         Mechanism to indicate support of features and capabilities in the
                      Session Initiation Protocol (SIP)
                 draft-ietf-sipcore-proxy-feature-07.txt

Abstract

   This specification defines a new SIP header field, Feature-Caps, to
   convey feature capability indicators, which are used by SIP entities
   not represented by the URI of the Contact header field to indicate
   support of features and capabilities, where media feature tags cannot
   be used to indicate the support.

   This specification also defines feature capability indicators, and
   creates a new IANA registry, "Proxy-Feature Feature Capability
   Indicator Trees", for registering feature capability indicators.

Status of this Memo

   This Internet-Draft is submitted to IETF in full conformance with the
   provisions of BCP 78 and BCP 79.

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   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."

   This Internet-Draft will expire on February 26, 2013.

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Table of Contents

1. Introduction

   The Session Initiation Protocol (SIP) [RFC3261] "Caller Preferences"
   extension, defined in RFC 3840 [RFC3840], provides a mechanism that
   allows a SIP message to convey information relating to the
   originator's features and capabilities, using the Contact header
   field.

   This specification defines a new SIP header field, Feature-Caps, to
   convey feature capability indicators, which are used by SIP entities
   not represented by the URI of the Contact header field to indicate
   support of features and capabilities, where media feature tags cannot
   be used to indicate the support. Such cases are:

   o - The SIP entity acts as a SIP proxy.
   o - The SIP entity acts as a SIP registrar.
   o - The SIP entity acts as a B2BUA, where the Contact header field
      URI represents another SIP entity.

   NOTE: Unlike media feature tags, feature capability indicators are
   intended to only be used with the SIP protocol.

   This specification also defines feature capability indicators, and
   creates a new IANA registry, "Proxy-Feature Feature Capability
   Indicator Trees", for registering feature capability indicators.

2. Conventions

   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 BCP 14, RFC 2119
   [RFC2119].

3. Definitions

   Downstream SIP entity: SIP entity in the direction towards which a
   SIP request is sent.

   Upstream SIP entity: SIP entity in the direction from which a SIP
   request is received.

4. Feature-Caps Header Field

[4.1](#). Introduction

The Feature-Caps header field is used by SIP entities to convey
support of features and capabilities, by setting feature capability
indicators. A feature capability indicator conveyed in a Feature-
Caps header field indicates that a SIP entity in the SIP message
signalling path supports the associated feature and capability.

[4.2](#). User Agent and Proxy Behavior

[4.2.1](#). General

If the URI in a Contact header field of a request or response
represents a SIP entity, the entity MUST NOT indicate supported
features and capabilities using a Feature-Caps header field within
that request or response.

When a SIP entity receives a SIP request, or response, that contains
one or more Feature-Caps header fields, the feature capability
indicators in the header field inform the entity about the features
and capabilities supported by entities in the SIP message signalling
path. Procedures how features and capabilities are invoked are
outside the scope of this specification, and MUST be described by
individual feature capability indicator specifications.

NOTE: It is not possible to, as a Feature-Caps header field value,
convey the address of the SIP entity that inserted the Feature-Caps
header field. If additional data about a supported feature needs to
be conveyed, such as the address of the SIP entity that indicated
support of the feature, then the feature definition needs to define a
way to convey that information as a value of the associated feature
capability indicator.

When a SIP entity adds a Feature-Caps header field to a SIP message,
it MUST place the header field before any existing Feature-Caps
header field in the message to be forwarded, so that the added header
field becomes the top-most one. Then, when another SIP entity
receives a SIP request or the response, the SIP feature capability
indicators in the top-most Feature-Caps header field will represent
the supported features and capabilities "closest" to the entity.

For a given fc-value, as defined in [section 5.3.1](#), feature capability
indicators are listed in a non-priority order, and any order of the
listed SIP feature capability indicators have the same meaning. For
example, "foo;bar" and "bar;foo" have the same meaning (i.e. that the
SIP entity that inserted the feature capability indicator supports
the features and capabilities associated with the "foo" and "bar"
feature capability indicators.

4.2.2. B2BUA Behavior

The procedures in this Section applies to UAs that are part of B2BUAs
that are referenced in the message by a Record-Route header field
rather than by the URI of the Contact header field.

