Connecting to Thredd Guide

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For the latest technical documentation, see the Documentation Portal.

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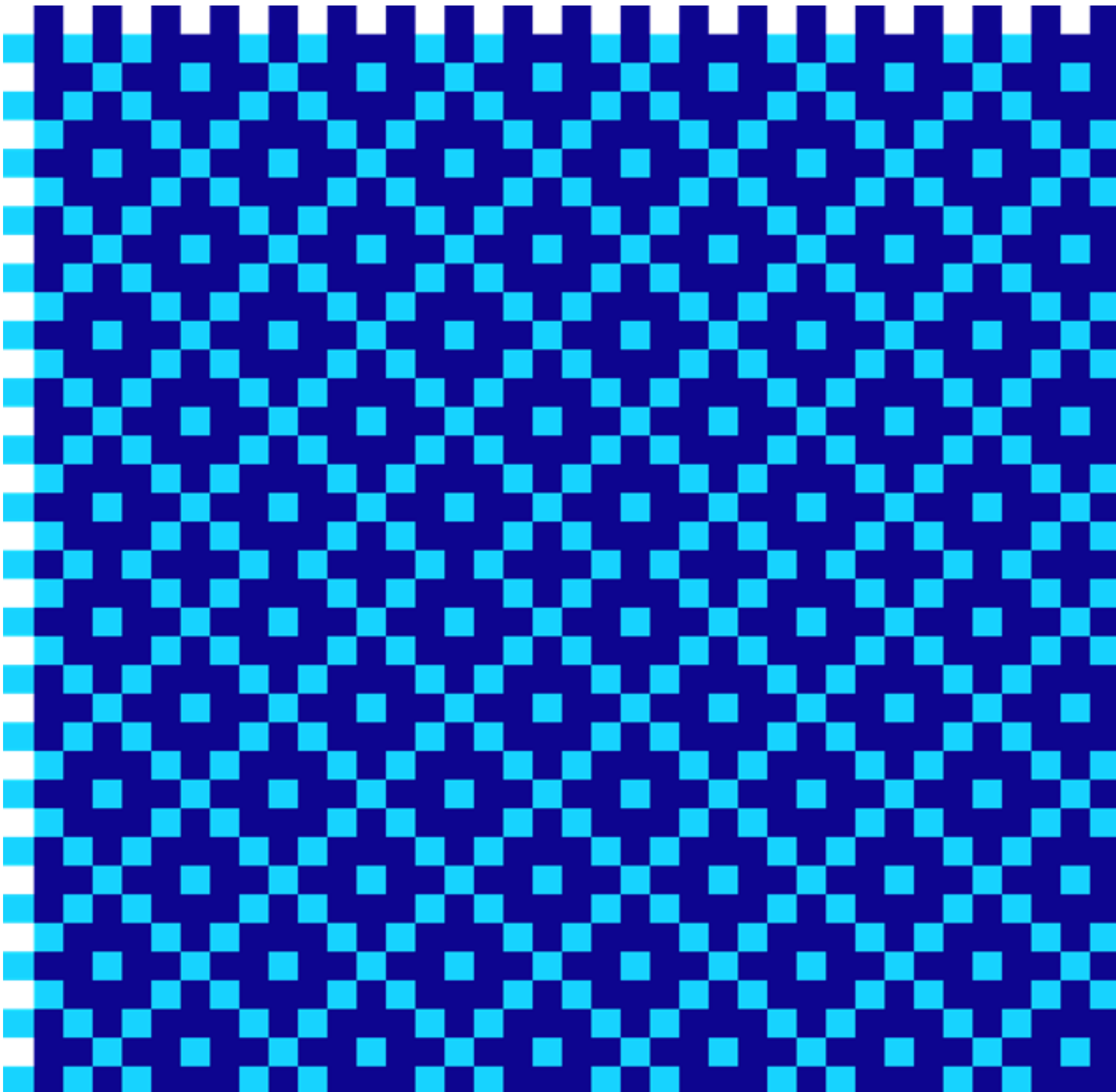

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About this guide

This guide is intended as a user guide, to provide information on connecting to Thredd services using Thredd's Secure Framework for the first time. It also provides information for existing clients that connect to Thredd via AWS and VPN.

Target audience

This guide is aimed at developers and system integrators who need to set up secure connections to Thredd services as a new client. It provides information for security consultants and Chief Information Security Officers (CISOs) who need to assess Thredd's security infrastructure.

Note: If you are an existing Thredd client and Thredd has contacted you about migrating your existing connectivity with Thredd services, see the dedicated Migration Guide.

What's changed?

If you want to find out what's changed since the previous release, see the Document History section.

Terminology used in this guide

Note: In this document, any terms in *italics* follow the standard (normative) terminology referenced in the OAuth 2.0 authorisation framework. For more information, see the IETF OAuth 2.0 Authorization Framework.

How to use this guide

If you are new to Thredd and its security infrastructure, you should refer to the Secure Framework and Setup Steps to understand how to connect to Thredd. To learn about the set up steps that you need to complete, refer to the relevant sections.

Other documentation

Refer to the table below for a list of other relevant documents that you should use together with this guide.

Document	Description
Key Concepts Guide	Provides an introduction to card payments and how describes how Thredd supports your card program.
REST API via API Hub (V2.0)	Explains how to use the endpoints available in Thredd's latest REST APIs via API Hub (V2.0).
Cards API (V1.0)	Explains how to use the endpoints available in Thredd's legacy Cards API (V1.0), which uses REST.
Web Services Guide (SOAP)	Provides information on the available Thredd web services and fields in each web service.
EHI Guide	Provides details of the Thredd External Host Interface (EHI).
Thredd Portal Guide	Explains how you can use the Thredd Portal guide for managing cards.
Card Transaction System Guide	Describes how to submit card test transactions in the UAT environment.

Tip: For the latest technical documentation, see the Documentation Portal.

Section 1: Getting Started

You should read this section if you are new to the Thredd Secure Framework and want to understand the basic principles, or want information on how to connect to Thredd's VPN and AWS options.

Topics covered in this section:

- Thredd Secure Framework
- Setup steps for TLS and mTLS connections to Thredd
- VPN and AWS connections to Thredd

Thredd Secure Framework

Thredd's Secure Framework is the combination of several components which enables clients to access Thredd's resources securely over TLS (Transport Level Security) or mTLS (Mutual Transport Level Security). *Thredd Portal* sits at the centre of this, enabling Admins to manage their organisation's applications, users, and credentials to access Thredd services through a single user interface and dashboard.

Thredd supports industry standards for authentication, identity and access management, and secure network and API-level connectivity.

Key features

Identity and Access Management through Thredd Portal

- Standards-based authentication – support for OpenID Connect (OIDC) and SAML.
- Single-Sign On (SSO), self-service onboarding, and token lifecycle management.
- Secure Access Control – role-based access (RBAC) and user management.

Connectivity Services

- Secure network and API-level connectivity via VPN, TLS and mTLS.
- Certificate lifecycle management – request, revoke and renew certificates issued by Thredd's Certificate Authority through Thredd Portal.
- mTLS Termination for mTLS connections in an EHI mTLS setup.

Developer Tooling

- Access Thredd REST APIs via API Hub over TLS or mTLS.
- Test connectivity to Thredd REST APIs and API Hub using the Postman Collection in a UAT environment.

Identity and Access Management through Thredd Portal

Thredd provides a Software as a Service (SaaS) capability that acts as the *Identity Provider (IDP)* to authenticate user access to Thredd's interfaces through logging in to Thredd Portal. It also acts as an *OAuth OpenID Provider (OP)* for the registration and management of customer applications, generation and validation of access tokens, and for the enforcement of access control policies.

Thredd uses a Client Secret access token for connecting to the REST APIs.

Thredd Certificate Authority through Thredd Portal

Thredd adopts a self-service approach that enables Admin users to independently request and manage certificates for their applications from Thredd's Certificate Authority (CA) through Thredd Portal.

Thredd can provide transport certificates if required. These can be used for mTLS connections for establishing connections between resources.

Thredd Application	Certificates Required
REST API over TLS	No certificate required.
REST API over mTLS	Transport Certificate for the mTLS connection, which you obtain from Thredd Portal.
SOAP API	Transport Certificate, which you obtain from Thredd.
External Host Interface (EHI)	Server Certificate (which you obtain separately), Thredd EHI Trust Chain (that you download from Thredd Portal), and a Transport Certificate (which Thredd presents).
Thredd Portal	Certificates that are pre-installed by Thredd.

Set up Preparation and Steps

This guide helps you prepare and complete setting up your connection and identity and access management for Thredd services. This summary focuses on a typical setup with a TLS or mTLS connection to API Hub (REST APIs) via Thredd Secure Framework and Thredd Portal, and EHI.

Note: To access SOAP APIs, see Creating Client Transport Certificates for SOAP APIs. For VPN setups, see Connecting with AWS and VPN.

Thredd Portal

Thredd Portal is the main entry point to onboard to Thredd and access Thredd services. It provides support for multiple roles, including an Organisation Admin. It enables an Organisation Admin to set up and manage the identity and access management for their organisation, applications, and users.

Thredd Portal's access management features include:

- Organisation, application and identity management – users with an Organisation Admin role can create and manage applications, OAuth clients, SSO details, certificates, generate and validate access tokens, and more.
- User management – Organisation Admin users can invite users to onboard to Thredd and manage user roles, permissions, and access.
- Supports Multi-Factor Authentication (MFA), Single Sign-On, password-based sign-on, multiple identity providers, SAML and OIDC.

An Organisation Admin must first successfully set up their access and log in to Thredd Portal before configuring and testing access to Thredd's API Hub and REST APIs. The set up process comprises several stages, depending on the different services that you use.

Before you begin

You must provide the details of your organisation and the user that will operate as the Organisation Admin to Thredd. Your Thredd Implementation representative coordinates with you about this and registers these details with the Thredd platform.

As the Organisation Admin user, you can begin the process of connecting to Thredd's Secure Framework once you receive confirmation from Thredd.

Configuring your set up in a test environment first

For best practice, Thredd recommends that you first set up your organisation's access in the UAT (User Acceptance Test) environment. This enables you to test and verify that your organisation can use Thredd applications and API endpoints successfully.

When you have verified that your setup and testing in the UAT environment is satisfactory, you can coordinate with Thredd and prepare to set up your Production environment. You will need to repeat all of these set up steps for your Production environment. You can optionally request new certificates if you are using TLS (the default), and you should ensure that environment-specific configurations are correct.

Summary of set up steps

Setting up access to Thredd starts with the Organisation Admin logging in to Thredd Portal and setting up their access to the Thredd platform. The Organisation Admin can then set up access for other users, but can choose to do this before or after setting up access to Thredd APIs and API Hub.

Here is an overall summary of the different stages of the set up process – use the links to visit the step-by-step guidance for each stage.

Step 1: Set up the Organisation Admin in Thredd Portal

The Organisation Admin user receives a welcome email inviting them to log in to Thredd Portal. They must set up their access to Thredd Portal before they can manage the access for their organisation, application and users.

As the Organisation Admin, you need to add your organisation's identity provider details in Thredd Portal, enabling authentication using your own Identity Provider (IdP). If your organisation does not use an IdP, Thredd's own provision can act as the IdP.

You can choose one of the following methods for users to log in to Thredd services:

- Single Sign-On (SSO) – this involves adding an SSO configuration in Thredd Portal and inviting users via your identity provider. This is not required, but Thredd recommends it to help automate user onboarding and management.

- Email address and password – a Organisation Admin manually adds each user in Thredd Portal and using its invite feature to ask them to log in.

For an overview of Thredd Portal and the set up process, see Thredd Portal overview.

Tip: This guidance outlines setting up the Organisation Admin for the first time and additional users. However, a Organisation Admin does not have to add users to Thredd Portal straight away. Instead, the Admin can choose to add the organisation's SSO details (if using SSO), create Client certificates, and test access to Thredd REST APIs first. An Organisation Admin can later return to this step to add the organisation's users.

Step 2: Create a new Application and OAuth Client in Thredd Portal

Before you can access Thredd's REST API, you must create an application and an OAuth Client in Thredd Portal to register it and receive a client ID. You can then request client credentials for your application and configure your application and REST interface (such as Postman) to provide them when making API calls. This allows Thredd to verify your identity and grant access.

See Creating an Application and OAuth Client.

Step 3: Create credentials to access the REST API

You need to create the necessary credentials to access Thredd's REST APIs, and configure your client application to provide these credentials when making API calls.

Thredd uses Client Secret credentials as an authentication method for the Authorisation Server. This requires an access token that you can request from Thredd's OAuth Token endpoint.

If you are using an mTLS connection, your application must also present a Transport Certificate from Thredd. Thredd adopts a self-service approach, which allows an Admin user to independently request and manage certificates via Thredd Portal.

See Connecting to the REST APIs.

Step 4: Configure the latest Postman collection to test Thredd's REST APIs via API Hub

You can access Thredd's API Hub and REST APIs over TLS or mTLS. Thredd provides separate Postman Collections for TLS and mTLS, which enable you to use Postman to test using the Thredd REST APIs in a UAT environment.

To use the collection, you need to configure Postman with the appropriate environment variables and credentials. Refer to the guides that matches how you are connecting to Thredd APIs:

- For TLS connections: Using the Postman Collection to call REST APIs over TLS
- For mTLS connections: Using the Postman Collection to call REST APIs over mTLS

Step 5: Set up access to Thredd Portal for your organisation's users

An Organisation Admin must invite your organisation's users to log in to Thredd applications, using either:

- Single Sign-On (SSO) – this involves inviting users to log in to Thredd Portal via your identity provider, providing you have set up SSO in Thredd Portal. Make sure that each user receives an email inviting them to activate their account. Once a user has logged in to Thredd Portal, it registers them in the system, and an Organisation Admin can assign the appropriate roles to the user, completing the user's profile.
- Email address and password – this involves manually adding each user, assigning an appropriate role, and sending an invite to them via Thredd Portal using its built-in tool. The user receives an email inviting them to activate their account, set a password and log in to Thredd Portal. Once complete, the user can log in to other Thredd applications.

For more information, see Connecting to Thredd Portal.

Step 6: Set up EHI and other Thredd applications

Secure connections are required to access the following Thredd applications:

- External Host Interface (EHI)
- SOAP API (if applicable)

External Host Interface (EHI)

The External Host Interface (EHI) offers a way to exchange transactional data between the Thredd processing system and the Program Manager's externally-hosted systems. All transaction data processed by Thredd is transferred to the external host system via EHI in real time.

EHI provides two main functions:

- a real-time transaction notification data feed
- payment authorisation control

Set up summary for EHI with an mTLS connection

To set up EHI with an mTLS connection:

1. Obtain a Server certificate from the Certificate Authority that you want to use. Install the Server and Client Certificates.
2. Download and install the EHI Trust Chain from Thredd, which contains Root Certificates and Issuing Certificates from the EHI Configuration page in Thredd Portal.
3. Store the Root and Issuing Certificates on your mTLS termination point.
4. Ensure that your mTLS termination point has access to Thredd's Online Certificate Status Protocol (OCSP) responder.
5. Test the Client and Server Certificates on your EHI endpoint for mTLS communication.
6. Provide the EHI endpoint details to Thredd and inform Thredd that you are ready to use the EHI application.

For more information, see Setting up EHI for mTLS connections.

Tip: Once you have set up your TLS or mTLS connection for the EHI, see the EHI Guide (JSON version) or EHI Guide (XML version).

SOAP API

Thredd's SOAP APIs are secured using mTLS. If you are using the SOAP APIs, you need to create Transport Certificates. For more information, see Creating Client Transport Certificates for SOAP APIs. Only refer to this information if Thredd has confirmed that you will use the SOAP APIs; otherwise, you can ignore this information.

Other services

Services such as Fraud Transaction Monitoring and 3D Secure do not require you to set up secure connections via Thredd Secure Framework.

Connecting with AWS and VPN

Here, you can learn how to access the Thredd AWS environments if you will connect to Thredd this way. Thredd services are hosted in AWS.

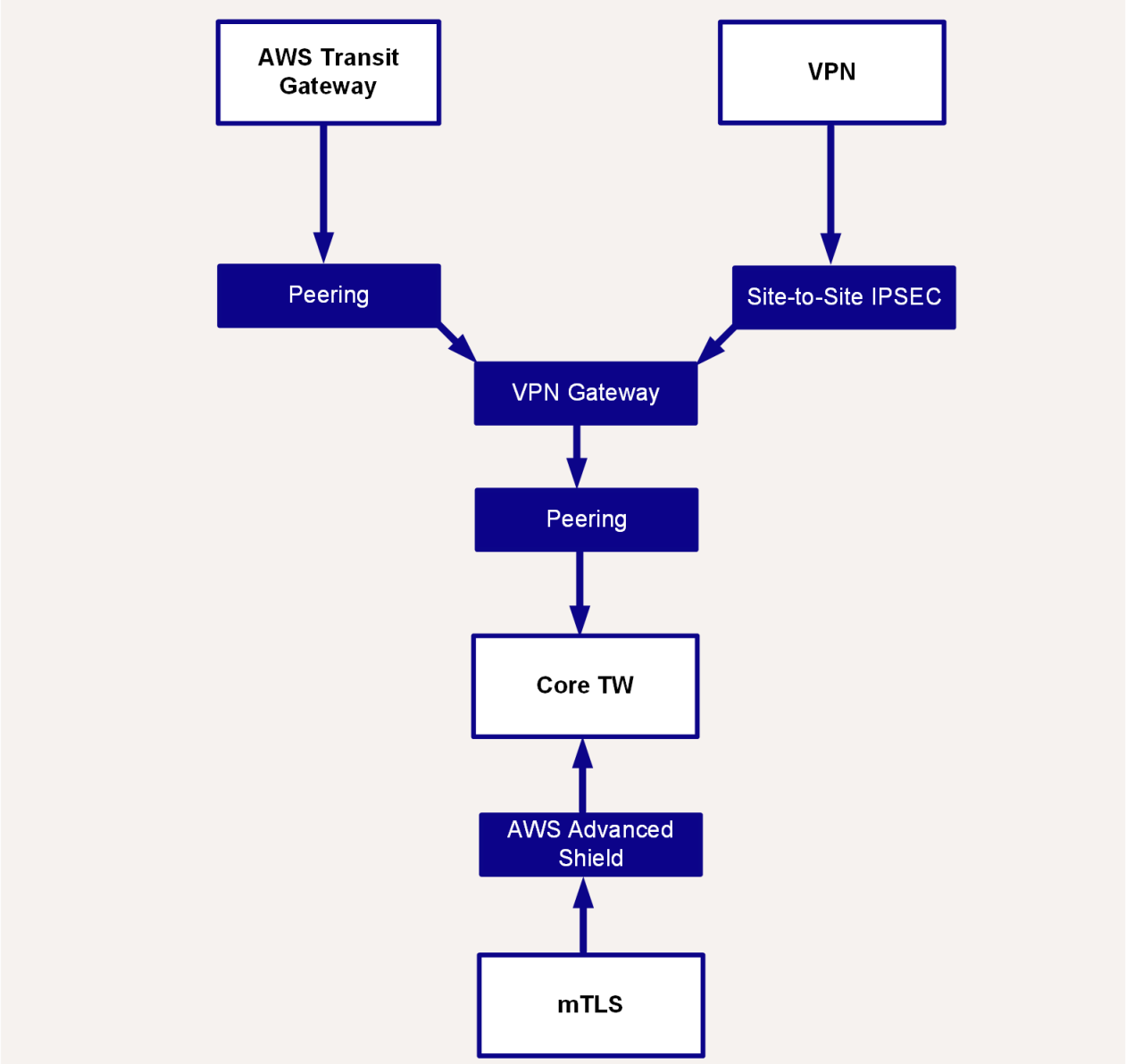
Note: Only refer to this information Thredd has confirmed that you will use it; otherwise, you can ignore this information.

