

**Extensions to the REFER mechanism for Third Party Call Control  
draft-olson-sipping-refer-extensions-00**

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Abstract

This document proposes a number of extensions to the REFER method used by the Session Initiation Protocol (SIP) for the purpose of third party call control.

## Table of Contents

<a href="#">1.</a>	<a href="#">Terminology</a>	<a href="#">3</a>
<a href="#">2.</a>	<a href="#">Introduction</a>	<a href="#">4</a>
<a href="#">3.</a>	<a href="#">Requirements</a>	<a href="#">5</a>
<a href="#">4.</a>	<a href="#">Use of the application/dialog-info+xml MIME type with REFER</a>	<a href="#">6</a>
<a href="#">5.</a>	<a href="#">Extending REFER to SIP response codes</a>	<a href="#">11</a>
<a href="#">6.</a>	<a href="#">Supressing forking of REFER requests</a>	<a href="#">18</a>
<a href="#">7.</a>	<a href="#">Supressing the NOTIFY associated with a REFER</a>	<a href="#">19</a>
<a href="#">8.</a>	<a href="#">Replacing complex Refer-To URIs with a MIME body</a>	<a href="#">21</a>
<a href="#">9.</a>	<a href="#">IANA Considerations</a>	<a href="#">24</a>
<a href="#">9.1</a>	<a href="#">norefersub option tag registration</a>	<a href="#">24</a>
<a href="#">9.2</a>	<a href="#">refer-response option tag registration</a>	<a href="#">24</a>
<a href="#">10.</a>	<a href="#">Security Considerations</a>	<a href="#">25</a>
<a href="#">11.</a>	<a href="#">Acknowledgements</a>	<a href="#">26</a>
	<a href="#">References</a>	<a href="#">27</a>
	<a href="#">Author's Address</a>	<a href="#">27</a>
	<a href="#">Intellectual Property and Copyright Statements</a>	<a href="#">28</a>



## 1. 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](#) [1].

To simplify discussions of the REFER method and its extensions, three new terms will be defined:

REFER-Issuer: the UA issuing the REFER request

REFER-Recipient: the UA receiving the REFER request

REFER-Target: the UA designated in the Refer-To URI



## 2. Introduction

The REFER [3] extension to SIP [2] defines a basis for third party call control that is useful for implementing features such as call transfer. REFER has a few limitations with respect to implementing more advanced features in conjunction with the dialog info event package [7]. These limitations derive in part from the limited information available in the message/sipfrag [4] content of the associated NOTIFY. Another limiting factor is the requirement to compress the semantics of the referred request in the Refer-To URI by encoding the desired headers as parameters of that URI. Finally, there are situations where the party issuing the REFER request does not need the NOTIFY associated with the REFER, perhaps because that agent is already subscribed to the appropriate dialog package outside of the REFER request. This represents additional unnecessary traffic and state in the REFER-Issuer and REFER-recipient.



Requirement 6: Reduce the number of messages exchanged to perform a REFER when the REFER-Issuer and REFER-Recipient support richer call control primitives such as the dialog and conference event packages.





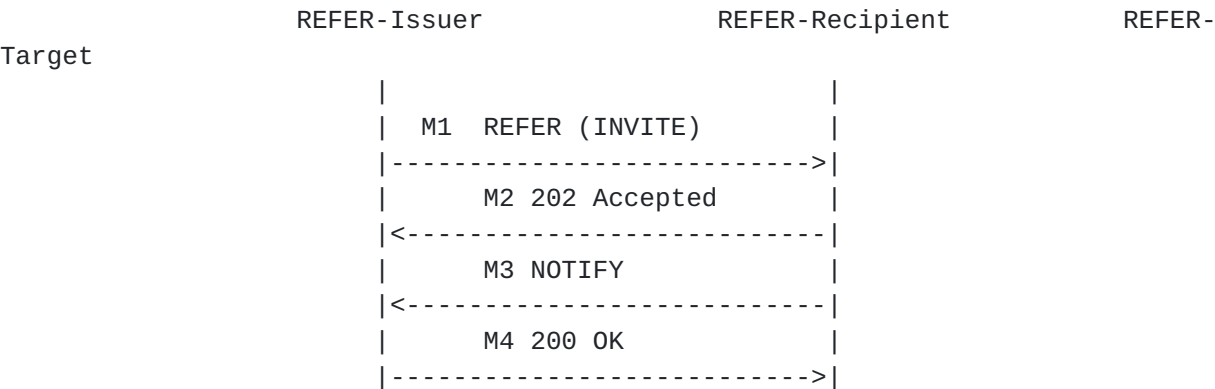
4. Use of the application/dialog-info+xml MIME type with REFER

