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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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

## Directory services architecture for H.323

Recommendation ITU-T H.350.1

# ITU-T H-SERIES RECOMMENDATIONS

## AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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

# Recommendation ITU-T H.350.1

## Directory services architecture for H.323

**Summary**

Recommendation ITU-T H.350.1 describes a lightweight directory access protocol (LDAP) schema to represent ITU-T H.323 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 all ITU-T H.323 alias types. These aliases can be downloaded to an endpoint for automatic configuration, accessed by a gatekeeper for call signalling and authorization, and 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.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.350.1 introduces several enhancements and clarifications to the previous version, primarily the addition of ITU-T X.500 directories support and clarification of h323IdentitypartyNumber.

This Recommendation includes an electronic attachment containing a text-only version of the schema configuration file for h323Identity.

**History**

| Edition | Recommendation | Approval | Study Group |
|---|---|---|---|
| 1.0 | ITU-T H.350.1 | 2003-08-06 | 16 |
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**Keywords**

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FOREWORD

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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/.

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# Recommendation ITU-T H.350.1

## Directory services architecture for H.323

## 1  Scope

This Recommendation[1] describes a lightweight directory access protocol (LDAP) schema to represent ITU-T H.323 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 all ITU-T H.323 alias types. These aliases can be downloaded to an endpoint for automatic configuration, accessed by a gatekeeper for call signalling and authorization, and 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.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 h323Identity classes may be extended as necessary for specific implementations. See the base ITU-T H.350 Recommendation 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 H.225.0]   Recommendation ITU-T H.225.0 (2009), *Call signalling protocols and media stream packetization for packet-based multimedia communication systems.*

[ITU-T H.323]   Recommendation ITU-T H.323 (2009), *Packet-based multimedia communications systems.*

[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.*

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[1]  This Recommendation includes an electronic attachment containing a text file with the schema configuration file for h323Identify.

| [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.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    call server**: A protocol-specific signalling engine that routes video or voice calls on the network. In ITU-T H.323, this entity is a gatekeeper. In SIP, this entity is a SIP proxy server. Note that not all signalling protocols use a call server.

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

**3.3    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 and 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.

**3.4    enterprise directory**: A canonical collection of information about users in an organization. Typically this information is collected from a variety of organizational units to create a whole. For example, Human Resources may provide name and address, Telecommunications may provide the telephone number, Information Technology may provide the e-mail address, etc. For the purposes of this architecture, it is assumed that an enterprise directory is accessible via LDAP.

**3.5    gateway**: A device that translates from one protocol to another. Often gateways translate between the IP network and the public switched voice network to allow integration of the two.

**3.6    multipoint control unit (MCU)**: A device capable of mixing audio/video from multiple endpoints to create a virtual meeting space.

**3.7**      **resource**: A non-human entity to which an endpoint is associated. For example, an endpoint may be associated with a conference room, classroom, office, or other physical or virtual location.

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

# 4      Abbreviations

This Recommendation uses the following abbreviations:

FQDN          Fully Qualified Domain Name

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 h323Identity object class represents ITU-T H.323 endpoints. It is an auxiliary class and is derived from the commObject class defined in [ITU-T H.350]. Note that the following seven alias types are defined in [ITU-T H.323] as dialling methods. Each of these alias types are represented below with the corresponding h323Identity definitions. Keep in mind that these are separate fields from other endpoint information in the enterprise directory. For example, email-ID is a separate field than a user's email address as represented in the enterprise directory. For implementation purposes, an administrator may set these values equal by direct entry or by referral.

* h323-ID

* dialedDigits

* email-ID

* URL-ID

* transportID

* partyNumber

* mobileUIM

## 6.1      h323Identity

```
OID: 0.0.8.350.1.1.3.2.1
objectclasses: (0.0.8.350.1.1.3.2.1
NAME 'h323Identity'
DESC 'ITU-T h323Identity object'
SUP top AUXILIARY
MAY ( h323IdentityGKDomain $ h323Identityh323-ID $
h323IdentitydialedDigits $ h323Identityemail-ID $
```

```
h323IdentityURL-ID $ h323IdentitytransportID $
h323IdentitypartyNumber $ h323IdentitymobileUIM $
h323IdentityEndpointType $ h323IdentityServiceLevel )
)
```

