

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.350.5

(05/2011)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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

**Directory services architecture for non-standard
protocols**

Recommendation ITU-T H.350.5



ITU-T H-SERIES RECOMMENDATIONS
AUDIOVISUAL AND MULTIMEDIA SYSTEMS

CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS	H.100–H.199
INFRASTRUCTURE OF AUDIOVISUAL SERVICES	
General	H.200–H.219
Transmission multiplexing and synchronization	H.220–H.229
Systems aspects	H.230–H.239
Communication procedures	H.240–H.259
Coding of moving video	H.260–H.279
Related systems aspects	H.280–H.299
Systems and terminal equipment for audiovisual services	H.300–H.349
Directory services architecture for audiovisual and multimedia services	H.350–H.359
Quality of service architecture for audiovisual and multimedia services	H.360–H.369
Supplementary services for multimedia	H.450–H.499
MOBILITY AND COLLABORATION PROCEDURES	
Overview of Mobility and Collaboration, definitions, protocols and procedures	H.500–H.509
Mobility for H-Series multimedia systems and services	H.510–H.519
Mobile multimedia collaboration applications and services	H.520–H.529
Security for mobile multimedia systems and services	H.530–H.539
Security for mobile multimedia collaboration applications and services	H.540–H.549
Mobility interworking procedures	H.550–H.559
Mobile multimedia collaboration inter-working procedures	H.560–H.569
BROADBAND, TRIPLE-PLAY AND ADVANCED MULTIMEDIA SERVICES	
Broadband multimedia services over VDSL	H.610–H.619
Advanced multimedia services and applications	H.620–H.629
IPTV MULTIMEDIA SERVICES AND APPLICATIONS FOR IPTV	
General aspects	H.700–H.719
IPTV terminal devices	H.720–H.729
IPTV middleware	H.730–H.739
IPTV application event handling	H.740–H.749
IPTV metadata	H.750–H.759
IPTV multimedia application frameworks	H.760–H.769
IPTV service discovery up to consumption	H.770–H.779

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

Recommendation ITU-T H.350.5

Directory services architecture for non-standard protocols

Summary

Recommendation ITU-T H.350.5 describes a lightweight directory access protocol (LDAP) schema to represent non-standard multimedia communications endpoints, and is meant to provide a very basic framework for representing these elements in a directory. 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.

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.323 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.350.5 introduces several enhancements and clarifications to the previous version, primarily the addition of ITU-T X.500 directories support.

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

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T H.350.5	2003-08-06	16
1.0	ITU-T H.350.5 attachment	2003-08-06	16
2.0	ITU-T H.350.5	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

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

© ITU 2012

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

Table of Contents

	Page
1 Scope	1
1.1 Extending the schema.....	1
2 References.....	1
3 Definitions	2
4 Abbreviations.....	2
5 Conventions	2
6 Object class definitions.....	3
6.1 genericIdentity	3
6.2 genericIdentityProtocolIdentifier	3
6.3 genericIdentityMessage	3
7 genericIdentity LDIF files	4
8 Using ITU-T H.350 with ITU-T X.500 directories	5
8.1 IMPORTS of ITU-T X.500 ASN.1	5
8.2 genericIdentityASN1.asn.....	6
Annex A – Indexing profile	8
Appendix I – Electronic attachment.....	9
Bibliography.....	10
Electronic attachment: Schema configuration file for genericIdentity	

Recommendation ITU-T H.350.5

Directory services architecture for non-standard protocols

1 Scope

This Recommendation¹ describes a lightweight directory access protocol (LDAP) schema to represent non-standard multimedia communications endpoints, and is meant to provide a very basic framework for representing these elements in a directory. 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.

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

In general, non-standard protocols will have a variety of attributes that only have meaning to the specific protocol. Implementers should be careful to use consistent and meaningful naming schemes to avoid confusion with other protocols that may be represented by the same object class.

It should be noted that standardized protocols should not extend and use genericIdentity, but should instead create and standardize their own protocol-specific auxiliary classes as new contributions to the ITU-T H.350.x-series of Recommendations.

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 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 genericIdentity.

- [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 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 (as defined in [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 genericIdentity object class represents generic multimedia conferencing information associated with a person or resource. It is an auxiliary class and is related to the commObject class, which is defined in [ITU-T H.350]. It should be noted that the particular user or resource with which an

endpoint is associated via commOwner takes on special importance, as that may represent contact information required for further information in the use of the particular endpoint.

If specific attributes, such as IP address or URIs, are necessary to support this endpoint type, then the standard attributes defining IP address and URI should be used. Keep in mind that in a directory of directories scenario, external searches will only be aware of the genericIdentity attributes and will not display IP address or URI.

6.1 genericIdentity

```
OID: 0.0.8.350.1.1.7.2.1
objectclasses: (0.0.8.350.1.1.7.2.1
NAME 'genericIdentity'
DESC 'genericIdentity object'
SUP top AUXILIARY
    MAY (genericIdentityProtocolIdentifier $ genericIdentityMessage
    )
)
```

6.2 genericIdentityProtocolIdentifier

```
OID: 0.0.8.350.1.1.7.1.1
attributetypes: (0.0.8.350.1.1.7.1.1
NAME 'genericIdentityProtocolIdentifier'
DESC 'name of the non-standard protocol'
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

Text string indicating the name of the non-standard protocol represented by this endpoint.

Notes

Semantics

Example applications for which this attribute would be useful

Search for endpoints that support a specific non-standard protocol.

Example (LDIF fragment)

```
genericIdentityProtocolIdentifier: 'MPEG2' //MPEG2 endpoint
```

6.3 genericIdentityMessage

```
OID: 0.0.8.350.1.1.7.1.2
attributetypes: (0.0.8.350.1.1.7.1.2
NAME 'genericIdentityMessage'
DESC 'informative text string'
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

Informative text string containing information about multimedia conferencing capabilities of the associated user and/or location of the service. This information may include instructions, other connection information, or pointers to specific documentation.

