AQUILA - SalesForce Integration Using JWT Authentication

Salesforce requires secure communication protocols for authorization and data exchange between external applications and Salesforce orgs. This involves creating digital certificates, configuring external client apps, and establishing secure authentication methods. OpenSSL provides the cryptographic tools needed to generate private keys and self-signed certificates for secure communication over networks.

Integration Overview

This integration supports secure communication through:

- JWT (JSON Web Token) authentication using digital certificates
- OAuth authentication with external client apps
- Self-signed certificates and keystore management

Organizations can authorize Salesforce CLI commands and establish secure API connections using these authentication methods.

Compatibility

- Supports Salesforce CLI authorization via JWT Bearer Flow
- Compatible with macOS, Linux, and Windows operating systems
- Requires OpenSSL for certificate generation
- Requires Java keytool for keystore conversion (optional)

Installing OpenSSL in your Log Collector

OpenSSL is an open-source software library that provides tools and protocols for secure communication over networks. It helps encrypt data so that information like passwords, credit card numbers, and private messages stay secure when sent over the internet.

Step 1:

In Linux:

Install OpenSSL on your system:

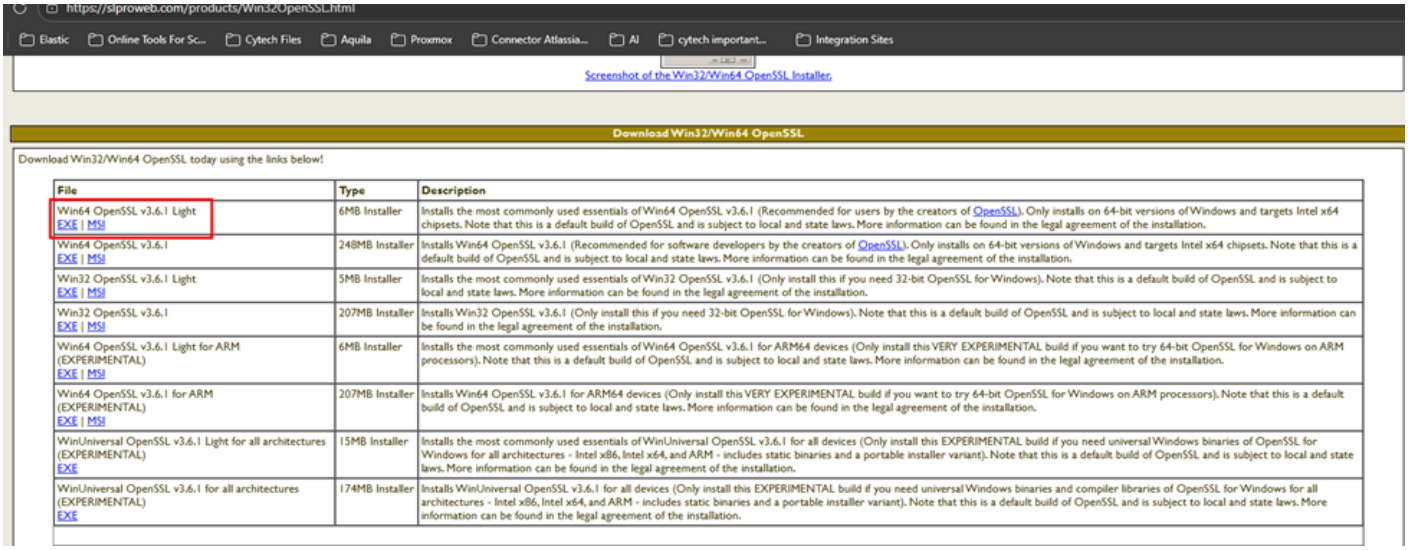
```
sudo apt install openssl
```

```
testing-[redacted]:~$ sudo apt install openssl
```

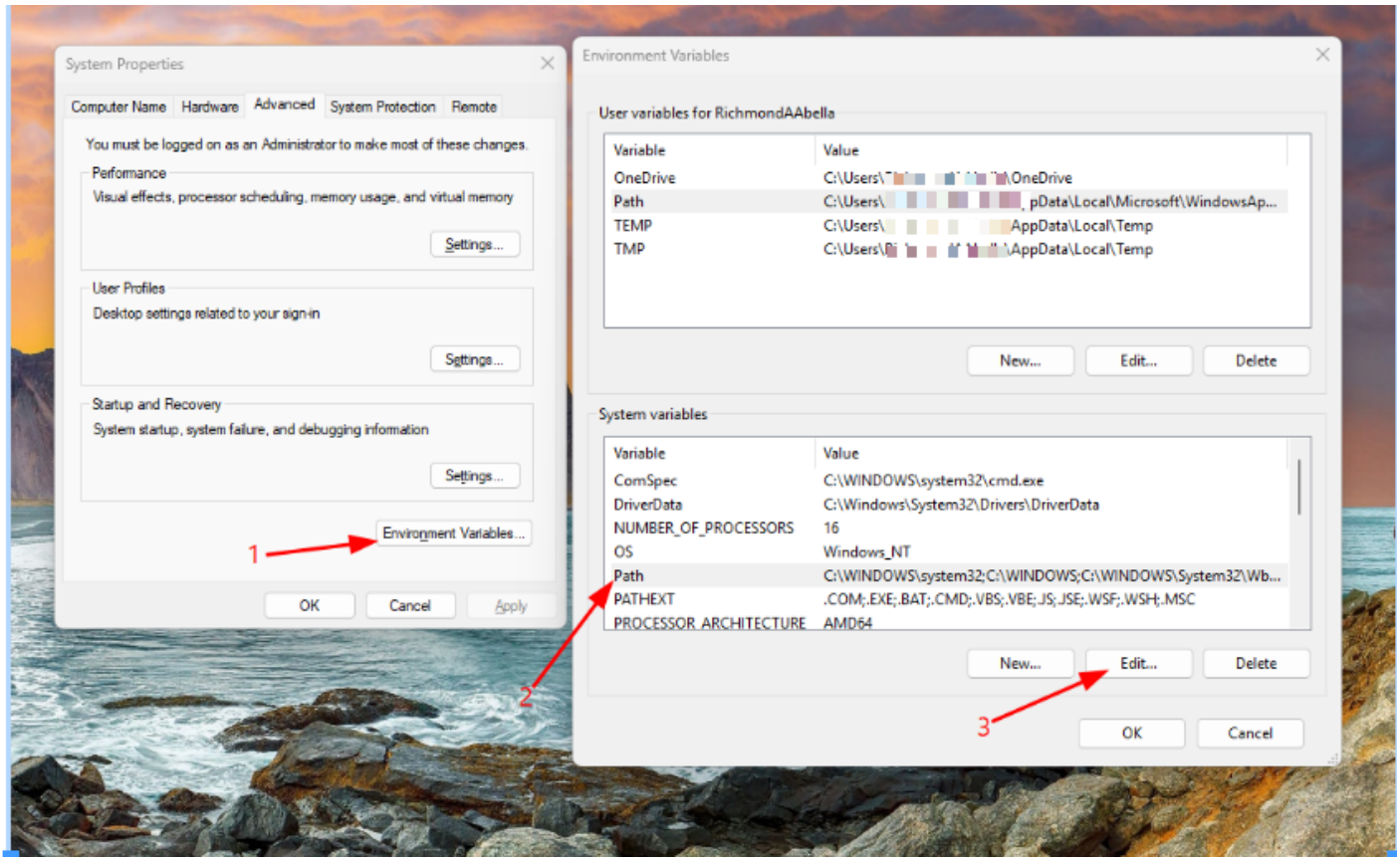
In Windows:

Download the Installer:

