IaC Snowflake Admin Service User RSA Key Credentials Creation Script

This script automates the creation of a Snowflake admin service user secured with RSA key-pair authentication. Designed for enterprise environments, it standardizes and accelerates the onboarding of Snowflake service users while maintaining strict security and compliance controls.

Table of Contents

- 1.0 Let's get started!
  - 1.1 Snowflake
  - 1.2 AWS Secrets Manager Secrets
- 2.0 Inside the Script
  - 2.1 What it Does
    - 2.1.1 Create Mode
    - 2.1.2 Delete Mode
  - 2.2 Script Sequence Diagram
- 3.0 Resources

1.0 Let's get started!

1. Take care of the cloud and local environment prequisities listed below:

   > You need to have the following cloud accounts:
   >
   > - AWS Account *with SSO configured*
   > - `aws2-wrap` utility
   > - Snowflake Account

   > You need to have the following installed on your local machine:
   >
   > - AWS CLI version 2
   > - Snowflake CLI

2. Clone the repo:

   ```
   git clone https://github.com/j3-signalroom/iac-snowflake-
   admin_service_user-rsa_key_credentials_creation-script.git
   ```

3. From the root folder of the `iac-snowflake-admin_service_user-rsa_key_credentials_creation-script/` repository that you cloned, run the script in your Terminal to create the Snowflake service user:

   ```
   ./provision-snowflake-admin-credentials.sh <create | delete> --
   profile=<SSO_PROFILE_NAME> \
                                                              --
   ```

```
  account_identifier=<ACCOUNT_IDENTIFIER> \
                                                                --
  snowflake_admin_user=<SNOWFLAKE_ADMIN_USER> \
                                                                --
  snowflake_password=<SNOWFLAKE_PASSWORD> \
                                                                --
  snowflake_warehouse=<SNOWFLAKE_WAREHOUSE> \
                                                                --
  secrets_root_path=<SECRETS_ROOT_PATH> \
                                                                --
  new_admin_service_user=<NEW_ADMIN_SERVICE_USER>
```

Argument placeholder	Replace with
`<SSO_PROFILE_NAME>`	your AWS SSO profile name for your AWS infrastructue that houses your AWS Secrets Manager.
`<ACCOUNT_IDENTIFIER>`	your organization's Snowflake account identifier.
`<SNOWFLAKE_ADMIN_USER>`	your Snowflake username that has been granted `ACCOUNTADMIN` privileges.
`<SNOWFLAKE_PASSWORD>`	your Snowflake password of the `<SNOWFLAKE_ADMIN_USER>`.
`<SNOWFLAKE_WAREHOUSE>`	your Snowflake warehouse is the virtual cluster of compute resources that provides CPU, memory, and temporary storage to perform DML (Data Management Language) operations.
`<SECRETS_ROOT_PATH>`	the root path in AWS Secrets Manager where the secrets will be stored.
`<NEW_ADMIN_SERVICE_USER>`	the name of the new Snowflake ACCOUNTADMIN service user to be created or updated.

For instance, here is an example command to create a new Snowflake admin service user named `admin_service_user`:

```
./provision-snowflake-admin-credentials.sh create --
profile=AdministratorAccess-0123987654321 \
                                                    --
snowflake_account_identifier=abcdef-xyz12345 \
                                                    --
snowflake_admin_user=your_admin_user \
                                                    --
snowflake_password=your_admin_password \
                                                    --
snowflake_warehouse=COMPUTE_WH \
                                                    --
secrets_root_path=/snowflake_admin_service_user_credentials \
                                                    --
new_admin_service_user=admin_service_user
```