The REFER specification [3] mandates the use of the message/sipfrag [4] MIME type for NOTIFYs of the refer event package. These NOTIFYs are sent as part of the implicit subscription created by the REFER. The purpose of the NOTIFY is to communicate the state of the transaction between the REFER-Recipient and the REFER-Target that is created as a result of the REFER

Where the purpose of sending the REFER is actually to establish a dialog, for example through an INVITE in the Refer-To, the derivative state of interest is actually the dialog state. While this may be inferred from the contents of the message/sipfrag body it is a bit clumsy and in many cases the REFER-Recipient will omit important details of the dialog in the message/sipfrag body. Two things that are generally lacking from the message/sipfrag content are the dialog identifier (Call-ID plus local and remote tags) and the state of the dialog. Not coincidentally, this is the same information available in the application/dialog-info+xml MIME type [7] used for the dialog event package.

To address this shortcoming, it is proposed to extend REFER to allow the (optional) use of the application/dialog-info+xml MIME type in place of message/sipfrag. The REFER-Issuer specifies support for this by including this MIME type in an Accept header. The REFER-Issuer MUST also support message/sipfrag for compatibility with strictly RFC3515 compliant implementations. If the REFER-Recipient supports this extension, it may choose to honor the request or default to using message/sipfrag dependent on local policy. It is OPTIONAL for the REFER-Recipient to maintain the subscription for the duration of the resultant (INVITE) dialog and RECOMMENDED that the subscription be maintained at least until the dialog is in "confirmed" state.

Figure 1: Example of using application/dialog-info+xml

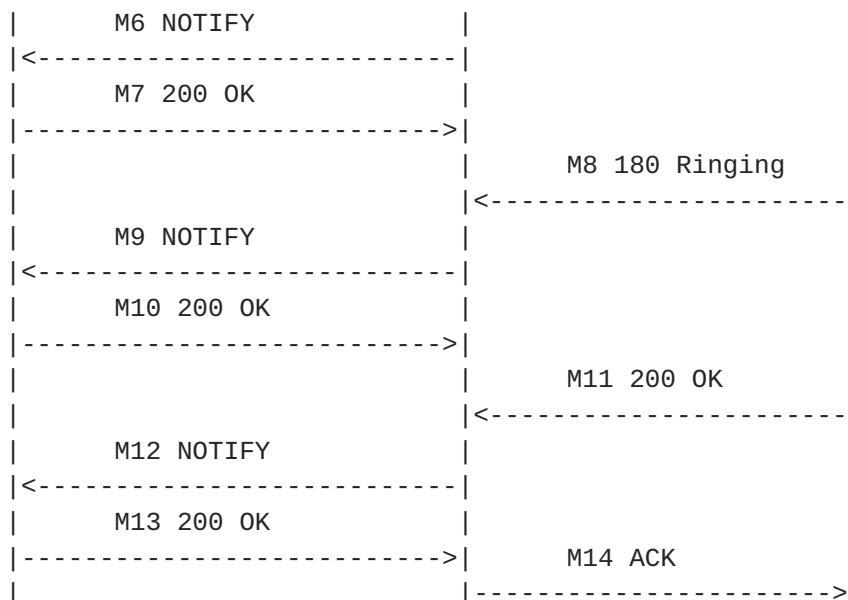


		M5	INVITE	
		----->		

Olson

Expires December 19, 2003

[Page 6]



Message flow:

M1: The REFER-Issuer creates a REFER, specifying a preference for the application/dialog-info+xml MIME type.

```
REFER sip:b@tradewind.com SIP/2.0
Via: SIP/2.0/TCP issuer.tradewind.com;branch=z9hG4bK-a-1
From: <sip:a@tradewind.com>;tag=1ab
To: <sip:b@tradewind.com>
Call-ID: 1@issuer.tradewind.com
CSeq: 234234 REFER
Max-Forwards: 70
Refer-To: sip:c@tradewind.com;method=INVITE
Accept: application/dialog-info+xml;q=0.5, message/sipfrag;q=0.1
Contact: sip:a@issuer.tradewind.com
Content-Length: 0
```

M5: The REFER-Recipient creates an appropriate INVITE based on the REFER and sends it to the REFER-Target.

INVITE sip:c@tradewind.com SIP/2.0  
Via: SIP/2.0/TCP recipient.tradewind.com;branch=z9hG4bK-b-1



From: <sip:b@tradewind.com>;tag=1bc

To: <sip:c@tradewind.com>

Call-ID: 1@recipient.tradewind.com

CSeq: 1234567 INVITE

Max-Forwards: 70

Contact: sip:b@recipient.tradewind.com

Content-Length: ...

<SDP for audio call>

M6: The REFER-Recipient sends a NOTIFY triggered by the INVITE being sent to the REFER-Target. The body of the NOTIFY contains the dialog identifier and current state ("trying").

