business group, family, and community schedules.

As you can see in Figure 7.1, Google Calendar looks pretty much like every other calendar you've ever seen. You enter your appointments (which Google calls "events") directly into the calendar, which you can display in either daily, weekly, or monthly views. You can also, if you like, view your weekly agenda on a single page.

NOTES



Figure 7.1 The easy-to-use interface of Google Calendar. Note the multiple calendars listed in the My Calendars box.

Like all web-based calendars, all your events are stored in the cloud (in this case, the cloud created by Google's own network of servers), not on your own computer. This means that you can access your calendar from any computer anywhere in the world. Just log in to the Google Calendar page and your calendar and all events are there.

Because Google Calendar is web based, you can use it to create not only a private calendar for yourself, but also public calendars for your company or organization. Create a public calendar and all employees or attendees can access it via the web. In addition, special event invitation features make it easy to invite others to an event—public or private.

In addition, Google allows you to create several different types of calendars. You can create one calendar for home, another for work, and yet another for your son's soccer team. Then you can view all your calendars from the same Google Calendar page, with the events from each calendar color-coded for easy visibility.

What types of calendars can you create with Google Calendar? Here's the list:

- **Personal calendars**, like your default calendar
- **Public calendars**, which others can access via the web
- **Friends' calendars**, which you import from their Google Calendar web pages

- **Holiday calendars**, which add national holidays to a basic calendar. Setting up a new calendar is comically easy. In fact, there's nothing to set up.

When you first sign into the Google Calendar page, your calendar is already there, waiting for your input. There's nothing to create, nothing to configure. Can it get any easier than that?

And here's something unique about Google Calendar. Because it's part of the mighty Google empire, Google Calendar integrates smoothly with Google's Gmail application. Google Calendar can scan your email messages for dates and times and, with a few clicks of your mouse, create events based on the content of your Gmail messages. For all these reasons, I'm a big fan and long time user of Google Calendar. I recommend it to any user for home or business use.

Yahoo! Calendar

One of Google Calendar's primary competitors is Yahoo! Calendar (calendar.yahoo.com), hosted by its search competitor Yahoo! This web-based calendar looks, feels, and functions quite similarly to Google Calendar, and is also free for anyone to use. Yahoo! Calendar's similarity to Google Calendar can be seen in Figure 7.2. To be honest, most web-based calendars have a similar visual look. (How different can you make a calendar look, anyway?) One subtle difference in Yahoo! Calendar, however, is the presence of an Add Task button. This reflects Yahoo! Calendar's offering of tasks in addition to events. You can still add individual items to your daily schedule, but you can also add longer-term tasks and have their due dates show up on your calendar. It's a nice addition.



Figure 7.2 The familiar look and feel of Yahoo! Calendar.

Of course, you can share your Yahoo! calendars with other users, in a collaborative environment. Just click the Sharing link and indicate how you want to share—no sharing, view-only for friends, view-only for anyone, or view-only with special friends allowed to edit. Choose this last option for true collaboration. At present, Yahoo! Calendar only lets you create a single calendar. All your events, public and private, have to be stored on this calendar; you can't create

NOTES

different calendars for different functions. (That's one advantage that Google has over Yahoo! here.)

Windows Live Calendar

Because Google and Yahoo! both offer web-based calendars, it's no surprise that the third-largest search site also has a competitive offering. Windows Live Calendar (mail.live.com/mail/calendar.aspx) is Microsoft's web-based calendar, actually part of the Windows Live Hotmail email service. Windows Live Calendar looks a lot like both of its primary competitors. It offers tasks, like Yahoo! Calendar, and also lets you schedule meetings with other calendar and Hotmail users. (Figure 7.3 shows the page you use to send a meeting request.) Naturally, you can share your calendars with authorized users for group collaboration.

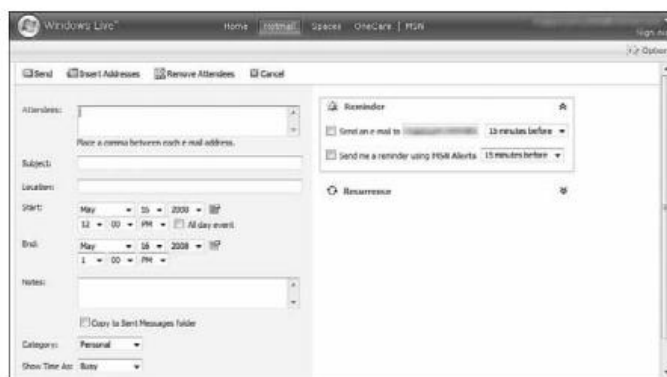


Figure 7.3 Scheduling a group meeting with Windows Live Calendar.

7.4 Exploring online scheduling applications

Exploring Online Scheduling Applications

As anyone in a large office knows, scheduling a meeting can be a frustrating experience. Not only do you have to clear time from all the attendees' individual schedules, you also have to make sure that the right-sized meeting room is available at the designated time. Experts claim that it takes seven emails or voice mails to arrange a single meeting; a typical businessperson can spend more than 100 hours each year just scheduling meetings. Enter, then, the online scheduling application. This web-based app takes much of the pain out of scheduling meetings, for both large and small groups. The typical app requires all users to enter their individual calendars beforehand. When you schedule a meeting, the app checks attendees' schedules for the first available free time for all. The app then generates automated email messages to inform attendees of the meeting request (and the designated time), followed by automatic confirmation emails when attendees accept the invitation.

Professionals who schedule appointments with their clients—doctors, lawyers, hairdressers, and the like—face similar scheduling challenges. For this purpose, separate web-based appointment scheduling applications exist. These apps function similarly to traditional meeting schedulers, but with a focus on customer appointments.

Jiffle

Let's start by looking at web-based solutions for meeting scheduling. Our first app is Jiffle (www.jiffle.com), which schedules meetings, appointments, and the like for the enterprise environment. To track employees' free time, it synchronizes seamlessly with both Microsoft Outlook and Google Calendar. It also offers its own Jiffle Calendar application.

Jiffle allows the originating user to mark available time slots on his calendar, as shown in Figure 7.4, and then share them with proposed attendees via a Jiffle-generated email invitation. These attendees view the invitation, log in to the Jiffle website, and then select their preferred time slots from the ones proposed. Based on these responses, Jiffle picks the best time for the meeting and notifies all attendees via an automatic confirmation email.

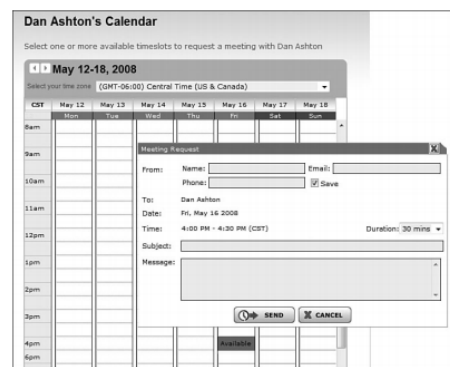


Figure 7.4 Scheduling a meeting with Jiffle

For smaller companies, Jiffle is free for up to 10 meeting confirmations per month. For larger companies, Jiffle Plus, Jiffle Pro, and Jiffle Corporate plans are available.

Presdo

Unlike Jiffle, Presdo (www.presdo.com) is a scheduling tool that isn't limited to a single company. Presdo lets you schedule meetings and events with anyone who has an email address. As you can see in Figure 7.5, adding an event is as simple as entering a description into a box. You then enter the email addresses of other participants, and Presdo emails out the appropriate invites. When an attendee responds, he's automatically added to the event's guest list. (And, for the convenience of all guests, it's a one-button process to add an event to a user's Microsoft Outlook, Google Calendar, Yahoo! Calendar, or Apple iCal calendar.)

NOTES

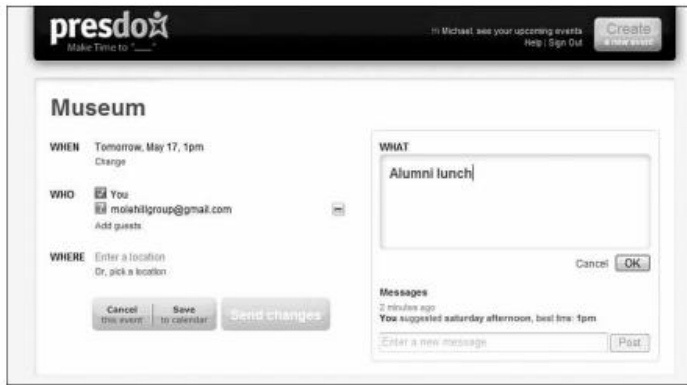


Figure 7.5 Viewing a scheduled Presdo event.

Schedulebook

Schedulebook (www.schedulebook.com) offers several different types of webbased scheduling services. Depending on the application, you can use Schedulebook to schedule employees, customers, or other interested parties.

The company's three offerings are

- **Schedulebook Professionals**, which is a business-oriented schedule/calendar/planning application
- **Schedulebook Office**, which schedules the use of any shared resource, such as company meeting rooms or even vacation homes
- **Schedulebook Aviation**, which is used by the aviation industry to schedule aircraft, flight training, and similar services

Questions to check your progress:

1. What is meant by web based calendar service?
2. What types of calendars can you create with Google Calendar?
3. What are the services provided by the schedulebook?

7.5 Exploring online planning and task management

Exploring Online Planning and Task Management

Now let's pivot from schedules to tasks. Planning and task applications let you manage everything from simple to-do lists to complex group tasks, all over the Internet and collaboratively with other users.

iPrioritize

Sharing to-do lists is important for families, community groups, and businesses. Your to-do list might be as simple as a grocery list or as complex as a list of activities for a community program or business project. Whatever the application, iPrioritize (www.iprioritize.com) is a

good basic to-do list manager. As you can see in Figure 7.6, authorized users can create a new to-do list, add items to the list, prioritize tasks by dragging them up and down the list, and mark items complete when finished. And, because it's web based, you can access your lists anytime and anyplace.

When you have a list, you can print it out, email it to someone else, subscribe to changes in the list via RSS, and even view lists on your mobile phone—which is a great way to consult your grocery list when at the supermarket!

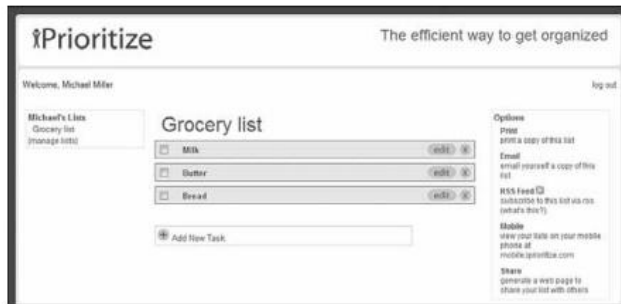


Figure 7.6 A Simple web-based to-do list from iPrioritize

Bla-Bla List

Bla-Bla List (www.blablalist.com) is another simple to-do list manager. It's web based, of course, so you can access your lists from any location at any time. You can even publish your lists via RSS so that family and coworkers can get instant updates.

Hiveminder

Hiveminder (www.hiveminder.com) is similar to all the previously discussed to-do list managers. What's nice about Hiveminder is that you can enter list items in a kind of freeform fashion, and it will help you create and prioritize lists based on your "brain dumps."

Remember the Milk

When you need to "remember the milk" at the grocery store, check out the aptly named Remember the Milk (www.rememberthemilk.com) web-based to-do list manager. Once you create a list, you can arrange reminders via email, instant messaging, or text messages to your mobile phone.

Ta-da List

Here's another web-based to-do list manager. Ta-da List (www.tadalist.com) lets you make all sorts of lists, share them with friends, family, and co-workers, and then check off items as they're completed.

Tudu List

Tudu List (www.tudulist.com) is a little different from other to-do list managers in that it also includes a web-based calendar. Items are added both to the appropriate to-do list and to your calendar, on the date they're due.

NOTES

Self-Instructional Material

TaskTHIS

TaskTHIS (taskthis.darthapo.com) is similar to most other to-do list managers, but offers the ability to add extended notes to any individual task. You can publish your tasks via RSS or share with others via the web.

Vitalist

Like other to-do list managers, Vitalist (www.vitalist.com) organizes all sorts of tasks and projects. It's unique in that it uses the Getting Things Done (GTD) workflow methodology popularized by management consultant David Allen.

