Development of Intranet App with JAVA on Oracle Cloud

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Abstract—Cloud computing is a computing environment, where a large pool of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage. With the advantage of this technology, the cost of computation, application hosting, content storage and delivery is reduced significantly. The idea of cloud computing is based on a very fundamental principal of ‘reusability of IT capabilities’. Developed system is a technique through cloud computing in which user will handle systems from Intranet with the help of servers as cloud and can access applications as well. User can also deploy application from client machines, and can store data on data storage area on cluster server. The proposed system will be used by an institute to deploy and execute application on centralized server Oracle Weblogic 11g as cloud. User does not have to install server and database as Oracle XE on each machine. The proposed system will also be used for providing various services on clustering of server.

Keywords—cluster, virtualization, cloud, scalable, datacenter.

I. INTRODUCTION

Cloud computing is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet and Intranet. In System the development of a technique through cloud computing in which user will access application on server which is allocated far away from user system or different node in an organization. According to independent technology and market research, cloud computing is a standardized IT capability, such as software application platform or infrastructure, delivered via Internet technologies and Intranet technologies in a pay-per-use and self-service way. The word Cloud Computing is not associated with any particular technology, protocol or vendor. It allows cloud applications to service the users (usually via websites, client applications, and so on) assuring that the service will have a single point of access (i.e. from main server and managed server ) and all the scaling, parallel computation, virtualization and whatever technology is used on the back end will be transparent to the client. There are main three types of Cloud computing service models used by the Cloud computing providers.

These are:

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

In the Infrastructure as a service (IaaS) model, refers to the sharing of hardware resources for executing services, typically using Virtualization technology.

In the Platform as a service approach (PaaS) model, includes a software execution environment, e.g. JRE provide platform independent execution environment.

In the Software as a service (SaaS) model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients.

There are three main types of Cloud deployment models. These are:

- Private Cloud
- Public Cloud
- Hybrid Cloud

In Public cloud, various applications, data storage, and other resources are made available to the general public by a service provider. These services are free or offered on a pay-per-use model. Generally, public cloud service providers like Amazon AWS, Microsoft and Google. These services are owned and operated by service provide and access only via Internet

Private cloud is cloud infrastructure operated solely for a single organization, whether managed internally or by a third-party and hosted internally. In private cloud environment servers are clustered in virtual and also physical machine and interconnected with Wi-Fi and LAN. Services are provided in limited geographical area, e.g. Institution.

Hybrid cloud is a composition of two or more clouds (private, community or public) that remain unique entities but are bound together, offering the benefits of multiple deployment models. Hybrid cloud architecture requires both on-premises resources and off-site (remote) server-based cloud infrastructure.
II. INTRANET AND THE CLOUD

While my operation is not big as Amazon S3 cloud computing, I can use the same sorts of principles within my institution to develop our IT infrastructure. By setting up thin clients with LAN and Wi-Fi to run, deploy and develop applications on local servers, rather than on their desktops, I ease the costs of deployment and maintenance, as well as reducing power costs. In my project, I develop Admin Server and Managed Servers by clustering on virtual machine by virtualization. Intranets are customarily used within an organization and are not accessible publicly. That is, a web server is maintained in-house and company information is maintained on it that others within the organization can access. However, now intranets are being maintained on the cloud.

III. WEBLOGIC SERVER CLUSTER

A cluster is a logical group of managed servers within a domain. Managed servers can reside on different machine but a cluster cannot span across more than one domain. WebLogic Server cluster consists of multiple WebLogic Server, server instances running simultaneously and working together to provide increased scalability and reliability. A cluster appears to clients to be a single WebLogic Server instance. The server instances that constitute a cluster can run on the same machine or be located on different machines. You can increase a cluster’s capacity by adding additional server instances to the cluster on an existing machine, or you can add machines to the cluster to host the incremental server instances. Each server instance in a cluster must run the same version of WebLogic Server.