NOTIFY sip:a@issuer.tradewind.com SIP/2.0

Via: SIP/2.0/TCP recipient.tradewind.com;branch=z9hG4bK-b-2

From: <sip:a@tradewind.com>;tag=1ab

To: <sip:b@tradewind.com>;tag=1ba

Call-ID: 1@issuer.tradewind.com

CSeq: 1278784 NOTIFY

Max-Forwards: 70

Event: refer;id=234234

Subscription-State: active;expires=3600

Contact: sip:b@recipient.tradewind.com

Content-Type: application/dialog-info+xml

Content-Length: ...

```
<?xml version="1.0" ?>
```

```
<dialog-info xmlns="urn:ietf:params:xml:ns:dialog-info"
              version="1"
```

```
state="partial"
```

```
entity="sip:b@tradewind.com">
```

```
<dialog id="2" call-id="1@recipient.tradewind.com"
```

```
local-tag="1bc"
```

```
direction="initiator">
```

```
<state>trying</state>
```

M9: The REFER-Recipient sends a NOTIFY triggered by the 180 Ringing received from the REFER-Target. The body of the NOTIFY contains the dialog identifier and current state ("early").



```
NOTIFY sip:a@issuer.tradewind.com SIP/2.0
Via: SIP/2.0/TCP recipient.tradewind.com;branch=z9hG4bK-b-3
From: <sip:a@tradewind.com>;tag=1ab
To: <sip:b@tradewind.com>;tag=1ba
Call-ID: 1@issuer.tradewind.com
CSeq: 1278785 NOTIFY
Max-Forwards: 70
Event: refer;id=234234
Subscription-State: active;expires=3600
Contact: sip:b@recipient.tradewind.com
Content-Type: application/dialog-info+xml
Content-Length: ...
```

```
<?xml version="1.0" ?>
<dialog-info xmlns="urn:ietf:params:xml:ns:dialog-info"
    version="2"
    state="partial"
    entity="sip:b@tradewind.com">
  <dialog id="2" call-id="1@recipient.tradewind.com"
    local-tag="1bc" remote-tag="1cb"
    direction="initiator">
    <state>early</state>
  </dialog>
</dialog-info>
```

M12: The REFER-Recipient sends a NOTIFY triggered by the 200 OK received from the REFER-Target. The body of the NOTIFY contains the dialog identifier and current state ("confirmed").

```
NOTIFY sip:a@issuer.tradewind.com SIP/2.0
Via: SIP/2.0/TCP recipient.tradewind.com;branch=z9hG4bK-b-4
From: <sip:a@tradewind.com>;tag=1ab
To: <sip:b@tradewind.com>;tag=1ba
Call-ID: 1@issuer.tradewind.com
CSeq: 1278786 NOTIFY
Max-Forwards: 70
Event: refer;id=234234
Subscription-State: active;expires=3600
Contact: sip:b@recipient.tradewind.com
Content-Type: application/dialog-info+xml
Content-Length: ...
```





```
<?xml version="1.0" ?>
<dialog-info xmlns="urn:ietf:params:xml:ns:dialog-info"
              version="3"
              state="partial"
              entity="sip:b@tradewind.com">
  <dialog id="2" call-id="1@recipient.tradewind.com"
          local-tag="1bc" remote-tag="1cb"
          direction="initiator">
    <state>confirmed</state>
  </dialog>
</dialog-info>
```



## 5. Extending REFER to SIP response codes

REFER is currently defined to trigger the sending of a request from the REFER-Recipient to the REFER-Target. The intention is most often to initiate a dialog from the REFER-Recipient to the REFER-Target. This is an excellent way to generate an action at the REFER-Recipient based on an event or action that takes places at the REFER-Issuer. The classic example is call transfer as a result of a user at the REFER-Issuer taking some action.

With the use of the dialog event package, it is possible for one UA to monitor events at another UA related to a dialog, such as the receipt of an INVITE to establish a new dialog. What is lacking is a way for the watcher to indicate what should be the response to such an INVITE request. For example, the dialog watcher would like the recipient of the session initiation request to accept the initiation (send a 200 OK response to the INVITE request). One motivating scenario for this is a set of co-operating User Agents (devices) that belong to the same user. The user, while using one SIP device, wishes to answer a call that is being received on another of that user's SIP devices. This gives the user a single UI focus for control while allowing multiple devices with differing capabilities.

To enable such a scenario, this document proposes an extension to the SIP(S) URI syntax as defined in SIP [2]. The extension is analogous to the "method" uri-parameter that currently exists to communicate a method for use in the Refer-To header. A new uri-parameter, "response", is proposed that is used in conjunction with the "method" uri-parameter and associated call-id, local tag, and remote tag to request that the REFER-Recipient send a response within the identified SIP transaction to the REFER-Target.

