October 2023

Language Assistant Capability Exchange Protocol

Hui Wang

Jayachandran C

Amruth Ramachandran

Language Assistant Capability Exchange Protocol

ABSTRACT

This disclosure describes techniques to support language assistance services for communication between devices. Per techniques of this disclosure, language assistant capabilities are exchanged between participating devices during call setup. A call protocol such as session initiation protocol (SIP) is suitably modified to exchange language assistant parameters during call set up. The SIP header fields are extended to add a parameter to indicate language assistant capabilities by indicating a suitable language code. An INVITE request is transmitted from an originating device that includes a language identifier that indicates the language assistant capabilities of the originating device. A corresponding language identifier of the terminating device is requested. A language identifier for the terminating device is obtained from and transmitted to the originating device along with a RING message. When the call is answered at the terminating device, an updated language identifier may be provided along with an OK message.

KEYWORDS

- Voice over Internet Protocol (VOIP)
- Session Initiation Protocol (SIP)
- Speech recognition
- Speech translation
- Language assistance
- International Standards Organization (ISO) 639
- Content language

BACKGROUND

Real-time language translation by a language assistance service can be utilized on computing devices that are connected via a network, e.g., during a voice call implemented over voice over internet protocol (VOIP), instant messaging, etc. Language assistance (live text transcript, translation, etc.) can be useful for users that have differing levels of comprehension of languages used during the communication session. However, automatic activation and use of language assistance services can be difficult in real-time since it can be difficult to detect the spoken language(s) in a live media stream.

DESCRIPTION

This disclosure describes techniques to support language assistance services for communication, e.g., live voice or video call over a network. Per techniques of this disclosure, language assistance capabilities are exchanged between participating devices. A call protocol such as session initiation protocol (SIP) is suitably modified to enable the exchange of language assistant parameters during call set up. For example, SIP header fields can be extended to add a parameter to indicate language assistance capabilities by indicating a suitable language code, e.g., ISO 639 language code.

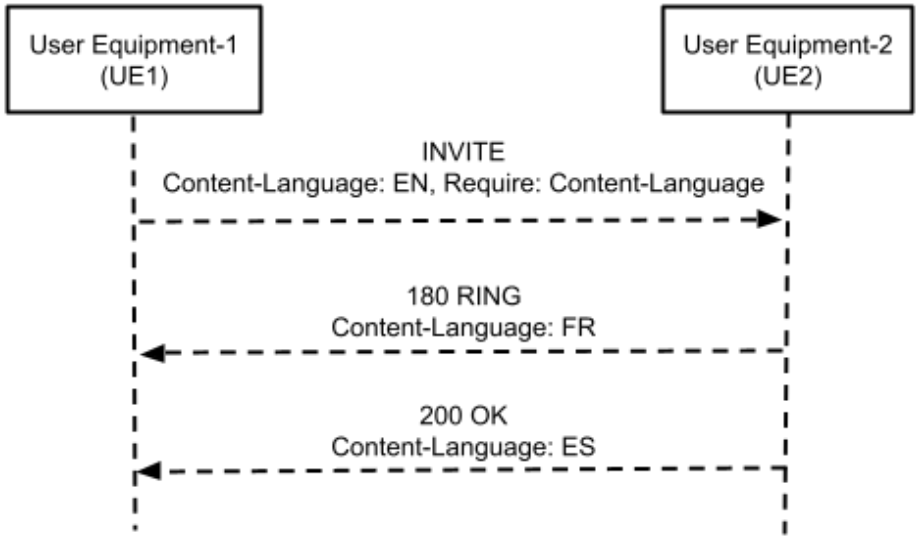

Fig. 1: Language indicators can be exchanged during call setup

Fig. 1 depicts an example call setup workflow to exchange language indicators, per techniques of this disclosure. As depicted in Fig. 1, the call setup follows a customary format of a SIP call; an INVITE request is transmitted from an originating device (user equipment-1), a 180 RING (ringback) response is received from the terminating device (user equipment-2), which is followed by a 200 OK response when the callee answers at the terminating device.

