

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.350.3

(05/2011)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Directory services
architecture for audiovisual and multimedia services

Directory services architecture for H.320

Recommendation ITU-T H.350.3



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For further details, please refer to the list of ITU-T Recommendations.

Recommendation ITU-T H.350.3

Directory services architecture for H.320

Summary

Recommendation ITU-T H.350.3 describes a lightweight directory access protocol (LDAP) schema to represent ITU-T H.320 endpoints. It is an auxiliary class related to Recommendation ITU-T H.350 and derives much of its functionality from that architecture. Implementers should review Recommendation ITU-T H.350 in detail before proceeding with this Recommendation. Its attributes include basic ITU-T H.320 address elements. These addresses can be downloaded to an endpoint for automatic configuration or published to white pages to create user dialling directories.

The scope of this Recommendation does not include normative methods for the use of the LDAP directory itself, or the data it contains. The purpose of the schema is not to represent all possible data elements in the ITU-T H.320 protocol, but rather to represent the minimal set required to accomplish the design goals enumerated in Recommendation ITU-T H.350.

This revised version of Recommendation ITU-T H.350.3 introduces several enhancements and clarifications to the previous version, primarily addition of ITU-T X.500 directories support.

This Recommendation includes an electronic attachment containing a schema configuration file for h320Identity.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T H.350.3	2003-08-06	16
1.0	ITU-T H.350.3 attachment	2003-08-06	16
2.0	ITU-T H.350.3	2011-05-14	16

Keywords

Directory services, ITU-T H.235.0, ITU-T H.320, ITU-T H.323, LDAP, SIP, ITU-T X.500.

FOREWORD

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Electronic attachment: Schema configuration file for h320Identity

Recommendation ITU-T H.350.3

Directory services architecture for H.320

1 Scope

This Recommendation¹ describes a lightweight directory access protocol (LDAP) schema to represent ITU-T H.320 endpoints. It is an auxiliary class related to [ITU-T H.350] and derives much of its functionality from that architecture. Implementers should review [ITU-T H.350] in detail before proceeding with this Recommendation. Its attributes include basic ITU-T H.320 address elements. These addresses can be downloaded to an endpoint for automatic configuration or published to white pages to create user dialling directories.

The scope of this Recommendation does not include normative methods for the use of the LDAP directory itself, or the data it contains. The purpose of the schema is not to represent all possible data elements in the ITU-T H.320 protocol, but rather to represent the minimal set required to accomplish the design goals enumerated in [ITU-T H.350].

1.1 Extending the schema

The h320Identity classes may be extended as necessary for specific implementations. See the base [ITU-T H.350] for a discussion on schema extension.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T E.164] Recommendation ITU-T E.164 (2010), *The international public telecommunication numbering plan*.
- [ITU-T H.320] Recommendation ITU-T H.320 (2004), *Narrow-band visual telephone systems and terminal equipment*.
- [ITU-T H.350] Recommendation ITU-T H.350 (2011), *Directory services architecture for multimedia conferencing*.
- [ITU-T X.500] Recommendation ITU-T X.500 (2008) | ISO/IEC 9594-1:2008, *Information technology – Open Systems Interconnection – The Directory: Overview of concepts, models and services*.
- [ITU-T X.501] Recommendation ITU-T X.501 (2008) | ISO/IEC 9594-2:2008, *Information technology – Open Systems Interconnection – The Directory: Models*.
- [ITU-T X.509] Recommendation ITU-T X.509 (2008) | ISO/IEC 9594-8:2008, *Information technology – Open Systems Interconnection – The Directory: Public-key and attribute certificate frameworks*.

¹ This Recommendation includes an electronic attachment containing a text file with a schema configuration for h320Identity.