The REFER-Issuer MUST specify a "method" parameter in addition to the "response" parameter. The REFER-Issuer MUST also include the appropriate local-uri, local-tag, remote-uri, and remote-tag encoded as From and To headers in the Refer-To URI (or using a message/sipfrag body as defined later in this document). Note that in order to satisfy this requirement, the REFER-Issuer must have access to this information. In particular, it is assumed that the REFER-Issuer receives the local-uri and remote-uri in the NOTIFY for the dialog event package from the REFER-Recipient. These elements are optional in the XML schema. It is anticipated that User Agents that support these REFER extensions will also include these optional elements in the application/dialog-info+xml payload (as privacy concerns allow).

To ensure the REFER-Recipient conformant with [RFC3515](#) does not misintepret this as a REFER to send a request of the specified

method, the REFER-Issuer MUST also include a Require: refer-response

Olson

Expires December 19, 2003

[Page 11]

header in the REFER request. REFER-Recipients which do not understand this extension will return a 420 response. The REFER-Target does not need to understand this extension for this to work. Support for this extension can be queried in advance using a standard OPTIONS request.

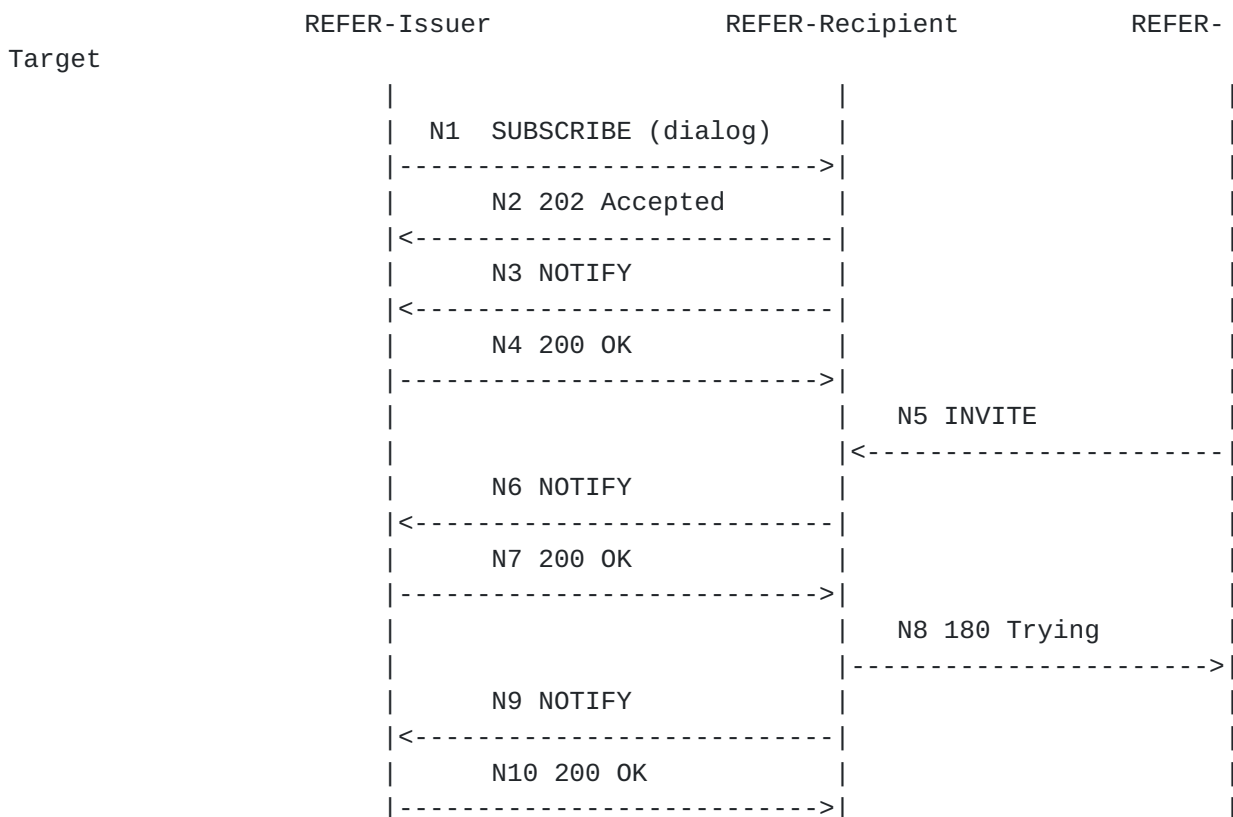
The REFER-Issuer MUST request the use of the application/  
dialog-info+xml MIME type in NOTIFYs associated with a REFER request  
which uses this "response" extension.

