HP storage

June 2003

invent

Technical blueprint

HP StorageWorks Disaster Tolerant Solution for mySAP Business Suite on EVA

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Executive summary

The HP StorageWorks Disaster Tolerant Solution for mySAP Business Suite enhances a high-availability cluster solution on various platforms with the disaster tolerant capabilities of HP StorageWorks Continuous Access (CA) Enterprise Virtual Array (EVA), maintaining application high performance I/O loads with respect to the distance between the two sites.

Replicating the entire SAP database is a robust, high-performing, managed solution for SAP customers. The solution measures failover/recovery time in minutes at a remote computing site. This scenario allows existing HP StorageWorks EVA customers a straightforward enhancement of their environment using CA EVA.

Replicating only SAP database redo log information by CA EVA using the Oracle Standby Database mechanism also provides disaster tolerant functionality up to the latest transactional update. In addition, this scenario requires less bandwidth when the Storage Area Network (SAN) has to span a wider distance and allows database changes to be propagated with a time delay at the alternate site to protect the standby database from human error. The trade-off for this scenario is the additional management effort required to maintain the standby database and the Oracle database expertise necessary in case of a site failover.

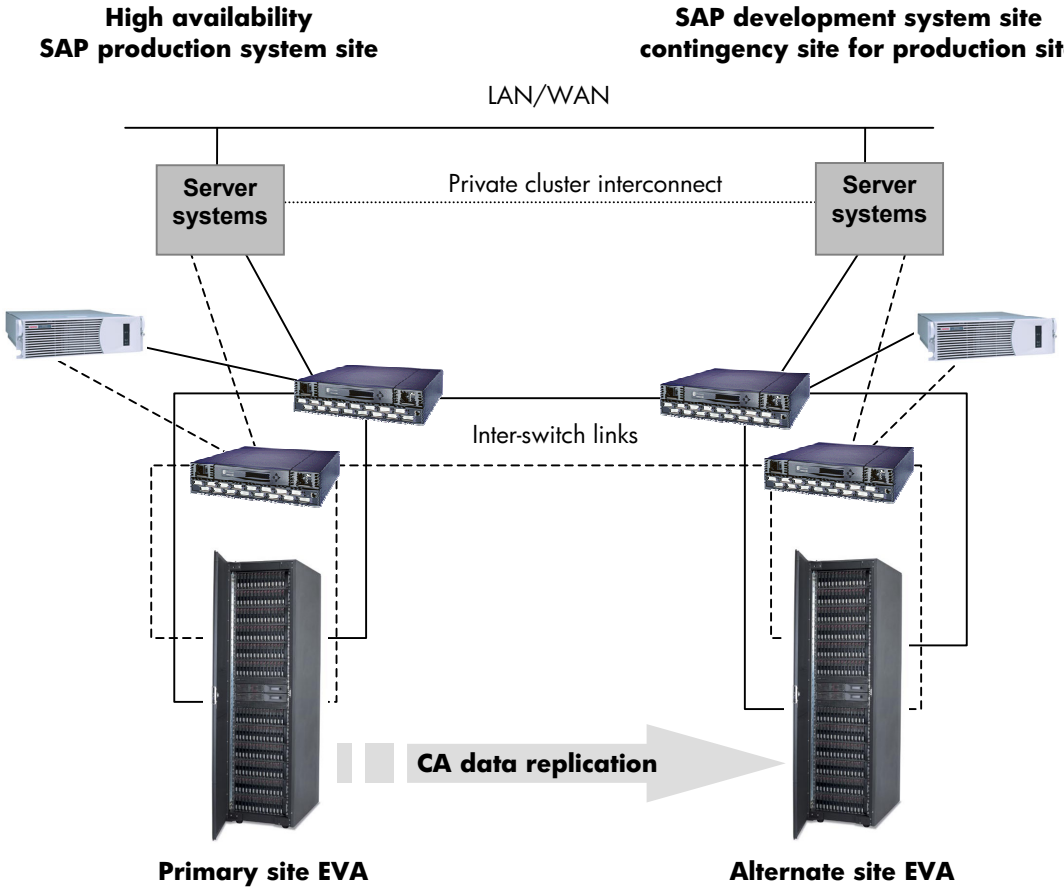
Business needs

When data security and availability are critical to the success of their businesses, SAP customers require a computing solution that protects their information systems from disasters, such as power outages, earthquakes, fires, floods, or acts of vandalism. The effects of a disaster range from temporary loss of availability to outright physical destruction of a facility and its assets. In the event of such a disaster, the mySAP Business Suite setup must allow customers to shift their information-processing activities to another site as quickly as possible. Therefore, procedures for disaster recovery must be predictable, well-defined, and immune to human error.

Disaster tolerance based on CA EVA is characterized by a short recovery time and avoidance of data loss. In a disaster tolerant system based on this approach, redundant, active servers and client interconnects are located at geographically separated sites. As SAP applications produce data, this data is replicated by CA, whose function is to maintain consistent replicas of the data at each site. Should the system at one site suffer a disaster, SAP instances that were running at the now-disabled site can be failed over to a surviving site that has the resources to support them. The process of failing over a mySAP Business Suite application to the alternate node involves making the application's replicated data accessible and starting instances on the destination node to restore application availability.

Solution design and design rules

