Abstract

PKCS #9 includes several useful definitions that are not yet reflected in the LDAP IANA registry. This document adds those definitions to the IANA registry.

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1. Introduction

This document registers the LDAP [RFC4510] schema definitions [RFC4512] for a subset of elements specified in PKCS #9 [PKCS9], including attribute types; matching rules and syntaxes to be used with these attribute types; and related object classes.

As the elements and their semantics are defined in [PKCS9], this document needs to be read in conjunction with [PKCS9] to make use of the LDAP registrations provided herein. [PKCS9] provides complete definitions, with one significant omission: the IANA Considerations section was never appended. This document provides the IANA Considerations section necessary to register appropriate descriptors.

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 [BCP14].

2. Syntaxes

Appendix B.1 of [PKCS9] describes various syntaxes used in LDAP to transfer PKCS #9 elements and related data types.

3. Matching Rules

Appendix B.4 of [PKCS9] provides matching rules for use in LDAP.

4. Attribute Types

Appendix B.3 of [PKCS9] details attribute types for use in LDAP, including (by its own admission) attributes that are highly unlikely to be stored in a Directory. The attributes in Appendix B.3 that are not highly unlikely to be stored in a Directory are registered via this document.

[PKCS9] includes certain attribute types that have found meaningful use outside of the PKCS series. Specifically:

- emailAddress is mandated in [RFC5750], and has mandatory processing requirements if included in a certificate [RFC5280].
- [RFC5280] recommends the recognition of pseudonym.
- The Qualified Certificates Profile [RFC3739] requires both pseudonym and the vital records dateOfBirth, placeOfBirth, gender, countryOfCitizenship, and countryOfResidence.
- "DESC" is sometimes emitted for the description (2.5.4.13) attribute.

As a result, certain applications not only encounter and generate
these attributes in practice, but also use short descriptors that have come to be widely recognized.

4.1. Semantics of dateOfBirth Clarified

[PKCS9] Section 5.2.4 states that dateOfBirth "is the date of birth for the subject it is associated with." Its GeneralizedTime syntax, however, requires time and time zone specifications that are not related to dateOfBirth’s semantics.

[RFC3739] RECOMMENDS that the time recorded be GMT (i.e., UTC) noon down to the granularity of seconds "in order to prevent accidental change of date due to time zone adjustments." Since contemporary time zones range from -1200 to +1400, however, naive processing will misinterpret this value by one day for timezones significantly ahead of UTC.

Since all specifications are under the change control of the IETF, the semantics of dateOfBirth are hereby defined: in dateOfBirth, only the date is meaningful. Parsers that need to convert the GeneralizedTime value to a specific point in time MUST decode the date in the UTC timezone to avoid shifting of the date due to timezone differences (such as in +14). Thus, a subject born in GMT+1400 will have a GeneralizedTime value that is essentially one day ahead (2am), when interpreted literally.

When stored in LDAP, a conformant implementation MAY record this value in UTC or in local time, but MUST NOT record this value with a timezone offset. I.e., [X.680] subclauses 46.2 a) and b) and 46.3 a) and b) are acceptable; subclauses 46.2 c) and 46.3 c) are not acceptable. [[TODO: get consensus on this.]] When comparing such values, "local time" values SHALL be compared as if the local time is UTC.

The following sentence of [RFC3739] Section 3.2.2 remains in effect for both certificate and non-certificate uses: "Compliant [certificate] [sic] parsing applications SHOULD ignore any time data and just present the contained date without any time zone adjustments."

4.2. Short Descriptors for Certain Useful Attribute Types

As permitted by Section 3.4 of [RFC4520], the short descriptors in Table 1 are registered along with their more verbose counterparts reflected in [PKCS9]:

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4.3. Short Descriptors for Certain Other Attribute Types

As permitted by Section 3.4 of [RFC4520], the short descriptors in Table 2 are registered along with their more verbose counterparts elsewhere:

<table>
<thead>
<tr>
<th>Short Descriptor</th>
<th>Regular Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>desc</td>
<td>description</td>
</tr>
</tbody>
</table>

Table 2: Short Descriptors for Certain Attribute Types

6. PKCS Attribute Types

Security-related applications make use of the Object Identifier Descriptors registry, but these registrations are not likely to be used directly by Directory (LDAP) applications. It is apparent that the descriptors for these applications occupy the same broad namespace, although LDAP-related technologies (including distinguished names, which are used outside of LDAP) have very little use for descriptors used by security applications, and vice-versa.

This section modifies the LDAP Descriptor Registration Template (Appendix A.4 of [RFC4520]) to permit an additional Usage: PKCS attribute type. LDAP implementations do not need to recognize these types. Conversely, PKCS (including PKIX and CMS) applications do not need to recognize non-PKCS attribute types when the context calls for PKCS attribute types (e.g., in CMS [RFC5652] and private key [RFC5958] attributes).

Generally, the proper way to store PKCS attributes in a directory is to include the attributes within a corresponding PKCS object, and then to store the PKCS object (e.g., PKCS #12 object [RFC7292]) in the appropriate attribute in the pkcsEntity auxiliary object class (Section 4.1 of [PKCS9]).
The remaining attributes in [PKCS9] are registered as PKCS attribute types in this document.