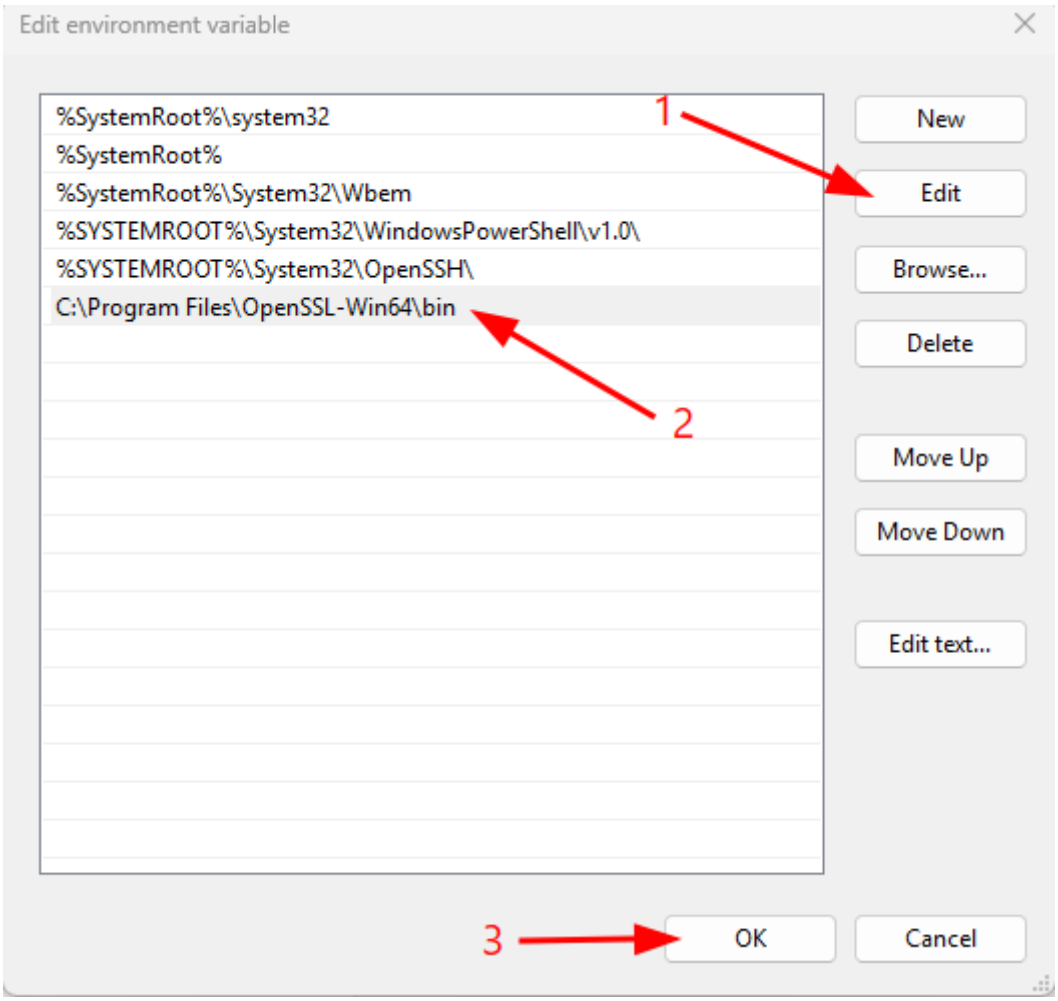
1. Go to the Shining Light Productions page and download the "Win64 OpenSSL Light" EXE installer (current version 3.x is recommended).



2. Run the Installer: Execute the downloaded file and follow the on-screen instructions.
3. Installation Path: It is generally recommended to install in the default location, typically C:\Program Files\OpenSSL-Win64.
4. Configure System Environment Variable:
Search for "Environment Variables" in the Windows search bar.
Click "Edit the system environment variables".
Click "Environment Variables".
Under "System Variables", find and select Path, then click "Edit".



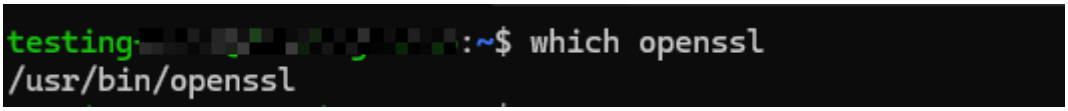
Click "Edit" and add the path to the bin folder, for example: C:\Program Files\OpenSSL-Win64\bin. Click OK on all windows to save.



Step 2:

Verify OpenSSL installation by running:

- macOS/Linux: `which openssl`
- Windows: `where openssl`



Creating a Private Key and Self-Signed Digital Certificate

A digital certificate and the private key used to sign the certificate are needed to authorize an organization using the `org login jwt` command. While it is strongly advised to utilize a certificate issued by a certifying authority, you can use OpenSSL to generate a self-signed certificate to get started.

This process produces two files:

- **server.key** — The private key used when authorizing an org with the `org login jwt` command
- **server.crt** — The digital certificate uploaded when creating the required external client app

Step 1:

Open a terminal (macOS and Linux) or command prompt (Windows).

Step 2:

Create a directory to hold the generated files and navigate to it:

```
mkdir /Users/jdoe/JWT
cd /Users/jdoe/JWT
```

Step 3:

Create a private key and save it as server.key file:

> Remember to change "**<your password>**" to the password of your choice. The password should be the same with the **server.pass.key** and **server.key**.

- server.pass.key command

```
openssl genpkey -aes-256-cbc -algorithm RSA -pass pass:<your password> -out server.pass.key -pkeyopt rsa_keygen_bits:2048
```

- server.key command

```
openssl rsa -passin pass:<your password> -in server.pass.key -out server.key
```

Step 4:

Use the server.key file to create a certificate signing request and save it as server.csr:

> When prompted, provide your organization's details. Enter only the **Country Name, State or Province, Locality, and Organization Name**—you may leave all other fields blank.

> **Do not enter a password when generating the `server.csr`, as it may cause an authentication mismatch.**

```
openssl req -new -key server.key -out server.csr
```

Step 5:

Create a self-signed digital certificate using the server.key and server.csr files:

```
openssl x509 -req -sha256 -days 365 -in server.csr -signkey server.key -out server.crt
```

Step 6:

Clone the server.key file and save it as server.pem

> **Important step to successfully integrate into SIEM**

```
cp server.key server.pem
```

Creating an External Client App in Your Salesforce Organization

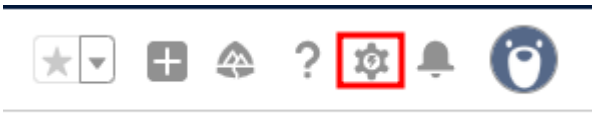
Salesforce CLI requires an external client app in the org that you're authorizing. An external client app is a packageable framework that enables a third-party application (Salesforce CLI) to integrate with Salesforce using APIs and security protocols. You must create your own external client app when authorizing the org with the `org login jwt` command.

Step 1:

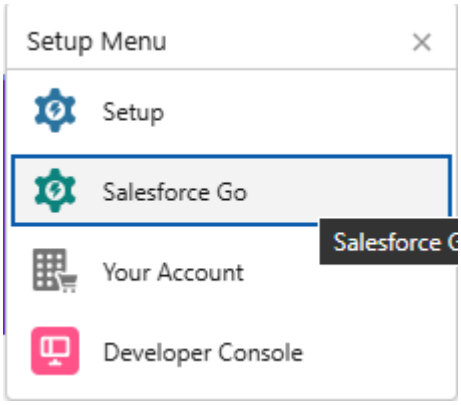
Log in to your Salesforce Organization.

> Note: If the salesforce dashboard interface is in classic mode change it to lighting mode.

