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Expires 18-May-1998   Nokia
                                                           14-Nov-1997

URLs for Telephony
<draft-antti-telephony-url-02.txt>

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Abstract

   This document specifies URL (Uniform Resource Locator) schemes
   ''telephone'', ''fax'' and ''modem'' for specifying the location
   of a terminal in the phone network and the connection types (modes
   of operation) that can be used to connect to that entity. This
   specification covers voice calls (normal phone calls, answering
   machines and voice messaging systems), facsimile (telefax) calls
   and data calls, both for POTS and digital/mobile subscribers.

Version History

   > Changes to the previous versions are indicated by a bar in the
   > left margin like in this section.

Contents

1. Introduction

1.1 New URL Schemes

   URLs that designate phone or fax numbers that can be dialed have
   been brought forward in other Internet-Drafts. However, none of
   these has reached the RFC status. This document tries to remedy
   the situation. All interested parties are invited to submit
   comments on this Internet-Draft. Contact information can be found
   at the end of this document.

   > This specification defines three new URL schemes: "telephone",
   > "fax" and "modem". They are intended for describing a terminal
   > that can be contacted using the telephone network. The
   > description includes the subscriber (telephone) number of the
   > terminal and the necessary parameters for successfully
   > connecting to that terminal.

   > The "telephone" scheme describes a connection to a terminal that
   > handles normal voice telephone calls, a voice mailbox or another
   > voice messaging system or a service that can be operated using
   > DTMF codes. The name (scheme specifier) for the URL is
   > "telephone" as recommended by [E.123].

   > The "fax" scheme describes a connection to a terminal that can
   > handle telefaxes (facsimiles). The name (scheme specifier) for
   > the URL is "fax" as recommended by [E.123].

   The "modem" scheme describes a connection to a terminal that can
   handle incoming data calls. The term "modem" refers to a device
   that does digital-to-analog and analog-to-digital conversions;
   in addition to these, a "modem" scheme can describe a fully
   digital connection.

   > The notation for phone numbers is the same which is specified in
   > [FAX-ADDR]. However, the syntax definition is a bit different
   > due to the fact that this document specifies URLs whereas
   > [FAX-ADDR] specifies electronic mail addresses. For example,
   > "/" (used in URLs to delimit path) has been replaced by ";".

1.2 Formal Definitions

> Formal definitions follow [ABNF]. This specification uses
> elements from the 'core' definitions (Appendix A of [ABNF]).

1.3 Requirements

Compliant software MUST follow this specification. Requirements
are indicated by capitalized words as specified in [RFC2119].

2. URL Schemes for Telephone Calls

2.1 Applicability

In this document, "user agent" means software that can detect and
parse one or more of these URLs and place a call to the remote
terminal using hardware at its disposal.

These URL schemes are used to direct the user agent to place a
call using the telephone network. The network in question may be a
landline or mobile phone network. If the phone network
differentiates between (for example) voice and data calls, or if
the user agent has several different telecommunications equipment
at its disposal, it is possible to specify which kind of call
(voice/fax/data) is requested. The URL can also contain
information about the capabilities of the remote entity, so that
the connection can be established successfully.

> None of the URL schemes do have a 'path' in them - they are
> always absolute. The URLs are always case-insensitive, except
> for the <user-name> and <password> in <modem-url>, which may
> be case-sensitive, depending on the remote system.

2.2 "telephone" URL Scheme

The URL syntax is formally described as follows:

```
> telephone-url         = telephone-scheme ":"
>                         telephone-subscriber
> telephone-scheme      = "telephone"
> telephone-subscriber  = global-phone-number / local-phone-number
> global-phone-number   = "+" 1*phonedigit [isdn-subaddress]
>                         [post-dial]
> local-phone-number    = 1*(phonedigit / dtmf-digit /
>                         pause-character) [isdn-subaddress]
>                         [post-dial]
> isdn-subaddress       = ";isub=" 1*phonedigit
```

```
> post-dial            = ";postd=" 1*(phonedigit / dtmf-digit
>                            / pause-character)
> phonedigit           = DIGIT / visual-separator
> visual-separator     = "-" / "."
> pause-character      = one-second-pause / wait-for-dial-tone
> one-second-pause     = "p"
> wait-for-dial-tone   = "w"
> dtmf-digit           = "*" / "#" / "A" / "B" / "C" / "D"
```

2.3 "fax" URL Scheme

```
> The URL syntax is formally described as follows (the definition
> reuses nonterminals from the definition above):

> fax-url              = fax-scheme ":" fax-subscriber
>                            [fax-params]
```

```
> fax-scheme           = "fax"
> fax-subscriber       = fax-global-phone / fax-local-phone
> fax-global-phone     = "+" 1*phonedigit [isdn-subaddress]
>                            [t33-subaddress] [post-dial]
> fax-local-phone      = 1*(phonedigit / dtmf-digit /
>                            pause-character) [isdn-subaddress]
>                            [t33-subaddress] [post-dial]
> t33-subaddress       = ";tsub=" 1*phonedigit
> fax-params           = ";type=" fax-capabilities
> fax-capabilities     = "T2" / "T3" / "T4" / "T6"
```

