

# LVS Cluster Technology in the Research and Application of State-owned Asset Management Platform

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**Abstract**-State-owned asset information management focuses on the process monitoring and data mining analysis, due to the state-owned enterprise asset management group information on the existence of multiple levels of management, the number of users and more users and more data reliability, high security requirements of the characteristics; single station server model has failed to meet current demand, and there is a physical device utilization is not high. This article focuses on how to build an LVS load-balancing cluster technology, combined with virtualization and shared storage technology to achieve the three-tier architecture of Web server clusters, in order to achieve low-cost investment in expensive hardware, computing and business storage solutions to achieve the bad environment.

**Keywords**-LVS, cluster technology, state-owned assets management, shared memory, Virtualization

## I. INTRODUCTION

Age of the Internet at any time there is a sudden increase of users; a sudden increase in visits to prepare the case, as the Web Server Integration Services can not break through the bottleneck there is the problem. On the contrary, more and more companies find themselves a lot of idle server resources to be serious, the actual usage of the server needs to be improved, people began to pin their hopes on load balancing and virtualization technology, hoping to use load balancing and virtualization technologies to solve the problem of idle servers, improve server utilization

According to national statistics, in recent years because of poor management of state assets, annual loss of nearly a thousand million. State-owned assets management system has reached a very period. From the experience of advanced countries, to complete a huge number of assets for regulatory tasks, information management tools is essential [1].

State-owned asset information management focuses on the process monitoring and data mining analysis, due to the state-owned enterprise asset management group exists at the enterprise level and more information, quantity and, more users and data reliability, security requirements is high. Rely on traditional computing and storage system architecture or there is a huge investment, or there exists a single server to meet the performance and security requirements, so must rely on load balancing and virtualization technologies to solve the problem.

In this paper, through a practical case study, the application of RE to the shape matching of a car is explained

in detail. The principles and methods are not only applicable to the autobody panels, but also to any other industry.

## II. ASSET MANAGEMENT INFORMATION PLATFORM SYSTEM ARCHITECTURE

Studied in this paper the state-owned group enterprise asset management information platform main functions involve large state-owned group companies and three state-owned assets and enterprises directly under the shareholders' meeting, board of directors and the board of supervisors and management executives layer and directly under, and three companies of assets management, financial and process management group, focusing on major issues and documentation of data generated by the realization of electronic storage, query, statistics and data mining. Goal is to create group, the unity of the invested enterprise asset management information platform. Improve the Group, is the synergy between investment enterprises.

### A. Group's asset management model

State-owned assets management information platform of the overall framework is divided into three:

(1) directly under the bottom of Group companies and three companies, it is an object monitoring system, the regulatory functions of the system is the data source. (2) the second layer perform business functions for the group supervision and control functions. (3) The third layer is the data mining analysis subsystem. Top management of the Group and its affiliated companies monitor and support the decision-making platform. Below:

### B. System Function

1 .Directors and Supervisors Management: All units provide directors and supervisors, chief financial officer of changes in information, work-related advice and management information reporting and did not provide the basis for assessment. Changes in property rights management: reflects the enterprises directly under its foreign investment enterprises and changes in property rights, including the equity transfer, equity ratio of the change in shareholder structure changes, changes in investment and other relevant circumstances.

2 .Business major issues: including the corporate shareholders, board of supervisors to make the important decision-making matters, as well as other business activities of enterprises in the process of major issues. Will be major issues through the development of corporate filing systems to be clarified and implemented.

3 .Corporate restructuring, reorganization: mainly companies and their subsidiary enterprises directly under the

restructuring and reorganization matters into management information systems management, and provide statistical information.

4. The disposal of assets: mainly reflects the transfer of corporate assets, reported that loss, scrapped, written off, non-performing assets and the leasing of major assets.

5 Asset valuation and for the record: The main types of asset assessment for the project management, asset valuation to reflect the purpose of commission, approval or filing data and assess the situation.

6. Basic financial information: reflects the basic unit of financial information, including the case of assets and liabilities, profits and the distribution of profits, dividends collection and to conduct regular updates.

7 .Real estate land, important equipment material management: The main control is to strengthen the city's major assets such as real estate land, equipment, rescue and relief material, stripping assets management restructuring to reflect the assets of the state, management and disposal.

8 .Foreign investment evaluation:The main access to the data types of foreign investment projects, combined with the next overseas investment to establish the dynamic evaluation system, foreign investment projects management and operations to assess the situation.

9. Company's Strategy: the company's strategic management information platform that can check the unit's strategic planning and development of the revision, and implementation of the strategy and implementation information.

System structure as below:

### III. LVS AND VIRTUALIZATION TECHNOLOGY

Different cluster usually divided into three basic types [3]: High-Performance Clusters, High-Availability Cluster and Load Balance Cluster. LVS load balancing cluster technology cluster structure is, the server cluster of horizontal expansion.

