



ENTRUST

Entrust PKIaaS

Customer Guide

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1 About this guide

This document provides a complete customer guide for Entrust PKIaaS (PKI as a Service).

- [Revision information](#)
- [Other documents](#)
- [Documentation feedback](#)

Revision information

See the below table for the issues of this document.

Date	Section	Changes
Feb 2024	Automating WSTEP enrollment with an Entrust-hosted Enrollment Gateway	New section
Oct 2023	Role-Based Access Control	New role-based access control feature
	Post-quantum Lab experimental region	New region to test PQ key types
	Multiuse certificate profiles	New certificate profiles
May 2023	Certification Authority instantiation	Remove the region limitation per ECS account
	Getting the Intune Service URL Getting Certificate Enrollment Gateway settings for MDM	Add Intune and MDM URLs for the US and EU regions.
	PKIaaS subscriber certificate profiles	Update the default validity from 3 to 1 year for most subscriber certificate profiles.
	Migrating a customer-hosted Enrollment Gateway to Entrust-hosted	Add this new section.

Date	Section	Changes
March 2023	Automating Intune enrollment with an Entrust-hosted Enrollment Gateway Automating MDM enrollment with an Entrust-hosted Enrollment Gateway Integrating third-party tools with the Entrust CA Gateway API Azure Firewall Intermediate CA certificate profile	Add these new sections.
Nov 2022	TLS Proxy CA certificate profile	Add this new feature.
	MDMWS certificate profiles	Add the P12 and client authentication profiles.
Oct 2021	All sections	Release the document.

Other documents

See the below table for other relevant documentation on Entrust PKIaaS.

Document	URL
PKIaaS Product Page	https://www.entrust.com/digital-security/certificate-solutions/products/pki/managed-services/pki-as-a-service
PKIaaS Terms and Conditions	https://www.entrust.com/legal-compliance/terms-conditions/entrust-managed-pki
PKIaaS Certification Practice Statement	https://api.managed.entrust.com/pkiaas/cps

Documentation feedback

You can rate and provide feedback about product documentation by completing the online feedback form:

<https://go.entrust.com/documentation-feedback>

Any information that you provide goes directly to the documentation team and is used to improve and correct the information in our guides.

2 Introduction to PKIaaS

Entrust PKI as a Service (PKIaaS) is a highly secure PKI that is quick to deploy, scales on-demand, and runs where you do business - the cloud.

As explained in the following sections, Entrust PKIaaS secures use cases through turnkey approaches, solving customer problems while maintaining simplicity by reducing the number of services, applications, and software they need to run on their premises.

- [PKIaaS benefits](#)
- [PKIaaS capabilities](#)
- [PKIaaS operation](#)
- [PKIaaS governance model](#)
- [PKIaaS quotas and limits](#)
- [Compliance frameworks](#)

See the following YouTube video playlist for a description of the main administration tasks.

<https://www.youtube.com/playlist?list=PLu4ev5P7cZ0IBmbH0iTWjWuNXH8OatwCM>

PKIaaS benefits

Entrust PKIaaS provides the following benefits.

- [Scalability](#)
- [Speed](#)
- [Security](#)
- [Simplicity](#)

Scalability

Modern use cases demand more and shorter-lived certificates. Entrust PKIaaS is a high-performing, cloud-native system that scales as needed with nearly limitless capacity, guided by Entrust experts. As a next-generation service built on today's technology, you will always have the capacity you need—when you need it.

Speed

The speed of business is changing. Your PKI needs to operate swiftly wherever you conduct business. Entrust PKIaaS deploys and expands within minutes, providing a rapid solution to secure your business use cases. For example:

- You can create new issuing CAs in minutes to handle the next generation of use cases.
- You can use the Entrust-hosted automation service to deploy IT use cases, such as mobile device management and Windows auto-enrollment.

Security

Maintaining your security posture matters. Entrust PKIaaS:

- Provides you with dedicated root and issuing Certification Authorities (CAs)
- Protects your keys in our Tier III data centers, secured by Entrust nShield HSMs running at FIPS 140-2 Level 3.

Simplicity

As deployments diversify and use cases grow in complexity, they present a management challenge. With our PKIaaS, Entrust handles PKI management, relieving you of the burden. Use cases are easy to deploy and adaptable, ensuring they won't impede business operations. PKIaaS seamlessly interoperates with other Entrust PKI products, including :

- Entrust Certificate Services Enterprise Portal (ECS).
- Certificate Enrollment Gateway (CEG).
- Certificate Hub.

PKIaaS capabilities

Entrust PKIaaS capabilities cover the following areas.

- [Certification Authority instantiation](#)
- [Certificate issuance](#)
- [Certificate management](#)
- [Certificate status checking](#)

Certification Authority instantiation

PKIaaS provides the following CA instantiation capabilities.

- [CA types](#)
- [CA key and signature algorithms](#)
- [Secure CA key management](#)
- [CA creation time](#)
- [CA validity period](#)

CA types

Each customer may have one or more subordinate issuing CAs. You can:

- Create an online root CA and add issuing CAs subordinate to this root CA.
- Add an issuing CA signed by an external root CA – for example, your on-premise Microsoft root CA.

CA key and signature algorithms

The following CA key and signature algorithm pairs are supported.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption

Key algorithm	Signature algorithm
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

 The NIST recommends not using RSA2048 after Dec 31, 2030. See <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-57pt1r5.pdf>

Secure CA key management


All CA private keys are stored in Entrust nShield Connect XC high HSMs FIPS140-2 level 3.

CA creation time

CAs are automatically provisioned in ~60 seconds after submitting your request.

CA validity period

CA certificates have a default validity period of 20 years for root CAs and 10 years for subordinate issuing CAs. You can select a different period when creating each CA.

 An issuing CA should have a **minimum lifespan of 3 years** to support some features. For example, to automate Intune/MDM enrollment using an Entrust Hosted Certificate Enrollment Gateway, an issuing CA must **have at least 3 years** of remaining lifespan when the Enrollment Gateway is created.

Certificate issuance

PKIaaS capabilities for certificate issuance include the following.

- [Certificate profiles](#)
- [Subscriber key algorithms](#)
- [Validity period](#)
- [Enrollment by CSR](#)
- [Subject Alt Names](#)
- [Extensions](#)
- [Proof of possession](#)

Certificate profiles

PKIaaS certificate issuance is always in the context of a certificate profile. These profiles are defined within the PKIaaS service and referenced by name in the certificate issuance requests. As described in [PKIaaS subscriber certificate profiles](#), Entrust tunes the profiles to specific use cases:

- ECS Enterprise UI
- CA Gateway API
- On-premises Certificate Enrollment Gateway (CEG).

Subscriber key algorithms

PKIaaS supports RSA and EC subscriber certificate key algorithms. PKIaaS is validated to sign certificates that use the following algorithms for their public key.

- ECDSA P-256
- ECDSA P-384
- ECDSA P-521
- RSA 2048
- RSA 3072
- RSA 4096

Validity period

The certificate validity period cannot go beyond the expiry date of the issuing CA. The validity period value defaults to 3 years if it is not specified in the request.

Enrollment by CSR

All certificate issuance requests are completed through CSR format. The calling application is responsible for the generation of the certificate's private key.

Subject Alt Names

Subject Alt Names (SANs) are supplied in the request separate from the CSR. API requests to PKIaaS support the "subjectAltNames" field of the request.

Some third-party services such as Venafi require to automatically supply SANs using the common names for TLS server certificates. To automatically supply SANs using common names, PKIaaS offers two certificate profiles under [Private SSL \(ACMEv2\) certificate profiles](#).

- `privatessl-tls-client-server-supply-san`
- `privatessl-tls-server-supply-san`

Extensions

Certificate extensions are supplied in the request separate from the CSR. Use the following API field to supply extensions.

```
optionalCertificateRequestDetails.extensions
```

Proof of possession

The proof of possession check automatically validates that the caller has possession of the private key. The POP check is always performed during certificate request validation.

Certificate management

To manage certificates, Entrust PKIaaS provides:

- The web portal described in [Managing certificates with Entrust Certificate Services Enterprise](#)
- The API described in <https://api.managed.entrust.com/doc/#operation/certificate-events>

Certificate status checking

PKIaaS provides the following certificate status-checking functions.

- [Entrust PKIaaS Certificate Revocation Lists](#)
- [Entrust PKIaaS OCSP service](#)

Entrust PKIaaS Certificate Revocation Lists

PKIaaS publishes Certificate Revocation Lists (CRLs) with the following settings.

Setting	Value
CRL validity	7 days
CRL extensions	crlNumber, invalidityDate, expiredCertsOnCRL
Signing key	CA key
CRL type	Full CRL
Maximum size	22 MB
CA type	Root and issuing CAs

Each CRL is updated:

- Automatically, every 24 hours.
- When including the "publish now" option on revocation requests to the API—this option results in the issuance of a new CRL within 15 minutes.
- When revoking an end-entity certificate using the ECS Enterprise UI or the Entrust Certificate Enrollment Gateway (CEG)—this type of revocation also results in the issuance of a new CRL within 15 minutes.

CRLs are available at the following URLs.

US region

`http://crl.pkiaas.entrust.com/crl/{accountId}/{caId}/crl.crl`

EU region

`http://crl.eu.pkiaas.entrust.com/crl/{accountId}/{caId}/crl.crl`

PQ Lab region

```
http://crl.pqlab.pkiaas.entrust.com/crl/{accountId}/{caId}/crl.crl
```

Where `{accountId}` is your account identifier, and `{caId}` is the Certification Authority identifier.

Entrust PKIaaS OCSP service

The Online Certificate Status Protocol (OCSP) supports:

- Nonce extension
- Archive Cutoff extension
- Multiple OCSP certificates per request
- Signed/Unsigned requests
- Delegated keys
- OCSP may be configured for both roots and issuing CAs

OCSP services are available at the following URLs.

US region

```
http://ocsp.pkiaas.entrust.com/ocsp/{accountId}/{caId}
```

EU region

```
http://ocsp.eu.pkiaas.entrust.com/ocsp/{accountId}/{caId}
```

PQ Lab region

```
http://ocsp.pqlab.pkiaas.entrust.com/ocsp/{accountId}/{caId}
```

Where `{accountId}` is your account identifier, and `{caId}` is the Certification Authority identifier.

PKIaaS operation

See below for a summary of the PKIaaS operational procedures.

- [Physical locations](#)
- [Access control and trusted roles](#)
- [CA key management](#)
- [Audit logging](#)
- [Disaster recovery](#)

i For the PKIaaS terms and agreements, see <https://www.entrust.com/legal-compliance/entrust-certificate-services-repository>

Physical locations

In each region, Entrust has implemented two physical datacenters with failover between the two.

Region	Datacenters
US	Dallas (TX), Denver (CO)
EU	Munich (Germany), Frankfurt (Germany)

Cloud-based components use multiple availability zones for high availability and a second region for disaster recovery.

Access control and trusted roles

The HSM and Activation Data are located in either Tier III, SSAE-18 datacenters or a two-person controlled safe located in a facility. The personnel in Trusted Roles with access:

- Can backup, store, and recover CA Private Keys using dual control in a physically secured environment.
- Receive alarm notifications on any violation of the rules for accessing the HSM or a CA.
- Are trained for their specific role and must undergo background investigations.
- Cannot change the product code.

CA key management

When a customer requests to provision a new CA, an API-based process generates the CA key pair within HSMs in a physically secured environment.

Audit logging

Significant security events in the CAs are automatically time-stamped and recorded as **internal** audit logs. Audit logs are:

- Periodically archived.
- Constantly monitored by the Entrust Security Information and Event Management (SIEM) system.

Additionally:

- The operations and security teams review the alerts generated by possible policy violations and other significant events.
- You can see the basic audit logs related to your PKIaaS account in the Enterprise UI using the Reports function.

Disaster recovery

To mitigate the event of a disaster, PKIaaS utilizes:

- Two data centers in each region (US and EU) with highly available HSMs

- Secure on-site and off-site storage of backup HSMs containing copies of all CA private keys
- Database replication between primary and secondary cloud regions and maintained in real-time.
- Daily database backups within both the primary and secondary cloud regions and weekly backup of critical data to a secure off-site storage facility

PKIaaS governance model

Defining the governance model for an enterprise-level PKI is a long and challenging process involving teams across the organization. To save you time and expense, and to ensure that you have a proper PKI, Entrust provides a pre-defined set of policies and practices governing these PKIs. See the following sections for a summary.

- [Entrust responsibilities](#)
- [Customer responsibilities](#)

See also:

- The [PKIaaS Certification Practices Statement \(CPS\)](#) for full documentation of these policies and practices.
- The [RFC 647](#) for a general description of the policy and practices framework.

Entrust responsibilities

In PKIaaS, Entrust has the following responsibilities.

- [Root CA](#)
- [Issuing CAs](#)
- [Policy Authority](#)
- [Operational Authority](#)

Root CA

The root CA serves as your PKI trust anchor. This CA is a dedicated root CA for your company alone to use. Root CAs are not shared. You define the common name of your root, though we ask for a naming relationship with your company so that we can support you more easily. Your root CAs will issue certificates to your issuing CAs and OCSP services.

Issuing CAs

You may have one or more issuing CAs. PKIaaS will support any number of use cases (and associated certificate profiles) on one issuer, or you can split the responsibility to multiple issuing CAs.

You will define Registration Authorities (RAs) that can issue certificates for all use cases supported by the issuing CA, so if you wish to have some division of responsibility, you may want to set up more than one issuing CA. These issuing CAs are subordinate to your root and issue certificates for subscribers.

Policy Authority

Entrust is the Policy Authority and is responsible for overseeing and setting policy and practices as applicable to the operation of the Certification Authorities.

Operational Authority

Entrust manages all root and issuing CA systems hosted and operated on your behalf, as part of PKIaaS. These systems issue and manage

- Certificates

- Certificate Revocation Lists (CRLs)
- OCSP responses

As the Operational Authority (OA), Entrust is responsible for all the operations of the CAs per the CPS.

Customer responsibilities


In PKIaaS, customers have the following responsibilities.

- [Registration Authority](#)
- [Subscribers](#)
- [Relying parties](#)

Registration Authority

In PKIaaS, you and your company are the Registration Authority (RA). The RA is the person or entity that decides whether to issue a certificate in response to a Subscriber request. Specifically, RAs:


1. Verify the identity of applicants. They are responsible for the applicant registration, identification, and authentication processes.
2. Submit certificate issuance requests on their behalf.

 To perform RA tasks, you will typically use software applications, such as the Entrust Certificate Enrollment Gateway, that interface with the PKIaaS API.

Subscribers

Subscribers are the end-users and entities that request and use certificates. Typical examples of Subscribers are

- Employees or contractors and their devices,
- Enterprise servers and infrastructure,
- IoT devices.

 As the RA, you are responsible for determining who may be a subscriber and determining which people, entities, and devices may receive certificates.

Relying parties

A relying party is an entity that uses a certificate, for example, to verify and identity. PKIaaS is tuned to support enterprise-level privately trusted certificates. You are responsible for assuring that relying parties perform the necessary certificate validity and status checks.

 Entrust PKIaaS supports both CRL and OCSP checks.

PKIaaS quotas and limits

Entrust PKIaaS enforces the following quotas and limits.

- [Region limits](#)
- [Rate limits](#)
- [Certificate issuance capping](#)

Region limits

PKIaaS currently supports setting up your PKI in the US or EU regions.

- You can set up your whole trust chain (root CA and issuing CA) in the same region.
- PKIaaS does not support cross-region trust chains; you cannot sign an issuing CA using a root CA from another region.

Rate limits

PKIaaS has two tiers of quotas based on your PKIaaS certificate inventory.

Quota	Purchased certificates
Standard quota	Less than 1 million
Premium quota	1 million or more

To protect against burst requests and prevent abuse, PKIaaS enforces a request rate limit based on **10-second** intervals.

Capability	Standard quota	Premium quota
Certificate creation	100 requests/10 seconds	1000 requests/10 seconds
OCSP	100 requests/10 seconds	1000 requests/10 seconds
CRL	100 requests/10 seconds	1000 requests/10 seconds
All others	100 requests/10 seconds	1000 requests/10 seconds

If the number of requests exceeds the allowed rate limit:

- The API access is temporarily blocked
- All requests return a 429 HTTP status code with a "TooManyRequests" error message.

Certificate issuance capping

When the number of active certificates reaches the number of PKIaaS certificates purchased by your Entrust Certificate Service Enterprise account, PKIaaS blocks your account from issuing any additional certificates. To issue more PKIaaS certificates, you can either:

- Revoke some of the active certificates.
- Contact your sales representative to purchase more certificates.

Compliance frameworks

See below for some of the certifications the Entrust corporation and the PKIaaS solution comply with.

- [Entrust headquarters certifications](#)

- [PKIaaS data center certifications](#)

Entrust headquarters certifications

At an enterprise-wide level, the Entrust headquarters comply with the following ISO certifications.

Certification	Headquarter
ISO 27001 (Information Security Management Systems)	All
ISO 27701 (Privacy Information Management Systems)	All
ISO 9001 (Quality Management Systems)	Entrust global headquarters in Shakopee, Minnesota
ISO 14001 (Environmental Management Systems)	Entrust global headquarters in Shakopee, Minnesota

For details on these certifications, check:

- <https://www.entrust.com/legal-compliance/iso-certifications>
- <https://www.entrust.com/legal-compliance/security>

PKIaaS data center certifications

The Entrust PKIaaS solution is hosted by reputable data centers following the best security practices and complying with security and privacy certifications, including but not limited to:

- Type 1 Attestation HIPAA/HITECH
- SOC2 Type 2
- SOC3
- ISO 27001
- HITRUST
- PCI-DSS

3 Ordering and activating PKIaaS

Follow the steps below to order and activate your PKIaaS account.

- [Placing an order](#)
- [Activating your Entrust Certificate Service Enterprise account](#)
- [Checking your PKIaaS inventory](#)
- [Activating Entrust TrustedCare \(optional\)](#)

Placing an order


Your Entrust Sales Representative usually helps you place orders based on your business needs. Alternatively, if you already have an Entrust Certificate Service Enterprise Account with eStore access, you can also order by yourself.

- [Purchasing enterprise bundles](#)
- [Purchasing services a la carte](#)

Purchasing enterprise bundles

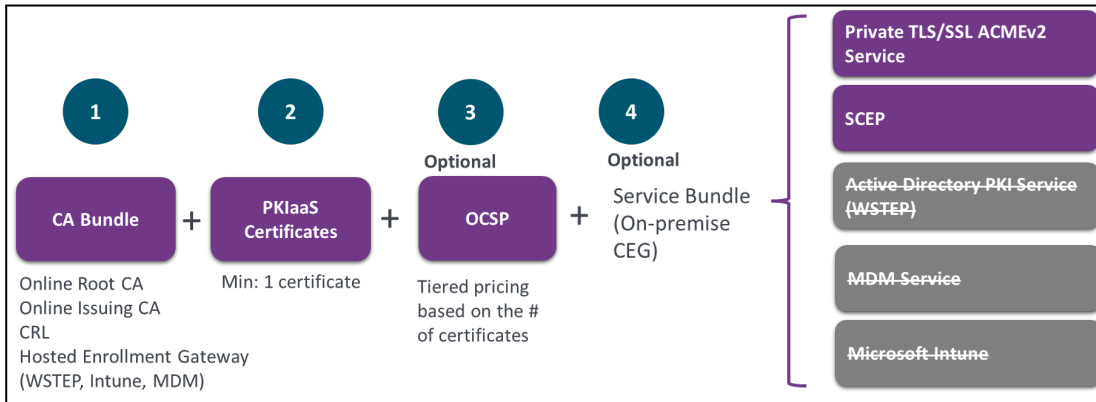
For most customers, we recommend buying the pre-packaged enterprise bundles according to the number of issuing CA and certificates, and whether an Entrust-managed offline root CA is required.

	Enterprise	Enterprise PRO
1k	<ul style="list-style-type: none"> • 1,000 certs • 1 CA Bundle (Online root & issuing) • Cloud Protocols (InTune, MDM, WSTEP, ACME) • 1 OSCP for 1,000 certs • Platinum Support 	<ul style="list-style-type: none"> • +1 Offline Root
10k	<ul style="list-style-type: none"> • 1,000 certs • 2 CA Bundle (Online root & issuing, Test/Prod) • Cloud Protocols (InTune, MDM, WSTEP, ACME) • 2 OSCP for 10,000 certs • Platinum Support 	<ul style="list-style-type: none"> • +1 Offline Root
100k	<ul style="list-style-type: none"> • 1,000 certs • 2 CA Bundle (Online root & issuing, Test/Prod) • Cloud Protocols (InTune, MDM, WSTEP, ACME) • 2 OSCP for 100,000 certs • Platinum Support 	<ul style="list-style-type: none"> • +1 Offline Root
1m	<ul style="list-style-type: none"> • 1,000,000 certs • 2 CA Bundle (Online root & issuing, Test/Prod) • Cloud Protocols (InTune, MDM, WSTEP, ACME) • 2 OSCP for 1,000,000 certs • Platinum Support 	<ul style="list-style-type: none"> • +1 Offline Root

 The cloud version of the ACME automation features has not yet been released.

Purchasing services a la carte

You can also purchase each Entrust PKIaaS service *à la carte* instead of [Purchasing enterprise bundles](#).



Orders for PKIaaS generally consist of the following.

- [PKIaaS CA bundles](#)
- [PKIaaS certificate licenses](#)
- [OCSF \(optional\)](#)
- [Enrollment service bundles \(optional, On-prem Enrollment Gateway\)](#)

PKIaaS CA bundles

Each PKIaaS CA bundle includes:

- A root CA license
- An issuing CA license
- An external root CA license for [Adding an issuing CA under an external root CA](#).
- A CRL instance for each CA
- All the pre-configured [Subscriber certificate profiles](#).
- Entrusted-hosted Enrollment Gateway for WSTEP, Intune, MDM,

You should purchase CA bundles based on how many issuing CAs you need. Specifically:

- PKIaaS only charges for the issuing CAs.
- An online root CA and a connection to an external root CA are free for each issuing CA purchased.

i See [Checking your PKIaaS inventory](#) for how to validate and track your inventory using the ECS Enterprise UI.

PKIaaS certificate licenses

PKIaaS certificate licenses are reusable within the terms of your contract.

- Each "normal" and "held" certificate requires one certificate license.
 - "normal" means certificates issued but not expired, suspended, or revoked.
 - "held" means a suspended certificate.
- A revoked or expired certificate returns the license to the certificate license inventory (the inventory refresh might be delayed by up to 30 minutes).

Purchase certificate licenses based on the certificates you want to issue.

- If you are bulk-renewing certificates (issuing new certificates before existing certificates are revoked or expire), you must purchase **2 times** the certificate licenses.
- You can also renew the certificates by batch; that way, you only need surplus license inventory to issue new certificates while the existing certificates are still active.

OCSP (optional)

If you want to use OCSP as your VA (Validation Authority) method, you must purchase the OCSP service for each CA that needs OCSP enabled. The pricing of the OCSP per CA is based on the volume of the certificates you purchased. A higher volume of certificates translates to a higher price for the OCSP service because the cost of the OCSP (queries and responses) is directly impacted by the number of certificates.

In many use cases, OCSP is not required or recommended; PKIaaS offers free CRL for each PKIaaS CA.

Enrollment service bundles (optional, On-prem Enrollment Gateway)

You can automate the following enrollment mechanisms when using Certificate Enrollment Gateway (CEG) software that needs to be deployed on your premises.

- ACME (Private SSL/TLS)
- SCEP

For these services, you get:

- Access to <https://trustedcare.entrust.com> for downloading the Entrust Certificate Enrollment Gateway software.
- An enrollment service license per issuing CA to activate a use case on Entrust Certificate Enrollment Gateway. See [Automating enrollment with an on-premises Enrollment Gateway](#) for details.

For example, each **PKIaaS WSTEP Enrollment Service Bundle** includes:

- The TrustedCare access to download the Certificate Enrollment Gateway software as described in [Activating Entrust TrustedCare \(optional\)](#).
- A license to activate the WSTEP protocol on the Certificate Enrollment Gateway software

i WSTEP, Intune, and MDM enrollment automation can be done directly on the ECS enterprise portal using Entrust Hosted Enrollment Gateway free of charge. A customer should only buy the on-premises Certificate Enrollment Gateway for the use case not supported by the Entrust-hosted solution yet, such as SCEP and ACME.

Activating your Entrust Certificate Service Enterprise account

When purchasing an Entrust Certificate Service (ECS) Enterprise account, you will receive a mail from auto-notice@entrust.com with the credentials and instructions to activate your account. For example:

Dear John Smith

You have received this email because you have been added as an administrator on an Entrust Certificate Services account (ECS), where you can create and manage your digital certificates. To start:

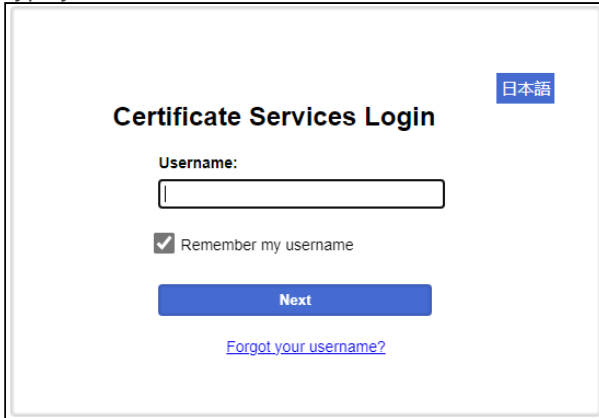
1. Log in to <https://cloud.entrust.net> with your username: john.smith@abc.com
2. Enter your temporary password: **XXXXXX**
3. Enter a new password.
4. Set up your second-factor authentication method and security questions.

5. Enter your One-Time Password (OTP) as sent to this email address.
6. Follow the directions on the ECS **Get Started** screen.

See below for how to activate your Entrust Certificate Service Enterprise account with these credentials.

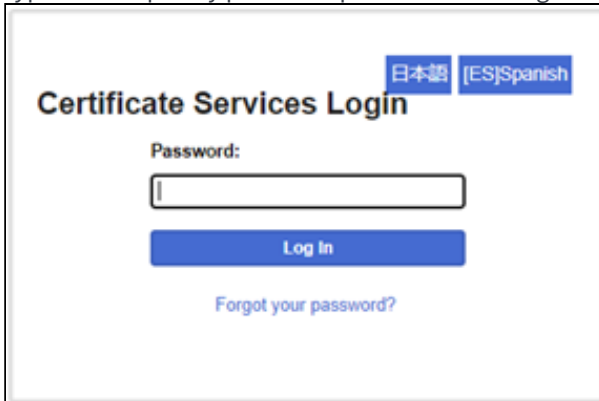
To activate an Entrust Certificate Service Enterprise account

1. Open your browser in the Entrust Certificate Services portal at cloud.entrust.net
2. Type your username and click **Next**.



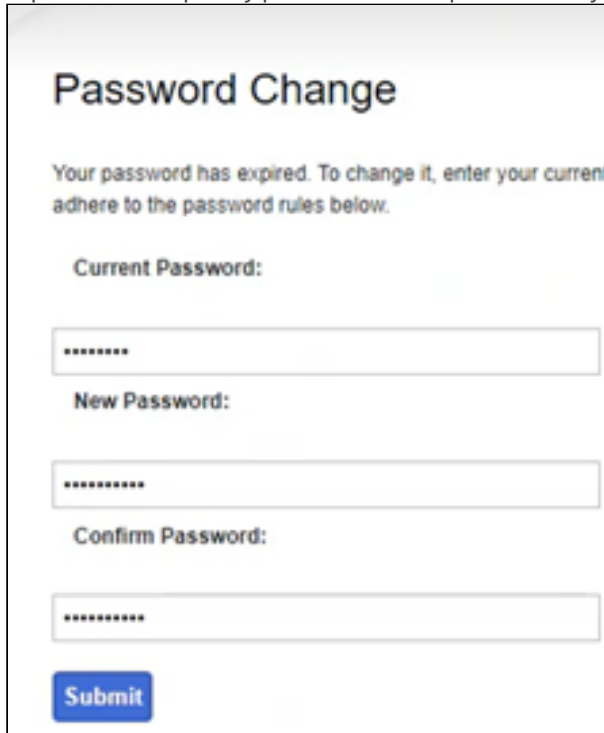
The screenshot shows the 'Certificate Services Login' page. At the top right, there is a language selection button labeled '日本語'. Below the title, there is a 'Username:' label followed by a text input field. Underneath the input field is a checked checkbox with the text 'Remember my username'. A blue 'Next' button is positioned below the checkbox. At the bottom of the form area, there is a blue link that says 'Forgot your username?'.

3. Type the temporary password provided in the registration email and click **Log In**.



The screenshot shows the 'Certificate Services Login' page. At the top right, there are two language selection buttons: '日本語' and '[ES]Spanish'. Below the title, there is a 'Password:' label followed by a text input field. A blue 'Log In' button is positioned below the input field. At the bottom of the form area, there is a blue link that says 'Forgot your password?'.

4. Replace the temporary password with a password of your choosing and click **Submit**.



Password Change

Your password has expired. To change it, enter your current password and a new password that adheres to the password rules below.

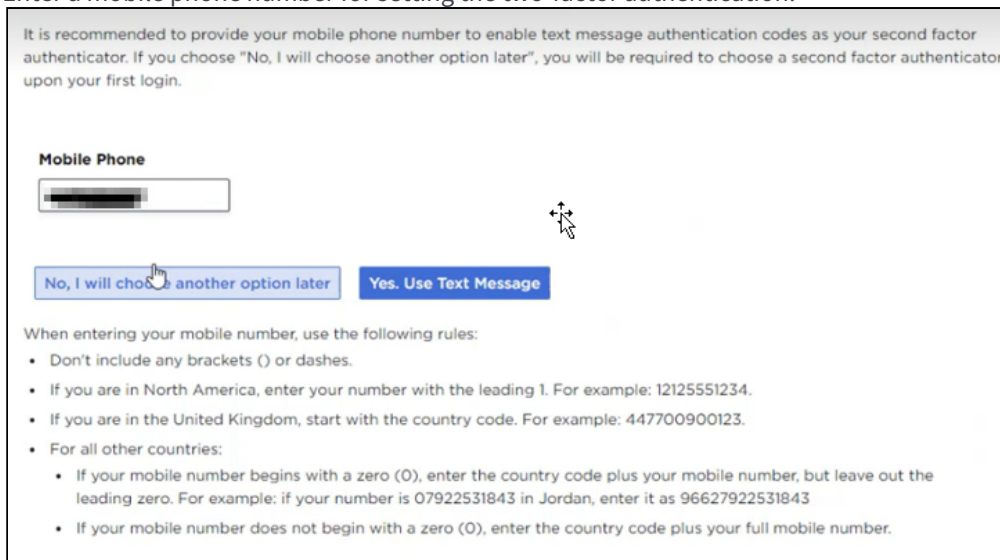
Current Password:

New Password:

Confirm Password:

Submit

5. Enter a mobile phone number for setting the two-factor authentication.



It is recommended to provide your mobile phone number to enable text message authentication codes as your second factor authenticator. If you choose "No, I will choose another option later", you will be required to choose a second factor authenticator upon your first login.

Mobile Phone

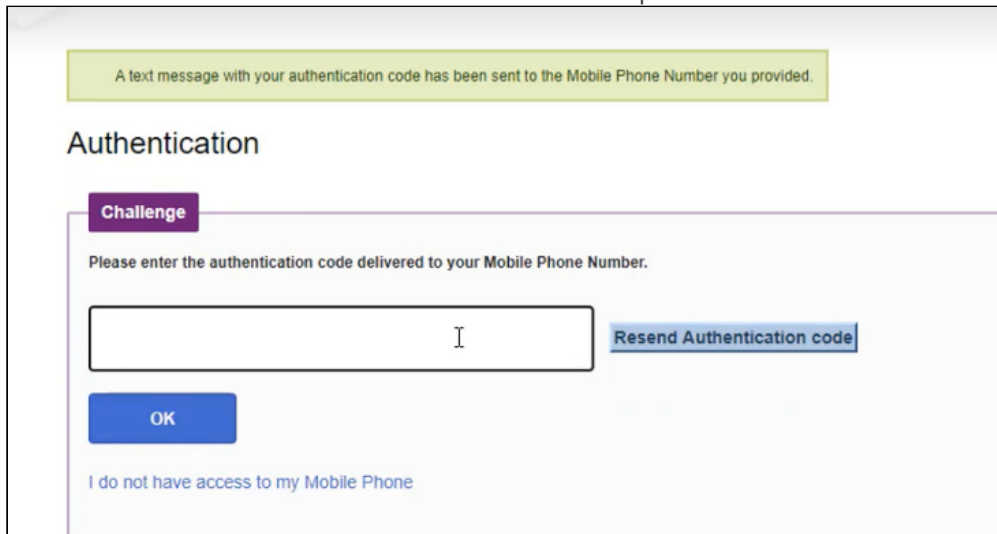
No, I will choose another option later **Yes. Use Text Message**

When entering your mobile number, use the following rules:

- Don't include any brackets () or dashes.
- If you are in North America, enter your number with the leading 1. For example: 12125551234.
- If you are in the United Kingdom, start with the country code. For example: 447700900123.
- For all other countries:
 - If your mobile number begins with a zero (0), enter the country code plus your mobile number, but leave out the leading zero. For example: if your number is 07922531843 in Jordan, enter it as 96627922531843
 - If your mobile number does not begin with a zero (0), enter the country code plus your full mobile number.

6. Click **Yes. Use Text Message**.

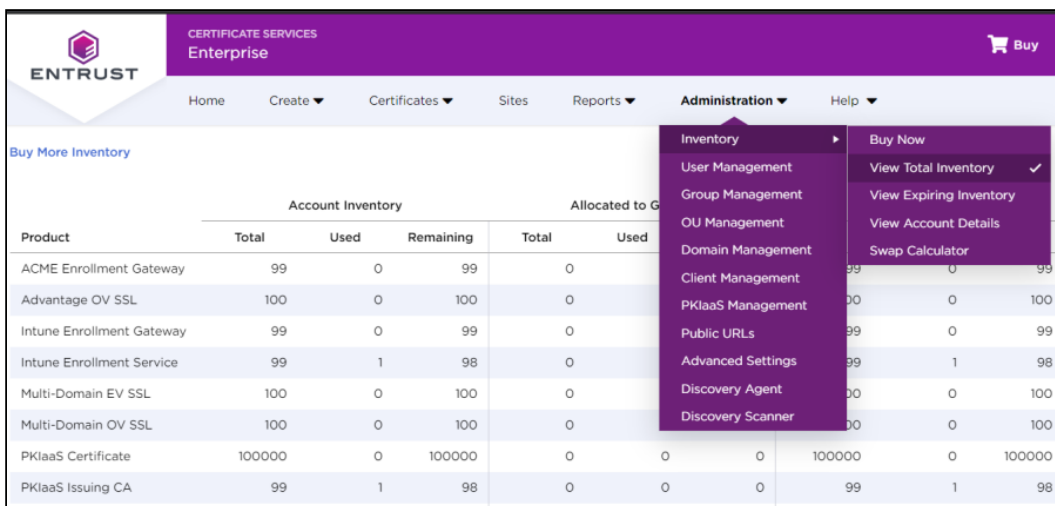
7. Enter the authentication code sent via SMS to the mobile phone and click **OK**.



! You will need the username, password, and a second-factor authentication code for your future Entrust Certificate Service Enterprise logins.

Checking your PKIaaS inventory

To check your PKIaaS inventory in Entrust Certificate Services (ECS), navigate to **Administration > Inventory > View Total Inventory**.



Product	Account Inventory			Allocated to G		
	Total	Used	Remaining	Total	Used	
ACME Enrollment Gateway	99	0	99	0		
Advantage OV SSL	100	0	100	0		
Intune Enrollment Gateway	99	0	99	0		
Intune Enrollment Service	99	1	98	0		
Multi-Domain EV SSL	100	0	100	0		
Multi-Domain OV SSL	100	0	100	0		
PKIaaS Certificate	100000	0	100000	0	0	0
PKIaaS Issuing CA	99	1	98	0	0	0

The inventory view is refreshed every 30 minutes and might not reflect the license consumption changes made within the 30 minutes window.

! Check that you have all the required licenses as discussed in [Ordering and activating PKIaaS](#).

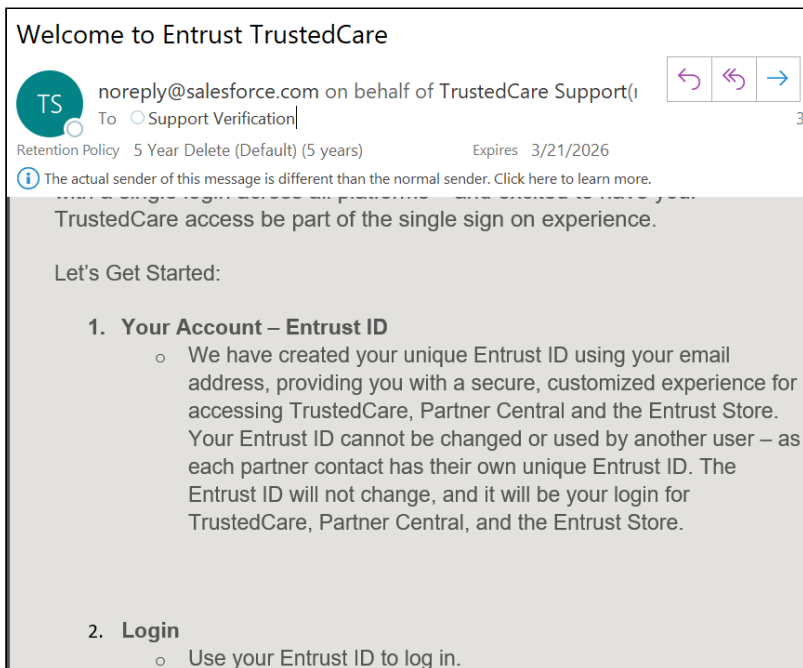
Activating Entrust TrustedCare (optional)

You only need an Entrust TrustCare account when you purchase one of the on-premises Certificate Enrollment Gateway (CEG) enrollment services.

- [TrustedCare credentials](#)
- [Certificate Enrollment Gateway download license](#)

TrustedCare credentials

TrustedCare allows you to download the purchased software and access detailed documentation. If you are a new customer and do not have access to Entrust TrustedCare, you will receive an email with instructions to set up your TrustedCare login at <https://trustedcare.entrust.com>.



The screenshot shows an email interface. At the top, it says "Welcome to Entrust TrustedCare". Below that is a circular profile picture with "TS" and the email address "noreply@salesforce.com on behalf of TrustedCare Support(| Support Verification)". There are navigation arrows and a "3" next to the sender information. Below the sender info, it says "Retention Policy 5 Year Delete (Default) (5 years) Expires 3/21/2026" and a small information icon with the text "The actual sender of this message is different than the normal sender. Click here to learn more." The main body of the email is shaded and contains the following text:

TrustedCare access be part of the single sign on experience.


Let's Get Started:


- 1. Your Account – Entrust ID**
 - We have created your unique Entrust ID using your email address, providing you with a secure, customized experience for accessing TrustedCare, Partner Central and the Entrust Store. Your Entrust ID cannot be changed or used by another user – as each partner contact has their own unique Entrust ID. The Entrust ID will not change, and it will be your login for TrustedCare, Partner Central, and the Entrust Store.
- 2. Login**
 - Use your Entrust ID to log in.

Certificate Enrollment Gateway download license

With the Certificate Enrollment Gateway purchase, you should also receive an email from SoftwareDistribution@entrust.com to notify you that you can access the Entrust Certificate Enrollment Gateway

software on TrustedCare.



Software Distribution
To:  **James@Gaz**

[Reply](#) [Reply All](#) [Forward](#)

Retention Policy: 5 Year Default (Default) (5 years) Expires: 10/14/2025 Wed 10/15/2025

Dear [REDACTED],

Thank you for licensing Entrust software and continuing with the 'Layered Security' approach to enable success within your organization. We appreciate your business.

You have licensed the following Entrust software:

CERTIFICATE SELF-ENROLLMENT (CEM) AND CONTROL CAPABILITY WITH ENROLLMENT CERTIFICATE ENROLLMENT

You can download Entrust software using the following link:

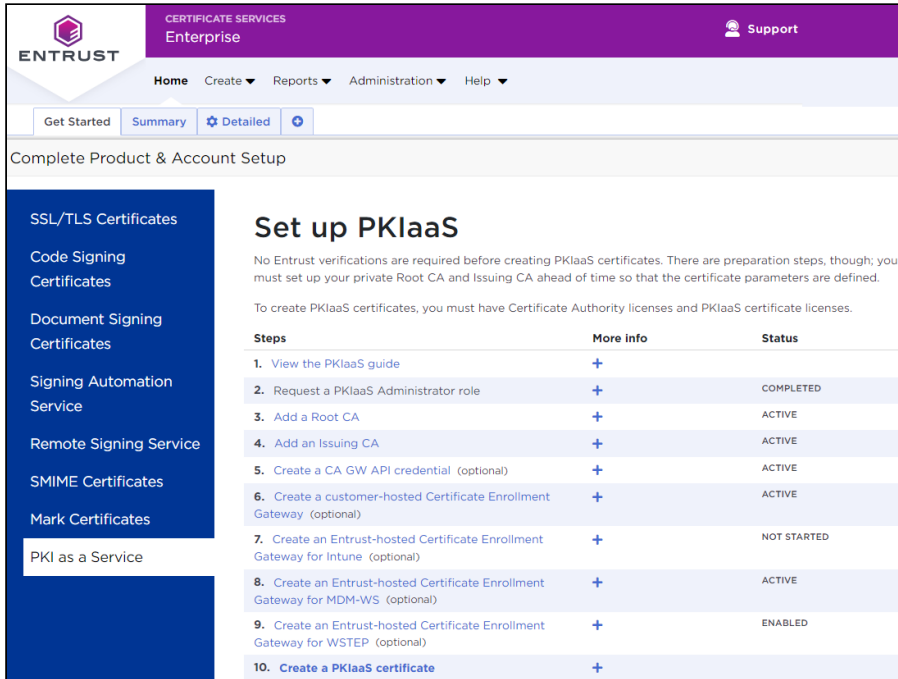
<https://trustedcare.entrust.com>

For any support issues please contact Entrust Support via telephone:
Platinum Customers: 1-877-754-7878 in North America or +1-613-270-3700 elsewhere
Silver & Gold Customers: 1-877-754-7878 in North America or +1-613-270-3715 elsewhere
Email: support@entrust.com

Now you can create your PKI hierarchy using ECS Enterprise, including automating your PKI use case using Certificate Enrollment Gateway, if desired.

4 PKIaaS setup wizard

Entrust Certificate Services Enterprise provides a **Set up PKIaaS** wizard to perform the main PKIaaS setup operations.



Set up PKIaaS

No Entrust verifications are required before creating PKIaaS certificates. There are preparation steps, though; you must set up your private Root CA and Issuing CA ahead of time so that the certificate parameters are defined.

To create PKIaaS certificates, you must have Certificate Authority licenses and PKIaaS certificate licenses.

Steps	More info	Status
1. View the PKIaaS guide	+	
2. Request a PKIaaS Administrator role	+	COMPLETED
3. Add a Root CA	+	ACTIVE
4. Add an Issuing CA	+	ACTIVE
5. Create a CA GW API credential (optional)	+	ACTIVE
6. Create a customer-hosted Certificate Enrollment Gateway (optional)	+	ACTIVE
7. Create an Entrust-hosted Certificate Enrollment Gateway for Intune (optional)	+	NOT STARTED
8. Create an Entrust-hosted Certificate Enrollment Gateway for MDM-WS (optional)	+	ACTIVE
9. Create an Entrust-hosted Certificate Enrollment Gateway for WSTEP (optional)	+	ENABLED
10. Create a PKIaaS certificate	+	

To display this wizard:

1. Click **Home** in the menu bar.
2. Select the **Get Started** tab.
3. Click **PKIaaS** in the sidebar.

See below for the operations provided by this wizard.

#	Step	Section of this document
1	View the PKIaaS guide	All
2	Request a PKIaaS Administrator role	Role-Based Access Control
3	Add a root CA	Creating an online root CA
4	Add an issuing CA	Creating an issuing CA under an online root CA
5	Create a CA Gateway API credential	Generating CA Gateway credentials
6	Create a customer-hosted Certificate Enrollment Gateway	Automating enrollment with an on-premises Enrollment Gateway

#	Step	Section of this document
7	Create an Entrust-hosted Certificate Enrollment Gateway for Intune	Automating Intune enrollment with an Entrust-hosted Enrollment Gateway
8	Create an Entrust-hosted Certificate Enrollment Gateway for MDM-WS	Automating MDM enrollment with an Entrust-hosted Enrollment Gateway
9	Create an Entrust-hosted Certificate Enrollment Gateway for WSTEP	Automating WSTEP enrollment with an Entrust-hosted Enrollment Gateway
10	Create a PKIaaS certificate	Issuing certificates

5 Role-Based Access Control


See below for how to manage PKIaaS user roles in Entrust Certificate Services (ECS).

- [User types with PKIaaS roles](#)
- [Creating a user with PKIaaS roles](#)
- [Granting PKIaaS roles to existing users](#)

User types with PKIaaS roles

Entrust Certificate Services (ECS) Enterprise offers various user types; however, only the following users can assume PKIaaS roles.

- [Super Admin](#)
- [Requester](#)

 Do not create Sub Admin or Singer users, as these users are only for public SSL service.

Super Admin


Super Admin users can do the following.

- When granted the User Management role:
 - Add, remove, and manage users
 - Assign PKIaaS roles to users.
- Conduct all the activities for the public SSL service.

Requester

Requester users can perform PKIaaS operations based on the roles granted to them by Super Admin users.

This Request user type is only granted to request public SSL certificates. Choose this type if you are using the Entrust public SSL certificate service and do not want to provide this permission to a PKIaaS user.

 If you are a public SSL service user, please read the how-to guide at the [Certificate Services Enterprise guide](#).

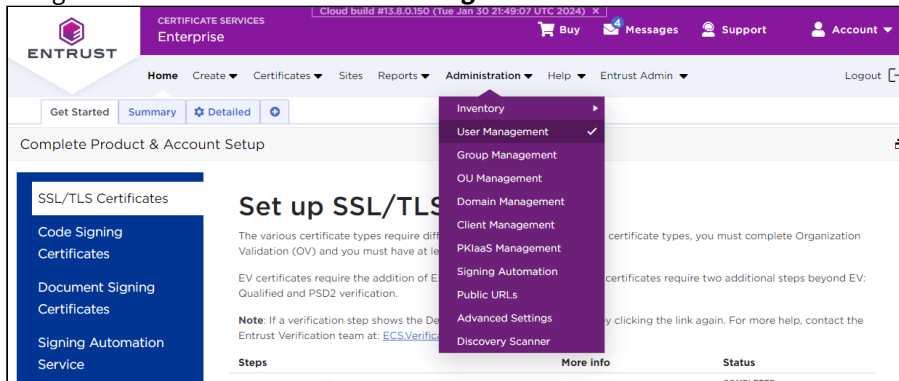
Creating a user with PKIaaS roles

See below for adding a new user and granting the corresponding roles.

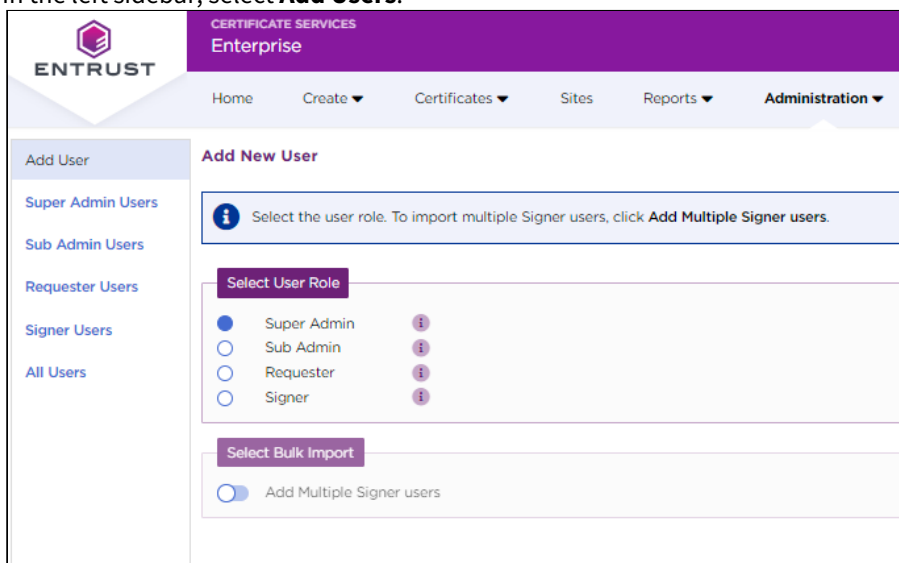
To add a new user with PKIaaS roles

1. Log into Entrust Certificate Services as a Super Admin with the User Management role.

2. Navigate to **Administration > User Management**.

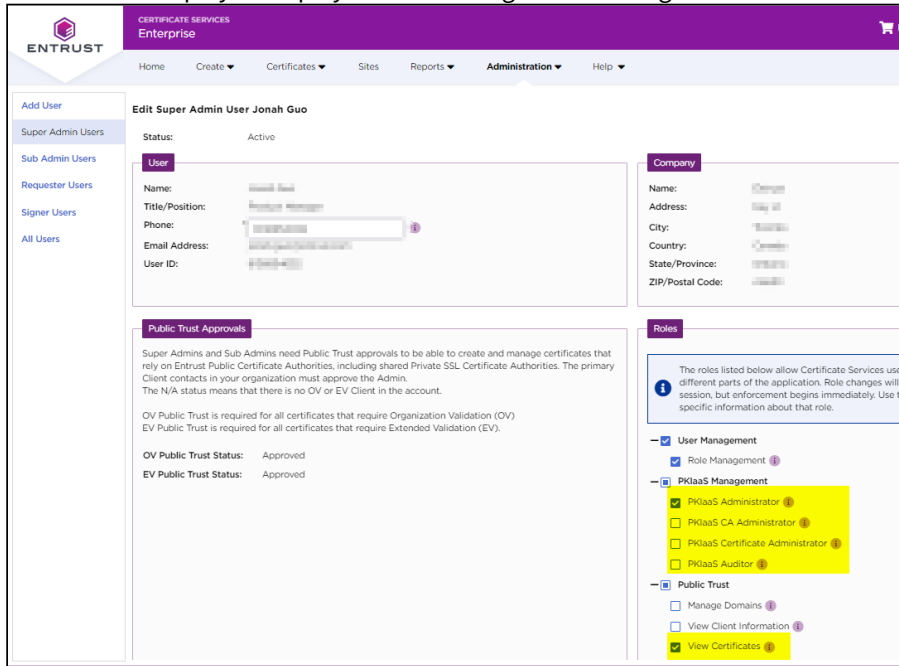


3. In the left sidebar, select **Add Users**.




4. Select the **Super Admin** or **Requester** user types described in [User types with PKIaaS roles](#).

5. Click **Next** to display to display the user configuration dialog.



6. Fill in the **User** and **Company** forms.
7. Under **Roles**, click **Public Trust** and ensure **View Certificates** is enabled so the user can access the **Certificate** tab and browse PKIaaS certificates.
8. Under **Roles**, click **PKIaaS Management** and select or deselect the PKIaaS roles.
 - PKIaaS Administrator
 - PKIaaS CA Administrator
 - PKIaaS Certificate Administrator
 - PKIaaS Auditor

See the below table for the permissions granted to each of these roles.

 The **Certificates** category requires enabling the **View Certificates** role as explained above.

Category	Permission	PKIaaS Administrator	PKIaaS CA Administrator	PKIaaS Certificate Administrator	PKIaaS Auditor
CA	View all private CAs	✓	✓	✓	✓
	Export to Excel	✓	✓	✓	✓
	Download CA Certificates	✓	✓	✓	✗
	Create CA	✓	✓	✗	✗
	Configure CA	✓	✓	✗	✗

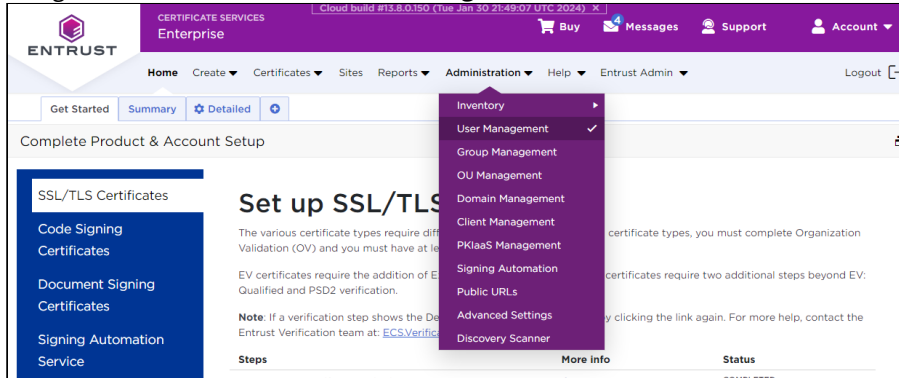
Category	Permission	PKIaaS Administrator	PKIaaS CA Administrator	PKIaaS Certificate Administrator	PKIaaS Auditor
	Delete CA	✓	✓	✗	✗
CA Gateway	View existing CA Gateway credentials	✓	✓	✓	✓
	Download CA Gateway credentials	✓	✗	✓	✗
	Generate CA Gateway credentials	✓	✗	✓	✗
	Remove CA Gateway credentials	✓	✗	✓	✗
Enrollment Gateway	View Enrollment Gateway	✓	✓	✓	✓
	Add Enrollment Gateway	✓	✓	✗	✗
	Update Enrollment Gateway	✓	✓	✗	✗
	Remove Enrollment Gateway	✓	✓	✗	✗
Certificates	Create certificates from root or issuing CA	✓	✗	✓	✗
	View PKIaaS certificates	✓	✓	✓	✓
	Export to Excel	✓	✓	✓	✓
	Export certificates	✓	✓	✓	✗
	Revoke PKIaaS certificates	✓	✗	✓	✗

Granting PKIaaS roles to existing users

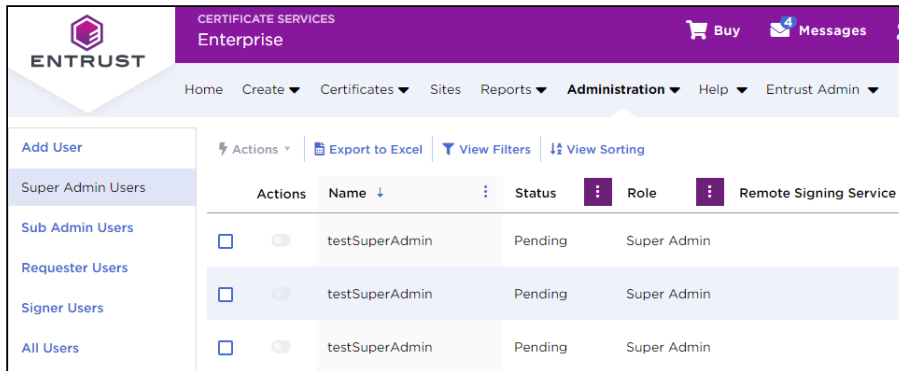
See below for granting roles to an existing PKIaaS user.

To granting PKIaaS roles to an existing user

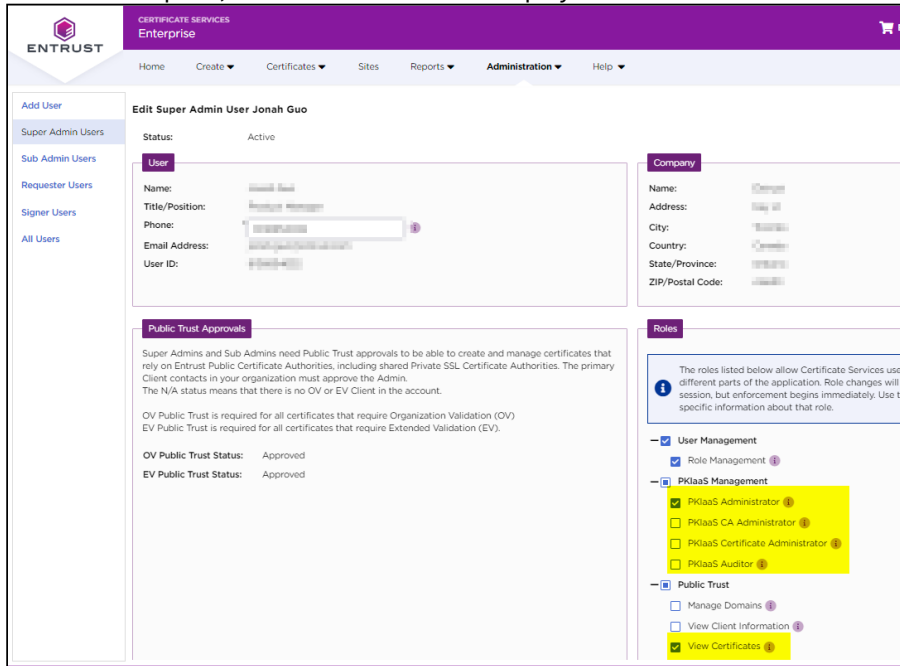
1. Log into Entrust Certificate Services as a Super Admin with the User Management role.
2. Navigate to **Administration > User Management**.



3. In the left sidebar, select **Super Admin Users** or **Requester Users** types described in [User types with PKIaaS roles](#).



- In the content pane, click on a user name to display the user details.



The screenshot shows the 'Edit Super Admin User' page for 'Jonah Guo'. The interface includes a navigation menu on the left with options like 'Add User', 'Super Admin Users', 'Sub Admin Users', 'Requester Users', 'Signer Users', and 'All Users'. The main content area is divided into several sections:


- User Information:** Fields for Name, Title/Position, Phone, Email Address, and User ID.
- Company Information:** Fields for Name, Address, City, Country, State/Province, and ZIP/Postal Code.
- Public Trust Approvals:** A section explaining that Super Admins and Sub Admins need Public Trust approvals. It lists 'OV Public Trust Status: Approved' and 'EV Public Trust Status: Approved'.
- Roles:** A list of roles with checkboxes. The 'PKIaaS Management' and 'Public Trust' sections are expanded. Under 'PKIaaS Management', 'PKIaaS Administrator' is checked. Under 'Public Trust', 'View Certificates' is checked.

- Under **Roles**, select the **PKIaaS Management** and **Public Trust** roles already described in [Creating a user with PKIaaS roles](#).

6 Managing CAs with Entrust Certificate Services Enterprise

Once logged into Entrust Certificate Services (ECS) Enterprise, you can manage your Certification Authority (CA) hierarchy as follows.

- Creating an online root CA
- Creating an issuing CA under an online root CA
- Selecting the certificate profiles of a CA
- Creating an external subordinate CA
- Adding an external root CA
- Adding an issuing CA under an external root CA
- Downloading a CA certificate
- Deleting a CA

 Ensure you have enough inventory before creating a CA.

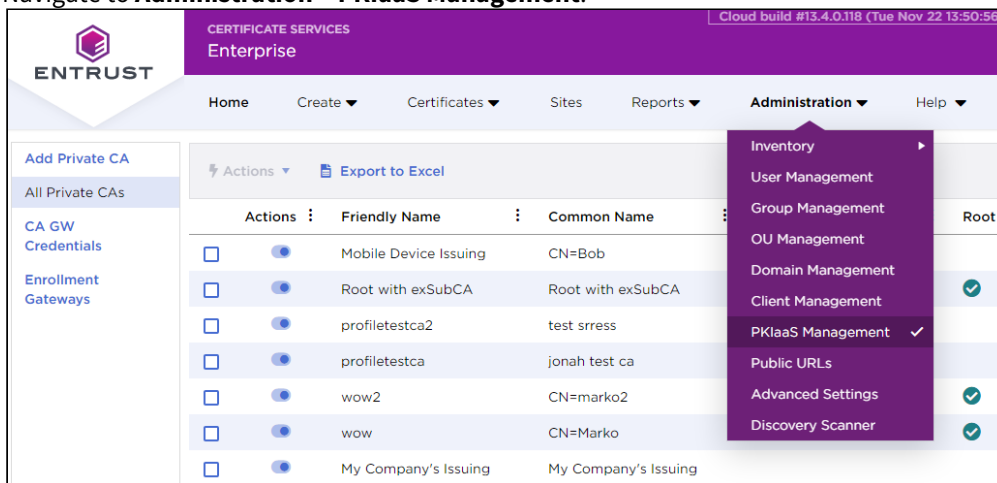
Creating an online root CA

See below for how to create an online root CA for your PKIaaS CA hierarchy.

 Alternatively, you can add your own root CA as explained in [Adding an external root CA](#).

To create an online root CA

1. Navigate to **Administration > PKIaaS Management**.

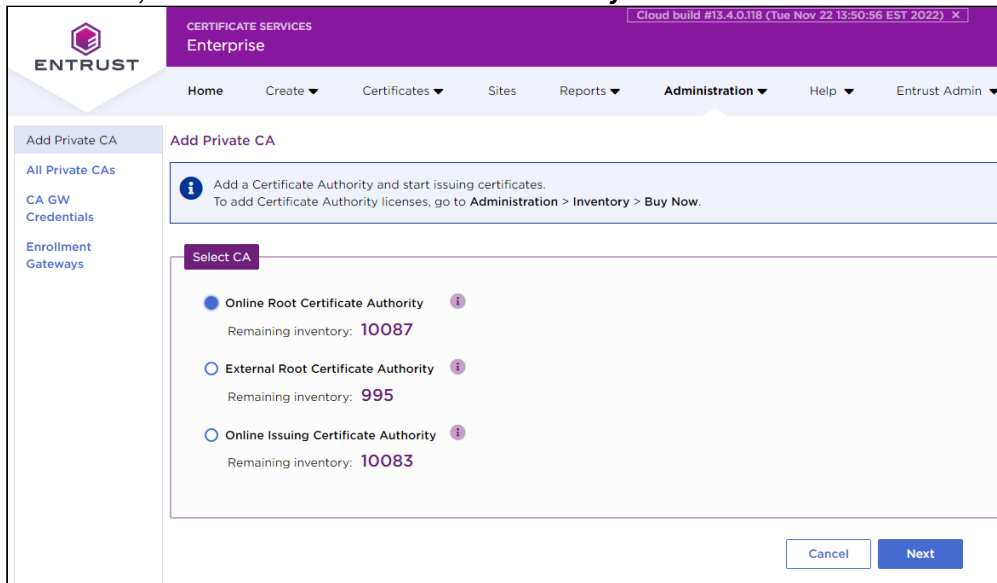


The screenshot shows the Entrust Certificate Services Enterprise Administration interface. The top navigation bar includes 'Home', 'Create', 'Certificates', 'Sites', 'Reports', 'Administration', and 'Help'. The 'Administration' menu is expanded, showing options like 'Inventory', 'User Management', 'Group Management', 'OU Management', 'Domain Management', 'Client Management', 'PKIaaS Management' (which is selected), 'Public URLs', 'Advanced Settings', and 'Discovery Scanner'. The main content area displays a table of CAs with columns for 'Actions', 'Friendly Name', and 'Common Name'. The table lists several CAs, including 'Mobile Device Issuing', 'Root with exSubCA', 'profiletestca2', 'profiletestca', 'wow2', 'wow', and 'My Company's Issuing'. The 'Root with exSubCA' entry is highlighted.

Actions	Friendly Name	Common Name	Root
<input type="checkbox"/>	Mobile Device Issuing	CN=Bob	
<input type="checkbox"/>	Root with exSubCA	Root with exSubCA	
<input type="checkbox"/>	profiletestca2	test srress	<input checked="" type="checkbox"/>
<input type="checkbox"/>	profiletestca	jonah test ca	
<input type="checkbox"/>	wow2	CN=marko2	
<input type="checkbox"/>	wow	CN=Marko	
<input type="checkbox"/>	My Company's Issuing	My Company's Issuing	

2. In the side pane, click **Add Private CA**.

3. In **Select CA**, choose **Online Root Certificate Authority**.



ENTRUST CERTIFICATE SERVICES Enterprise Cloud build #13.4.0.118 (Tue Nov 22 13:50:56 EST 2022) X

Home Create Certificates Sites Reports Administration Help Entrust Admin

Add Private CA **Add Private CA**

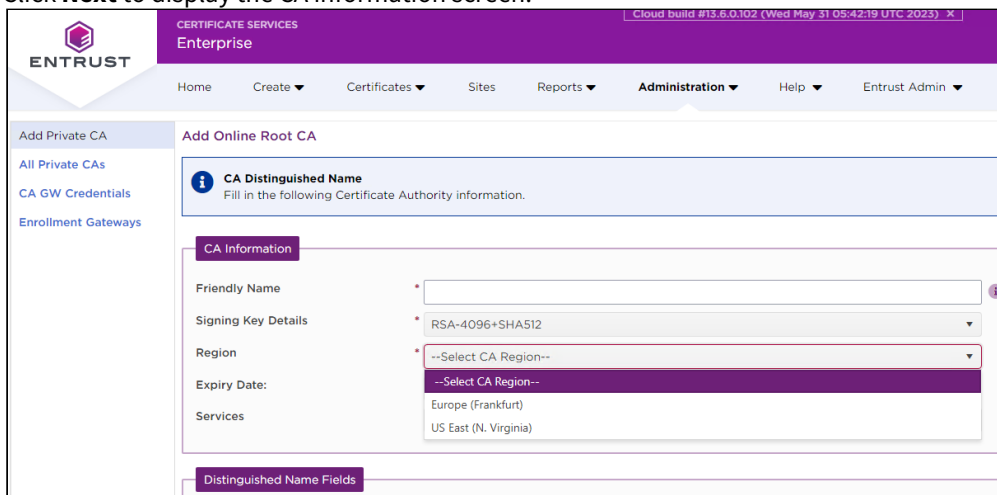
All Private CAs
CA GW Credentials
Enrollment Gateways

Select CA

- Online Root Certificate Authority** i
Remaining inventory: **10087**
- External Root Certificate Authority** i
Remaining inventory: **995**
- Online Issuing Certificate Authority** i
Remaining inventory: **10083**

Cancel Next

4. Click **Next** to display the CA information screen.



ENTRUST CERTIFICATE SERVICES Enterprise Cloud build #13.6.0.102 (Wed May 31 05:42:19 UTC 2023) X

Home Create Certificates Sites Reports Administration Help Entrust Admin

Add Private CA **Add Online Root CA**

All Private CAs
CA GW Credentials
Enrollment Gateways

CA Distinguished Name
Fill in the following Certificate Authority information.

CA Information

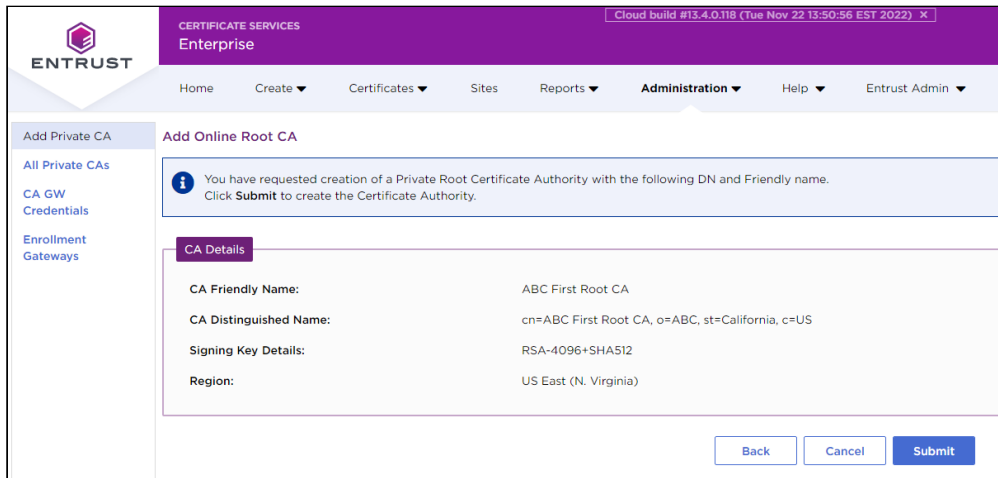
Friendly Name
Signing Key Details RSA-4096+SHA512
Region --Select CA Region--
Expiry Date: --Select CA Region--
Services Europe (Frankfurt)
US East (N. Virginia)

Distinguished Name Fields

5. Enter the values described below.

- Friendly Name
- Signing Key Details
- Region
- Expiry Date
- Services
- Service Profiles
- Distinguished Name Fields

6. Click **Next** and review the CA information.



7. Click **Submit**.
8. In the confirmation request, click **OK** to start the CA creation process.
9. When the CA creation completes, check the CA details in the CA grid view.
10. Refresh the grid. You will notice that the status changes to **Active**.

Friendly Name

Enter an informal name for the new CA.

Mandatory: Yes.

Signing Key Details

Select one of the algorithms described in [Certification Authority instantiation](#).

Mandatory: Yes.

Region

Select the region in which the CA will be hosted.

 The region of the root CA decides the region of the issuing CA.

Mandatory: Yes.

Expiry Date

Select the expiry date for the CA certificate. Use the date picker or enter a date in the following format.

mm/dd/yyyy

Mandatory: No. If you do not assign a specific expiry date, the expiry period defaults to 20 years for root CAs.

Services

Select a predefined set of certificate profiles.

 For online root CAs, the current PKIaaS version only supports the **External Sub-CA** profile set.

Mandatory: No.

Service Profiles

Select the certificate profiles you want to enable in the root CA. See the following table for the certificate profiles included in each service.

Service	Service Profiles
External Sub-CA	External subordinate CA certificate profiles

Mandatory: No.

Distinguished Name Fields

Enter a value for each field in the Distinguished Name of the CA certificate.

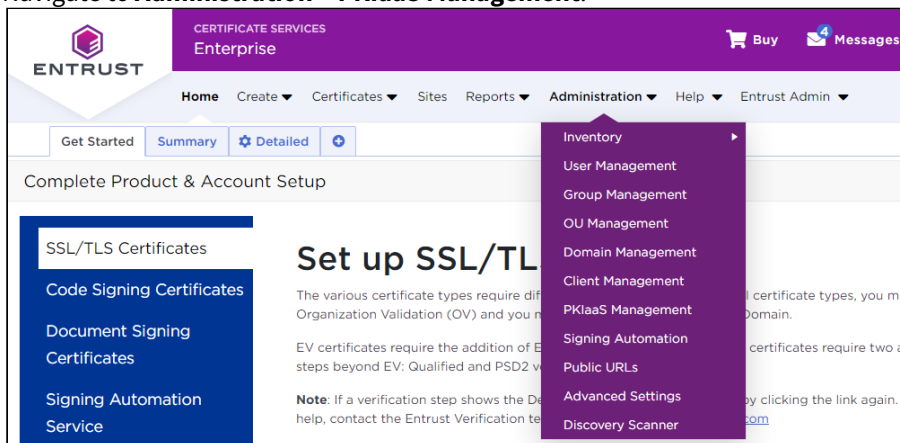
Mandatory: Only the **Common Name** certificate field.

Creating an issuing CA under an online root CA

See below for how to create an issuing CA after [Creating an online root CA](#).