There are three supported integration options for clients:

- **IPSec Site-to-Site VPN** for clients using AWS and other Cloud and on-premise infrastructure.
- **AWS Transit Gateway Peering** for clients that host their Infrastructure in AWS.
- **Mutual TLS (mTLS)** for certificate-based authentication.

Note: For a VPN setup, Thredd provides implementation guides for connecting to Thredd. For AWS, refer to the AWS documentation.

See the following diagram of the flow for each option.



Connecting using VPN

IMPORTANT: It is the responsibility of the client to ensure that any local changes are communicated to Thredd to maintain connectivity.

Internet Protocol Security (IPsec) VPN connections take place over public networks, but the data exchanged over the VPN is still private because it is encrypted. VPNs make it possible to securely access and exchange confidential data over shared network infrastructure. In this instance, the public Internet.

IPsec is a framework of open standards to ensure private and secure communications over Internet Protocol (IP) networks. Encapsulating Security Payload (ESP) and Authentication Header (AH) are the two IPsec security protocols used to provide these security services.

Thredd VPN Setup Information

Thredd enables a private connection from AWS for each client that sets up two VPNs per site. You must complete the Thredd VPN Connectivity Setup Form and share it with Thredd. When Thredd has received this, it sends you a configuration template for your VPN product.

Thredd typically only supports static routing for VPNs. However, in certain circumstances, Border Gateway Protocol (BGP) routing can be implemented. For AWS configurations, Thredd provides Transit Gateway (TGW) peering to allow you to connect directly to our environment and minimise latency. You must include the TGW ID when completing the Thredd VPN Connectivity Setup Form.

When a subnet has been provided, Thredd confirms that it is available. Note the following:

- An EHI endpoint must be a subnet.
- The maximum subnet is /22. Thredd recommends using /24.
- Subnet /20 is not permitted by Thredd.
- All services run through the same Thredd tunnel.

Where two VPNs are required for production access, you must split them as follows:

- Web Services and EHI
- Thredd Portal

Connecting using AWS

IMPORTANT: It is the responsibility of the client to ensure that any local changes are communicated to Thredd to maintain connectivity.

AWS Transit Gateway Peeringis for clients that host their Infrastructure in Amazon Web Services (AWS). Internet Protocol Security (IPsec) is a framework of open standards to ensure private and secure communications over Internet Protocol (IP) networks. Encapsulating Security Payload (ESP) and Authentication Header (AH) are the two IPsec security protocols used to provide these security services.

IPsec VPN connections take place over public networks, but the data exchanged over the VPN is still private because it is encrypted. VPNs make it possible to securely access and exchange confidential data over shared network infrastructure. In this instance, the public Internet.

Thredd AWS Setup Information

Thredd enables a private connection from AWS for each client and sets up a transit gateway attachment per site. You must complete the Thredd VPN Connectivity Setup Form and share it with Thredd. When Thredd has received this, Thredd sends you a configuration template for your VPN product.

Thredd only supports static routing for AWS Transit Gateway (TGW) attachments. When a subnet has been provided, Thredd confirms that it is available. Note the following:

- An EHI endpoint must be a subnet.
- The maximum subnet is /22. Thredd recommends using /24.
- Subnet /20 is not permitted by Thredd.
- All services run through the same Thredd tunnel.

Where two attachments are required for production access you must split them as follows:

- Web Services and EHI
- Thredd Portal

Mutual TLS explained

Mutual Transport Layer Security (Mutual TLS, mTLS) is an enhanced security protocol that requires a Client and Server to verify each other's identity before establishing a secure communication channel. This digital handshake requires both parties to provide their official identity.

What is Transport Layer Security (TLS) and how is mTLS different?

Transport Layer Security (TLS) is the standard internet protocol that ensures private, secure communication. For example, it enables HTTPS, where HTTP essentially runs over TLS, to secure the websites that people visit daily. TLS uses one-way authentication, where only the Server presents a certificate to the Client to prove its identity.

With *Mutual TLS* (mTLS), this process is reciprocal, as the 'Mutual' part of its name implies. mTLS requires two-way authentication, which means that both the Client and the Server must present a valid digital certificate that allows them to verify each other's identities.

Feature	TLS (one-way)	Mutual TLS (two-way)
Server Authentication	Required (the Server proves its identity to the Client)	Required
Client Authentication	Optional (usually none)	Required (the Client proves its identity to the Server)
Verification method	The Server uses a Server Certificate	The Client and the Server use Certificates

How mTLS works using a two-way verification process

The mTLS process involves four key steps:

1. Client request: A Client (your application) attempts to connect to the Server.
2. Server challenge and authentication: The Server sends its digital certificate to the Client and simultaneously requests the Client's Transport Certificate.
3. Client certificate presentation: The Client sends its unique Transport Certificate and a digital signature back to the Server.
4. Mutual verification:
    1. The Client verifies the Server's certificate.
    2. The Server verifies the Client's Transport Certificate, checking its validity, issuing authority, and integrity.
    3. If both checks pass, the Server and Client establish a TLS connection. If a check fails, the connection is immediately terminated.

Key benefits

By implementing mTLS, Thredd provides a significantly higher level of assurance and security for clients, and their data and services:

- Zero Trust Architecture (ZTA): mTLS is foundational to a Zero Trust security model. It ensures that no device or application is trusted by default, regardless of its location (inside or outside the network).
- Stronger authentication: It eliminates reliance on API keys alone. Your Transport Certificate is a unique, cryptographically-secured identity that is much harder to forge or steal.
- Protection against Man-In-The-Middle (MITM) attacks: The mutual verification process makes it virtually impossible for an unauthorised third party to impersonate either the client or the server to intercept data.

Transport Certificates to connect to REST APIs via mTLS

For Thredd's systems to securely authenticate your application, you must provide a valid Transport Certificate when using mTLS. This certificate is issued by Thredd's internal Certificate Authority and acts as the digital passport for your client application.

The Transport Certificate is mandatory for mTLS and is used solely for establishing the secure connection. Without a valid, signed Transport Certificate, your application is unable to connect to Thredd's secure endpoints.

To learn more, see Requesting certificates for applications using mTLS.

Using the EHI with mTLS

In an EHIm (External Host Interface and mTLS) setup, your role of your organisation is reversed. Instead, your organisation acts as the *Server* and Thredd is the *Client*. To configure an EHIm setup, you must download and install Thredd's Trust Chain on your EHI server. You do not need to request a Transport Certificate from Thredd, but you do need to obtain a Server certificate from a Certificate of Authority vendor, such as Verizon or Digicert or Amazon Web Services.

To learn more, see Setting up EHI for mTLS connections.

Section 2: Thredd Portal

You should read this section to understand the setup steps Thredd Portal.

Topics covered in this section:

- Thredd Portal overview
- Setting up Single Sign-On access and users to Thredd applications
- Setting up password logins to Thredd applications
- Understanding Roles
- Creating an Application and OAuth Client
- Understanding Scopes

Thredd Portal overview

Thredd Portal is the main entry point to Thredd services and is the main component that is related to the API Hub; before you can use the API Hub, your organisation must be set up on Thredd Portal and Thredd Secure Framework. These combine several components that enable secure access to Thredd's resources, using a common identity store.

Thredd Portal provides a number of features, including:

- Organisation and application management – Manage access for your organisation's applications, edit/add SSO details, and manage EHI certificates.
- User management – Invite users to onboard to Thredd and manage user roles, permissions, and access, including the option to suspend and activate users.
- Cards and transaction management, and other related functionality – for users with the appropriate roles.

Tip: You can learn more about the cards and transaction management features of Thredd Portal in Thredd Portal Guide: Getting Started.

Identity and Access Management

Thredd Portal provides identity and access management functionality at an organisation, application, and user level. Thredd Portal functions as a *Confidential Client*, where Thredd's own application infrastructure undertakes authentication and authorisation activity on behalf of the user.

When a user is registered and has logged in to Thredd Portal, they can access other Thredd services. Thredd Portal also operates behind-the-scenes as an authentication server, enabling a single sign-on journey and access to Thredd's REST APIs.

Thredd Portal also provides access to Thredd's Certificate Authority for setting up and managing certificates to connect to Thredd services, including the REST APIs via API Hub.

To learn more, see Thredd Secure Framework.

Connecting to Thredd Portal

Thredd Portal provides support for multiple roles, with Admin access available to an Organisation Admin. An Organisation Admin user can set up and manage the settings for your organisation's applications, certificates, SSO configuration, and users through Thredd Portal.

This guidance focuses on the initial set up by a user with the Organisation Admin role in Thredd Portal.

You can choose one of the following methods for users to log in to Thredd services:

- Single Sign-On (SSO) – this involves adding an SSO configuration for SAML or OIDC in Thredd Portal and inviting users via your identity provider. This is not required, but Thredd recommends it to help automate user onboarding and management.
- Email address and password – this involves manually adding details for each user in Thredd Portal and sending an invite using its built-in invitation feature.

About Single Sign-On access (optional)

Thredd's Secure Framework allows you to optionally set up SSO, using *SAML* (Security Assertion Markup Language) or *OIDC* (OpenID Connect), to access Thredd services, for example Thredd Portal. This not mandatory but Thredd recommends that your users log in using SSO instead of using a password because it offers the following benefits:

- An enhanced user experience for users as it removes the hassle of remembering passwords.
- Companies to save time on maintenance.
- Reductions in overheads when managing accounts.
- Enables you to automate user onboarding, where your users can visit the Thredd Portal URL and automatically create their account upon their first successful login.

This enables a Single Sign-On journey by linking your IdP with Thredd's own provision. If you do not use an IdP, Thredd can act as the IdP.

This Single Sign-On journey is involved with:

- Accessing the organisation and user management features of Thredd Portal for Organisation Admin users, such as creating certificates with Thredd's CA, and the user management functionality to set up access for other users.
- Accessing the card and transaction management features of Thredd Portal.
- Managing access behind-the-scenes to the REST API.

Setting up access to Thredd Portal for the first time

An Organisation Admin user at your organisation must first register and log in to Thredd Portal before other users within your organisation can access Thredd Portal and other services.

You can begin this process when Thredd has registered your organisation and your Organisation Admin user, and has sent an email inviting them to log in to Thredd Portal.

The set up guidance outlines the full process of setting up the Organisation Admin for the first time and setting up additional users. However, an Organisation Admin does not have to invite/add users to register with Thredd Portal straight away. Instead, the Admin can choose to add the organisation's SSO details (if using SSO), create Client certificates, and test access to Thredd REST APIs and API Hub first. An Organisation Admin can later return to this step to set up the SSO or password-based access for the organisation's users.

Set up guides

To learn more about setting up access for your organisation, applications and users in Thredd Portal, see:

- Setting up Single Sign-On access and users on the Thredd platform
- Setting up password-based access to Thredd Portal
- Understanding Roles
- Creating an Application and OAuth Client
- Understanding Scopes

If your organisation will use Single Sign-On to access Thredd services, the following guides will help you to configure your SSO provider:

- Configuring SSO with Okta (SAML)
- Configuring SSO with Google (SAML)
- Configuring SSO with Okta (OIDC)

Set up and manage Single Sign-On

Single Sign-On (SSO) enables users in your organisation to authenticate using your organisation's identity provider (IdP) when accessing Thredd Portal and supported services.

An Organisation Admin can create and manage SSO configurations for their organisation in Thredd Portal.

You configure SSO once for your organisation. Thredd Portal supports SAML 2.0 and OpenID Connect (OIDC).

Note: For best practice, Thredd recommends that you configure and test SSO in the UAT environment before configuring your Production environment.

Set up Single Sign-On

You can configure Single Sign-On (SSO) in Thredd Portal so that users in your organisation can authenticate using your identity provider.

SSO is configured separately from the credentials and certificates used to connect to Thredd APIs.

For information about configuring SSO using SAML 2.0 or OpenID Connect (OIDC), see Set up and manage Single Sign-On.

Before you begin

Before configuring SSO:

- You must have the Organisation Admin role for your organisation.
- You must have received confirmation from Thredd that your organisation is ready to use Thredd Portal.
- You must have the configuration details for your organisation's identity provider.

Sign in to Thredd Portal for the first time

When Thredd has registered your organisation and Organisation Admin, you receive an email inviting you to access Thredd Portal.

Follow the instructions in the email to activate your account and sign in to Thredd Portal for the first time.

Note: If the link in the email does not work or you need support, use the contact details provided in the email. Do not reply directly to the notification email.

Add an SSO configuration

To add an SSO configuration:

1. In Thredd Portal, navigate to the User Management area within System Admin, then select **Add SSO Provider**.
2. Enter the details for the identity provider, including its name and a description.
3. Select the protocol used by your identity provider: **SAML 2.0** or **OpenID Connect (OIDC)**.
    - **SAML 2.0** – provide the SAML metadata using one of the following methods:
        - **Metadata URL** – enter the metadata URL provided by your identity provider.
        - **Metadata XML** – provide the XML metadata supplied by your identity provider.
    - **OpenID Connect (OIDC)** – provide the required configuration details from your identity provider. Depending on your configuration, these can include:
        - Authorization Endpoint
        - Client ID
        - Client Secret
        - Discovery URL
        - Issuer
        - Response Mode
        - Response Type

- Scopes
- Token Endpoint
- User Info Endpoint

Complete all fields marked as required in Thredd Portal. Other fields depend on your identity provider configuration.

4. Configure the attribute mappings between your identity provider and Thredd. The default external attribute is **email**. Select **Add Attribute Mapping** if you need additional mappings.
5. Select **Next**. The Review & Submit page opens.
6. Review the details and select **Save Configuration**.
7. When you save the configuration, Thredd Portal runs a health check to validate it. If validation succeeds, the identity provider is added as an active SSO configuration. If validation fails, review the reported errors and correct the configuration.

Example SSO integrations are available in the SSO Sample Integration section.

Manage an SSO configuration

You can view, edit, check or delete existing SSO configurations using the User Management area within the System Admin menu in Thredd Portal.

Edit an SSO configuration

1. Locate the configuration and open its **Actions** menu.
2. Select **Edit**.
3. Update the required configuration details.
4. Select **Next**.
5. Review the changes and select **Save Configuration**.

Note: If you change settings that also apply to your identity provider, make the corresponding changes in your identity provider configuration.

Run a health check

You can run a health check at any time to validate an existing SSO configuration.

1. Locate the configuration and open its **Actions** menu.
2. Select **Run Health Check**.

Thredd Portal reports whether the configuration passes validation. If validation fails, use the reported error to identify the configuration that needs to be corrected.

Delete an SSO configuration

1. Locate the configuration and open its **Actions** menu.
2. Select **Delete**.
3. Review the confirmation message.
4. Select **Confirm and delete**.

Warning: Deleting an SSO configuration permanently removes that sign-in method for users who rely on it. Before deleting a configuration, make sure affected users have another supported method of accessing the Thredd platform.

Setting up password login to Thredd applications

Clients who do not have their own Single Sign-On (SSO)-compliant solution (such as Entra, Google, or Okta) can manually add users and set up their password-based access to Thredd Portal.

An Organisation Admin can set up and manage the settings for your organisation's applications, certificates, and users through Thredd Portal.

This guidance assumes that you are the Organisation Admin and need to log in to Thredd Portal for the first time. You can manually add users and set up password-based access when Thredd sends an email to the Organisation Admin user notifying them that it is ready for your organisation to do this.

Note: For best practice, Thredd recommends that you first set up your organisation's access in the test (UAT) environment, so that you can verify that your organisation can use Thredd applications and API endpoints successfully. You can then set up users later.

About password (non-SSO) user access

Adding new users who will use a password to access the Thredd platform is a manual process. It requires an Admin to manually create and invite each individual user via Thredd Portal, which sends email to users inviting them to log in. Offboarding users is also a manual process, requiring Admin users to revoke access for an individual user via Thredd Portal.

Tip: As an optional alternative, Thredd recommends that you configure Single Sign-On (SSO) access to Thredd. This enables you to automate user onboarding, where your users can visit the Thredd Portal URL and automatically create their account upon their first successful login. This eliminates the need to manually create and invite users.

Prerequisites

- You must have the Organisation Admin role for your organisation.
- You must have received confirmation from Thredd that you can start setting up your organisation's users.

Step 1. Log in to Thredd Portal for the first time

When Thredd has completed the initial step of registering your organisation and Organisation Admin user, it sends an email to the Organisation Admin containing a link to log in to Thredd Portal and set up your access.

You need to refer to the email during the following process to log in to Thredd Portal for the first time.

1. Click on the link in the email for **Log in to Thredd Portal**. This directs you to the initial access screen.
2. Enter the temporary password from the other email; this is the only password that you can use to gain access initially. Copy the temporary password and paste it into the field under **Temporary password**. Then select **Next**.
3. On the next screen, you must create a new password. The password must be at least eight characters in length. Enter and confirm the new password in the separate fields, and then select the **Save and Continue** button.

When you log in to Thredd Portal, you can set up access for your organisation's users whenever you are ready.

Note: If the link does not work or you need support, use the link at the bottom of the emails to contact Thredd. Do not reply to the email. It is system-generated and sent from a notification-only address that cannot accept incoming emails.

Step 2. Add users and configure their roles in the Thredd platform

An Organisation Admin user must add the details of other users at your organisation to ensure that they have access to the Thredd platform. An Organisation Admin can add, edit and remove users, including additional Admin users if your organisation requires this. You can either add additional users in the same flow or an Admin user can add other users later via **System Admin** > **User Management**.

Tip: While you must manually add and invite users who require access, you can complete this task when you are ready to do so. For example, if you want to first test your organisation's connection to the Thredd platform, such as to REST APIs, and then return to this step.

To add a new user immediately:

1. Select **Add New Users**.
2. The **Add new users** screen appears. Enter the user's first and last names, and email address.

3. Next, assign a role to the user. The platform assigns all users a **Read-Only** role by default which allows view-only access to cards and transactions. You can assign a different role to the user, and assign more than one role, as appropriate:
    - **Admin Roles**: Manager, Sales, Admin, Sensitive Information Manager
    - **Developer Roles**: Developer
    - **Cards & Transactions Roles**: Cards Operations Specialist, Card Config Manager, Card Balance Manager, Chargeback Manager, Credit Manager
    - **Read-Only Roles**: Read-Only

    Tip: To learn more, see Understanding Roles.
4. Click **Save and Continue**.
5. The **Review and Finish** screen appears. If all user details are correct, select **Confirm and finish**. To make a change, select **Previous step**.
6. When you return to the **User Management** screen, you can check if the new user details have been added successfully.

Note: After an Admin user has set up access for their organisation's users, users will receive an email inviting them to log in to Thredd Portal. A user must follow the instructions in the invitation email in order to access the Thredd services appropriate for their role.

Editing an existing user profile

An Organisation Admin can add, edit and remove users. To edit the details of a user:

1. Select the action menu (three dots) for an individual user.
2. Select **Edit User**.
3. The **Edit User** screen appears and displays the user's name, email address, and the role assigned to the user. You can view a list of the roles available to a user under **Roles**.

    The platform assigns all users a **Read-Only** role by default which allows view-only access to cards and transactions. You can assign a different role to this if required, and you can also assign more than one role to a user.
4. To change the assigned role, select the role that is most appropriate for the user based on its description.
5. Select **Next**.
6. The **Review User Details** screen appears. If correct, select **Save**. To make a change, select **Back** to return to the **Edit User** screen.
7. When you are ready to save the details, select **Save**. A message appears to confirm that the user details have been updated successfully.

Warning: Deactivating a user will revoke their access to the Thredd platform. If you need to restore access, you can reactivate a user.