## 6.2    h323IdentityGKDomain

```
OID: 0.0.8.350.1.1.3.1.1
attributetypes: (0.0.8.350.1.1.3.1.1
NAME 'h323IdentityGKDomain'
DESC 'FQDN of the Gatekeeper'
EQUALITY caseIgnoreIA5Match
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

Application utility class

standard

Number of values

multi

Definition

Specifies the fully qualified domain name (FQDN) or IP address of the gatekeeper to which the endpoint should register.

Permissible values (if controlled)

Notes

In the case where an endpoint gatekeeper location is configured via ITU-T H.323 URL, please note that this attribute will not hold an ITU-T H.323 URL with a scheme name but will hold a valid DNS domain name. If an endpoint is provisioned for its gatekeeper location with just a valid DNS domain name, it is assumed that this DNS domain name is the value of the *hostport* of the ITU-T H.323 URL. Clause O.8.2 of [ITU-T H.323] describes this special case. In particular, the endpoint will attempt to retrieve from the specified domain name value an SRV record indicating the gatekeeper(s) address. If the SRV lookup fails, then the endpoint will attempt to retrieve an A record. Clause O.9 of [ITU-T H.323] describes the flow of the lookup process.

Semantics

Example applications for which this attribute would be useful

A web page that displays a user's proper endpoint configuration information.

Example (LDIF fragment)

```
h323IdentityGKDomain: gk.radvision.com    // FQDN example
h323IdentityGKDomain: 1.1.1.1             // IP address example
```

## 6.3    h323Identityh323-ID

```
OID: 0.0.8.350.1.1.3.1.2
attributetypes: (0.0.8.350.1.1.3.1.2
NAME 'h323Identityh323-ID'
DESC 'specifies the endpoint address alias as specified in ITU-T H.323'
EQUALITY caseIgnoreIA5Match
SUBSTR caseIgnoreIA5SubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

Application utility class

Standard

Number of values

multi

Definition

> The endpoint's h323-ID alias as defined in [ITU-T H.225.0]. This is one of the dialling attributes defined by [ITU-T H.323].

Permissible values (if controlled)

Notes

> This field is often incorrectly referred to as 'alias' or 'user name' in many endpoints on the market.

Semantics

Example applications for which this attribute would be useful

> white pages, directory of directories, a web page that displays a user's correct configuration information.

Example (LDIF fragment)

```
h323Identityh323-ID: johnsmith
h323Identityh323-ID: conferenceroom201
```

## 6.4    h323IdentitydialedDigits

```
OID: 0.0.8.350.1.1.3.1.3
attributetypes: (0.0.8.350.1.1.3.1.3
NAME 'h323IdentitydialedDigits'
DESC 'Specifies the endpoint dialled digits as specified in ITU-T H.323'
EQUALITY caseIgnoreIA5Match
SUBSTR caseIgnoreIA5SubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

Application utility class

> Standard

Number of values

> multi

Definition

> The endpoint's ITU-T H.323 dialedDigits alias as defined in [ITU-T H.225.0]. This is one of the dialling attributes defined by [ITU-T H.323].

Permissible values (if controlled)

Notes

> This field is often incorrectly referred to as 'extension', 'E164' or 'user number' in many endpoints on the market.

Semantics

Example applications for which this attribute would be useful

> white pages, directory of directories, a web page that displays a user's correct configuration information.

Example (LDIF fragment)

```
h323IdentitydialedDigits: 2266126
```

## 6.5 h323Identityemail-ID

```
OID: 0.0.8.350.1.1.3.1.4
attributetypes: (0.0.8.350.1.1.3.1.4
NAME 'h323Identityemail-ID'
DESC 'Specifies an ITU-T H.323 entity that can be reached using ITU-T H.323'
EQUALITY caseIgnoreIA5Match
SUBSTR caseIgnoreIA5SubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

Application utility class

> Standard

Number of values

> multi

Definition

> The endpoint's ITU-T H.323 email-ID alias as defined in [ITU-T H.225.0]. This is one of the dialling attributes defined by [ITU-T H.323].

Permissible values (if controlled)

Notes

> In some implementations, it may be possible to have this field refer to the commOwner's e-mail address in the enterprise directory.

Semantics

Example applications for which this attribute would be useful

> white pages, directory of directories, a web page that displays a user's correct configuration information.

