

UNIT IV

Cloud Computing

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Cloud Services

- Cloud Services for Individuals
 - Basic and the easiest way to move to the cloud is at an individual or small business level
 - Offered at very low cost or free
 - Available Services
 - E.g. Gmail: free, access from any computer
 - Apple Mobile Me (<http://www.me.com/>): synchronizes emails, photos, and contacts among multiple devices
 - Google Docs (<http://docs.google.com/>): Provides a word processor, spreadsheet, and presentation designer
 - Adobe Acrobat (<http://www.adobe.com/>)
 - Evernote (<http://www.evernote.com/>)
 - Microsoft Live Search (<http://www.live.com/>)
 - Twitterfone (<http://www.twitterfone.com/>): uses speech recognition
 - Blis/Socrata (<http://www.socratabliss.com/>): database with an eye-catching interface, how-to videos, and a drag-and-drop design
 - Picnik (<http://www.picnik.com/>): Photo editor
 - Adobe Photoshop Express (<http://www.photoshop.com/express/>): Edit and store your photos on the cloud
 - G.ho.st (<http://g.ho.st/>): Global Hosted Operating System, G.ho.st is a Flash-based virtual OS

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Skytap Lab

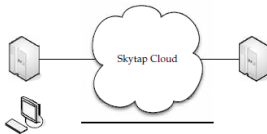
- Cloud Services for Individuals
 - Skytap Solution
 - **Virtual infrastructure on-demand** Virtually unlimited hardware, software, and storage available from any location and any browser. Skytap Virtual Lab scales up and down with software project demands and requires no upfront investment.
 - **Automated setup and tear-down of environments** A web-based virtual lab automation application that eliminates manual setup and tear-down tasks and enables the rapid provisioning and replication of multemachine production environments for development and testing.
 - **Skytap Library** A prepopulated software library that includes major operating systems, databases, and applications in multiple languages that dramatically reduces media installation tasks and enables construction of lab environments by dragging and dropping preconfigured virtual machines.
 - **Collaboration in a virtual environment** The capability to instantly collaborate on software issues and defects in a virtualized environment. Entire multemachine lab environments can be suspended and shared with distributed, global team members to enable reproduction and diagnosis of software bugs and issues.

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Skytap

- Cloud Services for Individuals
 - Skytap Migration API
 - Skytap's Web Services API and one-click VPN functionality allows organizations to create a "hybrid" IT model whereby cloud resources can be used as an extension of existing on-site IT environments
 - The API and advanced networking features that are now in Skytap Virtual Lab include
 - A REST-based Web Service interface that enables cloud resources to be controlled programmatically
 - Public/static IP addresses to provide seamless access to Skytap environments
 - One-click VPN for easy connection back to the onsite IT environments
 - Automated upload of existing virtual machines and software to run in Skytap Virtual Lab



The Skytap solution involves accessing their cloud and running lab services at your own site.

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Cloud Services Aimed at the Mid-Market

- At a mid-market level, there are things you want to keep locally, but other applications and storage that you want to do on the cloud
- Force.com
 - **Development projects** When you need to populate a test environment with large amounts of setup changes. If you were to make these changes using a web interface, it would take a large amount of time.
 - **Multistage release processes** Most development processes run in iterative cycles of building, testing, and staging before they are released to a production environment. Scripted retrieval and deployment of your components makes this process easier and cleaner.
 - **Repetitive deployment** using the same parameters You can retrieve all your organization's metadata, make changes as needed, and deploy that metadata. If you need to do it again, you just have to call the same deployment target.

Force.com is now Salesforce Platform

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Cloud Services Aimed at the Mid-Market

• Salesforce.com

You get started by following these basic steps:

1. On your deployment machine, log in to your Salesforce.com account.
2. Follow Setup | Develop | Tools, and then click Force.com Migration Tool.
3. Unzip the downloaded file. The Zip file contains the following:
 - A Readme.html file that explains how to use the tools
 - A Jar file containing the Ant task: ant-salesforce.jar
 - A sample folder containing
 - A codepkg\classes folder that contains SampleDeployClass.cls and SampleFailingTestClass.cls
 - A codepkg\triggers folder that contains SampleAccountTrigger.trigger
 - A mypkg\objects folder that contains the custom objects used in the examples
 - A removecodepkg folder that contains XML files for removing the examples from your organization
 - A sample build.properties file that you must edit, specifying your credentials, in order to run the sample Ant tasks in build.xml
 - A sample build.xml file that exercises the deploy and retrieve API calls
4. Copy the ant-salesforce.jar file from the unzipped file into the ant lib directory. The ant lib directory is found in the root folder of your Ant installation.
5. Open the sample subdirectory in the unzipped file.