5. Object Classes

Appendix B.2 of [PKCS9] details a set of object classes for use in LDAP.

6. Security Considerations

PKCS #9 security considerations (written for the RFC edition) [PKCS9] apply to the definitions in this document. LDAP security and privacy considerations in [RFC4510] and [RFC4512] apply as well.

Some attributes such as dateOfBirth and placeOfBirth may be subject to privacy laws in certain jurisdictions. If conveyed with LDAP, these attributes ought to be returned over a protected channel, such as TLS.

7. IANA Considerations

The IANA shall register an LDAP Object Identifier [RFC4520] for use in this technical specification. The IANA shall update the Note in the LDAP Descriptor registry [RFC4520] to include the new usage PKCS Attribute Type, with symbol P. The IANA shall update the LDAP Descriptor registry [RFC4520] with definitions from [PKCS9] as indicated below.

7.1. Object Identifier Registration

Subject: Request for LDAP OID Registration
Person & email address to contact for further information:
    Sean Leonard <dev+ietf@seantek.com>
Specification: draft-seantek-ldap-pkcs9
Author/Change Controller: IESG
Comments:
    Identifies the PKCS #9 schema elements registered in the IANA LDAP Descriptor and Syntaxes registries via this document.

7.2. Descriptor Registration

Subject: Request for LDAP Descriptor Registration
Descriptor (short name): see table
Object Identifier: see table
Person & email address to contact for further information:
    Sean Leonard <dev+ietf@seantek.com>
Usage: see table
Specification: draft-seantek-ldap-pkcs9
Author/Change Controller: IESG

pkcsEntity  O  1.2.840.113549.1.9.24.1
naturalPerson  O  1.2.840.113549.1.9.24.2

pKCS7PDU  A  1.2.840.113549.1.9.25.5
userPKCS12  A  2.16.840.1.113730.3.1.216
pKCS15Token  A  1.2.840.113549.1.9.25.1
encryptedPrivateKeyInfo  A  1.2.840.113549.1.9.25.2

e  A  1.2.840.113549.1.9.1

unstructuredName  A  1.2.840.113549.1.9.2
unstructuredAddress  A  1.2.840.113549.1.9.8

dob  A  1.3.6.1.5.5.7.9.1
dateOfBirth  A  1.3.6.1.5.5.7.9.1
pob  A  1.3.6.1.5.5.7.9.2
placeOfBirth  A  1.3.6.1.5.5.7.9.2
g  A  1.3.6.1.5.5.7.9.3
gender  A  1.3.6.1.5.5.7.9.3
coc  A  1.3.6.1.5.5.7.9.4
countryOfCitizenship  A  1.3.6.1.5.5.7.9.4
cor  A  1.3.6.1.5.5.7.9.5
countryOfResidence  A  1.3.6.1.5.5.7.9.5

pnym  A  2.5.4.65
desc  A  2.5.4.13

contentType  P  1.2.840.113549.1.9.3
messageDigest  P  1.2.840.113549.1.9.4
signingTime  P  1.2.840.113549.1.9.5
randomNonce  P  1.2.840.113549.1.9.25.3
sequenceNumber  P  1.2.840.113549.1.9.25.4
counterSignature  P  1.2.840.113549.1.9.6
challengePassword  P  1.2.840.113549.1.9.7
extensionRequest  P  1.2.840.113549.1.9.14
extendedCertificateAttributes  P*  1.2.840.113549.1.9.9
friendlyName  P  1.2.840.113549.1.9.20
localKeyId  P  1.2.840.113549.1.9.21
signingDescription  P  1.2.840.113549.1.9.13
smimeCapabilities  P  1.2.840.113549.1.9.15

pkcs9CaseIgnoreMatch  M  1.2.840.113549.1.9.27.1
signingTimeMatch  M  1.2.840.113549.1.9.27.3
7.3. PKCS9String Syntax Registration

    Subject: Request for LDAP Syntax Registration
    Object Identifier: 1.2.840.113549.1.9.26.1
    Description: PKCS9String
    Person & email address to contact for further information:
        Sean Leonard <dev+ietf@seantek.com>
    Specification: draft-seantek-ldap-pkcs9
    Author/Change Controller: IESG
    Comments:
        Identifies the PKCS #9 String syntax, which is a CHOICE of IA5String and DirectoryString.

7.4. SigningTime Syntax Registration

    Subject: Request for LDAP Syntax Registration
    Object Identifier: 1.2.840.113549.1.9.26.2
    Description: SigningTime
    Person & email address to contact for further information:
        Sean Leonard <dev+ietf@seantek.com>
    Specification: draft-seantek-ldap-pkcs9
    Author/Change Controller: IESG
    Comments:
        Identifies the SigningTime syntax, which is Time, which is a CHOICE of UTCTime and GeneralizedTime.

8. Acknowledgements

    This document relies on PKCS #9, a product of RSA Laboratories.

9. References

9.1. Normative References


9.2. Informative References


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