Understanding Roles

When an Organisation Admin user configures an individual user's profile in Thredd Portal, they can assign one or multiple roles to the user.

Roles are associated with *Users* – they provide the permissions to each individual user within your organisation based on the given *Role*. Thredd Portal Roles are preconfigured; for example, Developer, Manager, and Admin. Organisation Admin users can assign, view and update the Thredd Portal Roles for an individual user in Thredd Portal via **System Admin** > **User Management**.

Available Thredd Portal Roles

The following table describes what each Thredd Portal Role allows a user to do in Thredd Portal.

Thredd Portal Role	Description
Manager	• Transaction Search & View • Remove auth • Card Search & View • Balance adjustment • Card Load/Unload • Change card status • PIN & CVC2 services • Edit cardholder details • Edit card configurations • Extend Thredd Expiry Date • Activate a Card • Balance Transfer
Sales	Access scoped to sales-related activity, such as prospect and client account visibility.
Sensitive Information Manager	Restricted access to sensitive card data, including PAN Finder operations.
Organisation Admin	Full platform control, including configurations and all operational settings and user access.
Developer	Configures and manages webhooks for system integrations.
Card Operations Specialist	• Card Search & View • Transaction Search & View • Change card status • Activate a Card • Extend Thredd Expiry Date • PIN & CVC2 services • Remove auth
Card Config Manager	Manages card configurations. • Card Search & View • Transaction Search & View • Edit card configurations
Card Balance Manager	Manages balance adjustments and balance transfers.

Thredd Portal Role	Description
	• Card Search & View • Transaction Search & View • Balance Transfer • Balance adjustment
Read Only	View-only access to cards and transactions information. • Card Search & View • Transaction Search & View

Assigning Thredd Portal Roles to a User in Thredd Portal

An Organisation Admin user can add a Thredd Portal Role to a user via their user profile in Thredd Portal.

Users are not able to update there own roles within Thredd Portal.

To view and edit the Roles for a User:

1. Navigate to **System Admin**, then **User Management**.
2. In the list under **User**, locate the user that you want to check and select the **Actions** menu (three dots) next to the specific user, and select **Edit User**.
3. The **Edit User** screen appears and displays the user's Basic Information. Select **Next** to view the Groups and Thredd Portal Roles.
4. Assign the appropriate portal roles that provide access to the specific features and card operations that a user requires.
5. Select **Next**.
6. Review the user's details and select **Submit** to save the settings. If you need to make any changes, select **Back** and repeat the previous steps before updating the user details.

If the user is logged in to Thredd Portal at the time that the Admin makes any changes, the user might need to log out and then log in again to ensure that the changes take effect.

Creating an Application and OAuth Client

Before you can access Thredd's REST API, you must create an application and an OAuth Client in Thredd Portal to register it and receive a Client ID and Client Secret. You can then request client credentials for your application, and configure it and a REST interface (such as Postman) to provide credentials when making API calls. Think of the Client ID as the passport for your OAuth Client, and therefore your application. Combined with the credentials you need for your chosen Client Authentication method, it allows Thredd to verify your identity and grant access.

Summary of the steps

The steps for creating a new application and OAuth Client are as follows:

1. Log in to Thredd Portal.
2. Navigate to the System Admin menu, then select **Applications**.
3. Create a new client application, adding a name and description.
4. Create a new OAuth Client for the application.
5. Optional, if you have more than one PMID, select the required PMID. Users with only one PMID will have it auto-selected.

Prerequisites

1. You must have access to Thredd Portal.
2. You must be an Organisation Admin for your organisation.
3. You must have installed OpenSSL on the machine (the Server) that will make requests to Thredd platform (the Client).

Step 1: Log in to Thredd Portal

Log in to Thredd Portal and select **System Admin**. In **System Admin** menu, select **Organisation**, then **Applications**.

Step 2: Create a new client application

The **Applications** screen lists any applications that are registered in Thredd Portal.

Note: If an existing application is already present (and you do not need to create a new one), then check whether an OAuth Client already exists for it. Select the **Actions** menu and select **Review Application**. Check the **OAuth Clients** screen; if an OAuth Client is not present, see step 3.

To create a new application:

1. Select **Add Application**.
2. The **Create New Application** screen appears. Enter the basic information, such as a name and description, for the application.

   Tip: Thredd recommends that you use an application name that you can easily identify for any application management activities. For example, to distinguish it from other applications when you need to obtain credentials, such as a Client ID, access token or certificate.
3. Select **Next** and review the new application summary; select **Back** to make changes or select **Create Application** to save it.
4. Your new application now appears in the **Applications** screen. Select the menu (three dots) under **Actions** and select **Review Application**.

Step 3: Create a new OAuth Client

The application details has one tab; **OAuth Clients**. MTLS users will have an additional **Certificates** tab. The steps to create an OAuth Client are as follows:

1. In the **OAuth Clients** tab, select **Create Client**.
2. The **Create OAuth Client** screen appears, starting with the **Basic information** stage. Enter the basic information, such as the **Client Name** and **Description**.

3. Select the specific scopes from the ones available from the Allowed Scopes field. If none selected, all available scopes for the organisation will be granted.
4. Click **Next**.
5. Review the details of the client and the scopes associated with it. Scopes dictate what APIs you have permissions to use when calling the endpoints.
6. Click **Submit**.

You have now registered a new OAuth Client, with a unique Client ID for your application. You can view it in the **OAuth Clients** screen of your application's details in Thredd Portal.

Next steps

You must make sure that you request and provide the Client Secret from Thredd to access Thredd's REST APIs. The Client Secret is selected as the Client Authentication method when setting up your organisation in Thredd Portal.

If you are using an mTLS connection, your application must also present a Transport Certificate from Thredd. Thredd adopts a self-service approach, which allows an Admin user to independently request and manage certificates via Thredd Portal.

See Connecting to the REST APIs.

Understanding Scopes

Thredd assigns products (and scopes) to your organisation during the implementation stage, according to the Thredd services that you will use.

Applications are associated with *Scopes* – these relate to the products and services that your organisation will use in its agreement with Thredd.

When you register Application for your organisation in Thredd Portal, it is assigned the appropriate scopes. Organisation Admin users can view the available Scopes for their Application in Thredd Portal via **System Admin** > **Applications**.

Available Scopes

The following is an example of some of the scopes that are available from Thredd. These relate to the API endpoints that your organisation has access to. Thredd assigns scopes to your organisation according to the Thredd services that your organisation will use.

Scope Name	Description
cards.read	Enables you to use GET endpoints to return information on cards.
cards.write	Enables you to use the POST, UPDATE and PATCH endpoints to create and update card information.
pin.read	Enables you to use the Retrieve PIN endpoint.
pin.write	Enables you to use the Set PIN and Unblock PIN endpoint.
cvv.read	Enables you to use the Retrieve CVV endpoint.
cvv.write	Enables you to use the Unblock CVV endpoint.
bulkcard.read	Enables you to use the Get Bulk Card Progress endpoint.
bulkcard.write	Enables you to use the Create Bulk Card endpoint.
cards.encrypted	Enables you to use the Get Encrypted Data endpoint.
cards.sensitive	Enables you to use the Get Full PAN endpoint.
3ds.read	Enables you to use the Get 3DS Configuration endpoint.
ads.read	Enables you to use the GET endpoints for Visa Alias Directory.
ads.write	Enables you to use the POST, DELETE and PUT endpoints for Visa Alias Directory.
adxapi	Enables you to use endpoints for the ADX (Cardinal) 3D Secure provider integration.
apata.read	Enables you to use GET endpoints to retrieve Apata 3D Secure configuration/authentication data.
apata.write	Enables you to use POST/PATCH endpoints to create or update Apata 3D Secure configuration.
credit.read	Enables you to use GET endpoints for credit related account or product data.
credit.write	Enables you to use POST/PATCH endpoints for credit-related account or product operations.
cts.read	Enables you to use GET endpoints for Card Transaction Services (CTS) data.

Scope Name	Description
cts.write	Enables you to use POST endpoints for Card Transaction Services (CTS) operations.
issuer.write	Enables you to use POST endpoints for issuer-level configuration or operations.
limits.read	Enables you to use GET endpoints to retrieve card/account limit details (e.g. spend, velocity limits).
limits.write	Enables you to use POST endpoints to set or update card/account limits.
rdxapi	Enables you to use endpoints for the RDX 3D Secure provider integration (alternative to Apata).
scamdetect	Enables you to use endpoints related to scam/fraud detection features (e.g. flagging suspicious transactions).
ws	Enables access to Thredd webhook endpoints (Event Delivery System (EDS)).

Section 3: REST Applications

You should read this section to understand the set up steps for REST applications.

Topics covered in this section:

- Connecting to the REST APIs
- Requesting certificates for applications using mTLS
- Using the Postman Collection to call REST APIs over TLS
- Using the Postman Collection to call REST APIs over mTLS
- Updating Postman

Connecting to the REST APIs

There are two main areas in which you will need to set up your connection to access Thredd REST APIs:

1. Thredd Portal: Log in to Thredd Portal and create a client application, and obtain the client credentials for your application.
2. A REST tool: Configure your REST interface, such as Postman, to interact with Thredd's identity and access management platform, so that you can access the API endpoints.

For best practice, Thredd recommends that the Organisation Admin first sets up your organisation's access in the UAT (User Acceptance Test) environment. This enables you to test and verify that your organisation can use the API endpoints successfully. Once an Admin has verified that your testing in the UAT environment is satisfactory, you can prepare for migrating to a Production environment.

Note: For your Production environment, you will need to request new credentials and ensure that the environment-specific configuration is correct. Make sure that old credentials are not cached, such as a certificate or token, and that you send updated credentials to Thredd.

Overview of set up steps

You need to complete the following steps to set up your connection to Thredd for the first time.

1. Create a client application and OAuth Client in Thredd Portal and get a Client ID. If you have already done this, see step 2.
2. Get credentials for your client application via Thredd Portal.
3. Configure your REST tool to interact with Thredd to make calls to Thredd's API that include an access token. You must obtain an access token using your client credentials. You can also download Thredd's Postman Collection and configure your client credentials as variables in Postman to test making API calls in a UAT environment.
4. Get an access token from Thredd's OAuth token endpoint to include in the Authorization header of your API request
5. Make a call to Thredd's REST API to test your setup.

Step 1: Create a Client Application in Thredd Portal and get a Client ID

In order to call Thredd's REST APIs, you need to create an application and OAuth Client in Thredd Portal. This registers your client application with the Thredd's identity and access management platform. Make a note of the Client ID of your application.

See Creating an Application and OAuth Client.

Step 2: Get credentials for your Application via Thredd Portal

To access any Thredd API endpoint you must exchange your client credentials for a short-lived Bearer token (OAuth token).

You must make sure that you provide the Client Secret from Thredd to obtain an access (OAuth) token for Thredd's REST APIs.

When you have obtained your Client Secret, you must request an OAuth token and include it in the header of your requests to the REST API endpoints. To get an OAuth token, you can either use the endpoint within the Postman Collection (when testing in a UAT environment) or call the OAuth Token endpoint directly when using a Production environment (see step 3).

Complete the following steps to obtain the information you need via Thredd Portal, based on your Client Authentication method.

Client Secret authentication

You need:

- Client ID of your application
- Access token from Thredd's OAuth Token endpoint
- If you use mTLS, you also require a Transport Certificate from Thredd

Get the Client ID and Client Secret:

1. In Thredd Portal, navigate to **System Admin**, and select **Applications**. Select the **Actions** menu (icon of three dots) and select **Review Application**. A screen appears with tabs for the **OAuth Clients** and **Certificates** for your Application.
2. On the **OAuth Clients** tab, locate the OAuth Client that you will use to connect to the Thredd REST APIs. Select the **Actions** menu (icon of three dots) and select **View Details**. The **Overview** screen for the OAuth Client appears.

3. On the **Overview** tab, locate the **Client ID** and **Client Secret** under Client Configuration. You can copy the values from here when you need to.

Note: If you are using an mTLS connection, your application requires a Transport Certificate for establishing mutual connections between your Client and Thredd. An Admin user can obtain a Transport Certificate from Thredd Portal. See Requesting a Transport Certificate for applications using mTLS.

Step 3: Configure your REST tool to make calls to Thredd API using your client credentials

You can access Thredd's API Hub and REST APIs over TLS or mTLS. You must make sure that you configure your REST tool with the appropriate settings, for example:

- Base URL – this depends on whether you are using the UAT or Production environment.
- Headers – you must set the correct Authorization, Content-Type, and X-Region headers.

Base URL

Configuring headers

Whether you are using your own tool or the Postman Collection, you must make sure that you configure the following headers with the correct information in each API request. These headers are mandatory for all requests that you make to the API Hub.

- Authorization header – include your OAuth token in the `authorization` header as appropriate for your application's authentication method.
- X-Region header – this is mandatory and determines the environment you are trying to connect to. Select one of the following values to include in the `X-Region` header:
  - Use `0` for the Prd 0 (Production 0) environment
  - Use `1` for the Prd 1 (Production 1) environment
  - Use `2` for the Prd 2 (Production 2) environment

  Note: If you are not sure which environment to use, contact your Thredd Account Manager or Implementation team. By default, the Postman Collection is set to use the Prd 0 (Production 0) environment, but you can change this in the variables section.
- Content-Type header – specify the media type of the requested resource in the `content-type` header. Example value: `application/x-www-form-urlencoded`

For some endpoints, you can pass pagination values. Where this is relevant, this is stated in the documentation for a given endpoint in API Reference on the API Hub.

Thredd provides separate Postman Collections for TLS and mTLS, which enable you to use Postman to test using the Thredd REST APIs in a UAT environment. To use the collection, you need to configure Postman with the appropriate environment variables and credentials.

Note: Thredd previously used environment-specific production core API URLs, such as `https://coreapi-prdX.threddpay.net`. Thredd now uses a single production core API Hub endpoint: `https://api.thredd.com/core/`, with the `X-Region` header used to specify the target environment. Ensure you use the correct production core API Hub URL and `X-Region` value for your environment. For UAT, use `https://uat-api.thredd.com/core/` instead.

Postman Collection

Download the Postman Collection from the API Hub and follow the guide that matches your configuration:

- For TLS connections: Using the Postman Collection to call REST APIs over TLS
- For mTLS connections: Using the Postman Collection to call REST APIs over mTLS

To download the Postman Collection, see Accessing the API Hub.

Step 4: Get an access token using your client credentials

You must request an access token from Thredd and include it in the Authorization header of your requests to the REST API endpoints. You can get an access token using the following methods:

- Use the endpoint within the Postman Collection (when testing in a UAT environment).
- Call the OAuth Token endpoint directly when using a Production environment.

Access tokens are valid for 15 minutes and include the scopes that are associated with your application.

Follow the advice that match your Client Authentication method.

Client Secret authentication

You must provide your:

- Client ID
- Client secret

Endpoint:

```
POST https://threddid.com/oauth2/token
```

Example request body (URL-encoded):

```
curl --location 'https://threddid.com/oauth2/token' \
                --header 'Content-Type: application/x-www-form-urlencoded' \
                --data-urlencode 'grant_type=client_credentials' \
                --data-urlencode 'client_id=YOUR_CLIENT_ID'
            --data-urlencode 'client_secret=YOUR_CLIENT_SECRET'
```

If you use an mTLS connection, you must also include your Transport Certificate in your request to the OAuth token endpoint. The Authorisation Server will reject all requests without this.

Example OAuth token response

```
{
                "access_token": "eyJhbGciOi...",
                "token_type": "Bearer",
                "expires_in": 3600
            }
```

Access tokens are valid for 15 minutes and include the scopes that are associated with your application.

You must configure your application to refresh the token automatically when it expires.

Step 5: Make a call to Thredd's REST APIs

Once you have the `access_token`, you must include it in the Authorization header of every request to Thredd's REST APIs.

The next step is to test making an API call. Refer to the documentation for the base URLs and API Reference for endpoints at the API Hub: https://cardsapidocs.thredd.com/v2.0/docs

Remember to include the following in your requests:

- Base URL – this depends on whether you are using the UAT or Production environment.
- Mandatory information in your request headers.
- Correct HTTP method for the endpoint.

If you change the environment or region that you want to make API calls to, you must update the Base URL and headers that you include in your requests.

Example request header (TLS)

```
GET /core/api/v1/products HTTP/1.1
                Host: api.thredd.com
                Authorization: Bearer eyJhbGciOi...
            Content-Type: application/json
```

Example request header (mTLS)

```
GET /core/api/v1/products HTTP/1.1
                Host: api.thredd.com
                Authorization: Bearer eyJhbGciOi...
            Content-Type: application/json
```

Note: For mTLS, when making your request to `uat-api.thredd.com` (UAT environment) or `api.thredd.com` (production environment) you must also include your Transport Certificate in the request. Thredd's APIs will reject all requests that do not include this.

Requesting certificates for applications using mTLS

Client applications require a Transport Certificate in order for you to access Thredd's REST APIs over an mTLS connection.

Whether you want to generate a new certificate, or renew or revoke a certificate, you can manage certificates through Thredd Portal.

Note: You must use certificates from Thredd to connect to Thredd APIs. Using self-signed or third-party certificates may result in Thredd refusing connections.

Purpose of Transport Certificates

A *Transport Certificate* is mandatory for mTLS and is used solely for establishing the secure mutual connection between the Server and the Client. Without a valid, signed Transport Certificate, your application is unable to connect to Thredd's secure API endpoints.

Certificate Lifecycle Management

Regularly rotating (refreshing) your certificates is essential to maintain secure communication between your applications and the Thredd platform. New certificates are valid for 350 days; Thredd sends an email to you when a certificate is approaching its expiry date, notifying you 60 days in advance. If you want to renew a certificate, you should request a new Transport and rotate it before the date that it expires. This ensures that your application can continue to access Thredd applications.

You can also revoke a certificate at any time by logging in to Thredd Portal and choosing the option to revoke it in the **Certificates** tab of your Application. Fulfilling a revocation request can take up to one hour for Transport Certificates.

Summary of the steps

The steps for obtaining a certificate are as follows:

1. Log in to Thredd Portal and select or create the application that requires a certificate.
2. Create a private key and Certificate Signing Request for a new Transport Certificate.
3. Upload the Certificate Signing Request for your application.
4. Download the certificate for your application.
5. Store the private key on your client and ensure it can use the Transport Certificate.
6. Configure your Client to use the Transport Certificate in your requests.

Prerequisites

1. You must have access to Thredd Portal.
2. You must have an Admin role in Thredd Portal.
3. You must have installed OpenSSL on the machine (the Server) that will make requests to Thredd platform (the Client).

Step 1: Log in to Thredd Portal and select or create the application that requires a certificate

Log in to Thredd Portal and select **System Admin**. From the **System Admin** menu, select **Applications**. You will have access to at least one organisation for your parent company. The **Applications** screen lists any applications that are registered in Thredd Portal.

Step 2: Review the application details and create a new Transport Certificate

The **Applications** screen lists an entry for your application once it is registered in Thredd Portal. To request a Transport Certificate:

1. Select the Action menu (three dots) under **Actions** and select **Review Application**.
2. The **OAuth Clients** screen appears; it displays a summary of your application details and permissions. Check that these details are correct, and only update any details if you need to. Specific configuration details are under **Client Configuration**, such as the Client ID. The **Permissions** tab lists the available **Scopes** for your organisation.
3. Next, select the **Certificates** tab and select **New Certificate** button. The **New Certificate** screen appears.