- **In the Upper Right Corner click the gear icon.**

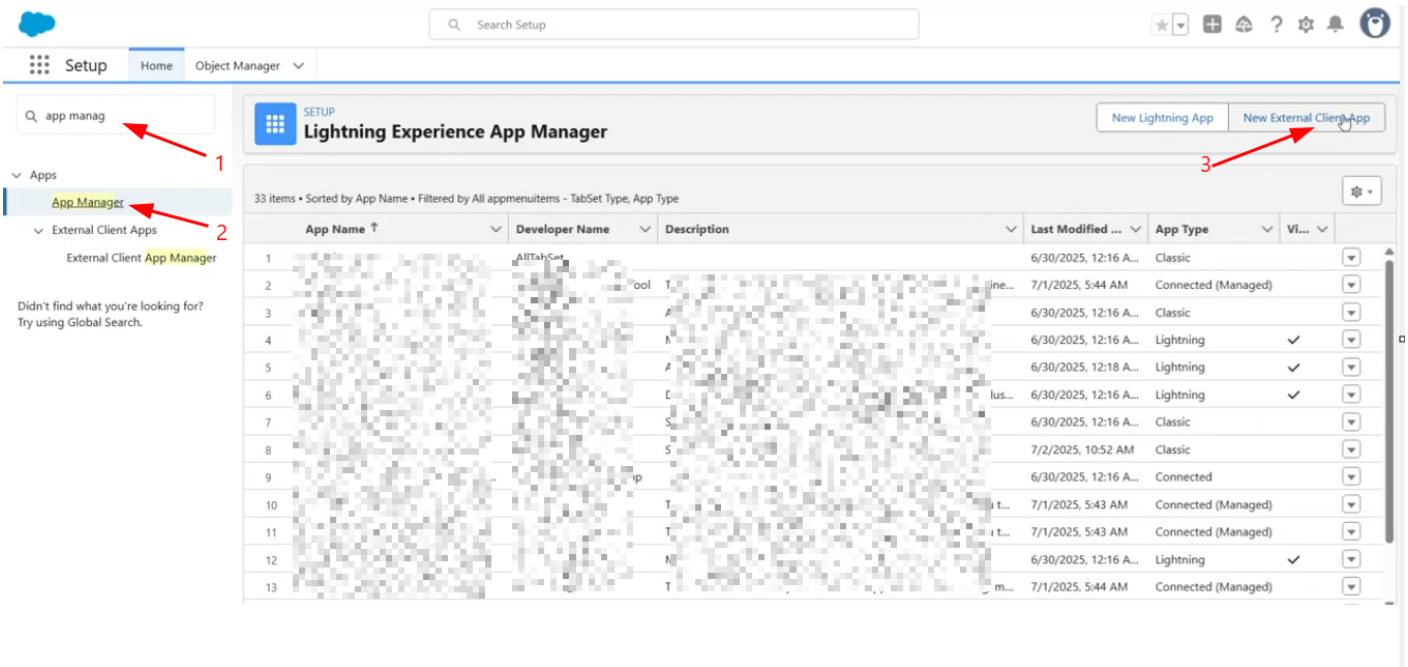


- **Select salesforce go.**



Step 2:

From the Quick Find box in Setup, enter **App Manager**, then click **App Manager**.



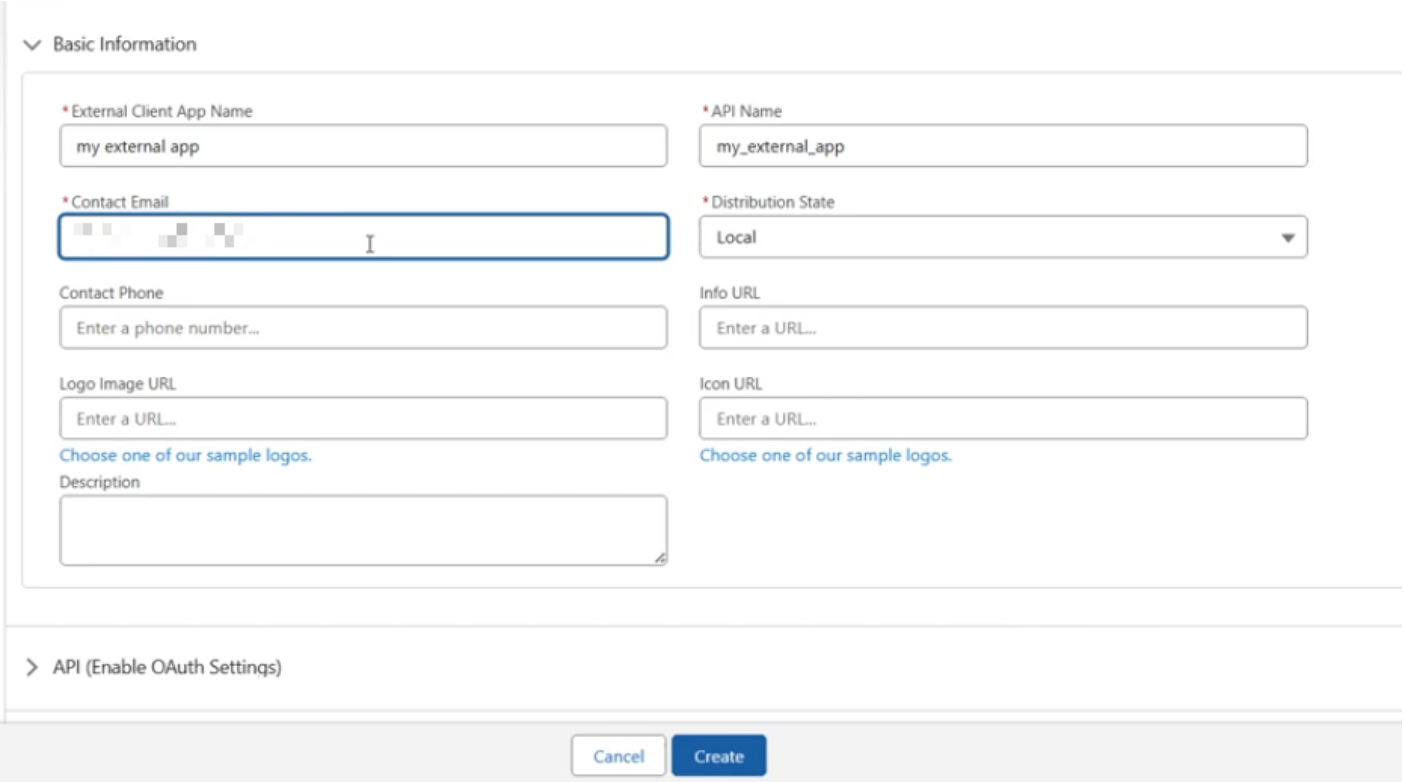
Step 3:

Click **New External Client App**.

Step 4:

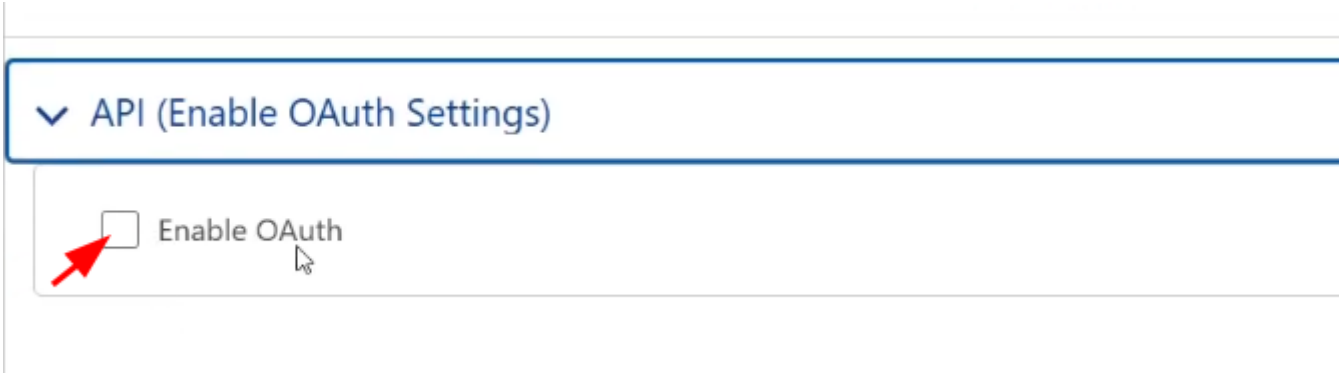
Update the basic information as needed, such as the external client app name and your contact email address.