The proposed syntax modification follows

```
uri-parameters    = *( ";" uri-parameter)
uri-parameter     = transport-param / user-param / method-param
                  / ttl-param / maddr-param / lr-param / response-param / other-param
response-param    = "response=" 1*3DIGIT
```

An example call flow follows:

Figure 2: Example of using the "response" uri-parameter in the Refer-To header



|

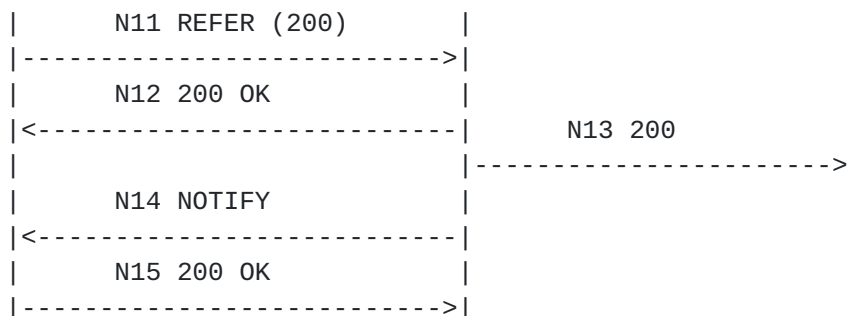
|

|

Olson

Expires December 19, 2003

[Page 12]



Message flow:

N1: The REFER-Issuer subscribes to the dialog event package at the REFER-Recipient.

SUBSCRIBE sip:b@tradewind.com SIP/2.0  
Via: SIP/2.0/TCP issuer.tradewind.com;branch=z9hG4bK-a-1  
From: <sip:a@tradewind.com>;tag=1ab  
To: <sip:b@tradewind.com>  
Call-ID: 1@issuer.tradewind.com  
CSeq: 234234 SUBSCRIBE  
Max-Forwards: 70  
Event: dialog  
Accept: application/dialog-info+xml  
Contact: sip:a@issuer.tradewind.com  
Content-Length: 0

N5: The REFER-Recipient receives an INVITE from the REFER-Target to start a new call.

```

INVITE sip:b@tradewind.com SIP/2.0
Via: SIP/2.0/TCP target.tradewind.com;branch=z9hG4bK-c-1
From: <sip:c@tradewind.com>;tag=1cb
To: <sip:b@tradewind.com>
Call-ID: 1@target.tradewind.com
CSeq: 1234567 INVITE
Max-Forwards: 70
Contact: sip:c@target.tradewind.com
Content-Length: ...

```



Olson

Expires December 19, 2003

[Page 13]

<SDP for an audio call>

N6: The REFER-Recipient sends a NOTIFY triggered by the INVITE received from the REFER-Target. The body of the NOTIFY contains the dialog identifier and current state ("trying").

```
NOTIFY sip:a@issuer.tradewind.com SIP/2.0
Via: SIP/2.0/TCP recipient.tradewind.com;branch=z9hG4bK-b-2
From: <sip:a@tradewind.com>;tag=1ab
To: <sip:b@tradewind.com>;tag=1ba
Call-ID: 1@issuer.tradewind.com
CSeq: 454545 NOTIFY
Max-Forwards: 70
Event: dialog;id=234234
Subscription-State: active;expires=3600
Contact: sip:b@recipient.tradewind.com
Content-Type: application/dialog-info+xml
Content-Length: ...
```

```
<?xml version="1.0" ?>
<dialog-info xmlns="urn:ietf:params:xml:ns:dialog-info"
              version="1"
              state="partial"
              entity="sip:b@tradewind.com">
  <dialog id="2" call-id="1@target.tradewind.com"
          remote-tag="1cb"
          direction="recipient">
    <local-uri>b@tradewind.com</local-uri>
    <remote-uri>c@tradewind.com</remote-uri>
    <state>trying</state>
  </dialog>
</dialog-info>
```

N8: The REFER-Recipient sends a 180 Ringing response to the REFER-Target.

SIP/2.0 180 Ringing  
Via: SIP/2.0/TCP target.tradewind.com;branch=z9hG4bK-b-3  
From: <sip:c@tradewind.com>;tag=1cb  
To: <sip:b@tradewind.com>;tag=1bc



Call-ID: 1@target.tradewind.com  
CSeq: 1234567 INVITE  
Contact: sip:b@recipient.tradewind.com  
Content-Length: 0

CSeq: 1234567 INVITE

Contact: sip:b@recipient.tradewind.com

Content-Length: 0

N9: The REFER-Recipient sends a NOTIFY triggered by the 180 Ringing sent to the REFER-Target. The body of the NOTIFY contains the dialog identifier and current state ("early").

```
NOTIFY sip:a@issuer.tradewind.com SIP/2.0
Via: SIP/2.0/TCP recipient.tradewind.com;branch=z9hG4bK-b-4
From: <sip:a@tradewind.com>;tag=1ab
To: <sip:b@tradewind.com>;tag=1ba
Call-ID: 1@issuer.tradewind.com
CSeq: 454546 NOTIFY
Max-Forwards: 70
Event: dialog;id=234234
Subscription-State: active;expires=3600
Contact: sip:b@recipient.tradewind.com
Content-Type: application/dialog-info+xml
Content-Length: ...
```