Step 3: Create a private key and Certificate Signing Request for a Transport Certificate

1. Select **Transport** from the **Certificate Type** dropdown menu, and then select **Next**.
2. Copy the OpenSSL command from the clipboard and run the command on the machine that you have installed OpenSSL on. This command creates a private key and a Certificate Signing Request (CSR). This command is unique to generate a Transport Certificate with the unique -rtstransport.csr and -rtstransport.key values.
3. You must store the private key securely. Once you have successfully created the private key (.key) and CSR (.csr) files, select **Next**.

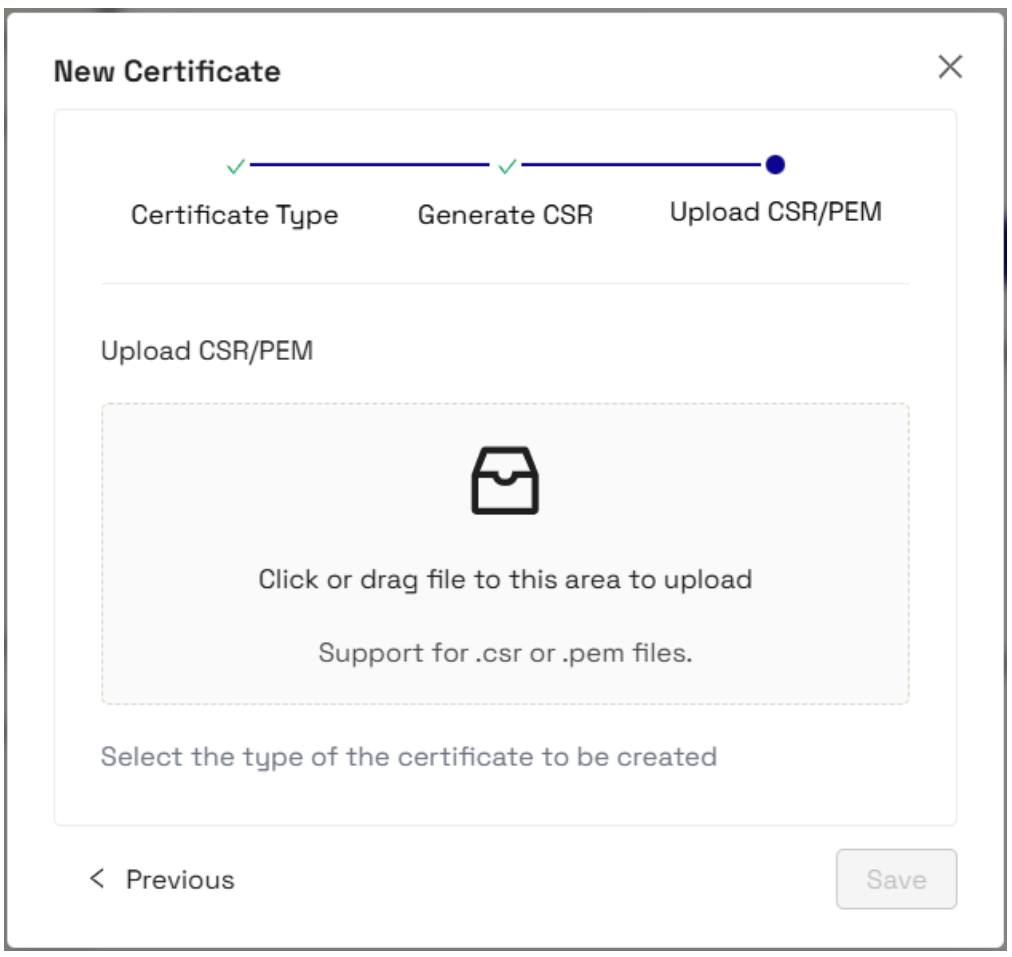
   Example:

```
openssl req -new -newkey rsa:2048 -nodes   -out MyUniqueFileName-rtstransport.csr   -keyout MyUniqueFileName-
rtstransport.key   -subj "/C=MyCountry/O=MyOrganization/OU=MyOrganizationalUnit/CN=MyUniqueFileName"   -sha256
```

   Note: The following example contains placeholder values, but the command that you copy contains your unique file name for .csr (-out) and .key (-keyout), and organisation information in the certificate subject (-subj).

Step 4: Upload the Certificate Signing Request for your application

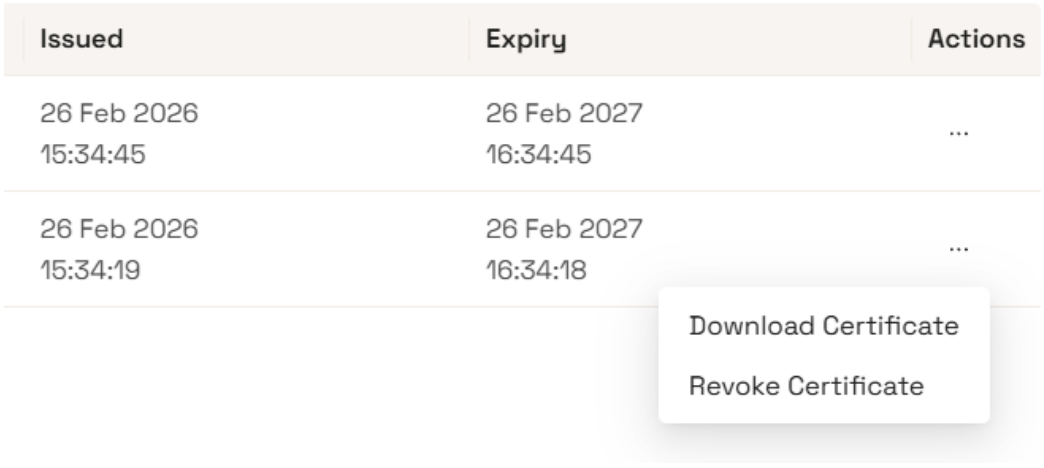
1. Select the **Upload CSR** button and select your Certificate Signing Request file. This uploads your Certificate Signing request onto the Thredd platform, so that it can use the file to request the Transport Certificate from the Thredd Certificate Authority (CA).
2. Select **Save**.



If this is successful, Thredd's system adds the newly-issued Transport Certificate to your application. You can verify this in the **App Certificates** screen of the **Certificates** tab for your application.

Step 5: Download the certificate for your application

Next, download the certificate from the **App Certificates** screen. Select the **Actions** menu (three dots) next to the TRANSPORT certificate, and select **Download Certificate**.



Step 6: Configure your Client to use the Transport Certificate in your requests

You must configure your Client to ensure that it includes the Transport Certificate in all calls that it makes to the Thredd platform. To understand how to do this in your specific case, refer to your Client library documentation.

The domain for mTLS connections is: api.thredd.com

Next steps

Once you have obtained the necessary credentials for your Client application, you can begin setting up your connection to the API Hub using the latest Postman Collection. See Using the Postman Collection to call REST APIs over mTLS.

Using the Postman Collection to call REST APIs over TLS

Follow these steps to configure Postman with your client credentials so that you can obtain an access token. You must include an access token in all requests to Thredd's REST APIs.

You must make sure that you request and provide the Client Secret from Thredd to access Thredd's REST APIs. The Client Secret is selected as the Client Authentication method when setting up your organisation in Thredd Portal.

Prerequisites

You must have the following before setting up the IAM Postman Collection:

- Administrator access to Thredd Portal
- Postman
- The Thredd IAM Postman Collection downloaded from here
- The Thredd IAM Postman Environment file from here

To set up Postman for TLS, see the following steps.

Step One: Create Application and Auth Client in Thredd Portal

You can create an application and auth client in Thredd Portal. Successfully creating these produces a Client Secret and Client ID that you can enter into the Postman Collection.

Details on how to create an Application and associated Auth Client can be found in the Applications page of the Thredd Portal guide.

Step Two: Import Postman Collection into Postman

You can download the Postman Collection from the API Explorer page. Ensure you download the Thredd IAM API Collection.

When you have successfully downloaded the collection, open Postman and import the collection.

1. Click File from the menu, then select Import.
2. Drag the downloaded collection into the window.

The collection displays and opens in Postman.

Step Three: Import Postman Environment File

The Postman Environment file includes the variables for the Postman Collection to work, and is where you enter your Client Secret and Client ID into the collection. You can download the Postman Environment from the API Explorer page.

To import the environment file:

1. Click File from the menu, then select Import.
2. Drag the downloaded file into the window.

The environment variables are added to Postman.

Step Four: Enter Client Secret and Client ID into Postman

Note: Before starting this step, ensure you have your applications Client Secret and Client ID ready.

To add the Client Secret and Client ID to the Collection:

1. Use the dropdown in the top-right of Postman to select the UAT Thredd environment.
2. Click the Variables button in the top-right corner of Postman. All variables for the environment display.
3. Enter your Client Secret from Thredd Portal into the client_secret field.
4. Enter your Client ID from Thredd Portal into the client_id field.

Step Five: Generate Authentication Token

Before you can use the API endpoints, you must create an authentication token. To create the token:

1. Open the Authorisation folder in the Collection and select the Get Access Token endpoint.
2. Click Send.

An authentication token is created and automatically added to your variables. This token lasts for 60 minutes. When the token expires you will need to generate a new token to continue using the APIs.

Step Six: Verify your setting

Make sure that you have configured the following settings for your API calls:

- You have set the correct Base URLs for the API Hub.
- You have obtained an access token.
- Including the access token in the authorisation header.
- Adding an X-Region header – this is mandatory and determines the environment that you want to connect to; select one of the following options:
    - Use `0` for the Prd 0 (Production 0) environment
    - Use `1` for the Prd 1 (Production 1) environment
    - Use `2` for the Prd 2 (Production 2) environment

When you have completed these steps, you are ready to make your first API call. For more information, see the Thredd API Hub.

Note: Thredd previously used environment-specific production core API URLs, such as `https://coreapi-prdX.threddpay.net`. Thredd now uses a single production core API Hub endpoint: `https://api.thredd.com/core/`, with the `X-Region` header used to specify the target environment. Ensure you use the correct production core API Hub URL and `X-Region` value for your environment. For UAT, use `https://uat-api.thredd.com/core/` instead.

Preparing your Production environment

Once an Admin has verified that your testing in the UAT environment is satisfactory, you can prepare for migrating to a Production environment. You will need to repeat all of these steps for Production, such as requesting new certificates or access tokens, and ensuring that environment-specification configurations are correct. See Updating Postman.

Using the Postman Collection to call REST APIs over mTLS

Follow these steps to configure Postman with your client credentials so that you can obtain an access token. You must include an access token in all requests to Thredd's REST APIs.

You must make sure that you request and provide the Client Secret from Thredd to access Thredd's REST APIs. The Client Secret is selected as the Client Authentication method when setting up your organisation in Thredd Portal.

Additionally, because you are using an mTLS connection, your application must also present a Transport Certificate, which an Admin user can obtain from Thredd Portal.

Prerequisites

You must have the following before setting up the IAM Postman Collection:

- Administrator access to Thredd Portal
- Postman
- The Thredd IAM Postman Collection downloaded from here
- The Thredd IAM Postman Environment file from here
- OpenSSL installed on your machine

Before starting, ensure you have installed OpenSSL on your machine as this is required to generate a Transport certificate.

To set up Postman for mTLS, see the following steps.

Step One: Create Application and Auth Client in Thredd Portal

You can create an application and auth client in Thredd Portal. Successfully creating these produces a Client Secret and Client ID that you can enter into the Postman Collection.

Details on how to create an Application and associated Auth Client can be found in the Applications page of the Thredd Portal guide.

Step Two: Create Transport Certificate in Thredd Portal

To use mTLS for the Postman Collection you must first create a Transport Certificate, which is done in Thredd Portal.

To create a Transport Certificate in Thredd Portal:

1. Open the System Admin menu and select Applications.
2. Click Actions for the application you want to create a certificate for and click Review Application.
3. Open the Certificates tab and click New Certificate. The New Certificate window opens.
4. Select Transport in the Certificate Type field and click Next.
5. Copy the generated CSR.
6. Open a command prompt on your device.
7. Paste the CSR into the command prompt. Two files are created - a CSR file and a KEY file.
8. Return to Thredd Portal and click Next.
9. Click on the window and navigate to and select the CSR file created in the previous step.
10. Click Save. The window closes and the Certificates tab updates with the new Transport certificate.
11. Click Actions on the certificate and click Download Certificate.

Step Three: Add Transport Certificate and Key to Postman

To add your certificate and key to Postman:

1. Click File from the menu, then select Settings.
2. Click Certificates.
3. Click Add Certificate.
4. Enter uat-api.thredd.com in the Host field.
5. Click Select File under the CRT file heading. A window opens.
6. Navigate to the where you saved your Transport certificate and select the PEM file. Click Open. The window closes and the certificate is added to Postman.
7. Click Select File under the KEY file heading. A window opens.
8. Navigate to the where you saved your Transport key and select the KEY file. Click Open. The window closes and the key is added to Postman.
9. Click Add.

The Transport Certificate is now added to Postman.

Note: If the certificate is not included in Postman, the API requests still work but they are downgraded to a TLS connection. You can confirm that your connection is mTLS by viewing the Postman console and ensuring there is a client_certificate section included. This indicates the request has used a mTLS connection.

Step Four: Import Postman Collection into Postman

You can download the Postman Collection from the API Explorer page. Ensure you download the Thredd IAM API Collection.

When you have successfully downloaded the collection, open Postman and import the collection.

1. Click File from the menu, then select Import.
2. Drag the downloaded collection into the window.

The collection displays and opens in Postman.

Step Five: Import Postman Environment File

The Postman Environment file includes the variables for the Postman Collection to work, and is where you enter your Client Secret and Client ID into the collection. You can download the Postman Environment from the API Explorer page.

To import the environment file:

1. Click File from the menu, then select Import.
2. Drag the downloaded file into the window.

The environment variables are added to Postman.

Step Six: Enter Client Secret and Client ID into Postman

Note: Before starting this step, ensure you have your applications Client Secret and Client ID ready.

To add the Client Secret and Client ID to the Collection:

1. Use the dropdown in the top-right of Postman to select the UAT Thredd environment.
2. Click the Variables button in the top-right corner of Postman. All variables for the environment display.
3. Enter your Client Secret from Thredd Portal into the client_secret field.
4. Enter your Client ID from Thredd Portal into the client_id field.

Step Seven: Generate Authentication Token

Before you can use the API endpoints, you must create an authentication token. To create the token:

1. Open the Authorisation folder in the Collection and select the Get Access Token endpoint.
2. Click Send.

An authentication token is created and automatically added to your variables. This token lasts for 60 minutes. When the token expires you will need to generate a new token to continue using the APIs.

Step Eight: Check your settings and finish setting up

Make sure that you have configured the following settings for your API calls:

- You have set the correct Base URLs for the API Hub.
- You have obtained an access token.
- Including the access token in the authorisation header.
- Adding an X-Region header – this is mandatory and determines the environment that you want to connect to; select one of the following options:
    - Use `0` for the Prd 0 (Production 0) environment
    - Use `1` for the Prd 1 (Production 1) environment
    - Use `2` for the Prd 2 (Production 2) environment

Once you have completed these steps, you are ready to make your first API call. For more information, see the Thredd API Hub.

Note: Thredd previously used environment-specific production core API URLs, such as `https://coreapi-prdX.threddpay.net`. Thredd now uses a single production core API Hub endpoint: `https://api.thredd.com/core/`, with the `X-Region` header used to specify the target environment. Ensure you use the correct production core API Hub URL and `X-Region` value for your environment. For UAT, use `https://uat-api.thredd.com/core/` instead.

Preparing your Production environment

Once an Admin has verified that your testing in the UAT environment is satisfactory, you can prepare for migrating to a Production environment. You will need to repeat all of these steps for Production, such as requesting new certificates or access tokens, and ensuring that environment-specification configurations are correct. See Updating Postman.

Updating Postman

You will need to update Postman if you delete an existing client application and create a new one. An Admin for your organisation must:

- For Client Secret client authentication: Request a new access token (TLS and mTLS).
- For mTLS connections only: Request a new Transport Certificate from Thredd via Thredd Portal, and request a new access token.

Users who will make calls to Thredd's APIs using the Postman Collection, must update their Postman Collection with the new credentials.

1. Update any access tokens or certificates.
2. Update the variables for the Client ID and other credentials.
3. Use the Postman Collection to obtain a new access token.

Adding Certificates to Hosts for mTLS connections in Postman

If you use an mTLS connection to Thredd REST APIs, you must include a Transport Certificate with the individual hosts. Complete these steps:

1. Select the gears icon and **Settings**.
2. Select **Certificates** from the left-hand menu.
3. Select **Add Certificate**.
4. Enter a host name.
5. Add the CRT and Key files for the host.
6. Select the **Add** button.

For more details, see Using the Postman Collection to call REST APIs over mTLS.

Base URLs

When calling Thredd endpoints, you must include the Base URLs within your REST tool. The Base URLs are the hosts that accept the certificates. The Cards API and API Hub hosts have unique URLs that are different between UAT and Production.

UAT environments use the following Base URLs:

- **Cards API**: https://api.uat.threddpay.com/api/v1
- **API Hub over TLS**: https://uat-api.thredd.com
- **API Hub over mTLS**: https://uat-api.thredd.com
- **Thredd Certificate Authority**: https://matls-auth.directory.sandbox.threddid.com

Production environments use the following Base URLs:

- **API Hub over TLS**: https://api.thredd.com (for all production environments)
- **API Hub over mTLS**: https://api.thredd.com (for all production environments)
- **Cards API**: https://coreapi.threddpay.com

Section 4: SOAP

You should read this section to understand setting up certificates for SOAP web services.

Topics covered in this section:

- Creating Organisation Transport Certificates for SOAP Web Services

Creating Transport Certificates for SOAP Web Services

This page describes how you create Transport Certificates for accessing Thredd's SOAP Web Services. As Thredd's SOAP Web Services are secured using Mutual Transport Layer Security (MTLS), your *client application* must present a trusted Transport Certificate for authentication.

The instructions for obtaining certificates are the same as those for clients using Thredd's REST APIs.

To obtain certificates, you must first set up an Organisation Admin user in Thredd Portal, create an application and OAuth Client, and then request certificates for it. See Requesting certificates for applications using mTLS.

Convert the certificate and key to PKCS#12 syntax

If required, for example you are using Windows services, you can convert the public certificate and private key to the PKCS#12 syntax. For converting, you can use OpenSSL commands. In the PKCS#12 syntax, the files are in the .pfx format. For more details, see RFC 7292: PKCS #12: Personal Information Exchange Syntax v1.1.

1 Set up webhook verification

Thredd signs webhook payloads so that your application can verify that a webhook was sent by Thredd and has not been modified.

Before processing a webhook, your application should verify its signature using the public signing keys published by Thredd.

Thredd webhooks are sometimes also referred to as the Thredd Event Delivery System or EDS.

How webhook signature verification works

When Thredd sends an event to your webhook endpoint:

1. Thredd signs the webhook payload.
2. Your application receives the webhook and reads the signing key identifier (kid).
3. Your application retrieves the available public signing keys from the Thredd JWKS endpoint.
4. Your application selects the key that matches the kid.
5. Your application verifies the signature.
6. Your application processes the event only if verification succeeds.

Before you start

You need:

- A webhook endpoint that is accessible to Thredd.
- The JWKS URL for your Thredd environment.
- Logic in your application to retrieve and cache JWKS signing keys.
- Logic to verify incoming webhook signatures.

Retrieve your JWKS endpoint

Thredd's Public Key Infrastructure (PKI) provides a JSON Web Key Set (JWKS) endpoint that you can use to validate signatures.

An Organisation Admin must log in to the Thredd Portal and obtain the JWKS endpoint details.

To view your JWKS endpoint in Thredd Portal:

1. Log in to Thredd Portal.
2. Navigate to the System Admin menu, select Organisation, and then select EHI Configuration.
3. The EHI Configuration page opens. Locate the JWKS endpoint and copy its URL.