7.6 Answers to Check Your Progress Questions

- A **web-based calendar** service stores your calendars on the Internet, where they can be accessed from any computer that has an Internet connection.
- **Personal calendars**, like your default calendar. **Public calendars**, which others can access via the web. **Friends' calendars**, which you import from their Google Calendar web pages
- **Schedulebook Professionals**, which is a business-oriented schedule/calendar/planning application. **Schedulebook Office**, which schedules the use of any shared resource, such as company meeting rooms or even vacation homes. **Schedulebook Aviation**, which is used by the aviation industry to schedule aircraft, flight training, and similar services

7.7 Summary

- A web-based calendar service stores your calendars on the Internet, where they can be accessed from any computer that has an Internet connection.
- Google Calendar is free, full featured, and easy to use.
- Planning and task applications let you manage everything from simple to-do lists to complex group tasks, all over the Internet and collaboratively with other users.

7.8 Key Words

- **Personal calendars** like your default calendar
- **Public calendars** which others can access via the web.
- **Friends' calendars** which you import from their Google Calendar web pages.
- **Holiday calendars** which add national holidays to a basic calendar.
- **Getting Things Done** (GTD) workflow methodology popularized by management consultant David Allen.
- **Schedulebook Professionals**, which is a business-oriented schedule
- **Schedulebook Office**, which schedules the use of any shared resource
- **Schedulebook Aviation**, which is used by the aviation industry to schedule aircraft, flight training, and similar services

7.9 Self-Assessment Questions and Exercises

Short Answer Questions:

1. What is meant by Google calendar?
2. List the online scheduling applications
3. What are the programs are used to online planning and task management?

Long Answer Questions:

1. Write short notes on
 - a. Google calendar
 - b. Yahoo! Calendar
 - c. Windows Live Calendar
2. Write short notes on
 - a. Jiffle
 - b. Presdo
 - c. Schedulebook
3. Explain an Online Planning and Task Management

7.10 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

Cloud Services

NOTES

Self-Instructional Material

UNIT VIII

Cloud Services

Structure

- 8.1 Introduction
- 8.2 Objectives
- 8.3 Collaborations with event management
- 8.4 Contact management
- 8.5 Project management
- 8.6 Word processing and databases
- 8.7 Answers to Check Your Progress Questions
- 8.8 Summary
- 8.9 Key Words
- 8.10 Self-Assessment Questions and Exercises
- 8.11 Further Readings

NOTES

8.1 Introduction

Cloud-based word processors also allow multiple users to edit the same document at the same time. Internet features, Allows users to embed Web links into their documents and format their documents for the Web. Some also link to Web services that can help users create their documents. Translation and speech, As artificial intelligence capabilities become more commonplace; some word processors have gained the ability to read text aloud, to accept voice commands, and to translate text from one language to another.

8.2 Objectives

This Chapter describes about

- Event management collaboration
- Project management applications
- Word processing

8.3 Collaborations with event management

Collaborating on Event Management

Scheduling a company meeting is one thing; putting together a large-scale event, such as a conference or seminar or trade show, is quite another. An undertaking of this scale involves more than just clearing a few schedules and making sure the conference room is free at 10 a.m. on Friday.

A big event is a big project with lots of individual tasks. To stage a successful event, you have to market it to potential attendees, sign up those attendees, process their fee payments, make sure that the event space and conference rooms are properly scheduled, handle travel and hotel arrangements, register attendees when they arrive onsite, manage event workers, and make sure everything runs on time during the event. It's a tremendous undertaking.

It's not surprising, therefore, that several companies have introduced web-based event management applications. What's nice about hosting these apps in the cloud is that you can work on the same master database whether you're in your office before the event or sitting at the registration desk during the event.

Self-Instructional Material

In addition, these web-based apps enable attendees to register in advance online, and for you to process onsite registration via notebook PCs connected to the Internet. Everything you need and use is hosted offsite, on the web, for you to access whenever and wherever you need be.

Understanding Event Management Applications

What exactly does an event management application manage? Less sophisticated apps may focus on one or two operations, such as event registration or facilities booking. The more full-featured apps include management of everything from pre-event marketing to post-event analysis. Let's take a look at what you can expect.

NOTES

Event Planning and Workflow Management

A successful event starts well in advance of its opening date. There are tons of details involved in an event of any size, and managing all those tasks takes quite a bit of computing horsepower just the thing cloud computing can help you out with. Most event management applications include robust task planning modules, similar to what you'd find in higher-end task management applications or lower-end project management apps.

What you want is the ability not just to track individual tasks in a to-do list fashion, but also benefit from sophisticated workflow management. That is, you need to know which tasks need to be completed before later tasks can be started; you need to know who's doing what, and be alerted to any tasks that are unstaffed or understaffed. In other words, you need the planning and workflow management functionality to continue into the event itself, so that you can manage your staff in an efficient and effective manner.

Event Marketing

Unless you let people know about your event, you could be disappointed with the final attendance. To that end, many event management applications include modules to help you market your event. For example, many apps offer web-based email marketing, which lets you promote your event via targeted email messages. Other apps help you create your own event website (on their cloud computers), which also helps to promote your event.

Event Calendar

Another part of your event marketing mix is an event calendar an online calendar that displays all the happenings within your overall event. This proves particularly useful if you're hosting a conference or trade show made of lots of individual panels, sessions, or meetings. You can post each individual event on the main event calendar, easily accessed by any attendee or potential attendee with a web browser.

Facilities Scheduling

Unless you're running a one-room meeting, chances are your event involves multiple rooms and maybe event multiple locations. If so, you need to be able to schedule different rooms for different components of your event; when a participant or group asks for a room, you need to be able to see what's available and when. To that end, most event management apps include a facilities scheduling module. Ideally, this module ties into the event host's systems, giving you complete power over room or hall scheduling.

Advance Registration

Larger events require or encourage advance registration of participants. To that end, most event management apps include a web-based registration module, where attendees can sign up (and, in most cases, pay) for the event. Attendee information is entered into a web form, and that data is then stored on the application provider's cloud servers. You then access attendee data from your own computer, wherever you may be. Some of the more sophisticated advance registration modules provide additional functionality. For example, you might want to collect demographic or other information from attendees, and then use that information to help plan specific programs during the event. Or a registration module might tie into a hotel reservations module, to automatically reserve hotel rooms for those who need them. The registration module is the backbone of the entire event management program. Make sure it does everything you need it to do, and does so in a way that you find usable.

Exploring Event Management Applications

Now that you know what to look for in an event management application, let's look at the most popular of these web-based apps. Whereas most perform similar functions, some stand out from the pack in terms of what they do or don't offer.

123 Signup

Taking these event management applications in alphanumeric order, the first out of the gate is 123 Signup (www.123signup.com). The company offers four different applications: Event Manager, Association Manager, Training Manager, and Member Directory. Of these, the one in which we're interested is the aptly named Event Manager. 123 Event Manager is scalable, so it can be used for both smaller (employee meetings, stockholder meetings, alumni meetings, and so forth) and larger (trade shows, fundraisers, conferences, and so on) events. The application handles a combination of front-office and back-office tasks. Front-office tasks include defining and marketing events, automatically generating informational web pages and registration forms, and marketing your event via targeted email messages. Back-office tasks include event registration, badge printing, payment collection, and database management. The program even provides real-time reports on registrations, attendance, collections, and other key factors.

Cloud Services

NOTES

Self-Instructional Material

Figure 8.1 shows a typical initial registration page. Potential attendees see information about the event, including a link to a map of the event hotel and the ability to add the event to their Microsoft Outlook calendar. To begin the registration process, an attendee need only click the Register icon; attendees are then prompted for their name and contact info, as well as payment method.

The screenshot shows a web page titled "123 SIGNUP" for "The Mohrill Group" with the email "mohrill@moohillgroup.com". The page is for a "Community Conference". It features a navigation bar with buttons: "Back", "Register", "Change", "Calendar", and "Cancel". The main content area includes:

- Location:** Indianapolis Hilton Inn, 101 W. Washington St., Indianapolis, IN. A "Map" link is provided.
- Date and Time:** Thursday, May 20, 2008 02:00 PM to Friday, May 20, 2008 02:00 PM. A link "Add to my Outlook Calendar" is present.
- Price:** Regular (May 19, 2008 - May 20, 2008)
- Registration Table:**

Registration Type	Price
General	USD 290.00

At the bottom, there is a "Help" icon and the text "Registration Powered by 123Signup".

NOTES

Figure 8.1 Beginning the event registration process with 123 signup Acteva

Acteva (www.acteva.com) offers online event registration and payments. Using Acteva's web-based solutions, you can handle event registration, ticketing, and payment handling (via any major credit card) directly from your own website. You can then sort and manage all event registration data online.

You start by creating what Acteva calls an Active Page for your event; this is simply a web page with built-in payment handling and data processing. (You create your Active Page by filling in a few web forms—it's quite easy.) After you've published your event page, you then use Acteva's EventMail service to send out notification of your event to potential attendees. Interested parties then visit your Active Page to register and pay for the event. Acteva processes and confirms event registration and sends an email confirmation to the participant. You can then use Acteva's online event management tools to generate will call lists, meal preference lists, name tags, badges, and the like.

Conference.com

Conference.com (www.conference.com) offers one of the most full-featured web-based event management applications available today. By using Conference.com's cloud servers, even small events can utilize the company's powerful event management tools, designed to serve the needs of the largest events. Your data (and the behind-the-scenes application modules) are hosted by Conference.com's secure servers, accessible from any Internet-enabled location.

The company offers a wealth of features for events big and small. You get wizard-based event setup, real-time credit authorization, customizable web pages and forms, onsite processing, and the like. When an event participant submits his registration via your custom-designed web form, the application automatically updates the database on Conference.com's web servers, so your information is always up-to-date.

Self-Instructional Material

Conference.com's Event Manager Systems application is actually a suite of interlocking modules, as shown in the diagram in Figure 8.2. These modules include the following:

- **Appointment Manager**, an online meeting scheduling application. This module enables attendees to self-schedule one-to-one sessions with other participants at your event, within time slots that you predefine.
- **Credit Card Manager**, offering real-time credit card authorization integrated into the registration process.
- **Email Manager**, an email broadcasting utility that dynamically pulls recipient names from your registration data.

NOTES

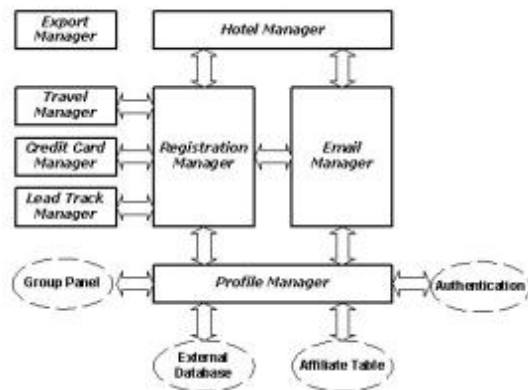


Figure 8.2 Conference.com's interlocking event management modules

Export Manager, an export/import utility that lets you copy the data from one event to another event in your database.

Hotel Manager, a professional room block management tool tightly integrated with the company's Registration Manager module. The system manages everything from small single property blocks to citywide room inventories. Each room type is defined with its own price, description, and starting inventory; as a room is sold, the nightly inventory for that room type is automatically adjusted.

Lead Track Manager uses bar code technology to verify session attendance and provide lead tracking services to exhibitors.

Profile Manager links member, employee, customer, and prospect databases with your conference registration processing, enabling attendees to authenticate themselves through a login web page.

Registration Manager is the core module of Conference.com's Event Manager systems. This module contains the accounting engine, report engine, a graphical report library, and other functions that integrate directly with other modules in the suite.

Survey Manager enables you to create professional-looking online surveys at any point in the event process. You can solicit pre- or post-event attendee surveys; Survey Manager lets you email invitations with hyperlinks that take the user to the correct survey form.

Travel Manager, which helps you manage ground transfer services between multiple airports and event hotels. Together, this suite of modules creates a full-featured event management application that should handle the needs of any sized event

8.4 Contact management

Collaborating on Contact Management

Most technically adept people today keep their lists of friends, family, and business contacts in some sort of computer-based address book. Maybe it's in the Windows Address Book, maybe it's in Microsoft Outlook, but it's likely that you have all your contacts in some electronic file someplace on your computer.

