



Certified Storage-Solution:
Open-E Data Storage Server
and Intel® SSR212MC2

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Flexible Storage-Solutions with Open-E DSS and Intel® SSR212MC2

The best storage solutions don't attract attention. Open-E's storage solution offer's enough space, is easy and quick to configure and saves data securely. Furthermore, it doesn't tear a hole in your IT-budget and is flexible and expandable for all tasks.

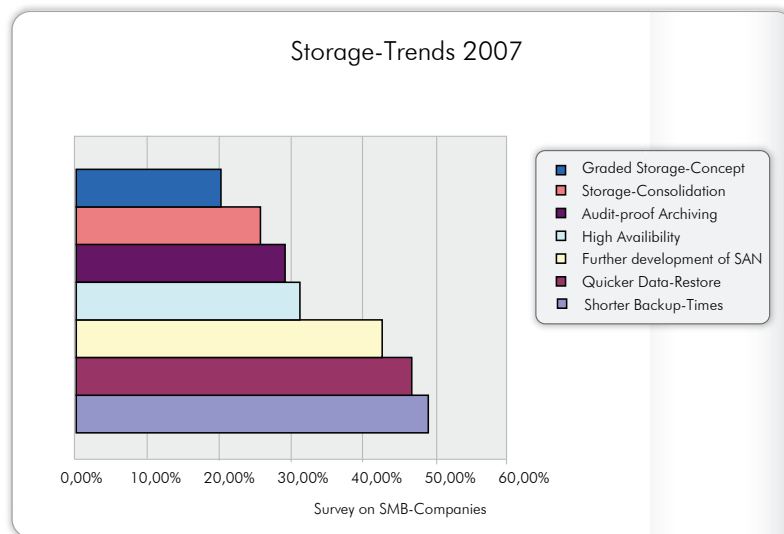
This document shows how you can use the newest generation of Intel® storage servers (SSR212MC2) together with the storage operating system Open-E Data Storage Server (DSS) for secure, flexible, high-performance, and easy to operate storage solutions. If you would like to use the described solution, the Solution Deployment Guide will help you further. This document explains all of the important steps for the deployment, installation, and use of Intel® SSR212MC2 and Open-E DSS.

Term definitions

- **Fibre Channel:** Standard protocol for high speed transfers into → SANs; access to hard drives is block-based;
- **Intel® I/O Acceleration Technology (I/OAT):** Efficient input/output processing in Intel® QuadCore and DualCore CPUs, eliminate bottlenecks;
- **Intel® SSR212MC2:** Hardware platform for storage servers from Intel; Codename McKay Creek; 2 units, rack-mounted, 12x SAS-/SATA connections;
- **iSCSI:** Storage-over-TCP procedure; carries out the operation of storage protocols such as SCSI via TCP/IP;
- **NAS (Network Attached Storage):** Storage devices connected directly to the local network;
- **Open-E DSS:** An easy to operate storage operating system, preinstalled on an internal USB flash module, for the setting up of → NAS or → SAN;
- **SAN (Storage Area Network):** Network for the connection of storage subsystems, separated from the servers;
- **SAS (Serial Attached SCSI):** Serial successor standard from SCSI; uses fast point-to-point connections;

New challenges for storage systems

The business of companies of every size is defined by their processes and the data used. Data security, rapid availability, and short backup and restore times are an absolute must. Especially for small and medium-sized companies, the requirements are even greater, as the stored data often represents the entire foundation of the business. »How can companies sustainably get a grip on the constantly increasing need for storage and higher performance?« Companies without a suitable storage strategy feel the effects directly:



Study: IT-storage for medium-sized businesses: What storage projects are medium-sized companies planning for 2007? Carried out in the second half of 2006 by Smart Research, evaluation of 224 questionnaires sent to medium-sized companies

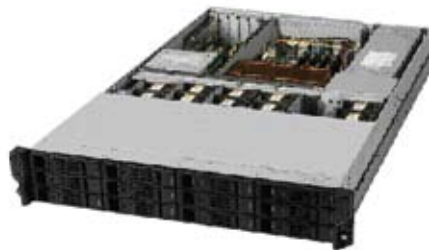
- **Rapidly increasing costs** through constant expansion, reorganisation, and adaptation of the storage environment
- **High administrative effort** for complex enterprise storage solutions not suited to small and medium-sized businesses
- **Legal problems** caused by the non-observance of legally prescribed archiving obligations
- **Non-optimal efficiency** of the existing storage solutions (mostly only between 35 and 50 per cent)
- **Problems with process management:** Companies can no longer react flexibly to market requirements
- **Risks due to breakdowns:** Provided backup/restore functions do not take effect in the event of data loss
- **Lack of scalability:** Connecting additional storage systems requires great effort or isn't possible
- **Inadequate performance:** Storage strategy is not equal to requirements; backups and restore are too slow

Especially for small and medium-sized businesses, the combination of Open-E Data Storage Server and Intel® SSR212MC2 serves well.