The address of the JWKS endpoint should be similar to the following:

https://jwks.threddid.com/{thredd_org_id}

Note: You must replace the placeholder {thredd_org_id} in the example JWKS endpoint URL with your unique organisation ID.

Use the JWKS URL for the environment that sends the webhook. If you use a JWKS URL from a different environment, signature verification will fail.

Retrieve the signing keys

Retrieve the JSON Web Key Set (JWKS) from the Thredd JWKS endpoint.

Your application should cache the retrieved keys rather than requesting the JWKS for every webhook.

Your implementation should also be able to refresh the cache when Thredd rotates its signing keys. AWS-based webhook verification requires clients to support key discovery and key rotation.

Select the signing key

When you receive a webhook:

1. Read the kid from the webhook signature information.
2. Find the corresponding key in the JWKS.
3. If the key is not available in your cache, refresh the JWKS.
4. Select the public key whose kid matches the webhook.

Note: Do not attempt to verify the payload using an unrelated signing key.

Verify the signature

Verify the webhook signature before processing the event.

Your application should reject a webhook if:

- The signature is missing.
- Signature verification fails.
- The payload has been modified.
- The signature is no longer valid.

Only process the event after verification succeeds.

Register your webhooks

When creating the webhook registration via the API, set certificateAuthority to AWS. This configures Thredd to sign webhook payloads using the AWS signing keys exposed through the Thredd JWKS endpoint.

You can create a webhook by making a POST request to the Create Webhook endpoint. For example:

```
POST https://api.thredd.com/eds/api/v1/Webhooks
```

Example Create Webhook request:

```
{
"productId": 12345,
"events": [101],
"webhookStatus": "active",
"config": {
    "url": "https://client_domain.com/webhook",
    "certificateAuthority": "AWS",
    "customHeaders": {
        "header1": "value_1",
        "header2": "value_2"
        }
    }
}
```

If successful, a 201 response is returned with the details of the newly registered webhook.

For more information, see:

- Create Webhook - Field Descriptions
- Create Webhook - API Explorer

Test your integration

Before moving to production, verify that your webhook receiver:

- Receives events successfully.
- Accepts correctly signed payloads.
- Rejects incorrectly signed payloads.
- Rejects modified payloads.
- Selects the correct signing key using kid.
- Refreshes cached signing keys when required.

Implementation checklist

- Create an endpoint to receive Thredd webhooks.
- Obtain the JWKS URL for your environment.
- Retrieve and cache the JWKS signing keys.
- Read the `kid` from incoming webhook signature information.
- Select the matching public key.
- Verify every webhook signature before processing the payload.
- Handle JWKS key rotation.
- Set `certificateAuthority` to `AWS` when registering the webhook.
- Test successful and failed signature verification.
- Validate the complete webhook flow in a non-production environment before going live.

Section 5: EHI Setup

You should read this section to understand the set up steps for EHI.

Topics covered in this section:

- Setting up EHI for mTLS connections

Setting up EHI for mTLS connections

The External Host Interface (EHI) offers a way to exchange transactional data between the Thredd processing system and the Program Manager's externally-hosted systems.

All transaction data processed by Thredd is transferred to the external host system via EHI in real time.

An EHI with mTLS (EHIm) setup comprises an integration with an external payments network that itself is authenticated using Mutual TLS (mTLS).

EHI provides two main functions:

- a real-time transaction notification data feed
- payment authorisation control

mTLS relies on a system of digitally-signed certificates issued by a trusted third party called a Certificate Authority (CA). The CA proves the authenticity of the public key and the identity of the Server presenting the key.

Here, you can follow the steps to set up the External Host Interface (EHI) to communicate with Thredd using mTLS.

Note: If you are currently presenting a certificate that has been issued by Raidiam Connect, you must replace it with a certificate that Thredd has issued and migrate your EHIm setup to Thredd. See the EHIm Migration Guide.

Overview of mTLS in EHI

In the EHIm (EHI + mTLS) communication flow, your application is the *Server* and Thredd is the *Client*. Both parties must prove their identities to each other for authentication by presenting their respective certificates to each other, and verifying this during the mTLS handshake.

The high-level communication flow is as follows:

1. The Client (Thredd) connects to the Server (you).
2. The Server (you) presents your Server certificate to the Client (Thredd. The Server certificate is a TLS certificate (the more modern version of an SSL certificate).
3. The Client (Thredd) verifies your certificate.
4. The Client (Thredd) presents its certificate.
5. The Server (you) verifies the Client's (Thredd's) certificate by matching it against the information held in Thredd's Certificate Authority's Trust Chain.

Once both certificates are verified, the Server grants access. The Client and Server then exchange information over the secure connection.

In order to enable thisyou need to install the Thredd EHIm Trust Chain on your EHI Server. The EHI Server must validate the Client Certificates that Thredd sends to you. This ensures that a Chain of Trust is established.

A Trust Chain is a collection of trusted root certificates that are installed on the Server, which includes the root anchor (top level) and intermediate Certificate Authority (CA) certificates. An end entity uses these to establish a Chain of Trust, by checking the certificate chain, and validates the Client Certificate. The Server uses the Certificate Chain to prove the legitimacy of a Client Certificate by tracing it back to a single Root CA.

What is mTLS?

Mutual Transport Layer Security (Mutual TLS or mTLS) is an enhanced security protocol that ensures that both the Client and the Server verify each other's identity before establishing a secure communication channel. This is a digital handshake where both parties must provide their official identity. To learn more about mTLS, see Mutual TLS explained.

Configuring your Server to use EHI over mTLS

You need to obtain, install and store the certificates on your EHI Server, which form the trust store that the Chain of Trust refers to when validating the path and certificates.

To ensure this, you must:

- Obtain a Server Certificate from a Certificate of Authority vendor, such as Verizon or Digicert or Amazon Web Services, and install it on your EHI listening point.

- Download and install Thredd's EHI Trust Chain on your Server, and store the CA's Root and Issuing Certificates on your mTLS termination point. You must configure your systems to ensure that your Server presents this certificate to the Client (Thredd) during the mTLS handshake.
- Ensure that your mTLS termination point has access to Thredd's Online Certificate Status Protocol (OCSP) responder.
- Test the EHI endpoint.
- Provide the EHI endpoint to and inform Thredd that you are ready to use the EHI application.

Prerequisites

- You must have the Organisation Admin role for your organisation in Thredd Portal.
- You must have access to Thredd Portal.
- You must have obtained and installed a Server Certificate from a Certificate of Authority vendor, such as Verizon or Digicert or Amazon Web Services.

Step 1: Download and install Thredd's EHI Trust Chain

You must install the EHI Trust Chain on your Server and configure your systems to ensure that your Server presents its Server Certificate to the Client (Thredd) and validates against the EHI Trust Chain during the mTLS handshake.

To download the Trust Chain:

1. Log in to Thredd Portal.
2. Navigate to and select **System Admin**, select **Organisation**, and then select **EHI Configuration**.
3. The EHI Configuration page opens. Locate the certificate/trust chain file under **Certificate Chain**, and click **Download**. If a certificate chain is not available to download, contact Thredd for support.

Next, configure your mTLS termination point (your load balancer, proxy, or server) settings to validate against the Thredd EHI Trust Chain. Point it to or copy the contents of the Thredd EHI Trust Chain file.

Before you proceed, you must ensure that:

- Your mTLS termination point is validating against the Thredd EHI Trust Chain file.
- You store the CA's Root and Issuing Certificates on your mTLS termination point.

Refer to your server's technical documentation for information about how to complete this task.

Step 2: Ensure that your mTLS termination point has access to Thredd's Online Certificate Status Protocol (OCSP) Responder

Thredd recommends that you configure your mTLS termination point (load balancer, proxy, or server) to carry out certificate status checks. For example, to check if the certificate has been revoked.

This is optional. However, if you want to ensure that it can do this, your mTLS termination point must have access Thredd's Online Certificate Status Protocol (OCSP) Responder. The OCSP Responder provides both clients and Thredd with the ability to verify the validity of certificates issued within Thredd's private PKI hierarchy, and in real time.

Check the settings for your mTLS termination point:

1. Make sure that your mTLS termination point can access Thredd's OCSP Responder at: https://ocsp.threddid.com
2. Verify and change the settings if necessary. For example, by adding the OCSP Responder to the allowlist.
3. Refer to your server's documentation for information about how to check and change your mTLS termination point settings.

Step 3: Test the EHI endpoint

Once you are ready, test the EHI endpoint with the online SSLLabs tool and OpenSSL. This is to ensure that you can successfully communicate with EHI over mTLS.

Once you have completed testing, provide the EHI endpoint to Thredd, as per step 4.

Note: You must not provide the EHI endpoint if you have not completed testing.

Test using SSLLabs

1. Go to the URL of the tool: https://www.ssllabs.com/ssltest/
2. Enter the URL to be tested in the SSL Labs test screen test page. For example, api.thredd.com. The results appear similar to the following:

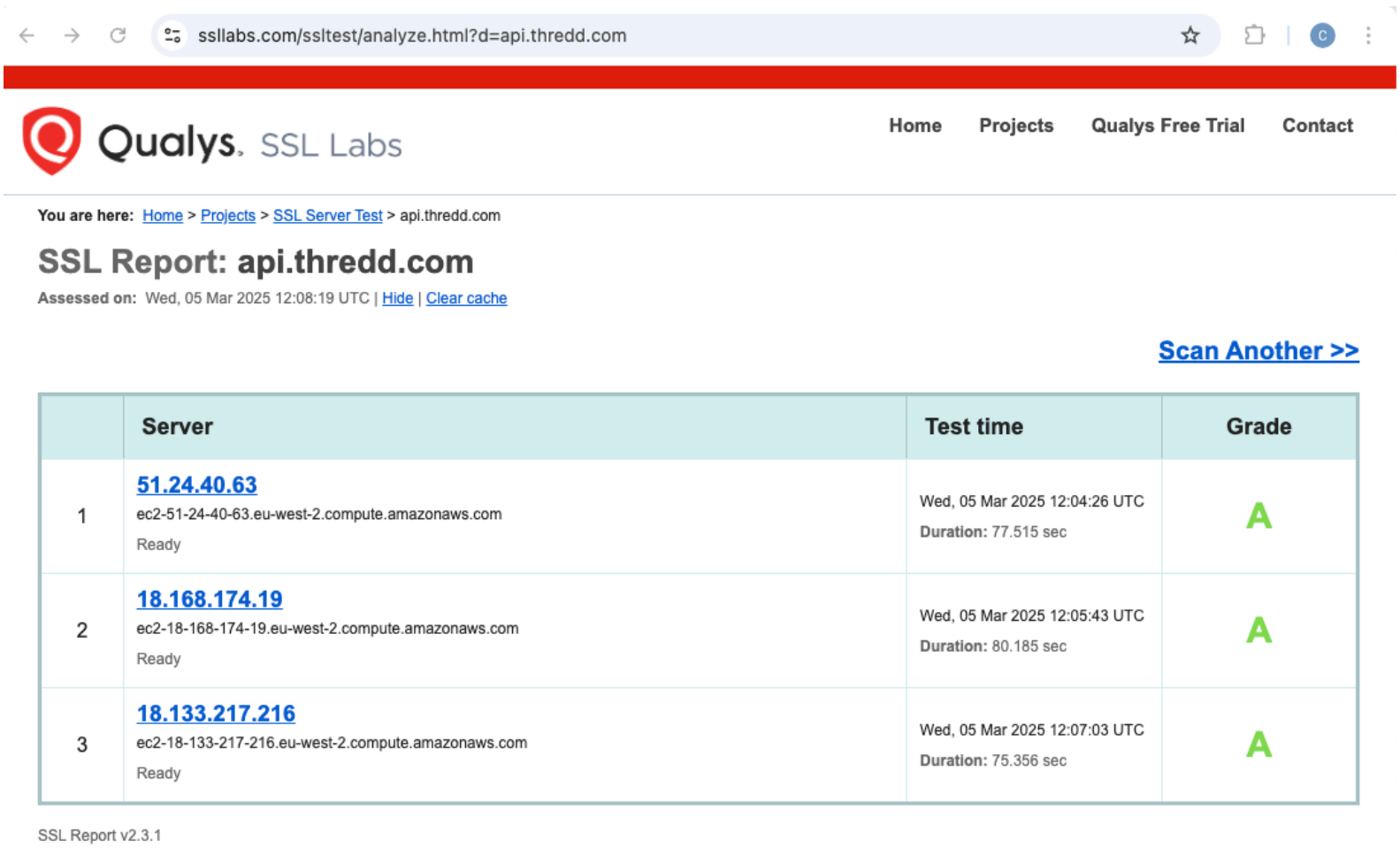


Figure: Passing Tests on SSL Labs

An "A" Grade results in the test passing. However, "B" will not result in a pass, and can indicate that the problem is due to a missing an Immediate or Root certificate on your Server.

Test using OpenSSL

You should run the following command that triggers the TLS handshake for the communication between Server (you) and the Client (Thredd). You receive responses for the Server and Client certificates.

```
openssl s_client -connect ehi.yourdomain.com:443
```

Server Certificate result

The results for the Server certificate appear as follows:

Figure: Server Certificate Result Including Depth Settings

If `Depth 0,1,2` all show `verify return:1` this indicates that the EHI servers trust the Server Certificate. There could be an issue with Server certificate result, if the results are different; for example, if there is no `verify return:1` for the depth settings. The Depth settings mean the following:

Depth Setting	Description
Depth 0 = Root	The Root certificate has been sent.
Depth 1 = Intermediate:	The Leaf certificate has been sent.

Depth Setting	Description
Depth 2 = Root:	The Root certificate has been sent.

You should configure your Server's TLS setup so that it sends the Server Certificate and the Intermediate Certificate. If the Server sends only the Server certificate then the Chain of Trust is not complete; the mTLS connection is not set up between the Server and the Client.

Client Certificate result

For validating the Client Certificate, certificates that Thredd users appear under `Acceptable client certificate CA names`. There may be an issue if the `Acceptable client certificate CA names` section is empty, where Thredd's CAs are not listed.

```
-----END CERTIFICATE-----
subject=C=GB, L=London, O=[redacted], CN=*.[redacted].com
issuer=C=US, O=DigiCert Inc, CN=DigiCert Global G2 TLS RSA SHA256 2020 CA1
---
Acceptable client certificate CA names
C=GB, O=Thredd UK Limited, OU=Thredd Directory, CN=Thredd Root CA - G1
C=GB, O=Thredd UK Limited, OU=Thredd Directory, CN=Thredd Issuing CA - G1
Client Certificate Types: RSA sign, DSA sign, ECDSA sign
Requested Signature Algorithms: ECDSA+SHA256:ECDSA+SHA384:ECDSA+SHA512:UNDEF:Ed25519:Ed448:RSA-PSS+SHA256:RSA-P
SS+SHA384:RSA-PSS+SHA512:RSA-PSS+SHA256:RSA-PSS+SHA384:RSA-PSS+SHA512:RSA+SHA256:RSA+SHA384:RSA+SHA512:ECDSA+SH
A224:ECDSA+SHA1:RSA+SHA224:RSA+SHA1:DSA+SHA224:DSA+SHA1:DSA+SHA256:DSA+SHA384:DSA+SHA512
Shared Requested Signature Algorithms: ECDSA+SHA256:ECDSA+SHA384:ECDSA+SHA512:Ed25519:Ed448:RSA-PSS+SHA256:RSA-
PSS+SHA384:RSA-PSS+SHA512:RSA-PSS+SHA256:RSA-PSS+SHA384:RSA-PSS+SHA512:RSA+SHA256:RSA+SHA384:RSA+SHA512:ECDSA+S
HA224:RSA+SHA224:DSA+SHA224:DSA+SHA256:DSA+SHA384:DSA+SHA512
Peer signing digest: SHA256
Peer signature type: RSA-PSS
Server Temp Key: X25519, 253 bits
---
SSL handshake has read 6235 bytes and written 443 bytes
Verification: OK
---
New, TLSv1.2, Cipher is ECDHE-RSA-AES128-GCM-SHA256
Protocol: TLSv1.2
Server public key is 2048 bit
```

Figure: Client Certificate Response

Note: Listing the CA authority is optional. If this is empty, it might not mean that the mutual part of the certificate validation has failed.

Note: You might need to check the EHI listener endpoint configuration if the following has occurred:

- If the SSL Labs test does not give an "A" Grade response.
- The Server Certificate does not show `verify return:1` at all depths.
- The Acceptable client certificate CA names are not sent.

Testing requests without a certificate

For additional testing, you can test a request to the EHI endpoint that does not contain a certificate. Using cURL, you see a 400 or 403 response as in the following example.

```
# Request
curl -v https://api.yourdomain.com/ehim/endpoint/api
# Partial Response
<html>
<head><title>400 No required SSL certificate was sent</title></head>
<body>
<center><h1>400 Bad Request</h1></center>
<center>No required SSL certificate was sent</center>
```

Testing requests with a certificate

You can also test a request to the EHI endpoint that contains a certificate. Using cURL, you see a 200 response as in the following example.

```
# Request
curl --cert ./exampleClientCert.pem --key ./exampleClientCert.key \
     -X POST \
     -H "Content-Type: application/json" \
     -d '{"foo": "bar"}' \
     -v https://api.yourdomain.com/ehim/endpoint/api
# Partial Response
200 OK
```

Step 4: Inform Thredd that you are ready to use the EHI application

Once you have completed testing, provide the EHI endpoint to Thredd.

> **Note:** You must not provide the EHI endpoint if you have not completed testing.

Thredd will confirm to you when you are ready to continue to setting up your integration with EHI. See one of the following guides to learn more about EHI:

- EHI Guide (JSON version)
- EHI Guide (XML version)

Message Architecture between Thredd and the Customer EHI

The following shows the message architecture between Thredd and your EHI components (the EHI Customer). The EHI listener endpoint and the mTLS termination point are part of your EHI components.

1. Thredd uses the *Certificate Authority*, Thredd Certificate Authority, to create a Transport Certificate to enable communication later over mTLS.
2. Thredd's Message Processor sends and processes EHI messages that are received from the Cards Schemes (Networks) to Thredd's EHI servers.
3. Thredd sends the EHI messages via a gateway and adds the Transport Certificate.
4. EHI requests travel across the Internet with the associated Transport Certificate attached. Note that Thredd's outgoing firewall has a fixed IP address.
5. The Transport Certificate is presented to your (the Server's) incoming mTLS termination point during the connection handshake.
6. Your systems validate the Transport Certificate by checking it against the CA chain of trust (Root and Issuing Certificates).
7. When the mTLS handshake is complete, you receive EHI messages on your EHI endpoint (External Host System).

Adding Security Controls

You can choose to implement additional optional controls to enhance mTLS security. These include the:

- **IP Address Allowlist** – Thredd EHI messages are sent from a firewall with a fixed IP address. Optionally, you can add this IP address to your allowlist.
- **Certificate Pinning** – the mutual communication, between your Server and Thredd (the Client), is secured by Thredd's Transport Certificate. Your Server only trusts the Transport Certificate if it the Thredd CA has issued it. However, you can choose to also implement Certificate Pinning. Certificate Pinning blocks attempted requests made with the incorrect certificates. For more information, see Certificate and Public Key Pinning | OWASP Foundation.

Section 6: Configuring an identity provider for SSO

You should read this section to understand the setup steps for Single Sign-On (SSO) with your chosen identity provider.

Topics covered in this section:

- Configuring SSO with Google (SAML)
- Configuring SSO with Okta (SAML)
- Configuring SSO with Okta (OIDC)

Configuring SSO with Okta (SAML)

This is a sample SSO integration. For more information on implementing SSO with Thredd, please see the SSO section of this guide.

