XML DTD for Roaming Access Phone Book

Status of this Memo

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Abstract

   This document defines the syntax as well as the semantics of the
   information to be included in the phone book for roaming
   applications. It comprises the information necessary to select the
   most appropriate ISP and to configure the host to get access to the
   network of the provider. The specification consists of a small set of
   required information elements and a variety of possible extensions.
   All data is specified in XML [5] (Extensible Markup Language) syntax
   leading to a concise XML DTD (Document Type Declaration) for the
   phone book.

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1. Introduction

   Roaming applications depend on the delivery of information about
   provided services and the procedures to get connected to the network
   from the roaming consortium to the individual users as well as from
   the operators of the network access servers, normally the members of
   the roaming consortium, and the roaming consortium.

```
                    "phone book"
      +------+    +--+
      |      |    |  | ++
      | ISP1 | -- |  | --+
      |      |    +---+    \          "phone book"
      +------+             \  +------+
      +------+    +--+      \_ |      |   +--+      +------+
      |      |    |  | ++      |      |   |  | ++   |      |
      | ISP2 | -- |  | -->>--- |      |   --- |  | ->> | USER |
      |      |    +---+      _  |      |   +---+      |      |
      +------+             /  |      |              +------+
      +------+    +--+    /  +------+
      |      |    |  | ++ /    Roaming
      | ISP# | -- |  | --+     Consortium
      |      |    +---+
      +------+
```
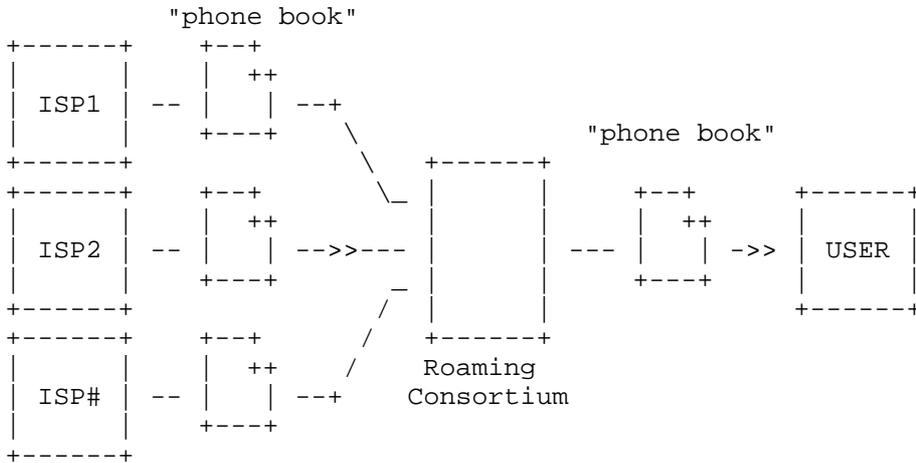
   The roaming consortium assembles from the individual contributions of
   the providers belonging to the consortium a unified version of the
   phone book for usage by the customers. Probably different groups of
   users get different versions of a phone book adapted to their
   particular needs. Even users might generate different subsets
   especially suited to particular applications from the information
   received from the roaming consortium, e.g., retrieving only entries
   for a particular country or extracting all access points providing
   wireless connectivity.

Therefore it is desirable to define a highly portable and well formed
structure of the phone book to enable easy generation and
postprocessing. 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 as
     well as to enable automatic extraction of configuration
     data by a wide variety of devices;
   - Defining a compact structure containing the essential
     information for the roaming user, to allow for storage
     and easy update even on small devices.

It is not intended by this document to create a plethoric solution,
with phone book elements to fit every condition on earth, neither to
define any kind of phone book update or transfer protocol.

2. Rationale for XML Usage

XML is rapidly becoming a standard format for data exchange between
different applications also taking into account the transfer and
access of data over the web. XML is used as syntax for expressing
the structure and content of a roaming phone book to enable
widespread usage and access to many different kind of media (e.g.,
paper, CDROM, www) using a widespread selection of access devices.
Furthermore XML enables:

   - Extensibility
   - Flexibility
   - Integration with directories

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 create new attributes in a well-understood fashion to meet
changing business 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 elements of
arbitrary type, the syntax chosen must be able to represent these
data objects cleanly. Using XML for describing the data content of
the phone book fits this bill nicely, since it can be used to
unambiguously describe virtually any data type.

Integration with directories: although it is unlikely that phone
books will be stored in the directory due to performance
considerations, the creation of a XML DTD describing phone book
content leaves that option open, with relatively little incremental
effort required to implement it.

3. 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].

4. Value type notations for 'stronger' typing

XML DTDs do not currently have capabilities for 'strong typing' of
the content of elements. The only type definition foreseen in the
base specification is "#PCDATA", 'parsable character data'. This
might be sufficient and is used throughout this document to define
elements containing information mainly aimed for interpretation by
human beings.

