

SIOS WHITE PAPER

Cost Savings in AWS with SQL Server High Availability



us.sios.com

Making a change in SQL Server infrastructure from on-premises to the cloud is often a complex undertaking. As most companies begin the process, there are generally numerous questions from both the business and technology teams, such as:

- How to seamlessly move to the cloud?
- How to reduce costs in the cloud?
- How to have a more robust and flexible HA/DR environment?
- How will the new infrastructure perform?
- How to improve business continuity by moving to the cloud?

In this white paper, learn about these considerations when running SQL Server in the cloud and how one company, PayGo, moved to AWS and improved their business continuity, HA and DR with SIOS DataKeeper.

Why do organizations choose the cloud?

Every customer, every workload has its own reasons for moving to the cloud. Overall, organizations select a cloud solution to take advantage of new capabilities that were previously not available with their on-premises or legacy platform including:

- **Management Ease** Cloud offerings remove a number of the burdens relating to managing infrastructure and hardware in order to focus on your core business
- Reliability Improved uptime for hardware
- Performance Access to high performance platform to meet application and user needs
- **Flexibility** Selection of architecture, hardware, sizing, software and geographic choices that may be cost prohibitive with an on-premises solution
- Security The scary security concerns that have been a deterrent in the past to cloud adoption have been addressed with domestic and international compliant platforms that are mature
- **Scalability** Ability to easily scale your resource needs as your organization grows, seasonal changes occur, new applications get deployed and more
- Cost Control Configurable architecture to reduce costs for development, test and production workloads as well as shift budgets from capital to operational expenditures
- **Disaster Recovery** Leverage a global footprint of data centers in a region or around the globe as a portion of the equation to continue business operations to prevent a site failure from causing downtime

Although some organizations fear moving to the cloud means losing some control over their infrastructure, the cloud enables new opportunities for the technology team to focus on core business initiatives with cost savings.

SQL Server Cloud High Availability Options

While the cloud offers additional redundancy in terms of power, connectivity and particular infrastructure, protection is still needed for your SQL Server instances. Whether you choose SQL Server Enterprise or Standard Edition to implement high availability in the cloud, it is generally recommended that you use synchronous replication between two or more availability zones (AZ) in the same region. This includes a degree of disaster recovery even within the region since the failure of an entire data center (AZ) does not impact availability. But with a multi-region implementation, there is further separation. For instance, you can replicate from one region in the US and another region in Europe or Asia. For multi-region replication you would use asynchronous replication.



Figure 1 – Multi-AZ Architecture

Another key component for making the decision to move to the cloud is to meet the everincreasing service level agreements (SLA) needed by organizations to support a 24x7 user experience. The cloud offers an attractive SLA for hardware, power, and connectivity, but a true SLA for applications is more than that. It ensures the application is available to fulfill the user needs even when the application hangs or fails. This is also the case with critical patching processes, where is it imperative to meet user needs and also ensure the latest versions of software are installed to proactively prevent issues. This can be achieved with clustering and data replication technology supported in the public cloud.

Why did PayGo move SQL Server to the AWS Cloud?

PayGo is a privately held integrated utility payment solution provider that manages the largest energy company prepayment programs in the United States. PayGo's original SQL Server platform consisted

of a on-premises SQL Server cluster with two physical servers in the same rack. As their business scaled, this platform quickly became mission-critical for key business operations.

They needed protection that was simple enough for their small team to implement and maintain. PayGo ran SQL Server Standard Edition using an active-passive SQL cluster and SIOS DataKeeper Cluster Edition software on the backend to handle the shared storage functionality.

In 2014, PayGo faced a decision point: either a large capital expense for a hardware refresh or a migration into the cloud. Although AWS was their clear choice for cloud, shared storage - a requirement for traditional failover clustering - is not available in AWS. This is a problem they faced really early on even with their on-premises solution, because none of the PayGo Team had enough experience to be able to administer a SAN shared storage. That's why they reached out to SIOS.

PayGo's Experience with AWS and SIOS

When PayGo moved their SQL Server solution protected by SIOS DataKeeper to AWS, they experienced the following benefits:

Low Learning Curve - The migration from on-premises to AWS was achieved with minimal architecture changes and minimal change for the PayGo Team to learn.

International Presence - From time to time, PayGo has new customers running their services in Europe and the Middle East. Without AWS, it would be cost prohibitive for them to expand into these geographies.

Cost Reduction - At the inception, PayGo moved two environments from on-premises locations to AWS. PayGo was spending about \$6,000 a month for data center costs on-premises and PayGo was able to replicate the solution in AWS for about \$900 a month, which is about one sixth of the cost. And that cost reduction has continued even though they have grown significantly.

Disaster Recovery - One architecture change that PayGo made was that they moved their SQL Server instances into different availability zones in AWS. Having each node in a different AZ gave PayGo not only machine high availability, but also geographic high availability. Fortunately, the AZs are far enough apart that they are isolated from events that would affect electrical service, cooling service, internet service, etc. This enables PayGo to meet all of their customer needs without interruption.

