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Open-E Data Storage Software and Intel Modular Server – a certified virtualization solution



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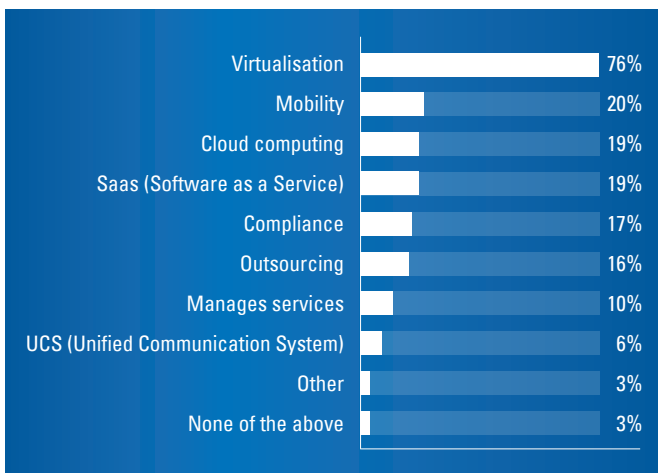
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1. New challenges for SME IT environments

Today's small businesses need information system infrastructure that are optimally compact, support virtualization, cloud computing, and storage management, deliver outstanding performance, and use a minimum amount of energy. The solutions described in this article meet many of these criteria.

Virtualization trends in 2009

Capital investments in virtualization solutions over the next 18 months



An International Data Corporation (IDC) study on virtualization showed that the lion's share of information system investments in 2009 and 2010 will be realized for virtualization solutions.

- Rapidly rising costs resulting from continuous IT infrastructure expansion, restructuring and modification.
- SMEs cannot afford the steep administrative cost entailed by complex IT environments.
- Legal problems resulting from non-compliance with the applicable regulations.

Suboptimal efficiency and capacity use of existing data server and storage infrastructures (usually between 15 and 50 percent)

SMEs are unable to react flexibly enough to process management related market requirements

Lack of redundancy and suboptimal backup and restore functions resulting from system failures often lead to data loss

Lack of scalability makes IT infrastructure expansion via servers and additional storage systems unfeasible or unduly labor intensive

2. Open-E DSS V6 and Intel Modular Server: the ideal virtualization

Open-E data storage software V6 (DSS V6) is an integrated file and block storage management operating system featuring Network Attached Storage (NAS), iSCSI, InfiniBand and Fiber Channel Storage Area Network (SAN) functionality.

Open-E DSS V6 delivers outstanding performance, security and scalability for a fraction of the cost of other storage solutions. Extended Open-E DSS V6 functions include data and volume replication, volume snapshots, and automatic failover for volume replication. Open-E DSS V6 also supports numerous hardware RAID platforms, as well as the Intel Modular Server storage unit.

Open-E DSS V6 also enables users to combine NAS and iSCSI SAN systems and connect multiple network interfaces controllers including 1 and 10 Gbit Ethernet/fiber channel, and features integrated virus protection.

Open-E DSS V6 is available as classic software, and can also be integrated into a virtual environment as a virtual appliance.



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Open-E storage systems are easy to install, administer and monitor.

Top performance thanks to support of latest generation Intel technologies.

Outstanding scalability via support of industry standards, thus reducing downtime risk.

Supports numerous hardware components such as Intel Modular Server, RAID and SAS.

Scalability thanks to the solution's extensibility, extra storage systems, low cost, and low maintenance.

Security thanks to comprehensive backup functions and separate user data and OS domains.

Top performance with Open-E DSS V6: This operating system uses latest generation Intel multi-core processors, thus guaranteeing extremely secure and above all fast, versatile and scalable virtual systems.

Open-E DSS V6 and Intel Modular Server are optimally compatible solutions that allow for rapid and efficient implementation of all virtual-system requirements based on standard components.

Advanced functions such as intelligent server/storage technology combinations allow for an exceptionally high availability and versatility. Support for all key virtualization, server and storage technologies provides the basis for central management, secure data storage, and reliable server systems.

Intel Modular Server is an integrated Intel Multi-Flex Technology based system featuring SAN memory, computers and networks that keep pace with the growing requirements of enterprise IT infrastructures. The fact that Intel Modular Server computer, network and storage functions are integrated into a single system makes this an ideal solution for small businesses.

The integrated server system supports up to six server blades and 14 2.5 inch SAS hard drives, as well as two Ethernet switch modules and a management module.



Intel Modular Server: The All-in-One Server offers everything a small and medium company requires.