The problem with that, of course, is what to do when you need to look up an address or phone number and you're not around that particular computer. Maybe you need a phone number for a family member and you're at work, or maybe you need the address for a business colleague and you're at home. You get the idea. Storing your contacts in the cloud would let you access all your contact information from any computer, anywhere.

The situation becomes more acute when your job depends on your contacts, as is the case with salespeople. We're talking customer relationship management (CRM) here, and it's no good to have all your contact information stored on your work computer when you're always on the road. CRM is an ideal application for cloud computing, as witnessed by the large number of firms offering web-based CRM and sales automation applications.

Exploring Contact Management and CRM Applications

The line between contact management, CRM, and SFA applications is blurry enough to make clear distinctions impossible. To that end, we'll look at all three types of applications in one long list—starting with the industry-leading Salesforce.com, and proceeding in alphabetic order from there.

Salesforce.com

The most popular web-based contact management/CRM available today is offered by Salesforce.com (www.salesforce.com). In fact, the company offers several different cloud services:

Salesforce.com, a software-as-a-service CRM application designed for sales, marketing, customer service, and other uses

Force.com, a platform-as-a-service application designed for developers who want to design or customize their own sales force apps.

App Exchange, an online marketplace of add-on software for Salesforce.com, developed by independent companies

NOTES

All these cloud services are buttressed by a robust community and support structure, including blogs, forums, education and training initiatives, and the like. The company's primary application is the self-named Salesforce.com.

The company offers a hosted collection of on-demand business applications that include the following:

Sales Force Automation, which includes activity management, channel and territory management, forecasting, mobile access, email templates, and real-time analytics that help companies increase sales productivity and grow revenues

Service & Support, a customer service solution for enterprise call centers

Partners, a partner relationship management application that enables collaboration and partnership with channel partners

Marketing, which includes tools to execute, manage, and analyze the results of multichannel marketing campaigns

- **Content**, which enables companies to share documents and other content across the organization
- **Ideas**, which helps a company build online communities with their customers, partners, and employees
- **Analytics**, which offers real-time reporting, calculations, and dashboards to help improve decision making and resource allocation

In addition, Salesforce enables clients to build their own custom applications. The company also offers a range of prebuilt industry-specific applications that can be plugged into the main application architecture.

Salesforce offers so many useful applications it's difficult to provide a quick overview, but as an example of the types of applications provided, let's take a quick look at the Activity Management component of the Sales Force Automation module. The specific applications offered in this component include activity tracking and collaboration (to track tasks and activities, schedule joint meetings, and set up automatic templates for recurring tasks), activity scheduling (including the ability to publish calendars for shared resources and set appointment reminders), sales activity reports, and team management functions (assigning and managing a team for large accounts, with specific roles for each team member). All of these tasks help salespeople and sales managers manage complex relationships with demanding customers.

Most Salesforce tasks can be managed via the use of customized dashboards. Each dashboard presents a visual display of key sales metrics. You can create your own custom dashboards to measure those activities of most importance to your company or department. For example, the dashboard shown in Figure 8.3 tracks closed sales to date, sales activity, open support cases, key account performance, leads by source, the top five open leads, and other key metrics. As you can no doubt gather, Salesforce has applications for companies of any

NOTES

size and type. Pricing is customized for each account, typically costed by number of users and applications used.

Cloud Services



NOTES

Figure 8.3 Tracking key metrics via a custom Salesforce dashboard.

bConnections

As popular as Salesforce.com is, it isn't the only web-based CRM solution available today. Witness bConnections (www.bconnections.com), a contact management program augmented with essential CRM functions for small and medium-sized businesses.

The bConnections application starts with a list of companies you do business with, and a list of contacts at those businesses. (Figure 8.4 shows a typical contact info entry screen.) This contact information is hosted on the web and accessible from any Internet-connected computer.

The application includes a web-based calendar that sales management can use to manage the activities of all their reps. It also tracks leads and sales opportunities, to help you better prepare sales forecasts. All activities are summarized in the application's Executive Summary dashboard.

A screenshot of a web-based contact information entry form titled 'Contact'. The form is organized into two columns. The left column contains fields for: Salutation (dropdown), First Name, Middle Name, Last Name, Company (dropdown), Department, Title, Telephone, Ext., Cell Phone, Email, and Time Zone (dropdown). The right column contains fields for: Address, City, State, ZIP, Country (dropdown), Birthday (Day, Month, Year dropdowns), Assistant, Spouse, Pets, and Notes/Description (text area). At the bottom right, there are 'Save' and 'Reset' buttons.

Figure 8.4 Entering contact information in bConnections

Self-Instructional Material

BigContacts

BigContacts (www.bigcontacts.com) is a web-based contact manager designed for workgroups as small as 2 people or as large as 2,000. It features an address book, group calendar, task manager, and to-do lists. Its CRM functions include sales tracking, activity reports, team management, and mobile access. Pricing is on a per-user basis.

eStudio Contact Manager

For more basic contact management, check out eStudio Contact Manager (www.same-page.com/contact-management.html). This application is an online address book specifically designed for business contacts. The address book can be accessed by multiple users from any Internet-connected computer, making it ideal for real-time contact management for sales teams, project groups, and small businesses.

As you can see in Figure 8.4, contacts can be organized into a series of hierarchical folders. Specific contacts can be found by browsing the folders, by browsing alphabetically, or by searching. You can search by any parameter, including name, organization, title, phone number, and the like.

8.5 Project management

Collaborating on Project Management

Managing a large project can be an exhaustive task. Even the smallest project has numerous pieces and parts, all of which have to be completed in a precise order and on an exacting timetable for the project to come in on time and on budget. If just one piece slips, the whole project goes out of whack.

The process of managing a project gets even more complex when the participants are in different locations. How do you keep track of the tasks that need to be completed by someone in your Denver branch when you're in New York? Or what about components that must be completed by outside vendors? It's a real nightmare.

Although you can't always turn a nightmare into a dream project, cloud computing can help alleviate the night sweats associated with this sort of complex project management. When you employ a web-based project management application, you can more easily manage all the pieces and parts, no matter where the players are located. Your project is turned into a single database hosted in the cloud, accessible by all from any Internet-connected computer.

Understanding Project Management

Put simply, project management is the act of planning, organizing, and managing resources to bring about the successful completion of specific project objectives. The project itself can be anything, from creating a product brochure to implementing a new hiring process to launching a new product line. What all projects have in common, however, is that they're finite endeavours every project has a specific start and completion date. And it's to this latter date that you must manage.

The challenge, of course, is completing the project by the assigned date and to the agreed-upon budget. Key to this is the tight management of each and task that comprises the project; if all the component tasks are completed on time and on budget, the entire project will be completed as planned. If one or more tasks slip and you can't make up the lost time elsewhere your project will come in late. To manage the individual tasks within a project requires managing a larger set of resources people, of course, but also money, materials, space, communications, and the like. This resource management is crucial to ensuring the eventual success of a project.

NOTES

Project management professionals like to think in terms of juggling a certain set of constraints: scope (what must be done to produce the end result), time (the amount of time available to complete the project), and cost (the budgeted amount available for the project). These constraints are interrelated; one constraint can't be changed without impacting the others. For example, if you increase the scope of a project, you typically need to increase the time and cost, too. If you want to reduce the time to complete the project, you might need to increase the costs (pay more to get it done faster) or reduce the scope (try to accomplish less things on a tighter schedule).

The key to effective project management is to use all available tools and techniques that enable the project team to organize their work to meet these constraints. And, not surprisingly, one such tool is a web based project management application.

Exploring Project Management Applications

Traditional project management software helps project managers and team members organize and track all the various tasks in a project. To do this, the software typically includes scheduling, budget management, and resource-allocation components. Web-based project management applications do all this online, with a centralized project file accessible to all team members. This enables improved communication and collaboration between members of the project team. The scheduling component of a project management application helps the project manager schedule the series of events that comprise the total project.

This should include a list of dependencies those events that need to be completed before other events can start. The project management application should then be able to calculate the project's critical path, which is the series of events that determine the length of the entire project. After the project has been planned, it then has to be executed. The project management application should enable this execution by creating task lists for team members, allocation schedules for project resources, overview information for the team manager, and, as the project progresses, an early warning of any risks to the project's completion.

@task

The web-based project management program known as @task (www.attask.com) offers a variety of traditional projection management functions. The application includes an interactive drag-and-drop Gantt chart (shown in Figure 8.5), critical path analysis, project milestones, planned/projected/ estimated comparisons, resource scheduling, issue management, and calendar views for project tasks. Tasks can even be managed remotely via a special software widget for Apple's iPhone.

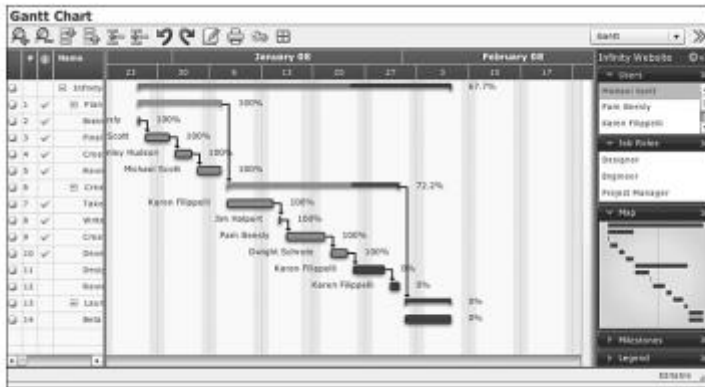


Figure 8.5 The drag-and-drop Gantt chart @task.

AceProject

AceProject (www.aceproject.com) is an easy-to-use web-based project management application. It lets users manage multiple projects using multiple resources and share those resources across projects. Tasks can be tracked via a variety of filters that fine-tune the results, and the application offers a number of different project reports and statistics. AceProject also offers time tracking, email notification of task deadlines, and a monthly project calendar, shown in Figure 8.6. The start and end dates are shown on their individual dates (in green and red, respectively)



Figure 8.6 AceProject’s web-based project calendar

Basecamp

One of the most popular project management applications today is Basecamp (www.basecamp.com). Its web-based nature makes it viable for both internal and external (client) projects. Project management is provided via a special dashboard, shown in Figure 8.7. The dashboard displays all projects and clients on a single screen, with late items and those due soon highlighted on the screen.

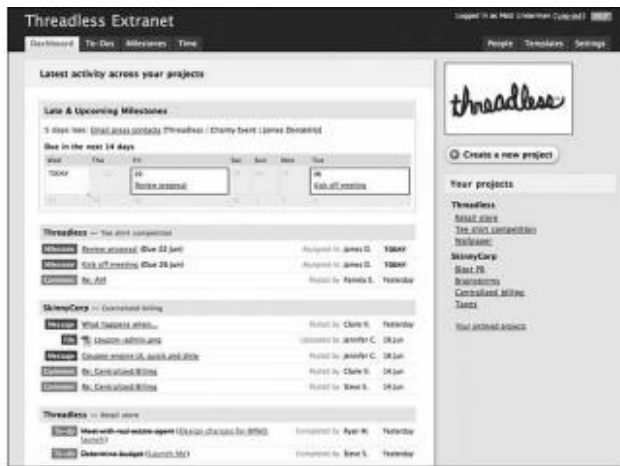


Figure 8.7 Basecamp's project management dashboard

In addition to standard project management operations such as time tracking and milestones, Basecamp includes to-do lists, file sharing, message boards, wiki-like web-based documents, and other group collaboration features. All web-based pages created by the program can be fully customized.

One of the aspects of Basecamp that makes it so appealing is its price. The company offers three different plans (Basic, Plus, and Max), priced from a flat \$24/month to \$149/month. This is in contrast to similar applications that price on a per-user basis. Basecamp's flat pricing makes it easy for organizations of any size to pick the plan that's right for them, based on the number of concurrent projects and storage space needed.

Copper Project

Copper Project (www.copperproject.com) is a project management application that can be hosted either on the company's servers or on your own server. Either version enables web-based collaboration.

Copper includes useful features such as a drag-and-drop weekly or monthly timeline, resource management, email alerts, statistical reports, and a unique personal time management tool. The program's Springboard view lets you see the progress of multiple projects on a single screen; you can drill down from there by client or project.

