

## 10 Reasons for Choosing ExpressCluster in virtualized environment

The introduction of server virtualization has attracted attention of organizations as it results in reduced total cost of ownership (TCO) through the consolidation of physical servers, utilization of existing IT infrastructure, and more efficient system operations. According to a survey done by IDC (U.S.), the number of virtual machines is steadily increasing in relation to physical servers (\*1) as a large number of companies and organizations are adopting server virtualization technology.

However, introduction of server virtualization is not the end of the story, subsequent operation of the resulting infrastructure is also important. Setup of a new IT environment, capable of more cost-effective and efficient operations, is meaningless if the company or organization is unable to reap its benefit for business growth.

For instance, when a number of virtual machines are aggregated on one physical server, and particularly when the number of virtual machines is higher in comparison to physical servers, failure at physical server level can all together stop the virtual servers running on that physical server, resulting in enormous business loss.

A study by Contingency Planning Research (U.S.) highlighted the following hourly losses from system downtime.

### Hourly Downtime Cost

Brokerage	\$6.45M
Credit Card	\$2.6M
Advertisement	\$200K
Pay-per-view	\$150K
Airline reservations	\$90K

Even virtual servers introduced to boost the operation efficiency of IT systems are useless when the system is down.

Solutions for business continuity include many different approaches, such as the use of backup software and data backup at the storage level, and fault-tolerant hardware. Among these, the high-availability clustering approach enables the recovery of operations with minimal downtime for a large array of failures ranging from natural disasters to application failure. Further, on occurrence of a server failure, not only the applications are recovered on a standby server, but also the loss of business data can be prevented.

Among the various clustering products on the market, NEC's ExpressCluster has a particularly strong track record of providing high-availability to virtual server system. ExpressCluster seamlessly supports all the leading virtualization software, including VMware, Hyper-V, and XenServer etc.

Here are 10 reasons for choosing ExpressCluster over other alternatives.

## 1. Support of business continuity in virtual environment

Typical virtualization software often includes standard features for business continuity. Some examples are VMotion in VMware, XenMotion in XenServer, and Live Migration in Microsoft Hyper-V (planned to be implemented from Windows Server 2008 R2).

As these features migrate live virtual machines, they are sometimes considered to offer the same functionality as high-availability software with fail-over and fault-recovery capability, but their intended purpose is actually different. These features do not have a functionality to recover operations automatically upon failure occurrences. Instead, they are mainly designed to avoid the suspension of operation during periodic planned maintenance of physical system resources such as servers and operating system.

For example, if VMotion is used as a tool for avoiding the suspension of operation due to failures, virtual servers must be migrated prior to failure occurrence. This necessitates failure prediction technology, which entails introduction and operation cost increases, and there is no guarantee that failure predictor will be reliably detected.

There are some other features in standard virtualization software that use clustering technology also, such as VMware HA and Xen High Availability. However, these functions perform only alive monitoring for virtual servers through ping packets, and unfortunately do not monitor the application layer. According to a study done by Microsoft, application failures accounts for approximately 24% of all system-down causes, and these functions of virtualization software can not recover the suspended operations due to application failure.

On the other hand, ExpressCluster is capable of monitoring broad range of system resources including application, OS, hardware and network, allowing it to quickly recover operations in case failure occurs in any of these monitored resources. This is an extremely important point from the viewpoint of **business continuity**.

## 2. Superior Hyper-V Platform Support

Windows Server includes Windows Server Failover Cluster (WSFC) as a Microsoft cluster software product. However, this product is included only in the Enterprise Edition of Windows Server. In the case of a virtual environment built using Hyper-V, which is provided free of charge in the Windows environment, ExpressCluster is a highly effective solution, especially for the Standard Edition of Windows Server, which does not include WSFC. ExpressCluster supports Hyper-V, and can continue to be used even after the user environment is migrated to the Enterprise Edition. Further, ExpressCluster can be used to configure not only clusters that use shared storage, but also clusters that do data mirroring across multiple servers.

