SIOS DataKeeper Cluster Edition on the AWS Cloud

Quick Start Reference Deployment

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This Quick Start deployment guide was created by SIOS Technology Corp. in collaboration with Amazon Web Services (AWS).

Overview

This Quick Start reference deployment guide provides step-by-step instructions for deploying SIOS DataKeeper Cluster Edition on the AWS Cloud. Quick Starts are automated reference deployments that use AWS CloudFormation templates to launch, configure, and run the AWS compute, network, storage, and other services required to deploy a specific workload on AWS.

SIOS DataKeeper Cluster Edition is a highly optimized, host-based replication solution that integrates seamlessly with Windows Server Failover Clustering (WSFC). WSFC features, such as cross-subnet failover and tunable heartbeat parameters, make it possible for administrators to deploy geographically dispersed clusters. SIOS DataKeeper provides the data replication mechanism that extends WSFC, and enables administrators to take advantage of these advanced features to support high availability and disaster recovery configurations without the need for shared storage.

SIOS DataKeeper Cluster Edition provides replication in a virtual private cloud (VPC) within a single AWS Region across two Availability Zones. It also supports a data replication node outside the cluster with all nodes in the AWS Cloud.

This Quick Start is for enterprise users who want to deploy SIOS DataKeeper Cluster Edition on AWS into their test or production environment.

Costs and Licenses

You are responsible for the cost of the AWS services used while running this Quick Start reference deployment. There is no additional cost for using the Quick Start.

The AWS CloudFormation template for this Quick Start includes configuration parameters that you can customize. Some of these settings, such as instance type, will affect the cost of deployment. For cost estimates, see the pricing pages for each AWS service you will be using. Prices are subject to change.

This Quick Start uses Amazon Machine Images (AMIs) from the AWS Marketplace. It supports two licensing options:

- [Pay as you go (PAYG)](#) — Use this consumption-based option to pay an hourly fee determined by usage. Current prices are listed on the AWS Marketplace page and billed to your AWS account. This option doesn't require a license for SIOS DataKeeper.

- [Bring your own license (BYOL)](#) — Use this option if you have a current license for SIOS DataKeeper Cluster Edition (which requires a run-time license for each server). You can deploy the Quick Start without first signing up for a license, but you must have a license to start and run SIOS DataKeeper Cluster Edition. You can contact SIOS to request a [run-time license](#) or a [14-day, free, trial license](#).

Subscription instructions are provided in [step 2](#) of the deployment instructions.

Architecture

Deploying this Quick Start for a [new virtual private cloud (VPC)](#) with **default parameters** builds the following SIOS DataKeeper Cluster Edition environment in the AWS Cloud.