To enable a more concise description of the content of particular
elements several value type notations are introduced. This allows
for a more detailed type description of the content of elements in
cases where it seems to be desirable.

```
    <?xml version="1.0" encoding="UTF-8"?>

    <!-- Phone book value type notation declarations -->
    <!NOTATION FQDN PUBLIC "-//IETF/roamPhoneBook/NOTATION
    value Type Fully_qualified_domain_name">
    <!NOTATION IPADR PUBLIC "-//IETF/roamPhoneBook/NOTATION
    value Type IP_address">
    <!NOTATION B64JPG PUBLIC "-//IETF/roamPhoneBook/NOTATION
    value Type Base64_encoded_jpeg_image">
    <!NOTATION B64GIF PUBLIC "-//IETF/roamPhoneBook/NOTATION
    value Type Base64_encoded_gif_image">
```

5. Container Element Definitions

5.1. PhoneBook

The phoneBook element is the basic container for phone book entries.
It has two attributes, a phone book name and a phone book version
number (applying to the phone book as a whole), and always contains
one or more pop elements. A phoneBook element may also contain
multiple Setup, Support and Provider elements, if they are referenced
to by more than one pop element.

```
Syntax:
   <!ELEMENT phoneBook (
         pop+,
         setup*,
         support*,
         provider*)>
   <!ATTLIST phoneBook
         name    CDATA    #REQUIRED
         version CDATA    #REQUIRED >

     phoneBook
    +---------------------------------+
    | phoneBookName             (req)|
    | phoneBookVersion          (req)|
    | +----------------------+        |
    | | pop                  |+  (req)|
    | +----------------------+|       |
    |   + - - - - - - - - - - +       |
    |                                 |
    | + - - - - - - - - - - +         |
    | | setup               |+  (opt)|
    | + - - - - - - - - - - +|        |
    |   + - - - - - - - - - - +       |
    |                                 |
    | + - - - - - - - - - - +         |
    | | support             |+  (opt)|
    | + - - - - - - - - - - +|        |
    |   + - - - - - - - - - - +       |
    |                                 |
    | + - - - - - - - - - - +         |
    | | provider            |+  (opt)|
    | + - - - - - - - - - - +|        |
    |   + - - - - - - - - - - +       |
    +---------------------------------+
```
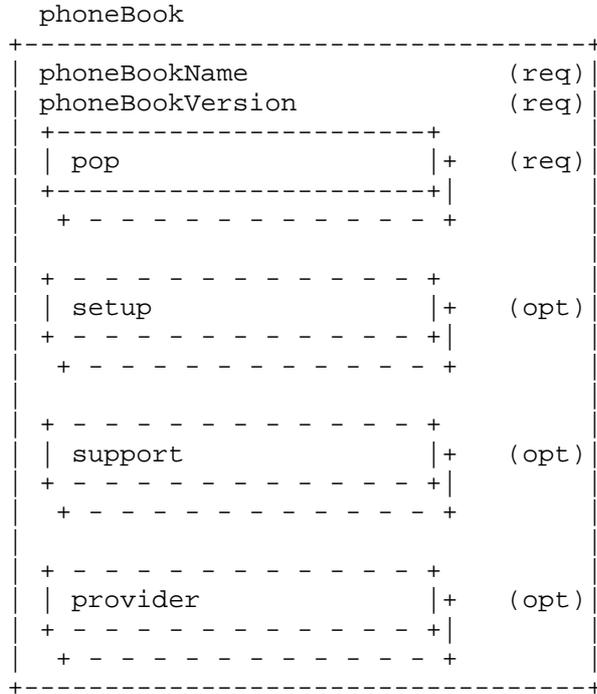
5.1.1. phoneBook Attribute "name"

   The phoneBook attribute "name" is an arbitrary string assigned as an
   identifier for a phone book.

5.1.2. phoneBook Attribute "version"

   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
   element 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
containing the differences between the client and server phone books.

5.2. POP

The pop element contains information elements relevant to individual
network points of presence (POPs). The required information elements
are addrFamily, address, media and entryVersion. The media element
represents the media types supported by the POP, while the
entryVersion element is a monotonically-increasing integer which
should be incremented whenever the object is modified.

The following information elements are currently defined for the pop
element. Additional information elements may be defined by IANA in
future.

```
      POP
   +--------------------------------+
   |  entryVersion            (req)|
   | +----------------------+      |
   | | address              | (req)|
   | +----------------------+      |
   |  media                   (req)|
   |  minBitsPerSecond        (opt)|
   |  maxBitsPerSecond        (opt)|
   |  "popProperties"         (opt)|
   |  "tunnelingProtocols"    (opt)|
   |  dialScript              (opt)|
   |  pricingInformation      (opt)|
   | + - - - - - - - - - - - +      |
   | | "location"           | (opt)|
   | + - - - - - - - - - - - +      |
   | + - - - - - - - - - - - +      |
   | | "popSetup"           | (opt)|
   | + - - - - - - - - - - - +      |
   | + - - - - - - - - - - - +      |
   | | "popSupport"         | (opt)|
   | + - - - - - - - - - - - +      |
   | + - - - - - - - - - - - +      |
   | | "popProvider"        | (opt)|
   | + - - - - - - - - - - - +      |
   +--------------------------------+
```

Syntax:

```
<!ENTITY % popInformation
     "address,
      media+,
      minBitsPerSecond?,
      maxBitsPerSecond?,
      popProperty*,
      tunnelProto*,
      dialScript?,
      pricingInformation?,
      city?,
      region?,
      country?,
      (setup | setupPtr)?,
      (support | supportPtr)?,
      (provider |providerPtr)?">

<!ELEMENT pop ( %popInformation; )>
<!ATTLIST pop
      entryVersion   CDATA   #REQUIRED>
```

5.2.1. pop Attribute "entryVersion"

   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.

5.3. Setup

   The Setup element includes information elements which describe
   services which may change from provider to provider or even from POP
   to POP. Some of the values contained in these information elements
   may be available by other means (e.g., DHCP), but others may not.

