Containerized IBM Security Guardium Key
Lifecycle Manager
Version 4.1

Documentation
(BETA 2)

Deploying IBM Security Guardium Key Lifecycle Manager

You can deploy IBM Security Guardium Key Lifecycle Manager with the IBM Db2 database or the PostgreSQL database.

Deploying IBM Security Guardium Key Lifecycle Manager containers on Kubernetes cluster using Helm charts (Sample provided for PostgreSQL only)

You can deploy IBM Security Guardium Key Lifecycle Manager containers on Kubernetes cluster using Helm charts only with PostgreSQL database.

Prerequisites

- Set up a Kubernetes cluster. You can use Version 1.17 or later. For more information, see https://kubernetes.io/docs/setup/.
- Ensure that you have an account on the Docker Hub.
- Install Helm Version 2.0 or later on the system from which you will access the Kubernetes cluster. For more information, see https://helm.sh/docs/intro/install/.
- To obtain the license activation file for IBM Security Key Lifecycle Manager, send us an email at: ibmsklm@in.ibm.com.

Procedure

Complete the following steps on the system on which you installed Helm:

1. Download the k8s-helm_beta2.zip file that contains the sample Helm charts for deploying IBM Security Guardium Key Lifecycle Manager.
2. Extract the **k8s-helm_beta2.zip** file.
3. In the directory where you extracted the files, navigate to **k8s-helm** > **sklm** directory.
4. Open the **values.yaml** file to modify the parameter values as per your requirement.
5. Navigate to **k8s-helm** directory and run the following command:

   ```
   helm install sklm
   ```

   Note: If you are using Helm Version 3.0 or later, use the following command:

   ```
   helm install <name> sklm
   ```

6. Verify the installation by running the following commands:
7. `helm list`
8. `kubectl get pods`
9. `kubectl get pv`
10. `kubectl get pvc`
11. Launch the IBM Security Guardium Key Lifecycle Manager graphical user interface:

    ```
    https://ip-address:sklmapp_https_port/ibm/SKLM/login.jsp
    ```

> **Note**: Refer to the **values.yaml** file for the value of **sklmapp_https_port**.

12. On the Configuration page that appears, click the License Agreements link to review the license terms, and then select the **I accept the terms in the License Agreements** check box.
13. Click **Activate License**.
14. Upload the IBM Security Key Lifecycle Manager license activation file and activate the license.
15. Click **Login**.
16. Log in to the IBM Security Guardium Key Lifecycle Manager graphical user interface with the Administrator user credentials (sklmadmin).

From the Welcome page, configure the drive types, keys, and certificates that your organization requires, or get started with using the product. See Working with IBM Security Key Lifecycle Manager.

Health checks
Health checks are a simple way to determine whether a server-side application is working properly. Kubernetes requires two types of health checks: readiness probe and liveness probe In IBM Security Guardium Key Lifecycle Manager, the probes are implemented by performing an HTTPS invocation, by using the Health Status REST service. For more information, see the attached PDF.

Kubernetes must be configured to call this REST service with the `Health-Authorization` header parameter.
For more information about configuring liveness and readiness probes, see the Kubernetes documentation.

Deploying IBM Security Key Lifecycle Manager with PostgreSQL database using Docker

See this section for instructions on deploying IBM Security Key Lifecycle Manager with PostgreSQL as the database.
Prerequisites

- Ensure that the host system meets the following minimum system requirements:

Resource	Requirement
CPU	4 Cores
Memory	8 GB
Disk space	100 GB
Operating system and Supported architectures	Linux
	o x86_64

Resource	Requirement
	o s390x

- Install Docker engine on the host system. For instructions, see https://docs.docker.com/.
- Ensure that you have an account on the Docker Hub.
- To obtain the license activation file for IBM Security Key Lifecycle Manager, send us an email at: ibmsklm@in.ibm.com.
- Set up the PostgreSQL container by running the following command:

```
docker run –d –v sklmpostgresdbvolume:/var/lib/postgresql/data –e
POSTGRES_PASSWORD=Example@db –e POSTGRES_USER=sklmdb41 –e
POSTGRES_DB=sklmdb41 –p 5432:5432 postgres
```

Note: The container might take a few minutes to start. You can monitor the progress by using the docker logs command.

