DigiCert® PKI Platform deployment options

Who should read this paper

This white paper explains some of the DigiCert PKI Platform enterprise deployment options based on an organization's current enterprise identity management methods, application requirements, and staff capabilities that are available to simplify or scale an enterprise's certificate lifecycle management process. It also covers the key features of the DigiCert PKI Client, which when deployed provides an improved user experience for end-user applications.

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Introduction

Public Key Infrastructure (PKI) is a combination of hardware, software, facilities, people, policies, and processes. It can be leveraged to create, manage, store, distribute, and revoke digital certificates. Digital certificates provide a simple, stable, scalable, and highly secure method of authenticating devices and users.

DigiCert PKI Platform is a managed service offering that allows organizations to outsource their infrastructure for managing digital certificates and leverage the best-practices and high availability of an expertly run certificate lifecycle platform.

This white paper explains some of the managed PKI service enterprise deployment options that are available to simplify or scale your enterprise's certificate lifecycle management process. This paper also covers the key features of the DigiCert PKI Client, which can be deployed to provide an improved user experience for end-user applications.

DigiCert PKI Platform

The DigiCert PKI Platform provides a full-featured solution equivalent to any on-premise PKI system with additional features and benefits, including a global validation, twenty-four hours a day, seven days a week, 365 days a year monitoring, high availability operations, and full disaster recovery.

Built on DigiCert's proven, globally managed, highly reliable infrastructure, the DigiCert PKI Platform reduces the cost and complexity associated with in-house PKI and focuses enterprises on delivering solutions, instead of infrastructure. It alleviates the burden of planning, building, and maintaining a PKI, while allowing enterprises to maintain internal control over digital certificate issuance, suspension, and revocation. Depending on your current enterprise identity management methods, application requirements, and the capabilities of your staff, you may opt to manage all certificate related user information entirely in the DigiCert PKI Platform, or integrate the managed PKI with your existing Active Directory® and Domain services. The following information will guide you through your options to help you make these decisions.

1.1 Key features

- Broad, cross-platform client support for certificate- based applications including Windows®, Mac®, iOS®, Android, or any standards-based browser client
- Supports authentication, encryption, digital signing, access control, and non-repudiation certificates out-of- the-box with flexible settings
- Public root of trust and certificate validation services
- Templatized certificate format provisioning for common applications such as VPNs, 802.11x WiFi, Web applications, Secure S/MIME email, and Adobe® CDS
- Web-based dashboard with on-demand and scheduled reports
- Simplified and automated certificate lifecycle management capabilities
- Flexible identity management options, either 100 percent in the cloud, or through an on-premise gateway to Active Directory
- Auto-configuration capabilities for iOS clients or through the DigiCert PKI Client for Windows, Mac, or Android devices

1.2 Enterprise deployment modes

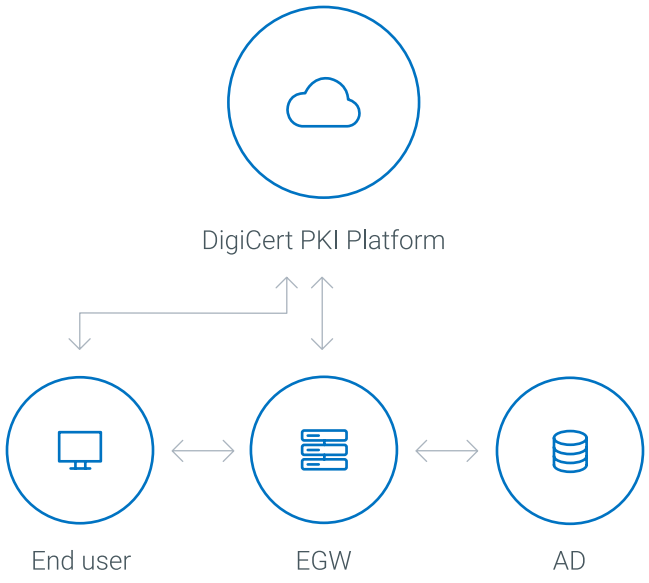
Organizations deploying a the DigiCert PKI Platform can choose a solely cloud-based identity management solution for simplicity, or deploy on-premise components to enable enterprise directory integration and automation. The available options are as follows:

1.2.1. Cloud deployment

In the cloud scenario, an enterprise can manage users directly in the cloud through DigiCert PKI Manager. Users can be managed through bulk operations as well as individually. The cloud service has a pass code distribution mechanism for authenticating the users before issuing certificates.