The solution is based on configuring a disaster tolerant mySAP Business Suite landscape distributed over distant computer sites by combining CA EVA with a high-availability cluster solution. In a cluster configuration using CA, some member systems reside at one site, and the others reside at a different site. A mySAP Business Suite application can run the database server on the primary (local) site and the corresponding central instance or one dialog instance on the alternate (remote) site. All I/Os occur on the storage subsystem on the primary site under non-disaster conditions. CA has exclusive access to storage at the alternate site, to which it replicates synchronously the I/O performed on the storage of the primary site. If a significant failure occurs at the primary site, data processing can be resumed at the alternate site where the data is intact and consistent.



The HP StorageWorks Disaster Tolerant Solution for mySAP Business Suite on EVA takes advantage of the best features of both the CA and the high-availability technology of the specific-server platform. Cluster members can span distances across a commercial or college campus to a distance of up to 100 km depending on the platform and the inter-switch link type of the SAN. Data replication hardware ensures correct and consistent mirroring across sites, while the HP management features for various platforms allow you to manage all cluster members, regardless of whether they are at the local or remote site. These capabilities save time during normal system administration and recovery procedures. Although storage failover across sites is a human decision, cluster resources automatically restart mySAP Business Suite applications at the alternate site when the systems are rebooted after a site failover is complete.

Component review

CA EVA

CA EVA is a controller-based data replication software solution for disaster tolerance and data movement that works with HSV-based storage systems and allows all data to be mirrored between storage elements in currently two different storage arrays that can be in separate geographical locations. Each I/O write access is sent to both storage locations, and reads occur only at the local storage location. CA EVA copies data online and synchronously in real time to remote locations by a local or extended SAN.

Regard CA EVA on the HSV controller as enhanced pendant to the HP StorageWorks Data Replication Manager (DRM) product on the HSG80 controller to which the existing HP datasafe solutions for SAP are related. The major enhanced features of CA EVA compared to DRM in a SAP environment are:

- Enhanced capacity and performance per storage subsystem
- Simplified setup and management of the overall disaster tolerant solution
- Bi-directional replication for a multi-instance SAP landscape

CA EVA supports all major operating system platforms and various options to connect the FC switches between the primary and the alternate site. The Continuous Access EVA Design Reference Guide list in the SAN solution checklist section actually supported platforms and Intersite Link options that are valid for a mySAP Business Application as well.

Oracle Storage Compatibility Program

As part of the Oracles Storage Compatibility Program (OSCP), Oracle created a suite that tests remote mirroring technologies to ensure their compatibility with Oracle databases. The self-test suite is provided for qualified vendors. HP chose to implement these tests. As a member of OSCP, HP has successfully completed all test requirements stated in Oracle's remote mirroring test suite. The results were submitted to Oracle for verification and approved for entry in the program.