   The following information elements are currently defined for the
   Setup element. Additional information elements may be defined by
   IANA in future.

   Syntax:

```
<!ENTITY % setupInformation
     "dnsServerAddress*,
      nntpServerName*,
      smtpServerName*,
      popServerName*,
      imapServerName*,
```

```
                wwwProxyServerName*,
                ftpProxyServerName*,
                winsockProxyServerName*,
                defaultGatewayAddress?,
                userNamePrefix?,
                userNameSuffix?">

        <!ELEMENT setup ( %setupInformation; )>
        <!ATTLIST setup
                id      ID      #REQUIRED>
```

5.4. Support

   The Support element includes those information elements that are
   pertinent to the provision of customer support for a POP or provider.
   Languages spoken by the staff at the support center might be
   specified by multiple entries for the attribute value language.

   Additional information elements for the Support element may be
   defined by IANA in future.

   Syntax:
```
        <!ENTITY % supportInformation
            "(supportTelephoneNumber | supportMailtoURL)+">

        <!ELEMENT support %supportInformation; >
        <!ATTLIST support
                id          ID          #REQUIRED
                language    NMTOKENS    #IMPLIED >
```

5.5. Provider

   The Provider element contains information elements pertaining to the
   general business operations of a given network service provider. The
   information elements include such things as telephone number, mailing
   address, etc., as well as URLs for e-mail and a World Wide Web site.
   A Provider element may also contain a reference to support
   information.

   Currently the following information elements are defined for the
   Provider element. Additional information elements may be defined by
   IANA in future.

   Syntax:
```
        <!ENTITY % providerInformation
            "providerName?,
             providerIcon?,
             wwwURL?,
```

```
                generalMailtoURL?,
                billingMailtoURL?,
                businessCategory?,
                x121Address?,
                registeredAddress?,
                destinationIndicator?,
                preferredDeliveryMethod?,
                telexNumber?,
                teletexTerminalIdentifier?,
                telephoneNumber?,
                internationalISDNNumber?,
                facsimileTelephoneNumber?,
                street?,
                postOfficeBox?,
                postalCode?,
                postalAddress?,
                physicalDeliveryOfficeName?,
                description?,
                supportPtr*">

        <!ELEMENT provider ( %providerInformation; )>
        <!ATTLIST provider
                id      ID      #REQUIRED>
```

6. Information Element Definitions

6.1. Information elements defined for the POP element

6.1.1. Address

The address element provides the information representing the address
of the POP. For POPs offering dial-up network access, the address
element will at least contain an IA5 string representing a telephone
number, formatted in standard fashion [4] (e.g., "+ 1 234 5678").
More detailed information may be available by optional attribute
values.

```
   Syntax:
      <!-- A network address for this POP -->
      <!ELEMENT address (#PCDATA)>
```

6.1.1.1. address Attribute "family"

The attribute family of the element address defines the address
family to which the element value belongs. For POPs offering dial-up
network access, the addrFamily attribute will generally contain a
value for a telephone network based address family. Currently the
following attribute values are defined. Additional values may be

registered by IANA in future.

```
        Value    Description
        ------   --------------------------------------
        E164     ITU-T E.164 (PSTN, SMDS, Frame Relay, ATM)
        X121     ITU-T X.121 (X.25, Frame Relay)
```

   Syntax:
```
      <!-- Attribute values for address family -->
      <!ENTITY % addressFamily "(E164|X121)" >
      <!ATTLIST address
              family %addressFamily; #REQUIRED >
```

6.1.1.2. address Attribute "countryCode"

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

   Syntax:
```
      <!-- ITU dialing code for the country in which this POP is located -->
      <!ATTLIST address
              countryCode CDATA #IMPLIED >
```

6.1.1.3. address Attribute "areaCode"

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

```
      <!-- Area or city code component of the telephone number in the
           accessTelephoneNumber element associated with this POP -->
      <!ATTLIST address
              areaCode CDATA #IMPLIED >
```

6.1.2. Media

   The media element is a container describing the types of media and
   related protocols supported by this POP. The following media types
   are currently defined. Additional types may be registered by IANA in
   future.

```
        Value          Media Type
        --------       -----------
        viaMODEM       Modem
        viaISDN        ISDN
        viaATM         ATM
        viaFR          Frame Relay
        viaX25         X.25
```

   Syntax:
```
      <!-- The types of media supported by this POP -->
      <!ENTITY % mediaTypes "(viaMODEM|viaISDN|viaATM|viaFR|viaX25)+" >
      <!ELEMENT media %mediaTypes; >
```

6.1.2.1. Modem Protocols

   The viaMODEM element is an empty element representing by its optional
   type attribute the modem protocol supported by the access devices
   that can be reached at address. To define multiple available
   protocols this element may be included repeatedly. The initially
   defined modem protocol types are listed in the table below.
   Additional values may be registered by IANA in future.

