An LDAP Schema for Phone Books

1. Status of this Memo

This document is an Internet-Draft. Internet-Drafts are working docu-
ments of the Internet Engineering Task Force (IETF), its areas, and its
working groups. Note that other groups may also distribute working doc-
uments as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months
and may be updated, replaced, or obsoleted by other documents at any
time. It is inappropriate to use Internet-Drafts as reference material
or to cite them other than as work in progress.''

To learn the current status of any Internet-Draft, please check the
``1id-abstracts.txt'' listing contained in the Internet-Drafts Shadow
Directories on ds.internic.net (US East Coast), nic.nordu.net (Europe),
ftp.isi.edu (US West Coast), or munnari.oz.au (Pacific Rim).

The distribution of this memo is unlimited. It is filed as <draft-ietf-
roamops-ldap-phonebook-01.txt>, and expires September 15, 1998. Please
send comments to the Roaming Operations Working Group mailing list
(roamops@tdmx.rutgers.edu) or to the author (glennz@microsoft.com).

2. Abstract

This document describes an LDAP schema for the attributes to be included
in the standard phone book. Goals of this document include:

   - Creating a flexible, extensible and robust framework
     upon which to build a standard phone book
   - Promoting a standard phone book format, to enhance
     interoperability between ISPs and roaming consortia

Non-goals of this document include:

   - Attempting to create a ''Swiss army knife'', with phone
     book attributes to please everyone on Earth
   - Definition of either server-server or client-server
     phone book update or transfer protocols

[3](). **Rationale for LDAP Usage**

The attributes are defined in terms that are directly usable by the
Lightweight Directory Access Protocol (LDAP) for several reasons:

   - Extensibility
   - Flexibility
   - Integration with LDAP-based Directory

Extensibility is important because phone books are living documents; as
such, it is unlikely that all the semantic requirements of arbitrary
Internet service providers (ISPs) would be met by a fixed scheme, no
matter how well thought out. Phone book designers must be free to cre-
ate new attributes in an well-understood fashion to meet changing busi-
ness needs.

Flexibility is required of the attribute definition syntax for many of
the same reasons that semantic extensibility is necessary. If we assume
that phone book designers may need to define attributes of arbitrary
type, the syntax chosen must be able to represent these objects cleanly.
The meta-language used to describe LDAP attributes fits this bill
nicely, since it can be used to unambiguously describe virtually any
data type.

Integration with LDAP-based directories: although it is unlikely that
phone books will be stored in the directory due to performance consider-
ations, the creation of an LDAP schema describing phone book attributes
leaves that option open, with relatively little incremental effort
required to implement it.

[4](). **Specification of Requirements**

In this document, the key words "MAY", "MUST, "MUST NOT", "optional",
"recommended", "SHOULD", and "SHOULD NOT", are to be interpreted as
described in [[1]()].

[5](). **Object definitions**

This document includes definitions of the following objects:

   - Phone Book class
   - Provider class
   - POP class
   - Support class
   - Setup class

5.1. Phone Book Class

5.1.1. Description
   The Phone Book class is the basic container for phone book entries.
   It always contains a phone book version number (applying to the phone
   book as a whole), a phone book name and one or more pointers (in the
   form of Distinguished Names) to POP objects. A Phone Book object may
   also contain multiple pointers to Provider and Setup   objects
   (described below).   These pointers also take the form of Distin-
   guished Names.

5.1.2. Syntax
   (phoneBookClass 1
        NAME 'phoneBookClass'
        SUP top
        STRUCTURAL
        MUST (
             phoneBookVersion $ phoneBookName $ popPointer
)
        MAY (
             setupPointer $ providerPointer $ supportPointer
)
)

5.2. Provider Class

5.2.1. Description
   The Provider class contains attributes pertaining to the general
   business operations of a given network service provider.   The
   attributes include such things as telephone number, mailing address,
   etc., as well as URLs for e-mail and a World Wide Web site. A
   Provider object may also contain a pointer (in the form of a Distin-
   guished Name) to support information.

5.2.2. Syntax
   (providerClass 1
        NAME 'providerClass'
        SUP top
        STRUCTURAL
        MAY (
             providerName $ providerIcon $ wwwURL
             $ generalMailtoURL $ billingMailtoURL
             $ businessCategory $ x121Address $ registeredAddress
             $ destinationIndicator $ preferredDeliveryMethod
             $ telexNumber $ teletexTerminalIdentifier
             $ telephoneNumber $ internationalISDNNumber
             $ facsimileTelephoneNumber $ street $ postOfficeBox
             $ postalCode $ postalAddress $ physicalDeliveryOfficeName

```
                $ description $ supportPointer
        )
    )
```

5.3. POP Class

5.3.1. Description
   The POP class contains attributes relevant to individual network
   points of presence (POPs). The required attributes are addrFamily,
   address, media and entryVersion. The media attribute represents the
   media types supported by the POP, while the entryVersion attribute is
   a monotonically-increasing integer which should be incremented when-
   ever the object is modified.