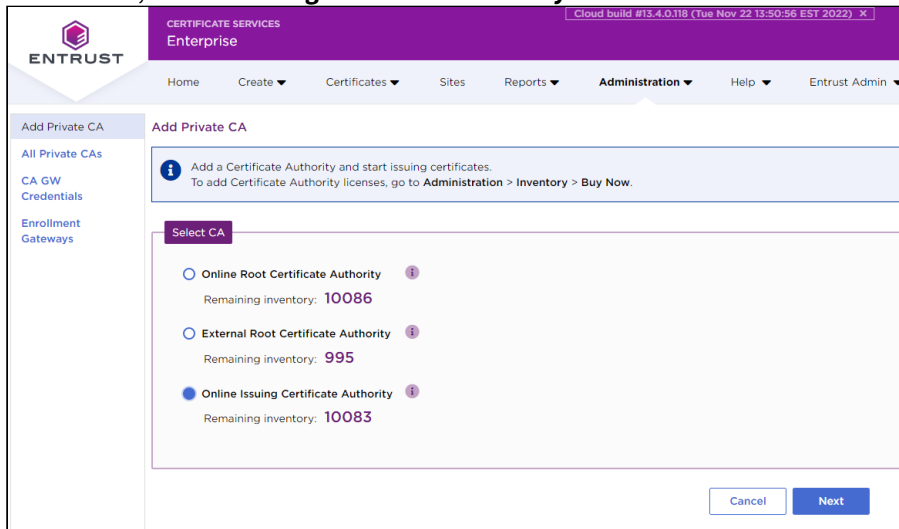
To create an issuing CA

1. Navigate to **Administration > PKIaaS Management**.



2. In the side pane, click **Add Private CA**.

3. In **Select CA**, choose **Issuing Certificate Authority**.



CERTIFICATE SERVICES Enterprise Cloud build #13.4.0.118 (Tue Nov 22 13:50:56 EST 2022) X

Home Create Certificates Sites Reports Administration Help Entrust Admin

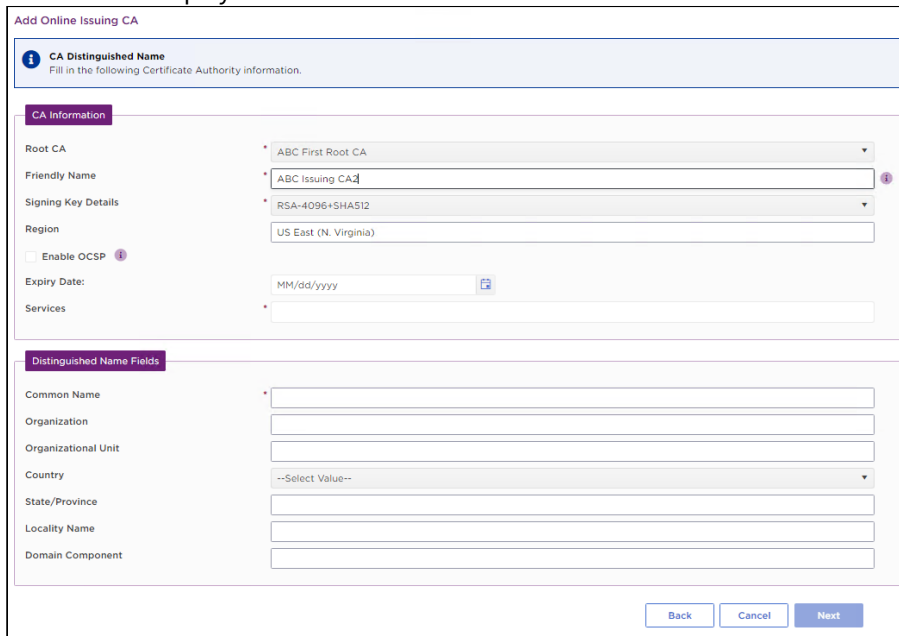
Add Private CA

Add Private CA

Select CA

- Online Root Certificate Authority i
Remaining inventory: **10086**
- External Root Certificate Authority i
Remaining inventory: **995**
- Online Issuing Certificate Authority i
Remaining inventory: **10083**

4. Click **Next** to display the **CA Information** screen.



Add Online Issuing CA

CA Distinguished Name
Fill in the following Certificate Authority information.

CA Information

Root CA: ABC First Root CA

Friendly Name: ABC Issuing CA i

Signing Key Details: RSA-4096+SHA512

Region: US East (N. Virginia)

Enable OCSP i

Expiry Date: MM/dd/yyyy i

Services:

Distinguished Name Fields

Common Name:

Organization:

Organizational Unit:

Country: --Select Value--

State/Province:

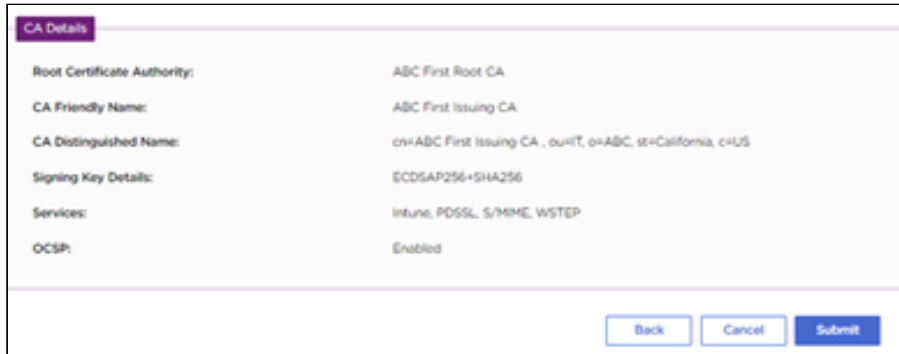
Locality Name:

Domain Component:

5. Enter the values described below.

- Root CA
- Friendly Name
- Signing Key Details
- Region
- Enable OCSP
- Expiry Date
- Services
- Service Profiles
- Distinguished Name Fields

6. Click **Next** to review the CA information.



CA Details	
Root Certificate Authority:	ABC First Root CA
CA Friendly Name:	ABC First Issuing CA
CA Distinguished Name:	cn=ABC First Issuing CA, ou=IT, o=ABC, st=California, c=US
Signing Key Details:	ECDSA256+SHA256
Services:	Intune, PDSSL, S/MIME, WSTEP
OCSP:	Enabled

Back Cancel Submit

7. Click **Submit**.
8. In the confirmation request, click **OK** to start the CA creation process.
9. When the CA creation completes, check the CA details in the CA grid view.
10. Refresh the grid. You will notice that the status changes to **Active**.

Root CA

Select the CA created in [Creating an online root CA](#).

Mandatory: Yes.

Friendly Name

Enter an informal name for the new CA.

Mandatory: Yes.


Signing Key Details

Select one of the algorithms described in [Certification Authority instantiation](#).

Mandatory: Yes.

Region

This view-only field displays the region of the root CA.

 You cannot change the region for an issuing CA. The region of the issuing CA will be decided by the region of the root CA that signs the issuing CA.

Enable OCSP

Check box if you want to enable OCSP for this issuing CA.


 You cannot change this setting after provisioning the CA.

Mandatory: No.

Expiry Date

Select the expiry date for the CA certificate. Use the date picker or enter a date in the following format.

mm/dd/yyyy

 The expiry date of an issuing CA must be earlier than the expiry date of the root CA.

Mandatory: No. If you do not assign a specific expiry date, the expiry period defaults to 10 years for issuing CAs.

Services

Select a predefined set of certificate profiles. For example,

- Select **Intune** for [Automating Intune enrollment with an Entrust-hosted Enrollment Gateway](#).
- Select **Active Directory** for [Automating enrollment with an on-premises Enrollment Gateway and WSTEP](#).

Mandatory: No.

Service Profiles

Select the certificate profiles you want to enable in the issuing CA.

- [Active Directory \(WSTEP\) certificate profiles](#)
- [CMPv2 certificate profiles](#)
- [Code signing certificate profile](#)
- [eSIM certificate profiles](#)
- [EST certificate profiles](#)
- [External subordinate CA certificate profiles](#)
- [Intune certificate profiles](#)
- [MDMWS certificate profiles](#)
- [Mobile device certificate profile](#)
- [Multiuse certificate profiles](#)
- [Private SSL \(ACMEv2\) certificate profiles](#)
- [S_MIME certificate profiles](#)
- [SCEP certificate profiles](#)
- [Smartcard certificate profiles](#)
- [V2G certificate profiles](#)

Mandatory: No.

Distinguished Name Fields

Enter a value for each field in the Distinguished Name of the CA certificate.

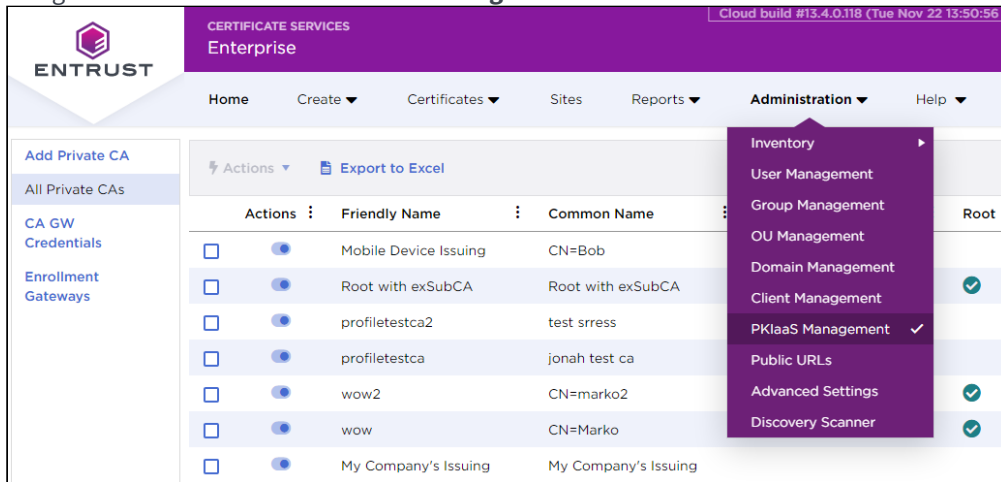
Mandatory: Only the **Common Name** certificate field.

Selecting the certificate profiles of a CA

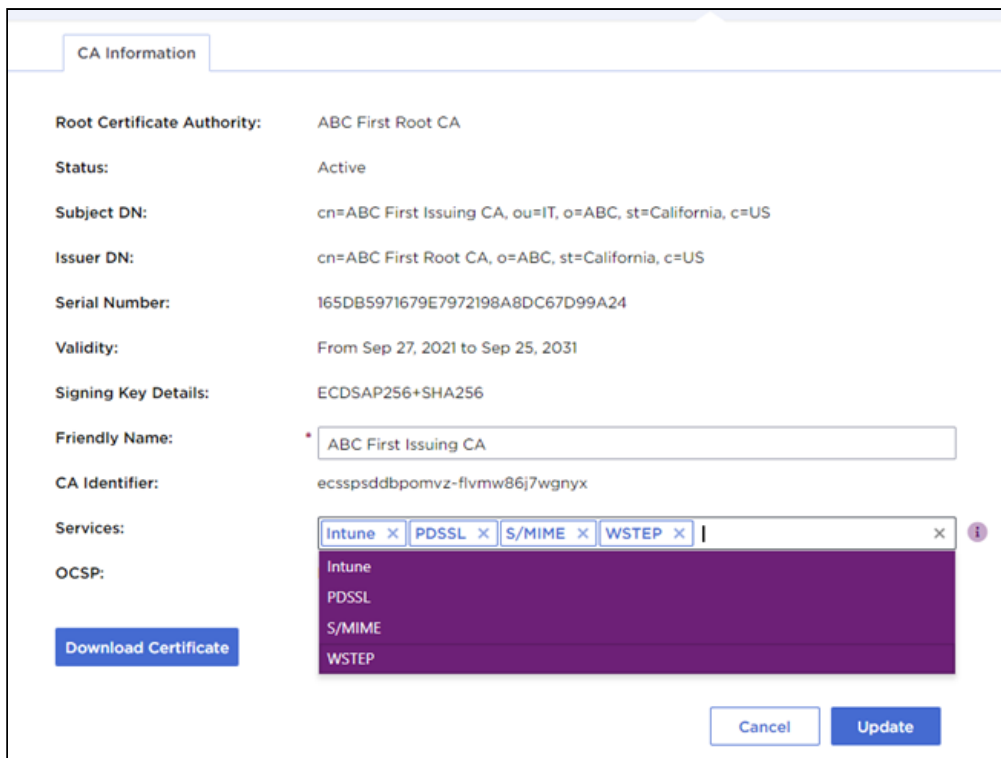
After [Creating an issuing CA under an online root CA](#), you can edit the CA settings to select or deselect certificate profiles.

To select the certificate profiles of a CA

1. Navigate to **Administration > PKIaaS Management**.



2. Click a CA row in the grid to open the CA details.
3. Configure the values described below.
 - [Services](#)
 - [Service Profiles](#)



4. Click **Update** to finalize your changes.

Services

Select a predefined set of certificate profiles. For example,

- Select **Intune** for Automating Intune enrollment with an Entrust-hosted Enrollment Gateway.
- Select **Active Directory** for Automating enrollment with an on-premises Enrollment Gateway and WSTEP.

Mandatory: No.

Service Profiles

Select the certificate profiles you want to enable in the issuing CA.

- [Active Directory \(WSTEP\) certificate profiles](#)
- [CMPv2 certificate profiles](#)
- [Code signing certificate profile](#)
- [eSIM certificate profiles](#)
- [EST certificate profiles](#)
- [External subordinate CA certificate profiles](#)
- [Intune certificate profiles](#)
- [MDMWS certificate profiles](#)
- [Mobile device certificate profile](#)
- [Multiuse certificate profiles](#)
- [Private SSL \(ACMEv2\) certificate profiles](#)
- [S_MIME certificate profiles](#)
- [SCEP certificate profiles](#)
- [Smartcard certificate profiles](#)
- [V2G certificate profiles](#)

Mandatory: No.

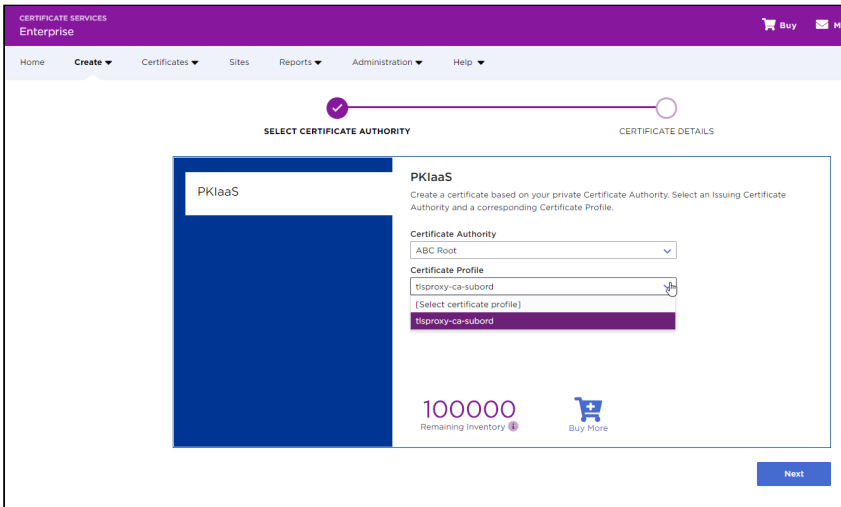
Creating an external subordinate CA

PKIaaS root CA currently supports two types of subordinate Certification Authorities (CAs):

- [TLS Proxy CA.](#)
- [Azure Firewall Subordinate CA.](#)

To create an external subordinate CA, follow the steps described in [Issuing certificates](#). The only difference from creating an end-entity certificate is you should select the following values.

Field	Value
Certificate Authority	Select an online root CA with the External Sub-CA service. See Creating an online root CA for how to create this CA.
Certificate Profile	Select one of the External subordinate CA certificate profiles .



i An external subordinate CA issued by a PKIaaS root CA only consumes one PKIaaS Certificate license. Entrust does not charge for the certificates issued by an external subordinate CA because those certificates are considered external and not using the PKIaaS infrastructure.

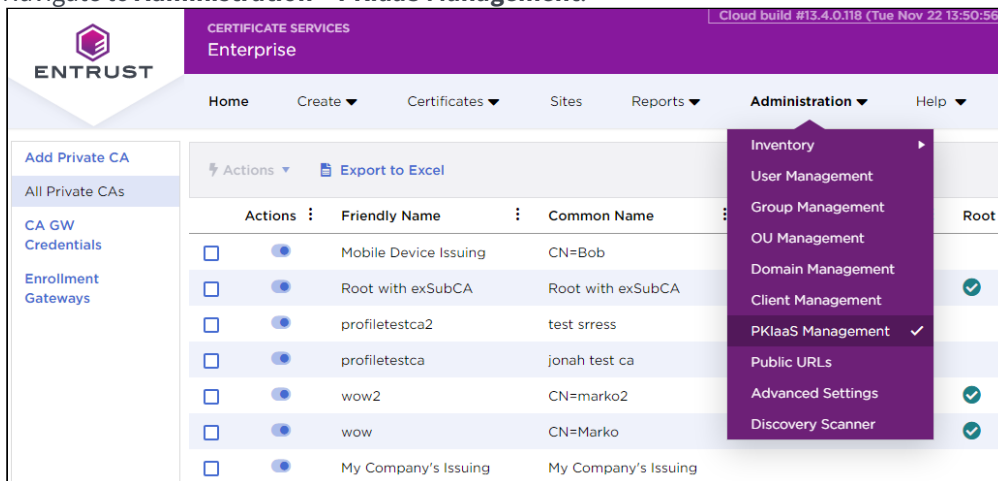
Adding an external root CA

If you want to leverage PKIaaS issuing CAs while maintaining the root of trust within your organization, PKIaaS allows you to sign an issuing CA using a non-PKIaaS root CA you owned.

i For this use case, you must add your external root CA certificate in ECS Enterprise before adding an issuing CA (as explained in [Adding an issuing CA under an external root CA](#)).

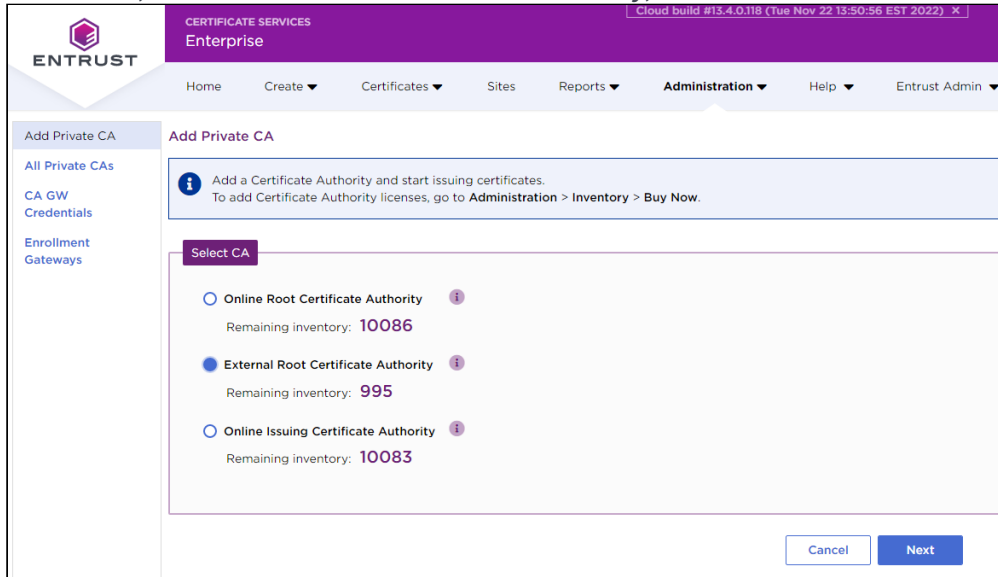
To add an external root CA

1. Navigate to **Administration > PKIaaS Management**.

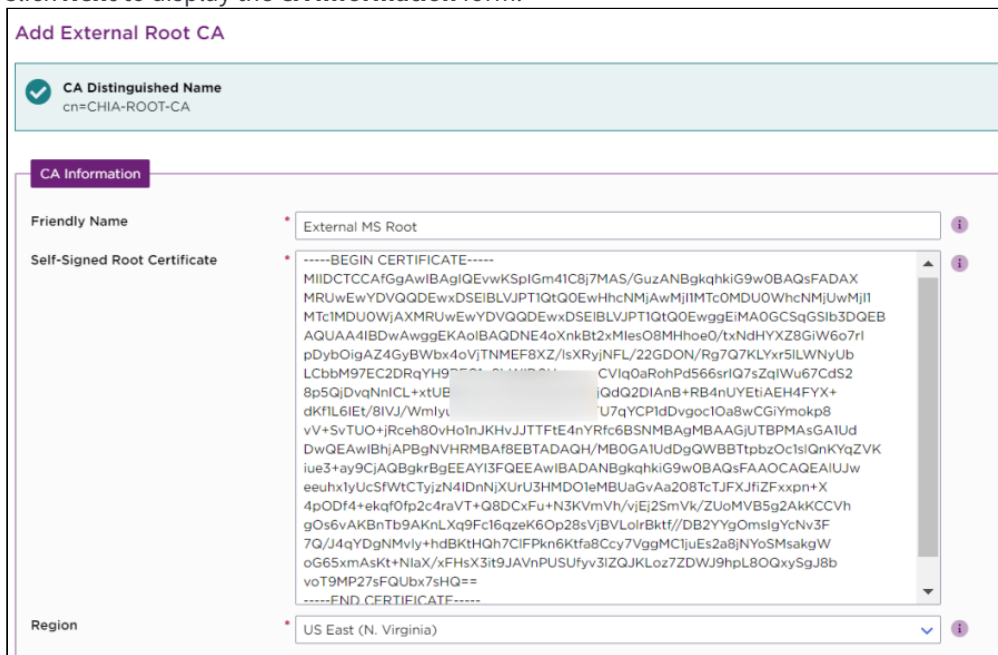


2. In the side pane, click **Add Private CA**.

3. In **Select CA**, choose **External Root Certificate Authority**, and click **Next**.



4. Click **Next** to display the **CA Information** form.



5. Enter the following information.

- **Friendly Name**
- **Self-Signed Root Certificate**
- **Region**

- Click **Next** to review the external root CA information.

Add External Root CA

i You have requested import of an External Root Certificate Authority with the following details. Click **Submit** to import the Certificate Authority.

CA Details

CA Friendly Name:	External MS Root
Serial Number:	12FC0A4A92069B8D42F23ECC012FC6BB
Subject DN:	cn=CHIA-ROOT-CA
Validity:	From Feb 25, 2020 to Feb 25, 2025
Signing Key Details:	RSA-2048+SHA256
Region:	US East (N. Virginia)

- Click **Submit**.
- When the CA creation completes, check the CA details in the CA grid view.
- Refresh the grid. You will notice that the status changes to **Active**.

Friendly Name

Enter an informal name for the new CA.

Mandatory: Yes.

Self-Signed Root Certificate

Paste the base64-encoded (PEM) self-signed root CA certificate.

Mandatory: Yes.

Region

Select the region in which the CA will be hosted.

⚠ The region of the root CA decides the region of the issuing CA.

Mandatory: Yes.

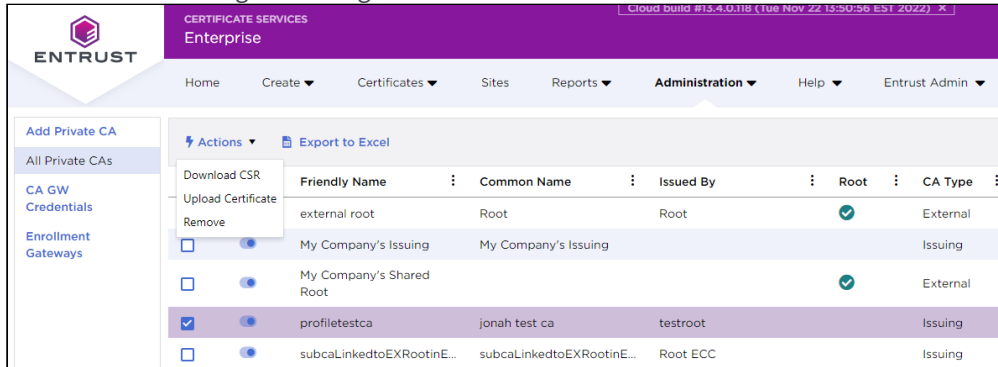
Adding an issuing CA under an external root CA

See below for how to add an issuing CA under the CA created in [Adding an external root CA](#).

To add an issuing CA under an external root CA

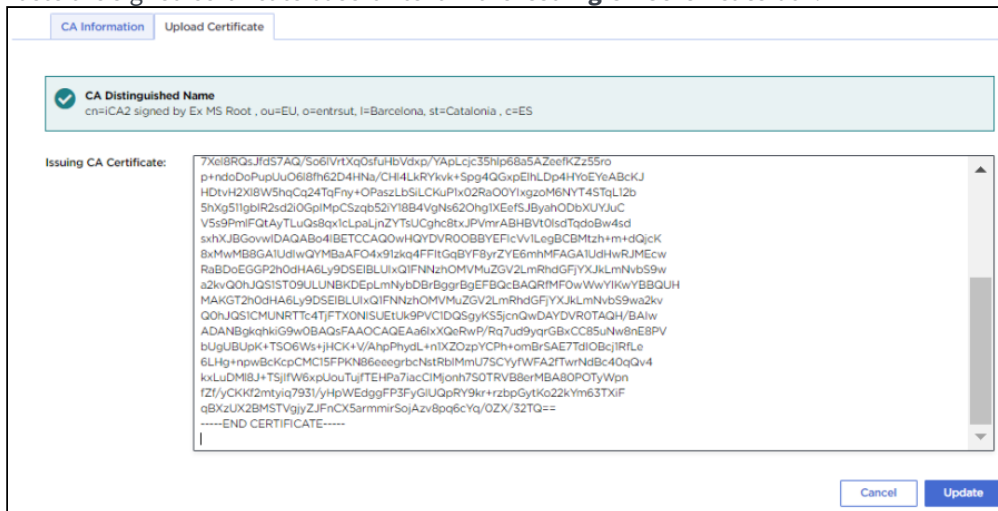
- Add an issuing CA as explained in [Creating an issuing CA under an online root CA](#). In the **Root Certificate Authority** field, select the external root CA you added in [Adding an external root CA](#).
- When the CA creation completes, check the CA details in the CA grid view.
- Refresh the grid. You will notice that the status changes to **CSR Ready**.

- Select the new issuing CA in the grid and select **Actions > Download CSR**.



Actions	Export to Excel					
Download CSR	Upload Certificate	Remove				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	external root	Root	Root	External
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	My Company's Issuing	My Company's Issuing		Issuing
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	My Company's Shared Root			External
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	profiletestca	jonah test ca	testroot	Issuing
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	subcaLinkedtoEXRootinE...	subcaLinkedtoEXRootinE...	Root ECC	Issuing

- Process the downloaded CSR with your external root CA to issue a CA certificate in base-64 format.
- Select the new issuing CA in the grid and select **Actions > Upload Certificate**.
- Paste the signed certificate base-64 text in the **Issuing CA Certificate** box.



CA Distinguished Name
cn=iCA2 signed by Ex MS Root , ou=EU, o=entrust, l=Barcelona, st=Catalonia, c=ES

Issuing CA Certificate:

```

7XeIBRQsJfG57AQ/So6iVrtXqQsfuHbVdXp/YAPLcjc35hlp68a5AZeeFKz25ro
p+ndoDoPupUuO6i8fh62D4HNa/CHI4LkRykvk+Spq4QGxpEiHLDp4HYoEYeABcKJ
HdvtH2Xi8W5hqCq24TqFny+OPaszLbSLCKuPlixO2RaOOYixgzoM6NYT4SQtL2b
5NxgS1lgbIR2sd2IOGpIMpCSzqb52Y18B4VgN62OghlXIEefSJByahODbXUYJuC
V5s9PmIFqtAyTLuQs8qxlLpaLjnZYTsUcghc8txJPVmrABHBVT0lisdTqdoBw4sd
sxhXJBGovwIDAQABo4IBETCAQOwHQYDR0OBBYEFicVlLegBCBmtzh+m+dQjck
8xMwMB8GA1UdlwQYMBaAF04x9Izqk4FFitGqYF8yrZYE6mhMFAGAIudhwRJMecw
RaBDoEGGP2h0dHA6Ly9DSEIBLUIxQIFNzOQwMuZGV2LmRhdGFjYXJkLmNvbS9w
a2kvQ0hJQS1STO9LUNBKDEpLmNybDBrBgggrBgEFBQcBAQRIMFowWwYIKwYBBQUH
MAKGT2h0dHA6Ly9DSEIBLUIxQIFNzOQwMuZGV2LmRhdGFjYXJkLmNvbS9wZ2kv
Q0hJQS1STO9LUNBKDEpLmNybDBrBgggrBgEFBQcBAQRIMFowWwYIKwYBBQUH
ADANBgkqhkiG9w0BAQsFAAQCAQEAa6ixXQeRwP/Rq7ud9yqrGBxCC85uNw@nEBPV
buGUBupK+TSO6Ws+JHCK+V/AhpPhydl+nIXZOzpyCPh+omBrSAE7TdiOBcJIRLe
6LHg+ngwBckKpCMC15FFPKNB6eeegrbcN8rBimU7SCyYWFa2TtwNdBc40qQv4
ixLuDMBj+TSjIfW6xpUouTujfTEHPa7iacCimJonh75OTRVBberMBABOPOTyWpn
fZf/yCkIKZmtYiq7931/yHpwEdggFP3FyGIUQpRY9kr+rzbpoytKoz22kYm63TXf
qBxLUX2BMSTVgijZJfMx5armmirSojAzb8pqcYq/OZX/32TQ==
-----END CERTIFICATE-----

```

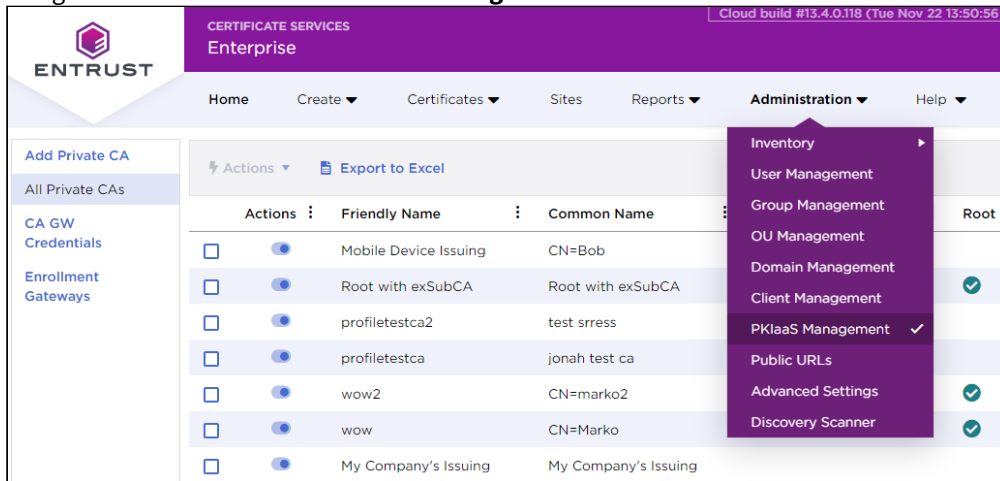
- Click **Update**. In the CA grid, the issuing CA status will change to **Updating**.
- Refresh the grid; the issuing CA is ready to use when the status changes to **Active**.

Downloading a CA certificate

See below for how to download the CA certificate of a root or issuing CA.

To download a CA certificate

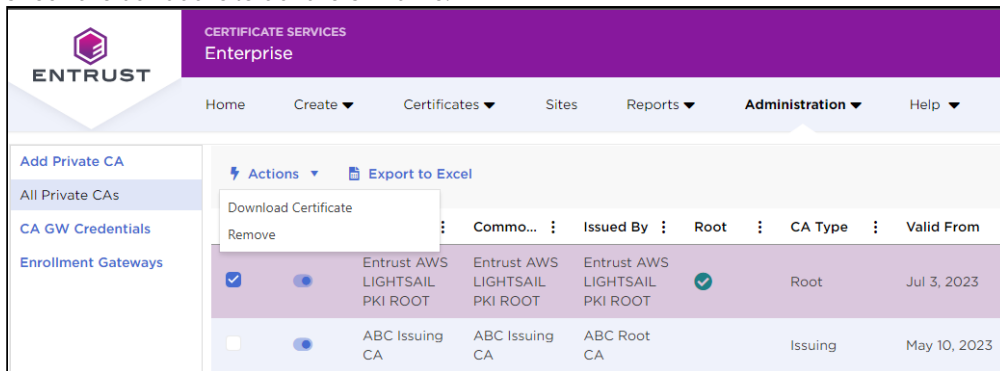
1. Navigate to **Administration > PKIaaS Management**.



The screenshot shows the Entrust Enterprise Administration interface. The top navigation bar includes 'Home', 'Create', 'Certificates', 'Sites', 'Reports', 'Administration', and 'Help'. The 'Administration' menu is open, showing options like 'Inventory', 'User Management', 'Group Management', 'OU Management', 'Domain Management', 'Client Management', 'PKIaaS Management' (which is selected), 'Public URLs', 'Advanced Settings', and 'Discovery Scanner'. Below the menu, a table lists various CA entries with columns for 'Actions', 'Friendly Name', and 'Common Name'.

Actions	Friendly Name	Common Name	Root
<input type="checkbox"/>	Mobile Device Issuing	CN=Bob	
<input type="checkbox"/>	Root with exSubCA	Root with exSubCA	
<input type="checkbox"/>	profiletestca2	test srress	
<input type="checkbox"/>	profiletestca	jonah test ca	
<input type="checkbox"/>	wow2	CN=marko2	
<input type="checkbox"/>	wow	CN=Marko	
<input type="checkbox"/>	My Company's Issuing	My Company's Issuing	

2. In the left navigation sidebar select **All Private CAs**.
3. Check the box at the left of the CA name.



The screenshot shows the Entrust Enterprise Administration interface with the 'All Private CAs' sidebar selected. The 'Actions' menu is open, showing 'Download Certificate' and 'Remove'. Below the menu, a table lists CA entries with columns for 'Commo...', 'Issued By', 'Root', 'CA Type', and 'Valid From'.


Commo...	Issued By	Root	CA Type	Valid From
<input checked="" type="checkbox"/>	Entrust AWS LIGHTSAIL PKI ROOT	Entrust AWS LIGHTSAIL PKI ROOT	Root	Jul 3, 2023
<input type="checkbox"/>	ABC Issuing CA	ABC Issuing CA	Issuing	May 10, 2023

4. select **Actions > Download Certificate**.

Deleting a CA

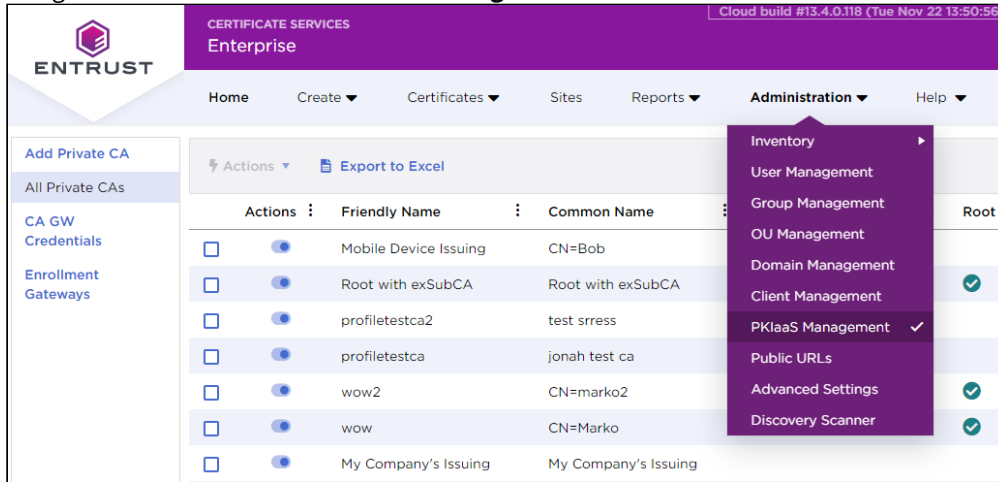
When deleting CAs take into account that:

- Before deleting a root CA, you must delete all issuing CAs under the root CA.
- Before deleting an issuing CA, you must first remove any CA Gateway Credential and Enrollment Gateway associated with this CA.
- When you delete an issuing CA, you also delete all the certificates you issued from this CA.
- After deleting a CA, the CA license returns to inventory, generally within 24 hours.

 CA deletion is not reversible.

To delete a CA

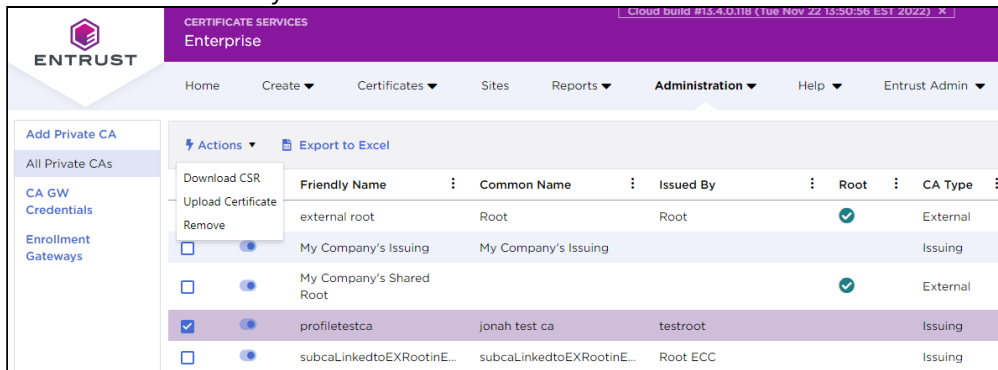
1. Navigate to **Administration > PKIaaS Management**.



The screenshot shows the Entrust Enterprise Administration interface. The 'Administration' dropdown menu is open, and 'PKIaaS Management' is selected. The main content area displays a table of Private CAs.

Actions	Friendly Name	Common Name	Root
<input type="checkbox"/>	Mobile Device Issuing	CN=Bob	
<input type="checkbox"/>	Root with exSubCA	Root with exSubCA	
<input type="checkbox"/>	profiletestca2	test srress	
<input type="checkbox"/>	profiletestca	jonah test ca	
<input type="checkbox"/>	wow2	CN=marko2	
<input type="checkbox"/>	wow	CN=Marko	
<input type="checkbox"/>	My Company's Issuing	My Company's Issuing	

2. Select the row of the CA you want to delete and select **Actions > Remove**.



The screenshot shows the same CA grid view. The 'Actions' dropdown menu is open, and 'Remove' is selected. The row for 'profiletestca' is highlighted.

Actions	Friendly Name	Common Name	Issued By	Root	CA Type
<input type="checkbox"/>	external root	Root	Root	<input checked="" type="checkbox"/>	External
<input type="checkbox"/>	My Company's Issuing	My Company's Issuing			Issuing
<input type="checkbox"/>	My Company's Shared Root			<input checked="" type="checkbox"/>	External
<input checked="" type="checkbox"/>	profiletestca	jonah test ca	testroot		Issuing
<input type="checkbox"/>	subcaLinkedtoEXRootinE...	subcaLinkedtoEXRootinE...	Root ECC		Issuing

3. Review the information on the confirmation request before confirming the deletion.
4. In the CA grid view, the CA status becomes **Deleting** while the deletion is processed (usually ~60 seconds). Refresh the grid. You will notice that the deleted CA is no longer listed.

7 Managing certificates with Entrust Certificate Services Enterprise

Once logged into Entrust Certificate Services (ECS) Enterprise, you can manage your certificates as follows.

- [Issuing certificates](#)
- [Browsing and downloading certificates](#)
- [Revoking certificates](#)
- [Managing reports, alerts, and notifications](#)
- [Configuring auto-enrollment](#)

Issuing certificates

Depending on the selected certificate profile, you can issue certificates on the following modes.

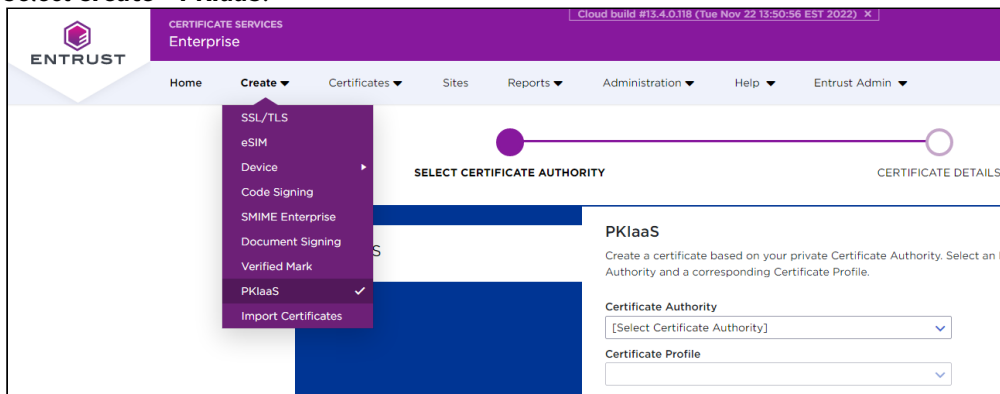
- [Processing a Certificate Signing Request](#)
- [Generating a PKCS #12](#)

Processing a Certificate Signing Request

Issue a certificate by processing a Certificate Signing Request (CSR) for pre-generated keys.

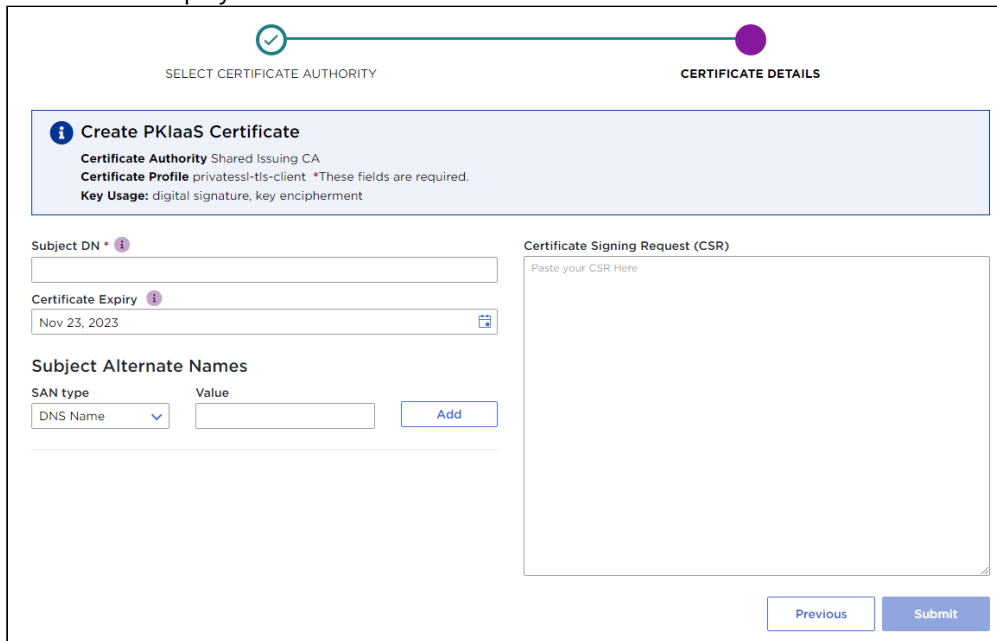
To process a Certificate Signing Request

1. Select **Create > PKIaaS**.



2. Select the **Certificate Authority**.
3. Select a **Certificate Profile** configured to process Certificate Signing Requests.

4. Click **Next** to display the certificate form.



Create PKIaaS Certificate

Certificate Authority Shared Issuing CA
Certificate Profile privatessl-tls-client *These fields are required.
Key Usage: digital signature, key encipherment

Subject DN ⓘ

Certificate Expiry ⓘ
Nov 23, 2023

Subject Alternate Names

SAN type	Value
DNS Name	

Certificate Signing Request (CSR)
Paste your CSR Here

Previous Submit

5. Configure the following settings:

- [Subject DN](#)
- [Certificate Expiry](#)
- [Subject Alternate Names](#)
- [Certificate Signing Request \(CSR\)](#)

6. Click **Submit** to issue the certificate.

7. On the confirmation page, click the link to download the issued certificate.

Subject DN

Write the Distinguished Name (DN) of the certificate subject. For example:

```
CN=www.entrust.com, OU=PKIaaS, O=Entrust, c=CA
```

Certificate Expiry

Select the certificate expiration date. Specifically, the certificate will expire at 23:59:59 on the selected date, calculated for the time zone set in your browser.

⚠ Because of Daylight Savings Time (if applicable) and the time zone set in your browser, you may see a discrepancy between the actual certificate expiry date (the one you set) and the expiry date you will see in some system viewers or parsers. The Windows System Viewer, in particular, does not handle Daylight Savings Time correctly.


Subject Alternate Names

Select optional Subject Alternate Names (SAN) for the certificate subject – for example:


- S/MIME email certificates require an **RFC822 Name** email address.

- Network device or web server certificates for TLS authentication require a **DNS Name** or **IP Address** value matching the URL used by the client.

See below for the supported types.


 The selected CA profile may forbid some Subject Alternate Names.

SAN Type	Sample value
DNS Name	server.example.com
IP Address	192.168.1.1
RFC822 Name	john.doe@example.com
Directory Name	cn=john doe,o=example inc,c=us
Uniform Resource Identifier	http://example.com/
Registered ID	1.2.3.4.5.6.7.8
Other Name	oBgGCCsGAQUFBwgDoAwwCgwIMTIzNDU2Nzg=

 The **Other Name** value is a DER encoding because this type supports an unbounded number of possible subtypes which often cannot be represented as simple strings.

Certificate Signing Request (CSR)

Paste the Certificate Signing Request (CSR) contents.

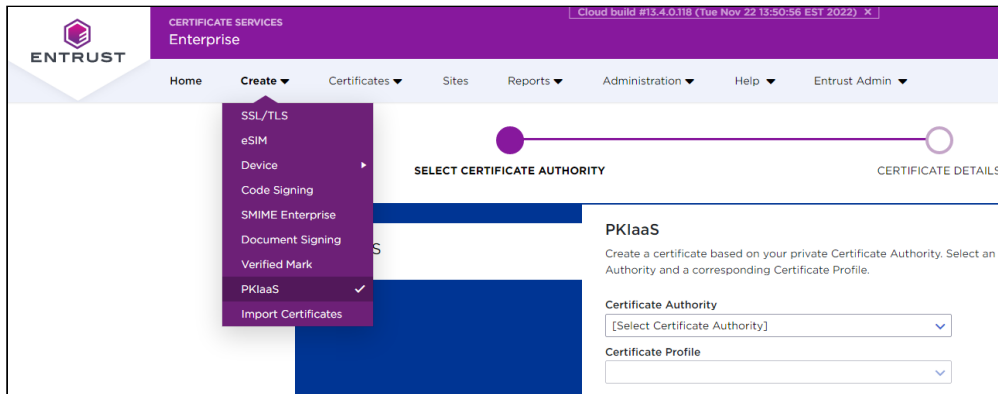
 PKIaaS currently does not support copying DNS or SANs from the CSR. You must manually input the DNS and SANs on the certificate creation page. As explained in [Private SSL \(ACMEv2\) certificate profiles](#), PKIaaS has two certificate profiles that use the CN (common name) input value to fill the DNS Name field.

Generating a PKCS #12

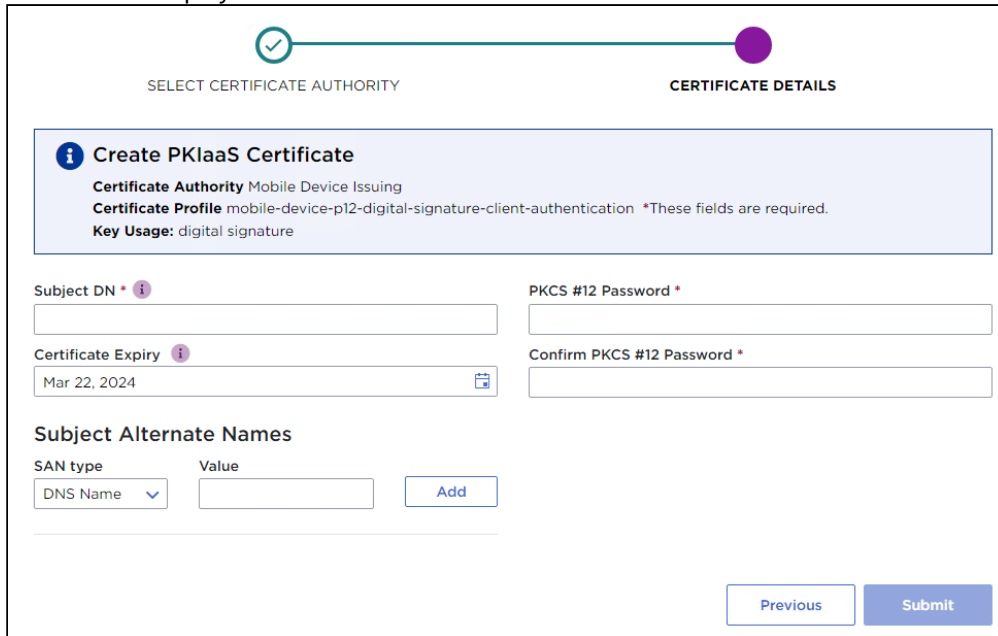
Generate a PKCS #12 file containing both a certificate and a key pair.

To generate a PKCS #12

1. Select **Create > PKIaaS**.



2. Select the **Certificate Authority**.
3. Select a **Certificate Profile** configured to generate PKCS #12 files.
4. Click **Next** to display the certificate form.



5. Configure the following settings:
 - [Subject DN](#)
 - [Certificate Expiry](#)
 - [Subject Alternate Names](#)
 - [PKCS #12 Password](#)
 - [Confirm PKCS #12 Password](#)
6. Click **Submit** to generate the certificate and the key pair.
7. On the confirmation page, click the link to download a PKCS #12 file containing the certificate and the key pair.

Subject DN

Write the Distinguished Name (DN) of the certificate subject. For example:

CN=www.entrust.com, OU=PKIaaS, O=Entrust, c=CA

Certificate Expiry

Select the certificate expiration date. Specifically, the certificate will expire at 23:59:59 on the selected date, calculated for the time zone set in your browser.

⚠ Because of Daylight Savings Time (if applicable) and the time zone set in your browser, you may see a discrepancy between the actual certificate expiry date (the one you set) and the expiry date you will see in some system viewers or parsers. The Windows System Viewer, in particular, does not handle Daylight Savings Time correctly.

Subject Alternate Names

Select optional Subject Alternate Names (SAN) for the certificate subject – for example:

- S/MIME email certificates require an **RFC822 Name** email address.
- Network device or web server certificates for TLS authentication require a **DNS Name** or **IP Address** value matching the URL used by the client.

See below for the supported types.

⚠ The selected CA profile may forbid some Subject Alternate Names.

SAN Type	Sample value
DNS Name	server.example.com
IP Address	192.168.1.1
RFC822 Name	john.doe@example.com
Directory Name	cn=john doe,o=example inc,c=us
Uniform Resource Identifier	http://example.com/
Registered ID	1.2.3.4.5.6.7.8
Other Name	oBgGCCsGAQUFBwgDoAwwCgwIMTlzNDU2Nzg=

i The **Other Name** value is a DER encoding because this type supports an unbounded number of possible subtypes which often cannot be represented as simple strings.

PKCS #12 Password

Type a password to protect the PKCS #12 contents.

Confirm PKCS #12 Password

Retype the password.

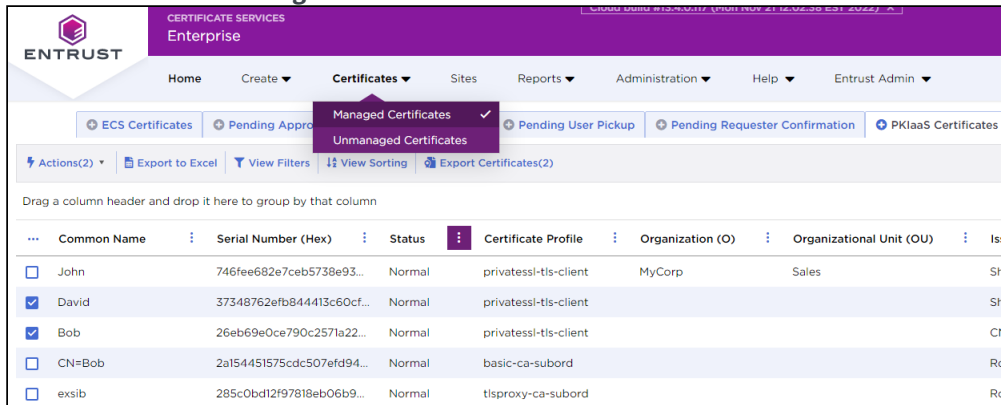
Browsing and downloading certificates

Once issued as explained in [Issuing certificates](#), you can browse and download certificates in bulk.

i PKIaaS certificates issued via API or Enrollment Gateway might take up to 30 seconds to show up in the grid view.

To browse and download certificates

1. Go to **Certificates > Managed Certificates**.



...	Common Name	Serial Number (Hex)	Status	Certificate Profile	Organization (O)	Organizational Unit (OU)	Issu
<input type="checkbox"/>	John	746fee682e7ceb5738e93...	Normal	privatessl-tls-client	MyCorp	Sales	Sha
<input checked="" type="checkbox"/>	David	37348762efb84413c60cf...	Normal	privatessl-tls-client			Sha
<input checked="" type="checkbox"/>	Bob	26eb69e0ce790c2571a22...	Normal	privatessl-tls-client			CN
<input type="checkbox"/>	CN=Bob	2a154451575cdc507efd94...	Normal	basic-ca-subord			Rod
<input type="checkbox"/>	exsib	285c0bd12f97818eb06b9...	Normal	tlsproxy-ca-subord			Rod

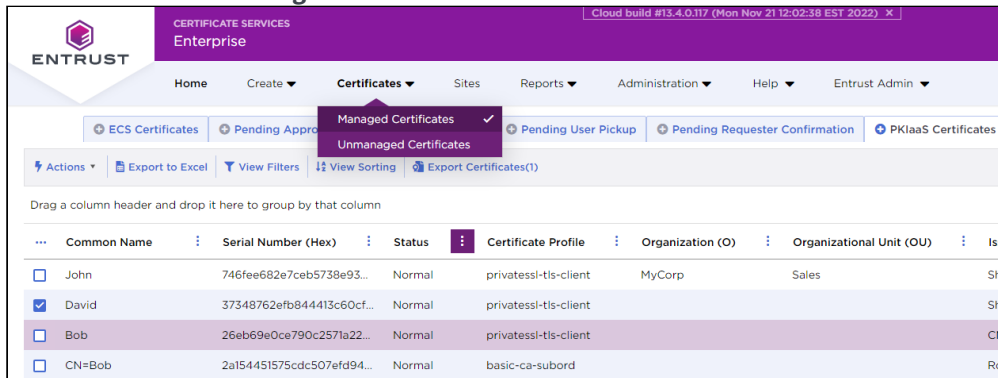
2. Select the **PKIaaS Certificates** tab.
3. Select one or more certificates on the grid.
4. Click **Export Certificates** to download a ZIP file containing the certificates in DER format.

Revoking certificates

You can revoke issued certificates to invalidate them before the expiry date.

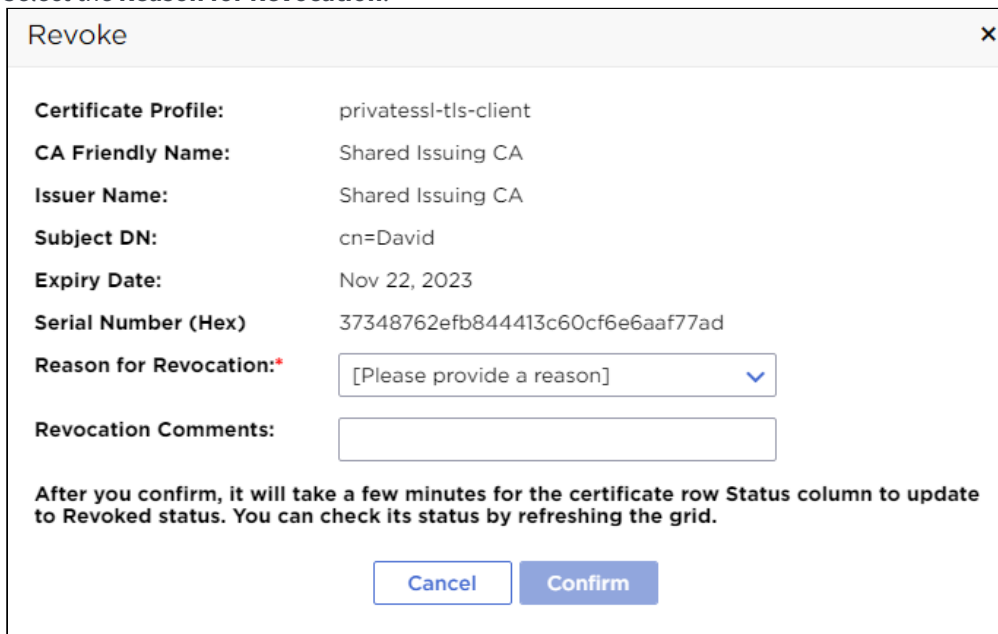
To revoke a certificate

1. Go to **Certificates > Managed Certificates**.



The screenshot shows the Entrust Enterprise web interface. The top navigation bar includes 'Home', 'Create', 'Certificates', 'Sites', 'Reports', 'Administration', 'Help', and 'Entrust Admin'. The 'Certificates' dropdown menu is open, showing 'Managed Certificates' (selected), 'Unmanaged Certificates', and 'PKIaaS Certificates'. Below the navigation, there are tabs for 'ECS Certificates', 'Pending Approvals', 'Pending User Pickup', 'Pending Requester Confirmation', and 'PKIaaS Certificates'. A table of certificates is visible with columns for 'Common Name', 'Serial Number (Hex)', 'Status', 'Certificate Profile', 'Organization (O)', and 'Organizational Unit (OU)'. The table contains four rows: John, David (selected), Bob, and CN=Bob.

2. Select the **PKIaaS Certificates** tab.
3. Select a certificate on the grid.
4. Select **Actions > Revoke**.
5. Select the **Reason for Revocation**.



The screenshot shows a 'Revoke' dialog box with the following fields and options:

- Certificate Profile:** privatesl-tls-client
- CA Friendly Name:** Shared Issuing CA
- Issuer Name:** Shared Issuing CA
- Subject DN:** cn=David
- Expiry Date:** Nov 22, 2023
- Serial Number (Hex):** 37348762efb844413c60cf6e6aaf77ad
- Reason for Revocation:** [Please provide a reason] (dropdown menu)
- Revocation Comments:** (text input field)

Below the fields, there is a message: "After you confirm, it will take a few minutes for the certificate row Status column to update to Revoked status. You can check its status by refreshing the grid." At the bottom, there are two buttons: 'Cancel' and 'Confirm'.

6. Click **Confirm**.
7. The revoked certificate will disappear from the **PKIaaS Certificate** grid view because the default filter only displays active certificates. Select **Status > Filter > Select All** to display also the revoked certificates.

CERTIFICATE SERVICES Enterprise Cloud build #13.4.0.117 (Mon N...

Home Create Certificates Sites Reports Administration

[+ ECS Certificates](#)
[+ Pending Approvals](#)
[+ Foreign Certificates](#)
[+ Pending User Pickup](#)
[+ Pending Reque](#)

[⚡ Actions](#)
[📄 Export to Excel](#)
[🔍 View Filters](#)
[📄 View Sorting](#)
[📄 Export Certificates](#)

Drag a column header and drop it here to group by that column

...	Common Name	Serial Number (Hex)	Status	Certificate Profile	Organization (O)
<input type="checkbox"/>	John	746fee682e7ceb5738e93...	Normal		MyCorp
<input type="checkbox"/>	David	37348762efb84413c60cf...	Normal		
<input type="checkbox"/>	Bob	26eb69e0ce790c2571a22...	Normal		
<input type="checkbox"/>	CN=Bob	2a154451575cdc507efd94...	Normal		
<input type="checkbox"/>	exsib	285c0bd12f97818eb06b9...	Normal	tlsproxy-ca-subord	
<input type="checkbox"/>	testcertificates.com	32bfee8973019a0b951aa8...	Normal	scep-digital-signature-	
<input type="checkbox"/>	testcertificates.com	1a0da534a666553a7c9df...	Normal	scep-key-enciphermen	
<input type="checkbox"/>	testcertificates.com	77d20b513bbaf84ef04fe5...	Normal	scep-digital-signature	

↑ Sort Ascending

↓ Sort Descending

☰ Columns

🔍 Filter

📄 Set Column Position

Select All

Normal

Revoked

Held

3 items selected

[Filter](#) [Clear](#)

Managing reports, alerts, and notifications

Define reports based on the information your business needs, such as daily certificate issuance, revocation, and renewal activity. Select:

- **Reports > Report Center** to view reporting, notifications, and alerts.
- **Reports > Report Schedule** to schedule report.
- **Reports > Alerts** to program alerts, for example, based on certificate state.

Configuring auto-enrollment

To set up Itune or MDM auto-enrollment, you need a Registration Authority (RA) certificate.

- Issuing this certificate requires one PKIaaS certificate license.
- Renewing this certificate requires an unused PKIaaS certificate in the inventory – to issue the new certificate before revoking the old one. The license of the revoked certificate returns to the inventory within half an hour of the revocation.

8 Automating Intune enrollment with an Entrust-hosted Enrollment Gateway

Configure an Entrust-hosted Enrollment Gateway to operate as SCEP Server and process Intune enrollment requests with PKIaaS Certification Authorities.

- [Intune integration requirements](#)
- [Creating an Intune application in Azure](#)
- [Configuring Intune automation in Entrust Certificate Services](#)
- [Configuring Intune profiles in Azure](#)
- [Enrolling user devices with the Intune Company Portal](#)
- [Renewing enrolled certificates](#)

See the following video for a quick guide on the required steps.

<https://www.youtube.com/watch?v=XH0pwhowK0Q>

See also the Microsoft documentation for details on the third-party SCEP integration with Intune.

<https://learn.microsoft.com/en-us/mem/intune/protect/certificate-authority-add-scep-overview>

Intune integration requirements

You must meet the following requirements to automate Intune enrollment with an Entrust-hosted Enrollment Gateway.

- [Entrust Certificate Services](#)
- [Microsoft Azure](#)
- [Supported operating systems](#)
- [Supported encryption algorithms](#)

Entrust Certificate Services

You need an Entrust Certificate Services (ECS) Enterprise account with privileges to create an issuing Certification Authority.

Microsoft Azure

You need a Microsoft Azure account with privileges to create and configure an Intune application.

Supported operating systems

This release of the Intune automated enrollment is tested with devices running the following operating systems.

OS	Tested versions
MacOS	Ventura 13.2.1
iPhone/iPad	16.3.1

OS	Tested versions
AndroidOS	13
Microsoft Windows	10 and 11
ChromeOS	—

For more details on the supported operating systems, please check the Microsoft documentation:

<https://learn.microsoft.com/en-us/mem/intune/fundamentals/supported-devices-browsers>

Supported encryption algorithms

The Intune automated enrollment with an Entrust-hosted Enrollment Gateway supports the following encryption algorithms.

- aes128-CBC-PAD
- aes128-GCM
- aes256-CBC-PAD
- aes256-GCM
- desCBC
- des-ede3-cbc
- id-RSAES-OAEP
- rsaEncryption

Creating an Intune application in Azure

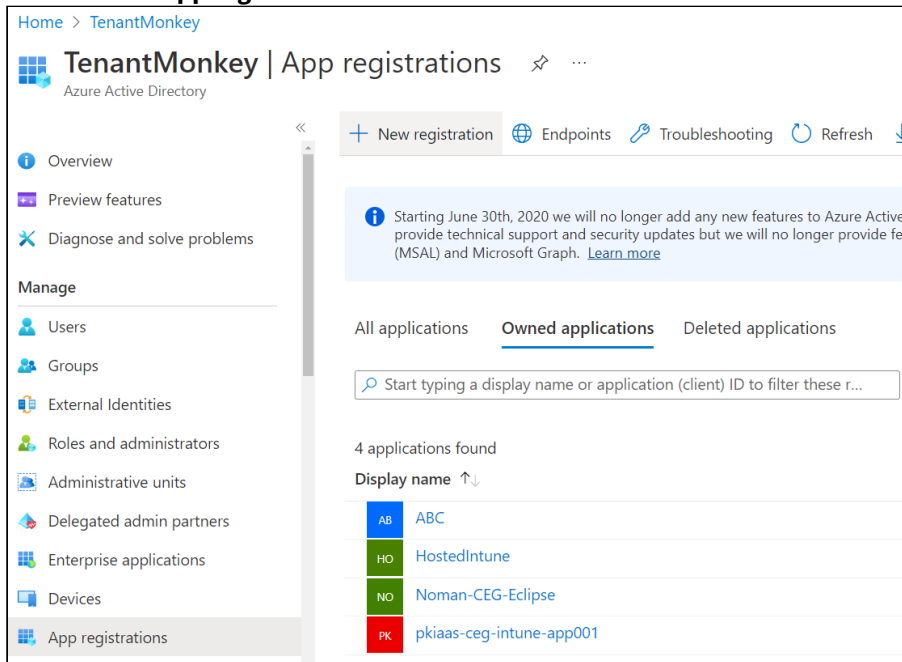
In the Microsoft Azure portal, create an application for running the Intune service.

i At the end of this process, you should have the **Application (client) ID**, **Directory (tenant) ID**, and **Client secret** values required when [Configuring an Entrust-hosted Certificate Enrollment Gateway for Intune](#).

To create an Intune application in Azure

1. Log into portal.azure.com as a user with administrative permissions.

2. Go to **Home > App registrations**.



Home > TenantMonkey

TenantMonkey | App registrations

Azure Active Directory

Overview

Preview features

Diagnose and solve problems

Manage

- Users
- Groups
- External Identities
- Roles and administrators
- Administrative units
- Delegated admin partners
- Enterprise applications
- Devices
- App registrations

+ New registration Endpoints Troubleshooting Refresh

Starting June 30th, 2020 we will no longer add any new features to Azure Active Directory. We will continue to provide technical support and security updates but we will no longer provide feature updates for Microsoft Authentication Library (MSAL) and Microsoft Graph. [Learn more](#)

All applications **Owned applications** Deleted applications

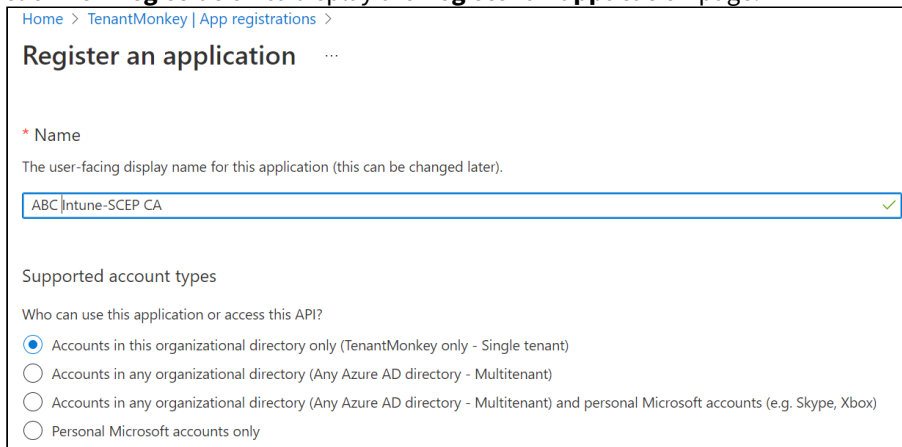
Start typing a display name or application (client) ID to filter these results

4 applications found

Display name ↑↓

Display name
ABC
HostedIntune
Noman-CEG-Eclipse
pkiaas-ceg-intune-app001

3. Click **New registration** to display the **Register an application** page.



Home > TenantMonkey | App registrations >

Register an application

* Name

The user-facing display name for this application (this can be changed later).

ABC Intune-SCEP CA

Supported account types

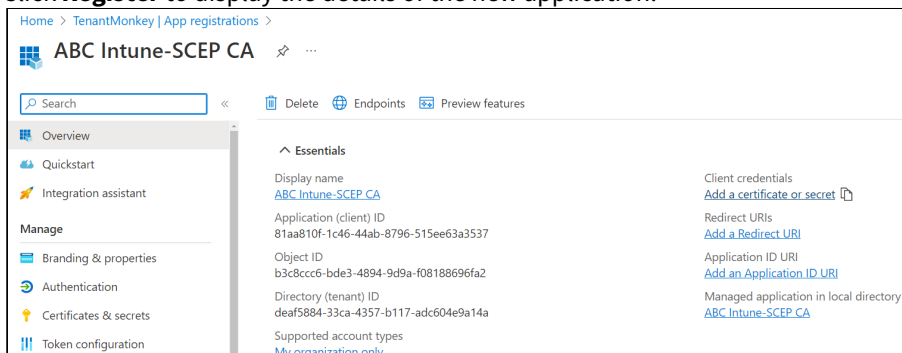
Who can use this application or access this API?

- Accounts in this organizational directory only (TenantMonkey only - Single tenant)
- Accounts in any organizational directory (Any Azure AD directory - Multitenant)
- Accounts in any organizational directory (Any Azure AD directory - Multitenant) and personal Microsoft accounts (e.g. Skype, Xbox)
- Personal Microsoft accounts only

4. In the **Name** field, type the name of the new Intune application.

5. In the **Supported account types** list, be sure that **Accounts in this organizational directory only (TenantMonkey only - Single tenant)** is selected.

6. Click **Register** to display the details of the new application.



Home > TenantMonkey | App registrations >

ABC Intune-SCEP CA

Search

Delete Endpoints Preview features

Overview

Quickstart

Integration assistant

Manage

- Branding & properties
- Authentication
- Certificates & secrets
- Token configuration

Essentials

Display name
ABC Intune-SCEP CA

Application (client) ID
81aa810f-1c46-44ab-8796-515ee63a3537

Object ID
b3c8ccc6-bde3-4894-9d9a-f08188696fa2

Directory (tenant) ID
deaf5884-33ca-4357-b117-adc604e9a14a

Supported account types
My organization only

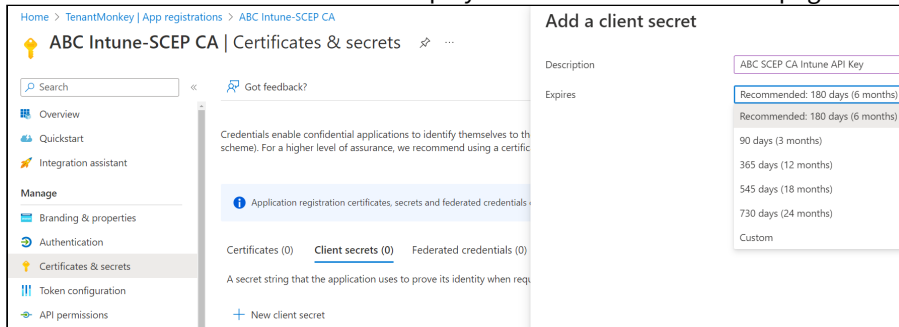
Client credentials
Add a certificate or secret

Redirect URIs
Add a Redirect URI


Application ID URI
Add an Application ID URI

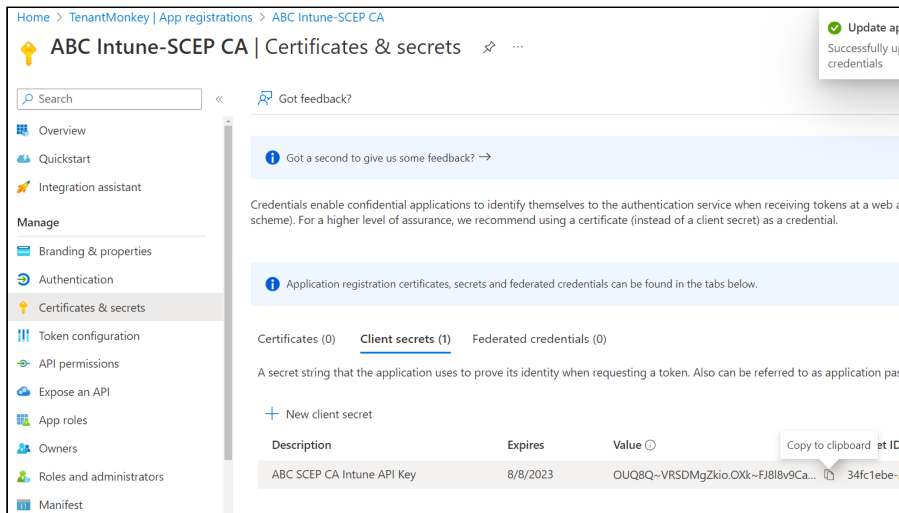
Managed application in local directory
ABC Intune-SCEP CA

- Copy the **Application (client) ID** and **Directory (tenant) ID** values in a text file. You will use these values when [Configuring an Entrust-hosted Certificate Enrollment Gateway for Intune](#).
- Click **Add a certificate or secret** to display the **Certificates & secrets** page.

