Abstract

Business continuity is a critical component of any enterprise data protection strategy and this is especially important in mission-critical SAP environments. This paper explores strategies for business continuity and disaster recovery of SAP using EMC® RecoverPoint and references customer use cases to validate these strategies and demonstrate the benefits to the business.

March 2011
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Executive summary

Business continuity is a critical component of any enterprise data protection strategy. You must determine which applications and what data need to be protected, and why. You must understand that the design you implement will be part of an overall strategy to ensure that your business continues to run. Your business continuity strategy will be a lasting part of your organization and must be flexible enough to adapt to changes in your business. The implementation itself requires a broad range of skills across the entire organization. Finally, you should approach business continuity with the mindset of recovering your business, not simply shipping data from one site to the next.

Business continuity strategies

When evaluating different continuity strategies, it is often difficult to meet recovery point objectives (RPO) and recovery time objectives (RTO) under certain business objectives. For example, as shown in Figure 1, consider the following:

- Nightly operational backups provide 24-hour or longer recovery times.
- Disk-based snapshots are able to reduce the recovery time to several hours.
- Continuous replication enables quick recovery and minimizes data loss in the event of data corruption.

Definitions

Federated consistency groups: Federated consistency groups are related applications that span multiple servers and storage arrays. Each application may have its own RPO and RTO policies governing the protection and recoverability of the application’s data.

Parallelized tasks: In the context of DR testing and used in conjunction with consistency groups, parallelized tasks improve efficiency and result in shorter system recovery times by enabling multiple processes to be run simultaneously.

Recovery: A true recovery for SAP business continuity purposes means that all related and interdependent applications are up, running, and working together.

Recovery point objective (RPO): RPO addresses the age of files that must be recovered from backup storage for normal operations to resume after a computer, system, or network goes down. RPO is expressed backward in time from the instant at which the failure occurs, and can be specified in seconds, minutes, hours, or days.

Recovery time objective (RTO): RTO is the maximum acceptable length of time that a computer, system, network, or application can be down after a failure or disaster occurs. The RTO is a function of the extent to which the interruption disrupts normal operations and the amount of revenue lost as a result of the disaster.
The core of a business continuity plan is the disaster recovery (DR) strategy—the ability to maintain an acceptable level of operational continuity after any event that impacts data center availability. A key consideration in DR is having sufficient physical distance between the data centers so that a single catastrophic event cannot render both entities inoperable simultaneously.

This level of protection can sometimes require connecting data centers separated by distances measured in hundreds and even thousands of miles. Such is the case for an EMC customer that recently deployed an EMC RecoverPoint system using continuous replication to replicate its federated SAP environments across a 2,500-mile span.

**Audience**

This white paper is intended for systems integrators, systems administrators, and members of the professional services community. This paper provides an overview of an SAP long-distance disaster recovery solution and discusses key features and benefits of EMC® RecoverPoint.

**Long-distance disaster recovery for SAP**

The EMC customer featured in this overview operates two data centers separated by over 2,500 miles as depicted in Figure 2. Together, they host SAP production and non-production systems for five business units—three in the west and two in the east.
The customer's federated SAP environments comprise related applications that span multiple servers and storage arrays. Each application has its own RPO and RTO policies that govern the protection and recoverability of its data.

The customer needed to replicate 10 TB of SAP data from west to east and 7 TB from east to west. EMC was able to deliver a comprehensive solution that featured the RecoverPoint system.

EMC RecoverPoint enabled the customer to dramatically reduce operational expense (OPEX) due to shortened DR exercise time and the ability to parallelize tasks. Components of DR exercises can easily be done monthly to increase business confidence and the DR sites are able to use lower-cost storage while complete disaster recovery testing is performed on an annual basis.

Let's take a closer look at the benefits this EMC customer received by using EMC RecoverPoint for SAP.

**Bi-directional replication and protection**

Unlike traditional DR architectures, this recent EMC RecoverPoint deployment used bi-

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**EMC Storage Managed Services**

While EMC Storage Managed Services are not a requirement for EMC RecoverPoint deployment in your SAP environment, you will find it highly beneficial to leverage EMC’s expertise in storage management, disaster recovery, and business continuity.

EMC Storage Managed Services provide comprehensive management of your storage operations in accordance with your specific service-level requirements.