2.4 "modem" URL Scheme

The "modem" URL scheme has two free-text fields, which contain the
user name and password for authentication. Certain characters in
these fields are marked as "reserved", and they MUST be escaped
using URL-encoding if present in the free-text fields. Characters
not present in 7-bit US ASCII, unprintable characters and
whitespace MUST also be escaped.

```
reserved             = " " / ":" / "?" / ";" / "=" / "@" / "+"
```

The URL syntax is formally described as follows:

```
> modem-url            = modem-scheme ":" remote-host
> modem-scheme         = "modem"
> remote-host          = [user-name [":" password] "@"]
>                            telephone-subscriber *modem-params
> modem-params         = ";type=" data-capabilities
> data-capabilities    = modem-type ["?" data-bits parity
>                            stop-bits]
> modem-type           = "V21" / "V22" / "V22b" /
```

```
   >                         "V23" / "V26" / "V32" /
   >                         "V32b" / "V34" / "V110" /
   >                         "V120" / "B103" / "B212" /
   >                         "X75"
   > data-bits         = "7" / "8"
   > parity            = "n" / "e" / "o" / "m" / "s"
   > stop-bits         = "1" / "2"
   > user-name         = *OCTET ;a user name for authentication,
   >                           ;in URL-encoded notation
   > password          = *OCTET ;a password for authentication,
   >                           ;in URL-encoded notation
```

2.5 Parsing telephone, fax and modem URLs

> A. The type of call is specified by the scheme specifier.
> "Telephone" means that a voice call is opened. "Fax" indicates
> that the call should be a facsimile (telefax) call. "Modem"
> means that it should be a data call.

> B. <telephone-subscriber> and <fax-subscriber> indicate the
> phone number to be dialed. The phone number can be written in
> either international or local notation. All phone numbers SHOULD

> always be written in the international form if there is no good
> reason to use the local form.

Any telephone number must contain at least one <DIGIT>, that is,
numbers consisting only of non-numbers are not allowed.

> International numbers MUST begin with the "+" character. Local
> numbers MUST NOT contain that character. International numbers
> MUST be written with the country (CC) and national (NSN) numbers
> as specified in [E.123] and [E.164]. Local numbers MAY be used
> if the number only works from inside a certain geographical area
> or a network. Note that some numbers may work from several
> networks but not from the whole world - these SHOULD be written
> in international form.

> C. All <visual-separator> characters MUST be removed from the
> phone number by the user agent before using it do dial out.
> These cracaters are present only to aid readability: they MUST
> NOT have any other meaning. Note that although [E.123]
> recommends the use of space (SP) characters as the separators,
> spaces MUST NOT be used in these URLs.

> D. After the telephone number has been extracted, it is
> converted to the format that the user agent can use to place the
> call. (For example, the "+" character might be replaced by the

> international call prefix, or the international and trunk
> prefixes might be removed to place a local call.) Numbers that
> have been specified using <local-phone> or <fax-local-phone>
> MUST be used by the user agent "as is", without any conversions.

> E. The number may contain a <post-dial> sequence, which MUST be
> dialled using Dual Tone Multifrequency (DTMF) in-band signalling
> after the call setup is complete. If the user agent does not
> support DTMF, <post-dial> MUST be ignored. In that case, the
> user SHOULD be notified.

> F. A local phone number or a post-dial sequence may contain
> <pause-character> characters which indicate a pause of 1 second
> while dialing ("p"), or a wait for dial tone ("w"). User agents
> SHOULD support this method of dialing. If it is not supported,
> user agents MUST ignore everything in the dial string after the
> first <pause-character> and the user SHOULD be notified.

> Any <dtmf-digit> characters and all dial string characters after
> the first <pause-character> or <dtmf-digit> MUST be sent to line
> using DTMF (Dual Tone Multifrequency) in-band signaling, even if
> dialing is done using direct network signaling (a digital
> subscriber loop or a mobile phone).

> G. A phone number MAY also contain an <isdn-subaddress> which
> indicates an ISDN subaddress. User agent SHOULD support ISDN
> subaddresses. These addresses are sent to the network by using a
> method available to the user agent (typically, ISDN subscribers
> send the address with the call setup signalling). If ISDN

> subaddressing is not supported by the caller, <isdn-subaddress>
> MUST be ignored and the user SHOULD be notified.

> H. A fax number MAY also contain a <t33-subaddress>, which
> indicates the start of a T.33 subaddress [T.33]. User agents
> SHOULD support this. Otherwise <t33-subaddress> MUST be ignored
> and the user SHOULD be notified.

> I. <fax-params> or <modem-params> indicate which kind of telefax
> or modem can be used to contact the remote entity. The user
> agent MUST call out using compatible hardware, or request that
> the network provides such a service. For the "modem" URL, this
> also means that the number of data and stop bits and parity MUST
> be set according to the information given in the URL or to
> default values, if the information is not present.

The capability tokens are listed below. If parsed capabilities
suggest that it is impossible to create a connection, the

connection MUST NOT be created.