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Cloud Services Aimed at the Mid-Market

• Salesforce.com

6. Edit the build.properties file.
 - a. Enter your Salesforce production organization username and password for the sf.user and sf.password fields, respectively.

NOTE The username you use should have the permissions to call Apex.

- b. If you are deploying to a sandbox organization, change the sf.serverurl field to <https://test.salesforce.com>.

7. Open a command window in the sample directory.

8. Enter the following:

```
ant deployCode

This runs the deployAPI call, using the sample class and Account trigger provided with the Force.com Migration Tool.
The ant deployCode calls the Ant target named deploy in the build.xml file.

<!-- shows deploying code & running tests for package 'codepkg' -->
<target name="deployCode">
  <!-- reload the contents of the 'codepkg' package,
  running the tests for just 1 class -->
  <ant-deploy username="{sf.username}"
    password="{sf.password}" serverurl="{sf.serverurl}"
    deployment="codepkg"/>
  <!-- run sample deployment class / run tests -->
  </ant-deploy>
</target>
```

9. Remove the test class and trigger added as part of the execution of ant deployCode. To do this, enter the following in the command window:

```
ant undeployCode

ant undeployCode calls the Ant target named undeployCode in the build.xml file.

<target name="undeployCode">
  <ant-deploy username="{sf.username}"
    password="{sf.password}" serverurl="{sf.serverurl}"
    deployment="removecodepkg"/>
</target>
```

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Cloud Services Aimed at the Mid-Market

• Force.com Apps

- Apprio Calendar Sync for Salesforce.com and Google Apps
- Gmail to Salesforce.com browser button for Firefox
- Lead and opportunity management dashboards
- Apprio CRM Dashboards for Salesforce.com & Google Apps
- Sales Activity Dashboard
- VerticalResponse for AppExchange
- Salesforce.com for Google AdWords
- Astadia Report Collaboration for Google Spreadsheets
- Apprio Search for Salesforce.com & Google Apps

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Enterprise-Class Cloud Offerings

- MS Exchange
 - Microsoft Exchange service for email
 - Now, Exchange Online and Microsoft SharePoint Online for businesses
 - EO and MSSP offer businesses a new way to purchase, deploy, and manage the industry-leading email and calendaring solution, and the industry-leading solution for portals and collaboration
 - Exchange is an easy tool to migrate to the cloud, especially given that the cloud offering is an online version of the traditional server and client application
 - Office Live Meeting for conferencing for instant messaging and presence
 - Microsoft Exchange Hosted Services
 - Microsoft Office Communications Online for instant messaging and presence
 - Email, calendar and contacts

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Enterprise-Class Cloud Offerings

- Vmotion
 - The main tool for migrations in VMware's arsenal is VMotion
 - Perform migrations with no downtime, undetectable by your users.
 - Optimize virtual machines in resource pools.
 - Perform hardware maintenance without downtime and disrupting operations.
 - Move virtual machines from poorly performing or failing physical servers onto new machines.
 - Multiple concurrent migrations can optimize a virtual IT environment.
 - A migration wizard can provide real-time availability information to identify the optimal placement of a virtual machine.
 - Migrate any virtual machine running any operating system across hardware
 - supported by VMware ESX, including Fibre Channel SAN, NAS, and iSCSI SAN.
 - Prioritize live migrations to ensure that mission-critical virtual machines maintain access to the resources they need.
 - Schedule migrations to happen at predefined times, and without an administrator's presence.
 - Maintain an audit trail with a detailed record of migrations.

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Enterprise-Class Cloud Offerings

- VMware vCenter Converter
 - VMware offers its vCenter Converter to migrate physical servers to virtual servers
 - With this enterprise-class migration tool, you can
 - Quickly convert local and remote physical machines into virtual machines with no downtime.
 - Simultaneously convert multiple servers with a centralized management console and conversion wizard.
 - Convert other virtual machine formats (like Microsoft Virtual PC and Microsoft Virtual Server) or back up images of physical machines to VMware virtual machines.
 - Restore VMware Consolidated Backup (VCB) images onto running virtual machines.
 - Clone and back up physical machines to virtual machines, as part of a disaster recovery plan.
 - Among its features, VMware Converter includes these attributes:
 - The ability to perform simultaneous conversions, enabling large-scale virtualization projects.
 - Snapshooting of the guest OS on the source machine before migrating. This ensures the data is migrated reliably.
 - Hot cloning allows for non-disruptive conversions.
 - Sector-based copying to enhance cloning and conversion speed.
 - Use of a centralized management console that allows users to queue up and monitor multiple simultaneous remote locations, as well as local conversions.
 - Wizards minimize the number of steps in a conversion.
 - The ability to clone both local and remote servers allows conversions in remote locations.