A Powerful Team: Open-E DSS and Intel® SSR212MC2

A tailored storage strategy provides a solid basis for streamlining IT processes in companies. The storage platform SSR212MC2 from Intel provides all the necessary prerequisites, and in combination with the storage software from Open-E, you gain an important technological edge in your business. With high performance multi-core processors, Intel provides exactly the right foundation for your applications and users.

Customers thereby profit from the integrated I/O Acceleration Technology, with which bottlenecks in your network are eliminated in a targeted fashion. Your IP storage systems are thereby always ready to use and will be fast enough for all new requirements.



Storage-Server Intel® SSR212MC2

Intel® SSR212MC2 unites high-performance enterprise functions with affordable expansion possibilities through the observance of industry standards.

The simple use of standard components makes the SSR212MC2 of special interest to small and medium-sized businesses. It is thereby possible to use up to 12 SATA or SAS hard drives; even as a mixed assembly. The optional use of 10-Gbit network interface cards, RAID controllers, and NICs with an iSCSI boot option offers flexibility without limits. With Open-E Data Storage Servers, customers get an operating system that is certified for the Intel storage platform. Due to the comprehensive support of the platform, customers can completely exploit all the advantages.



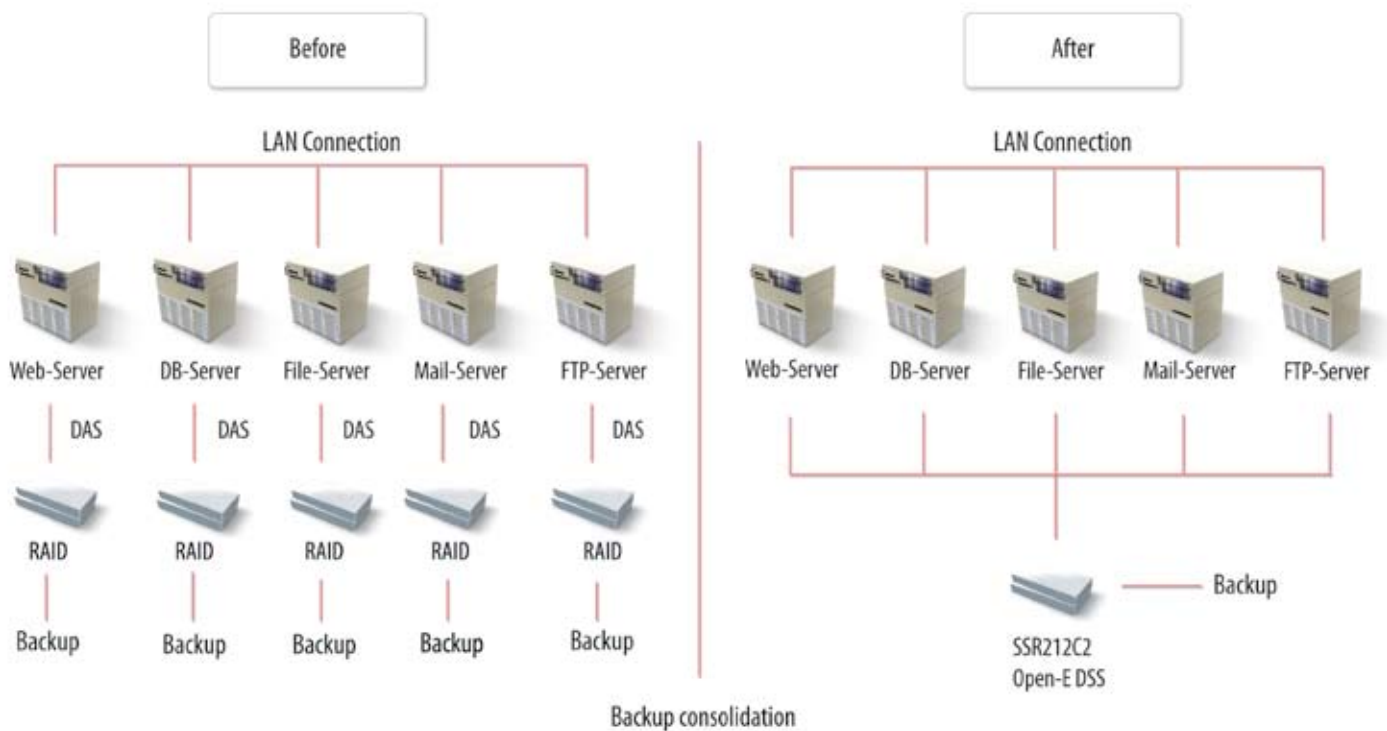
Open-E Data Storage-Server
(internal USB Disk-on-Module)

