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**Indicating Fax over IP Capability
in the Session Initiation Protocol (SIP)
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Abstract

This document defines and registers with IANA the new 'fax' media feature tag for use with SIP. Currently, fax calls are indistinguishable from voice at call initiation. Consequently, fax calls can be routed to SIP user agents that are not fax capable. A 'fax' media feature tag implemented in conjunction with caller preferences allows for more accurate fax call routing.

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1. Introduction

Fax communications in the Session Initiation Protocol (SIP) [[RFC3261](#)] are handled in a "voice first" manner. Indications that a user desires to use a fax transport protocol, such as ITU-T T.38 [[T38](#)], to send a fax are not known when the initial INVITE message is sent. The call is set up as a voice call first and then only after it is connected, does a switchover to the T.38 [[T38](#)] protocol occur. This is problematic in that fax calls can be routed inadvertently to SIP user agents (UAs) that are not fax capable.

To ensure that fax calls are routed to fax capable SIP user agents, an implementation of caller preferences defined in [RFC 3841](#) [[RFC3841](#)] can be used. Feature preferences are a part of [RFC 3841](#) [[RFC3841](#)] that would allow UAs to express their preference for receiving fax communications. Subsequently SIP servers take these preferences into account to increase the likelihood that fax calls are routed to fax capable SIP user agents.

This document defines the 'fax' media feature tag for use in the SIP tree as per [Section 12.1 of RFC 3840](#) [[RFC3840](#)]. This feature tag will be applied per [RFC 3841](#) [[RFC3841](#)] as a feature preference for fax capable UAs.

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 [[RFC2119](#)].

3. Motivation

In the majority of circumstances, it is preferred that capabilities be handled in the Session Description Protocol (SDP) portion of the SIP [[RFC3261](#)] communication. However, fax is somewhat unique in that the ultimate intention of the call is not accurately signaled in the initial SDP exchange. Specifically, indications of T.38 [[T38](#)] or any other fax transport protocol in the call are not known when the call is initiated by an INVITE message. Fax calls are always considered voice calls until after they are connected. This results in the possibility of fax calls being received by SIP user agents not capable of handling fax transmissions.

For example, Alice wants to send a fax to Bob. Bob has registered two SIP UAs. The first SIP UA is not fax capable but the second one supports the T.38 [[T38](#)] fax protocol. Currently, SIP servers are

unable to know when the call starts that Alice prefers a fax capable SIP UA to handle her call. Additionally, the SIP servers are also not aware of which of Bob's SIP UAs are fax capable.

To resolve this issue of calls not arriving at a UA supporting fax, this document defines a new media feature tag specific to fax per [RFC 3840](#) [RFC3840]. Caller preferences as defined in [RFC 3841](#) [RFC3841] can then be used for registering UAs that support fax and routing fax calls to these UAs. Thus, Alice can express up front that she prefers a T.38 [T38] fax capable SIP UA for this call. At the same time, Bob's SIP UAs have expressed their fax capabilities as well during registration. Now when Alice places a fax call to Bob, the call is appropriately routed to Bob's fax capable SIP UA.

4. Usage of the sip.fax Parameter

The sip.fax media feature tag is a new string parameter, defined in this document, that allows a call to indicate a fax preference. A UA preferring the reception of fax calls MUST include the "sip.fax" media feature tag in the Contact header field of REGISTER messages. To confirm the registration of this preference, a SIP [RFC3261] Registrar MUST then include this tag in the Contact header field of its 200 OK response.

If a calling UA wants to ensure that a call is routed to a fax capable UA, then the UA MUST include the "sip.fax" media feature tag in the Contact header field of an INVITE request. Otherwise, without this tag, fax call determination is not possible until after the call is connected.

This parameter has two allowed values: "t38" and "passthrough". The "t38" value indicates that the impending call will utilize the ITU-T T.38 [T38] protocol for the fax transmission. The "passthrough" value indicates that the ITU-T G.711 [G711] codec will be used to transport the fax call.

