

OpenXPKI Manual

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OpenXPKI Manual

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Chapter 2. Introduction

Abstract

This manual aims to describe the installation and use of the OpenXPKI software, an open source trustcenter solution written by The OpenXPKI Project. The intended audience are CA administrators and operators. We assume that readers are familiar working on a Unix shell and have enough background knowledge about Public Key Infrastructures to understand the relevant terms. Currently we do not have an end-user manual available, but help for the user should instead become part of the web interface.

The OpenXPKI manual is split into four main parts:

1. The introduction, which you are reading right now. Following this abstract, you will learn more about where to get the software, where to get help. Furthermore, a high-level overview of the system design and some key concepts will be presented.
2. The “Quick Start” chapter lays the emphasis on getting a minimal Certificate Authority (CA) without any bells and whistles running. Reference to further configuration options is provided inline, so that you know where to look if you want to configure more advanced features. Please note that setting up a working CA is a complex task and thus the “quick” in “quick start” may be a bit euphemistic.
3. Following the quick start, more information on the workflow engine and the pre-defined workflows is given. This section also provides help if you are looking for information on implementing your own custom workflow.
4. The last chapter is called “Reference” and provides just that – information on all of the various configuration options concerning databases, cryptographic settings, workflows and access control, manuals for the various administrative and deployment tools as well as some information on where to look if something goes wrong.

Key features

Assuming this is your first contact with OpenXPKI here is a quick summary of what it is and what it is capable of.

OpenXPKI aims to be an enterprise-scale Public Key Infrastructure (PKI) solution, supporting well established infrastructure components like RDBMS and Hardware Security Modules (HSMs). It is the successor of OpenCA, and builds on the experience gained while developing it.

- CA rollover: “Normal” trust center software usually does not account for the installment of a new CA certificate, thus if the CA certificate becomes invalid, a complete re-deployment has to be undertaken. OpenXPKI solves this problem by automatically deciding which CA certificate to use at a certain point in time.
- Support for multiple so-called “PKI realms”: Different CA instances can be run in a single installation without any interaction between them, so one machine can be used for different CAs.
- Private key support both in hardware and software: OpenXPKI has support for professional Hardware Security Modules such as the nCipher nShield or the Chrysalis-ITS Luna CA modules. If such modules are not available, access to a key can be protected by using a threshold secret sharing algorithm.
- Professional database support: The user can choose from a range of database backends, including commercial ones such as Oracle or DB2, which are typically used in enterprise scenarios.

- Many different interfaces to the server: Currently, one can access the CA server using a web-interface (which also allows for client-side request generation using SPKAC) or using a command line client. Embedded devices such as routers can use the Simple Certificate Enrollment Protocol (SCEP) to talk to the server and apply for certificates.
- Workflow Engine: OpenXPki aims to be extremely customizable by allowing the definition of workflows for any process you can think of in the PKI area. Typical workflows such as editing and approving certificate signing requests, certificate and CRL issuance are already implemented. Implementing your own idea is normally pretty easy by defining a workflow in XML and (maybe) implementing a few lines in Perl.
- I18N: Localization of the application and interfaces is easily possible and OpenXPki can of course deal with the whole range of Unicode characters in certificates.
- Self-Service application for token personalization: A web application which allows a user to easily create and install certificates to a smartcard is available.

Resources

Website

The official OpenXPki website is at <http://www.openxpki.org>. There, you can find all relevant information on OpenXPki, i.e. news, documentation, security advisories as well as the software itself. Furthermore, the website provides legacy documentation for the OpenCA software.

Sourceforge

All of the development efforts take place on Sourceforge.net [<http://www.sourceforge.net>], a collaborative software development platform. There, you can browse our Subversion source repository, download the latest release from one of many mirrors, report bugs or file requests for new features. It also hosts the various mailing list the project uses. The project page is at <http://www.sourceforge.net/projects/openxpki/>.

Checking out the source using subversion

If you are interested in helping out with developing or want to check out the latest development, you may want to download the latest development version using Subversion. To do so, simply type **`svn co https://svn.sourceforge.net/svnroot/openxpki openxpki`** into your favourite shell.

Mailing lists

Development discussions and support mostly take place on one of the project's mailing lists. These currently are:

- openxpki-devel: Here, development issues are discussed among the developers, but source-related or very technical questions are welcome here as well.
- openxpki-users: This is the mailing list for the users of OpenXPki and the place where you should post if you still get stuck after looking up things in the manual
- openxpki-svn: This is the place where all Subversion checkins are sent to. It is thus only relevant/useful for developers.

To post to one of the lists, send a mail to *listname*@lists.sourceforge.net. If you want to subscribe to one of the lists, email to *listname*-request@lists.sourceforge.net with a subject of "subscribe".

Consulting Services and Commercial Support

OpenXPKI users are invited to use the mailing lists to get free support. However, our software is admittedly complex and it is not always possible to solve complicated requirements via email. Hence if you plan to deploy OpenXPKI in your organization, you may be in need of professional support in order to attain your project goals.

Currently, commercial support and OpenXPKI consultancy is offered by the following companies:

- Cynops GmbH – network security engineering. Cynops is an IT security consulting and development company which has been heavily involved in OpenXPKI development from the very beginning and is committed to supporting the project. A considerable part of OpenXPKI's system architecture and project source code has been contributed by Cynops employees. The company has experience in customization, deployment and integration of open source PKIs (OpenCA, OpenXPKI) in enterprise environments.