Procedure

Complete the following steps on the host system:

1. Log in to Docker Hub.
   Open the command line interface and run the command:
2. `docker login .`
3. (*Optional*) Create an environment variable list file (for example, sklmenv) with the parameters for the IBM Security Guardium Key Lifecycle Manager container:
   - o   **Parameter list**

Parameter	Mandatory /Optional	Description
Container name		
name	Mandatory	Specify a name for the container.
Environment variables		
DB_PASSWORD	Mandatory	Password to connect to the database instance where the IBM Security Guardium Key Lifecycle Manager database is running
DB_TYPE	Optional	Type of the database. Specify postgres as the value. Default value: db2 **Note**: This parameter is ignored in the subsequent docker run commands when the same value of the sklmAppVolume parameter is used.

DB_USER	Optional	User name of the database. Default value: sklmdb41
DB_NAME	Optional	Name of the database. Default value: sklmdb41
DB_PORT	Mandatory	Port number of the database instance where the IBM Security Guardium Key Lifecycle Manager database is running
DB_HOST	Mandatory	IP address or fully qualified host name of the system that hosts the database instance where the IBM Security Guardium Key Lifecycle Manager database is running. You can use the same system to host the database instance and the application Docker container, or choose a different system for each of them.
LICENSE	Mandatory	Variable to accept license terms. Specify value as "**accept**".
SKLM_SEED	Mandatory	Secret passcode that is unique for a deployment, and must be stored securely. The value must be a random string of 32 or 64 characters that you can generate using an external utility. **Note**: Ensure that the value of this parameter in the subsequent docker run commands is the same as that used in the first docker run command, when the same value of the **sklmAppVolume** parameter is used.
SKLMADMIN_USERNAME	Optional	User name of the IBM Security Guardium Key Lifecycle Manager administrator. You can specify only alphanumeric characters. Default value: sklmadmin **Note**: This parameter is ignored in the subsequent docker run commands when the same value of the **sklmAppVolume** parameter is used.
SKLMADMIN_PASSWORD	Mandatory	Password for the IBM Security Guardium Key Lifecycle Manager administrator user that is specified in the **SKLMADMIN_USERNAME** parameter. **Note**: This parameter is ignored in the subsequent docker run commands when the

		same value of the **sklmAppVolume** parameter is used.
KEY_STORE _PWD	Optional	Password for the IBM Security Guardium Key Lifecycle Manager keystore. Default value: SKLMWebAS **Note**: Ensure that the value of this parameter in the subsequent docker run commands is the same as that used in the first docker run command, when the same value of the **sklmAppVolume** parameter is used.
Port numbers		
9443	Mandatory	Port number for the graphical user interface.
5696	Mandatory	KMIP port
1441	Mandatory	SSL port
3801	Mandatory	TCP port
Persistent storage		
sklmAppVolu me	Mandatory	Persistent storage to store the application server configuration and metadata information. Sample value: /opt/ibm/wlp/usr/products

4. Ensure that the PostgreSQL container is running and ready to accept connections.
5. Run the IBM Security Guardium Key Lifecycle Manager application Docker container by using the environment list file or specifying the parameters.
Sample command with [environment list file](#):

```
docker run --name sklm_test -itd -h sklm.com -p 9443:9443 -p
3801:3801 -p 5696:5696 -p 1441:1441  --env-file=sklmenvpp.txt  -v
sklmAppVolume_new:/opt/ibm/wlp/usr/products ibmcom/sklm
```

Sample command with parameters:

```
docker run --name sklm -itd -h sklm.com -p 9443:9443 -p 3801:3801 -p
5696:5696 -p 1441:1441  -e LICENSE=accept -e
SKLMADMIN_USERNAME=sklmadminuser -e KEY_STORE_PWD=Example@keystore123
-e SKLMADMIN_PASSWORD=Example@admin123 -e DB_HOST=172.x.x.x -e
DB_PORT=5432 -e SKLM_SEED=68d95f0081f1dbfc0b06de9b0916df1c -e
DB_PASSWORD=Example@db2 -e DB_TYPE=postgres -e DB_USER=sklmdb41 -e
DBNAME=sklmdb41 -v sklmAppVolume:/opt/ibm/wlp/usr/products
ibmcom/sklm
```

Note: The container might take a few minutes to start. You can monitor the progress by using the docker logs command.