When such a UA sends a SIP request, if the UA wants to indicate
support of features and capabilities towards its downstream SIP
entities, it inserts a Feature-Caps header field to the request,
containing one or more feature capability indicators associated with
the supported features and capabilities, before it forwards the
request.

If the SIP request is triggered by another SIP request that the B2BUA
has received, the UA MAY forward received Feature-Caps header fields
by copying them to the outgoing SIP request, similar to a SIP proxy,
before it inserts its own Feature-Caps header field to the SIP
request.

When such a UA receives a SIP response, if the UA wants to indicate
support of features and capabilities towards its upstream SIP
entities, it inserts a Feature-Caps header field to the response,
containing one or more feature capability indicators associated with
the supported features and capabilities, before it forwards the
response.

If the SIP response is triggered by another SIP response that the
B2BUA has received, the UA MAY forward received Feature-Caps header
field by copying them to the outgoing SIP response, similar to a SIP
proxy, before it inserts its own Feature-Caps header field to the SIP
response.

4.2.3. Registrar Behavior

If a SIP registrar wants to indicate support of features and
capabilities towards its upstream SIP entities, it inserts a Feature-
Caps header field, containing one or more feature capability
indicators associated with the supported features and capabilities,
to a REGISTER response.

4.2.4. Proxy behavior

When a SIP proxy receives a SIP request, if the proxy wants to
indicate support of features and capabilities towards its downstream
SIP entities, it inserts a Feature-Caps header field to the request,
containing one or more SIP feature capability indicators associated
with the supported features and capabilities, before it forwards the
request.

Holmberg, et al.   Expires February 26, 2013   [Page 6]

When a proxy receives a SIP response, if the proxy wants to indicate
support of features and capabilities towards its upstream SIP
entities, it inserts a Feature-Caps header field to the response,
containing one or more SIP feature capability indicators associated
with the supported features and capabilities, before it forwards the
response.

4.3. SIP Message Type and Response Code Semantics

4.3.1. General

This Section describes the general usage and semantics of the
Feature-Caps header field for different SIP message types and
response codes.

Section 6.2.1 defines the Feature-Caps header field ABNF.

4.3.2. SIP Dialog

The Feature-Caps header field can be used within an initial SIP
request for a dialog, within a target refresh SIP request, and within
any 18x or 2xx response associated with such requests.

If a feature capability indicator is inserted in a Feature-Caps
header field of an initial request for a dialog, or within a response
of such request, it indicates to the receivers of the request (or
response) that the feature associated with the feature capability
indicator is supported for the duration of the dialog, until a target
refresh request is sent for the dialog, or the dialog is terminated.

Unless a feature capability indicator is inserted in a Feature-Caps
header field or a target refresh request, or within a response of
such request, it indicates to the receivers of the request (or
response) that the feature is no longer supported for the dialog.

For a given dialog a SIP entity MUST insert the same feature
capability indicators in all 18x and 2xx responses associated with a
given transaction.

NOTE: As it cannot be guaranteed that 2xx responses associated with
SIP SUBSCRIBE requests will reach the UAC, due to forking of the
request, entities need to indicate supported features and
capabilities in the SIP NOTIFY request that will be sent for each of
the created subscription dialogs.

4.3.3. SIP Registration (REGISTER)

The Feature-Caps header field can be used within a SIP REGISTER
request, and within the 200 (OK) response associated with such
request.

If a feature capability indicator is conveyed in a Feature-Caps
header field of a REGISTER request, or within an associated response,
it indicates to the receivers of the message that the feature
associated with the feature capability indicator is supported for the
registration, until the registration of the contact that was
explicitly conveyed in the REGISTER request expires, or until the
registered contact is explicitly refreshed and the refresh REGISTER
request does not contain the feature capability indicator associated
with the feature.

NOTE: While a REGISTER response can contain contacts that have been
registered as part of other registration transactions, support of any
indicated feature only applies to requests sent to the contact(s)
that were explicitly conveyed in the associated REGISTER request.

