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Negotiating Human Language in Real-Time Communications
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Abstract

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1. Introduction

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This document does not address user interface (UI) issues, such as if or how a UE client informs a user about the result of language and media negotiation.

1.1. Applicability

Within this document, it is assumed that the negotiating endpoints have already been determined, so that a per-stream negotiation based on the Session Description Protocol (SDP) can proceed.

When setting up interactive communications sessions it is necessary to route signaling messages to the appropriate endpoint(s). This document does not address the problem of language-based routing.

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5. Solution

An SDP attribute (per direction) seems the natural choice to negotiate human (natural) language of an interactive media stream, using the language tags of BCP 47 [RFC5646].

5.1. The 'hlang-send' and 'hlang-recv' attributes

This document defines two media-level attributes starting with 'hlang' (short for "human interactive language") to negotiate which human language is selected for use in each interactive media stream. (Note that not all streams will necessarily be used.) There are two attributes, one ending in "-send" and the other in "-recv", registered in Section 6. Each can appear in offers and answers for media streams.

In an offer, the 'hlang-send' value is a list of one or more language(s) the offerer is willing to use when sending using the media, and the 'hlang-recv' value is a list of one or more language(s) the offerer is willing to use when receiving using the media. The list of languages is in preference order (first is most preferred). When a media is intended for interactive communication using a language in one direction only (e.g., a user with difficulty speaking but able to hear who indicates a desire to send using text and receive using audio), either hlang-send or hlang-recv MAY be omitted. When a media is not primarily intended for language (for example, a video or audio stream intended for background only) both SHOULD be omitted. Otherwise, both SHOULD have the same value. Note that specifying different languages for each direction (as opposed to the same or essentially the same language in different modalities) can make it difficult to complete the call (e.g., specifying a desire to send audio in Hungarian and receive audio in Portuguese).

In an answer, 'hlang-send' is the language the answerer will send if using the media for language (which in most cases is one of the languages in the offer's 'hlang-recv'), and 'hlang-recv' is the language the answerer expects to receive if using the media for language (which in most cases is one of the languages in the offer's 'hlang-send').

In an offer, each value MUST be a list of one or more language tags per BCP 47 [RFC5646], separated by white space. In an answer, each value MUST be one language tag per BCP 47. BCP 47 describes mechanisms for matching language tags. Note that [RFC5646] Section 4.1 advises to "tag content wisely" and not include unnecessary subtags.

When placing an emergency call, and in any other case where the language cannot be inferred from context, in an offer each media stream primarily intended for human language communication SHOULD specify both (or for asymmetrical language use, one of) the 'hlang-send' and 'hlang-recv' attributes.

Clients acting on behalf of end users are expected to set one or both 'hlang-send' and 'hlang-recv' attributes on each media stream primarily intended for human communication in an offer when placing an outgoing session, and either ignore or take into consideration the attributes when receiving incoming calls, based on local configuration and capabilities. Systems acting on behalf of call centers and PSAPs are expected to take into account the attributes when processing inbound calls.

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When placing an emergency call, and in any other case where the language cannot be inferred from context, in an offer each media stream primarily intended for human language communication SHOULD specify the 'hlang-send' and/or 'hlang-recv' attributes for the direction(s) intended for interactive communication.

Clients acting on behalf of end users are expected to set one or both 'hlang-send' and 'hlang-recv' attributes on each media stream primarily intended for human communication in an offer when placing an outgoing session, and either ignore or take into consideration the attributes when receiving incoming calls, based on local configuration and capabilities. Systems acting on behalf of call centers and PSAPs are expected to take into account the attributes when processing inbound calls.

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preferred and less preferred combinations of media and language are all accepted). This is not a problem.

5.2. No Language in Common

A consideration with the ability to negotiate language is if the call proceeds or fails if the callee does not support any of the languages requested by the caller. This document does not mandate either behavior.

If the call is rejected due to lack of any languages in common, it is suggested to use SIP response code 488 (Not Acceptable Here) or 606 (Not Acceptable) [RFC3261] and include a Warning header field

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[RFC3261] in the SIP response. The Warning header field contains a warning code of [TBD: IANA VALUE, e.g., 308] and a warning text indicating that there are no mutually-supported languages; the text SHOULD also contain the supported languages and media.

Example:

```
Warning: [TBD: IANA VALUE, e.g., 308] proxy.example.com
"Incompatible language specification: Requested languages not
supported. Supported languages are: es, en; supported media
are: audio, text."
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IANA is requested to add a new value in the warn-codes sub-registry of SIP parameters in the 300 through 329 range that is allocated for indicating problems with keywords in the session description. The reference is to this document. The warn text is "Incompatible language specification: Requested languages not supported. Supported languages and media are: [list of supported languages and media]."

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7. Security Considerations

The Security Considerations of BCP 47 [RFC5646] apply here. In addition, if the 'hlang-send' or 'hlang-recv' values are altered or deleted en route, the session could fail or languages incomprehensible to the caller could be selected; however, this is also a risk if any SDP parameters are modified en route.

The Security Considerations of BCP 47 [RFC5646] apply here. An attacker with the ability to modify signaling could prevent a call from succeeding by altering any of several crucial elements, including the 'hlang-send' or 'hlang-recv' values. RFC 5069 [RFC5069] discusses such threats. Use of TLS or IPsec can protect against such threats. Emergency calls are of particular concern; RFC 6881 [RFC6881], which is specific to emergency calls, mandates use of TLS or IPsec (in ED-57/SP-30).

8. Privacy Considerations

Language and media information can suggest a user's nationality, background, abilities, disabilities, etc.

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9. Changes from Previous Versions

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Author's Address

Randall Gellens
Core Technology Consulting
Email: rg+ietf@coretechnologyconsulting.com

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Randall Gellens
Core Technology Consulting
Email: rg+ietf@coretechnologyconsulting.com

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