5. Example

Bob registers with the fax media feature tag. The message flow is shown in Figure 1:

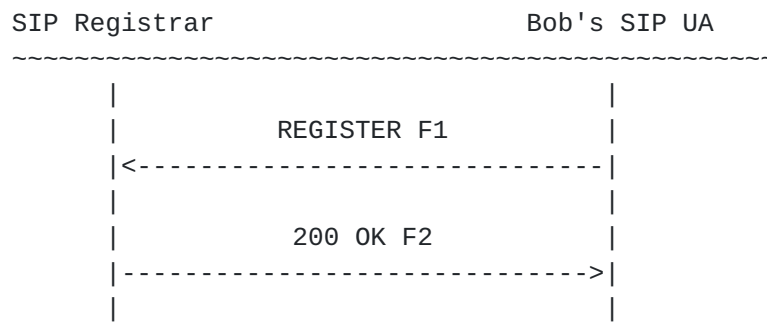


Figure 1: Fax Media Feature Tag SIP Registration Example

F1 REGISTER Bob -> Registrar

```

REGISTER sip:example.com SIP/2.0
Via: SIP/2.0/TCP bob-TP@example.com;branch=z9hG4bK309475a2
From: <sip:bob-tp@example.com>;tag=a6c85cf
To: <sip:bob-tp@pexample.com>
Call-ID: a84b4c76e66710
Max-Forwards: 70
CSeq: 116 REGISTER
Contact: <sip:bob-tp@example.com;transport=tcp>;+sip.fax="t38"
Expires: 3600
  
```

The registrar responds with a 200 OK:

F2 200 OK Registrar -> Bob

```

SIP/2.0 200 OK
From: <sip:bob-tp@example.com>;tag=a6c85cf
To: <sip:bob-tp@example.com>;tag=1263390604
Contact: <sip:bob-tp@example.com;transport=tcp>;+sip.fax="t38"
Expires: 120
Call-ID: a84b4c76e66710
Via: SIP/2.0/TCP bob-TP@example.com;branch=z9hG4bK309475a2
CSeq: 116 REGISTER
Expires: 3600
  
```

Callers desiring to express a preference for fax will include the sip.fax media feature tag in the Accept-Contact header of their INVITE.


```
INVITE sip:UserY@example.com SIP/2.0
From: sip:UserX@operator.com
To: sip:UserY@example.com
Accept-Contact: *;+sip.fax="t38"
Content-Type: application/sdp
```

6. Security Considerations

The security considerations related to the use of media feature tags from [Section 11.1 of RFC 3840](#) [[RFC3840](#)] apply.

7. IANA Considerations

This specification adds a new media feature tag to the SIP Media Feature Tag Registration Tree per the procedures defined in [RFC 2506](#) [[RFC2506](#)] and [RFC 3840](#) [[RFC3840](#)].

Media feature tag name: sip.fax

ASN.1 Identifier: 1.3.6.1.8.4.{PH}

Summary of the media feature indicated by this tag: This feature tag indicates whether a communications device supports the ITU-T T.38 [[T38](#)] fax protocol ("t38") or the passthrough method of fax transmission using the ITU-T G.711 [[G711](#)] audio codec ("passthrough").

Values appropriate for use with this feature tag: Token with an equality relationship. Values are:

t38: The device supports the image/t38 media type [[RFC3326](#)] and implements ITU-T T.38 [[T38](#)] for transporting the ITU-T T.30 [[T30](#)] and ITU-T T.4 [[T4](#)] fax data over IP.

passthrough: The device supports the audio/pcmu and audio/pcma media types [[RFC4856](#)] for transporting ITU-T T.30 [[T30](#)] and ITU-T T.4 [[T4](#)] fax data using the ITU-T G.711 [[G711](#)] audio codec. Additional implementation recommendations are in ITU-T V.152 [[V152](#)] Sections [6](#) and [6.1](#).

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 the early identification of a Fax over IP (FoIP) call.

Examples of typical use: Ensuring a fax call is routed to a fax capable SIP UA.

Related standards or documents: RFCXXXX

Security Considerations: The security considerations related to the use of media feature tags from [Section 11.1 of RFC 3840](#) [[RFC3840](#)] apply.

[[NOTE TO RFC EDITOR: Please change {PH} above to the correct identifier for this entry in the IANA registry for iso.org.dod.internet.features.sip-tree (1.3.6.1.8.4)]]

[[NOTE TO RFC EDITOR: Please change XXXX to the number assigned to this specification, and remove this paragraph on publication.]]

8. Acknowledgements

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