If new modem or fax types are standardized by ITU-T, this list can
be extended with those capability tokens. Tokens are formed by
taking the name of the standard and joining together the first
letter, number and the first letter of the postfix. New
capabilities SHOULD then be documented in an RFC. New non-ITU-T
capabilities MUST be specified in an RFC.

Capability	Explanation
V21	ITU-T V.21
V22	ITU-T V.22
V22b	ITU-T V.22bis
V23	ITU-T V.23
V26t	ITU-T V.26ter
V32	ITU-T V.32
V32b	ITU-T V.32bis
V34	ITU-T V.34
V110	ITU-T V.110
V120	ITU-T V.120
X75	ITU-T X.75
B103	Bell 103
B212	Bell 212
T2	ITU-T T.2 (G1) facsimile
T3	ITU-T T.3 (G2) facsimile
T4	ITU-T T.4 (G3) facsimile
T6	ITU-T T.6 (G4) facsimile
Data bits: "8" or "7"	The number of data bits. If not specified, defaults to "8".
Parity: "n", "e", "o", "m", "s"	Parity. None, even, odd, mark or space parity, respectively. If not specified, defaults to "n".
Stop bits: "1" or "2"	The number of stop bits. If not specified, defaults to "1".

J. After a data connection has been established, <user-name> and
<password> parts instruct the user agent of how to identify itself
to the remote entity. How this identifying information is used is
outside the scope of this document. For example, they might be
given as parameters to an autologin script.

2.6 Examples of Use

> telephone:+358-55-1234567

This URL instructs the user agent to place a voice call to the

specified number in Finland. The hyphens are included to make the
number more human-readable: country and area codes have been
separated from the subscriber number.

   fax:+358.55.1234567

> The above URL instructs the user agent to place a fax call to
> the specified number. It uses dots instead of hyphens as
> separators, but they have no effect on the functionality.

   modem:+358551234567;type=v34?7e1;type=v110

This URL instructs the user agent to place a data call to the
specified number. The user agent may opt to use either a ITU-T
V.34 modem (or a slower one, which is compatible with V.34), using
settings of 7 data bits, even parity and one stop bit, or an ISDN
connection using ITU-T V.110 protocol.

> telephone:+358-55-1234567;postd=pp22

The above URL instructs the user agent to place a voice call to
+358-55-1234567, then wait two seconds and emit two DMTF dialing
tones "2" on the line (for example, to choose a particular
extension number).

> telephone:0w00358551234567

> This URL places a voice call to the given number. The number
> format is intended for local use: the first zero opens an
> outside line, the "w" character waits for a second dial tone,
> and the number already has the international access code
> appended to it ("00"). This kind of phone number MUST NOT be
> used in an environment where all users of this URL might not be
> able to successfully dial out by using this number directly.
> However, this might be appropriate for pages in a company
> intranet.

3. References

> [ABNF] Augmented BNF for Syntax Specifications: ABNF. 1997. D.
> Crocker et al. An Internet-Draft (work in progress).
> <URL:ftp://ftp.ds.internic.net/internet-drafts/
> draft-drums-abnf-05.txt>

> [FAX-ADDR] PSTN and Fax Address Format in E-Mail Services. 1997.
> C. Allocchio. An Internet-Draft (work in progress).
> <URL:ftp://ftp.ds.internic.net/internet-drafts/
> draft-ietf-fax-addressing-01.txt>

[RFC1738] Uniform Resource Locators (URL). December 1994. T.
Berners-Lee et al. <URL:ftp://ftp.ds.internic.net/rfc/rfc1738.txt>

[RFC2119] Key Words for Use in RFCs to Indicate Requirement
Levels. March 1997. S. Bradner.
<URL:ftp://ftp.ds.internic.net/rfc/rfc2119.txt>

[E.123] ITU-T Recommendation E.123: Telephone Network and ISDN
Operation, Numbering, Routing and Mobile Service: Notation for
National and International Telephone Numbers. 1993.

[E.164] ITU-T Recommendation E.164: Telephone Network and ISDN
Operation, Numbering, Routing and Mobile Service: Numbering Plan
for the ISDN Era. 1991.

[T.33] ITU-T Recommendation T.33: Facsimile Routing Utilizing
the Subaddress. 1996.

[4]. Security Considerations

It should be noted that the user agent SHOULD NOT call out without
the knowledge of the user because of associated risks, which
include

- call costs (including long calls, long distance calls,
  international calls and prime rate calls)
- wrong numbers inserted on web pages by malicious users
- making the user's phone line unavailable (off-hook) for a
  malicious purpose
- opening a data call to a remote host, thus possibly opening a
  back door to the user's computer

The user agent SHOULD have some mechanism that the user can use to
filter out unwanted numbers. The user agent SHOULD NOT use rapid
redialing of the number if it is busy to avoid the congestion of
the (signaling) network. Also, the user agent SHOULD detect if the
number is unavailable or if the call is terminated before the
dialing string has been completely processed (for example, the
call is terminated while waiting for user input) and not try to
call again, unless instructed by the user.

[5]. Authors' Addresses

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