> Note: The email address provided must be valid, as **Salesforce** will use it to communicate with your team regarding any updates or issues related to your application usage.



Step 5:

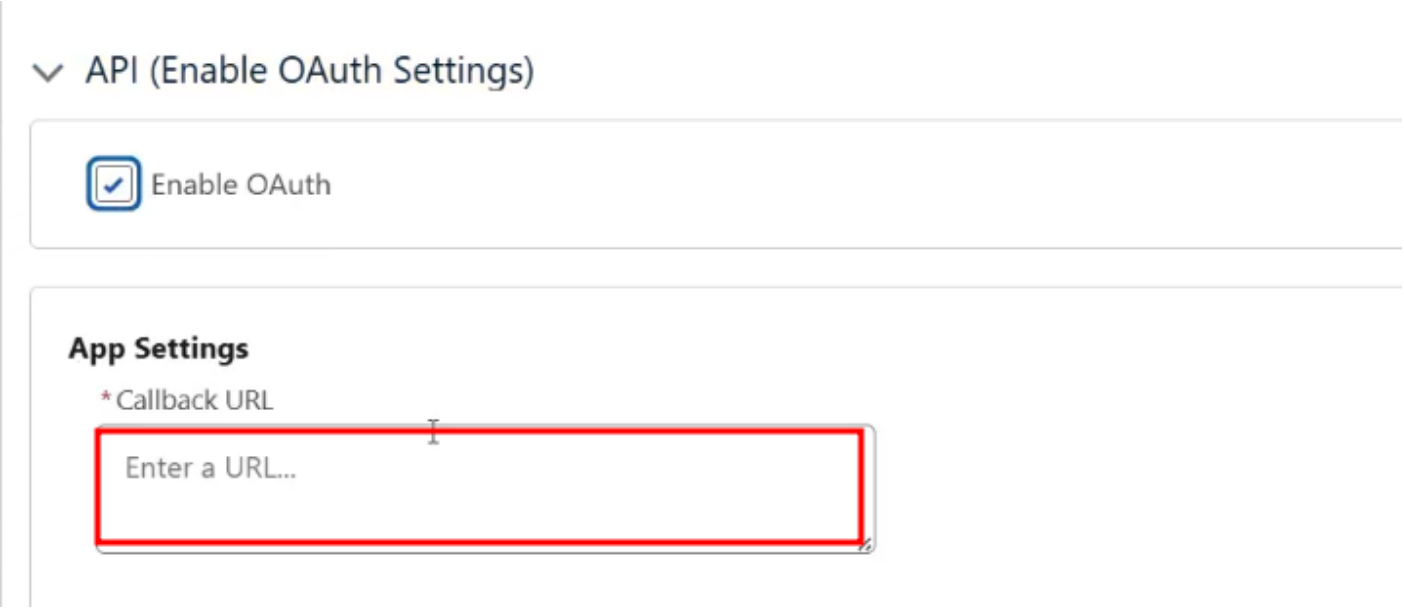
Under **API (Enable OAuth Settings)**, click **Enable OAuth**.



Step 6:

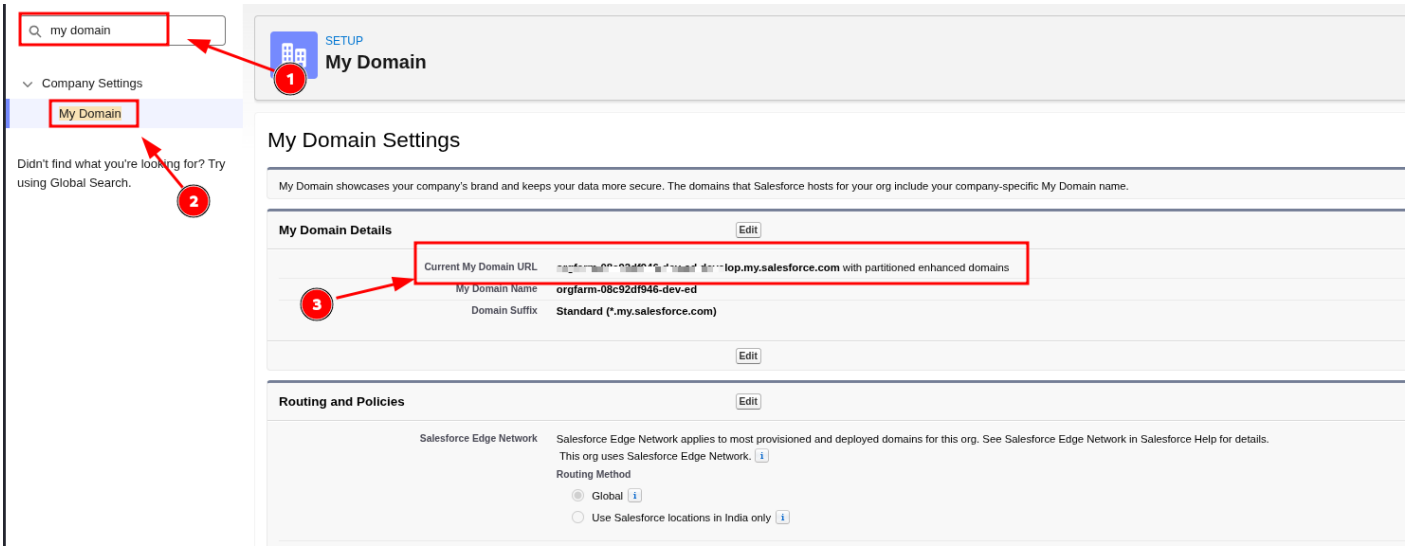
Under **App Settings**, in the **Callback URL** box, enter the URL below:

```
https://<base-url>/callback
```



To find the base URL and instance URL follow the guide below.

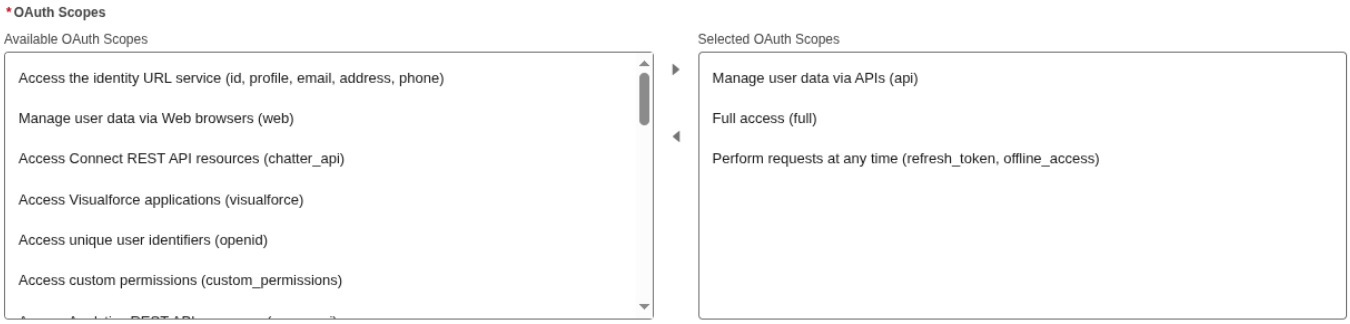
- In quick find box, enter my domain then select my domain under Company Settings.
- Under My Domain Details copy Current My Domain URL that's your base URL and Instance URL.



