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SIP URI Conventions for Media Servers

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1. Abstract

Application Servers, SIP Proxies, and SoftSwitches (a.k.a. Media Gateway Controllers) act as SIP [2] User Agents to control the media processing capabilities of media servers. The SIP Request URI identifies the desired service and provides a context for the media server to interpret the SIP message. This document describes a standard SIP addressing mechanism to address specific services. Because of SIP's flexibility, the existing protocol accommodates these services. This document proposes a standard URI scheme for important media services such as announcements and conferencing.

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 [3].

FORMATTING NOTE: Notes, such at this one, provide additional, nonessential information that the reader may skip without missing anything essential. The primary purpose of these non-essential notes is to convey information about the rationale of this document, or to place this document in the proper historical or evolutionary context. Readers whose sole purpose is to construct a conformant implementation may skip such information. However, it may be of use to those who wish to understand why we made certain design choices.

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3. Overview

Media servers are devices that perform media processing on real-time packet media. Examples of such processing are tone detection and generation, packet recording (usually with transcoding), packet playing (usually with transcoding - also known as prompting), and mixing (also known as conferencing).

These services are of general utility to a wide array of SIP UA's including application servers, softswitches and proxy servers. In addition, the behaviors and semantics of these services are well understood. For these reasons, it is both desirable and possible to create standard SIP interfaces for these services.

4. Service Definition

A service is a set of related media processing features with a well-defined set of properties. The defining properties of a service are its SIP URI signature, the MIME types it accepts and any SUBSCRIBE/NOTIFY [4] event packages it supports. The SIP URI signature consists of the service indicator, instance ID and any associated URI parameters.

Services MUST have a unique SIP URI signature. Services MAY offer support for MIME types other than "application/sdp" and SUBSCRIBE/NOTIFY event packages if required to implement service features.

In the context of SIP control of media servers, we take advantage of the fact that the standard SIP URI has a user part [2]. Media processing services may be thought of as user automatons that participate in SIP sessions. It naturally follows that the user address, or the left-hand-side of the URI, should be utilized as a service indicator.

Media servers commonly offer multiple services at a single host address. Use of the user part as a service indicator enables service consumers to direct their requests without ambiguity. It has the added benefit of enabling media services to register their availability with SIP Registrars just as any "real" SIP user would. This maintains consistency and provides enhanced flexibility in the deployment of media services in the network.

For per-service security, the media server MAY use any of the security protocols described in [2].

Following [2], the media server MAY issue 401 challenges for authentication.

The media server, upon receiving the INVITE, notes the service indicator. Depending on the service indicator, the media server will either honor the request or return a failure response code.

5. Service Indicators and URI Signatures

The service indicator is the concatenation of the service name and an optional service instance identifier, separated by an equal sign. The service name MAY be modified by an optional service namespace.

There has been much discussion about the potential for confusion if media services URIs are not readily distinguishable from other types

of SIP UA's. The use of a service namespace provides a mechanism to unambiguously identify standard interfaces while not constraining the development of private or experimental services.

It is proposed that standard services, such as the announcement and conferencing services described here, be registered with IANA using the "org.iana" service namespace.

Service developers MAY use a service namespace other than "org.iana" for private or experimental services.

Per [2], the service indicator is case insensitive. The service name MUST be from the set alphanumeric characters plus dash (US-ASCII %2C). The service name MUST NOT include an equal sign (US-ASCII %3C).

The service name MAY have long- and short-forms, as SIP does for headers.

A given service indicator MAY have an associated set of parameters. Such parameters MUST follow the convention set out in [2] for SIP URI parameters. That is, a semi-colon separated list of keyword=values.

Certain services may have an association with a unique service instance on the media server. For example, a given media server can host multiple, separate conference sessions. To identify unique service instances, a unique identifier modifies the service name. The unique identifier MUST meet the rules for a legal user part of a SIP URI as set out in [2]. An equal sign, US-ASCII %3D, MUST separate the service indicator from the unique identifier.

Note that since the service indicator is case insensitive per [2], the service instance identifier is also case insensitive.

6. Operation

The requesting client issues a SIP INVITE to the media server, specifying the requested service and any appropriate parameters.

If the media server can perform the requested service, it does so, following the processing steps described in the service definition document (see IANA Considerations, below).

If the media server cannot perform the requested service or does not recognize the service indicator, it MUST respond with the response code 488 NOT ACCEPTABLE HERE. This is appropriate, as 488 refers to

a problem with the user part of the URI. Moreover, 606 is not appropriate, as some other media server may be able to satisfy the request. [2] describes the 488 and 606 response codes.