Regardless of whether to a decision in favour of network attached storage or a storage area network, with Open-E Data Storage Server it is easy to set up the storage strategy that is best suited to a company's needs.

Your backups run fluently and quickly, and you can restore data in a fraction of the time previously spent. The complete control of all possible tasks takes place through the unique Open-E web interface, quickly and without any detours. You don't need to first install administration tools; instead you can start right away.

Following the implementation of an appropriate storage strategy, companies profit from the following effects:

Before	After
a lot of island-solutions	central storage-system
high cost	low cost
limited flexibility	flexible extensibility with standard components
backup strategies are hard to implement	integrated security mechanisms and easy to use backup-tools
a lot of bottlenecks very hard to monitor	easy to use monitoring
bad scalability	top scalability
bad working load	optimal working load



Storage consolidation with SSR212MC2 and Open-E DSS: The server landscape is pre-equipped with directly connected storage devices. Following the consolidation, SSR212MC2 and Open-E DSS take on the storage tasks via IP SAN connection.

Key Technologies: Store quickly and securely

Open-E, in co-operation with Intel®, supplies you with all the components that are necessary for providing your customers with the optimal storage solutions. The Open-E DSS operating system supports the new Intel storage platform in every way. Thanks to the intensive co-operation between Intel and Open-E, customers profit from the rather well-harmonised products and professional support.

Open-E Data Storage Server

Open-E DSS, the compact and reliable storage operating system, stands out from other solutions due to its numerous unique selling points: It is delivered entirely preinstalled and preconfigured on an internal USB-DOM (disk-on-module) flash module, which is plugged into the server system. There are no complex installation routines. Simply plug the module into the SSR212MC2 and you can get started with setting up NAS or SAN in 5 minutes.

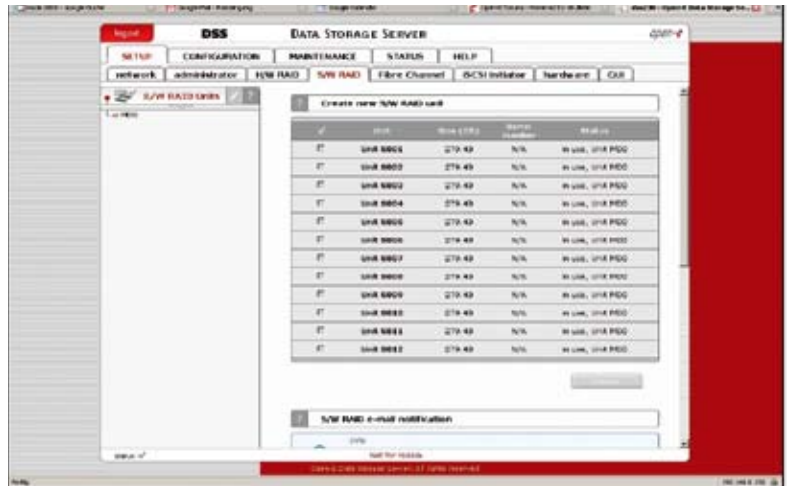
The Open-E Data Storage Server recognizes the complete hardware and automatically installs the drivers of the SAS and RAID controllers, FC-HBAs and Ethernet cards. The flexible foundation of the operating system ensures fast, stable, and secure operation. Via the intuitive web interface, even the setup of complex storage systems remains simple and clear. The key benefits:

- **Easy installation**, administration and monitoring of the storage systems
- **Top performance** thanks to support for the newest Intel technologies
- **Exceptional scalability** through the support of industry standards, risks due to breakdowns are minimized
- **Support of a variety of hardware components** such as RAID or SAS (Certification for Intel® SSR212MC2)
- **Scalability**: Connecting additional storage systems requires less effort and costs
- **Security** through comprehensive backup functions, and the separation of the operating system from user data

Open-E DSS for top performance: The operating system uses the most up-to-date hardware technologies of the Intel® Multi-Core processors, such as Intel® I/O Acceleration Technology. This means secure, and most importantly, fast, flexible, and expandable storage systems.