If your organisation uses Okta as an IdP, you can use Okta for configuring SSO for accessing various Thredd services, for example, Thredd Portal. This guidance describes the steps for using the 2.0 version of Security Assertion Markup Language (SAML) protocol for setting up SSO.

As a client, you would already have an account on the Okta Administration Console.

Note: Setting up SSO is not mandatory, but Thredd recommends it.

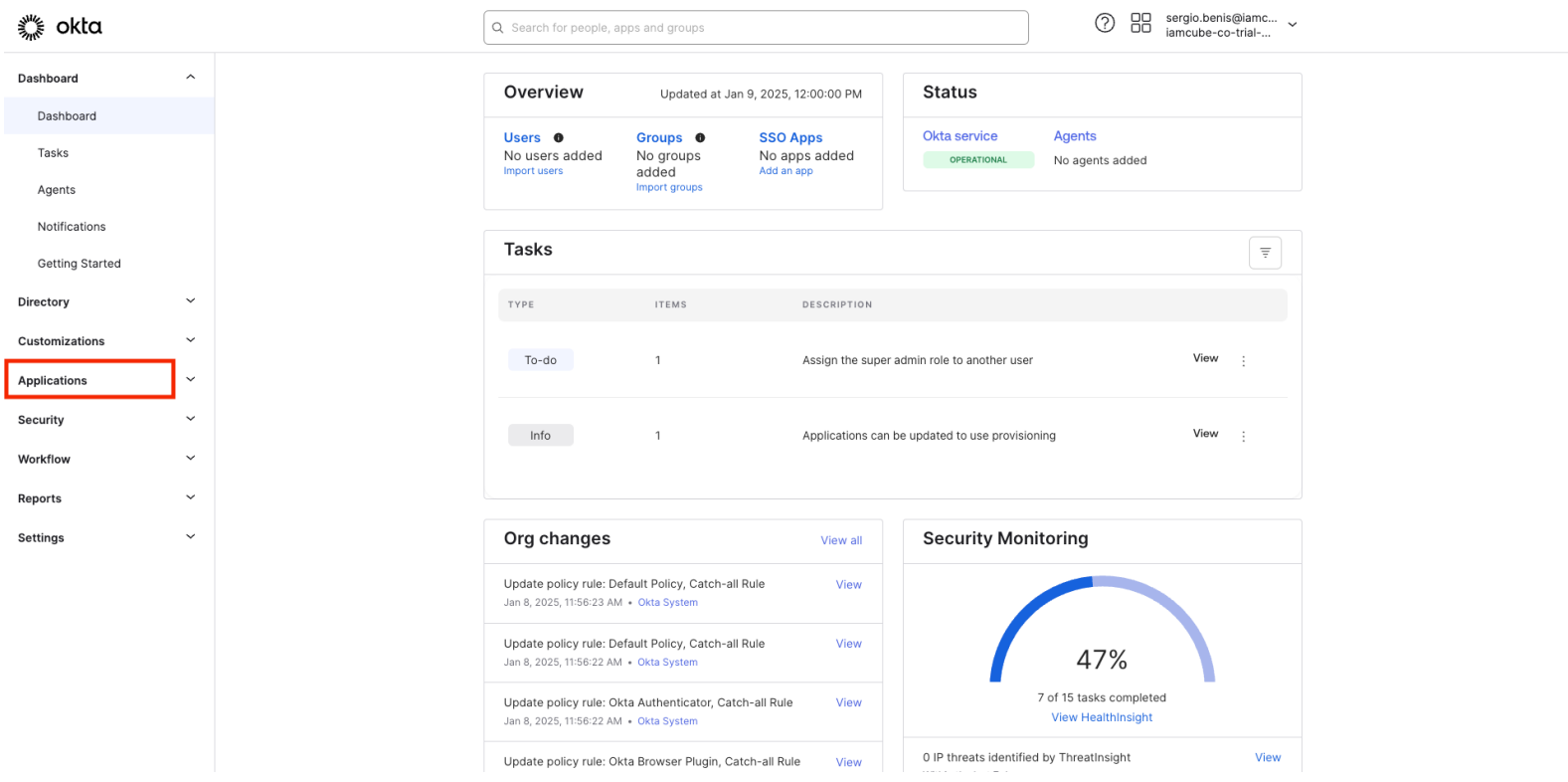
Summary of the steps

The steps involve:

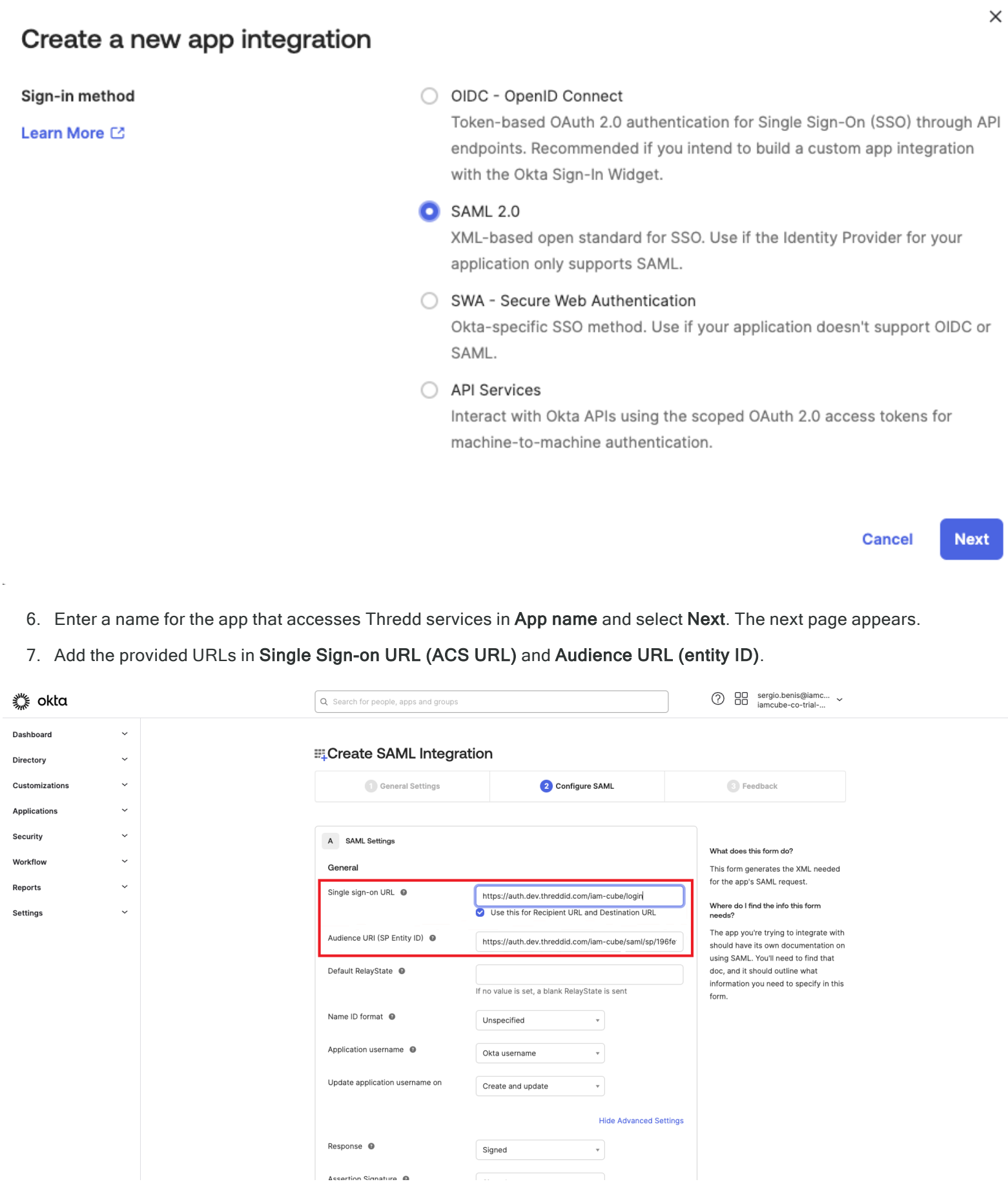
- Creating a SAML app for your SSO connection to Thredd services.
- Adding configurations from Thredd including the SSO URLs and the Entity ID.
- Mapping fields associated with the users defined by Okta with those used by your app.
- Sharing the Metadata URL with Thredd.

Configuring SSO

1. Log in to the Okta Administration console.
2. From the left-hand menu, select **Applications**.

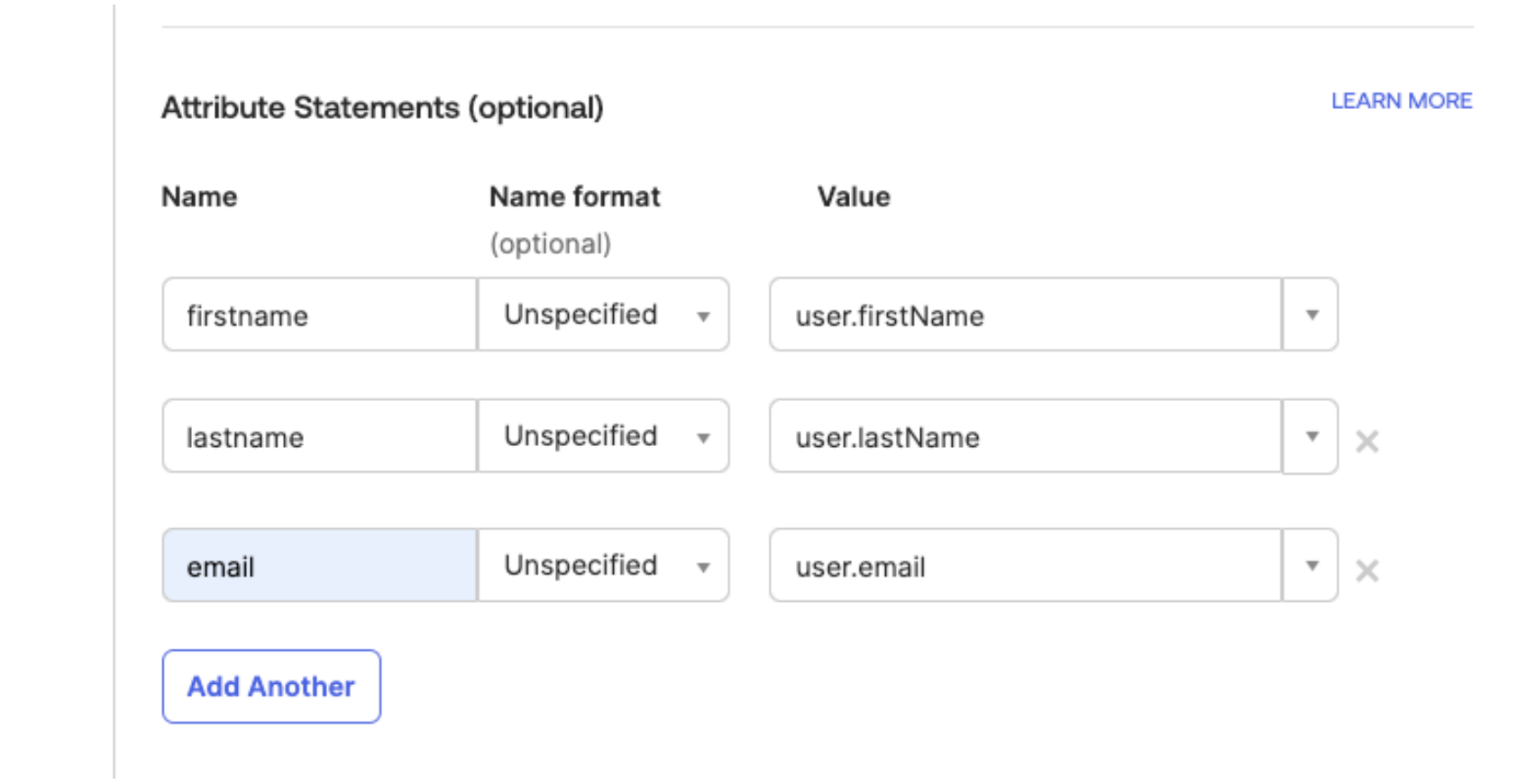


3. Select **Create Application**.
4. Select **SAML 2.0** and select **Next**. The next page appears.



6. Enter a name for the app that accesses Thredd services in **App name** and select **Next**. The next page appears.
7. Add the provided URLs in **Single Sign-on URL (ACS URL)** and **Audience URL (entity ID)**.

8. Scroll down on the same page and configure the following Attribute Statements:
    a. Enter an attribute name in the **Name** column.
    b. Select a value in the **Value** column.
    c. To add another entry, select the **Add Another** button.
    d. Repeat steps a and b.



9. Select **Next**.
10. In the displayed page, select **This is an internal app that we created** and select **Finish**.
11. In the displayed **Metadata Data** details that appear, share the Metadata URL with Thredd.

You can then assign the application to the users or groups who will be using the Thredd services.

Configuring SSO with Google (SAML)

This is a sample SSO integration. For more information on implementing SSO with Thredd, please see the SSO section of this guide.

If your organisation uses Google, you can configure Google as an IdP provider to provide SSO access to various Thredd services. For example, you can use SSO to access Thredd Services, such as Thredd Portal. This guidance describes the steps for using the 2.0 version of Security Assertion Markup Language (SAML) protocol for setting up SSO. As a client, you would already have an account on the Google Admin Console.

Note: Setting up SSO is not mandatory, but Thredd recommends it.

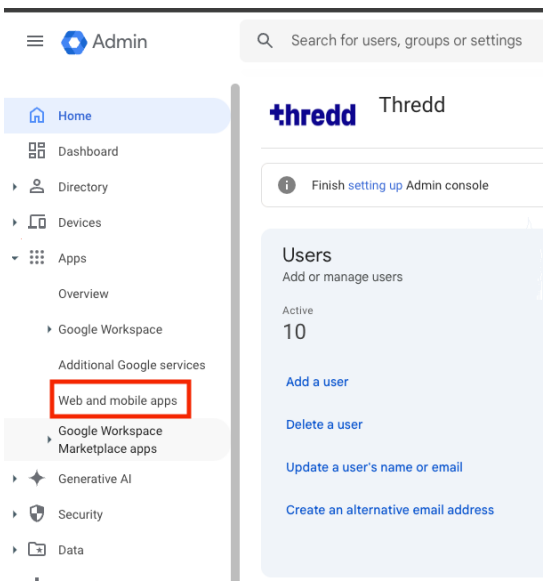
Summary of steps

The steps involve:

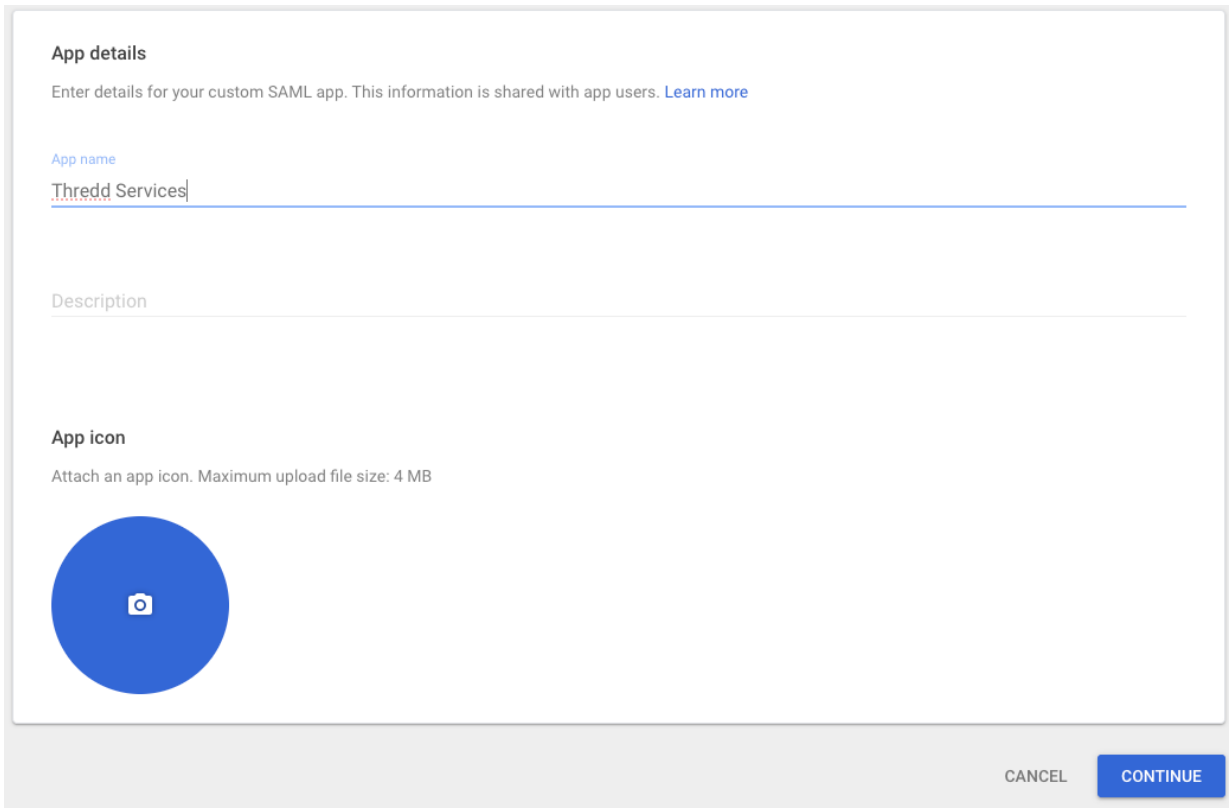
- Creating a SAML app for your SSO connection to Thredd services.
- Choosing either to download IdP metadata or to add configurations from Thredd. If you add configurations from Thredd, you include the SSO URL and the Entity ID.
- Mapping fields associated with the users defined by Google to those used by your app.
- Assigning access permission on your app.