Low Latency - Another benefit with the AWS AZs is that the latency is so low, it can effectively be treated like a LAN. When PayGo moved to AWS in 2014, their network latency was less than 10 milliseconds, which was generally considered LAN speed. PayGo's experience with AWS network latency between nodes in different availability zones is less than one millisecond. This enabled them to split the nodes into two AZs, resulting in geographic high availability, and was really appealing to their customers. And it was something that PayGo was paying quite a bit of money for in their previous on-premises data center model, which was not high availability, but only disaster recovery with a four-hour failover window.

Solid SIOS Solution - Since the original implementation, PayGo has grown into four customer

environments. They are running four, two-node SQL Server clusters and the SIOS clustering solution has been very solid the whole time. One of the things that PayGo's technology team really appreciates about SIOS DataKeeper is that once it is setup, you truly don't have to think about it. DataKeeper has been reliable and meets the needs of the business.

SIOS Integration - Beyond DataKeeper's integration with AWS EC2 platform, SIOS DataKeeper also seamlessly integrates with Windows Failover Clustering. When you want to perform a failover, either manual or automatic, there's only one place to go: Windows Failover Cluster Manager. So, it's been really solid not just for SQL Server, but also for File and FTP Servers because SIOS DataKeeper replicates at a block level.

Traditional SQL Server Clustering vs. SIOS DataKeeper

A traditional SQL Server cluster looks like the image below with multiple nodes connected to shared storage. Unfortunately, a shared SAN storage device is not available in the cloud. This is where SIOS DataKeeper delivers a unique solution consisting of application orchestration and data replication to bring high availability and disaster recovery to the SQL Server platform.



Figure 2 – Traditional SQL Server Clustering Not Available in the Cloud

SIOS DataKeeper for SQL Server enables customers to build failover cluster instances in the cloud without the shared storage device that would normally be required for a failover cluster instance to work. SIOS DataKeeper integrates with Microsoft Windows Failover Clustering to creates a SANLess cluster that is fully supported by Microsoft. A SANless cluster is exactly the same as a traditional cluster, except that, instead of shared storage, DataKeeper synchronizes local attached storage on each node using host-based, block level replication. In the cloud, SIOS DataKeeper is designed to attach to local storage on each cluster node to perform block level replication between the different instances. Application failover is orchestrated with Windows Failover Clustering and SIOS DataKeeper provides high-speed data replication for SANLess clustering in the cloud, on-premises or via a hybrid architecture.



Figure 3 – SANLess Clustering

SIOS DataKeeper value is:

- Simplicity Remove the complexities of building and maintaining native SQL Server Availability Groups, especially if customers have multiple groups
- Holistic Failover the entire instance at once with Windows Cluster Manager
- Support Everywhere Cloud, on-premises or hybrid solution
- 100% SQL Server Protection Protect all user defined and system databases (Master, Model, MSDB, etc.) including SQL Server Agent Jobs, Logins, SSIS Packages, etc. which is not possible with SQL Server Availability Groups
- Scalability No dependence on Distributed Transaction Coordinator, which does not always scale with a large number of databases
- Block Level Replication Ability to replicate more than just SQL Server, such as File Servers, FTP, etc. with high performance between cluster nodes
- High Availability and Disaster Recovery Architecture to support local, remote, and multiple site
- Cost Reduction Rock solid clustering solution on-premises or in the cloud with SQL Server Standard Edition, which is a fraction of the cost of SQL Server Enterprise licensing

Multi-Node Clusters

SIOS DataKeeper can also be used to create multi-node clusters for added disaster protection. As shown in the diagram below, data can be replicated to multiple, geographically separated nodes.



Figure 4 – SANLess Multi-Site Clustering

SIOS DataKeeper Cost Savings

The cost savings when comparing a two-node native SQL Server Cluster running on Enterprise Edition with Always On Availability Groups with Software Assurance versus a two-node SQL Server Cluster running on Standard Edition with SIOS DataKeeper and Software Assurance is a savings of 58% to 71% with the SIOS solution. The cost savings increase as the number of CPU cores scale. This enables server consolidation and the introduction of high availability and disaster recovery at a lower cost with simplified administration



Figure 5 – SIOS Saves Licensing Costs

How do I get started with SIOS?

Check out the resources below to get started with SIOS DataKeeper:

- To learn more about SIOS visit https://us.sios.com/products/windows/ datakeeper-cluster/
- Schedule time with a SIOS Solution Architect https://us.sios.com/demo-request/
- Request a Trial Copy of SIOS High Availability Clustering Software for Windows or Linux - https://us.sios.com/san-sanless-clusters/free-trial-evaluation-san-sanlessclusters/
- Contact Sales: 1.617.245.6955 or sales@us.sios.com



SIOS Technology Corp. 155 Bovet Road, Suite 476 San Mateo, CA 94402 Tel: 650-645-7000

> info@us.sios.com https://us.sios.com

© 2023 SIOS Technology Corp. All rights reserved. SIOS, SIOS Technology, SIOS DataKeeper, SIOS LifeKeeper, SIOS Protection Suite and associated logos are registered trademarks or trademarks of SIOS Technology Corp. and/or its affiliates in the United States and/or other countries. All other trademarks are the property of their respective owners. WP-1017-B