            Definition of an X.500 Attribute Type and an Object Class to Hold
                     Uniform Resource Identifiers (URIs)

Status of this Memo

   This document specifies an Internet standards track protocol for the
   Internet community, and requests discussion and suggestions for
   improvements. Please refer to the current edition of the "Internet
   Official Protocol Standards" (STD 1) for the standardization state
   and status of this protocol. Distribution of this memo is unlimited.

Abstract

   Uniform Resource Locators (URLs) are being widely used to specify the
   location of Internet resources. There is an urgent need to be able
   to include URLs in directories that conform to the LDAP and X.500
   information models, and a desire to include other types of Uniform
   Resource Identifiers (URIs) as they are defined. A number of
   independent groups are already experimenting with the inclusion of
   URLs in LDAP and X.500 directories. This document builds on the
   experimentation to date and defines a new attribute type and an
   auxiliary object class to allow URIs, including URLs, to be stored in
   directory entries in a standard way.

Background and Intended Usage

   Uniform Resource Locators (URLs) as defined by [1] are the first of
   several types of Uniform Resource Identifiers (URIs) being defined by
   the IETF. URIs are widely used on the Internet, most notably within
   Hypertext Markup Language [2] documents. This document defines an
   X.500 [3,4] attribute type called labeledURI and an auxiliary object
   class called labeledURIObject to hold all types of URIs, including
   URLs. These definitions are designed for use in LDAP and X.500
   directories, and may be used in other contexts as well.

Schema Definition of the labeledURI Attribute Type

```
    Name:               labeledURI
    ShortName:          None
    Description:        Uniform Resource Identifier with optional label
    OID:                umichAttributeType.57 (1.3.6.1.4.1.250.1.57)
    Syntax:             caseExactString
    SizeRestriction:    None
    SingleValued:       False
```

Discussion of the labeledURI Attribute Type

   The labeledURI attribute type has the caseExactString syntax (since
   URIs are case-sensitive) and it is multivalued. Values placed in the
   attribute should consist of a URI (at the present time, a URL)
   optionally followed by one or more space characters and a label.
   Since space characters are not allowed to appear un-encoded in URIs,
   there is no ambiguity about where the label begins. At the present
   time, the URI portion must comply with the URL specification [1].
   Multiple labeledURI values will generally indicate different
   resources that are all related to the X.500 object, but may indicate
   different locations for the same resource.

   The label is used to describe the resource to which the URI points,
   and is intended as a friendly name fit for human consumption. This
   document does not propose any specific syntax for the label part. In
   some cases it may be helpful to include in the label some indication
   of the kind and/or size of the resource referenced by the URI.

   Note that the label may include any characters allowed by the
   caseExactString syntax, but that the use of non-IA5 (non-ASCII)
   characters is discouraged as not all directory clients may handle
   them in the same manner. If non-IA5 characters are included, they
   should be represented using the X.500 conventions, not the HTML
   conventions (e.g., the character that is an "a" with a ring above it
   should be encoded using the T.61 sequence 0xCA followed by an "a"
   character; do not use the HTML escape sequence "&aring").

Examples of labeledURI Attribute Values

   An example of a labeledURI attribute value that does not include a
   label:

                     ftp://ds.internic.net/rfc/rfc822.txt

An example of a labeledURI attribute value that contains a tilde
character in the URL (special characters in a URL must be encoded as
specified by the URL document [1]). The label is "LDAP Home Page":

        http://www.umich.edu/%7Ersug/ldap/ LDAP Home Page

Another example. This one includes a hint in the label to help the
user realize that the URL points to a photo image.

        http://champagne.inria.fr/Unites/rennes.gif Rennes [photo]

Schema Definition of the labeledURIObject Object Class

    Name: labeledURIObject
    Description: object that contains the URI attribute type
    OID: umichObjectClass.15 (1.3.6.1.4.1.250.3.15)
    SubclassOf: top
    MustContain:
    MayContain: labeledURI

Discussion of the labeledURIObject Object Class

    The labeledURIObject class is a subclass of top and may contain the
    labeledURI attribute. The intent is that this object class can be
    added to existing directory objects to allow for inclusion of URI
    values. This approach does not preclude including the labeledURI
    attribute type directly in other object classes as appropriate.

Security Considerations

    Security considerations are not discussed in this memo, except to
    note that blindly inserting the label portion of a labeledURI
    attribute value into an HTML document is not recommended, as this may
    allow a malicious individual to include HTML tags in the label that
    mislead viewers of the entire document in which the labeledURI value
    was inserted.

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Appendix: The labeledURL Attribute Type (Deprecated)

   An earlier draft of this document defined an additional attribute
   type called labeledURL. This attribute type is deprecated, and
   should not be used when adding new values to directory entries. The
   original motivation for including a separate attribute type to hold
   URLs was that this would better enable efficient progammatic access
   to specific types of URIs. After some deliberation, the IETF-ASID
   working group concluded that it was better to simply have one
   attribute than two.

   The schema definition for labeledURL is included here for historical
   reference only. Directory client software may want to support this
   schema definition (in addition to labeledURI) to ease the transition
   away from labeledURL for those sites that are using it.

   Name: labeledURL
   ShortName: None
   Description: Uniform Resource Locator with optional label
   OID: umichAttributeType.41 (1.3.6.1.4.1.250.1.41)
   Syntax: caseExactString
   SizeRestriction: None
   SingleValued: False
   OID: umichAttributeType.41 (1.3.6.1.4.1.250.1.41)

References

   [1] Berners-Lee, T., Masinter, L., and M. McCahill, "Uniform
   Resource Locators (URL)", RFC 1738, CERN, Xerox Corporation,
   University of Minnesota, December 1994.
   <URL:ftp://ds.internic.net/rfc/rfc1738.txt>

   [2] Berners-Lee, T., and D. Connolly, "Hypertext Markup Language -
   2.0", RFC 1866, <URL:ftp://ds.internic.net/rfc/rfc1866.txt>

   [3] The Directory: Overview of Concepts, Models and Service. CCITT
   Recommendation X.500, 1988.

   [4] Information Processing Systems -- Open Systems Interconnection --
   The Directory: Overview of Concepts, Models and Service. ISO/IEC JTC
   1/SC21; International Standard 9594-1, 1988.

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