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## The Reason Header Field for the Session Initiation Protocol (SIP)

### 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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### Abstract

For creating services, it is often useful to know why a Session Initiation Protocol (SIP) request was issued. This document defines a header field, Reason, that provides this information. The Reason header field is also intended to be used to encapsulate a final status code in a provisional response. This functionality is needed to resolve the "Heterogeneous Error Response Forking Problem", or HERFP.

## Table of Contents

1.	Introduction .....	2
1.1.	Terminology .....	3
2.	The Reason Request Header Field .....	3
3.	Examples .....	4
3.1.	Call Completed Elsewhere .....	4
3.2.	Refusing an Offer that Comes in a Response .....	4
3.3.	Third Party Call Control .....	5
3.4.	ISUP interworking .....	5
4.	IANA Considerations .....	6
5.	Security Considerations .....	6
6.	Acknowledgments .....	7
7.	Authors' Addresses .....	7
8.	Normative References .....	7
9.	Full Copyright Statement .....	8

## 1. Introduction

The same SIP [1] request can be issued for a variety of reasons. For example, a SIP CANCEL request can be issued if the call has completed on another branch or was abandoned before answer. While the protocol and system behavior is the same in both cases, namely, alerting will cease, the user interface may well differ. In the second case, the call may be logged as a missed call, while this would not be appropriate if the call was picked up elsewhere.

Third party call controllers sometimes generate a SIP request upon reception of a SIP response from another dialog. Gateways generate SIP requests after receiving messages from a different protocol than SIP. In both cases the client may be interested in knowing what triggered the SIP request.

SIP responses already offer a means of informing the user of why a request failed. The simple mechanism in this document accomplishes something roughly similar for requests.

An INVITE can sometimes be rejected not because the session initiation was declined, but because some aspect of the request was not acceptable. If the INVITE forked and resulted in a rejection, the error response may never be forwarded to the client unless all the other branches also reject the request. This problem is known as the "Heterogeneous Error Response Forking Problem", or HERFP. It is foreseen that a solution to this problem may involve encapsulating the final error response in a provisional response. The Reason header field is a candidate to be used for such encapsulation.

Initially, the Reason header field defined here appears to be most useful for BYE and CANCEL requests, but it can appear in any request within a dialog, in any CANCEL request and in any response whose status code explicitly allows the presence of this header field.

Note that the Reason header field is usually not needed in responses because the status code and the reason phrase already provide sufficient information.

Clients and servers are free to ignore this header field. It has no impact on protocol processing.

## 1.1 Terminology

In this document, the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in BCP 14, RFC 2119 [2] and indicate requirement levels for compliant SIP implementations.

## 2. The Reason Header Field

The Reason header field MAY appear in any request within a dialog, in any CANCEL request and in any response whose status code explicitly allows the presence of this header field. The syntax of the header field follows the standard SIP parameter syntax.

```
Reason           = "Reason" HCOLON reason-value *(COMMA reason-value)
reason-value     = protocol *(SEMI reason-params)
protocol         = "SIP" / "Q.850" / token
reason-params    = protocol-cause / reason-text
                  / reason-extension
protocol-cause   = "cause" EQUAL cause
cause            = 1*DIGIT
reason-text      = "text" EQUAL quoted-string
reason-extension = generic-param
```

The following values for the protocol field have been defined:

SIP: The cause parameter contains a SIP status code.

Q.850: The cause parameter contains an ITU-T Q.850 cause value in decimal representation.

Examples are:

```
Reason: SIP ;cause=200 ;text="Call completed elsewhere"
Reason: Q.850 ;cause=16 ;text="Terminated"
Reason: SIP ;cause=600 ;text="Busy Everywhere"
Reason: SIP ;cause=580 ;text="Precondition Failure"
```

Proxies generating a CANCEL request upon reception of a CANCEL from the previous hop that contains a Reason header field SHOULD copy it into the new CANCEL request.

In normal SIP operation, a SIP status code in a response provides the client with information about the request that triggered the response, the session parameters, or the user. For example, a 405 (Method not allowed) response indicates that the request contained an unsupported method. A 488 (Not Acceptable Here) indicates that the session parameters are unacceptable and a 486 (Busy Here) provides information about the status of the user.

Any SIP status code MAY appear in the Reason header field of a request. However, status codes that provide information about the user and about session parameters are typically useful for implementing services whereas status codes intended to report errors about a request are typically useful for debugging purposes.

A SIP message MAY contain more than one Reason value (i.e., multiple Reason lines), but all of them MUST have different protocol values (e.g., one SIP and another Q.850). An implementation is free to ignore Reason values that it does not understand.

### 3. Examples

This section contains a number of examples that illustrate the use of the Reason header field.

#### 3.1 Call Completed Elsewhere

A proxy forks an INVITE request and one of the branches returns a 200 (OK). The forking proxy includes this status code in a Reason header field in the CANCEL request that it sends to the rest of the branches.

