Building Resilient SAP Architectures for High Availability & Disaster Recovery Process on Onpremise & Azure Environment

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Abstract

The following research project has exemplified a curated structure for building resilient SAP architectures onpremises and in the context of the Azure environment. This has been used to determine high availability and the disaster recovery process. It has been observed that the research project has covered several considerations like design principles and best practices for architecting an SAP environment. Moreover, this has been crucial to minimise downtime and rapid recovery in the case of disaster. Thus, this has demonstrated the practical application of these principles thereby advantaging the organisations to manage any sort of disaster.

Keywords: SAP Architecture, High Availability, Disaster Recovery, Onpremises, Azure Environment, Resilience

I. INTRODUCTION

This research project will shed light on the intricacies of building resilient SPA architectures. It will mainly target high availability and disaster recovery processes on onpremise and Azure environments. At the same time, it will also focus on essential factors such as Availability Sets, Availability Zones, database replication mechanisms and Azure Site Recovery to ensure a streamlined flow of operation. This will be found to be relevant in the case of system disruptions or disasters. However, the research project will also highlight the architectural overview which will enable to nurturing of high availability and load-balancing strategies. Furthermore, the research project will also portray disaster recovery and business continuity plans within will be effective in synchronising the data to maintain operational continuity.

II. DESCRIBING ARCHITECTURAL OVERVIEW AND CONSIDERATIONS FOR DESIGNING SAP ARCHITECTURE

The design of SAP architecture needs to include proper deployment environments which aid in mapping solution building blocks and visualising the actual flow of data. It includes a nuanced understanding of the organisation and its collaboration with the necessary stakeholders. It passes through several stages. The first stage refers to the identification of deployment environments which allows consideration of the hosting and deployment environments for the solution components like public with private and onpremise. The second stage is mapping the solutions with the help of building blocks[1]. This is strictly complied with the deployment environments. The next stage visualises the amount of data flow along the building blocks considering factors such as request-response or information flow. It tends to predict the potential latency of network requirements. The fourth stage talks about considering network design. It indulges with a hubspoke topology that is often recommended for SAP infrastructure. Thus stands as a central hotspot for virtual networks which enables it to connect to the onpremises network. As a result, this results in poking virtual networks. The final step requires several models and diagrams to drive a curated understanding and promotion of sustainable outcomes and thus optimise enterprise-wide employment of SAP[2]. As a result, this helps in monitoring and detecting the alert on potential issues before they emerge as critical. Thus, this ensures that the resulting data centre landscape has sufficient power to mitigate the failure of the systems.

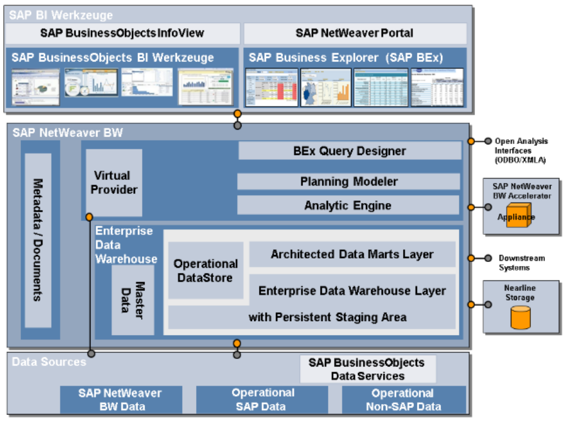

Figure 1: Overview of SAP Architecture

III. INTEGRATING HIGH AVAILABILITY AND LOAD BALANCING STRATEGIES

The amalgamation of high availability and load balancing strategies is considered to be of paramount importance as it can determine a robust and resilient SAP architecture. SAP architectures are designed by getting familiarised with high availability considerations several parameters into important elements such as RPO and RTO. The first parameter refers to the utilisation of multiple servers[3]. It tends to implement applications across multiple servers to minimise the chances of downtime and ensure effective turning. The second parameter is getting accustomed to a load balancer to distribute the traffic mapping to the servers.
This grants the users access to the load balancer instead of accessing the servers directly. Another important parameter talks about scale servers checking high availability in either up or down direction based on the load of the application. The fourth parameter is the coupling of the servers that have failover capabilities[4]. As a result, this necessitates automatic activation in the case of primary system failure. Similarly, SPA architectures are constricted by the application of load balancing strategies. It encompasses several factors. The first factor is to deploy load balancers in different locations like on Azure along with AWS and Google Cloud. The second factor refers to the type of load balancer like client-side flower by server-side and hybrid side which determines sophisticated constriction of SAP architecture. The third factor talks about logon groups which are used to balance the load between a collection of application servers[5]. Amalgamation of hardware and software load balancing benefits both the hardware and the software to distribute network traffic across several SAP systems in hybrid mode.