Notes

Semantics

Example applications for which this attribute would be useful

Multimedia conferencing services that are not ITU-T H.323, ITU-T H.320, or SIP; for example: MPEG2, access grid or other IP multicast service; instant messaging service.

Example (LDIF fragment)

```
genericIdentityMessage: 'see www.foo.com/mpeg2 for connection instructions'
```

7 genericIdentity LDIF files

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

```
# genericIdentity Object Schema
#
# Schema for representing a genericIdentity Protocol Object in an LDAP Directory
#
# Abstract
#
# This Recommendation defines the schema for representing genericIdentity
# object in an LDAP directory [LDAPv3]. It defines schema elements
# to represent a genericIdentity object [genericIdentity].
#
#           .1 = Communication related work
#           .1.7 = genericIdentity
#           .1.7.1 = attributes
#           .1.7.2 = objectclass
#           .1.7.3 = syntax
#
#
# Attribute Type Definitions
#
# The following attribute types are defined in this Recommendation:
#
#   genericIdentityProtocolIdentifier
#   genericIdentityMessage
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 genericIdentity
# 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:(0.0.8.350.1.1.7.1.1 NAME 'genericIdentityProtocolIdentifier' )
attributetypes: (0.0.8.350.1.1.7.1.2 NAME 'genericIdentityMessage' )
-
#
# re-add the attributes -- in case there is a change of definition
```

```

#
#
add: attributetypes
attributetypes: (0.0.8.350.1.1.7.1.1
    NAME 'genericIdentityProtocolIdentifier'
    DESC 'name of the non-standard protocol'
    EQUALITY caseIgnoreMatch
    SUBSTR caseIgnoreSubstringsMatch
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.15 )
attributetypes: (0.0.8.350.1.1.7.1.2
    NAME 'genericIdentityMessage'
    DESC 'informative text string'
    EQUALITY caseIgnoreMatch
    SUBSTR caseIgnoreSubstringsMatch
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.15 )
-
# Object Class Definitions
#
# The following object class is defined in this Recommendation:
#
#     genericIdentity
#
# genericIdentity
#
#
delete: objectclasses
objectclasses: (0.0.8.350.1.1.7.2.1 NAME 'genericIdentity' )
-
add: objectclasses
objectclasses: (0.0.8.350.1.1.7.2.1
    NAME 'genericIdentity'
    DESC 'genericIdentity object'
    SUP top AUXILIARY
    MAY ( genericIdentityProtocolIdentifier $ genericIdentityMessage )
)
-
#
# 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])
- DSAOperationalAttributeTypes ([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 genericIdentityASN1.asn

```

GenericIdentity { itu-t(0) recommendation(0) h(8) 350 1 cr(1) genericIdentity(7)
module(4) }
DEFINITIONS ::=
BEGIN

-- genericIdentity Object Schema

-- Schema for representing a genericIdentity Protocol Object in an LDAP Directory

-- Abstract

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

--
--           .1 = Communication related work
--           .1.7 = genericIdentity
--           .1.7.1 = attributes
--           .1.7.2 = objectclass
--           .1.7.3 = syntax

IMPORTS

-- from Rec. ITU-T H.350
h350-cr
    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

genericIdentityProtocolIdentifier ATTRIBUTE ::= {
    WITH SYNTAX UnboundedDirectoryString
    EQUALITY MATCHING RULE caseIgnoreMatch
    SUBSTRINGS MATCHING RULE caseIgnoreSubstringsMatch
    ID { at 1 } }

genericIdentityMessage ATTRIBUTE ::= {

```

```

WITH SYNTAX UnboundedDirectoryString
EQUALITY MATCHING RULE caseIgnoreMatch
SUBSTRINGS MATCHING RULE caseIgnoreSubstringsMatch
ID { at 2 } }

-- Object Class Definitions

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

-- genericIdentity

-- genericIdentity

genericIdentity OBJECT-CLASS ::= {
  SUBCLASS OF { top }
  MAY CONTAIN { genericIdentityProtocolIdentifier | genericIdentityMessage }
  ID { oc 1 } }

gi          OBJECT IDENTIFIER ::= { h350-cr gi(7) }
at          OBJECT IDENTIFIER ::= { gi at(1) }
oc          OBJECT IDENTIFIER ::= { gi oc(2) }

-- end of ASN.1
END

```

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. Use of this profile is optional.

genericIdentityProtocolIdentifier: equality

genericIdentityMessage: 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.350.5 contains file `genericIdentity.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.350.5> .

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.

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	Telecommunication management, including TMN and network maintenance
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Terminals and subjective and objective assessment methods
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks, open system communications and security
Series Y	Global information infrastructure, Internet protocol aspects and next-generation networks
Series Z	Languages and general software aspects for telecommunication systems