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How the GOV.UK One Login Signal Exchange works

When a user is redirected from your service to GOV.UK One Login, One Login records the user's activity during their interaction. As the user interacts with One Login, certain activities will trigger different signals which the GOV.UK One Login Signal Transmitter may send programatically to your receiver using a POST request.

The signals will be sent asynchronously and independently of the One Login flow.
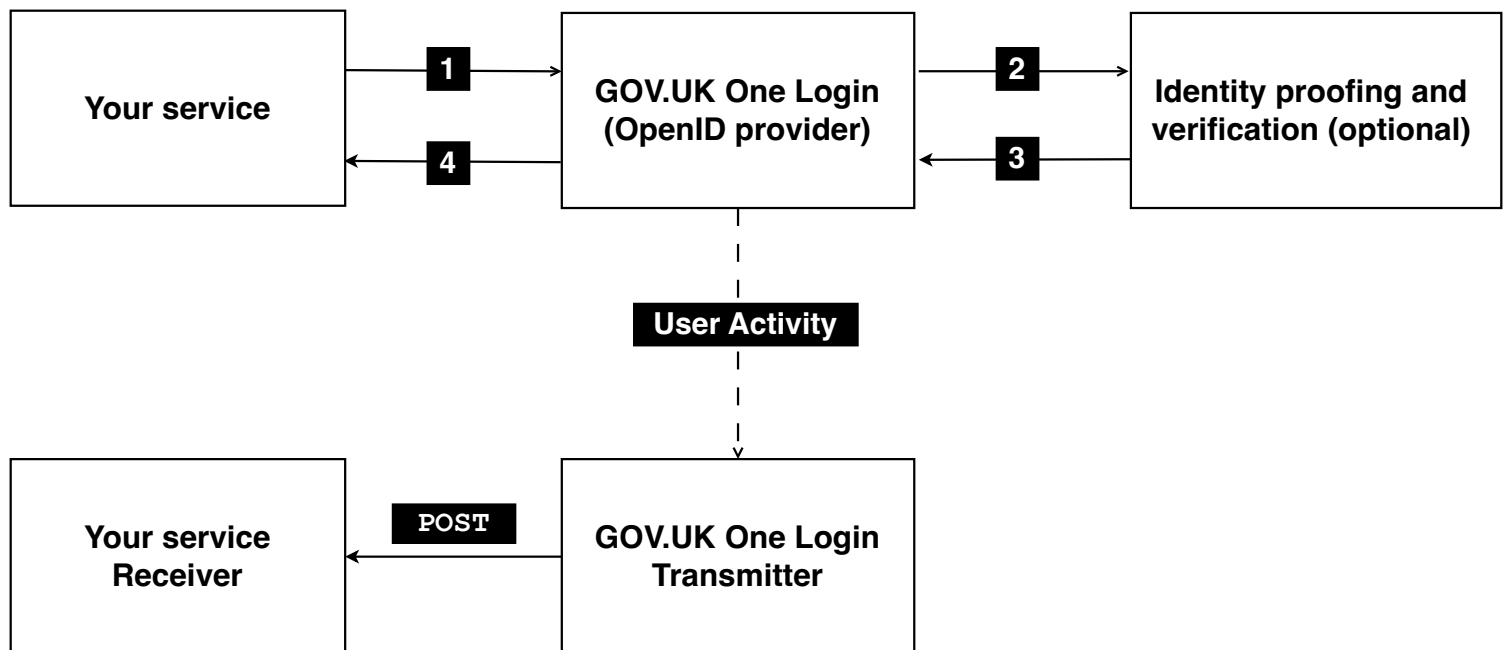
What kind of signals can One Login send to you

The GOV.UK One Login Signal Exchange uses the Shared Signals Events Framework (https://openid.github.io/sharedsignals/openid-sharedsignals-framework-1_0.html) (SSE) to send user related activity. Signals that are supported are:

- Specific to users interacting with GOV.UK One Login with your service.
- Signals related to the user but not to an interaction with your service.

