SAP Technology

Solutions for Business Continuity

Preserving High Levels of Business Continuity

The Best-Run Businesses Run SAP™

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Keeping the Lights On While Safeguarding Your Data

Business continuity is an essential underpinning of any modern, global enterprise, necessary for running a complex, worldwide organization. Here we outline and describe a collection of technologies from SAP that you can use to preserve high levels of business continuity. We present a series of independent, real-world scenarios that demonstrate our technologies in action.

DRIVERS FOR BUSINESS CONTINUITY

Business continuity is commonly defined as the act of maintaining continual operations while safeguarding vital organizational data. Central concepts revolve around the high availability of business and operational systems and disaster planning.

While keeping the lights on and the doors open has always been a fundamental part of running any organization, this responsibility has become magnified in recent years for a number of significant reasons. Key drivers behind the need for business continuity include:

- **Pervasive use of computing resources** – Global organizations have computing resources and data spread across the world. Optimizing those resources while synchronizing your data across the enterprise requires continuous 24x7 operations to succeed in an interconnected business environment.
- **Mission-critical applications** – Your enterprise relies on crucial software services as a core part of its daily business; downtime is not an option.
- **Advent of inexpensive, commodity hardware** – While low-cost servers enable IT to deliver new classes of more cost-effective applications, these platforms are more prone to continuity-damaging failure than their pricier ancestors.
- **Externally generated security violations** – Barely a day goes by without media reports of an attempted or successful cyber infiltration against a corporation or government entity. These assaults can range from minor annoyances to devastating attacks. Unfortunately, this trend is bound to escalate.

COMPONENTS OF BUSINESS CONTINUITY

From the perspective of information processing, business continuity can be thought of as an umbrella term for two major independent disciplines: high availability and disaster recovery. Both of these specialties consist of technologies and procedures that aim to guarantee continual access to essential computing resources and data.

High availability focuses on minimizing technological and procedural failures within a single data center. Well-known techniques designed to foster high availability include shared-disk clustering, data replication, and failover clustering. Disaster recovery is designed to help organizations restore operations from a remote geographic location after an interruption has already taken place.

Commonly known technologies that make disaster recovery possible include data replication, tape backup, log shipping, and disk mirroring. While core IT infrastructures such as relational databases offer features designed to minimize downtime, they often aren't enough to ensure sufficient business continuity. For example, baseline technologies are usually subject to planned outages, which generally occur every 30 to 90 days. These disruptions are meant to provide a window for normal administrative responsibilities such as version upgrades, bug fixes, migrations, and hardware maintenance.

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While planned outages can be scheduled to minimize disruption, IT management is all too familiar with unplanned crises, including:

- Physical disasters (fire, flood, earthquake, and so on)
- Database corruption
- Storage failure
- Critical application logic faults
- Human errors
- Business process inconsistencies

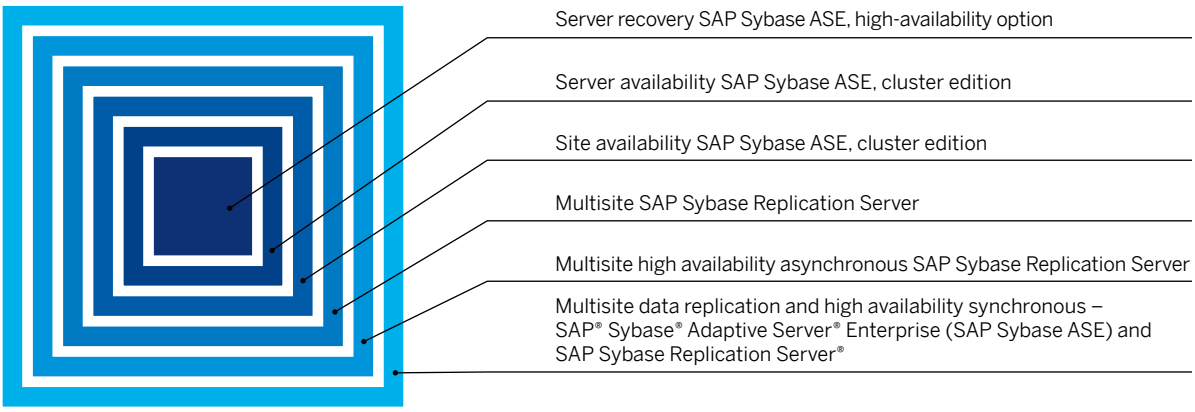
While these events may be rare on their own, collectively most IT organizations will experience one of them once or twice a year, and recovery is usually difficult.

