CHAPTER – 2

BACKGROUND AND OBJECTIVE OF PRESENT WORK
2.1 Background

Today middleware technology is not implemented only in banking and payment system even this is the most important point in the field of computing centers. Through this technology we can support 24*7 very easily. In past lot of researcher worked on various technologies to provide the better solution to achieve Scalability, High-Availability, Load balancing, and Security. Middleware technology came after two tier technology where only two parts were there (front end) and database (back end), however 3 tier architecture Client-front end (request is given through client), business logic: Middle layer (protocols are used for processing the request), Database: back end (response is given to the client) Web applications are good examples for 3 tier architecture.

2.2 Status 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 failer, 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 like a computer or it’s a physical entity where we can create more than one Weblogic 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]

2.3 Motive 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 24x7 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 not available due to any reason in that case task is finished by copy of object.

As Weblogic cluster is a group of managed servers, so when we used the cluster environment for any enterprise application, there will be failover. Basic meaning of failover is route to object or information to other managed server when the primary managed server is not available or terminated due to any reason. Failure of connection can be happen in below two ways.

1] Suppose accessing the application or crating the connection.

2] Once connection is created successfully.

The first one is very easy and normal, suppose we are accessing an application and the request is routing to the managed server in cluster is fail, connection is not created however we can attempt until and unless request will not route to other backup managed server in cluster.

Second one is little bit typical it happen when connection is created successfully, mean request is route to managed server and after that suddenly managed server went down, in that case all session in primary managed server will pass to second managed server to complete the request.

It means, all information or complete object will migrate to another managed server from the server that is failed in cluster.

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

There are two types of migration in Weblogic cluster

1] Automatic Migration

2] Manual Migration

Suppose there is an application running in cluster environment and the request is processing after successful connection after the connection is terminated then it will be migrate to another server that are available in cluster and call migratable server.

For high availability environment, we need to design this type of architecture.

In case of ensuring uninterrupted availability of singleton service or service that is deployed in single server so in that case server migration is very useful, 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.

2.4 WORK PLAN

My work plan is executed in many phases with the concept of system analysis and design (SAD). First I have gone through the middleware technology and its feature (Scalability, High-Availability, Load balancing and Security) in existing banking and finance sector. What were the core problems before middleware technology, what need to be done for better performance and for current key problems?

Second, still there are multiple banks in India and all over the world and still lot of banks are not using the middle tier technology and its feature. What extra feature we need to use for better steup of banking application.[31][32][33]

2.4.1 Main key points

1] Need to find out and analyze the existing middleware technology and its feature in current banking organizations including government and private banks all over the world.

2] Solution, how this technology will improve Scalability, High-Availability, Load balancing and Security.

3] How will educate the people about this technology is better for banking and finance sector.

4] How this technology will reduce the cost and will improve the performance.

5] Find out the current issue with middleware technology in banking.

6] Identify how we can use this technology in better way.
2.4.2 Implementation of work Plan

Below point will use during executing of the work plans

I have discussed in staring, used the SAD theory to execute the work plan. According to SAD theory first need to collect the data collection.

1. Feasibility study
2. Detailed system study
3. System analysis
4. System design
5. Coding
6. Testing
7. Implementation
8. Maintenance

During the feasibility study, we have to know to about the system that we are going to develop. During this phase below point need to keep in mind.

1. How system will good workable.
2. How system will provide the user requirement in easy ways.
3. How the system will be good effective
4. Cost

 Basically when we develop a system, we need to thing about these above point because these involve technical, operational, and economic and schedule feasibility. Solution of a problem is not a part of feasibility study, achieving good scope is called feasibility study. When we develop a system, we should think about the cost during developing a system and the return against the cost, we have spent. For detail investigation, resource is also needed. The detailed investigation about the system which we have to develop will depend according to the system that proposed. There are lot of task performed by system and their relationships within and outside the system and it is also a part feasibility study. Data collection that is already available and decision in present system is also a part of this process.

During system analysis, we collect the data then understand the process and need to find out the problem that will come and recommendation of suggestion for that will improved the functioning of system.
In Design phase I have created a complete banking setup in my personal lab. For any system, we have a basic requirement that is provided by the user. According to this requirement we do the detail study of the current system. Designing of system is the phase, which is very important for developing or preparing a system.

A system should be in good working mode. For it we need to implement designing. This involves the writing of code in any programming language that is understandable by computer. This is the part where developers write a code in any programming language and the program is covert into machine understandable language by compiler or through interpreter. Developers always write a code in form of module for easy control. As i have said coding is the most important part because it communicates one module to another module. And it controls the whole process of the system. Basically a program divided into many modules and it's a good practice to make a system in form of module because it is very easy for future development and changed that might be require in future. Before actually implementing the new system into operation, a test run of the system is done for removing the bugs, if any.

Once complete system will ready then deploy the code and implement the complete setup and do the testing in different cases. [12][6]