



**SIOS Protection Suite for Linux
Route53 Recovery Kit
v9.2.2**

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Table of Contents

Chapter 1: Introduction	1
Route53 Recovery Kit	1
SIOS Protection Suite Documentation	1
Chapter 2: Requirements	2
LifeKeeper Software:	2
Chapter 3: Configuration	3
Specific Configuration Considerations for Route53 Resources	3
Creating a Resource Hierarchy	4
Deleting a Resource Hierarchy	5
Extending Your Hierarchy	5
Unextending Your Hierarchy	7
Adjusting Route53 Recovery Kit Tunable Values	7
Resource Monitoring and Recovery	8
User System Setup	8
When Using the Virtual IP Resource	8
When Using the Actual IP Resource	9
Troubleshooting	10
Updating the record associated with the Route53 resource startup may take time	10
Correctly set TTL value of the DNS record	10

Chapter 1: Introduction

Route53 Recovery Kit

Route53 Recovery Kit provides a mechanism for updating Amazon Route 53 DNS information corresponding to a virtual IP address and an actual IP address information of IP resources that are in dependency relation when switching to a failed primary server to a backup server

SIOS Protection Suite Documentation

The following is a list of SIOS Protection Suite for Linux related information available from SIOS Technology Corp.

- [SPS for Linux Technical Documentation](#)
- [SPS for Linux Release Note](#)
- [SIOS Technology Corp. Documentation](#)

For the details, please refer to [Amazon Route 53 Documentation](#).

Note: LifeKeeper 9.2.2 now supports IAM Role. If you upgrade LifeKeeper 9.2.1 or earlier to LifeKeeper 9.2.2 or later, please follow the process described in [“How to make existing resources support IAM Role”](#)

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Chapter 2: Requirements

Prior to installing and configuring the Route53 Recovery Kit, be sure your configuration meets the following requirements.

- AWS Command Line Interface (AWS CLI) must be installed on all EC 2 instances. Refer to ["Installing AWS Command Line Interface"](#) for installation information.
- Instances need to have an access to Amazon Route 53 service endpoint, route53.amazonaws.com, with HTTPS protocol. Please configure EC2 and the OS properly.
- Register an appropriate domain name for Amazon Route 53.
- In order for LifeKeeper to operate AWS, an IAM user or an IAM role with the following access privilege is required. Please configure [IAM roles for Amazon EC2](#) or [the AWS CLI](#) appropriately so that it can be accessed from root user of the Amazon EC2 instance.
 - route53:GetChange
 - route53:ListHostedZones
 - route53:ChangeResourceRecordSets
 - route53:ListResourceRecordSets

LifeKeeper Software:

You need to install the same version of LifeKeeper software and patches on each server. For the specific LifeKeeper requirements, please refer to [Technical Documentation](#) or [SPS for Linux release note](#)

Chapter 3: Configuration

To configure LifeKeeper to provide the required protection capability and flexibility, you need to know the configuration requirements. You also need to understand Amazon, Amazon Virtual Private Cloud (VPC), Amazon Elastic Compute Cloud (EC2), Amazon Route 53 and hierarchy configuration options of the user system. In addition to the configuration planning, this section also describes the specific tasks required to set up the Recovery Kit.

Specific Configuration Considerations for Route53 Resources

The following configuration tasks for Route53 resources are described in this section. They are unique to a Route53 resource instance and different for each recovery kit.

- [Creating a Resource Hierarchy](#): Creates an application resource hierarchy in your LifeKeeper cluster.
- [Deleting a Resource Hierarchy](#): Deletes a resource hierarchy from all servers in your LifeKeeper cluster.
- [Extending Your Hierarchy](#): Extends a resource hierarchy from the primary server to a backup server.
- [Unextending Your Hierarchy](#): Unextends (removes) a resource hierarchy from a single server in your LifeKeeper cluster.
- [Adjusting Route53 Recovery Kit Tunable Values](#): Tunes characteristics of the overall behavior of the Route53 Recovery Kit.

The following tasks are described in the [Administration](#) section within the [SPS for Linux Technical Documentation](#). They are common tasks with steps that are identical across all Recovery Kits.

- [Create a Resource Dependency](#): Creates a parent/child dependency between an existing resource hierarchy and another resource instance and propagates the dependency changes to all applicable servers in the cluster.
- [Delete a Resource Dependency](#): Deletes a resource dependency and propagates the dependency changes to all applicable servers in the cluster.
- [In Service](#): Brings a resource hierarchy into service on a specific server.
- [Out of Service](#): Takes a resource hierarchy out of service on a specific server.
- [View Properties](#) / [Edit Properties](#): View or edit the properties of a resource hierarchy on a specific server.