1.2.2. Hybrid enterprise deployment through DigiCert PKI Enterprise Gateway

The hybrid enterprise mode takes advantage of a PKI Enterprise Gateway (EGW) to provide corporate directory integration, where the EGW effectively acts as a proxy for the cloud-based service. This allows certificate metadata to be automatically populated, and certificates can be directly published in the corporate directory. The PKI EGW also acts as local Registration Authority and integrates with Hardware Security Modules to protect key material. The diagram below illustrates the hybrid deployment mode:

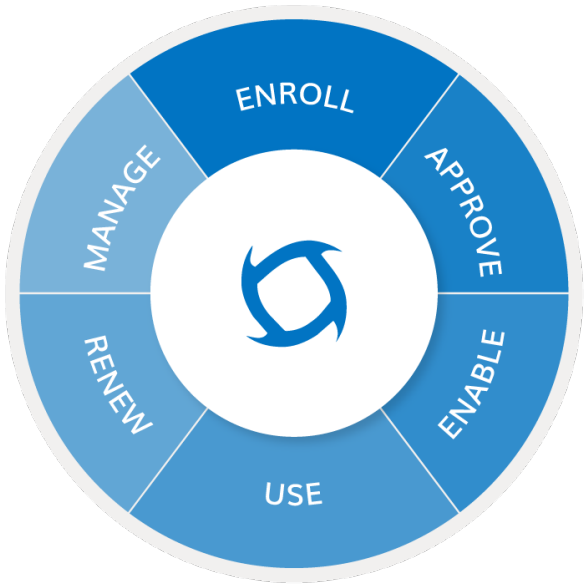


DigiCert PKI Platform options

Certificate lifecycle management is a policy-based process. Each organization using the DigiCert PKI Platform has its own management objectives and therefore defines its own policies, such as the type of certificates they issues, the method of distributing certificates, and so on.

Typically, as a best practice, certificates are issued with a finite lifespan as defined by policy. When a certificate expires, if the choice is made to renew, a new certificate will be issued. Thus, the certificate management process is a lifecycle process.

The figure below illustrates the various processes within the certificate management lifecycle:



2.1 Enrollment options

After global account policies have been defined, the enroll and approve processes are the first steps toward defining certificate policies and issuing certificates. DigiCert PKI Platform provides three distinct options for the enroll category. Within the provisioning for the chosen enrollment option are policies that will affect the enable, use, and renew options of the certificate's lifecycle.

At a high level the three enrollment options are:

2.1.1 Native browser enrollment

The native browser enrollment requires no software to be installed on the end user's computer, and works in both cloud and hybrid scenarios. Enrollment is performed through a web interface available in either Firefox® or Internet Explorer® (IE); web interfaces are continuously being added.

2.1.2 Microsoft auto-enroll client

Auto-enrollment using Microsoft auto-enroll client requires an Enterprise Gateway to be installed on-premise, and therefore works only for hybrid scenarios. Enrollment is performed through the Microsoft® auto-enrollment client distributed with the various versions of Windows; users will be automatically enrolled through their domain credentials.

2.1.3 Enrollment using DigiCert PKI Client

PKI Client is available for both cloud and hybrid scenarios, supports both Windows and Mac operating systems, and provides several lifecycle management functions as well as security policies that are not available with the other enrollment options. This does come at the cost of having to initially distribute software. However, once software is installed on an end user's computer the software automatically keeps itself current through DigiCert's Live Update technology.

Auto-enrollment is also supported by PKI Client. Auto-enrollment requires an Enterprise Gateway be installed on-premise so therefore works only for the hybrid scenario. Manual enrollment is performed through a web interface available in either Firefox or IE; browsers are continuously being added. Once enrolled, the certificate lifecycle is managed by the client through automatic renewals.

2.2 How to choose an enrollment method

When choosing an enrollment method, an organization must balance their requirements for security, usability, and scale. The method which is the most broadly supported across client platforms is browser-based enrollment. However, this method puts some of the enrollment processes in the hands of the end user. The most automated enrollment method makes the enrollment and client configuration process all but invisible to the end user. This is accomplished by utilizing either DigiCert PKI Client software, or specialized built-in client capabilities such as iOS Simple Certificate Enrollment Protocol (SCEP) -based enrollment.