This specification does not define any semantics for usage of the
Feature-Caps header field in pure registration binding fetching
messages (see Section 10.2.3 of RFC 3261), where the REGISTER request
does not contain a Contact header field. Unless such semantics is
defined in a future extension, fetching messages will not have any
impact on previously indicated support of features and capabilities,
and SIP entities MUST NOT insert a Feature-Caps header field to such
messages.

If SIP Outbound [RFC5626] is used, the rules above apply. However,
supported features and capabilities only apply for the registration
flow on which support has been explicitly indicated.

4.3.4. SIP Stand-Alone Transactions

The Feature-Caps header field can be used within a standalone SIP
request, and within any 2xx response associated with such request.

If a feature capability indicator is inserted in a Feature-Caps
header field of a standalone request, or within a response of such
request, it indicates to the receivers of the request (or response)
that the feature associated with the feature capability indicator is
supported for the duration of the standalone transaction.

5. Feature Capability Indicators

5.1. Introduction

Feature capability indicators are used by SIP entities not represented by the URI of the Contact header field to indicate support of features and capabilities, where media feature tags cannot be used to indicate the support.

A value, or a list of values, that provides additional information about the supported feature or capability, can be associated with a feature capability indicator.

5.2. Registration Trees

5.2.1. General

The following subsections define registration trees, distinguished by the use of faceted names (e.g., names of the form "tree.feature-name"). The registration trees are defined in the IANA "Proxy-Feature Feature Capability Indicator Trees" registry.

The trees defined herein are similar to the global tree and sip tree defined for media feature tags, in RFC 2506 [RFC2506] and RFC 3840. Other registration trees are outside the scope of this specification.

NOTE: In contrast to RFC 2506 and RFC 3840, this specification only defines a global tree and a sip tree, as they are the only trees defined in those RFCs that have been used for defining SIP-specific media feature tags.

When a feature capability indicator is registered in any registration tree, no leading "+" is used in the registration.

5.2.2. Global Tree

The global feature capability indicator tree is similar to the media feature tag global tree defined in RFC 2506 [RFC2506].

A feature capability indicator for the global tree will be registered by the IANA after review by a designated expert. That review will serve to ensure that the definition of the feature capability indicator meets the technical requirements of this specification.

A feature capability indicator in the global tree will be distinguished by the leading facet "g.". An organization can propose either a designation indicative of the feature, (e.g., "g.blinktags") or a faceted designation including the organization name (e.g.,

"g.organization.blinktags").

When a feature capability indicator is registered in the global tree,
it needs to meet the "Specification Required" policies defined in RFC
5226 [RFC5226]. A designated area expert will review the proposed
feature capability indicator, and consult with members of related
mailing lists.

5.2.3. SIP Tree

The sip feature capability indicator tree is similar to the media
feature tag sip tree defined in RFC 3840.

A feature capability indicator in the sip tree will be distinguished
by the leading facet "sip.".

When a feature capability indicator is registered in the sip tree, it
needs to meet the "IETF Consensus" policies defined in RFC 5226. An
RFC, which contains the registration of the feature capability
indicator, MUST be published.

5.3. Feature Capability Indicator Specification Requirements

5.3.1. General

A feature capability indicator specification MUST address the issues
defined in the following subsections, or document why an issue is not
applicable for the specific feature capability indicator. A
reference to the specification MUST be provided when the feature
capability indicator is registered with IANA (see Section 8).

It is bad practice for feature capability indicator specifications to
repeat procedures (e.g. general procedures on the usage of the
Feature-Caps header field and feature capability indicators) defined
in this specification, unless needed for clarification or emphasis
purpose. A feature capability indicator specification MUST NOT
modify the Feature-Caps header field rules and semantics defined in
Section 4.

A feature capability indicator specification MUST NOT weaken any
behavior designated with "SHOULD" or "MUST" in this specification.
However, a specification MAY strengthen "SHOULD", "MAY", or
"RECOMMENDED" requirements to "MUST" strength if features and
capabilities associated with the SIP feature capability indicator
require it.