⚠ **You cannot receive signals about users interacting with GOV.UK One Login with different government services**

Find out what to consider before you integrate your service with the GOV.UK One Login Signal Exchange (/govuk-one-login-signal-exchange/before-you-integrate/).

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Before you integrate with the GOV.UK One Login Signal Exchange

Before you integrate with the GOV.UK One Login Signals Exchange, you must decide on:

- A value to be used as part of the audience (https://datatracker.ietf.org/doc/html/rfc7519#section-4.1.3) claim in the Security Event Token (https://www.rfc-editor.org/info/rfc8417) (SET). For example: `https://notfication.department.gov.uk`
- What signal(s) you would like to receive - the GOV.UK One Login Signal Exchange team can help you with this.
- Your expected throughput (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/receiver/#signal-delivery) of users to use GOV.UK One Login.
- A support process in case we need to contact you.

As a minimum, you should be able to provide a value for the `audience` claim so that we can provide a `clientId` and `clientSecret` that you can use for authenticating against the GOV.UK One Login Signals Exchange Transmitter API.

You must also set up:

- An OAuth2 service (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/oauth/) that supports the OAuth2 Client Credential Grant (https://oauth.net/2/grant-types/client-credentials/).
- A receiver service (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/receiver/) that can receive signals sent by the GOV.UK One Login Transmitter.

You should also:

- Set up a health check using the verification endpoint (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/health/).

You can:

- View your configuration (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/configuration/).

Find out what you need to do to start developing your integration (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/).

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Configuring for production

Configuring for production is similar to the integration environment (/govuk-one-login-signal-exchange/testing-your-integration/). First getting in touch with your Engagement manager to say that you're ready to integrate in production. We will then perform a health check to establish a connectivity test our production environment and your production receiver.

We will perform then perform some additional changes to the GOV.UK One Login Signal Exchange to enable the delivery of the signals that have been agreed upon.

Once all the changes are made, any user that goes through your production environment will generate signals and these will be delivered to your receiver.

Once the production configuration is complete, you can continue with configuring your service for production (/configure-for-production/)

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GOV·UK One Login
Beta

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View Your configuration

The GOV.UK One Login Signals Exchange Transmitter API uses the Stream Endpoint (https://openid.github.io/sharedsignals/openid-sharedsignals-framework-1_0.html#name-stream-configuration) as a way to view the configuration of the integration.

In order to view your configuration, you must first authenticate against the GOV.UK One Login Transmitter OAuth token endpoint:

```
curl --request POST \
  --url TOKEN ENDPOINT \
  --header 'Content-Type: application/x-www-form-urlencoded' \
  --data client_id=CLIENT_ID \
  --data client_secret=CLIENT_SECRET \
  --data grant_type=client_credentials
```

Where:

- `CLIENT_ID` : The `clientId` supplied to you before you integrate (/govuk-one-login-signal-exchange/before-you-integrate/).
- `CLIENT_SECRET` : The `clientSecret` supplied to you before you integrate (/govuk-one-login-signal-exchange/before-you-integrate/).
- `ENDPOINT` : The token endpoint of Transmitter API. Below are the token endpoints for our
  - Integration Environment (https://auth.ssf-transmitter.transaction.integration.account.gov.uk/oauth2/token).
  - Production Environment (https://auth.shared-signals-transmitter.transaction.account.gov.uk/oauth2/token).

The expected response should look like the following:

```
{
  "access_token": "ACCESS_TOKEN",
```

```
  "token_type": "bearer",
  "expires_in": 14400
}
```

Once you've obtained an `ACCESS_TOKEN` , you can make the following request to view your configuration:

```
curl --request GET \
   --url STREAM_ENDPOINT \
   --header 'Authorization: Bearer ACCESS_TOKEN' \
   --header 'Content-Type: application/json' \
```

Below are the stream endpoints for our:

- [Integration (https://ssf-transmitter.transaction.integration.account.gov.uk/stream)](https://ssf-transmitter.transaction.integration.account.gov.uk/stream) Environment.
- [Production (https://shared-signals-transmitter.transaction.account.gov.uk/stream)](https://shared-signals-transmitter.transaction.account.gov.uk/stream) Environment.