5.3.2. Syntax
```
    ( popClass 1
        NAME 'popClass'
        SUP top
        PARENT (
            country $ organization $ organizationalunit
            $ locality $ container
        )
        STRUCTURAL
        MUST (
            addrFamily $ address $ media $ entryVersion
        )
        MAY (
            encodingType $ modemProtocols
            $ isdnProtocols $ city $ region $ country
            $countryCode $ minBitsPerSecond
            $ maxBitsPerSecond $ areaCode
            $ unicastRoutingProtocols
            $ multicastRoutingProtocols $ dialScriptType
            $ dialScript $ pricing $ vpnProtocols $ popProperties
            $ popSetupPointer $ popSupportPointer $ popProviderPointer
        )
    )
```

5.4. Support Class

5.4.1. Description
   The Support class includes those attributes that are pertinent to the
   provision of customer support for a POP or provider.

5.4.2. Syntax
```
    ( supportClass 1
        NAME 'supportClass'
        SUP top
```

```
        PARENT (
             country $ organization $ organizationalunit
             $ locality $ container
        )
        STRUCTURAL
        MAY (
             supportTelephoneNumber $ supportLanguages
             $ supportMailtoURL
        )
    )
```

5.5. Setup Class

5.5.1. Description
   The Setup class includes attributes which describe services which may
   change from provider to provider or even from POP to POP.   Many of
   the values contained in these attributes may be available by other
   means (e.g., DHCP), but others may not.

5.5.2. Syntax
```
    ( setupClass 1
        NAME 'setupClass'
        SUP top
        PARENT (
             country $ organization $ organizationalunit
             $ locality $ container
        )
        STRUCTURAL
        MAY (
             dnsServerAddress $ nntpServerName $ smtpServerName
             $ popServerName $ imapServerName $ wwwProxyServerName
             $ ftpProxyServerName $ winsockProxyServerName
             $ defaultGatewayAddress $ userNamePrefix $ userNameSuffix
        )
    )
```

6. Attribute Definitions

6.1. New attributes defined for the Phone Book Class

6.1.1. Phone Book Version

6.1.1.1. Description
   The phoneBookVersion attribute is an integer representing the version
   of the phone book; it is a monotonically increasing counter which
   should be incremented each time the phone book is modified.   This
   attribute can be used by a server to help decide what (if any)
   actions are required to bring a client's phone book up to date.   For

example, the client can, at connect time, send an update request to
the server including in the request the version number of its current
phone book.   If the client's phone book version is not the same as
the server's current phone book version, the server can easily take
appropriate action, e.g., reply with a URL pointing to a file con-
taining the differences between the client and server phone books.

6.1.1.2. **Syntax**
    (phoneBook phoneBookClass 1
          NAME 'phoneBookVersion'
          DESC 'Version number of the phone book'
          EQUALITY IntegerMatch
          SYNTAX 'INTEGER'
          SINGLE-VALUE
)

6.1.2. **Phone Book Name**

6.1.2.1. **Description**
   The phoneBookName attribute is an arbitrary string assigned as an
   identifier for a phone book.

6.1.2.2. **Syntax**
    (phoneBook phoneBookClass 2
          NAME 'phoneBookName'
          DESC 'The name of the phone book'
          EQUALITY caseIgnoreIA5Match
          SYNTAX PrintableString
          SINGLE-VALUE
)

6.1.3. **POP Pointer**

6.1.3.1. **Description**
   The popPointer attribute is a Distinguished Name which points to a
   POP object for this phone book.

6.1.3.2. **Syntax**
    (phoneBook phoneBookClass 3
          NAME 'popPointer'
          DESC 'A pointer to one or more POP objects'
          EQUALITY distinguishedNameMatch
          SYNTAX 'DN'
)

6.1.4. **Setup Pointer**

6.1.4.1. **Description**
   The setupPointer attribute is a Distinguished Name which points to a
   Setup object for this phone book.

6.1.4.2. **Syntax**
   (phoneBook phoneBookClass 4
         NAME 'setupPointer'
         DESC 'A pointer to a Setup object for this phone book'
         EQUALITY distinguishedNameMatch
         SYNTAX 'DN'
         SINGLE-VALUE
)

6.1.5. **Provider Pointer**

6.1.5.1. **Description**
   The providerPointer attribute is a Distinguished Name which points to
   a Provider object for this phone book.

6.1.5.2. **Syntax**
   (phoneBook phoneBookClass 5
         NAME 'providerPointer'
         DESC 'A pointer to a Provider object for this phonebook'
         EQUALITY distinguishedNameMatch
         SYNTAX 'DN'
         SINGLE-VALUE
)

6.1.6. **Support Pointer**

6.1.6.1. **Description**
   The supportPointer attribute is a Distinguished Name which points to
   a Support object for this phone book.