6. Launch the IBM Security Guardium Key Lifecycle Manager graphical user interface:

```
https://ip-address:port/ibm/SKLM/login.jsp
```

7. On the Configuration page that appears, click the License Agreements link to review the license terms, and then select the **I accept the terms in the License Agreements** check box.
8. Click **Activate License**.
9. Upload the IBM Security Guardium Key Lifecycle Manager license activation file and activate the license.
10. Click **Login**.
11. Log in to the IBM Security Guardium Key Lifecycle Manager graphical user interface with the Administrator user credentials (sklmadmin).

From the Welcome page, configure the drive types, keys, and certificates that your organization requires, or get started with using the product. See Working with IBM Security Key Lifecycle Manager.

Deploying IBM Security Guardium Key Lifecycle Manager with Db2 database using Docker

See this section for instructions on deploying IBM Security Guardium Key Lifecycle Manager with IBM Db2 as database.

Prerequisites

- Ensure that the host system meets these minimum system requirements:

Resource	Requirement
CPU	4 Cores
Memory	8 GB
Disk space	100 GB
Operating system and Supported architectures	Linux o x86_64 o s390x

- Install Docker engine on the host system. For instructions, see https://docs.docker.com/.
- Ensure that you have an account on the Docker Hub.
- To obtain the license activation file for IBM Security Key Lifecycle Manager, send us an email at: ibmsklm@in.ibm.com.

Set up IBM Db2 by using one of the following options:

- **Obtain the IBM Db2 container and customize it for IBM Security Guardium Key Lifecycle Manager**

  Note: You can customize IBM Db2 for IBM Security Guardium Key Lifecycle Manager only with the **Standard** or **Advanced** edition of IBM Db2. Ensure that you

are using the required license key for one of these editions. The file type for the license is **.lic**. For example, db2awse_c_np.lic.

To obtain the IBM Db2 image, go to the IBM Db2 container.
To customize the IBM Db2 container:

1. Download the attached file and extract its content in a directory on the host system.
2. Edit the **Dockerfile.sample** file, as required, and save the file.
   You can use any text editor.
3. Run the following command from the directory where the **Dockerfile.sample** file is extracted:
4. `docker build -t sklmdb -f Dockerfile.sample --no-cache .`
5. Run the customized IBM Db2 container.
   For example:

   ```
   docker run --name sklmdb --restart=always --detach --ipc="" --
   cap-add=IPC_OWNER -p 50000:50000 -e LICENSE=accept -e
   DB2INSTANCE=sklmdb41 -e DB2INST1_PASSWORD=Example@db2 -e
   DBNAME=sklmdb41 -v sklmDb2Volume:/database sklmdb
   ```

   For more information, see https://hub.docker.com/r/ibmcom/db2.

- **Use an existing on-premise or standalone version of IBM Db2**

  You can use an existing version of IBM Db2 and create an empty or blank database.

  Instructions on deploying IBM Security Guardium Key Lifecycle Manager with native Db2 for z/OS are covered under a separate section.

  Note: Minimum supported version of the standalone IBM Db2 is Version 11.1.4.4 interim fix 1.

Note: The IBM Db2 container might take a few minutes to start. You can monitor the progress by using the docker logs command.