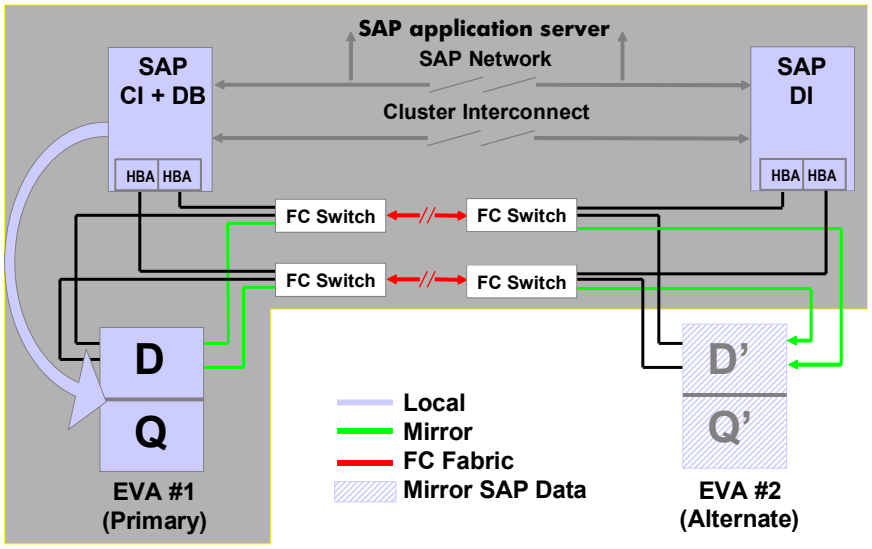
Microsoft cluster service and Oracle fail safe in an SAP environment

The Microsoft Cluster Service (MSCS) provides high availability for services and resources in a two-node advanced server and up to four nodes in a data center configuration. MSCS allows every node in a cluster to be actively running. In case of a failure, the protected SAP database, the central instance, or a dialog instance would fail over to a surviving node that would assume the additional workload. The cluster server groups resources, such as network names, IP addresses, or disks, and forms "virtual servers" with which clients communicate. The group or virtual server can run on any physical server at any point in time.

The Oracle Fail Safe product, integrated with MSCS, is responsible for failing over and restarting the SAP database on a surviving node in the solution configuration. The SAP database in an Oracle active-passive configuration with a single instance runs on one of the cluster members.

Synergy of components

In a CA EVA environment, two major configuration options exist for replicating the Oracle database synchronously to the alternate site with no potential data loss.



Replicating the entire Oracle database

In this configuration, all volumes that contain either Oracle data files, online redo log files, or control files are configured equally at both sites and linked to each other by a copy set on the HSV level. In a database environment all copy sets are treated as a single entity if they are in the same Data Replication (DR) group.

Replicating Oracle redo log information only

The Oracle standby database mechanism is used only to replicate Oracle redo log information to the target site by way of CA EVA to achieve a disaster tolerant state for the SAP Oracle database. Using the Oracle standby database mechanism without CA is a common approach at SAP customer sites today. These customers accept that the latest transactional updates in the Oracle database might get lost in the event of a disaster at the primary site. The setup of an Oracle standby database is integrated in the SAPDBA utility.

CA disaster management

An essential part of a CA-based disaster tolerant solution is the mechanism for managing a planned/unplanned failover or failback operation in the event of a disaster or during maintenance operations. CA EVA functionality can be managed with either the EVA default management interface command view EVA, the command line interface SSSU for scripting purposes, or the new graphical CA User Interface (UI).

Which interface an SAP customer plans to use depends on the customer's preference and the complexity of the CA EVA implementation. The advantage of command view EVA is that the customer would use one single interface to manage an EVA for all management activities while the advantage of the CA UI is that this interface is dedicated to CA and the probability of a human error in a disaster situation is reduced to a minimum.

Adaptable – extensible – controllable

Adaptable: SAP and Microsoft cluster environments

The HP StorageWorks Disaster Tolerant Solution for mySAP Business Suite on EVA enhances the Microsoft high-availability features with the disaster tolerant capabilities of CA EVA, maintaining application performance dependant on the distance between the two sites. The CA overhead in a write-intensive SAP-specific workload can be neglected compared to the same workload without CA in a zero latency SAN.