A feature comparison of the three Managed PKI enrollment options is provided below to help select the best enrollment method for users. In each row, the enrollment option that best supports that particular feature is highlighted.

As the highlights in the table illustrate, the PKI Client is the preferred option for most categories. This resonates well with the vision behind Managed PKI, which in short is to revolutionize the digital certificate experience with dramatic enhancements in flexibility and usability; PKI Client is an integral part of this vision. The next section will look at some of the PKI Client differentiating features in detail.

	Native browser enrollment	Auto-enrollment using Mircrosoft auto-enroll client	Enrollment using DigiCert PKI Client
Requires software installed on end users' computers	No	No	Yes, software can be distributed through group policy or as a manual MSI installer.
Support for non-Windows platforms	Windows and Mac	No	Windows and Mac
Automatic enrollment	No	Yes	Yes
Automatic renewal	No	Yes	Yes
Automatic application enablement	No	No	PKI Client installs root certificates, configures Outlook, Juniper VPN clients, and custom application enabling scripts can be executed as well
Automatic removal of old certificates to simplify user experience	No	No	PKI Client removes old certificates from the certificate store when configured by policy, limiting the list of active certificates
Private key exportability control	None	None	Enterprise controlled by policy, high security certificates cannot be moved across machines, whereas tools exist to copy Microsoft CAPI keys even if marked as non-exportable

	Native browser enrollment	Auto-enrollment using Mircrosoft auto-enroll client	Enrollment using DigiCert PKI Client
Availability to enforce where private key is generated	None	None	Enterprise controlled by policy; for example, PKI Client can ensure that Adobe Certificate Document Services (CDS) certificates are issued to smart cards according to Adobe policy
PIN requirements	Limited support in IE	Limited support in IE	Basic PIN policy can be configured across browsers (on/off, length); future enhancements planned
Browser agnostic certificate store	No (Firefox enrollment supported, but no enrollment per today)	No Firefox support	PKI Client provides agnostic support for IE and Firefox today; other browsers are under investigation
Certificate management	Limited management through browser certificate store	Limited management through browser certificates store	PKI Client provides advanced certificate management console where users can change PINs, perform renewals, change certificate-friendly names, etc.
Transaction signing	No	No	PKI Client will provide a transaction signing API for third-party web applications to be able to perform digital signatures

2.3 DigiCert PKI Client software

PKI Client can issue and automatically renew DigiCert manged PKI software and hardware certificates for a simplified user experience that works across various web browsers. This section describes some of the key features of PKI Client.

2.3.1 Streamlined PKI lifecycle management

PKI Client offers a uniform enrollment experience regardless of the browser that is used for enrollment. The certificate store is also browser agnostic, meaning the user can enroll in Firefox and have the certificate available for usage in IE. PKI Client supports auto-enrollment, where end users automatically have certificates installed based on their domain credentials.

One of the main issues facing enterprises is renewal of certificates before they expire. DigiCert PKI Client automatically renews certificates that are not PIN-protected, and will ask the user to renew PIN-protected certificates well before they expiration date.

2.3.2 Centralized policy management for security and convenience

Policies dictating how credentials are secured on the client, such as user PIN and export policies, can be configured for PKI Client through PKI Manager. Policy also allows the enterprise to control which physical store to use for the certificates that are enrolled. This option is important in terms of ensuring that high security certificates, such as a smart card or USB token, end up in the appropriate store.

Friendly names for certificates can also be set through policy (as well as customized by the user), and provide the user a more recognizable credential for authentication. Furthermore, policy can dictate whether to remove certificates from the user's certificate store on renewal. This feature ensures that in scenarios where users do have to select between certificates, only relevant certificates show up in the list presented to the user.