Project Drive

The Project Drive (www.project-drive.net) application includes communication and collaboration features in addition to basic project management functionality. Users get a customizable overview dashboard, templates for fast project setup, Gantt charts, task management, resource allocation, document sharing and management, automated communication tools, a group calendar, cost analysis and budgeting, and a large number of management reports.

Vertabase

Vertabase (www.vertabase.com) is a popular web-based project management application. It offers a summary executive dashboard, multiple schedule views, project portfolio, cross-project Gantt charts, resource planning, budget control, issue tracking, and a detailed project schedule.

Cloud Services

NOTES

Self-Instructional Material

Wrike

Wrike (www.wrike.com) is a project management application that offers a unique way to create project tasks. The application is email based; emails from project members are automatically converted into tasks in the appropriate project. Wrike then automatically reminds employees about overdue tasks, creates individual schedules for employees, and generates Gantt charts for each project.

Cloud Services

NOTES

Questions to check your progress:

1. Name of the few process in an event management?
2. Define: CRM
3. What is meant by project management?

8.6 Word processing and databases

Collaborating on Word Processing

Just about everyone who uses a computer uses a word processing program. You use your word process most likely some version of Microsoft Word to write memos, letters, thank you notes, fax coversheets, reports, newsletters, you name it. The word processor is an essential part of our computing lives. But what do you do when you don't have your word processor at hand? Maybe you're visiting your parents' home for the holidays and you want to catch up on your memo writing, but your folks don't have a computer in the house or they do, but it doesn't have Word installed. Or maybe you're on a short business trip, without your trusty notebook PC, and you need to fire off a short letter for work. Or perhaps you're a student on campus with an assignment due, and you left your computer back in the dorm. In short, what do you do when you don't have Microsoft Word handy? The solution, believe it or not, lies in the clouds in the form of a web-based word processor.

Benefits of Web-Based Word Processors

As you're by now well aware, the most obvious benefit of using a cloud service is that your documents can be accessed wherever you are, from any PC. With a web-based word processing application, you'll never discover that the document you need is located on your office PC when you're at home or away.

Also nice is that, by being web based, you can easily share your documents with others. That makes real-time workgroup collaboration possible from anywhere around the globe, which is something you don't have with Microsoft Word and similar desktop software programs.

Another benefit of being web based is that you can't lose your work theoretically, anyway. After you've named the document you're working on, the web based word processor saves your file on its cloud of servers. From that point on, every change you make to the document gets saved to the cloud servers automatically. Nothing gets lost if you close your web browser, navigate to another website, or even turn off your computer. Everything you do is saved on the web.

Best of all, most of these web-based applications are free. That's free, as in it costs zero dollars, unlike the ever increasingly expensive Microsoft Office suite.

Self-Instructional Material

Being free makes it easy to take for a test drive, and even easier to add to your bag of applications. Many early users who've tried these web-based applications have said that they're likely to switch from Microsoft Word. These cloud services can perform nearly all of Word's basic functions, which makes them perfect for corporate and small business environments.

Exploring Web-Based Word Processors

There are a half-dozen or so really good web-based word processing applications, led by the ever-popular Google Docs. We'll start our look at these applications with Google's application and work through the rest in alphabetic order.

Google Docs

Google Docs (docs.google.com) is the most popular web-based word processor available today. Docs is actually a suite of applications that also includes Google Spreadsheets and Google Presentations; the Docs part of the Docs suite is the actual word processing application. Like all things Google, the Google Docs interface is clean and, most important, it works well without imposing a steep learning curve. Basic formatting is easy enough to do, storage space for your documents is generous, and sharing/collaboration version control is a snap to do. When you log in to Google Docs with your Google account, you see the page shown in Figure 8.8. This is the home page for all the Docs applications (word processing, spreadsheets, and presentations); all your previously created documents are listed on this page.



Figure 8.8 The Google Docs home page—where all your documents are listed

The leftmost pane helps you organize your documents. You can store files in folders, view documents by type (word processing document or spreadsheet), and display documents shared with specific people.

The documents for the selected folder or filter are displayed in the main part of the window. As you can see, word processing documents are noted with a document icon, spreadsheets have a spreadsheet icon, and presentations have a presentation icon. To open any document, click the item's title. The document will open in a new window. To delete an item, select it and then click the Delete button.

NOTES

To create a new word processing document, click the New button and select Document. The new document opens in a new browser window, as shown in Figure 8.9. Your document looks like a big blank space in this new browser window, one with a pull-down menu and toolbar at the top. You use the toolbar buttons and the functions on the pull-down menu to edit and format your document.



Figure 8.9 A new Google Docs document

As with all web-based word processors, when you create a Google Docs document, you're actually creating an HTML document—just like a web page. All HTML-type formatting is available for your documents, through the Google Docs interface. The document is also saved in HTML format, although you can export (download) the document in a number of other formats, including Microsoft Word DOC format and Adobe PDF.

Of course, one of the most useful features of Google Docs is the capability to share a document with other Google Docs users, either for viewing or for collaborative editing. To share a document or spreadsheet for viewing or collaboration, click the Share button and select Share with others. This displays the Share This Document page, shown in Figure 8.10



Figure 8.10 Getting ready to share a Google Docs document

In the Invite People box, enter the email addresses of the people you want to share the document (separate multiple addresses with commas). If you want others to just view the document without being able to edit it, check the As Viewers option. If you want others to be able to edit the document, check the As Collaborators option. Click the Invite Viewers or Invite Collaborators button to send out the invitations.

Your recipients now receive an invitation via email. The invitation contains a link to the document; clicking this link opens the document in a new browser window. Invited viewers can navigate around the entire file and also save that file to their personal Google Docs online storage area or as a file to their own PC. Anyone invited as a collaborator can edit the file, in real time; in fact, multiple users can edit the document at the same time. It's like each of you is sitting next to each other, all typing away at the same keyboard at the same time.

NOTES

Finally, there's a relatively new feature in Google Docs that some users might find beneficial: the ability to work on your documents offline, without an Internet connection. To use Google Docs Offline, as this feature is called, click the Offline link to download and install Google Gears, a software tool that converts Google online apps into traditional desktop apps. While this defeats some of the aspects of cloud computing, it does let you work on your documents literally anywhere—even when there's no Internet connection to be found.

Bottom line, Google Docs is a good full featured web-based word processor. Collaboration is easy, and you have the option of working on your documents offline if you like. And, although some competing applications may offer greater formatting flexibility, none have near the installed base of users that Google Docs has.

NOTES

Collaborating on Databases

It used to be that the big three office applications were word processing, spreadsheets, and databases. It's possible that databases have fallen from the top three (replaced either by email or presentation applications, depending on how you look at things), but large businesses especially still have plenty of need for database management applications. In the past, a large database had to be housed onsite, typically on a large server. That limited database access to users either located in the same physical location or connected to the company's internal database and excluded, in most instances, travelling workers and users in remote offices.

This, in turn, limited the usefulness of the data contained in the database. Today, thanks to cloud computing technology, the underlying data of a database can be stored in the cloud on collections of web servers instead of housed in a single physical location. This enables users both inside and outside the company to access the same data, day or night, which increases the usefulness of that data. It's a way to make data universal.

Understanding Database Management

Before we start looking at web-based database management applications, it helps to know a little about how databases themselves work. Although it's convenient to think of a database as simply a collection of data, there's more to it than just that.

How Databases Work

A database does many of the same things that a spreadsheet does, but in a different and often more efficient manner. In fact, many small businesses use spreadsheets for database-like functions. Think of it this way. If a spreadsheet is a giant list, a database is a giant filing cabinet. Each "filing cabinet" is actually a separate database file, and contains individual index cards (called *records*) filled with specific information (arranged in *fields*).

You can use a database application to create and store anything that includes a large amount of data. For example, you can create a database that contains all your favorite recipes or the contents of your CD or video collection. For businesses, databases tend to house large amounts of granular data—information about customers, employees, and sales. A database management program not only stores this data but also automates data entry, retrieval, and analysis. Many businesses build custom applications around their databases,

so that the database itself becomes somewhat transparent. Users see only the front end that pulls information from the database.

How Online Databases Work

A local database is one in which all the data is stored on an individual computer. A networked database is one in which the data is stored on a computer or server connected to a network, and accessible by all computers connected to that network. Finally, an online or web-based database stores data on a cloud of servers somewhere on the Internet, which is accessible by any authorized user with an Internet connection.

The primary advantage of a web-based database is that data can easily be shared with a large number of other users, no matter where they may be located. When your employee database is in the cloud, for example, the human resources department in your Alaska branch can access employee information as easily as can the HR staff in Chicago—as can HR managers travelling across the country to various college job fairs.

And, because the data itself is stored in the cloud, when someone at one location updates a record, everyone accessing the database sees the new data. Synchronization is not an issue. With these advantages in mind, most online databases are oriented toward quick information sharing among members of workgroups who've assembled to attack a project for a month or two. When accessing data in this manner, ease of use is paramount, which most of these cloud applications address with simple and intuitive interfaces.

Exploring Web-Based Databases

In the desktop computing world, the leading database program today is Microsoft Access. (This wasn't always the case; dBase used to rule the database roost, but things change over time.) In larger enterprises, you're likely to encounter more sophisticated software from Microsoft, Oracle, and other companies. Interestingly, none of the major database software developers currently provide web-based database applications. Instead, you have to turn to a handful of start-up companies (and one big established name) for your online database needs.

Blist

One of the newest entrants in the web-based database market is Blist (www.blist.com). Blist is a relatively easy-to-use database designed for nontechnical businesspeople; in fact, the company bills it as something of a cross between a spreadsheet and database program. Not surprisingly, the default Blist interface uses a spreadsheet metaphor, as you can see in Figure 8.11, complete with rows and columns. That said, you can switch to a forms-based interface, shown in Figure 8.12, which is perhaps better for entering raw data one record at a time.

NOTES

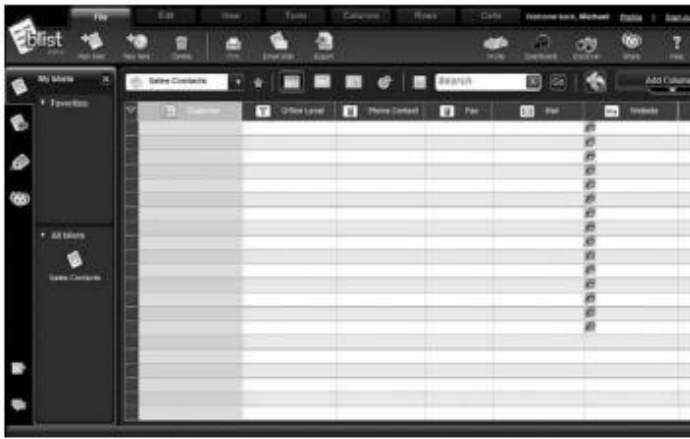


Figure 8.11 Blist's default spreadsheet-like interface



Figure 8.12 Another way to enter data, with Blist's form view

Despite its ease of use, Blist provides some robust database management and reporting capabilities. You can make your data completely public or share it with designated users. Databases can be read-only, or users can have the option of adding new records or deleting old ones.

Cebase

Cebase (www.cebase.com) lets you create new database applications with a few clicks of your mouse; all you have to do is fill in a few forms and make a few choices from some pull-down lists. Data entry is via web forms, and then your data is displayed in a spreadsheet-like layout, as shown in Figure 8.13. You can then sort, filter, and group your data as you like.



Figure 8.13 Viewing data in a Cebase database

Sharing is accomplished by clicking the Share link at the top of any data page. You invite users to share your database via email, and then adjust their permissions after they've accepted your invitation.

8.7 Answers to Check Your Progress Questions

- Sign up those attendees, process their fee payments, make sure that the event space and conference rooms are properly scheduled, handle travel and hotel arrangements, register attendees when they arrive onsite, manage event workers
- Customer Relationship Management is an ideal application for cloud computing, as witnessed by the large number of firms offering web-based CRM and sales automation applications.
- Project management is the act of planning, organizing, and managing resources to bring about the successful completion of specific project objectives.