6.1.6.2. **Syntax**
   (phoneBook phoneBookClass 6
         NAME 'supportPointer'
         DESC 'A pointer to a Support object for this phone book'
         EQUALITY distinguishedNameMatch
         SYNTAX 'DN'
         SINGLE-VALUE
)

6.2. **New attributes defined for the Provider Class [3]**

6.2.1. **Provider Name**

6.2.1.1. **Description**
   The providerName attribute is a string containing the name of the
   provider (e.g., "BIGNET Corporation").

6.2.1.2. **Syntax**
   (phoneBook providerClass 1
        NAME 'providerName'
        DESC 'The name of the provider'
        EQUALITY caseIgnoreIA5Match
        SYNTAX 'PrintableString'
        SINGLE-VALUE
)

6.2.2. **Provider Icon**

6.2.2.1. **Description**
   The providerIcon attribute contains a JPEG graphic which may be used
   for 'branding' phone book entries or displayed when dialing.

6.2.2.2. **Syntax**
   (phoneBook providerClass 2
        NAME 'providerIcon'
        DESC 'An icon in JPEG format'
        EQUALITY octetStringMatch
        SYNTAX 'JPEG'
        SINGLE-VALUE
)

6.2.3. **Provider's World Wide Web URL**

6.2.3.1. **Description**
   The wwwURL attribute contains a Uniform Resource Locator (URL) for
   the provider's Web site, for example, http://www.uu.net.

6.2.3.2. **Syntax**
   (phoneBook providerClass 3
        NAME 'wwwURL'
        DESC 'A Uniform Resource Locator for the provider's home page'
        EQUALITY caseExactIA5Match
        SYNTAX 'IA5String'
        SINGLE-VALUE
)

6.2.4. **Provider's Main Email Address**

6.2.4.1. **Description**
   The generalMailtoURL attribute contains a URL for the provider's main
   email address, for example, mailto://contact@uu.net. This URL could
   be used for general correspondence, complaints, etc.

6.2.4.2. **Syntax**
   (phoneBook providerClass 4
         NAME 'generalMailtoURL'
         DESC 'A Uniform Resource Locator for the provider's
               email address'
         EQUALITY caseExactIA5Match
         SYNTAX 'IA5String'
         SINGLE-VALUE
)

6.2.5. **Billing Inquiry Email Address**

6.2.5.1. **Description**
   The billingMailtoURL attribute contains a URL for the provider's
   billing support email address, for example, mailto://billing@uu.net.
   This URL could be used to for correspondence regarding billing and
   payment issues.

6.2.5.2. **Syntax**
   (phoneBook providerClass 6
         NAME 'billingMailtoURL'
         DESC 'A Uniform Resource Locator for the email
               address to be used for billing inquiries'
         EQUALITY caseExactIA5Match
         SYNTAX 'IA5String'
         SINGLE-VALUE
)

6.3. **New attributes defined for the POP Class**

6.3.1. **Address Family**

6.3.1.1. **Description**
   The addrFamily attribute is an integer which represents the address
   family to which the value in the address attribute (below) belongs.
   For POPs offering dial-up network access, the addrFamily attribute
   will generally contain a value for a telephone network based address
   family.   The current list of IANA-assigned address family numbers is
   reproduced below for convenience; for an up-to-date list, see [2].

        Number Description

```
      ------  -------------------------------------
      0       Reserved
      1       IP (IP version 4)
      2       IP6 (IP version 6)
      3       NSAP
      4       HDLC (8-bit multidrop)
      5       BBN 1822
      6       802 (includes all 802 media
                  plus Ethernet "canonical format")
      7       E.163
      8       E.164 (SMDS, Frame Relay, ATM)
      9       F.69 (Telex)
      10      X.121 (X.25, Frame Relay)
      11      IPX
      12      Appletalk
      13      Decnet IV
      14      Banyan Vines
      65535   Reserved
```

6.3.1.2. **Syntax**
```
   ( phoneBook popClass 1
         NAME 'addrFamily'
         SUP top
         DESC 'The address family to which the address attribute
             below belongs'
         EQUALITY integerMatch
         SYNTAX INTEGER
         SINGLE-VALUE
   )
```

6.3.2. **Address**

6.3.2.1. **Description**

   The address attribute in a binary quantity representing the address
   of the POP.   For POPs offering dial-up network access, the address
   attribute will generally contain an IA5 string representing a tele-
   phone number, formatted in standard fashion [4] (e.g. "+ 1 234
   5678").