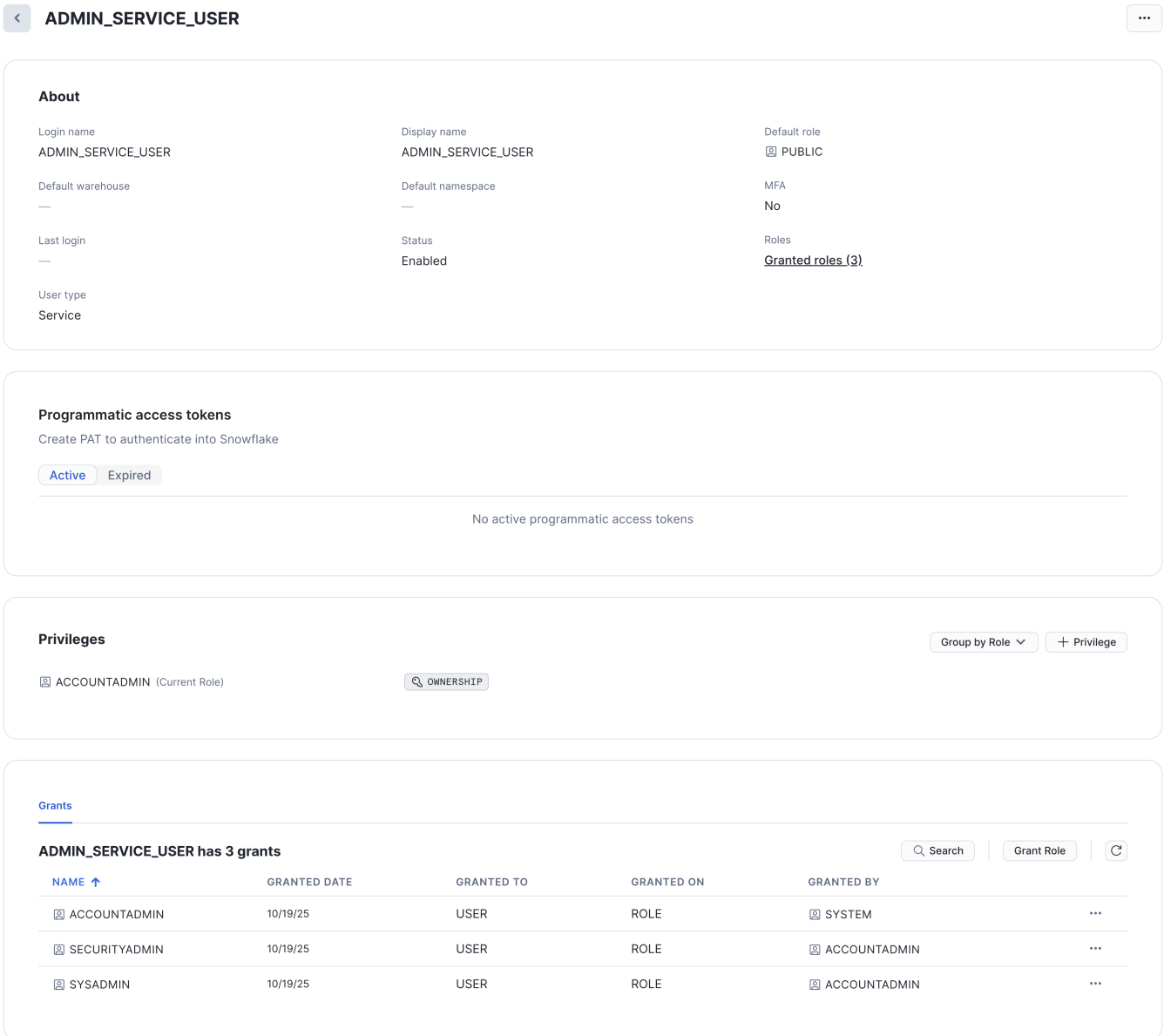
The output of the script running successfully:

```
Attempting to automatically open the SSO authorization page in your
default browser.
If the browser does not open or you wish to use a different device to
authorize this request, open the following URL:

https://your-organization.awsapps.com/start/#/device

Then enter the code:

WXYZ-ABCD
Successfully logged into Start URL: https://your-
organization.awsapps.com/start
writing RSA key
writing RSA key
CREATE USER admin_service_user TYPE=SERVICE
RSA_PUBLIC_KEY="MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEApVfuwgFR6bD0qI
j+Em2E6asyvZ66I0BgHG6uxgzQzy0NxGVXSguXDWdQGyAWce4WGD8ZKG4g1UFgY+swF1jqHXpW
QqHd1mG99XigUSFhr0iF8cD7eA797GAygPyWywfYeK2aRduedqh9+DGtVF8jfeT+KCV6GQWZqF
v1nChJY+o1rDpF14PhmVVwyEpNrmiJ3WUIeQo7m1gRL1ZlNKaucahuHIOoJUaKlC0xYY3AkHgZ
ecN24d/HF5TN0TX4rb6fXUQgbkj1ga3WxsaEoyq8mU4DwrLo/Eqhngx9Dq3GQUU8cxvZrwJm6X
Rn5WgFRpWafDBnBJuP8xDHTG5oN9bbywIDAQAB" DEFAULT_ROLE=PUBLIC;
+-------------------------------------------------+
| status                                          |
|-------------------------------------------------|
| User ADMIN_SERVICE_USER successfully created. |
+-------------------------------------------------+

GRANT ROLE ACCOUNTADMIN TO USER admin_service_user;
+----------------------------------+
| status                           |
|----------------------------------|
| Statement executed successfully. |
+----------------------------------+

GRANT ROLE SECURITYADMIN TO USER admin_service_user;
+----------------------------------+
| status                           |
|----------------------------------|
| Statement executed successfully. |
+----------------------------------+

GRANT ROLE SYSADMIN TO USER admin_service_user;
+----------------------------------+
| status                           |
|----------------------------------|
| Statement executed successfully. |
+----------------------------------+

{
    "ARN": "arn:aws:secretsmanager:us-east-
1:0123987654321:secret:/snowflake_admin_service_user_credentials-0zVHcy",
```

```
    "Name": "/snowflake_admin_service_user_credentials",
    "VersionId": "645f7f6c-e8ef-4fba-b0c6-7ece065abdfd"
}
```