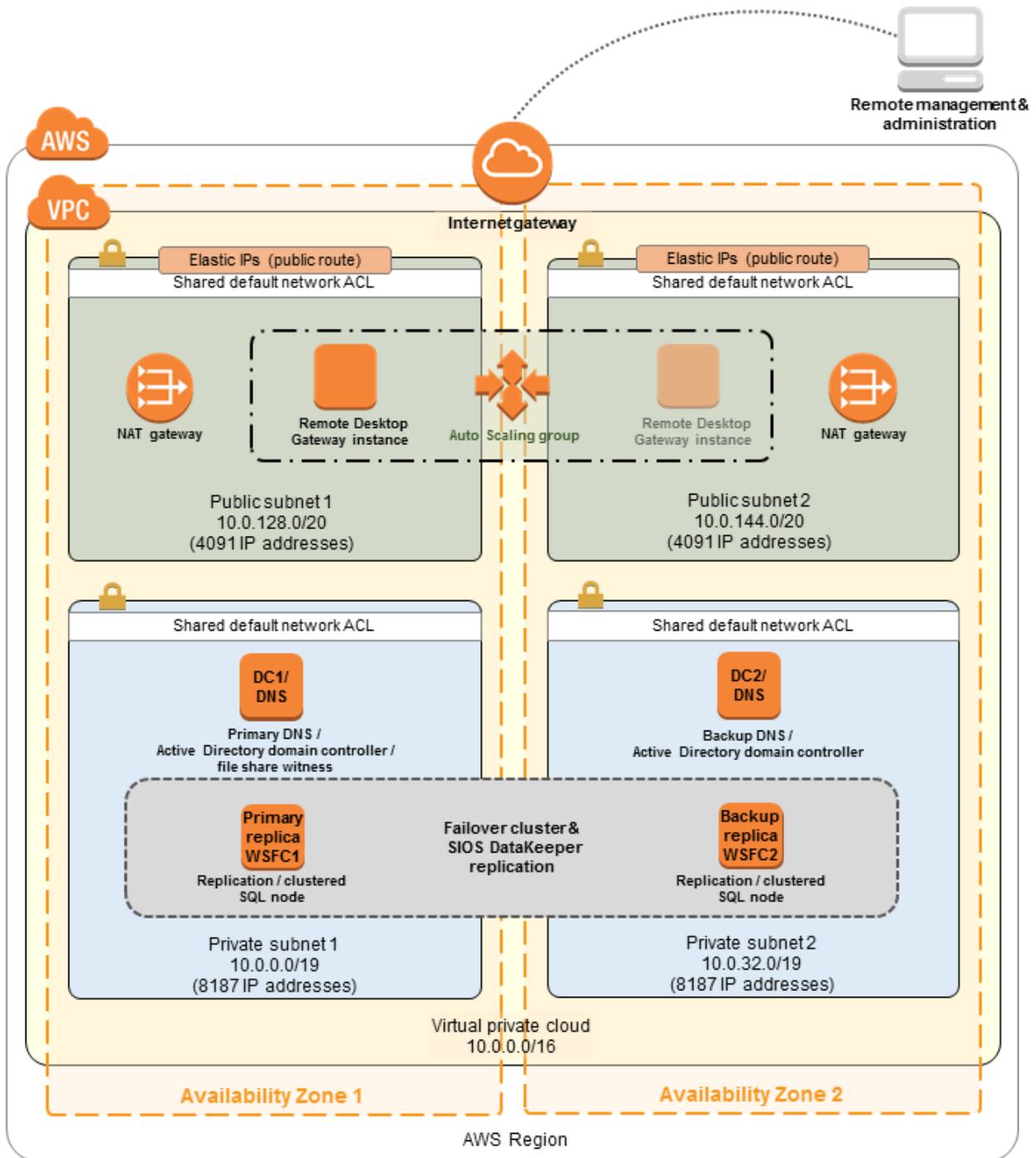**Figure 1: Quick Start architecture for SIOS DataKeeper Cluster Edition architecture on AWS**

The Quick Start sets up the following:

- One VPC with associated private and public subnets and security groups across two Availability Zones

- An internet gateway to allow access to the internet

- In the public subnets, a Remote Desktop Gateway instance in an Auto Scaling group for remote administration

- In the public subnets, two NAT gateways to allow outbound internet access for resources in the private subnets

- In the private subnets, two Active Directory domain controllers

- In the private subnets, two cluster nodes featuring SIOS DataKeeper replication software and SQL Server 2014

Technical specifications for the architecture:

Component	Details
VPC	Single AWS Region with two Availability Zones
Instance type	Minimum recommended instance type: m3.xlarge
Operating system	See the [DKCE Support Matrix](#)
Elastic IP	An Elastic IP address connected to the Remote Desktop Gateway server
Instances	Four instances: Two DNS / Active Directory domain controllers and two SIOS DataKeeper / SQL Server cluster nodes
SQL Server	Elastic network interface (ENI) with three IPs for each SQL Server instance: • Primary ENI IP is statically defined in Windows and used by SIOS DataKeeper Cluster Edition • Two IPs are maintained by Amazon EC2, and used by WSFC and SQL Server 2014
Volumes	Two volumes (Amazon EBS and NTFS only): • One primary volume (C drive) • One additional volumes for replicated data storage

Prerequisites

Specialized Knowledge

Before you deploy this Quick Start, we recommend that you become familiar with the following AWS services. (If you are new to AWS, see [Getting Started with AWS](#).)

- [Amazon VPC](#)
- [Amazon EC2](#)
- [Amazon Elastic Block Store](#) (Amazon EBS)

We recommend that you also take a look at the [SIOS DataKeeper Deployment Guide](#).

Deployment Options

This Quick Start provides two deployment options:

- **Deployment of SIOS DataKeeper Cluster Edition into a new VPC** (end-to-end deployment) builds a new AWS environment consisting of the VPC, subnets, NAT gateways, security groups, Remote Desktop Gateway server, domain controllers, and other infrastructure components. It then deploys two SIOS DataKeeper Cluster Edition nodes into this new VPC.

