



Fault Tolerant Virtualization FOR MICROSOFT WINDOWS SERVER HYPER-V

Continuous Availability and Scalability for Virtualization

Virtualization is driving the need for high availability as one of the most important requirements for data centers. According to TheInfoPro¹, data center servers are hosting more and more virtual machines (VMs). In 2009, each server hosted an average of nine VMs, which was a 28% increase from the prior year. (*TheInfoPro, server study, Q3 2010.*)

To protect the migration of mission critical applications into the virtualized world, NEC is expanding the value of fault tolerance (FT) for virtualization by introducing the first solution for Microsoft[®] Windows Server[®] 2008 R2 with Hyper-V[™]. This solution delivers the continuous availability, scalable performance, and TCO savings required to accelerate the adoption of virtualization technology in data centers, branch offices, and ASPs (application solution providers).

The introduction of Microsoft Hyper-V support on NEC's Express5800 FT Series server family leverages and extends the benefits of both technologies. NEC can now deliver the cost savings and performance improvements of virtualization with the reliability and operational simplicity of fault tolerance.

Microsoft Hyper-V Server allows organizations to consolidate workloads using a standard, familiar user interface and common methodology. With the NEC Express5800/R320 FT Series, this straightforward and highly reliable virtualization solution can consolidate mission critical line of business applications in data centers and branch offices.

While conventional high availability (HA) virtualization approaches provide some level of assurance, these approaches fall short in delivering sustainable service-level agreements (SLA), and can

"With the full support of Windows Server Hyper-V on NEC's next generation FT Server Series, customers can now realize the highest level of virtualization availability for mission critical workloads on Hyper-V in their data centers."

*Bill Laing, Corporate Vice President,
Microsoft Windows Server*

instigate cost and complexity issues. SLAs with conventional HA approaches are challenged because of the time it takes to identify a failure, transition, or even reboot the workload to another physical server, which can lose not only processing resources, but also data that was not written to the storage systems. Additionally, dependent upon the failure, these approaches do not address issues associated with corruption in the file system, database, or application layers – all which require consistency checks or manual intervention - making it difficult to provide a sustainable SLA.

The NEC Express5800 FT Series with Hyper-V is the ideal solution for large data center workloads that require a high level of SLA, as well as a simple and cost-effective solution for mission critical departmental, and branch office workloads. High availability through NEC is affordable because fault tolerance is found on a single logical server, and it does not require a data center or large IT staff to manage the physical or virtual infrastructure.

The union of fault tolerance and virtualization enables NEC Express5800 FT Series to deliver unsurpassed availability, data integrity, operational simplicity and financial savings.



Empowered by Innovation



Availability and Data Integrity

Continuous availability is achieved on NEC Express5800/R320 servers through fully redundant modular hardware featuring industry standard Intel® Xeon® processors. NEC's Gemini Engine™ technology operates the system modules in lockstep to deliver complete redundancy and protection of processing (CPU and memory) and I/O subsystems.

The NEC Express5800 fault tolerant dual modular architecture is designed to enable lockstep processing and comparison of both server modules in real time without performance penalty. Processing of the Hyper-V virtualization layer and guest software occurs concurrently on both modules, eliminating potential downtime when a hardware component fails on either module. The faulty module can be removed from service without loss of Hyper-V state or loss of guest software.

Hardware redundancy of all components – CPU, memory, motherboards, I/O, hard disk drives, and cooling fans – ensures continuous processing and no loss of Hyper-V guest OS, application or client data through any type of host-based failure. This redundancy enables Hyper-V guest OS and applications to be maintained without interruption of service or being taken offline.

Advanced Performance

By utilizing NEC's high performance Gemini Engine, system performance is assured by supporting the full I/O bandwidth of the Intel system architecture. The NEC FT Series delivers full system performance and enhanced I/O capability by offering the ability to load balance through the I/O subsystems in addition to failover. This functionality delivers unique performance advantages to the I/O intensive Hyper-V environment.

In the event of a failure, the system continues operation without an impact on processing performance. The system will log errors and provide appropriate reporting — far more than traditional servers that would be completely down — while providing the same level of uninterrupted processing performance to Hyper-V. When considering the complexity of other forms of high availability, NEC delivers fault tolerance simply with even greater availability.

In the event of a module replacement, the NEC FT Series has the ability to resynchronize into lockstep, or full redundant operation, without rebooting Hyper-V or moving applications. It delivers continuous availability at the same performance level.

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Benefits of NEC FT Series with Hyper-V

- » Unsurpassed Hyper-V Availability
- » Deployment & Infrastructure Simplicity
- » CAPEX & OPEX Savings

Operational Simplicity

Standard remote management tools, simple recovery and in-the-box fault tolerance on the NEC Express5800 FT Series server improves the ease of management for virtualized data centers. For a standard Hyper-V virtualization deployment, no special external infrastructure is required. Other options for high availability server virtualization require additional infrastructure, which adds complexity and expense. The NEC FT Series can deliver continuous availability for Hyper-V by using internal storage and standard management software.

Hyper-V in Windows Server 2008 R2 running on the NEC Express5800 FT Series allows administrators to realize all of the functionality of Hyper-V. Benefits include the ability to add and remove .vhd files, and pass-through disks attached to a virtual SCSI controller on a running VM, without requiring a reboot. It also provides more flexibility in data center backups, as well as in complex Microsoft Exchange® and SQL Server® deployments — all while running in fault tolerance — simply.

“NEC’s solution can be deployed quickly and easily, without the presence of special administrative skills associated with deployment of clustering and failover software.”

IDC, Insight, September 2010

IT managers now for the first time have a solution that delivers a sustainable SLA simply for their Hyper-V high availability deployments.

Cost Savings of Virtualization on NEC FT

The NEC Express5800 FT Series with Hyper-V can lower CAPEX (capital expenses) in infrastructure and licensing, as well as OPEX (operational expenses) in terms of IT resources, maintenance, and power/cooling. Since the NEC FT server provides a single logical server, clients can realize significant license policy savings.