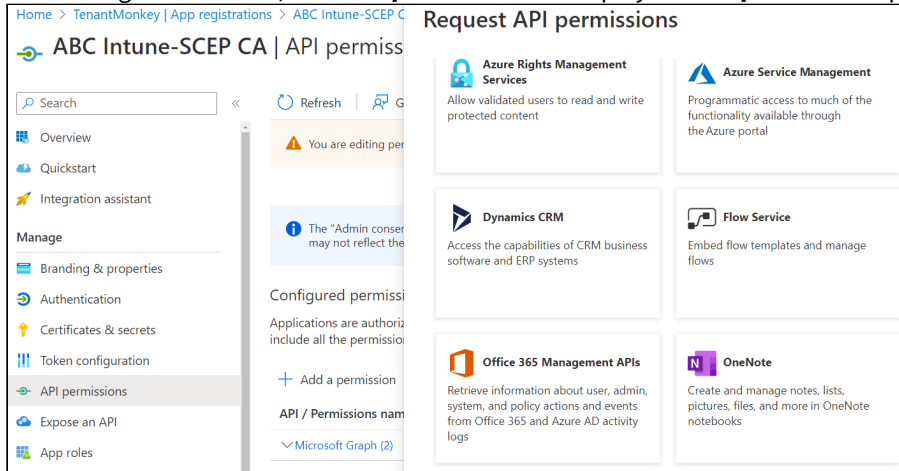


- Click **New client secret** to display the **Add a client secret** dialog.
- In the **Description** field, write a description of the new secret.
- In the **Expires** drop-down list, select the expiration date of the new secret.
- Click **Add** to add the new secret and close the **Add a client secret** dialog.
- On the **Certificates & secrets** page, copy the **Value** of the new secret in a text file. You will use this value when [Configuring an Entrust-hosted Certificate Enrollment Gateway for Intune](#).

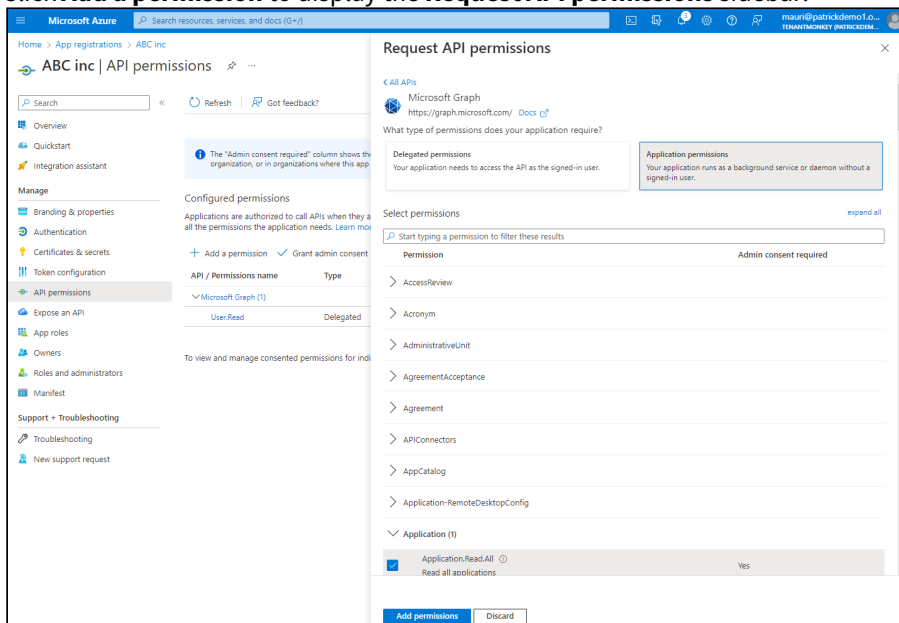
 The secret value will no longer be available after leaving this page.



- In the navigation sidebar, click **API permissions** to display the **API permissions** page.



- Click **Add a permission** to display the **Request API permissions** sidebar.



- In the **Request API permissions** sidebar:
 - Click **Microsoft Graph**.
 - Click **Application permissions**.
 - Under **Select permissions**, expand the **Application** list and select the **Application.ReadAll** permissions.
 - Click **Add permissions**.
- Click **Add a permission** to display the **Request API permissions** sidebar again.
- In the **Request API permissions** sidebar:
 - Click **Intune**.
 - Click **Application permissions**.
 - Under **Select permissions**, select the **scep_challenge_provider** permission.
 - Click **Add permissions**.
- On the **API permissions** page, click **Add admin consent for the TenantMonkey** for granting these permissions to the new Intune application.


Configuring Intune automation in Entrust Certificate Services

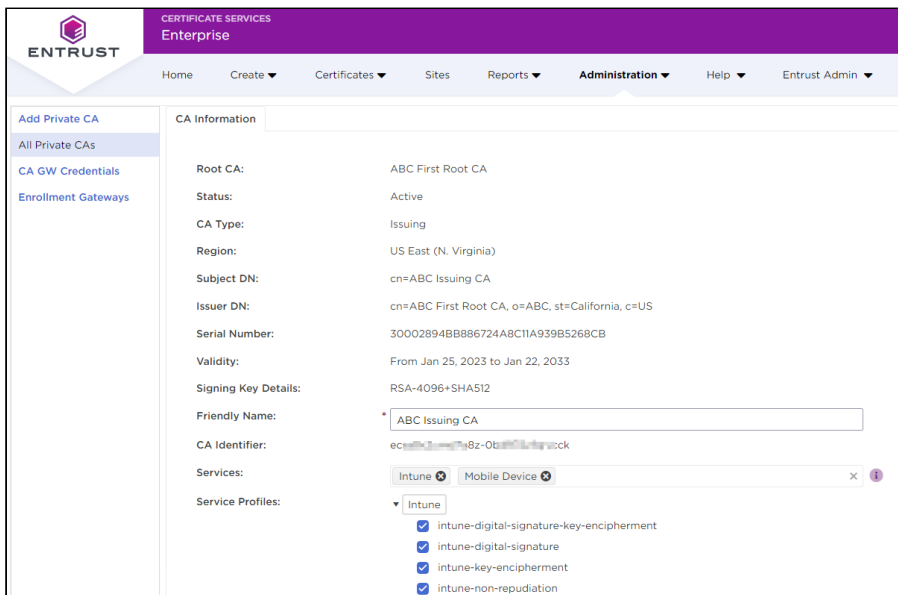
Follow the instructions below on the Entrust Certificate Services Enterprise portal to configure an Entrust-hosted Enrollment Gateway for Intune enrollment.

- [Configuring an Entrust PKIaaS issuing CA for Intune](#)
- [Downloading the Entrust PKIaaS CA certification chain for Intune](#)
- [Configuring an Entrust-hosted Certificate Enrollment Gateway for Intune](#)
- [Getting the Intune Service URL](#)

Configuring an Entrust PKIaaS issuing CA for Intune

On the Entrust Certificate Services Enterprise portal, add the **Intune** service profile to either a new or an existing issuing CA.

 See [Creating an issuing CA under an online root CA](#) for how to create issuing CAs.



The screenshot shows the Entrust Certificate Services Enterprise portal interface. The left sidebar contains navigation options: Add Private CA, All Private CAs, CA GW Credentials, and Enrollment Gateways. The main content area displays the configuration for a CA named 'ABC Issuing CA'. The configuration includes the following details:

Field	Value
Root CA:	ABC First Root CA
Status:	Active
CA Type:	Issuing
Region:	US East (N. Virginia)
Subject DN:	cn=ABC Issuing CA
Issuer DN:	cn=ABC First Root CA, o=ABC, st=California, c=US
Serial Number:	30002894BB886724A8C11A939B5268CB
Validity:	From Jan 25, 2023 to Jan 22, 2033
Signing Key Details:	RSA-4096+SHA512
Friendly Name:	ABC Issuing CA
CA Identifier:	ec...Bz-Ot...
Services:	Intune, Mobile Device
Service Profiles:	<input checked="" type="checkbox"/> intune-digital-signature-key-encipherment <input checked="" type="checkbox"/> intune-digital-signature <input checked="" type="checkbox"/> intune-key-encipherment <input checked="" type="checkbox"/> intune-non-repudiation

Downloading the Entrust PKIaaS CA certification chain for Intune

On the Entrust Certificate Services Enterprise portal, download the certificates for:

- The CA previously created in [Configuring an Entrust PKIaaS issuing CA for Intune](#).
- The root CA.

You will use these certificates when [Configuring Intune profiles in Azure](#).

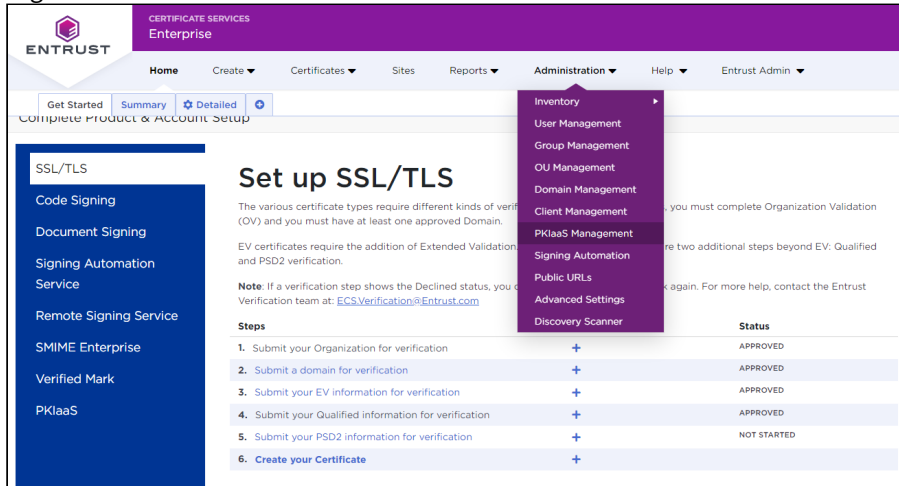
 See [Downloading a CA certificate](#) to download CA certificates from the Entrust Certificate Services Enterprise portal.

Configuring an Entrust-hosted Certificate Enrollment Gateway for Intune

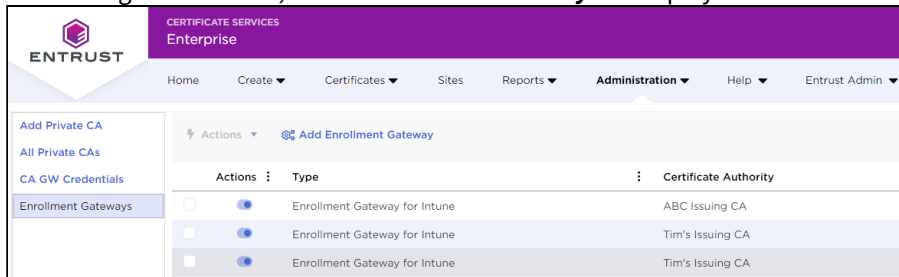
On the Entrust Certificate Services portal, add and configure a Certificate Enrollment Gateway instance to process Intune requests.

To configure Entrust Certificate Enrollment Gateway for Intune

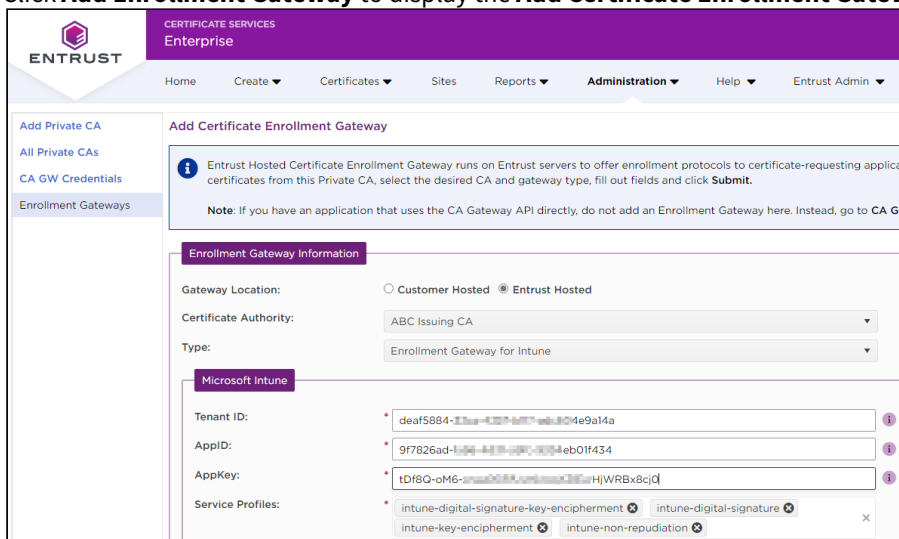
1. Log into cloud.entrust.net



2. In the menu bar, select **Administration > PKIaaS Management**.
3. In the navigation sidebar, click **Enrollment Gateways** to display the Certificate Enrollment Gateway list.



4. Click **Add Enrollment Gateway** to display the **Add Certificate Enrollment Gateway** page.



5. Configure the following settings.

- [Certificate Enrollment Gateway Information](#)
 - [Microsoft Intune](#)
6. Click **Submit**.
 7. Click **OK** in the **Add Enrollment Gateway Confirmation** dialog and wait while the Entrust Certificate Services provision the new Certificate Enrollment Gateway.
 8. Click **OK** on the **Enrollment Gateway Request Submitted** dialog.

Certificate Enrollment Gateway Information

Add the following settings on the **Certificate Enrollment Gateway Information** section of the **Add Certificate Enrollment Gateway** page.

Setting	Value
Gateway Location	Select Entrust Hosted .
Certificate Authority	Select the Certificate Authority described in Configuring an Entrust PKIaaS issuing CA for Intune .
Type	Select Enrollment Gateway for Intune .

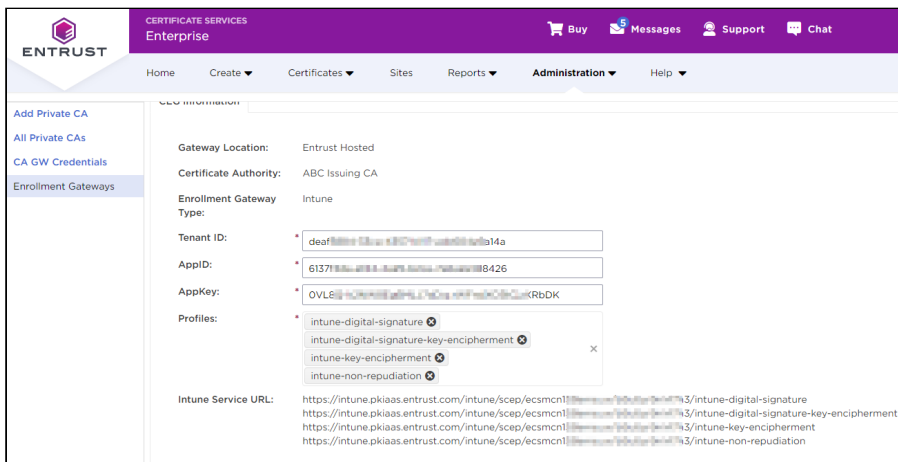
Microsoft Intune

Add the following settings on the **Microsoft Intune** section of the **Add Certificate Enrollment Gateway** page.

Setting	Value
Tenant ID	Paste the Directory (tenant) ID value previously obtained when Creating an Intune application in Azure .
AppID	Paste the Application (client) ID value previously obtained when Creating an Intune application in Azure .
AppKey	Paste the secret value previously obtained when Creating an Intune application in Azure .
Service Profiles	Select the desired Intune profiles.

Getting the Intune Service URL

After [Configuring an Entrust-hosted Certificate Enrollment Gateway for Intune](#), click on the name of the new Certificate Enrollment Gateway.



On the **CEG Information** page, copy the **Intune Service URL** value to use later when [Configuring Intune profiles in Azure](#). The syntax of these URLs is the following.

US region

```
https://intune.pkiaas.entrust.com/intune/scep/{accountId}/{caId}/{profileId}
```

EU region

```
https://intune.eu.pkiaas.entrust.com/intune/scep/{accountId}/{caId}/{profileId}
```

Where:

- `{accountId}` is your account identifier.
- `{caId}` is the Certification Authority identifier.
- `{profileId}` is one of the profiles described in [Intune certificate profiles](#).

Configuring Intune profiles in Azure

In the Microsoft Azure portal, create and configure the required profiles to automate Intune enrollment with an Entrust-hosted Enrollment Gateway.

- [Creating Intune profiles for Windows in Azure](#)
- [Creating Intune profiles for Android in Azure](#)
- [Creating Intune profiles for MacOS in Azure](#)
- [Creating Intune profiles for iOS and iPadOS in Azure](#)

See the following Microsoft guides for more details on Azure profile management.

- <https://learn.microsoft.com/en-us/mem/intune/protect/certificates-trusted-root>
- <https://learn.microsoft.com/en-us/mem/intune/protect/certificates-profile-scep>
- <https://learn.microsoft.com/en-us/troubleshoot/mem/intune/certificates/troubleshoot-scep-certificate-profiles>

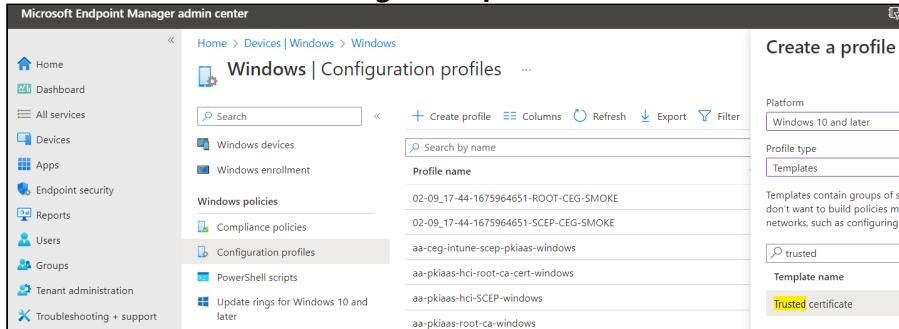
Creating Intune profiles for Windows in Azure

Create the following profiles for enrolling Microsoft Windows devices with Intune.

- A root CA profile
- An issuing CA profile
- A SCEP profile

To create a Windows profile for Intune

1. Log into endpoint.microsoft.com as a user with administrative privileges.
2. Go to **Devices > Windows > Configuration profiles**.



3. Click **Create profile**.
4. Configure the values described in the following sections.
 - [Create a profile](#)
 - [Basics](#)
 - [Configuration settings](#)
 - [Assignments](#)
 - [Applicability Rules](#)
 - [Review and create](#)

Create a profile

In the **Create a profile** dialog, select the following values for each Windows profile.

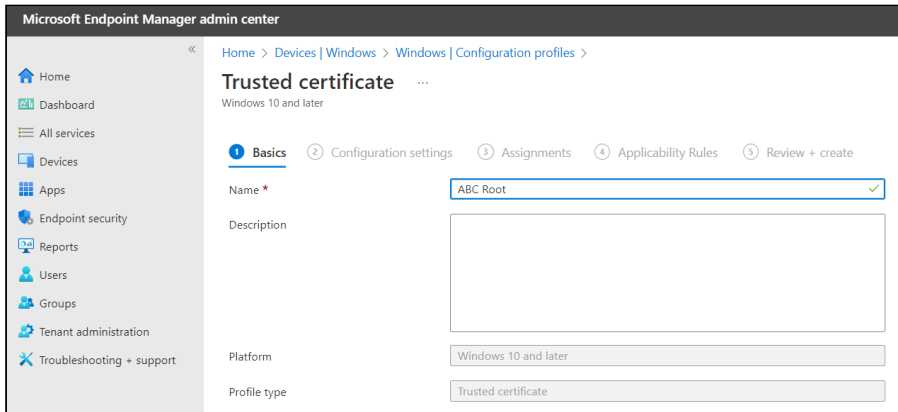
Setting	root CA profile	issuing CA profile	SCEP profile
Platform	Windows 10 and later	Windows 10 and later	Windows 10 and later
Profile type	Templates	Templates	Templates
Template name	Trusted certificate	Trusted certificate	SCEP certificate

Basics

In the **Name** field of the **Basics** page, type the name of the profile – for example:

- ABC Root
- ABC Issuing
- ABC Digital Signature SCEP Cert

Optionally, add a description of the profile purpose.



Configuration settings

When creating a root or issuing CA profile for Windows, configure the following settings on the **Configuration settings** page.

Setting	Root CA profile	Issuing CA profile
Certificate file	The root Certification Authority certificate	The issuing Certification Authority certificate
Destination store	Computer certificate store - Root	Computer certificate store - Intermediate

 See [Downloading a CA certificate](#) to download CA certificates.

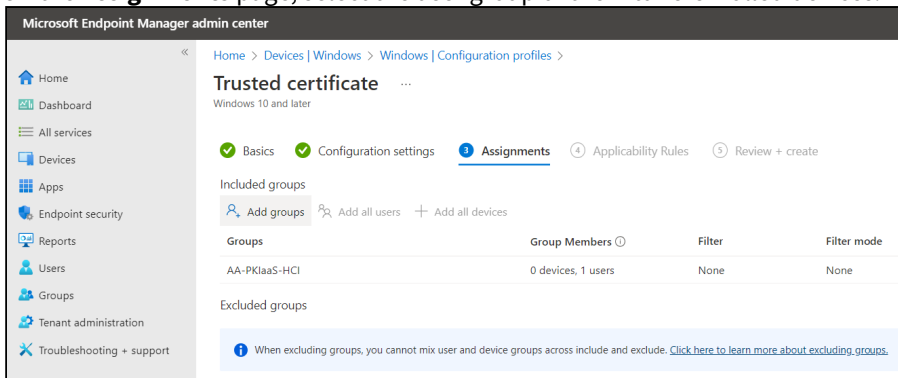
When creating a SCEP profile for Windows, configure the following settings on the **Configuration settings** page.

Setting	Value
Certificate type	Select User .
Subject name format	The syntax of the certificate subject names. This field supports the variables described in https://learn.microsoft.com/en-us/mem/intune/protect/certificates-profile-scep
Subject alternative name	The value of each attribute in the certificate subject alternative name. Optional.
Certificate validity period	The validity period of the certificates.
Key storage provider (KSP)	Select Enroll to Software KSP for Windows 10 Intune enrollments; select any of the listed values for Windows 11.

Setting	Value
Key usage	The key usage of the enrolled certificates.
Key size (bits)	Select 2048 (Entrust PKIaaS does not support key sizes below 2048).
Hash algorithm	Select SHA-2 .
Root certificate	Select the root CA profile
Extended key usage	Select Client Authentication .
SCEP Server URLs	Paste one of the URLs obtained when Getting the Intune Service URL .

Assignments

On the **Assignments** page, select the user group of the Intune-enrolled devices.



Applicability Rules

On the **Applicability Rules** page, select optional filters for the selected group – for example, the operating system of the devices.

Review and create

On the **Review + create** page, check the settings of the new profile and click **Create** to confirm the profile creation.

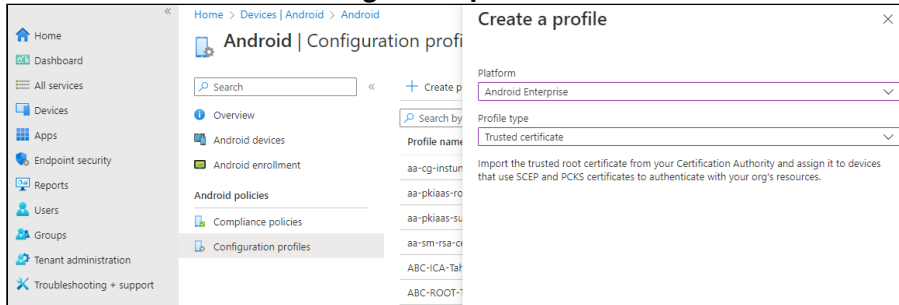
Creating Intune profiles for Android in Azure

Create the following profiles for enrolling Android devices with Intune.

- A root CA profile
- An issuing CA profile
- A SCEP profile

To create an Android profile for Intune

1. Log into endpoint.microsoft.com as a user with administrative privileges.
2. Go to **Devices > Android > Configuration profiles**.



3. Click **Create profile**.
4. Configure the settings described in the following sections.
 - [Create a profile](#)
 - [Basics](#)
 - [Configuration settings](#)
 - [Assignments](#)
 - [Review and create](#)

Create a profile

In the **Create a profile** dialog, select the following fields for each Android profile.

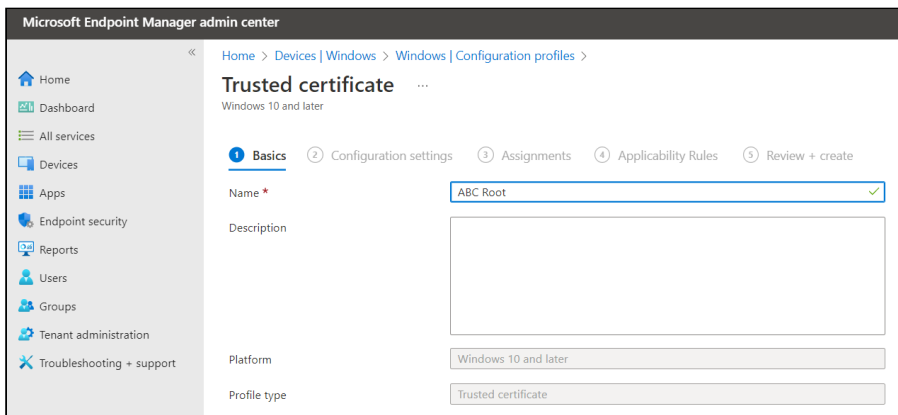
Setting	Root CA profile	Issuing CA profile	SCEP profile
Platform	Android Enterprise	Android Enterprise	Android Enterprise
Profile type	Trusted certificate	Trusted certificate	SCEP certificate

Basics

In the **Name** field of the **Basics** page, type the name of the profile – for example:

- ABC Root
- ABC Issuing
- ABC Digital Signature SCEP Cert

Optionally, add a description of the profile purpose.



Configuration settings

When creating root or issuing CA profiles, configure the following settings on the **Configuration settings** page.

Setting	Root CA profile	Issuing CA profile
Certificate file	The root Certification Authority certificate	The issuing Certification Authority certificate

 See [Downloading a CA certificate](#) to download CA certificates.

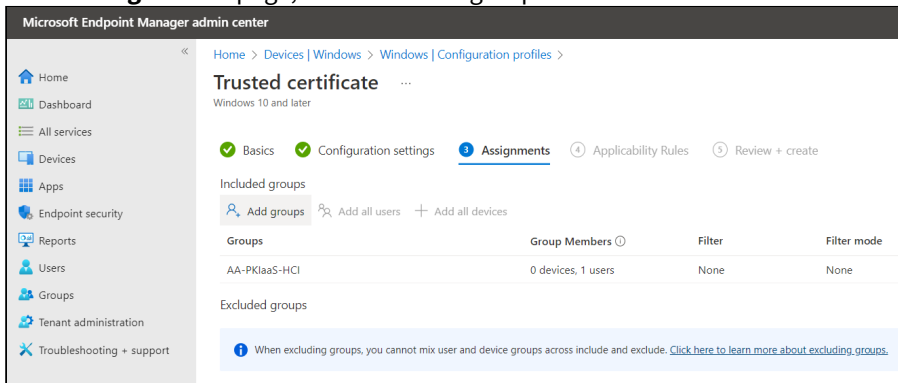
When creating a SCEP profile for Android, configure the following settings on the **Configuration settings** page.

Setting	Value
Certificate type	Select User .
Subject name format	The syntax of the certificate subject names. This field supports the variables described in https://learn.microsoft.com/en-us/mem/intune/protect/certificates-profile-scep
Subject alternative name	The value of each attribute in the certificate subject alternative name. Optional.
Certificate validity period	The validity period of the certificates.
Key usage	The key usage of the enrolled certificates.
Key size (bits)	Select 2048 or 4096 (Entrust PKIaaS does not support key sizes below 2048).
Hash algorithm	Select SHA-2 .

Setting	Value
Root certificate	Select the root CA profile
Extended key usage	Select Client Authentication .
SCEP Server URLs	Paste one of the URLs obtained when Getting the Intune Service URL .

Assignments

On the **Assignments** page, select the user group of the Intune-enrolled devices.



The screenshot shows the Microsoft Endpoint Manager admin center interface. The breadcrumb trail is: Home > Devices | Windows > Windows | Configuration profiles >. The main heading is "Trusted certificate" for "Windows 10 and later". The navigation tabs are: Basics (checked), Configuration settings (checked), **Assignments** (active), Applicability Rules, and Review + create. Under "Included groups", there is a search bar and buttons for "Add groups", "Add all users", and "Add all devices". A table lists the included groups:

Groups	Group Members	Filter	Filter mode
AA-PKIaaS-HCI	0 devices, 1 users	None	None

Below the table, there is an "Excluded groups" section with a note: "When excluding groups, you cannot mix user and device groups across include and exclude. [Click here to learn more about excluding groups.](#)"

Review and create

On the **Review + create** page, check the settings of the new profile and click **Create** to confirm the profile creation.

Creating Intune profiles for MacOS in Azure

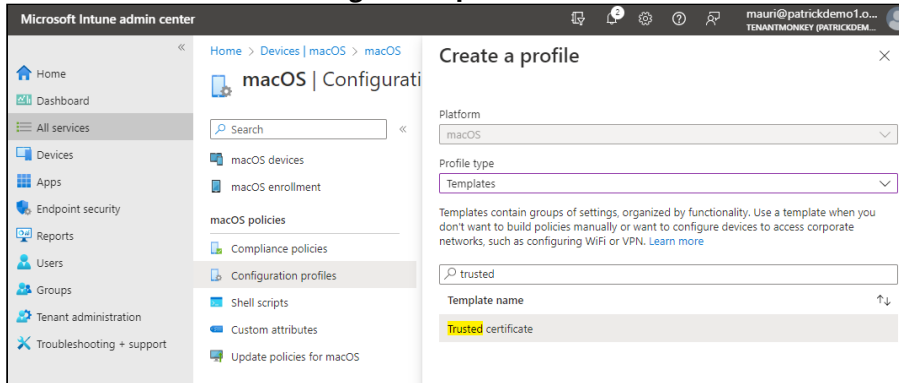
Create the following profiles for enrolling MacOS devices with Intune.

- A root CA profile
- An issuing CA profile
- A SCEP profile

To create MacOS profile for Intune

1. Log into endpoint.microsoft.com as a user with administrative privileges.

2. Go to **Devices > MacOS > Configuration profiles**.



3. Click **Create profile**.
4. Configure the settings described in the following sections.
 - [Create a profile](#)
 - [Configuration settings](#)
 - [Assignments](#)
 - [Review and create](#)

Create a profile

On the **Create a profile** dialog, select the following fields for the SCEP profile.

Setting	Root CA profile	Issuing CA profile	SCEP profile
Platform	MacOS Enterprise	MacOS Enterprise	MacOS Enterprise
Profile type	Templates	Templates	Templates
Template name	Trusted certificate	Trusted certificate	SCEP certificate

Configuration settings

When creating root or issuing CA profiles, configure the following settings on the **Configuration settings** page.

Setting	Root CA profile	Issuing CA profile
Certificate file	The root Certification Authority certificate	The issuing Certification Authority certificate

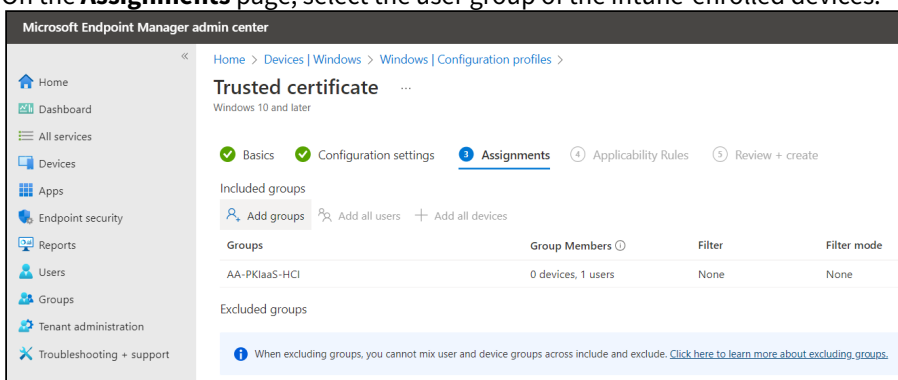
 See [Downloading a CA certificate](#) to download CA certificates.

When creating a SCEP profile, configure the following settings on the **Configuration settings** page.

Setting	Value
Certificate type	Select User .
Subject name format	The syntax of the certificate subject names. This field supports the variables described in https://learn.microsoft.com/en-us/mem/intune/protect/certificates-profile-scep
Subject alternative name	The value of each attribute in the certificate subject alternative name. Optional.
Certificate validity period	The validity period of the certificates.
Key usage	The key usage of the enrolled certificates.
Key size (bits)	Select 2048 or 4096 (Entrust PKIaaS does not support key sizes below 2048).
Hash algorithm	Select SHA-2 .
Root certificate	Select the root CA profile.
Extended key usage	Select Client Authentication .
SCEP Server URLs	Paste one of the URLs obtained when Getting the Intune Service URL .

Assignments

On the **Assignments** page, select the user group of the Intune-enrolled devices.



Microsoft Endpoint Manager admin center

Home > Devices | Windows > Windows | Configuration profiles >

Trusted certificate

Windows 10 and later

Basics
 Configuration settings
 Assignments
 Applicability Rules
 Review + create

Included groups

Groups	Group Members	Filter	Filter mode
AA-PKIaaS-HCI	0 devices, 1 users	None	None

Excluded groups

When excluding groups, you cannot mix user and device groups across include and exclude. [Click here to learn more about excluding groups.](#)

Review and create

On the **Review + create** page, check the settings of the new profile and click **Create** to confirm the profile creation.

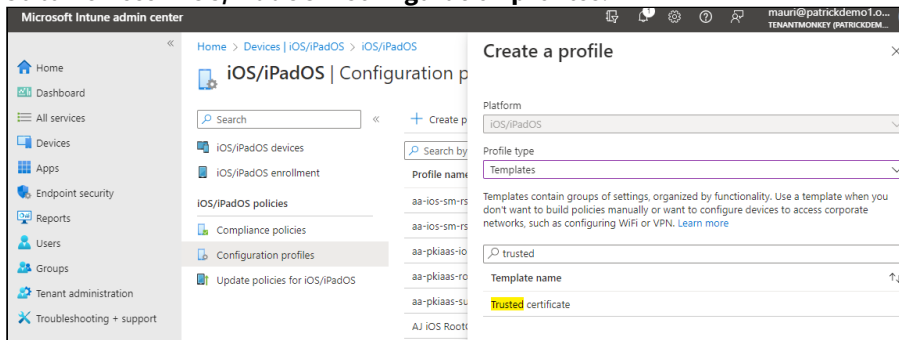
Creating Intune profiles for iOS and iPadOS in Azure

Create the following profiles for enrolling iOS and iPadOS devices with Intune.

- A root CA profile
- An issuing CA profile
- A SCEP profile

To create iOS/iPadOS profiles for Intune

1. Log into endpoint.microsoft.com as a user with administrative privileges.
2. Go to **Devices > iOS/iPadOS > Configuration profiles**.



3. Click **Create profile**.
4. Configure the settings described in the following sections.
 - [Create a profile](#)
 - [Configuration settings](#)
 - [Assignments](#)
 - [Review and create](#)

Create a profile

On the **Create a profile** dialog, select the following fields for the SCEP profile.

Setting	Root CA profile	Issuing CA profile	SCEP profile
Platform	iOS/iPadOS	iOS/iPadOS	iOS/iPadOS
Profile type	Templates	Templates	Templates
Template name	Trusted certificate	Trusted certificate	SCEP certificate

Configuration settings

When creating root or issuing CA profiles, configure the following settings on the **Configuration settings** page.

Setting	Root CA profile	Issuing CA profile
Certificate file	The root Certification Authority certificate	The issuing Certification Authority certificate

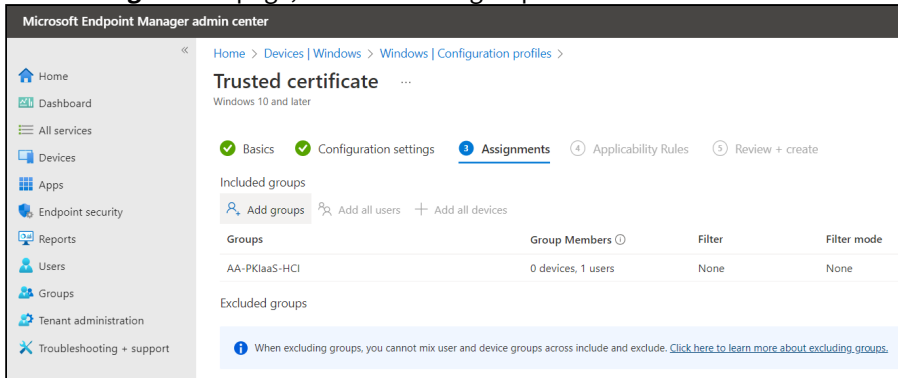
 See [Downloading a CA certificate](#) to download CA certificates.

When creating a SCEP profile, configure the following settings on the **Configuration settings** page.

Setting	Value
Certificate type	Select User .
Subject name format	The syntax of the certificate subject names. This field supports the variables described in https://learn.microsoft.com/en-us/mem/intune/protect/certificates-profile-scep
Subject alternative name	The value of each attribute in the certificate subject alternative name. Optional.
Certificate validity period	The validity period of the certificates.
Key usage	The key usage of the enrolled certificates.
Key size (bits)	Select 2048 or 4096 (Entrust PKIaaS does not support key sizes below 2048).
Hash algorithm	Select SHA-2 .
Root certificate	Select the root CA profile.
Extended key usage	Select Client Authentication .
SCEP Server URLs	Paste one of the URLs obtained when Getting the Intune Service URL .

Assignments

On the **Assignments** page, select the user group of the Intune-enrolled devices.



Review and create

On the **Review + create** page, check the settings of the new profile and click **Create** to confirm the profile creation.

Enrolling user devices with the Intune Company Portal

When completing the Intune integration steps, download and install the Intune Company Portal to enroll your device.

- [Enrolling Windows devices with the Intune Company Portal](#)
- [Enrolling Android devices with the Intune Company Portal](#)
- [Enrolling iOS devices with the Intune Company Portal](#)
- [Enrolling MacOS devices with the Intune Company Portal](#)

For more details, check the Microsoft Intune documentation at learn.microsoft.com/en-us/mem/intune/user-help

Enrolling Windows devices with the Intune Company Portal

Install the Intune Company Portal application to enroll your Windows device with Intune.

To enroll a Windows device with Intune

1. Download the Intune Company Portal app from the Microsoft Store:
<https://apps.microsoft.com/store/detail/company-portal/9WZDNCRFJ3PZ>
2. Log into the application with your Microsoft user credentials.
3. Follow the application instructions to enroll your device with Intune.
4. In the **Windows Settings** panel of your device, go to **User accounts > Sync your settings**.
5. Enable the device synchronization.

Enrolling Android devices with the Intune Company Portal

Install the Intune Company Portal application to enroll your Android device with Intune.

To enroll an Android device with Intune

1. Download the Intune Company Portal app from the Google Play Store:
<https://play.google.com/store/apps/details?id=com.microsoft.windowsintune.companyportal>
2. Log into the application with your Microsoft user credentials.
3. Follow the application instructions to enroll your device with Intune.

4. Wait while the installation process adds the application to:
 - The **Personal** workspace.
 - The **Work** workspace.

Enrolling iOS devices with the Intune Company Portal

Install the Intune Company Portal mobile application to enroll your iOS device with Intune.

To enroll an iOS device with Intune

1. Download the Intune Company Portal application from the App Store:
<https://apps.apple.com/us/app/intune-company-portal/id719171358>
2. Log into the application with your Microsoft user credentials.
3. Follow the application instructions to enroll your device and install the Certificate Management Profile.

Enrolling MacOS devices with the Intune Company Portal

Enroll your MacOS device with the Intune Company Portal application as explained in the following guide.

<https://learn.microsoft.com/en-us/mem/intune/user-help/enroll-your-device-in-intune-macos-cp>

Renewing enrolled certificates

When close to expiring, the Microsoft Intune protocol automatically renews certificates on Windows and Android devices. However, as reported in the Microsoft documentation, the iOS, iPadOS, and macOS devices have the following issue.

Renewal behavior on iOS/iPadOS and macOS: Certificates can only be renewed during the renewal threshold phase. In addition, the device has to be unlocked while syncing with Intune. If the renewal was not successful, the expired certificate will remain on the device and Intune does not trigger a renewal anymore. Also, Intune does not offer an option to redeploy expired certificates. Affected devices need to be excluded from the SCEP profile temporarily to remove the expired certificate and request a new one.

i See <https://learn.microsoft.com/en-us/mem/intune/protect/certificates-profile-scep> for details on this issue.

Therefore, to renew certificates on iOS, iPad, and macOS devices, you must:

1. Deselect the device on the Intune Company Portal application.
2. Reenroll the device on the Intune Company Portal.

9 Automating MDM enrollment with an Entrust-hosted Enrollment Gateway

Configure an Entrust-hosted Enrollment Gateway to operate as SCEP Server and process MDM (Mobile Device Management) enrollment requests with PKIaaS Certification Authorities.

- [MDM integration requirements](#)
- [Configuring MDM automation in Entrust Certificate Services](#)
- [Configuring MDM automation in Ivanti MobileIron Cloud](#)
- [Configuring MDM automation in Jamf](#)
- [Configuring MDM automation in VMware Workspace ONE](#)

MDM integration requirements

You must meet the following requirements to automate MDM enrollment with an Entrust-hosted Enrollment Gateway.

- [Entrust Certificate Services](#)
- [MDM providers](#)
- [Operating systems and devices](#)

Entrust Certificate Services

You need an Entrust Certificate Services (ECS) Enterprise account with privileges to create an issuing Certification Authority.

MDM providers

Enrollment integration is tested for this release with the following MDM providers.

- Jamf
- VMware Workspace One
- Ivanti

Other MDM vendors that leverage dynamic SCEP are not validated yet. Please get in touch with customer support if you run into any issues during integration.

⚠ Static SCEP is not a secure protocol for a cloud service; therefore, PKIaaS does not support static-only solutions like Google Endpoint Management and Chromebook OS. See [Automating enrollment with an on-premises Enrollment Gateway](#) for how to connect these solutions with a generic SCEP server.

Operating systems and devices

Enrollment integration for this release is tested and validated with the following devices and operating systems.

Provider	iPad	iPhone	MacOS	Windows	Android	ChromeOS
Jamf	16.6	16.6	Ventura 13.5.1	N/A	N/A	N/A

Provider	iPad	iPhone	MacOS	Windows	Android	ChromeOS
Workspace ONE	16.6	16.6	Ventura 13.5.1	10 and 11	13	N/A
Ivanti MobileIron Cloud						

Other devices and operating systems listed in the Jamf and Workspace One support documents should work but have not been tested.

Configuring MDM automation in Entrust Certificate Services

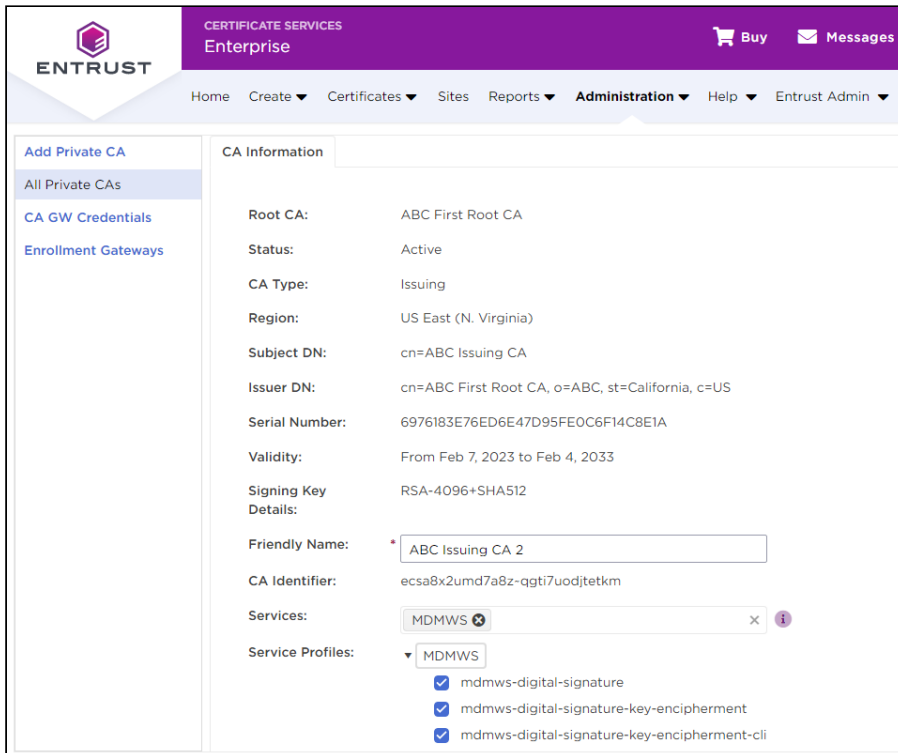
Configure an Entrust-hosted Enrollment Gateway for MDM enrollment.

- [Configuring an Entrust PKIaaS issuing CA for MDM](#)
- [Downloading the Entrust PKIaaS root CA certificate for MDM](#)
- [Configuring an Entrust-hosted Certificate Enrollment Gateway for MDM](#)
- [Getting Certificate Enrollment Gateway settings for MDM](#)

Configuring an Entrust PKIaaS issuing CA for MDM

On the Entrust Certificate Services Enterprise portal, add the **MDMWS** service profile to either a new or an existing issuing CA.

 See [Creating an issuing CA under an online root CA](#) for how to create issuing CAs.




The screenshot shows the 'CA Information' page in the Entrust Certificate Services Enterprise portal. The 'Services' field is set to 'MDMWS' and the 'Service Profiles' section has three profiles checked: 'mdmws-digital-signature', 'mdmws-digital-signature-key-encipherment', and 'mdmws-digital-signature-key-encipherment-cli'.

Downloading the Entrust PKIaaS root CA certificate for MDM

After [Configuring an Entrust PKIaaS issuing CA for MDM](#), download the certificates of the root and issuing CAs. You will use these certificate when:

- [Configuring MDM automation in Jamf](#)
- [Configuring MDM automation in VMware Workspace ONE](#)

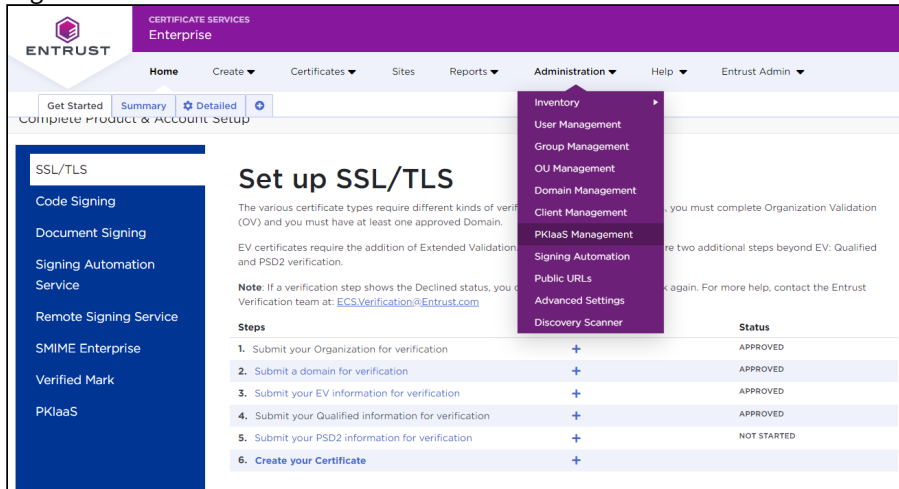
 See [Downloading a CA certificate](#) to download CA certificates from the Entrust Certificate Services Enterprise portal.

Configuring an Entrust-hosted Certificate Enrollment Gateway for MDM

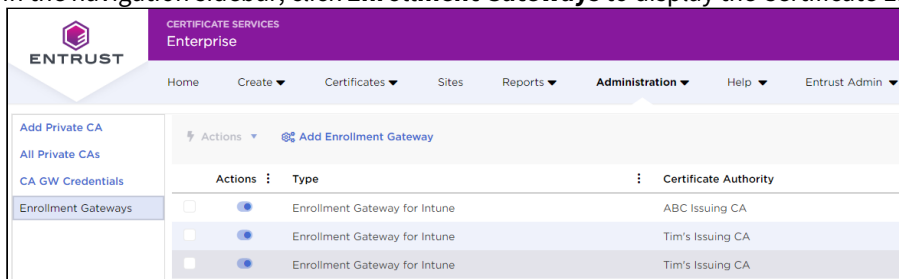
On the Entrust Certificate Services portal, add and configure a Certificate Enrollment Gateway instance to process MDM requests.

To configure Entrust Certificate Enrollment Gateway for MDM

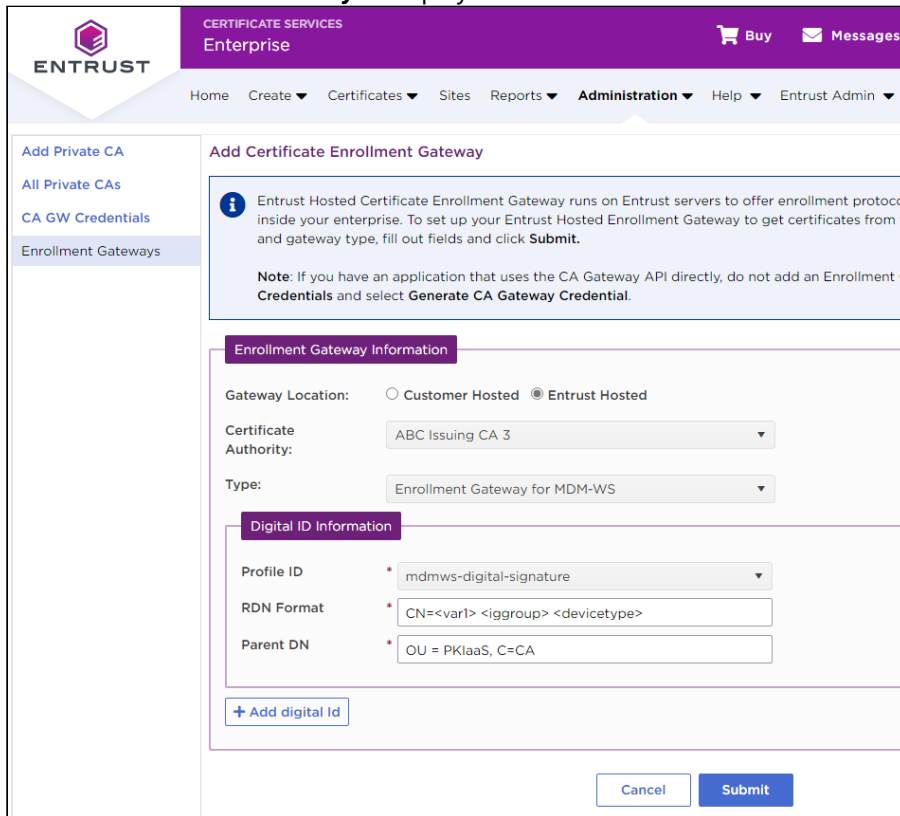
1. Log into cloud.entrust.net



2. In the menu bar, select **Administration > PKIaaS Management**.
3. In the navigation sidebar, click **Enrollment Gateways** to display the Certificate Enrollment Gateway list.



- Click **Add Enrollment Gateway** to display the **Add Certificate Enrollment Gateway** page.



- Configure the following settings.
 - Gateway Location
 - Certificate Authority
 - Type
 - Profile ID
 - RDN Format
 - Parent DN
- Optionally, click **Add digital Id** to add new identifier information.
- Click **Submit**.
- Click **OK** in the **Add Enrollment Gateway Confirmation** dialog and wait while the Entrust Certificate Services provision the new Certificate Enrollment Gateway.
- Click **OK** on the **Enrollment Gateway Request Submitted** dialog.

Gateway Location

Select **Entrust Hosted**.

Certificate Authority

Select the Certificate Authority described in [Configuring an Entrust PKIaaS issuing CA for MDM](#).

Type

Select **Enrollment Gateway for MDM-WS**.


Profile ID

Select the CA profile for issuing the enrolled certificates.

RDN Format

The Relative Distinguished Name (RDN) format to build certificate Subject Names. This field supports custom variable names using the `<variable>` syntax – for example:

```
CN=<var1> <var2> <var3> SampleStaticText
```


 Entrust PKIaaS will only process enrollment requests containing values for all variables defined in this field.

Jamf enrollment requests will always contain values for the following RDN variables, even if this field does not define them.

Variable	Value
igusername	The name of the device user.
iggroup	The group of enrolled devices.
devicetype	The type of enrolled device.

To make use of these RDN variables on Jamf, define an RDN format like the following.

```
CN=<igusername> <iggroup> <devicetype>
```

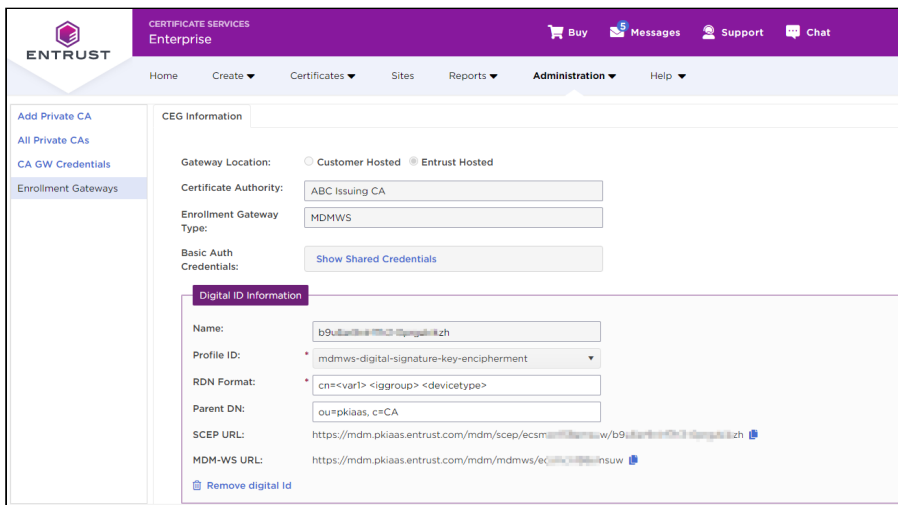
 See [Configuring MDM automation in Jamf](#) for how to add custom variables outside of the above variables.

Parent DN

The parent Distinguished Name (DN) for building the RDN of a certificate. Specifically, the selected value is appended to the end of the Subject DN after the RDN Format variables have been processed.

Getting Certificate Enrollment Gateway settings for MDM

After [Configuring an Entrust-hosted Certificate Enrollment Gateway for MDM](#), click on the name of the Certificate Enrollment Gateway to display the **CEG Information** page.



Copy the following values to use later when [Configuring MDM automation in Jamf](#).

- [Basic Auth Credentials](#)
- [Digital ID Information / Name](#)
- [Digital ID Information / SCEP URL](#)
- [Digital ID Information / MDM-WS-URL](#)

Basic Auth Credentials

Click **Show Shared Credentials** to copy the **UserID** and the **Password**.

Digital ID Information / Name

Copy your digital configuration name.

Digital ID Information / SCEP URL

Copy the URL of the SCEP enrollment web service.

US region

```
https://mdm.pkiaas.entrust.com/mdm/scep/{accountId}/{name}
```

EU region

```
https://mdm.eu.pkiaas.entrust.com/mdm/scep/{accountId}/{name}
```

Where `{accountId}` is your account identifier and `{name}` is your digital configuration name.

Digital ID Information / MDM-WS-URL

Copy the URL of the MDM enrollment web service.

US region

https://mdm.pkiaas.entrust.com/mdm/scep/{accountId}

EU region

https://mdm.eu.pkiaas.entrust.com/mdm/scep/{accountId}


Where `{accountId}` is your account identifier.

Configuring MDM automation in Ivanti MobileIron Cloud

When using MobileIron as MDM provider, the enrollment automation supports the following protocols.

- The PKI protocol for Entrust MDMWS PKCS #12 enrollment.
- The Simple Certificate Enrollment Protocol (SCEP).

See below the [MDMWS certificate profiles](#) supported by each protocol.

 MobileIron Cloud is addressing the limitations in its SCEP implementation to ensure full support for all profiles.

Profile	PKI	SCEP
mdmws-digital-signature	✗	✗
mdmws-digital-signature-key-encipherment	✗	✗
mdmws-digital-signature-key-encipherment-clientauth	✗	✗
mdmws-key-encipherment	✗	✗
mdmws-non-repudiation	✗	✗
mdmws-p12-digital-signature	✓	✓
mdmws-p12-digital-signature-key-encipherment	✓	✓
mdmws-p12-digital-signature-key-encipherment-clientauth	✓	✓
mdmws-p12-key-encipherment	✓	✓

Profile	PKI	SCEP
mdmws-p12-non-repudiation	✓	✓

Follow the steps below to automate MDM enrollment in MobileIron.

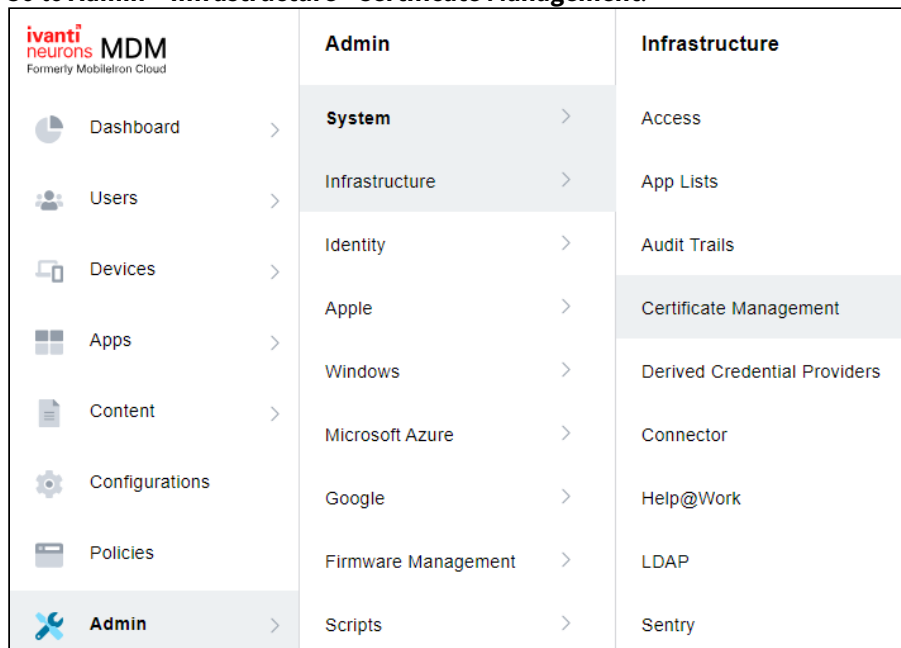
- [Adding Entrust as issuing certificate authority in MobileIron Cloud](#)
- [Adding an identity certificate in Ivanti MobileIron Cloud](#)

Adding Entrust as issuing certificate authority in MobileIron Cloud

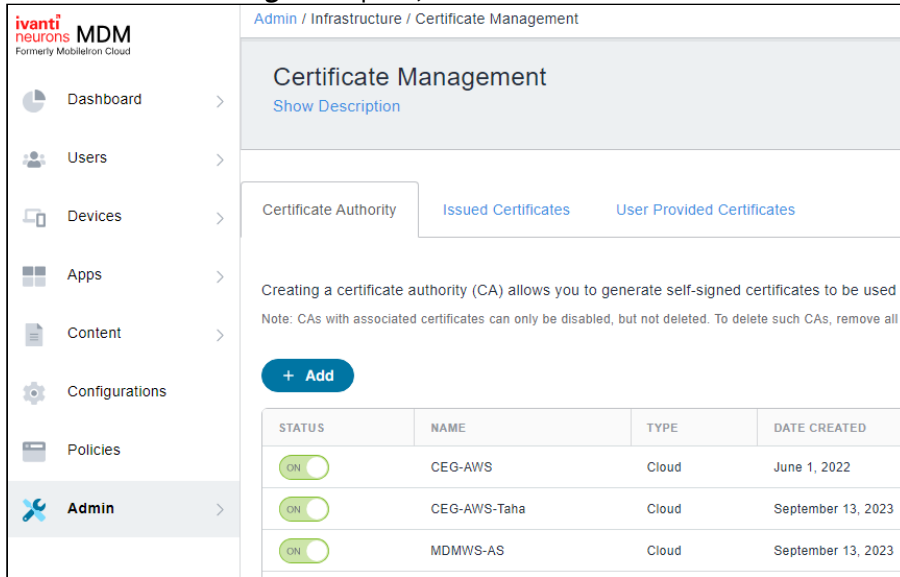
Add and configure Entrust as an issuing certificate authority in MobileIron to automate MDM enrollment.

To add Entrust as issuing certificate authority in MobileIron

1. Log into the MobileIron Cloud portal.
2. Go to **Admin > Infrastructure > Certificate Management**.



- In the **Certificate Management** pane, click the **Add** button of the **Certificate Authority** tab.



Admin / Infrastructure / Certificate Management

Certificate Management

[Show Description](#)

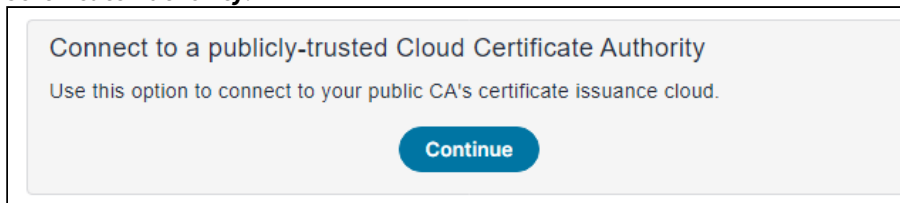
Certificate Authority Issued Certificates User Provided Certificates

Creating a certificate authority (CA) allows you to generate self-signed certificates to be used by your devices. Note: CAs with associated certificates can only be disabled, but not deleted. To delete such CAs, remove all their certificates.

[+ Add](#)

STATUS	NAME	TYPE	DATE CREATED
<input checked="" type="checkbox"/>	CEG-AWS	Cloud	June 1, 2022
<input checked="" type="checkbox"/>	CEG-AWS-Taha	Cloud	September 13, 2023
<input checked="" type="checkbox"/>	MDMWS-AS	Cloud	September 13, 2023

- In the **Add Certificate Authority** dialog, click **Continue** under **Connect to a publicly-trusted Cloud Certificate Authority**.



Connect to a publicly-trusted Cloud Certificate Authority

Use this option to connect to your public CA's certificate issuance cloud.

[Continue](#)

- In the **Create a Cloud Certificate Authority** dialog, configure the following settings.
 - [Name](#)
 - [Select Cloud CA](#)
 - [Description](#)
 - [Enter URL](#)
 - [Enter Username](#)
 - [Enter Password](#)
 - [Group](#)
 - [Cache Identities on MobileIron Cloud](#)

! Create a Cloud Certificate Authority ✕

Name

Select Cloud CA

Description

Enter URL

Enter Username

Enter Password

Group

Cache Identities on Ivanti Neurons for MDM
Full identities will be stored on Ivanti Neurons for MDM instead of being generated each time

← Back Done

6. Add the MDM configuration described in the following sections.

- [Name](#)
- [Select Cloud CA](#)
- [Description](#)
- [Enter URL](#)
- [Enter Username](#)
- [Enter Password](#)
- [Group](#)
- [Cache Identities on MobileIron Cloud](#)

Name

Enter a name for the Entrust CA

Select Cloud CA

Select **Entrust**.

Description

Add an optional description for the Entrust CA.

Enter URL

Enter the following URL.

Enter Username

Enter

Enter Password

Group

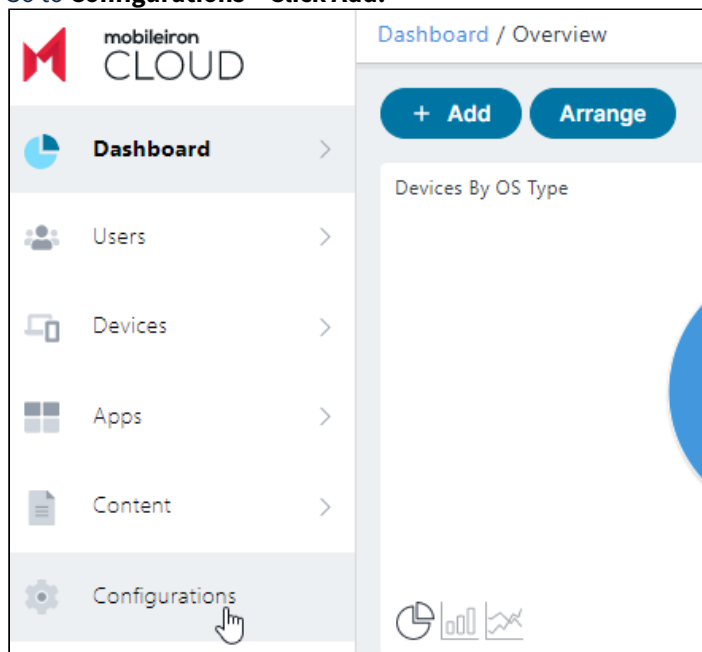
Cache Identities on MobileIron Cloud

Adding an identity certificate in Ivanti MobileIron Cloud

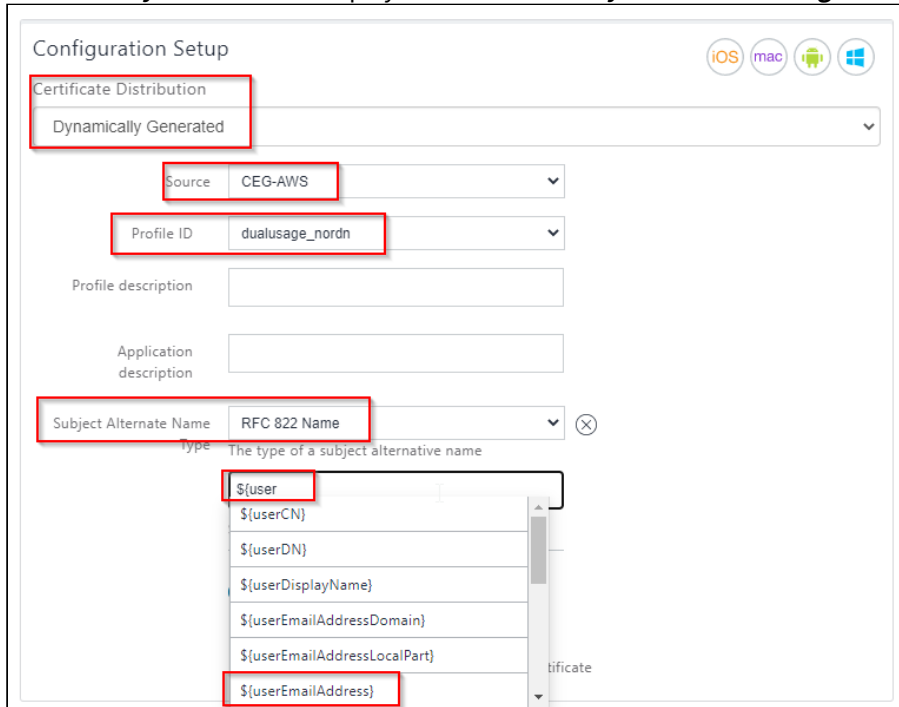
Add an identity certificate in MobileIron to automate MDM enrollment.

To add an identity certificate in MobileIron

1. Log into the MobileIron Cloud portal.
2. Go to **Configurations** > **Click Add**.



3. Click **Identity certificate** to display the **Create Identify Certificate Configuration** dialog.



4. Configure the following settings.

- [Certificate Distribution](#)
- [Source](#)
- [Profile ID](#)
- [Profile description](#)
- [Application description](#)
- [Subject Alternate Name](#)
- [Type](#)

Certificate Distribution

Select **Dynamically Generated**.

Source

Select ??

Profile ID

Select ??

Profile description

Add an optional description of the enrollment profile.

Application description

Add an optional description of the enrollment application.

Subject Alternate Name

Select **RFC 822 Name**.

Type

Select the following placeholders.

`${user}`

`${userEmailAddress}`

Configuring MDM automation in Jamf

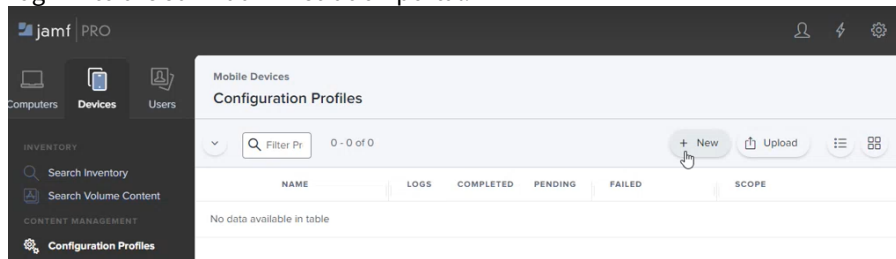
Jamf is a cloud service for managing Apple devices such as Mac, iPad, or iPhone. When enrolling these devices, the SCEP Payload must include the settings described in:

<https://support.apple.com/guide/deployment/scep-payload-settings-dep495a6d79/web>

If using Jamf as MDM provider, configure and install a profile as described below.

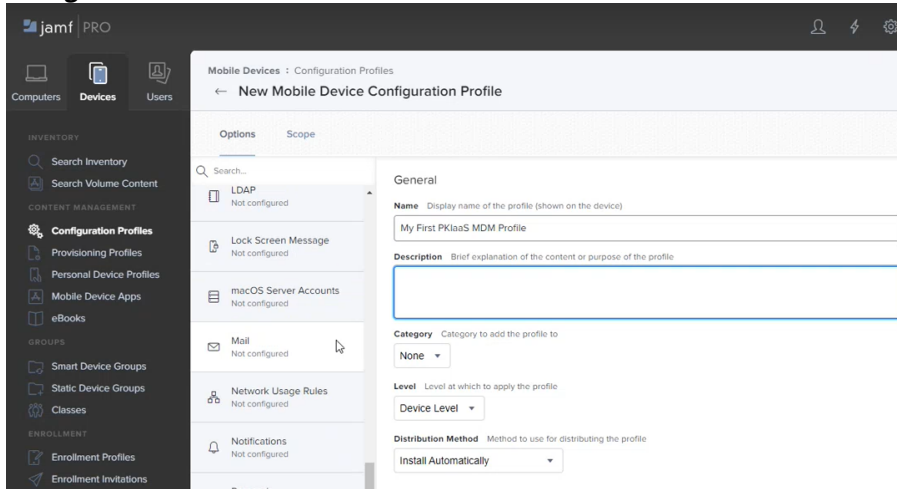
To configure and install a MDM profile in Jamf

1. Login into the Jamf administration portal.



2. Select:
 - **Computer** to create a profile for enrolling Apple computers such as MacBooks.
 - **Device** to create a profile for enrolling iPhones, iPads, etc.
3. On the sidebar, click on **Configuration profiles**.
4. In the **Configuration Profiles** page, click **New**.

- On the **New Mobile Device Configuration Profile** page, click **New** to display the **New Mobile Device Configuration Profile** form.



- Configure the following settings.
 - Options / General
 - Options / SCEP
 - Options / Certificate
 - Scope
- Click **Save**.
- To enroll devices, users must login to Jamf and follow the prompts for enrollment.
 - Depending on how Jamf was configured, users may or may not be prompted to download and install CA Certificates.
 - Users will be prompted to download and install a profile.
 - Wait while the device is enrolled. Certificates will automatically be issued during enrollment.

Options / General

Click **General** on the **Options** tab and configure the following settings.