Example (LDIF fragment)

```
h323Identityemail-ID: user@host
```

## 6.6 h323IdentityURL-ID

```
OID: 0.0.8.350.1.1.3.1.5
attributetypes: (0.0.8.350.1.1.3.1.5
NAME 'h323IdentityURL-ID'
DESC 'ITU-T H.323 specs'
EQUALITY caseExactMatch
SUBSTR caseExactSubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.15 )
```

Application utility class

> Standard

Number of values

> multi

Definition

> The endpoint's ITU-T H.323 URL-ID alias as defined in [ITU-T H.323]. This is one of the dialling attributes defined by [ITU-T H.323].

Permissible values (if controlled)

Notes

> The ITU-T H.323 URL has the general form of user@hostport where either both of the parts (i.e., user and host) or only one of the parts (i.e., user alone or @host alone) is present. The user part corresponds to an ITU-T H.323 user or service name. The host part is a legal numeric IP address or a fully qualified domain name, thus providing means for address resolution using the DNS infrastructure. Examples include h323:9198437008, h323:Dumbledore@gatekeeper.hsww.edu, h323:dumbledore@152.2.2.203, etc. Note that this dialling mechanism is expected to become the preferred addressing scheme for [ITU-T H.323].

Semantics

Example applications for which this attribute would be useful

> white pages, directory of directories, a web page that displays a user's correct configuration information.

Example (LDIF fragment)

```
h323IdentityURL-ID: h323:dumbledore@gatekeeper.hsww.edu
```

## 6.7 h323IdentitytransportID

```
OID: 0.0.8.350.1.1.3.1.6
attributetypes: (0.0.8.350.1.1.3.1.6
NAME 'h323IdentitytransportID'
DESC 'specifies endpoint transport Id as defined in ITU-T H.323'
EQUALITY caseIgnoreIA5Match
SUBSTR caseIgnoreIA5SubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

Application utility class

> Standard

Number of values

> multi

Definition

> The endpoint's ITU-T H.323 transport ID as defined in [ITU-T H.225.0]. This is one of the dialling attributes defined by [ITU-T H.323].

Permissible values (if controlled)

Notes

Semantics

Example applications for which this attribute would be useful

Example (LDIF fragment)

```
h323IdentitytransportID: 161.58.151.216
```

## 6.8 h323IdentitypartyNumber

```
OID: 0.0.8.350.1.1.3.1.7
attributetypes: (0.0.8.350.1.1.3.1.7
NAME 'h323IdentitypartyNumber'
DESC 'endpoint party Number as defined in ITU-T H.323'
EQUALITY caseIgnoreIA5Match
SUBSTR caseIgnoreIA5SubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

Application utility class

>Standard

Number of values

>multi

Definition

>The endpoint's ITU-T H.323 partyNumber alias as defined in [ITU-T H.225.0]. This is one of the dialling attributes defined by [ITU-T H.323].

Permissible values (if controlled)

Notes

Semantics

Example applications for which this attribute would be useful

Example (LDIF fragment)

```
h323IdentitypartyNumber: 2266126
```

Notes

This LDAP attribute has three elements encoded together, and separated by a colon (:) delimiter. The form of the encoding shall be as follows:

```
partyNumber:numberingPlan:typeOfNumber
```

Valid values for these elements are enumerated in the following clauses.

### 6.8.1    partyNumber

The `partyNumber` element is the actual digit string of the alias. Example: 1234567890

### 6.8.2    numberingPlan

The `numberingPlan` element shall be exactly one of the following string values as defined in [ITU-T H.225.0]:

```
privateNumber
e164Number
```

### 6.8.3    typeOfNumber

When `numberingPlan` is 'privateNumber', `typeOfNumber` shall be exactly one of the following string values as defined in [ITU-T H.225.0]:

```
level2RegionalNumber
level1RegionalNumber
pISNSpecificNumber
localNumber
```

When `numberingPlan` is 'e164Number', `typeOfNumber` shall be exactly one of the following string values as defined in [ITU-T H.225.0]:

>Unknown

>internationalNumber

>networkSpecificNumber

>subscriberNumber

>abbreviatedNumber

Note that when encoding a private numbering plan of type 'unknown' (000) it is not necessary to encode it in the `h323IdentitypartyNumber` attribute. Instead, use `h323IdentitydialedDigits`.