- [ITU-T X.511] Recommendation ITU-T X.511 (2008) | ISO/IEC 9594-3:2008, *Information technology – Open Systems Interconnection – The Directory: Abstract service definition.*
- [ITU-T X.518] Recommendation ITU-T X.518 (2008) | ISO/IEC 9594-4:2008, *Information technology – Open Systems Interconnection – The Directory: Procedures for distributed operation.*
- [ITU-T X.519] Recommendation ITU-T X.519 (2008) | ISO/IEC 9594-5:2008, *Information technology – Open Systems Interconnection – The Directory: Protocol specifications.*
- [ITU-T X.520] Recommendation ITU-T X.520 (2008) | ISO/IEC 9594-6:2008, *Information technology – Open Systems Interconnection – The Directory: Selected attribute types.*
- [ITU-T X.525] Recommendation ITU-T X.525 (2008) | ISO/IEC 9594-9:2008, *Information technology – Open Systems Interconnection – The Directory: Replication.*
- [IETF RFC 4510] IETF RFC 4510 (2006), *Lightweight Directory Access Protocol (LDAP): Technical Specification Road Map.*
- [IETF RFC 4511] IETF RFC 4511 (2006), *Lightweight Directory Access Protocol (LDAP): The Protocol.*

3 Definitions

This Recommendation defines the following terms:

3.1 commObject: An LDAP object class defined in [ITU-T H.350] that represents generic multimedia conferencing endpoints.

3.2 endpoint: A logical device that provides video and/or voice media encoding/decoding, and signalling functions. Examples include:

- 1) a group teleconferencing appliance that is located in a conference room;
- 2) an IP telephone;
- 3) a software program that takes video and voice from a camera and microphone, encodes it and applies signalling using a host computer.

Note that from the perspective of most signalling protocols, gateways and MCUs are special cases of endpoints.

3.3 white pages: An application that allows end users to look up the address of another user.

4 Abbreviations

This Recommendation uses the following abbreviations:

LDAP	Lightweight Directory Access Protocol
	NOTE – This is consistent with [IETF RFC 4510].
LDIF	LDAP Data Interchange Format

5 Conventions

In this Recommendation, the following conventions are used:

"Shall" indicates a mandatory requirement.

"Should" indicates a suggested but optional course of action.

"May" indicates an optional course of action rather than a recommendation that something takes place.

References to clauses, subclauses, annexes and appendices refer to those items within this Recommendation, unless another specification is explicitly listed.

6 Object class definitions

The `h320Identity` object class represents ITU-T H.320 terminals. It is an auxiliary class and is derived from the `commObject` class in [ITU-T H.350]. The only attribute described is the GSTN address of the terminal. Note that in this architecture, an international public telecommunications number is broken down into its component parts of CC+NDC+SN as defined in [ITU-T E.164].

6.1 h320Identity

```
OID: 0.0.8.350.1.1.5.2.1
objectclasses: (0.0.8.350.1.1.5.2.1
NAME 'h320Identity'
DESC 'h320Identity object'
SUP top AUXILIARY
MAY ( h320IdentityCC $ h320IdentityNDC $ h320IdentitySN $
h320IdentityServiceLevel $ h320IdentityExtension)
)
```

6.2 h320IdentityCC

```
OID: 0.0.8.350.1.1.5.1.1
attributetypes: (0.0.8.350.1.1.5.1.1
NAME 'h320IdentityCC'
DESC 'Country Code'
EQUALITY caseIgnoreIA5Match
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26{3}
)
```

Application utility class

standard

Number of values

multi

Definition

Country Code portion of the terminal address as defined in [ITU-T E.164].

Notes

May also be used for voice numbers.

Semantics

Example applications for which this attribute would be useful

A white pages directory that displays a user's ISDN visual telephone address.

Example (LDIF fragment)

```
h320IdentityCC: 1
```

6.3 h320IdentityNDC

```
OID: 0.0.8.350.1.1.5.1.4
attributetypes: (0.0.8.350.1.1.5.1.4
NAME 'h320IdentityNDC'
DESC 'National Destination Code'
EQUALITY caseIgnoreIA5Match
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26{15}
```

)

Application utility class

standard

Number of values

multi

Definition

National Destination Code portion of the terminal address as defined in [ITU-T E.164].

Notes

May also be used for voice numbers. For example, in the US, the NDC is the area code.

Semantics

Example applications for which this attribute would be useful

A white pages directory that displays a user's ISDN visual telephone address.

Example (LDIF fragment)

```
h320IdentityNDC: 919
```

6.4 h320IdentitySN

```
OID: 0.0.8.350.1.1.5.1.5
attributetypes: (0.0.8.350.1.1.5.1.5
NAME 'h320IdentitySN'
DESC 'Subscriber Number'
EQUALITY caseIgnoreIA5Match
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26{15}
)
```

Application utility class

standard

Number of values

multi

Definition

Subscriber Number portion of the terminal address as defined in [ITU-T E.164].

