

NEC High Availability EXPRESSCLUSTER Solution for a Henan

IPTV Project

Ensuring High Usability and Reliability for Enterprise Critical Systems

Project Background

In June of 2003, the Central Party Congress initiated the rural cadre remote education program, which provides TV and internet based on-demand, interactive, and directly broadcast continuing education courses for cadres in rural areas across China.

In response to this initiative, Henan Netcom teamed up with local IPTV solutions providers to create remote education programs for rural cadres. After much discussion, an IPTV solution was decided on. The system would be responsible for managing and processing streaming media content, and would need to be highly scalable, secure, and easy to use.

Needs Analysis

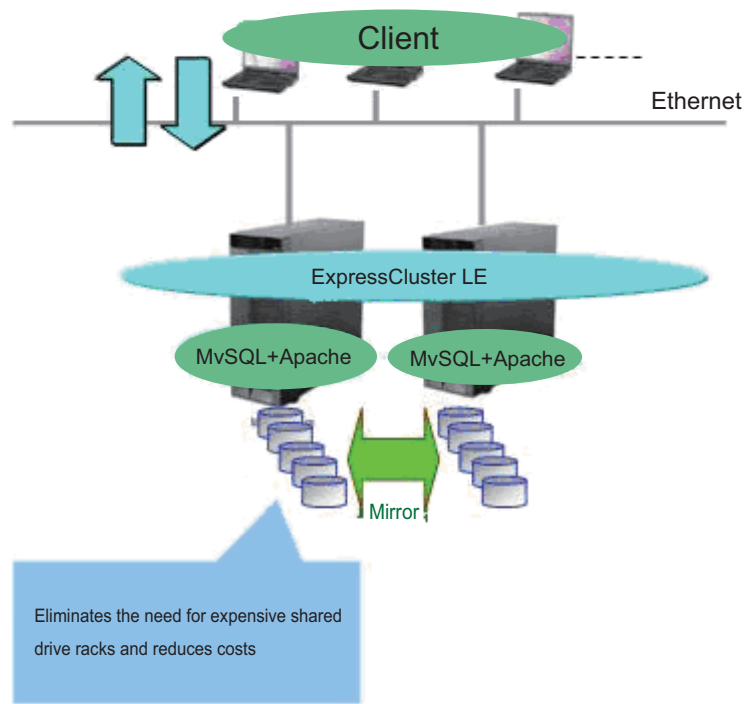
The above described IPTV system needs to provide uninterrupted service, and needs to be exceptionally user friendly and reliable. With respect to reliability and fault tolerance, the customer had the following demands:

- Support for Red Hat Linux AS/ES 3.0, 4.0
- Protection for MySQL databases and Apache web servers
- Automatic switching when errors occur, and automatic process and data failover
- Two node cluster supporting active/active mode
- Both nodes support software-only mirrored clustering

NEC provided the company with the high availability cluster middleware EXPRESSCLUSTER mirrored HA clustering solution, to achieve dual node fault tolerance and increase system reliability.

System Design and Construction

HA System Architecture Diagram:



Based on the customer's needs, the two servers were configured as follows:

A two node mirrored cluster was created, with customer data stored on the local mirror in active/active mode. One server (Server1) was used as a MySQL host, and the other (Server2) as an Apache host. Each server also acted as a backup for the other, to achieve mutual backup fault tolerance.

HA System Principles:

EXPRESSCLUSTER stores customer data on local mirrors, and, in active/active mode, both servers are active hosts. When a malfunction (software or hardware) occurs on Server1, Server2 detects the malfunction via the heartbeat circuit and takes over management of all Server1's resources (including floating IP addresses, database services, and data on local and mirror discs), and continues to provide database services. This switchover is imperceptible from the customer's side, and customers can continue using the system as before. When Server1 returns to normal, the services taken over by Server2 can be returned to Server1 either manually or automatically. If a malfunction occurs on Server2, Server1 similarly takes over the resources of Server2.

For an overview of the NEC High Availability Cluster Middleware EXPRESSCLUSTER, visit <http://www.nec-as.com.cn/>.

Product Overview:

EXPRESSCLUSTER is NEC's Linux and Windows platform cluster management middleware. It can be used to create highly available, highly reliable, and highly scalable clusters. Whether you need low cost software-only mirroring or large scale disk array based cluster systems, EXPRESSCLUSTER can be easily set up to provide 24/7/365 protection for critical business applications.

Product Features

- 24/7/365 uninterrupted enterprise systems Flexible scalability, featuring dynamic expansion of up to 32 nodes
- Provides shared, mirrored, or share + mirror hybrid clustering options
- Easy to use web clustering tools for convenient remote management and monitoring of clusters
- Support for multiple platforms
Support for Windows platforms and all major Linux systems, including Windows NT/2000/2003, Red Hat, Turbolinux, Miracle Linux, Novell SUSE LINUX, and Red Flag
- Support for the latest Linux 2.4/2.6 core
- Supports not only IA-32 servers, but also 64-bit servers and operating platforms including IA-64, EM64T, and x86-64
- Multiple heartbeats for increased reliability: supports multiple network cards (public/private), COM(RS-232C), and disk heartbeats
- Protection for a large variety of programs and services, including almost all major Windows and Linux applications
- Multiple optional products for added monitoring and fault detection: In addition to normal program and server monitoring (program level monitoring), EXPRESSCLUSTER provides a series of optional monitoring features, including Database Agent, Internet Server Agent, LAN Agent, and File Server Agent, that check for stalled databases and applications, adding another layer of protection for critical enterprise services.
- Four clustering modes: Active/Standby, Active/Active, N+1 redundancy, and N redundancy, to satisfy even the most demanding customers
- Heartbeats originate in the kernel drivers, which greatly increases durability under a heavy system load.

Customer Evaluation

After rigorous customer testing, EXPRESSCLUSTER has beaten the competition due to its cutting edge technology and exceptional performance. At present, this HA architecture is being used in IPTV systems in 18 cities across Henan and Hebei Provinces, greatly increasing IPTV reliability and ensuring the success of the government's rural communications projects.