From the perspective of a database administrator, the potential for failure is magnified because databases rely on all layers of the technology stack, including servers, networks, disks, middleware, and the applications themselves. Thus, a fault in any one of these constituents will impact the database itself. While the vast majority of business continuity interruptions pass unnoticed in the media, there are numerous examples that have garnered the wrong kind of fame, including:

- The failure of a major financial institution's credit card payment processing system
- "Black Friday" retail Web site overloads
- A blizzard that interrupted ATM service for nearly 2 weeks
- The East Coast power grid failure of 2003
- Ongoing denial of service attacks on popular Web sites

To help protect their customers from this kind of unwanted publicity, we developed a collection of business continuity solutions, depicted in Figure 1 and described as follows.

Figure 1: Solutions for Business Continuity



TECHNOLOGIES FOR BUSINESS CONTINUITY

Each of the solutions that we'll describe in this section can function individually as well as collectively. The technologies are integrated with SAP® Sybase® Adaptive Server® Enterprise (SAP Sybase ASE), but there's no need to deploy them all at once. Instead, you may elect to implement them to target specific aspects of business continuity, which we demonstrate in the use case section.

SAP Sybase Adaptive Server Enterprise, Cluster Edition
Engineered to boost business continuity yet reduce hardware and maintenance costs, SAP Sybase ASE, cluster edition, supplants large, costly, single-point-of-failure database servers with a reliable grid of database servers running on much less expensive hardware. Virtualization is employed to decouple applications from their physical disk storage. These applications interact with logical clusters instead, which themselves are responsible for communicating with physical clusters. This separation shields applications from the nuances of physical storage, thereby enabling enhanced uptime. The cluster edition employs a shared disk architecture, which supports up to 32 SAP Sybase ASE server instances at one time.

Cluster nodes share details about their status over multiple secure, dedicated channels. Should a failure occur, this decoupled architecture lets the cluster edition of SAP Sybase ASE automatically migrate connections among nodes, all without interrupting or inconveniencing users. Your database administrators have the flexibility to add or remove resources from their environment based on need, load, and other factors. Automated failover helps combat unplanned interruptions, while administrator-controlled scaling reduces the impact of planned outages.

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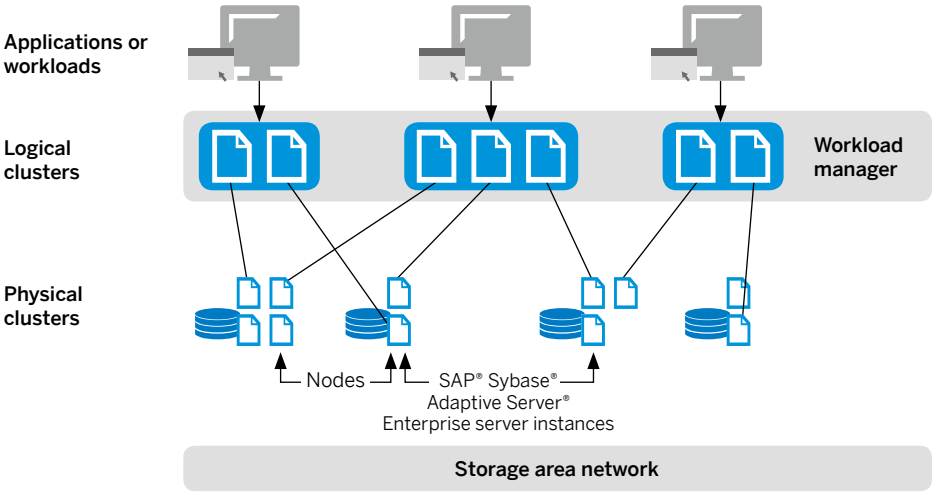
In addition to dramatic performance advantages, the cluster edition delivers even more business continuity benefits than those provided by SAP Sybase ASE, high-availability option. For example, recovery times are measured in a few seconds in the cluster edition installations versus up to a minute with the high-availability option of SAP Sybase ASE. The cluster edition also supports more SAP Sybase ASE instances.

If both instances of a high-availability environment fail at the same time, downtime occurs. The cluster edition's virtualization and shared disk architecture greatly diminish this possibility. This approach also reduces the performance degradation that naturally occurs when individual nodes fail. Figure 2 illustrates a complete SAP Sybase ASE, cluster edition, configuration.

SAP Sybase Replication Server® Software

Copying information to remote locations is a time-tested way to safeguard valuable data and augment business continuity. SAP Sybase Replication Server® software implements distributed, bidirectional synchronization and flexible data translations among heterogeneous data sources, with guaranteed delivery. This reliable, cross-database approach means that you're free to replicate Oracle or IBM DB2–hosted data into an SAP Sybase ASE instance. Administrators control their replication configuration from a centralized location and are able to use modeling, development, and system management tools to streamline operations. They're also free to select the optimal network route to guarantee the fastest response time.