## 6.9 h323IdentitymobileUIM

```
OID: 0.0.8.350.1.1.3.1.8
attributetypes: (0.0.8.350.1.1.3.1.8
NAME 'h323IdentitymobileUIM'
DESC 'endpoint mobile UIM as defined in ITU-T H.323 document'
EQUALITY caseIgnoreIA5Match
SUBSTR caseIgnoreIA5SubstringsMatch
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
```

Application utility class

> Standard

Number of values

> multi

Definition

> The endpoint's ITU-T H.323 mobileUIM alias as defined in [ITU-T H.225.0]. This is one of the dialling attributes defined by [ITU-T H.323].

Permissible values (if controlled)

Notes

Semantics

Example applications for which this attribute would be useful

Example (LDIF fragment)

```
h323IdentitymobileUIM: EXAMPLE
```

## 6.10 h323IdentityEndpointType

```
OID: 0.0.8.350.1.1.3.1.9
attributetypes: (0.0.8.350.1.1.3.1.9
NAME 'h323IdentityEndpointType'
DESC 'The endpoint ITU-T H.323 type as defined in ITU-T H.323.'
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 endpoint as defined in [ITU-T H.323]. Values must be one of the following:
>
> 1) terminal;
>
> 2) mcu;
>
> 3) gateway.

Permissible values (if controlled)

Notes

> This attribute can be used to search the directory for the presence of MCUs, gateways or terminals, by searching for the presence of attributes of this type.

Semantics

Example applications for which this attribute would be useful

Example (LDIF fragment)

```
h323IdentityEndpointType:gateway
```

## 6.11    h323IdentityServiceLevel

```
OID: 0.0.8.350.1.1.3.1.10
attributetypes: (0.0.8.350.1.1.3.1.10
NAME 'h323IdentityServiceLevel'
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