1.1 Snowflake

Below is a picture of an example Snowflake admin service user created with the `ACCOUNTADMIN` role granted by the script:



1.2 AWS Secrets Manager Secrets

Here is the list of secret keys generated by the script:

Key	Description
`snowflake_account_identifier`	Your organization's Snowflake account identifier.
`snowflake_organization_name`	The name of your Snowflake organization, which is the part of the account identifier before the hyphen.

Key	Description
`snowflake_account_name`	The name of your Snowflake account, which is the part of the account identifier after the hyphen.
`new_admin_service_user`	The name of the new Snowflake admin user to create and manage future Snowflake resources.
`active_key_number`	The current active RSA public key number.
`snowflake_rsa_public_key_1_pem`	The `new_admin_service_user` Snowflake RSA Public Key 1 PEM, which is encoded in **base64**.
`snowflake_rsa_public_key_2_pem`	The `new_admin_service_user` Snowflake RSA Public Key 2 PEM, which is encoded in **base64**.
`snowflake_rsa_private_key_1_pem`	The `new_admin_service_user` Snowflake RSA Private Key 1 PEM, which is encoded in **base64**.
`snowflake_rsa_private_key_2_pem`	The `new_admin_service_user` Snowflake RSA Private Key 2 PEM, which is encoded in **base64**.

2.0 Inside the Script

This bash script provisions or removes Snowflake admin credentials by creating a service account with RSA key-pair authentication and storing the credentials in AWS Secrets Manager:

2.1 What it Does

2.1.1 Create Mode

When run in `create` mode, the script performs the following actions:

1. Generates two RSA key pairs (2048-bit) for Snowflake authentication, converting them to the required formats (PKCS8 private keys and base64-encoded public keys)
2. Creates a Snowflake service user with:

- The first public key for authentication
- `ACCOUNTADMIN`, `SECURITYADMIN`, and `SYSADMIN` role grants:

Role	Description
`ACCOUNTADMIN`	The `ACCOUNTADMIN` role in Snowflake is the highest-level administrative role within a Snowflake account. It has full control over all objects, resources, and configurations within the account. This role is responsible for managing all aspects of the Snowflake environment, including user access, resource allocation, and security settings.