6.3.2.2. **Syntax**
```
   ( phoneBook popClass 2
         NAME 'address'
         SUP top
         DESC 'A network address for this POP'
         EQUALITY bitStringMatch
         SYNTAX 'BitString'
         SINGLE-VALUE
   )
```

6.3.3. Media

6.3.3.1. Description

The media attribute describes the types of media supported by this
POP.   The following values are defined:

```
   Type              Value
   -----------       -----
   Modem             1
   ISDN              2
   ATM               3
   Frame Relay       4
   X.25              5
   SMDS              6
```

6.3.3.2. Syntax

```
( phoneBook popClass 3
      NAME 'media'
      SUP top
      DESC 'The types of media supported by this POP'
      EQUALITY integerMatch
      SYNTAX INTEGER
)
```

6.3.4. Entry Version

6.3.4.1. Description

The entryVersion attribute is an integer representing the version of
the POP object; it is a monotonically increasing counter which should
be incremented each time the object is modified. This attribute may
be useful in merging and updating phone books.

6.3.4.2. Syntax

```
( phoneBook popClass 4
      NAME 'entryVersion'
      DESC 'version number of POP object'
      EQUALITY IntegerMatch
      SYNTAX 'INTEGER'
      SINGLE-VALUE
)
```

6.3.5. Encoding Type

6.3.5.1. Description

The encodingType attribute is an integer representing the type of
encoding used within a specific address family The value '0' is
reserved and represents the native encoding.

6.3.5.2. **Syntax**
```
   ( phoneBook popClass 5
         NAME 'entryVersion'
         DESC 'the type of encoding used within this address family'
         EQUALITY IntegerMatch
         SYNTAX 'INTEGER'
         SINGLE-VALUE
   )
```

6.3.6. **Modem Protocols**

6.3.6.1. **Description**

   The modemProtocols attribute is a bit string representing the modem
   protocols supported by the access devices that can be reached at
   address. The initially defined modem protocol flags are listed in
   the table below.   All 'Position' values are in hexadecimal, all
   'Speed' values are in bits per second. If the bit in 'Position' is
   1, 'Protocol' is supported; otherwise, 'Protocol' is unsupported.
   For example, the string 00110001 (0x31) means that V.21, V.32bis and
   V.34 are supported while V.22, V.29 and V.32 are not.

```
      Name Position    Duplex   Speed   Protocol
      ---- --------    ------   -----   ------------
      V21  0x0001      Full     300     ITU-T V.21
      V22  0x0002      Full     1200    ITU-T V.22
      V29  0x0004      Half     9600    ITU-T V.29
      V32  0x0008      Full     9600    ITU-T V.32
      V32b 0x0010      Full     14.4k   ITU-T V.32bis
      V34  0x0020      Full     28.8k   ITU-T V.34
      VF   0x0040      Full             V.FAST
```

   Question: Are these flags useful? If so, are there more that need to
   be added?

6.3.6.2. **Syntax**
```
   ( phoneBook popClass 6
         NAME 'modemProtocols'
         DESC 'A bit string representing the modem
               protocols supported by the access devices at
               this POP'
         EQUALITY bitStringMatch
         SYNTAX 'BitString'
         SINGLE-VALUE
   )
```

[6.3.7](#). ISDN Protocols

[6.3.7.1](#). Description

The isdnProtocols attribute is a bit string representing the ISDN protocols supported by the access devices that can be reached at address. The initially defined ISDN protocols are listed in the table below. All 'Value. values are in hexadecimal, all 'Speed' values are in bits per second. If the bit in 'Position' is 1, 'Protocol' is supported; otherwise, 'Protocol' is unsupported. For example, the string 00001101 (0x0d) means that V.120 is supported at both 56K and 64K bps while V.110 is supported only at 19.2K bps.

```
Name   Value    Speed    Meaning
-----  ------   -----    -----------
V110L  0x0001   19.2k    ITU-T V.110
V110H  0x0002   38.4k    ITU-T V.110
V120L  0x0004   56k      ITU-T V.120
V120H  0x0008   64k      ITU-T V.120
```

Question: Are the ISDN flags useful? If so, should there be more?

[6.3.7.2](#). Syntax

```
( phoneBook popClass 7
      NAME 'isdnProtocols'
      DESC 'A bit string representing the ISDN flavors
          supported by the access devices at this POP'
      EQUALITY bitStringMatch
      SYNTAX 'BitString'
      SINGLE-VALUE
)
```

[6.3.8](#). City

[6.3.8.1](#). Description

The city attribute contains the name of the city in which the POP is located (not the city(s) from which it is accessible by a local call).

[6.3.8.2](#). Syntax

```
( phoneBook popClass 8
      NAME 'city'
      DESC 'The name of the city in which this POP is located'
      EQUALITY caseExactIA5Match
      SYNTAX 'IA5String {64}'
      SINGLE-VALUE
)
```

6.3.9. **Region**

6.3.9.1. **Description**
   The region attribute contains the name of the region in which the POP
   is located. In the United States, this would be the name of a state
   or (for Washington, D.C.) administrative district. In other coun-
   tries, it might be the name of a province, parish or county.