Procedure

Complete the following steps on the host system:

1. Log in to Docker Hub.
   Open the command line interface and run the command:
2. `docker login .`
3. (*Optional*) Create an environment variable list file (for example, sklmenv) with the parameters for the IBM Security Guardium Key Lifecycle Manager container:

- **Parameter list**

Parameter	Mandatory/ Optional	Description
Container name		
name	Mandatory	Specify a name for the container.
Environment variables		
DB_PASSWORD	Mandatory	Password to connect to the database instance where the IBM Security Guardium Key Lifecycle Manager database is running
DB_TYPE	Optional	Type of the database. Default value: db2 Other possible value: postgres **Note**: This parameter is ignored in the subsequent docker run commands when the same value of the **sklmAppVolume** parameter is used.
DB_USER	Optional	User name of the database. Default value: sklmdb41
DB_NAME	Optional	Name of the database. Default value: sklmdb41
DB_PORT	Mandatory	Port number of the database instance where the IBM Security Guardium Key Lifecycle Manager database is running
DB_HOST	Mandatory	IP address or fully qualified host name of the system that hosts the database instance where the IBM Security Guardium Key Lifecycle Manager database is running. You can use the same system to host the database instance and the application Docker container, or choose a different system for each of them.
LICENSE	Mandatory	Variable to accept license terms. Specify value as "**accept**".

- **Parameter list**

SKLM_SEED	Mandatory	Secret passcode that is unique for a deployment, and must be stored securely. The value is a random string of 32 or 64 characters that you can generate using an external utility. **Note**: Ensure that the value of this parameter in the subsequent docker run commands is the same as that used in the first docker run command, when the same value of the sklmAppVolume parameter is used.
SKLMADMIN_USER NAME	Optional	User name of the IBM Security Guardium Key Lifecycle Manager administrator. You can specify only alphanumeric characters. Default value: sklmadmin **Note**: This parameter is ignored in the subsequent docker run commands when the same value of the **sklmAppVolume** parameter is used.
SKLMADMIN_PASS WORD	Mandatory	Password for the IBM Security Guardium Key Lifecycle Manager administrator user that is specified in the SKLMADMIN_USERNAME parameter. **Note**: This parameter is ignored in the subsequent docker run commands when the same value of the **sklmAppVolume** parameter is used.
KEY_STORE_PWD	Optional	Password for the IBM Security Guardium Key Lifecycle Manager keystore. Default value: SKLMWebAS

		Note: Ensure that the value of this parameter in the subsequent docker run commands is the same as that used in the first docker run command, when the same value of the **sklmAppVolume** parameter is used.
Port numbers		
9443	Mandatory	Port number for the graphical user interface.
5696	Mandatory	KMIP port
1441	Mandatory	SSL port
3801	Mandatory	TCP port
Persistent storage		
sklmAppVolume	Mandatory	Persistent storage to store the application server configuration and metadata information. Sample value: /opt/ibm/wlp/usr/products

4. Ensure that the IBM Db2 container is running and ready to accept connections.
5. Run the IBM Security Guardium Key Lifecycle Manager application Docker container by using the environment list file or specifying the parameters.

Sample command with environment list file:

```
docker run --name sklmapp -itd -h sklm.com -p 9443:9443 -p
3801:3801 -p 5696:5696 -p 1441:1441  --env-file=sklmenvd.txt -v
sklmAppVolume_db2:/opt/ibm/wlp/usr/products ibmcom/sklm
```

Sample command with parameters:

```
docker run --name sklm -itd -h sklm.com -p 9443:9443 -p
3801:3801 -p 5696:5696 -p 1441:1441  -e LICENSE=accept -e
KEY_STORE_PWD=Example@keystore123 -e
SKLMADMIN_USERNAME=sklmadminuser -e
SKLMADMIN_PASSWORD=Example@admin123 -e DB_HOST=172.x.x.x -e
DB_PORT=50000 -e SKLM_SEED=68d95f0081f1dbfc0b06de9b0916df1c -e
DB_PASSWORD=Example@db2 -e DB_TYPE=db2 -e DB_USER=sklmdb41 -e
DBNAME=sklmdb41 -v sklmAppVolume_db2:/opt/ibm/wlp/usr/products
ibmcom/sklm
```

Note: The container might take a few minutes to start. You can monitor the progress by using the docker logs command.