Via: SIP/2.0/TCP recipient.tradewind.com;branch=z9hG4bK-b-4

From: <sip:a@tradewind.com>;tag=1ab

To: <sip:b@tradewind.com>;tag=1ba

Call-ID: 1@issuer.tradewind.com

CSeq: 454546 NOTIFY

Max-Forwards: 70

Event: dialog;id=234234

Subscription-State: active;expires=3600

Contact: sip:b@recipient.tradewind.com

Content-Type: application/dialog-info+xml

Content-Length: ...

```
<?xml version="1.0" ?>
<dialog-info xmlns="urn:ietf:params:xml:ns:dialog-info"
              version="2"
              state="partial"
              entity="sip:b@tradewind.com">
  <dialog id="2" call-id="1@target.tradewind.com"
          local-tag="1bc" remote-tag="1cb"
          direction="recipient">
    <local-uri>b@tradewind.com</local-uri>
    <remote-uri>c@tradewind.com</remote-uri>
    <state event="1xx-tag">early</state>
  </dialog>
</dialog-info>
```

```
<dialog-info xmlns="urn:ietf:params:xml:ns:dialog-info"
              version="2"
```

```
state="partial"
```

```
entity="sip:b@tradewind.com">
```

```
<dialog id="2" call-id="1@target.tradewind.com"
```

```
local-tag="1bc" remote-tag="1cb"
```

```
direction="recipient">
```

&lt;local-uri&gt;b@tradewind.com&lt;/local-uri&gt;

```
<remote-uri>c@tradewind.com</remote-uri>
```

```
<state event="1xx-tag">early</state>
```

&lt;/dialog-info&gt;

N11: The REFER-Issuer creates a REFER, specifying that the REFER-Recipient should send a 200 OK to accept the session invitation. The From and To headers of the 200 OK are encoded in the Refer-To URI. The local and remote tags for this are determined from the information provided in the NOTIFY for the dialog package. This allows the REFER-Issuer to specify a particular dialog. Combined with the "method" parameter, this



identifies a specific transaction within the dialog.

```

REFER sip:b@tradewind.com SIP/2.0
Via: SIP/2.0/TCP issuer.tradewind.com;branch=z9hG4bK-a-2
From: <sip:a@tradewind.com>;tag=1ab
To: <sip:b@tradewind.com>
Call-ID: 2@issuer.tradewind.com
CSeq: 818181 REFER
Max-Forwards: 70
Accept: application/dialog-info+xml;q=0.5, message/sipfrag;q=0.1
Require: refer-response
Refer-To: sip:c@tradewind.com;method=INVITE;response=200?Call-
ID=1%40target.tradewind.com&
    To=b%40tradewind.com;tag=1bc&From=c%40tradewind.com;tag=1cb
Contact: sip:a@issuer.tradewind.com
Content-Length: 0

```

N13: The REFER-Recipient sends a 200 OK to the REFER-Target constructed using the information in the Refer-To header.

SIP/2.0 200 OK  
Via: SIP/2.0/TCP target.tradewind.com;branch=z9hG4bK-c-1  
From: <sip:c@tradewind.com>;tag=1cb  
To: <sip:b@tradewind.com>;tag=1bc  
Call-ID: 1@target.tradewind.com  
Supported: refer-response  
CSeq: 1234567 INVITE  
Contact: sip:b@recipient.tradewind.com  
Content-Length: 0

N14: The REFER-Recipient sends a NOTIFY triggered by the 200 OK sent to the REFER-Target. The body of the NOTIFY contains the dialog identifier and current state ("confirmed").

NOTIFY sip:a@issuer.tradewind.com SIP/2.0  
Via: SIP/2.0/TCP recipient.tradewind.com;branch=z9hG4bK-b-4  
From: <sip:a@tradewind.com>;tag=1ab

To: <sip:b@tradewind.com>;tag=1ba

Olson

Expires December 19, 2003

[Page 16]

Call-ID: 1@issuer.tradewind.com

CSeq: 454547 NOTIFY

Max-Forwards: 70

Event: dialog;id=234234

Subscription-State: active;expires=3600

Contact: sip:b@recipient.tradewind.com

Content-Type: application/dialog-info+xml

Content-Length: ...

```
<?xml version="1.0" ?>
```

```
<dialog-info xmlns="urn:ietf:params:xml:ns:dialog-info"
```

```
version="3"
```

```
state="partial"
```

```
entity="sip:b@tradewind.com">
```

```
<dialog id="2" call-id="1@target.tradewind.com"
```

```
local-tag="1bc" remote-tag="1cb"
```

```
direction="recipient">
```

```
<local-uri>b@tradewind.com</local-uri>
```

```
<remote-uri>c@tradewind.com</remote-uri>
```

```
<state event="2xx">confirmed</state>
```