- **Deployment of SIOS DataKeeper Cluster Edition into an existing VPC** provisions two SIOS DataKeeper Cluster Edition nodes into your existing Active Directory domain running on AWS.

The Quick Start also lets you configure additional settings such as CIDR blocks, instance types, and SIOS DataKeeper Cluster Edition settings, as discussed later in this guide.

Deployment Steps

Step 1. Prepare Your AWS Account

1. If you don't already have an AWS account, create one at https://aws.amazon.com by following the on-screen instructions.

2. Use the region selector in the navigation bar to choose the AWS Region where you want to deploy SIOS DataKeeper Cluster Edition on AWS.

3. Create a key pair in your preferred region.

4. If necessary, request a service limit increase for the Amazon EC2 **r3.xlarge** instance type. You might need to do this if you already have an existing deployment that uses this instance type, and you think you might exceed the default limit with this reference deployment.

Step 2. Subscribe to the SIOS DataKeeper Cluster Edition AMI

This Quick Start uses Amazon Machine Images (AMIs) from the AWS Marketplace. Before you launch the Quick Start, you must subscribe to one of the SIOS DataKeeper Cluster Edition AMIs.
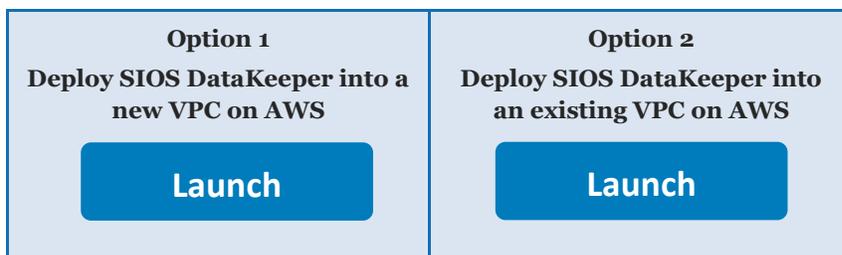
Two licensing options are available: Bring Your Own License (BYOL) and pay as you go (PAYG), as described previously in the Costs and Licenses section.

1. If you're planning to use the BYOL licensing option, obtain a permanent license by contacting SIOS directly. You can also sign up for a free, 14-day, trial license.

2. Log in to the AWS Marketplace at https://aws.amazon.com/marketplace.

3. Open the page for the licensing option you'd like to use:

   • Pay as you go (PAYG)
     —or—
   • Bring your own license (BYOL)

4. Choose **Continue**.

5. Use the **Manual Launch** option, and then choose **Accept Software Terms**. For detailed instructions, see the AWS Marketplace documentation.

Step 3. Launch the Quick Start

> **Note**   You are responsible for the cost of the AWS services used while running this Quick Start reference deployment. There is no additional cost for using this Quick Start. For full details, see the pricing pages for each AWS service you will be using in this Quick Start. Prices are subject to change.

1. Choose one of the following options to launch the AWS CloudFormation template into your AWS account. For help choosing an option, see deployment options earlier in this guide.

Option 1	Option 2
Deploy SIOS DataKeeper into a new VPC on AWS	**Deploy SIOS DataKeeper into an existing VPC on AWS**
Launch	**Launch**

> **Important**   If you're deploying SIOS DataKeeper Cluster Edition into an existing VPC, make sure that your VPC has two private subnets in different Availability Zones for the database instances. These subnets require NAT gateways or NAT instances in their route tables, to allow the instances to download packages and software without exposing them to the internet. You'll also need the domain name option configured in the DHCP options as explained in the Amazon VPC documentation. You'll be prompted for your VPC settings when you launch the Quick Start.

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End-to-end deployment (option 1) takes about 3 hours to complete. Deploying SIOS DataKeeper into an existing VPC (option 2) takes almost 2 hours to complete.

2. Check the region that's displayed in the upper-right corner of the navigation bar, and change it if necessary. This is where the network infrastructure for SIOS DataKeeper Cluster Edition will be built. The template is launched in the US East (N. Virginia) Region by default.

3. On the **Select Template** page, keep the default setting for the template URL, and then choose **Next**.

4. On the **Specify Details** page, change the stack name if needed. Review the parameters for the template. Provide values for the parameters that require input. For all other parameters, review the default settings and customize them as necessary. When you finish reviewing and customizing the parameters, choose **Next**.