NOTES

8.8 Summary

- stage a successful event, you have to market it to potential attendees, sign up those attendees, process their fee payments, make sure that the event space and conference rooms are properly scheduled, handle travel and hotel arrangements, register attendees when they arrive onsite, manage event workers, and make sure everything runs on time during the event.
- A web-based calendar that sales management can use to manage the activities of all their reps. It also tracks leads and sales opportunities, to help you better prepare sales forecasts.
- To manage the individual tasks within a project requires managing a larger set of resources people, of course, but also money, materials, space, communications, and the like.
- The resource management is crucial to ensuring the eventual success of a project
- The project management application should then be able to calculate the project's critical path, which is the series of events that determine the length of the entire project.
- The most obvious benefit of using a cloud service is that your documents can be accessed wherever you are, from any PC.
- Google Docs is a good full featured web-based word processor.
- The primary advantage of a web-based database is that data can easily be shared with a large number of other users, no matter where they may be located.
- Blist is a relatively easy-to-use database designed for nontechnical businesspeople;

8.7 Key Words

- **CRM** is an ideal application for cloud computing.
- An **online calendar** that displays all the happenings within your overall event.
- The registration module is the **backbone** of the entire event management program.
- **123 Event Manager** is scalable, so it can be used for both smaller and larger events.

- **Front-office tasks** include defining and marketing events, automatically generating informational web pages and registration forms, and marketing.
- **Back-office tasks** include event registration, badge printing, payment collection, and database management.
- **Acteva** offers online event registration and payments.
- By using **Conference.com's** cloud servers, even small events can utilize the company's powerful event management tools
- Salesforce.com, a **software-as-a-service** CRM application designed for sales, marketing, customer service, and other uses
- **bConnections**, a contact management program augmented with essential CRM functions for small and medium-sized businesses.
- **@task** offers a variety of traditional project management functions it includes an interactive drag-and-drop Gantt chart .
- **AceProject** is an easy-to-use **web-based project management** application it also offers time tracking, email notification of task deadlines.
- **Google Docs** is the most popular **web-based word processor** available today.
- An **online** or **web-based database** stores data on a cloud of servers somewhere on the Internet, which is accessible by any authorized user with an Internet connection.

8.8 Self-Assessment Questions and Exercises

Short Answer Questions:

1. What is meant by Event management?
2. Write the few event management applications names.
3. Define: Project Management
4. What is meant by word processing?
5. What is called an Online Database?

Long Answer Questions:

1. Explain about Event Planning and Workflow Management
2. Elaborate on the modules of Conference.com's application ?
3. Describe the Contact Management and CRM Applications.
4. Write notes on
 - a. AceProject
 - b. Basecamp
 - c. Copper Project
 - d. Project Drive
5. List and explain the benefits of Web-Based Word Processors.
6. Explain the working of Online Databases.

8.9 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

UNIT IX

Cloud Services

Structure

- 9.1 Introduction
- 9.2 Objectives
- 9.3 Storing and sharing files and other online content
- 9.4 Answers to Check Your Progress Questions
- 9.5 Summary
- 9.6 Key Words
- 9.7 Self-Assessment Questions and Exercises
- 9.8 Further Readings

NOTES

9.1 Introduction

Cloud file storage is a method for storing data in the cloud that provides servers and applications access to data through shared file systems. Cloud file sharing provides end users with the ability to access files with any Internet-capable device from any location. Usually, the user has the ability to grant access privileges to other users as they see fit. Although cloud file sharing services are easy to use, the user must rely upon the service provider ability to provide high availability and backup and recovery in a timely manner.

9.2 Objectives

This chapter illustrates about:

- Storing files on cloud
- Sharing the files using cloud

9.3 Storing and sharing files and other online content

Storing and Sharing Files and Other Online Content

Cloud computing isn't just about accessing applications over the web. The cloud can also be used to store documents, either as a giant backup drive or as your primary source of file storage. In addition, you can use the cloud to store and share your favorite websites. By putting your favorites online, you can share them with all your friends—no email or instant messaging necessary. (When stored on the cloud, you can also access your favorites when you're using another computer, which is great when you're traveling or out of the office.) Read on, then, to learn more about these two similar but different ways to store things in the cloud

Evaluating Online File-Storage and -Sharing Services

Where online can you store your valuable data? Let's look at some of the more popular cloud storage services—many of which also offer file-sharing capabilities.

Amazon S3

The Amazon Simple Storage Service (S3) provides unlimited online storage. You access your stored data via a simple web interface. S3 launched in March 2006, making it one of the most established online storage services in today's market.

Self-Instructional Material

Amazon charges fees for the amount of data stored and for the bandwidth used in uploading and downloading that data. In the United States, you pay \$0.15 per gigabyte of storage used, plus a data transfer fee that ranges between \$0.10 and \$0.17 per gigabyte transferred. One of the selling points for S3 is that it uses the same scalable storage infrastructure that Amazon.com uses to run its own global e-commerce website. You access Amazon S3 by going to aws.amazon.com and clicking the Amazon Simple Storage Service link.

Egnyte

NOTES

Egnyte (www.egnyte.com) provides online file storage, backup, and sharing. You can easily designate authorized users with whom to share specific files and folders, complete with automatic file versioning.

Access to the Egnyte service is via the simple web interface you see in Figure 9.1. You set up a virtual online file server that you configure according to your specific needs. You can then designate shared folders and subfolders with different permissions for power users and standard users. Uploading files is as easy as clicking a few buttons. Anything you upload to your shared folders can then be shared with other users you authorize.



Figure 9.1 Managing uploaded files with Egnyte

ElephantDrive (www.elephantdrive.com) is a user-friendly online file-storage service. They offer three different versions of different-sized users: Home Edition, Pro Edition, and Pro Plus Edition. Each edition has different storage and transfer limits. The Home Edition is priced at an affordable \$9.95/month.

Microsoft Office Live Workspace

The Live Workspace as a specialized cloud storage service; you can use it to store Microsoft Office documents and Office documents only. In addition, you're limited to the number of documents you can store, typically around 1,000 per user.

The nice thing about Office Live Workspace is that it's free—although you do need to own the Microsoft Office suite to create your Office documents, of course. This makes it a great way to store your main or backup copies of your Word, Excel, and PowerPoint documents. You can also access your documents from any location, whether you're in the office, at home, or on the road. What you can't do, however, is store non-Office documents, which makes it a rather limited data-storage service.

Mosso

Mosso (www.mosso.com) is a businessready cloud hosting platform. Both storage and bandwidth scale automatically as needed; you pay on a per-gigabyte basis for what you actually use. You can use Mosso to host anything from individual files to complete websites. In fact, Mosso let you serve as your own website hosting service, complete with domain registration and client billing services.

myDataBus

The myDataBus service (www.mydatabus.com) is a combination cloud storage and file-sharing service. You can use myDataBus to store your individual files or to share photos, videos, and music with your friends and family. The service also offers group collaboration tools and integration with Facebook, MySpace, LiveJournal, and other similar sites.

Nirvanix

If your storage needs are larger, consider Nirvanix (www.nirvanix.com). Nirvanix is a cloud storage platform optimized for large files and large enterprise-level customers. The Nirvanix Storage Delivery Network intelligently stores, delivers, and processes storage requests in the best network location. Storage is offered on an on-demand, completely scalable basis.

steekR

As you can see in Figure 9.2, steekR (www.steekr.com) is designed especially for consumers who want to share their documents and media files online. After you've uploaded a file, you can share it with anyone in your contact list. You can also opt to make specific files editable by other, or assign them readonly restrictions.



Figure 9.2 A cloud storage service for home users: steekR.

The basic steekR service, with 1GB of storage, is free. Paid plans, with up to 100GB of storage, are also available.

Questions to check your progress:

1. Define: Cloud Storage
2. List an online storing and sharing service providers

9.4 Answers to Check Your Progress Questions

- Cloud computing isn't just about accessing applications over the web. The cloud can also be used to store documents, either as a giant backup drive or as the primary source of file storage.
- Amazon S3, Egnyte, ElephantDrive

Cloud Services

9.5 Summary

- The cloud can also be used to store documents, either as a giant backup drive or as your primary source of file storage.
- Use the cloud to store and share your favorite websites.
- Amazon charges fees for the amount of data stored and for the bandwidth used in uploading and downloading that data.
- ElephantDrive (www.elephantdrive.com) is a user-friendly online file-storage service.
- The myDataBus service (www.mydatabus.com) is a combination cloud storage and file-sharing service.

NOTES

9.6 Key Words

- The **Amazon Simple Storage Service (S3)** provides unlimited online storage.
- **Egnyte** provides online file storage, backup, and sharing.
- **ElephantDrive** (www.elephantdrive.com) is a user-friendly online file-storage service
- The **Live Workspace** as a specialized cloud storage service
- **Mosso** is a businessready cloud hosting platform. Both storage and bandwidth scale automatically as needed;
- The **myDataBus** service is a combination cloud storage and file-sharing service.
- **Nirvanix** is a cloud storage platform optimized for large files and large enterprise-level customers.

9.7 Self-Assessment Questions and Exercises

Short Answer Questions:

1. What is meant by cloud storage?
2. How the online storing and sharing help the users?

Long Answer Questions:

1. Explain the significances of online file storage and sharing services.

9.8 Further Readings

- Michael Miller, *Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online*, Que Publishing, August 2008.
- Haley Beard, *Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs*, Emereo Pty Limited, July 2008.

Self-Instructional Material

BLOCK -IV CLOUD COMPUTING ENVIRONMENT

UNIT X

Structure

UNIT – 10

- 10.1 Introduction
- 10.2 Objectives
- 10.3 Classification of cloud implementation
- 10.4 Amazon web services
- 10.5 IaaS
- 10.6 Vmware vCloud
- 10.7 Google AppEngine
- 10.8 PaaS
- 10.9 Windows Azure Platform
- 10.10 SaaS/PaaS
- 10.11 Microsoft Live
- 10.12 Answers to Check Your Progress Questions
- 10.13 Summary
- 10.14 Key Words
- 10.15 Self-Assessment Questions and Exercises
- 10.16 Further Readings

NOTES

10.1 Introduction

An all-cloud environment describes a company, organization or individual that uses a Web-based application for every task rather than installing software or storing data on a computer. Software as a Service (SaaS), this is where users simply make use of a web-browser to access software that others have developed and offer as a service over the web. At the SaaS level, users do not have control or access to the underlying infrastructure being used to host the software. PaaS provides users with a high level of abstraction that allows them to focus on developing their applications and not worry about the underlying infrastructure. Infrastructure as a Service (IaaS), this is where users acquire computing resources such as processing power, memory and storage from an IaaS provider and use the resources to deploy and run their applications.

10.2 Objectives

This chapter illustrates about:

- Cloud implementations
- Amazon Web Services
- Google AppEngine

10.3 Classification of cloud implementation

Moving an application to the cloud is not a simple task, so its best to work with an experienced service provider that can help ensure the migration, implementation and ongoing support of your solution. By following some key steps, your business can expedite the development and implementation of your cloud services, and quickly obtain the benefits.

- Define project – Some applications and infrastructures should never be put on a cloud. Decide the cloud and whether or not its feasible.

Self-Instructional Material

NOTES

- Select the platform – Choose a platform that is fast, easy and safe to deploy.
- Understand security policies – Make sure you have a clear understanding of who is responsible and ensure that the right resources are in place.
- Select cloud computing service provider – Partner with a service provider that has success with businesses similar to yours and knows your technology.
- Determine service level agreements – In addition to uptime, be very clear with your service provider when it comes to SLAs and exactly what they do and do not cover, such as data availability or data protection.
- Understand who owns recovery – Outages will happen, so know in advance if you or your service provider is responsible for recovery.
- Migrate in phases – Roll out a phased migration that allows you to gradually increase the load and gives you time to fine tune and minimize risks while maintaining business continuity.
- Think ahead – Business requirements can change at any time, so choose a cloud solution that allows you to move between on-premise and cloud as needed, and one that allows you to move to a different cloud service provider if necessary.

Creating and implementing a cloud strategy takes time, energy and effort. Its important to choose the right cloud strategy that can help you open up new market opportunities, grow your business and increase customer loyalty.

10.4 Amazon web services

Amazon Web Services (AWS)

It provides a cloud computing platform for all business sizes. AWS helps business organization to choose their own computing platform as in need of the organization and pay for what they use. Services provided AWS are:- Amazon Elastic compute cloud, Amazon Simple Storage services, Amazon Virtual Private Cloud, Amazon Cloud front, Amazon Relational Database and Amazon Simple Queue services.