6. Launch the IBM Security Guardium Key Lifecycle Manager graphical user interface:

   ```
   https://ip-address:port/ibm/SKLM/login.jsp
   ```

7. On the Configuration page that appears, click the License Agreements link to review the license terms, and then select the **I accept the terms in the License Agreements** check box.
8. Click **Activate License**.
9. Upload the IBM Security Guardium Key Lifecycle Manager license activation file and activate the license.
10. Click **Login**.
11. Log in to the IBM Security Guardium Key Lifecycle Manager graphical user interface with the Administrator user credentials (sklmadmin).

From the Welcome page, configure the drive types, keys, and certificates that your organization requires, or get started with using the product. See Working with IBM Security Key Lifecycle Manager.

Deploying IBM Security Guardium Key Lifecycle Manager on IBM zCX environment with Db2 for z/OS

Prerequisites

- Prepare the database system:
  - o Install Db2 for z/OS. For more information, see Installing and migrating Db2.
  - o Create a database. You can use these parameter values:
    DB_USER=sklmdb41
    DB_NAME=sklmdb41
  - o Ensure that you have the license file for Db2 for z/OS, db2jcc_license_cisuz.jar. This file is used by the IBM Security Guardium Key Lifecycle Manager application container to connect to the Db2 for z/OS database.
- Prepare the host system with the IBM zCX environment:
  - o Ensure that your host system meets these minimum system requirements for the Guardium Key Lifecycle Manager application container:

Resource	Requirement
CPU	4 zIIP
Memory	8 GB
User data disk space	60 GB

      o   Provision an IBM z/OS Container Extension (zCX) instance on the host system. For more information, see [What is z/OS Container Extension?](#) .

- To obtain the license activation file for IBM Security Key Lifecycle Manager, send us an email at: ibmsklm@in.ibm.com.
- Save the license file (sklm.license.zip) to the host system.
- Download the [attached](#) file and extract its content (**Dockerfile**) in the same directory where you saved the license file (sklm.license.zip) on the host system.

Procedure

Complete the following steps on the host system with the IBM zCX environment:

1. Log in to the host system and navigate to the directory where you saved the Guardium Key Lifecycle Manager license and Docker files.
2. Save the license file for Db2 for z/OS (db2jcc_license_cisuz.jar) in this directory where the Guardium Key Lifecycle Manager application files are located.
3. Build the Docker image of the Guardium Key Lifecycle Manager application by using the Docker file.

```
docker build -t sklmzos --build-arg LATEST_IMAGE=ibmcom/sklm --build-
arg DB2_LICENSE_FILE=db2jcc_license_cisuz.jar --no-cache .
```

4. Ensure that the database (sklmdb41) is running and ready to accept connections.

Create an environment variable list file with the parameters for the Guardium Key Lifecycle Manager application container.

Tip: You can use the [sklmenvz.txt](#) file and modify it as per your requirements.

- **Parameter list**

Parameter	Mandatory /Optional	Description
Container name		
Name	Mandatory	Specify a name for the container.
Environment variables		
ZOS_DB	Mandatory	Specify the value as true. This parameter indicates that the native (non-container) Db2 for z/OS is used.
DB_PASSWORD	Mandatory	Password to connect to the database.
DB_TYPE	Optional	Type of the database. Retain the default value: db2 **Note**: This parameter is ignored in the subsequent docker run commands when the same value of the sklmAppVolume parameter is used.
DB_USER	Optional	User name of the database. Default value: sklmdb41
DB_NAME	Optional	Name of the database.