The system is ideal for small businesses whose IT requirements are growing, but that have limited financial resources and wish to ramp up their server capacity incrementally. The use of modular servers based on Intel Multi-Flex Technology allows small businesses to obtain additional server and data storage capacity, as well as a highly reliable and affordable solution that integrates management functions.

Scalable server computing capacity: supports up to six Intel Xeon Multi-Core dual processor based Server Compute Modules.

Virtual, integrated and shared-use storage: server modules without their own hard drives use integrated SAN featuring virtual drives, with a view to ramping up versatility and maximizing storage capacity. The timing and scope of system procurement can be fully adapted to individual needs.

Management via Virtual Presence user interfaces allows for system management via virtual presence.

Integrated network: dual GB Ethernet switches offer up to ten 1 GbE connections per module.



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Reliable solution thanks to redundant components: Server Compute Modules and storage drives can be replaced in go-live mode and allow for immediate performance ramp-up. Redundant modules and hot spare options optimize the IT availability of Intel Modular Server.

The casing power supply is rated for 100 to 240 V, thus allowing for worldwide use of Open-E. The use of compact power supplies and fans reduces operating costs.



Connectivity: The Intel Modular Server offers connections for any kind of applications.

3. Advantages for you

The virtualization combination comprising Open-E DSS V6 and Intel Modular Server represents a major technical advance that enables your customers to optimize and secure their IT processes over the long term and ensures that they will receive long term professional support.

Compact structure. Thanks to the compact form of the server chassis and the system's versatile extendibility up to six blades and 14 hard drives, the system saves space over the long term, thus obviating the need for additional storage space and cooling systems. The direct integration of storage capacity greatly optimizes this advantage.

Better scalability. The use of modular servers in conjunction with virtualization and virtual storage solutions (as virtual appliances) allows enterprises to adapt their IT environments to evolving needs incrementally. Thus additional blades, storage capacity and/or virtual appliances can be integrated depending on whether improved performance, higher capacity, or optimization availability is needed.

Higher capacity. Thanks to the comprehensive performance potential of Multi-Core Architecture, high performance Hypervisor technology, and optimal Open-E support, the performance of entire enterprise IT systems can be ramped up.

Integrated security mechanisms and optimized availability. Support via RAID, backups, replication, and snapshots, in conjunction with the reliable and preconfigured Open-E DSS V6 operating system, are key when it comes to data security. Strict separation of data and operating system also helps protect against virus propagation. And what's more, even in the event of two Open-E DSS V6 system failovers, extended availability is still enabled.

Lower energy costs. Server virtualization, as well as the compact design and the optimal resource use of computer modules via their storage components and virtually deployed server system, allow for significant energy cost reductions.

Streamlined system management. Regardless of whether servers or storage solutions need to be managed, servers, NAS, SAS, backups, replications and system snapshots are all extremely easy to configure and manage thanks to Intel's advanced Open-E DSS V6 Web interfaces.



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4. Configuration options

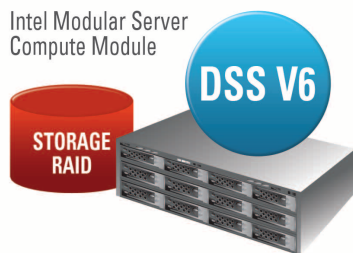
The combined use of Open-E DSS V6, Intel Modular Server and Microsoft, VMware, and XEN virtualization solutions allows for numerous configuration options, function extensions, internal storage management, system availability ramp-up, integration of external storage solutions, and scalability optimization.

1. Single Storage Server (Compute Module)

Intel's Single Storage Server is a simple, high performance solution involving Open-E DSS V6 installation on a small partition that is assigned to a server, whose LUN capacity need only be 2 GBs.

This server is used solely to manage internal storage pools, and in conjunction with basic Intel Modular Server functions, provides snapshot and backup/restore capacity, and above all allows for greatly simplified system management.

This configuration also allows for the realization of bootable Open-E DSS V6 LUN via the BIOS of various Compute Modules. In the event of a blade malfunction, another blade takes over, thus ensuring fail-safe availability. This feature is available in all configurations.