6.3.9.2. **Syntax**
   (phoneBook popClass 9
        NAME 'region'
        DESC 'The name of the region in which this POP is located'
        EQUALITY caseExactIA5Match
        SYNTAX 'IA5String {64}'
        SINGLE-VALUE
)

6.3.10. **Country**

6.3.10.1. **Description**
   The country attribute contains the name of the country in which the
   POP is located. The country name may be abbreviated (e.g., "USA" for
   the United States of America or "UK" for the United Kingdom) but if
   abbreviations are used the usage must be consistent within a given
   phone book.

6.3.10.2. **Syntax**
   (phoneBook popClass 10
        NAME 'country'
        DESC 'The name of the country in which this POP is located'
        EQUALITY caseExactIA5Match
        SYNTAX 'IA5String {64}'
        SINGLE-VALUE
)

6.3.11. **Country Code**

6.3.11.1. **Description**
   The countryCode attribute indicates the international dialing prefix
   for the country in which the POP is located.

6.3.11.2. **Syntax**
   (phoneBook popClass 11
        NAME 'countryCode'
        DESC 'ITU dialing code for the country in which
             this POP is located'
        EQUALITY integerMatch
        SYNTAX 'INTEGER'

```
        SINGLE-VALUE
   )
```

6.3.12. **Minimum Data Rate**

6.3.12.1. **Description**
   The minBitsPerSecond attribute indicates the minimum data rate (in
   bits/second) supported by the access devices at the POP.

6.3.12.2. **Syntax**
```
   ( phoneBook popClass 12
        NAME 'minBitsPerSecond'
        DESC 'Minimum data rate supported by this POP'
            in bits/second'
        EQUALITY integerMatch
        SYNTAX 'INTEGER'
        SINGLE-VALUE
   )
```

6.3.13. **Maximum Data Rate**

6.3.13.1. **Description**
   The maxBitsPerSecond attribute indicates the maximum data rate (in
   bits/second) supported by the access devices at the POP.

6.3.13.2. **Syntax**
```
   ( phoneBook popClass 13
        NAME 'maxBitsPerSecond'
        DESC 'Maximum data rate supported by this POP,
            in bits/second'
        EQUALITY integerMatch
        SYNTAX 'INTEGER'
        SINGLE-VALUE
   )
```

6.3.14. **Area Code**

6.3.14.1. **Description**
   The areaCode attribute contains the area or city code component of
   the telephone number in the 'address' attribute (if any) associated
   with this POP.

6.3.14.2. **Syntax**
```
   ( phoneBook popClass 14
        NAME 'areaCode'
        DESC 'Area or city code component of the telephone
            number in the accessTelephoneNumber attribute
            associated with this POP'
```

```
        EQUALITY integerMatch
        SYNTAX INTEGER
        SINGLE-VALUE
   )
```

6.3.15. **Unicast Routing Protocols**

6.3.15.1. **Description**
   The unicastRoutingProtocols attribute is a bitstring representing the
   unicast routing protocols supported by this POP. The initially
   defined values are listed in the table below. If the bit in 'Posi-
   tion' is 1, 'Protocol' is supported; otherwise, 'Protocol' is unsup-
   ported.

```
    Position   Protocol
    --------   --------
    0x0001     Static
    0x0002     RIP v1
    0x0004     RIP v2
    0x0008     OSPF
    0x0010     IS-IS
    0x0020     IGRP
    0x0040     EIGRP
    0x0080     BGP
```

6.3.15.2. **Syntax**
```
   ( phoneBook popClass 15
        NAME 'unicastRoutingProtocols'
        DESC 'A bit string representing the unicast routing
             protocols supported by the access devices at this POP'
        EQUALITY bitStringMatch
        SYNTAX 'BitString'
        SINGLE-VALUE
   )
```

6.3.16. **Multicast Routing Protocols**

6.3.16.1. **Description**
   The multicastRoutingProtocols attribute is a bitstring representing
   the multicast routing protocols supported by this POP. The initially
   defined values are listed in the table below. If the bit in 'Posi-
   tion' is 1, 'Protocol' is supported; otherwise, 'Protocol' is unsup-
   ported.

```
   Position   Protocol
   --------   ----------
   0x0001     Static
   0x0002     DVMRP
```

```
   0x0004    SM-PIM
   0x0008    DM-PIM
   0x0010    CBT v1
   0x0020    CBT v2
   0x0040    BGMP
   0x0080    Proxy IGMP
```

6.3.16.2. **Syntax**
```
   ( phoneBook popClass 15
        NAME 'multicastRoutingProtocols'
        DESC 'A bit string representing the multicast routing
              protocols supported by the access devices at this POP'
        EQUALITY bitStringMatch
        SYNTAX 'BitString'
        SINGLE-VALUE
   )
```

6.3.17. **Dial Script Type**

6.3.17.1. **Description**
   The dialScript attribute indicates the type of dialing script that
   should be used when connecting to this POP.