5.3.2. Overall Description

The feature capability indicator specification MUST contain an
overall description of the feature capability indicator: how it is
used to indicate support of a feature, a description of the feature
associated with the feature capability indicator, a description of
any additional information (conveyed using one or more feature
capability indicator values) that can be conveyed together with the
feature capability indicator, and a description of how the associated
feature may be exercised/invoked.

5.3.3. Feature Capability Indicator Values

A feature capability indicator can have an associated value, or a
list of values. The feature capability indicator specification MUST
define the syntax and semantics of any value defined for the feature
capability indicator, including possible restrictions related to the
usage of a specific value. The feature capability indicator
specification MUST define the value(s) in accordance with the ABNF
defined in Section 6.3.2. The feature capability indicator
specification MUST define whether the feature capability indicator
has a default value.

If no values are defined for the feature capability indicator, it
MUST be indicated in the feature capability indicator specification.

A feature capability indicator value is only applicable for the
feature capability indicator for which it has been defined. For
other feature capability indicators, the value has to be defined
explicitly, even if the semantics are identical.

It is strongly RECOMMENDED to not re-use a value that already has
been defined for another feature capability indicator, unless the
semantics of the values are the same.

5.3.4. Usage Restrictions

If there are restrictions on how SIP entities can insert a feature
capability indicator, the feature capability indicator specification
MUST document such restrictions.

There might be restrictions related to whether entities are allowed
to insert a feature capability indicator in registration related
messages, standalone transaction messages, or dialog related
messages, whether entities are allowed to insert a feature capability
indicator in requests or responses, whether entities also need to
support other features and capabilities in order to insert a feature
capability indicator, and whether entities are allowed to indicate

support of a feature in conjunction with another feature.

5.3.5. Interoperability Considerations

If there are specific interoperability considerations that apply to
the feature capability indicator, the feature capability indicator
specification MUST document such considerations.

5.3.6. Security Considerations

If there are specific security considerations that apply to the
feature capability indicator, the feature capability indicator
specification MUST document such considerations.

5.3.7. Examples

It is RECOMMENDED that the feature capability indicator specification
provide demonstrative message flow diagrams, paired with complete
messages and message descriptions.

Note that example message flows are by definition informative, and do
not replace normative text.

5.3.8. Other Information

If there is additional information about the feature capability
indicator, it is RECOMMENDED to describe such information. It can
include e.g. names of related feature capability indicators.

6. Syntax

6.1. General

This Section defines the ABNF for the Feature-Caps header field, and
for the feature capability indicators.

6.2. Syntax: Feature-Caps header field

6.2.1. ABNF

The ABNF for the Feature-Caps header fields is:


```
Feature-Caps = "Feature-Caps" HCOLON fc-value
                 *(COMMA fc-value)
fc-value     = "*" *(SEMI feature-cap)
```

Figure 1: ABNF

   NOTE: The "*" value is present in order to follow the guidelines for
   syntax in RFC 4485 [RFC4485] and to maintain a consistent format with
   RFC 3840 and RFC 3841 [RFC3841].

6.3. Syntax: feature capability indicator

6.3.1. General

   In a feature capability indicator name (ABNF: fcap-name), dots can be
   used to implement a feature capability indicator tree hierarchy (e.g.
   tree.feature.subfeature). The description of usage of such tree
   hierarchy must be described when registered.

6.3.2. ABNF

   The ABNF for the feature capability indicator:

   feature-cap   = "+" fcap-name [EQUAL LDQUOT (fcap-value-list
                           / fcap-string-value) RDQUOT]
   fcap-name   = ftag-name
   fcap-value-list   = tag-value-list
   fcap-string-value = string-value
   ;; ftag-name, tag-value-list, string-value defined in RFC 3840

   NOTE: In comparison with media feature tags, the "+" sign in front
   of the feature capability indicator name is mandatory.

Figure 2: ABNF

7. IANA Considerations

7.1. Registration of the Feature-Caps header field

   This specification registers a new SIP header field, Feature-Caps,
   according to the process of RFC 3261 [RFC3261].