Value	Duplex	Speed	Protocol
V21	Full	300	ITU-T V.21
V22	Full	1200	ITU-T V.22
V29	Half	9600	ITU-T V.29
V32	Full	9600	ITU-T V.32
V32B	Full	14.4k	ITU-T V.32bis
V34	Full	28.8k	ITU-T V.34
V34B	Full	33.6k	ITU-T V.34bis
V90	Full	56k	ITU-T V.90

   Syntax
```
      <!-- A modem media type element -->
      <!ENTITY % modemProtocols "(V21|V22|V29|V32|V32B|V34|V34B|V90)" >
      <!ELEMENT viaMODEM EMPTY>
      <!ATTLIST viaMODEM
              type %modemProtocols; #IMPLIED >
```

6.1.2.2. ISDN Protocols

   The viaISDN element is an empty element representing by its optional
   type attribute the ISDN protocol supported by the access devices that
   can be reached at address. To define multiple available protocols
   this element may be included repeatedly. The initially defined ISDN
   protocol types are listed in the table below. Additional values may
   be registered by IANA in future.

Value	Speed	Meaning
V110L	19.2k	ITU-T V.110
V110H	38.4k	ITU-T V.110
V120L	56k	ITU-T V.120

```
     V120H   64k       ITU-T V.120
     X75     64k       ITU-T X.75
     HDLC    64k       RFC 1618
```

   Syntax:
```
      <!-- An ISDN media type element -->
      <!ENTITY % isdnProtocols "(V110L|V110H|V120L|V120H|X75|HDLC)">
      <!ELEMENT viaISDN EMPTY>
      <!ATTLIST viaISDN
              type %isdnProtocols; #IMPLIED >
```

6.1.2.3. ATM Protocols

   The viaATM element is an empty element representing by its optional
   type attribute a particular protocol supported by the access devices
   that can be reached at address. To define multiple available
   protocols this element may be included repeatedly. Currently only
   one protocol is defined. Additional values may be registered by IANA
   in future.

   Syntax:
```
      <!-- An ATM media type element -->
      <!ENTITY % atmProtocols "(RFC2364)">
      <!ELEMENT viaATM EMPTY>
      <!ATTLIST viaATM
              type %atmProtocols; #IMPLIED >
```

6.1.2.4. Frame Relay Protocols

   The viaFR element is an empty element representing by its optional
   type attribute the particular protocol supported by the access
   devices that can be reached at address. To define multiple available
   protocols this element may be included repeatedly. Currently only
   one protocol is defined. Additional values may be registered by IANA
   in future.

   Syntax:
```
      <!-- A Frame Relay media type element -->
      <!ENTITY % frProtocols "(RFC1973)">
      <!ELEMENT viaFR EMPTY>
      <!ATTLIST viaFR
              type %frProtocols; #IMPLIED >
```

6.1.2.5. X.25 Protocols

   The viaX25 element is an empty element representing by its optional
   type attribute the particular protocol supported by the access
   devices that can be reached at address. To define multiple available

protocols this element may be included repeatedly. Currently only
one protocol is defined. Additional values may be registered by IANA
in future.

   Syntax:
      <!-- A X.25 media type element -->
      <!ENTITY % x25Protocols "(RFC1598)">
      <!ELEMENT viaX25 EMPTY>
      <!ATTLIST viaX25
               type %x25Protocols; #IMPLIED >

6.1.3. Minimum Data Rate

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

   Syntax:
      <!-- Minimum data rate supported by this POP in bits/second -->
      <!ELEMENT minBitsPerSecond (#PCDATA)>

6.1.4. Maximum Data Rate

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

   Syntax:
      <!-- Maximum data rate supported by this POP in bits/second -->
      <!ELEMENT maxBitsPerSecond (#PCDATA)>

6.1.5. POP Properties

   The popProperty element is an empty element representing by its
   attribute value a particular property of this POP. To define
   multiple available protocols this element might be included several
   times. The initially defined properties are listed in the table
   below. Additional values may be registered by IANA in future.

      Value   Property
      ------   ---------------------
      MPPP   Multilink PPP (RFC 1990)
      MOBIP   Mobile IP (RFC 2002)
      MCRX   Multicast Reception
      MCTX   Multicast Transmission

   Syntax:
      <!-- A property characterizing this POP -->
      <!ENTITY % popProperties "(MPPP|MOBIP|MCRX|MCTX)" >

```
<!ELEMENT popProperty EMPTY>
<!ATTLIST popProperty
        type %popProperties; #REQUIRED>
```

6.1.6. Tunneling Protocols

   The tunnelProto element is an empty element representing by its
   attribute a tunneling protocol supported by this POP. To define
   multiple available protocols this element might be included several
   times. The initially defined values are listed in the table below.
   Additional values may be registered by IANA in future.

```
   Value       Protocol
   ------      ------------------
   L2TP        RFC 2661   L2TP
   PPTP        RFC 2637   PPTP
   L2F         RFC 2341   L2F
   ATMP        RFC 2107   ATMP
   AHT         RFC 2402   IP AH Tunnel Mode
   ESPT        RFC 2406   IP ESP Tunnel Mode
   IPIP        RFC 1853   IP-IP
   MIP         RFC 2004   Minimal IP-IP
   GRE         RFC 1701   GRE
```

   Syntax:
```
   <!-- A tunneling protocol supported by this POP -->
   <!ENTITY % tunnelingProtocols
           "(L2TP|PPTP|L2F|ATMP|AHT|ESPT|IPIP|MIP|GRE)" >
   <!ELEMENT tunnelProto EMPTY>
   <!ATTLIST tunnelProto
           type %tunnelingProtocols; #REQUIRED>
```

6.1.7. Dialing Script

   The dialScript element contains the dialing script to be used when
   connecting to this POP. The attribute value type of dialScript
   defines the type of the script that should be used when connecting to
   this POP.