   Question: What kinds of scripts are there?

6.3.17.2. **Syntax**
```
   ( phoneBook popClass 16
        NAME 'dialScriptType'
        DESC 'Type of the dial script to be used'
        EQUALITY caseExactIA5Match
        SYNTAX 'IA5String {64}'
        SINGLE-VALUE
   )
```

6.3.18. **Dialing Script**

6.3.18.1. **Description**
   The dialScript attribute contains the dialing script to be used when
   connecting to this POP.

6.3.18.2. **Syntax**
```
   ( phoneBook popClass 17
        NAME 'dialScript'
        DESC 'The dial script to be used'
        EQUALITY caseIgnoreIA5Match
        SYNTAX 'IA5String'
        SINGLE-VALUE
   )
```

6.3.19. **Pricing Information**

6.3.19.1. **Description**

The pricing attribute is a free-form string representing pricing information for this POP. It may be anything from a simple string indicating relative expense (e.g., "$$$$" for a very expensive POP) to a paragraph describing time-of-day and other differential pricing variables.

6.3.19.2. **Syntax**

```
( phoneBook popClass 18
      NAME 'pricing'
      DESC 'Pricing information for this POP'
      EQUALITY caseIgnoreIA5Match
      SYNTAX 'IA5String'
)
```

6.3.20. **Tunneling Protocols**

6.3.20.1. **Description**

The tunnelingProtocols attribute is a bitstring representing the tun- neling protocols supported by this POP. The initially defined values are listed in the table below. If the bit in 'Position' is 1, 'Pro- tocol' is supported; otherwise, 'Protocol' is unsupported.

Position	Protocol
0x0001	PPTP
0x0002	L2F
0x0004	L2TP
0x0008	ATMP
0x0010	VTP
0x0020	IP AH Tunnel Mode
0x0040	IP-IP
0x0080	Minimal IP-IP
0x0100	IP ESP Tunnel Mode
0x0200	GRE
0x0400	Bay DVS

6.3.20.2. **Syntax**

```
( phoneBook popClass 21
      NAME 'tunnelingProtocols'
      DESC 'A bit string representing the tunneling protocols
            supported by the access devices at this POP'
      EQUALITY bitStringMatch
      SYNTAX 'BitString'
      SINGLE-VALUE
)
```

6.3.21. POP Properties

6.3.21.1. Description
   The popProperties attribute is a bitstring representing a variety of
   Boolean properties characterizing this POP.   The initially defined
   properties are listed in the table below. If the bit in 'Position'
   is 1, 'Property' is supported; otherwise, 'Property' is unsupported.

```
   Position      Property
   --------      ---------------------
   0x0001        Multilink
   0x0002        Mobile IP
   0x0004        Multicast Reception
   0x0008        Multicast Transmission
```

6.3.21.2. Syntax
```
   ( phoneBook popClass 22
        NAME 'popProperties'
        DESC 'A bit string representing a variety of Boolean
             properties characterizing this POP'
        EQUALITY bitStringMatch
        SYNTAX 'BitString'
        SINGLE-VALUE
   )
```

6.3.22. POP Setup Pointer

6.3.22.1. Description
   The popSetupPointer attribute is a Distinguished Name which points to
   a Setup object for this POP.

6.3.22.2. Syntax
```
   ( phoneBook popClass 23
        NAME 'popSetupPointer'
        DESC 'A pointer to a Setup object for this POP'
        EQUALITY distinguishedNameMatch
        SYNTAX 'DN'
        SINGLE-VALUE
   )
```

6.3.23. POP Support Pointer

6.3.23.1. Description
   The popSupportPointer attribute is a Distinguished Name which points
   to a Support object for this POP.

6.3.23.2. Syntax
```
( phoneBook popClass 25
      NAME 'popSupportPointer'
      DESC 'A pointer to a Support object for this POP'
      EQUALITY distinguishedNameMatch
      SYNTAX 'DN'
      SINGLE-VALUE
)
```

6.3.24. POP Provider Pointer

6.3.24.1. Description
The popProviderPointer attribute is a Distinguished Name which points
to a Provider object for this POP.

6.3.24.2. Syntax
```
( phoneBook popClass 24
      NAME 'popProviderPointer'
      DESC 'A pointer to a Provider object for this POP'
      EQUALITY distinguishedNameMatch
      SYNTAX 'DN'
      SINGLE-VALUE
)
```

6.4. New attributes defined for the Support Class

6.4.1. Support Telephone Number

6.4.1.1. Description
The supportTelephoneNumber attribute contains a number that may be
called to reach the support center for a particular provider or POP.
This attribute is basically a string and should contain the entire
telephone number in international form, e.g., "+1 425 838 8080".

