

**Lightweight Directory Access Protocol (LDAP):  
The Binary Encoding Option**

Copyright (C) The Internet Society (2006).

Status of this Memo

By submitting this Internet-draft, each author represents that any applicable patent or other IPR claims of which he or she is aware have been or will be disclosed, and any of which he or she becomes aware will be disclosed, in accordance with [Section 6 of BCP 79](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

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".

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/lid-abstracts.html>

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>

Technical discussion of this document should take place on the IETF LDAP Revision Working Group (LDAPbis) mailing list <ietf-ldapbis@openldap.org>. Please send editorial comments directly to the editor <steven.legg@eb2bcom.com>.

This Internet-Draft expires on 30 July 2006.

Abstract

Each attribute stored in a Lightweight Directory Access Protocol (LDAP) directory has a defined syntax (i.e., data type). A syntax definition specifies how attribute values conforming to the syntax are normally represented when transferred in LDAP operations. This representation is referred to as the LDAP-specific encoding to distinguish it from other methods of encoding attribute values. This

document defines an attribute option, the binary option, which can be used to specify that the associated attribute values are instead encoded according to the Basic Encoding Rules (BER) used by X.500 directories.

## Table of Contents

<a href="#">1.</a>	Introduction . . . . .	<a href="#">3</a>
<a href="#">2.</a>	Conventions. . . . .	<a href="#">4</a>
<a href="#">3.</a>	The binary Option. . . . .	<a href="#">4</a>
<a href="#">4.</a>	Syntaxes Requiring Binary Transfer . . . . .	<a href="#">4</a>
<a href="#">5.</a>	Attributes Returned in a Search. . . . .	<a href="#">5</a>
<a href="#">6.</a>	All User Attributes. . . . .	<a href="#">6</a>
<a href="#">7.</a>	Conflicting Requests . . . . .	<a href="#">6</a>
<a href="#">8.</a>	Security Considerations. . . . .	<a href="#">6</a>
<a href="#">9.</a>	IANA Considerations. . . . .	<a href="#">6</a>
<a href="#">10.</a>	References . . . . .	<a href="#">7</a>
	<a href="#">10.1.</a> Normative References. . . . .	<a href="#">7</a>
	<a href="#">10.2.</a> Informative References. . . . .	<a href="#">7</a>
	Author's Address . . . . .	<a href="#">8</a>
	Full Copyright Statement . . . . .	<a href="#">8</a>

## [1.](#) Introduction

Each attribute stored in a Lightweight Directory Access Protocol (LDAP) directory [[ROADMAP](#)] has a defined syntax (i.e., data type) which constrains the structure and format of its values.

The description of each syntax [[SYNTAX](#)] specifies how attribute or assertion values [[MODELS](#)] conforming to the syntax are normally represented when transferred in LDAP operations [[PROT](#)]. This representation is referred to as the LDAP-specific encoding to distinguish it from other methods of encoding attribute values.

This document defines an attribute option, the binary option, which can be used in an attribute description [[MODELS](#)] in an LDAP operation to specify that the associated attribute values or assertion values are, or are requested to be, encoded according to the Basic Encoding Rules (BER) [[BER](#)] as used by X.500 [[X.500](#)] directories, instead of the usual LDAP-specific encoding.

The binary option was originally defined in [RFC 2251](#) [[RFC2251](#)]. The LDAP technical specification [[ROADMAP](#)] has obsoleted the previously defined LDAP technical specification [[RFC3377](#)], which included [RFC 2251](#). The binary option was not included in the revised LDAP technical specification for a variety of reasons including implementation inconsistencies. No attempt is made here to resolve the known inconsistencies.

This document reintroduces the binary option for use with certain attribute syntaxes, such as certificate syntax [[PKI](#)], which specifically require it. No attempt has been made to address use of the binary option with attributes of syntaxes which do not require



its use. Unless addressed in a future specification, this use is to be avoided.