Open-E DSS and Intel® SSR212MC2 are optimally harmonised, and enable the fast and efficient realisation of all the storage plans of your customers based on the standard components.

Innovative functions, such as the clever combination of SAS and SATA technology, make it possible for your customers to increase availability and flexibility as easily as possible. The support for all of the important storage technologies, such as iSCSI and Fibre Channel, provides the basis for centralised storage management, and secure data management that extends the possibilities of efficient disaster recovery scenarios.

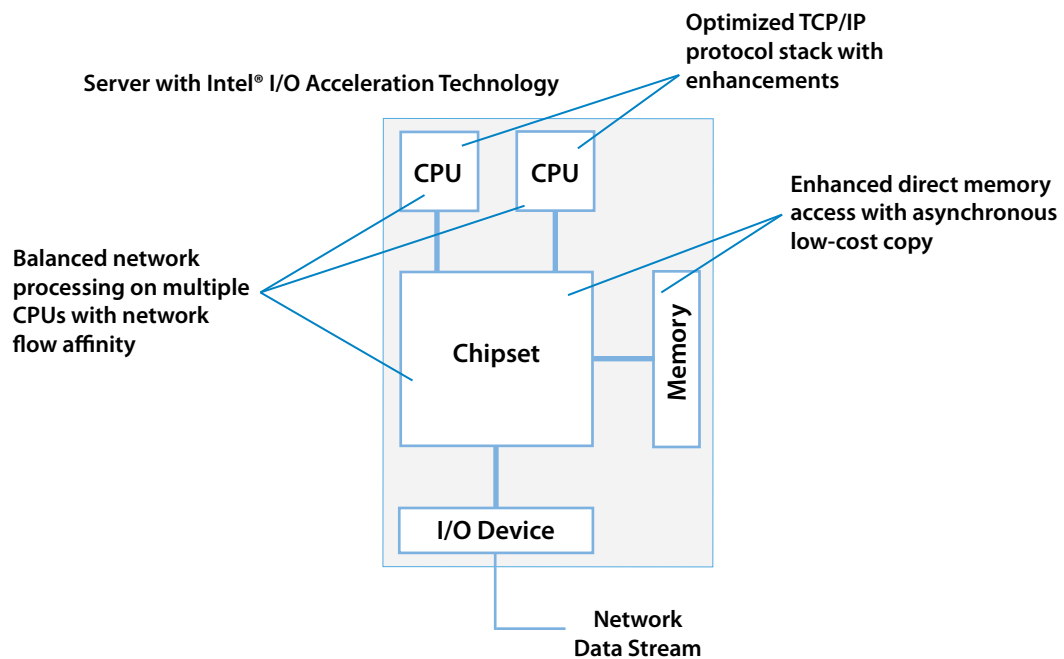


Easy & Fast: All storage tasks are done quickly with the intuitive Web-GUI.

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Intel® I/O Acceleration Technology

This new technology considerably accelerates the network data transfer of the new Intel storage server (double the throughput compared to earlier server platforms). The protocol overhead of TCP/IP thereby reduces I/OAT by up to 40 per cent, and distributes the remaining I/O load cleverly to chip set, RAM, CPU, and NICs. All of the LAN features such as bonding are of course thereby maintained. It is not only the clearly better performance that speaks in favour of I/OAT, but Intel also has improved the scalability and breakdown security. It is possible to use I/OAT with up to eight simultaneously working network interface cards.



Intel I/OAT: Throughput-Optimization for the whole platform. (Source: Intel Corp.)

Multi-Core Technology

Enormously increased performance at a low cost, as well as considerably reduced energy consumption speaks for the Xeon processors with QuadCore and DualCore functionality. Open-E DSS makes use of all the advantages of these Multi-Core platforms.