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Enterprise-Class Cloud Offerings

- **Hyper-V Live Migration**
 - moving virtual servers around to different machines
 - Migration is accomplished through Live Migration, a tool part of Windows Server 2008 R2
 - Live migration utilizes the integrated hypervisor technology and high-availability features of the server operating system so that customers can move running applications between servers to accommodate changing, dynamic computing needs across a datacenter.
 - In addition to other features, the next version of Microsoft Hyper-V Server will have live migration capabilities.
 - Microsoft Hyper-V Server 2008, a hypervisor-based server virtualization product, that is available at no cost via the Web, provides an optimized virtualization solution that allows customers to consolidate Windows or Linux workloads onto a single physical server and allows customers to leverage their existing patching, provisioning, management and support tools, processes and skills.
 - System Center Virtual Machine Manager 2008 enables customers to configure and deploy new virtual machines and centrally manage their virtualized infrastructure, whether running on Windows Server 2008 Hyper-V, Microsoft Virtual Server 2005 R2, Microsoft Hyper-V Server 2008, or VMware Virtual Infrastructure 3.
 - Microsoft Application Virtualization 4.5 gives desktop users a boost in fully harnessing the power of Windows Vista by streaming resource-heavy applications to the desktop. This helps eliminate potential software conflicts driving desktop stability and performance, while simultaneously enabling IT managers to centrally control key applications and their use.

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Best Practices and the Future of Cloud Computing

- **Tools**
 - Tools
 - Hyperic HQ: systems monitoring and management application and needs of businesses embracing Amazon cloud services to create scalable IT deployment strategies
 - CloudStatus: Hyperic also offers a free cloud monitoring tool, CloudStatus. Their most recent addition to the tool is continuous monitoring of Google.
 - CollabNet CUBIT 2.0
 - CollabNet's CUBIT 2.0 strives to eliminate the time-intensive process of configuring servers for build and test by managing those configurations as "profiles" across the application life cycle. Applying the cloud computing model to distributed development, CollabNet CUBIT 2.0 enables teams to access on-demand servers from private corporate datacenters or public clouds, to significantly reduce development cycles and hardware expenses.
 - Cassatt
 - Cassatt Corporation offers several products to help internal cloud computing—an IT approach that delivers the benefits of cloud computing using the resources that organizations already have inside their datacenters.

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Best Practices

- **Finding the Right Vendor**
 - Does the provider support me the way I need support?
 - Are they easy to work with?
 - Will they charge me a crippling amount of money?
 - What is their support like?
 - What is their track record for uptime?
 - Can they give me some references?
- **Read the Fine Print**
- **Performance**
- **Spread Your Services**
- **Data**
- **Data Flow**
- **Phased-in vs. Flash-cut Approaches**
- **Be Creative in Your Approach**

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How Cloud Computing Might Evolve

- Researcher Predictions
- Gartner
 - Gartner sees cloud computing as an evolution of business that is no less influential than e-business. Gartner maintains that the very confusion and contradiction that surrounds the term "cloud computing" signifies its potential to change the status quo in the IT market.
- Three Stages
 - **Phase 1: 2007 to 2011** - Pioneers and Trailblazers This will largely be a market development phase. Through 2011, given the natural immaturity of SEAP solutions, compounded by their proprietary nature, Gartner advises most SEAP adopters to focus on opportunistic solutions quick-hit, tactical opportunities where time to market and developer productivity outweigh long-term technical viability.
 - **Phase 2: 2010 to 2013** - Market Consolidation Gartner predicts that by 2012, the SEAP market will become overcrowded with a broad range of solutions from large and small vendors, and competitive pressure will drive many weaker players from the market, resulting in acquisition activity
 - **Phase 3: 2012 to 2015 and Beyond** - Mainstream Critical Mass and Commoditization In 2013, a small number of large SEAP providers will dominate the market, providing de-facto standards.
- Salesforce.com and Customer Service

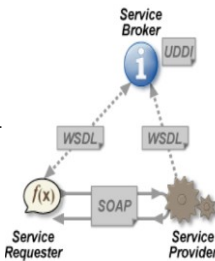
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Web Services

A Web service is a method of communication between two electronic devices over the web (internet).

