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Uniform Resource Identifier (URI) Parameters for indicating the Calling
        Party's Category and Originating Line Information
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Abstract

   This document defines two new URI parameters to describe the calling
   party's category and toll class of service originating line
   information which are parameters also used in SS7 ISUP and other
   telephony signalling protocols. The intended use of these URI
   parameters is for the tel URI address scheme.

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1. Introduction

   SS7 ISUP[ITU-ISUP] defines a Calling Party's Category (CPC) parameter
   that characterizes the station used to originate a call and carries
   other important state that can describe the originating party. One
   example of such information is the call may originate from a
   payphone; such information can be used by the network to handle the
   call in a specific way. When telephone numbers are contained in
   URIs, such as the tel URI [RFC3966] or equivalent SIP URI, it may be
   desirable to communicate any CPC associated with that telephone
   number or, in the context of a call, the party calling from it. This
   document proposes a method of carrying CPC data in SIP messages.

   In some networks (including North America), the Originating Line
   Information (OLI) parameter defined in ANSI ISUP [ANSI-ISUP] is used
   to carry information related to the calling party and the class of
   service for a call. Legacy multifrequency (MF) signalling networks
   carry this information in the ANI II Digits
   <http://www.nanpa.com/number_resource_info/ani_ii_assignments.html>.
   The call can originate from a multitude of devices or stations. For
   example, a coin operated phone or a phone located inside a prison can
   be used to originate a call. In such cases, it can be desirable to
   handle calls originating from such stations in a specific manner, or
   to restrict certain services to the calling party. This document
   proposes a method of carrying OLI data in SIP messages.

   The primary use case for these parameters is for interworking CPC and
   OLI information between SIP and ISUP. Other use cases may exist
   where it is useful to transfer information about the endpoint even
   when interworking with the PSTN does not occur.

2. Terminology

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
   document are to be interpreted as described in RFC 2119 [RFC2119].

3. Parameter Definitions

   The Calling Party's Category (CPC) and the Originating Line
   Information (OLI) are represented as URI parameters for the tel URI
   scheme and the SIP URI representation of telephone numbers. The ABNF
   [RFC5234] syntax is as follows. The 'par' production is defined in
   RFC 3966 [RFC3966]. The "/=" syntax indicates an extension of the
   production on the left-hand side:

```
   par /= cpc / oli
   cpc = cpc-tag "=" cpc-value
   oli = oli-tag "=" oli-value
   cpc-tag = "cpc"
   oli-tag = "oli"
   cpc-value = "ordinary" / "test" / "operator" / "payphone" /
   "unknown" / "mobile-hplmn" / "mobile-vplmn" / genvalue
   oli-value = 2*(DIGIT)
   genvalue = 1*(alphanum / "-" / "." )
```

The semantics of these CPC and OLI values are described below:
   ordinary: The caller has been identified, and has no special
   features.
   test: This is a test call that has been originated as part of a
   maintenance procedure.
   operator: The call was generated by an operator position.
   payphone: The calling station is a payphone.
   unknown: The CPC could not be ascertained.
   mobile-hplmn: The call was generated by a mobile device in its
   home PLMN.
   mobile-vplmn: The call was generated by a mobile device in a
   vistited PLMN.

The decimal coded values for "oli" are assigned and administered
NANPA and are the decimal codes used in the ANI II digits of the ANI
sequence for in-band signalling system
<http://www.nanpa.com/number_resource_info/ani_ii_assignments.html>.

The "cpc" and "oli" URI parameters are optional parameters. At the
most, one "cpc" and/or one "oli" parameter may be included in a URI
of the calling party. In SIP the calling party is generally
identified by the identity given in the From header field, or
alternatively, in the P-Asserted-Identity header field if this is
used. Usage is discussed in the following sections of this document.

An example of the syntax of the "cpc" parameter is given below:

From: <tel:+17005554141;cpc=payphone>;tag=1928301774

Alternatively, the tel URI may be included in the P-Asserted-Identity
header field [RFC3325]:

P-Asserted-Identity: <tel: +17005554141;cpc=payphone>

The "oli" URI parameter usage is given in the following example,
which uses the SIP URI representation of telephone numbers:

From: <sip: +1700554141;oli=29@example.com>;tag=1928301774

The "oli" parameter with value 29 indicates that the device that the call is initiated from is located within a prison.

4. Usage

The CPC and OLI are generally useful only when describing the originator of a telephone call or the station from where a telephone call is originated. Therefore, when this parameter is used in an application such as SIP, it is recommended that the parameter be applied to URIs that characterize the originator of a call (such as a tel URI or SIP URI in the P-Asserted-Identity header field or the From header field of a SIP message). Note that many Calling Party's Category values from the PSTN are intentionally excluded from the "cpc" parameter as they are either meaningless outside of the PSTN or can be represented using another existing concept. For example, the language of an operator can be expressed more richly using the Accept-Language header in SIP than in the "cpc" parameter. Similarly the priority of a call is a characteristic of the call and not the calling party.

It is anticipated that "cpc" and "oli" URI parameters will be used primarily by gateways that interwork ISUP or ANI II networks with SIP networks. However, scenarios where interworking with the PSTN does not occur are not precluded. Various SIP network intermediaries might consult the CPC or OLI information as they make routing decisions, although no specific behavior is prescribed in this document. While no specific mapping of the various ISUP parameters that contain CPC or OLI data is offered in this document, creating such a mapping would be trivial.

