             Mechanism to Indicate Support of Features and Capabilities in
                    the Session Initiation Protocol (SIP)

Abstract

   This specification defines a new SIP header field, Feature-Caps. The
   Feature-Caps header field conveys feature-capability indicators that
   are used to indicate support of features and capabilities for SIP
   entities that are not represented by the Uniform Resource Identifier
   (URI) of the Contact header field.

   SIP entities that are represented by the URI of the SIP Contact
   header field can convey media feature tags in the Contact header
   field to indicate support of features and capabilities.

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

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1. Introduction

    The Session Initiation Protocol (SIP) [RFC3261] extension for
    indicating User Agent (UA) capabilities, 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. The
    Feature-Caps header field conveys feature-capability indicators that
    are used to indicate support of features and capabilities for SIP
    entities that are not represented by the Uniform Resource Identifier
    (URI) of the Contact header field. 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 Back-to-Back User Agent (B2BUA)
       [RFC3261], where the Contact header field URI represents another
       SIP entity.

    SIP entities that are represented by the URI of the SIP Contact
    header field can convey media feature tags in the Contact header
    field to indicate support of features and capabilities.

Unlike media feature tags, feature-capability indicators are intended
to only be used with SIP.

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 signaling 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 signaling

path. The procedure by which features and capabilities are invoked
are outside the scope of this specification and MUST be described by
individual feature-capability indicator specifications.

A Feature-Caps header field value cannot 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", from a SIP
signaling point of view, to the entity.

Based on features and policies, a SIP entity MAY remove a
Feature-Caps header field from a SIP message. Also, a SIP entity MAY
remove a feature-capability indicator from a Feature-Caps header
field within a SIP message. A SIP entity SHOULD NOT re-order the
Feature-Caps header fields within a SIP message.

For a given fc-value, as defined in Section 6.2.1, the order in which
feature-capability indicators are listed has no significance. 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 apply to User Agents (UAs) [RFC3261]
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 in 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 in 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 in 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
fields by copying them to the outgoing SIP response, similar to a SIP
proxy, before it inserts its own Feature-Caps header field in 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,
in 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 in the request,
containing one or more SIP feature-capability indicators associated
with the supported features and capabilities, before it forwards the
request.

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 in 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 a 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 until the dialog is
   terminated.

   Unless a feature-capability indicator is inserted in a Feature-Caps
   header field of a target refresh request, or within a response of
   such a 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.

   As it cannot be guaranteed that 2xx responses associated with SIP
   SUBSCRIBE requests will reach the User Agent Client (UAC) [RFC3261],
   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 a
   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.

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 are
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 in 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 Standalone Transactions

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

If a feature-capability indicator is inserted in a Feature-Caps
header field of a standalone request, or within a response of such a
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 such 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 RFCs 2506 [RFC2506] and 3840
   [RFC3840]. Other registration trees are outside the scope of this
   specification.

   In contrast to RFCs 2506 and 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 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").

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.".

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
   purposes. 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 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 or not entities

   o are allowed to insert a feature-capability indicator in
      registration-related messages, standalone transaction messages, or
      dialog-related messages,

   o are allowed to insert a feature-capability indicator in requests
      or responses,

   o also need to support other features and capabilities in order to
      insert a feature-capability indicator, and

   o are allowed to indicate support of a feature in conjunction with
      another feature.

5.3.5. Interoperability Considerations

   The feature-capability indicator specification MUST document any
   specific interoperability considerations that apply to the feature-
   capability indicator.

   Interoperability considerations can, e.g., include procedures related
   to cases where an expected feature-capability indicator is not
   present or where it contains an unexpected value.

5.3.6. Security Considerations

   The feature-capability indicator specification MUST document any
   specific security considerations that apply to the feature-capability
   indicator.

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, for example, 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. The ABNF defined in this
   specification is conformant to RFC 5234 [RFC5234].

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)

   NOTE: The "*" value is present in order to follow the guidelines for
   syntax in RFC 4485 [RFC4485] and to maintain a consistent format with
   RFCs 3840 [RFC3840] and 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 a
   tree hierarchy must be described when registered.

6.3.2. ABNF

   The ABNF for the feature-capability indicator is:

   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.

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 defined in RFC 3261 [RFC3261].