## 2. Conventions

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 [BCP 14](#), [RFC 2119](#) [[BCP14](#)].

## 3. The binary Option

The binary option is indicated with the attribute option string "binary" in an attribute description. Note that, like all attribute options, the string representing the binary option is case insensitive.

Where the binary option is present in an attribute description the associated attribute values or assertion values MUST be BER encoded (otherwise the values are encoded according to the LDAP-specific encoding [[SYNTAX](#)] for the attribute's syntax). Note that it is possible for a syntax to be defined such that its LDAP-specific encoding is exactly the same as its BER encoding.

In terms of the protocol [[PROT](#)], the binary option specifies that the contents octets of the associated AttributeValue or AssertionValue OCTET STRING are a complete BER encoding of the relevant value.

The binary option is not a tagging option [[MODELS](#)] so the presence of the binary option does not specify an attribute subtype. An attribute description containing the binary option references exactly the same attribute as the attribute description without the binary option. The supertype/subtype relationships of attributes with tagging options are not altered in any way by the presence or absence of the binary option.

An attribute description SHALL be treated as unrecognized if it contains the binary option and the syntax of the attribute does not have an associated ASN.1 type [[SYNTAX](#)], or the BER encoding of values of that type is not supported.

The presence or absence of the binary option only affects the transfer of attribute and assertion values in protocol; servers store any particular attribute value in a format of their choosing.

## 4. Syntaxes Requiring Binary Transfer



The attribute values of certain attribute syntaxes are defined without an LDAP-specific encoding and are required to be transferred in the BER encoded form. For the purposes of this document, these syntaxes are said to have a binary transfer requirement. The Certificate, Certificate List, Certificate Pair and Supported Algorithm syntaxes [[PKI](#)] are examples of syntaxes with a binary transfer requirement. These syntaxes also have an additional requirement that the exact BER encoding must be preserved. Note that this is a property of the syntaxes themselves, and not a property of the binary option. In the absence of this requirement, LDAP clients would need to re-encode values using the Distinguished Encoding Rules (DER).

## 5. Attributes Returned in a Search

An LDAP search request [[PROT](#)] contains a list of the attributes (the requested attributes list) to be returned from each entry matching the search filter. An attribute description in the requested attributes list also implicitly requests all subtypes of the attribute type in the attribute description, whether through attribute subtyping or attribute tagging option subtyping [[MODELS](#)].

The requested attributes list MAY contain attribute descriptions with the binary option, but MUST NOT contain two attribute descriptions with the same attribute type and the same tagging options (even if only one of them has the binary option). The binary option in an attribute description in the requested attributes list implicitly applies to all the subtypes of the attribute type in the attribute description (however, see [Section 7](#)).

Attributes of a syntax with the binary transfer requirement, if returned, SHALL be returned in the binary form, i.e., with the binary option in the attribute description and the associated attribute values BER encoded, regardless of whether the binary option was present in the request (for the attribute or for one of its supertypes).

Attributes of a syntax without the binary transfer requirement, if returned, SHOULD be returned in the form explicitly requested. That is, if the attribute description in the requested attributes list contains the binary option then the corresponding attribute in the result SHOULD be in the binary form. If the attribute description in the request does not contain the binary option then the corresponding attribute in the result SHOULD NOT be in the binary form. A server MAY omit an attribute from the result if it does not support the requested encoding.

Regardless of the encoding chosen, a particular attribute value is





returned at most once.

## **6. All User Attributes**

If the list of attributes in a search request is empty, or contains the special attribute description string "\*", then all user attributes are requested to be returned.

Attributes of a syntax with the binary transfer requirement, if returned, SHALL be returned in the binary form.

Attributes of a syntax without the binary transfer requirement and having a defined LDAP-specific encoding SHOULD NOT be returned in the binary form.

Attributes of a syntax without the binary transfer requirement and without a defined LDAP-specific encoding may be returned in the binary form or omitted from the result.