While the CPC and OLI could be conveyed using the ISUP tunneling mechanism described in RFC 3372 [RFC3372], this technique is widely regarded by the implementation community as overkill for the problem of conveying CPC and OLI information. For example, the "cpc" and "oli" parameters provides a convenient way for SIP intermediaries to make routing decisions based on the CPC and OLI information without having to implement an ISUP parser. The "cpc" and "oli" URI parameters provide a simple, convenient form of CPC and OLI interoperability of SIP with ISUP and ANI II, which is otherwise poorly addressed in RFC 3372[RFC3372]. Indeed when a SIP intermediary makes routing decisions for a call where both the originating and the terminating gateways natively use ANI II, the ISUP tunneling approach is especially unattractive, requiring each of the three devices to perform a translation into an otherwise unneeded PSTN protocol.

If the "cpc" URI parameter is not present, consumers of the CPC

information should treat the URI as if it specified a CPC of
"ordinary". If the "oli" URI parameter is not present, consumers of
the OLI information should treat the URI as if no OLI information is
provided. If a SIP intermediary does not support the "cpc" or "oli"
URI parameters and receives a SIP message where the calling party URI
in the From or P-Asserted-header fields includes a "cpc" or "oli" URI
parameter, then the SIP intermediary silently ignores the URI
parameter in accordance with RFC 3261[RFC3261].

At most, one instance of the "cpc" parameter and/or one instance of
the "oli" parameter can be associated with a particular URI within a
SIP request. It is recommended that the "cpc" and "oli" URI
parameters are associated with URIs included in the P-Asserted-
Identity header field. Where the P-Asserted-Identity header field is
not supported or included, another header field used to carry a URI
to characterize the originator of a call may be used. One example of
such a header field is the From header field. The following section
discusses further the motivation behind this recommendation.

5. Security Considerations

There are three potential risks specific to the information provided
by the Calling Party's Category or Originating Line Information:

- leakage of potentially private information;

- the threat of tampering with the CPC or OLI to add false CPC or OLI
values; and

- the threat of tampering with the CPC or OLI to remove actual CPC or
OLI values.

The information contained in the "cpc" or "oli" parameter may be of a
private nature, and it may not be appropriate for this value to be
revealed to the destination user (typically it would not be revealed
in the PSTN). However, the calling party's category is often
discoverable or easily guessable from the calling party's phone
number. For that reason it is unlikely that this information is
significantly more privacy sensitive than the telephone number
itself. The same techniques used to provide complete or partial
telephone number privacy in SIP are appropriate to apply to the "cpc"
and "oli" parameters as well. For more information about privacy
issues in SIP see RFC 3323[RFC3323]. The mechanism described in RFC
3325 [RFC3325] may also be relevant for maintaining partial privacy
of the CPC or OLI within a trusted administrative domain or
federation of domains as described in RFC 3324[RFC3324].

Making a call with a falsified CPC or OLI (i.e. "operator") could
allow the caller to gain access to resources or information not
otherwise available. Likewise removing an "undesirable" CPC or OLI
value (i.e. prison or hotel) could allow the caller to bypass various
restrictions in the telephone network. For that reason, agents which
expect CPC or OLI values SHOULD take care to insure the integrity and
authenticity of the "cpc" or "oli" URI parameter. The RECOMMENDED
mechanism to protect the entire calling party address along with the
"cpc" or "oli" URI parameter is the SIP Identity mechanism [RFC4474]
. Alternatively, agents within an administrative domain or
federation of domains MAY use the mechanism described in RFC
3325[RFC3325] to place the "cpc" or "oli" URI parameter in a
P-Asserted-Identity header field. When such mechanism is used, the
"cpc" or "oli" URI parameter is added by a network entity or SIP
intermediary if knowledge of the calling party's category or
originating line information (class of service) is known.

When the end-device, acting as a UAC originating a call, is not
trusted, the value of a "cpc" or "oli" URI parameter included by the
UAC may be removed or modified by a trusted network entity. If a
request containing CPC or OLI is sent towards a non-trusted entity,
this information should be removed.

The SIP Identity mechanism provides a signature over the URI in the
From header field of a SIP request. It can sign a SIP URI or a tel
URI alone or a tel URI embedded in a SIP or SIPS URI, but it provides
stronger protection against tampering when the tel URI is embedded in
a SIP or SIPS URI. Because there is no direct correlation between a
tel URI and an Internet domain, the receiver can use a list of
domains from which it will trust CPC or OLI information, or a list of
root certificates which are associated with trusting CPC or OLI
information.

Otherwise, this mechanism adds no new security considerations to
those discussed in RFC 3261[RFC3261].

6. IANA Considerations

This document extends the registry of URI parameters for the Tel URI
as defined RFC 3969[RFC3969]. Two new URI parameters for the Tel URI
scheme are defined in this document as follows:

Parameter Name: cpc, oli

Predefined Values: Yes

Reference: This document

7. Acknowledgements

The original version of this document was written by Jon Peterson as
a result of spliiting the appendix from draft-ietf-sip-privacy-04 and
subsequently authored by Rohan Mahy.

This document is based on draft-mahy-iptel-cpc-06.

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