The top features of the 5300 series are: Intel® Core Microarchitecture, fully buffered DIMM memory, and Intel® Smart Cache as guarantors for high performance storage platforms. Manufactured with the 65 nanometre process, the CPUs provide the reserves needed for all of your storage tasks. Nothing stands in the way of optimising your processes anymore.

iSCSI Boot

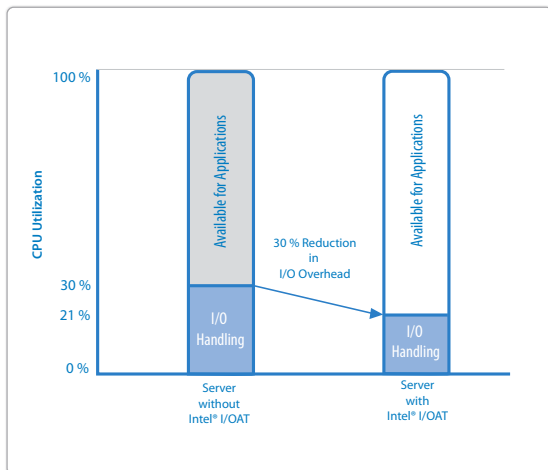
A special highlight: optionally available network interface cards are equipped with an iSCSI boot function, which has previously been offered only in expensive iSCSI HBAs. It is therefore now possible to boot the server from an image via an IP SAN. That is an indispensable feature, especially for virtualisation solutions. Another advantage: You can implement simple backup/restore concepts in the IP SAN with the complete boot images.

Your Benefits

The certified storage team Open-E DSS and Intel® SSR212MC2 offers a technological advance. The main advantage: your customers can optimise their processes for the long-term and can be sure that they will receive professional support at all times.

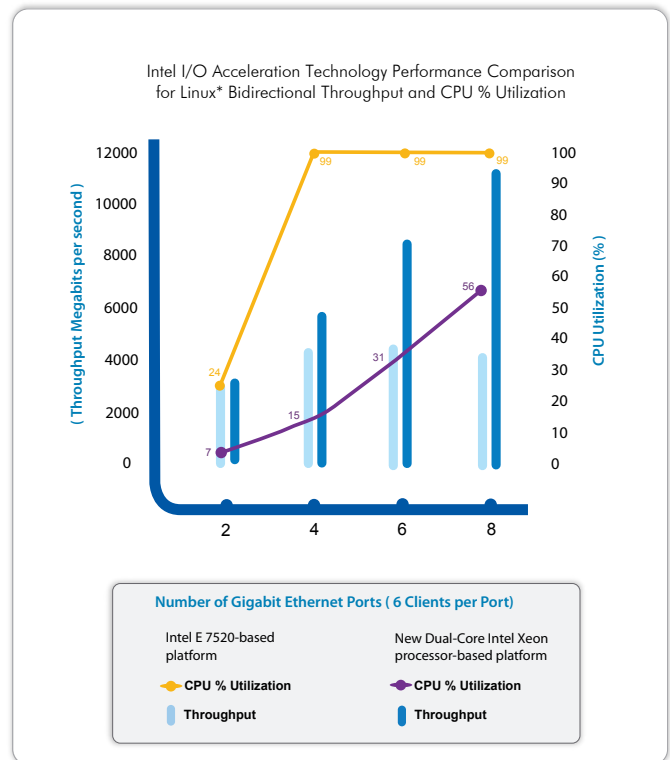
Benefits for your customers

- **More flexibility:** Due to the flexible expandability with standard components such as SAS-/SATA hard drives and RAID controllers, as well as the setting up of NAS or SAN, customers can configure their own individual storage solution. The possibilities extend from file server services through to high-availability storage for databases.
- **Better scalability:** Be fully equipped today for the storage requirements of tomorrow. With Open-E and Intel® SSR212MC2, your customers can start small (for example with NAS) and expand step-by-step (for example IP-SAN). The storage solution grows with the requirements of the processes. For example, you can expand the supported hard drive space with additional license keys of 4, 8, 16, 32, or 64 TByte.



I/OAT reduces I/O-Overhead by 30 percent
(Source: Intel Corp.)

- **Integrated security and increased availability:** Broad support for RAID, backups, replication, snapshots, along with the robust, preconfigured operating system Open-E DSS are guarantees for data security. The strict separation of the operating system and user data also provides protection against the spreading of viruses.
- **Low costs:** Through the simple use of standard components, customers can configure an optimal storage system at an affordable price, for example, starting with affordable SATA hard drives and later converting to high-performance SAS data carriers. The easy commissioning and administration also removes a significant burden from the time budget of your IT department giving you a much higher return on your investment.



(Source: Intel Corp.)

Higher performance: Thanks to the extensive performance potential of the Intel Multi-Core architecture with I/OAT and the broad support of Open-E DSS for these technologies, the SSR212MC2/Open-E team accelerates data through-put processes.

Simple administration: Regardless of whether NAS, SAS, backup, replication, or a system snapshot, with the innovative web interface of Open-E, the setting up of storage solutions becomes a simple task.