Once you have managed to view your configuration, you can then begin testing in the GOV.UK One Login [integration evironment (/govuk-one-login-signal-exchange/testing-your-integration/)](/govuk-one-login-signal-exchange/testing-your-integration/). If you are unable to view your configuration or the configuration is not what you expect, please get in touch with GOV.UK One Login support team and we can investigate further.

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Perform a Health check

The health check uses the [Verification Endpoint (https://openid.github.io/sharedsignals/openid-sharedsignals-framework-1_0.html#name-verification)](https://openid.github.io/sharedsignals/openid-sharedsignals-framework-1_0.html#name-verification) as a way to confirm the connection between the GOV.UK One Login Transmitter and your receiver as well as a way to test your [receiver (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/receiver/)](/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/receiver/).

In order to send a health check, you must first authenticate against the GOV.UK One Login Transmitter OAuth token endpoint:

```
curl --request POST \
  --url TOKEN ENDPOINT \
  --header 'Content-Type: application/x-www-form-urlencoded' \
  --data client_id=CLIENT_ID \
  --data client_secret=CLIENT_SECRET \
  --data grant_type=client_credentials
```

Where:

- `CLIENT_ID` : The `clientId` supplied to you [before you integrate (/govuk-one-login-signal-exchange/before-you-integrate/)](/govuk-one-login-signal-exchange/before-you-integrate/).
- `CLIENT_SECRET` : The `clientSecret` supplied to you [before you integrate (/govuk-one-login-signal-exchange/before-you-integrate/)](/govuk-one-login-signal-exchange/before-you-integrate/).
- `ENDPOINT` : The token endpoint of Transmitter API. Below are the token endpoints for our
  - [Integration Environment (https://auth.ssf-transmitter.transaction.integration.account.gov.uk/oauth2/token)](https://auth.ssf-transmitter.transaction.integration.account.gov.uk/oauth2/token).
  - [Production Environment (https://auth.shared-signals-transmitter.transaction.account.gov.uk/oauth2/token)](https://auth.shared-signals-transmitter.transaction.account.gov.uk/oauth2/token).

The expected response should look like the following:

```
{
    "access_token": "ACCESS_TOKEN",
    "token_type": "bearer",
    "expires_in": 14400
}
```

Once you've obtained an `ACCESS_TOKEN` you can then send a `POST` request to the verification endpoint:

```
curl --request POST \
    --url VERIFICATION_ENDPOINT \
    --header 'Authorization: Bearer ACCESS_TOKEN' \
    --header 'Content-Type: application/json' \
    --data PAYLOAD
```

Where the optional `PAYLOAD` field is the following JSON object converted to a JSON string:

```
{
    "state": "abc123"
}
```

Below are the verfication endpoints for our:

- Integration (https://ssf-transmitter.transaction.integration.account.gov.uk/verify) Environment.
- Production (https://shared-signals-transmitter.transaction.account.gov.uk/verify) Environment.

Once the request is made, the value of `state` will be included in the verification signal to your receiver endpoint if supplied. The value of `state` must be:

- Any alphanumeric character.
- Maximum length of 64 characters.
- Only special character allowed is `-`

You should send a health check on a recurring schedule at a sensible rate, usually every 5-10 minutes. If you do not receive a verfification signal or the signal does not contain the expected the state value, please get in touch with GOV.UK One Login support team and we can investigate further.

You can also [view your configuration (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/configuration/)](/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/configuration/).

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OAuth Token Endpoint

The GOV.UK One Login Signal Exchange uses the [OAuth2 Client Credentials Grant (https://oauth.net/2/grant-types/client-credentials/)](https://oauth.net/2/grant-types/client-credentials/) to authenticate between GOV.UK One Login Signal Exchange transmitter and your receiver when sending signals.