Single Storage Server

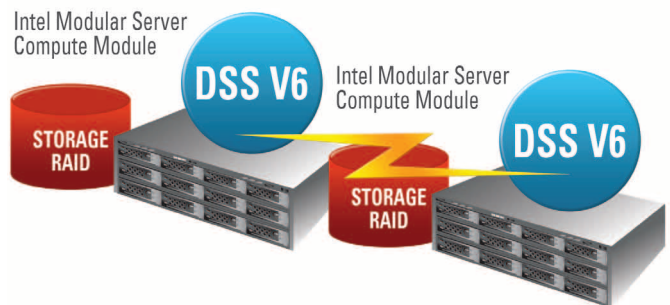
Advantages

- Easy to install via the transfer of Open-E DSS V6 to a small internal LUNs
- Extended management functionality

2. Dual Storage Server including failover (Compute Module)

The setup for this installation is essentially the same as for the Single Storage Server version described above, except that two 2 GB LUNs are installed, and are connected to different blades. Thus two Compute Modules in lieu of a server are used for the storage solution.

The advantage of this lies in the Open-E failover function that features volume synchronization, thus providing fail-safe protection via a hot spare operation in the event of a storage unit failure. This also means that, inasmuch as Intel Modular Server supports the provisioning of various RAID arrays, if one server fails the second server can take over its functions without any data loss or transition time.



Dual Storage Server inkl. Failover

Advantages

- Easy to install via Open-E DSS V6 transfer to a small internal LUN
- Outstanding availability thanks to Open-E's failover function
- Expanded capabilities for standard Intel Modular Server storage management.

3. Single Virtual Storage Server (Virtual Appliance)

The Single Virtual Server is achieved via simple configuration of Open-E Data Storage Software via a virtual appliance on a virtual server that is installed on an Intel Modular Server Compute Module, without the need for specific customization (only a 2 GB LUN is needed). This configuration allows for the installation not only of DSS V6, but other servers as well, and in this turn optimized blade capacity use. What's more, all Open-E Data Storage Software functions are retained, thus allowing for extension of basic Intel Modular Server storage management functions.



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Intel Modular Server Compute Module



Single Virtual Storage Server

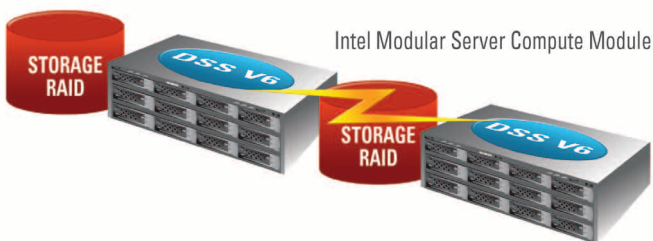
Advantages

- Simple installation via a virtual appliance
- Minimal resource use as a virtual machine
- Expanded management capabilities for standard Intel Modular Server storage management.

4. Dual Storage Server including failover (virtual appliance)

The combination of Open-E Dual Storage Server and Intel Modular Server is the optimal solution for high reliability in enterprise information systems. To this end, Open-E DSS V6 is installed in two Compute Modules, thus allowing for distribution of the available storage units. All elements remain encapsulated with a single unit, and the Compute Modules and Open-E DSS V6 can be interconnected via a failover function. Internal storage capacities are provided in hot running mode, and a failure induces no operational slowdown.

Intel Modular Server Compute Module



Dual Virtual Storage Server inkl. Failover

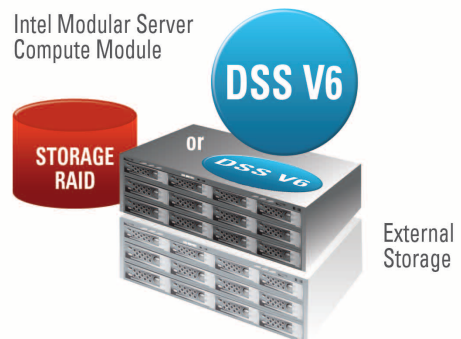
Advantages

- Optimal availability with minimal resource use
- Outstanding availability thanks to Open-E's failover function
- High availability through the use of virtualization (HA) clusters

5. External Storage Solution

If all storage resources in the Intel Modular Server are being used and additional resources are needed, Open-E Data Storage Software integrates an option that allows for connection of an additional storage server as an external solution that provides the same functions and features as Intel Modular Server. What's more, in combination with this external solution, the failover function for Intel Modular Server storage functions allows for optimal data security and extremely high availability.

Intel Modular Server Compute Module



External Storage Solution

Advantages

- Optimized storage capacity thanks to external extension
- Integrated storage management and integration
- Outstanding availability thanks to Open-E's failover function



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5. Advantages of Open-E at a glance

Compatibility

Open-E storage systems are based on established Network Attached Storage (NAS) and Storage Area Network (SAN) standards, which are compatible with all types of databases, files, applications and other data structures such as Oracle databases, Exchange and SharePoint – all of which are fully interoperable with Open-E.