In order to exchange language capabilities, during the INVITE request, the SIP header fields include a parameter (language identifier) that indicates the language assistance capabilities of the originating device (UE1). A corresponding language identifier of the terminating device (UE2) is requested. In some implementations, the content-language parameter of the SIP protocol may be utilized for this purpose.

During the 180 RING, a language identifier is obtained from settings associated with UE2, and transmitted to UE1. In the example of Fig. 1, the language identifier indicates French (code: FR). When the call is answered at UE2, an updated language identifier may be provided. In the example of Fig. 1, the updated language identifier indicates Spanish (code: ES). In this

illustrative example, a user may have set the system language as French which is indicated initially but may wish to converse in Spanish for this call, which is indicated in the update.

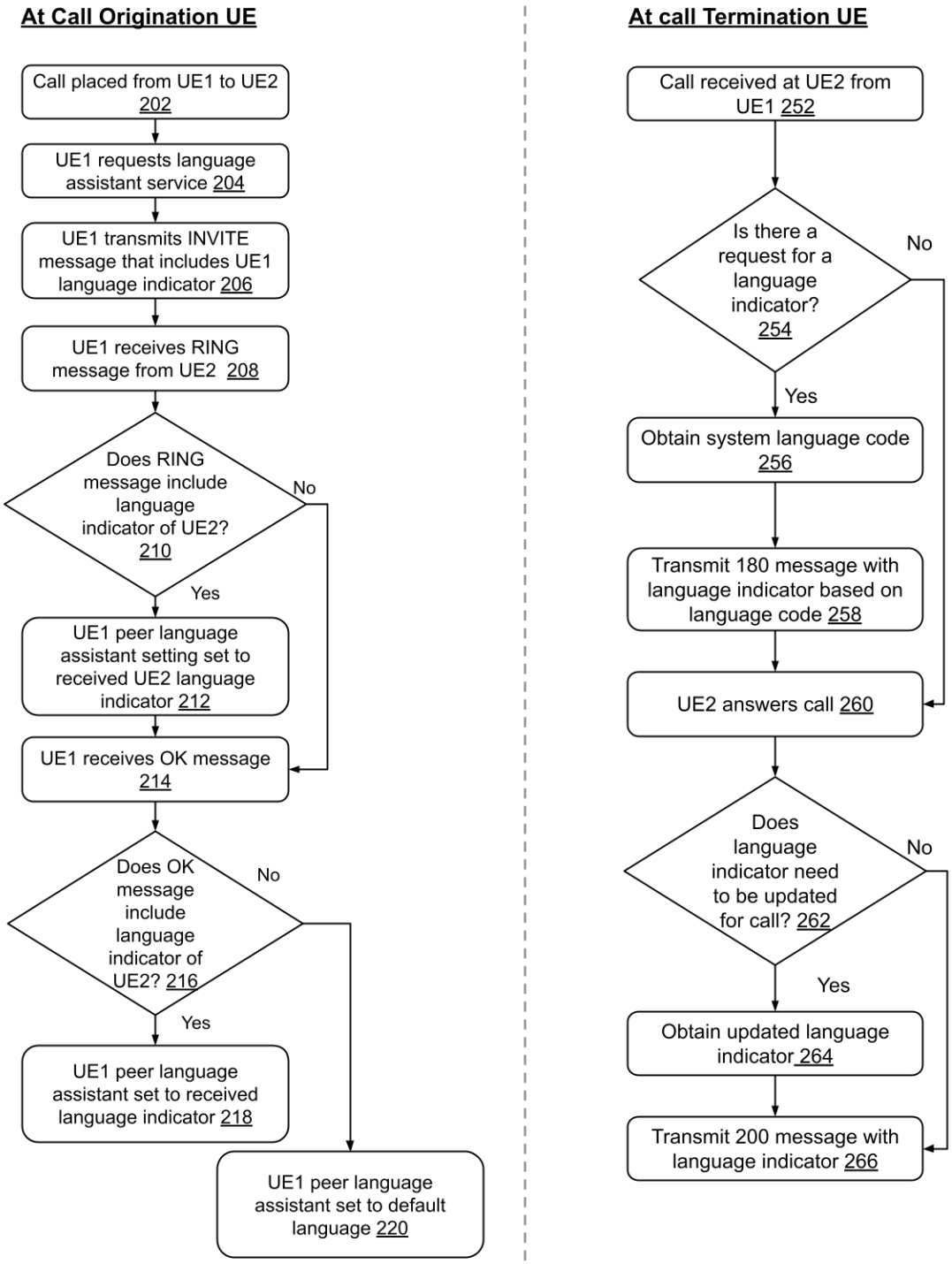

Fig. 2: Workflow for setting language at originating and terminating user equipment

Fig. 2 depicts example workflows at respective originating (UE1) and terminating (UE2) user equipment to exchange language capabilities during a peer-to-peer call.

A call is placed (202) from UE1 to UE2. Language assistant service is requested (204) at a language assistant enabled device. An INVITE message is transmitted (206) that includes a language indicator associated with UE1. A RING message (e.g., 180 RING message) is received (208) from UE2 at UE1.

It is determined (210) whether the RING message includes a language indicator associated with UE2. If the RING message includes a language indicator associated with UE2, the UE1 peer message setting is set (212) to the received language indicator associated with UE2. If the RING message does not include a language indicator associated with UE2, e.g., because UE2 does not support language assistance, block 210 may be followed by block 214.

An OK message (e.g., a call confirmation message such as a 200 OK message) is received (214) at UE1. It is determined (216) whether the OK message includes a language indicator associated with UE2. If the OK message includes a language indicator associated with UE2, the UE1 peer message setting is updated (218) to the received language indicator associated with UE2. If the OK message does not include a language indicator associated with UE2, block 216 may be followed by block 220. At block 220, the peer language assistant may be set to a default language, or another method of language detection may be utilized.