Setting	Value	Mandatory
Name	Write a profile name to display on the device.	✓
Description	Write a description of the profile purpose.	✗
Category	Select a profile category.	✗
Level	Select Device Level .	✓
Distribution Method	Select Install Automatically .	✓

Options / SCEP

Click **SCEP** on the **Options** tab and configure the following settings.

- URL
- Name
- Redistribute Profile
- Subject
- Subject Alternative Name Type
- Retries
- Retry delay
- Challenge type
- Entrust Web Service URL
- Administrator Username
- Administrator Password
- Verify Password
- Digital ID Configuration Name
- Group Name
- RDN Variables
- Key Size
- Use as digital signature
- Use for key encipherment
- Fingerprint

URL

Paste the **SCEP URL** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).

Mandatory: Yes.

Name

Enter the name of the SCEP service to display on the device.

Mandatory: Yes.

Redistribute Profile

Select **Never**.

Mandatory: Yes.

Subject

Enter the Subject Distinguished Name to include in the Certificate Signing Requests (CSRs). The enrollment process will ignore this dummy value and use instead the **Digital ID Information** selected when [Configuring an Entrust-hosted Certificate Enrollment Gateway for MDM](#).

Mandatory: Yes.

Subject Alternative Name Type

Select the type of Subject Alternative Name.

Mandatory: No.

Retries

Select the maximum number of retries after a PENDING response.

Mandatory: No.

Retry delay

Select the period between retries.

Mandatory: No.

Challenge type

Select **Dynamic Entrust**.

Mandatory: Yes.

Entrust Web Service URL

Paste the **MDM-WS-URL** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).

Mandatory: Yes.

Administrator Username

Paste the **User ID** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).

Mandatory: Yes.

Administrator Password

Paste the **Password** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).

Mandatory: Yes.

Verify Password

Paste the **Password** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).

Mandatory: Yes.

Digital ID Configuration Name

Paste the **Name** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).

Mandatory: Yes.

Group Name

Enter a name for the group.

Mandatory: When the **RDN Format** template described in [Configuring an Entrust-hosted Certificate Enrollment Gateway for MDM](#) includes the `<igroup>` variable. Jamf will automatically map this **Group Name** to the `<igroup>` variable.

RDN Variables

Enter a value for each variable evaluated by the **RDN Format** template described in [Configuring an Entrust-hosted Certificate Enrollment Gateway for MDM](#). To use Jamf dynamic values, insert the following variables:

- [Payload Variables for Computer Configuration Profiles](#)
- [Payload Variables for Device Configuration Profiles](#)

Omit the following variables from the list of RDN Variables.

- <igusername>
- <devicetype>


These two variables do not need to be added because Jamf always provides values for these variables.

Mandatory: Yes.

Key Size

Select one of the following values.

- 2048
- 4096

 Entrust PKIaaS does not support key sizes below 2048.

Mandatory: Yes.

Use as digital signature

Check to use the enrolled certificates for signing data.

Mandatory: No.

Use for key encipherment

Check to use the enrolled certificates for ciphering keys.

Mandatory: No.

Fingerprint

Paste the SHA-256 fingerprint (in hexadecimal format) of the whole root CA certificate in DER binary encoding (not in PEM). You can obtain this value from the certificate properties or run the following commands.

Windows

```
certutil -hashfile rootca.der SHA256
```

MacOS

```
openssl x509 -fingerprint -sha256 -noout -in rootca.crt | sed "s/[://g"
```

Mandatory: Yes. It is recommended to always configure this field when possible.

Options / Certificate

Click **Certificate** on the **Options** tab and configure the following settings.

Settings	Value	Mandatory
Certificate Name	Write a name for the certificate.	✓
Select certificate option	Click Upload	✓
Certificate	Upload the certificate file obtained when Downloading the Entrust PKIaaS root CA certificate for MDM.	✓

Scope

Configure the following settings on the **Scope** tab.

Setting	Value	Mandatory
Target Mobile Devices	Mobile devices to assign the profile to.	✓
Target Users	Users to distribute the profile to.	✓

Configuring MDM automation in VMware Workspace ONE

When using VMware Workspace ONE as MDM provider, the enrollment automation supports the following protocols.

- The PKI protocol for Entrust MDMWS PKCS #12 enrollment.
- The Simple Certificate Enrollment Protocol (SCEP).

See below the [MDMWS certificate profiles](#) supported by each protocol.

Profile	PKI	SCEP
mdmws-digital-signature	✗	✓
mdmws-digital-signature-key-encipherment	✗	✓
mdmws-digital-signature-key-encipherment-clientauth	✗	✓
mdmws-key-encipherment	✗	✓
mdmws-non-repudiation	✗	✓

Profile	PKI	SCEP
mdmws-p12-digital-signature	✓	✓
mdmws-p12-digital-signature-key-encipherment	✓	✓
mdmws-p12-digital-signature-key-encipherment-clientauth	✓	✓
mdmws-p12-key-encipherment	✓	✓
mdmws-p12-non-repudiation	✓	✓

See below for additional protocol differences.

	PKI	SCEP
Private key	Generated by the Entrust CA and delivered to Workspace One as a PKCS #12. Workspace One delivers the resulting private key and certificate to the managed device.	Generated along with the CSR by the managed device
Certificate information	Provided to the Entrust CA using the MDMWS API.	Contained within the CSR.
CSR challenge passwords	Not used.	<p>Workspace One:</p> <ol style="list-style-type: none"> 1. Requests challenge passwords from the MDMWS API of the Entrust CA. 2. Provides the challenge password to the managed devices. <p>The devices embed the challenge password into the CSR for SCEP enrollment.</p>
Enrollment request	Submitted by Workspace One.	Submitted by the managed devices to the SCEP endpoint of the Entrust CA. Optionally, you can use Workspace One as SCEP Proxy to perform SCEP against Workspace One instead of the Entrust CA.

	PKI	SCEP
Support status	Fully supported	Temporarily broken because Workspace One: <ul style="list-style-type: none"> • Sends an incorrect SCEP URL to the managed devices • Ignores the custom variables defined in the RDN Format field when Configuring an Entrust-hosted Certificate Enrollment Gateway for MDM. We are working with Workspace One to fix this.

Follow the steps below to automate MDM enrollment in VMware Workspace ONE.

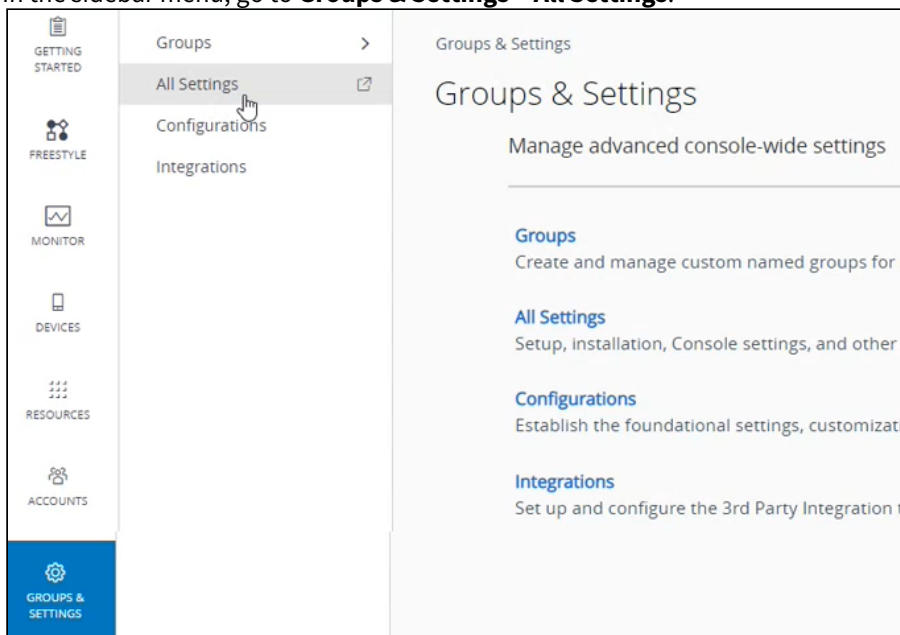
- [Adding a Certificate Authority and a Request Template for MDM automation in VMware Workspace ONE](#)
- [Adding a profile for trusted certificates in VMware Workspace ONE](#)
- [Adding a PKI profile for MDM automation in VMware Workspace ONE](#)
- [Adding a SCEP profile for MDM automation in VMware Workspace ONE](#)
- [Testing MDM automation in VMware Workspace ONE](#)

Adding a Certificate Authority and a Request Template for MDM automation in VMware Workspace ONE

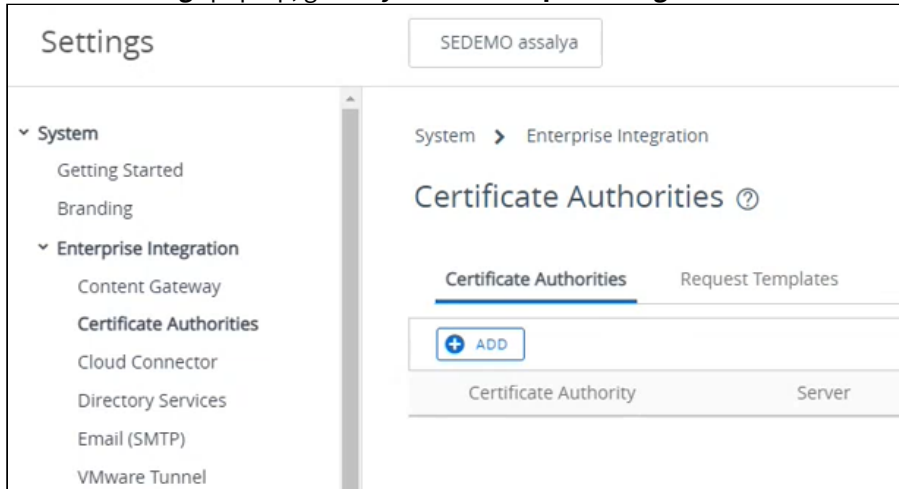
Add a Certificate Authority and a request template for MDM automation in VMware Workspace ONE.

To add a Certificate Authority and a request template

1. Log into your Workspace ONE UEM (Unified Endpoint Management).
2. In the sidebar menu, go to **Groups & Settings > All Settings**.



3. In the **All Settings** pop-up, go to **System > Enterprise integration > Certificate Authorities**.



4. Configure the following settings.

- [Certificate Authorities](#)
- [Request Templates](#)

Certificate Authorities

In the **Certificate Authorities** tab, click **ADD** to configure a new CA.

Setting	Value
Name	Enter a name for the CA in the VMware environment.
Description	Enter an optional description for the CA in the VMware environment.
Authority Type	Select Entrust .
Protocol	Select the SCEP or PKI protocols described in Configuring MDM automation in VMware Workspace ONE .
Server URL	Paste the MDM-WS URL value described in Getting Certificate Enrollment Gateway settings for MDM .
Username	Paste the UserID value described in Getting Certificate Enrollment Gateway settings for MDM .
Password	Paste the Password value described in Getting Certificate Enrollment Gateway settings for MDM .

Setting	Value
SCEP Endpoint URL	When Protocol is SCEP , paste the SCEP URL value described in Getting Certificate Enrollment Gateway settings for MDM .

Click **TEST CONNECTION** to check the connection with the Entrust CA, and **SAVE** to save the new CA settings.

Request Templates

In the **Request Templates** tab, click **ADD** to configure a new template for the CA.

Setting	Value
Name	Enter a name for the template in the VMware environment.
Description	Enter an optional description for the template in the VMware environment.
Certificate Authority	Select the name of the CA previously created in the Certificate Authorities tab.
Managed CA	Select the CA name described in Getting Certificate Enrollment Gateway settings for MDM .
Profile name	Select the value of the Digital ID Information / Name value described in Getting Certificate Enrollment Gateway settings for MDM .
<field>	Configure the RDN Format variables defined in Configuring an Entrust-hosted Certificate Enrollment Gateway for MDM . You can provide static text or click the + symbol and select a Workspace One variable.

Mandatory Field Value Characters & = Not Allowed

var1 +

var2 +

{EmailDomain}	domain	▲
{EmailUserName}	User Email Username	
{EmailAddress}	User Email Address	▼
{EnrollmentUser}	Username	
{EnrollmentUserId}	User ID	▼

Click **SAVE** to save the new template settings.

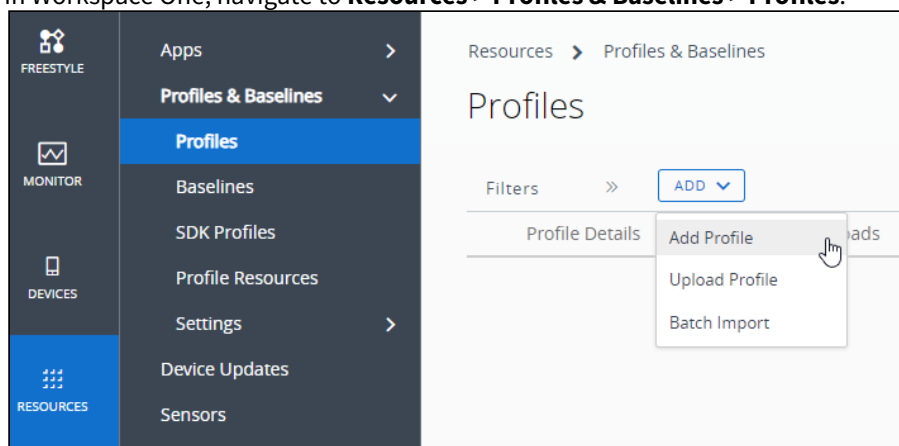
Adding a profile for trusted certificates in VMware Workspace ONE

Profiles with the **User Profile** context do not support uploading certificates to the **Trusted Root** certificate store. Therefore, you must create a profile with the **Device Profile** context and the following settings.

⚠ When creating a Workspace One profile with the **User Profile** context, assign them to the same **Smart Group**. This way, the devices managed by the user profile will trust the CA certificate chain of the device profile.

To add a device profile in Workspace One

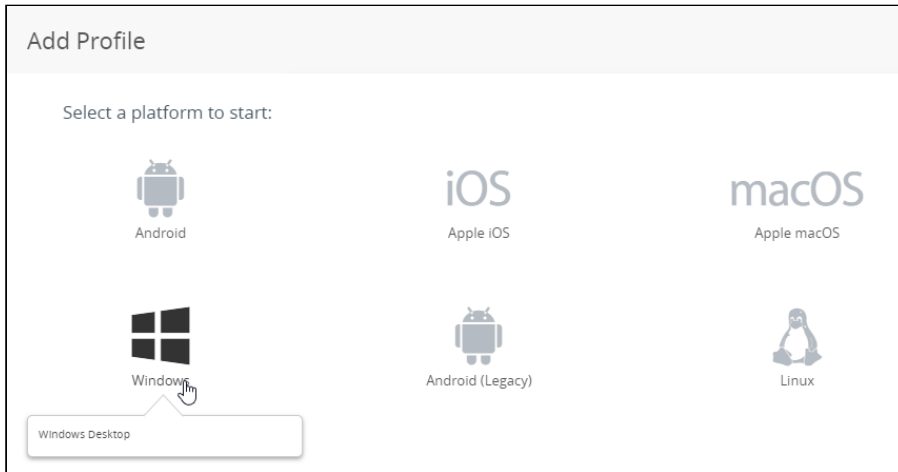
1. In Workspace One, navigate to **Resources > Profiles & Baselines > Profiles**.



2. In the content pane, click **Add > Add Profile**.
3. Follow the wizard pages described below.
 - [Add Profile](#)
 - [Select Device Type](#)
 - [Select Context](#)
 - [General](#)
 - [Credentials](#)

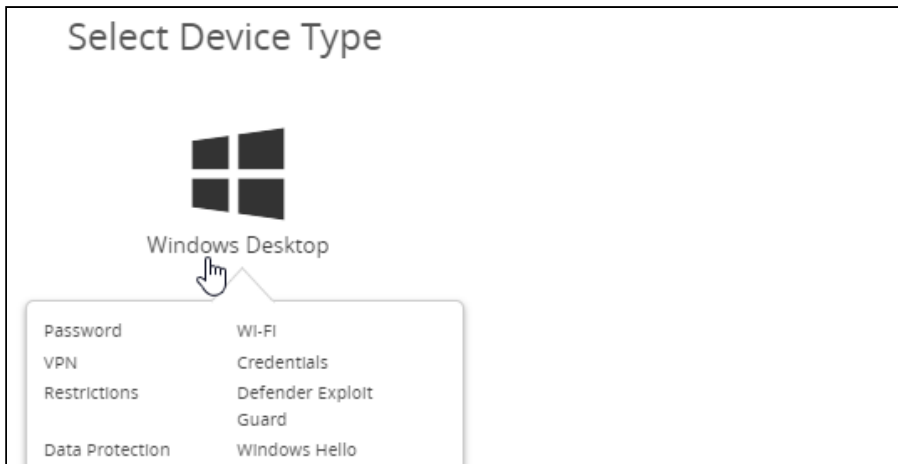
Add Profile

Click on the name of the platform running the enrollment device.



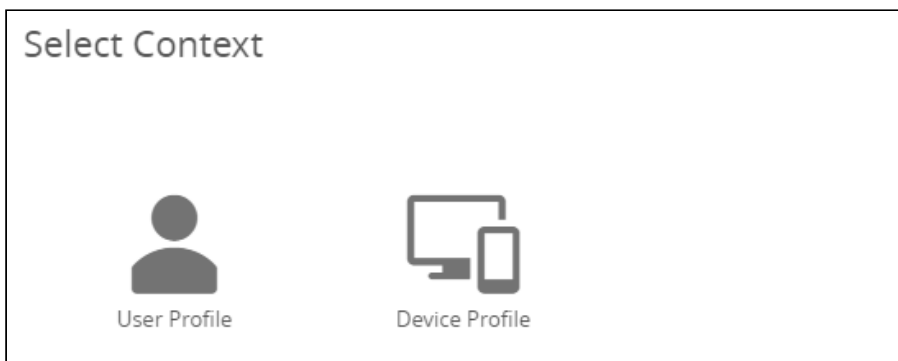
Select Device Type

Click on the type of enrolled device.



Select Context

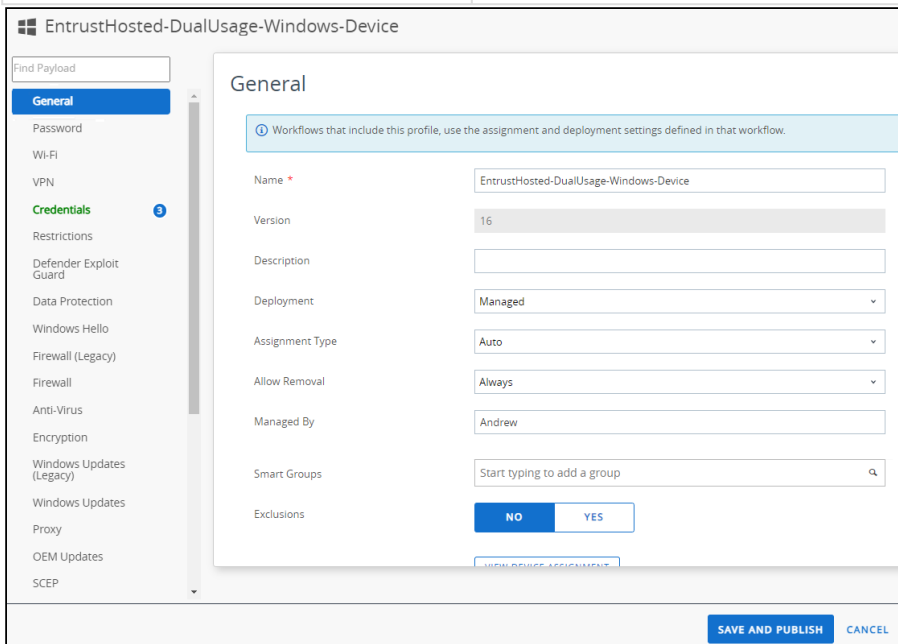
Click on **Device Profile** to enroll devices.



General

Click **General** in the sidebar menu to configure the following settings in the content pane.

Field	Value
Name	Enter a name for the profile.
Smart Group	Select the smart group containing the managed users or devices.



Credentials

Click **Credentials** in the sidebar menu to configure the user credentials.

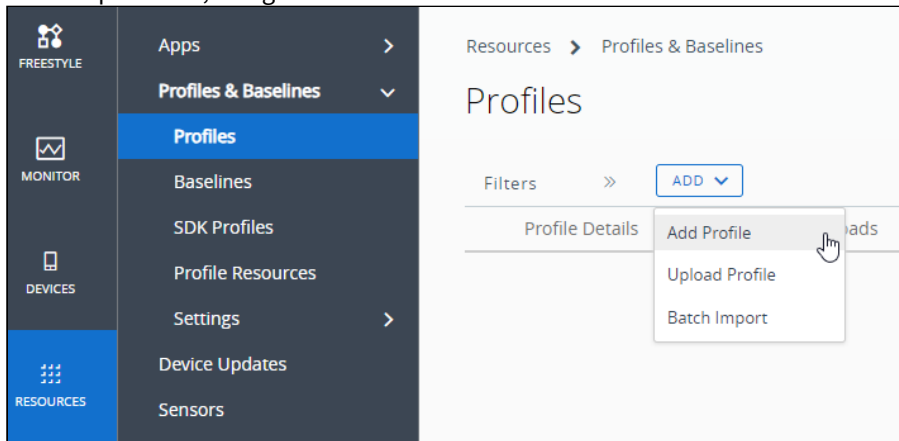
Field	Value
Credential Source	Select Defined Certificate Authority .
Certificate	Upload separately the certificates of the root and issuing CAs.
Certificate Store	Select Trusted Root .

Adding a PKI profile for MDM automation in VMware Workspace ONE

See below for creating an MDM automation profile to issue certificates with the PKI protocol.

To add a PKI profile in Workspace One

1. In Workspace One, navigate to **Resources > Profiles & Baselines > Profiles**.



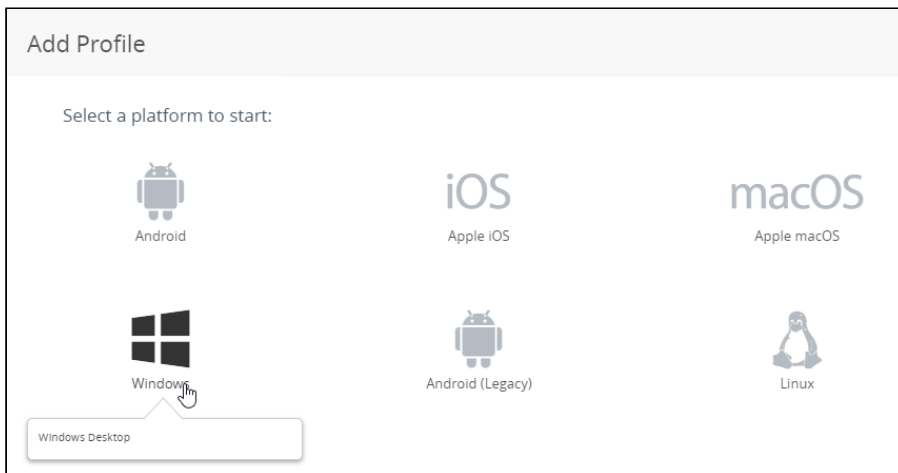
2. In the content pane, click **Add > Add Profile**.

3. Follow the wizard pages described below.

- [Add Profile](#)
- [Select Device Type](#)
- [Select Context](#)
- [General](#)
- [Credentials](#)

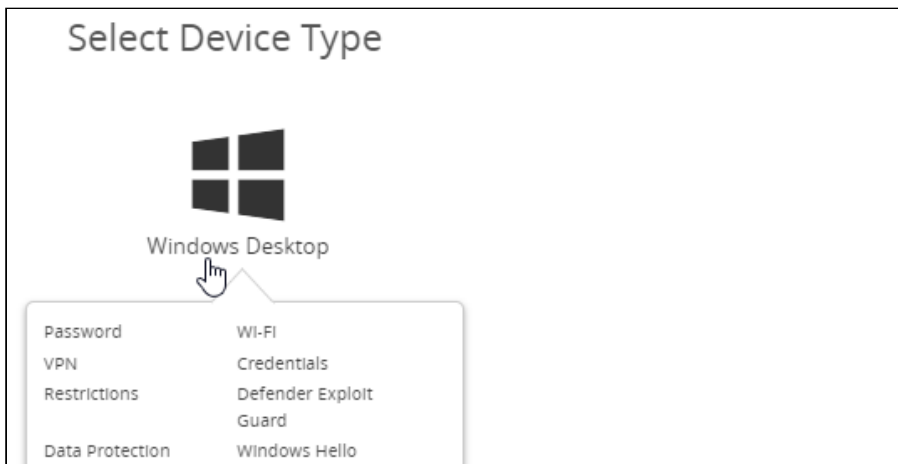
Add Profile

Click on the name of the platform running the enrollment device.



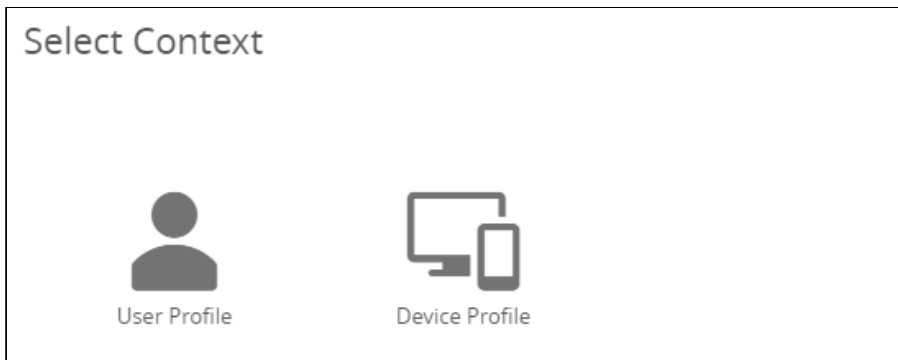
Select Device Type

Click on the type of enrolled device.



Select Context

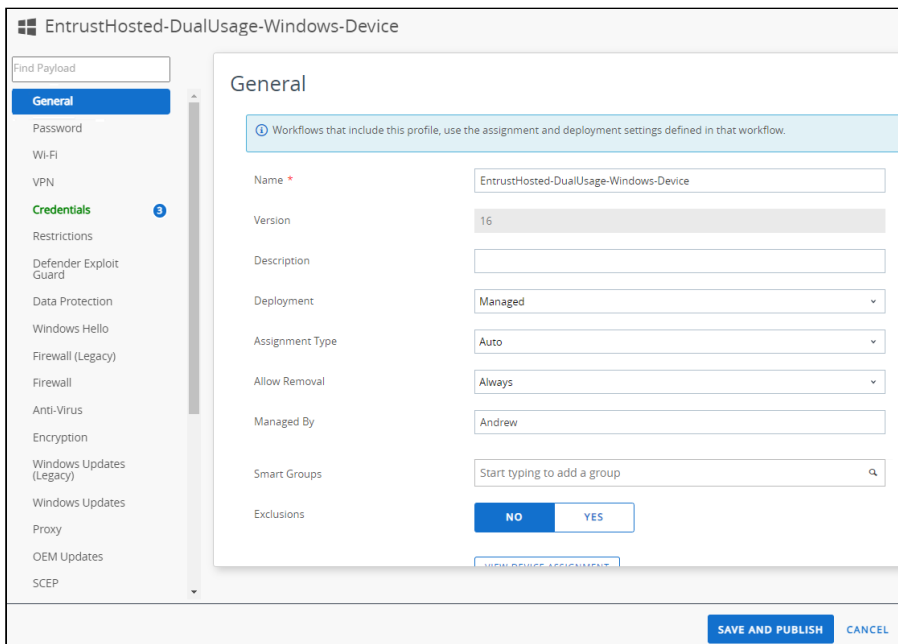
Click on **User Profile** to enroll users or **Device Profile** to enroll devices.



General

Click **General** in the sidebar menu to configure the following settings in the content pane.

Field	Value
Name	Enter a name for the profile.
Smart Group	Select the smart group containing the managed users or devices.



Credentials

Click **Credentials** in the sidebar menu to configure the user credentials.

Field	Value
Credential Source	Select Defined Certificate Authority .
Certificate	Upload separately the certificates of the root and issuing CAs.
Certificate Store	Select Personal or Intermediate for profiles with the User Profile context. Select Trusted Root for profiles with the User Device context.

Click the **+** symbol to create a new credential with the following settings.

Field	Value
Credential Source	Select Defined Certificate Authority .
Certificate Authority	Select the CA configured in Adding a Certificate Authority and a Request Template for MDM automation in VMware Workspace ONE .

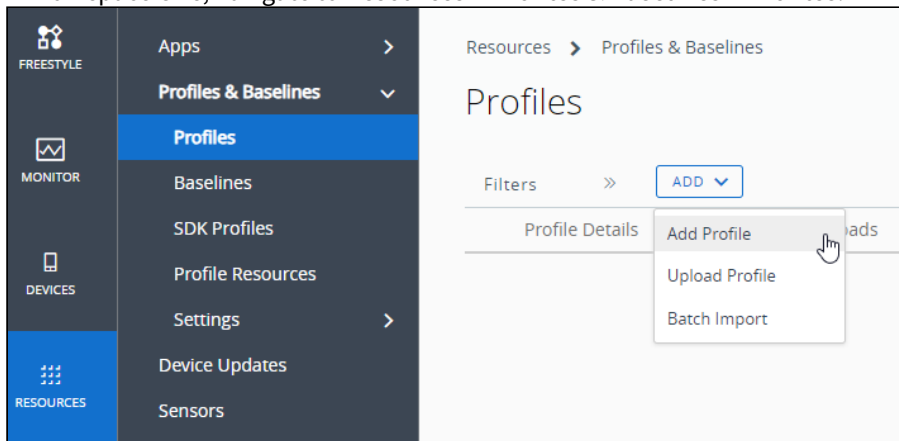
Field	Value
Certificate Template	Select the request template configured in Adding a Certificate Authority and a Request Template for MDM automation in VMware Workspace ONE .
Key Location	Specify the location for the issued certificate: Software or Hardware .
Certificate Store	Enter the name of the certificate store.

Adding a SCEP profile for MDM automation in VMware Workspace ONE

See below for creating an MDM automation profile to issue certificates with the SCEP protocol.

To add a SCEP profile in Workspace One

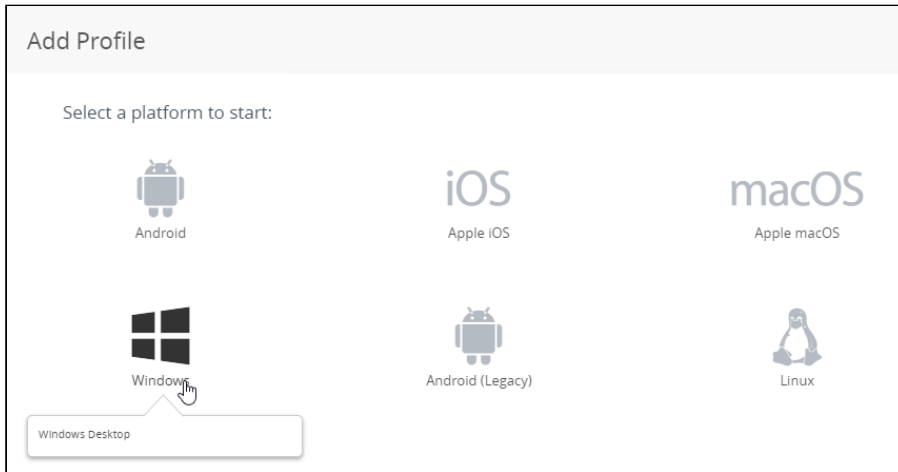
1. In Workspace One, navigate to **Resources > Profiles & Baselines > Profiles**.



2. In the content pane, click **Add > Add Profile**.
3. Follow the wizard pages described below.
 - [Add Profile](#)
 - [Select Device Type](#)
 - [Select Context](#)
 - [General](#)
 - [Credentials](#)
 - [SCEP](#)

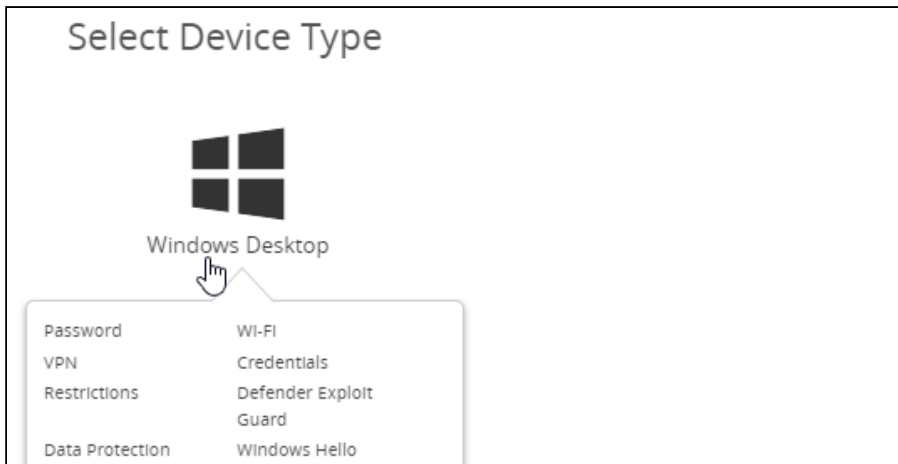
Add Profile

Click on the name of the platform running the enrollment device.



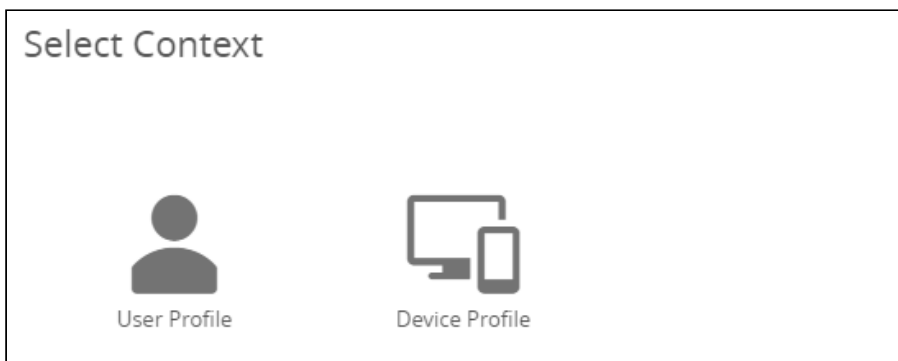
Select Device Type

Click on the type of enrolled device.



Select Context

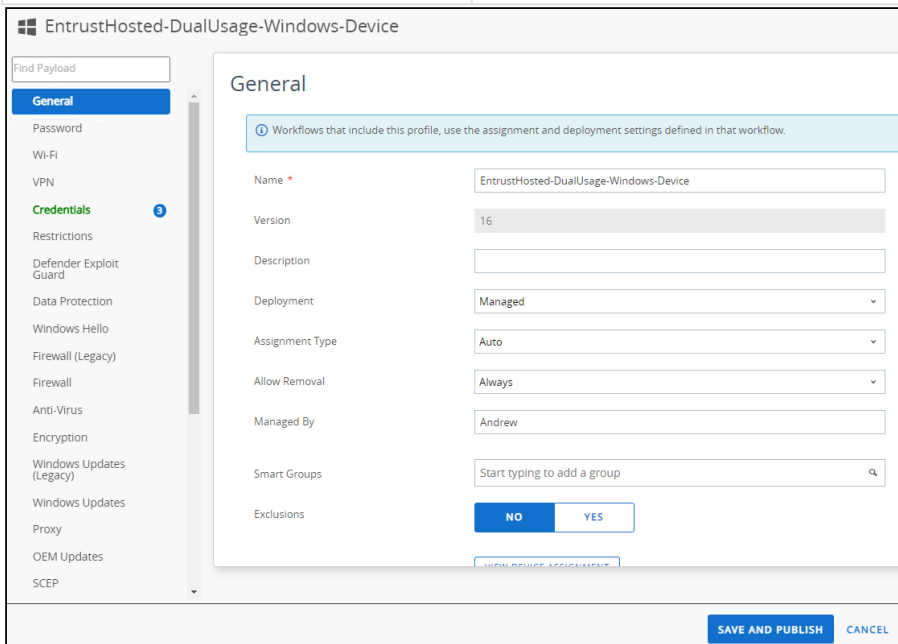
Click on **User Profile** to enroll users or **Device Profile** to enroll devices.



General

Click **General** in the sidebar menu to configure the following settings in the content pane.

Field	Value
Name	Enter a name for the profile.
Smart Group	Select the smart group containing the managed users or devices.



The screenshot shows the configuration page for 'EntrustHosted-DualUsage-Windows-Device'. The 'General' tab is selected in the sidebar. The main content area displays the following settings:

- Name ***: EntrustHosted-DualUsage-Windows-Device
- Version**: 16
- Description**: (Empty text field)
- Deployment**: Managed (Dropdown menu)
- Assignment Type**: Auto (Dropdown menu)
- Allow Removal**: Always (Dropdown menu)
- Managed By**: Andrew (Text field)
- Smart Groups**: Start typing to add a group (Searchable list)
- Exclusions**: NO (Selected), YES (Button)

At the bottom of the form, there are buttons for 'SAVE AND PUBLISH' and 'CANCEL'.

Credentials

Click **Credentials** in the sidebar menu to configure the user credentials.

Field	Value
Credential Source	Select Defined Certificate Authority .
Certificate	Upload separately the certificates of the root and issuing CAs.
Certificate Store	Select Personal or Intermediate for profiles with the User Profile context. Select Trusted Root for profiles with the User Device context.

SCEP

Click **SCEP** in the sidebar menu to configure the following settings in the content pane.

Field	Value
Credential Source	Select Defined Certificate Authority .
Certificate Authority	Select the CA configured in Adding a Certificate Authority and a Request Template for MDM automation in VMware Workspace ONE .
Certificate Template	Select the request template configured in Adding a Certificate Authority and a Request Template for MDM automation in VMware Workspace ONE .
Key Location	Specify the location for the issued certificate: Software or Hardware .

Testing MDM automation in VMware Workspace ONE

Test the MDM automation in VMware Workspace ONE after completing the configuration steps.


To test MDM automation in VMware Workspace ONE

1. Open a browser at <https://getwsone.com>
2. Download the VMware Workspace ONE Intelligent Hub application.
3. Install the application on the device you want to enroll.
4. Log into the VMware Workspace ONE Intelligent Hub.

 The user must belong to the Smart Group selected when adding the profile.

5. Click **Sync Device**.

Workspace ONE Intelligent Hub



Basic


Support

[555-123-4567](#)

[Email Support](#)

[Collect Logs](#)

[Hub Status](#)



DMSPCEGWS1AA03

- Enrolled
- No compliance set

[Sync Device](#)

Sync has completed
Last Sync: 7/24/2023 12:13:45 PM

Enrollment

Enrolled server

Enrolled group ID

Network

Internet access

UEM server

Device

Serial number

Encryption

10 Automating WSTEP enrollment with an Entrust-hosted Enrollment Gateway

Entrust PKIaaS integrates into Microsoft Active Directory environments to automate enrollment with the following Microsoft protocols.

Protocol	Purpose	See
X.509 Certificate Enrollment Policy Protocol (MS-XCEP)	Defines the interactions between a requesting client and a responding server to exchange a certificate enrollment policy, which is the collection of certificate templates and certificate issuers available to the requestor for X.509 certificate enrollment.	learn.microsoft.com/en-us/openspecs/windows_protocols/ms-xcep
WS-Trust X.509v3 Token Enrollment Extensions (MS-WSTEP)	Define the message formats and server behavior to manually or automatically enroll X.509 certificates for users and computers.	learn.microsoft.com/en-us/openspecs/windows_protocols/ms-wstep

See below for the required configuration steps.

- [WSTEP enrollment requirements](#)
- [Planning your WSTEP deployment](#)
- [Configuring WSTEP automation in Entrust Certificate Services](#)
- [Preparing the Active Directory forest for WSTEP](#)
- [Configuring WSTEP automation on the PKIaaS portal](#)
- [Enabling WSTEP for users and devices](#)
- [Managing Microsoft certificate templates in Active Directory](#)
- [Managing on-premises PKIaaS Virtual Machines](#)
- [Troubleshooting WSTEP enrollment issues](#)

WSTEP enrollment requirements

See below the requirements to automate WSTEP enrollment with an Entrust-hosted Enrollment Gateway.

- [ECS account requirements for WSTEP enrollment](#)
- [PKIaaS Virtual Machine requirements](#)
- [Windows requirements for WSTEP enrollment](#)

ECS account requirements for WSTEP enrollment

Automating WSTEP enrollment requires creating an Entrust Certificate Services (ECS) Enterprise user account, as explained in [Creating a user with PKIaaS roles](#). Assign to this user one of the following roles.

- PKIaaS Administrator
- PKIaaS CA Administrator

Both roles grant permissions to:

- Create CA

- Add Enrollment Gateway

To enable the WSTEP certificate profiles, this user must add the Active Directory Service to an issuing CA, as later explained in [Configuring an Entrust PKIaaS issuing CA for WSTEP](#).

PKIaaS Virtual Machine requirements

The on-premises installation of the Entrust PKIaaS Virtual Machine has the following requirements.

- [Network requirements for the PKIaaS Virtual Machine](#)
- [VMware requirements for the PKIaaS Virtual Machine](#)

Network requirements for the PKIaaS Virtual Machine

The PKIaaS Virtual Machine has the following network requirements.

- [PKIaaS Virtual Machine connection settings](#)
- [PKIaaS Virtual Machine outbound access to Active Directory](#)
- [PKIaaS Virtual Machine outbound access to the Oracle Yum server](#)
- [PKIaaS Virtual Machine outbound access to the PKIaaS package repository](#)
- [PKIaaS Virtual Machine outbound access to Entrust PKIaaS](#)

PKIaaS Virtual Machine connection settings

The connection of the PKIaaS Virtual Machine requires:

- The NAT (Network address translation) mechanism.
- A DHCP server with configured DNS.


PKIaaS Virtual Machine outbound access to Active Directory

Grant the PKIaaS Virtual Machine the following outbound access to:

- The Active Directory DNS servers (to query SRV DNS records for the FQDN of Active Directory Domain controllers).
- The Active Directory LDAP or LDAPS service (to look up information on Microsoft certificate templates, Active Directory users, and Active Directory machines).

See below for the required outbound ports.

Target port	Protocol	Application	Target service
53	TCP/UDP	DNS	Active Directory DNS
389	TCP	LDAP	Active Directory secured with StartTLS
636	TCP	LDAPS	Active Directory

 If an attempted LDAPS connection fails, the PKIaaS Virtual Machine switches to LDAP port 389 and attempts to use StartTLS (because plaintext LDAP is not supported).

PKIaaS Virtual Machine outbound access to the Oracle Yum server

Grant the PKIaaS Virtual Machine the following outbound access to the Oracle Yum server.

yum.oracle.com		
Target port	Protocol	Application
443	TCP	HTTPS

PKIaaS Virtual Machine outbound access to the PKIaaS package repository

Grant the PKIaaS Virtual Machine access to the package repository.

EU region		
pkiaas-eu-prod-rpm.s3.eu-central-1.amazonaws.com		
US region		
pkiaas-prod-rpm.s3.us-east-1.amazonaws.com		
Target port	Protocol	Application
443	TCP	HTTPS

PKIaaS Virtual Machine outbound access to Entrust PKIaaS

Grant the PKIaaS Virtual Machine access to the Entrust PKIaaS services.

EU region		
idp.eu.pkiaas.entrust.com satellit.eu.pkiaas.entrust.com wstep.eu.pkiaas.entrust.com		
US region		
idp.pkiaas.entrust.com satellit.pkiaas.entrust.com		

wstep.pkiaas.entrust.com

Target port	Protocol	Application
443	TCP	HTTPS

VMware requirements for the PKIaaS Virtual Machine

Entrust distributes the PKIaaS Virtual Machine as an OVA (Open Virtual Appliance) file. To deploy this virtual machine on-premises, you need a VMware virtualization platform with the following requirements.

- [VMware version for running the PKIaaS Virtual Machine](#)
- [VMware machine requirements for running the PKIaaS Virtual Machine](#)

i Unlike the cloud-based PKIaaS WSTEP service, the PKIaaS Virtual Machine does not currently support high availability deployments. See [Recovering a PKIaaS Virtual Machine from disaster](#) for details on disaster recovery.

VMware version for running the PKIaaS Virtual Machine

You need an environment that supports Virtual Hardware version 14. The following VMware products are compatible with this version.

- ESXi 6.7
- Fusion 10.x
- Workstation Pro 14.x
- Workstation Player 14.x

VMware machine requirements for running the PKIaaS Virtual Machine

The OVA file of the PKIaaS Virtual Machine is configured to use the following resources:

- 2 cores
- 8 GB of RAM
- 30 GB of disk space

Make sure the VMware environment running the PKIaaS Virtual Machine provides these resources.

Windows requirements for WSTEP enrollment

The Windows environment of the enrolled devices must meet the following requirements.

- [Windows user requirements for configuring WSTEP enrollment](#)
- [Network requirements for the Windows devices](#)
- [Active Directory requirements for WSTEP enrollment](#)

Windows user requirements for configuring WSTEP enrollment

For [Installing the default set of Microsoft Certificate Templates](#), you will need to log into the root domain of the forest as a user belonging to the following groups.

- Domain Admins
- Enterprise Admins

Network requirements for the Windows devices

See below for the network requirements for all Windows devices in an Active Directory forest.

- [Device outbound access to the Entrust WSTEP service](#)
- [Device outbound access to the Entrust certificate validation services](#)

i Connection to the Windows domain is not a requirement for certificate enrollment. When fulfilling the below requirements, domain-joined devices can enroll for certificates even when not connected to the same network as the Windows domain.

Device outbound access to the Entrust WSTEP service

Grant any device access to Entrust PKIaaS.

EU region		
wstep.eu.pkiaas.entrust.com		
US region		
wstep.pkiaas.entrust.com		
Target port	Protocol	Application
443	TCP	HTTPS

Device outbound access to the Entrust certificate validation services

Grant any device access to the following Entrust certificate validation services

Target port	Protocol	Application	Target service
80	TCP	HTTP	See Entrust PKIaaS OCSP service
80	TCP	HTTP	See Entrust PKIaaS Certificate Revocation Lists

Active Directory requirements for WSTEP enrollment

Each Windows Active Directory forest must meet the following requirements.

- [LDAPS TLS certificate requirements for Active Directory domain controllers](#)
- [SRV record requirements for Active Directory LDAP services](#)

LDAPS TLS certificate requirements for Active Directory domain controllers

In each Active Directory domain controller, the TLS certificate for LDAPS must meet the requirements described in:

<https://learn.microsoft.com/en-us/troubleshoot/windows-server/identity/enable-ldap-over-ssl-3rd-certification-authority#requirements-for-an-ldaps-certificate>


Specifically, this certificate:

- Must be stored in the NT Directory Services (NTDS) personal certificate store.
- Must contain the FQDN (Fully Qualified Domain Name) of the Domain Controller as a DNS SAN (Subject Alternative Name).
- Must use the RSA algorithm.
- Must include Server Authentication (1.3.6.1.5.5.7.3.1) as Enhanced Key Usage.

SRV record requirements for Active Directory LDAP services

Service Location (SRV) resource records for the LDAP Service must be valid for all domains in the forest. Verify this requirement as explained at:

<https://learn.microsoft.com/en-us/troubleshoot/windows-server/networking/verify-srv-dns-records-have-been-created>

 SRV records do not require extra configuration steps as Active Directory automatically creates and updates them.

Planning your WSTEP deployment

WSTEP integration requires the on-premises installation of a PKIaaS Virtual Machine in the customer's LAN. Once installed, this PKIaaS Virtual Machine:

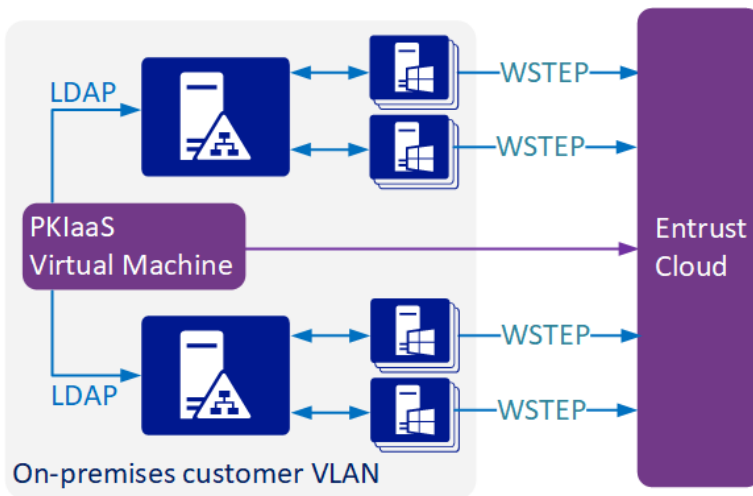
- Performs LDAPS queries against the Domain Controllers in an Active Directory forest.
- Establishes an outbound connection with the Entrust Cloud.

The Windows devices send WSTEP requests directly to the PKIaaS service hosted in the Entrust cloud. See below for the main integration scenarios.

- [Deploying a single PKIaaS Virtual Machine for multiple Active Directory forests](#)
- [Deploying different PKIaaS Virtual Machines for different Active Directory forests](#)

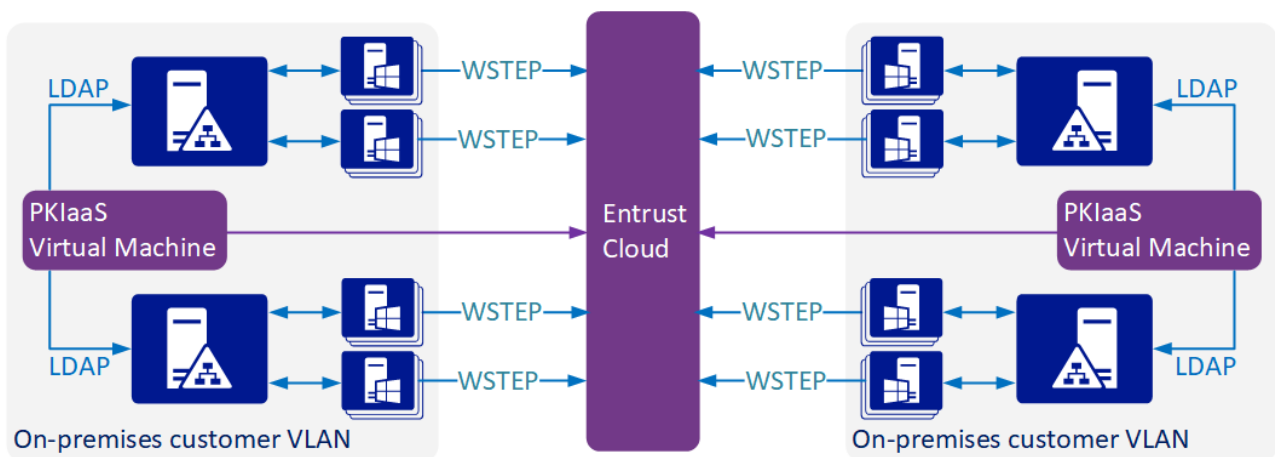
Deploying a single PKIaaS Virtual Machine for multiple Active Directory forests

A single PKIaaS Virtual Machine can handle any number of Active Directory forests, provided the virtual machine can connect with each forest as explained in [Network requirements for the PKIaaS Virtual Machine](#).



Deploying different PKIaaS Virtual Machines for different Active Directory forests

When a single PKIaaS Virtual Machine cannot communicate with all forests, multiple PKIaaS Virtual Machines are required, as illustrated in the diagram below.



In any case, configuring multiple Active Directory forests:

- Requires the domain controllers of each Windows forest to be prepared as explained in this document.
- Requires the root domain of each Windows Forest to be added to the PKIaaS portal.
- Does not require two-way transitive trusts.

Configuring WSTEP automation in Entrust Certificate Services

Configure an Entrust-hosted Enrollment Gateway for WSTEP enrollment.

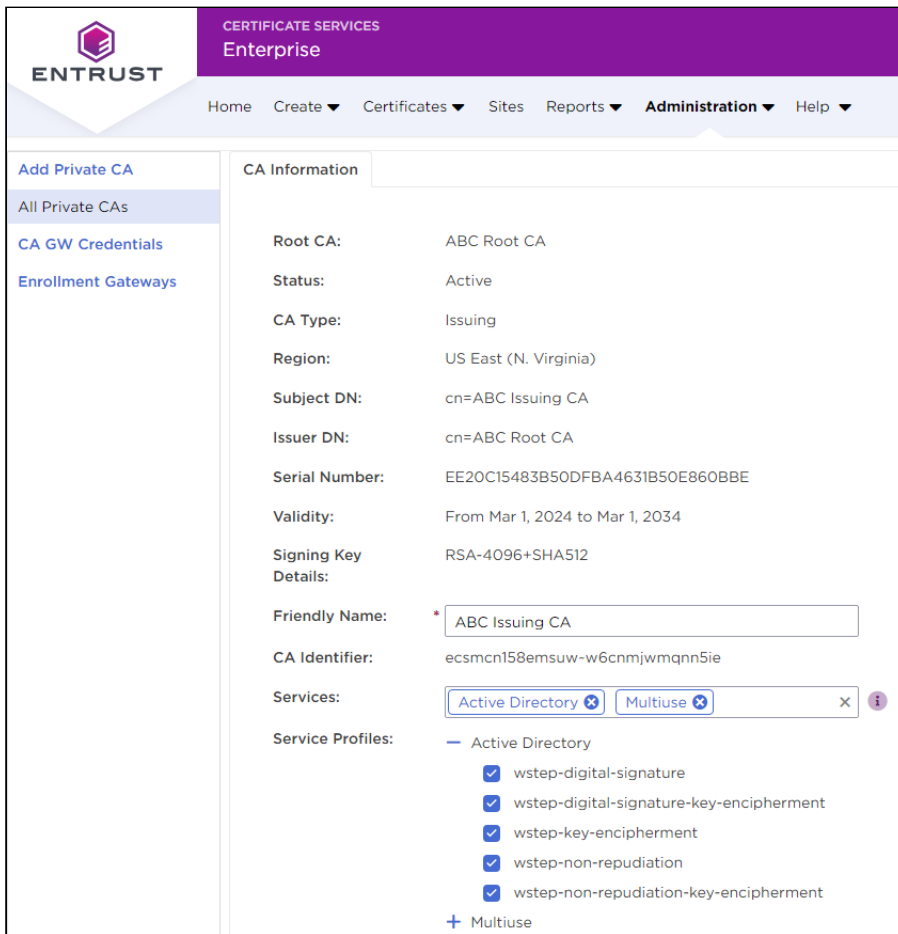
- [Configuring an Entrust PKIaaS issuing CA for WSTEP](#)
- [Creating an Entrust-hosted Certificate Enrollment Gateway for WSTEP](#)

Configuring an Entrust PKIaaS issuing CA for WSTEP

On the Entrust Certificate Services Enterprise portal, add the following services to either a new or an existing issuing CA.

- The **Active Directory** service to issue WSTEP-enrolled certificates.
- The **Multiuse** service to issue LDAPS TLS certificates in P12 format.

 See [Creating an issuing CA under an online root CA](#) for how to create issuing CAs.



The screenshot displays the 'Add Private CA' configuration page in the Entrust Certificate Services Enterprise portal. The page is titled 'CERTIFICATE SERVICES Enterprise' and includes a navigation menu with options like Home, Create, Certificates, Sites, Reports, Administration, and Help. The left sidebar shows a list of CA management options: Add Private CA, All Private CAs, CA GW Credentials, and Enrollment Gateways. The main content area is titled 'CA Information' and contains the following details:

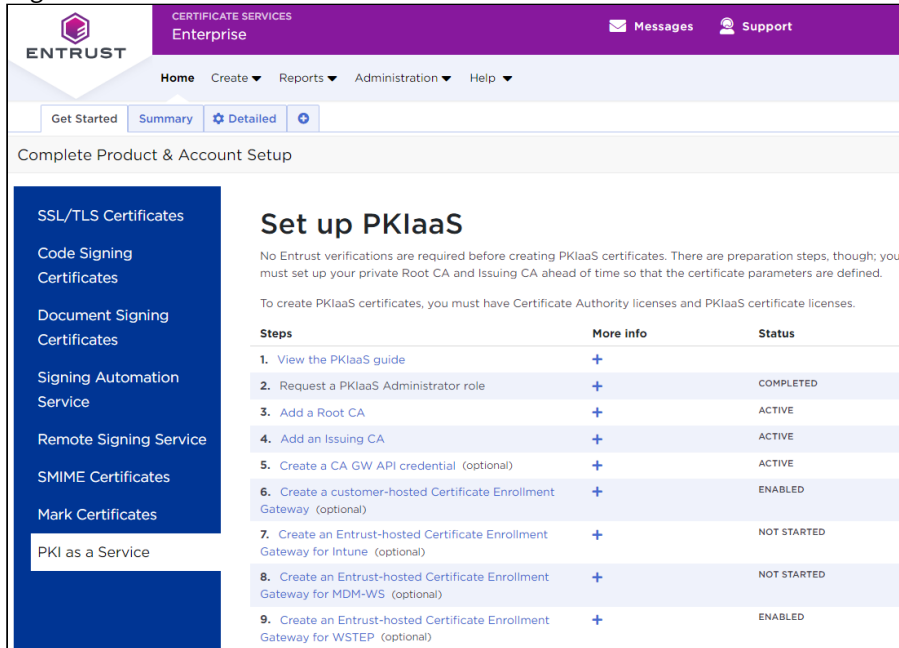
- Root CA:** ABC Root CA
- Status:** Active
- CA Type:** Issuing
- Region:** US East (N. Virginia)
- Subject DN:** cn=ABC Issuing CA
- Issuer DN:** cn=ABC Root CA
- Serial Number:** EE20C15483B50DFBA4631B50E860BBE
- Validity:** From Mar 1, 2024 to Mar 1, 2034
- Signing Key Details:** RSA-4096+SHA512
- Friendly Name:** ABC Issuing CA
- CA Identifier:** ecsmcn158emsuw-w6cnmjwmqnn5ie
- Services:** Active Directory, Multiuse
- Service Profiles:**
 - Active Directory
 - wstep-digital-signature
 - wstep-digital-signature-key-encipherment
 - wstep-key-encipherment
 - wstep-non-repudiation
 - wstep-non-repudiation-key-encipherment
 - Multiuse

Creating an Entrust-hosted Certificate Enrollment Gateway for WSTEP

On the Entrust Certificate Services portal, add and configure a Certificate Enrollment Gateway instance to process WSTEP requests.

To configure a Certificate Enrollment Gateway for WSTEP

1. Log into cloud.entrust.net



Set up PKIaaS

No Entrust verifications are required before creating PKIaaS certificates. There are preparation steps, though; you must set up your private Root CA and Issuing CA ahead of time so that the certificate parameters are defined.

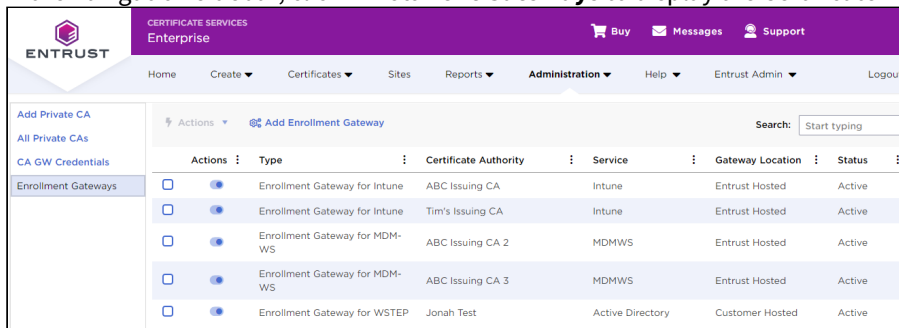
To create PKIaaS certificates, you must have Certificate Authority licenses and PKIaaS certificate licenses.

Steps	More info	Status
1. View the PKIaaS guide	+	
2. Request a PKIaaS Administrator role	+	COMPLETED
3. Add a Root CA	+	ACTIVE
4. Add an Issuing CA	+	ACTIVE
5. Create a CA GW API credential (optional)	+	ACTIVE
6. Create a customer-hosted Certificate Enrollment Gateway (optional)	+	ENABLED
7. Create an Entrust-hosted Certificate Enrollment Gateway for Intune (optional)	+	NOT STARTED
8. Create an Entrust-hosted Certificate Enrollment Gateway for MDM-WS (optional)	+	NOT STARTED
9. Create an Entrust-hosted Certificate Enrollment Gateway for WSTEP (optional)	+	ENABLED

2. In the **Get Started** tab, click **PKI as a Service**.
3. In the **Set up PKIaaS** pane, click **Create an Entrust-hosted Certificate Enrollment Gateway for WSTEP**.

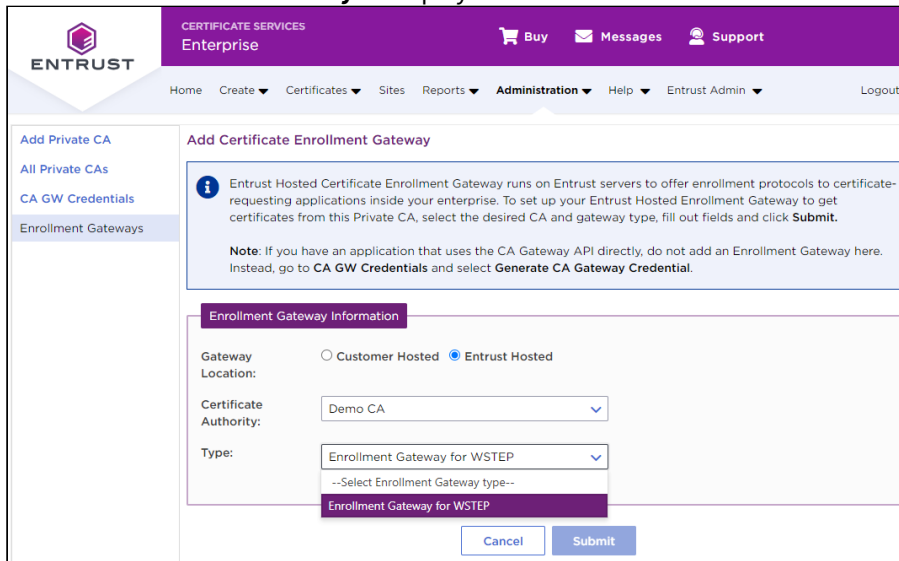
 Alternatively, you can select **Administration > PKIaaS Management** in the menu bar.

4. In the navigation sidebar, click **Enrollment Gateways** to display the Certificate Enrollment Gateway list.

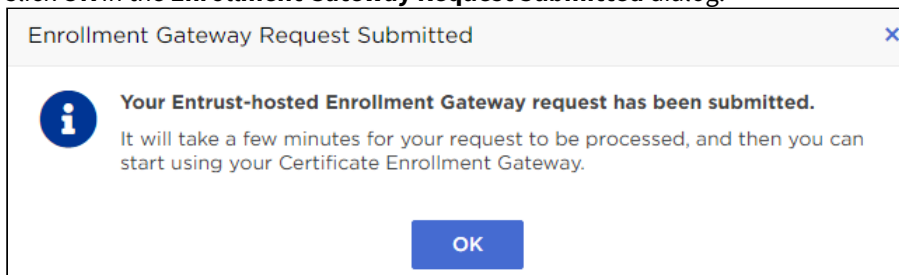


Actions	Type	Certificate Authority	Service	Gateway Location	Status
<input type="checkbox"/>	Enrollment Gateway for Intune	ABC Issuing CA	Intune	Entrust Hosted	Active
<input type="checkbox"/>	Enrollment Gateway for Intune	Tim's Issuing CA	Intune	Entrust Hosted	Active
<input type="checkbox"/>	Enrollment Gateway for MDM-WS	ABC Issuing CA 2	MDMWS	Entrust Hosted	Active
<input type="checkbox"/>	Enrollment Gateway for MDM-WS	ABC Issuing CA 3	MDMWS	Entrust Hosted	Active
<input type="checkbox"/>	Enrollment Gateway for WSTEP	Jonah Test	Active Directory	Customer Hosted	Active

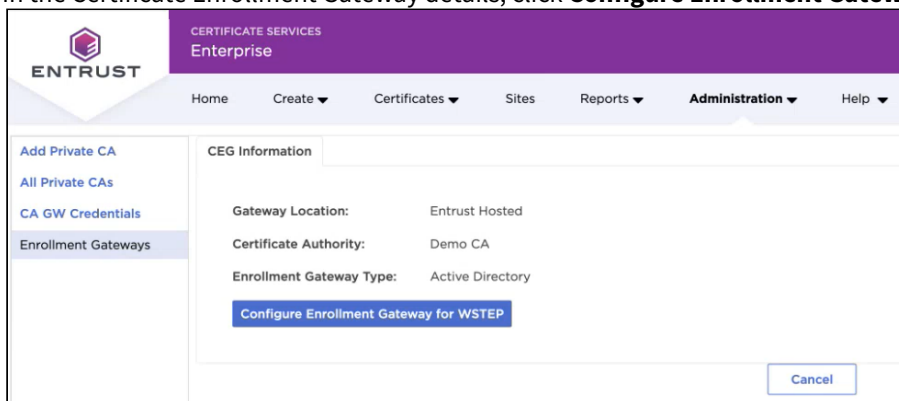
- Click **Add Enrollment Gateway** to display the **Add Certificate Enrollment Gateway** page.




- In **Gateway Location**, select **Entrust Hosted**.
- In **Certificate Authority**, select the Certificate Authority described in [Configuring an Entrust PKIaaS issuing CA for WSTEP](#).
- In **Type**, select **Enrollment Gateway for WSTEP**.
- Click **Submit**.
- Click **OK** in the **Add Enrollment Gateway Confirmation** dialog.
- Click **OK** in the **Enrollment Gateway Request Submitted** dialog.




- In the **Enrollment Gateways** view, click the name of the newly created Certificate Enrollment Gateway.
- In the Certificate Enrollment Gateway details, click **Configure Enrollment Gateway for WSTEP**.



- Wait while being redirected to the PKIaaS portal.

 If displayed, ignore the "You are not logged in" warning and wait until you are automatically logged in with your Entrust Certificate Services credentials.

15. Configure the Certificate Enrollment Gateway as explained in [Configuring WSTEP automation on the PKIaaS portal](#).

 The new Certificate Enrollment Gateway will not be operational until completing the configuration in Entrust PKIaaS. Specifically, this configuration will require deploying an on-premises agent to synchronize the Active Directory settings.


Preparing the Active Directory forest for WSTEP

To prepare for WSTEP enrollment, perform the following operations in the domain controller of the Windows Active Directory forest's root domain.

- [Creating a PKIaaS WSTEP Service Account](#)
- [Installing the default set of Microsoft Certificate Templates](#)
- [Downloading the certificate chain](#)
- [Setting up LDAPS on domain controllers](#)


Creating a PKIaaS WSTEP Service Account

Create a PKIaaS WSTEP service account for the PKIaaS WSTEP agent and PKIaaS WSTEP server to authenticate all incoming requests from WSTEP clients.

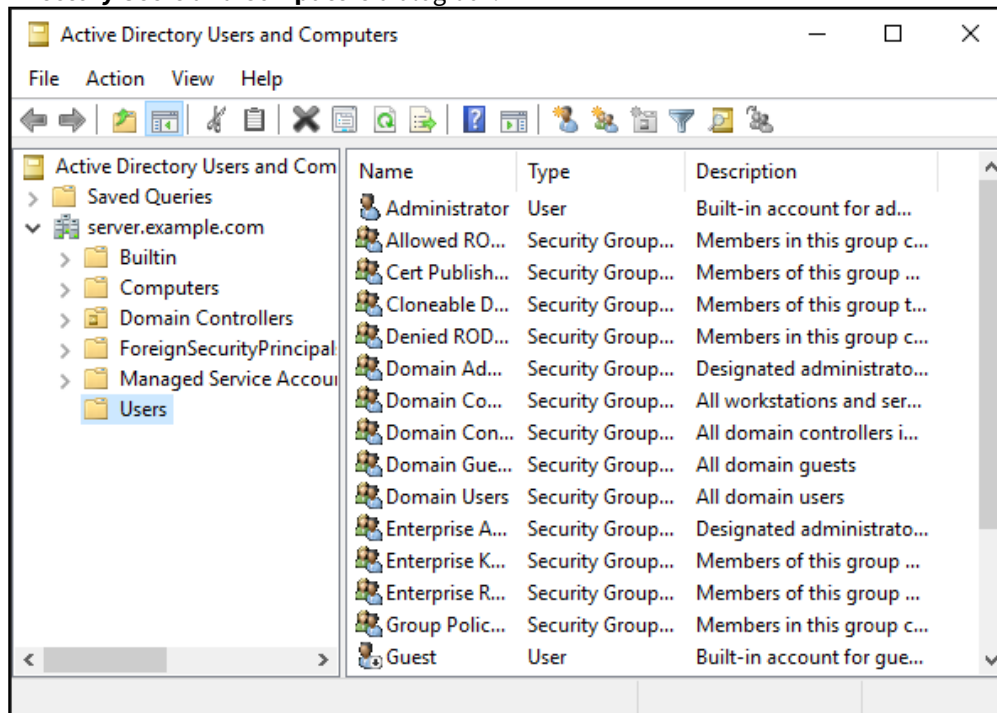
 Each root domain in the Active Directory forest requires a separate PKIaaS WSTEP service account, as each Active Directory forest must be configured separately.

To create a PKIaaS WSTEP Service Account

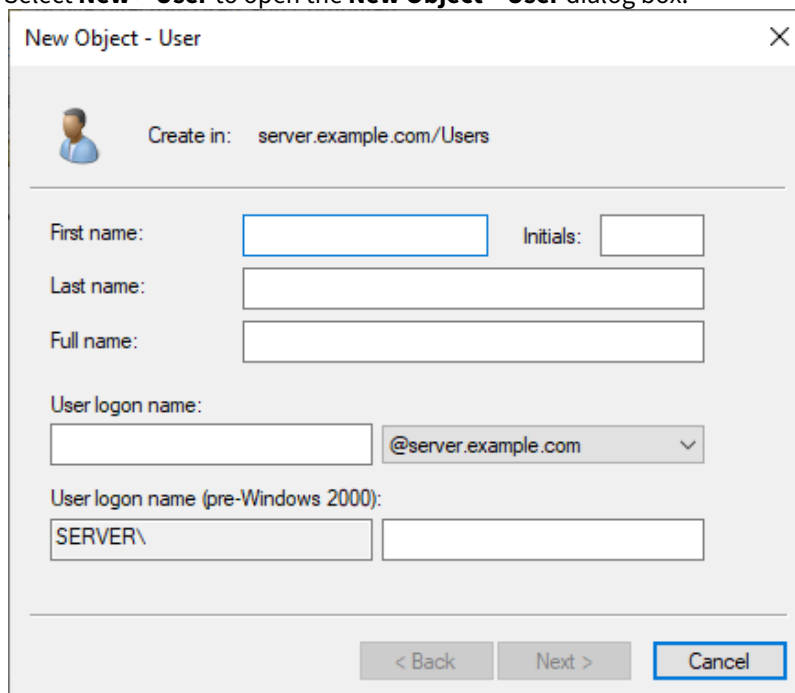
1. Log into a domain controller of the Active Directory forest's root domain as a user who is a member of both the Domain Admins and Enterprise Admins groups..

 The service account created for the PKIaaS Virtual Machine must have read permissions on certificate templates, user objects, and computer objects in LDAP.

2. Select **Start > Windows Administrative Tools > Active Directory Users and Computers** to open the **Active Directory Users and Computers** dialog box.

