

# ENHANCING SAP HANA® Reliability WITH NEC AND RED HAT®



TECHNOLOGY BRIEF

## Delivering new levels of performance and availability when using SAP HANA in-memory database

### THE POWER OF IN-MEMORY DATABASES

The in-memory database platform is the fastest growing segment in the database market and is forecasted to grow at a 43% CAGR between 2013 and 2018.<sup>1</sup> Until recently, storing and processing larger amounts of data in memory was not an option because of the prohibitively expensive infrastructure and lack of software that was optimized for in-memory computing. Today's in-memory database platforms such as SAP HANA, have changed the way we build and deliver systems. By investing in the in-memory system architecture, organizations are able to realize the benefits of real-time analytics and new levels of transaction throughput, all while reducing the size of the dataset. The traditional approach of storing data on resilient disk and later integrating and analyzing it is no longer acceptable; organizations need to provide the exact business recommendation in seconds, not hours or days.

### THE IN-MEMORY ARCHITECTURE CHALLENGE

Using in-memory systems allows organizations to evolve to a new infrastructure where storing and processing customer data, events, and clickstreams supports the demanding business needs for sub-second, low-latency access to information. This architectural shift of moving persistent data into memory, without the storage, places greater emphasis on the infrastructure used to host the in-memory database. Redundant storage to keep the data intact is no longer an option. The ability of the infrastructure to protect the processing and memory state becomes far more important.

### THE INFRASTRUCTURE SOLUTION

Conventional Intel E7-based servers offer processor and memory protection through an advanced function called the Machine Check Architecture (MCA). The MCA provides the ability to detect and correct memory and processor related errors to a point, however cannot protect all failure scenarios. As memory and processor densities and capacity increase, the likelihood of failures increases. For SAP HANA, given that the database runs in memory, the importance of taking corrective action before an issue arises becomes far more important than for traditional databases.

In the event of a fatal memory or processor core event, an SAP HANA event will also occur, resulting in an outage as well as the potential loss of any data not yet logged. The re-creation of the SAP HANA state can take an extended amount of time to rebuild from log files, not to mention the time to reconnect to the various surrounding applications.

### THE NEC-RED HAT ENTERPRISE SYSTEM COLLABORATION

Before the advent of in-memory systems, NEC worked collaboratively with Red Hat in the development of enterprise systems that delivered dynamic processing and memory functionality. This collaboration resulted in the ability to hot add, remove, and reallocate system resources without system outage through standardized system calls to Red Hat Enterprise Linux. First introduced into Red Hat Enterprise Linux with the NEC Express5800 1000 Series, this core collaboration is what today delivers enhanced reliability, availability, and service (RAS) for SAP HANA.

---

1 Source: <http://www.marketsandmarkets.com/PressReleases/in-memory-computing.asp>



### THE NEC-RED HAT PREDICTIVE FAILURE SOLUTION

The NEC-Red Hat Predictive Failure solution is based on the deep collaboration between NEC and Red Hat surrounding the advanced system calls developed with Enterprise Server collaboration, combined with NEC's predictive failure technology. This combined solution provides a higher level of RAS functionality designed to avert SAP HANA down time.

Through NEC's deep integration and understanding of Intel's MCA, predictive failure action is taken, working hand in hand with Red Hat Enterprise Linux for SAP HANA. This solution allows SAP HANA data and processing threads to be physically moved proactively from infrastructure areas that NEC has identified are prone to failure. SAP HANA memory state is migrated to other physical memory locations through firmware system calls. Additionally, SAP HANA thread execution state is also protected by migrating system execution threads to different cores through firmware system calls.

The combination of these changes provides a higher level of protection to SAP HANA by ensuring corrective action is taken before a critical system state that could cause a system outage, and ensures the system state is not corrupted.

Once the proactive measure is taken, NEC considers this as a service event, and will perform the replacement of the infrastructure component at a non-critical system time. This solution provides SAP HANA Clients the added assurance that SAP HANA in memory applications continue to operate through fatal system errors during critical times, improving overall SAP HANA system availability.

### AN OPERATING SYSTEM TUNED FOR SAP HANA PERFORMANCE

Red Hat Enterprise Linux for SAP HANA delivers the same capabilities and features that over 90% of Fortune 500 companies benefit from with Red Hat Enterprise Linux. The result of a collaborative engineering relationship between SAP and Red Hat, Red Hat Enterprise Linux for SAP HANA includes technology optimized to meet additional requirements unique to SAP HANA, making it simple to deploy.

Feature	Benefit
Reliability	Red Hat Enterprise Linux customers are able to deliver 99.999% up-time to their enterprise users. The rock-solid reliability of Red Hat Enterprise Linux is achieved with the help of advanced hardware reliability, availability, and serviceability (RAS) features.
Performance	When solution providers want to showcase performance, they frequently choose Red Hat Enterprise Linux Server as the platform. This is particularly true when benchmarking criteria like I/O speed that is crucial to the performance of an in-memory data management system like SAP HANA.
Security	Red Hat Enterprise Linux is certified for deployment in government agencies where data protection is of the utmost importance. The security of your Red Hat Enterprise Linux systems is backed by Red Hat's global security response team that rapidly identifies and repairs security issues.