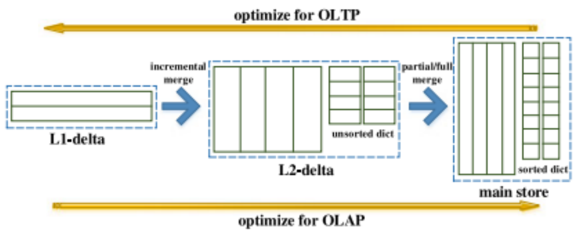

Figure2: Depicting SAP in Hybrid Mode

IV. COMMEMORATING DISASTER RECOVERY AND BUSINESS CONTINUITY PLANS

Disaster recovery and business continuity plans stand to be crucial for making sure that an organisation has the probability to recover from an outage. It considers several processes that are understood systematically[6]. The first process is about testing and validation which helps to test and validate disaster recovery plans to determine that they are efficient. The second process states that the identification of a disaster recovery site is termed. This is because it recovers SAP systems in the event of a disaster. The third process involves a proper stringent backup and recovery strategy that aids the entire process to make sure that the data is recoverable under any circumstances. A suitable example states that a global manufacturer with several SAP environments in different locations ensures disaster recovery and business continuity. The organisation identifies a disaster recovery site for recovering crucial SAP systems in case of any sort of disaster[7]. This gauges the organisation to get supported with ethical backup and recovery strategy to ensure that the data is recoverable posing to be effective. As a result, this ensures the stakeholders that are informed in the event of a disaster.

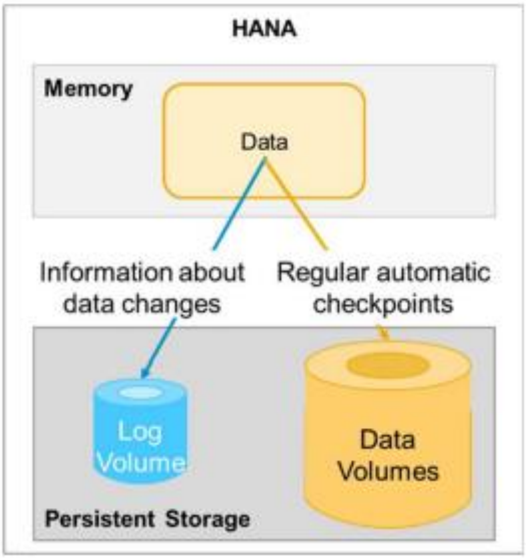

Figure3: Demonstrating the Memory Segment of HANA

V. CONCLUSION

The research project has analysed in construction of a resilient SAP architecture which needs careful planning along with top-notch design and implementation. It has provided a detailed comprehensive guide to building resilient SAP architectures onpremises and in the Azure environments. This has been beneficial to achieve high availability and disaster recovery. Furthermore, the research project has followed the principles and best practices that have been outlined in this research project. As a result, this has made the organisations determine that their SAP environments which stand to be stringent along with scalability have been secured to meet the rising business needs.

Abbreviations and Acronyms

- HA- High Availability
- DR- Disaster Recovery
- LB- Load Balancer
- Azure ASR- Azure Site Recovery
- RPO- Recovery Point Objective
- RTO- Recovery Time Objective

Units

- Power is measured in kilowatts
- Data is calculated in megabytes

Equations

- Recovery Point Objective (RPO) = [Timestamp of Last Backup - Business Impact Timestamp]
- Recovery Time Objective (RTO) = [Total Downtime / Number of Incidents]

REFERENCES

[1] F. Färber *et al.*, “SAP HANA Database -Data Management for Modern Business Applications,” Dec.2011.Available:https://sigmodrecord.org/publications/sigmodRecord/1112/pdfs/08.industry.farber.pdf

[2] H. Zhang, G. Chen, B. C. Ooi, K.-L. Tan, and M. Zhang, *Ieee.org*, Jul. 2015. https://ieeexplore.ieee.org/iel7/69/7116676/07097722.pdf

[3] I. V. Ilyin, O. Yu. Iliashenko, K. M. Makov, and K. V. Frolov, “Developiing a reference model of the information system architecture of high-tech enterprises,” *St. Petersburg State Polytechnical University Journal. Economics*, vol. 228, no. 5, pp. 97–107,Nov.2015,doi:https://doi.org/10.5862/je.228.10

[4] M. Andrei *et al.*, “SAP HANA adoption of non-volatile memory,” *Proceedings of the VLDB Endowment*, vol. 10, no. 12, pp. 1754–1765,Aug.2017,doi:https://doi.org/10.14778/3137765.3137780

[5] M. Kiran, P. Murphy, I. Monga, J. Dugan, and S. S. Baveja, “Lambda architecture for cost-effective batch and speed big data processing,” *2015 IEEE International Conference on Big Data (Big Data)*, Oct. 2015,doi:https://doi.org/10.1109/bigdata.2015.7364082

[6] S. Nadal *et al.*, “A software reference architecture for semantic-aware Big Data systems,” *Information and Software Technology*, vol. 90, pp. 75–92, Oct 2017, doi:https://doi.org/10.1016/j.infsof.2017.06.001

[7] Z. Sun, H. Zou, and K. Strang, “Big Data Analytics as a Service for Business Intelligence,” *Open and Big Data Management and Innovation*, vol. 9373, pp. 200211,Jan.2017,doi:https://doi.org/10.1007/978-3-319-25013-7_16