2.3.3 Post-processing framework

After a certificate is enrolled on an end user's computer, it is still necessary for the user to configure the certificate for usage with their applications. To simplify the end user experience, PKI Client offers a post-processing framework that automatically takes care of the application configuration. The framework can also be extended to perform custom configurations. The following applications are supported by the post-processing framework out of the box: Juniper® VPN Client

- Cisco® VPN client
- Check Point® VPN client
- Outlook® 2007 and 2010
- Installation of root/intermediate certificates for IE and Firefox
- Install PKCS#11 module in Firefox (basically exposing the enrolled certificate in Firefox)
- Publish S/MIME encryption certificate to the user attribute in Active Directory for cloud scenarios
- Configure WiFi connections for Microsoft® WiFi client

2.3.4 PKI Client use cases

Studies have shown that PKI deployments are most successful when the certificates are made transparent to the user; so that end users are not required to make technical choices regarding certificates. Through the PKI Client integration with the DigiCert PKI Platform and the post-processing framework, the certificate experience can largely be hidden from the end user.

Example use cases supported by the DigiCert PKI Client include:

1. **WiFi PKI certificates for enterprise users authenticated through Active Directory credentials:**

   One simple PKI enrollment flow with very few clicks for ENROLL, APPROVE, and ENABLE:

   - Enroll the certificate using a Web interface
   - Authenticate the user with active directory credentials through Enterprise Gateway
   - The certificate is enabled for WiFi automatically by PKI Client

   USE: no action required from user to authenticate to a WiFi network

   RENEW: no action required from user, PKI Client will automatically renew the certificate and delete the expired certificate from the client computer

2. **SSL client authentication for enterprise website using Active Directory:**

   One simple PKI enrollment flow with very few clicks for ENROLL, APPROVE, and ENABLE:

   - Enroll the certificate using a web interface
   - credentials through Enterprise Gateway
   - The certificate is enabled for WiFi automatically by PKI Client

   USE: one click to choose the certificate identified by a friendly name

   RENEW: no action required from user, PKI Client will automatically renew the certificate and delete the expired certificate from the client computer

2.3.5 Certificate management console

The end user will be able to perform the following operations using the certificate management console provided by PKI Client console:

- Change PIN for a device
- Manually renew certificates
- Export certificates
- Import certificates
- View diagnostics information to help troubleshooting
- See a list of certificates on their system
- Be able to view certificate details of individual certificates
- Delete individual certificates
- Erase all certificates from a device