The rest of this section explains how to configure your recovery kit by selecting certain tasks from the [Edit] menu of the LifeKeeper GUI. You may also select each configuration task from the toolbar.

- Right-click on a global resource in the Resource Hierarchy Tree (left-hand pane) of the status display window to display the same drop down menu choices as the [Edit] menu. This is only an option when a hierarchy already exists.
- Right-click on a resource instance in the Resource Hierarchy Table (right-hand pane) of the status display window to perform all the configuration tasks, except Creating a Resource Hierarchy, depending on the state of the server and the particular resource

Creating a Resource Hierarchy

To create a resource instance from the primary server, complete the following steps.

1. From the LifeKeeper GUI menu, select **Edit** then **Server**. From the drop down menu, select **Create Resource Hierarchy**.
2. A dialog box will appear with a drop down list showing all of the recognized recovery kits installed within the cluster. Select **Amazon Route53** from the drop down list and click **[Next]**
3. You will be prompted to enter the following information. (When the Back button is active in any of the dialog boxes, you can go back to the previous dialog box. This is especially helpful in the event that you need to correct previously entered information.)

Note: you click the Cancel button at any time when creating your hierarchy, LifeKeeper will cancel the entire creation process.

Field	Tips
Switchback Type	<p>This dictates how the Route53 instance will be switched back to this server when the server recovers after a failover. You can choose either intelligent or automatic.</p> <ul style="list-style-type: none"> Intelligent switchback requires administrative intervention to switch the instance back to the primary/-original server. Automatic switchback means the switchback will occur as soon as the primary server comes back on line and reestablishes LifeKeeper communication paths. <p>Note: The switchback type can be changed later from the General tab of the Resource Properties dialog box.</p>
Server	Select the Server for the Route53 resource (typically this is referred to as the primary or template server). All the servers in your cluster are included in the drop down list.
Domain name (Route53 hosted zone)	Route53 hosted zones are listed in the drop down list. Select the domain name to use.
Host Name (Not FQDN)	Enter the host name.
IP resource	Select the IP resource. This is the virtual IP address or the actual IP address that is protected by LifeKeeper.
Route53 Resource Tag	Select or enter a unique Route53 Resource Tag name for the Route53 resource instance you are creating. This field is populated automatically with a default tag name, route53-<host name>.

4. Click **Create**. The Create Resource Wizard will then create your Route53 resource
5. At this point, an information box appears and LifeKeeper will validate that you have provided valid data to create your Route53 resource hierarchy. If LifeKeeper detects a problem an ERROR will appear in the information box. If the validation is successful your resource will be created. Click **Next**

Another information box will appear confirming that you have successfully created a Route53 resource hierarchy. You must extend that hierarchy to another server in your cluster in order to place it under LifeKeeper protection

When you click **Continue**, LifeKeeper will launch the Pre-Extend configuration task. Refer to Extending Your Hierarchy for details on how to extend your resource hierarchy to another server.

If you click **[Cancel]** now, another dialog box will appear alerting you that you will need to manually extend your Route53 resource hierarchy to another server at some other time to put it under LifeKeeper protection.

Deleting a Resource Hierarchy

To delete a resource hierarchy from all of the servers in your LifeKeeper environment, complete the following steps:

1. From the LifeKeeper GUI menu, select **Edit**, then **Resource**. From the dropdown menu, select **Delete Resource Hierarchy**.
2. Select the name of the Target Server that you are deleting from your Route53 resource hierarchy and click **Next**

Note: This dialog will not appear if you selected the Delete Resource task by right clicking on a resource instance in either pane.

3. Select the Hierarchy to Delete. Identify the resource hierarchy you wish to delete, highlight it then click **Next**

Note: This dialog will not appear if you selected the Delete Resource task by right clicking on a resource instance in the left or right pane.

4. An information box appears confirming your selection of the target server and the hierarchy you have selected to **Delete** to proceed.
5. An information box appears confirming that the Route53 resource was deleted successfully.
6. Click **Done** to exit.

Extending Your Hierarchy

After you have created a hierarchy, you must extend that hierarchy to another server in the cluster. There are three possible scenarios to extend your resource instance from the template server to a target server.

- Continue from creating the resource into extending that resource to another server.
- Enter the Extend Resource Hierarchy task from the edit menu as shown below.
- Right click on an unextended hierarchy in either the left or right hand pane.

Each scenario takes you through the same dialog boxes (with a few exceptions, detailed below).