In the following tables, parameters are listed by category and described separately for the two deployment options:

– [Parameters for deploying SIOS DataKeeper into a new VPC](#)

– [Parameters for deploying SIOS DataKeeper into an existing VPC](#)

- **Option 1: Parameters for deploying SIOS DataKeeper Cluster Edition into a new VPC**

[View template](#)

Network Configuration:

Parameter label (name)	Default	Description
Availability Zones (AvailabilityZones)	*Requires input*	The list of Availability Zones to use for the subnets in the VPC. The Quick Start uses two Availability Zones from your list and preserves the logical order you specify.
VPC CIDR (VPCCIDR)	10.0.0.0/16	CIDR block for the VPC to create.
Private Subnet 1 CIDR (PrivateSubnet1ACIDR)	10.0.0.0/19	CIDR block for the private subnet located in Availability Zone 1.
Private Subnet 2 CIDR (PrivateSubnet2ACIDR)	10.0.32.0/19	CIDR block for the private subnet located in Availability Zone 2.
Public Subnet 1 CIDR (PublicSubnet1CIDR)	10.0.128.0/20	CIDR block for the public (DMZ) subnet located in Availability Zone 1.
Public Subnet 2 CIDR (PublicSubnet2CIDR)	10.0.144.0/20	CIDR block for the public (DMZ) subnet located in Availability Zone 2.

Amazon EC2 Configuration:

Parameter label (name)	Default	Description
Key Pair Name (KeyPairName)	*Requires input*	Public/private key pair, which allows you to connect securely to your instance after it launches. When you created an AWS account, this is the key pair you created in your preferred region.

Microsoft Active Directory Configuration:

Parameter label (name)	Default	Description
Domain Controller 1 Instance Type (ADServer1InstanceType)	t2.large	EC2 instance type for the first Active Directory instance.
Domain Controller 1 NetBIOS Name (ADServer1NetBIOSName)	DC1	NetBIOS name of the first Active Directory server. This can be up to 15 characters long.
Domain Controller 1 Private IP Address (ADServer1PrivateIP)	10.0.0.10	Fixed private IP for the first Active Directory server located in Availability Zone 1.
Domain Controller 2 Instance Type (ADServer2InstanceType)	t2.large	EC2 instance type for the second Active Directory instance.
Domain Controller 2 NetBIOS Name (ADServer2NetBIOSName)	DC2	NetBIOS name of the second Active Directory server. This can be up to 15 characters long.
Domain Controller 2 Private IP Address (ADServer2PrivateIP)	10.0.32.10	Fixed private IP for the second Active Directory server located in Availability Zone 2.
Domain DNS Name (DomainDNSName)	datakeeper.local	Fully qualified domain name (FQDN) of the forest root domain.
Domain NetBIOS Name (DomainNetBIOSName)	DATAKEEPER	NetBIOS name of the domain for users of earlier versions of Windows. This can be up to 15 characters long.
Domain Admin User Name (DomainAdminUser)	siosadmin	User name for the account that is added as domain administrator. This is separate from the default administrator account.
Domain Admin Password (DomainAdminPassword)	*Requires input*	Password for the domain administrator user. This must be a [complex password](#) that's at least 8 characters long.

Remote Desktop Gateway Configuration:

Parameter label (name)	Default	Description
Allowed Remote Desktop Gateway External Access CIDR (RDGWCIDR)	*Requires input*	Allowed CIDR block for external access to the Remote Desktop Gateway instance. We recommend that you set this value to a trusted CIDR block.
Remote Desktop Gateway Instance Type (RDGWInstanceType)	t2.large	EC2 instance type for the Remote Desktop Gateway instance.

Replication Configuration:

Parameter label (name)	Default	Description
SIOS AMI Version (AMIType)	PAYG	AMI type for SIOS license purposes. The two options are PAYG (pay as you go) and BYOL (bring your own license). For more information, see Costs and Licenses.
SIOS License Key FTP URL (SIOSLicenseKeyFtpURL)	*Requires input*	URL used to obtain the license key for SIOS DataKeeper software, for BYOL licenses. This parameter is ignored if you've selected the PAYG AMI.
SQL Server Version (SQLServerVersion)	2014SP1	The version of SQL Server to install. Choose **None** if you don't want to install SQL Server.
Service Account Name (SQLServiceAccount)	sqlsa	User name for the SQL Server service account. This account is a domain user.
Service Account Password (SQLServiceAccountPassword)	*Requires input*	Password for the SQL Server service account. This must be at least 8 characters, consisting of letters, numbers, and symbols.
Data Volume Size (GiB) (Volume1Size)	100	Data volume size for the SQL drive, in GiB.
Data Volume Type (Volume1Type)	gp2	Data volume type for the SQL drive. The two options are gp2 and io1.
Data Volume IOPS (Volume1Iops)	1000	Data volume IOPS for the SQL drive. This parameter is used only when the volume type is set to io1.