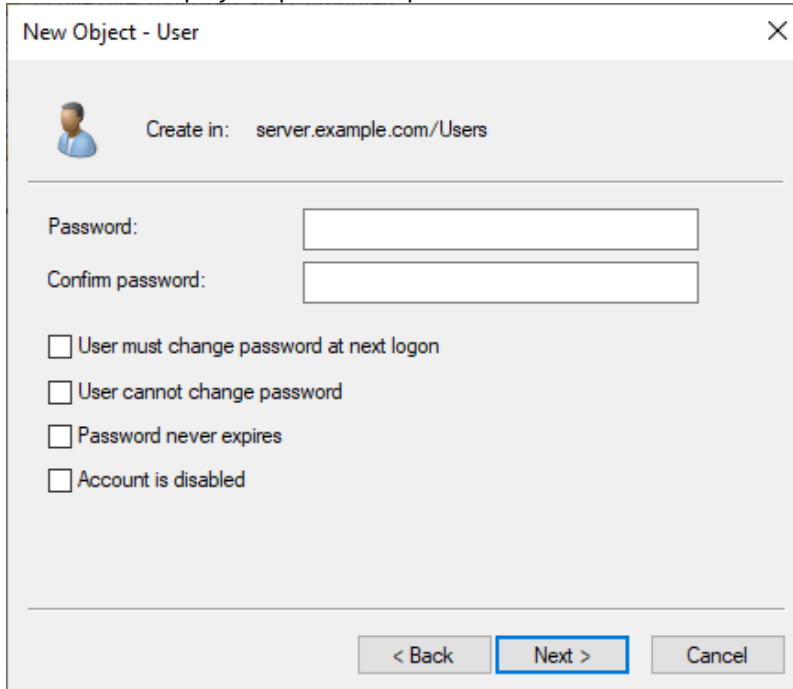


3. Right-click the folder where you want to create the new account
4. Select **New > User** to open the **New Object - User** dialog box.

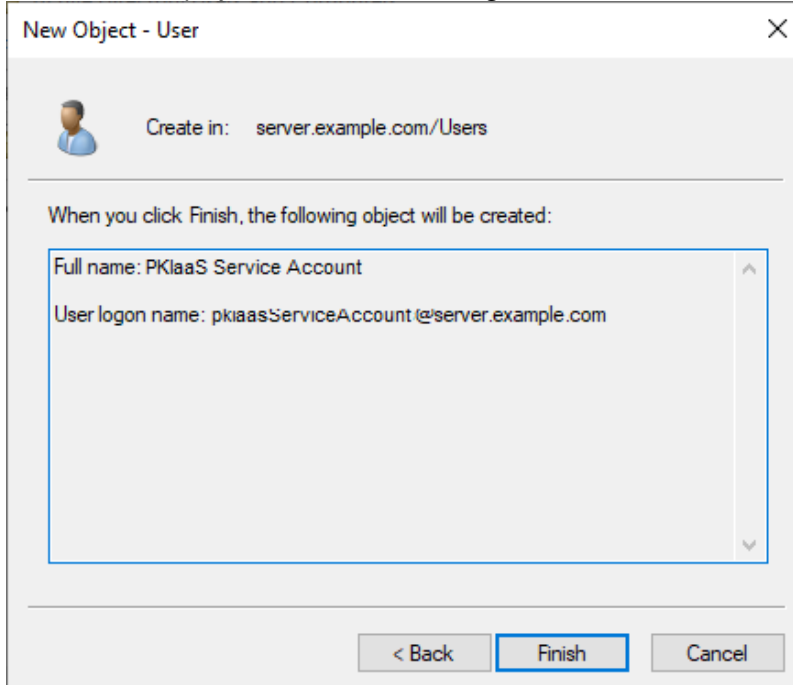


5. Enter the **First name**, **Last name**, and **Full name** for the new user account.
6. Enter a Windows **User logon name** for the user account. Optionally, enter a **User logon name (pre-Windows 2000)** for pre-Windows 2000 computers.

7. Click **Next** to display the password options.

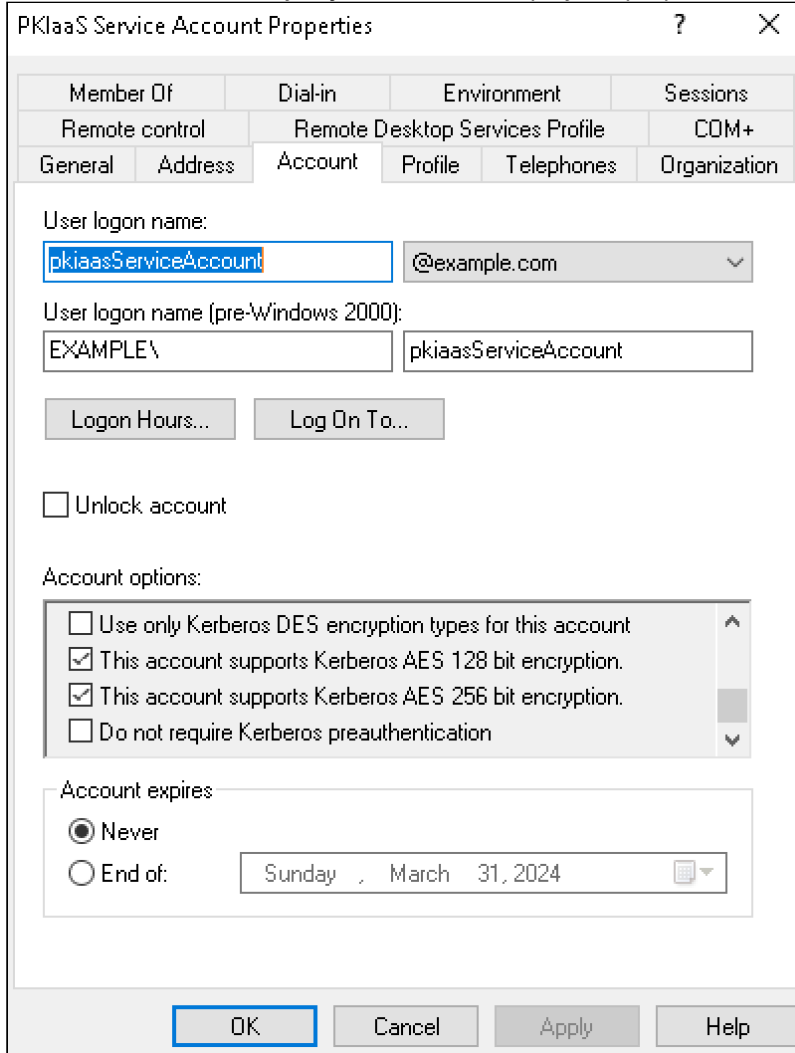


8. Enter a **Password** for the user account.
9. Enter the password again in the **Confirm password** field.
10. Deselect **User must change password at next logon**.
11. Click **Next** to display the confirmation dialog.



12. Record the user logon name of the account. You will use this logon name later to add a Service Principal Name (SPN) mapping for Kerberos.
13. Click **Finish**.

- Double-click the account you just created to display the properties dialog box.



The screenshot shows the 'PKIaaS Service Account Properties' dialog box with the 'Account' tab selected. The 'User logon name' field contains 'pkiaasServiceAccount' and the domain dropdown is set to '@example.com'. The 'User logon name (pre-Windows 2000):' field contains 'EXAMPLE\pkiaasServiceAccount'. There are buttons for 'Logon Hours...' and 'Log On To...'. Under 'Account options', the following checkboxes are checked: 'This account supports Kerberos AES 128 bit encryption.' and 'This account supports Kerberos AES 256 bit encryption.'. The 'Account expires' section has 'Never' selected. At the bottom are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

- In the **Account** tab, check the following boxes under **Account options**:
 - This account supports Kerberos AES 128 bit encryption.**
 - This account supports Kerberos AES 256 bit encryption.**
- Click **OK**.

Installing the default set of Microsoft Certificate Templates

If not installed, install the default set of Microsoft certificate templates, as described in the following sections.

- [Enabling the Certificate Templates snap-in](#)
- [Installing the default set of Microsoft Certificate Templates using the snap-in](#)

i This section is mainly for new Microsoft Active Directory forests deployments as they do not include a set of Microsoft certificate templates.

Enabling the Certificate Templates snap-in

Before Installing the default set of Microsoft Certificate Templates, you must enable the Certificate Templates snap-in. As explained below, you can perform this operation in either command or graphical mode.

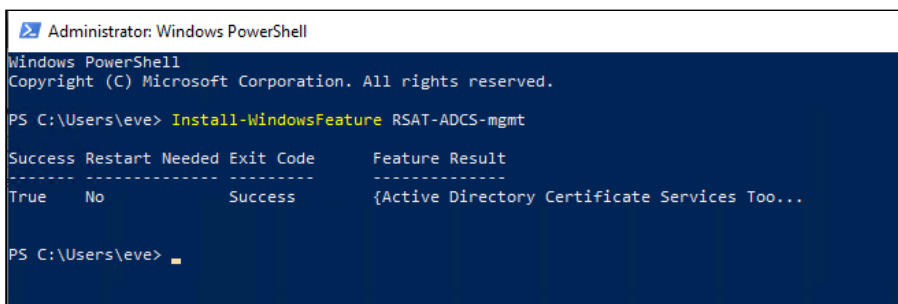
- [Enabling the Certificate Templates snap-in using PowerShell](#)
- [Enabling the Certificate Templates snap-in using the Windows Server Manager](#)

Enabling the Certificate Templates snap-in using PowerShell

You can enable the Certificate Templates snap-in by simply running the following command on PowerShell.

```
Install-WindowsFeature RSAT-ADCS-mgmt
```

For example:



```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\eve> Install-WindowsFeature RSAT-ADCS-mgmt

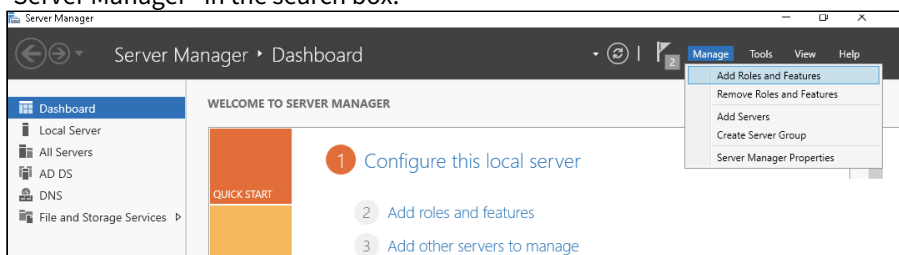
Success Restart Needed Exit Code      Feature Result
-----
True     No           Success      {Active Directory Certificate Services Too...
```

Enabling the Certificate Templates snap-in using the Windows Server Manager

You can enable the Certificate Templates snap-in using the Windows Server Manager wizard.

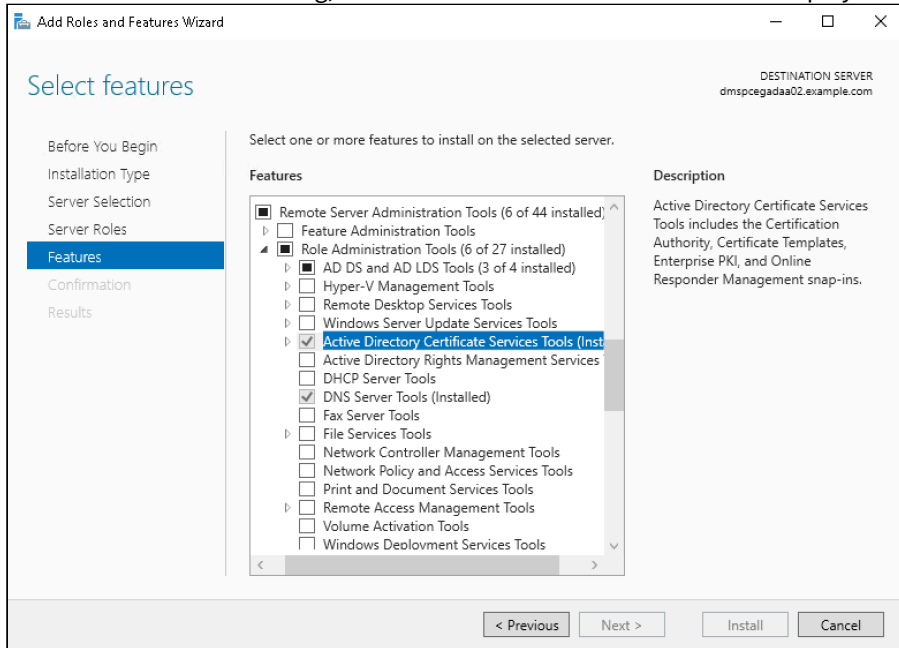
To enable the Certificate Templates snap-in using the Windows Server Manager

1. Open the Windows Server Manager – for example, by pressing the Windows key on the keyboard and typing "Server Manager" in the search box.



2. On the top-right of the window, click **Manage > Add Roles and Features**.

3. In the **Select Features** dialog, click **Next** until the **Features** section is displayed.




4. Check the following box: **Remote Server Administration Tools / Remote Administration Tools / Active Directory Certificate Services Tools**.
5. Click **Next** until the **Install** button appears, and click the **Install** button.
6. Wait while the installation completes before proceeding to the next step.

Installing the default set of Microsoft Certificate Templates using the snap-in

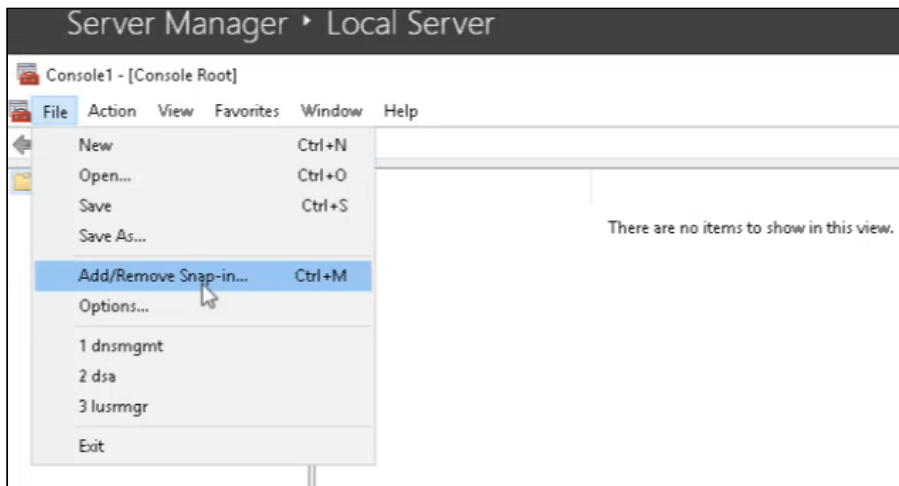
After [Enabling the Certificate Templates snap-in](#), add the snap-in to install the default set of Microsoft Certificate Templates.

To install the default set of Microsoft Certificate Templates using the snap-in

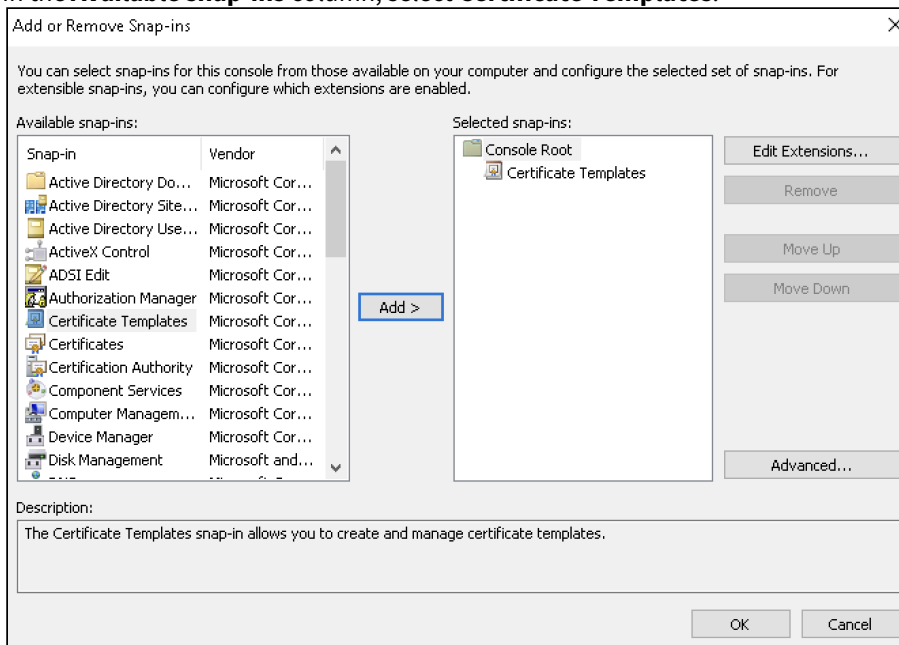
1. Log into the root Active Directory Domain of the Windows forest as a member of both the Enterprise Admins and Domain Admin groups.

 Users without these privileges cannot access the dialog options described in this section.

2. Open Microsoft Management Console (MMC) – for example, by pressing the Windows key on the keyboard and typing "MMC." (ending with a period) in the search box.

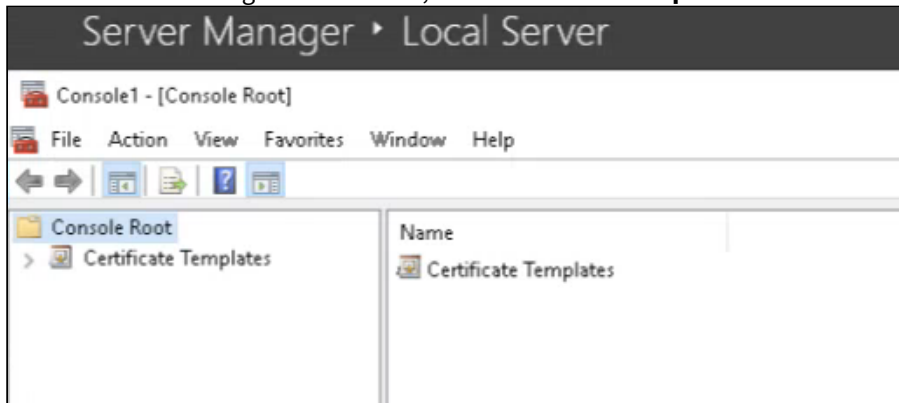


3. Select **File > Add/Remove Snap-in**.
4. In the **Available snap-ins** column, select **Certificate Templates**.

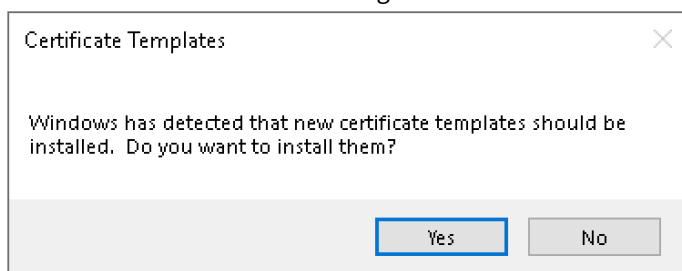


5. Click **Add** to move the **Certificate Templates** snap-in to the **Selected snap-ins** column.
6. Click **OK** to close the **Add or Remove Snap-ins** wizard and return to the Microsoft Management Console.

7. In the Microsoft Management Console, click **Certificate Templates** under **Console Root**.



8. Click **Yes** in the confirmation dialog.



⚠ If you accidentally click **No** in the confirmation dialog, you must remove the Active Directory Certificate Services Tools and repeat all the steps explained in [Installing the default set of Microsoft Certificate Templates](#).

Downloading the certificate chain

Log into cloud.entrust.net and follow the steps described in [Downloading a CA certificate](#) to download the certificate chain of the following certificates:

- The LDAPS TLS certificates.
- The WSTEP-enrolled certificates.

Specifically, you must download:

- The certificate of the issuing Certificate Authority.
- The certificate of the root Certificate Authority.

If the LDAPS TLS and WSTEP certificates are not issued by the same Certificate Authorities, you must download both certificate chains separately.

Setting up LDAPS on domain controllers

If the LDAPS connections with the Active Directory domain controllers are not configured or you want to replace the current TLS certificates, follow the steps below.

- [Establishing trust of the LDAPS TLS chain](#)
- [Generating LDAPS TLS certificates on the ECS portal](#)
- [Installing the LDAPS TLS certificates](#)
- [Validating the LDAPS configuration](#)

If you want to maintain an existing LDAPS configuration, remember to add the root CA certificate of the LDAPS TLS certificates when [Configuring an Active Directory in the agent](#).

Establishing trust of the LDAPS TLS chain

Before generating the LDAPS TLS certificates, configure the Active Directory Forest to trust the certificate chain. Otherwise, there is a risk of breaking the LDAP communications between the various domain controllers. As explained below, the recommended method to configure the LDAPS certificate chain trust is to create a GPO (Group Policy Object) linked to all domains in the Active Directory Forest.

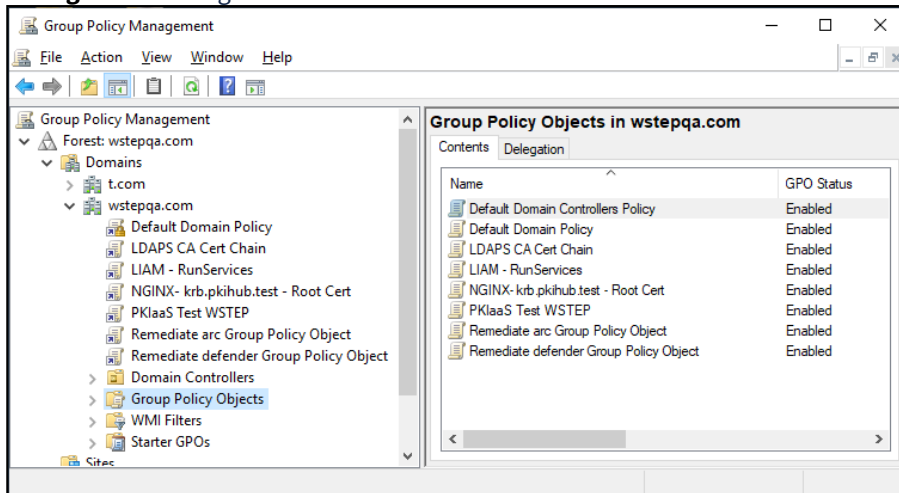
- [Creating a Group Policy Object for the LDAPS TLS certificate chain](#)
- [Importing the LDAPS TLS certificate chain into the Group Policy Object](#)
- [Linking the TLS LDAPS Group Policy Object to all domains](#)

Creating a Group Policy Object for the LDAPS TLS certificate chain

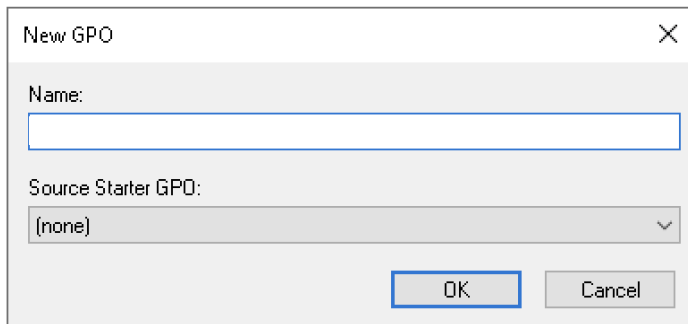
The recommended method to configure a certificate chain trust is to create a Group Policy Object (GPO) linked to all domains in the Active Directory forest.

To create a Group Policy Object

1. Log into the root Active Directory of the forest as an Active Directory administrator.
2. Select **Start > Windows Administrative Tools > Group Policy Management** to open the **Group Policy Management** dialog.



3. Under the root domain, right click the **Group Policy Objects** folder and select **New** to display the **New GPO** dialog.



4. Provide a new **Name** for the GPO and click **OK**.

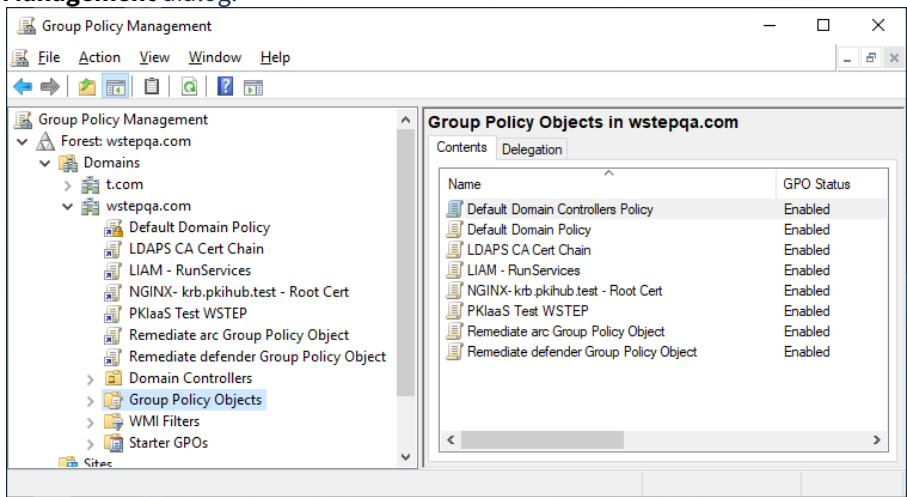
Importing the LDAPS TLS certificate chain into the Group Policy Object

Import the LDAPS TLS certificate chain into the GPO previously created in [Creating a Group Policy Object for the LDAPS TLS certificate chain](#).

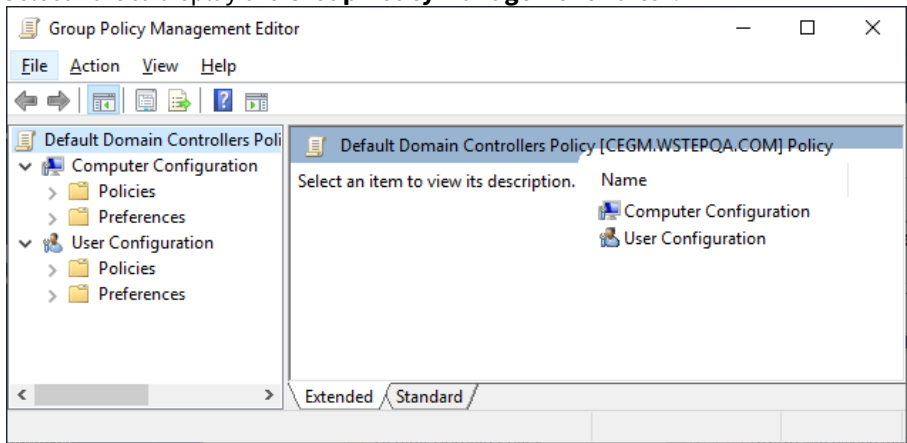
i See [Downloading the certificate chain](#) for how to download the required certificates.

To import the certificate chain into the GPO

1. Log into the root Active Directory of the forest as an Active Directory administrator.
2. Select **Start > Windows Administrative Tools > Group Policy Management** to open the **Group Policy Management** dialog.

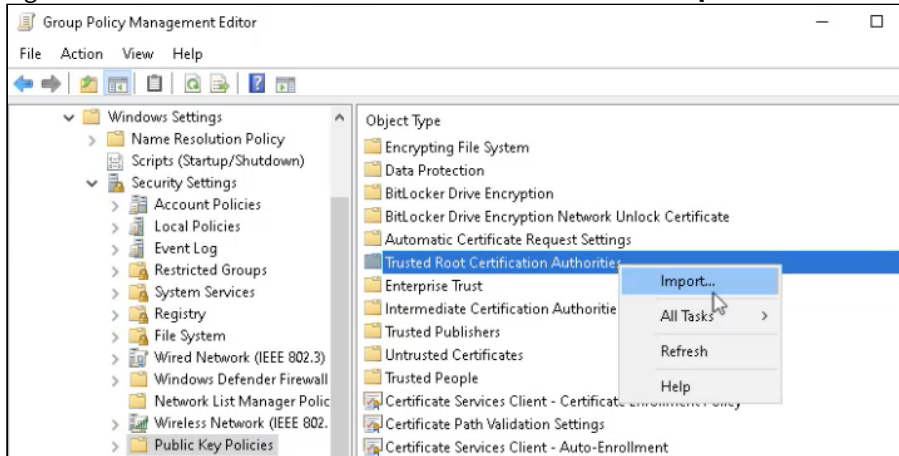


3. Right click the Group Policy Object.
4. Select **Edit** to display the **Group Policy Management Editor**.

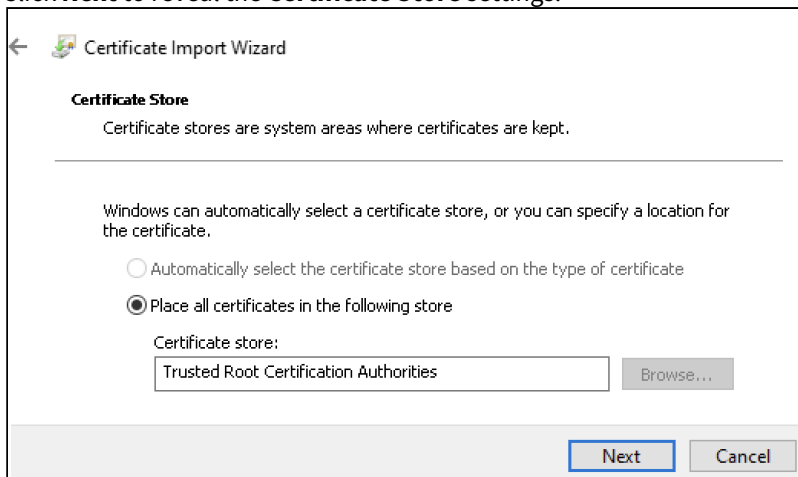


5. Navigate to **Computer Configuration > Policies > Windows Settings > Security Settings > Public Key Policies**.

- Right click **Trusted Root Certificate Authorities** and select **Import**.



- In the **Certificate Import Wizard**, click **Next** and select the root CA certificate file to import.
- Click **Next** to reveal the **Certificate Store** settings.



- Verify the selected certificate store is **Trusted Root Certification Authorities**.
- Click **Next** to display the **Completing the Certificate Import Wizard**,
- Click **Finish** to return to the **Group Policy Management** dialog.
- In the **Group Policy Management** dialog, navigate to **Computer Configuration > Policies > Windows Settings > Security Settings > Public Key Policies**,
- Right-click **Intermediate Certificate Authorities** and select **Import** to display the **Certificate Import Wizard**.
- Click **Next** and select the issuing CA certificate file to import.
- Click **Next** to reveal the Certificate Store settings.
- Verify the selected certificate store is **Trusted Root Certification Authorities**
- Click **Finish**.
- Select **File > Exit** to close the **Group Policy Management Editor**.

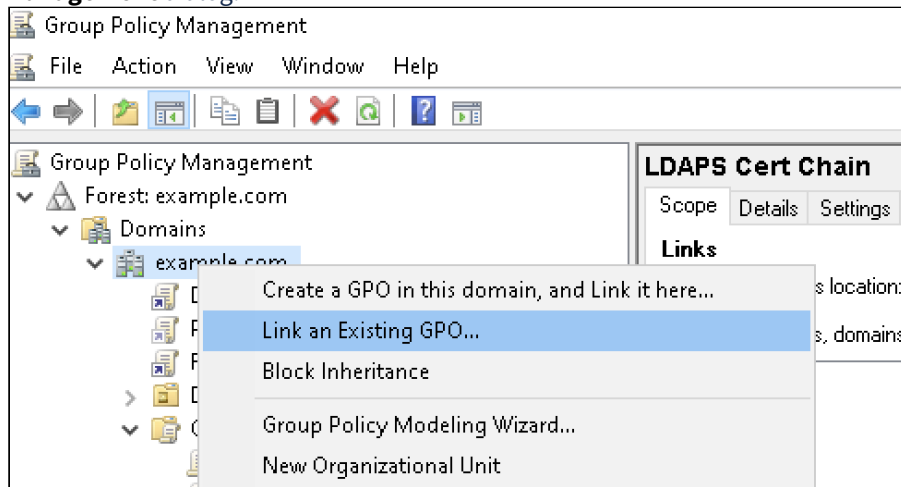
Linking the TLS LDAPS Group Policy Object to all domains

In each domain of the Active Directory forest, repeat the following procedure to link the Group Policy Object created for the LDAPS TLS certificate chain.

To link a Group Policy Object with a domain

- Log into the root Active Directory of the forest as an Active Directory administrator.

2. Select **Start > Windows Administrative Tools > Group Policy Management** to open the **Group Policy Management** dialog.



3. Right-click the domain name and select **Link an existing GPO....** to display the **Select GPO** dialog.
4. Select the Group Policy Object.
5. Click **OK**.

Generating LDAPS TLS certificates on the ECS portal

Follow the steps described in [Generating a PKCS #12](#) to generate a LDAPS TLS certificate for each domain. Specifically:

- Select the issuing CA described in [Creating an Entrust-hosted Certificate Enrollment Gateway for WSTEP](#)
- Use the **multiuse-p12-key-encipherment-client-server** certificate profile described in [Multiuse certificate profiles](#).
- The CN in the subject DN must match the FQDN of the Domain Controller (for example: [dc.example.com](#)).
- The validity period cannot exceed 397 days.
- The Subject Alternative Names must include a DNS matching the FQDN of the Domain Controller.

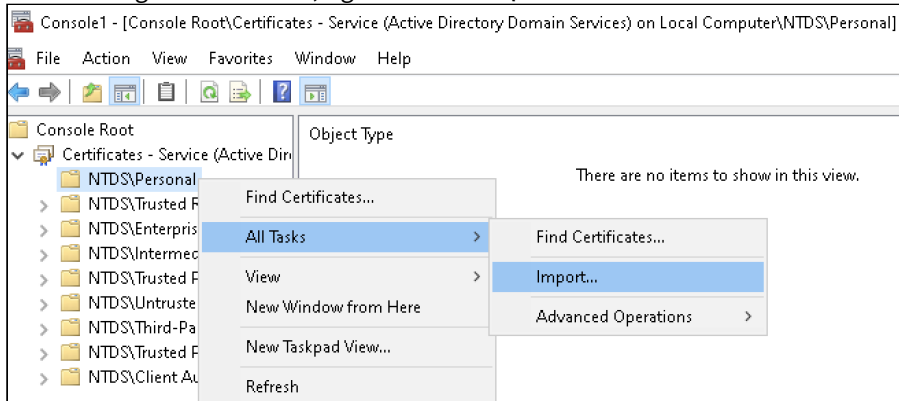
Installing the LDAPS TLS certificates

Repeat the following steps in each domain controller to install the LDAPS TLS certificate in the NTDS\Personal certificate store.

To install the LDAPS TLS certificate in a Domain Controller

1. Copy in the Domain Controller machine the P12 file obtained when [Generating LDAPS TLS certificates on the ECS portal](#).
2. If not already installed, install the Certificate Templates snap-in as explained in [Enabling the Certificate Templates snap-in](#).

3. In the management console, right-click **NTDS\Personal** under **Certificates**.



4. Select **All Tasks > Import** to display the **Certificate Import Wizard**.
5. Follow the wizard instructions to import the certificate file, enter the password and install the certificate in the **NTDS\Personal** certificate store.

Validating the LDAPS configuration

After completing the LDAPS TLS configuration, open a command shell in any machine with OpenSSL installed and run the following command for each Domain Controller.

```
openssl s_client -connect <DOMAIN-FQDN>:636 -showcerts
```

Where <DOMAIN-FQDN> is the Fully Qualified Domain Name of the Domain Controller. For example:

```
openssl s_client -connect dc1.example.com:636 -showcerts
```

If LDAPS is properly configured properly, this command will display the LDAPS certificate for the selected domain controller.

Configuring WSTEP automation on the PKIaaS portal

Once created, as explained in [Creating an Entrust-hosted Certificate Enrollment Gateway for WSTEP](#), configure the Enrollment Gateway in the Entrust PKIaaS portal.

- [Downloading the PKIaaS Virtual Machine](#)
- [Running the PKIaaS Virtual Machine](#)
- [Registering the PKIaaS Virtual Machine](#)
- [Adding an agent to the PKIaaS Virtual Machine](#)
- [Linking additional Active Directories to an agent](#)
- [Managing PKIaaS Virtual Machine configurations](#)
- [Managing Active Directory configurations](#)

Once set, the final configuration must include:

- An on-premises PKIaaS Virtual Machine linked to one PKIaaS Virtual Machine configuration.
- One WSTEP enrollment agent associated with the PKIaaS Virtual Machine configuration.
- One or more root Active Directory configurations linked with each WSTEP enrollment agent.

Downloading the PKIaaS Virtual Machine

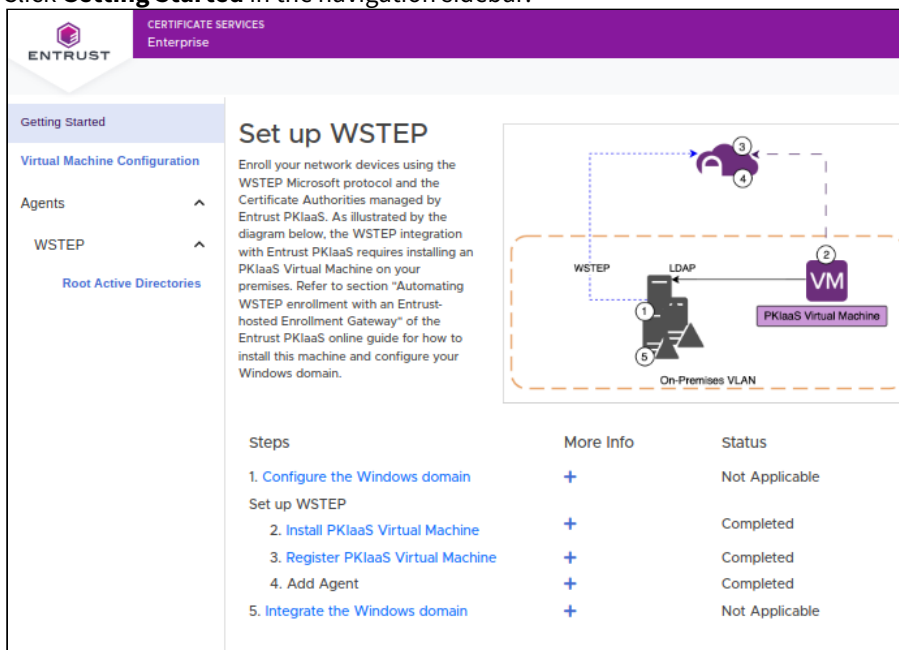
Automating WSTEP enrollment requires installing a PKIaaS Virtual Machine on your premises. See below for how to download this machine.

Permitted use of the PKIaaS Virtual Machine

You may use PKIaaS Virtual Machine for integrating the on-premises Windows infrastructure of a User with your cloud-based PKIaaS instance. You may only use PKIaaS Virtual Machine in connection with your validly licensed use of Entrust PKIaaS. You are expected to keep reasonable records relating to at least the number of copies of the software that you have made, used and distributed, and the environments where they have been deployed.

To download the PKIaaS Virtual Machine

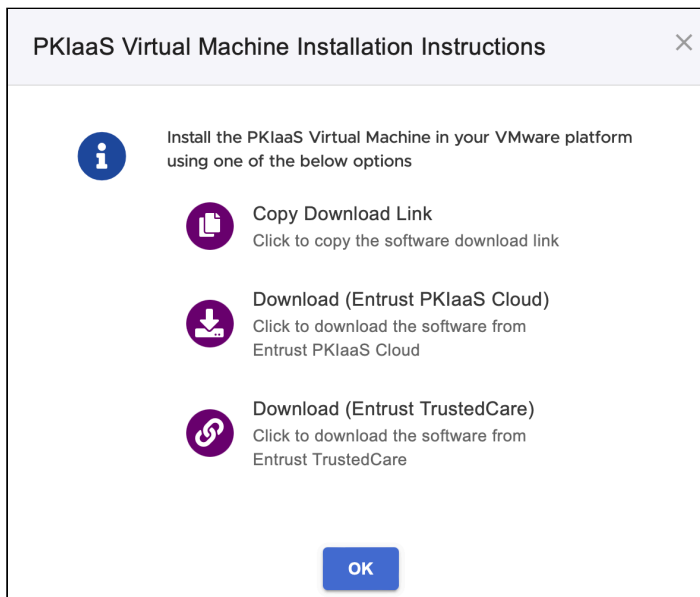
1. Click **Getting Started** in the navigation sidebar.



The screenshot shows the Entrust Enterprise console interface. The top navigation bar includes the Entrust logo and 'CERTIFICATE SERVICES Enterprise'. The left sidebar has 'Getting Started' selected. The main content area is titled 'Set up WSTEP' and contains a diagram illustrating the integration of WSTEP, LDAP, and a PKIaaS Virtual Machine (VM) on an On-Premises VLAN. The diagram shows a WSTEP server connected to a PKIaaS VM via LDAP, with numbered steps 1 through 5 indicating the process flow.

Steps	More Info	Status
1. Configure the Windows domain	+	Not Applicable
Set up WSTEP		
2. Install PKIaaS Virtual Machine	+	Completed
3. Register PKIaaS Virtual Machine	+	Completed
4. Add Agent	+	Completed
5. Integrate the Windows domain	+	Not Applicable

2. On the **Set up WSTEP** pane, click the **Install PKIaaS Virtual Machine** step to display the **PKIaaS Virtual Machine Installation Instructions** dialog.



3. In the **PKIaaS Virtual Machine Installation Instructions** dialog, click one of the download options.
 - Click **Copy Download Link** to copy the PKIaaS Virtual Machine download URL in your computer clipboard. You can provide this URL to your VMware vSphere infrastructure to automatically download the machine.
 - Click **Download (Entrust PKIaaS Cloud)** to directly download the PKIaaS Virtual Machine from Entrust.
 - Click **PKIaaS Virtual Machine** to download the PKIaaS Virtual Machine from the Entrust TrustedCare portal.

Running the PKIaaS Virtual Machine

Install and run the PKIaaS Virtual Machine on your premises.

 The PKIaaS Virtual Machine is stateless and stores all configuration settings on the Entrust cloud.

To download and run the PKIaaS Virtual Machine

1. Use the file or the link obtained in [Downloading the PKIaaS Virtual Machine](#) to install the PKIaaS Virtual Machine on VMware.
2. Make sure the environment meets the [Network requirements for the PKIaaS Virtual Machine](#).
3. Run the PKIaaS Virtual Machine.

```

PKIaaS Virtual Machine

[✓] PKIaaS Virtual Machine running
    Version: v202402160726
[✓] Connected to PKIaaS
    Region: PROD-US
[-] OTP: 315918 | 10s .....***
    Go to the PKIaaS portal, click "Register PKIaaS Virtual
    Machine", and paste this OTP to register the virtual machine
    in your account.
[ ] Virtual Machine Configuration
[ ] Agent installation
  
```

- Take note of the One-time Password (OTP) the PKIaaS Virtual Machine displays on start. You will need this OPT for [Registering the PKIaaS Virtual Machine](#).

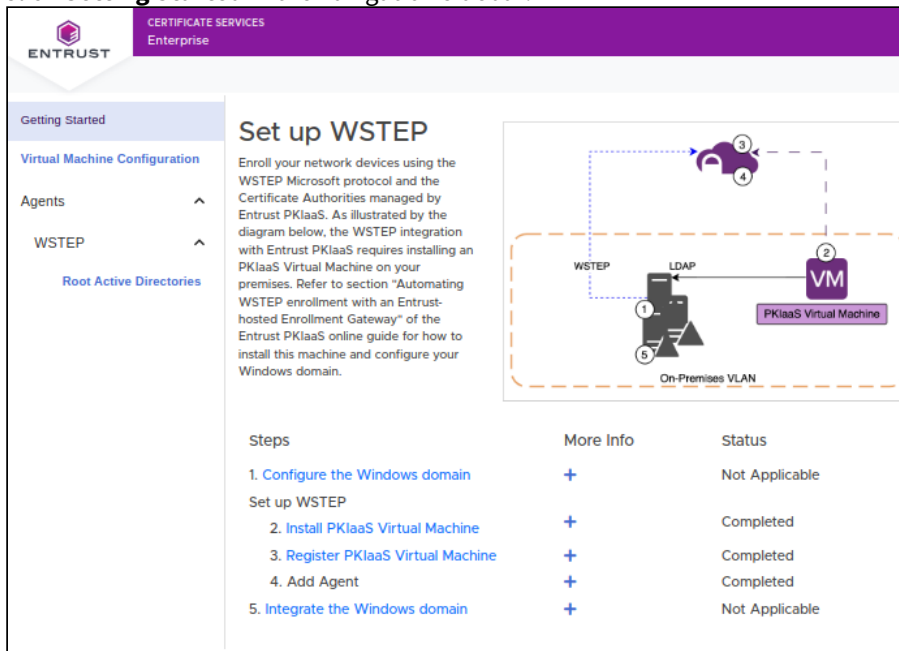
⚠ The PKIaaS Virtual Machine refreshes the OTP every 30 seconds.

Registering the PKIaaS Virtual Machine

Once installed on your premises, register the PKIaaS Virtual Machine in the Entrust PKIaaS portal.

To register the PKIaaS Virtual Machine

- Click **Getting Started** in the navigation sidebar.



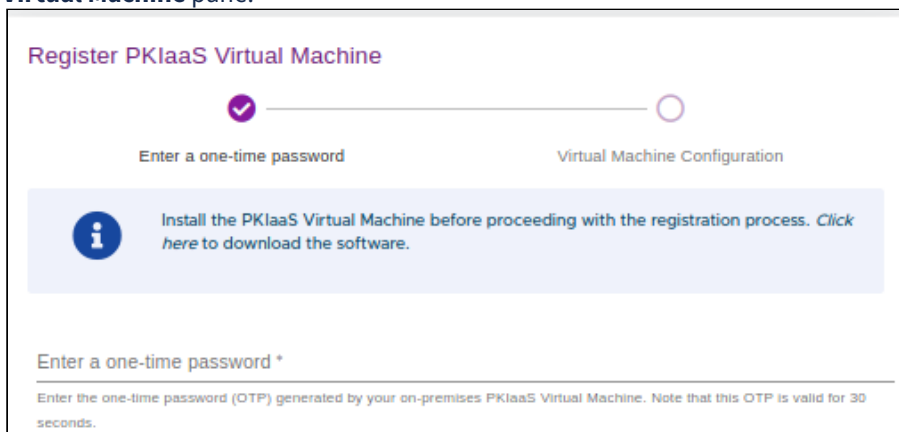
Set up WSTEP

Enroll your network devices using the WSTEP Microsoft protocol and the Certificate Authorities managed by Entrust PKIaaS. As illustrated by the diagram below, the WSTEP integration with Entrust PKIaaS requires installing an PKIaaS Virtual Machine on your premises. Refer to section "Automating WSTEP enrollment with an Entrust-hosted Enrollment Gateway" of the Entrust PKIaaS online guide for how to install this machine and configure your Windows domain.

Steps

Steps	More Info	Status
1. Configure the Windows domain	+	Not Applicable
Set up WSTEP		
2. Install PKIaaS Virtual Machine	+	Completed
3. Register PKIaaS Virtual Machine	+	Completed
4. Add Agent	+	Completed
5. Integrate the Windows domain	+	Not Applicable

- On the **Set up WSTEP** pane, click the **Register PKIaaS Virtual Machine** step to display the **Register PKIaaS Virtual Machine** pane.



Register PKIaaS Virtual Machine


Enter a one-time password Virtual Machine Configuration

i Install the PKIaaS Virtual Machine before proceeding with the registration process. [Click here to download the software.](#)

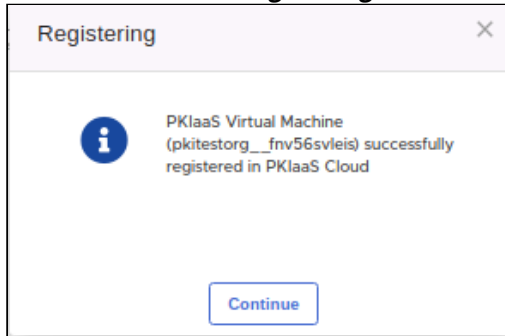
Enter a one-time password *

Enter the one-time password (OTP) generated by your on-premises PKIaaS Virtual Machine. Note that this OTP is valid for 30 seconds.

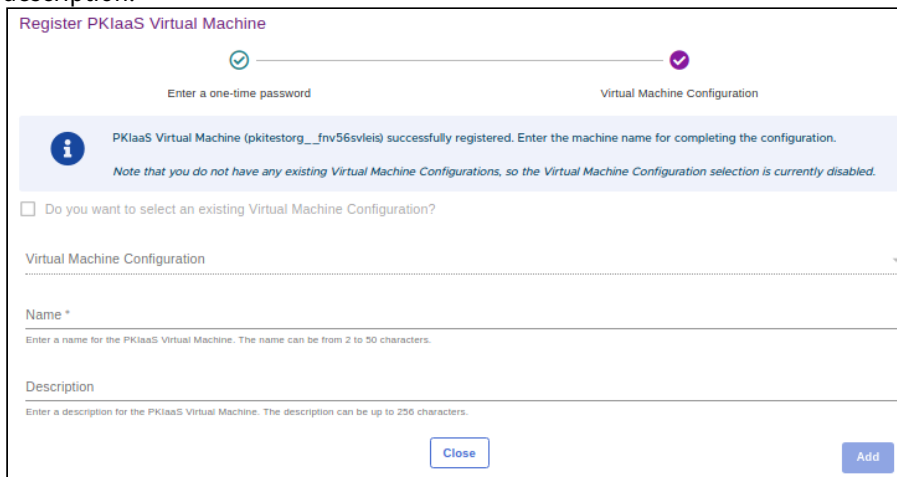
- In the **Enter OTP field**, enter the one-time password you obtained when [Running the PKIaaS Virtual Machine](#).

 The PKIaaS Virtual Machine refreshes the OTP every 30 seconds.

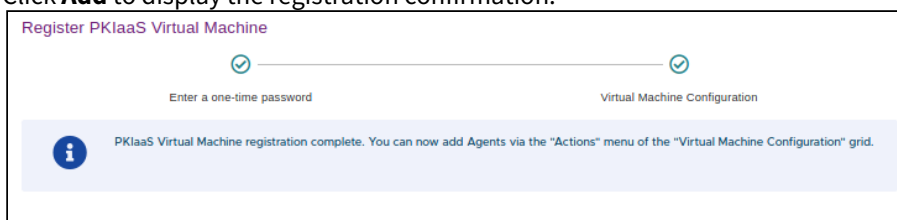
4. Click **Next** and wait while Entrust PKIaaS registers the machine
5. Click Continue in the **Registering** confirmation dialog.



6. In the **PKIaaS Virtual Machine Configuration** form, enter a unique name for the machine and an optional description.

A form titled "Register PKIaaS Virtual Machine" with a progress bar at the top showing two steps: "Enter a one-time password" (completed with a green checkmark) and "Virtual Machine Configuration" (in progress with a purple checkmark). Below the progress bar is an information icon (i) and the text: "PKIaaS Virtual Machine (pkitestorg__fnv56svleis) successfully registered. Enter the machine name for completing the configuration. Note that you do not have any existing Virtual Machine Configurations, so the Virtual Machine Configuration selection is currently disabled." There is a checkbox labeled "Do you want to select an existing Virtual Machine Configuration?" which is unchecked. Below this is a dropdown menu for "Virtual Machine Configuration". There are two text input fields: "Name *" with a note "Enter a name for the PKIaaS Virtual Machine. The name can be from 2 to 50 characters." and "Description" with a note "Enter a description for the PKIaaS Virtual Machine. The description can be up to 256 characters." At the bottom right, there are "Close" and "Add" buttons.


7. Click **Add** to display the registration confirmation.

A dialog box titled "Register PKIaaS Virtual Machine" with a progress bar at the top showing two steps: "Enter a one-time password" (completed with a green checkmark) and "Virtual Machine Configuration" (completed with a green checkmark). Below the progress bar is an information icon (i) and the text: "PKIaaS Virtual Machine registration complete. You can now add Agents via the 'Actions' menu of the 'Virtual Machine Configuration' grid." At the bottom, there is a "Close" button.

8. Click **Close**.

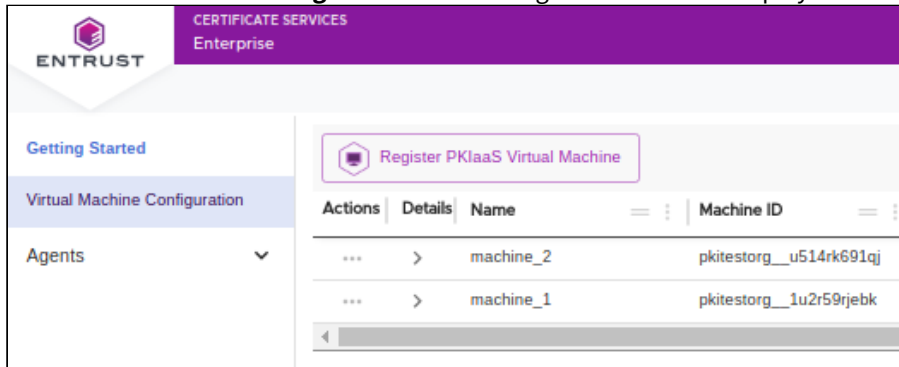
Adding an agent to the PKIaaS Virtual Machine

Add an enrollment agent to the PKIaaS Virtual Machine you previously registered in [Registering the PKIaaS Virtual Machine](#).

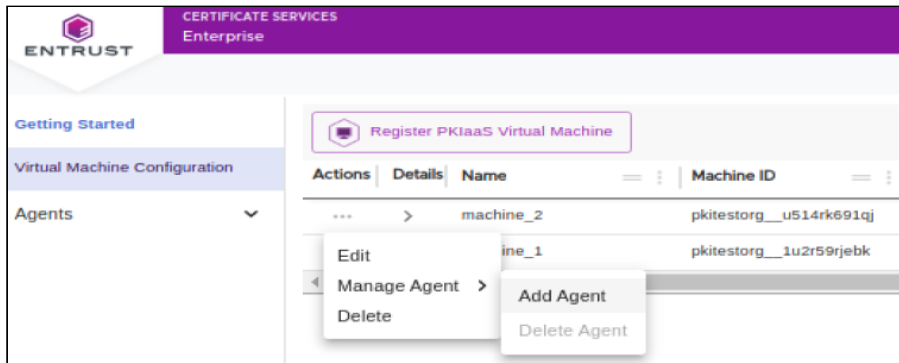
 You cannot link the same Active Directory to different agents. However, you can link additional Active Directories to an agent as explained in [Linking additional Active Directories to an agent](#).

To add an agent to a PKIaaS Virtual Machine

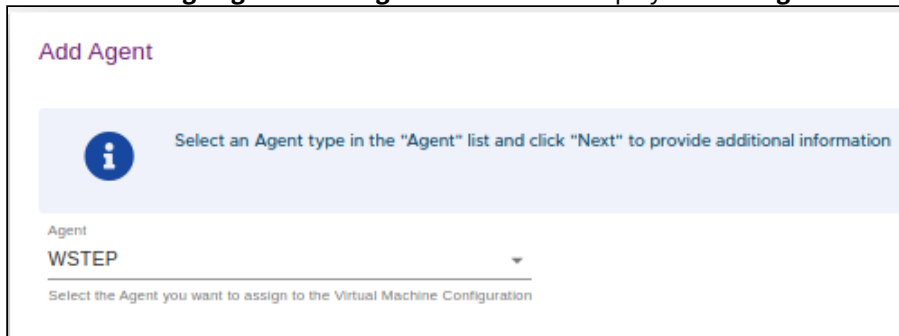
1. Click **Virtual Machine Configuration** in the navigation sidebar to display the PKIaaS Virtual Machines grid.



2. In the PKIaaS Virtual Machines grid, click the ... three dots icon of the machine you registered in [Registering the PKIaaS Virtual Machine](#).



3. Select the **Manage Agent > Add Agent** command to display the **Add Agent** form.



4. Select **WSTEP** in the **Agent** list.
5. Click **Next** and follow the steps below.
 - [Configuring an Active Directory in the agent](#)
 - [Preparing the service account for Kerberos](#)
 - [Synchronizing the agent with the root Active Directory](#)

Configuring an Active Directory in the agent

Each agent must be associated with at least one Active Directory.

Add Root Active Directory

Password *
 👁

The service account password

DNS Server
 10.34.22.55:53

The DNS server for the WSTEP Agent to query. Enter the IP and port (in IP:PORT syntax), or just the IP to assume the default port 53.

Certificate Authority
 My Subordinate CA

The default Certificate Authority for the root Active Directory certificate templates. You can later select a different Certificate Authority via the "Manage Certificate Templates" action in the "Root Active Directories" grid.

LDAPS Trusted Certificates Add Certificate

```
qRCf9Uq6T1ZF5rTamx508RpdLKip8cYh/
Wvc2xRgUZnWtWZA1R1u/E2p5C9c/yX
yWt1pRsQ0FnePXRni+CXvJRG+hmuJhPeo09RbGIPSA6PwxTLDLsnd
TJt4DiR4y
kmLTraKmxhBqqCgnzQR3lksbJ6MMkxE8VD9h29qnIVB5sFVJ0U17A
```

Paste the PEM or Base64 encoded certificate. To add more, click the Add Certificate button

Distinguished Name CN=demoserver,O=Entrust,ST=Barcelona,C=ES

Certificate Authority CN=demoserver,O=Entrust,ST=Barcelona,C=ES

Serial (Hex) 22200f5c85dad245c215099a736fd6fac9a0301b

Valid From April 17, 2024 at 11:30 AM GMT+2

Valid To April 17, 2025 at 11:30 AM

Close
Add

See below for the required parameters.

- [Domain Name](#)
- [Username](#)
- [Password](#)
- [DNS](#)
- [Certificate Authority](#)
- [LDAPS Trusted Certificates](#)

Domain Name

The name of the root domain of the Microsoft Active Directory forest that was used when [Preparing the Active Directory forest for WSTEP](#).

- If an Active Directory with the same name exists and is linked to another agent, the wizard will display an error message.
- If an Active Directory with the same name exists but is not linked to another agent, the wizard will display a confirmation request to load the Active Directory configuration.
- The value used for the domain name should not be an IP address, nor should it be the FQDN of a domain controller.

Username

The user logon name obtained when [Creating a PKIaaS WSTEP Service Account](#). This parameter supports the two formats described in:

<https://learn.microsoft.com/en-us/windows/win32/secauthn/user-name-formats>

For example:

mydomain\john.smith

john.smith@mydomain.com

Password

The password selected when [Creating a PKIaaS WSTEP Service Account](#).

DNS

The DNS of the Active Directory you configured in [Preparing the Active Directory forest for WSTEP](#). Use the following syntax to set this value.

<machine>:<port>

Where

- <machine> is the domain name or IP address of the DNS server.
- <port> is the port of the DNS service.

Certificate Authority

The Certificate Authority you configured in [Configuring an Entrust PKIaaS issuing CA for WSTEP](#).

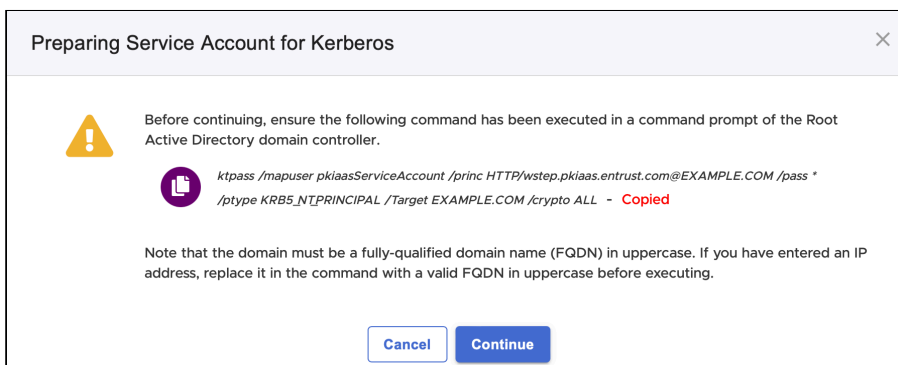
LDAPS Trusted Certificates

The root CA certificate of the LDAPS TLS certificates chain. The PKIaaS Virtual Machine will use this root CA certificate for validating connections with the Active Directory LDAPS service. Click **Add Certificate** to import one or more root CA certificates.

 See [Setting up LDAPS on domain controllers](#) for how to configure the LDAPS TLS certificates.

Preparing the service account for Kerberos

After [Configuring an Active Directory in the agent](#), click **Next** to display the **Preparing Service Account for Kerberos** dialog.




If you have not yet executed the displayed command:

1. Click the icon to copy the command.
2. Log in to the server hosting the root Active Directory domain controller as either:
 - A domain administrator

- A user who is a member of the built-in Account Operators domain group.
3. Paste the command in the Windows PowerShell.
 4. Replace the value of the `/pass` option with the password entered when [Creating a PKIaaS WSTEP Service Account](#).
 5. Run the command.

Specifically, this `ktpass` command maps a Kerberos Principal to:

- The Service Principal Names (SPN).
- The User Principal Name (UPN).

 These mappings are necessary for compatibility with AES128 and AES256 algorithms in Kerberos Authentication.

See below for the command syntax.

```
ktpass /mapuser <USER> /princ HTTP/<PKIAAS-WSTEP-URL>@<UPPERCASE-DOMAIN-NAME> /pass <PASS> /ptype KRB5_NT_PRINCIPAL /Target <UPPERCASE-DOMAIN-NAME> /crypto ALL
```

Parameter	Value
<USER>	The name of the user described in Creating a PKIaaS WSTEP Service Account .
<PKIAAS-WSTEP-URL>	The region-specific URL for Entrust PKIaaS WSTEP.
<UPPERCASE-DOMAIN-NAME>	The domain selected when previously Configuring an Active Directory in the agent , in uppercase.
<USER-PASSWORD>	The password of the user described in Creating a PKIaaS WSTEP Service Account .

Synchronizing the agent with the root Active Directory

After [Preparing the service account for Kerberos](#), click **Continue** and wait while the agent connects with the root Active Directory. When the process completes, a confirmation dialog displays the URL of the enrollment service for the agent.

Link Root Active Directory

 **Important Information**
 Agent successfully synchronized with the Root Active Directory (10.34.22.55). The discovered RootRealm Name is oscar.test.

Use the following URL when creating the Group Policy Object for the Certificate Enrollment Policy:
<https://wstep.pki.entrust.com/wstep/pkitestorg/cep>

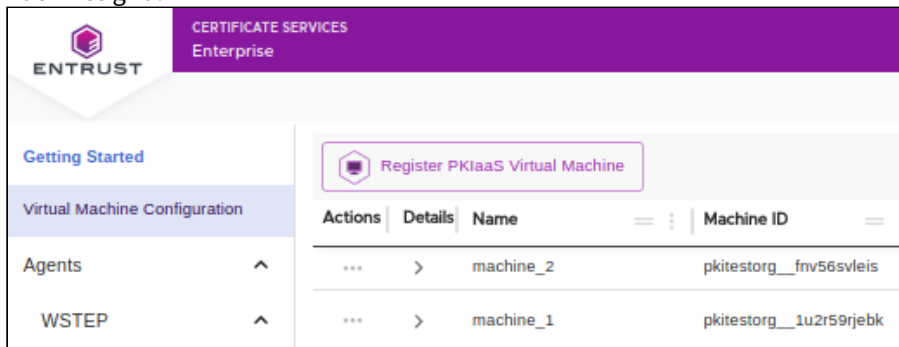
Copy the URL, you will need it when later [Enabling PKIaaS WSTEP for users](#) on your Windows domain.

Linking additional Active Directories to an agent

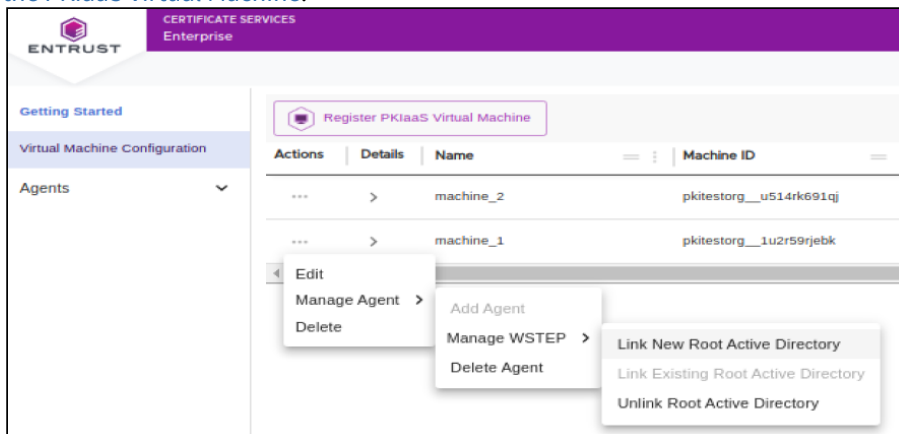
When [Adding an agent to the PKIaaS Virtual Machine](#), you are asked to enter configuration data for linking a first Windows root Active Directory. See this section for how to link additional Active Directories.

To link an additional Active Directory to an agent

1. Click **PKIaaS Virtual Machine Configuration** in the navigation sidebar to display the PKIaaS Virtual Machines grid.



2. In the PKIaaS Virtual Machines grid, click the ... three dots icon of the machine you registered in [Registering the PKIaaS Virtual Machine](#).



3. Select the **Manage Agent > Manage WSTEP > Link New Root Active Directory** command.
4. Follow the steps already described in [Adding an agent to the PKIaaS Virtual Machine](#).
 - [Configuring an Active Directory in the agent](#)
 - [Preparing the service account for Kerberos](#)
 - [Synchronizing the agent with the root Active Directory](#)

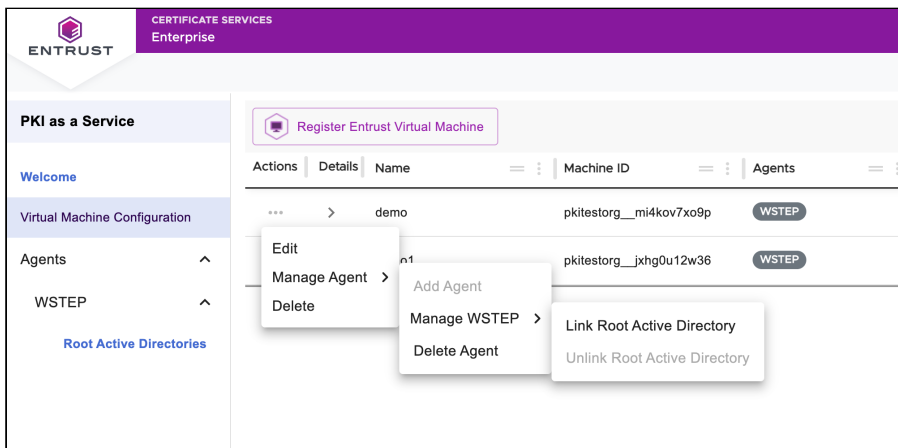
Managing PKIaaS Virtual Machine configurations

To manage the configuration of the PKIaaS Virtual Machines registered in Entrust PKIaaS, click **Virtual Machine Configuration** in the navigation sidebar.

- [Selecting PKIaaS Virtual Machine actions](#)
- [Copying the enrollment URL](#)

Selecting PKIaaS Virtual Machine actions

In the PKIaaS Virtual Machine grid, click the ... three dots line for a PKIaaS Virtual Machine



Select the following actions.

- [Edit](#)
- [Manage Agent / Add Agent](#)
- [Manage Agent / Manage WSTEP / Link Root Active Directory](#)
- [Manage Agent / Manage WSTEP / Unlink Root Active Directory](#)
- [Manage Agent / Delete Agent](#)
- [Delete](#)

Edit

Select this command to edit the following PKIaaS Virtual Machine Configuration settings.

Setting	Value
Machines	The identifiers of the PKIaaS Virtual Machines the configuration is applied to.
Name	The name selected when Registering the PKIaaS Virtual Machine .
Description	The optional description added when Registering the PKIaaS Virtual Machine .

Manage Agent / Add Agent

Select this command to add an agent to the PKIaaS Virtual Machine.

Manage Agent / Manage WSTEP / Link Root Active Directory

Select this command for linking an Active Directory with a WSTEP agent. See below for the required steps.

- [Configuring an Active Directory in the agent](#)
- [Preparing the service account for Kerberos](#)
- [Synchronizing the agent with the root Active Directory](#)

Manage Agent / Manage WSTEP / Unlink Root Active Directory


Select this command to unlink an Active Directory configuration from a WSTEP agent.

Manage Agent / Delete Agent

Select this command to delete the agent.

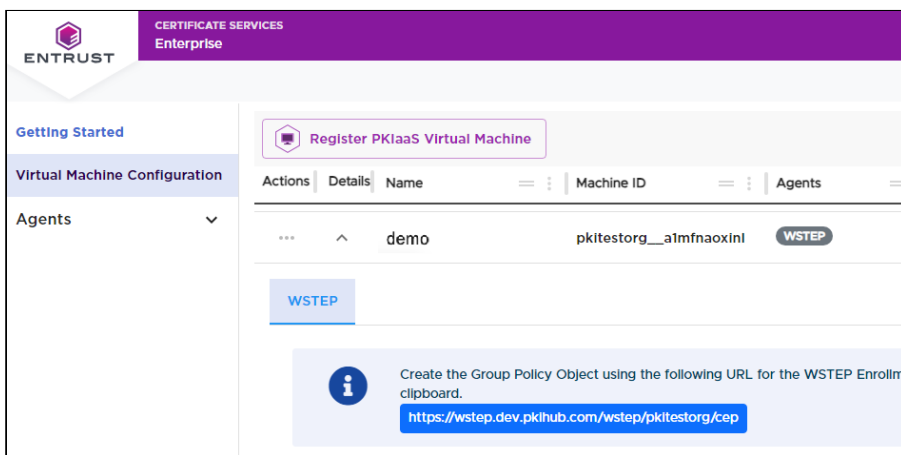
Delete


Select this command to delete the PKIaaS Virtual Machine configuration.

 Deleting a PKIaaS Virtual Machine configuration fails when it is still assigned to a machine. Click **Edit** and set **Machines** to **<Unassign>** to remove any machine assignment.

Copying the enrollment URL

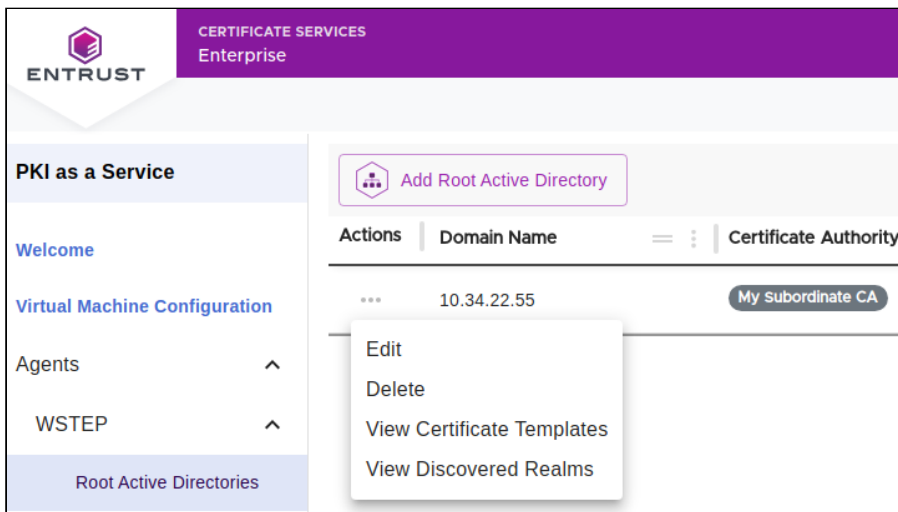
In the PKIaaS Virtual Machine grid, click the > arrow to unfold the details of a PKIaaS Virtual Machine configuration.



Click the  panel to copy the WSTEP enrollment URL. You will later need this URL when [Enabling PKIaaS WSTEP for users](#) on your Windows domain.

Managing Active Directory configurations

To manage Windows root Active Directory configurations in Entrust PKIaaS, click **Agents > WSTEP > Root Active Directories** in the sidebar.



See below for the available configuration options.

- [Add Root Active Directory](#)
- [Edit Active Directory](#)
- [Delete Active Directory](#)
- [Manage Certificate Templates](#)
- [View discovered domains](#)

Add Root Active Directory

See below for adding a new Active Directory to Entrust PKIaaS.

i You can later link this Active Directory to an agent as explained in [Adding an agent to the PKIaaS Virtual Machine](#) and [Linking additional Active Directories to an agent](#).