   The following is the registration for the Feature-Caps header field:

   RFC Number: RFC XXXX

   Header Field Name: Feature-Caps

7.2. Registration of the Feature-Caps header field parameter

This specification adds the Feature-Caps header field to the IANA
"Header Field Parameters and Parameter Values" registry, according to
the process of RFC 3968 [RFC3968].

```
                                  Predefined
Header Field        Parameter Name   Values       Reference
------------------------------------------------------------------

Feature-Caps        +<fcap-name> *   No           [RFC &rfc.number;]

        * <fcap-name> denotes parameter names conforming to the
          syntax <fcap-name> defined in RFC &rfc.number;. Valid
          feature capability indicators are registered in [IANA:
          insert reference to the new Proxy-Feature Feature
          Capability Indicator Trees registry].
```

Figure 3: SIP Parameter Header Field

(IANA: please sort the "Feature-Caps" line into the table and place
the remainder of the above as a footnote to the table.)

7.3. Proxy-Feature Feature Capability Indicator Trees

7.3.1. Introduction

This specification creates a new sub registry to the IANA "Session
Initiation Protocol (SIP) Parameters" Protocol Registry, according to
the process of RFC 5226. The name of the sub registry is "Proxy-
Feature Feature Capability Indicator Trees".

7.3.2. Global Feature Capability Indicator Registration Tree

This specification creates a new feature capability indicator tree in
the IANA "Proxy-Feature Feature Capability Indicator Trees" registry.
The name of the tree is "Global Feature Capability Indicator
Registration Tree", and its leading facet is "g.". It is used for
the registration of feature capability indicators.

When a feature capability indicator is registered in the global tree,
it needs to meet the "Specification Required" policies defined in RFC
5226. A designated area expert will review the proposed feature
capability indicator, and consult with members of related mailing
lists. The information required in the registration is defined in
Section 5.3 of RFC XXXX.

Holmberg, et al.   Expires February 26, 2013   [Page 14]

Note that all feature capability indicators registered in the global
tree will have names with a leading facet "g.". No leading "+" is
used in the registrations in any of the feature capability indicator
registration trees.

The format of the global tree is as described below:

Name   Description   Reference

Name contains the Feature Capability Indicator Name, provided
in the registration feature capability indication registration
template.

Description contains the Abstract, provided in the registration
feature capability indication registration template.

Reference contains the Feature Capability Indicator Specification
Reference, provided in the registration feature capability
indication registration template.

                              Figure 4

7.3.3. SIP Feature Capability Indicator Registration Tree

This specification creates a new feature capability indicator tree in
the IANA "Proxy-Feature Feature Capability Indicator Trees" registry.
The name of the tree is "SIP Feature Capability Indicator
Registration Tree", and its leading facet is "sip.". It is used for
the registration of feature capability indicators.

When a feature capability indicator is registered in the sip tree, it
needs to meet the "IETF Consensus" policies defined in RFC 5226. An
RFC, which contains the registration of the feature capability
indicator, MUST be published. The information required in the
registration is defined in Section 5.3 of RFC XXXX.

Note that all feature capability indicators registered in the SIP
tree will have names with a leading facet "sip.". No leading "+" is
used in the registrations in any of the feature capability indicator
registration trees.

The format of the SIP tree is as described below:

   Name   Description   Reference

   Name contains the Feature Capability Indicator Name, provided
   in the registration feature capability indication registration
   template.

   Description contains the Abstract, provided in the registration
   feature capability indication registration template.

   Reference contains the Feature Capability Indicator Specification
   Reference, provided in the registration feature capability
   indication registration template.

                              Figure 5

8. Feature Capability Indicator Registration Template

   Registration requests for the global tree are submitted
   by e-mail to iana@iana.org.

   Registration requests for the sip tree requires submitting
   an Internet-Draft to the IESG.

   | Instructions are preceded by '|'. All fields are mandatory.

   Feature capability indicator name:

   Description:

   | The description should be no longer than 4 lines. More
   | detailed information can be provided in the feature
   | capability indicator specification.

   Feature capability indicator name:

   | The referenced specification MUST contain the information
   | listed in Section 5.3 of RFC &rfc.number;.

   Feature capability indicator specification reference:

   | The referenced specification MUST contain the information
   | listed in Section 5.3 of RFC &rfc.number;.

   Contact:

   | Name(s) & email address(es) of person(s) to
   | contact for further information."