Failover Cluster Configuration:

Parameter label (name)	Default	Description
Windows Server OS Version for Cluster Nodes (ClusterNodeOSServerVersion)	2012R2	The operating system version of the Windows Server that hosts the cluster nodes.
Instance Type for Cluster Node 1 (WSFCNode1InstanceType)	r3.xlarge	EC2 instance type for the WSFC node located in Availability Zone 1.
Cluster Node 1 NetBIOS Name (WSFCNode1NetBIOSName)	WSFCNode1	NetBIOS name of the WSFC node located in Availability Zone 1 (up to 15 characters).
Cluster Node 1 Private IP Address 1 (WSFCNode1PrivateIP1)	10.0.0.100	Primary private IP for the WSFC node located in Availability Zone 1.
Cluster Node 1 Private IP Address 2 (WSFCNode1PrivateIP2)	10.0.0.101	Secondary private IP for the WSFC cluster on the WSFC node located in Availability Zone 1.
Cluster Node 1 Private IP Address 3 (WSFCNode1PrivateIP3)	10.0.0.102	Third private IP for the availability group listener on the WSFC node located in Availability Zone 1.
Instance Type for Cluster Node 2 (WSFCNode2InstanceType)	r3.xlarge	EC2 instance type for the WSFC node located in Availability Zone 2.
Cluster Node 2 NetBIOS Name (WSFCNode2NetBIOSName)	WSFCNode2	NetBIOS name of the WSFC node located in Availability Zone 2 (up to 15 characters).

Parameter label (name)	Default	Description
Cluster Node 2 Private IP Address 1 (WSFCNode2PrivateIP1)	10.0.32.100	Primary private IP for the WSFC node located in Availability Zone 2.
Cluster Node 2 Private IP Address 2 (WSFCNode2PrivateIP2)	10.0.32.101	Secondary private IP for the WSFC cluster on the WSFC node located in Availability Zone 2.
Cluster Node 3 Private IP Address 3 (WSFCNode2PrivateIP3)	10.0.32.102	Third private IP for the availability group listener on the WSFC node located in Availability Zone 2.

AWS Quick Start Configuration:

Parameter label (name)	Default	Description
Quick Start S3 Bucket Name (QSS3BucketName)	aws-quickstart	The S3 bucket you have created for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. The bucket name can include numbers, lowercase letters, uppercase letters, and hyphens, but should not start or end with a hyphen.
Quick Start S3 Key Prefix (QSS3KeyPrefix)	quickstart-sios-datakeeper/	The S3 key name prefix used to simulate a folder for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. This prefix can include numbers, lowercase letters, uppercase letters, hyphens, and forward slashes.

- **Option 2: Parameters for deploying SIOS DataKeeper into an existing VPC**

View template

Network Configuration:

Parameter label (name)	Default	Description
VPC to place SQL cluster in (VPCID)	*Requires input*	ID of your existing VPC (e.g., vpc-0343606e).
Private Subnet 1 ID (PrivateSubnet1ID)	*Requires input*	ID of the private subnet in Availability Zone 1 in your existing VPC (e.g., subnet-a0246dcd).
Private Subnet 1 CIDR (PrivateSubnet1CIDR)	10.0.0.0/19	CIDR block for private subnet 1 located in Availability Zone 1.
Private Subnet 2 ID (PrivateSubnet2ID)	*Requires input*	ID of the private subnet in Availability Zone 2 in your existing VPC (e.g., subnet-b58c3d67).
Private Subnet 2 CIDR (PrivateSubnet2CIDR)	10.0.32.0/19	CIDR block for private subnet 2 located in Availability Zone 2.

Amazon EC2 Configuration:

Parameter label (name)	Default	Description
Key Pair Name (KeyPairName)	*Requires input*	Public/private key pair, which allows you to connect securely to your instance after it launches. When you created an AWS account, this is the key pair you created in your preferred region.

