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## 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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Paul-Andre Pays, Martijn Koster, Tim Howes, Rakesh Patel, Russ Wright, and Hallvard Furuseth provided invaluable assistance in the creation of this document.

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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 programmatic 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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