Notes

May also be used for voice numbers.

Semantics

Example applications for which this attribute would be useful

A white pages directory that displays a user's ISDN visual telephone address.

Example (LDIF fragment)

```
h320IdentitySN: 1234567
```

6.5 h320IdentityExtension

```
OID: 0.0.8.350.1.1.5.1.3
attributetypes: (0.0.8.350.1.1.5.1.3
NAME 'h320IdentityExtension'
DESC 'Extension of terminal required to dial after initial PSTN address is connected.'
EQUALITY caseIgnoreMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{120}
```

)

Application utility class

standard

Number of values

multi

Definition

Specifies an optional extension to be dialled after the PSTN address.

Notes

May also be used for voice numbers. This attribute can accommodate non-numeric characters, allowing for automatic dialling of extensions. For example, an extension of 1234 that is reachable via interactive voice response (IVR), followed by a pound sign, could be represented as ,1234# where the comma indicates that the automatic dialler should pause, and the pound sign indicates end of dial string to the IVR. The specific function of digits and characters is not defined here. Note that if the CC+NDC+SN address terminates in a gateway to an IP network, it may be desirable to dial a valid IP address or URL for call completion on the Internet.

Semantics

Example applications for which this attribute would be useful

A white pages directory that displays a user's ISDN visual telephone address, including instructions for dialling through an IVR.

Example (LDIF fragment)

```
h320IdentityExtension: 71002
h320IdentityExtension: ,1234#
h320IdentityExtension: h323:user@gatekeeper.foo.com
h320IdentityExtension: 127.0.0.1
```

6.6 h320IdentityServiceLevel

```
OID: 0.0.8.350.1.1.5.1.2
attributetypes: (0.0.8.350.1.1.5.1.2
NAME 'h320IdentityServiceLevel'
DESC 'To define services that a user can belong to.'
EQUALITY caseIgnoreMatch
SUBSTR caseIgnoreSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15
)
```

Application utility class

Standard

Number of values

multi

Definition

This describes the type of services a user can belong to.

Permissible values (if controlled)

Notes

This attribute does not represent a data element found in [ITU-T H.320]. Instead, it provides a mechanism for the storage of authorization information directly in LDAP. For larger applications, it may be desirable to ignore this attribute and instead utilize an external authorization server

Semantics

Example applications for which this attribute would be useful

Specifying whether certain terminals are authorized to make MCU calls.