		Default value: sklmdb41
DB_PORT	Mandatory	Port number of the database system.
DB_HOST	Mandatory	IP address or fully qualified host name of the system that hosts the database.
LICENSE	Mandatory	Specify value as accept. This parameter is a variable to accept license terms.
SKLM_SEED	Mandatory	Secret passcode that is unique for a deployment, and must be stored securely. The value must be a random string of 32 or 64 characters that you can generate using an external utility. **Note**: Ensure that the value of this parameter in the subsequent docker run commands is the same as that used in the first docker run command, when the same value of the sklmAppVolume parameter is used.
SKLMADMIN_USERNAME	Optional	Name of the Guardium Key Lifecycle Manager administrator user. You can specify only alphanumeric characters. Default value: sklmadmin **Note**: This parameter is ignored in the subsequent docker run commands when the same value of the sklmAppVolume parameter is used.
SKLMADMIN_PASSWORD	Mandatory	Password for the Guardium Key Lifecycle Manager administrator user that is specified in the SKLMADMIN_USERNAME parameter. **Note**: This parameter is ignored in the subsequent docker run commands when the same value of the sklmAppVolume parameter is used.
KEY_STORE_PWD	Optional	Password for the IBM Security Key Lifecycle Manager keystore. Default value: Ch@ngemypa55word **Note**: Ensure that the value of this parameter in the subsequent docker run commands is the same as that used in the

		first docker run command, when the same value of the sklmAppVolume parameter is used.
Port numbers		
9443	Mandatory	Port number for the graphical user interface.
5696	Mandatory	KMIP SSL/TLS port
1441	Mandatory	IPP SSL/TLS port
3801	Mandatory	IPP TCP port
Persistent storage		
sklmAppVolume	Mandatory	Persistent storage to store the application server configuration and metadata information. Sample value: /opt/ibm/wlp/usr/products

5. Run the Guardium Key Lifecycle Manager application Docker container. Sample command with environment list file:

```
docker run –-name sklmapp –itd –h sklm.com –p 9443:9443 –p 3801:3801
–p 5696:5696 –p 1441:1441 –-env-file=sklmenvz.txt –v
sklmAppVolume:/opt/ibm/wlp/usr/products sklmzos
```

Note: The container might take a few minutes to start.

6. Monitor the progress by using the docker logs command.

```
docker logs –f sklmzos
```

After you see the following message in the logs, proceed to the next step:
IBM Security Guardium Key Lifecycle Manager server
started.

7. Launch the IBM Security Guardium Key Lifecycle Manager graphical user interface:
8. https://*ip-address*:*port*/ibm/SKLM/login.jsp
9. On the Configuration page that appears, click the License Agreements link to review the license terms, and then select the **I accept the terms in the License Agreements** check box.
10. Click **Activate License**.
11. Upload the IBM Security Key Lifecycle Manager license activation file and activate the license.
12. Click **Login**.
13. Log in to the IBM Security Guardium Key Lifecycle Manager graphical user interface with the Administrator user credentials (sklmadmin).

From the Welcome page, configure the drive types, keys, and certificates that your organization requires, or get started with using the product. See Working with IBM Security Key Lifecycle Manager.
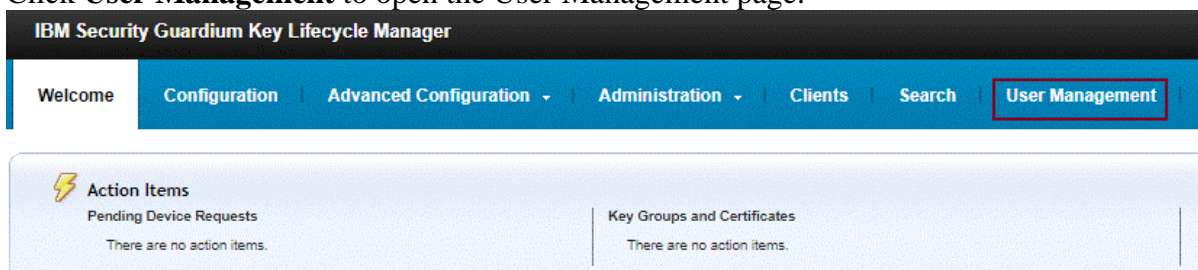
User management

Users, user roles, and user groups control who has access to the product, which tasks they can perform, and which data they can access.