#### 3.2 Refusing an Offer that Comes in a Response

A client sends an empty INVITE and receives an unacceptable offer in a 200 (OK) response. The client sends an ACK with a correctly formatted answer and immediately sends a BYE to terminate the

session. The client includes a 488 (Not Acceptable Here) status code in a Reason header field.

### 3.3 Third Party Call Control

The third party call controller of figure 1 tries to establish a session between A and B. However, user B is busy. The controller sends a BYE with the status code 486 (Busy Here) in a Reason header field.

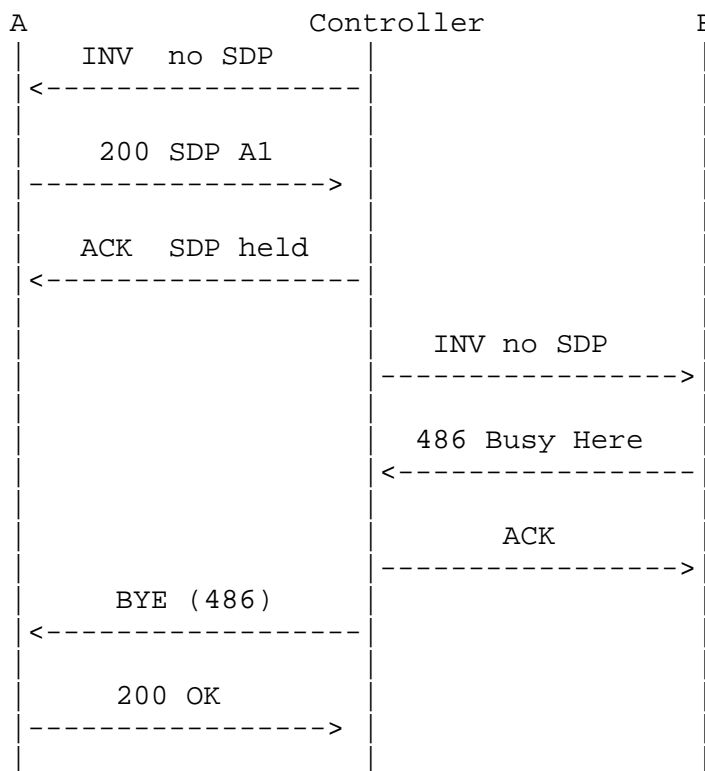


Figure 1: Third Party Call Control

### 3.4 ISUP interworking

The PSTN gateway of figure 2 generates an INVITE that has to be CANCELED when a REL (release) message is received from the ISUP side. The CANCEL request contains the Q.850 cause value (16 Normal Call Clearing) of the REL message.

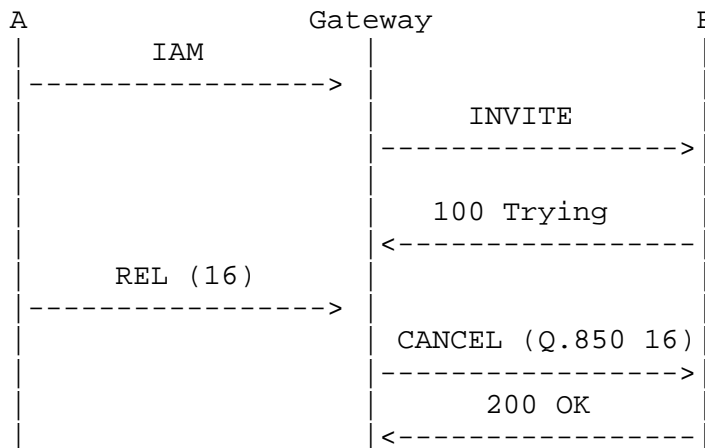


Figure 2: ISUP Interworking

#### 4. IANA Considerations

This document defines a new SIP header field, "Reason", according to Section 27 of RFC 3261.

Protocol values (and their associated protocol cause) to be used with this header field are registered by the IANA into a new sub-registry under <http://www.iana.org/assignments/sip-parameters>, labeled "Reason Protocols". Reason protocols MUST refer to either an ITU-T Recommendation number, an IETF protocol name or the recognized protocol identifier from another standardization organization. Protocol cause describes the source of the 'cause' field in the Reason header field.

The only entries in the registry for the time being are:

Protocol Value	Protocol Cause	Reference
-----	-----	-----
SIP	Status code	RFC 3261
Q.850	Cause value in decimal representation	ITU-T Q.850

#### 5. Security Considerations

Spoofing or removing the Reason header field from a response in a HERFP scenario can make it impossible for a client to update properly its previous request, making therefore session establishment impossible. Thus, it is RECOMMENDED that this header field is protected by a suitable integrity mechanism.

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## 6. Acknowledgments

Jonathan Rosenberg, Rohan Mahy and Vijay K. Gurbani provided helpful comments and suggestions.

## 8. Normative References

- [1] Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M. and E. Schooler, "SIP: Session Initiation Protocol", RFC 3261, June 2002.
- [2] Bradner, S., "Key words for use in RFCs to indicate requirement levels," BCP 14, RFC 2119, March 1997.

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