The GOV.UK One Login Transmitter will initiate the client credentials flow by making this API request:

```
curl --request POST \
  --url https://YOUR.SERVICE.gov.uk/oauth2/token \
  --header 'Content-Type: application/x-www-form-urlencoded' \
  --data client_id=CLIENT_ID \
  --data client_secret=CLIENT_SECRET \
  --data grant_type=client_credentials
```

The expected response should look like the following:

```
{
  "access_token": "ACCESS_TOKEN",
  "token_type": "bearer",
  "expires_in": 14400,
  "scope": "hello"
}
```

Token Endpoint behaviour

There are certain assumptions that we make about your endpoint. These are:

- Validity of `access_token` :

- GOV.UK One Login Signal Exchange Transmitter must be able to request a new token without invalidating previously issued tokens.
  - The token must be valid for a minimum of 1 hour.
- Throughput:
  - The `/token` endpoint will need to be able to support a high throughput (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/receiver/#signal-delivery).

The token endpoint will then be used to authenticate against the receiver endpoint (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/receiver/) which you must set up next.

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Receiver Endpoint

The receiver endpoint is where the GOV.UK One Login Signal Exchange Transmitter will send signals related to user activity and should be built as per RFC 8935 (https://www.rfc-editor.org/rfc/rfc8935.html) .

After obtaining an `ACCESS_TOKEN` from the OAuth Token Endpoint (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/oauth/), the transmitter will make the following request when attempting to send the signal:

```
curl --request POST \
  --url https://your.service.gov.uk/receiver \
  --header 'Accept: application/json' \
  --header 'Authorization: Bearer ACCESS_TOKEN' \
  --header 'Content-Type: application/secevent+jwt' \
  --data SIGNAL
```

`SIGNAL` is a Security Event Token (https://www.rfc-editor.org/info/rfc8417) (SET) which builds upon the JSON Web Token (JWT) (https://www.rfc-editor.org/rfc/rfc7519) format and can be decoded as a regular JWT. You must return a `HTTP 202 (Accepted)` as any other responses will be treated as an error and will be attempted to be delivered again (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/receiver/#signal-delivery).

Signature Verfication

As part of the SET, there is a signature that should be used to verify the authenticity of the payload:

1. Validate that the SET `kid` claim exists in the JWKS (JSON web key set) returned by the `/jwks` endpoint.
2. Check the JWT `alg` header matches the value for the key you are using.

3. Use the key to validate the signature on the logout token according to the [JSON Web Signature Specification (https://datatracker.ietf.org/doc/html/rfc7515)](https://datatracker.ietf.org/doc/html/rfc7515).
4. Check the value of `iss` (issuer) matches `https://ssf.account.gov.uk/` .
5. Check the `aud` (audience) claim is the same client ID you received when you [registered your service to use GOV.UK One Login Signal Exchange (/govuk-one-login-signal-exchange/before-you-integrate/)](/govuk-one-login-signal-exchange/before-you-integrate/).
6. Check the `iat` (issued at) claim is in the past.

Below are the JWKS endpoints for our:

- [Integration (https://ssf-transmitter.transaction.integration.account.gov.uk/jwks.json)](https://ssf-transmitter.transaction.integration.account.gov.uk/jwks.json) Environment.
- [Production (https://shared-signals-transmitter.transaction.account.gov.uk/jwks.json)](https://shared-signals-transmitter.transaction.account.gov.uk/jwks.json) Environment.

As we may send SETs at a [high throughput (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/receiver/#signal-delivery)](/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/receiver/#signal-delivery), you must implement caching of the JWKS endpoint. The cache must:

- Refresh regularly.
- Refresh if the value in the `kid` claim does not exist in your cache.

Payload validation

As the SET is a JWT, the body will the the signal itself. After the body has been decoded, we recommend validating the payload. The GOV.UK One Login Signal Exchange team can provide JSON schema's to help with payload validation.

Signal Delivery

A single user interaction with GOV.UK One Login may generate several signals therefore during the development of your receiver, you need to ensure that your solution can support a large volume of signals.