To add an Active Directory configuration

1. Click **Agents > WSTEP > Root Active Directories** in the sidebar.
2. Click the **Add Root Active Directory** button.
3. Select a PKIaaS Virtual Machine configuration to add the Active Directory to.
4. Click **Next** and configure the following settings of a new Active Directory.
 - [Domain Name](#)
 - [Username](#)
 - [Password](#)
 - [DNS](#)
 - [Certificate Authority](#)
 - [LDAPS Trusted Certificates](#)

Domain Name

The name of the root domain of the Microsoft Active Directory forest that was used when [Preparing the Active Directory forest for WSTEP](#).

- If an Active Directory with the same name exists and is linked to another agent, the wizard will display an error message.
- If an Active Directory with the same name exists but is not linked to another agent, the wizard will display a confirmation request to load the Active Directory configuration.

- The value used for the domain name should not be an IP address, nor should it be the FQDN of a domain controller.

Username

The user logon name obtained when [Creating a PKIaaS WSTEP Service Account](#). This parameter supports the two formats described in:

<https://learn.microsoft.com/en-us/windows/win32/secauthn/user-name-formats>

For example:

```
mydomain\john.smith
```

```
john.smith@mydomain.com
```

Password

The password selected when [Creating a PKIaaS WSTEP Service Account](#).

DNS

The DNS of the Active Directory you configured in [Preparing the Active Directory forest for WSTEP](#). Use the following syntax to set this value.

```
<machine>:<port>
```

Where

- `<machine>` is the domain name or IP address of the DNS server.
- `<port>` is the port of the DNS service.

Certificate Authority

The Certificate Authority you configured in [Configuring an Entrust PKIaaS issuing CA for WSTEP](#).

LDAPS Trusted Certificates

The root CA certificate of the LDAPS TLS certificates chain. The PKIaaS Virtual Machine will use this root CA certificate for validating connections with the Active Directory LDAPS service. Click **Add Certificate** to import one or more root CA certificates.

 See [Setting up LDAPS on domain controllers](#) for how to configure the LDAPS TLS certificates.

Edit Active Directory

See below for editing the configuration of an Active Directory in Entrust PKIaaS.

To edit an Active Directory configuration

1. Click **Agents > WSTEP > Root Active Directories** in the sidebar.
2. Click the ... three dots line for an Active Directory and select **Edit**

3. Update the following configuration settings.

- [Domain Name](#)
- [Username](#)
- [Password](#)
- [DNS](#)
- [Certificate Authority](#)
- [LDAPS Trusted Certificates](#)

Domain Name

The name of the root domain of the Microsoft Active Directory forest that was used when [Preparing the Active Directory forest for WSTEP](#).

- If an Active Directory with the same name exists and is linked to another agent, the wizard will display an error message.
- If an Active Directory with the same name exists but is not linked to another agent, the wizard will display a confirmation request to load the Active Directory configuration.
- The value used for the domain name should not be an IP address, nor should it be the FQDN of a domain controller.

Username

The user logon name obtained when [Creating a PKIaaS WSTEP Service Account](#). This parameter supports the two formats described in:

<https://learn.microsoft.com/en-us/windows/win32/secauthn/user-name-formats>

For example:

```
mydomain\john.smith
```

```
john.smith@mydomain.com
```

Password

The password selected when [Creating a PKIaaS WSTEP Service Account](#).

DNS

The DNS of the Active Directory you configured in [Preparing the Active Directory forest for WSTEP](#). Use the following syntax to set this value.

```
<machine>:<port>
```

Where

- `<machine>` is the domain name or IP address of the DNS server.
- `<port>` is the port of the DNS service.

Certificate Authority

The Certificate Authority you configured in [Configuring an Entrust PKIaaS issuing CA for WSTEP](#).


LDAPS Trusted Certificates

The root CA certificate of the LDAPS TLS certificates chain. The PKIaaS Virtual Machine will use this root CA certificate for validating connections with the Active Directory LDAPS service. Click **Add Certificate** to import one or more root CA certificates.

 See [Setting up LDAPS on domain controllers](#) for how to configure the LDAPS TLS certificates.

Delete Active Directory

See below for removing an Active Directory from Entrust PKIaaS.


 Removing an Active Directory results in an error if the Active Directory is linked to a PKIaaS Virtual Machine configuration.

To remove an Active Directory from Entrust PKIaaS

1. If still linked to a PKIaaS Virtual Machine configuration, unlink the Active Directory as explained in [Managing PKIaaS Virtual Machine configurations](#).
2. Click **Agents > WSTEP > Root Active Directories** in the sidebar.
3. Click the ... three dots line for an Active Directory and select **Delete**.

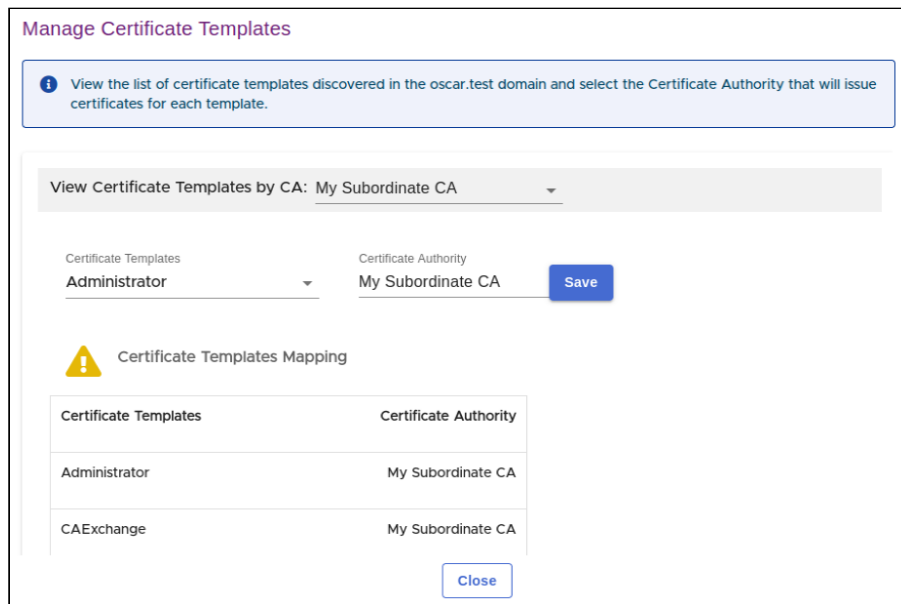
Manage Certificate Templates

See below for how to browse and manage the Windows certificate templates enabled in an Active Directory for WSTEP enrollment.

 See [Managing Microsoft certificate templates in Active Directory](#) for how to add and configure certificate templates in your on-premises Windows environment.

To manage certificate templates

1. Click **Agents > WSTEP > Root Active Directories** in the sidebar.
2. Click the ... three dots line for an Active Directory and select **View Certificate Templates** to display the **Manage Certificate Templates** pane.



3. In the **View Template by CA** list of the **Manage Certificate Templates** pane, select one of the Certificate Authorities added when [Configuring an Entrust PKIaaS issuing CA for WSTEP](#). Select **All** to list certificate templates for all Certificate Authorities.
4. In the **Certificate Templates** field, select a certificate template you want to assign or unassign to a certificate authority.
5. In the **Certificate Authority** field, select the certificate authority that will issue certificates for the selected certificate template. Click **<Unassign>** to assign no certificate authority.
6. Click **Save** to associate the certificate template with the certificate authority.

View discovered domains

See below for how to list the domains managed by a root Active Directory.

To list the domains managed by a root Active Directory

1. Click **Agents > WSTEP > Root Active Directories** in the sidebar.
2. Click the ... three dots line for an Active Directory and select **View Discovered Domains**.
3. Check the name of each domain managed by the Active Directory.

Enabling WSTEP for users and devices

Enable PKIaaS WSTEP enrollment and autoenrollment for users and devices.

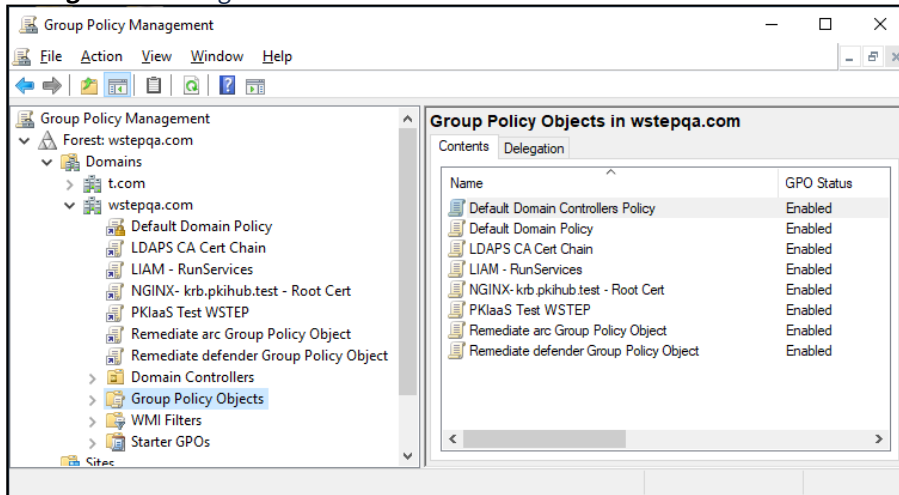
- [Creating a Group Policy Object for the WSTEP certificate chain](#)
- [Importing the WSTEP certificate chain into the Group Policy Object](#)
- [Enabling PKIaaS WSTEP for users](#)
- [Enabling autoenrollment for users](#)
- [Enabling PKIaaS WSTEP for devices](#)
- [Enabling autoenrollment for devices](#)
- [Linking the WSTEP Group Policy Object to all domains](#)

Creating a Group Policy Object for the WSTEP certificate chain

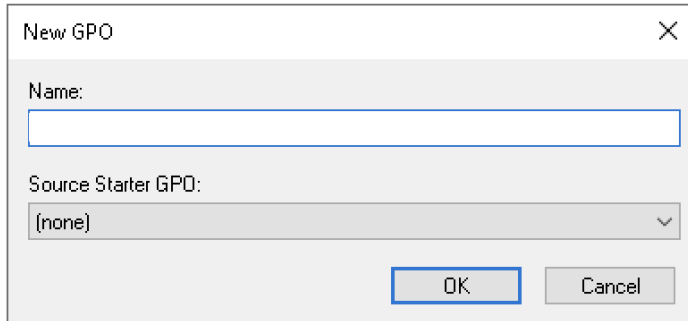
The recommended method to configure a certificate chain trust is to create a Group Policy Object (GPO) linked to all domains in the Active Directory forest.

To create a Group Policy Object

1. Log into the root Active Directory of the forest as an Active Directory administrator.
2. Select **Start > Windows Administrative Tools > Group Policy Management** to open the **Group Policy Management** dialog.




3. Under the root domain, right click the **Group Policy Objects** folder and select **New** to display the **New GPO** dialog.



4. Provide a new **Name** for the GPO and click **OK**.

Importing the WSTEP certificate chain into the Group Policy Object

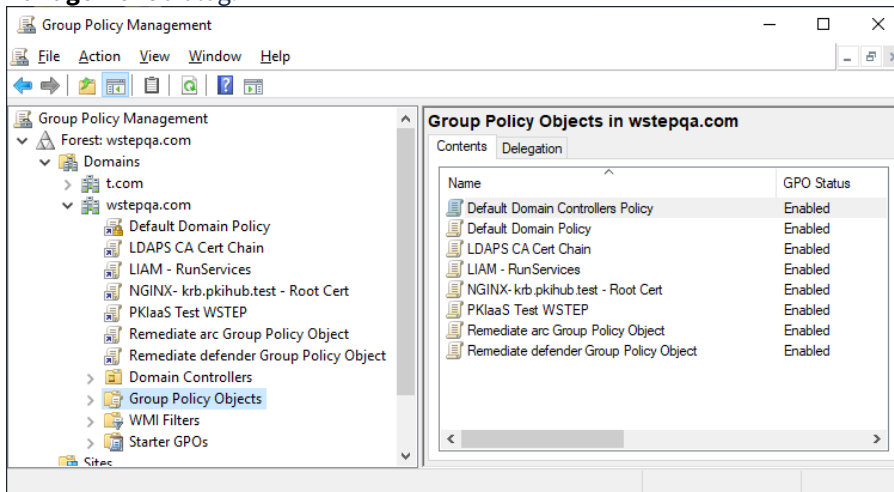
Import the WSTEP certificate chain into the GPO previously created in [Importing the WSTEP certificate chain into the Group Policy Object](#).

 See [Downloading the certificate chain](#) for how to download the required certificates.

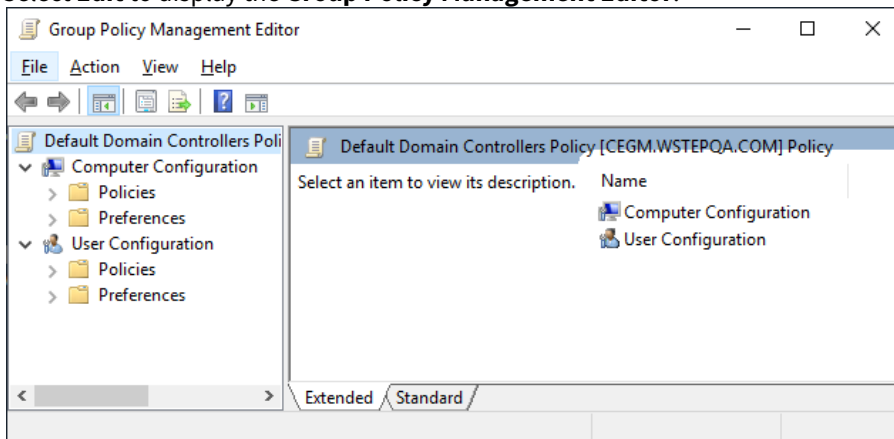
To import the certificate chain into the GPO

1. Log into the root Active Directory of the forest as an Active Directory administrator.

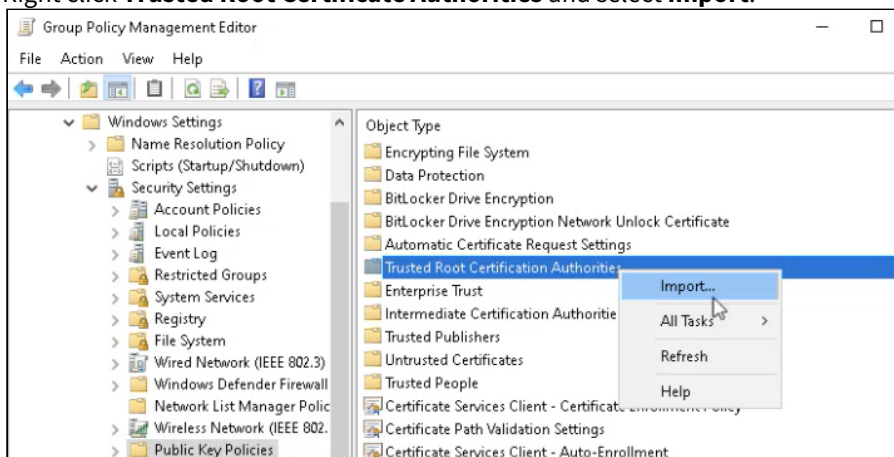
2. Select **Start > Windows Administrative Tools > Group Policy Management** to open the **Group Policy Management** dialog.



3. Right click the Group Policy Object.
4. Select **Edit** to display the **Group Policy Management Editor**.

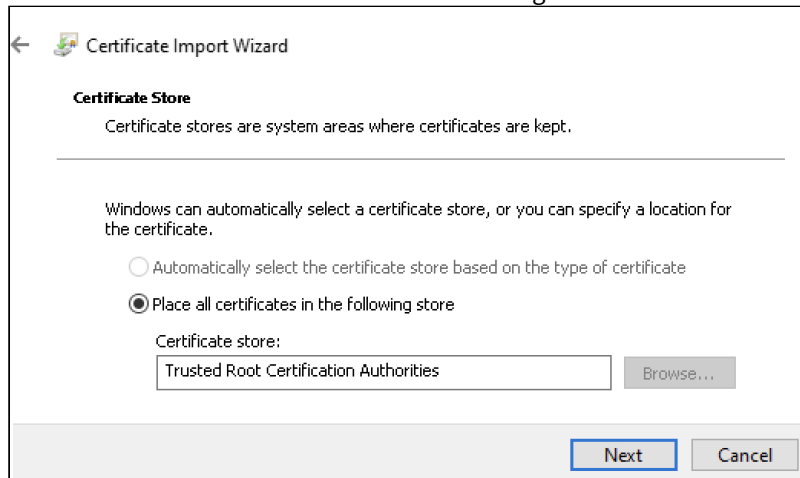


5. Navigate to **Computer Configuration > Policies > Windows Settings > Security Settings > Public Key Policies**.
6. Right click **Trusted Root Certificate Authorities** and select **Import**.



7. In the **Certificate Import Wizard**, click **Next** and select the root CA certificate file to import.

8. Click **Next** to reveal the **Certificate Store** settings.



9. Verify the selected certificate store is **Trusted Root Certification Authorities**.
10. Click **Next** to display the **Completing the Certificate Import Wizard**,
11. Click **Finish** to return to the to the **Group Policy Management** dialog.
12. In the **Group Policy Management** dialog, navigate to **Computer Configuration > Policies > Windows Settings > Security Settings > Public Key Policies**,
13. Right-click **Intermediate Certificate Authorities** and select **Import** to display the **Certificate Import Wizard**.
14. Click **Next** and select the issuing CA certificate file to import.
15. Click **Next** to reveal the Certificate Store settings.
16. Verify the selected certificate store is **Trusted Root Certification Authorities**
17. Click **Finish**.
18. Select **File > Exit** to close the **Group Policy Management Editor**.

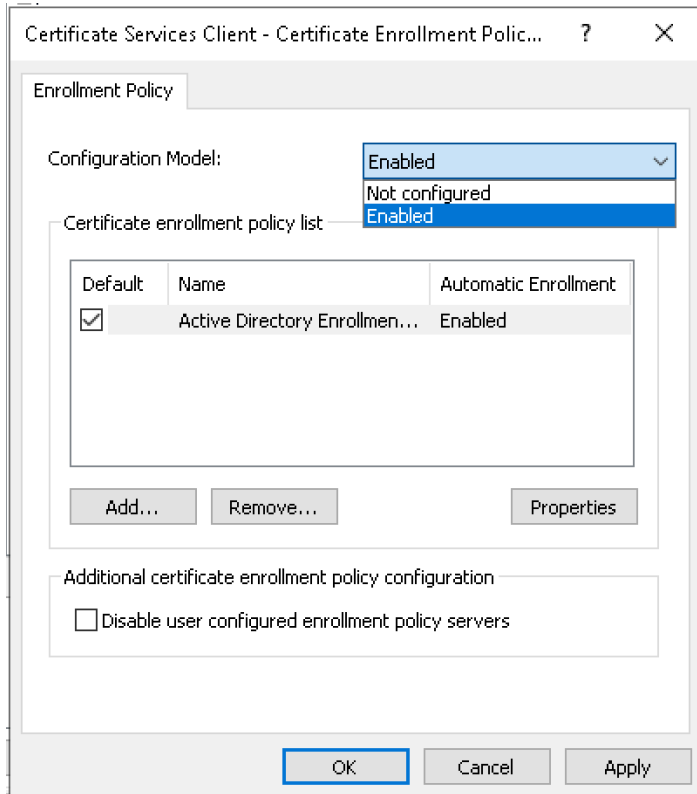
Enabling PKIaaS WSTEP for users

Configure the PKIaaS WSTEP to enable WSTEP for users.

To enable PKIaaS WSTEP for users

1. In the navigation tree of the new PKIaaS WSTEP Group Policy Object, expand **User Configuration > Policies > Windows Settings > Security Settings > Public Key Policies**.
2. In the content pane, right-click **Certificate Services Client - Certificate Enrollment Policy** and select **Properties** to display the **Certificate Services Client - Certificate Enrollment Policy Properties** dialog

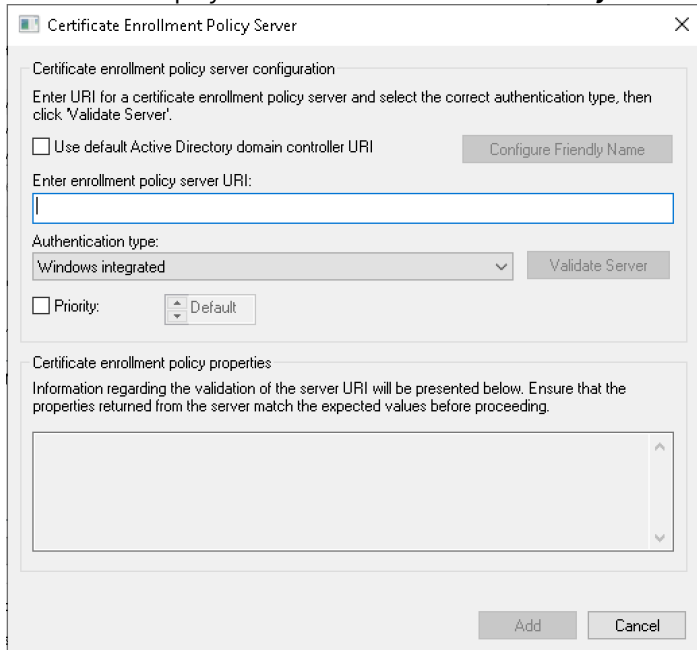
box.



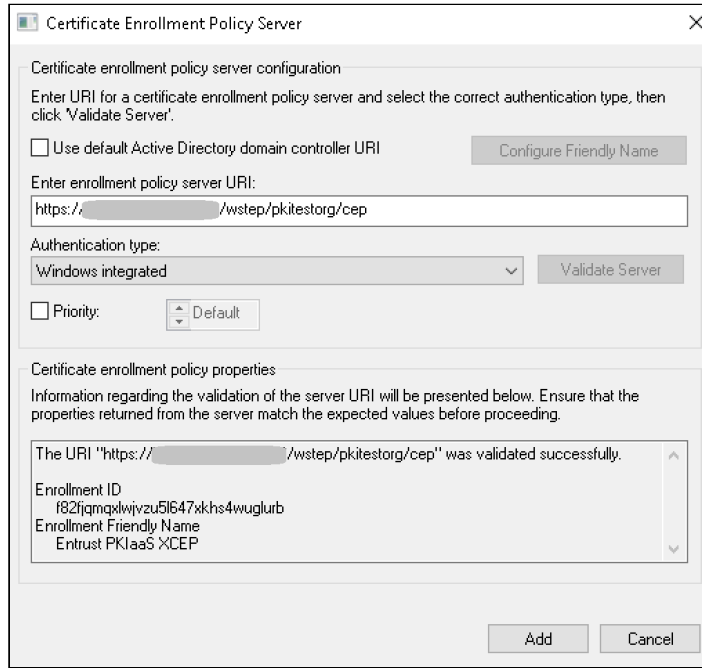
3. Select **Enabled** in the **Configuration Model** drop-down list.

⚠ If you are not installing WSTEP alongside an existing Microsoft CA WSTEP, select **Active Directory Enrollment** in the **Certificate enrollment policy list** pane, and click **Remove**.

4. Click **Add** to display the **Certificate Enrollment Policy Server** dialog box.



5. In the **Enter enrollment policy server URI** field, enter the PKIaaS WSTEP URI you obtained in either:
 - [Synchronizing the agent with the root Active Directory](#)
 - [Copying the enrollment URL](#).
6. In the **Authentication type** drop-down list, select the same "Windows Integrated" option (should be selected by default).
7. Click **Validate Server** and check the URI validation results.



The screenshot shows a dialog box titled "Certificate Enrollment Policy Server" with a close button (X) in the top right corner. The dialog is divided into two main sections: "Certificate enrollment policy server configuration" and "Certificate enrollment policy properties".

Certificate enrollment policy server configuration

Enter URI for a certificate enrollment policy server and select the correct authentication type, then click 'Validate Server'.

Use default Active Directory domain controller URI Configure Friendly Name

Enter enrollment policy server URI:

Authentication type:
Windows integrated Validate Server

Priority: Default

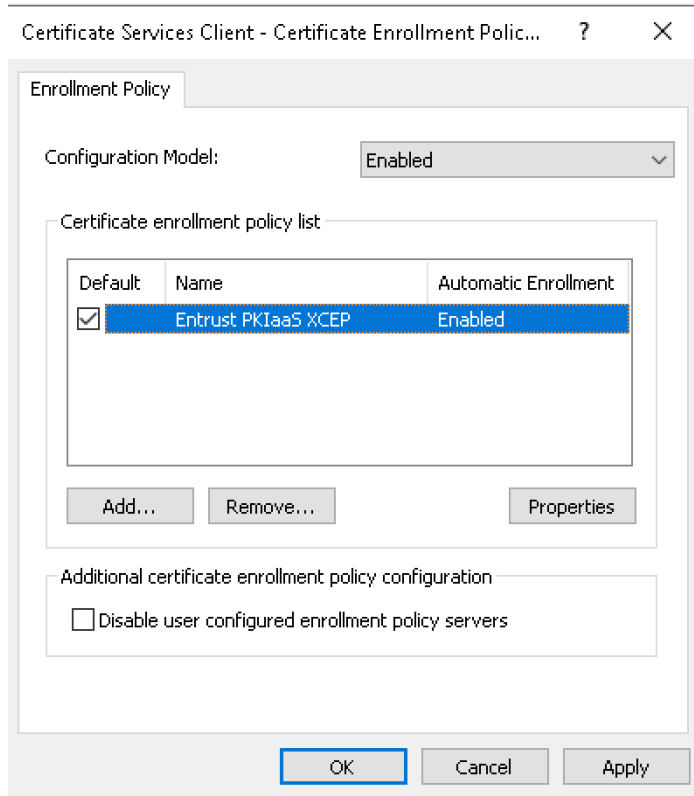
Certificate enrollment policy properties

Information regarding the validation of the server URI will be presented below. Ensure that the properties returned from the server match the expected values before proceeding.

The URI "https://[redacted]/wstep/pkitestorg/cep" was validated successfully.

Enrollment ID
f82fjqmqxlwvzv51647xkhs4wuglurb
Enrollment Friendly Name
Entrust PKIaaS XCEP

- Click **Add** to add the new PKIaaS WSTEP service to the **Certificate enrollment policy list** pane.



- In the **Certificate enrollment policy list** pane, check the box of the new **Entrust PKIaaS XCEP** certificate enrollment policy to make it the default one.
- Click **OK**.

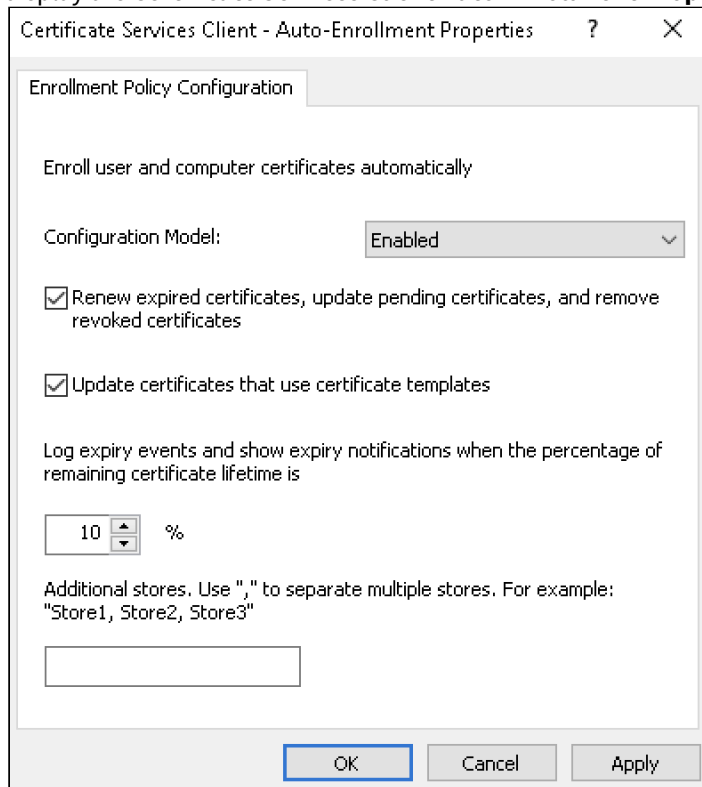
Enabling autoenrollment for users

Configure the PKIaaS WSTEP Group Policy Object to enable autoenrollment for users.

To enable autoenrollment for users

- In the navigation tree of the new PKIaaS WSTEP Group Policy Object, expand **User Configuration > Policies > Windows Settings > Security Settings > Public Key Policies**.

- In the content pane, right-click **Certificate Services Client Auto Enrollment** and select **Properties** to display the **Certificate Services Client Auto-Enrollment Properties** dialog box.



- Select **Enabled** in the **Configuration Model** drop-down list.
- Check the following boxes:
 - Renew expired certificates, update pending certificates, and remove revoked certificates**
 - Update certificates that use certificate templates.**
- Optionally, change the percentage under **Log expiry events and show expiry notifications when the percentage of remaining certificate lifetime is.**
- Click **OK**.

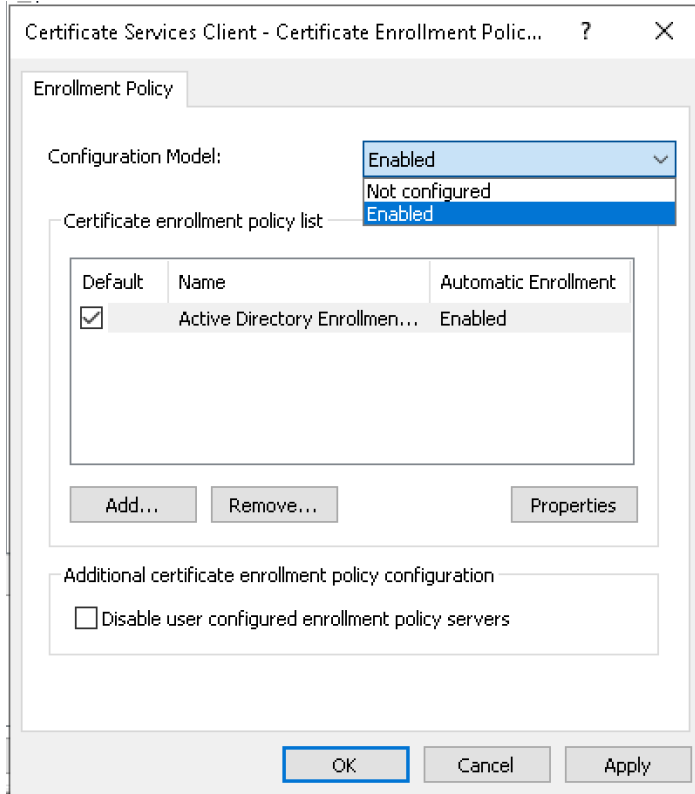
Enabling PKIaaS WSTEP for devices

Configure the PKIaaS WSTEP to enable WSTEP for devices.

To enable PKIaaS WSTEP for devices

- In the navigation tree of the new PKIaaS WSTEP Group Policy Object, expand **Computer Configuration > Policies > Windows Settings > Security Settings > Public Key Policies**.
- In the content pane, right-click **Certificate Services Client - Certificate Enrollment Policy** and select **Properties** to display the **Certificate Services Client - Certificate Enrollment Policy Properties** dialog

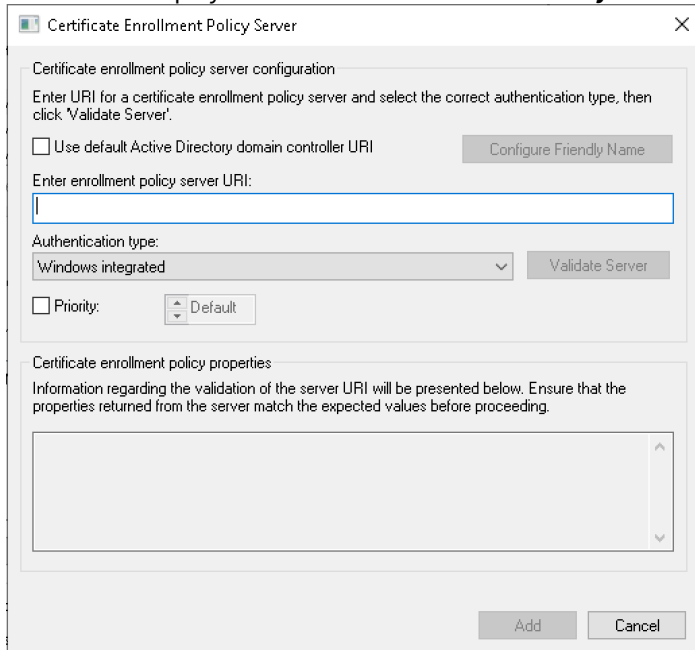
box.



3. Select **Enabled** in the **Configuration Model** drop-down list.

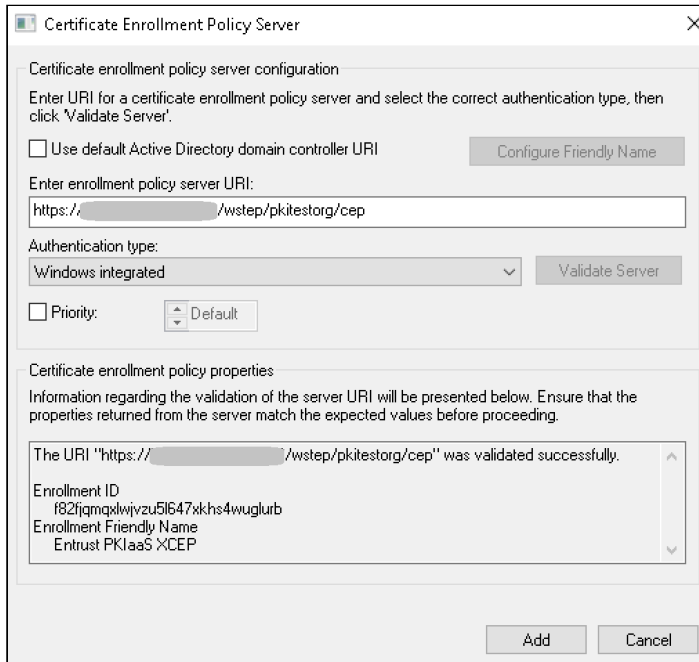
⚠ If you are not installing WSTEP alongside an existing Microsoft CA WSTEP, select **Active Directory Enrollment** in the **Certificate enrollment policy list** pane, and click **Remove**.

4. Click **Add** to display the **Certificate Enrollment Policy Server** dialog box.



- 5.

6. In the **Enter enrollment policy server URI** field, enter the PKIaaS WSTEP URI provided on the Entrust Certificate Services portal for device enrollment.
7. In the **Authentication type** drop-down list, select the same "Windows Integrated" option (should be selected by default).
8. Click **Validate Server** and check the URI validation results.



Certificate Enrollment Policy Server

Certificate enrollment policy server configuration

Enter URI for a certificate enrollment policy server and select the correct authentication type, then click 'Validate Server'.

Use default Active Directory domain controller URI Configure Friendly Name

Enter enrollment policy server URI:

Authentication type:
 Windows integrated Validate Server

Priority: Default

Certificate enrollment policy properties

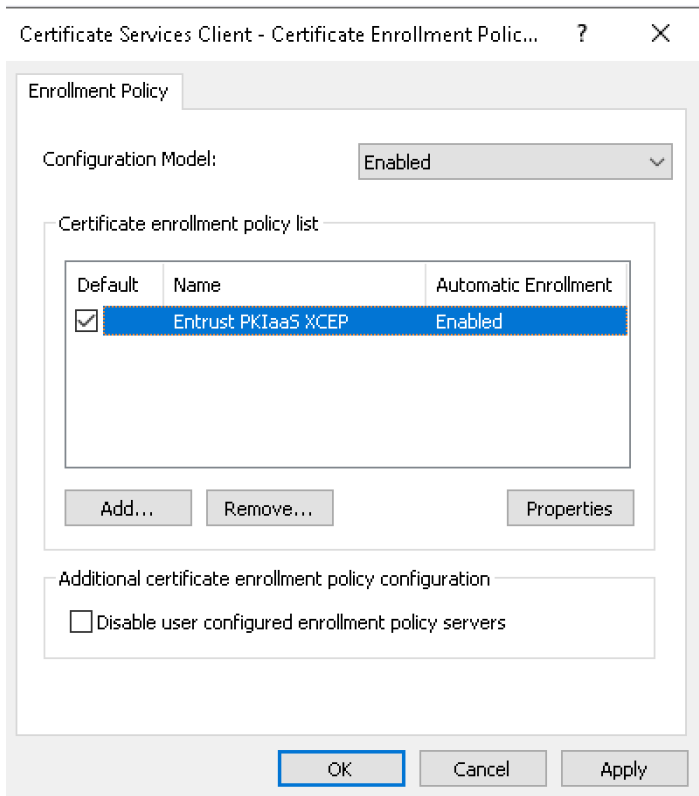
Information regarding the validation of the server URI will be presented below. Ensure that the properties returned from the server match the expected values before proceeding.

The URI "https://[redacted]/wstep/pkitestorg/cep" was validated successfully.

Enrollment ID
 f82jqmqxlwvzv51647xkhs4wuglurb
 Enrollment Friendly Name
 Entrust PKIaaS XCEP

Add Cancel

9. Click **Add** to add the new PKIaaS WSTEP service to the **Certificate enrollment policy list** pane.



Certificate Services Client - Certificate Enrollment Polic...

Enrollment Policy

Configuration Model: Enabled

Certificate enrollment policy list

Default	Name	Automatic Enrollment
<input checked="" type="checkbox"/>	Entrust PKIaaS XCEP	Enabled

Add... Remove... Properties

Additional certificate enrollment policy configuration

Disable user configured enrollment policy servers

OK Cancel Apply

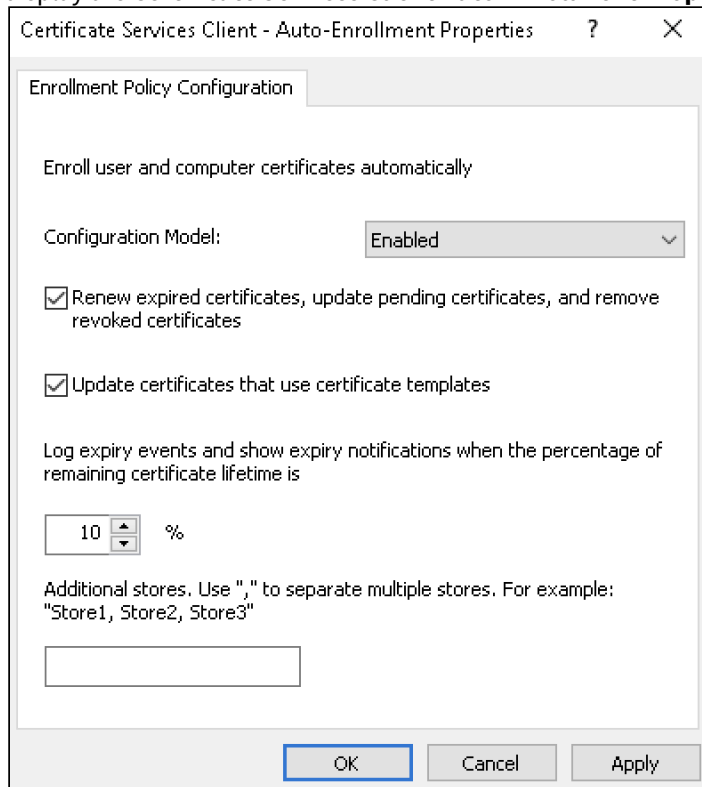
10. In the **Certificate enrollment policy list** pane, check the box of the new PKIaaS WSTEP service to make it the default Certificate Enrollment Policy.
11. Click **OK**.

Enabling autoenrollment for devices

Configure the PKIaaS WSTEP Group Policy Object to enable autoenrollment for devices

To enable autoenrollment for devices

1. In the navigation tree of the new PKIaaS WSTEP Group Policy Object, expand **Computer Configuration > Policies > Windows Settings > Security Settings > Public Key Policies**.
2. In the content pane, right-click **Certificate Services Client Auto Enrollment** and select **Properties** to display the **Certificate Services Client Auto-Enrollment Properties** dialog box.



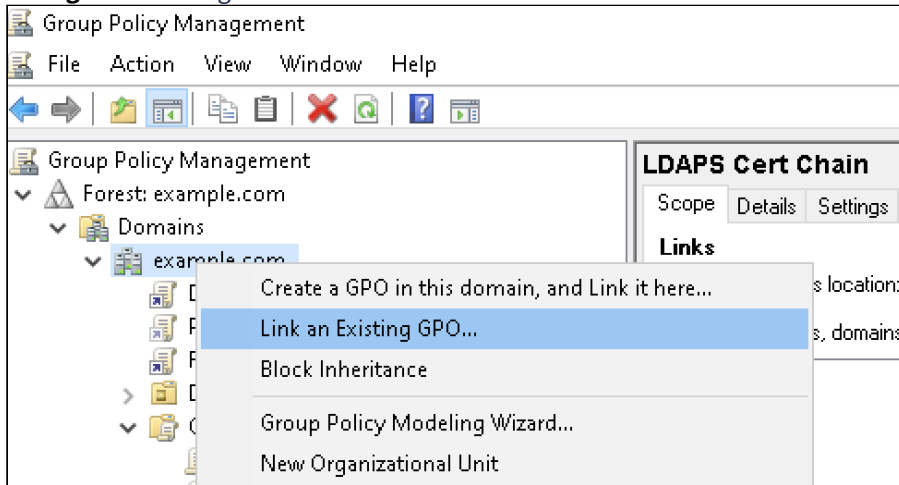
3. Select **Enabled** in the **Configuration Model** drop-down list.
4. Check the following boxes:
 - **Renew expired certificates, update pending certificates, and remove revoked certificates**
 - **Update certificates that use certificate templates.**
5. Optionally, change the percentage under **Log expiry events and show expiry notifications when the percentage of remaining certificate lifetime is**.
6. Click **OK**.

Linking the WSTEP Group Policy Object to all domains

In each domain of the Active Directory forest, repeat the following procedure to link the Group Policy Object created for the WSTEP certificate chain.

To link a Group Policy Object with a domain

1. Log into the root Active Directory of the forest as an Active Directory administrator.
2. Select **Start > Windows Administrative Tools > Group Policy Management** to open the **Group Policy Management** dialog.



3. Right-click the domain name and select **Link an existing GPO....** to display the **Select GPO** dialog.
4. Select the Group Policy Object.
5. Click **OK**.

Managing Microsoft certificate templates in Active Directory

See below for adding and managing the Microsoft certificate templates in Active Directory for WSTEP enrollment and autoenrollment.

- [Creating and configuring certificate templates](#)
- [Disabling a certificate template](#)

Creating and configuring certificate templates

In your Active Directory, create and configure Windows certificate templates for WSTEP enrollment.

To create and configure a Windows certificate template

1. If not already installed, install the **Certificate Templates** snap-in as explained in [Installing the default set of Microsoft Certificate Templates using the snap-in](#).
2. Select the existing certificate template that most closely meets your desired specs.
3. Right-click on the existing template and select **Duplicate template**.
4. Configure settings in the following tabs in the **Properties of the New Template** dialog.
 - [Compatibility](#)
 - [Cryptography](#)
 - [Extensions](#)
 - [General](#)
 - [Issuance requirements](#)
 - [Key Attestation](#)
 - [Request Handling](#)
 - [Security](#)
 - [Server](#)
 - [Superseded Templates](#)
5. Click **OK**.

Compatibility


Configure the following setting in the **Compatibility** tab of the **Properties of New Template** dialog.

Compatibility Settings

Select the minimum Windows versions compatible with the following components.

- Certification Authority
- Certificate recipient

The selected values impact the schema version of the certificate template. See [Cryptography](#) for the **Provider Category** supported by each template version.

 After creating the template, these settings can be modified but not the template version.

Cryptography

Configure the following settings in the **Cryptography** tab of the **Properties of the New Template** dialog.

- [Provider Category](#)
- [Algorithm name](#)
- [Minimum key size](#)

Provider Category

Select one of the following providers.

Provider	Supported certificate template versions
Legacy Cryptograph Service Provider	1, 2, 3, 4
Key Storage Provider	3, 4

 See [Compatibility](#) for selecting the template version.

Algorithm name

When the **Provider Category** value is **Key Storage Provider**, you can select one of the following algorithms.

- RSA
- ECDH_P256
- ECDH_P384
- ECDH_P521

Minimum key size


Do not modify this field unless the **Algorithm name** value is **RSA**. Supported key sizes are the following.

- 2048
- 3072
- 4096

Extensions

Configure the following setting in the **Extensions** tab of the **Properties of the New Template** dialog.

- [Application Policies](#)
- [Key Usage](#)

 See [Active Directory \(WSTEP\) certificate profiles](#) for a full reference on the WSTEP certificate capabilities.

Application Policies

Select this field and click **Edit** to choose the Extended Key Usages (EKUs) of the issued certificates. For example:

- Client Authentication
- Server Authentication

Key Usage

Select this field and click **Edit** to choose supported key usage combinations.

- Digital Signature
- Digital Signature and Key Encipherment
- Digital Signature and Nonrepudiation
- Key Encipherment
- Key Encipherment and Digital Signature with Nonrepudiation

Specifically, any combination containing the following key usages is not supported.

- CRL Sign
- Decipher Only
- Encipher Only
- Key Agreement
- Key Cert Sign


General

Configure the following settings in the **General** tab of the **Properties of New Template** dialog.

- [Template display name](#)
- [Template name](#)
- [Publish certificate in Active Directory](#)


Template display name

Enter a friendly name for the template

 This setting must be configured during certificate template creation and cannot be modified later. The only way to change this setting value is to duplicate the certificate template.

Template name

Enter the same name as the display name.

 This setting must be configured during certificate template creation and cannot be modified later. The only way to change this setting value is to duplicate the certificate template.

Publish certificate in Active Directory

Ensure this box is not checked, as PKIaaS WSTEP ignores this setting when enabled.

Issuance requirements

Configure the following setting in the **Issuance requirements** tab of the **Properties of New Template** dialog.

CA certificate manager approval

Ensure this box is not checked, as PKIaaS WSTEP ignores this setting when enabled.

Key Attestation

Configure the following setting in the **Key Attestation** tab of the **Properties of New Template** dialog.

Key Attestation

Select the **None** option, as WSTEP enrollment does not support this feature.

Request Handling


Configure the following settings in the **Request Handling** tab of the **Properties of New Template** dialog.

- [Purpose](#)
- [Archive subject's encryption private key](#)

Purpose

Select a purpose for the enrolled certificates.

- Encryption
- Signature
- Signature and encryption
- Signature and smartcard logon

 The selected purpose alters the certificate key usage and application policies. See [Extensions](#) for how to check the key usage is among the supported combinations.

Archive subject's encryption private key

Ensure this box is not checked, as PKIaaS WSTEP ignores this setting when enabled.

Security

Configure the following settings in the **Security** tab of the **Properties of New Template** dialog.

- [Groups or user names](#)
- [Permissions](#)

 Newly duplicated certificate templates inherit the security settings of the original templates.

Groups or user names

The names of the users and groups with permission to enroll and autoenroll certificates using the template.

To add a user or group name

1. Click **Add** to display the **Select Users, Computers, Service Accounts or Groups** dialog.
2. Enter the user or group name in the **Enter the object names to select** field.
3. Click **Check Names** to verify the name is valid.
4. Click **OK**.

Permissions

For each user or group in the **Groups or user names** list, ensure the following permissions are allowed.

- Enroll
- Autoenroll

Server

Configure the following settings in the **Server** tab of the **Properties of New Template** dialog.

- [Do not include revocation information in issued certificates](#)
- [Do not store certificates and requests in the CA Database](#)

Do not include revocation information in issued certificates

Ensure this box is not checked, as PKIaaS WSTEP ignores this setting when enabled.

Do not store certificates and requests in the CA Database

Ensure this box is not checked, as PKIaaS WSTEP ignores this setting when enabled.

Superseded Templates


If you want the new certificate template to replace an existing one:

1. Select the **Superseded Template** tab of the **Properties of the New Template** dialog.
2. Click the **Add** button.
3. Select the name of the existing certificate template.

Disabling a certificate template

There may be some situations where you may not want to use or sync a particular certificate template for WSTEP enrollments. See the supported methods for disabling certificate templates below.

- [Disabling a certificate template by removing the read permission](#)
- [Disabling a certificate template by unassigning the CA](#)

 While disabled, certificate templates remain defined in Active Directory but can no longer be used to enroll certificates.

Disabling a certificate template by removing the read permission

To disable a certificate template, you can:

1. Select the [Security](#) tab in the certificate template properties dialog.
2. Disable the **Read** permission for the PKIaaS WSTEP service account.

i The performed changes will take effect on the next automatic synchronization.

Disabling a certificate template by unassigning the CA

To disable a certificate template, you can unassign the associated CA as explained in [Manage Certificate Templates](#).

i Changes performed on the Entrust PKIaaS UI take effect instantly.

Managing on-premises PKIaaS Virtual Machines

As explained in [Running the PKIaaS Virtual Machine](#), the PKIaaS Virtual Machine prompts a registration OTP when launched. See below for additional information.

- [PKIaaS Virtual Machine keyboard shortcuts](#)
- [Browsing PKIaaS Virtual Machine logs](#)
- [Creating an additional PKIaaS Virtual Machine for disaster recovery](#)
- [Recovering a PKIaaS Virtual Machine from disaster](#)

i Press the tab key to switch between tabs.

PKIaaS Virtual Machine keyboard shortcuts

The ribbon at the bottom displays information on the keyboard shortcuts for managing the PKIaaS Virtual Machine.

```
TAB: switches apps · SPACE: logs · CTRL+C: exits app on focus ·
· CTRL+K: kills app · CTRL+U: forces app refresh ·
[ Fri, 01 Mar 2024 13:28:13 UTC · 14m18s · 10.1.188.122 ]
```


As detailed in the following table, not all these shortcuts are currently supported by the Entrust PKIaaS Virtual Machine.

Shortcut	Action	Supported
TAB	Switch tab.	✓
Space	Display detailed logs on the current tab.	✓
CTRL+C	Restart the application running on current tab. Restarting the whole PKIaaS Virtual Machine can only be done from the VMware Host Client.	✓
CTRL+K	Kill the application running on the current tab.	✗
CTRL+U	Refresh the application running on the current tab.	✗

Browsing PKIaaS Virtual Machine logs

Browse the following logs on the PKIaaS Virtual Machine prompt.

- [Browsing PKIaaS Virtual Machine startup logs](#)
- [Browsing WSTEP enrollment logs](#)

 The Entrust PKIaaS Virtual Machine does not currently support SIEM integration.

Browsing PKIaaS Virtual Machine startup logs

The **PKIaaS Virtual Machine** tab of the PKIaaS Virtual Machine prompt displays information on each startup step.

```

WSTEP      PKIaaS Virtual Machine
[✓] PKIaaS Virtual Machine running
    Version: v202402160726
[✓] Connected to PKIaaS
    Region: PROD-US
[✓] PKIaaS Virtual Machine registered to your account
    Account ID:      ecsmcn158emsuw
    Machine ID:      ecsmcn158emsuw__iqfrj0tu.jzw
[✓] VM Config ID:   1e627351cb5077d50aa57d5c35b175483ceb9e04
    Friendly name:   ABC PKIaaS VM
[✓] Installed agents: wstep
  
```

Press the space bar to display more detailed logs.

```

WSTEP      PKIaaS Virtual Machine
PKIaaS Virtual Machine logs (4, offset:0 horizontal-offset:0):
Mar 01 13:14:07 Init StartConnectionCheck.OK Checking TCP connection to satellit.pki.entrust.com:443
Mar 01 13:14:13 Init ConnectionCheck.OK Connected to satellit.pki.entrust.com
Mar 01 13:14:13 Synchronization StartSync.OK Starting synchronization
Mar 01 13:14:17 Synchronization Sync.OK Synchronization done
  
```

See the following table for a description of each step.

Step	Step Information	Step completion
PKIaaS Virtual Machine Running	The version of the PKIaaS Virtual Machine	When the machine is running
Connected to PKIaaS	The region hosting the Entrust PKIaaS services.	When the machine is running
PKIaaS Gateway registered to your account	A registration confirmation message and details on the registered machine	After Registering the PKIaaS Virtual Machine
Node ID	The internal Entrust PKIaaS identifier of the PKIaaS Virtual Machine	After Registering the PKIaaS Virtual Machine

Step	Step Information	Step completion
Installed agents	The "WSTEP" name of the installed agent.	After Adding an agent to the PKIaaS Virtual Machine

For each step, the prompt displays the following status symbols.

Symbol	Step status
[]	Not yet started
[N]	In progress
[v]	Completed
[x]	Failed

Browsing WSTEP enrollment logs

When completing the startup process, press the tab key to switch to the **WSTEP** tab and browse logs on the WSTEP agent.

```

WSTEP          PKIaaS Virtual Machine
[✓] WSTEP Agent running
    Version: v202402160726
[✓] Reporter running
    Last Sync: Thu, 29 Feb 2024 12:53:01 UTC
[✓] Poller running
    Last Sync: Thu, 29 Feb 2024 12:53:15 UTC
[✓] LDAP Connectivity
    Connected to LDAP abc.corp
[✓] LDAP Authentication
    Authenticated to LDAP abc.corp
  
```

Press the space bar to display more detailed logs.

```

WSTEP          PKIaaS Virtual Machine
WSTEP logs (1485, offset:8 horizontal-offset:0):
Mar 01 13:23:01 Reporter SyncRootAD.OK Synced ABC.CORP in abc.corp
Mar 01 13:23:02 Reporter SyncRealm.OK Synced ABC.CORP in ABC.CORP
Mar 01 13:23:02 Reporter SyncRealm.OK Synced XYZ.ABC.CORP in ABC.CORP
Mar 01 13:23:02 Reporter SyncRealm.OK Synced FINANCE.ABC.CORP in ABC.CORP
Mar 01 13:23:02 Reporter SyncRealm.OK Synced tree.corp in ABC.CORP
Mar 01 13:23:02 Reporter GetWindowsCertTemplates.OK Found 36 windows cert templates in ABC.CORP
Mar 01 13:23:02 Reporter SyncWindowsTemplate.OK Synced Administrator in ABC.CORP
Mar 01 13:23:02 Reporter SyncWindowsTemplate.OK Synced AndrewAutoEnroll in ABC.CORP
Mar 01 13:23:02 Reporter SyncWindowsTemplate.OK Synced CA in ABC.CORP
  
```

The displayed WSTEP enrollment logs:

- Do not contain any sensitive information.
- Are stored alongside the PKIaaS WSTEP service in the cloud for troubleshooting purposes.
- Cannot be manually exported.

Creating an additional PKIaaS Virtual Machine for disaster recovery

After completing the installation, registration and configuration of the PKIaaS Virtual machine, it is recommended to deploy an additional PKIaaS Virtual Machine for disaster recovery.

To create an additional PKIaaS Virtual Machine for disaster recovery

1. Repeat the steps described in [Running the PKIaaS Virtual Machine](#) to create a new PKIaaS Virtual Machine. Use the same OVA file obtained when [Downloading the PKIaaS Virtual Machine](#).
2. Register the new PKIaaS Virtual Machine as explained in [Registering the PKIaaS Virtual Machine](#).
3. Keep the machine running.

Recovering a PKIaaS Virtual Machine from disaster

To recover a PKIaaS Virtual Machine from disaster, you can:

1. Log into the Entrust PKIaaS portal.
2. In the PKIaaS Virtual Machine grid, click the ... three dots line for the initial PKIaaS Virtual Machine and select the **Edit** action as explained in [Selecting PKIaaS Virtual Machine actions](#).
3. Set the **Machine** setting to the registration name of the virtual machine described in [Creating an additional PKIaaS Virtual Machine for disaster recovery](#).

While a PKIaaS Virtual Machine goes offline, the PKIaaS WSTEP service:

1. Continues to accept enrollment requests.
2. Places the requests into a queue of pending requests.
3. Processes all the pending requests when the new PKIaaS Virtual Machine comes online.

Troubleshooting WSTEP enrollment issues

See below for how to solve the main issues related to WSTEP enrollment configuration and execution.

- [Troubleshooting PKIaaS Virtual Machine onboarding issues](#)
- [Troubleshooting WSTEP agent configuration issues](#)
- [Troubleshooting Group Policy Object configuration issues](#)
- [Troubleshooting enrollment and certificate template issues](#)

Troubleshooting PKIaaS Virtual Machine onboarding issues

If you are having problems connecting the on-premises PKIaaS Virtual Machine to the Entrust PKIaaS cloud:


1. Check the error log as explained in [Browsing PKIaaS Virtual Machine startup logs](#).
2. Take a screenshot of the error log.
3. Attach the screenshot to a support ticket.

Troubleshooting WSTEP agent configuration issues

The steps described in [Configuring WSTEP automation on the PKIaaS portal](#) require adding and configuring a WSTEP agent. See below for how to solve possible issues you might encounter.

- [DNS Server unreachable](#)

- [Invalid LDAP credentials](#)
- [LDAP timeout](#)
- [TLS handshake failed](#)
- [Unknown LDAP host](#)

 See [Browsing WSTEP enrollment logs](#) for browsing logs in the **WSTEP** tab of the the on-premises PKIaaS Virtual Machine.

DNS Server unreachable

While [Configuring an Active Directory in the agent](#), you may encounter the following error on the **WSTEP** tab of the on-premises PKIaaS Virtual Machine.

ErrorDialURL

```
LDAP Result Code 200 "Network Error": dial tcp: lookup <DOMAIN-NAME>: i/o timeout
```

See below for a list of possible causes and the corresponding solutions.

- [Firewall rules blocking the access](#)
- [Invalid DNS settings in the Agent configuration](#)

Firewall rules blocking the access

Firewall rules may block connections from the IP address of the PKIaaS Virtual Machine to the DNS server on port 53.

 See [Network requirements for the PKIaaS Virtual Machine](#) for all the port access requirements.

Issue resolution: Edit the firewall rules to allow access.

Invalid DNS settings in the Agent configuration

The DNS server settings were not properly defined when [Configuring an Active Directory in the agent](#).

Issue resolution: Edit the agent configuration to update the DNS settings.

Invalid LDAP credentials

While [Configuring an Active Directory in the agent](#), you may encounter the following error on the **WSTEP** tab of the on-premises PKIaaS Virtual Machine.

ErrorLDAPAuthentication

```
LDAP Result Code 49 "Invalid Credentials": 80090308: LdapErr: DSID-0C090439, comment: AcceptSecurityContext error, data 52e, v4563
```

The cause of this error is an invalid LDAP username or password.

Issue resolution:

1. Edit the Active Directory as explained in [Edit Active Directory](#).
2. Enter a valid username and user password.

LDAP timeout

While [Configuring an Active Directory in the agent](#), you may encounter the following error on the **WSTEP** tab of the on-premises PKIaaS Virtual Machine.

ErrorDialURL

```
ldap://<DOMAIN-CONTROLLER>  
LDAP Result Code 200 "Network Error": dial tcp dc1.example.com:389: i/o timeout
```

See below for a list of possible causes and the corresponding solutions.

- [Domain Controller powered off](#)
- [Orphaned Domain Controller](#)
- [Incorrect IP address](#)

Domain Controller powered off

The `<DOMAIN-CONTROLLER>` might be powered off.

Issue resolution: Power on the Domain Controller.

Orphaned Domain Controller

The `<DOMAIN-CONTROLLER>` Domain Controller mentioned in the error might be orphaned. This might occur if the Domain Controller was accidentally or incorrectly removed from an Active Directory forest.

Issue resolution: Remove the orphaned Domain Controller as explained in <https://learn.microsoft.com/en-us/troubleshoot/windows-server/identity/remove-orphaned-domains>

Incorrect IP address

The DNS Entry for the `<DOMAIN-CONTROLLER>` Domain Controller might point to an incorrect IP address. This can occur if:

- A Domain Controller was erroneously deployed using a DHCP-assigned IP address instead of a static IP address.
- Mistakes were made while deliberately changing the IP address of a Domain Controller.

Issue resolution:

1. Check the `<DOMAIN-CONTROLLER>` DNS entry in the Microsoft DNS manager.
2. Verify that the IP Address listed is correct.
3. If the IP address in the Microsoft DNS Manager is correct and differs from the IP address in the logs, another DNS record must be fixed.

TLS handshake failed

While [Configuring an Active Directory in the agent](#), you may encounter the following error on the **WSTEP** tab of the on-premises PKIaaS Virtual Machine.

ErrorDialURL

```
url: ldap://<DOMAIN-CONTROLLER-FQDN>LDAP Result Code 200 "Network Error": TLS handshake failed (tls: either ServerName or InsecureSkipVerify must be specified in the tls.Config)
```

See below for a list of possible causes and the corresponding solutions.

- [Missing LDAPS TLS certificate](#)
- [Invalid LDAPS TLS certificate](#)
- [LDAPS TLS certificate not trusted](#)
- [Incorrect DNS entries](#)

Missing LDAPS TLS certificate

The Domain Controller is missing a TLS certificate for LDAPS.

Issue resolution:

1. Run the command described in [Validating the LDAPS configuration](#)
2. If the output of the command does not contain an LDAPS TLS certificate, follow the steps described in [Setting up LDAPS on domain controllers](#).

Invalid LDAPS TLS certificate

The Domain Controller does not have a valid TLS certificate for LDAPS connections.

Issue resolution: Check the following.

- The certificate meets the requirements described in [Generating LDAPS TLS certificates on the ECS portal](#).
- The certificate chain has been imported as explained in [Creating a Group Policy Object for the LDAPS TLS certificate chain](#).

LDAPS TLS certificate not trusted

The root CA certificate of the LDAPS TLS certificate chain is not trusted.

Issue resolution: Verify the root CA certificate in the root Active Directory domain matches the root CA certificate imported when [Configuring an Active Directory in the agent](#).

Incorrect DNS entries

The DNS server on your network might have an incorrect IP address for the Active Directory domain controller.

Issue resolution: Verify the IP address of the Active Directory domain controller is properly configured in the DNS server.

Unknown LDAP host

While [Configuring an Active Directory in the agent](#), you may encounter the following error on the **WSTEP** tab of the on-premises PKIaaS Virtual Machine.

ErrorDialURL

```
ldap://<DOMAIN-CONTROLLER>  
LDAP Result Code 200 "Network Error": dial tcp lookup <DOMAIN-CONTROLLER> on <DNS-  
RESOLVER-IP-ADDRESS>:53 no such host
```

See below for a list of possible causes and the corresponding solutions.

- [Orphaned Domain Controller](#)
- [Missing DNS record](#)

Orphaned Domain Controller

The `<DOMAIN-CONTROLLER>` Domain Controller mentioned in the error might be orphaned. This might occur if the Domain Controller was accidentally or incorrectly removed from an Active Directory forest.

Issue resolution: Remove the orphaned Domain Controller as explained in <https://learn.microsoft.com/en-us/troubleshoot/windows-server/identity/remove-orphaned-domains>

Missing DNS record

The DNS server running on `<DNS-RESOLVER-IP-ADDRESS>:53` does not have a DNS Record for `<DOMAIN-CONTROLLER>`. This error might occur after following the Microsoft documentation to solve the orphaned Domain Controller issue mentioned above.

Issue resolution: Adding the missing DNS record.

Troubleshooting Group Policy Object configuration issues

Issues may arise while [Creating a Group Policy Object for the WSTEP certificate chain](#). See below for how to solve them.

- [Access denied by remote endpoint](#)
- [Remote endpoint not reachable.](#)

Access denied by remote endpoint

When [Enabling WSTEP for users and devices](#), the Windows machine can display the following error.

```
Error: Access was denied by the remote endpoint.  
080300005 (-2143485947 WS_E_ENDPOINT_ACCESS-DENIED)
```

See below for a list of possible causes and the corresponding solutions.

- [Invalid enrollment URL](#)
- [Invalid agent configuration](#)
- [Invalid root Active Directory username](#)

Invalid enrollment URL

The CEP URL provided to the Group Policy Manager may contain a typo.

Issue resolution: Check the entered URL matches the URL displayed on the welcome page of the Entrust PKIaaS UI.

Invalid agent configuration

The WSTEP agent configuration is not valid.

Issue resolution: Check the following.

- The WSTEP agent runs with a valid configuration before the PKIaaS CEP URL can be defined in a Group Policy Object.
- The WSTEP agent on the PKIaaS Virtual Machine completes an initial synchronization of the Kerberos data (SPN, KVNO) from the root Active Directory before the Microsoft Group Policy Manager can validate the PKIaaS CEP URL.

See [Troubleshooting WSTEP agent configuration issues](#) for solving agent-related issues.

Invalid root Active Directory username

The username defined on the Entrust PKIaaS UI for the root Active Directory RootAD does not have a properly configured SPN (Service Principal Name) or UPN (User Principal Name).

Issue resolution: Run the following command to fix the root Active Directory username.

```
ktpass -mapuser <USER> -princ HTTP/<PKIAAS-WSTEP-URL>@<UPPERCASE-DOMAIN-NAME> -pass <PASS> -ptype KRB5_NT_PRINCIPAL /Target <UPPERCASE-DOMAIN-NAME> /crypto ALL
```

Remote endpoint not reachable.

When [Enabling WSTEP for users and devices](#), the Windows machine can display the following error.

```
Error: The remote endpoint was not reachable.  
0x005de01a (-2143485936 WS_E_ENDPOINT_UNREACHABLE)
```

See below for a list of possible causes and the corresponding solutions.

- [Invalid enrollment URL](#)
- [Network issues](#)

Invalid enrollment URL

The CEP URL provided to the Group Policy Manager may contain a typo.

Issue resolution: Check the entered URL matches the URL displayed on the welcome page of the Entrust PKIaaS UI.

Network issues

Network issues prevent the Microsoft server from accessing the PKIaaS WSTEP URLs.

Issue resolution: Verify the following.

- The entrust PKIaaS WSTEP URL is reachable.
- The firewall rules do not block traffic to the PKIaaS WSTEP URL.

Troubleshooting enrollment and certificate template issues

See below for solving issues related to enrollment, autoenrollment and certificate template management.

- [Certificate template not enrolling or autoenrolling](#)

- [Missing certificate template](#)
- [Unexpected behavior of certificate enrollment](#)

Certificate template not enrolling or autoenrolling

Once configured, a Windows certificate template may not enroll or autoenroll devices. See below for the possible causes and the corresponding solution.

- [Missing Group Policy Object](#)
- [Missing permissions](#)

Missing Group Policy Object

The Group Policy Object to enable Autoenrollment may not have been created, or may not have been linked to the various domains in the Windows Active Directory forest.

Issue resolution: Configure a Group Policy Object as explained below.

- [Enabling autoenrollment for users](#)
- [Enabling autoenrollment for devices](#)
- [Linking the WSTEP Group Policy Object to all domains](#)

Missing permissions

The user or group facing may not have permission to enroll or autoenroll.

Issue resolution: Select the [Security](#) to select the users and groups with permission to enroll and autoenroll.

Missing certificate template

When browsing certificate templates as explained in [Manage Certificate Templates](#), a certificate template may be missing because it does contain an unsupported key usage.

Issue resolution: Verify the key usages as explained in [Extensions](#).

Unexpected behavior of certificate enrollment

Certificate enrollment may not behave as expected when the Windows certificate template includes unsupported settings.

Issue resolution: Verify the certificate template matches the configuration described in [Creating and configuring certificate templates](#). Specifically, the configuration must not include any of the following unsupported settings.

Tab	Unsupported setting
Extensions	Any key usage combination containing the following key usages: CRL Sign Decipher Only, Encipher Only, Key Agreement, Key Cert Sign
General	Publish certificate in Active Directory
Issuance requirements	CA certificate manager approval

Tab	Unsupported setting
Key Attestation	Required
Request Handling	Archive subject's encryption private key
Server	Do not include revocation information in issued certificates
	Do not store certificates and requests in the CA Database

11 Automating enrollment with an on-premises Enrollment Gateway

When hosted on-premises by the customer, Certificate Enrollment Gateway (CEG) supports the following automation integrations.

- Intune
- MDM Web Service (MDMWS)
- Private TLS/SSL(ACMEv2)
- Active Directory / WSTEP
- SCEP

See below for how to set up an on-premises Entrust Certificate Enrollment Gateway with PKIaaS.

- [Adding an on-premises Enrollment Gateway to an issuing CA](#)
- [Activating an on-premises Certificate Enrollment Gateway](#)
- [Installing an on-premises Certificate Enrollment Gateway](#)
- [Deleting an on-premises Certificate Enrollment Gateway](#)

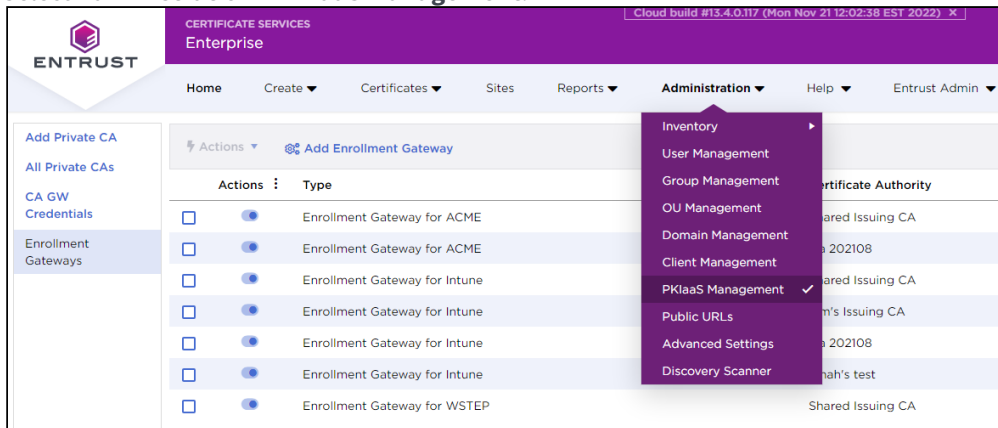
Adding an on-premises Enrollment Gateway to an issuing CA

Add a Certificate Enrollment Gateway instance to an issuing PKIaaS CA.

⚠ As discussed in [Creating an issuing CA under an online root CA](#), please add the required service to the issuing CA. For example, add the SCEP service to your issuing CA before adding the Enrollment Gateway for SCEP.

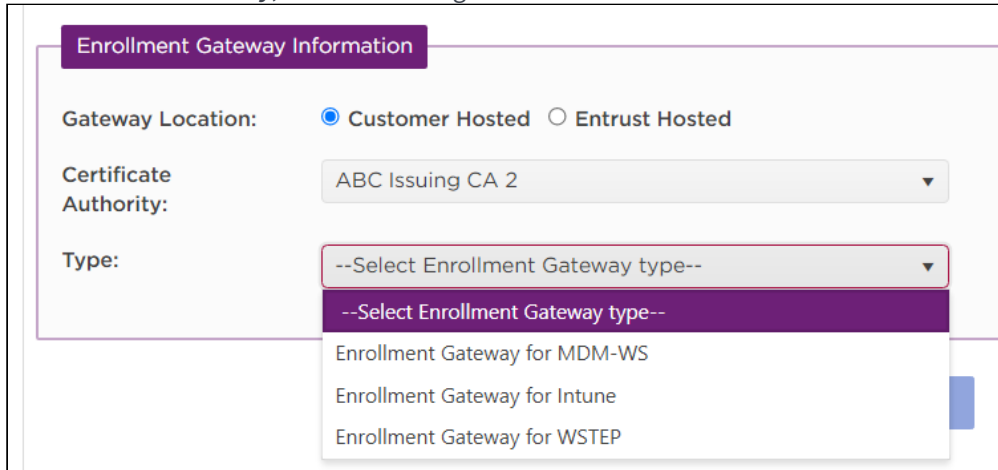
To add a Certificate Enrollment Gateway service to an issuing CA

1. Select **Administration > PKIaaS Management**.



2. In the side pane, click **Enrollment Gateways**.
3. Click **Add Enrollment Gateway**.
4. In **Gateway Location**, select **Customer Hosted**

5. In **Certificate Authority**, select an issuing CA.



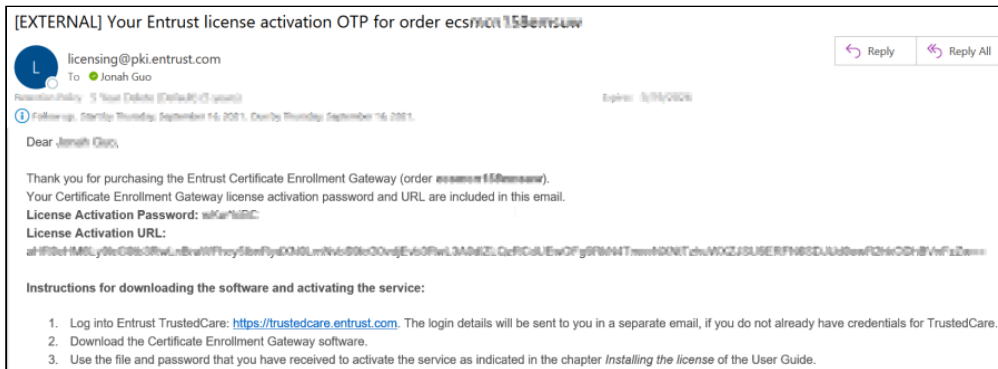
6. In **Type**, select one of the Certificate Enrollment Gateway services enabled in the issuing CA.