Some services require a unique identifier. Most services automatically create a service instance upon the first INVITE with the given identifier. However, if a service requires an existing service instance, and no such service instance exists on the media server, the media server MUST respond with the response code 404 NOT

FOUND. This is appropriate as the service itself exists on the media server, but the particular service instance does not. It is as if the user was not home.

7. Formal Syntax

The following syntax specification uses the augmented Backus-Naur Form (BNF) as described in RFC-2234 [6].

```
SERVICE-URL     = "sip:" [srvc-namespace] srvc-ind "@" hostport
                        url-parameters [headers]

srvc-namespace  = ("org.iana" "." | 1*nmspc-part)

nmspc-part      = 1*(ALPHA | DIGIT) "."

srvc-ind        = srvc-name [ "=" instanceId ]

srvc-name       = "annc" | "conf" | token

instanceId      = token
```

Section 2 of [2] defines the elements hostport and token. See the IANA Considerations section for procedures for adding new service indicators.

8. Security Considerations

The security issues are the same as for SIP [2], as the media server is simply a SIP User Agent.

9. IANA Considerations

This document describes an extensible set of SIP Media Server Service Indicator types. To promote interoperability and coherent

interpretations of different types, we need a central repository for well-known service indicator types.

IANA will create a repository for service indicator types called "SIP Media Server Service Indicator Types". Following the policies outlined in [7], this repository is "Specification Required by RFC." The documents [8] and [10] describe the initial values for the repository. For reference, the values are as follows.

NOTE: Drafts describing service indicators for conferencing, transcoding and IVR are currently being developed.

SIP Media Server Service Indicator Types

Value	Meaning	Parameter	Values	Reference
annc	Announcement Service			draft-burger-sipping-netann-01.txt
		play=	URI or provisioned sequence identifier	
		early=	("yes" | "no")	
		repeat=	Integer, number of repetitions	
		delay=	Integer, delay between repetitions	
		duration=	Integer, max. prompt duration	
		locale=	Language and country codes	
		param[n]=	Variable values to be substituted in a sequence	
conf	Conference Service			
		<none>		

10. Examples

These examples are informative. For the normative definitions of the given services, see the referenced documents.

NOTE: The line wrapping (backslash, CRLF, and spacing before continued lines) in the examples is for readability purposes only.

10.1. Announcement

The document [8] fully specifies the announcement service. In brief, the announcement service can play a prompt as early media or

after the establishment of a connection.

The announcement service indicator is "annc". The service has several associated parameters that control the content and delivery of the announcement.

In the following example, the media server at ms2.carrier.net retrieves an audio file using HTTP [9] from the server prompts.carrier.net and plays it as early media.

```
     sip:annc@ms2.carrier.net; \
       play="http://prompts.carrier.net/audio/allcircuitsbusy.g711";
\
       early=yes
```


10.2. Conference

The conference service creates a conference upon the first instance of a unique service instance identifier. The media server places subsequent requests with the same service instance identifier into a conference.

The conference service indicator is "conf". There are no parameters for the conference service.

In the following example, the media server at ms2.carrier.net creates (or places into conference) the stream associated with the SDP in the INVITE to the conference identified by the identifier "q4unfcqdscQS".

```
     sip:conf=q4unfcqdscQS@ms2.carrier.net
```

NOTE: A draft describing the conference service in detail is in progress.

11. References

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

2 Handley, M., Schulzrinne, H., Schooler, E., Rosenberg, J., "SIP: Session Initiation Protocol", draft-ietf-sip-rfc2543bis-03.txt, May 2001, work in progress.

3 Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

4 Roach, A., "SIP-Specific Event Notification, "draft-ietf-sip-events-01.txt, November 2001, work in progress.

6 Crocker, D. and Overell, P.(Editors), "Augmented BNF for Syntax Specifications: ABNF", RFC 2234, November 1997.

7 Alvestrand, H. and Narten, T., "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 2434, October 1998.

8 O'Connor, W., Burger, E., "Network Announcements with SIP", draft-burger-sipping-netann-01.txt, November 2001, work in progress.

9 Fielding, R., Gettys, D., Mogul, J., Frystyk, H., Masinter, L., Leach, P., and Berners-Lee, T., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999.

12. Changes Made in Version 01

- **Added additional explanatory text to explain motivations for** use of service indicators and benefits of the proposed format.
- Updated description of the announcement service to be consistent with draft-burger-sipping-netann-01.txt.
- Proposed an option for implementing a namespace for service indicators.

13. Acknowledgments

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