With EMC Storage Managed Services, a dedicated EMC team of storage management professionals assumes full onsite responsibility for all or part of your storage environment over a fixed term. This team leverages ITIL standards and EMC proven best practices, proprietary operational processes, and management oversight during the service engagement.

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**Figure 2.** RecoverPoint remote replication of SAP across two data centers
directional continuous replication with active data on both sites. This has led to cost savings and the ability to optimally leverage real estate with each site protecting the other.

Replicated components include database and operating-system-level files in consistency groups. Federated consistency groups allow for the grouping of SAP systems—ERP Central Component (ECC), Business Warehouse (BW), Exchange Infrastructure (XI), Enterprise Portal (EP), Supplier Relationship Management (SRM)—for each operating division. This grouping is important because SAP applications are interdependent. From a business continuity perspective, it is not enough to recover one application such as ECC, since having ECC up and running all by itself will not put a particular business unit back in business, impacting the RTO. A true recovery for business continuance purposes means that all related and interdependent SAP applications have to be up, running, and working together.

In order for all these SAP applications to be up and running in a cohesive manner, they need to be recovered from the same consistent point in time. And that is the value of EMC RecoverPoint’s federated consistency groups—the combination of all the SAP applications. (It is true that the applications supporting a particular business unit can be recovered without federated consistency groups, but the recovery time will be much longer.)

**Lower WAN bandwidth requirements**

With EMC RecoverPoint’s very efficient use of data compression and two OC-3 WAN pipes rated at 150 Mb/s, WAN bandwidth requirements are lower than array-based replication technologies. This dramatically lowers the customer’s total cost of ownership by reducing recurring OPEX.

**Heterogeneous storage environment**

The DR solution works well in a heterogeneous storage environment. It also allows the customer to tier replication services with Tier 1 disk as the production data disks and Tier 2 disk as the secondary replica disks, providing dramatic cost savings. The customer has EMC Symmetrix VMAX™ systems in one data center and EMC CLARiiON® CX4 systems (along with some other brands of storage) in the other.

**No overhead penalty on host resources**

With EMC RecoverPoint, all replication and recovery processing is performed in the SAN; no drivers are required to be loaded on the host. This allows administrators to keep host operating-system patch levels current. This also allows clean segregation of infrastructure and host resources. For this customer, EMC RecoverPoint is implemented using SAN fabric splitters for VMAX and non-EMC storage, while also using CLARiiON splitters running on the CX4 arrays.
Handles heavy change rate

The heavy change rate for transactional applications—the customer reports a replication change rate of 15 percent to 20 percent per day—is not an issue with EMC RecoverPoint. It supports heavy transaction loads, both sustained and in bursts.

Aggressive RPO and RTO targets

For SAP environments, data loss and recovery times must be minimized to avoid impacting systems availability. In this case, the customer set aggressive RPO and RTO targets. EMC RecoverPoint—working in conjunction with EMC Replication Manager—actually exceeded those targets of 30 minutes for RPO and several hours for RTO.

EMC RecoverPoint’s continuous replication capability uses the journaling architecture to minimize data loss (RPO) by defining granular recovery to previous points in time. The ability to quickly restart the SAP environment and reduce RTO is enabled through integration between Replication Manager and RecoverPoint. This integration provides application-consistent views of the data and enables rapid application recovery once the data has been restored.

Dramatically reduced OPEX, improved SLAs

By simplifying operational tasks, this customer is able to reduce OPEX in terms of full time equivalents (FTEs). RecoverPoint has improved SLAs to the business units in the event of an actual disaster. The customer also improved the reliability of their DR testing, giving the company more confidence that an actual DR failover will be successful.

Increased efficiency and faster recovery

EMC RecoverPoint improves DR testing efficiency with support for parallelized operations. Because the testing team does not have to wait for other operations to complete, system recovery time is shortened. The customer parallelizes the recovery tasks during the DR exercise by using a large number of consistency groups, 14 in this case. Segregating the DR tests into these smaller, more manageable groupings enables the tests to be performed in parallel, providing significant cost savings and risk aversion for the DR testing period.