The GOV.UK One Login Signal Exchange team will work with you to identify the expected delivery rate of signals based on a number of factors, as well as implement rate limiting to prevent your infrastructure from being overwhelmed with signals. These factors may include:

- Your expected throughput of users attempting to use your service.
- The signal(s) that you have subscribed to.
- If you are strictly an Auth only service or if you are an Identity Proofing and Verification Service.

We recommend that your receiver is **initially** setup to support minimum of 10 signals per second until a more accurate number can be determined based on the factors above.

> ⚠ **You must not conduct any security testing, penetration testing, performance testing, or IT health checks of the GDS estate. You must also not use personal identifiable information (PII) – GOV.UK One Login will provide example data.**

Transmitter Assumptions

You should also assume that the GOV.UK One Login Transmitter may deliver:

- Signals out of order.
- Duplicate signals.

GOV.UK One Login Transmitter will make a best effort attempt to ensure that signals are delivered in order and that there is no duplication.

Transmitter Error Handling

If the transmitter receives any response other than `HTTP 202 (Accepted)`, then it is considered an error. The transmitter may attempt redelivery every 2 minutes up to 5 times. After the 5th attempt, the failed signals may be kept for up to 14 days before they are discarded. The GOV.UK One Login Signal Exchange will get in touch via the support process to arrange a replay.

Once you have set up your transmitter, you may test the integration by either:

- Setting up a health check (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/health/).
- Testing in the GOV.UK One Login integration environment (/govuk-one-login-signal-exchange/testing-your-integration/).

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Integrating with One Login Signal Exchange

Before integrating with the GOV.UK One Login Signal Exchange, there are several services (/govuk-one-login-signal-exchange/before-you-integrate/) that need to be built.

To get started, first setup an OAuth2 Service (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/oauth/).

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Support

Use the [#govuk-one-login channel (https://ukgovernmentdigital.slack.com/archives/C02AQUJ6WTC)](https://ukgovernmentdigital.slack.com/archives/C02AQUJ6WTC) to contact the GOV.UK One Login technical team.

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Testing your integration in GOV.UK One Login integration environment

Once you have built the necessary services (/govuk-one-login-signal-exchange/before-you-integrate/), you can start testing your integration with GOV.UK One Login and the GOV.UK One Login Signal Exchange

To get started, first get in touch with your Engagement Manager, they will work with you and the GOV.UK One Login Signal Exchange team to perform a health check (/govuk-one-login-signal-exchange/integrating-with-govuk-one-login-signal-exchange/health/). By performing a health check, we are establishing connectivity between the GOV.UK One Login Signal Exchange integration environment and your receiver.

Once the health check is complete, the rest of the integration requirements will need to be addressed (/govuk-one-login-signal-exchange/before-you-integrate/) and some additional changes will be made by the GOV.UK One Login Signal Exchange to enable the delivery of the signals that have been agreed upon.

Once the changes are complete, you can continue with your integration (/integrate-with-integration-environment/) with GOV.UK One Login and begin testing (/test-your-integration/) your integration with GOV.UK One Login as normal.

As you interact with One Login's integration environment, signals will be generated and delivered to your receiver.

After testing is complete, you can move towards Configuring your service for Production (/govuk-one-login-signal-exchange/configuring-for-production/)

(!) **You must not conduct any security testing, penetration testing, performance testing, or IT health checks of the GDS estate. You must also not use personal identifiable information (PII) – GOV.UK One Login will provide example data.**

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About GOV.UK One Login Signal Exchange

The GOV.UK One Login Signal Exchange is a way for both GOV.UK One Login and relying parties to share signals related to the users who are using their systems. This technical documentation gives you information on:

- What the GOV.UK One Login Signal Exchange is
- How it works
- How to configure your service to use the service

To get started, contact your Engagement Manager – if you do not have an Engagement Manager, complete the form to register your interest (https://www.sign-in.service.gov.uk/register).

Learn How the GOV.UK One Login Signal Exchange works (/govuk-one-login-signal-exchange/about-govuk-one-login-signal-exchange-works/)

Documentation updates

These are the most recent changes to this documentation.

Publication date	Update
February 19 2025	Published initial version of the GOV.UK One Login Signal Exchange documentation

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