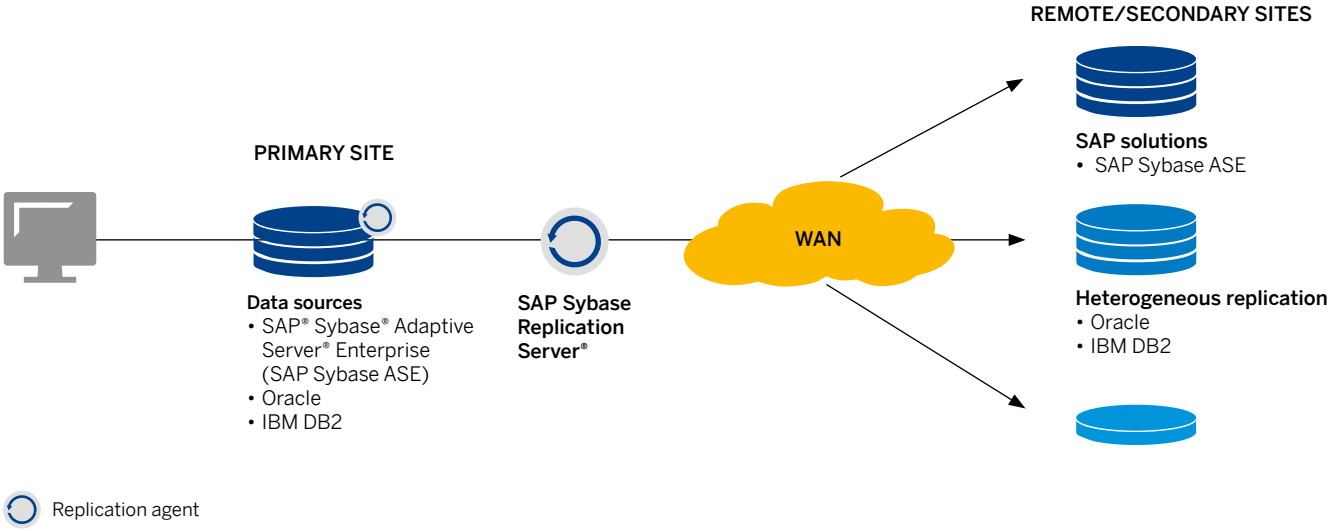
Figure 2: SAP Sybase ASE, Cluster Edition, Architecture



The high-availability option builds upon the already proven speed, scalability, and reliability of SAP Sybase ASE. It employs a clustering architecture that lets two SAP Sybase ASE instances act as companions.

SAP Sybase Replication Server is meant for high-performance data distribution and consolidation. First, it was designed specifically for this important responsibility, instead of being added as an afterthought. Using Structured Query Language (SQL) statement replication, optimized transaction performance in the target database, stored procedure replication, and continuous real-time log-based transactional data capture, SAP Sybase Replication Server reduces both the performance overhead that naturally occurs when moving large amounts of information as well as the inherent latency of these types of operations. Figure 3 shows a common SAP Sybase Replication Server configuration.

Figure 3: SAP Sybase Replication Server Software

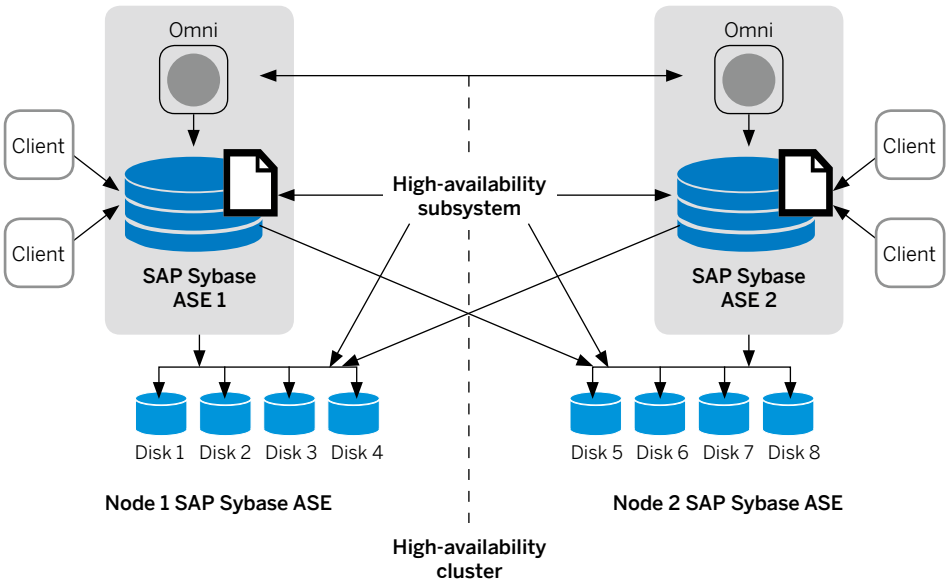


SAP Sybase ASE, High-Availability Option
The high-availability option builds upon the already proven speed, scalability, and reliability of SAP Sybase ASE. It employs a clustering architecture that lets two SAP Sybase ASE instances act as companions. If any disruptive events occur, connections and database operations move between these two instances without impacting your users or important processes. Administrators can structure their hardware in asymmetric (one server is the master, one is the slave) as well as symmetric (one server is designated as active while the other acts as a hot backup) configurations.