   Syntax:
```
   <!-- The dial script to be used -->
   <!ELEMENT dialScript (#PCDATA)>
   <!ATTLIST dialScript
           type CDATA #IMPLIED >
```

6.1.8. Pricing Information

   The pricingInformation element 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.

   Syntax:
      <!-- Pricing information for this POP -->
      <!ELEMENT pricing (#PCDATA)>

6.1.9. City

   The city element 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).

   Syntax:
      <!-- The name of the city in which this POP is located -->
      <!ELEMENT city (#PCDATA)>

6.1.10. Region

   The region element 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
   countries, it might be the name of a province, parish or county.

   Syntax:
      <!-- The name of the region in which this POP is located -->
      <!ELEMENT region (#PCDATA)>

6.1.11. Country

   The country element 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.

   Syntax:
      <!-- The name of the country in which this POP is located -->
      <!ELEMENT country (#PCDATA)>

6.1.12. POP Setup

   The popSetup element is either a setup element, if setup is specific
   to this particular POP, or a reference to any of the setup elements
   given in the outer scope of the phonebook element.

   Syntax:
      <!-- Reference for setup information for this POP -->
      <!ELEMENT setupPtr EMPTY>
      <!ATTLIST setupPtr
            setupID   IDREFS #IMPLIED>

6.1.13. POP Support

   The popSupport element is either a support element, if support is
   specific to this particular POP, or a reference to any of the support
   elements given in the outer scope of the phonebook element.

   Syntax:
      <!-- Reference for support information for this POP -->
      <!ELEMENT supportPtr EMPTY>
      <!ATTLIST supportPtr
            supportID IDREFS #IMPLIED>

6.1.14. POP Provider

   The popProvider element is either a provider element, if provider
   information is specific to this particular POP, or a reference to any
   of the provider elements given in the outer scope of the phonebook
   element.

   Syntax:
      <!-- Reference for provider information for this POP -->
      <!ELEMENT providerPtr EMPTY>
      <!ATTLIST providerPtr
            providerID IDREFS #IMPLIED>

6.2.   Information elements defined for the Setup element

6.2.1. DNS Server Address

   The dnsServerAddress element 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).

   Syntax:
      <!-- Domain Name Server IP address -->
      <!ELEMENT dnsServerAddress (#PCDATA)>
      <!ATTLIST dnsServerAddress
              value NOTATION (IPADR) #IMPLIED>

6.2.2. NNTP Server Name

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

   Syntax:
      <!-- Name of an NNTP server -->
      <!ELEMENT nntpServerName (#PCDATA)>
      <!ATTLIST nntpServerName
              value NOTATION (FQDN) #IMPLIED>

6.2.3. SMTP Server Name

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

   Syntax:
      <!-- Name of an SMTP mail server -->
      <!ELEMENT smtpServerName (#PCDATA)>
      <!ATTLIST smtpServerName
              value NOTATION (FQDN) #IMPLIED>

6.2.4. POP3 Server Name

   The popServerName element contains the FQDN of the Post Office
   Protocol (POP) server which should be used when connected to this
   POP.

   Syntax:
      <!-- Name of an POP3 mail server -->
      <!ELEMENT popServerName (#PCDATA)>
      <!ATTLIST popServerName
              value NOTATION (FQDN) #IMPLIED>

6.2.5. IMAP Server Name

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

Syntax:
```
    <!-- Name of an IMAP4 server -->
    <!ELEMENT imapServerName (#PCDATA)>
    <!ATTLIST imapServerName
            value NOTATION (FQDN) #IMPLIED>
```

6.2.6. WWW Proxy

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

   Syntax:
```
    <!-- Name of an WWW Proxy -->
    <!ELEMENT wwwProxyServerName (#PCDATA)>
    <!ATTLIST wwwProxyServerName
            value NOTATION (FQDN) #IMPLIED>
```

6.2.7. FTP Proxy

   The ftpProxyServerName element contains the FQDN of the File Transfer
   Protocol (FTP) proxy server which should be used when connected to
   this POP.

   Syntax:
```
    <!-- Name of an FTP Proxy -->
    <!ELEMENT ftpProxyServerName (#PCDATA)>
    <!ATTLIST ftpProxyServerName
            value NOTATION (FQDN) #IMPLIED>
```

6.2.8. Winsock Proxy

   The winsockProxyServerName element contains the FQDN of the Windows
   Socket (Winsock) proxy server which should be used when connected to
   this POP.

   Syntax:
```
    <!-- Name of an Winsock Proxy -->
    <!ELEMENT winsockProxyServerName (#PCDATA)>
    <!ATTLIST winsockProxyServerName
            value NOTATION (FQDN) #IMPLIED>
```

6.2.9. Default Gateway Address

   The defaulttGatewayAddress element 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).

```
   Syntax:
      <!-- Default Gateway IP address (in dotted decimal notation) -->
      <!ELEMENT defaultGatewayAddress (#PCDATA)>
      <!ATTLIST defaultGatewayAddress
              value NOTATION (IPADR) #IMPLIED>
```

6.2.10. User Name Suffix

   The userNameSuffix element represents a string which should be
   concatenated to the base username. For example, if the base username
   is "userA" and the value of this element is "@bigco.com", the
   resulting 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.

```
   Syntax:
      <!-- User Name suffix -->
      <!ELEMENT userNameSuffix (#PCDATA)>
```

6.2.11. User Name Prefix

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

```
   Syntax:
      <!-- User Name prefix -->
      <!ELEMENT userNamePrefix (#PCDATA)>
```

6.3. Information elements defined for the support element

6.3.1. Support Telephone Number

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

```
   Syntax:
      <!-- The number to be dialed to contact customer support
           for this POP or provider -->
      <!ELEMENT supportTelephoneNumber (#PCDATA)>
```

6.3.2. Support Email Address

   The supportMailtoURL element contains a URL for the provider's
   customer support email address, e.g., mailto:support@uu.net. This
   URL could be used to contact customer support personnel regarding
   non-urgent issues.