#### A. LVS cluster architecture

LVS is mainly deal with four layers of the OSI model information package, according to certain rules to forward the request directly to the back-end services processing nodes. Virtual Server is a server Load Balancer and the logical combination collectively, need only use the service to interact with the Virtual Server can get efficient service. LVS cluster is proportional to the number provided with the server load capacity, the use of IP-based layer to IP layer load balancing of TCP / IP requests to a server in the pool even different servers; When a cluster system failure , the cluster software to respond quickly, the system dynamically allocates tasks to the work of others in the cluster is performed on a system, thus ensuring continuity of services; when the overall work flow beyond the capabilities of each system cluster, it will there are other systems added to the cluster, so that the overall system performance to smoothly expand, and the client are not affected, nor do they need any

changes to the external service and efficient [4]. Figure 3 is LVS architecture.

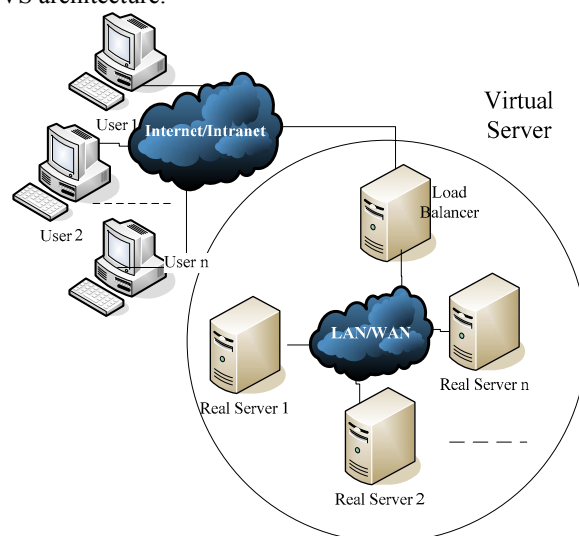


Figure 3 LVS structure

#### B. LVS load-balancing technology of three

There are three different LVS load balancing [5], respectively Virtual Server via Network Address Translation (VS / NAT), Virtual Server via IP Tunneling (VS / TUN), Virtual Server via Direct Routing (VS / DR).

1.VS/NAT through network address translation, packet scheduler request to rewrite the destination address, according to the pre-scheduling algorithm, dispatch the request to the real back-end server; real server response packets through the scheduler, the packet source address is rewritten, and then returned to the client, complete the entire load scheduling process.

2. the use of NAT technology,the scheduler, the request message forwarded through the IP tunnel to the real server, real server returns the response directly to the customer, so the scheduler only processes the request message. As the general network service response much larger than the request packet, using the VS / TUN technology, the cluster system can increase the maximum throughput of 10 times.

3. VS/DR through to rewrite the request of a message, will be asked to send the MAC address to real server, but the real server will be directly back to the customer.

The following table is sorted out the official Virtual Server on the difference between three different modes:

TABLE I. THE OFFICIAL VIRTUAL SERVER ON THE DIFFERENCE BETWEEN THREE DIFFERENT MODES

	VS/NAT	VS/TUNNEL	VS/DR
SERVER REQUIREMENT	NO	Need to support IP channels	No arp componet
NET REQUIREMENT	Private	LAN/WAN	LAN
Server nodes to support	less ( 10-20)	more	more

SERVER GATEWAY	Load Balancer	SELF	SELF
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#### IV. LVS-DR THREE-TIER ARCHITECTURE DESIGN AND IMPLEMENTATION OF WEB SERVICES

Three different modes for Virtual Server properties and characteristics of state-owned asset management, this choice of VS / DR model to achieve at the same time with the VS / NAT, and VS / TUNNEL comparison. Web Server using RHEL 5.4 OS, while using Xen as the VMM.

1. In the Load Balancer install LVS configuration tool. Most of the Linux operating system has support for the current Virtual Server, so did not have to compile the kernel, users only need to download and install the configuration tool ipvsadmin, this paper ipvsadm-1.24.tar.gz package.

2. In the Load Balancer on to set up virtual IP.

Demand for different web services, LVS scheduler to achieve 10 kinds of load scheduling algorithms, the following four common algorithms: Round Robin, Weighted Round Robin, Least Connections, Weighted Least Connections [6]. Least-Connection Scheduling: the distribution of new connection requests to the current minimum number of connections the server.