- The W3C defines a "Web service" as "a software system designed to support interoperable machine-to-machine interaction over a network".
- It has an interface described in a machine-processable format (specifically Web Services Description Language, known by the acronym WSDL).
- Other systems interact with the Web service in a manner prescribed by its description using SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards."



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What is a Web Service?

- A programmable application component that is accessible via standard Internet protocols
- Web page with functions
- Available for a variety of clients
- Examples: stock quotes, traffic conditions, calculators, news, weather, et cetera

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Technologies Used

- Standard way to represent data
 - XML (and XML schemas)
- Common, extensible message format
 - SOAP
- Common, extensible contract language
 - Web Services Description Language (WSDL)
- Way to discover service providers
 - Universal Description, Discovery, and Integration (UDDI)

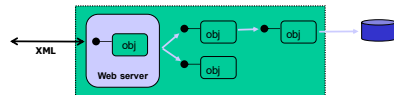
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Web services?

“Web services are web apps that return data, not presentation. Since applications are typically about accessing data, web services are poised to become the next evolutionary step in distributed software development...”

- Why?
 - cross-platform application development
 - legacy system integration

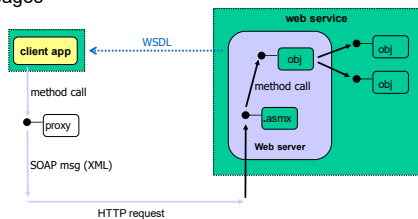


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Overview

- Web services involve many technologies:
 - WSDL to learn about web service
 - to call: proxy objects, SOAP, XML, HTTP and .ASMX pages



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How Web Service comes into existence?

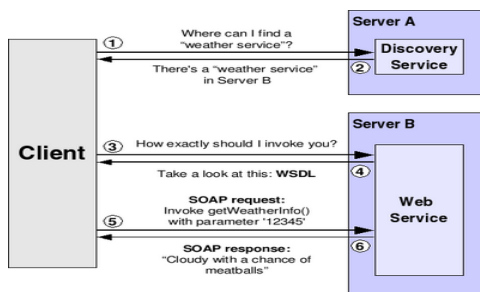
As i have mention before that Web Service is nothing but means for interacting with objects over the Internet.

1. **Initially Object - Oriented Language** comes which allow us to interact with two object within same application.
2. Than comes **Component Object Model (COM)** which allows to interact two objects on the same computer, but in different applications.
3. Than comes **Distributed Component Object Model (DCOM)** which allows to interact two objects on different computers, but within same local network.
4. And finally the **web services**, which allows two object to interact internet. That is it allows to interact between two object on different computers and even not within same local network.

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Web Service Invocation



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Web Services Architecture



- **Service Processes:** This part of the architecture generally involves more than one Web service. For example, discovery belongs in this part of the architecture, since it allows us to locate one particular service from among a collection of Web services.
- **Service Description:** One of the most interesting features of Web Services is that they are *self-describing*.
- **Service Invocation:** SOAP is by far the most popular choice for Web Services.
- **Transport:** Finally, all these messages must be transmitted somehow between the server and the client. The protocol of choice for this part of the architecture is HTTP (HyperText Transfer Protocol)

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WEB SERVICES

- Introduction to Service Oriented Architecture
- XML
- SOAP, SOAP Message Structure
- WSDL
- UDDI

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Web services

- Web Service is an application that is designed to interact directly with other applications over the internet. In simple sense, Web Services are means for interacting with objects over the Internet. Web Service is:
 - Language Independent
 - Protocol Independent
 - Platform Independent
 - It assumes a stateless service architecture.

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Cloud Portal

- The Cloud Portal provides information about the service for which the user has an active subscription
- Provides options for both monitoring and operating your services
- allows you to monitor the status of services for an entire account, across multiple data centers and identity domains
- displays information about active, expired, and pending services
- to perform all operating tasks after your services are activated
- a cloud portal is a point of access for the cloud platform
- Cloud Platforms
 - A cloud platform is basically a virtual environment that provides essential cloud services from which applications
 - A cloud platform consists of the hardware and servers in a data center that connect and work together to create new virtual space

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Handling Cloud Shell

- Google Cloud Shell (Hands-on).

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Google Cloud Platform

- Google Cloud Shell (Hands-on).

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