High Availability and Disaster Recovery Setup for ASE and HANA Database to Ensure Seamless and Uninterrupted Business Operations

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Abstract

This paper focuses on studying the HA & DR solutions for ASE & HANA databases. From the objective system architectures, issues, and successful implementation strategies outlined in the study, this paper presents a detailed roadmap that organizations can use to ensure the continuation of business and the safeguarding of organizational data in case system failure or disaster occurs.

Keywords: High availability, Disaster recovery, HANA, ASE

I. INTRODUCTION

As much as it is important to be Prepared Business Continuity has become significant in the current world that is dominated by technological advancement. This paper focuses on HA and DR configurations of ASE and HANA to counter the disruption of business operations. High Availability is all about avoiding system failure and thus uses standby systems and structures that can swiftly take over if the other system fails, on the other hand, Disaster Recovery refers to the guidelines required to rebuild the IT systems after mishaps. The importance of such systems is further proved by their usage in different cases, for instance, in the Louisiana flood, where they served crucial functions in terms of service continuity.

II.SIGNIFICANCE OF HIGH AVAILABILITY AND DISASTER RECOVERY

Both High Availability (HA) and Disaster Recovery (DR) play major roles in providing effective and efficient continuity and resilience of information systems, especially in disaster-prone areas/organizations[1]. High Availability is a strategy that aims to prevent or eliminate the time duration by making sure that systems are up and running despite a failed component. This is done through double resources, failed backup, and distribution. It normally means that it is possible to gain access to the required services with the least of interferences, or interruptions, which is crucial for organizations that are presently operating online. Disaster Recovery, on the other hand, is a set of policies, tools, and procedures that are used to restore the IT structure in case of a disaster. This could be natural disasters such as floods and earthquakes, or even cyber-attacks, or mainframe failure. An individual can measure uptime percentage by dividing the total time by total uptime and multiple the product with 100. Additionally, the availability can be measured by dividing uptime with the aggregate of uptime and downtime. Afterwards, the product is multiplied with 100 to get the desired result.

III. HIGH AVAILABILITY SETUP

ASE

A High Availability Setup for Area Spectral Efficiency (ASE) is generally an improved approach to providing efficiency in the networks by achieving dependable data transmission to attain high levels of network availability. The function of ASE is to calculate the average number of bits that are transmitted in one-time units, bandwidth, and area[2]. Hence in high availability configurations, the active receivers are connected to their respective neighboring transmitting devices to limit latency and interferences, which overall enhances ASE. Two scenarios are discussed; those are, connecting to the closest transmitter which gives the maximum ASE, and connecting to the farthest transmitter, which gives the minimum ASE. This helps to compromise between the link utilization and interference between clusters leading to an efficient network throughput and reliability.

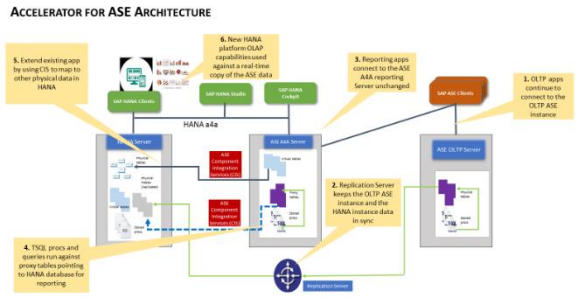

Figure 1: High Availability Setup for Area Spectral Efficiency (ASE)

HANA

The HA setup of SAP HANA also has a view to Hybrid Column Storage where it has a database in-memory and on disk. HANA's Native Store Extension (NSE) combines disc-based storage with in-memory capabilities in a way that HANA can perform computing tasks even if the resource is limited especially in cloud installations. Columnar storage makes it easy for columns to appear fully loaded in memory or paged, or a combination thereof depending on the workload involved. This makes certain that heavy activities are handled swiftly while other activities that are not often used take up less space hence the system performance during failure or heavy load.

IV. DISASTER RECOVERY SETUP

ASE

In the case of ASE, the setup usually comprises backup methods such as; the database snapshot, the backup of the transaction log, or replication to standby servers[3]. For this reason, the best practice of having a sound backup schedule and storing the backup offsite can greatly help minimize data loss.

HANA

In the case of HANA, DR settings are usually based on the replication tools, which include System Replication or Backup and Restore tools[4]. These enable the accomplishment of real-time master and sub-

master data replication or synchronization. Failure testing is another useful technique that is meant to indicate whether or not the specified recovery objectives can be met on a timely basis, and this type of testing should be executed frequently.

The two systems need to have considerations in terms of network configurations, storage architecture, and resource provisioning so that issues that cause downtime during a disaster are prevented. Theremust be documentation of organizational DR plans at organizations; IT professionals need to undergo rehearsals and training drills[5]. It is understood that such measures would help boost the levels of business resiliency to calamities and also protect important information and programs.

V. CHALLENGES CAN BE FACED

The setup of DR for ASE and HANA creation has challenges as described below. First of all, it is very challenging to keep the instances of such systems in a consistent state when replicating them asynchronously. Secondly, there may be a problem of compatibility of different types of hardware and software, which shall be a big challenge for its integration[6]. Thirdly, the Availability of high service continuity during failover is something that may demand a lot of time and planning and therefore can be costly.

VI. BEST PRACTICES CAN BE ADOPTED

To put it in place disaster recovery configurations for ASE and HANA the following best practices should be put into consideration. First, ensure that appropriate measures for backing up the systems are employed through periodic backups of databases and essential configurations[7]. Second, in terms of replication to the secondary site, use automated replication to have the latest data replicated to the secondary sites as soon as possible. Thirdly, include practicing disaster recovery plans to ascertain how well the corresponding plans work effectively, also making sure all the staff is oriented in the particular procedures.

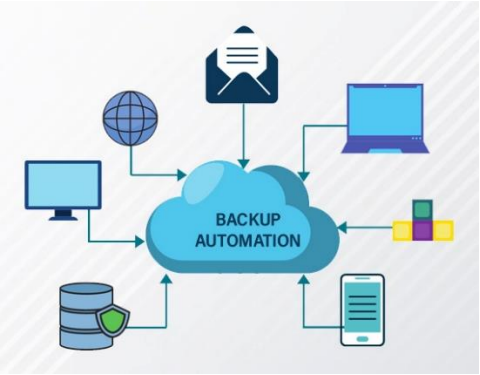

Figure 2: Backup Automation

VII. CONCLUSION

HA and DR setups for ASE and HANA databases can be viewed as opportunities and challenges by different organizations. Although there are issues that include breaks in system consistencies during asynchronous replication and compatibility of the hardware with other subsystems, these can be resolved to

a certain extent after considering certain precautions and using some principles. The measures include: All these measures of disaster backup help enhance the overall organization's disaster resilience. Effective HA and DR therefore not only achieves efficiency for business continuity but also delivers a market factor for an organization operating in an advancing digital business world.

Abbreviations and Acronyms

ASE - Adaptive Server Enterprise
HANA - High-Performance Analytic Appliance
HA – High Availability
DR – Disaster Recovery

Units

Mean Time Between Failures – Hours
Failover Time - Seconds or minutes
Replication Lag - Milliseconds (ms) or Seconds

Equations

Uptime Percentage= (Total Time/Total Uptime)×100
Availability= (Uptime/Uptime+Downtime) ×100

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