Real-World Adoption

Regardless of whether the storage requirements of your customers involve the development of new storage strategies, meeting archiving obligations, implementation of disaster recovery concepts, or migration of legacy applications to better performing environments: With Open-E solutions and Intel® SSR212MC2 you have all the necessary components at hand.

Know-how and practical examples

With an Intel storage server and the Open-E DSS operating system, you can begin with a number of storage solutions. Here a few examples:

Storage consolidation with virtualisation

Open-E DSS and Intel® SSR212MC2 are ideally suited for IT infrastructures with virtualisation. Users can, for example, establish test environments, operate legacy systems, implement disaster recovery concepts, or undertake server consolidation. Concrete implementations generally run with, for example, VMware ESX servers or Xen. The storage server thereby works as a fast iSCSI target.

Accelerate backup/restore

According to a survey carried out by the market research institute Smart Research concerning the most urgent storage tasks for 2007, the reduction of backup times is at the very top of the to-do lists in IT departments.

Storage servers from Intel and Open-E DSS are exceptionally well-suited for this. In place of distributed backups, of which the connected systems are only able to utilise a fraction of, you can centralise your data backups with the presented solution. You can thereby better utilise the storage systems and obtain faster and more reliable backups. For reference projects, the capacity utilisation quota of the storage systems used increased from 30 per cent for a DAS solution, and following the centralisation in the IP-SAN to up to 85 per cent.

Video streaming via IP cameras

The team of Intel storage servers and Open-E DSS is especially suitable for applications with large amounts of data and high demands of data throughput. The reason: The built-in Intel I/OAT and optimal support of this technology by Open-E DSS. Entire new possibilities are made available for customers in the video streaming area. For example, surveillance cameras can be combined with central storage to which the data is streamed via a fast network connection. A second field of usage is medical technology, where not only documented examination results create large quantities of data; live recordings of operations also place very high demands on the storage server used.



Video cameras like the model above can record direct to iSCSI targets (Source: Robert Bosch GmbH).

Perfect database platform for Exchange, Oracle, MySQL

The operating systems of Open-E masters all challenges for a wide range of storage solutions. This is particularly true for databases. With Open-E software, customers have the following benefits:

Benefit 1: Compatible

The Open-E storage systems rely on approved standards for network attached storage and storage area networks. Therefore you can host every database from a small MySQL installation to an Oracle cluster. Popular examples are Microsoft Exchange and Sharepoint for example, because their native file systems work smoothly together with Open-E

Benefit 2: Fast

Mainly the high performance connection to block based SAN predestines Open-E DSS for the adoption as database storage. Together with a certified storage server you use the newest technologies like multicore CPUs or Intel I/O Acceleration Technology. Built-in tuning options like bonding of several network interface cards avoid bottlenecks. This results in shorter backup times. Example systems with two network interfaces reach 180 MByte per second via Multipath

Benefit 3: Easy

Save complexity for your database queries. The storage configuration of Open-E DSS is made easy with an intuitive web interface and takes only a few minutes. There is no time consuming installation because the operating system is preinstalled on an internal USB-DOM (Disk on Module).

Benefit 4: Secure

Your data is stored securely with Open-E. The storage system supports security features like RAID, replication, snapshots and the integration of backup software agents.

Benefit 5: Cluster-ready

Database clusters have only been a solution for big companies with huge IT budgets until now, but with Open-E storage operating systems and standard hardware, small and midsize companies can now do their own installations. Open-E DSS is optimally suited for a database cluster with Oracle RAC.

Premium Support

Open-E and Intel® have subjected the storage solution to the most comprehensive testing and certification processes in order to guarantee security, performance, stability, and conformity with the standards.

Open-E and Intel® support you with your storage projects in marketing, sales, and technology.

You can find Open-E licences and an up-to-date list of the respective partners online at <http://www.open-e.com/partner>

Customers can comfortably test the possibilities at no charge in the form of a demo CD from Open-E DSS (<http://www.open-e.com/demo-cd>)

In order to receive information and technical support for Intel® hardware components, please continue to address your enquiries to your existing Intel® Support Services (<http://www.intel.com/support>).

You can find the relevant Intel reseller at <http://www.intel.com/reseller>

Further reading

Background, quick-start guides, white papers, and technical information about Open-E and Open-E products: www.open-e.com/products

Background and technical information about Intel® SSR212MC2: www.intel.com/products/server/storage/index.htm

You can find further information about other Intel solutions at: www.intel.com/go/solutions