Semantics

Example applications for which this attribute would be useful

Example (LDIF fragment)

```
h323IdentityServiceLevel:deluxe
```

## 7    h323Identity LDIF files

This clause contains a schema configuration file for h323Identity that can be used to configure an LDAP server to support this class.

```
# h323Identity Object Schema
#
# Schema for representing h323Identity Object in an LDAP Directory
#
# Abstract
#
# This Recommendation defines the schema for representing h323Identity
# object in an LDAP directory [LDAPv3]. It defines schema elements
# to represent an h323Identity object [h323Identity].
#
#                    .1 = Communication related work
#                    .1.3 = h323Identity
#                    .1.3.1 = attributes
#                    .1.3.2 = objectclass
#                    .1.3.3 = syntax
```

```
#
#
#
# Attribute Type Definitions
#
#     The following attribute types are defined in this Recommendation:
#
#         h323IdentityGKDomain
#         h323Identityh323-ID
#         h323IdentitydialedDigits
#         h323Identityemail-ID
#         h323IdentityURL-ID
#         h323IdentitytransportID
#         h323IdentitypartyNumber
#         h323IdentitymobileUIM
#         h323IdentityEndpointType
#         h323IdentityServiceLevel
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 h323Identity
# 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: (0.0.8.350.1.1.3.1.1 NAME 'h323IdentityGKDomain' )
attributetypes: (0.0.8.350.1.1.3.1.2 NAME 'h323Identityh323-ID' )
attributetypes: (0.0.8.350.1.1.3.1.3 NAME 'h323IdentitydialedDigits' )
attributetypes: (0.0.8.350.1.1.3.1.4 NAME 'h323Identityemail-ID' )
attributetypes: (0.0.8.350.1.1.3.1.5 NAME 'h323IdentityURL-ID' )
attributetypes: (0.0.8.350.1.1.3.1.6 NAME 'h323IdentitytransportID' )
attributetypes: (0.0.8.350.1.1.3.1.7 NAME 'h323IdentitypartyNumber' )
attributetypes: (0.0.8.350.1.1.3.1.8 NAME 'h323IdentitymobileUIM' )
attributetypes: (0.0.8.350.1.1.3.1.9 NAME 'h323IdentityEndpointType' )
attributetypes: (0.0.8.350.1.1.3.1.10 NAME 'h323IdentityServiceLevel' )
-
#
# re-add the attributes -- in case there is a change of definition
#
#
add: attributetypes
attributetypes: (0.0.8.350.1.1.3.1.1
    NAME 'h323IdentityGKDomain'
    DESC 'FQDN of the Gatekeeper'
    EQUALITY caseIgnoreIA5Match
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
attributetypes: (0.0.8.350.1.1.3.1.2
    NAME 'h323Identityh323-ID'
    DESC 'specifies the endpoint address alias as specified in ITU-T H.323'
    EQUALITY caseIgnoreIA5Match
    SUBSTR caseIgnoreIA5SubstringsMatch
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
attributetypes: (0.0.8.350.1.1.3.1.3
    NAME 'h323IdentitydialedDigits'
    DESC 'Specifies the endpoint dialled digits as specified in ITU-T H.323'
    EQUALITY caseIgnoreIA5Match
    SUBSTR caseIgnoreIA5SubstringsMatch
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
attributetypes: (0.0.8.350.1.1.3.1.4
    NAME 'h323Identityemail-ID'
    DESC 'Specifies an ITU-T H.323 entity that can be reached using ITU-T H.323'
    EQUALITY caseIgnoreIA5Match
    SUBSTR caseIgnoreIA5SubstringsMatch
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
attributetypes: (0.0.8.350.1.1.3.1.5
    NAME 'h323IdentityURL-ID'
```

```
    DESC 'ITU-T H.323 specs'
    EQUALITY caseExactMatch
    SUBSTR caseExactSubstringsMatch
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.15 )
attributetypes: (0.0.8.350.1.1.3.1.6
    NAME 'h323IdentitytransportID'
    DESC 'specifies endpoint transport Id as defined in ITU-T H.323'
    EQUALITY caseIgnoreIA5Match
    SUBSTR caseIgnoreIA5SubstringsMatch
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
attributetypes: (0.0.8.350.1.1.3.1.7
    NAME 'h323IdentitypartyNumber'
    DESC 'endpoint party Number as defined in ITU-T H.323'
    EQUALITY caseIgnoreIA5Match
    SUBSTR caseIgnoreIA5SubstringsMatch
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
attributetypes: (0.0.8.350.1.1.3.1.8
    NAME 'h323IdentitymobileUIM'
    DESC 'endpoint mobile UIM as defined in ITU-T H.323 document'
    EQUALITY caseIgnoreIA5Match
    SUBSTR caseIgnoreIA5SubstringsMatch
    SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 )
attributetypes: (0.0.8.350.1.1.3.1.9
  NAME 'h323IdentityEndpointType'
  DESC 'The endpoint ITU-T H.323 type as defined in ITU-T H.323.'
  EQUALITY caseIgnoreMatch
  SUBSTR caseIgnoreSubstringsMatch
  SYNTAX 1.3.6.1.4.1.1466.115.121.1.15 )
attributetypes: (0.0.8.350.1.1.3.1.10
  NAME 'h323IdentityServiceLevel'
  DESC 'To define services a user can belong to.'
  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:
#
#        h323Identity
#
# h323Identity
#
#
delete: objectclasses
objectclasses: (0.0.8.350.1.1.3.2.1 NAME 'h323Identity' )
-
add: objectclasses
objectclasses: (0.0.8.350.1.1.3.2.1
    NAME 'h323Identity'
    DESC 'ITU-T h323Identity object'
    SUP top AUXILIARY
    MAY ( h323IdentityGKDomain $ h323Identityh323-ID $
        h323IdentitydialedDigits $ h323Identityemail-ID $
        h323IdentityURL-ID $ h323IdentitytransportID $
        h323IdentitypartyNumber $ h323IdentitymobileUIM $
        h323IdentityEndpointType $ h323IdentityServiceLevel )
    )
-
#
# 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 h323IdentityASN1.asn

```
H323Identity { itu-t(0)  recommendation(0) h(8) 350 1 cr(1) h323Identity(3) module(4) }
DEFINITIONS ::=
BEGIN

-- h323Identity Object Schema

-- Schema for representing h323Identity Object in an LDAP Directory

-- Abstract

-- This Recommendation defines the schema for representing h323Identity
-- object in an LDAP directory [LDAPv3].  It defines schema elements
-- to represent an h323Identity object [h323Identity].

