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Indicating Support for Interactive Connectivity Establishment (ICE) in the Session Initiation Protocol (SIP)

Abstract

This specification defines a media feature tag and an option tag for use with the Session Initiation Protocol (SIP). The media feature tag allows a User Agent (UA) to communicate to its registrar that it supports ICE. The option tag allows a UA to require support for ICE in order for a call to proceed.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc5768.

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1. Introduction

RFC 3264 [RFC3264] defines a two-phase exchange of Session Description Protocol (SDP) [RFC4566] messages for the purposes of establishment of multimedia sessions. This offer/answer mechanism is used by protocols such as the Session Initiation Protocol (SIP) [RFC3261].

Protocols using offer/answer are difficult to operate through Network Address Translators (NAT). Because their purpose is to establish a flow of media packets, they tend to carry IP addresses within their messages, which is known to be problematic through NAT [RFC3235]. To remedy this, an extension to SDP, called Interactive Connectivity Establishment (ICE) has been defined [RFC5245]. ICE defines procedures by which agents gather a multiplicity of addresses, include all of them in an SDP offer or answer, and then use peer-to-peer Session Traversal Utilities for NAT (STUN) [RFC5389] connectivity checks to determine a valid address.

This specification defines a media feature tag, "sip.ice", and a SIP option tag, "ice", that can be used by SIP User Agents that make use of ICE. Section 3 motivates the need for the media feature tag and option tag, and Section 4 and Section 5 formally define them.

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. Motivation

There are two primary motivations for defining an option tag and a media feature tag. They are support for gateways, and requiring ICE for a call.

3.1. Gateways

Unfortunately, ICE requires both endpoints to support it in order for it to be used. Within a domain, there will typically be User Agents that do and do not support ICE. In order to facilitate deployment of ICE, it is anticipated that domains will make use of gateways that act as ICE agents on one side, and non-ICE agents on the other side. This would allow a call from domain A into domain B to make use of ICE, even if the device in domain B does not itself yet support ICE. However, when domain B receives a call, it will need to know whether the call needs to pass through such a gateway, or whether it can go to the terminating UA directly.

In order to make such a determination, this specification defines a media feature tag, "sip.ice", which can be included in the Contact header field of a REGISTER request [RFC3840]. This allows the registrar to track whether or not a UA supports ICE. This information can be accessed by a proxy in order to determine whether or not a call needs to route through a gateway.

3.2. Mandating Support for ICE

Although ICE provides a built in fall back to non-ICE operation when the answerer doesn’t support it, there are cases where the offerer would rather abort the call rather than proceed without ICE. Typically, this is because they would like to choose a different m/c-line address for a non-ICE peer than they would for an ICE capable peer.

To do this, the "ice" SIP option tag can be included in the Require header field of an INVITE request.

4. Media Feature Tag Definition

The "sip.ice" media feature tag indicates support for ICE. An agent supports ICE if it is either a lite or full implementation, and consequently, is capable of including candidate attributes in an SDP offer or answer for at least one transport protocol. An agent that supports ICE SHOULD include this media feature tag in the Contact header field of its REGISTER requests and OPTION responses.

An agent MAY include the media feature tag in the Contact header field of an INVITE or INVITE response; however, doing so is redundant with ICE attributes in the SDP that indicate the same thing. In cases where an INVITE omits an offer, the lack or presence of the media feature tag in the Contact header field cannot be used by the callee (which will be the offerer) to determine whether the caller supports ICE. In cases of third-party call control [RFC3725], the caller may be a controller that does (or doesn't) support ICE, while the answerer may be an agent that does (or doesn't) support ICE.

5. Option Tag Definition

This "ice" OPTION tag SHOULD NOT be used in conjunction with the Supported header field (this SHOULD NOT include responses to OPTION requests). The media feature tag is used as the one and only mechanism for indicating support for ICE. The option tag is meant to be used only with the Require header field. When placed in the Require header field of an INVITE request, it indicates that the User Agent Server (UAS) must support ICE in order to process the call. An agent supports ICE if it is either a full or lite implementation, and consequently, is capable of including candidate attributes in an SDP offer or answer for at least one transport protocol.

6. Security Considerations

A malicious intermediary might attempt to modify a SIP message by inserting a Require header field containing the "ice" option tag. If ICE were not supported on the UAS, this would cause the call to fail when it would otherwise succeed. Of course, this attack is not specific to ICE, and can be done using any option tag. This attack is prevented by usage of the SIPS mechanism as defined in RFC 3261.

Similarly, an intermediary might attempt to remove the media feature tag from a REGISTER request or OPTIONS request, which might cause a call to skip ICE processing when it otherwise might make use of it. This attack is also prevented using the SIPS mechanism.

7. IANA Considerations

This specification defines a new media feature tag and SIP option tag.

7.1. Option Tag

This section defines a new SIP option tag per the guidelines in Section 27.1 of RFC 3261.

Name: ice

Description: This option tag is used to identify the Interactive Connectivity Establishment (ICE) extension. When present in a Require header field, it indicates that ICE is required by an agent.

7.2. Media Feature Tag

This section registers a new media feature tag in the SIP tree, defined in Section 12.1 of RFC 3840 [RFC3840].

Media feature tag name: sip.ice

ASN.1 Identifier: 1.3.6.1.8.4.22

Summary of the media feature indicated by this tag: This feature tag indicates that the device supports Interactive Connectivity Establishment (ICE).

Values appropriate for use with this feature tag: Boolean.

The feature tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms: This feature tag is most useful in a communications application, for describing the capabilities of a device, such as a phone or PDA.

Examples of typical use: Routing a call to a phone that can support ICE.

Related standards or documents: RFC 5768

Security Considerations: Security considerations for this media feature tag are discussed in Section 6 of this document.

8. References

8.1. Normative References

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8.2. Informative References

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[RFC3725] Rosenberg, J., Peterson, J., Schulzrinne, H., and G. Camarillo, "Best Current Practices for Third Party Call Control (3pcc) in the Session Initiation Protocol (SIP)", BCP 85, RFC 3725, April 2004.

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