10.5 IaaS

Offering virtualized resources (computation, storage, and communication) on demand is known as Infrastructure as a Service (IaaS).

A cloud infrastructure enables on-demand provisioning of servers running several choices of operating systems and a customized software stack. Infrastructure services are considered to be the bottom layer of cloud computing systems.

Amazon Web Services mainly offers IaaS, which in the case of its EC2 service means offering VMs with a software stack that can be customized similar to how an ordinary physical server would be customized.

Users are given privileges to perform numerous activities to the server, such as: starting and stopping it, customizing it by installing software packages, attaching virtual disks to it, and configuring access permissions and firewalls rules.

10.6 VMware vCloud

VMware promotes vCloud a lot on the web but, like “cloud computing,” it may be confusing as to many what vCloud actually is. To clarify, VMware vCloud isn’t a product or service at all. vCloud is a brand and a part of a family of VMware products, with the most popular being the vCloud Suite and vCloud IaaS offerings.

VMware vCloud providers are third-party companies that offer infrastructure as a service (IaaS) solutions. These providers run the VMware vCloud Suite (covered next) and allow you to move your existing VMware vSphere virtual machines to their infrastructure clouds.

Also, you can use the VMware vCloud Connector to connect your internal vSphere infrastructure with their vCloud datacenters. VMware houses a director of service providers at vCloud.VMware.com

Vcloud suite

The other side of the vCloud family is the VMware vCloud Suite. Prior to vSphere 5.1, VMware offered vSphere, vCenter, vCloud Director, and other products, but with the announcement of vSphere 5.1, all these infrastructure products are now offered as a suite called the vCloud Suite. In the graphic below, you can see what makes up the vCloud Suite.

The major components are:

- vSphere / ESXi — the hypervisor you load on your physical servers
- vCenter — the centralized management console for all the vSphere hosts and virtual machines
- vCloud Director — the private cloud self-service portal
- vCloud Networking and Security (vCNS) — previously called vSphere, vCNS is what keeps the cloud infrastructure secure.

The vCloud Suite could be used by private companies in their own datacenter to create a private cloud. Or, the vCloud Suite could be used by vCloud service providers to offer public IaaS clouds, available to admins around the world. If you connect your private vCloud to your provider’s public vCloud, you have created a hybrid cloud.

10.7 Google AppEngine

Google App Engine

Cloud Services provided by this provider are Paas, Saas. Platforms Supported are Java Runtime Environment, Python Runtime Environment. The various services and tools provided are Google Search, Gmail Chrome browser, Google Maps. Automatic scaling is built in with App Engine, No matter how many users you have or how much data your application stores. App Engine can scale to meet your needs. For security it provides Google’s 2 step verification. An efficient application on a free account can use up to 500MB of storage and up to 5 million page views a month.

NOTES

10.8 Paas

Platform as a Service

In addition to infrastructure-oriented clouds that provide raw computing and storage services, another approach is to offer a higher level of abstraction to make a cloud easily programmable, known as Platform as a Service (PaaS).

A cloud platform offers an environment on which developers create and deploy applications and do not necessarily need to know how many processors or how much memory that applications will be using. In addition, multiple programming models and specialized services (e.g., data access, authentication, and payments) are offered as building blocks to new applications.

Google App Engine, an example of Platform as a Service, offers a scalable environment for developing and hosting Web applications, which should be written in specific programming languages such as Python or Java, and use the services' own proprietary structured object data store.

10.9 Windows Azure Platform

Windows Azure

At a high level, Windows Azure is simple to understand: It runs Windows applications and stores data in the cloud.

The five parts of Windows Azure today are the following:

Compute: The Windows Azure compute service runs applications on a Windows Server foundation. These applications can be created using the .NET Framework in languages such as C# and Visual Basic, or they can be built without .NET in C++, Java, and other languages. Developers can use Visual Studio or other development tools, and they're free to use technologies such as ASP.NET, Window Communication Foundation (WCF), and PHP.

Storage: This service allows storing binary large objects (blobs), provides queues for communication between components of Windows Azure applications, and even offers a form of tables with a simple query language. (Windows Azure applications that need traditional relational storage can also use SQL Azure.) Both Windows Azure applications and on-premises applications can access the Windows Azure storage service, and both do it in the same way: using a RESTful approach.

Fabric controller: As the figure suggests, Windows Azure runs on a large number of machines. The fabric controller's job is to knit the machines in a single Windows Azure data center into a cohesive whole. The Windows Azure compute and storage services are then built on top of this pool of processing power.

Content delivery network (CDN): Caching frequently accessed data closer to its users speeds up access to that data. The Windows Azure CDN can do this for blobs, maintaining cached copies at sites around the world.

Connect: It's often useful for organizations to interact with cloud applications as if they were inside the organization's own firewall. Windows Azure Connect allows this, making it easier for, say, a Windows Azure application to access an on-premises database.

NOTES

10.10 SaaS/PaaS

Software as a Service

Applications reside on the top of the cloud stack. Services provided by this layer can be accessed by end users through Web portals. Therefore, consumers are increasingly shifting from locally installed computer programs to on-line software services that offer the same functionally.

Traditional desktop applications such as word processing and spreadsheet can now be accessed as a service in the Web. This model of delivering applications, known as Software as a Service (SaaS), alleviates the burden of software maintenance for customers and simplifies development and testing for providers.

Salesforce.com, which relies on the SaaS model, offers business productivity applications (CRM) that reside completely on their servers, allowing customers to customize and access applications on demand.

10.11 Microsoft Live

Questions to check your progress:

1. What are the steps for cloud implementation?
2. What is meant by AWS?
3. Define: PaaS

Windows Live is a discontinued brand-name for a set of web services and software products from Microsoft as part of its software plus services platform.

Chief components under the brand name included web services, several computer programs that interact with the services, and specialized web services for mobile devices.

Windows Live also provides customised services specifically created for feature phones. It is offered via three channels through Client-based (for Windows Mobile and other supported mobile devices such as Nokia phones),

Web-based (for WAP or GPRS-enabled mobile web browsers), or SMS-based services Bing, a replacement of the search engine Live Search, was originally named Windows Live Search (and MSN Search prior to that) and was once part of the Windows Live family of services..

Live Connect is a collection of APIs and common controls that allow developers to have a deeper control and offers access to the core Windows Live services and data through open and easily accessible application programming interfaces (APIs).

10.12 Answers to Check Your Progress Questions

- Define project, Select the platform, Understand security policies, Select cloud computing service provider these are the some key steps for obtaining the cloud implementation.

NOTES

- Amazon Web Service is simply known as AWS. AWS helps business organization to choose their own computing platform as in need of the organization and pay for what they use.
- To offer a higher level of abstraction to make a cloud easily programmable, known as Platform as a Service (PaaS).

10.13 Summary

- Creating and implementing a cloud strategy takes time, energy and effort.
- AWS helps business organization to choose their own computing platform as in need of the organization and pay for what they use.
- Offering virtualized resources (computation, storage, and communication) on demand is known as Infrastructure as a Service (IaaS).
- Services provided by this Google App Engine are Paas, Saas.
- To offer a higher level of abstraction to make a cloud easily programmable, known as Platform as a Service (PaaS).
- Windows Azure is simple to understand, It runs Windows applications and stores data in the cloud.
- Traditional desktop applications such as word processing and spreadsheet can now be accessed as a service in the Web. This model of delivering applications, known as Software as a Service (SaaS).
- Windows Live also provides customised services specifically created for feature phones.

10.14 Key Words

- Offering virtualized resources (computation, storage, and communication) on demand is known as Infrastructure as a Service (**IaaS**).
- To offer a higher level of abstraction to make a cloud easily programmable, known as Platform as a Service (**PaaS**).
- Traditional desktop applications such as word processing and spreadsheet can now be accessed as a service in the Web. This model of delivering applications, known as Software as a Service (**SaaS**).

10.15 Self-Assessment Questions and Exercises

Short Answer Questions:

1. Define: IaaS
2. What are the Major components in Vcloud suite?
3. Define:Saas

Long Answer Questions:

1. Explain the key steps for business development and implementation of cloud services.
2. Write a short note on:
 - a. IaaS
 - b. Saas
 - c. Paas
3. Write a short note on:
 - a. AWS
 - b. Google App Engine
 - c. Microsoft Live

10.16 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

NOTES

Self-Instructional Material

UNIT – XI

Structure

- 11.1 Introduction
- 11.2 Objectives
- 11.3 Comparison of cloud computing platforms
- 11.4 Answers to Check Your Progress Questions
- 11.5 Summary
- 11.6 Key Words
- 11.7 Self-Assessment Questions and Exercises
- 11.8 Further Readings

NOTES

11.1 Introduction

The hardware and operating environment of a server in an Internet-based is called as datacenter. The software infrastructure for a cloud computing service, which includes applications that let users create and manage their own accounts. There are three major players in the public cloud platforms arena - Amazon Web Services (AWS), Microsoft's Azure, and Google Cloud Platform.

11.2 Objectives

This chapter describe about:

- Cloud Platforms
- Comparison of cloud platforms

11.3 Comparison of cloud computing platforms

A useful way to think about cloud platforms is to see how the services an application developer relies in the on premises environment translate to the cloud.

Whether it's on-premises or in the cloud, an application platform can be thought of as comprising three parts:

A foundation: Nearly every application uses some platform software on the machine it runs on. This typically includes various support functions, such as standard libraries and storage, and a base operating system.

A group of infrastructure services: In a modern distributed environment, applications frequently use basic services provided on other computers. It's common to provide remote storage, for example, integration services, an identity service, and more.

A set of application services: As more and more applications become service-oriented, the functions they offer become accessible to new applications. Even though these applications exist primarily to provide services to end users, this also makes them part of the application platform.

Amazon:

Amazon has spent a lot of time and money setting up a multitude of servers to service its popular website, and is making those vast hardware resources available for all developers to use. The service in question is called the Elastic Compute Cloud, also known as EC2. This is a commercial web service that allows developers and companies to rent capacity on Amazon's proprietary cloud of

servers which happens to be one of the biggest server farms in the world. EC2 enables scalable deployment of applications by letting customers request a set number of virtual machines, onto which they can load any application of their choice. Thus, customers can create, launch, and terminate server instances on demand, creating a truly “elastic” operation.

Google App Engine

Google is a leader in web-based applications, so it’s not surprising that the company also offers cloud development services. These services come in the form of the Google App Engine, which enables developers to build their own web applications utilizing the same infrastructure that powers Google’s powerful applications. The Google App Engine provides a fully integrated application environment. Using Google’s development tools and computing cloud, App Engine applications are easy to build, easy to maintain, and easy to scale. All you have to do is develop your application (using Google’s APIs and the Python programming language) and upload it to the App Engine cloud; from there, it’s ready to serve your users.

Microsoft Azure

Microsoft Azure is a cloud computing service created by Microsoft for building, testing, deploying, and managing applications and services through Microsoft-managed data centers. It provides software as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS) and supports many different programming languages, tools and frameworks, including both Microsoft-specific and third-party software and systems.

Sun Network.com (Sun Grid)

The Sun Cloud Compute Utility provided access to a substantial computing resource over the Internet. It was based on and supported open source technologies such as Solaris 10, Sun Grid Engine, and the Java platform. Sun Cloud delivered enterprise computing power and resources over the Internet, enabling developers, researchers, scientists and businesses to optimize performance, speed time to results, and accelerate innovation without investment in IT infrastructure.

Questions to check your progress:

- Define: Cloud platform
- What is amazon cloud platform?