Extensible: enabling you to do business they way you choose to

Two approaches to replication were tested in the solution. Replicating the entire SAP database is a robust, managed solution for SAP customers. The solution measures failover/recovery time in minutes at a remote computing site. A medium-sized SAP configuration placed on six Vdisks can fail over to a recovery site in less than 9 minutes. This scenario allows existing HP StorageWorks customers a straightforward enhancement of their environment using CA.

Replicating only SAP database redo log information by CA using the Oracle standby database mechanism also provides disaster tolerant functionality up to the latest transactional update. In addition, this scenario requires less bandwidth and allows database changes to be propagated with a time delay at the target site to protect the standby database from human error. The trade-off for this scenario is the additional management effort required to maintain the standby database and the Oracle database expertise necessary in the event of a site failover, creating a longer failover time.

Controllable

An important consideration in a SAP customer's disaster tolerance plan is the necessary time it takes to be in a disaster tolerant state again following a disaster and subsequent failover. Resynchronizing of CA copy sets in a zero latency SAN for a medium-sized SAP database is in the range of up to 80 MB/s between the primary and alternate site with direct fiber ISLs. As distance between the sites and the latency of the SAN increase, the throughput is in direct relation to these criteria and can be reduced. This could cause a full resynchronization of an SAP database to take days or even weeks. In this case the Oracle standby database scenario makes it possible to restore a backup from tape on the target site and to roll forward using archived redo log information.

Solution-specific configuration

Hardware sample configuration

The solution is not limited to PL8500 servers or a specific amount of memory or the number of switches. Every HA/F500-enhanced disaster tolerant configuration meets the requirements HP StorageWorks Disaster Tolerant Solution for mySAP Business Suite on EVA.[1]

	Primary site	#	Alternate site	#
Server	PL8500	1	PL8500	1
	CPU	8	CPU	8
	4-GB memory		4-GB memory	
	KGPSA-BC	2	KGPSA-BC	2
Storage	EVA 2C2D	1	EVA 2C2D	1
	10K RPM FC disk drives	28	10K RPM FC disk drives	28
FC infrastructure	SAN Switch/16	1	SAN Switch/16	1
	SAN Switch 2/8-EL	1	SAN Switch 2/8-EL	1
SAN management		1		1
Client (SAP)	ML370			
Network	Servers and clients are connected by way of a 10/100 NICs			

Software

Software	Version
Windows 2000 Advanced Server / Data Center	SP3
HP StorageWorks Secure Path	4.0
Array Controller Version VCS	3.0
Fabric OS	2.6h/3.0.2k
SAP R/3	4.6D
Oracle	8.1.7

[1] The ProLiant Cluster HA/F500 for EVA Enhanced DT will be qualified in June 2003.

Why HP

- **Ensures continuous uptime** by systematically eliminating single points of failure across the board—from the hardware right up to the SAP application level. HP solutions for SAP provide instant, automated switchover for hardware, OS, database, and SAP components, ensuring service continuity in the event of failure.
- **Delivers security** with solutions that perform encryption for secure transactions and instant authorization/authentication checks.
- **Prepares you for sudden load peaks** by keeping extra CPU and storage capacity on standby for instant activation whenever needed.
- **Enables rapid deployment of mySAP Business Suite solutions** because HP consultants, cooperating closely with SAP, use a structured approach based on SAP best practices to help customers design and implement the IT infrastructure that their enterprise needs to ensure a smooth, speedy rollout of mySAP.com solutions.
- **Provides end-to-end control** of the entire SAP environment with management tools and support services that manage every component, from hardware to application—even in distributed, Internet-based system environments.
- **Enables faster recovery time** to ensure that the customer's SAP environment is restored with minimal impact to their business.
- **Provides the highest level of storage performance in the industry,** which contributes to higher productivity of the customer's SAP resources.

For more information

To learn more about HP storage solutions for SAP, contact your local HP sales representative or visit our Web site at: http://www.hp.com/.

06/2003