Web applications can consist of different types of objects, including Enterprise Java Beans (EJBs), servlets, and Java Server Pages (JSPs). Each object type has a unique set of behaviours related to control, invocation, and how it functions within an application. For this reason, the methods that WebLogic Server uses to support clustering can vary for different types of objects. The following types of objects can be clustered in a WebLogic Server deployment:

- Servlets
- JSPs
- EJBs
- Remote Method Invocation (RMI) objects
- Java Messaging Service (JMS) destinations
- Java Database Connectivity (JDBC) connections

IV. PROPOSED EXECUTION ENVIRONMENT

Equal load distribution may improve resource utilization by transferring load from heavily loaded server to the idle server. This research work based Weblogic server on clustering environment and this clustering environment based on virtualization (Oracle VM). Datacenter component is used for handling service requests. VM consist of application elements e.g. database, which are connected with these requests, so Datacenter’s host components should allocate VM process sharing. According to below image my execution environment will work.

In my proposed execution environment, application based on first virtual disk is Weblogic Application Server and on second disk Oracle Database server reside. In first virtual disk Weblogic Application Server have a single domain and this domain is clustered and provides two managed server. First managed server is handling for request processing with client and according to client demand second managed server extract data from database. Proposed execution environment may reside on different physical system with LAN and Wi-Fi connectivity.

In proposed execution environment one client deploy their application remotely and other client also access application with proper internet protocol address.
Clients have no need to install Server Application and database in their own system. They have only need to connect with datacenter with LAN and Wi-Fi. Client can deploy different type of application based on different technology, e.g., Servlet and JSP based application, EJB or Hibernate based application, Struts and Spring based application.

Physical setup of propose execution environment are as follows:

Two main servers:
1) Server 1 i.e. clustered of Admin and two managed server.
2) Server 2 i.e. database server.

Multiple clients: Client facilitated to access and deploys application.

The client will be communicates with server1 which is a cloud server as datacenter with the help of private switching with Wi-Fi. The server 1 and server 2 will communicate with each other using private switching with LAN.

V. REQUIREMENTS

A. Software requirements:-
- Window 8
- Window XP ServicePack 3
- Oracle Weblogic Server 11g
- Oracle Database 10g Express Edition
- Eclipse or Oracle JDeveloper
- Oracle VirtualBox

B. Hardware requirement:-

<table>
<thead>
<tr>
<th>Item</th>
<th>Server 1</th>
<th>Server 2</th>
<th>Client</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Core i7-3630 @2.40GHz</td>
<td>Intel Core i7-3630 @2.40GHz</td>
<td>Intel Pentium Dual CPU @1.6GHz</td>
</tr>
<tr>
<td>Main Memory</td>
<td>8 GB Minimum</td>
<td>8 GB Minimum</td>
<td>2 GB Minimum</td>
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<tr>
<td>Virtual Disk</td>
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<td>50 GB Minimum</td>
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<tr>
<td>Local Disk</td>
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<td>200 GB Minimum</td>
<td>80GB</td>
</tr>
<tr>
<td>Networking</td>
<td>Wi-Fi/LAN</td>
<td>Wi-Fi/LAN</td>
<td>Wi-Fi/LAN</td>
</tr>
</tbody>
</table>

VI. INSTALLATION SETUP FOR ORACLE CLOUD

Operating System:
On Host Operating System (Window 8) installed two Guest Operating System (Window XP Service Pack2).

Virtualization:
On Host Operating System two Virtual Disks stabilised with Oracle VirtualBox

Guest Operating System:
Two Operating Systems install on two Virtual Disks.

Server Installation:
Oracle Weblogic Server and Oracle Database Server installed on both Operating System respectively.

VII. CONFIGURATION STEPS FOR ORACLE CLOUD

Assumption: Weblogic Server is already installed on the machine with Windows Operating System.

1. Creating Weblogic Domain
2. Configuring Domain
3. Configure the cluster
4. Start Admin Server
5. Start Managed Servers
6. Configure a Node manager service on localhost
7. Testing Node manager
8. Deploying Application
9. Testing Deployment
10. Testing Load Balancing and Failover Replication
11. Installing Oracle Database in other Windows Operating System
12. Configure Oracle Database and unlock user

Configure Weblogic Server with Oracle Database as Thin Client
VIII. CONCLUSIONS

This paper introduces implementation of private cloud computing environment in small infrastructure based institution. Implementation of Cloud Computing environment is an expensive and complex work and only big player can implemented it – is a myth. Implementation of cloud computing is cost effective and better utilization of resources. In low budget project, project must run on open source technology. So in my project, I implemented private Cloud computing environment on open source technology like Oracle, JAVA, Eclipse, etc. My implementation is not big as Amazon S3 or Google but my need to deploy and access JAVA based web application into a cloud based server accomplished.

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REFERENCES