Speed and efficiency

Outstanding performance in conjunction with block based SAN makes Open-E DSS V6 ideal for use in database environments with high data volumes. What's more, integrated tuning options such as bonding prevent bottlenecks, thus allowing for shorter backup times and considerably higher data transfer rates.

Simplicity

Open-E's storage configurations can be implemented in a manner of minutes via an intuitive Web interface. No time consuming installation is needed since the operating system is available as a virtual appliance and as an installable version can be installed on a small 2GB LUN.

Secure data storage

Open-E allows for secure data storage, in that it supports data security functions such as RAID, replication, snapshots and backup software agent integration.

Scalability

The use of Intel Modular Server makes Open-E an optimal solution for small businesses that need simple and cost efficient IT system scalability. Open-E allows customers to ramp up hard drive capacity, extend Compute Modules, and implement additional Open-E DSS V6 solutions.

6. Support

Open-E has undergone an exhaustive testing and certification process, thus ensuring that the solution will deliver outstanding security, performance and stability, and that it complies with all applicable standards.

Open-E/Intel provides customers with support for sales, marketing and IT projects.

You can license and update Open-E from our partners, of whom a list is available at <http://www.open-e.com/partner>.

A 60 day free-trial of Open-E with unlimited storage capacity is available from <http://www.open-e.com/trial>.

For information and technical support regarding Intel hardware components, visit Intel Support Services at <http://www.intel.com/support>.

For a list of Intel resellers, visit <http://www.intel.com/reseller>.

References

<http://www.open-e.com/products>
www.open-e.com/library

Basic information, a Quick Start Guide, white papers, and technical information regarding Open-E and Open-E products are available at <http://www.open-e.com/products>

Background and technical information regarding Intel Modular Server are available at <http://www.intel.com/products/server/modular-server/modular-server/modular-server-overview.htm>

For further information regarding Intel solutions, visit <http://www.intel.com/go/solutions>.



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7. Terminologies

Intel Modular Server

Intel Modular Server, which is based on Intel Multi-Flex technology, integrates a memory, computer, and network, thus streamlining what would otherwise be a complex information system environment. Intel Modular Server is a server system that allows for uninterrupted installation, seamless migration and scaleable growth for small businesses in a compact format. A versatile and high performance system for small businesses, Intel Modular Server supports six Server Compute Modules, 14 2.5 inch SAS hard drives, two Ethernet switch modules, integrated SAN and a management module.

Open-E DSS V6

Open-E Data Storage Software V6 is an all in one IP storage operating system that combines NAS, iSCSI (target and initiator) and FC functions into a single operating system. Open-E DSS V6 is an extremely cost effective solution that allows for extended management functions and IT environment reliability for businesses of all sizes.

SAN (Storage Area Network)

A Storage Area Network (SAN) is a network comprising servers and the memory resources supported thereby, and is thus fundamentally different from a Local Area Network (LAN). SAN data traffic is mainly realized via block-based data, which is used for communication between two computers and their ATA and SCSI drives. In block-based data communication, the participating computers request individual data blocks from their hard drives. Most SANs use the SCSI communication protocol, which is based on the Fiber Channel (FC) or iSCSI transport protocol.

SAS (Serial Attached SCSI)

The precursor of SAS was the parallel interface SCSI and its final standard known as Ultra-320 SCSI. However the latter constituted the physical boundaries of SCSI since the signal runtime of the various bits on the parallel bus differed too much. This prompted the development of a new serial interface that allowed for higher reserve performance. Inasmuch as the Serial ATA (S-ATA) interface had already been introduced for desktop computers, the successor to SCSI was realized in such a way as to make it largely compatible with S-ATA so as to reduce the scope of future development and manufacturing costs.

Virtualization

There are varying definitions of virtualization, since the term has different meanings according to application domain. Numerous types of hardware and software solutions and technologies use the term virtualization, of which a very broad definition is as follows: virtualization refers to methods that allow for the consolidation or distribution of computer resources, particularly for servers.

Virtual appliance

A virtual appliance (virtual machine) is a virtual computer consisting of software only. A number of virtual appliances can be run simultaneously on a physical computer. Virtual appliances are realized as runtime environments or operating systems. In the latter case, virtual machines can be realized as software only, can be supported via Intel VT hardware and firmware, or can be realized solely as hardware and firmware.