Using Curve25519 and Curve448 in PKIX
draft-josefsson-pkix-newcurves-01

Abstract

This document specify "named curve" object identifiers for the Curve25519 and Curve448 curves, for use in various X.509 PKIX structures.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on April 14, 2016.

Copyright Notice

Copyright (c) 2015 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust’s Legal Provisions Relating to IETF Documents (http://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.
1. Introduction

In [I-D.irtf-cfrg-curves], the elliptic curves Curve25519 and Curve448 are described. They are designed with performance and security in mind. The curves may be used for Diffie-Hellman and Digital Signature operations.

This RFC define ASN.1 "named curve" object identifiers for Curve25519 and Curve448, for use in the Internet X.509 PKI [RFC5280].

Rather than defining a new subject public key format for these two curves, this document re-use the existing ECDSA/ECDH public-key contained (described in section 2.3.5 of [RFC3279]) and introduce two new "named curve" OIDs. This approach is the same as for the Brainpool curves [RFC5639].

2. Requirements Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

3. Curve25519 and Curve448 Named Curve Identifier

Certificates conforming to [RFC5280] may convey a public key for any public key algorithm. The certificate indicates the algorithm through an algorithm identifier. This algorithm identifier is an OID and optionally associated parameters. Section 2.3.5 of [RFC3279] describe ECDSA/ECDH public keys, specifying the id-ecPublicKey OID. This OID has the associated EcpkParameters parameters structure, which contains the namedCurve CHOICE. Here we introduce two new OIDs for use in the namedCurve field.

```
id-Curve25519 OBJECT IDENTIFIER ::= { 1.3.6.1.4.1.11591.15.1 }
id-Curve448 OBJECT IDENTIFIER ::= { 1.3.6.1.4.1.11591.15.2 }
id-Curve25519ph OBJECT IDENTIFIER ::= { 1.3.6.1.4.1.11591.15.3 }
id-Curve448ph OBJECT IDENTIFIER ::= { 1.3.6.1.4.1.11591.15.4 }
```

The OID id-Curve25519 refers to Curve25519. The OID id-Curve448 refers to Curve448. Both curves are described in [I-D.irtf-cfrg-curves]. The OIDs id-Curve25519ph and id-Curve448ph refers to Curve25519 and Curve448 when used with pre-hashing as Ed25519ph and Ed448ph described in [I-D.irtf-cfrg-eddsa].

The public key value encoded into the ECPoint value is the raw binary values described in [I-D.irtf-cfrg-curves].
4. Acknowledgements

Text and/or inspiration were drawn from [RFC5280], [RFC3279], [RFC5480], and [RFC5639].

Several people suggested the utility of specifying OIDs for encoding Curve25519/Curve448 public keys into PKIX certificates, the editor of this document cannot take credit for this idea.

5. IANA Considerations

None.

6. Security Considerations

The security considerations of [RFC3279], [RFC5280], [RFC5480] and [I-D.irtf-cfrg-curves] apply accordingly.

7. References

7.1. Normative References


7.2. Informative References


Author’s Address

Simon Josefsson
SJD AB

Email: simon@josefsson.org