Step 7:

In the **OAuth Scopes** section, select these scopes:

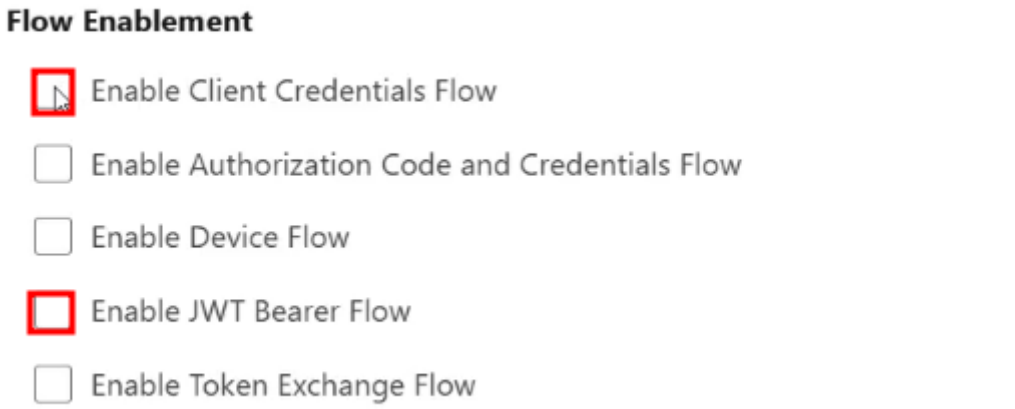
- **Manage user data via APIs** (api) - Gives you access to user data.
- **Perform requests at any time (refresh_token, offline_access)** - Permits you to get an OAuth access token.
- **Full access (full) -** grant all access to the permission for integration.



Step 8:

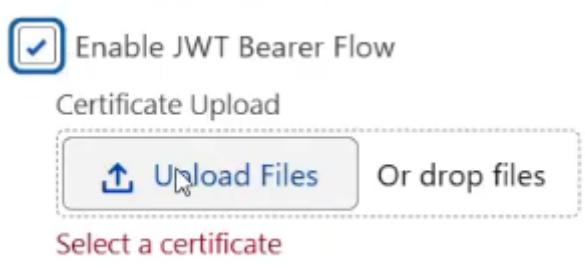
(Required for JWT) In the **Flow Enablement** section, select **Enable Client Credentials Flow** and **Enable JWT Bearer Flow**.

- **Enable Client Credentials Flow** - Allows your app to exchange its client credentials for an access token. And be able to access the credential Client ID.
- **Enable JWT Bearer Flow** - A secure, server-to-server authentication method used to integrate external applications with Salesforce without requiring manual user login.



Step 9:

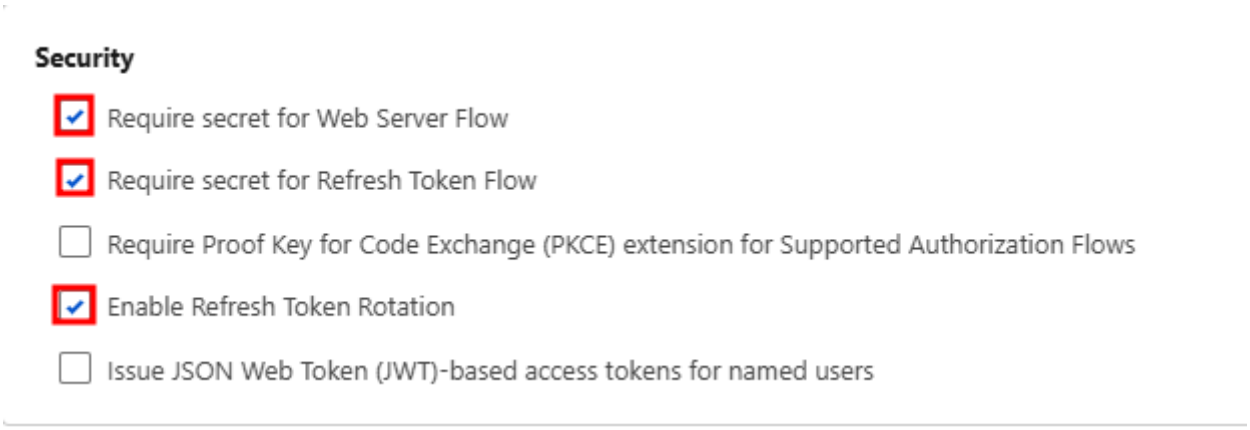
(Required for JWT) Click **Upload Files** and upload your digital certificate file (**server.crt**).



Step 10:

In **Security** section check the following:

- Require secret for Web Server Flow
- Require secret for Refresh Token Flow
- Enable Refresh Token Rotation



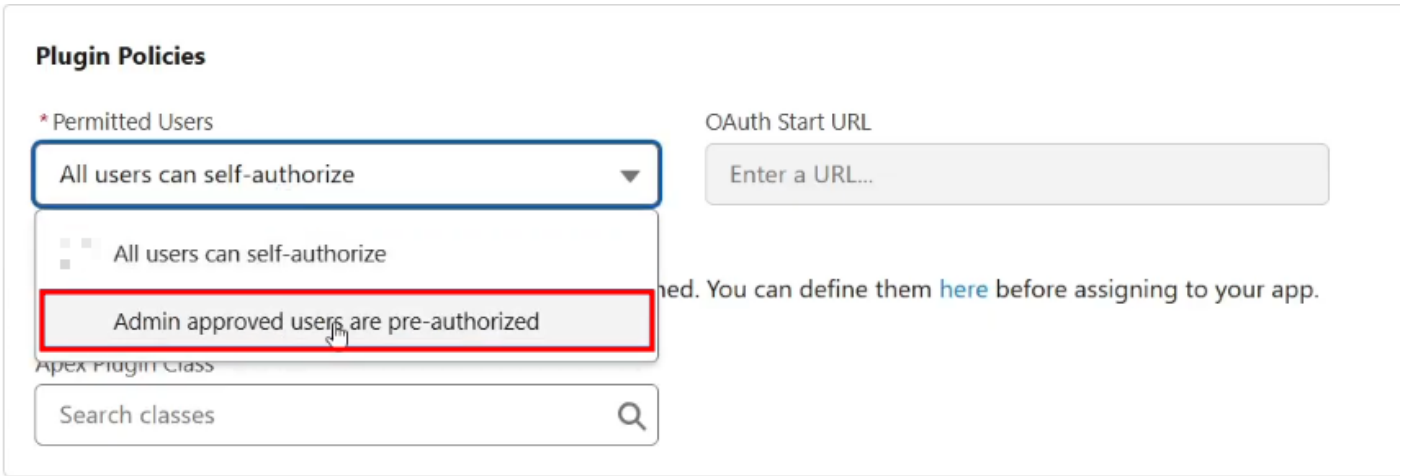
Step 11:

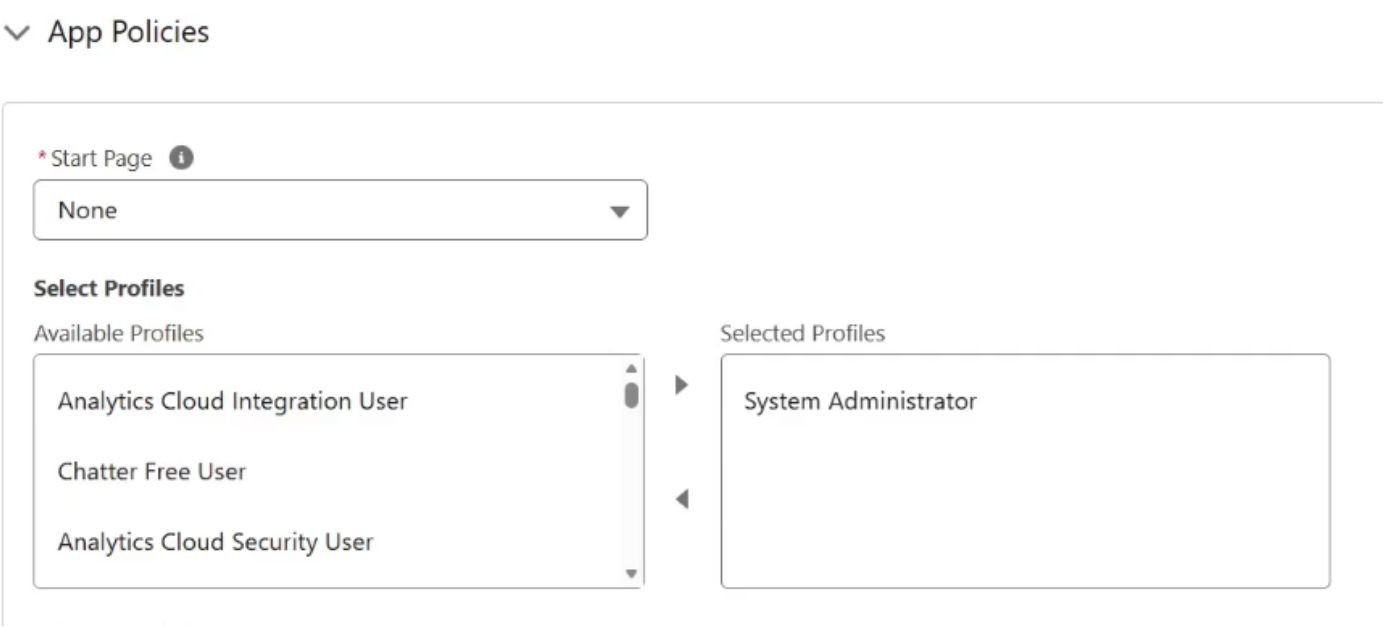
Click **Create** and **Edit** to configure additional settings.