Cutting full-scale DR exercises from days to hours

With EMC RecoverPoint, the customer was able to significantly reduce the time needed to conduct a full-scale DR exercise as shown in Figure 3. In 2008, without EMC RecoverPoint, the exercise took 80 hours. In 2009, EMC RecoverPoint was used to recover some of the components and the exercise was cut to 32 hours. And in 2010 when EMC RecoverPoint was used to recover all components of the SAP system—SAP ECC and all its associated supporting systems—it took only 8 hours.
Regular exercise improves confidence

Regular, incremental EMC RecoverPoint DR tests increase the confidence and likelihood of a successful full-scale DR recovery. The customer is now able to test the RPO monthly by putting the RecoverPoint replica into image access mode and bringing up the eastern side without taking western production offline. This not only ensures data integrity on a monthly basis but also provides a fresh copy of production to the development teams. The full RPO/RTO test is, of course, an annual event. From a DR preparedness standpoint, the EMC RecoverPoint configuration enables administrators to exercise the DR capability and build confidence that they can, in fact, recover in the event of a catastrophe.

Protecting SAP environments with EMC RecoverPoint

Many customers are familiar with traditional backup-based data protection technologies that take a copy of data, typically one time per day, providing a single recovery point. If data loss occurs 12 hours into the new backup period, any new data created since the last backup is lost, because the system can only be rolled back to the last recovery point. That’s not the case with EMC RecoverPoint, an enterprise-scale product designed to protect application data on heterogeneous SAN-attached servers and storage arrays.

EMC RecoverPoint’s replication technology continuously tracks changes made to a protected SAP system. This provides the ability to roll back, or recover, from any

Figure 3. Duration of full-scale SAP DR exercises with and without EMC RecoverPoint
change that causes unexpected results or the corruption of data. By leveraging continuous replication technology, EMC RecoverPoint provides the ability to return to any point in time prior to the disruptive change.

As depicted in Figure 4, EMC RecoverPoint runs on an out-of-band appliance and combines industry-leading continuous replication technology with a bandwidth-efficient, no-data-loss replication technology, allowing it to protect data both locally and remotely.

**Figure 4.** EMC RecoverPoint for SAP data protection and availability

The RPO and RTO for mission-critical SAP applications should be defined by the requirements of the business, keeping in mind there can be different data protection objectives for RPO and RTO within the same SAP landscape. SAP is a write-intensive environment and data loss must be minimized regardless of the failure type. It is imperative that SAP administrators be able to recover an SAP system to any user-specified point in time. RecoverPoint non-disruptively selects an image, tests that image, and then uses it as the desired recovery failover point. This is made possible by the continuous replication architecture using time-indexed recovery points to provide granular recovery windows and application bookmarks. This enhances the ability of SAP administrators to meet RPO and RTO by indicating points in time when the application was last consistent.

**Facing the future with confidence**

Planning for SAP disaster recovery and business continuity can be an unpleasant task. It forces you to consider many “doomsday” disaster scenarios as you work to ensure that your business can survive any incident that might arise. Though it might be unpleasant, DR planning is also essential. You need to have the mindset—like that of the customer in our case study—that DR and business continuity are all about recovering the business, not simply shipping data from one site to the next. This business-oriented approach enabled by EMC RecoverPoint has made a world of
difference in the customer's ability to confidently face the uncertainties of the future, while delivering substantial operational and business benefits.

Conclusion

EMC RecoverPoint offers both continuous data protection and continuous remote replication products. RecoverPoint supports SAP configurations and provides continuous protection for local SAN-attached storage. Supporting a DVR-like any-point-in-time recovery capability, RecoverPoint is designed to protect your critical business processes and improve their operational recovery with minimal impact to your production environment. With support for consistency groups, RecoverPoint provides true CDP capability for your SAP environment with no data loss and full write-order consistency for protected volumes that can span multiple heterogeneous storage systems and servers.

References

More information on EMC RecoverPoint can be found at the RecoverPoint page on EMC.com including:

- Introduction to EMC RecoverPoint 3.4: New Features and Functions — Applied Technology white paper
- EMC RecoverPoint Family Overview – A Detailed Review white paper
- Using EMC RecoverPoint Concurrent Local and Remote for Operational and Disaster Recovery — Applied Technology white paper
- Simplifying Your SAP Environment with EMC RecoverPoint — Applied Technology white paper