   Syntax:
      <!-- A Uniform Resource Locator for the provider's customer
           support email address -->
      <!ELEMENT supportMailtoURL (#PCDATA)>

6.4. Information elements defined for the provider element

6.4.1. Provider Name

   The providerName element is a string containing the name of the
   provider (e.g., "BIGNET Corporation").

   Syntax:
      <!-- The name of the provider -->
      <!ELEMENT providerName (#PCDATA)>

6.4.2. Provider Icon

   The providerIcon attribute contains a BASE64 encoded JPEG or GIF
   image which may be used for 'branding' phone book entries or
   displayed when dialing.

   Syntax:
      <!-- An icon in BASE64 encoded JPEG or GIF format -->
      <!ELEMENT providerIcon (#PCDATA)>
      <!ATTLIST providerIcon
              value NOTATION (B64JPG | B64GIF) #IMPLIED>

6.4.3. Provider's World Wide Web URL

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

   Syntax:
      <!-- A Uniform Resource Locator for the provider's home page -->
      <!ELEMENT wwwURL (#PCDATA)>

6.4.4. Provider's Main Email Address

   The generalMailtoURL element 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.

   Syntax:
      <!-- A Uniform Resource Locator for the provider's
                  email address -->
      <!ELEMENT generalMailtoURL (#PCDATA)>

6.4.5. Billing Inquiry Email Address

   The billingMailtoURL element 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.

   Syntax:
      <!-- A Uniform Resource Locator for the email
                  address to be used for billing inquiries -->
      <!ELEMENT billingMailtoURL (#PCDATA)>

6.4.6. Further elements

   The remainder of the information elements of the provider element are
   described in principle in [3].

7. Complete XML DTD for the roaming phone book

   <?xml version="1.0" encoding="UTF-8"?>

   <!-- Parameter entity declaration -->
   <!-- ++ -->
   <!-- This section will be maintained by IANA and can be direct
        referenced by the DTD specification by means of an external
        parameter entity. -->