Configuring SSO

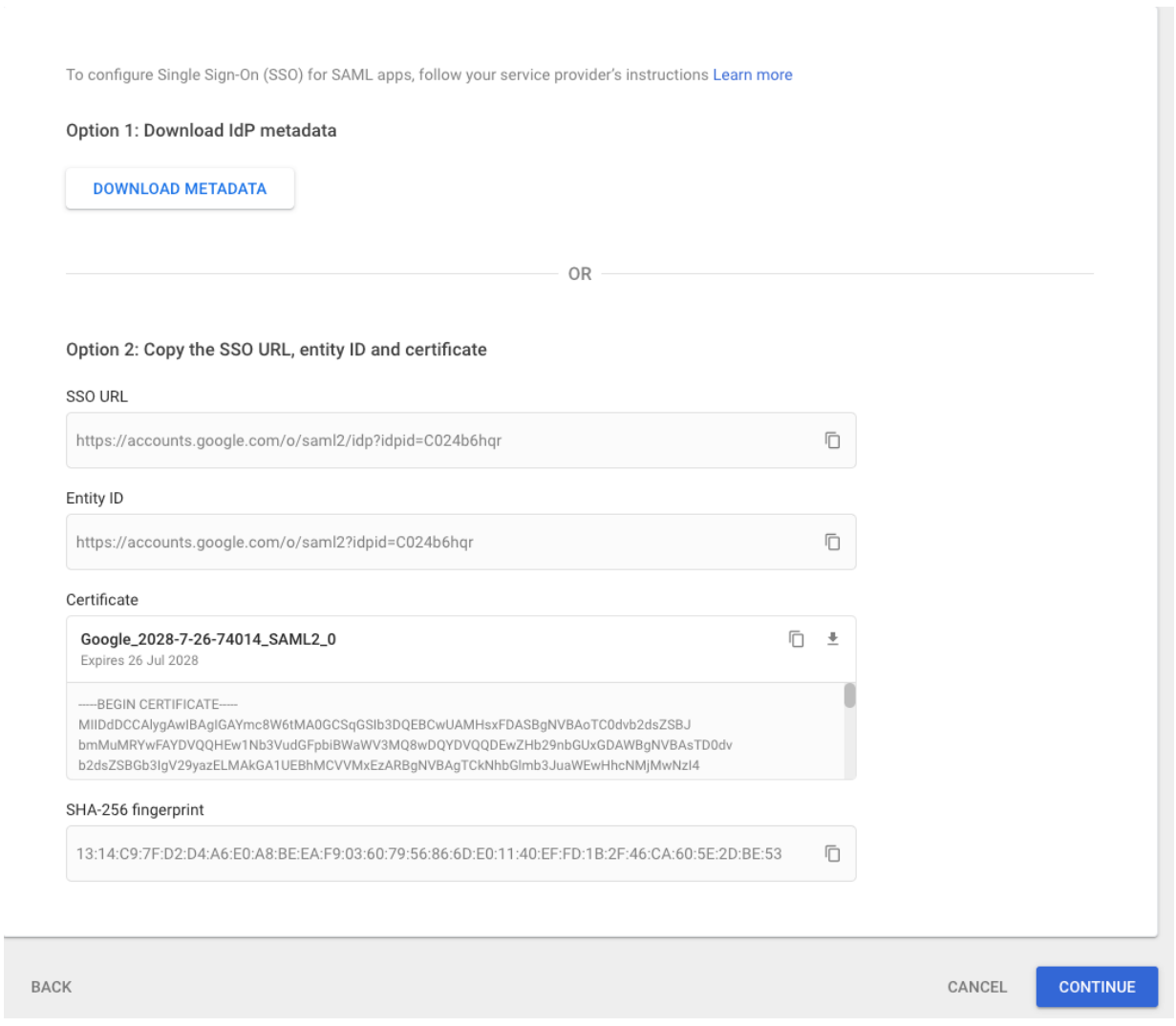
1. Log in to the Google Admin console.
2. Select **Apps** > **Web and mobile apps**.



3. Select **Add app** and select **Add custom SAML app**.
4. Enter a name for the app that accesses Thredd services in **App name** and select **Continue**. The next page appears.

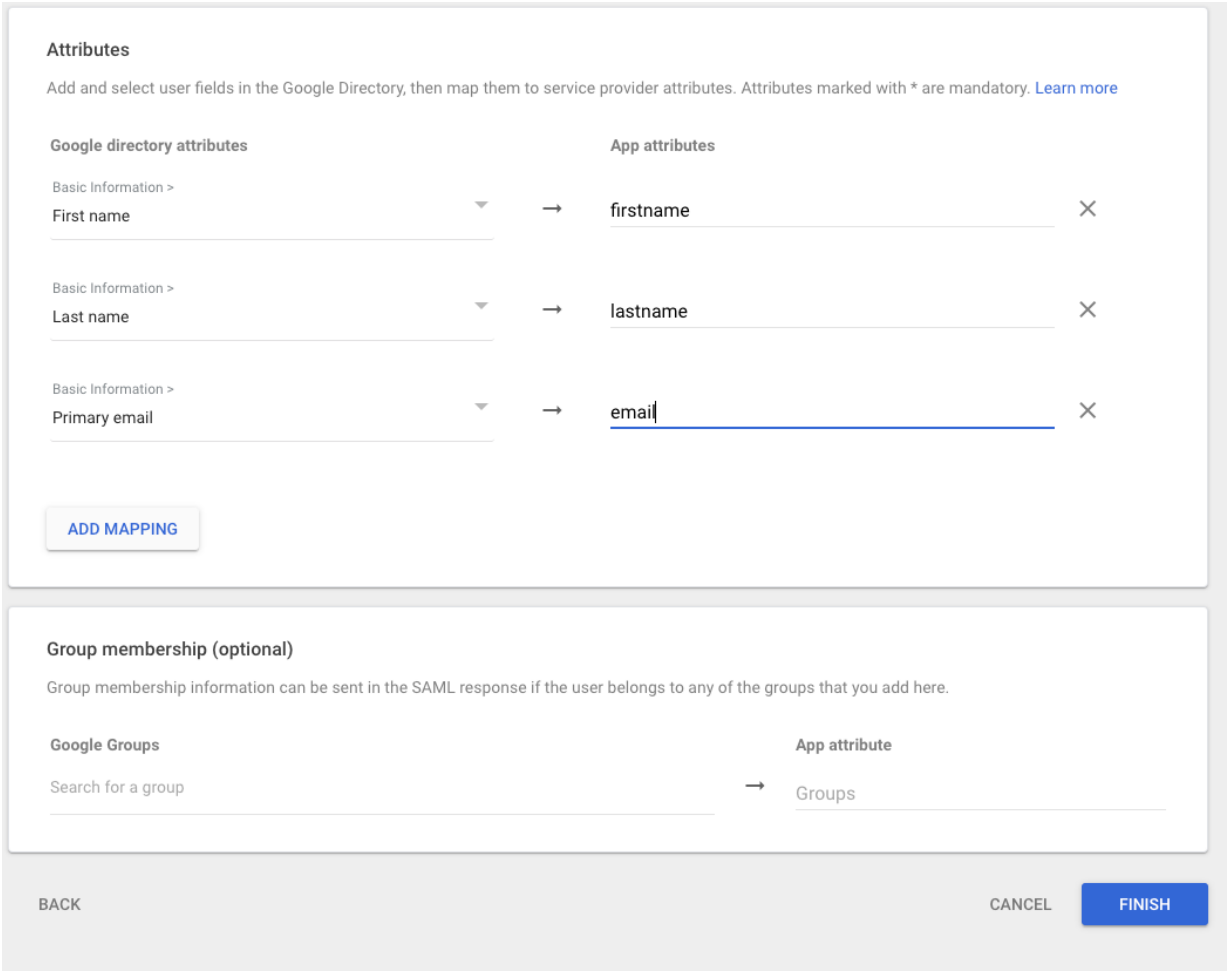


5. To download the metadata, select **Download Metadata** and save the file. Then share the file with Thredd. Proceed to step 7.
6. To include entity ID and URL details:
    a. Add the URL in **SSO URL**.
    b. Add in the Entity ID in **Entity ID**. A certificate and a SHA-256 fingerprint appear. These are generated automatically on the console.



7. Select **Continue**.
8. Configure attribute mapping.
    a. Select the **Add Mapping** button.
    b. Select a group in **Google directory attributes** and choose a group in **App attributes**.
    c. To add another entry, select the **Add Mapping** button again and repeat the step for choosing both attributes.

The following shows an example.

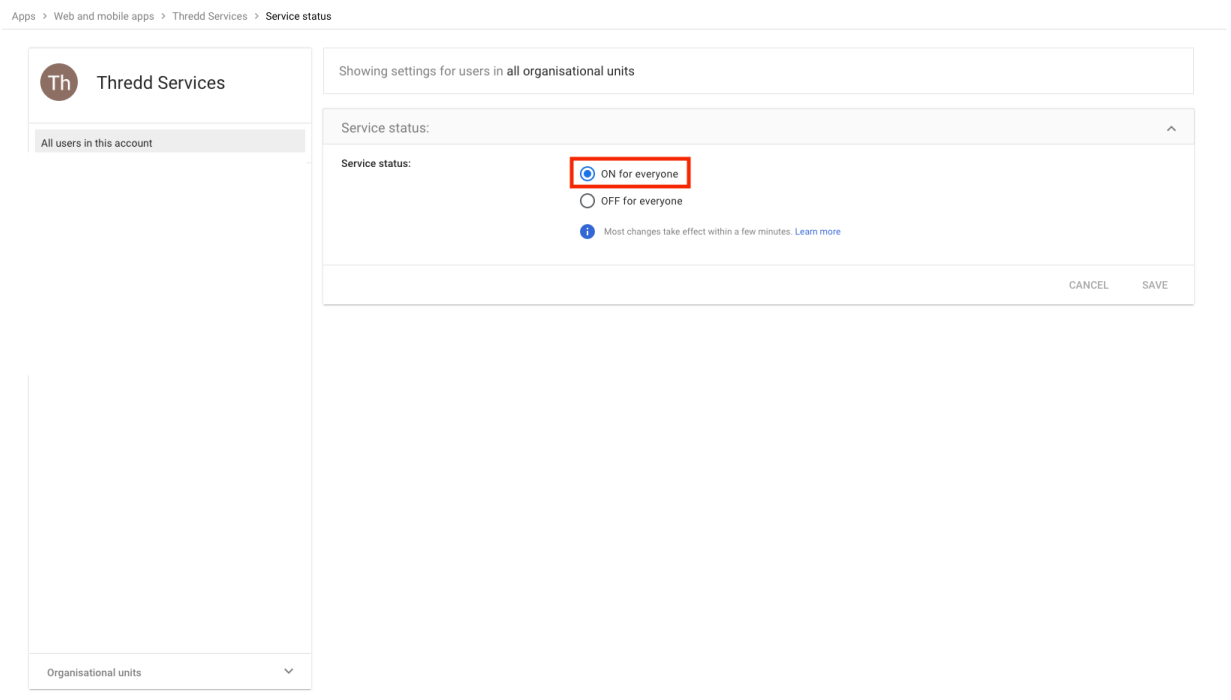


9. Select **Finish**.
10. Once completed, select access permission options (see the following procedure).

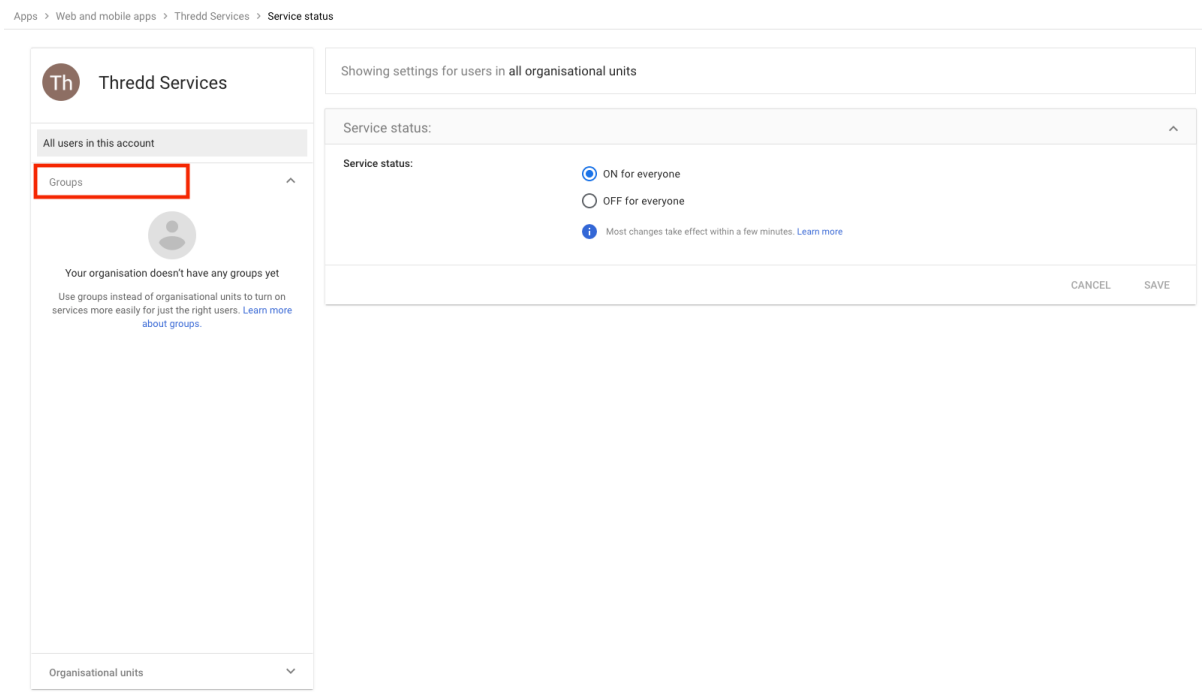
Setting Access Permission Options

You can set access permission options for the app based on anyone who holds a Google account, membership of specific Google groups, and organisational units. An organisational unit is a named organisation within Google.

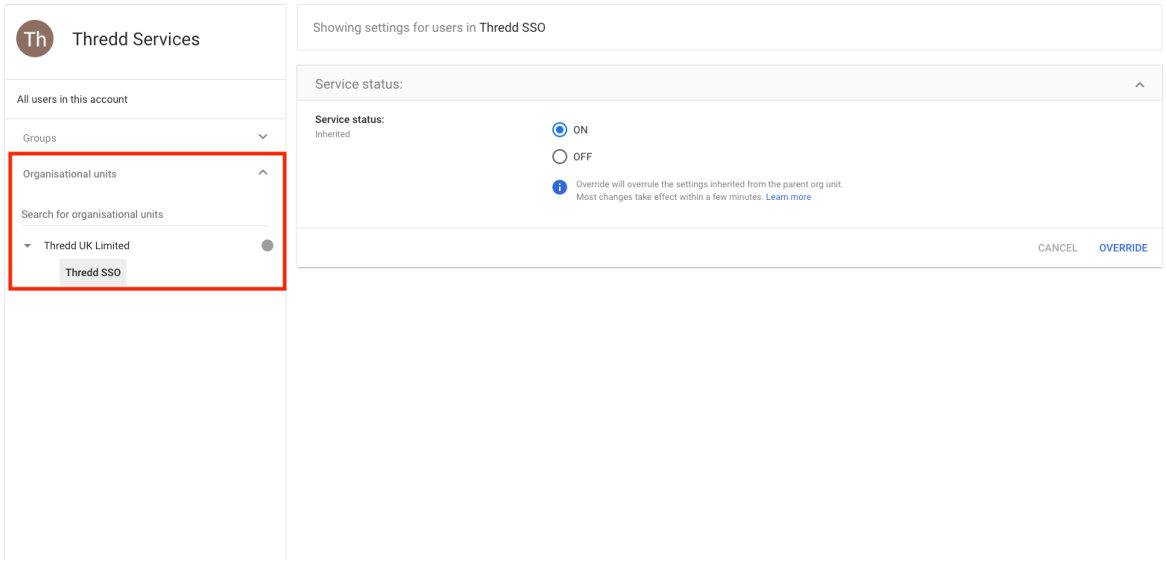
1. To provide access to anyone who holds a corporate Google account, select **All users in this account** on the left hand menu. Then choose **ON for everyone** in the main screen.



2. To provide access to members of a selected group:
    a. Select **Groups** on the left hand menu.
    b. Select a group.
    c. Select **ON for everyone** in the main screen.



3. To provide access to members of specific Organisational units:
    a. Select **Organisational units** on the left hand menu.
    b. Select an organisational unit.
    c. Select **ON for everyone** in the main screen.



Configuring SSO with Okta (OIDC)

This is a sample SSO integration. For more information on implementing SSO with Thredd, please see the SSO section of this guide.

If your organisation uses Okta, you can configure Okta as an IdP provider to provide SSO access to various Thredd services. For example, you can use SSO to access Thredd services such as Thredd Portal. This guidance describes the steps for using the OpenID Connect (OIDC) protocol for setting up SSO.

Note: Setting up SSO is not mandatory, but Thredd recommends it.

Overview

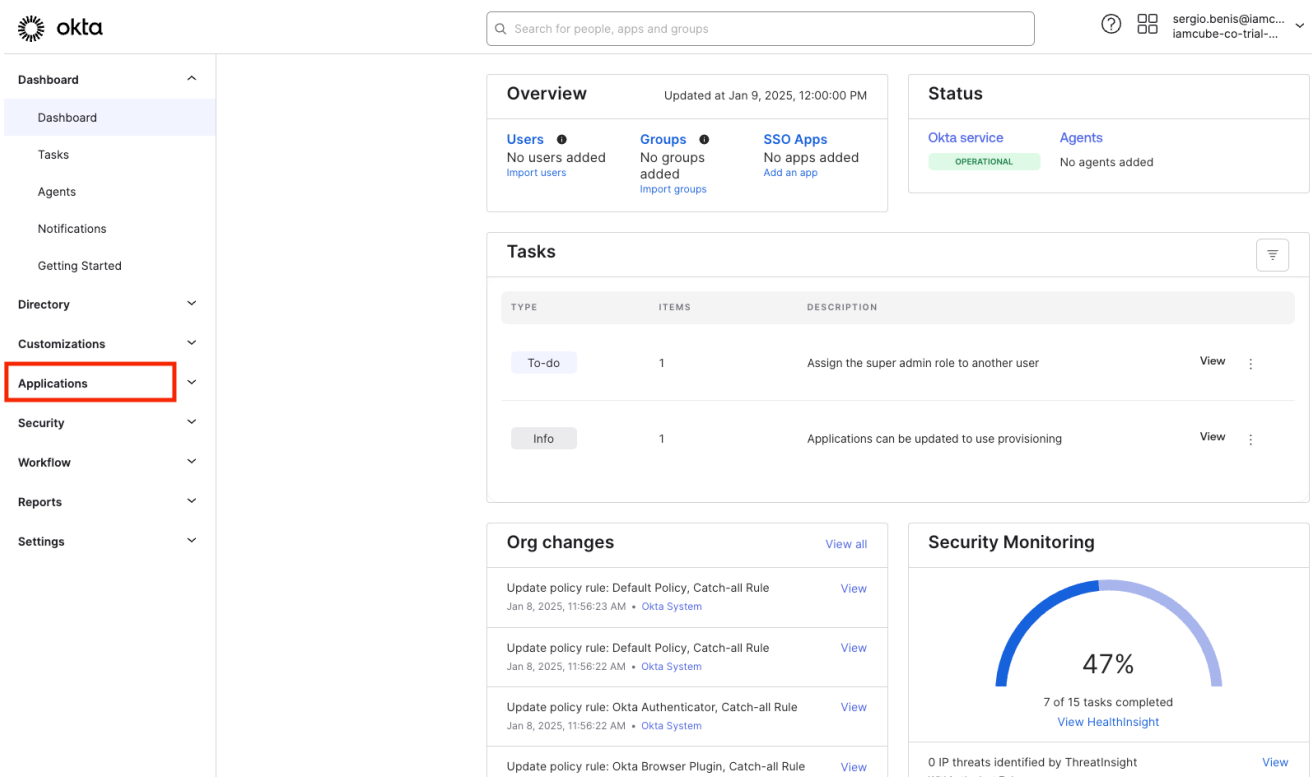
The steps involve:

- Creating an app and app integration.
- Setting URL and refresh token settings.
- Specifying your access control requirement.
- Sharing authentication details with Thredd, via the Client ID/Client Secret method

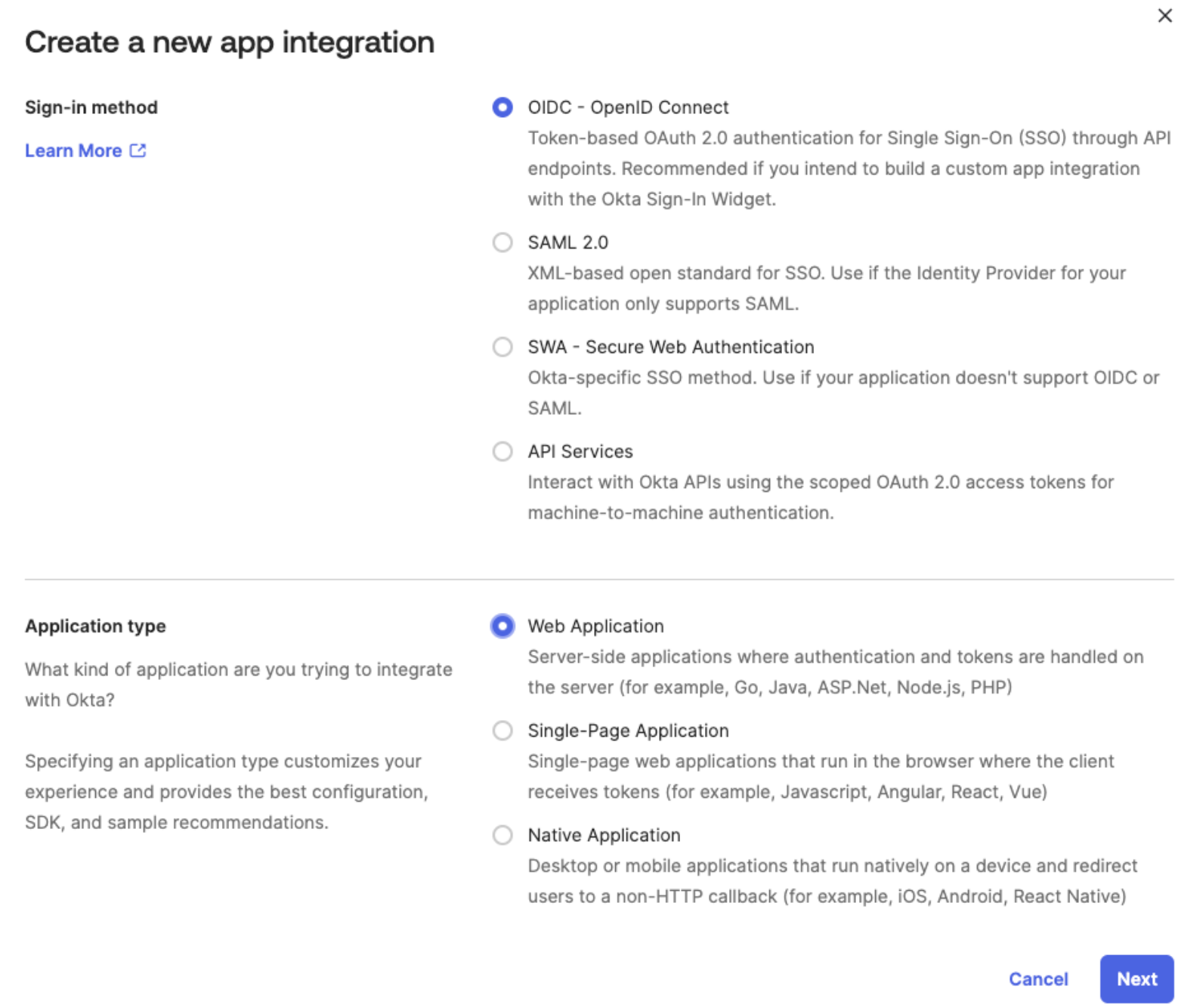
Thredd will provide you with a Sign-in Redirect URI for creating a web application integration.