## 6. Suppressing forking of REFER requests

The REFER specification allows for the possibility of forking a REFER request which is sent outside of an existing dialog. In some situations forking a REFER may result in absolutely incorrect behavior. This is especially true when the REFER is intended to target a specific device, perhaps with specific capabilities. Fortunately, there is already a mechanism which can address the need to indicate that a REFER should NOT be forked. The caller preferences extension [8] defines both a way to indicate a request not be forked and a means to target a specific device with the desired capabilities. No further extension is required. An example of the usage of caller preferences in conjunction with REFER is shown below.

### Example of REFER using Caller Preferences extension

```
REFER sip:b@tradewind.com SIP/2.0
Via: SIP/2.0/TCP issuer.tradewind.com;branch=z9hG4bK-a-1
From: <sip:a@tradewind.com>;tag=1a
To: <sip:b@tradewind.com>
Call-ID: 1@issuer.tradewind.com
CSeq: 234234 REFER
Max-Forwards: 70
Refer-To: sip:c@tradewind.com;method=INVITE
Require: pref
Request-Disposition: no-fork
Accept-Contact: *;audio;require
Reject-Contact: *;video
Contact: sip:a@issuer.tradewind.com
Content-Length: 0
```



## 7. Suppressing the NOTIFY associated with a REFER

The REFER specification mandates that every REFER create an implicit subscription between the REFER-Issuer and the REFER-Recipient. This subscription results in at least one NOTIFY being sent from the REFER-Recipient to the REFER-Issuer. The REFER-Recipient may choose to cancel the implicit subscription with this NOTIFY. The REFER-Issuer may choose to cancel this implicit subscription with an explicit SUBSCRIBE (Expires: 0) after receipt of the initial NOTIFY or by sending a 481 response to this initial NOTIFY request.

The purpose of requiring the implicit subscription and initial NOTIFY is to allow for the situation where the REFER request gets forked and the REFER-Issuer needs a way to see the multiple dialogs that may be established as a result of the forked REFER. This is the same approach used to handle forking of SUBSCRIBE [5] requests. Where the REFER-Issuer explicitly specifies that forking not occur via caller preferences, or implicitly does not allow for forking by sending the REFER within an existing dialog, the requirement that an implicit subscription be established is unnecessary.

Another purpose of the NOTIFY is to inform the REFER-Issuer of the progress of the SIP transaction that results from the REFER at the REFER-Recipient. In the case where the REFER-Issuer is already aware of the progress of the SIP transaction, such as when the REFER-Issuer has an explicit subscription to the dialog event package at the REFER-Recipient, the implicit subscription and resultant NOTIFY traffic related to the REFER is superfluous and unnecessary network overhead.

To avoid this unnecessary overhead, it is proposed that the REFER-Issuer insert a Supported: norefersub header in the REFER request to indicate to the REFER-Recipient that no implicit subscription or NOTIFY is needed with respect to this REFER request. This MUST be used by the REFER-Issuer only when the REFER-Issuer can be certain that the REFER request will not be forked. The REFER-Recipient MUST signal support for this extension by inserting a Supported: norefersub header in the 2xx response to the REFER request.

### Example of REFER which supresses the implicit subscription

REFER sip:b@tradewind.com SIP/2.0  
Via: SIP/2.0/TCP issuer.tradewind.com;branch=z9hG4bK-a-1  
From: <sip:a@tradewind.com>;tag=1a



Internet-Draft      Extensions to the REFER mechanism for Third Party Call  
Control                          June 2003

To: <sip:b@tradewind.com>  
Call-ID: 1@issuer.tradewind.com  
CSeq: 234234 REFER  
Max-Forwards: 70  
Refer-To: sip:c@tradewind.com;method=INVITE  
Request-Disposition: no-fork  
Accept-Contact: \*;audio;require  
Supported: norefersub  
Contact: sip:a@issuer.tradewind.com  
Content-Length: 0



## 8. Replacing complex Refer-To URIs with a MIME body

Much of the semantics of the REFER request is encapsulated in the Refer-To URI. This URI will commonly encode the method, From, To, Call-ID, Accept-Disposition, Accept-Contact [8], and other headers all in a properly escaped URI. Such a URI can become long, difficult to debug, and prone to URI escaping errors in SIP implementations. The situation becomes more complex if the method is itself a REFER complete with a Refer-To which must contain URI-escaped characters. This double escaping obfuscates things even more and increases the chances of improperly escaping/unescaping of the Refer-To URI.