Microsoft Active Directory Configuration:

Parameter label (name)	Default	Description
Domain DNS Name (DomainDNSName)	datakeeper.local	Fully qualified domain name (FQDN) of the forest root domain.
Domain NetBIOS Name (DomainNetBIOSName)	DATAKEEPER	NetBIOS name of the domain for users of earlier versions of Windows. This can be up to 15 characters long.
Domain Admin User Name (DomainAdminUser)	siosadmin	User name for the account that is added as domain administrator. This is separate from the default administrator account.
Domain Admin Password (DomainAdminPassword)	*Requires input*	Password for the domain administrator user. This must be a complex password that's at least 8 characters long.
Domain Controller 1 NetBIOS Name (ADServer1NetBIOSName)	DC1	NetBIOS name of the first Active Directory server. This can be up to 15 characters long.
Domain Controller 1 Private IP Address (ADServer1PrivateIP)	10.0.0.10	Fixed private IP for the first Active Directory server located in Availability Zone 1.
Domain Controller 2 NetBIOS Name (ADServer2NetBIOSName)	DC2	NetBIOS name of the second Active Directory server. This can be up to 15 characters long.
Domain Controller 2 Private IP Address (ADServer2PrivateIP)	10.0.32.10	Fixed private IP for the second Active Directory server located in Availability Zone 2.
Security Group ID for AD domain members (DomainMemberSGID)	*Requires input*	ID of the Domain Member security group (e.g., sg-7f16e910).

Replication Configuration:

Parameter label (name)	Default	Description
SIOS AMI Version (AMIType)	PAYG	AMI type for SIOS license purposes. The two options are PAYG (pay as you go) and BYOL (bring your own license). For more information, see Costs and Licenses.
SIOS License Key FTP URL (SIOSLicenseKeyFtpURL)	*Requires input*	URL used to obtain the license key for SIOS DataKeeper software, for BYOL licenses. This parameter is ignored if you've selected the PAYG AMI.
SQL Server Version (SQLServerVersion)	2014SP1	The version of SQL Server to install. Choose **None** if you don't want to install SQL Server.

Parameter label (name)	Default	Description
Service Account Name (SQLServiceAccount)	sqlsa	User name for the SQL Server service account. This account is a domain user.
Service Account Password (SQLServiceAccountPassword)	*Requires input*	Password for the SQL Server service account. This must be at least 8 characters, consisting of letters, numbers, and symbols.
Data Volume Size (GiB) (Volume1Size)	100	Data volume size for the SQL drive, in GiB.
Data Volume Type (Volume1Type)	gp2	Data volume type for the SQL drive. The two options are gp2 and io1.
Data Volume IOPS (Volume1Iops)	1000	Data volume IOPS for the SQL drive. This parameter is used only when the volume type is set to io1.

Failover Cluster Configuration:

Parameter label (name)	Default	Description
Cluster Node OS Version (OSVersion)	2012R2	The operating system version of the Windows Server that hosts the cluster nodes.
Instance Type for Cluster Node 1 (WSFCNode1InstanceType)	r3.xlarge	EC2 instance type for the WSFC node located in Availability Zone 1.
Cluster Node 1 NetBIOS Name (WSFCNode1NetBIOSName)	WSFCNode1	NetBIOS name of the WSFC node located in Availability Zone 1 (up to 15 characters).
Cluster Node 1 Private IP Address 1 (WSFCNode1PrivateIP1)	10.0.0.100	Primary private IP for the WSFC node located in Availability Zone 1.
Cluster Node 1 Private IP Address 2 (WSFCNode1PrivateIP2)	10.0.0.101	Secondary private IP for the WSFC cluster on the WSFC node located in Availability Zone 1.
Cluster Node 1 Private IP Address 3 (WSFCNode1PrivateIP3)	10.0.0.102	Third private IP for the availability group listener on the WSFC node located in Availability Zone 1.
Instance Type for Cluster Node 2 (WSFCNode2InstanceType)	r3.xlarge	EC2 instance type for the WSFC node located in Availability Zone 2.
Cluster Node 2 NetBIOS Name (WSFCNode2NetBIOSName)	WSFCNode2	NetBIOS name of the WSFC node located in Availability Zone 2 (up to 15 characters).
Cluster Node 2 Private IP Address 1 (WSFCNode2PrivateIP1)	10.0.32.100	Primary private IP for the WSFC node located in Availability Zone 2.
Cluster Node 2 Private IP Address 2 (WSFCNode2PrivateIP2)	10.0.32.101	Secondary private IP for the WSFC cluster on the WSFC node located in Availability Zone 2.
Cluster Node 3 Private IP Address 3 (WSFCNode2PrivateIP3)	10.0.32.102	Third private IP for the availability group listener on the WSFC node located in Availability Zone 2.