Role	Description
`SECURITYADMIN`	The `SECURITYADMIN` role in Snowflake is a built-in system role designed to manage security-related tasks, primarily concerning user and role management. The `SECURITYADMIN` role has elevated privileges that allow it to control access within a Snowflake account, making it one of the key roles for maintaining the security posture of a Snowflake environment.
`SYSADMIN`	The `SYSADMIN` role in Snowflake is one of the predefined system roles that comes with a broad set of administrative privileges. It is designed to provide comprehensive control over most Snowflake resources, such as databases, schemas, warehouses, and other objects within an account. The `SYSADMIN` role is typically used for database administrators who manage the creation and configuration of Snowflake resources and control access to them.

- `SERVICE` account type designation.

3. Stores credentials in AWS Secrets Manager including:

- Snowflake account identifiers (full identifier, organization name, account name)
- Service username
- Both RSA key pairs (public and private)
- Active key indicator (for key rotation)

4. Cleans up temporary key files from disk

2.1.2 Delete Mode

When run in `delete` mode, the script performs the following actions:

1. Removes the Snowflake service user created in `create` mode.
2. Deletes the associated RSA key pairs from the file system.
3. Removes the credentials stored in AWS Secrets Manager.

2.2 Script Sequence Diagram

```
sequenceDiagram
    participant Script as Bash Script
    participant OpenSSL as OpenSSL
    participant FS as File System
    participant Snow as Snowflake CLI
    participant AWS as AWS Secrets Manager

    Note over Script: RSA Key Pair 1 Generation
    Script->>OpenSSL: genrsa 2048
    OpenSSL-->>Script: RSA private key (raw)
    Script->>OpenSSL: pkcs8 -topk8 -inform PEM -nocrypt
    OpenSSL->>FS: private_key_1.p8

    Script->>OpenSSL: rsa -pubout -outform DER
```

```
    OpenSSL-->>Script: Public key (DER format)
    Script->>OpenSSL: base64 -A
    OpenSSL->>FS: public_key_1.pub

    Script->>OpenSSL: base64 -A (private key)
    OpenSSL->>FS: private_key_1.b64

    Note over Script: RSA Key Pair 2 Generation
    Script->>OpenSSL: genrsa 2048
    OpenSSL-->>Script: RSA private key (raw)
    Script->>OpenSSL: pkcs8 -topk8 -inform PEM -nocrypt
    OpenSSL->>FS: private_key_2.p8

    Script->>OpenSSL: rsa -pubout -outform DER
    OpenSSL-->>Script: Public key (DER format)
    Script->>OpenSSL: base64 -A
    OpenSSL->>FS: public_key_2.pub

    Script->>OpenSSL: base64 -A (private key)
    OpenSSL->>FS: private_key_2.b64

    Note over Script: Snowflake Service User Creation
    Script->>FS: cat public_key_1.pub
    FS-->>Script: Public key content
    Script->>Snow: CREATE USER TYPE=SERVICE with RSA_PUBLIC_KEY
    Snow-->>Script: Service User created successfully

    Script->>Snow: GRANT ROLE ACCOUNTADMIN
    Snow-->>Script: Role granted

    Script->>Snow: GRANT ROLE SECURITYADMIN
    Snow-->>Script: Role granted

    Script->>Snow: GRANT ROLE SYSADMIN
    Snow-->>Script: Role granted

    Note over Script: AWS Secret Creation
    Script->>FS: cat public_key_1.pub
    FS-->>Script: Public key 1 content
    Script->>FS: cat public_key_2.pub
    FS-->>Script: Public key 2 content
    Script->>FS: cat private_key_1.b64
    FS-->>Script: Private key 1 content
    Script->>FS: cat private_key_2.b64
    FS-->>Script: Private key 2 content

    Script->>AWS: create-secret with JSON payload
    Note right of AWS: Secret contains:
- Account info
- User info
- Both public keys
- Both private keys
- Active key: 1
    AWS-->>Script: Secret created successfully
```

3.0 Resources

- Snowflake Configuring key-pair authentication
- Supported Snowflake Clients