If the high-availability option of SAP Sybase ASE detects the need to perform a failover, this important responsibility is handled gracefully. First, applications are notified of this occurrence and are free to resubmit any open transaction requests. Recovery from the disruption generally takes less than a minute to complete, and users need never know about the episode.

To further automate and optimize this essential assignment, the high-availability option of SAP Sybase ASE is designed to work with high-availability hardware and software-based technology offerings from other major suppliers. Figure 4 shows the SAP Sybase ASE, high-availability option, architecture.

Figure 4: SAP Sybase ASE, High-Availability Option



TYING IT ALL TOGETHER

Each of the technologies we've been describing can greatly aid an enterprise seeking to improve its business continuity profile. For organizations with a relatively simple server architecture, the high-availability option of SAP Sybase ASE lets a pair of servers collaborate to strengthen overall uptime. On the other hand, for sites that feature a more complex topography with multiple servers available to contribute to higher availability, the cluster edition is the right fit. All establishments with distributed locations can safeguard vital data and improve performance by leveraging the power of SAP Sybase Replication Server. The table provides comparisons among these options.

Comparison of Solutions for Business Continuity

	SAP® Sybase® Replication Server® software	SAP Sybase Adaptive Server® Enterprise, high-availability option	SAP Sybase Adaptive Server Enterprise, cluster edition
Data duplicated among nodes	Yes	No	No
Configurability	Low	Medium	High
Typical downtime	Less than 30 minutes	Less than 2 minutes	Less than 10 seconds
Typical data loss	None	None	None
Automated failover	No	Yes	Yes
Limits on number of servers	No	Yes	No

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Use Cases of Business Continuity Solutions

Now that we've examined each solution for business continuity from SAP, let's see how real-world enterprises might employ these technologies to derive enhanced business continuity benefits.

USE CASE: RETAIL

Using SAP Sybase ASE, high-availability option, a retailer maintains high levels of uptime. To better support customers, this retailer maintains a 24x7 call center where live operators field customer questions. While there aren't a huge number of active calls at any one time, IT management is still concerned about what might happen if their database server fails. In this scenario, a relatively simple business continuity solution is all that's required to allay these fears.

The high-availability option of SAP Sybase ASE lets two database servers work together as companions. Should a service interruption affect the primary server, it's easy for administrators to switch over to the secondary server, with minimal interruptions to the user community.

USE CASE: AIRLINE

Using SAP Sybase ASE, cluster edition, an airline gains better business continuity while controlling costs. With hundreds of transactions per second and thousands of users connecting over the Internet as well as from a network of global call centers, this reservation system is the cornerstone of the airline's operations. Given the potential financial and operational implications of interrupted activities, management wants to minimize the chances of losing any information. Disaster recovery is another crucial consideration, but the hardware and software licensing costs of any business continuity–based solution will be a major determinant as well.

By using the cluster edition of SAP Sybase ASE as the underpinning of a grid of multiple redundant servers, the airline is able to leverage the cost savings afforded by commodity hardware while dramatically lowering the risk of business continuity interruptions. In addition, since these servers are distributed into multiple data centers spread over thousands of miles, the risk of a disaster that completely cripples operations is miniscule.

USE CASE: FINANCIAL SERVICES

A financial services organization uses SAP Sybase Replication Server to help balance processing loads. Dramatic events such as outages and disasters aren't the only disturbances to business continuity; sometimes something as benign as slightly degraded performance can damage an enterprise's ability to operate efficiently.

For example, a financial services organization relies on its database infrastructure for critical operational support when providing quotes and processing trades. Unfortunately, a new real-time reporting system has sapped overall system responsiveness, leading to slower trade execution and unhappy customers. Fortunately, this unpleasant situation is easy to remedy. Using SAP Sybase Replication Server, IT is free to set up an operational data store, which is a dedicated decision support system that lets users work with a replicated database to run all the queries they like. Results are retrieved in near-real time, without having any impact on the performance of production applications.

CONCLUSION

As user and operational requirements continue to expand, business continuity will remain a primary consideration for any global enterprise. Independent yet coordinated technologies from SAP make it easy for your architects and administrators to design flexible solutions that will help to keep operations running smoothly.

FIND OUT MORE

To learn more about how SAP can help you maintain business continuity, call your SAP representative today or visit us on the Web at www.sap.com/solutions/technology/database/index.epx.

www.sap.com/contactsap

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