   <!ENTITY % addressFamily "(E164|X121)" >

   <!ENTITY % mediaTypes "(viaMODEM|viaISDN|viaATM|viaFR|viaX25)+" >

   <!ENTITY % modemProtocols "(V21|V22|V29|V32|V32B|V34|V34B|V90)" >

   <!ENTITY % isdnProtocols "(V110L|V110H|V120L|V120H|X75|HDLC)">

   <!ENTITY % atmProtocols "(RFC2364)">

```
    <!ENTITY % frProtocols "(RFC1973)">

    <!ENTITY % x25Protocols "(RFC1598)">

    <!ENTITY % popProperties "(MPPP|MOBIP|MCRX|MCTX)" >

    <!ENTITY % tunnelingProtocols
         "(L2TP|PPTP|L2F|ATMP|AHT|ESPT|IPIP|MIP|GRE)" >

    <!ENTITY % popInformation
         "address,
          media+,
          minBitsPerSecond?,
          maxBitsPerSecond?,
          popProperty*,
          tunnelProto*,
          dialScript?,
          pricingInformation?,
          city?,
          region?,
          country?,
          (setup|setupPtr)?,
          (support|supportPtr)?,
          (provider|providerPtr)?">

    <!ENTITY % setupInformation
         "dnsServerAddress*,
          nntpServerName*,
          smtpServerName*,
          popServerName*,
          imapServerName*,
          wwwProxyServerName*,
          ftpProxyServerName*,
          winsockProxyServerName*,
          defaultGatewayAddress?,
          userNamePrefix?,
          userNameSuffix?">

    <!ENTITY % supportInformation
         "(supportTelephoneNumber|supportMailtoURL)+">

    <!ENTITY % providerInformation
         "providerName?,
          providerIcon?,
          wwwURL?,
          generalMailtoURL?,
          billingMailtoURL?,
          businessCategory?,
```

```
        x121Address?,
        registeredAddress?,
        destinationIndicator?,
        preferredDeliveryMethod?,
        telexNumber?,
        teletexTerminalIdentifier?,
        telephoneNumber?,
        internationalISDNNumber?,
        facsimileTelephoneNumber?,
        street?,
        postOfficeBox?,
        postalCode?,
        postalAddress?,
        physicalDeliveryOfficeName?,
        description?,
        supportPtr*">

   <!-- +++++++++++++ End of IANA maintained section ++++++++++ -->

   <!-- Phone book value type notation declarations -->
   <!NOTATION FQDN PUBLIC "-//IETF/roamPhoneBook/NOTATION
   value Type Fully_qualified_domain_name">
   <!NOTATION IPADR PUBLIC "-//IETF/roamPhoneBook/NOTATION
   value Type IP_address">
   <!NOTATION B64JPG PUBLIC "-//IETF/roamPhoneBook/NOTATION
   value Type Base64_encoded_jpeg_image">
   <!NOTATION B64GIF PUBLIC "-//IETF/roamPhoneBook/NOTATION
   value Type Base64_encoded_gif_image">

   <!-- Phone book element declarations -->
   <!ELEMENT phoneBook (
        pop+,
        setup*,
        support*,
        provider*) >
   <!ATTLIST phoneBook
        name    CDATA   #REQUIRED
        version CDATA   #REQUIRED >

   <!ELEMENT pop ( %popInformation; )>
   <!ATTLIST pop
        entryVersion   CDATA   #REQUIRED>

   <!ELEMENT setup ( %setupInformation; )>
   <!ATTLIST setup
        id      ID      #REQUIRED>

   <!ELEMENT support ( %supportInformation; )>
```

```
     <!ATTLIST support
            id           ID          #REQUIRED
            language     NMTOKENS    #IMPLIED >

     <!ELEMENT provider ( %providerInformation; )>
     <!ATTLIST provider
            id       ID       #REQUIRED>

     <!-- Information elements for pop -->
     <!ELEMENT address (#PCDATA)>
     <!ATTLIST address
            family          %addressFamily;   #REQUIRED
            countryCode  CDATA              #IMPLIED
            areaCode     CDATA              #IMPLIED >

     <!ELEMENT media %mediaTypes; >

     <!ELEMENT viaMODEM EMPTY>
     <!ATTLIST viaMODEM
            type %modemProtocols; #IMPLIED >

     <!ELEMENT viaISDN EMPTY>
     <!ATTLIST viaISDN
            type %isdnProtocols; #IMPLIED >

     <!ELEMENT viaATM EMPTY>
     <!ATTLIST viaATM
            type %atmProtocols; #IMPLIED >

     <!ELEMENT viaFR EMPTY>
     <!ATTLIST viaFR
            type %frProtocols; #IMPLIED >

     <!ELEMENT viaX25 EMPTY>
     <!ATTLIST viaX25
            type %x25Protocols; #IMPLIED >

     <!ELEMENT minBitsPerSecond (#PCDATA)>

     <!ELEMENT maxBitsPerSecond (#PCDATA)>

     <!ELEMENT popProperty EMPTY>
     <!ATTLIST popProperty
            type          %popProperties;  #REQUIRED >

     <!ELEMENT tunnelProto EMPTY>
     <!ATTLIST tunnelProto
            type   %tunnelingProtocols;   #REQUIRED >
```

```
   <!ELEMENT dialScript (#PCDATA)>
   <!ATTLIST dialScript
         type CDATA #IMPLIED >

   <!ELEMENT pricing (#PCDATA)>

   <!ELEMENT city (#PCDATA)>

   <!ELEMENT region (#PCDATA)>

   <!ELEMENT country (#PCDATA)>

   <!ELEMENT setupPtr EMPTY>
   <!ATTLIST setupPtr
        setupID   IDREFS  #IMPLIED>

   <!ELEMENT supportPtr EMPTY>
   <!ATTLIST supportPtr
        supportID IDREFS  #IMPLIED>

   <!ELEMENT providerPtr EMPTY>
   <!ATTLIST providerPtr
        providerID IDREFS  #IMPLIED>

   <!-- Information elements for setup -->
   <!ELEMENT dnsServerAddress (#PCDATA)>
   <!ATTLIST dnsServerAddress
         value NOTATION (IPADR) #IMPLIED>

   <!ELEMENT nntpServerName (#PCDATA)>
   <!ATTLIST nntpServerName
         value NOTATION (FQDN) #IMPLIED>

   <!ELEMENT smtpServerName (#PCDATA)>
   <!ATTLIST smtpServerName
         value NOTATION (FQDN) #IMPLIED>

   <!ELEMENT popServerName (#PCDATA)>
   <!ATTLIST popServerName
         value NOTATION (FQDN) #IMPLIED>

   <!ELEMENT imapServerName (#PCDATA)>
   <!ATTLIST imapServerName
         value NOTATION (FQDN) #IMPLIED>

   <!ELEMENT wwwProxyServerName (#PCDATA)>
   <!ATTLIST wwwProxyServerName
         value NOTATION (FQDN) #IMPLIED>
```

```
   <!ELEMENT ftpProxyServerName (#PCDATA)>
   <!ATTLIST ftpProxyServerName
           value NOTATION (FQDN) #IMPLIED>

   <!ELEMENT winsockProxyServerName (#PCDATA)>
   <!ATTLIST winsockProxyServerName
           value NOTATION (FQDN) #IMPLIED>

   <!ELEMENT defaultGatewayAddress (#PCDATA)>
   <!ATTLIST defaultGatewayAddress
           value NOTATION (IPADR) #IMPLIED>

   <!ELEMENT userNameSuffix (#PCDATA)>

   <!ELEMENT userNamePrefix (#PCDATA)>

   <!-- Information elements for support -->
   <!ELEMENT supportTelephoneNumber (#PCDATA)>

   <!ELEMENT supportMailtoURL (#PCDATA)>

   <!-- Information elements for provider -->
   <!ELEMENT providerName (#PCDATA)>

   <!ELEMENT providerIcon (#PCDATA)>
   <!ATTLIST providerIcon
           value NOTATION (B64JPG|B64GIF) #IMPLIED>

   <!ELEMENT wwwURL (#PCDATA)>

   <!ELEMENT generalMailtoURL (#PCDATA)>

   <!ELEMENT billingMailtoURL (#PCDATA)>

   <!-- Further provider elements according to RFC1274 -->

   <!ELEMENT businessCategory (#PCDATA)>

   <!ELEMENT x121Address (#PCDATA)>

   <!ELEMENT registeredAddress (#PCDATA)>

   <!ELEMENT destinationIndicator (#PCDATA)>

   <!ELEMENT preferredDeliveryMethod (#PCDATA)>

   <!ELEMENT telexNumber (#PCDATA)>
```

```
<!ELEMENT teletexTerminalIdentifier (#PCDATA)>

<!ELEMENT telephoneNumber (#PCDATA)>

<!ELEMENT internationalISDNNumber (#PCDATA)>

<!ELEMENT facsimileTelephoneNumber (#PCDATA)>

<!ELEMENT street (#PCDATA)>

<!ELEMENT postOfficeBox (#PCDATA)>

<!ELEMENT postalCode (#PCDATA)>

<!ELEMENT postalAddress (#PCDATA)>

<!ELEMENT physicalDeliveryOfficeName (#PCDATA)>

<!ELEMENT description (#PCDATA)>

<!-- end of dtd -->
```