With support for WebSphere Application Server Liberty, IBM Security Guardium Key Lifecycle Manager application container now includes the user management feature.
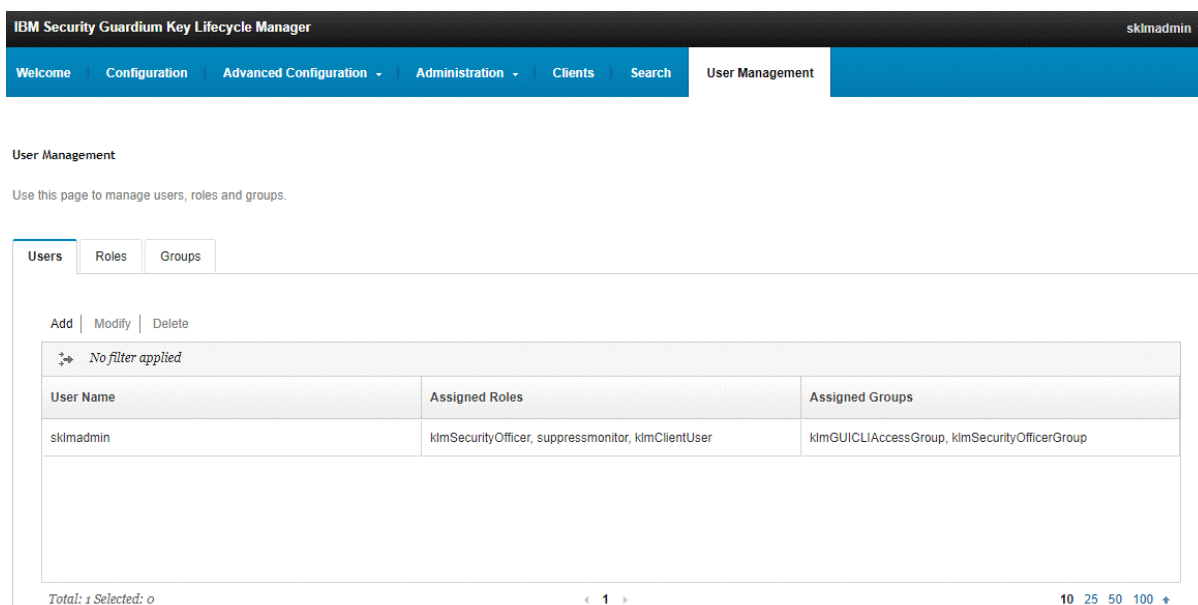
You can use the graphical user interface or the REST interface to configure and manage user roles and groups.

- **From the graphical user interface**

  Click **User Management** to open the User Management page.

  The User Management page is displayed. Click the **Users**, **Roles**, and **Groups** tabs on this page to manage users, user roles, and user groups, respectively.

- **From the REST interface**

  Use the User Management REST services. For details, see the *attached* PDF.

Known issues, limitations, and requirements

This Beta version of the containerized IBM Security Guardium Key Lifecycle Manager application has the following issues, limitations, and requirements:

- The following features are not supported:
    - CLI commands. Alternatively, use REST APIs. Swagger UI is now integrated with IBM Security Key Lifecycle Manager, and you can use it to call any REST API.
    - Multi-Master cluster
    - Replication
    - LDAP
    - HSM
    - Security standards: FIPS, Suite B, SP800-131a, SSL/TLS Cipher suites, and CA-signed Certificate for Liberty
    - Database password change from the user interface
- Server restart is not supported. To restart the server, you must restart the application container.
- After completing the user management changes, you must restart the application container.
- The **Groups** section on the User Management page is not fully functional.
- To support the keys rollover feature when using the PostgreSQL database, modify the postgres.conf file that exists in the Persistent storage or volume. In the Resource usage section, replace `max_prepared_transactions = 0` by `max_prepared_transactions = 100` and then restart the PostgreSQL container.

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Feedback and support
For more information, any questions or feedback, send us an email at: ibmsklm@in.ibm.com

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