⚠ The process will fail if the **Certificate Authority** already has a Certificate Enrollment Gateway instance with the same **Type**.

7. Click **Submit** and accept the confirmation request.

Activating an on-premises Certificate Enrollment Gateway

The first time you add a Certificate Enrollment Gateway, you will receive an email containing license activation information.



i Subsequent Certificate Enrollment Gateway addition will not trigger a new email, including those added to a different issuing CA under the same account.

Activate your Certificate Enrollment Gateway software during the 14-day validity of the password.

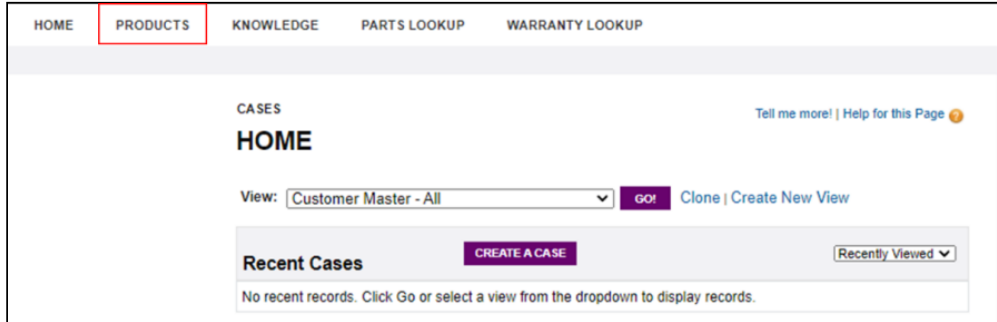
- If the person managing the Enrollment Gateway is a different administrator, please forward the email as required.
- If you no longer have the original activation email or try to activate the software after 14 days, please contact Entrust Support to resend the activation email.
- If you have activated the software and need to reinstall Certificate Enrollment Gateway software, please contact Entrust Support to reset the license. You will receive the reset license via a new email.

Installing an on-premises Certificate Enrollment Gateway

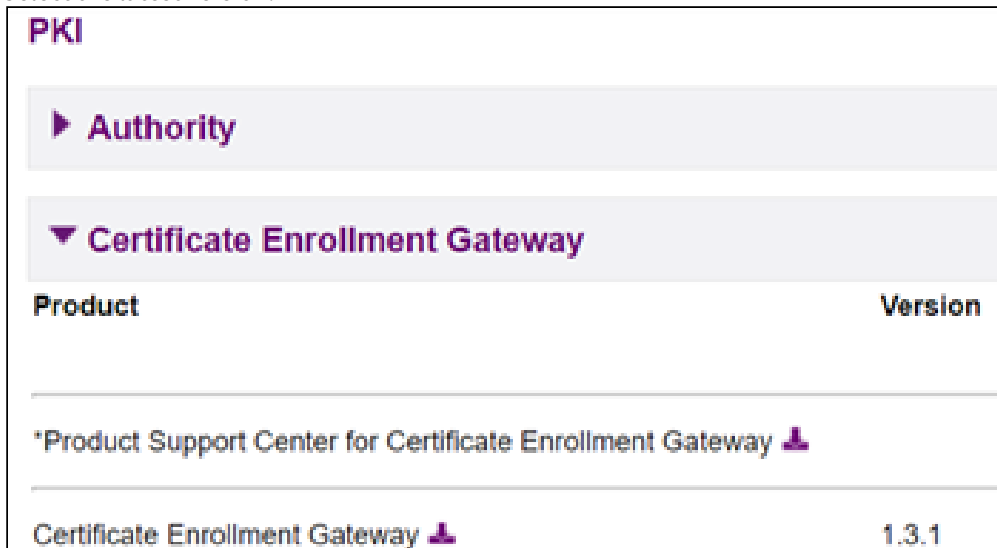
Download and install Certificate Enrollment Gateway as explained below.

To download and install Certificate Enrollment Gateway

1. Log in <https://trustedcare.entrust.com>
2. Click **PRODUCTS**.



3. Navigate to the PKI section.
4. Click **Certificate Enrollment Gateway**.
5. Select the latest version.



6. By default, you will have the **Software Downloads** tab open with a **Related Software** section listed below.

CERTIFICATE ENROLLMENT GATEWAY

Version 1.3.1

SOFTWARE
DOWNLOADS

PATCHES

DOCUMENTS

COLLATERAL

SERVICE
MANUALS

Content Title	Platform	File Type	Size	Posted Date	Digest	
WSTEP PowerShell scripts	Windows	ZIP	20.92 KB	12-15-2021	MD5 SHA-1 SHA-256	Download
log4j Mitigation Script	Windows	SH	1.70 KB	12-15-2021	MD5 SHA-1 SHA-256	Download
CEG Software		GZ	192.11 MB	12-15-2021	MD5 SHA-1 SHA-256	Download

RELATED SOFTWARE

Product	Version
*Product Support Center for Entrust Deployment Manager	1.0
Entrust Deployment Manager	1.3.1

7. Open the **Entrust Deployment Manager** page in a new browser window/tab and download the **Entrust Deployment Manager Software**.

ENTRUST DEPLOYMENT MANAGER

Version 1.3.1

SOFTWARE
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DOCUMENTS

COLLATERAL

SERVICE
MANUALS

Content Title	Platform	File Type	Size	Posted Date	Digest	
Diagnostic Report	Multi	GZ	4.34 KB	12-16-2021	MD5 SHA-1 SHA-256	Download
Entrust Deployment Manager Software	Multi	GZ	1.29 GB	11-15-2021	MD5 SHA-1 SHA-256	Download

- Click the **Documents** tab and download the **Entrust Deployment Manager x.x.x - Installation and Administration Guide**.

ENTRUST DEPLOYMENT MANAGER

Version 1.3.1

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DOCUMENTS

COLLATERAL

SERVICE
MANUALS

Content Title	Platform	File Type	Size	Posted Date		
EDM Troubleshooting Guide Internal use only.		PDF	371.31 KB	12-21-2021	More Info	Download
Entrust Deployment Manager 1.3.1 - Installation and Administration Guide		PDF	998.71 KB	12-16-2021	More Info	Download
Entrust Deployment Manager 1.3.1 - Release Notes		PDF	214.55 KB	12-09-2021	More Info	Download
Entrust Deployment Manager 1.3 Attribution Report		HTML	8.53 MB	11-15-2021	More Info	Download

- Follow the guide to provision a clustered platform and move to the next step when you are ready to install Certificate Enrollment Gateway (referred to as an "Entrust solution" in the guide)
- Move back to the Certificate Enrollment Gateway page.
- Download the CEG Software.

CERTIFICATE ENROLLMENT GATEWAY

Version 1.3.1

SOFTWARE
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DOCUMENTS

COLLATERAL

SERVICE
MANUALS

Content Title	Platform	File Type	Size	Posted Date	Digest	
WSTEP PowerShell scripts	Windows	ZIP	20.92 KB	12-15-2021	MD5 SHA-1 SHA-256	Download
log4j Mitigation Script	Windows	SH	1.70 KB	12-15-2021	MD5 SHA-1 SHA-256	Download
CEG Software		GZ	192.11 MB	12-15-2021	MD5 SHA-1 SHA-256	Download

RELATED SOFTWARE

Product	Version
*Product Support Center for Entrust Deployment Manager	1.0
Entrust Deployment Manager	1.3.1

- Click the **Documents** tab and download the **Entrust Certificate Enrollment Gateway x.x.x Documentation Suite**.


Content Title	Platform	File Type	Size	Posted Date	More Info	Download
Entrust Certificate Enrollment Gateway 1.3.1 Documentation Suite - Issue 2.0		ZIP	3.52 MB	01-07-2022	More Info	Download
The Documentation Suite contains the documentation for Entrust Certificate Enrollment Gateway.						
Entrust Certificate Enrollment Gateway 1.3.1 Release Notes		HTML	18.00 KB	12-15-2021	More Info	Download
The Release Notes provide information about new features, fixes, and known issues for Certificate Enrollment Gateway.						
Entrust Certificate Enrollment Gateway 1.3.1 Attribution Report		HTML	1.89 MB	12-15-2021	More Info	Download

- Unzip the file and follow the Deployment Guide to deploy the Certificate Enrollment Gateway software. Follow the corresponding integration guide to set up the purchased enrollment use cases.

 Certificate Enrollment Gateway 1.3.1 - ACMEv2 Integration Guide.pdf
 Certificate Enrollment Gateway 1.3.1 - Deployment Guide - Issue 2.pdf
 Certificate Enrollment Gateway 1.3.1 - Intune integration Guide.pdf
 Certificate Enrollment Gateway 1.3.1 - Release Notes.html
 Certificate Enrollment Gateway 1.3.1 - SCEP Integration Guide.pdf
 Certificate Enrollment Gateway 1.3.1 - WSTEP Integration Guide.pdf

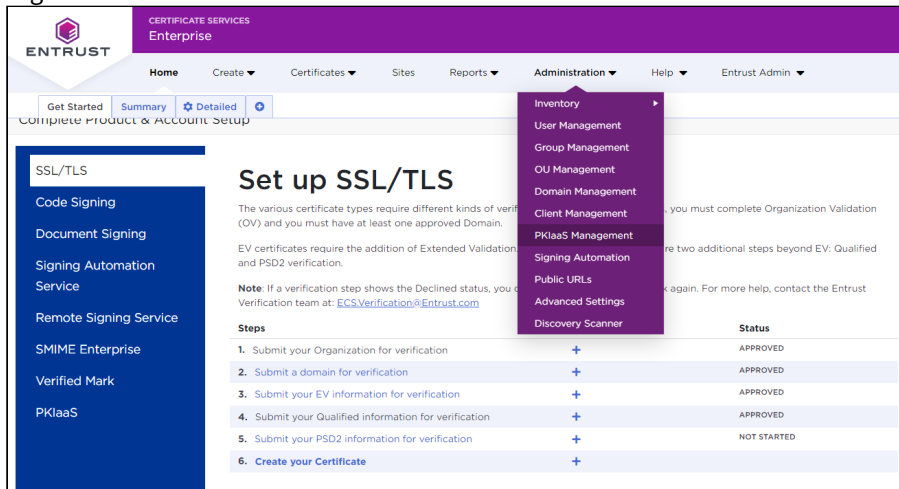
Deleting an on-premises Certificate Enrollment Gateway

When deleting an on-premises Certificate Enrollment Gateway instance, the Certificate Enrollment Gateway license returns to inventory within 24 hours.

 Removing a Certificate Enrollment Gateway instance removes ALL the Certificate Enrollment Gateway instances from ALL the CAs in the account.

To delete a Certificate Enrollment Gateway instance

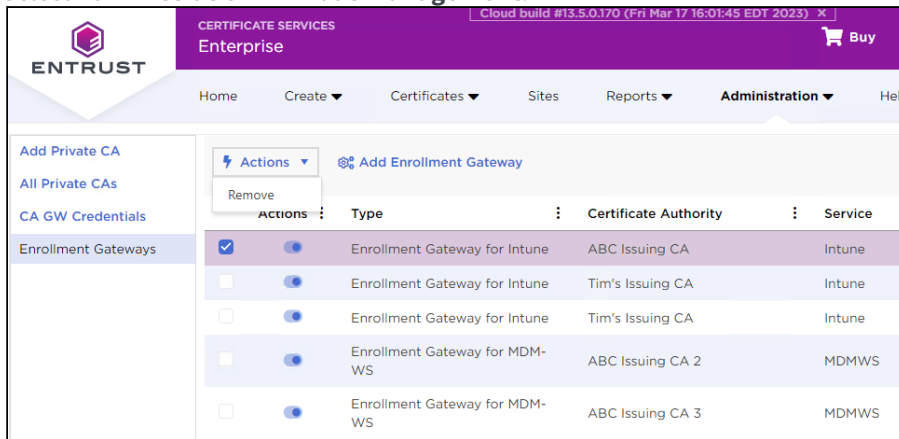
1. Log into cloud.entrust.net.



The screenshot shows the Entrust Enterprise dashboard. The main heading is "Set up SSL/TLS". A sidebar on the left lists various services like Code Signing, Document Signing, etc. The "Administration" menu is open, showing options like User Management, Group Management, and PKIaaS Management. Below the heading, there are instructions and a progress table for the setup steps.

Steps	Status
1. Submit your Organization for verification	APPROVED
2. Submit a domain for verification	APPROVED
3. Submit your EV information for verification	APPROVED
4. Submit your Qualified information for verification	APPROVED
5. Submit your PSD2 information for verification	NOT STARTED
6. Create your Certificate	

2. Select **Administration > PKIaaS Management**.



The screenshot shows the "Administration" page with the "Enrollment Gateways" section selected. A table lists several enrollment gateway instances with columns for Actions, Type, Certificate Authority, and Service.

ACTIONS	Type	Certificate Authority	Service
<input checked="" type="checkbox"/>	Enrollment Gateway for Intune	ABC Issuing CA	Intune
<input type="checkbox"/>	Enrollment Gateway for Intune	Tim's Issuing CA	Intune
<input type="checkbox"/>	Enrollment Gateway for Intune	Tim's Issuing CA	Intune
<input type="checkbox"/>	Enrollment Gateway for MDM-WS	ABC Issuing CA 2	MDMWS
<input type="checkbox"/>	Enrollment Gateway for MDM-WS	ABC Issuing CA 3	MDMWS

3. In the side pane, click **Enrollment Gateways**.
4. On the row grid, select a Certificate Enrollment Gateway instance.
5. Select **Actions > Remove**.
6. Click **OK** on the confirmation dialog.

12 Migrating a customer-hosted Enrollment Gateway to Entrust-hosted

Entrust PKIaaS supports the following migrations from a customer-hosted Certificate Enrollment Gateway to an Entrust-hosted one for the same CA and certificate profile.

- [Migrating an Intune on-premises Enrollment Gateway to an Entrust-hosted Enrollment Gateway](#)
- [Migrating an MDM on-premises Enrollment Gateway to an Entrust-hosted Enrollment Gateway](#)
- [Migrating a WSTEP on-premises Enrollment Gateway to an Entrust-hosted Enrollment Gateway](#)

Migrating an Intune on-premises Enrollment Gateway to an Entrust-hosted Enrollment Gateway

See below for migrating Intune enrollment from a customer-hosted Enrollment Gateway to an Entrust-hosted Enrollment Gateway.

To migrate Intune enrollment to an Entrust-hosted Enrollment Gateway

1. Deploy an Entrust-hosted Enrollment Gateway as explained in [Configuring Intune automation in Entrust Certificate Services](#).
2. In Microsoft Endpoint, replace the **SCEP Server URLs** of all your Intune SCEP configuration profiles with the values described in [Getting the Intune Service URL](#).
3. Test and validate the new Entrust-hosted Intune service.
4. If the customer-hosted Enrollment Gateway was only used for Intune enrollment, remove it as explained in [Deleting an on-premises Certificate Enrollment Gateway](#). Otherwise, if still used for other enrollment protocols (such as ACME, SCEP, or WSTEP):
 - Disable Intune enrollment in the customer-hosted Enrollment Gateway configuration.
 - DO NOT remove the customer-hosted Enrollment Gateway from the Entrust Certificate Services portal.

Migrating an MDM on-premises Enrollment Gateway to an Entrust-hosted Enrollment Gateway

See below for migrating MDM enrollment from a customer-hosted Enrollment Gateway to an Entrust-hosted Enrollment Gateway.


To migrate MDM enrollment to an Entrust-hosted Enrollment Gateway

1. Deploy an Entrust-hosted Enrollment Gateway as explained in [Automating MDM enrollment with an Entrust-hosted Enrollment Gateway](#).
2. When [Configuring MDM automation in Jamf](#), go to **Options / SCEP** and update only the following parameters of your existing Jamf configuration.
 - In **URL**, paste the **SCEP URL** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).
 - In **Entrust Web Service URL**, paste the **MDM-WS-URL** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).
 - In **Administrator Username**, paste the **UserID** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).
 - In **Administrator Password**, paste the **Password** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).
 - In **Digital ID Configuration Name**, paste the **Name** value obtained when [Getting Certificate Enrollment Gateway settings for MDM](#).

3. Test and validate the new Entrust-hosted MDM service.
4. If the customer-hosted Enrollment Gateway was only used for MDM enrollment, remove it as explained in [Deleting an on-premises Certificate Enrollment Gateway](#). Otherwise, if still used for other enrollment protocols (such as ACME, SCEP, or WSTEP):
 - Disable MDM enrollment in the customer-hosted Enrollment Gateway configuration.
 - DO NOT remove the customer-hosted Enrollment Gateway from the Entrust Certificate Services portal.

Migrating a WSTEP on-premises Enrollment Gateway to an Entrust-hosted Enrollment Gateway

To configure the migration from an WSTEP on-premises Enrollment Gateway to an Entrust-hosted Enrollment Gateway, follow the steps under [Automating WSTEP enrollment with an Entrust-hosted Enrollment Gateway](#). See below for specific considerations on each section.

 It is recommended to keep the on-premises WSTEP Enrollment Gateway running until the Entrust-hosted WSTEP Enrollment Gateway is fully deployed and integrated within the Microsoft Active Directory forest.

Section	Considerations for migrating an on-premises deployment
Planning your WSTEP deployment	Determine the required number of PKIaaS Virtual Machines based on your current deployment.
WSTEP enrollment requirements	Determine the networking requirements based on your current deployment. Make any necessary adjustment to the DNS server and the firewall rules.
Configuring WSTEP automation in Entrust Certificate Services	You can skip section Configuring an Entrust PKIaaS issuing CA for WSTEP as WSTEP is already configured for your on-premises deployment.
	You cannot skip Creating an Entrust-hosted Certificate Enrollment Gateway for WSTEP .
Preparing the Active Directory forest for WSTEP	Repeat Creating a PKIaaS WSTEP Service Account for each root Active Directory in every Microsoft Active Directory forest. It is recommended to create a new service account for the Entrust-hosted WSTEP Enrollment Gateway to allow the existing on-premises WSTEP Enrollment Gateway to continue functioning until decommissioned.
	You can skip Installing the default set of Microsoft Certificate Templates as the certificate templates should already exist for each Microsoft Active Directory forest.
	Repeat Setting up LDAPS on domain controllers across the entire Microsoft Active Directory forest. In contrast, the on-premises WSTEP Enrollment Gateway requires LDAPS TLS certificates to be configured only on the root Active Directory domain controllers.

Section	Considerations for migrating an on-premises deployment
Configuring WSTEP automation on the PKIaaS portal	Complete all the steps. When Configuring an Active Directory in the agent , ensure the selected Certificate Authority matches the one used for the on-premises WSTEP Enrollment Gateway.
Enabling WSTEP for users and devices	Do not reuse the Group Policy Object (GPO) of the on-premises WSTEP Enrollment Gateway. Instead, complete all the steps to: <ol style="list-style-type: none"> 1. Create a new GPO. 2. Apply the GPO to single a test user. 3. Complete the migration testing. 4. Apply the GPO across the entire forest. 5. Unlink the the existing GPO for the on-premises WSTEP Enrollment Gateway. This will allow rolling back the process, if needed.

When completing these configuration steps, perform the following cleanup steps.

- [Cleaning up the Windows domain after migrating WSTEP to an Entrust-hosted Enrollment Gateway](#)
- [Cleaning up Entrust Deployment Manager after migrating WSTEP to an Entrust-hosted Enrollment Gateway](#)

Cleaning up the Windows domain after migrating WSTEP to an Entrust-hosted Enrollment Gateway

Perform the follow steps in your Windows domain to complete the migration.

To clean up the Windows domain after migration

1. Remove all Group Policy Objects (GPOs) for the on-premises WSTEP Enrollment Gateway
2. Run the following command to force a group policy update.

```
gpupdate /force
```





3. In the root domains of the Microsoft Active Directory forests, delete the WSTEP Service account for the on-premises WSTEP Enrollment Gateway.
4. Turn off the Microsoft servers with the Certificate Enrollment Policy (CEP) service. If these are virtual machines, you can delete them.
5. Open the ADSI Edit console and remove the Enrollment Service for the on-premises WSTEP Enrollment Gateway.

Cleaning up Entrust Deployment Manager after migrating WSTEP to an Entrust-hosted Enrollment Gateway

The required cleanup operations on Entrust Deployment Manager vary depending on the following situations.

- The on-premises Entrust Enrollment Gateway runs other enrollment protocols such as ACME, MDM, Intune or SCEP.
- The Entrust Deployment Manager cluster hosts other solutions such as Certificate Hub or CA Gateway.

See the table below for the required cleanup actions to be performed on every Entrust Deployment Manager cluster.

Enrollment protocols	Other solutions	Cleanup actions
WSTEP		<p>Run the following command to delete the <code>ceg</code> namespace from Entrust Deployment Manager.</p> <pre style="border: 1px solid #ccc; padding: 5px; margin: 10px 0;">sudo kubectl delete namespace ceg</pre> <p>This operation will keep the configuration and the license in case you need to redeploy.</p>
WSTEP		<p>You can shut-down or delete the nodes of the Entrust Deployment Manager cluster.</p>
WSTEP and other protocols		<p>Do nothing.</p>
WSTEP and other protocols		<p>Do nothing.</p>

13 Managing certificates with Entrust Certificate Hub

You can view and manage your issued certificates through the Entrust Certificate Hub product, which offers more advanced Certificate Lifecycle Management features.

- [Connecting your CA](#)
- [Dashboard](#)
- [Reporting on certificate activity](#)
- [Ad-hoc exploration](#)
- [Expiry notifications](#)

⚠ Certificate Hub is not part of the PKIaaS offering and requires a separate license. Please contact your Entrust sales representative if you want to purchase Certificate Hub.

Connecting your CA

Connect your issuing CA as a source using the credentials obtained in [Generating CA Gateway credentials](#). The URL will be the relevant one listed in the Entrust CA Gateway API. Once you set this up, Certificate Hub will check with your CA every 15 minutes and pull in any issued certificates through CEG or other applications. It will also update for any revocations.

Optionally, you can also connect your issuing CA as an Authority. The URL will be the same. Connecting your issuing CA as an authority will allow you to revoke and manually issue certificates for other applications supported by the certificate profiles assigned to your CA.

Dashboard

The Certificate Hub dashboard provides a quick overview of all activities.

Reporting on certificate activity

Certificate Hub provides an engine to define reports based on your business needs, such as daily certificate issuance, revocation, and renewal activities.

Ad-hoc exploration

The certificate view allows you to filter and display certificates from your PKIaaS CA or any other CA that you have connected. Certificate Hub's "Single Pane of Glass" view gives you enterprise-wide visibility of all your PKI activity.

Expiry notifications

You can define expiry notifications to inform certificate owners that certificates are about to expire and must be renewed. Such notifications are valuable in some scenarios, but notifications may be unnecessary if you are using Certificate Enrollment Gateway to automate the issuance and renewal of certificates. You may find that weekly reports of certificates about to expire are a better way to monitor that the overall system operation is working.

14 Integrating third-party tools with the Entrust CA Gateway API

Entrust CA Gateway provides the API described at:

<https://api.managed.entrust.com/doc>

Of the capabilities documented in this reference, PKIaaS supports natively the ones listed in:

<https://api.managed.entrust.com/doc/#operation/caCapabilities>

To implement the other capabilities, you must integrate a third-party tool as explained in this section.

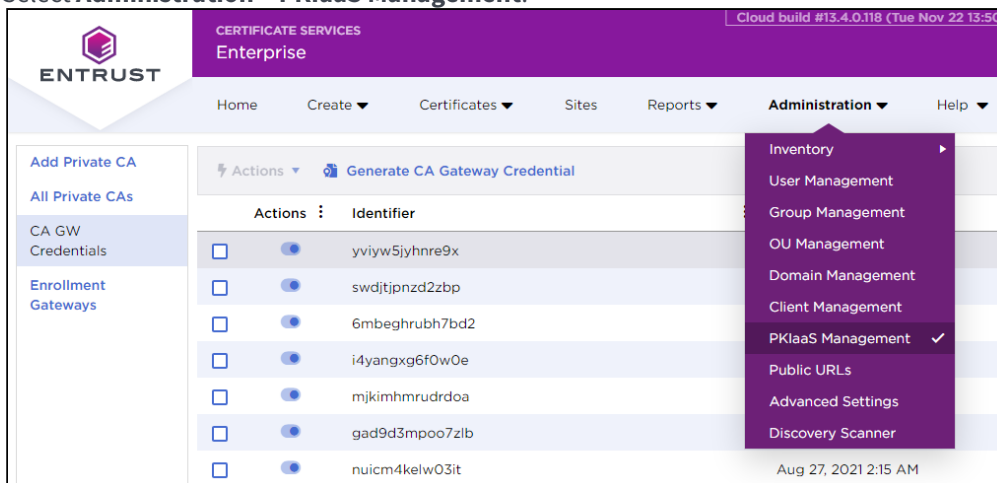
- [Generating CA Gateway credentials](#)
- [Accessing the CA Gateway API](#)
- [Integrating with Ansible](#)
- [Integrating with HashiCorp Vault](#)
- [Integrating with KeyFactor CLM](#)
- [Integrating with ServiceNow](#)
- [Integrating with Venafi](#)

Generating CA Gateway credentials

Generate and download credentials to connect with the Entrust CA Gateway API.

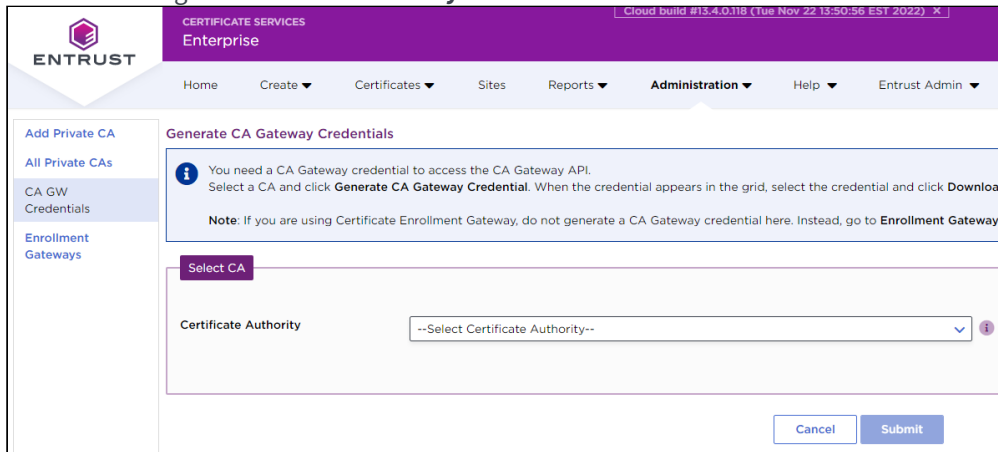
To generate and download CA Gateway credentials

1. Select **Administration > PKIaaS Management**.

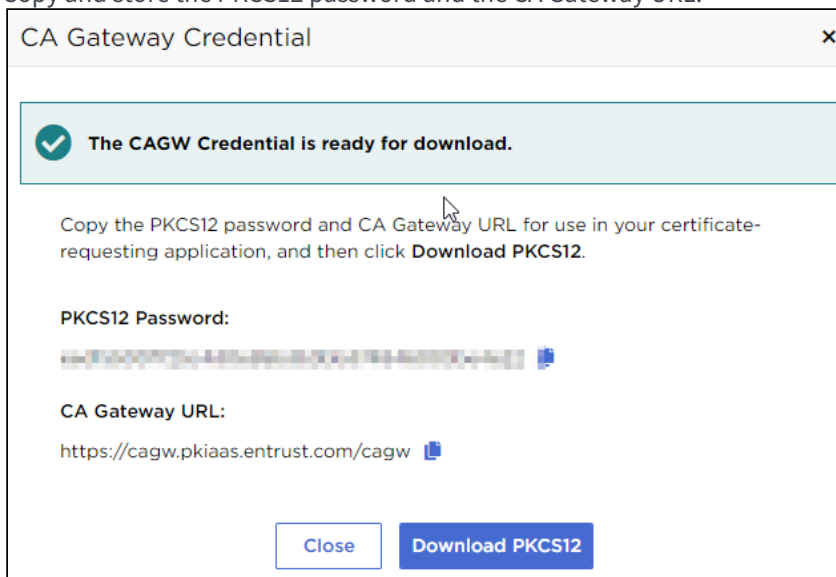


2. In the side pane, click **CA GW Credentials**.
3. Click **Generate CA Gateway Credential**.

4. Select an issuing **Certification Authority**.



5. Click **Submit** and accept the confirmation request. The credential will appear in the grid with the **Provisioning** status.
6. Refresh the grid to check completion.
7. When the credential status is **Active**, click the credential row and select **Actions > Download**.
8. Copy and store the PKCS12 password and the CA Gateway URL.



9. Click **Download PKCS12**.

Accessing the CA Gateway API

After you have installed the Entrust CA Gateway credential on your local machine, you can access the API via Swagger UI using a web browser or the API client you prefer.

PKI region	CA Gateway endpoint
US	https://cagw.pkiaas.entrust.com/cagw

PKI region	CA Gateway endpoint
EU	https://cagw.eu.pkiaas.entrust.com/cagw

Integrating with Ansible

To integrate Entrust PKIaaS with Ansible, use the open-source client:

<https://github.com/EntrustCorporation/entrust-ansible-collection>

Integrating with HashiCorp Vault

To integrate Entrust PKIaaS with HashiCorp Vault, use the open-source plug-in:

<https://github.com/EntrustCorporation/cagw-vault-plugin>

Integrating with KeyFactor CLM

To integrate Entrust PKIaaS with the KeyFactor CLM, use the CA Gateway connector:

<https://github.com/Keyfactor/entrust-cagateway>

Integrating with ServiceNow

To integrate Entrust PKIaaS with the ServiceNow automation software, use Entrust CA Gateway as described in:

https://store.servicenow.com/sn_appstore_store.do#!/store/application/dc1de8e30f1c3200de7a45ace1050e02

Integrating with Venafi

To integrate PKIaaS with the Venafi certificate management software, add an Entrust CA as explained in:

<https://docs.venafi.com/Docs/current/TopNav/Content/Drivers/r-drivers-Entrust-CAGateway-ConfiguringCATemplateObject.php>

15 Revoking certificates in bulk

The user interface of the Entrust Certificate Service Enterprise portal does not currently support bulk revocation of certificates. Nevertheless, you can revoke certificates in bulk using the PKIaaS CA Gateway API and the following open-source utility:

<https://github.com/EntrustCorporation/pki-utilities/tree/main/bulk-revoke-shell>

16 PKIaaS CA & VA certificate profiles

Entrust PKIaaS uses the following profiles for root CAs, issuing CAs, and VA (OCSP).

- basic-ca-root
- basic-ca-subord
- basic-ocsp

⚠ These profiles are not exposed nor configurable. External root CAs are not covered by this profile.

See below a description of these profiles.

- [Key and signature algorithms](#)
- [Certificate fields](#)
- [Certificate critical extensions](#)
- [Certificate non-critical extensions](#)

Key and signature algorithms

All the PKIaaS CA & VA profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

Certificate fields

The PKIaaS CA & VA profiles set the following certificate fields.

Field	basic-ca-root	basic-ca-subord	basic-ocsp
Issuer	Self-signed	Customer's online root CA	Customer's online root/ issuing CA
Subject	No constraint	No constraint	No constraint

Field	basic-ca-root	basic-ca-subord	basic-ocsp
Validity period	Less than or equal to 20 years	Less than or equal to 10 years. The subordinate expiry cannot exceed the root validity.	30 days

Certificate critical extensions

The PKIaaS CA & VA profiles set the following certificate critical extensions.

Extension	basic-ca-root	basic-ca-subord	basic-ocsp
Basic Constraints	cA=True	cA=True, pathLenConstraint=0	cA = False
Extended Key Usage	Never present	Never present	OCSP Signing
Key Usage	digitalSignature, keyCertSign, cRLSign	digitalSignature, keyCertSign, cRLSign	digitalSignature, keyCertSign, cRLSign

Certificate non-critical extensions


The PKIaaS CA & VA profiles set the following non-critical certificate extensions.

Extension	basic-ca-root	basic-ca-subord	basic-ocsp
AIA	Never present	Supplied when the customer enables OCSP on CA creation	Always present
Authority Key Identifier	Never present	Matches subjectKeyIdentifier of the signing certificate	Matches subjectKeyIdentifier of the signing certificate
CRL Distribution Points	Never present (not applicable)	Always present	Always present
OCSP	Never present	Never present	No check

Extension	basic-ca-root	basic-ca-subord	basic-ocsp
Subject Key Identifier	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

17 PKIaaS subscriber certificate profiles

Entrust provides the following certificate policies and tunes them to specific use cases from the ECS Enterprise UI, CA Gateway API, Entrust-hosted Enrollment Gateway, and on-premises Enrollment Gateway (CEG).

 When supported, we recommend the Entrust-hosted Enrollment Gateway instead of the on-premises Enrollment Gateway.

Profile set	ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollme... Gateway
Active Directory (WSTEP) certificate profiles	✓	✓	✓	✓
Azure Firewall Intermediate CA certificate profile	✓	✓	✗	✗
CMPv2 certificate profiles	✓	✓	✗	✗
Code signing certificate profile	✓	✓	✗	✗
eSIM certificate profiles	✓	✓	✗	✗
EST certificate profiles	✓	✓	✗	✗
Intune certificate profiles	✓	✓	✓	✓
MDMWS certificate profiles	✓	✓	✓	✓
Mobile device certific... profile	✓	✓	✗	✗
Multiuse certificate profiles	✓	✓	✗	✗
Private SSL (ACMEv2) certificate profiles	✓	✓	✗	✓
S_MIME certificate profiles	✓	✓	✗	✗
SCEP certificate profiles	✓	✓	✗	✓

Profile set	ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
Smartcard certificate profiles	✓	✓	✗	✗
TLS Proxy CA certificate profile	✓	✓	✗	✗
V2G certificate profiles	✓	✓	✗	✗

Active Directory (WSTEP) certificate profiles

PKIaaS provides the following Active Directory (WSTEP) certificate profiles.

- wstep-digital-signature
- wstep-digital-signature-key-encipherment
- wstep-key-encipherment
- wstep-non-repudiation
- wstep-non-repudiation-key-encipherment

These profiles support the following features.

- [WSTEP use cases](#)
- [WSTEP key usages](#)
- [WSTEP request extensions](#)
- [WSTEP certificate fields](#)
- [WSTEP certificate extensions](#)
- [WSTEP algorithm constraints](#)
- [WSTEP distinguished names](#)

WSTEP use cases

All WSTEP profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✓	✓

WSTEP key usages

Each WSTEP profile supports the following Key Usage extension values.

Profile	Key Usage name
wstep-digital-signature	Digital Signature

Profile	Key Usage name
wstep-digital-signature-key-encipherment	Digital Signature, Key Encipherment
wstep-key-encipherment	Key Encipherment
wstep-non-repudiation	Non-Repudiation
wstep-non-repudiation-key-encipherment	Non-Repudiation, Digital Signature, Key Encipherment

WSTEP request extensions

All WSTEP profiles support the following non-critical extensions in request.

Extension name	Extension OID
Certificate Policies	2.5.29.32
Extended Key Usage	2.5.29.37
Application Policies	1.3.6.1.4.1.311.21.10
Smime Capabilities	1.2.840.113549.1.9.15
MSTemplateOID	1.3.6.1.4.1.311.21.7
MSTemplateName	1.3.6.1.4.1.311.20.2
szOID_NTDS_CA_SECURITY_EXT	1.3.6.1.4.1.311.25.2

WSTEP certificate fields

All WSTEP profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.

Field	Value
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

WSTEP certificate extensions

All WSTEP profiles set the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA =False
CRL Distribution Points	No	Always present
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

WSTEP algorithm constraints

All WSTEP profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption

Key algorithm	Signature algorithm
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

WSTEP distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43

Alias	OID
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5

Alias	OID
'StatuteURL'	1.3.6.1.4.1.53087.3.6

CMPv2 certificate profiles

PKIaaS provides the following CMPv2 certificate profiles.

- cmp-digital-signature
- cmp-key-encipherment
- cmp-non-repudiation
- cmp-digital-signature-key-encipherment

These profiles support the following features.

- [CMPv2 use cases](#)
- [CMPv2 key usages](#)
- [CMPv2 request extensions](#)
- [CMPv2 certificate fields](#)
- [CMPv2 certificate extensions](#)
- [CMPv2 algorithm constraints](#)
- [CMPv2 distinguished names](#)

CMPv2 use cases

All CMPv2 profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

CMPv2 key usages

Each CMPv2 profile supports the following Key Usage extension values.

Profile	Key Usage
cmp-digital-signature	Digital Signature
cmp-key-encipherment	Key Encipherment
cmp-non-repudiation	Non-Repudiation
cmp-digital-signature-key-encipherment	Digital Signature, Key Encipherment

CMPv2 request extensions

All CMPv2 profiles support the following non-critical extensions in request.

Extension name	Extension OID
Certificate Policies	2.5.29.32
Extended Key Usage	2.5.29.37
Application Policies	1.3.6.1.4.1.311.21.10
Smime Capabilities	1.2.840.113549.1.9.15
MSTemplateOID	1.3.6.1.4.1.311.21.7
MSTemplateName	1.3.6.1.4.1.311.20.2
szOID_NTDS_CA_SECURITY_EXT	1.3.6.1.4.1.311.25.2

CMPv2 certificate fields

All CMPv2 profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

CMPv2 certificate extensions

All CMPv2 profiles set the following certificate extension.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA

Extension	Critical	Value
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA =False
CRL Distribution Points	No	Always present
Extended Key Usage	No	No constraints
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

CMPv2 algorithm constraints

All CMPv2 profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

CMPv2 distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2

Alias	OID
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

Code signing certificate profile

PKIaaS provides the `codesigning-digital-signature` certificate profile for code signing.

- [Code signing use cases](#)
- [Code signing certificate fields](#)
- [Code signing certificate extensions](#)
- [Code signing algorithm constraints](#)
- [Code signing distinguished names](#)

Code signing use cases

The `codesigning-digital-signature` profile supports the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

Code signing certificate fields

The `codesigning-digital-signature` profile sets the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA
Validity period	Less than or equal to the expiry of the issuing CA. Default to 1 year if not specified in the request.
Subject	No constraint

Code signing certificate extensions

The `codesigning-digital-signature` profile sets the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA=False
CRL Distribution Points	No	Always present
Extended Key Usage	No	1.3.6.1.5.5.7.3.3 (Code Signing)
Key Usage	Yes	Digital Signature

Extension	Critical	Value
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

Code signing algorithm constraints

The `codesigning-digital-signature` profile supports the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

Code signing distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6

Alias	OID
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3

Alias	OID
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

eSIM certificate profiles

PKIaaS provides the following certificate profiles for eSIM end-entity users.

- esim-delivery-auth
- esim-delivery-binding
- esim-delivery-tls-server
- esim-discovery-auth
- esim-discovery-tls-server

These profiles support the following features.

- [eSIM use cases](#)
- [eSIM key usages and certificate policies](#)
- [eSIM certificate fields](#)
- [eSIM certificate extensions](#)
- [eSIM algorithm constraints](#)
- [eSIM distinguished names](#)

eSIM use cases

All eSIM end-entity profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

eSIM key usages and certificate policies

Each eSIM profile supports the following Key Usage, Extended Key Usage (EKU), and Certificate Policy extension values.

Profile	Key Usage	Extended Key Usage	Certificate Policy
esim-delivery-auth	Digital Signature	—	id-rspRole-dp-auth (2.23.146.1.2.1.4)
esim-delivery-binding	Digital Signature	—	id-rspRole-dp-pb (2.23.146.1.2.1.5)
esim-delivery-tls-server	Digital Signature	TLS server authentication (1.3.6.1.5.5.7.3.1)	id-rspRole-dp-tls (2.23.146.1.2.1.3)
esim-discovery-auth	Digital Signature	—	id-rspRole-ds-auth (2.23.146.1.2.1.7)
esim-discovery-tls-server	Digital Signature	TLS server authentication (1.3.6.1.5.5.7.3.1)	id-rspRole-ds-tls (2.23.146.1.2.1.6)

eSIM certificate fields

All eSIM profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 3 years if not specified in the request.

eSIM certificate extensions

All eSIM profiles set the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA =False
CRL Distribution Points	No	Always present
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

eSIM algorithm constraints

All eSIM profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

eSIM distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25

Alias	OID
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

EST certificate profiles

PKIaaS provides the following EST (Enrollment over Secure Transport) certificate profiles.

- est-digital-signature

- est-key-encipherment
- est-non-repudiation
- est-digital-signature-key-encipherment

These profiles support the following features.

- [EST signing use cases](#)
- [EST key usages](#)
- [EST request extensions](#)
- [EST certificate fields](#)
- [EST certificate extensions](#)
- [EST algorithm constraints](#)
- [EST signing distinguished names](#)

EST signing use cases

All EST profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

EST key usages

Each EST profile supports the following Key Usage extension values.

Profile	Key Usage
est-digital-signature	Digital Signature
est-key-encipherment	Key Encipherment
est-non-repudiation	Non-Repudiation
est-digital-signature-key-encipherment	Digital Signature, Key Encipherment

EST request extensions

All EST profiles support the following non-critical extensions in request.

Extension name	Extension OID
Certificate Policies	2.5.29.32

Extension name	Extension OID
Extended Key Usage	2.5.29.37
Application Policies	1.3.6.1.4.1.311.21.10
Smime Capabilities	1.2.840.113549.1.9.15
MSTemplateOID	1.3.6.1.4.1.311.21.7
MSTemplateName	1.3.6.1.4.1.311.20.2
szOID_NTDS_CA_SECURITY_EXT	1.3.6.1.4.1.311.25.2

EST certificate fields

All EST profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

EST certificate extensions

All EST profiles set the following certificate extension values.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA=False

Extension	Critical	Value
CRL Distribution Points	No	Always present
Extended Key Usage	No	No constraints
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

EST algorithm constraints

All EST profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

EST signing distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4

Alias	OID
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1

Alias	OID
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

External subordinate CA certificate profiles

The External Sub-CA certificate profiles are only available to the root CAs.

- [Azure Firewall Intermediate CA certificate profile](#)
- [TLS Proxy CA certificate profile](#)


i Each external subordinate CA issued by a PKIaaS root CA only consumes one PKIaaS Certificate license. Entrust does not charge for certificates issued by external subordinate CAs because those certificates are considered external and not using the PKIaaS infrastructure.

Azure Firewall Intermediate CA certificate profile

The Azure Firewall Intermediate CA service provides a `azure-firewall-ca-subord` profile with the following settings.

- [Azure Firewall Subordinate CA signing use cases](#)
- [Azure Firewall Subordinate CA request extensions](#)
- [Azure Firewall Subordinate CA certificate fields](#)
- [Azure Firewall Subordinate CA certificate extensions](#)
- [Azure Firewall Subordinate CA algorithm constraints](#)
- [Azure Firewall Subordinate CA distinguished names](#)

This certificate profile is only available for the root CA.

 Follow the [Microsoft Azure Intermediate requirements](#) to generate the CSR before requesting the CA certificate from PKIaaS.

Azure Firewall Subordinate CA signing use cases

The `azure-firewall-ca-subord` profile supports the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✔	✔	✘	✘

Azure Firewall Subordinate CA request extensions

The `azure-firewall-ca-subord` profile supports the following non-critical extensions in request.

Extension name	Extension OID
Certificate Policies	2.5.29.32

Azure Firewall Subordinate CA certificate fields

The `azure-firewall-ca-subord` profile sets the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint
Validity period	Defaults to 1 year if not specified.

Azure Firewall Subordinate CA certificate extensions

The `azure-firewall-ca-subord` profile sets the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA=True, pathLenConstraint=1
CRL Distribution Points	No	Always present
Key Usage	Yes	Certificate Signing, CRL Signing, Digital Signature
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

Azure Firewall Subordinate CA algorithm constraints

The `azure-firewall-ca-subord` profile supports the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

Azure Firewall Subordinate CA distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1


Alias	OID
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

TLS Proxy CA certificate profile

The TLS Proxy CA service provides a `tlsproxy-ca-subord` certificate profile with the following settings.

- [TLS Proxy CA use cases](#)
- [TLS Proxy CA request extensions](#)
- [TLS Proxy CA certificate fields](#)
- [TLS Proxy CA certificate extensions](#)

- [TLS Proxy CA algorithm constraints](#)
- [TLS Proxy CA distinguished names](#)

 This certificate profile is only available for the root CA.

TLS Proxy CA use cases

The `tlsproxy-ca-subord` profile supports the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

TLS Proxy CA request extensions

The `tlsproxy-ca-subord` profile supports the following non-critical extensions in request.

Extension name	Extension OID
CertificatePolicies	2.5.29.32

TLS Proxy CA certificate fields

The `tlsproxy-ca-subord` profile sets the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint
Validity period	Defaults to 1 year if not specified.

TLS Proxy CA certificate extensions

The `tlsproxy-ca-subord` profile sets the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA

Extension	Critical	Value
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA=True, pathLenConstraint=0
CRL Distribution Points	No	Always present
Extended Key Usage	No	TLS server authentication 1.3.6.1.5.5.7.3.1 TLS client authentication 1.3.6.1.5.5.7.3.2
Key Usage	Yes	Certificate Signing, CRL Signing, Digital Signature
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

TLS Proxy CA algorithm constraints

The `tlsproxy-ca-subord` profile supports the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

TLS Proxy CA distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2

Alias	OID
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

Intune certificate profiles

PKIaaS provides the following Intune certificate profiles.

- intune-digital-signature
- intune-key-encipherment
- intune-non-repudiation
- intune-digital-signature-key-encipherment

These profiles support the following features.

- [Intune use cases](#)
- [Intune key usages](#)
- [Intune request extensions](#)
- [Intune certificate fields](#)
- [Intune certificate extensions](#)
- [Intune algorithm constraints](#)
- [Intune distinguished names](#)

Intune use cases

All Intune profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✓	✓

Intune key usages

Each Intune profile supports the following Key Usage extension values.

Profile	Key Usage
intune-digital-signature	Digital Signature
intune-key-encipherment	Key Encipherment
intune-non-repudiation	Non-Repudiation
intune-digital-signature-key-encipherment	Digital Signature, Key Encipherment

Intune request extensions

All Intune profiles support the following non-critical extensions in request.

Extension name	Extension OID
Certificate Policies	2.5.29.32
Extended Key Usage	2.5.29.37
Application Policies	1.3.6.1.4.1.311.21.10

Extension name	Extension OID
Smime Capabilities	1.2.840.113549.1.9.15
MSTemplateOID	1.3.6.1.4.1.311.21.7
MSTemplateName	1.3.6.1.4.1.311.20.2
szOID_NTDS_CA_SECURITY_EXT	1.3.6.1.4.1.311.25.2

Intune certificate fields

All Intune profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

Intune certificate extensions

All Intune profiles set the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA=False
CRL Distribution Points	No	Always present
Subject Alternative Name	No	No constraints

Extension	Critical	Value
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

Intune algorithm constraints

All Intune profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

Intune distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7

Alias	OID
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2

Alias	OID
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

MDMWS certificate profiles

PKIaaS provides the following MDMWS (Mobile Device Management Web Service) certificate profiles.

- mdmws-digital-signature
- mdmws-p12-digital-signature
- mdmws-key-encipherment
- mdmws-p12-key-encipherment
- mdmws-non-repudiation
- mdmws-p12-non-repudiation
- mdmws-digital-signature-key-encipherment
- mdmws-digital-signature-key-encipherment-clientauth
- mdmws-p12-digital-signature-key-encipherment
- mdmws-p12-digital-signature-key-encipherment-clientauth

These profiles support the following features.

- [MDMWS use cases](#)
- [MDMWS issuance modes and key usages](#)
- [MDMWS request extensions](#)
- [MDMWS certificate fields](#)
- [MDMWS certificate extensions](#)
- [MDMWS algorithm constraints](#)
- [MDMWS distinguished names](#)

MDMWS use cases

All MDMWS profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✓	✓

MDMWS issuance modes and key usages

MDMWS profiles support the following issuance modes:

- Issue the certificate from a CSR.
- Issue the certificate and an RSA2048 private key in a P12 file.

Each Intune profile supports the following issuance modes and key usage extension values.

Profile	CSR	P12	Key Usage	Extended Key Usage	Allow EKU in request
mdmws-digital-signature	✓	✗	Digital Signature	No constraints	✓
mdmws-p12-digital-signature	✓	✓	Digital Signature	No constraints	✓
mdmws-key-encipherment	✓	✗	Key Encipherment	No constraints	✓
mdmws-p12-key-encipherment	✓	✓	Key Encipherment	No constraints	✓
mdmws-non-repudiation	✓	✗	Non-Repudiation	No constraints	✓
mdmws-p12-non-repudiation	✓	✓	Non-Repudiation	No constraints	✓
mdmws-digital-signature-key-encipherment	✓	✗	Digital Signature, Key Encipherment	No constraints	✓
mdmws-digital-signature-key-encipherment-clientauth	✓	✗	Digital Signature, Key Encipherment	TLS client authentication	✗

Profile	CSR	P12	Key Usage	Extended Key Usage	Allow EKU in request
mdmws-p12-digital-signature-key-encipherment	✓	✓	Digital Signature, Key Encipherment	No constraints	✓
mdmws-p12-digital-signature-key-encipherment-clientauth	✓	✓	Digital Signature, Key Encipherment	TLS client authentication	✗

MDMWS request extensions

All MDMWS profiles support the following non-critical extensions in request.

Extension	OID
CertificatePolicies	2.5.29.32
ApplicationPolicies	1.3.6.1.4.1.311.21.10
SmimeCapabilities	1.2.840.113549.1.9.15
MSTemplateOID	1.3.6.1.4.1.311.21.7
MSTemplateName	1.3.6.1.4.1.311.20.2
szOID_NTDS_CA_SECURITY_EXT	1.3.6.1.4.1.311.25.2

MDMWS certificate fields

All MDMWS profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

MDMWS certificate extensions

All MDMWS profiles set the following certificate extension values.

Extension	OID
CertificatePolicies	2.5.29.32
ApplicationPolicies	1.3.6.1.4.1.311.21.10
SmimeCapabilities	1.2.840.113549.1.9.15
MSTemplateOID	1.3.6.1.4.1.311.21.7
MSTemplateName	1.3.6.1.4.1.311.20.2
szOID_NTDS_CA_SECURITY_EXT	1.3.6.1.4.1.311.25.2

MDMWS algorithm constraints

All MDMWS profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

MDMWS distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2

Alias	OID
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

Mobile device certificate profile

PKIaaS provides the `mobile-device-p12-digital-signature-client-authentication` certificate profile for mobile devices.

- [Mobile device use cases](#)
- [Mobile device certificate issuance mode](#)
- [Mobile device certificate fields](#)
- [Mobile device certificate extensions](#)
- [Mobile device algorithm constraints](#)

- [Mobile distinguished names](#)

Mobile device use cases

The `mobile-device-p12-digital-signature-client-authentication` profile supports the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

Mobile device certificate issuance mode

The `mobile-device-p12-digital-signature-client-authentication` profile supports the following issuance modes:

- Issue the certificate from a CSR.
- Issue the certificate and an RSA2048 private key in a P12 file.

Mobile device certificate fields

The `mobile-device-p12-digital-signature-client-authentication` profile sets the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA
Validity period	Less than or equal to subordinate expiry of the issuing CA. Default to 1 year if not specified in the request.
Subject	No constraint

Mobile device certificate extensions

The `mobile-device-p12-digital-signature-client-authentication` profile sets the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA

Extension	Critical	Value
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA =False
CRL Distribution Points	No	Always present
Extended Key Usage	No	1.3.6.1.5.5.7.3.2 (TLS client authentication)
Key Usage	Yes	Digital Signature
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

Mobile device algorithm constraints

The `mobile-device-p12-digital-signature-client-authentication` profile supports the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

Mobile distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2

Alias	OID
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

Multiuse certificate profiles

PKIaaS provides the following multiuse profiles.

- multiuse-p12-client
- multiuse-p12-client-server
- multiuse-p12-custom
- multiuse-p12-key-encipherment-client
- multiuse-p12-key-encipherment-client-server
- multiuse-p12-key-encipherment-custom

- multiuse-p12-key-encipherment-non-repudiation-client
- multiuse-p12-key-encipherment-non-repudiation-client-server
- multiuse-p12-key-encipherment-non-repudiation-custom
- multiuse-p12-key-encipherment-non-repudiation-server
- multiuse-p12-key-encipherment-server
- multiuse-p12-non-repudiation-client
- multiuse-p12-non-repudiation-client-server
- multiuse-p12-non-repudiation-custom
- multiuse-p12-non-repudiation-server
- multiuse-p12-server

These profiles support the following features.

- [Multiuse use cases](#)
- [Multiuse issuance modes](#)
- [Multiuse key usages](#)
- [Multiuse request extensions](#)
- [Multiuse certificate fields](#)
- [Multiuse certificate extensions](#)
- [Multiuse algorithm constraints](#)
- [Multiuse distinguished names](#)

Multiuse use cases

All multiuse profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

Multiuse issuance modes

All multiuse profiles support the following issuance modes:

- Issue the certificate from a CSR.
- Issue the certificate and an RSA2048 private key in a P12 file.

Multiuse key usages

Each multiuse profile supports the following Key Usage and Extended Key Usage (EKU) extension values.

Profile Name (suggestion)	Key Usage	Extended Key Usage	Allow EKU in request
multiuse-p12-client	Digital Signature, Key Agreement	Client Authentication	✗

Profile Name (suggestion)	Key Usage	Extended Key Usage	Allow EKU in request
multiuse-p12-client-server	Digital Signature, Key Agreement	Client Authentication, Server Authentication	✗
multiuse-p12-custom	Digital Signature, Key Agreement	No constraints	✓
multiuse-p12-key-encipherment-client	Digital Signature, Key Agreement, Key Encipherment	Client Authentication	✗
multiuse-p12-key-encipherment-client-server	Digital Signature, Key Agreement, Key Encipherment	Client Authentication, Server Authentication	✗
multiuse-p12-key-encipherment-custom	Digital Signature, Key Agreement, Key Encipherment	No constraints	✓
multiuse-p12-key-encipherment-non-repudiation-client	Digital Signature, Key Agreement, Key Encipherment, Non-Repudiation	Client Authentication	✗
multiuse-p12-key-encipherment-non-repudiation-client-server	Digital Signature, Key Agreement, Key Encipherment, Non-Repudiation	Client Authentication, Server Authentication	✗
multiuse-p12-key-encipherment-non-repudiation-custom	Digital Signature, Key Agreement, Key Encipherment, Non-Repudiation	No constraints	✓
multiuse-p12-key-encipherment-non-repudiation-server	Digital Signature, Key Agreement, Key Encipherment, Non-Repudiation	Server Authentication	✗
multiuse-p12-key-encipherment-server	Digital Signature, Key Agreement, Key Encipherment	Server Authentication	✗

Profile Name (suggestion)	Key Usage	Extended Key Usage	Allow EKU in request
multiuse-p12-non-repudiation-client	Digital Signature, Key Agreement, Non-Repudation	Client Authentication	✗
multiuse-p12-non-repudiation-client-server	Digital Signature, Key Agreement, Non-Repudation	Client Authentication, Server Authentication	✗
multiuse-p12-non-repudiation-custom	Digital Signature, Key Agreement, Non-Repudation	No constraints	✓
multiuse-p12-non-repudiation-server	Digital Signature, Key Agreement, Non-Repudation	Server Authentication	✗
multiuse-p12-server	Digital Signature, Key Agreement	Server Authentication	✗

Multiuse request extensions

All multiuse profiles support the following non-critical extensions in request.

Extension	OID
ApplicationPolicies	1.3.6.1.4.1.311.21.10
CertificatePolicies	2.5.29.32

Multiuse certificate fields

All multiuse profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.

Field	Value
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

Multiuse certificate extensions

All multiuse profiles set the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA =False
CRL Distribution Points	No	Always present
Key Usage	Yes	Digital Signature, Key Encipherment
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

Multiuse algorithm constraints

All multiuse profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512

Key algorithm	Signature algorithm
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

Multiuse distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42

Alias	OID
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4

Alias	OID
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

Private SSL (ACMEv2) certificate profiles

PKIaaS provides the following Private SSL (ACMEv2) certificate profiles.

- `privatessl-tls-client`
- `privatessl-tls-client-server`
- `privatessl-tls-client-server-data-encipherment`
- `privatessl-tls-client-server-supply-san`
- `privatessl-tls-server`
- `privatessl-tls-server-supply-san`

These profiles support the following features.

- [Private SSL use cases](#)
- [Private SSL key usages](#)
- [Private SSL fill_san_dns_with_cn](#)
- [Private SSL request extensions](#)
- [Private SSL certificate fields](#)
- [Private SSL certificate extensions](#)
- [Private SSL algorithm constraints](#)
- [Private SSL distinguished names](#)

Private SSL use cases

All private SSL profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✓

Private SSL key usages

Each private SSL profile supports the following Key Usage and Extended Key Usage (EKU) extension values.

Profile	Key Usage	Extended Key Usage
<code>privatessl-tls-client</code>	Digital Signature	TLS client authentication (1.3.6.1.5.5.7.3.2)

Profile	Key Usage	Extended Key Usage
privatessl-tls-client-server	Digital Signature	TLS client authentication (1.3.6.1.5.5.7.3.2) TLS server authentication (1.3.6.1.5.5.7.3.1)
privatessl-tls-client-server-data-encipherment	Digital Signature, Data Encipherment	TLS client authentication (1.3.6.1.5.5.7.3.2) TLS server authentication (1.3.6.1.5.5.7.3.1)
privatessl-tls-client-server-supply-san	Digital Signature	TLS client authentication (1.3.6.1.5.5.7.3.2) TLS server authentication (1.3.6.1.5.5.7.3.1)
privatessl-tls-server	Digital Signature	TLS server authentication (1.3.6.1.5.5.7.3.1)
privatessl-tls-server-supply-san	Digital Signature	TLS server authentication (1.3.6.1.5.5.7.3.1)

Private SSL fill_san_dns_with_cn

When the `fill_san_dns_with_cn` parameter is `True`, the profile copies in the `SubjectAltname` extension all the `CN` fields:

- included in the `Subject` extension, and
- not already in the `SubjectAltname` extension (to avoid duplicated entries).

See below the value of this parameter in each profile.

Profile	fill_san_dns_with_cn
privatessl-tls-client	False
privatessl-tls-client-server	False
privatessl-tls-client-server-data-encipherment	False
privatessl-tls-client-server-supply-san	True

Profile	fill_san_dns_with_cn
privatessl-tls-server	False
privatessl-tls-server-supply-san	True

Private SSL request extensions

All private SSL profiles support the following non-critical extensions in request.

Extension Name	Extension OID
Application Policies	1.3.6.1.4.1.311.21.10
Certificate Policies	2.5.29.32

Private SSL certificate fields

All Private SSL profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

Private SSL certificate extensions

All private SSL profiles set the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate

Extension	Critical	Value
Basic Constraints	Yes	cA =False
CRL Distribution Points	No	Always present
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

Private SSL algorithm constraints

All private SSL profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

Private SSL distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4

Alias	OID
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1

Alias	OID
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

S/MIME Secure Email certificate profiles

PKIaaS provides the following S/MIME Secure Email certificate profiles.

- [smime-digital-signature-key-encipherment](#)
- [smime-key-encipherment](#)
- [smime-non-repudiation](#)

These profiles support the following features.

- [S/MIME use cases](#)
- [S/MIME key usages](#)
- [S/MIME certificate fields](#)
- [S/MIME certificate extensions](#)
- [S/MIME algorithm constraints](#)
- [S/MIME distinguished names](#)

S/MIME use cases

All S/MIME Secure Email profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

S/MIME key usages

Each S/MIME Secure Email profile supports the following Key Usage and Extended Key Usage (EKU) extension values.

Profile	Key Usage	Extended Key Usage
smime-digital-signature-key-encipherment	Digital Signature, Key Encipherment	TLS client authentication (1.3.6.1.5.5.7.3.2) Email Protection (1.3.6.1.5.5.7.3.4)
smime-key-encipherment	Key Encipherment	Email Protection (1.3.6.1.5.5.7.3.4)
smime-non-repudiation	Digital Signature, Non-Repudiation	Email Protection (1.3.6.1.5.5.7.3.4)

S/MIME certificate fields

All S/MIME Secure Email profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

S/MIME certificate extensions

All S/MIME Secure Email profiles set the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA =False
CRL Distribution Points	No	Always present
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

S/MIME algorithm constraints

All S/MIME Secure Email profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

S/MIME distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2

Alias	OID
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

SCEP certificate profiles

PKIaaS provides the following SCEP (Simple Certificate Enrollment Protocol) certificate profiles.

- scep-digital-signature
- scep-key-encipherment
- scep-non-repudiation
- scep-digital-signature-key-encipherment

These profiles support the following features.

- [SCEP use cases](#)
- [SCEP key usages](#)
- [SCEP request extensions](#)
- [SCEP certificate fields](#)
- [SCEP certificate extensions](#)
- [SCEP algorithm constraints](#)
- [SCEP distinguished names](#)

SCEP use cases

All SCEP profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✓

SCEP key usages

Each SCEP profile supports the following Key Usage extension values.

Profile	Key Usage
scep-digital-signature	Digital Signature
scep-key-encipherment	Key Encipherment
scep-non-repudiation	Non-Repudiation
scep-digital-signature-key-encipherment	Digital Signature, Key Encipherment

SCEP request extensions

All SCEP profiles support the following non-critical extensions in request.

Extension name	Extension OID
Certificate Policies	2.5.29.32
Extended Key Usage	2.5.29.37
Application Policies	1.3.6.1.4.1.311.21.10

Extension name	Extension OID
Smime Capabilities	1.2.840.113549.1.9.15
MSTemplateOID	1.3.6.1.4.1.311.21.7
MSTemplateName	1.3.6.1.4.1.311.20.2
szOID_NTDS_CA_SECURITY_EXT	1.3.6.1.4.1.311.25.2

SCEP certificate fields

All SCEP profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

SCEP certificate extensions

All SCEP profiles set the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA=False
CRL Distribution Points	No	Always present
Extended Key Usage	No	No constraints

Extension	Critical	Value
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

SCEP algorithm constraints

All SCEP profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

SCEP distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6

Alias	OID
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3

Alias	OID
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

Smartcard certificate profiles

PKIaaS provides the following smartcard certificate profiles.

- smartcard-card-authentication
- smartcard-digital-signature
- smartcard-domain-controller
- smartcard-key-management
- smartcard-piv-authentication
- smartcard-piv-content-signing

These profiles support the following features.

- [Smartcard use cases](#)
- [Smartcard key usages and request extensions](#)
- [Smartcard certificate fields](#)
- [Smartcard certificate extensions](#)
- [Smartcard algorithm constraints](#)
- [Smartcard distinguished names](#)

Smartcard use cases

All smartcard profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

Smartcard key usages and request extensions

For each smartcard profile, the following table details: supported Key Usage extension values, supported Extended Key Usage extension values, supported extensions in request.

Profile	Key Usage	Extended Key Usage	In request
smartcard-card-authentication	Digital Signature	No constraints	PIV Interim Indicator (2.16.840.1.101.3.6.9.1) Security ID (1.3.6.1.4.1.311.25.2)
smartcard-digital-signature	Digital Signature, Non-Repudiation	No constraints	PIV Interim Indicator (2.16.840.1.101.3.6.9.1) Security ID (1.3.6.1.4.1.311.25.2)
smartcard-domain-controller	Digital Signature, Key Encipherment	TLS server authentication (1.3.6.1.5.5.7.3.1) TLS client authentication (1.3.6.1.5.5.7.3.2)	—
smartcard-key-management	Key Encipherment	No constraints	PIV Interim Indicator (2.16.840.1.101.3.6.9.1) Security ID (1.3.6.1.4.1.311.25.2)
smartcard-piv-authentication	Digital Signature	Any Extended Key Usage (2.5.29.37.0) Microsoft Smart Card Login (1.3.6.1.4.1.311.20.2.2) TLS client authentication (1.3.6.1.5.5.7.3.2)	PIV Interim Indicator (2.16.840.1.101.3.6.9.1) Security ID (1.3.6.1.4.1.311.25.2)

Profile	Key Usage	Extended Key Usage	In request
smartcard-piv-content-signing	Digital Signature, Non-Repudiation	No constraints	—

Smartcard certificate fields

All smartcard profiles set the following certificate fields.

Field	Value
Issuer	Customer's subordinate issuing CA.
Subject	No constraint.
Validity period	Less than or equal to the expiry of the issuing CA. Defaults to 1 year if not specified in the request.

Smartcard certificate extensions

All smartcard profiles set the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA =False
CRL Distribution Points	No	Always present
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

Smartcard algorithm constraints

All smartcard profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

Smartcard distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11

Alias	OID
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6

Alias	OID
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6

V2G certificate profiles

PKIaaS provides the following V2G (Vehicle-to-Grid) certificate profiles

- v2g-supply-equipment
- v2g-user-identity

These profiles support the following features.

- [V2G use cases](#)
- [V2G key usages and validity periods](#)
- [V2G certificate fields](#)
- [V2G certificate extensions](#)
- [V2G algorithm constraints](#)
- [V2G distinguished names](#)

V2G use cases

All V2G profiles support the following use cases.

ECS Enterprise UI	CA Gateway API	Entrust-hosted Enrollment Gateway	On-prem Enrollment Gateway
✓	✓	✗	✗

V2G key usages and validity periods

For each smartcard profile, the following table details: supported Key Usage extension values, supported Extended Key Usage extension values, validity period for the issued certificates.

Profile	Key Usages	Extended Key Usages	Validity period
v2g-supply-equipment	Digital Signature, Key Agreement	TLS server authentication (1.3.6.1.5.5.7.3.1)	1 year
v2g-user-identity	Digital Signature, Non-Repudiation	—	2 year

V2G certificate fields

All V2G profiles set the following certificate fields.

Field	Value
Issuer	The customer's subordinate issuing-CA
Subject	No constraint

V2G certificate extensions

All V2G profiles set the following certificate extensions.

Extension	Critical	Value
AIA	No	Supplied if the customer enables OCSP when creating the CA
Authority Key Identifier	No	Matches subjectKeyIdentifier of the signing certificate
Basic Constraints	Yes	cA =False
CRL Distribution Points	No	Always present
Subject Alternative Name	No	No constraints
Subject Key Identifier	No	«The leftmost 160-bits of the SHA-256 hash of the value of the BIT STRING subjectPublicKey» as described in RFC 7093 section 2

V2G algorithm constraints

All V2G profiles support the following key and signature algorithms.

Key algorithm	Signature algorithm
ECDSA P-256	ecdsa-with-SHA256
ECDSA P-384	ecdsa-with-SHA384
ECDSA P-521	ecdsa-with-SHA512
RSA 2048	sha256WithRSAEncryption
RSA 3072	sha256WithRSAEncryption
RSA 4096	sha512WithRSAEncryption

V2G distinguished names

PKIaaS has no restriction on Distinguished Names (DNs) per certificate profile. All certificate profiles support the following identifiers.

Alias	OID
'CN' 'CommonName'	2.5.4.3
'SN' 'SurName'	2.5.4.4
'SERIALNUMBER' 'DeviceSerialNumber'	2.5.4.5
'C' 'Country'	2.5.4.6
'L' 'Locality'	2.5.4.7
'ST' 'S' 'State'	2.5.4.8
'STREET' 'StreetAddress'	2.5.4.9
'O' 'Org' 'Organization'	2.5.4.10
'OU' 'OrganizationalUnit' 'OrganizationUnit' 'OrgUnit'	2.5.4.11

Alias	OID
'T' 'Title'	2.5.4.12
'BUSINESSCATEGORY'	2.5.4.15
'POSTALCODE'	2.5.4.17
'givenName' 'G'	2.5.4.42
'I' 'Initials'	2.5.4.43
'ORGANIZATIONIDENTIFIER'	2.5.4.97
'UID'	0.9.2342.19200300.100.1.1
'DC' 'DomainComponent'	0.9.2342.19200300.100.1.25
'Email' 'E'	1.2.840.113549.1.9.1
'unstructuredName'	1.2.840.113549.1.9.2
'unstructuredAddress'	1.2.840.113549.1.9.8
'JurisdictionOfIncorporationLocalityName'	1.3.6.1.4.1.311.60.2.1.1
'JurisdictionOfIncorporationStateOrProvinceName'	1.3.6.1.4.1.311.60.2.1.2
'JurisdictionOfIncorporationCountryName'	1.3.6.1.4.1.311.60.2.1.3
'TrademarkOfficeName'	1.3.6.1.4.1.53087.1.2
'TrademarkCountryOrRegionName'	1.3.6.1.4.1.53087.1.3
'TrademarkRegistration'	1.3.6.1.4.1.53087.1.4
'LegalEntityIdentifier'	1.3.6.1.4.1.53087.1.5
'WordMark'	1.3.6.1.4.1.53087.1.6

Alias	OID
'MarkType'	1.3.6.1.4.1.53087.1.13
'StatuteCountryName'	1.3.6.1.4.1.53087.3.2
'StatuteStateOrProvinceName'	1.3.6.1.4.1.53087.3.3
'StatuteLocalityName'	1.3.6.1.4.1.53087.3.4
'StatuteCitation'	1.3.6.1.4.1.53087.3.5
'StatuteURL'	1.3.6.1.4.1.53087.3.6


18 Post-quantum Lab experimental region

PKIaaS customers can test the algorithms listed in the post-quantum (PQ) cryptography standard of the NIST (National Institute of Standards and Technology).

<https://www.nist.gov/programs-projects/post-quantum-cryptography>

Specifically, Entrust provides a "PQ Lab" sandbox experimental region to create CA hierarchies (root CA + issuing CA). This region has the limitations described in the following table.

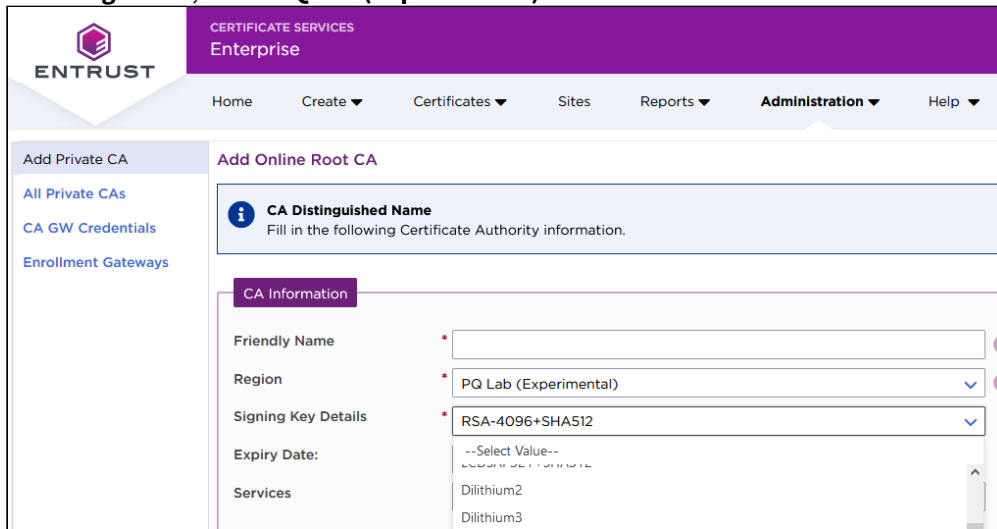
Feature	PQ Lab limitations
Key generation mechanism	liboqs (https://openquantumsafe.org/liboqs) open-source software library for post-quantum keys; Entrust nShield HSMs for RSA and ECDSA keys. In future releases, PKIaaS will support post-quantum key generation using Entrust nShield HSMs.
PKIaaS Certificate Practice Statement and associated terms	Do not apply.
CA validity	A maximum of 6 months.
External CAs onboarding	Not supported.
Region and Data availability	Not guaranteed.
Enrollment Gateway	Not supported. The PQ Lab region does not support customer-hosted (on-premises) or Entrust-hosted enrollment gateway features.