Overview

System Design

Server architecture

Clients

Public Key Infrastructure (PKI)

PKI Realms

CA Rollover

Chapter 3. Quickstart

Installation

Compilation and Module installation

Assuming you've gotten a source tree from somewhere (i.e. either an official release tar-ball or a Subversion checkout), enter the `trunk/perl-modules/core/trunk` directory. Run **perl Makefile.PL** to create a Makefile. If this should fail, please make sure that you have installed all required Perl modules. If you don't, you can install them using either software packages from your distribution or by using the CPAN shell. If it works, you can compile OpenXPKI using **make**. Once that is taken care of, make sure to run **make test** to see if the compiled OpenXPKI runs correctly. **make install** completes the installation of the Perl modules. Note that if you want to install OpenXPKI locally, i.e. into your home directory, you can run **perl Makefile.PL PREFIX=directory** in the first step to prepare for an installation below *directory*.

Now you have all the required modules for the server installed. As the administrative tools use code of the OpenXPKI client as well, you need to install the corresponding modules, too. They come in handy later on when you want to set up a client (such as the Mason-based web interface) as well. Change to the `trunk/clients/perl/OpenXPKI-Client` directory and repeat the same steps as above, again using **perl Makefile.PL PREFIX=directory** if necessary.

Initial (pre-deployment) configuration

Before being able to run the server, the administrative tools and the (base) configuration have to be deployed. To install them, change into the `trunk/deployment` directory. Run **./configure**, or (if you want to install into a local directory) **./configure --prefix directory**. Then, run **make** and **make install** to install the tools.

Deployment

To install the meta configuration file (`openxpki.conf`), run **openxpkiadm deploy --template quickstart**. Follow the instructions and run **openxpki-configure**. This is an interactive tool that allows you to specify some of the basic configuration options. The most important options that you need to set right now are the location of your openssl binary (defaults to `/usr/bin/openssl`) and your database configuration. Exit the tool and allow it to write the modified configuration. Depending on the deployment style, you now have one huge `config.xml` or a number of smaller XML files in your `etc/openxpki` directory. These are the files that are actually used by the OpenXPKI server and which you can modify later to set up your desired behaviour. After having set up a database using your favourite tool for your favourite DBMS, you should run **openxpkiadm initdb** to set up the database schema. If everything goes right, try to start the OpenXPKI server using **openxpkictl start**. If you see "DONE." in the last line of output, this works and the OpenXPKI server is up and running. Stop it for now using **openxpkictl stop**. If it goes wrong, please check your `PERL5LIB` environment variable. This variable needs to include the location where your Perl modules were installed (which depends on your `PREFIX` setting).

Setting up the web interface

So now you've got a working server, but of course you can not see very much of it, which is why the installation of the web interface will be the next step. Change into the `trunk/clients/perl/OpenXPKI-Client-HTML-Mason` directory and run **perl Makefile.PL** (again adding the `PREFIX` option if necessary), **make** and **make install**. This installs the needed client modules. In the next step, copy the `htdocs` directory to a path of your liking that is readable by your webserver. We will refer to this directory as the (Mason) component root later on.

For the rest of this section, we assume you are using Apache as your webserver. Installation under different webrowsers is possible, but you are largely on your own here. There are two different options how to install the OpenXPki Mason client – either using `mod_perl` or using CGI. If you have `mod_perl` available, go for it, as it is much faster than using CGI. CGI is not recommend for production use, but to quickly try out OpenXPki, it works.

Installing using `mod_perl`

Use the `eg/openxpki-mason-mod_perl.conf` file as a boilerplate for your Apache configuration. You need to change four variables defined in this file. The first one is the `MasonDataDir` variable, which should point to a directory that is writable by your webserver user. This is a directory where Mason temporarily caches its components. The second one is the `MasonCompRoot` variable, which should point to the component root that you chose earlier. Furthermore, you need to set up `OPENXPki_SOCKET_FILE` to point to your OpenXPki socket file. Note that this file needs to be readable and writable by both your OpenXPki user as well as the webserver user – the easiest way to achieve this is putting them in a common group. You can look up the location of the socket file in your `config.xml`. The last variable is `OPENXPki_LOCALE_PREFIX`, which needs to point to your `locale` directory if you have installed it in a non-standard path.

Setting up the CA certificate and key

Configuration

Meta-Configuration

Administration

PKI Realm Setup

CA Setup

Key generation

Certificate signing request generation

CA Certificate installation

User Administration

RA Operator

CA Operator

Running OpenXPki

Server startup

Client test

Chapter 4. Workflow Engine

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Shipped workflow implementations

Certificate Signing Request

Browser request

Certificate Issuance

Smartcard Personalization

Simple Certificate Enrollment Protocol (SCEP)

Data Exchange

Custom workflows

Definition (XML configuration)

Implementation (Perl modules)

Chapter 5. Reference

Configuration

Base configuration

Daemon settings

Database

PostgreSQL

MySQL

Oracle

DB2

Cryptographic Settings

Crypto Backends

Hardware Security Modules (HSMs)

nCipher

OpenSC

LunaHSM

Key and PIN management

PIN entry

per session

per server lifetime

Secret splitting

CA Certificate profile

CRL profile

End entity profile

Workflow configuration

Definitions

Activities

Conditions

Validators

Access Control

Authentication

Mechanisms

Authorization

Built-in (configuration file)

Administration tools

`openxpkiadm`

`openxpkictl`

Deployment tools

`openxpki-configure`

Troubleshooting

Log files

Debugging

Glossary

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