Step 12:

(Required for JWT) Click the **Policies** tab and configure the following:

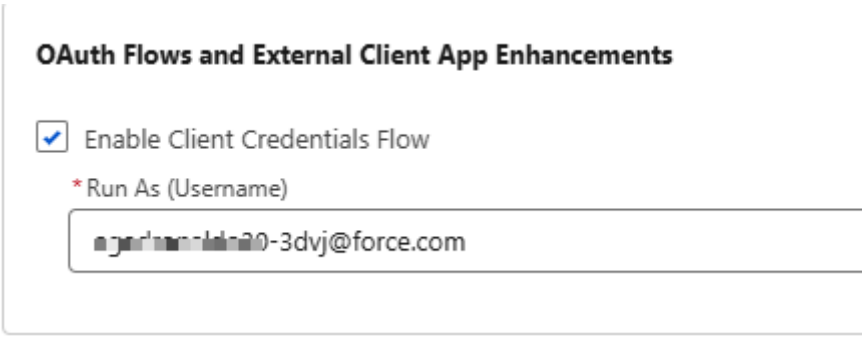
- Open **OAuth(Open Authorization) Policies**
- In the **Plugin Policies** section, set **Permitted Users** to **Admin approved users are pre-authorized**
- **In OAuth Start URL** use your organization base URL example: (https://fun-dream-996.my.salesforce.com/)
- Click **OK**
- In the **App Policies** section, select the profiles and permission sets that are pre-authorized to use this external client app





Step 14:

In the **OAuth Flows and External Client App Enhancements** section **Enable Client Credentials Flow** and add username**.**



Step 15:

In the **App Authorization** section, under **OAuth(Open Authorization) Policies**, click **Expire refresh token after a specific time**.

Step 16:

Configure token expiration settings:

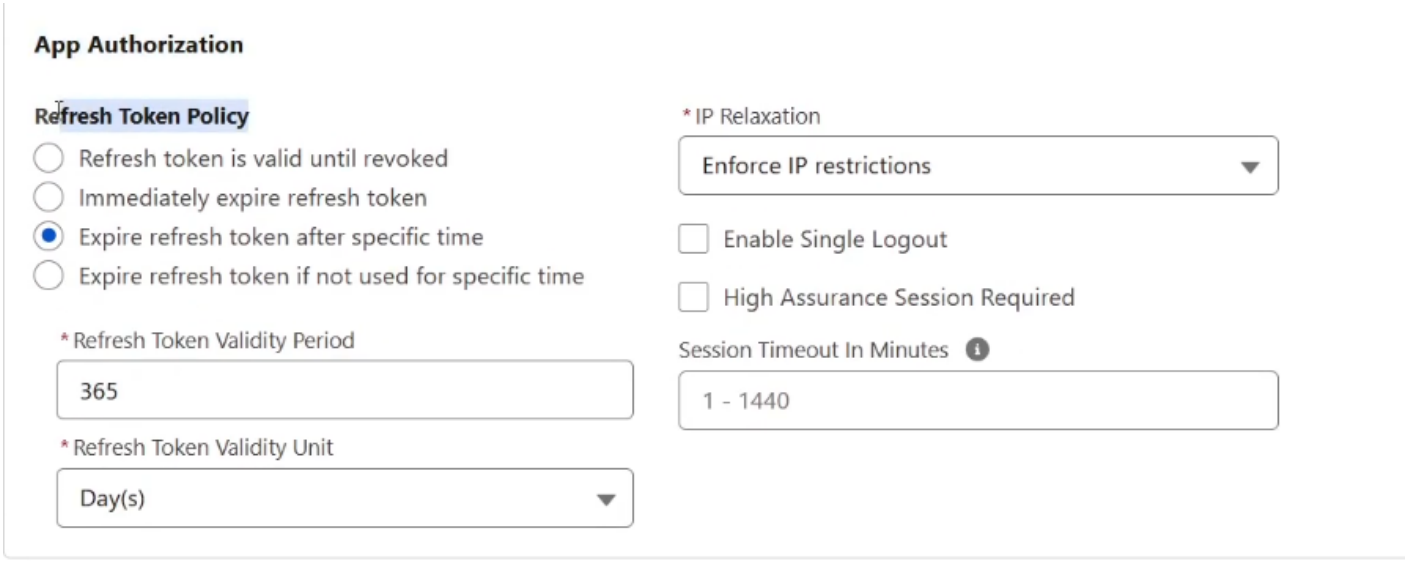
- **Refresh Token Validity Period**: Enter 365
- **Refresh Token Validity Unit**: Select **Day(s)**

Step 17:

In the **Session Timeout in Minutes** box, enter **15**.

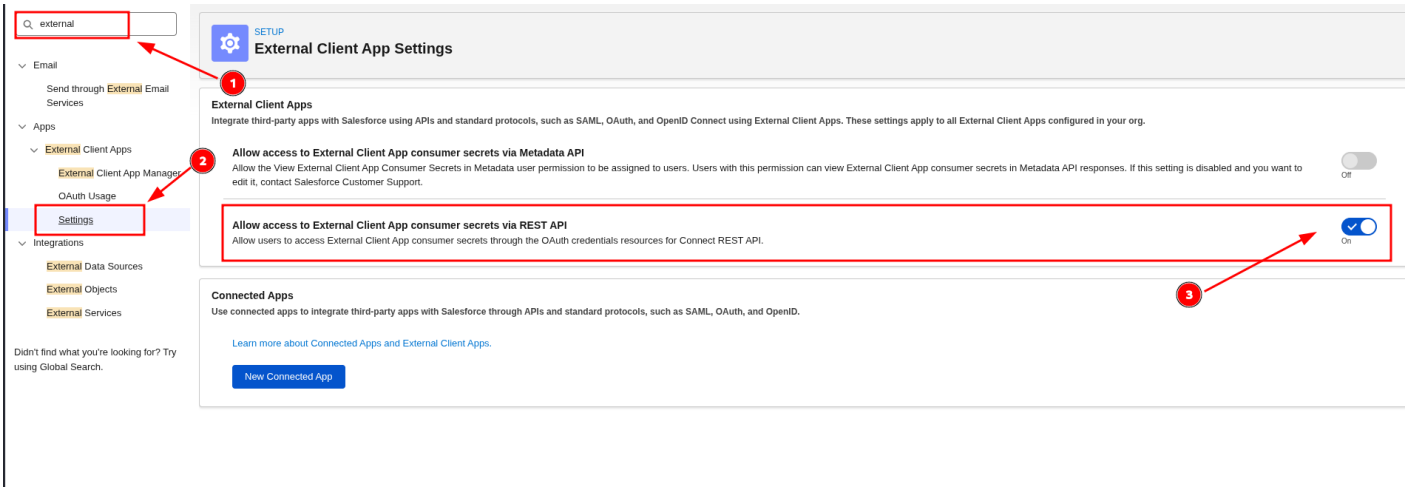
Step 18:

Click **Save**.



