OBJECTIVE OF PRESENT WORK

Basic object of my research work is to implement the complete setup of banking application through the middleware product (weblogic) to achieve the following task as I have discussed in introduction section as below.

Scalability

High-Availability

Load balancing

Security

Nowadays most of the companies including banking sector are creating the application in J2EE and these J2EE applications are require a J2EE application server to run these applications. During my research work I have used the Oracle weblogic server to achieve the above mentioned task.

This is completely a three tier architecture setup. Before three tier architecture, two tier technologies was there in IT market including banking sector but one of the most disadvantage to two-tier applications is limited scalability--few applications can support more than hundred simultaneous users. So we have added a one more tier in middleware in form of application server.

Through this technology (three tiers) we can get the application without any frailer, means we get the continuity of applications or we can say it’s available for 24*7.

Once we used the Oracle weblogic application server in middle tier, we can run our application either in a single machine or in a multiple machine by using the clustered environment.

Basic meaning of clustering is grouping of managed server (application server) that work together and participate in work load management and failover. There are two types of clustering, single machine clustering and Multi machine clustering.

A machine is a logical representation of the physical machine (computer) that hosts one or more Weblogic Server instances. In single machine all application are distributed on same machine however in multi machine all application servers are distributed in different machine as per requirement.

In today’s IT market customer want the application is highly available for 24*7 in low cost and there should be no outage of application. So all these advantages, we get achieve through the clustering because when we deploy an application in cluster environment it’s always available for us.

As I have discussed clustering is a grouping of server, when we are deploying our application in clustering environment that means it running on each server that are in cluster. Suppose one server goes down then request will route to other server that are available (running) in cluster. One more
important thing is that once one server will go down there is mechanism called heartbeat is produce the message to other.[31][32]

3.1) Main purpose or objective of my research work

1] Control the complete setup of application through a single point

We can control the complete setup of application through a single point is called weblogic console. As I have discussed above, in multi machine clustering, application server are distributed in different machine so whenever we need to control the application server we not need to login on to physical machine we can control all the application server through weblogic console by configuring the node manager. Node manager is a separate java utility that automatically installed onto machine once weblogic server is installed and through node manager we can remotely control to application server that are distributed on different machine.

2] High Security Implementation to secure the application

As I have discussed in introduction section, security is a major concern in banking application. Deploying, managing, and maintaining security is a huge challenge for an information technology (IT) organization that is providing new and expanded services to customers using the Web. Till ye lot of security feature implemented in banking and in all other sector but still lot of fraud is going on. In my research work I have used weblogic security feature that secure to application in more efficient way. WebLogic Server includes a security architecture that provides a unique and secure foundation for applications that are available via the Web. By taking advantage of the new security features in WebLogic Server, enterprises benefit from a comprehensive, flexible security infrastructure designed to address the security challenges of making applications available on the Web. WebLogic security can be used standalone to secure WebLogic Server applications or as part of an enterprise-wide, security management system that represents a best-in-breed, security management solution. [23][24]

3] Application available for 24*7 environments

This is one of the main objects because application should be available for 24*7 environments because as per SLA (Service-level agreement) of any application there is specific down time is provided by customer however if the application is not available apart from that time then company need to pay for it. [15][19]

4] Failover mechanism implementation.

When an application component performing a particular task, during that time some part of that task is unavailable for any reason, a copy of the failed object finishes the task.

For the new object to be able to take over for the failed object:
There should be a copy of the failed object available to take over the task. There should be information, available to other objects and the program that manages failover, defining the location and operational status of all objects, so that it can be determined that the first object failed before finishing its task.

There should be information, available to other objects and the program that manages failover, about the progress of jobs in process, so that an object taking over an interrupted job knows how much of the job was completed before the first object failed, for example, what data has been changed, and what steps in the process were completed. [28][27]

Weblogic Server uses communication techniques and facilities, including IP sockets and the Java Naming and Directory Interface (JNDI) to share and maintain information about the availability of objects in a cluster. These techniques allow Weblogic Server to determine that an object stopped before finishing its job, and where there is a copy of the object to complete the interrupted task.

Information about what has been done on a task is called state. Weblogic Server maintains state information using techniques called session replication and replica-aware stubs. When an object unexpectedly stops doing its job, replication techniques enable a copy of the object to pick up where the failed object stopped and finish the task.

### 5] Migration in clustering to achieve high availability

Weblogic Server provides automatic and manual migration of a clustered server instance from one system to another. A Managed Server that can be migrated is called as a migratable server. This feature is designed for environments with requirements for high availability. Server migration is useful for ensuring uninterrupted availability of singleton service, services that must run on only a single server instance at any given time, such as JMS and the JTA transaction recovery system, when the hosting server instance fails. A Managed Server configured for automatic migration automatically migrate to another system if a failure occurs.

Facilitating the process of relocating a Managed Server and all services it hosts, as part of a planned system administration process. You can initiate the Managed Server migration from the Administration Console or command line.

The server migration process relocates a Managed Server in its entirety, including IP addresses and hosted applications, to one of a predefined set of available host systems.

### 6] Designed operational environment

During the initially setup, create a weblogic domain for banking application and configure a managed server, node manager configuration, configure clustering environment to achieve the load balancing and result as how we can configure and secure a banking application in middleware technology.

A complete result is banking application configured in middleware technology (weblogic), single point of control, application continuity, migration, failover and load balancing for better performance.