1. If you are entering the Extend wizard from the LifeKeeper GUI menu, select **Edit** , then **Resource** . From the drop down menu, select **Extend Resource Hierarchy**. This will launch the Extend Resource Hierarchy wizard. If you are unfamiliar with the Extend operation, click **Next** . If you are familiar with the LifeKeeper Extend Resource Hierarchy defaults and want to bypass the prompts for input/confirmation, click **Accept Defaults** .
2. The Pre-Extend Wizard will prompt you to enter the following information

Note:The first two fields appear only if you initiated the Extend from the Edit menu. It should be noted that if you click Cancel at any time during the sequence of extending your hierarchy, LifeKeeper will cancel the extension process to that particular server. However, if you have already extended the resource to another server, that instance will continue to be in effect until you specifically unextend it.

Field	Tips
Switchback Type	<p>Select the Switchback Type. This dictates how the Route53 instance will be switched back to this server when it comes back into service after a fail-over to the backup server. You can choose either intelligent or automatic.</p> <ul style="list-style-type: none"> • Intelligent switchback requires administrative intervention to switch-back the instance to the primary/original server. • Automatic switchback means the switchback will occur as soon as the primary server comes back on line and reestablishes LifeKeeper communication paths. <p>The switchback type can be changed later, if desired, from the General tab of the Resource Properties dialog box.</p>
Template Priority	<p>Select or enter a Template Priority. This is the priority for the Route53 hierarchy on the server where it is currently in service. Any unused priority value from 1 to 999 is valid, where a lower number means a higher priority (1=highest). The extend process will reject any priority for this hierarchy that is already in use by another system. The default value is recommended.</p> <p>Note:This selection will appear only for the initial extend of the hierarchy.</p>
Target Priority	<p>Select or enter the Target Priority. This is the priority for the new extended Route53 hierarchy relative to equivalent hierarchies on other servers. Any unused priority value from 1 to 999 is valid, indicating a server's priority in the cascading failover sequence for the resource. A lower number means a higher priority (1=highest).</p> <p>Note:LifeKeeper assigns the number "1" to the server on which the hierarchy is created by default. The priorities do not need to be consecutive and no two servers can have the same priority for a given resource.</p>

3. An information box will appear explaining that LifeKeeper has successfully checked your environment and that all the requirements for extending this Route53 resource have been met. If there were some requirements that have not been met, LifeKeeper will not allow you to select the **Next**

button, and the **Back** button will be enabled. If you click **Back** , you can make changes to your resource extension according to any error messages that may appear in the information box. If you click **Cancel** now, you will need to manually extend your Route53 resource hierarchy to another server to put it under LifeKeeper protection. When you click **Next** , LifeKeeper will launch you into the Extend Resource Hierarchy configuration task.

4. The Extend Resource Hierarchy configuration task will prompt you to enter the following information

Field	Tips
Route53 Resource Tag	Select or enter the Route53 Resource Tag. This is the resource tag name to be used by the Route53 resource being extended to the target server. Note: The field is not editable.

5. An information box will appear verifying that the extension is being performed. Click **Next Server** if you want to extend the same Route53 resource instance to another server in your cluster. This will repeat the Extend Resource Hierarchy operation. If you click **Finish** , LifeKeeper will verify that the extension of the Route53 resource was completed successfully.
6. Click **Done** to exit from the Extend Resources Hierarchy menu selection.

Note: Be sure to test the functionality of the new instance on all servers.

Unextending Your Hierarchy

To unextend a hierarchy complete the following steps:

1. From the **LifeKeeper GUI menu** , select **Edit** , then **Resource** . From the dropdown menu, select **Unextend Resource Hierarchy** .
2. Select the Target Server that you are unextending from the Route53 resource. It cannot be the server that the Route53 resource is currently in service on. Click **Next**.

Note: If you selected the **Unextend** task by right-clicking from the right pane on an individual resource instance, the dialog box will not appear.

3. Select the Route53 Hierarchy to unextend. Click **Next**

Note: If you selected the **Unextend** task by right-clicking from either the left pane on a global resource or the right pane on an individual resource instance, the dialog will not appear.

4. An information box will appear confirming the target server and the Route53 resource hierarchy you have chosen to unextend. Click **Unextend** .
5. An information box will appear confirming the Route53 resource hierarchy you have chosen to unextend.
6. Click **Done** to exit.