                       Figure 6: Registration Template

9. Security Considerations

   The security issues for feature capability indicators are similar to
   the ones defined in RFC 3840 for media feature tags. Media feature
   tags can reveal information about end-users and end-user equipment,
   which can be used for industrial espionage. The knowledge about end-
   user equipment capabilities can also be used to influence application
   behavior. As feature capability indicators are not intended to
   convey capability information of end-user devices, such end-user
   security aspects of RFC 3840 do not apply to feature capability

   indicators.

   In addition, the RFC 3840 security issue regarding an attacker using
   the SIP caller preferences extension [RFC3841] in order to affect
   routing decisions does not apply, as the mechanism is not defined to
   be used with feature capability indicators.

   Feature capability indicators can, however, provide capability and
   characteristics information about the SIP entity, some of which might
   be sensitive. Malicious elements viewing the indicators may be able
   to discern application deployment details or identify elements with
   exploitable feature implementation weaknesses. The Feature-Caps
   header field does not convey address information about SIP entities.
   However, individual feature capability indicators might provide
   address information as feature capability indicator values.
   Therefore, mechanisms for guaranteeing confidentiality and
   authenticity SHOULD be provided.

10. Acknowledgements

   The authors wish to thank everyone in the SIP community that provided
   input and feedback on the work of this specification.

11. Change Log

   [RFC EDITOR NOTE: Please remove this Section when publishing]

   Changes from draft-holmberg-sipcore-proxy-feature-06
   o Editorial changes.

   Changes from draft-holmberg-sipcore-proxy-feature-05
   o AD comments from Robert Sparks
   o Additional text added to the Security Considerations section.
   o IANA registration template modified.
   o IANA registration procedures clarified.
   o Feature Capability Indicator specification requirements modified.
   o Note regarding SUBSCRIBE 200 responses added.
   o Editorial modifications.

   Changes from draft-holmberg-sipcore-proxy-feature-04
   o WGLC comments from Keith Drage
   o 'feature cap' name changed to 'feature capability indicator'.
   o Feature-Caps header field added to IANA Header Field Parameters
      and Parameter Values registry.

o Editorial modifications.

Changes from [draft-ietf-sipcore-proxy-feature-03](#)
o Additional Security Considerations text added.
o IANA Considerations modified.
o Editorial corrections.

Changes from [draft-ietf-sipcore-proxy-feature-02](#)
o Changes based on WGLC comments from Shida Schubert.
o - Document title changed
o - Terminology alignment
o - Note text clarifications
o Changes based on WGLC comments from Lili Yang.

Changes from [draft-ietf-sipcore-proxy-feature-01](#)
o Changes based on comments from Paul Kyzivat.
o IANA Considerations text added.

Changes from [draft-holmberg-sipcore-proxy-feature-04](#)/
[draft-ietf-sipcore-proxy-feature-00](#)
o Media feature tags replaced with feature caps, based on SIPCORE
   consensus at IETF#83 (Paris).
o Editorial corrections and modifications.

Changes from [draft-holmberg-sipcore-proxy-feature-03](#)
o Hadriel Kaplan added as co-author.
o Terminology change: instead of talking of proxies, talk about
   entities which are not represented by the URI in a Contact header
   field ([http://www.ietf.org/mail-archive/web/sipcore/current/
   msg04449.html](#)).
o Clarification regarding the usage of the header field in 18x/2xx
   responses ([http://www.ietf.org/mail-archive/web/sipcore/current/
   msg04449.html](#)).
o Specifying that feature support can also be indicated in target
   refresh requests ([http://www.ietf.org/mail-archive/web/sipcore/
   current/msg04454.html](#)).
o Feature Cap specification registration information added.

Changes from [draft-holmberg-sipcore-proxy-feature-02](#)
o Definition, and usage of, a new header field, instead of Path,
   Record-Route, Route and Service-Route.

Changes from [draft-holmberg-sipcore-proxy-feature-01](#)
o Requirement section added
o Use-cases and examples updated based on work in 3GPP

Changes from [draft-holmberg-sipcore-proxy-feature-00](#)

o Additional use-cases added
o Direction section added

12. References

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