Step 19:

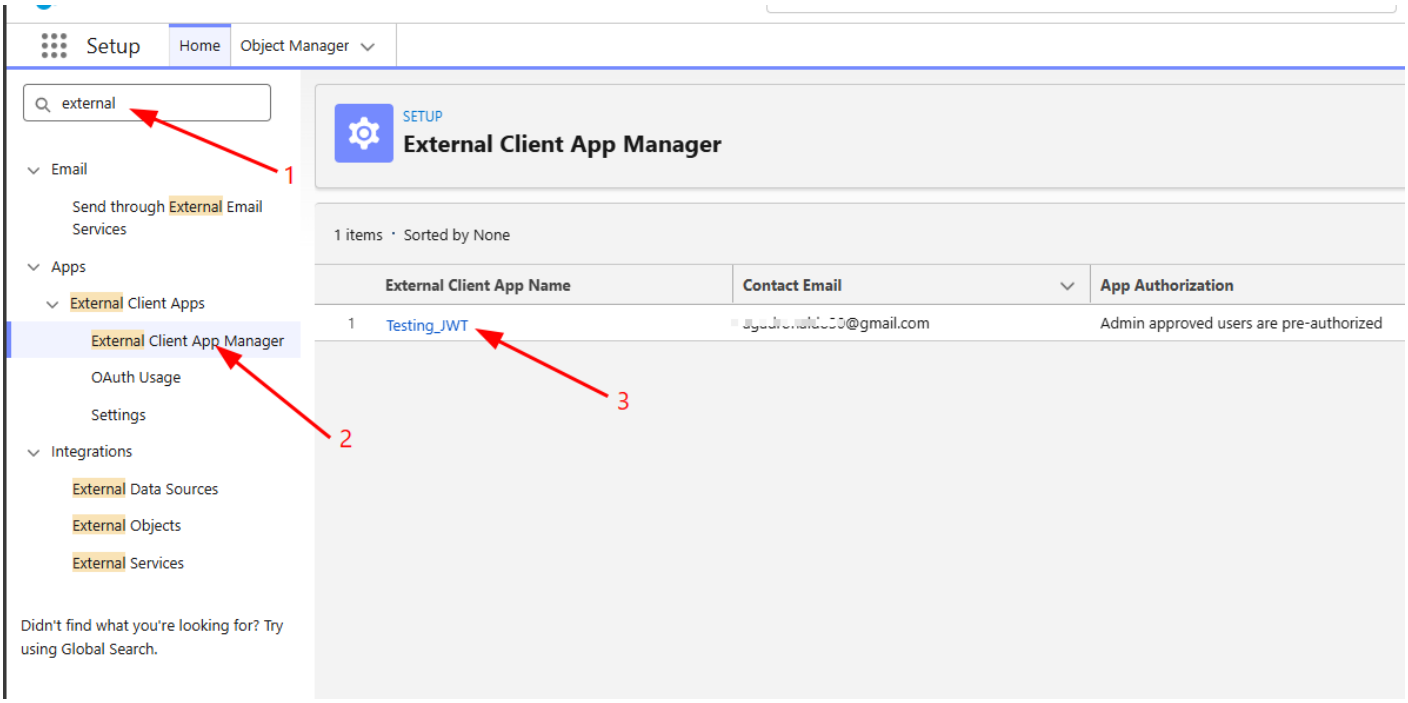
Enable Allow Access to External Client App Consumer Secret via REST API



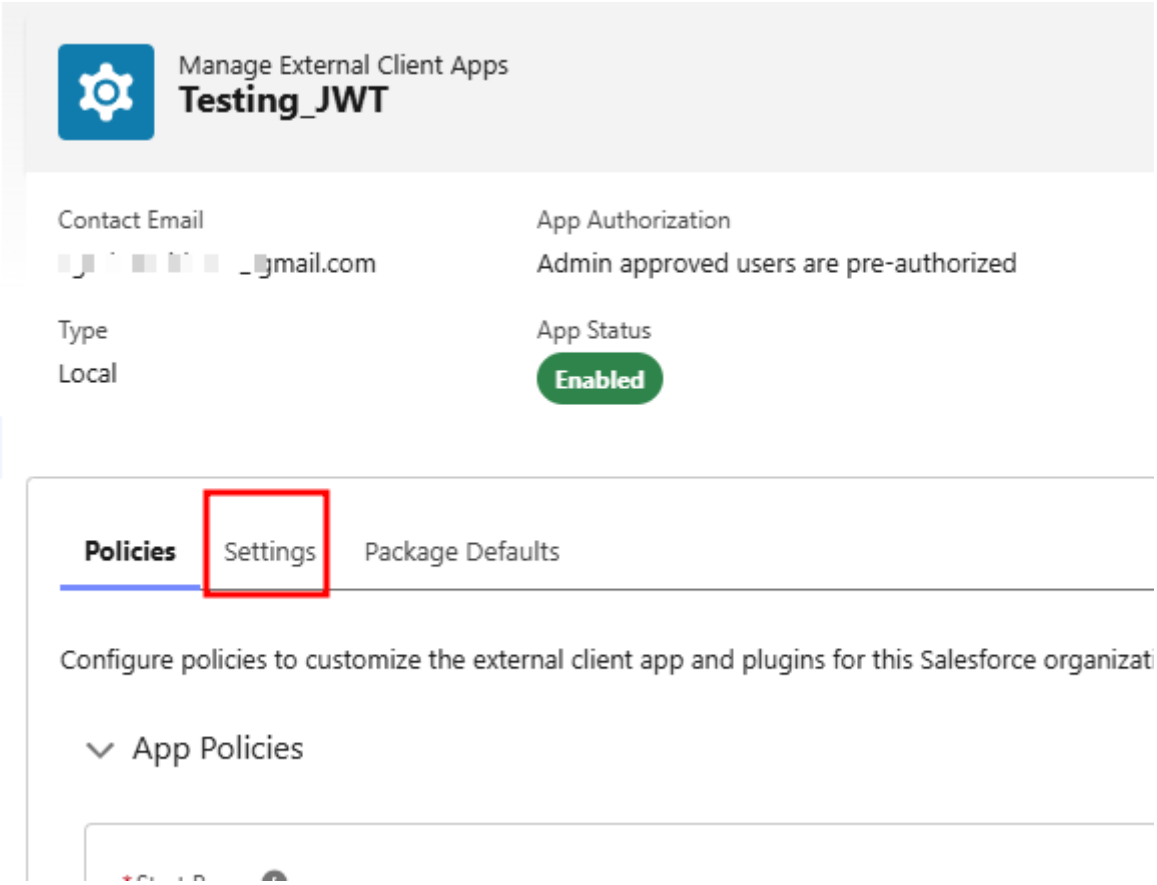
> Your external client app is now ready to use.