Adjusting Route53 Recovery Kit Tunable Values

The table below lists and explains the tunable values that are available for modifying the behavior of the Route53 Recovery Kit. These values are set by adding the `/etc/default/LifeKeeper` configuration file. Because none of the components of the Route53 Recovery Kit are memory resident, changes to these particular values become effective immediately after they are changed in `/etc/default/LifeKeeper` without requiring a restart of LifeKeeper or the OS.

Tunable Value	Default value	Explanation
ROUTE53_TTL	10 (seconds)	The default setting value for TTL (Time To Live) of the A record created for the Route53 resource. *Switchover is required to reflect the setting
ROUTE53_RECORD_INTERVAL	2 (seconds)	The amount of time in seconds between Route 53 API communication when updating the A record.
ROUTE53_RECORD_TRY_COUNT	3 (times)	The number of trials of Route 53 API communication when updating the A record.
ROUTE53_CHANGEID_INTERVAL	20 (seconds)	The interval of Route 53 API communications when checking the status. ル
ROUTE53_CHANGEID_TRY_COUNT	5 (回)	The number of trials of Route 53 API communications when checking the status
ROUTE53_RECORDCHECK_INTERVAL	2 (seconds)	The amount of time in seconds between attempts to retrieve the A record information via Route 53 APIs.
ROUTE53_RECORDCHECK_TRY_COUNT	4 (times)	The number of trials of Route 53 API communication when retrieving the A record.

Resource Monitoring and Recovery

The Route53 resource monitors the normality of the retrieval of the DNS A record registered at the time of creation and the association with the virtual IP address. The monitoring process is as follows.

1. Obtain the address set in the Route 53 A record with API. If it fails to obtain the record, it will retry 3 additional times waiting 2 seconds between attempts (by default). After the third unsuccessful attempt it will stop the monitoring and record the failure in the log.
2. Obtain an IP address from the dependent IP resource and compare it with the IP address in the DNS A record information. If the IP address information matches, then exit with a success as no errors exist. If the IP addresses do not match then exit with a failure to initiate a local recovery.

User System Setup

RA n IP resource that required for creating the Route53 resource can be either the virtual IP resource or the actual IP resource (resource for the primary IP address that is configured for NIC).

When Using the Virtual IP Resource

When using the virtual IP resource for a child resource of the Route53 resource, you need to reconfigure the route table so that the communication with the virtual IP address to the backup server is enabled when

switching over the resource. Please use the Recovery Kit for EC2 along with the Route53 Recovery Kit. For details, please refer to the [Recovery Kit for EC2 document](#)

When Using the Actual IP Resource

No additional information needs to be configured when using the actual IP resource for a child resource for the Route53 resource. However, because the destination IP address will be changed every time the switch over occurs, please note that the connection should be established with the host name that is protected by the Route53 resource.

Troubleshooting

The [MessageCatalog](#) provides a listing of all messages that may be encountered while using SIOS Protection Suite for Linux and, where appropriate, provides additional explanation of the cause of the errors and necessary action to resolve the error condition. This full listing may be searched for any error code received.

Updating the record associated with the Route53 resource startup may take time

Amazon provides the following information regarding the propagating speed of changes made to DNS record.

AAmazon Route 53 FAQs

Q: How quickly will changes I make to my DNS settings on Amazon Route 53 propagate globally?

https://aws.amazon.com/route53/faqs/?nc1=h_ls

The Route53 resource checks the status of updates to the DNS record using the Route53 API. It considers that updates are completed when receiving INSYNC status, and retries the status checking when it receives PENDING status. As a result, the Route53 resource may result in a startup failure when it takes a long time to propagate updates to the DNS even though the record is updated successfully for the Route53 resource startup process.

If the startup of the Route53 resource fails, check the Route53 management console to make sure that the A record is updated correctly. If it is updated, updates to the relevant DNS service have been completed. Updates to LifeKeeper is required to propagate the updates to the DNS service. Restart the Route53 resource from LifeKeeper GUI

If you encounter the startup failure of the Route53 resource all the time due to the above mentioned reason, increase the number of the value of "ROUTE53_CHANGEID_TRY_COUNT" in /etc/default/LifeKeeper to 6 or 7 (the default value is 5). Restart of LifeKeeper or the OS is not required for this change.

Correctly set TTL value of the DNS record

An access from a client after a switchover or a failover uses the DNS information cache that each client holds until the time set as TTL is passed. If the longer TTL value is set, access attempts to the address before switching increase and unexpected problems may occur. If the shorter TTL value is set, DNS resolution often occurs and network load increases. Please set the TTL value as short as possible according to your environment.

Set the "ROUTE53_TTL" for the TTL value in /etc/default/LifeKeeper. The unit should be seconds