EXHIBIT K

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M. Handley
ACIRI
H. Schulzrinne
Columbia U.
E. Schooler
Cal Tech
J. Rosenberg
Bell Labs
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SIP: Session Initiation Protocol

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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IESG Note

The IESG intends to charter, in the near future, one or more working groups to produce standards for "name lookup", where such names would include electronic mail addresses and telephone numbers, and the result of such a lookup would be a list of attributes and characteristics of the user or terminal associated with the name. Groups which are in need of a "name lookup" protocol should follow the development of these new working groups rather than using SIP for this function. In addition it is anticipated that SIP will migrate towards using such protocols, and SIP implementors are advised to monitor these efforts.

Abstract

The Session Initiation Protocol (SIP) is an application-layer control (signaling) protocol for creating, modifying and terminating sessions with one or more participants. These sessions include Internet multimedia conferences, Internet telephone calls and multimedia distribution. Members in a session can communicate via multicast or via a mesh of unicast relations, or a combination of these.

SIP invitations used to create sessions carry session descriptions which allow participants to agree on a set of compatible media types. SIP supports user mobility by proxying and redirecting requests to the user's current location. Users can register their current location. SIP is not tied to any particular conference control protocol. SIP is designed to be independent of the lower-layer transport protocol and can be extended with additional capabilities.

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redirect server maintains transaction state for the whole SIP transaction. It is up to the client to detect forwarding loops between redirect servers.

12.2 User Agent Server

User agent servers behave similarly to redirect servers, except that they also accept requests and can return a response of class 2xx.

12.3 Proxy Server

This section outlines processing rules for proxy servers. A proxy server can either be stateful or stateless. When stateful, a proxy remembers the incoming request which generated outgoing requests, and the outgoing requests. A stateless proxy forgets all information once an outgoing request is generated. A forking proxy SHOULD be stateful. Proxies that accept TCP connections MUST be stateful.

> Otherwise, if the proxy were to lose a request, the TCP client would never retransmit it.

A stateful proxy SHOULD NOT become stateless until after it sends a definitive response upstream, and at least 32 seconds after it received a definitive response.

A stateful proxy acts as a virtual UAS/UAC. It implements the server state machine when receiving requests, and the client state machine for generating outgoing requests, with the exception of receiving a 2xx response to an INVITE. Instead of generating an ACK, the 2xx response is always forwarded upstream towards the caller. Furthermore, ACK's for 200 responses to INVITE's are always proxied downstream towards the UAS, as they would be for a stateless proxy.

A stateless proxy does not act as a virtual UAS/UAC (as this would require state). Rather, a stateless proxy forwards every request it receives downstream, and every response it receives upstream.

12.3.1 Proxying Requests

To prevent loops, a server MUST check if its own address is already contained in the Via header field of the incoming request.

The To, From, Call-ID, and Contact tags are copied exactly from the original request. The proxy SHOULD change the Request-URI to indicate the server where it intends to send the request.