3. In the Load Balancer on to set up virtual IP and the relationship between the two entities server.

4. In the other two sets to build a virtual entity server IP and network card of the circle bound.

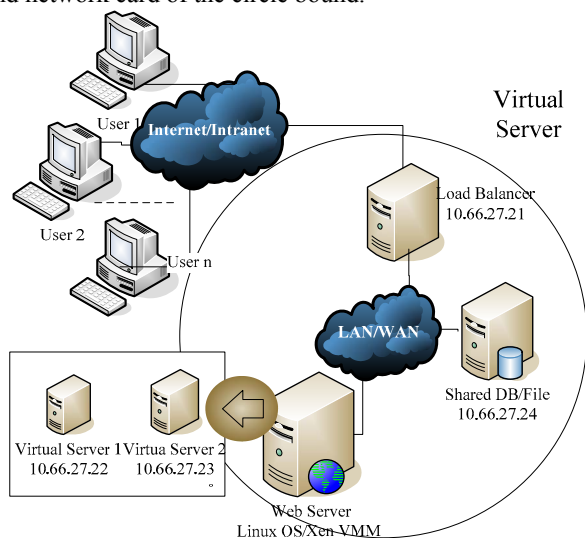


Figure 4 LVS and Xen three-tier network architecture

#### V. TEST

By VS / NAT, VS / TUNNEL and VS / DR implementation, with 200 concurrent users, 50,000 times the

total number of requests, the three Apache LVS mode stress test results are as follows.

TABLE II. CUTTING PARAMETERS OF SIMULATION MILLING

	TOTAL TIME(s)	TPS(/sec)
VS/NAT	4.96	4222.78
VS/TUNNEL	2.42	9221.82
VS/DR	2.122	9967.9

Since NAT mode, the Load Balancer for the performance of great impact, we can see that the latter two bad NAT performance than doubled. While pressure for the load itself and the limited number of nodes in the background, VS / DR and VS / TUNNEL mode can support more server nodes and load performance excellent.

#### VI. SUMMARIES

State-owned Asset Management is a sensitive topic today, because the nature of its business with the wide span of industries, business levels, and the number of enterprises, management of contents, showing a large number of users, concurrency, and easy to congestion and so on, which requires Server is not only a better price, higher processing speed, the larger I / O throughput, strong fault tolerance, but also have high reliability and strong stability, virtualization technology and LVS clustering technology on a good solution to these problems. Proven virtualization technology and LVS Clustering technology to lower costs to eliminate network bottlenecks, increase network flexibility and reliability, improve overall system throughput, especially for clusters in the performance of different server nodes, cluster network provided Services program to access the resource diversity of the situation, would bring substantial economic and social good, with a wide range of applications.

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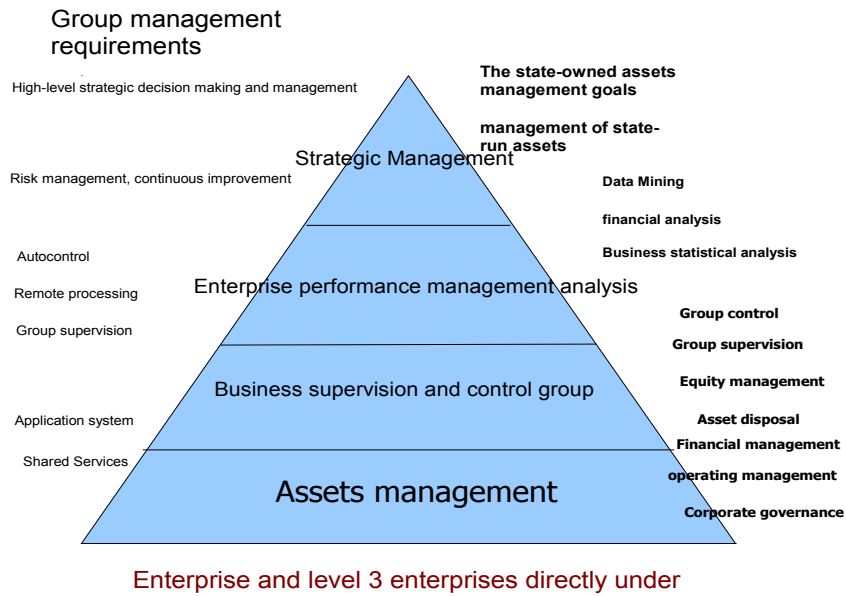


Figure 1 Group's asset management model

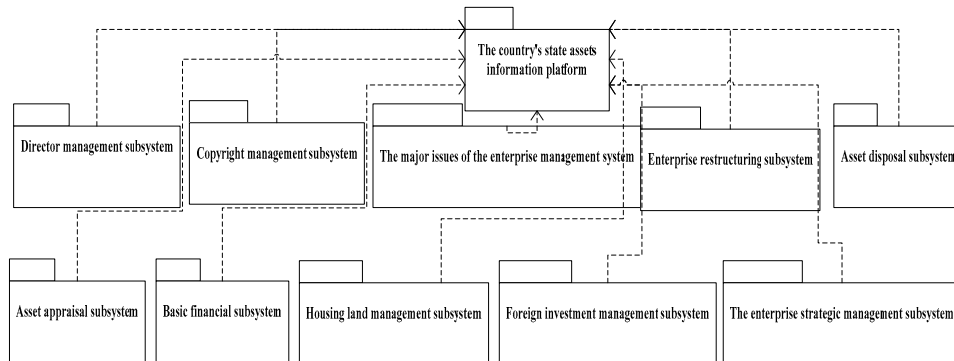


Figure 2 system static map