Network Announcements with SIP

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This document is the result of a chartered SIPPING work group item.

1. Abstract

In SIP-based networks [2], there is a need to provide announcements. In some situations, one must play the announcement without providing an answer indication. In others, one must play the announcement after completing call setup. This document describes how to provide such announcements in a SIP-based network. The method described here is a media server service instance. The document [3] describes generic URI’s for media server service instances.

2. Conventions used in this document

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 [4].

3. Overview

A network announcement is the delivery of an audio resource, such as a prompt file, to a terminal device.

There are two types of network announcements. The differentiating characteristic between the two types is whether the network fully sets up the call before playing the announcement. The analog in the
PSTN is whether answer supervision is supplied; i.e. does the announcement server answer the call prior to delivering the announcement.

Playing an announcement after call setup is straightforward. First, the requesting device issues an INVITE to the media server requesting the announcement service. The media server negotiates the SDP and responds with a 200 OK. After receiving the ACK from the requesting device, the media server plays the requested prompt and issues a BYE to the requesting device.

In replicating and expanding on the existing telephone network, there is a need to play announcements during call setup. That is, the network delivers media to the caller before the setup completes. Network operators need this capability to provide informational network announcements, such as "The person you are trying to reach is unavailable. Good Bye." or "We are sorry, but all circuits are busy. Please try your call again later. Good Bye."

Note that simply redirecting the caller to a media server, with the media server issuing a 200 OK response, is not appropriate. The call has not completed successfully. To support the appropriate paradigm, the media server issues a 100 TRYING response, followed immediately by a 183 SESSION PROGRESS response with SDP. This enables the media server to send early media to the caller. The media server sends the requested audio. After playing the audio, the media server issues a 487 REQUEST TERMINATED response code to the requesting device.

If the media server does not support announcements, it MUST respond with the 488 NOT ACCEPTABLE HERE response code, as specified by [3]. If the media server supports announcements, but it cannot find the referenced URI, it MUST respond with the 404 NOT FOUND response code, as specified by [3].

If the media server receives an INVITE for the announcement service without a "play=" parameter, it MUST respond with the 404 NOT FOUND response code, as there is no default value for the announcement service.

If there is an error retrieving the announcement, the media server MUST respond with an appropriate 4xx error code reflecting the error.

4. Announcement Service

The Request URI fully describes the announcement service through the use of the user part of the address and additional URI parameters, as described in [3]. The user portion of the address, "annc", specifies the announcement service on the media server. The service has several associated URI parameters that control the content and delivery of the announcement. These parameters are described below:

"play=" specifies the audio resource or announcement sequence to be played.
"early=" Specifies whether early media treatment is desired.

"repeat=" Specifies how many times the media server should repeat the announcement or sequence named by the "play=" parameter.

"delay=" Specifies a delay interval between announcement repetitions. The delay is measured in milliseconds.

"duration=" Specifies the maximum duration of the announcement. The media server will discontinue the announcement and end the call if the maximum duration has been reached. The duration is measured in milliseconds.

"locale=" Specifies the language and country variant of the announcement sequence named in the "play=" parameter. The language is defined as a two letter code per ISO 639 [5]. The country variant is also defined as a two letter code per ISO 3166 [6]. These elements are concatenated with a single underbar (%x5F) character.

"param[n]=" Provides a mechanism for passing values that are to be substituted into an announcement sequence. Up to 9 parameters ("param1=" through "param9=") may be specified.

The "play=" parameter is mandatory and MUST be present. All other parameters are OPTIONAL.

NOTE: Some encodings are not self-describing. Should we specify something like content-type? Alternatively, how about a "media=" parameter?

The form of the SIP Request URI for announcements is as follows. Note that the backslash, CRLF, and spacing before the "play=" is for readability purposes only.

```
sip:annc@ms2.carrier.net; \n play="http://audio.carrier.net/allcircuitsbusy.g711"; \n early=yes
 sip:annc@ms2.carrier.net; \n play="file://fileserver.carrier.net/geminii/yourHoroscope.wav"
```

5. Operation

The scenarios below assume there is a SIP Proxy, application server, or SoftSwitch between the caller and the media server. However, the announcement service works as described below even if the caller invokes the service directly. We chose to discuss the proxy case, as it will be the most common case.

As described above, the "early=" parameter determines whether the media server plays the prompt after call setup or as early media. The default value for the "early=" parameter MUST BE "yes". That is, the default action is for the media server to play the prompt before establishing the call. We envision that that service will be most commonly used for network announcements which require
early media, hence that is the default behavior.

5.1. Established Call Prompting

5.1.1. Description

The caller issues an INVITE to the serving SIP Proxy. The SIP Proxy determines what audio prompt to play to the caller. The proxy responds to the caller with 100 TRYING.