### **3. Fast recovery in virtual environment**

The high-availability functions provided as standard feature in virtualization software allows switching of operations of a failed virtual server to another virtual server. However, looking at the total time required to start up the OS of the virtual machine and a business application, it can take 10 minutes from system suspension on one server to the resumption of operation on another server. On other hand, once ExpressCluster has been installed on the guest OS, only the application switching time is required, so the operations of failed server can be promptly switched to the standby server.

### **4. "Made in Japan" quality**

The points that matter the most for HA clustering are reliable failure detection and failover execution. Upon detection of a failure, ExpressCluster switches the tasks running on the current active server to the standby server without exception. For example, if a failure occurs on the current active server owing to a resource shortfall, ExpressCluster is able to force shutdown the server as the result of reliable failover execution. Further, if server shutdown from the OS is not possible, power-down through hardware reset is also possible. This level of functionality is made possible by NEC's combined hardware and software development capabilities.

### **5. Comprehensive business continuity solutions**

ExpressCluster can be used across large number of environments for the automatic operation recovery from system failures, minimization of down-time during periodic planned maintenance, disaster recovery through remote clusters, and so on, to achieve business continuity in all kinds of real world environments.

### **6. Rich functionalities**

Ever since its release in Japan in 1996, ExpressCluster development has kept pace with fast changing market requirements. As a clustering software that protects both data and applications, ExpressCluster naturally comes with failover and disaster recovery functions. In terms of clustering method, it supports both shared-disk clustering and mirroring-type clustering. Further, through flexible support of various server configurations, ranging from two-server active-standby configurations to N+M configurations, ExpressCluster can meet broad array of customer needs.

With regard to failure detection, a pivotal aspect of cluster software, ExpressCluster provides hardware failure detection functions based on NEC's deep server technology knowledge and skills gained through years of experience as the server market leader in Japan. ExpressCluster provides reliable failure detection by monitoring system resources, inclusive of the OS and application layers. In this manner, NEC is continuously improving ExpressCluster to meet the diverse needs of customers, which makes ExpressCluster a more robust and reliable business continuity solution.

## 7. Broad Platform and Application Support

ExpressCluster supports many different types of user environments.

- OS and hardware

Windows and Linux are supported as OS.

The x86 servers of not only NEC but also other major hardware vendors such as HP, Dell, IBM, Fujitsu and Hitachi are supported as hardware.

- Application

Database Servers            Microsoft SQL Server, Oracle DB, IBM DB2, MySQL, PostgreSQL

Email Servers                Microsoft Exchange, Sendmail, Lotus Domino

Virtualization Platforms    VMware Server/ESX, Microsoft Virtual Server, Microsoft Hyper-V, Citrix XenServer

Operating Systems         Windows, Linux (Novell, SUSE and Red Hat)

Application Servers        WebLogic, WebSphere, JRun4, JBoss, OracleAS

Web Servers                 Microsoft IIS, Apache, Tomcat

## 8. Hardware cost reduction

As ExpressCluster is a clustering software which is independent of hardware, it can be used to protect data and applications on existing IT resources without the need to purchase additional hardware. By offering the flexibility to support all kinds of server configurations, ExpressCluster enables the design of environments offering ideal business continuity while minimizing hardware outlays.

## 9. Easy to Use and Manage

Monitoring the operating status of the cluster system is easy, thanks to the intuitive GUI of ExpressCluster. During periodic planned maintenance, the migration of cluster groups and the reallocation of tasks to standby servers can be done with a few mouse clicks. In other words, if ExpressCluster configuration needs to be updated, clustered applications need not to be stopped. For example, changing the failover destination server can be done without stopping applications.

## 10. Over 20,000 successful deployments worldwide

ExpressCluster has a solid track record of customer adoption in Japan as well as China, U.S., Singapore, France, and many other countries.

< Note >

(\*1 ) Source: "High Availability in a Virtualized World" multi-client study, January, 2009

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