## **7. Conflicting Requests**

A particular attribute could be explicitly requested by an attribute description and/or implicitly requested by the attribute descriptions of one or more of its supertypes, or by the special attribute description string "\*". If the binary option is not present in all these attribute descriptions, nor absent in all these attribute descriptions, then the effect of the request with respect to binary transfer is implementation defined.

## **8. Security Considerations**

When interpreting security-sensitive fields, and in particular fields used to grant or deny access, implementations MUST ensure that any matching rule comparisons are done on the underlying abstract value, regardless of the particular encoding used.

## **9. IANA Considerations**

The Internet Assigned Numbers Authority (IANA) is requested to update the LDAP attribute description option registry [[BCP64](#)] as indicated by the following template:

Subject:

Request for LDAP Attribute Description Option Registration

Option Name: binary

Family of Options: NO

Person & email address to contact for further information:

Steven Legg <[steven.legg@eb2bcom.com](mailto:steven.legg@eb2bcom.com)>



Specification: RFC XXXX

Author/Change Controller: IESG

Comments: The existing registration for "binary"  
should be updated to refer to RFC XXXX.

## **10. References**

### **10.1. Normative References**

- [BCP14] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [BCP64] Zeilenga, K., "Internet Assigned Numbers Authority (IANA) Considerations for the Lightweight Directory Access Protocol (LDAP)", [BCP 64](#), [RFC 3383](#), September 2002.
- [ROADMAP] Zeilenga, K., "Lightweight Directory Access Protocol (LDAP): Technical Specification Road Map", [draft-ietf-ldapbis-roadmap-xx.txt](#), a work in progress, February 2005.
- [MODELS] Zeilenga, K., "LDAP: Directory Information Models", [draft-ietf-ldapbis-models-xx.txt](#), a work in progress, February 2005.
- [PROT] Sermersheim, J., "LDAP: The Protocol", [draft-ietf-ldapbis-protocol-xx.txt](#), a work in progress, October 2005.
- [SYNTAX] Legg, S., "Lightweight Directory Access Protocol (LDAP): Syntaxes and Matching Rules", [draft-ietf-ldapbis-syntaxes-xx.txt](#), a work in progress, June 2005.
- [PKI] Zeilenga, Kurt D., "Lightweight Directory Access Protocol (LDAP) schema definitions for X.509 Certificates", [draft-zeilenga-ldap-x509-xx.txt](#), a work in progress, July 2005.
- [BER] ITU-T Recommendation X.690 (07/02) | ISO/IEC 8825-1, Information Technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).

### **10.2. Informative References**

- [RFC2251] Wahl, M., Howes, T. and S. Kille, "Lightweight Directory



Access Protocol (v3)", [RFC 2251](#), December 1997.

[RFC3377] Hodges, J. and R. Morgan, "Lightweight Directory Access Protocol (v3): Technical Specification", [RFC 3377](#), September 2002.

[X.500] ITU-T Recommendation X.500 (02/01) | ISO/IEC 9594-1:2001, Information technology - Open Systems Interconnection - The Directory: Overview of concepts, models and services

#### Author's Address

Dr. Steven Legg  
eB2Bcom  
Suite 3, Woodhouse Corporate Centre  
935 Station Street  
Box Hill North, Victoria 3129  
AUSTRALIA

Phone: +61 3 9896 7830  
Fax: +61 3 9896 7801  
EMail: [steven.legg@eb2bcom.com](mailto:steven.legg@eb2bcom.com)

#### Full Copyright Statement

Copyright (C) The Internet Society (2006).

This document is subject to the rights, licenses and restrictions contained in [BCP 78](#), and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

#### Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be



found in [BCP 78](#) and [BCP 79](#).

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at <http://www.ietf.org/ipr>.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at [ietf-ipr@ietf.org](mailto:ietf-ipr@ietf.org).