AWS Quick Start Configuration:

Parameter label (name)	Default	Description
Quick Start S3 Bucket Name (QSS3BucketName)	aws-quickstart	The S3 bucket you have created for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. The bucket name can include numbers, lowercase letters, uppercase letters, and hyphens, but should not start or end with a hyphen.
Quick Start S3 Key Prefix (QSS3KeyPrefix)	quickstart-sios-datakeeper/	The S3 key name prefix used to simulate a folder for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. This prefix can include numbers, lowercase letters, uppercase letters, hyphens, and forward slashes.

Other parameters:

Parameter label (name)	Default	Description
ClusterName (ClusterName)	WSFCCluster	The NetBIOS name of the WSFC cluster.

5. On the **Options** page, you can specify tags (key-value pairs) for resources in your stack and set advanced options. When you're done, choose **Next**.

6. On the **Review** page, review and confirm the template settings. Under **Capabilities**, select the check box to acknowledge that the template will create AWS Identity and Access Management (IAM) resources.

7. Choose **Create** to deploy the stack.

8. Monitor the status of the stack. When the status is **CREATE_COMPLETE**, the SIOS DataKeeper cluster is ready.

9. Use the URLs displayed in the **Outputs** tab for the stack to view the created resources.

Step 4. Test the Deployment

The easiest way to determine whether SIOS DataKeeper Cluster Edition has been correctly deployed and configured is to launch Failover Cluster Manager on one of the replication nodes, and switch over resources. Follow these steps:

1. Connect to the Remote Desktop Gateway instance.

2. From that node, RDP into the replication node.

3. When you've connected to a replication node, launch Failover Cluster Manager.

4. In the left pane, choose **Roles**, and verify that the MSSQLSERVER role is online.

5. In the **Roles** pane, open the context (right-click) menu for MSSQLSERVER, choose **Move**, **Select Node**, and then choose the other replication node as the destination node. The role should come online within two minutes.

6. Move the role back to the primary replication node. If the role comes online without any issues on either node, the deployment was successful and can be used as desired.

For further configuration details, see the [SIOS technical documentation](#).

Troubleshooting

Q. I encountered a CREATE_FAILED error when I launched the Quick Start. What should I do?

A. If AWS CloudFormation fails to create the stack, we recommend that you relaunch the template with **Rollback on failure** set to **No**. (This setting is under **Advanced** in the AWS CloudFormation console, **Options** page.) With this setting, the stack's state will be retained and the instance will be left running, so you can troubleshoot the issue. (You'll want to look at the log files in `%ProgramFiles%\Amazon\EC2ConfigService` and `C:\cfn\log`.)

> **Important**   When you set **Rollback on failure** to **No**, you'll continue to incur AWS charges for this stack. Please make sure to delete the stack when you've finished troubleshooting.

For additional information, see [Troubleshooting AWS CloudFormation](#) on the AWS website.

Q. I encountered a size limitation error when I deployed the AWS Cloudformation templates.

A. We recommend that you launch the Quick Start templates from the location we've provided or from another S3 bucket. If you deploy the templates from a local copy on your computer or from a non-S3 location, you might encounter template size limitations when you create the stack. For more information about AWS CloudFormation limits, see the [AWS documentation](#).

Q. I encountered problems using SIOS DataKeeper on AWS.

A. Use the following resources to help troubleshoot issues:

- Check the [Troubleshooting](#) section of the SIOS DataKeeper documentation.

- If you have a support contract, visit http://us.sios.com/support/overview/.

- If you're evaluating the software, email [SIOS pre-sales support](#).

Best Practices

AWS services

SIOS recommends following AWS best practices for creating and using IAM roles and policies, IAM user credentials and roles, and access key rotation.