Example (LDIF fragment)

```
h320IdentityServiceLevel: premium
```

7 h320Identity LDIF files

This clause contains a schema configuration file for h320Identity that can be used to configure an LDAP server to support this class.

```
# h320Identity Object Schema
#
# Schema for representing h320Identity Object in an LDAP Directory
#
# Abstract
#
# This Recommendation defines the schema for representing h320Identity
# object in an LDAP directory [LDAPv3]. It defines schema elements
# to represent an h320Identity object [h320Identity].
#
#           .1 = Communication related work
#           .1.5 = h320Identity
#           .1.5.1 = attributes
#           .1.5.2 = objectclass
#           .1.5.3 = syntax
#
#
# Attribute Type Definitions
#
#   The following attribute types are defined in this Recommendation:
#
#       h320IdentityCC
#       h320IdentityNDC
#       h320IdentitySN
#       h320IdentityServiceLevel
#       h320IdentityExtension
dn: cn=schema
changetype: modify
#
# if you need to change the definition of an attribute,
#       then first delete and re-add in one step
#
# if this is the first time you are adding the h320Identity
# objectclass using this LDIF file, then you should comment
# out the delete attributetypes modification since this will
# fail. Alternatively, if your ldapmodify has a switch to continue
# on errors, then just use that switch -- if you are careful
#
delete: attributetypes
attributetypes: (0.0.8.350.1.1.5.1.1 NAME 'h320IdentityCC' )
attributetypes: (0.0.8.350.1.1.5.1.4 NAME 'h320IdentityNDC' )
attributetypes: (0.0.8.350.1.1.5.1.5 NAME 'h320IdentitySN' )
attributetypes: (0.0.8.350.1.1.5.1.2 NAME 'h320IdentityServiceLevel' )
attributetypes: (0.0.8.350.1.1.5.1.3 NAME 'h320IdentityExtension' )
-
#
```

```

# re-add the attributes -- in case there is a change of definition
#
#
add: attributetypes
attributetypes: (0.0.8.350.1.1.5.1.1
  NAME 'h320IdentityCC'
  DESC 'Country Code'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26{3} )
attributetypes: (0.0.8.350.1.1.5.1.4
  NAME 'h320IdentityNDC'
  DESC 'National Destination Code'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26{15} )
attributetypes: (0.0.8.350.1.1.5.1.5
  NAME 'h320IdentitySN'
  DESC 'Subscriber Number'
  EQUALITY caseIgnoreIA5Match
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.26{15} )
attributetypes: (0.0.8.350.1.1.5.1.2
  NAME 'h320IdentityServiceLevel'
  DESC 'To define services that a user can belong to.'
  EQUALITY caseIgnoreMatch
  SUBSTR caseIgnoreSubstringsMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15 )
attributetypes: (0.0.8.350.1.1.5.1.3
  NAME 'h320IdentityExtension'
  DESC 'Extension of terminal required to dial after initial PSTN
  address is connected.'
  EQUALITY caseIgnoreMatch
  SUBSTR caseIgnoreSubstringsMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15{120} )
-
# Object Class Definitions
#
#   The following object class is defined in this Recommendation:
#
#       h320Identity
#
# h320Identity
#
#
delete: objectclasses
objectclasses: (0.0.8.350.1.1.5.2.1 NAME 'h320Identity' )
-
add: objectclasses
objectclasses: (0.0.8.350.1.1.5.2.1
  NAME 'h320Identity'
  DESC 'h320Identity object'
  SUP top AUXILIARY
  MAY ( h320IdentityCC $ h320IdentityNDC $ h320IdentitySN $
    h320IdentityServiceLevel $ h320IdentityExtension )
)
-
#
# end of LDIF
#

```

8 Using ITU-T H.350 with ITU-T X.500 directories

8.1 IMPORTS of ITU-T X.500 ASN.1

To satisfy all the IMPORTS clauses, the following modules are needed:

BasicAccessControl ([ITU-T X.501])

DSASOperationalAttributeTypes ([ITU-T X.501])

EnhancedSecurity ([ITU-T X.501])

InformationFramework ([ITU-T X.501])
 OperationalBindingManagement ([ITU-T X.501])
 ServiceAdministration ([ITU-T X.501])
 UsefulDefinitions ([ITU-T X.501])
 AttributeCertificateDefinitions ([ITU-T X.509])
 AuthenticationFramework ([ITU-T X.509])
 CertificateExtensions ([ITU-T X.509])
 MTSAbstractService ([ITU-T X.509])
 PKIX1Implicit93 ([ITU-T X.509])
 DirectoryAbstractService ([ITU-T X.511])
 SpkmGssTokens ([ITU-T X.511])
 DistributedOperations ([ITU-T X.518])
 HierarchicalOperationalBindings ([ITU-T X.518])
 CommonProtocolSpecification ([ITU-T X.519])
 DirectoryOSIProtocols ([ITU-T X.519])
 DirectoryOperationalBindingTypes ([ITU-T X.519])
 OSIProtocolSpecification ([ITU-T X.519])
 SelectedAttributeTypes ([ITU-T X.520])
 DirectoryShadowAbstractService ([ITU-T X.525])
 ldap ([IETF RFC 4511])

It is noted that these modules can be downloaded from the [ITU-T ASN.1 module database](#).

8.2 h320IdentityASN1.asn

```

H320Identity { itu-t(0) recommendation(0) h(8) 350 1 cr(1) h320Identity(5) module(4) }
DEFINITIONS ::=
BEGIN

-- h320Identity Object Schema

-- Schema for representing h320Identity Object in an LDAP Directory

-- Abstract

-- This Recommendation defines the schema for representing h320Identity
-- object in an LDAP directory [LDAPv3]. It defines schema elements
-- to represent an h320Identity object [h320Identity].

--
--           .1 = Communication related work
--           .1.5 = h320Identity
--           .1.5.1 = attributes
--           .1.5.2 = objectclass
--           .1.5.3 = syntax

IMPORTS

-- from Rec. ITU-T H.350

h350-cr, caseIgnoreIA5Match
    FROM CommURI { itu-t(0) recommendation(0) h(8) 350 1 cr(1) commURI(1) module(4) }
  