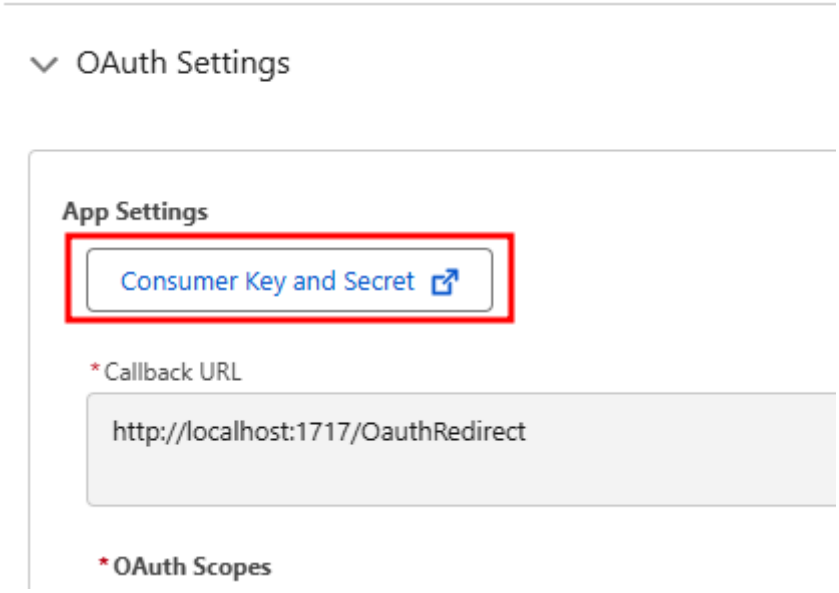
How to Find Client ID (Consumer Key)

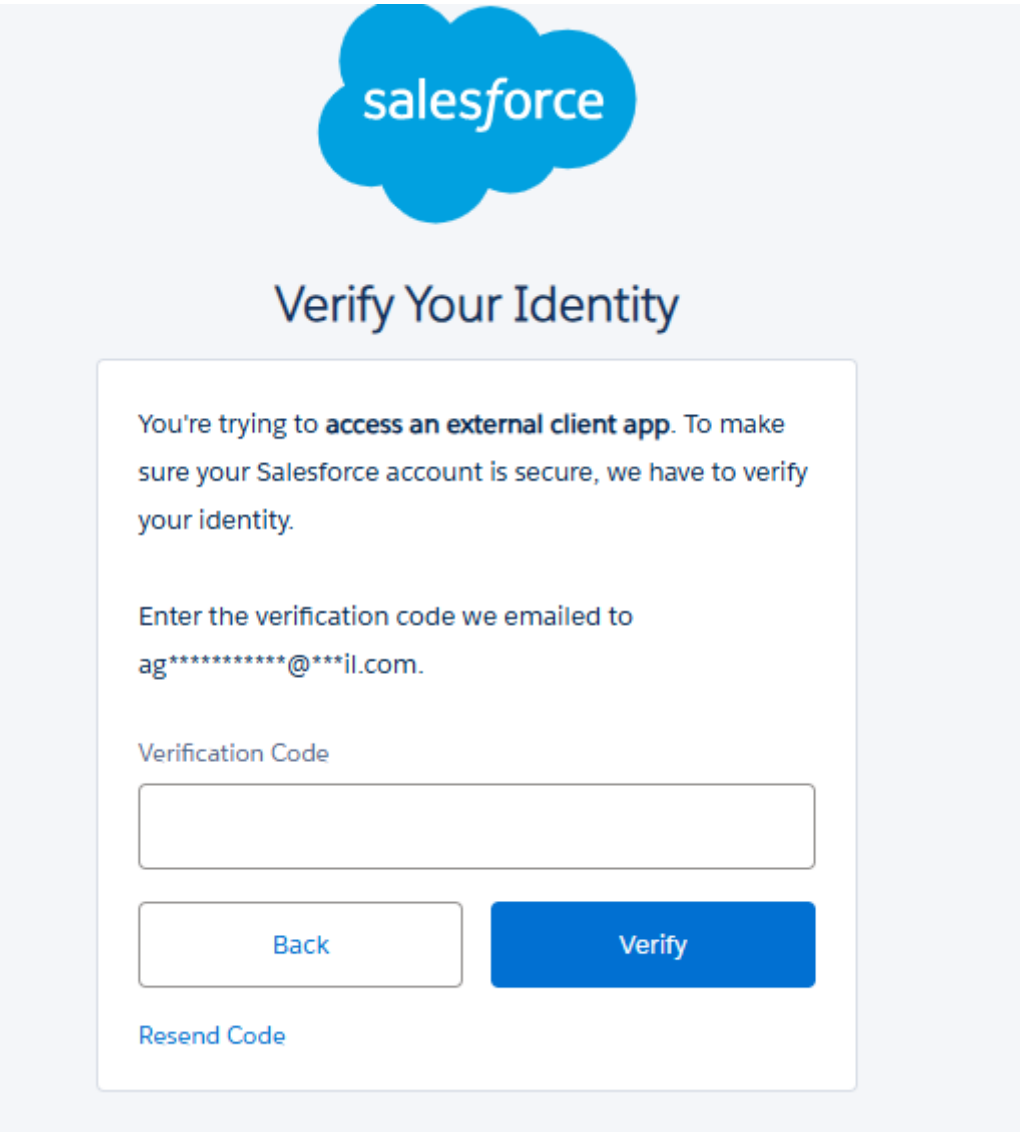
- type **external** in quick find search bar and click **external client app manager**
- under **External Client App Name** locate the app you created earlier and click it.



- under settings tab click **OAuth Settings** then you can the view your **client key** and **client secret** after the verification process.







Converting server.crt to JKS Keystore File

To use the certificate with Salesforce, convert it to a Java KeyStore (JKS) format.

Step 1:

> **Important step to successfully integrate into SIEM**

Clone the server.key file and save it as server.pem.

In Linux

```
cp server.key server.pem
```

> Note: Step 2 - 4 are **Optional - (use for salesforce to salesforce integration)**

Step 2:

Create a PKCS12 keystore file (minimum password length: 6 characters):

```
openssl pkcs12 -export -in server.crt -inkey server.pem -out keystore.p12
```

Step 3:

Convert the PKCS12 file to JKS format:

```
keytool -importkeystore -srckeystore keystore.p12 -srcstoretype pkcs12 -destkeystore
servercert.jks -deststoretype JKS
```

You will be prompted to create a password. Remember this password for future use.

Step 4:

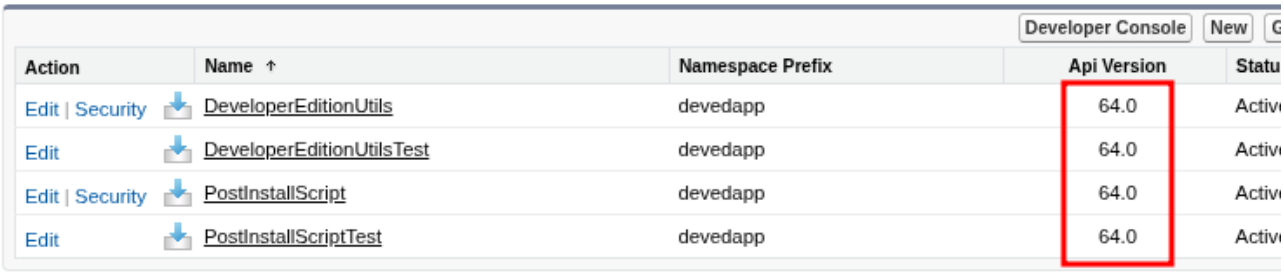
Change the default alias (Salesforce doesn't support alias "1"):

```
keytool -keystore servercert.jks -changealias -alias 1 -destalias <name of certificate>
```

Required fields for JWT Authentication Integration:

- `JWT Authentication Client Key Path (full file folder path of server.pem not in root directory)`
  - ex: Users/jdoe/JWT/server.pem

- `Username (can be found in users)`
  - example format: ADMIN-3dvj@force.com
- `Client ID (Consumer Key)`
  - example format: 3MVxxxxxtCx.CV6cbh7fSpKs_5iexxxxxxxxxxxxxxxxxxxxxxxxxxxxxZKBaepcxlJUhO1
- `Instance URL`
  - example format: https://company.my.salesforce.com
- `API Version`
  - in quick find type Apex Classes



Provide this required fields to **CyTech Support**.

Reference Link:

Create an External Client App in Your Org | Salesforce DX Developer Guide | Salesforce Developers

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*If you need further assistance, kindly contact our support at **support@cytechint.com** for prompt assistance and guidance.*

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