At the call terminating device (UE2), a call is received (252) from UE1. It is determined (254) whether the INVITE message includes a request for a language indicator. If it is determined that the message includes a request for a language indicator, a system language code is obtained (256), e.g., from local settings at UE2. A 180 message is transmitted (258) by UE2 to UE1 that includes the language indicator.

The call is answered (260) at UE2. It is determined (262) whether the language identifier is to be updated, e.g., if the user intends to communicate in a language other than the system language setting. If the language identifier is to be updated (264), an updated language indicator is obtained. A 200 message is transmitted (266) from UE2 to UE that includes the updated language indicator.

The techniques described herein can be utilized to automatically communicate language capabilities of respective user equipment of users participating in a call, e.g., VOIP call, that includes language translation via a language assistant.

CONCLUSION

This disclosure describes techniques to support language assistance services for communication between devices. Per techniques of this disclosure, language assistant capabilities are exchanged between participating devices during call setup. A call protocol such as session initiation protocol (SIP) is suitably modified to exchange language assistant parameters during call set up. The SIP header fields are extended to add a parameter to indicate language assistant capabilities by indicating a suitable language code. An INVITE request is transmitted from an originating device that includes a language identifier that indicates the language assistant capabilities of the originating device. A corresponding language identifier of the terminating device is requested. A language identifier for the terminating device is obtained from and transmitted to the originating device along with a RING message. When the call is answered at the terminating device, an updated language identifier may be provided along with an OK message.

REFERENCES

1. Wang, Hui and Ramachandran, Amruth, "Real-Time Voice-Call Language Translation", Technical Disclosure Commons, (January 29, 2021), https://www.tdcommons.org/dpubs_series/4026.
2. Flanagan, W.A., “Chapter 5: VoIP Signaling and Call Processing,” VoIP and Unified Communications, W.A. Flanagan (Ed.), https://doi.org/10.1002/9781118166048.ch5.