The proxy issues an INVITE to the media server, requesting the appropriate prompt to play coded in the play= parameter. The INVITE MUST contain the parameter "early=no" to invoke the Established Call Prompting service. The media server responds with 200 OK. The proxy sends a 200 OK to the caller. The caller then issues an ACK. The proxy then issues an ACK to the media server.

With the call setup, the media server plays the requested prompt. When the media server completes the play of the prompt, it issues a BYE to the proxy. The proxy then issues a BYE to the caller.

5.1.2. Protocol Diagram

5.2. Early Media Prompting

5.2.1. Description

The caller issues an INVITE to the serving SIP Proxy. Normally, the SIP Proxy would complete the call to the requested destination. However, if the destination is not available, the proxy will request a media server to play an audio prompt to the caller. The proxy responds with a 100 TRYING.

The proxy issues an INVITE to the media server, requesting the appropriate prompt to play. The INVITE MUST contain the parameter
"early=yes" or omit the "early=" parameter to invoke the Early Media Prompting service. The media server responds with 100 TRYING followed by 183 SESSION PROGRESS. At that point, the media server sends the announcement to the caller. The document [7] describes the 183 SESSION PROGRESS result code.

After the media server completes the streaming of the prompt, it MUST send a 487 REQUEST TERMINATED to the Proxy.

Note: When the early media service is used the requester is implicitly asking the media server to cancel the transaction as soon as the announcement is played. Since 487 is associated with an explicit CANCEL request it seems appropriate for this use as well. The 00 version specified 486 BUSY HERE as the appropriate response in this scenario. However, 486 might could potentially be mis-interpreted as a true busy by the requester so its use has been deprecated.

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The proxy sends the appropriate error response to the caller. That could be 487 or any other appropriate code reflective of the failure situation.

5.2.2. Protocol Diagram

<table>
<thead>
<tr>
<th>Caller</th>
<th>Proxy</th>
<th>Media Server</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INVITE</td>
<td>INVITE</td>
</tr>
<tr>
<td></td>
<td>100 TRYING</td>
<td>100 TRYING</td>
</tr>
<tr>
<td></td>
<td>183 SESSION PROGRESS</td>
<td>183 SESSION PROGRESS</td>
</tr>
<tr>
<td></td>
<td>Play Announcement (RTP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>487 REQUEST TERMINATED</td>
<td>487 REQUEST TERMINATED</td>
</tr>
<tr>
<td></td>
<td>ACK</td>
<td>ACK</td>
</tr>
</tbody>
</table>

6. Formal Syntax

The following syntax specification uses the augmented Backus-Naur Form (BNF) as described in RFC-2234 [8].

ANNNC-URL = "sip:" annnc-ind "@" hostport
annnc-parameters

annnc-ind = "annc"

annnc-parameters = ";" play-param [ ";" early-param ]
[ ";" delay-param] [ ";" duration-param ] [ ";" repeat-param ]
[ ";" locale-param ] [ ";" variable-params ]
play-param = "play=" prompt-url
early-param = "early=" ( "yes" | "no" )
delay-param = "delay=" delay-value
delay-value = 1*DIGIT
duration-param = "duration=" duration-value
duration-value = 1*DIGIT
repeat-param = "repeat=" repeat-value

repeat-value = 1*DIGIT
locale-param = "locale=" locale-value
locale-value = 2 ALPHA %x5F 2 ALPHA
variable-params = param-name "=" variable-value
param-name = "param" DIGIT ; e.g "param1"
variable-value = 1*(ALPHA | DIGIT)


The definition of hostport is as specified by [2].

The syntax of prompt-url consists of a URL scheme as specified by [9] or a special token indicating a provisioned announcement sequence. We expect the URL to be one of the following schemes.
- http
- ftp
- file (referencing a local or nfs (RFC 2224) location)

If a provisioned announcement sequence is to be played the value of prompt-url will have the following form:
prompt-url = "/provisioned/" announcement-id

announcement-id = 1*(ALPHA | DIGIT)

This document is strictly focused on the SIP interface for the announcement service and as such does not detail how announcement sequences are provisioned or defined.

7. Security Considerations

Untrusted network elements could use the protocol described here for providing information services. Many extant billing arrangements are for completed calls. Successful call completion occurs with a 2xx result code.
8. References

1  Bradner, S., "The Internet Standards Process -- Revision 3", BCP 9, RFC 2026, October 1996.


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9. Changes Made in Version 01
   o Added duration, repeat, delay, locale and variable parameters.
   o Added the ability to reference a provisioned announcement.
   o Made early media treatment the default behavior for the service.
   o 487 REQUEST TERMINATED replaces 486 BUSY HERE as the media server's final response when early media treatment is desired.

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    We would like to thank Kevin Summers and Ravindra Kabre of Sonus Networks for their constructive comments.

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