6.4.1.2. Syntax
```
( phoneBook supportClass 1
      NAME 'supportTelephoneNumber'
      SUP TelephoneNumber
      DESC 'The number to be dialed to contact customer
            support for this POP or provider'
      SINGLE-VALUE
)
```

6.4.2. Support Languages

6.4.2.1. **Description**
   The supportLanguages attribute contains a comma-separated list of
   languages spoken by the staff at the support center at supportTele-
   phoneNumber.

   Question: Is there a standard way to represent languages (like coun-
   try codes for phone numbers)?

6.4.2.2. **Syntax**
   (phoneBook supportClass 2
         NAME 'supportLanguages'
         DESC 'A comma-separated list of languages spoken by
               support personnel for this POP or provider'
         EQUALITY caseExactIA5Match
         SYNTAX 'IA5String'
)

6.4.3. **Support Email Address**

6.4.3.1. **Description**
   The supportMailtoURL attribute contains a URL for the provider's cus-
   tomer support email address, for example, mailto://support@uu.net.
   This URL could be used to contact customer support personnel regard-
   ing non-urgent issues.

6.4.3.2. **Syntax**
   (phoneBook supportClass 3
         NAME 'supportMailtoURL'
         DESC 'A Uniform Resource Locator for the
               provider's customer support email address'
         EQUALITY caseExactIA5Match
         SYNTAX 'IA5String'
         SINGLE-VALUE
)

6.5. **New attributes defined for the Setup class**

6.5.1. **DNS Server Address**

6.5.1.1. **Description**
   The dnsServerAddress attribute represents the IP address of the
   Domain Name Service (DNS) server which should be used when connected
   to this POP. The address is represented in the form of a string in
   dotted-decimal notation (e.g., 192.168.101.1).

6.5.1.2. **Syntax**
```
( phoneBook setupClass 1
      NAME 'dnsServerAddress'
      DESC 'Domain Name Server IP address (in dotted decimal
           notation)'
      EQUALITY caseIgnoreIA5Match
      SYNTAX 'IA5String {128}'
      SINGLE-VALUE
)
```

6.5.2. **NNTP Server Name**

6.5.2.1. **Description**

The nntpServerName attribute contains the fully qualified domain name
(FQDN) of the Network News Transfer Protocol (NNTP) server which
should be used when connected to this POP.

6.5.2.2. **Syntax**
```
( phoneBook setupClass 2
      NAME 'nntpServerName'
      DESC 'Name of an NNTP server'
      EQUALITY caseIgnoreIA5Match
      SUBSTRINGS caseIgnoreIA5SubstringsMatch
      SYNTAX 'IA5String'
      SINGLE-VALUE
)
```

6.5.3. **SMTP Server Name**

6.5.3.1. **Description**

The smtpServerName attribute contains the FQDN of the Simple Mail
Transfer Protocol (SMTP) server which should be used when connected
to this POP.

6.5.3.2. **Syntax**
```
( phoneBook setupClass 3
      NAME 'smtpServerName'
      DESC 'Name of an SMTP mail server'
      EQUALITY caseIgnoreIA5Match
      SUBSTRINGS caseIgnoreIA5SubstringsMatch
      SYNTAX 'IA5String'
      SINGLE-VALUE
)
```

6.5.4. **POP3 Server Name**

6.5.4.1. **Description**
   The popServerName attribute contains the FQDN of the Post Office Pro-
   tocol (POP) server which should be used when connected to this POP.

6.5.4.2. **Syntax**
   (phoneBook setupClass 4
         NAME 'popServerName'
         DESC 'Name of an POP3 mail server'
         EQUALITY caseIgnoreIA5Match
         SUBSTRINGS caseIgnoreIA5SubstringsMatch
         SYNTAX 'IA5String'
         SINGLE-VALUE
)

6.5.5. **IMAP Server Name**

6.5.5.1. **Description**
   The imapServerName attribute contains the FQDN of the Internet Mail
   Access Protocol (IMAP) server which should be used when connected to
   this POP.

6.5.5.2. **Syntax**
   (phoneBook setupClass 5
         NAME 'imapServerName'
         DESC 'Name of an IMAP4 server'
         EQUALITY caseIgnoreIA5Match
         SUBSTRINGS caseIgnoreIA5SubstringsMatch
         SYNTAX 'IA5String'
         SINGLE-VALUE
)

6.5.6. **WWW Proxy**

6.5.6.1. **Description**
   The wwwProxyServerName attribute contains the FQDN of the World Wide
   Web (WWW) proxy server which should be used when connected to this
   POP.