NOTES

Property	Different Platforms				
	Amazon Elastic Compute Cloud (EC2)	Google App Engine	Microsoft Azure	Sun Network.com (Sun Grid)	GRIDS Lab Aneka
Focus	Infrastructure	Platform	Platform	Infrastructure	Enterprise Clouds
Service Type	Compute, Storage (Amazon S3)	Web Application	Web and non-web application	Compute	Compute
Virtualization	OS level running on a Xen hypervisor	Application container	OS level through fabric controller	Job management system (Sun Grid Engine)	Resource manager and scheduler
Dynamic negotiation of QOS	None	None	None	None	SLA-base resources reservation
Web APIs	Yes	Yes	Yes	Yes	Yes
User Access Interface	Amazon EC2 command-line tools	Web-based administration	Microsoft windows azure portal	Scripts, Sun Grid web portal	Workbench, web-based portal
Value-added service providers	Yes	No	Yes	Yes	No
Programming framework	Amazon Machine Images (AMI)	Python	Microsoft. Net	Solaris OS, Java, C, C++, FORTRAN	APIs supporting models in C#.Net

NOTES

11.4 Answers to Check Your Progress Questions

- The hardware and operating environment of a server in an Internet-based datacenter. The software infrastructure for a cloud computing service, which includes applications that let users create and manage their own accounts. See cloud management system.
- It offers a virtual environment for computing and facilities computational capacity which can be resized according to needs

11.5 Summary

- In the public cloud platforms arena - Amazon Web Services (AWS), Microsoft's Azure, and Google Cloud Platform.
- The Google App Engine provides a fully integrated application environment
- Microsoft Azure is a cloud computing service created by Microsoft for building, testing, deploying

Cloud Computing Environment

NOTES

11.6 Key Words

- **EC2** enables scalable deployment of applications by letting customers request a set number of virtual machines, onto which they can load any application of their choice.
- **Google App Engine**, which enables developers to build their own web applications utilizing the same infrastructure that powers Google's powerful applications.
- The **Sun Cloud** Compute Utility provided access to a substantial computing resource over the Internet.

11.7 Self-Assessment Questions and Exercises

Short Answer Questions:

- What is meant by Cloud Platforms?
- List some Cloud platforms.
- How AWS differ from Google App Engine?

Long Answer Questions:

- Explain the components of Cloud platform?
- Describe the comparison of cloud platforms.

11.8 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

Self-Instructional Material

BLOCK-V CLOUD VIRTUALIZATION TECHNOLOGY

UNIT - XII INTRODUCTION

NOTES

Structure

- 12.1 Introduction
- 12.2 Objectives
- 12.3 Virtualization Defined
- 12.4 Benefits
- 12.5 Server virtualization
- 12.6 Answers to Check Your Progress Questions
- 12.7 Summary
- 12.8 Key Words
- 12.9 Self-Assessment Questions and Exercises
- 12.10 Further Readings

12.1 Introduction

Virtualization represents the logical view of data representation- the power to compute in virtualized environments. It is used to manage a group of computers together- instead of managing resources separately. Virtualization is an abstraction layer (hypervisor) that decouples the physical hardware from the operating system to deliver greater IT resources utilization and flexibility

12.2 Objectives

This section gives an introduction about the:

- Virtualization
- Applications of Virtualization

12.3 Virtualization Defined

Virtualization is a technique how to separate a service from the underlying physical delivery of that service. It is the process of creating a virtual version of something like computer hardware. It was initially developed during the mainframe era. It involves using specialized software to create a virtual or software-created version of a computing resource rather than the actual version of the same resource. With the help of Virtualization multiple operating systems and applications can run on same Machine and its same hardware at the same time increasing the utilization and flexibility of hardware.

In other words, One of the main cost effective, hardware reducing, energy saving techniques used by cloud providers is virtualization. Virtualization is a technique, which allows to share a single physical instance of a resource or an application among multiple customers and organizations at one time. It does by assigning a logical name to a physical storage and providing a pointer to that physical resource on demand.

The term virtualization is often synonymous with hardware virtualization, which plays a fundamental role in efficiently delivering Infrastructure-as-a-Service (IaaS) solutions for cloud computing. Moreover, virtualization technologies provide a virtual environment for not only executing applications but also for storage, memory, and networking.

Self-Instructional Material

12.4 Benefits

1. More flexible and efficient allocation of resources.
2. Enhance development productivity.
3. It lowers the cost of IT infrastructure.
4. Remote access and rapid scalability.
5. High availability and disaster recovery.
6. Pay per use of the IT infrastructure on demand.
7. Enables running multiple operating system

NOTES

Security

During the process of virtualization security is one of the important concerns. The security can be provided with the help of firewalls, which will help to prevent unauthorized access and will keep the data confidential. Moreover, with the help of firewall and security, the data can protect from harmful viruses malware and other cyber threats.

Encryption process also takes place with protocols which will protect the data from other threads. So, the customer can virtualize all the data store and can create a backup on a server in which the data can store.

Flexible operations

With the help of a virtual network, the work of it professional is becoming more efficient and agile. The network switch implement today is very easy to use, flexible and saves time. With the help of virtualization in Cloud Computing, technical problems can solve in physical systems. It eliminates the problem of recovering the data from crashed or corrupted devices and hence saves time.

Economical

Virtualization in Cloud Computing, save the cost for a physical system such as hardware and servers. It stores all the data in the virtual server, which are quite economical. It reduces the wastage, decreases the electricity bills along with the maintenance cost. Due to this, the business can run multiple operating system and apps in a particular server.

Eliminates the risk of system failure

While performing some task there are chances that the system might crash down at the wrong time. This failure can cause damage to the company but the virtualizations help you to perform the same task in multiple devices at the same time. The data can store in the cloud it can retrieve anytime and with the help of any device. Moreover, there is two working server side by side which makes the data accessible every time. Even if a server crashes with the help of the second server the customer can access the data.

Self-Instructional Material

Flexible transfer of data

The data can transfer to the virtual server and retrieve anytime. The customers or cloud provider don't have to waste time finding out hard drives to find data. With the help of virtualization, it will very easy to locate the required data and transfer them to the allotted authorities. This transfer of data has no limit and can transfer to a long distance with the minimum charge possible. Additional storage can also provide and the cost will be as low as possible.

NOTES**12.5 Server virtualization**

This technique is the masking of server resources. It simulates physical servers by changing their identity, numbers, processors and operating systems. This spares the user from continuously managing complex server resources. It also makes a lot of resources available for sharing and utilizing, while maintaining the capacity to expand them when needed.

Questions to check your progress:

1. Define: Virtualization
2. Write any three benefits of Virtualization

In server virtualization in Cloud Computing, the software directly installs on the server system and use for a single physical server can divide into many servers on the demand basis and balance the load. It can be also stated that the server virtualization is masking of the server resources which consists of number and identity. With the help of software, the server administrator divides one physical server into multiple servers.

12.6 Answers to Check Your Progress Questions

- Virtualization is a technique how to separate a service from the underlying physical delivery of that service.
- More flexible and efficient allocation of resources.
Enhance development productivity.
It lowers the cost of IT infrastructure.

12.7 Summary

- Virtualization is a technique, which allows to share a single physical instance of a resource or an application among multiple customers and organizations at one time.
- A virtual network, the work of it professional is becoming more efficient and agile.
- The failure can cause damage to the company but the virtualizations help you to perform the same task in multiple devices at the same time.
- The data can transfer to the virtual server and retrieve anytime.
- In server virtualization in Cloud Computing, the software directly installs on the server system and use for a single physical server can divide into many servers on the demand basis and balance the load.

12.8 Key Words

- A **virtual network**, the work of it professional is becoming more efficient and agile.
- **Virtualization** in Cloud Computing, save the cost for a physical system such as hardware and servers.
- In **server virtualization** in Cloud Computing, the software directly installs on the server system and use for a single physical server can divide into many servers on the demand basis and balance the load.

12.9 Self-Assessment Questions and Exercises

Short Answer Questions:

1. Define: Virtualization.
2. What is Server Virtualization?

Long Answer Questions:

1. List and explain the concept and benefits of Virtualization.
2. Elaborate on Server Virtualization.

12.10 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

NOTES

Self-Instructional Material

UNIT – XIII

Structure

- 13.1 Introduction
- 13.2 Objectives
- 13.3 Hypervisor management software
- 13.4 Logical Partitioning
- 13.5 VIO Server
- 13.6 Virtual Infrastructure requirements
- 13.7 Answers to Check Your Progress Questions
- 13.8 Summary
- 13.9 Key Words
- 13.10 Self-Assessment Questions and Exercises
- 13.11 Further Readings

NOTES

13.1 Introduction

A hypervisor or virtual machine monitor is a piece of computer software, firmware or hardware that creates and runs virtual machines. A computer on which a hypervisor is running one or more virtual machines is defined as a host machine. Each virtual machine is called a guest machine. The hypervisor presents the guest operating systems with virtual operating platforms and manages the execution of the guest operating systems. Multiple instances of a variety of operating systems may share the virtualized hardware resources.

13.2 Objectives

After reading this chapter, you can understand the:

- Hypervisor
- Logical Partitioning
- Virtual Infrastructure

13.3 Hypervisor management software

Hypervisor is a form of virtualization software used in Cloud hosting to divide and allocate the resources on various pieces of hardware. The program which provide partitioning, isolation or abstraction is called virtualization hypervisor. Hypervisor is a hardware virtualization technique that allows multiple guest operating systems (OS) to run on a single host system at the same time. A hypervisor is sometimes also called a virtual machine manager(VMM).

TYPE-1 Hypervisor:

Hypervisor runs directly on underlying host system. It is also known as “Native Hypervisor” or “Bare metal hypervisor”. It does not require any base server operating system. It has direct access to hardware resources. Examples of Type 1 hypervisors include VMware ESXi, Citrix XenServer and Microsoft Hyper-V hypervisor.

TYPE-2 Hypervisor:

A Host operating system runs on underlying host system. It is also known as

‘Hosted Hypervisor’. Basically a software installed on an operating system. Hypervisor asks operating system to make hardware calls. Example of Type 2 hypervisor include VMware Player or Parallels Desktop. Hosted hypervisors are often found on endpoints like PCs.

GUI tools for KVM

Red Hat now plays as large a role in the open source KVM hypervisor as it does in Linux. The company aims to provide support and value with additional software tools. Red Hat purchased Ansible in 2015 to build up its hypervisor management software and deliver better ease of use with automation and configuration tools. Ansible is a playbook-driven modular package.

There are other GUI tools for KVM from a variety of startup companies. Among the most popular are VMmanager, Archipel, Virtualizor and Solus Virtual Manager. WebVirtMgr is an open source GUI. If you consider it a management tool, OpenStack is also KVM-centric. Kimchi, Mist.io, oVirt and Proxmox all have loyal followings.

New tools for Xen

Citrix refocused its hypervisor strategy in 2016, placing emphasis on virtual desktops and hyper-converged infrastructure. Xen continues to grow and, since Xen underpins Amazon Web Services, it's the most used hypervisor in the cloud.

Due to years of uncertainty and lower community engineering support, Xen's hypervisor management software isn't as robust as those of other major hypervisors. Accelerite acquired CloudPlatform and CloudPortal Business Manager from Citrix in 2016 to offer orchestration and automation.

13.4 Logical Partitioning

Logical Partitioning (LPAR)

One single system can be logically divided in multiple partitions. Each such partition can host a standalone AIX/Linux server. Each such partition is called a LPAR

Categories of LPAR

- Dedicated
- Shared
- Capped
- Uncapped
- Dynamic LPAR

LPAR Type

- VIO
- AIX/Linux

Workload Partitions

Workload Partition is a new software based virtualization approach. They enable the creation of multiple virtual environments inside of a single instance. They can

NOTES

be used to save administrative overhead when consolidating system

Live Application Mobility

Workload partitions can be moved from one system to another without restarting the application or causing significant disruption to the application end user. This process is called Live Application Mobility

Live Migration

The movement of virtual machine from one physical host to another while continuously powered up is called Virtual Machine Mobility. This provides protective maintenance.

NOTES

13.5 VIO Server

The means to share physical IO resources among partition is known as Virtual IO. This is needed to overcome insufficient physical IO resources in case of smaller systems

In virtualized environments, server I/O plays a major role in deploying the server effectively and successfully. Virtualized servers are capable of running multiple applications at a time, and there is a constant demand for more bandwidth and connections to multiple networks and storage devices.

Virtual I/O methodology helps in removing performance bottlenecks by binding I/O to a single connection. This single virtual I/O connection usually has a bandwidth that exceeds the server's I/O capacity. In virtualized servers running I/O-intensive applications, the virtual I/O technique can help increase virtual machine performance as well as the number of virtual machines per server.

Some of the important features of virtual I/O include:

Cost Savings: Virtual I/O helps to lower costs by allowing easy and simple server management. The use of fewer cards, cables and switch ports further helps in reducing costs.