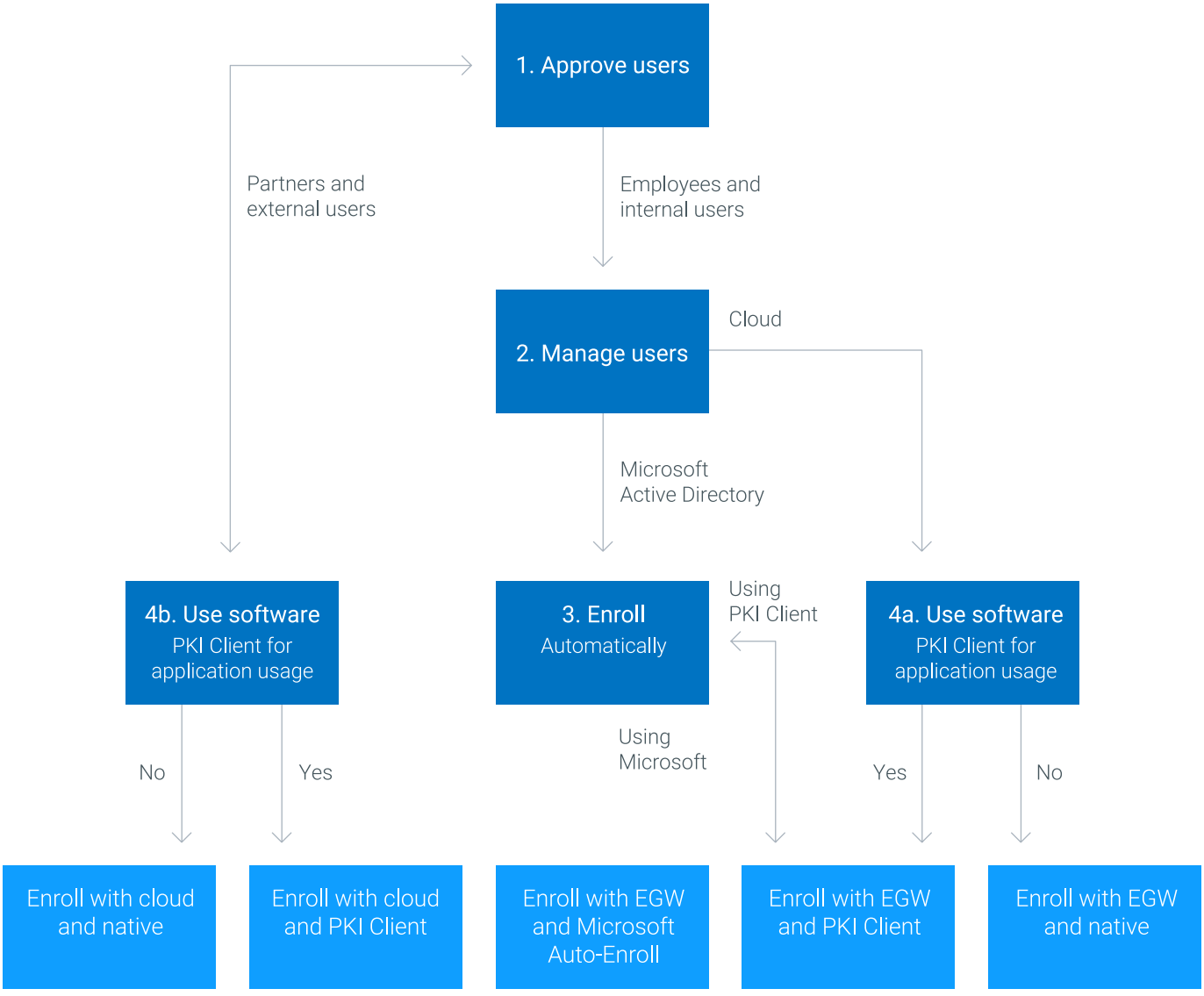
2.3.6 PKI Client support matrix

The table below provides the support matrix for PKI Client:

Description	Application/Versions
Microsoft Windows	• Windows 8.1 (32/64 bit) • Windows 7 (32/64 bit)
OSX	• 10.9.5 • 10.10.3
Browsers	• Internet Explorer 9/10/11 • Firefox 38 • Safari 7/8 • Chrome 43
Email Clients	• Outlook 2007/2010 • Mail App (OSX) • Thunderbird 3
Document Signing	• Adobe Acrobat 9/X • Word 2007/2010
Smart Cards	• Aladdin Token
Languages	• English • German • Japanese • Spanish (traditional) • French • Norwegian • Portuguese (Brazilian)

Selecting the right certificate enrollment method and lifecycle

The decision tree below highlights a few common questions an administrator should ask regarding their PKI deployment, along with the recommended enrollment methods:



1. **Approve Users** - The first path concerns whether the end user base is internal or external. If the end users are external (for example, partners), they are most likely not in an Active Directory infrastructure within the organization, and would need to be managed through the DigiCert cloud infrastructure.
2. **Manage Users** - Assuming the end-user base is internal, the enterprise has a choice of whether to manage users through the cloud, or install an Enterprise Gateway, which can perform authentication directly against an Active Directory infrastructure.
3. **Enroll** - If the enterprise has chosen to deploy an Enterprise Gateway, the next question is whether to automatically enroll users. If automatic enrollment is desired to simplify the enrollment experience, the administrator can configure the auto-enrollment service that is installed as part of the Enterprise Gateway. This will take advantage of the Microsoft auto-enrollment client.
4. **Use Software**

    4a) Assuming auto-enrollment is not a requirement, the next question is whether to deploy PKI Client. The client can easily be pushed out to end user's computers through standard Microsoft group policy installation.

    4b) Similar to 4a) above, but for cloud deployments, the enterprise must decide whether to deploy PKI Client. The difference in this scenario is that since the external customer's computers may not be available in a domain, the software distribution would be more complicated and Native enrollment may be preferred.

Want to try before you buy?

More information and trials are available for the DigiCert PKI Platform on the web at www.digicert.com.

About DigiCert

DigiCert, with the addition of Symantec's Website Security business, is a leading global provider of digital certificates. The world's leading banks, e-commerce, technology, healthcare and manufacturing companies rely on us to provide scalable encryption and authentication for their most valuable online properties. Beyond the web, DigiCert innovates with leading scalable, automated PKI-based solutions for identity, authentication, and encryption for the Internet of Things (IoT) and other emerging, connected markets.

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