```

```

-- from Rec. ITU-T X.501 | ISO/IEC 9594-2
ATTRIBUTE, OBJECT-CLASS, top
    FROM InformationFramework {joint-iso-itu-t ds(5) module(1) informationFramework(1)
6}

-- from Rec. ITU-T X.520 | ISO/IEC 9594-6
UnboundedDirectoryString, caseIgnoreMatch, caseIgnoreSubstringsMatch
    FROM SelectedAttributeTypes {joint-iso-itu-t ds(5) module(1)
selectedAttributeTypes(5) 6} ;

-- Attribute Type Definitions

-- The following attribute types are defined in this Recommendation:

--     h320IdentityCC
--     h320IdentityNDC
--     h320IdentitySN
--     h320IdentityServiceLevel
--     h320IdentityExtension

h320IdentityCC ATTRIBUTE ::= {
    WITH SYNTAX IA5String (SIZE (1..3))
    EQUALITY MATCHING RULE caseIgnoreIA5Match
    ID { at 1 } }

h320IdentityNDC ATTRIBUTE ::= {
    WITH SYNTAX IA5String (SIZE (1..15))
    EQUALITY MATCHING RULE caseIgnoreIA5Match
    ID { at 4 } }

h320IdentitySN ATTRIBUTE ::= {
    WITH SYNTAX IA5String (SIZE (1..15))
    EQUALITY MATCHING RULE caseIgnoreIA5Match
    ID { at 5 } }

h320IdentityServiceLevel ATTRIBUTE ::= {
    WITH SYNTAX UnboundedDirectoryString
    EQUALITY MATCHING RULE caseIgnoreMatch
    SUBSTRINGS MATCHING RULE caseIgnoreSubstringsMatch
    ID { at 2 } }

h320IdentityExtension ATTRIBUTE ::= {
    WITH SYNTAX UnboundedDirectoryString
    EQUALITY MATCHING RULE caseIgnoreMatch
    SUBSTRINGS MATCHING RULE caseIgnoreSubstringsMatch
    ID { at 3 } }

-- Object Class Definitions

-- The following object class is defined in this Recommendation:

--     h320Identity

-- h320Identity

h320Identity OBJECT-CLASS ::= {
    SUBCLASS OF { top }
    MAY CONTAIN { h320IdentityCC |
                  h320IdentityNDC |
                  h320IdentitySN |
                  h320IdentityServiceLevel |
                  h320IdentityExtension }
    ID { oc 1 } }

h320-Id      OBJECT IDENTIFIER ::= { h350-cr h320-Id(5) }
at          OBJECT IDENTIFIER ::= { h320-Id at(1) }
oc          OBJECT IDENTIFIER ::= { h320-Id oc(2) }

END -- end of ASN.1

```

Annex A

Indexing profile

(This annex forms an integral part of this Recommendation.)

Indexing of attributes is an implementation-specific activity and depends upon the desired application. Non-indexed attributes can result in search times sufficiently long to render some applications unusable. Notably, user and alias lookup should be fast. This annex indexing profile describes an indexing configuration for h320Identity directories that will be optimized for use in the directory of directories applications. Use of this profile is optional.

h320IdentityCC: presence, equality, sub

h320IdentityNDC: presence, equality, sub

h320IdentitySN: presence, equality, sub

h320IdentityExtension: presence, equality, sub

h320IdentityServiceLevel: equality

Appendix I

Electronic attachment

(This appendix does not form an integral part of this Recommendation.)

The associated ZIP file for Recommendation ITU-T H.350.3 contains file `h320Identity.ldif.txt` with a text-only version of the LDIF file described in clause 7.

The ZIP file is available for free download at <http://www.itu.int/rec/T-REC-H.350.3>

Bibliography

- [b-Howes-1] Howes, T.A., PhD, Smith, M.C., and Good, G.S. (1998), *Understanding and Deploying LDAP Directory Services*, New Riders Publishing, ISBN: 1578700701.
- [b-Howes-2] Howes, T.A., PhD, and Smith, M.C. (1997), *LDAP Programming Directory-Enabled Applications with Lightweight Directory Access Protocol*, New Riders Publishing, ISBN: 1578700000.

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