6.5.6.2. **Syntax**
   (phoneBook setupClass 6
         NAME 'wwwProxyServerName'
         DESC 'Name of an WWW Proxy'
         EQUALITY caseIgnoreIA5Match
         SUBSTRINGS caseIgnoreIA5SubstringsMatch
         SYNTAX 'IA5String'
         SINGLE-VALUE
)

6.5.7. **FTP Proxy**

6.5.7.1. **Description**
   The ftpProxyServerName attribute contains the FQDN of the File Trans-
   fer Protocol (FTP) proxy server which should be used when connected
   to this POP.

6.5.7.2. **Syntax**
   (phoneBook setupClass 7
          NAME 'ftpProxyServerName'
          DESC 'Name of an FTP Proxy'
          EQUALITY caseIgnoreIA5Match
          SUBSTRINGS caseIgnoreIA5SubstringsMatch
          SYNTAX 'IA5String'
          SINGLE-VALUE
)

6.5.8. **Winsock Proxy**

6.5.8.1. **Description**
   ThewinsockProxyServerName attribute contains the FQDN of the Windows
   Socket (Winsock) proxy server which should be used when connected to
   this POP.

6.5.8.2. **Syntax**
   (phoneBook setupClass 8
          NAME 'winsockProxyServerName'
          DESC 'Name of an Winsock Proxy'
          EQUALITY caseIgnoreIA5Match
          SUBSTRINGS caseIgnoreIA5SubstringsMatch
          SYNTAX 'IA5String'
          SINGLE-VALUE
)

6.5.9. **Default Gateway Address**

6.5.9.1. **Description**
   The defaulttGatewayAddress attribute represents the address of the
   default gateway which should be used when connected to this POP. The
   address is represented in the form of a string in dotted-decimal
   notation (e.g., 192.168.101.1).

6.5.9.2. **Syntax**
   (phoneBook setupClass 8
          NAME 'defaultGatewayAddress'
          DESC 'Default Gateway IP address (in dotted decimal notation)'
          EQUALITY caseIgnoreIA5Match
          SYNTAX 'IA5String {128}'

```
        SINGLE-VALUE
    )
```

6.5.10. **User Name Suffix**

6.5.10.1. **Description**
   The userNameSuffix attribute represents a string which should be con-
   catenated to the base username. For example, if the base username is
   "userA" and the value of this attribute is "@bigco.com", the result-
   ing augmented username would be "userA@bigco.com". An intelligent
   dialer may concatenate the string automatically. Note that both the
   userNameSuffix and the userNamePrefix (below) may be applied to the
   same base username.

6.5.10.2. **Syntax**
```
    ( phoneBook setupClass 9
        NAME 'userNameSuffix'
        DESC 'User Name suffix'
        EQUALITY caseIgnoreIA5Match
        SYNTAX 'IA5String {128}'
        SINGLE-VALUE
    )
```

6.5.11. **User Name Prefix**

6.5.11.1. **Description**
   The userNamePrefix attribute represents a string to which the base
   username should be concatenated. For example, if the base username
   is "userB" and the value of this attribute is "BIGCO/" the resulting
   augmented username would be "BIGCO/userB". An intelligent dialer may
   perform the concatenation automatically. Note that both the user-
   NameSuffix (above) and the userNamePrefix may be applied to the same
   base username.

6.5.11.2. **Syntax**
```
    ( phoneBook setupClass 10
        NAME 'userNamePrefix'
        DESC 'User Name prefix'
        EQUALITY caseIgnoreIA5Match
        SYNTAX 'IA5String {128}'
        SINGLE-VALUE
    )
```

7. **Security Considerations**

None (submissions welcome).

8. References

[1] Bradner, S., "Key words for use in RFCs to Indicate Requirement
     Levels", BCP 14, RFC 2119, March 1997

[2] Reynolds, J. and Postel, J., "ASSIGNED NUMBERS", STD 2, RFC 1700,
     October 1994

[3] The rest of the attributes in this class are described in RFC 1274

[4] ITU Rec. E.123, "Notation for national and international telephone
     numbers", 1988

9. Acknowledgements

Thanks   to   Bernard   Aboba   (aboba@internaut.com),   Jay   Farhat
(jfarhat@ipass.com), Butch Anton (butch@ipass.com), Quentin   Miller
(quentinm@microsoft.com), and Ken Crocker (kcrocker@microsoft.com) for
salient input and review.

10. Author's Address

Questions about this memo can be directed to:

    Glen Zorn
    Microsoft Corporation
    One Microsoft Way
    Redmond, Washington 98052

    Phone: +1 425 703 1559
    E-Mail: glennz@microsoft.com

11. Expiration Date

This memo is filed as draft-ietf-roamops-ldap-phonebook-01.txt and
expires on September 15, 1998.