8. Security Considerations

    The secure distribution and transport of information of a phone book
    for roaming applications require a reliable authentication of the
    issuer of the information as well as means to preserve the integrity
    of the provided information.

    No specific elements for security requirements are provided by the
    phone book XML DTD itself. It is assumed that security of the
    roaming phone book is provided by means outside of the scope of this
    specification, such as signing the phone book using pgp.

9. IANA Considerations

    This specification provides the possibility to define further
    attribute values for all information elements owning enumerated
    attribute lists as well as to extend the main structures 'pop',
    'setup', 'support' and 'provider' by additional information elements.
    Therefore the specification of the roaming phone book can be adopted
    to future requirements without changing this document. Extensions
    and refinements to this specification can be achieved by registration
    of new elements and attributes by IANA.

    Extending this specification with additional attributes or elements
    must not change the validity of documents based on an older version
    of the XML DTD. Therefore all added information elements must be

optional, prohibiting the mandatory inclusion of newly defined
information elements. Adding new values to enumerated attribute
lists has no backward compatibility constraints because it does not
harm the validity of attributes already defined.

To facilitate the registration of new information elements and
attribute values the DTD of the phone book has been separated in two
parts, the extensible part containing only parameter entity
declarations for ease inclusion of new values, and the fixed part
containing the detailed specification of the content and structure of
the phone book. By referencing the parameter entity declarations in
the fixed part of the specification the whole phone book becomes
extensible.

The part containing the parameter entity declarations has to be
maintained by the IANA. There are two different classes of
declarations in this part requiring different policies for
registering new values.

9.1. Registration of new attribute values

The entities 'addressFamily', 'modemProtocols', 'isdnProtocols',
'atmProtocols', 'frProtocols', 'x25Protocols', 'popProperties' and
'tunnelingProtocols' are describing enumerated attribute value lists.
Because there is no limitation in the name space of these attribute
values and newly defined attribute values can not harm the validity
of existing values, new attribute values can be assigned by
Specification Required [6].

9.2. Registration of new information elements

The entities 'mediaTypes', 'popInformation', 'setupInformation', '
supportInformation' and 'providerInformation' define the information
elements probably included in the media, pop, setup, support and
provider elements. Inserting new values into these lists extends the
phone book by arbitrarily new information elements. Inappropriate
use of the XML content model can destroy the backward compatibility
of the DTD. Therefore the assignment of new information elements
requires the approval of a Designated Expert [6]. In addition to the
insertion of a new value into the list, the detailed definition of
the information element has to be appended to the specification part
maintained by the IANA.

10. References

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

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

   [3] Barker, P. and S. Kille, "The COSINE and Internet X.500 Schema",
        RFC 1274, November 1991.

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

   [5] "Extensible Markup Language (XML) 1.0" W3C Recommendation 10-
        February-1998 http://www.w3.org/TR/1998/REC-xml-19980210

   [6] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA
        Considerations Section in RFCs", BCP 26, RFC 2434, October 1998.

11. Appendix: Examples

11.1. The most simple example

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE phoneBook SYSTEM "roamPhoneBook.dtd">
<phoneBook name="minimalExample" version="1">
   <pop entryVersion="1">
      <address family="E164">+1 234 5678901</address>
      <media><viaMODEM/></media>
   </pop>
</phoneBook>
```

11.2. A more comprehensive example

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE phoneBook SYSTEM "roamPhoneBook.dtd">
<phoneBook name="KNF_simple" version="1">
   <pop entryVersion="1">
      <address family="E164" countryCode="49">+49913130540</address>
      <media>
         <viaMODEM type="V90"/>
         <viaMODEM type="V34B"/>
         <viaISDN type="HDLC"/>
      </media>
      <setup>
         <dnsServerAddress>192.168.147.5</dnsServerAddress>
         <dnsServerAddress>193.175.24.33</dnsServerAddress>
      </setup>
   </pop>
   <support id="KNF_main" language="EN DE">
      <supportMailtoURL>mailto:support@franken.de</supportMailtoURL>
      <supportTelephoneNumber>+499123968066</supportTelephoneNumber>
   </support>
</phoneBook>
```

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Quentin Miller, and Ken Crocker for salient input and review.

13. Authors' Addresses

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