--                      .1 = Communication related work
--                      .1.3 = h323Identity
--                      .1.3.1 = attributes
--                      .1.3.2 = objectclass
--                      .1.3.3 = syntax


IMPORTS

-- from Rec. ITU-T H.350

h350-cr, caseIgnoreIA5Match, caseIgnoreIA5SubstringsMatch
     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, caseExactMatch, caseExactSubstringsMatch, 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:

--        h323IdentityGKDomain
--        h323Identityh323-ID
--        h323IdentitydialedDigits
--        h323Identityemail-ID
--        h323IdentityURL-ID
--        h323IdentitytransportID
--        h323IdentitypartyNumber
--        h323IdentitymobileUIM
--        h323IdentityEndpointType
--        h323IdentityServiceLevel

h323IdentityGKDomain ATTRIBUTE ::= {
     WITH SYNTAX IA5String
     EQUALITY MATCHING RULE caseIgnoreIA5Match
     ID { at 1 } }

h323Identityh323-ID ATTRIBUTE ::= {
     WITH SYNTAX IA5String
     EQUALITY MATCHING RULE caseIgnoreIA5Match
     SUBSTRINGS MATCHING RULE caseIgnoreIA5SubstringsMatch
     ID { at 2 } }

h323IdentitydialedDigits ATTRIBUTE ::= {
     WITH SYNTAX IA5String
     EQUALITY MATCHING RULE caseIgnoreIA5Match
     SUBSTRINGS MATCHING RULE caseIgnoreIA5SubstringsMatch
     ID { at 3 } }

h323Identityemail-ID ATTRIBUTE ::= {
     WITH SYNTAX IA5String
     EQUALITY MATCHING RULE caseIgnoreIA5Match
     SUBSTRINGS MATCHING RULE caseIgnoreIA5SubstringsMatch
     ID { at 4 } }

h323IdentityURL-ID ATTRIBUTE ::= {
     WITH SYNTAX UnboundedDirectoryString
     EQUALITY MATCHING RULE caseExactMatch
     SUBSTRINGS MATCHING RULE caseExactSubstringsMatch
     ID { at 5 } }

h323IdentitytransportID ATTRIBUTE ::= {
     WITH SYNTAX IA5String
     EQUALITY MATCHING RULE caseIgnoreIA5Match
     SUBSTRINGS MATCHING RULE caseIgnoreIA5SubstringsMatch
     ID { at 6 } }

h323IdentitypartyNumber ATTRIBUTE ::= {
     WITH SYNTAX IA5String
     EQUALITY MATCHING RULE caseIgnoreIA5Match
     SUBSTRINGS MATCHING RULE caseIgnoreIA5SubstringsMatch
     ID { at 7 } }

h323IdentitymobileUIM ATTRIBUTE ::= {
     WITH SYNTAX IA5String
```

```
      EQUALITY MATCHING RULE caseIgnoreIA5Match
      SUBSTRINGS MATCHING RULE caseIgnoreIA5SubstringsMatch
      ID { at 8 } }

h323IdentityEndpointType ATTRIBUTE ::= {
      WITH SYNTAX UnboundedDirectoryString
      EQUALITY MATCHING RULE caseIgnoreMatch
      SUBSTRINGS MATCHING RULE caseIgnoreSubstringsMatch
      ID { at 9 } }

h323IdentityServiceLevel ATTRIBUTE ::= {
      WITH SYNTAX UnboundedDirectoryString
      EQUALITY MATCHING RULE caseIgnoreMatch
      SUBSTRINGS MATCHING RULE caseIgnoreSubstringsMatch
      ID { at 10 } }

-- Object Class Definitions

--    The following object class is defined in this Recommendation:
--
--        h323Identity

-- h323Identity

h323Identity OBJECT-CLASS ::= {
      SUBCLASS OF { top }
      MAY CONTAIN { h323IdentityGKDomain |
                    h323Identityh323-ID |
                    h323IdentitydialedDigits |
                    h323Identityemail-ID |
                    h323IdentityURL-ID |
                    h323IdentitytransportID |
                    h323IdentitypartyNumber |
                    h323IdentitymobileUIM |
                    h323IdentityEndpointType |
                    h323IdentityServiceLevel }
      ID { oc 1 } }

h323-Id      OBJECT IDENTIFIER   ::=   { h350-cr h323-Id(3) }
at           OBJECT IDENTIFIER   ::=   { h323-Id at(1) }
oc           OBJECT IDENTIFIER   ::=   { h323-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 h323Identity directories that will be optimized for use in directory of directories applications. Use of this profile is optional.

h323IdentityGKDomain: no recommendation

h323Identityh323-ID: equality

h323IdentitydialedDigits: equality

h323Identityemail-ID: equality

h323IdentityURL-ID: equality

h323IdentitytransportID: equality

h323IdentitypartyNumber: equality

h323IdentitymobileUIM: equality

h323IdentityEndpointType: equality

h323IdentityServiceLevel: 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.350.1 contains file `h323Identity.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.350.1

# 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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