The alternative that is proposed is to make use of the currently unused REFER body to encapsulate all the information that is potentially escaped in the Refer-To URI. The possible information includes the method, headers, and body of the request which is desired to be created by the REFER-Recipient. The ideal candidate for this is the message/sipfrag MIME type. This MIME type can express all of these: the method, Request-URI, headers, and body. This applies to requests as well as responses (as an extension).

There are two possibilities: use a cid URI [6] in the Refer-To header to reference the message/sipfrag content in the body of the REFER or continue to place the URI of the REFER-Target in the Refer-To header and place all other facets of the request in the message/sipfrag body with the understanding that the presence of the body implies its usage for this purpose. A few examples should illuminate things.

Before

```

REFER sip:b@tradewind.com SIP/2.0
Via: SIP/2.0/TCP issuer.tradewind.com;branch=z9hG4bK-a-1
From: <sip:a@tradewind.com>;tag=1a
To: <sip:b@tradewind.com>
Call-ID: 1@issuer.tradewind.com
CSeq: 234234 REFER
Max-Forwards: 70
Refer-To: sip:c@tradewind.com;method=INVITE;response=200?Call-
=1%40target.tradewind.com&
    From=b%40tradewind.com;tag=2b&To=c%40tradewind.com;tag=1c
Accept: application/dialog-info+xml;q=0.5, message/sipfrag;q=0.1
Require: refer-response
Contact: sip:a@issuer.tradewind.com
Content-Length: 0

```





After (placing the REFER-Target in the Refer-To)

```
REFER sip:b@tradewind.com SIP/2.0
Via: SIP/2.0/TCP issuer.tradewind.com;branch=z9hG4bK-a-1
From: <sip:a@tradewind.com>;tag=1a
To: <sip:b@tradewind.com>
Call-ID: 1@issuer.tradewind.com
CSeq: 234234 REFER
Max-Forwards: 70
Refer-To: sip:c@tradewind.com;method=INVITE
Accept: application/dialog-info+xml;q=0.5, message/sipfrag;q=0.1
Require: refer-response
Contact: sip:a@issuer.tradewind.com
Content-Type: message/sipfrag
Content-Length: ...
```

SIP/2.0 200 OK  
Call-ID: 1@target.tradewind.com  
From: b@tradewind.com;tag=2b  
To: c@tradewind.com;tag=1c

After (using a cid URI)

```
REFER sip:b@tradewind.com SIP/2.0
Via: SIP/2.0/TCP issuer.tradewind.com;branch=z9hG4bK-a-1
From: <sip:a@tradewind.com>;tag=1a
To: <sip:b@tradewind.com>
Call-ID: 1@issuer.tradewind.com
CSeq: 234234 REFER
Max-Forwards: 70
Refer-To: cid:1239103912039@issuer.tradewind.com
Accept: application/dialog-info+xml;q=0.5, message/sipfrag;q=0.1
Require: refer-response
Contact: sip:a@issuer.tradewind.com
Content-Type: message/sipfrag
Content-Id: <1239103912039@issuer.tradewind.com>
Content-Length: ...
```

SIP/2.0 200 OK  
Call-ID: 1@target.tradewind.com  
From: b@tradewind.com;tag=2b



To: c@tradewind.com;tag=1c

Note that the target URI and method are still included in the Refer-To header.

If the REFER-Recipient does not understand this extension, it MUST return a 4xx response to the REFER request. The REFER-Issuer SHOULD re-issue the REFER request using URI escaping and only the Refer-To: URI to convey the same information if possible.



## 9. IANA Considerations

### 9.1 norefersub option tag registration

This document defines a new option tag, `norefersub`, which specifies that an implicit subscription for event package refer should not be created as a result of accepting this REFER request. This option tag is only meaningful for the REFER request defined in [RFC3515](#).

## 9.2 refer-response option tag registration

This document defines a new option tag, refer-response, which specifies that the recipient of the REFER request is expected to issue a response for the SIP transaction identified within the Refer-To URI. This option tag is only meaningful for the REFER request defined in [RFC3515](#).



## 10. Security Considerations

No additional concerns above what is defined in [RFC3515](#).





## 11. Acknowledgements

The author would like to thank Rohan Mahy for his insightful comments. The author would also like to thank Sriram Parameswar for his [draft-parameswar-sipping-norefersub-00](#) proposal which is the basis for the norefersub option tag proposed in this draft.



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### Author's Address

Sean Olson  
Microsoft  
One Microsoft Way  
Redmond, WA 98052  
US

Phone: +1-425-707-2846  
E-Mail: seanol@microsoft.com  
URI: <http://www.microsoft.com/rtc>



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Internet-Draft      Extensions to the REFER mechanism for Third Party Call  
Control                  June 2003

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