- IAM roles
  https://docs.aws.amazon.com/IAM/latest/UserGuide/id_roles_create_for-service.html

- IAM policies
  https://docs.aws.amazon.com/IAM/latest/UserGuide/access_policies_create.html

- IAM users
  https://docs.aws.amazon.com/IAM/latest/UserGuide/id_users_sign-in.html

- Access keys
  https://aws.amazon.com/blogs/security/how-to-rotate-access-keys-for-iam-users/

SIOS DataKeeper Cluster Edition

SIOS also has some recommendations for customers seeking optimal performance. These recommendations include considerations specific to both the Windows operating system and the AWS Cloud configurations.

The primary component of SIOS DataKeeper is an upper filter volume driver. This driver tracks and processes every request sent to a source volume, and therefore incurs some overhead for all volume operations. When properly configured in a cloud environment, this overhead should be no more than 10-20 percent.

- Instance size - Replication performance relies on several factors. While CPU usage is minimal, RAM utilization depends entirely on network performance, peak active workload, volume read/write latency, and the number of concurrent mirrors under load. With these considerations in mind, SIOS recommends using instance sizes that have at least medium network performance, enabling Amazon EBS optimization by default, and providing at least one instance for storage volume. The r3.xlarge instance size is the smallest recommended instance size if performance is a concern. If performance is not an issue, SIOS DataKeeper can be installed on any instance size that is currently available.

- Amazon EBS optimization - This feature is required for best performance. It is turned on by default in the Quick Start deployment.

- Instance storage - Several features of SIOS DataKeeper rely on very low latency volume access. Bitmap storage must be configured to reside on an instance storage volume. This is automatically configured during Quick Start deployment, but any nodes added to the cluster afterward will need [manual configuration](#).

- Volume properties - While a simple volume is all that is required for proper mirror operation, more advanced techniques can be used to minimize read/write latency. SIOS recommends creating identical **Storage Pools** to support mirror volumes on both source and target systems. This Quick Start does **not** configure Storage Pools during deployment. Storage Spaces Direct is **not** compatible with SIOS DataKeeper, and should not be used.

- Recovery Time Objective (RTO) and Recovery Point Objective (RPO) - SIOS DataKeeper does not add significantly to a typical cluster single-server outage failover RTO. Assuming appropriate instance sizes are utilized, resource contention is not an issue, SIOS DataKeeper is properly configured and in the mirroring state, and assuming trivial application recovery time, an RTO of <1 minute is possible. Realistically, an RTO of 2 –5 minutes should be expected unless the application being protected (Microsoft SQL Server, SAP, etc.) has an unusually large recovery time.

  Assuming the same conditions, RPO should be only a few milliseconds larger than the current network write latency between the source and target nodes. RPO can be measured with the [QueueCurrentAge perfmon counter](#).

  In many cases, the RPO will be measured in milliseconds, but factors like network congestion, abnormally high disk write activity, or slow write performance on the target server can impact RPO greatly.

  SIOS DataKeeper does not conflict with Amazon EBS snapshots, and it can be used in conjunction with them on the source system. However, restoring a source volume from snapshot is not trivial, and will require a full resync of all data protected by the applicable mirror before the above RPO guidelines are applicable again.

  To optimize RTO and RPO, follow the [best practices guide](#) for SIOS DataKeeper Cluster Edition.

Additional Resources

AWS services

- Amazon EC2
  https://docs.aws.amazon.com/AWSEC2/latest/WindowsGuide/

- AWS CloudFormation
  https://aws.amazon.com/documentation/cloudformation/

- Amazon VPC
  https://aws.amazon.com/documentation/vpc/

SIOS DataKeeper Cluster Edition

- Step-by-Step: Configuring a 2-Node Multi-Site Cluster on Windows Server 2008 R2 – Part 1
  http://clusteringformeremortals.com/2009/09/15/step-by-step-configuring-a-2-node-multi-site-cluster-on-windows-server-2008-r2-%E2%80%93-part-1/

- Step-by-Step: Configuring a 2-Node Multi-Site Cluster on Windows Server 2008 R2 – Part 3
  http://clusteringformeremortals.com/2009/10/07/step-by-step-configuring-a-2-node-multi-site-cluster-on-windows-server-2008-r2-%E2%80%93-part-3/

Quick Start reference deployments

- AWS Quick Start home page
  https://aws.amazon.com/quickstart/

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Document Revisions

Date	Change	In sections
September 2019	Advanced Tier Compliance	Best Practices
October 2017	Added parameter for optional installation of SQL Server	Parameter tables in step 3
May 2017	Placed RD Gateway instance in an Auto Scaling group; updated parameters	Architecture; step 3
April 2017	Initial publication	—

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