Fewer Cables: Virtual I/O requires only a single cable to connect servers to both storage and the network. Multiple I/O cables are thus replaced with a single cable that facilitates shared transport for all network and storage devices.

Increased I/O Density: Virtual I/O technique increases the I/O density by enabling more connections.

Simplified Management: Virtual I/O enables greater use of virtual NICs and HBAs while providing greater flexibility.

Space Savings: Virtual I/O enables more I/O connections to exist within a small space by consolidating all storage and network connections to a single physical interconnect.

Questions to check your progress:

1. Define: Hypervisor
2. What is meant by Logical Partitioning
3. What is called as VIO Server?

NOTES

13.6 Virtual Infrastructure requirements

Virtual Infrastructure Requirements

Virtualization products have strict requirements on backend infrastructure components including storage, backup, system management, security and Time Sync. Ensuring that these components are of required configuration is critical for successful implementation

Server Virtualization Suitability assessment

One of the key advantages of virtualization is greater utilization of physical server resources. To ensure that existing servers will operate in a shared environment, detailed hardware inventory and performance utilization information must be obtained and analyzed for assessment purposes.

Detailed Design

The platform can co-exist and interact with existing infrastructure. The purpose of detailed design to set naming and security standards, define the disk and network structure. It includes the following

- Security and Administrative Model
- Back up methodology
- VMware service console configuration
- implement tables and configuration setting

13.7 Answers to Check Your Progress Questions

- Hypervisor is a form of virtualization software used in Cloud hosting to divide and allocate the resources on various pieces of hardware.
- One single system can be logically divided in multiple partitions. Each such partition can host a standalone AIX/Linux server. Each such partition is called a LPAR
- The means to share physical IO resources among partition is known as Virtual IO.

13.8 Summary

- Hypervisor is a key to enable virtualization.
- A type I hypervisor operates directly on host's hardware to monitor hardware and guest virtual machines, and it's referred as the bare metal.
- A type II hypervisor is known as a hosted hypervisor because it is usually installed onto an existing operating system.
- One single system can be logically divided in multiple partitions is known as Logical Partitioning.
- The movement of virtual machine from one physical host to another while continuously powered up is called Virtual Machine Mobility.

13.9 Key Words

- One single system can be logically divided in multiple partitions. Each such partition is called a **LPAR**
- **Workload Partition** is a new software based virtualization approach.
- The means to share physical IO resources among partition is known as **Virtual IO**.

13.10 Self-Assessment Questions and Exercises

Short Answer Questions:

1. What is meant by LPR and list the types?
2. Write some features of VIO server.
3. What are the components of virtual infrastructure?

Long Answer Questions:

1. Short notes on
 - a. Hypervisor
 - b. LPR
 - c. Categories and Types of LPR
2. Explain about VIO Server and its features
3. Elaborate on the Virtual infrastructure requirements

13.11 Further Readings

- Michael Miller, Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

NOTES

Self-Instructional Material

UNIT – XIV

Structure

- 14.1 Introduction
- 14.2 Objectives
- 14.3 Introduction to Cloud Virtualization
- 14.4 Storage virtualization
- 14.5 Storage area networks
- 14.6 Cloud server virtualization
- 14.7 Virtualized data centre
- 14.8 Answers to Check Your Progress Questions
- 14.9 Summary
- 14.10 Key Words
- 14.11 Self-Assessment Questions and Exercises
- 14.12 Further Readings

NOTES

14.1 Introduction

The masking of resources that is located in server which includes the number and identity of processors, physical servers & the operating system. Server Virtualization is a technology which enables the creation of a virtual instance of any operating system on a virtual platform. Before server virtualization became mainstream, each individual operating system required a physical platform, typically a server with CPU, Disk, Memory and other associated hardware to host the operating system. On a physical server, an operating system has access to all available computing resources of the host hardware. As servers have become more powerful, this approach has proven very wasteful on hardware resource availability.

14.2 Objectives

This chapter will impart the concepts of:

- Cloud Virtualization
- Storage Virtualization
- Storage area networks
- Virtualized data centre

14.3 Introduction to Cloud Virtualization

Virtualization represents the logical view of data representation the power to compute in virtualized environments. It is a technique that has been used in large mainframe computer for 30 years. It is used to manage a group of computers together- instead of managing resources separately.

Virtualization Defined

Virtualization is an abstraction layer (hypervisor) that decouples the physical hardware from the operating system to deliver greater IT resources utilization and flexibility

Self-Instructional Material

Virtualization can bring the following benefits

- save money
- increased control
- simplify disaster recovery
- business readiness assessment

Why Virtualization?

Here are some reasons for going for virtualization

- lower cost of infrastructure
- Reducing the cost of adding to that infrastructure
- Gathering information across IT set up for increased utilization and collaboration
- Deliver on SLA response time during spikes in production
- Building heterogeneous infrastructure that are responsive

NOTES

14.4 Storage virtualization

The amount of data that organizations are creating and storing is exploding. This tremendous growth in storage requirements has made storage virtualization increasingly important.

Storage virtualization is the process of abstracting logical storage from physical storage. The physical storage resources (such as disk drives) are aggregated into storage pools, from which the logical storage is created and presented to the application environment.

Storage virtualization can be implemented within the storage arrays themselves (array-based virtualization) or at the network level where multiple disk arrays or networked storage systems from different vendors, scattered over the network, can be pooled into a single monolithic storage device. This allows the multiple arrays to be managed uniformly as if they were a single pool. Virtualized storage arrays offer more flexibility, simplified management, and better performance and capacity utilization in comparison to traditional disk arrays.

There are two major types of shared networked storage systems where you will find storage virtualization incorporated: NAS and SAN systems. A shared storage system (SAN or NAS) is required for your company to take advantage of the advanced capabilities of server virtualization, such as migrating live virtual machines, high availability, fault tolerance, and disaster recovery.

14.5 Storage area networks

A storage area network (SAN) is a storage device (such as a disk array or tape library) accessible to servers so the devices appear as locally attached to the operating system. A SAN typically has its own network of storage devices that are generally not accessible through the regular network by regular devices. A SAN alone doesn't provide the "file" abstraction like NAS, only block-level operations.

Self-Instructional Material

Most SANs use Fibre Channel connectivity, a network technology specially designed to handle storage communications, or iSCSI, which is an IP-based networking standard for linking storage devices.

Companies move to SAN storage to centralize the management of corporate data. Common uses of a SAN include provisioning of transactionally accessed data that require high-speed block-level access to the storage hard drives such as e-mail servers, databases, and high usage file servers

NOTES

14.6 Cloud server virtualization

Three main types of server virtualization exist: operating system virtualization (often referred to as containers); hardware emulation; and para virtualization, which is designed to deliver a lighter weight (in terms of application size), higher performance approach to virtualization

Server virtualization in cloud computing:

Hypervisor

A Hypervisor is a layer between the operating system and hardware. The hypervisor is the reason behind the successful running of multiple operating systems. It can also perform tasks such as handling queues, dispatching and returning the hardware request. Host operating system works on the top of the hypervisor, we use it to administer and manage the virtual machines.

Para-Virtualization

In Para-virtualization model, simulation in trapping overhead in software virtualizations. It is based on the hypervisor and the guest operating system and modified entry compiled for installing it in a virtual machine. After the modification, the overall performance is increased as the guest operating system communicates directly with the hypervisor.

Full Virtualization

Full virtualizations can emulate the underlying hardware. It is quite similar to Para-virtualization. Here, machine operation used by the operating system which is further used to perform input-output or modify the system status. The unmodified operating system can run on the top of the hypervisor. This is possible because of the operations, which are emulated in the software and the status codes are returned with what the real hardware would deliver.

Questions to check your progress:

1. Define: Virtualization
2. What is meant by Storage Virtualization?
3. What is called Full Virtualization?

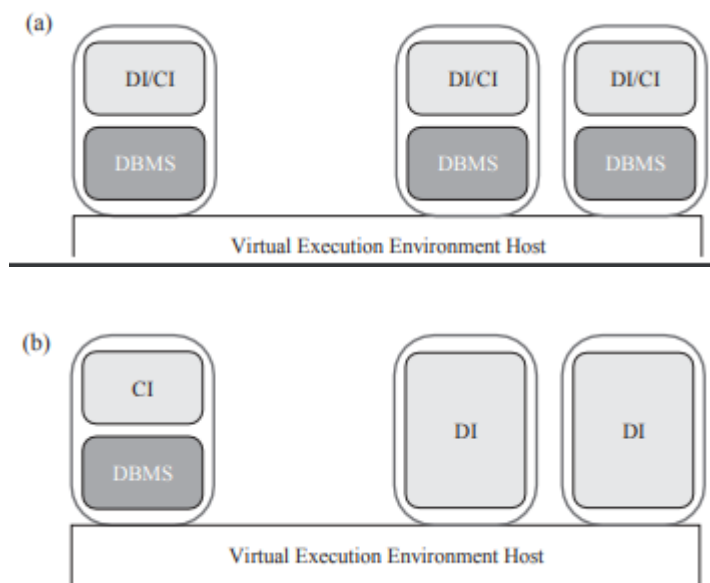
Self-Instructional Material

14.7 Virtualized data centre

The Virtualized Data Center

Consider a data center that consolidates the operation of different types of SAP applications and all their respective environments (e.g., test, production) using virtualization technology. The applications are offered as a service to external customers, or, alternatively, the data center is operated by the IT department of an enterprise for internal users (i.e., enterprise employees). We briefly mention here a few aspects that are typical of virtualized data centers:

NOTES



Sample SAP system deployments. (a) All components run in the same virtual execution environment (represented as rounded rectangles); (b) the large components (CI and DBMS) run each on a dedicated virtual execution environment.

The virtual execution environment host refers to the set of components managing the virtual environments.

- The infrastructure provider must manage the life cycle of the application for hundreds or thousands of tenants while keeping a very low total cost of ownership (TCO).
- Setting up a new tenant in the SaaS for SMBs case is completely automated by a Web-based wizard.
- The customers are billed a fixed monthly subscription fee or a variable fee based on their usage of the application.
- There are several well-known approaches to multi-tenancy of the same database schema.

The key challenges in all these use cases from the point of view of the infrastructure provider are:

Self-Instructional Material

- Managing thousands of different service components that comprise a variety of service applications executed by thousands of virtual execution environments,.
- Consolidating many applications on the same infrastructure, thereby increasing HW utilization and optimizing power consumption, while keeping the operational cost at minimum.
- Guaranteeing the individual SLAs of the many customers of the data center who face different and fluctuating workloads.

14.8 Answers to Check Your Progress Questions

- Virtualization is an abstraction layer (hypervisor) that decouples the physical hardware from the operating system to deliver greater IT resources utilization and flexibility
- Storage virtualization is the process of abstracting logical storage from physical storage.
- Full virtualizations can emulate the underlying hardware. It is quite similar to Para-virtualization.

14.9 Summary

- Virtualization represents the logical view of data representation the power to compute in virtualized environments.
- A Hypervisor is a layer between the operating system and hardware.
- In Para-virtualization model, simulation in trapping overhead in software virtualizations.
- The infrastructure provider must manage the life cycle of the application for hundreds or thousands of tenants while keeping a very low total cost of ownership (TCO).

14.10 Key Words

- Virtualization is used to manage a group of computers together- instead of managing resources separately.
- A SAN alone doesn't provide the "file" abstraction like NAS, only block-level operations.
- Full virtualizations can emulate the underlying hardware. It is quite similar to Para-virtualization.
- A data center that consolidates the operation of different types of SAP applications and all their respective environments using virtualization technology.

14.11 Self-Assessment Questions and Exercises

1. Short Answer Questions:
2. Why Virtualization?
3. What are the two types of shared network storage system?
4. Define: SAN

Long Answer Questions:

1. Write a note on
 - a. Virtualization
 - b. Benefits of Virtualization
 - c. Needs of Virtualization
2. Describe the storage virtualization and storage area networks
3. Explain the types of server virtualization

Cloud Virtualization Technology

NOTES

14.12 Further Readings

- Michael Miller, *Cloud Computing: Web-based Applications That Change the Way You Work and Collaborate Online*, Que Publishing, August 2008.
- Haley Beard, *Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs*, Emereo Pty Limited, July 2008.

Self-Instructional Material