Configuring SSO

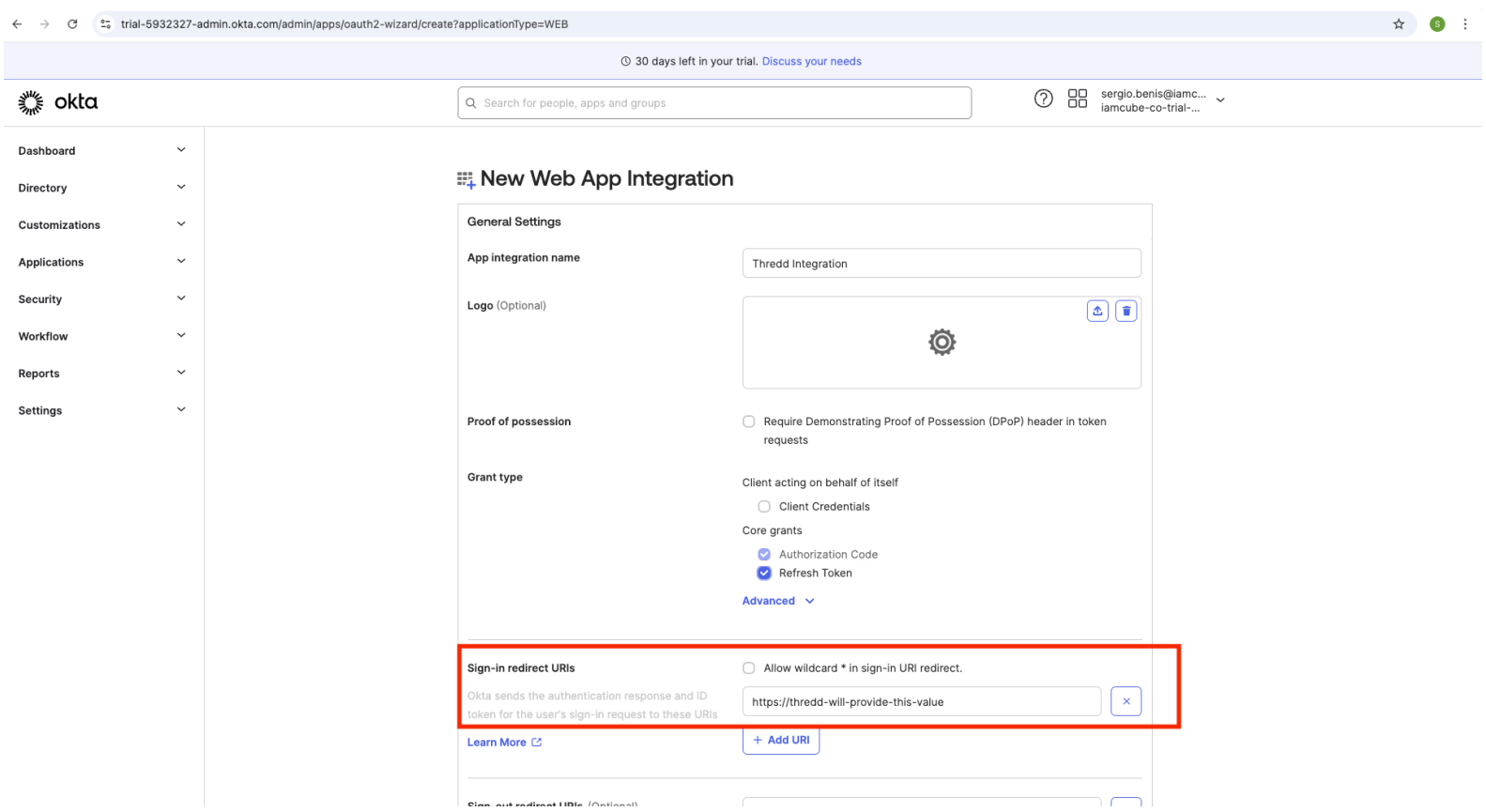
1. Log in to the Okta Administration console.
2. Select **Applications** from the left-hand menu.



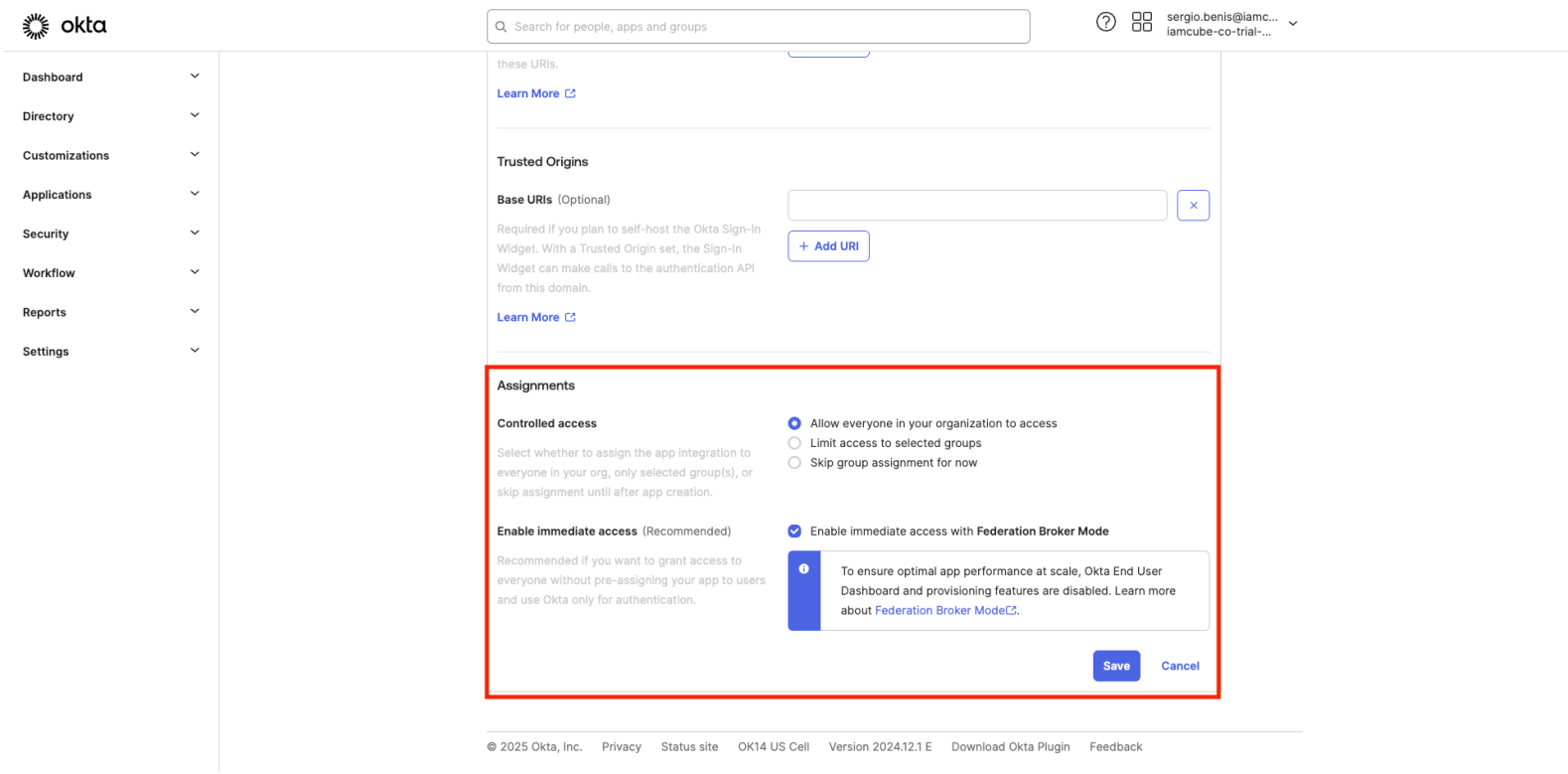
3. Select **Create Application**.
4. In **Create a new application integration**, select **OIDC - OpenID Connect** and **Web Application.**



5. Select **Next.**
6. Enter a name for your application integration in **Application integration name**.
7. Select the **Refresh Token** check box.
8. Enter the URL value of the sign-in redirect URIs in the **Sign-in redirect URIs** section.



9. Select how you want to control access to Thredd applications from your organisation. The following example shows that access is available to all users in your organisation, and where there is immediate access.



10. Share your Client ID/Client secret details with Thredd using your preferred secure method.

General FAQs

The following detailed list of FAQs focuses on the Thredd Secure Framework and its components, and related topics. These components include Thredd Portal and Thredd CA.

Overview

What is the Secure Framework?

The Thredd Secure Framework is a combination of components that enable secure access to Thredd's resources using a common identity store. These include Thredd Portal, Thredd CA, and mTLS termination (for those clients using mTLS). It ensures secure communication and access control through features like mTLS, OAuth, and certificate-based authentication. For more information, see Thredd Secure Framework.

What is mTLS and how is it used in the Secure Framework?

mTLS (Mutual Transport Layer Security) is a security protocol used to establish trust between clients and servers.

- Transport Certificates issued by Thredd CA are used to establish secure connections.
- mTLS Termination requires on-premise infrastructure to establish Trust Chains to ensure certificates originate from legitimate sources.
- It is used in the External Host Interface (EHI) setup, and works in the background for the SOAP and REST API setups.

For more information about Mutual TLS, see Mutual TLS explained.

Can I still use or request a VPN setup?

No, Thredd does not support new VPN setups. You must connect securely to Thredd using the Secure Framework.

Certificates

What is Thredd CA, and what certificates does it provide?

Thredd CA is Thredd's Certificate Authority responsible for creating and managing certificates. Users with an Admin role can request and revoke certificates from within Thredd Portal. It provides:

- **Transport Certificates:** For secure connections between resources.
- **Root and Issuing Certificates:** Bundled in the EHI Trust Chain, for verifying Transport Certificates in EHI setups that use mTLS.

What certificates are required for different Thredd applications?

The certificates required for various Thredd applications are as follows:

- **REST API:** Requires Transport Certificates for mTLS connections.
- **SOAP API:** Requires only Transport Certificates.
- **External Host Interface (EHI):** Requires Root and Issuing Certificates (available in Thredd Trust Chain).
- **Thredd Portal:** Pre-installed Transport Certificates.
- **Smart Client:** Bundled Transport Certificates in the installer.

For more information, see the following sections that are related to requesting certificates in the Connecting to Thredd Guide:

- Creating an Application and OAuth Client
- Requesting certificates for applications using mTLS
- Setting up EHI for mTLS connections

Single Sign-On

How does SSO work in the Secure Framework?

SSO capabilities are provided through Thredd Portal, allowing federated authentication. This enables users to authenticate once and gain access to multiple Thredd resources instead of logging in separately for each service. You can also configure your own IdP provider for SSO.

See the following section within the Connecting to Thredd Guide: Setting up Single Sign-On access for users

External Host Interface

How do I set up mTLS for EHI?

Step 1: Set up certificates.

You need a Server Certificate and the EHI Trust Chain to enable mTLS.

1. Set up Server Certificates:
    a. Obtain a Server Certificate from a trusted Certificate Authority (CA) vendor, such as Verizon, Digicert, or Amazon Web Services.
    b. Install the following certificates on your EHI listening endpoint:
        - Server or Leaf Certificate: Issued to individual servers by a CA. This certificate is the "leaf" of the hierarchical tree of trust.
        - Intermediate or Issuing Certificate: Represents the CA that issued the server certificate.
        - Root Certificate: The trusted root of the CA chain.
2. Set up Client certificates. Thredd presents its Transport Certificate during the connection handshake. Your system must validate this certificate against the CA Thredd Trust Chain (Root and Issuing Certificates).

Step 2: Test the mTLS Connection.

1. Test the connection to ensure the mTLS handshake is successful.
2. Verify that your system can receive and process EHI messages securely.

Step 3: Add Optional Security Enhancements

To further secure your mTLS setup, consider implementing the following:

1. IP Address Allowlist: Add Thredd's fixed IP address to your allow list to ensure only authorised traffic is accepted.
2. Certificate Pinning: Implement certificate pinning to block requests made with incorrect certificates.

For more information, see Setting up EHI for mTLS connections.

Postman Setup

How do I use Postman to test the Secure Framework?

Prerequisites

- Install Postman on your system.
- Create an application in Thredd Portal.

Main steps

1. Ensure that you have the necessary certificates generated and signed by the Thredd Certificate Authority (CA).
2. Add variables from Thredd CA to the variables section in the Postman collection. You can obtain this information from your application's details in Thredd Portal.
3. If using mTLS, add certificates for mTLS and repeat this process for all required hosts.
4. Set the variables in the **Variables** tab.
5. Check your settings and finish setting up.
6. Test making an API call using the Postman Collection.

For a full step-by-step guidance, see one of the following:

- Using the Postman Collection to call REST APIs over TLS
- Using the Postman Collection to call REST APIs over mTLS

More information

Where can I find more information?

For more details, refer to the following resources:

- Setup preparation and steps – for connecting to Thredd API Hub (REST APIs) and Thredd Portal via TLS or mTLS connections
- API Hub website – API Reference and guides for Thredd's REST APIs
- Thredd Portal: Card and Transaction Management Guide

- External Interface (EHI) Guide (JSON)
- External Interface (EHI) Guide (XML)

Glossary

This page provides a list of glossary terms used in this guide.

C

Card Scheme (Network)

Card network, such as Discover, MasterCard, or Visa, responsible for managing transactions over the network and for arbitration of any disputes.

Certificate Authority

A Certificate Authority is an entity that validates the identities of entities (such as individuals, organizations, or websites) and binds them to cryptographic key pairs through the issuance of digital certificates.

Confidential Client

A client that can maintain the confidentiality of their credentials (e.g., client implemented on a secure server with restricted access to the client credentials), or capable of secure client authentication using other means. For more details, refer to RFC 6749 for the OAuth 2.0 Authorization Framework.

E

External Host Interface (EHI)

The external system to which Thredd sends real-time transaction-related data. The Program Manager uses their external host system to hold details of the balance on the cards in their programme and perform transaction-related services, such as payment authorisation, transaction matching and reconciliation.

I

Identity Provider (IDP)

An IDP is a system entity that creates, maintains, and manages identity information for principals and also provides authentication services for relying on applications within a federation or distributed network.

M

Mutual Transport Layer Security (mTLS)

mTLS is a method for mutual authentication that ensures the parties at each end of a network connection are who they claim to be by verifying that they both have the correct private key. The information within their respective TLS certificates provides additional verification.

O

OAuth OpenID Provider

An OAuth OpenID Provider (OP) is an entity that has implemented the OpenID Connect and OAuth 2.0 protocols. OPs can also be referred to by the role it plays, such as: a security token service, an identity provider (IDP), or an authorization server.

P

Program Manager

A customer who manages a card program. The program manager can create branded cards, load funds and provide other card or banking services to their end customers.

S

Scope

The permissions related to the resources your application is registered to access. Each scope relates to specific endpoints. For example, the cards.encrypted scope gives permission to use the Get Encrypted Data endpoint.

Secure Connectivity Framework

The Secure Connectivity Framework is an umbrella set of rules and standards for identity management, verification, and assurance within a sector. The framework establishes common principles, definitions, and Open Standards for data sharing to create the foundations of a trusted data-sharing ecosystem

Smart Client

Smart Client is a user interface for programme managers to manage their account on the Thredd Platform. Smart Client is installed as a desktop application.

T

Thredd CA

Thredd CA (Certificate Authority) acts as the Certificate Authority for issuing certificates. You can create applications for your organisation, as well as request Transport and Signing certificates.

Transport Certificate

A Transport Certificate (or TLS Certificate) is a data file that contains important information for verifying a server's or device's identity, including the public key, a statement of who issued the certificate (TLS certificates are issued by a Certificate Authority), and the certificate's expiration date.

Document History

This section provides details of what has changed since the previous document release.

Version	Date	Reason	Revised by
Version 1.2	16/09/2026	Updated Using the Postman Collection to call REST APIs over mTLS and Using the Postman Collection to call REST APIs over TLS to cover set up Postman for Thredd Identity and Access Management (IAM) users.	JB
	16/09/2026	Updated the Webhook integration (sometimes referred to as the Thredd Event Delivery System or EDS) section.	GF
	02/09/2026	Removing support for Raidiam Connect and Cloudentity.	GF
Version 1.1	23/01/2026	Added section on how to connect to Thredd using AWS and VPN. See Connecting with AWS and VPN.	JB
	23/01/2026	Added a prerequisites list in the Generating and Obtaining a Software Statement Assertion (SSA) section and linked it with related information elsewhere in the guide.	ER
	14/08/2025	Added section on how to manually create users, including how to assign restricted codes and Thredd Portal roles. See Manually Create Users.	JB
	05/06/2025	New FAQ section. See FAQs.	KD
Version 1.0	25/03/2025	First version.	WS

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Technical Publications

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