   The following is the registration for Feature-Caps in the "Header
   Fields" registry:

   RFC Number: RFC 6809

   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 described in RFC 3968 [RFC3968].

| | Predefined | |
Header Field	Parameter Name	Values	Reference
Feature-Caps	+<fcap-name> *	No	[RFC6809]

        * <fcap-name> denotes parameter names conforming to the
          syntax <fcap-name> defined in RFC 6809. Valid
          feature-capability indicators are registered in the
          Proxy-Feature Feature-Capability Indicator Trees registry.

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" registry, according to the
   process defined in RFC 5226. The name of the sub-registry is
   "Proxy-Feature Feature-Capability Indicator Trees".

   Feature-capability indicators are categorized by the "leading facet"
   of their name. The leading facet is a prefix of the name consisting
   of all characters up to and including the first ".". Feature-
   capability indicator names that contain no "." characters are
   considered to have an empty ("") leading facet.

   The "Proxy-Feature Feature-Capability Indicator Trees" registry
   contains sub-registries for subsets (called 'trees') of feature-
   capability indicators sharing the same leading facet. Each feature-
   capability indicator is registered within the tree that matches its
   leading facet. If no tree matches its leading facet, then the
   feature-capability indicator cannot be registered.

   New feature-capability indicator sub-registries (trees) can be
   registered. The registration must meet the "Standards Action"
   policies defined in RFC 5226 [RFC5226]. A new name, unique leading
   facet, and registration policies (as defined in RFC 5226) for
   feature-capability indicators within this tree need to be provided.

   This document defines the first two feature-capability indicator
   trees ("g." and "sip."). It does not define a tree for the empty
   leading facet.

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 this document.

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 - 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.

No initial values are registered in the global tree.

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 Review" policies defined in RFC 5226. The
information required in the registration is defined in Section 5.3 of
this document.

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:

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

Description - 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.

No initial values are registered in the SIP tree.

8. Feature-Capability Indicator Registration Template

Registration requests for the global tree are submitted by email 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 specification reference:

| The referenced specification must contain the information
| listed in Section 5.3 of RFC 6809.

Contact:

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

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 security issue discussed in RFC 3840 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, if the feature-capability indicators provide information
that requires data integrity or origin authentication, mechanisms for
providing those MUST be provided. If confidentiality is required,
then the specification MUST call for the use of Transport Layer
Security (TLS) [RFC5246] at all hops. Since there are no
satisfactory middle-to-end or middle-to-middle SIP confidentiality
mechanisms, TLS is as good as it gets, and specifications SHOULD NOT
define feature-capability indicators that need confidentiality that
is better than the hop-by-hop confidentiality provided by TLS.

10. Acknowledgements

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

11. References

11.1. Normative References

[RFC2119]   Bradner, S., "Key words for use in RFCs to Indicate
            Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC3261]   Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston,
            A., Peterson, J., Sparks, R., Handley, M., and E.
            Schooler, "SIP: Session Initiation Protocol", RFC 3261,
            June 2002.

[RFC5234]   Crocker, D. and P. Overell, "Augmented BNF for Syntax
            Specifications: ABNF", STD 68, RFC 5234, January 2008.

11.2. Informative References

[RFC2506]   Holtman, K., Mutz, A., and T. Hardie, "Media Feature Tag
            Registration Procedure", BCP 31, RFC 2506, March 1999.

[RFC3840]   Rosenberg, J., Schulzrinne, H., and P. Kyzivat,
            "Indicating User Agent Capabilities in the Session
            Initiation Protocol (SIP)", RFC 3840, August 2004.

[RFC3841]   Rosenberg, J., Schulzrinne, H., and P. Kyzivat, "Caller
            Preferences for the Session Initiation Protocol (SIP)",
            RFC 3841, August 2004.

[RFC3968]   Camarillo, G., "The Internet Assigned Number Authority
            (IANA) Header Field Parameter Registry for the Session
            Initiation Protocol (SIP)", BCP 98, RFC 3968,
            December 2004.

[RFC4485]   Rosenberg, J. and H. Schulzrinne, "Guidelines for Authors
            of Extensions to the Session Initiation Protocol (SIP)",
            RFC 4485, May 2006.

[RFC5226]   Narten, T. and H. Alvestrand, "Guidelines for Writing an
            IANA Considerations Section in RFCs", BCP 26, RFC 5226,
            May 2008.

[RFC5246]   Dierks, T. and E. Rescorla, "The Transport Layer Security
            (TLS) Protocol Version 1.2", RFC 5246, August 2008.

[RFC5626]   Jennings, C., Mahy, R., and F. Audet, "Managing Client-
            Initiated Connections in the Session Initiation Protocol
            (SIP)", RFC 5626, October 2009.

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