 Entrust might rebuild the PQ Lab region from time to time to reflect the latest changes from the post-quantum standards initiatives. On these occasions, your data in this region might be destroyed. We don't recommend deploying post-quantum CAs and certificates to your production environment.

To test post-quantum algorithms with the PQ Lab region

1. Make sure you have unused licenses to issue an online root CA/issuing CA and certificates.

- In the **Region** list, select **PQ Lab (Experimental)**.




The screenshot shows the 'Add Online Root CA' form in the Entrust Certificate Services Enterprise interface. The form includes a sidebar with navigation options like 'All Private CAs', 'CA GW Credentials', and 'Enrollment Gateways'. The main form area has a section for 'CA Information' with the following fields:


- Friendly Name:** A text input field.
- Region:** A dropdown menu currently showing 'PQ Lab (Experimental)'.
- Signing Key Details:** A dropdown menu currently showing 'RSA-4096+SHA512'.
- Expiry Date:** A dropdown menu currently showing '--Select Value--'.
- Services:** A list of options including 'Dilithium2' and 'Dilithium3'.

- Select a post-quantum algorithm in the **Signing Key Details** list.
- Fill in the rest of the fields described in [Creating an online root CA](#).
- Follow the steps described in [Creating an issuing CA under an online root CA](#).
- Create a certificate request, for example, using the [openquantumsafe/oqs-openssl3](#) tool. Alternatively, you can copy one of the below sample requests.

- **Pure post-quantum algorithms**
 - Dilithium2 (1.3.6.1.4.1.2.267.7.4.4)
 - Dilithium3 (1.3.6.1.4.1.2.267.7.6.5)
 - Dilithium5 (1.3.6.1.4.1.2.267.7.8.7)
 - Falcon-512 (1.3.9999.3.6)
 - Falcon-1024 (1.3.9999.3.9)
 - SPHINCS+-SHA2-128f-simple (1.3.9999.6.4.13)
 - SPHINCS+-SHA2-128s-simple (1.3.9999.6.4.16)
 - SPHINCS+-SHA2-192f-simple (1.3.9999.6.5.10)
 - SPHINCS+-SHA2-192s-simple (1.3.9999.6.5.12)
 - SPHINCS+-SHA2-256f-simple (1.3.9999.6.6.10)
 - SPHINCS+-SHA2-256s-simple (1.3.9999.6.6.12)
- **Explicit composite algorithms**
 - Dilithium3-ECDSA-P256-SHA256 (2.16.840.1.114027.80.5.1.2)
 - Dilithium3-RSA3072-PKCS15-SHA256 (2.16.840.1.114027.80.5.1.1)
 - Dilithium5-ECDSA-P384-SHA384 (2.16.840.1.114027.80.5.1.5)
 - Falcon512-ECDSA-P256-SHA256 (2.16.840.1.114027.80.5.1.8)

 The Certificate Authorities of the PQ Lab region can also issue RSA and ECDSA certificates; use your existing tools to generate requests for these certificates.

- Issue end-entity certificates using either:
 - Entrust Certificate Services Enterprise, as explained in [Processing a Certificate Signing Request](#).
 - The API described in [Accessing the CA Gateway API](#).

 In the current version, PKIaaS does not support issuing post-quantum certificates in PKCS #12 format.

Pure post-quantum algorithms

See below sample requests for the supported pure post-quantum algorithms.

- [Dilithium2 \(1.3.6.1.4.1.2.267.7.4.4\)](#)
- [Dilithium3 \(1.3.6.1.4.1.2.267.7.6.5\)](#)
- [Dilithium5 \(1.3.6.1.4.1.2.267.7.8.7\)](#)
- [Falcon-512 \(1.3.9999.3.6\)](#)
- [Falcon-1024 \(1.3.9999.3.9\)](#)
- [SPHINCS+-SHA2-128f-simple \(1.3.9999.6.4.13\)](#)
- [SPHINCS+-SHA2-128s-simple \(1.3.9999.6.4.16\)](#)
- [SPHINCS+-SHA2-192f-simple \(1.3.9999.6.5.10\)](#)
- [SPHINCS+-SHA2-192s-simple \(1.3.9999.6.5.12\)](#)
- [SPHINCS+-SHA2-256f-simple \(1.3.9999.6.6.10\)](#)
- [SPHINCS+-SHA2-256s-simple \(1.3.9999.6.6.12\)](#)

Dilithium2 (1.3.6.1.4.1.2.267.7.4.4)

Use the following CSR and keys to test the Dilithium2 post-quantum algorithm with the 1.3.6.1.4.1.2.267.7.4.4 object identifier (OID).

- [Sample CSR to test the Dilithium2 post-quantum algorithm](#)
- [Sample public key to test the Dilithium2 post-quantum algorithm](#)
- [Sample private key to test the Dilithium2 post-quantum algorithm](#)

Sample CSR to test the Dilithium2 post-quantum algorithm

Use the following CSR to test the Dilithium2 post-quantum algorithm.

dil2csr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
MIIPBjCCBXgCAQAwOzELMAkGA1UEBhMCQ0ExEDAOBgNVBAsTB0VudHJ1c3QxGjAY
BgNVBAMTEURpbG0aG1bTJFbmcVc2VyMIIIFNDANBgSRBgEEAQKCCwEBAOCBSEA
AZnPjDsGaAF4AerAeDZsYGG2dGtBweRC+DbUB9RepHQmHwq0CaIndIBkmfxzGn99
k/WwUkPozyL9IL2Y9aXYyMexUa1WqHY8XUidNgqii5Z/at/ljCinavF11xAZPALF
oDeJbCzKv78gCJUgJfFEVfVv22LWHJ4+OvK94FcSA8R6DXvCkATH5yQwnTS9xgTE
c0TbvKw2DbYfoqFX6A8LEEUfUqLuMAqU7ILXKkqT5Q/oBJn6zwwDFH8vJb0H7Tco
cJYQBku4Bn8kg2StQJ1RTLKqKjoakWISYA0G7BoPATxxpBC8I+C3jjqk/3nwpFoZ
zN08mDVaserlp/mHnEpCmdfBJnGLpaoyKlNg9Y/z0uaGJi4/r9LzXbenaPs4rkUV
GvvRccZzjmRAoGvA/Yyp9vceHw1E0pwAIHK3aDI86aZ52b42qL32HcxF3Pfm7v8
bJziS0c9E0bP786JvVPY/sXUHTdzw/xjRn16850dfI5KgKuKc2YEcDljWxoZ2gTs
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/z6if7W2Qmzqgru8kYd/E0xmfB0JGIDSP4onokzaPAj5Tt2j6hLFugZQAcIa3XGb
20ziUeQmo8Iz/o03mDqRIh/aNvSLZxHgi2P7KTLhBlvVmSdyvV3IoPT6kmlk0Sma
bUQLGaW5+UPLcvSEY3fA671IH/L6d1+0/BDEVqnMMdyVeGrKEXex0flp0E9aI/rI
A4oa2kEY+vkxpkk/QSinU1eD3silJUsEfZbxhrc6NgJMdekZZNxZ7jLfEczFHknb
+sQnGRTLGuAIInE6AQ/I8o7meBNwXa2xwVmn7zb79flWAW+SKBD+1KNytEF2/F3Z+
gdYKtffXyJU2HsIXMIcaBXKQfQuMTHgA+UZqrS7IFNWEWm7dfAGIFaHhXqtm0Fdt
hA6AbBQox+NyqsD8XeUWrTB28CF1C/Um5hjiCLs+ifP5/wPEC9v9tSLsoozLRxDC
eSF45SVwPQ/AuP4NFB+jQD4g39tT00ZELsFAsdHcgX3272+CDVCBjxVv82hgZzyQ
```

6s/10u++hStcGkUuCy/8axGA08HswVV50759o339Y1mPXK//X58VNOiDl6MtySAi
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vYi0vZQff3JvQqAEyDyrvKx/wEUQdcNPT1rtLZ2THw3AzScgGER+0xM+XBeTRO
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zFFrsTuUbtLvgs6cNUGXbS4QCcJX7JdxlPGx7ly8KjhWehdVr9w907fERYl348EO
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XpdVHPOYfALsJn1Iy60d90QgX6ppEDdeMPq/3rUy6Pa5CroF563DKk8d0KDYmWdd
JxA0nqq49J7A4hD6vxH+fK7U89VdXtI4jInsyZDqNmntM76Eh/H/CO5V9ejXiyNj
XefWrphhwTacEmVJcBjMNJ8GLmk5xMqnKPFUGBM+/7KfJ1pW8UbUPI98C4CR925E
WBoIsHmjFuxhozpzRyuRzzAPBgSRBgEEAQKCCwEBAUAA4IJDQDm50UljS yJDtbl
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lMFQEOrMTuY88G5ZpE9M8juS+5UUaeHdZM5E0qjMyLwuogLvpjJzn2cV9WRI1RO
nECiLRutksxNRHLiZL9luXAWz9gB7H2Yr/eXr0t/a33w2ozu69vcqZCABfQjWt8w
LLIG/rzMN2w4XAqlZjSf7oEG7ss9hMmKl0ur8zHadLst8j1RIio7NhlVBMtxVOFk
nhsbp6KoVXjWRE3KqlZG72zrvawc7cLcWZF/9mwlsKX25NSq0NH2tV/CSCu2uDqp
Ype41EV6yOz1maYRE/QHX302zVMA6nh8W1KS4d0no7Ly0Ve0PX4SAuV06uvk46xp
s+2/5yfSgqhPE2izd/u10UzX7Ytv02byFEnFh/cUCS0q6lkeukWM+q1zkn71uCOt
p0hikChmj0h70h00fRxtG7Bc2drh9FaVcC50EdtJJMvDpxQoE2BB5ySFEXLzmzGL9
ZWR/T3I8dTvBT+CQPEhvp/huNxr8LnJlGdPop5LUUxqG46bQqNJI9+3TJ8B2s4LL
XXXXId3u0PICMLEjUtIgiHiJaVNGIZHJ0XJCxbPlzPzNoMQ245IaIiyEpLznA8H
CdkN38psmDh0yz8+eYtb9u+bUkUcuFRgtBR7bN2/hrSf9Wks81sPes7ncTRhSZiy
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AAAAAAAAAChQpMg==
-----END CERTIFICATE REQUEST-----
```

Sample public key to test the Dilithium2 post-quantum algorithm

Use the following public key to test the Dilithium2 post-quantum algorithm.

dil2pub.pem

```
-----BEGIN PUBLIC KEY-----
MIIFNDANBgSrBgEEAQKCCwCEBAOCBSEAAZnPjDsGaAF4AerAeDZsYGG2dGtBweRC
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KPFUGBM+/7KfJ1pW8UBUPI98C4CR925EWBoLsHmJfuXhozpzRyuRzw==
-----END PUBLIC KEY-----
```

Sample private key to test the Dilithium2 post-quantum algorithm

Use the following private key to test the Dilithium2 post-quantum algorithm.

dil2priv.pem

```
-----BEGIN PRIVATE KEY-----
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-----END PRIVATE KEY-----
```

Dilithium3 (1.3.6.1.4.1.2.267.7.6.5)

Use the following CSR and keys to test the Dilithium3 post-quantum algorithm with the 1.3.6.1.4.1.2.267.7.6.5 object identifier (OID).

- [Sample CSR to test the Dilithium3 post-quantum algorithm](#)
- [Sample public key to test the Dilithium3 post-quantum algorithm](#)
- [Sample private key to test the Dilithium3 post-quantum algorithm](#)

Sample CSR to test the Dilithium3 post-quantum algorithm

Use the following CSR to test the Dilithium3 post-quantum algorithm.

dil3csr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
MIIU7zCCB/gCAQAwOzELMAkGA1UEBhMCQ0ExEDAOBgNVBAsTB0VudHJ1c3QxGjAY
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-----END CERTIFICATE REQUEST-----
```

Sample public key to test the Dilithium3 post-quantum algorithm

Use the following public key to test the Dilithium3 post-quantum algorithm.

dil3pub.pem

```
-----BEGIN PUBLIC KEY-----
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-----END PUBLIC KEY-----
```

Sample private key to test the Dilithium3 post-quantum algorithm

Use the following private key to test the Dilithium3 post-quantum algorithm.

dil3priv.pem

```
-----BEGIN PRIVATE KEY-----
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-----END PRIVATE KEY-----

Dilithium5 (1.3.6.1.4.1.2.267.7.8.7)

Use the following CSR and keys to test the Dilithium5 post-quantum algorithm with the 1.3.6.1.4.1.2.267.7.8.7 object identifier (OID).

- [Sample CSR to test the Dilithium5 post-quantum algorithm](#)
- [Sample public key to test the Dilithium5 post-quantum algorithm](#)
- [Sample private key to test the Dilithium5 post-quantum algorithm](#)

Sample CSR to test the Dilithium5 post-quantum algorithm

Use the following CSR to test the Dilithium5 post-quantum algorithm.

dil5csr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
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-----END CERTIFICATE REQUEST-----
```

Sample public key to test the Dilithium5 post-quantum algorithm

Use the following public key to test the Dilithium5 post-quantum algorithm.

dil5pub.pem

```
-----BEGIN PUBLIC KEY-----  
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-----END PUBLIC KEY-----
```

Sample private key to test the Dilithium5 post-quantum algorithm

Use the following private key to test the Dilithium5 post-quantum algorithm.

dil5priv.pem

```
-----BEGIN PRIVATE KEY-----
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Falcon-512 (1.3.9999.3.6)

Use the following CSR and keys to test the Falcon-512 post-quantum algorithm with the 1.3.9999.3.6 object identifier (OID).

- [Sample CSR to test the Falcon-512 post-quantum algorithm](#)
- [Sample public key to test the Falcon-512 post-quantum algorithm](#)
- [Sample private key to test the Falcon-512 post-quantum algorithm](#)

Sample CSR to test the Falcon-512 post-quantum algorithm

Use the following CSR to test the Falcon-512 post-quantum algorithm.

fal512csr.pem

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UW4HLUbqWlZKEtnfACoSWRWAYijkPAYjgI5i03Cx2nfqYU01Hu7XYc8gIn59ljXT
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cq8aYThSB0hK0ZiBH9JLSBaL5+PKaUMSTkt+Ea06MilJ/stpeqh4J5IBAL5lobZr
a28FYlVILqd5m60dW5EGsA/4tLriJGacVjMkrYpIP8CWo0oEL06qpabs3zQ17rpn
HYKHBACoqLLOSUQNfSTZFpGnuPg6n8hEjGVrxRIPLhyBNnDaC0dj1nKrmah3aKHT
C2VHIVc9gINMKYALCh12Qa1ltw7WivDZrFQWqxTXwcy+GagaCGH1EfuUpwVYPj2I
iicJGxGtvj1VKY1iJn1raH4Z6JnCh3YuZbkwCQYFK84PAwYFAAOCAo4A0TP2JI/+
zcbvaZkZishfX/5DpCU65NvyrZWqMrcxla8qt8Ybzer3e29nldaxKEURMc7kEEds
gi8cFxtY5kP3z0fLze3zmRP5M75ddf2MblcbYvo93W8q6uih+ALNXabk0/7oQtSH
wiCX5RkfwxEyxpqvZHot5u5Ya9AYMv5j0BG9QAKSTxTdlXyeno+nzEpRCRyHBvrY
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rnX5capVyLmlffITcuH8NjJ2Gx0VgCA=
-----END CERTIFICATE REQUEST-----
```

Sample public key to test the Falcon-512 post-quantum algorithm

Use the following public key to test the Falcon-512 post-quantum algorithm.

fal512pub.pem

```
-----BEGIN PUBLIC KEY-----
MIIDjzAHBgUrzg8DBgOCA4IACXe6JibEWJd1ksfk2yEMbIDP564fyyJhL3LhDJwP
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gGnlJe8nVJkipyN74WCdVJir5FTFXhEL9bhN8QI0zaS05S03hQNZyVyMCEg9YwAk
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G+WIbER2CgYDIpHv10+juVMd5Munz1sEqenKtKhvfPn/wGDKppAmtHRuo6JU2LS4
5dgDwAHnKGSKRg0q1Co2bpSA6ZaWbooYouK0kg3YekKwwrgJa2FtBSSLTWHqTTxw
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r5XhEuvTD6lsE7i1JYaLmtdRY02Gs4Yjk4sMwoSp0WWGY90w9SPTZ1NTGrq1kzJS
lCEK/nmKxVfGdi7Eg52+G+wtMTyBqYRm54iLwUWFOJx46CoLEGLxRbUBe376tHjP
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glYzJK2KSD/AlqNKBC90qqWm7N80Ne66Zx2CoQQAqkiyzklEDRUK2RaRp7j40p/I
RIxla8USdy4cgTZw2gjnY9Zyq5mod2ioUwtlRyFXPYCDTCmAJQoddkGtZbc01orw
2axUFqsU18HMvhmoGghh9RH1FKcFWD49iIonCRLxrb49VSmNYiZ9a2h+GeiZwod2
LmW5
-----END PUBLIC KEY-----
```

Sample private key to test the Falcon-512 post-quantum algorithm

Use the following private key to test the Falcon-512 post-quantum algorithm.

fal512priv.pem

```
-----BEGIN PRIVATE KEY-----
MIIIkGIBADAHBgUrzg8DBgSCCIJZDBD9+8//A7AC9FADC3F9+B/GBB/+6C/ICMBC
CAHC6/AGGBCCCF/5AA8FB8H+D+/DA6/F8DD+F9BAF8EBC/CE8F95H//BD9FF6C4E
/DA93A2AF/+8B7AC5D/G/CD9/7+/AD/CACCAB/CC+E9J3+GACH+DC98BBDE//D6G
I/++DCD75DBE7BB/A8DBDC8GB/FACDAEI77+9FADEF/89+62DBBE9AB+8CADD29F
/C/BCI/17B6BI7H/FAM/CA9GA+KDB//HE++ABC4D+FFE78CAB/6I9AC+8ACAEB/D
A8A5DCD+OABEC+DH+7DC+/8+F3GB3/5A86B+6C64C+8+/7C65AHDF+GE988A+DE/
E/A/A+FGCC7BAGC8CBEDDA+D/I1D+CCCA8IGAAGAAAF/C/AB1AFD/7H7BFC8FE+D
+/9GHJG64EI9/988AB9+8EBK4I/99FHJD/E++898/AGJ5+DF/C9BDC+/AG3DCEAD
CIB+BH9+8B5CGA7BGC8GIB8E36+9ABAFGB6597+HA9+/95EAC7B/F+BADE/+BB7B
DFEI6B+9D/9BAHD469B+D4C+DDA+G+9/96/69/DCB/G9AA/+79AA69BEI998+EB9
+CB/DAEAB1DB9AF+/E/+6D9889F+B8ABF/99A6BB4BGB8DB4FA7/EAB79/++8BB/
C839A/7EGA+BCB8GD877CC7/7CA8FE/FDEACG99FDEACGDCD+EF97/9HI/GBB9AB
ABC8B8GA9AB55C/B/5B/E759+A+EJC6B5BA9E//DCC8//CDDH8DBA+/868CCAC8+
BA/7BD6F+C55DFDJ+9D8DAF9/F/AAC9+GF+6A5H+BD7AFD+DH94+B79BBGC//EC
//A8/CDCHB8AEA/CE/+E+I+F6CE8GE882/99D+ICJC5AC+H/AFBAA5/4H49DA3CB
-----END PRIVATE KEY-----
```

```
+98DDFA6EC4BC+GDAB9/5/FC9C+/6++BE5/BBIH7AK//6C/BFC7CA+6FCIABAC89
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BAPrMxBE+CsB1gja0+YNxgse5dwJ5gQo5gfdBfDz//3l+QTLewnr+vbpHxrvEhL1
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YJ1UmKvkVMVeEQv1uE3xAjTnPLTLI7eFA1nJXIwISD1jACR7AKY40RxFXIXt51Ey
Vsh9CsVx9hitTtAvWz1N+UAJNeaNKIIIfgk87DunhJyxCQfQb5YhsRHYKBgMike/U
7605Ux3ky6fPwWSp6cq0qG98+f/AYmqmkCa0dG6joLTYtLjL2APAAecoZIpEbSrU
KjZulIDplpZuIhii4o6SDdh6QrDCuAlrYW0FJItNYepNPFaiqCNfRKIV6l8pkXVY
NTgSnNMi6oK7yyzNUW4HLUbqWlZKEtnfACoSWRWAYijKPAYjgI5i03Cx2nfqYU01
Hu7XYc8gIn59ljXTLBFZgiFgKLGsWYtL0oyurzXusD9UenuQ51v0BgiKcmQ9940
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7gbMAF4ATkr5BRVmngIH8tOrbTL1zCJx53uoeMxiEWX+QMDkUhut2LAQQHmWRZuo
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L06qpabs3zQ17rpnHYKhBACoQLLOSUQNFSTZFpGnuPg6n8hEjGvrxRIPLhyBNnDa
C0dj1nKrmah3aKhTC2VHIVc9gINMKYALCh12Qa1ltw7WivDZrFQWqxTXwcy+Gaga
CGH1EFUUpwYYPj2IiicJGXGtvj1VKY1iJn1raH4Z6JnCh3YuZbk=
-----END PRIVATE KEY-----
```

Falcon-1024 (1.3.9999.3.9)

Use the following CSR and keys to test the Falcon-1024 post-quantum algorithm with the 1.3.9999.3.9 object identifier (OID).

- [Sample CSR to test the Falcon-1024 post-quantum algorithm](#)
- [Sample public key to test the Falcon-1024 post-quantum algorithm](#)
- [Sample private key to test the Falcon-1024 post-quantum algorithm](#)

Sample CSR to test the Falcon-1024 post-quantum algorithm

Use the following CSR to test the Falcon-1024 post-quantum algorithm.

fal1024csr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
```

MIIMVzCCB1MCAQAwOzELMAKGA1UEBHMCCQ0ExEDA0BgNVBAsTB0VudHJ1c3QxGjAYBgNVBAMTEUZhbG9nbjEwMjRfRmRvc2V2MIIHdzAHBGUrzg8DCQOCBwIACHEueiJm b/6wEnWpDGYPdCq5JSXYDWCtdEZt7LU+NoI0wkWPM6L7oVAp81vp9UZDJzEDrGoA i4u1Bd3oejSIpJwo0KBIlC1GMG69WNN2LhGxmSJS5A4QhivFb1fNkdBYQRfLY8 c0Tcm6kyOMkiXYh19PcgLMffJWz18GBDzJsYesDFLLOUUVF+cxxXpaaktiCSwVa eoqBzcxVAg0w6x980Sma08mkYVIO/CsqVASEiM9khqLoWYUMpw4pHJN6VIQUkJR7 7JU6qiKoRNFoBaueLLbqs3Y/JXZIsoaKEcqNrDK3+Hcuph14Q1ojbip8AGLSP++u BvUMu08K2Di2mWLNgnadzViln00bIqCRBrCWjVB4P1b06qlfzHkQPWlHSGkiKArt /SHQVRlgSML3qHoCq0c4U0ryY3ZC6rVu4ISxnAh4sZ3K2l5YKmaeZZNICw4W04dB imJ4PS113JKqR5D+ic6W0wPVqlSFppGZ4X+6wp0peq6F6mBhCzG0oGEDWIC0knWI RgaTBraIE55u1HOR6WaxrVIElCL7/mots87PefiowFzR0ge0gSh+fN3YWSFNgWwA E41A4b+uZkUYEQtsAUC6f1jUWioNhHWJZLbexiu4DIleolVlTmFohw6YEiio374 LsayCtJ7rFB3sKMcAKBLUlHmZgkAUKOG6mRdqGVJmReguxqGe2BLCGgB00DW3HCE It/TDZsyM9n0Jogv2GGyA/pQTxu60rVTjdXRcipfRuPI7AK1i0B5Cws4MY3iu+hy tLSuRjHOGwVJ6HXZnAdF0lra+48Np/a00MbJ9R+JDEX8rsyG5f4GJI1VNjDSCkKD qIKV2BW4A5hARXySoZ0aCEEUqSjofDaQe7ESHaorYvLTZ+e2DbwcQduDeE3Un3Ms XWVCDKulhkt1VXz9cfZcjUwcHEmhAKGLVqEkyLuLcDb6isW00zu89uTLpFAHGwoQ j+cLdJw15gDofRNkm2UDD0JJ8HQ3slddMfpjJiffwIWfBnCCoeoZXraAhauYB8Jf 50DtbDbIIgAkp0cZGQE4WSU2nty3uWyYQ63CwJc0Bg9gkWWAF0IUibDb6qGZL40c 5YnAJZh95Qvyk5Q5oCF5GsMRKWYp+PLuX6ebUAQXzehXHSFda0QhYSG8mDTi2Yu6 /pEdxCdiPOKMo1YTCraWmTps5tk/HUt4UqVwSL5YvYsvQeKdZLHq8GcdnQwEZ4h n7xzuEMTJIFg2yWm5vF49e1p6+t4b7gJtx6EuBBNmbD6Kwm+8dk5PGzauaSAphqd gK/M1NRhCmyPwb6ngCLXcd5eRqcahk/QPBR0w5h6rAClxZ1ZbjzmCmWaQL9pIwo7 gMhxkhWC91GuenbW1ZZR3UG98nVlabdo0SJrZqGFbV0+kJAqHD2Z04BnRuJIHg1Z xIYabn7AQp2dYxZmoTQL2a46hH0BZ1+9q/QPUHurVjxqjwmWRzAKOFJ2yUJrCFVU MHIqsUqN8YtTZkdA0fgLYI9wnwajs6HS8liWjvM/pve/1SazucTcN4jBi3tRLgMe I6GNaIKpBP7CbkiqthRV8qvgvhycuFJNBEMyBlbSZJxkhImctVWDbXp62CL7YImL pC+FrhT/s3RNsYStR3TGC0bcL0d70lp2egNLgAB70ixf+FvgEESoHpYLFoQB/sr6 i84cCHKuczLFE2cMR+BTURHqL8fLCq0se5FKFpQB8BXch8C0UULFbYmQEDrHJ8KR q0FCBBFRF2y0Pu2Z8K6dqaCaNmsn53rk2vCIBrg7qj5hC005vNWUacMwkjWunrb4 YPIIdKLSr7SmfYeGalDksAnVJ2ktjJq6ayNuU15c7QdzzRtbl7mwUs0NA6UQ0njfp TqrKBIyMuzIT6GodYCutn7gqYesXFKW90IBlNF0KuAzoerBITsmXjvmEqsvTUjja Q5+HSLzu32XPJ79o8kJPw4Bwah7+sDGjG0qG06LGr41QPuLGF+tldsDdqHBEj64 Qlo1GTRepCm5o9xIVZVaAtFb+o/xlosmHhHqFsVagUm2AboREDDQ5E8ctcdVYm7EU CFPwSoigMeBV85ZdSjY0bpN2DXUePKxqpFyDc1oQSN0kK0BIIIRBpwKLKLxQ6iRV KtzjoADiwl6RujTGysQVKHgTP5DRvByAhJFPr2bijNG5LJ1DWZHC0ILII5HPh1ju uqlg6eLJLpp8Gs0juKI6nowAJk0HNq8NNrh4QdW07uLHtKdml7hzhePJ0JDK2ZtT YCYYSXTfkxw+tWhVVNZfkQJqPV0FbTMIKGe5EGa6lhZB0Xjjogbw+g0HnIjnnjuE QdZ7dC6bQWygD07oxhKzAXFC0hiw0J0X08X3gmRn0785cQHDVIs0L0d1c2HqYZJe YA/KP6s1Bxe0jPMwCQYFK84PAwkFAAOCBPEA0tkfiZFz+C2m6M8HZaQAq4SLNJCC q60/UyU6fzL2Xfyb2Bnhli5sFbZCODiH/gV65DtbHFQ2vkHy0IcbBwid0FGGKxCi ZlpfLi9RPupQ5+ZdeTKdNHn2kPTruGESaBaIwojlni3NliqnYSh4Lo0C3mzpX76u harBzYwsZQ9wGDLCc5IF1Edv+cq0dH1vxt0ja2CEWV408YMaYsN4k7PuRWL2L9Ph +cYXZ7hZwW/8fiZQPFyFco9NLTYqC7u0n2VY/iyPraFPkjrL8onFv02aIvWcjboy puG0MboUD78lBptU98Lsb890Lo880zf/KrTAWq1wZSYZ2nr52Y5TusNa70cGgJYw 7oKfI5mcrbYpZtmaJnvpP+5i5pIUd4rp7zCwcZRokEiq0u5hoa00aVwfGimYUQ3D 88enXTS2pBlaaJ8fvyvVqnu9ppIF3lFYwrHgZv3YIg+EkEYgEC17T7amdmQdoSU5 PmhCqjP4rAOSqeizNCJLYbHjBjEBYw83aYLGs/ey6GLvgmVVXeqiotxq6Y0qn8xN wvC9SYZLb979dbom15dMMEZ/FdGAp91HjfnvwU12rXnzVCEwX0mKP0b6SWrz29b4 bZqSxKwLEZbIvniHx3049Nkwm7mel+1bQBwtOudcI9051CtEu/km0/8GZZHWPdkn 3bb2QzESp+ILYcohjhzS21mawkjHS1Jx6wjRAq2ie2RomHT07LRkzPrBrNLooWjX K5KZT2wNt3Hn0a0RbFpWsu9amwz/MobNyHEoUi4LWyWixyns1eWDoFnnbLuFW4d8


```
uvUPjxZ3d9EahgyHR+Q5TyRqFLY1L461HBd2bsmJX13d6922QVgfHlr5dnPsT22r
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20Ekmk6k2SLPiK8hkjosULL8UW4N0IC/j4xyn8f/f6J666w3FPHOWN2r6lpSvvyh
E0JRxImIQzq18z1ozssQtus4qRDYFTkozmCwkI3aNJMSLDxb+KPBej1vrhupQEVh
isYBoLYte35fnSUnXZhFuJ4xDp1STLK/3hrKdZuKNIKmqwV0hK3dKcKeUo8Vsl+4
RESFgooy0709PhRsSayA/U0b3LwBPYAZaEQBLRNdpvE3jfoJEOR9pZjiGsjPINR
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RpmXotNyxEeTtsippqnZnEJpFRhONwVFJjPTFITQUQnnab6n6Yl8PYSZKzi5Ue1N
CAfWv800vXi4aXpk4MvNevZSWUjiGwlBj6xG4YnuKK70WibDZt9eZ9LpAkUI7c/1
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/h0NabAwZh+ZbKWuvVQqN/NyotB3burPHm5rZyHpfNKM1/N8EINpR2Q7GZbgz7C
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-----END CERTIFICATE REQUEST-----
```

Sample public key to test the Falcon-1024 post-quantum algorithm

Use the following public key to test the Falcon-1024 post-quantum algorithm.

fal1024pub.pem

```
-----BEGIN PUBLIC KEY-----
MIIHDzAHBgUrzg8DCQOCBwIACHeueiJmb/6wEnWpDGypdCq5JSXYDWCtdEZt7LU+
NoI0wkWPM6l7oVAp81vp9UZDJzEDrGoAi4u1Bd3oejSIpJwo0KBILcC1GMG69WXN
N2LhGxmSJS5A4QhivFb1fNkdBYQRfLYy8c0Tcm6kyOMkiXYh19PcglMffJWz18GBD
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```

```
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08X3gmRn0785cQHDVIs0LOd1c2HqYZJeYA/KP6s1BxeOjPM=
-----END PUBLIC KEY-----
```

Sample private key to test the Falcon-1024 post-quantum algorithm

Use the following private key to test the Falcon-1024 post-quantum algorithm.

fal1024priv.pem

```
-----BEGIN PRIVATE KEY-----
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d9/gghF34hg8HYUhaPxB9H8n+a/3gP//9A/AJ0YxhALw0d+HQRAH8As/D74jgFwI
C5L/ofB+UAQi6AIVdJ4owBEEQ+a+QYde8Hx0AD/owD8QH+C/zwSA+IIeCB8X0k58
geiAHXx67znwAIH3++CEPvgDoIQ8EP5BiD8nwfD4W/BB8fAg/0AhCAIvydEIzDB+
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-----END PRIVATE KEY-----

```

SPHINCS+-SHA2-128f-simple (1.3.9999.6.4.13)

Use the following CSR and keys to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm with the 1.3.9999.6.4.13 object identifier (OID).

- [Sample CSR to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm](#)
- [Sample public key to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm](#)
- [Sample private key to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm](#)

Sample CSR to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm

Use the following CSR to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm.

sp128fcsr.pem

```

-----BEGIN CERTIFICATE REQUEST-----
MIJDSTB2AgEAMEIx CzAJBgNVBAYTAKNBMAwDgYDVQQLEwdFbnRydXN0MSEwHwYD
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-----END CERTIFICATE REQUEST-----

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Sample public key to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm

Use the following public key to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm.

sp128fpub.pem

```

-----BEGIN PUBLIC KEY-----
MC0wCAYGK84PBgQNAyEADkCD2dkYjz fAsSh9DFz1TTzQ6VuYfmm9yNnMwaDD3ps=
-----END PUBLIC KEY-----

```

Sample private key to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm

Use the following private key to test the SPHINCS+-SHA256-128f-simple post-quantum algorithm.

sp128fpriv.pem

```

-----BEGIN PRIVATE KEY-----
MG8CAQAwCAYGK84PBgQNBGBUjZGtLITEBX3TM64mBet0ph0rMuor/OAwkVh+/aYu
MQ5Ag9nZGI83wLEofQxc9U0800lbnH5pvcjZzMGgw96bDkCD2dkYjz fAsSh9DFz1
TTzQ6VuYfmm9yNnMwaDD3ps=
-----END PRIVATE KEY-----

```


SPHINCS+-SHA2-128s-simple (1.3.9999.6.4.16)

Use the following CSR and keys to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm with the 1.3.9999.6.4.16 object identifier (OID).

- [Sample CSR to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm](#)
- [Sample public key to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm](#)
- [Sample private key to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm](#)

Sample CSR to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm

Use the following CSR to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm.

sp128scsr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
MII f0TB2AgEAMEIxCzAJBgNVBAYTAKNBMAwDgYDVQQLEwdFbnRydXN0MSEwHwYD
VQQDEhTcGhpbmNzMTI4c3NpbXBsZUVuZGVzZXIwLTAIBgYrZg8GBBADIQDCMdkI
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-----END CERTIFICATE REQUEST-----
```

Sample public key to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm

Use the following public key to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm.

sp128spub.pem

```
-----BEGIN PUBLIC KEY-----
MC0wCAYGK84PBgQQAyEAwjHSoqo63jA72arEqHu60gap6yp7sa/d20DvIIHmZug=
-----END PUBLIC KEY-----
```

Sample private key to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm

Use the following private key to test the SPHINCS+-SHA2-128s-simple post-quantum algorithm.

sp128spriv.pem

```
-----BEGIN PRIVATE KEY-----
```

```
MG8CAQAwCAYGK84PBgQQBGAaYwScEF5RwmautTQ3MxjW++ezabe7LXPVsHaCdWY
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0gap6yp7sa/d20DvIIHmZug=
-----END PRIVATE KEY-----
```

SPHINCS+-SHA2-192f-simple (1.3.9999.6.5.10)

Use the following CSR and keys to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm with the 1.3.9999.6.5.10 object identifier (OID).

- [Sample CSR to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm](#)
- [Sample public key to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm](#)
- [Sample private key to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm](#)

Sample CSR to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm

Use the following CSR to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm.

sp192fcsr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
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-----END CERTIFICATE REQUEST-----
```

Sample public key to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm

Use the following public key to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm.

sp192fpub.pem

```
-----BEGIN PUBLIC KEY-----
MD0wCAYGK84PBgUKAzEAKYNAQ2b5QPWsvVjEdJ1EaL+i6gYwod9qWSrIIPwn/bC
jGyLq6T2Aqwm+AFt+UtA
-----END PUBLIC KEY-----
```

Sample private key to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm

Use the following private key to test the SPHINCS+-SHA2-192f-simple post-quantum algorithm.

sp192fpriv.pem

```
-----BEGIN PRIVATE KEY-----
MIGgAgEAMAgGBivODwYFCgSBkHHzWUKhenPqr fHDz/J8duR0p0h5mPueQ0NyUtpF
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8J/2woxs-i6uk9gKsJvgBbflLQA==
-----END PRIVATE KEY-----
```

SPHINCS+-SHA2-192s-simple (1.3.9999.6.5.12)

Use the following CSR and keys to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm with the 1.3.9999.6.5.12 object identifier (OID).

- [Sample CSR to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm](#)
- [Sample public key to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm](#)
- [Sample private key to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm](#)

Sample CSR to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm

Use the following CSR to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm.

sp192scsr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
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-----END CERTIFICATE REQUEST-----

```

Sample public key to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm

Use the following public key to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm.

sp192spub.pem

```

-----BEGIN PUBLIC KEY-----
MD0wCAYGK84PBgUMAZEA+irBFrQTtcqWTH1biT4hxl8xCilPNJhFRFQHwuOd1Dt+
6h+Zv8lRa0Gcgtnb1K7u
-----END PUBLIC KEY-----

```

Sample private key to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm

Use the following private key to test the SPHINCS+-SHA2-192s-simple post-quantum algorithm.

sp192spriv.pem

```

-----BEGIN PRIVATE KEY-----
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ndQ7fuofmb/JUWtBnILZ29Su7g==
-----END PRIVATE KEY-----

```

SPHINCS+-SHA2-256f-simple (1.3.9999.6.6.10)

Use the following CSR and keys to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm with the 1.3.9999.6.6.10 object identifier (OID).

- [Sample CSR to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm](#)
- [Sample public key to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm](#)
- [Sample private key to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm](#)

Sample CSR to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm

Use the following CSR to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm.

sp256fcsr.pem

```
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4cDYbS048xnNFmWIncw=
-----END CERTIFICATE REQUEST-----
```

Sample public key to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm

Use the following public key to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm.

sp256fpub.pem

```
-----BEGIN PUBLIC KEY-----
ME0wCAYGK84PBgYKA0EAjo5juJCOzaD0vkWxSu7ag7+mWrWUGwywdz1m/fSmfJwr
xRjcpz349JvFF/3efdwVHpUMvUpLhpn3FBU+sPLz9g==
-----END PUBLIC KEY-----
```

Sample private key to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm

Use the following private key to test the SPHINCS+-SHA2-256f-simple post-quantum algorithm.

sp256fpriv.pem

```
-----BEGIN PRIVATE KEY-----
MIHQAgEAMAgGBiv0DwYGCgSBw05cCXlnr015+nIth9m6uKQH10kRUWwAPcwn4sH2
wsBduM0KZ1iZR9qClrLATqGFoTEq0Ej22ILn+//rZKzEoy00jm04kI7NoM6+RbFK
7tqDv6ZatZQbDLB3PwB99KZ8nCvFGNynPj0m8UX/d593BUelQy9SkuGmfCUFT6w
8vP2jo5juJCOzaD0vkWxSu7ag7+mWrWUGwywdz1m/fSmfJwrXRjcpz349JvFF/3e
fdwVHpUMvUpLhpn3FBU+sPLz9g==
-----END PRIVATE KEY-----
```


SPHINCS+-SHA2-256s-simple (1.3.9999.6.6.12)

Use the following CSR and keys to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm with the 1.3.9999.6.6.12 object identifier (OID).

- [Sample CSR to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm](#)
- [Sample public key to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm](#)
- [Sample private key to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm](#)

Sample CSR to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm

Use the following CSR to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm.

sp256scsr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
MIJ1CjCBlgIBADBCMQswCQYDVQQGEwJDQTEQMA4GA1UECXMHRW50cnVzdDEhMB8G
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```

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hk+aFvzIfkxFU/Ryjr5cjd2l+pF/8Mjkn+rWnmCsshKrzB+T0cwYz06ZkJvWi/92x
vgIejYPZZvs+BW4P8ksyoj2SiWq+jnF4sPfygVfCLKBGWqE2bEJAYvrFS/k1v6Y
cFZlpP4ZleasWA6llKh24K8J3t1vS6eCgKlfjRg/tYDpMLE/muwJ+P+yVss0hECf
UZP9WxTxY5agCawlncNKMkNp+Tzl/ZX31wauXJ81jnpLEILRoy2/By60SWdFP6h
ydFeMK1JgrAtrKHq0LE=
-----END CERTIFICATE REQUEST-----
```

Sample public key to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm

Use the following public key to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm.

sp256spub.pem

```
-----BEGIN PUBLIC KEY-----
ME0wCAYGK84PBgYMA0EAPEQFo8tfYEYYTke08AvLYQdkbWhQV/cCuTJ4FaEt7ssE
EQ558kj7cIZVwqAhH2nDX5oLT1S33RhuknoeN2ojA==
-----END PUBLIC KEY-----
```

Sample private key to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm

Use the following private key to test the SPHINCS+-SHA2-256s-simple post-quantum algorithm.

sp256spriv.pem

```
-----BEGIN PRIVATE KEY-----
MIHQAgEAMAgBiv0DwYGDASBwP4lU4Saf09duWzWfzVD0/+0ALoS7gA+dJqTCGB9
Tj+fQcxBNF0evMG5ExT43uqz11anvYkHCN5jCL+UrvCVaM8RAWjy19gRhh0QQ7w
C+VhB2RtaFBX9wK5MngVoS3uywQRDnnyS0rtwhlXCoCEfacNfmiVPVlfdGG6Seh4
3aiMPEQFo8tfYEYYTke08AvLYQdkbWhQV/cCuTJ4FaEt7ssEEQ558kj7cIZVwqA
hH2nDX5oLT1S33RhuknoeN2ojA==
-----END PRIVATE KEY-----
```

Explicit composite algorithms

See below sample requests for the supported explicit composite algorithms.

- [Dilithium3-ECDSA-P256-SHA256 \(2.16.840.1.114027.80.5.1.2\)](#)
- [Dilithium3-RSA3072-PKCS15-SHA256 \(2.16.840.1.114027.80.5.1.1\)](#)
- [Dilithium5-ECDSA-P384-SHA384 \(2.16.840.1.114027.80.5.1.5\)](#)
- [Falcon512-ECDSA-P256-SHA256 \(2.16.840.1.114027.80.5.1.8\)](#)

Dilithium3-ECDSA-P256-SHA256 (2.16.840.1.114027.80.5.1.2)

Use the following CSR and keys to test the id-Dilithium3-ECDSA-P256-SHA256 explicit composite algorithm with the 2.16.840.1.114027.80.5.1.2 object identifier (OID).

- [Sample CSR to test the id-Dilithium3-ECDSA-P256-SHA256 composite algorithm](#)
- [Sample public key to test the id-Dilithium3-ECDSA-P256-SHA256 post-quantum algorithm](#)
- [Sample private key to test the id-Dilithium3-ECDSA-P256-SHA256 post-quantum algorithm](#)

Sample CSR to test the id-Dilithium3-ECDSA-P256-SHA256 composite algorithm

Use the following CSR to test the id-Dilithium3-ECDSA-P256-SHA256 explicit composite algorithm.

dil3ec256csr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
MIIIV2zCCCHUCAQAwQTElMAkGA1UEBhMCQ0ExEDAOBgNVBAsTB0VudHJ1c3QxIDAe
BgNVBAMTF0RpbG10aG11bTNFQ1A1YNTZfBmRVc2VyMIIKzANBgtghkgBhvprUAUB
AgOCCBgAMIIEzCCB7QdQYLKwYBBAECggsHBgUDggeHAE33J5kwbwtK03uLAESu
QqsIDJ7TFNu7GUM6IPo2F03e9rD46AcGCZqbR+92Hx3NNny8K6mZu7oo8IrRueWx
Vj3l17PjCbnJ8yta5wTswmPwKkcIz8rgdcthipi1EHeADmiiuYrMMNst0qpK2STOp
vbIkwRw5b1vwPM6BQXd8B5LAUrDaxEE3zmBdwZM/iYsRbF6eemhfOrVsvyXgMDma
0Q/a0Hvj1wvy23hK2+Y99Az5q3Q1SQUgmDOP2agAM58wUORvy4If0LTkn/YETKAv
CHtAiXQm6BJGt9WHyr56NIV99QrpywBcd+WiWIP2U7D9RWvX6A1eHkeHT5UzA6xV
K7k8IMKSBz2AYzWseba+0F2RA5f+C5ScCQS5JUUnTN9LuCwi+pJIBSjGw4ithu0
sqpT34VFXR9pgFGxrrAG98iHa2Q1bqckXXxxRW0go+LB6m+TXst8q/rv7twKv7Am
MVp6w57avQaYrCrHBE62Ta95wjPs3+le7eYVenKnwLZhBkFkKzx38S3n6cycLLPH
KHltaupny+qIB3Fb3kE5WYaMb+mLJXQeYxs5J4VW4cJj48Ub5nXdUhB3N04DAG20
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tUsCJED2Dk424+L46gwsYPjERVGyh//SWHPevDB+hH009sXnQ/kbx1shnrCm5GW3
uGHj1Bc1fwYx3WPy3xx7zt3lxvQevZ0YJkYcHNYPs5m6PWBAY1bfff9QJC88/4w
DgcmGATfJIqbTpiVVVgv7pWgxN6GGZjAzR4jEbiAINnRUALo6XECHloTvM3BxbjA
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X5UTOFYgnCtNuk12r8Nsx/Fl8RlBjWXMRFx1Whrb6+BVi27G+1XkV14T7fIuYQWA
wmH1N8YSI/Q6/XdIq/Bc4qzULmzuc+W0z9VmxvvdhAj7gitoc3KdtjoaODPDka5
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```

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+9t+0260ttXfYk5IqkH6zNkGmDtSLXmWgqzXnJTeKKc+0FmS7BwSfs681k2GDezM
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SUEqapRFoo09Y1qHctL6R6IVzC0WoSeL0PWRQEEfeBBSwt99NIUP/peK5IFC+Wn8
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w5MwfmnFJ6dXsiouSc6vHq2ap28RC1XnK25D4Nnr3NtWny4p83Uq7GfsB63l9Stn
x4UJJ3e7m3LK3+oFwPlipsK8t8BiyuDRiimtDvy0oVi383158Dlz7igmodW+2K8E
mGiTxMWhSonkIH347Y0q07YstLFpOTWggxksUeqXjGshzSN/uGaAYK4R/83i40e9
ATTZRC6d3Yy/oWQyWicyQz8bmxkg0CR2fhkLX1vkc83V7WchJrW/unVUjRwShw3
dvn7/aZa2LzVZvRDzGA58ik+K9Z5FpJHFnRijzoNInoXINnYGTGSfInyU/FxgBw/
iaXL2gkY1eovEttMpUst9J66hQ0ssTZgCLSV7BDuQP7LxAzTw4ZeIOJLnJMK76Rx
ANcUogFd7F0guR1EhnFy2r2PyXvvv/QksFNRj0Yr1cY9gpJ2j0tL4Md0dUtbt1J9
1FFcJHU0Mq9mdI2qpRZSmID23Guwrii+PnZjyMcB/6pcKENHV924H4EpDGkCecDJ
Mi5iyVq5GAx/JBjmaT4gdd8rYIwtgklWu2HjZ9kBNrYMHpv964HcBb7yy7Iu4rA0
NI9zEX9jgr4gf2I9LddSmioeHHLkRcXiQfPoZrpqUK/pt32n4pUrRBYx6vLRpsmy

```

zvzmk8m8iLJsPyfsWcKIFgCndLP8i7LhA9XxaCK5Mh6ikajzkdGmUJq65boXt4
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wH19W9YaxcGPqsq9FxxSbr1FatZiBXf+Unqq5LRWUdtW0GgcWcpOmJtkdq0FnpKh
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QYZTcxCvnMnpcTaD4Wa4SqBU7KQ3BbkcoxdjNRfLnIUkxg+9vrVwI2qrpPGWIuqQ
pY2atgJuJN5A5+wU7mJP5E+A90j3ZBaynLtfqT5l3AFwqqCm31ZpakJP7zojlfIm
LQVco8h17tbgeSww5rX0gqB3lu1w1gFBEXRNqjP9rIjN4YzE/QDNku9gZgOVTho
3AfzgjilpJL+TqWqX8rWGLW8CKaTgrDUfEMKket/Ptgrj7wddebRG4Ls3J4DFjXs
GKXWrS5hoHNA8NF7vcyXPeS1KLLGFFHuFm0T+qPBmMcPXs/jsB8T0miFP0AbmSau
Pd0UtIVqycr1eDMXu5v120/DWe8F0uL9Lb4D8YFF214cz4il/iV+c7NJ/f7vgnSJ
rqQKKQPeWaqnv9aDFEH9yNfwtFMt9qvgIJCBSBswofhcEg/ok5AcZ4842jjI3PuL
bSzGnSFNpcqIRHccg9/Uj3pX7Zlx321cGtLJnGLTExrsL+DHFQ4hA1LFoAl6Nk
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3NEGtLeupsKA5GqhYzrBIFATFH28P0cuShMoacI7m/5TTVw88QtLL0rmYYJVqNk/
xHUcKPIIMBgFDk6H1jStNSW0KLgyxcf0QFaW8NNBZULRv1vhaC8Sh18iDu+ui7p7
06gKq50Bv5xbD4YJTqx7fMFkQt3QyKLy6Z/f4fe30mFnVpnsVjPXVgVzxeZa9sj
1ChXzqhcnd24nSwLg6+waom7HU+8DJQ9yZkUI8K0dOgjuhjl50ep0hwYhkaqyc
KuPR+igPvDhRLniRcLLMnwFMA+fyCw6v/j50RVDq5A48uY8xYYBX9DYb6le65bl
fkQt7kmkKzGccFj2xMpXy8bV2+EbGSTjBCR4sa6/hTxKnXgoLIs1cb229erhgrm7
s7Dt2uv509u8IT59jH7MdfLUX9KL3HyFMOpIWSfy9RfB8ncR7NtYvSKPGMLMZgdU
k5NJoZucUsF69siwIq12DW+jx+UUTIjg3NF1la6fYu5zdAoLTDYg742GG6defMIZ
Ysr7s1FxDQimT1KBZYhDP91f07mCRs/VVGZBvbXZout9ZyACrJjVxqAVvblHaGi1
ejhdZhrk6/T99N1PT/YE70N4KSXkkRRUdB7fesfAh49Fqxvnxezy2NN0Tgn6gljW
ERxeySFXcuf+NawVUrFJAYbMP778FRxgwVcrr1nmYmLcmjVSEC1C/Pv230r0hcQe
EzaMof7BrVN3MQc4XawZLAoFGilB64FNYjSURDQrxihY3DoNFN8tddhupZas2wq7
wc1EFoJQHz2HFjLraVdvH6Fqht1wpSubB5R0GRP6ti7puMqSZdSRphR2LUFHkgKG
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4Esfz5y6Pf+LkoBOAbHj5fSI7PF8zk7WGpdw/00xjQ==
-----END CERTIFICATE REQUEST-----

```

Sample public key to test the id-Dilithium3-ECDSA-P256-SHA256 post-quantum algorithm

Use the following public key to test the id-Dilithium3-ECDSA-P256-SHA256 explicit composite algorithm.

dil3ec256pub.pem

```

-----BEGIN PUBLIC KEY-----
MIIIKzANBgtghkgBhvprUAUBAgoCCBgAMIIIEzCCB7QwDQYLKwYBBAECggsHBgUD

```



```
ggehAE33J5kwbwtK03uLAESuQqsIDJ7TFNu7GUM6IPo2F03e9rD46AcGCZqbR+92
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dSDX0eCo/bzURHK1WppqXdDMFblnmzM4YimJ7hCecQ==
-----END PUBLIC KEY-----
```

Sample private key to test the id-Dilithium3-ECDSA-P256-SHA256 post-quantum algorithm

Use the following private key to test the id-Dilithium3-ECDSA-P256-SHA256 explicit composite algorithm.

dil3ec256priv.pem

```
-----BEGIN PRIVATE KEY-----
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x + e D / G r 0 t g q u 2 R Z g q L t Q t T F m Q i i s d 9 S N m 3 0 D R C G I s g A 7 I F 1 N n j 1 2 y L z a 4 A U S E 1 X 0
l 0 0 o 4 n l W g K / L R X P 7 W p K a g Y g p q M L G g K I M o b J p A W m T Q f a w V 7 x M F f 1 5 8 a Z t 0 4 P j I i p y
q e C Q X I V W 0 p e v + 6 4 l 3 k 4 9 e b f w 3 6 c Y f Q D o s g q D K s o x h t Z N W 4 e Y X + 7 4 Z E X q H 0 Q + 4 m v Y
+ f + i x b z B 1 K W M I G g J / M 3 8 n v R x e o m z C z + C 0 x G q t x z + j L Q j 9 u K t X w n X V z M 7 Q c W 1 k r O f
7 m Z m V j R b N b c J k a f y s u Y w N d / U P V 0 I X x g P m / m + 9 E 3 s j v J V U g o a V r v g b u s 6 I A 4 0 q 0 o L
W Z F F 4 4 0 1 r o b j I M + 1 i F 1 6 y 4 Q 4 l q 8 e + 5 U C s R A 5 w X V J y W K 4 h T L B 3 B k a g 9 s g i M L 4 E 1 O S
F b G J z t C G 6 u A I b 3 Z r U h 7 P z o r j 6 n y X U r T O B u 9 d n / 2 X z A 7 D v c Z W 1 j a 3 G t Q Z T S m O w f 6 a
Y 5 u f E 1 W j j u g J 2 D g l n C Q U 3 6 o 9 p c H 3 r H J 8 f f 5 D u r s 7 A 5 U U W 0 + X z M k V 2 5 c K A l s r z g m B
u f r 6 u u K q 7 w + E b b Q 7 8 W 0 8 c n W J 0 t 1 Y y H d o J Z f B V U w V o h a l C s Q Q 0 h X T 9 e O J U / X 5 k N d 1
Y m 0 T K 8 9 0 0 Q I t g P B o 6 1 F / t D G V C 3 v E m v F e V a 0 g M G L A y t N v 2 X p A + 6 r K 5 t 0 / N s P 0 D a N
n P 1 A 5 e J D r T B R m C D U z m / u / d R 5 H 1 I 4 h g e V B N U I c / d O U / r t G G K m W X q v L Q n D E + Q v i 5 H B
M N Z V X 0 X d / a 3 / X 7 q q A C Z K s W x / l E e f Q 8 S g a a F k P V q Z G r B P 0 u 0 z C O C 0 y A P G k v S l 8 h u f
3 l W 5 w b 0 L R A Y D b A f y D i + V i x E k L z e R / c 4 R L J K f V 1 w V 5 Z t y h 0 A e O Z W 8 u y G r E s w f o P z w
A Y / m H d T Z Z m m 3 y j Q d B + J X a 1 R 7 b n L H d B z 3 H H 6 2 x E Z o 6 e S 3 S l H k 1 R f J x P R E L o y L o k y K
8 E x 2 C g k k e Y K V c I R C j F a Q q Q 9 p G X R Q 8 R L 6 v Y g k o D g X Q 3 A r n d 5 s 5 p v K S L P v E o o z 0 H O P
s 6 c a J + Q D 1 k o i 9 f a J P k J w j P y J + 3 j 8 S z 0 l C o C C j d X m p h 4 g E e 5 r 1 7 4 R M w c 4 v 9 k C s L 2 n
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D z T Y F I W E 1 n L 9 r a 8 8 F c X r L Y P Y h n A k O p j O x f 7 U Z 6 s e L 1 2 8 C t / d u s f m k 6 L m z 3 A p v X a x
E W P c 0 8 P 9 I v k 3 V y B n k K q t m E 2 Z p R K s w J P D G Q z 7 h K T Y G S q H u G 9 T 7 F M m t 2 X F a V z 3 v v w W
E P d 5 m 4 r f E Z 5 X L C T G 1 d a b K 5 D k q K i V X 5 Q L Z n q 2 t w s H E G n 6 h D 4 c 8 3 N j Z E G 1 3 r n c T q y 2
9 F w o d V y u K 0 B n U a c L 5 5 q b b Z u U 0 f i w U l J I e m J + Y 0 0 V p A A q L X J v G Z D 3 P x D Y + a B V 0 Q f A
x 4 N 9 w r m C v C M L e w K a j J S O D 3 R U w C C H y x h A 1 A r A y b q D D s q E e Q 8 c P j F K 5 F J g u K k V + v 3 1
h s 0 p 4 + b z x z p N s z + W u V 9 6 f M V 8 S S T o N O v d D j Q o A H + / L H k / s 2 a P l e r A 2 w P b R 6 t 8 I a H 5
C B m F 7 A V A K A d K j t l o Y N 7 z N 3 b 0 h P R 6 Y w Z I j P i x Y r g I i x P F s P 9 M t / d C y l L X z Y 6 v w J W D
U 4 x Q 0 Q N l 2 E H Z F d 0 v u 1 9 k 7 2 g N z c c x 4 A 3 d 4 U t v E O d o w h + m r y T c / 8 p 3 d W B x 2 Y G x + n 1 4
8 3 i u H 7 Y 7 L I 7 c / K q X U N M G 7 h 2 W 2 V / f r r z o n F Q X j b W f m s t m c o 8 r R h V 7 d W C D T Y s u H e P U
H s A 9 t p l 7 H 1 l 3 B t 1 3 7 3 v 0 7 I Y L U l w o p 2 M n P E C f 9 I r z h D i v h U j 5 v q o h Y C 3 o 2 z W T j p 7 k
6 n X k n Y M w A 7 6 V o V v k i m + 4 + 9 F S 4 f i f I 5 0 t 4 4 Z C 8 k Q 2 0 M h Q v m r G N Y L j I j D Z v t 8 7 w d D I
R y 5 p 6 Q m Y y b R M 4 Z n f E K D 6 o r b m + v d 7 U U f V o w c y 2 + W g j P E g M F D h 5 P S 1 r R K 9 f j 8 P E 2 n T
V f Y z N V 0 j 1 V o t 9 V 0 c b e J D f I z U 7 m S m N o h + + c S U 0 0 I 9 a G s v 7 d T R X P 9 2 1 + 1 u u o B f 7 I D M
h r d U c S l B 6 K X Q G p g q h z 1 2 2 x d 0 0 4 g q b 4 m N 1 Y R 4 x 9 K F m R d k Z D y n R X w A 6 S f l j t a a v Z S U
G 0 1 5 h U i x m J g 5 e I V T l 4 n z q Y 8 c I d 7 J H o Z 1 7 7 R 2 / D P I g J V 2 T q I f 0 g M I l 0 R C M m P p N N H 4
Y U B 8 u c d b L Q N m 1 v n V 9 X o 7 Z T f G U 9 S J l 5 p R i S n J d n G Z U p 0 q h C m Q T Z w L b + U K y 6 g B X 9 r C
n R Y v a P R 6 a f 2 g U 2 8 q V X x 4 N r m 8 I y I r w 6 0 h i 1 G G A p e G 9 q P J f C u 1 U 2 m p B K + 6 0 S w Z p Z S m
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K 1 r n B 0 x a Y / A q R w j P y u B 1 y 2 G m L U Q d 4 A o a K K 5 i s w w 2 y 3 S q k r Z J M 6 m 9 s i T B H D l v W / A 8
z o F b d 3 w H k s B S s N r E Q T f O Y F 3 B k z + J i x F s X p 5 6 a F 8 6 t W y / L G A w 0 Z r R D 9 r Q e + P X C / L b
e E r b 5 j 3 0 D P m r d V J B S C Y M 4 / Z q A A z n z B Q 5 G / L g h 8 6 V M q f 9 g R M o C 8 I e 0 C J d C b o E k a 3
1 Y f K v n o 0 h X 3 1 C u n L A F x 3 5 Y j A g / Z T s P 1 F a 9 f o D V 4 e R 4 d P l T M D r F U r u T w g w p I H P Y B j
N a x 5 t r 7 Q X Z E D l / 4 L l J w J B L k l R T K d M 3 0 u 4 L C L 6 k k g F i k Z b i k 2 G 4 6 y q l P f h U V d H 2 m A
U b G u s A b 3 y I d r Z D V u p y R d f H F F Y 6 C j 4 s H q b 5 N e x P y r + u / u 3 A q / s C Y x W n r D n t q 9 B p i t
y s c E T r Z n r 3 n C M + z f 6 V 7 t 5 h V 6 c q f A t m E G Q W Q r P H f x L e f p z J y U s 8 c o e W 1 q 6 m f L 6 o g H
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4 v j q D C x g + M R F U b K H / 9 J Y c 9 6 8 M H 6 E f Q 7 2 x e d D + R v H W y G e s K b k Z b e 4 Y e P U F z V / B j E X
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m J V V W C / u l a D E 3 o Y Z m M D N H i M R u I A g 2 d F Q A u j p c Q I e W h 0 8 z c H F u M B R R W X y D P D U / n + W
q L m y h v T 1 t l f A 3 u T Q D t v l d s B v Q + 4 + o S 2 v W 9 k P v a v A J 2 u P U E 5 J Y L H E l a d 8 S J 6 r 6 w W j

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-----END PRIVATE KEY-----

```

Dilithium3-RSA3072-PKCS15-SHA256 (2.16.840.1.114027.80.5.1.1)

Use the following CSR and keys to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm with the 2.16.840.1.114027.80.5.1.1 object identifier (OID).

- [Sample CSR to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm](#)
- [Sample public key to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm](#)
- [Sample private key to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm](#)

Sample CSR to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm

Use the following CSR to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm.

dil3rsacsr.pem

```

-----BEGIN CERTIFICATE REQUEST-----
MIIXjCCCT0CAQAwPjELMAKGA1UEBhMCQ0ExEDAOBgNVBAsTB0VudHJ1c3QxHTAb
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```


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-----END CERTIFICATE REQUEST-----
```

Sample public key to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm

Use the following public key to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm.

dil3rsapub.pem

```
-----BEGIN PUBLIC KEY-----  
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-----END PUBLIC KEY-----
```

Sample private key to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm

Use the following private key to test the id-Dilithium3-RSA-PKCS15-SHA256 explicit composite algorithm.

dil3rsapriv.pem

```
-----BEGIN PRIVATE KEY-----
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```


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Dilithium5-ECDSA-P384-SHA384 (2.16.840.1.114027.80.5.1.5)

Use the following CSR and keys to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm with the 2.16.840.1.114027.80.5.1.5 object identifier (OID).

- [Sample CSR to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm](#)
- [Sample public key to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm](#)
- [Sample private key to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm](#)

Sample CSR to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm

Use the following CSR to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm.

dil3ec384csr.pem

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YJTxBcV0RD02hl2rbU6DQg==
-----END CERTIFICATE REQUEST-----
```

Sample public key to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm

Use the following public key to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm.

dil3ec384pub.pem

```
-----BEGIN PUBLIC KEY-----
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-----END PUBLIC KEY-----
```

Sample private key to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm

Use the following private key to test the id-Dilithium5-ECDSA-P384-SHA384 explicit composite algorithm.

dil3ec384priv.pem

```
-----BEGIN PRIVATE KEY-----
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```


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/+zbur7HviAc5g72Jz01EFFfgXC12J9JfMw/AMDn8u4CxCkjIJOQ4MvI8mGRx+0k
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```
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bpoFBzneIOSrdSWBgSEwwR7XblAFh3rwlEFTXKIXUNMG+juiZVPoB7+UMaaScuOg
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F0JcehNrTk7fY2n8BKUwBz3Me4MDCliHME4CAQAwEAYHkoZIZj0CAQYFK4EEACIE
NzA1AgEBDBj1+4vt4XRTfv0IY0xH00RKdiCJutnDYu/UdR3o09dCDcbeGQ08qoC
ZL/axyioXM4=
-----END PRIVATE KEY-----
```

Falcon512-ECDSA-P256-SHA256 (2.16.840.1.114027.80.5.1.8)

Use the following CSR and keys to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm with the 2.16.840.1.114027.80.5.1.8 object identifier (OID).

- [Sample CSR to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm](#)
- [Sample public key to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm](#)
- [Sample private key to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm](#)

Sample CSR to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm

Use the following CSR to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm.

fal512ec256csr.pem

```
-----BEGIN CERTIFICATE REQUEST-----
MIIHYDCCBE8CAQAwQDELMAkGA1UEBhMCQ0ExEDAOBgNVBAsTB0VudHJ1c3QxHzAd
BgNVBAMTFkZhbGNvbG91bnRlbnR1c3QxHzAdBgNVBAMTFkZhbGNvbG91bnRlbnR1c3QxHzAd
A4ID8wAwggPuMIIDjzAHBgUrZg8DBgOCA4IACR+oy3XcE8Vvo0MVcWUNPunXNIfk
DaJc4FKSKZJSfZuZQJHgjJy/cjdThCwAGqixpTKcjb/Gbg+xx0oSJYEs+mmomFCk
ihV+AU2ZHCIDDb3iuXrihbZIKt0D36fJgwmcmRemX19sBlHICyLpFnuhf1kYmGf
ldxxfQp2QqmoZWY01lnFJDMoJM7KMSDEtnAOIMjftiPJKrof4GW0lqmBuFa/ghRp
d5SeEZvEEIUvzLgCqhm3ser1lR62EVlq42MWERdEE/8WkdtxmyMcLj0fEWrkWFzL
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bMvhUm8ylmaz1VfyDFilHo092LY2AvLELp4mYtT5m+MqlHUsVaPuj1csqihE9xgc
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3ofTT2T++CzAFBJGj3UwCD0jjj/hpcqJMW4kGFJLqYLiytpUFDFTGFST1J3Nhtit
msTg2UZIz7uoKThfPboJeOPxPpxsEfSS0LhYrLCVTDZlaZb55qmbBT0Vgqmb1ieW
QF06aRg+/FKk4qaTkVQdm3nexq+wKkcc0NQWQFTnqpmvIh5oa5tmYYb+0XKoxEor
cONTXW/mlF0v+XsQjx0xBCEGTuWjuMPLHA+LARYUQww0ikdhYvE7g9ErRhugILuZ
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86WXAHF4Zr4GgxhXUcyXFtupbKJGKHwIWINl8tVpI7Rp5M0CR0Ljy/Y77GRBoDw9
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w4+vPch4GMTuLRMeULMCx1Vo1m8=
-----END CERTIFICATE REQUEST-----
```


Sample public key to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm

Use the following public key to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm.

fal512ec256pub.pem

```
-----BEGIN PUBLIC KEY-----
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MNEhoUQt03YlS/VDmREGRmxIIGzL4VJvMpZms9VX2HRSJR6DvdpWNGLyxC6eJmLU
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IA3LXNn4Z3o/ZkYLSg/K1MMoD/xRbEtqQ0J4aDjxqhTovmNA9nmZvp5mTopwmU7b
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S6mC4sraVBQxUxhUk9SdzYbYrZrE4NLGSM+7qCk4Xz26CXjj8T6cbBH0kji4WKyw
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FEMMDopHYWLx04PRK0YboCJbmZCI7ycExJoN4G6HMqzkbz3r5wbOUgnWy0osX7UQ
tnmCa2rBYdHLY2TH7L29/PVn6ciYJYXDlVK1k7jeyaiokjnRojV+ZmwRgL/nVdsb
LvSY60zi2yZx3brhQ7YJRe5Sn6CPnJZAUvinzQJmPQoLazufqLIXGIY+UC3HRWvf
1hgeALKlgPFvJIuLw4jKQjEbgDAqjnAeZER1HbK80WR6U06DGdS49bcabaEx+eHa
pUmKDsgVa+WZn8F40/1kskbtN6rFSgQq5kHEuy43fuZSQzQMfmrknelK6XVgYef5
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SM49AwEHA0IABGJ8AKEahCurY45fqe7NUKW1ERY608v6si/LdTSODJ3pf3jXLMei
rmyHYPIlDMRtSINSKri89Q4WBYUs2DRf0UE=
-----END PUBLIC KEY-----
```

Sample private key to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm

Use the following private key to test the id-Falcon512-ECDSA-P256-SHA256 explicit composite algorithm.

fal512ec256priv.pem


```
-----BEGIN PRIVATE KEY-----
MIIEI8wIBADANBgtghkgBhvprUAUBCASCN0wggjZMIIKkgIBADAHBgUrzg8DBgSC
CIJZ5FDAD/88/BEABBE/D/CD/8+B8EE4CH54J+9B+B9DC86AD9CFD+965D/6G9BE
FD98E8+ACB958HB8AA7995A7C/FECE5+CI96C+8G+9HB+/AGACAA+8A+ABC/C/
+ECAE/JCE937A+FG/C65AB6A9CF57ECG+/I68GBF8E+7E+B7996BEDCCAAB+3DBB
DAD7+/D/A5/IB78/C+/54/AB/DCJG/GDAFFC76HB+C9EAD9A98AEB+HDACF8/AJ+
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IAF7+9IA/++D98+DC8/E+AE+/7AD+C/++E+C8DEE9EF+BBI/9E7ADEHDDA3B8+AB
G//KB+B/9B8A7EGBLC++B78B+85CBBE1+GF5E8+/B9/3A8AD4/+8H////K+B9CBD
59C/B/++8BA5/D+C++HC9D8B9C9BC//8CFF6K/999BB9CH7BD6A64//+AABF+7AC
```

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DCCE4ACDB8CJBBC7C9ABG+E7BHCB6E7ADDD/D//8D87749EFGDAE/59IB7AB774/
+DBE+/C/89DD+599IAD//CGCBA4F6D/3D/B8FDB+9C++/AA6+/z/+C7/D8C//8B8
C+CA86C+33P9+AD8+6BCE38FCC6C+G9A9//AB9ECI1+8DKB/E6697EE87ECJAIC/
4BADH+rc6dYD7+8I8QggKBPP/QPvz/YLChL80RwYBvrq80LSE08N8hAnIw/m4xPq
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Ch73DtZ85BYk9P8S8P/ZJgTe6tLx9sYj4/YDCSAPz/zRCx7n/uIq9uAJ3fLzC98V
59T/F/MlC/7n/fPRCTPrx0kBH+sWE/XYEiA0900KFeQA6foj50f64wgT3PALDg7/
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9f40KgELFP/1710W/QQOzwbIG9/n5/T6Mg4L/iX7KvTpHSHg/BYX9wEj1yvf6vka
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-----END PRIVATE KEY-----

19 Obtaining support

See below for getting support on your purchased products.

- [Contacting Entrust Certificate Services support](#)
- [Obtaining TrustedCare resources](#)

 To contact the Entrust sales department, fill in the form at <https://www.entrust.com/contact/sales>

Contacting Entrust Certificate Services support

To contact Entrust Certificate Services support, email ECS.Support@Entrust.com or call the following phone numbers.

- North America: 1-866-267-9297
- Outside North America: 1-613-270-2680
- Toll-free support numbers for Silver & Gold customers outside of North America: <https://www.entrust.com/knowledgebase/ssl/contact-silver-gold-support-numbers>

As explained in the following document, the availability of the support team depends on your service plan: Silver vs. Platinum.

<https://www.entrust.com/-/media/documentation/licensingandagreements/entrust-certificate-solutions-hosted-support-schedule-lg.pdf>

Obtaining TrustedCare resources

Entrust provides a comprehensive service and support program through the <https://trustedcare.entrust.com> online portal. This portal allows you to:

- Download software product updates for components you run on your premises or in your cloud.
- Browse product documentation, frequently asked questions, or technical bulletins.
- Open support cases.
- Check on the status of existing cases.