

SIP Message Manipulation

Version 7.2

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Notice

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Abbreviations and Terminology

Each abbreviation, unless widely used, is spelled out in full when first used.

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1 Introduction

This document provides a reference guide with examples for configuring SIP message manipulation rules in the Message Manipulation table. It describes each field in the table and the supported syntax.

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2 Message Manipulation Table Fields

SIP Message Manipulation is configured in the Message Manipulations table (**Setup** menu > **Signaling & Media** tab > **Message Manipulation** folder > **Message Manipulations**). The figure below shows an example of SIP Message Manipulation rules in the table.

Figure 2-1: Message Manipulations Table

INDEX	NAME	MANIPULATION SET ID	MESSAGE TYPE	CONDITION	ACTION SUBJECT	ACTION TYPE	ACTION VALUE	ROW ROLE
0	Add.com	1	invite.response.200		header.to.url.user	Add Prefix	'.com'	Use Current Condition
1	From userpart to	1	invite.response.200		header.from.url.user	Modify	header.p-asserted-idx	Use Current Condition
2	From = "Unknown"	2	invite.request	header.from.url.user	header.from.url.user	Modify	param.jpg.src.user	Use Current Condition

This section describes the fields in the Message Manipulations table and the syntax used for entering their values:

- Manipulation Set ID – see Section 2.1 on page 11
- Message Type – see Section 2.2 on page 12
- Condition – see Section 2.3 on page 13
- Action - See Section 2.4 on page 14
 - Action Subject
 - Action Type
 - Action Value
- Row Rule – see Section 2.5 on page 15

2.1 Manipulation Set ID

The 'Manipulation Set ID' field enables you to group message manipulation rules that you have defined. Once you have defined manipulation rules and associated them with a specific Manipulation Set ID, you **must** assign this ID to the relevant IP Group in the IP Group table, where they can be assigned to either the inbound (Inbound Message Manipulation Set) or outbound (Outbound Message Manipulation Set) leg.

Syntax:

<0-19>

where:

- <0-19> specifies the Manipulation Set ID.

2.2 Message Type

The following syntax determines the type of message to which the manipulation rule refers.

Syntax:

```
<SIP-method/any> . <request/response/any> . <response-type>
```

where:

- **<SIP-method/any>** specifies the SIP method used with the option to specify requests of all method types.
- **<request/response/any>** specifies the SIP request or SIP response type with the option to specify any request or response type.
- **<response-type>** specifies the SIP response type. You can also use the 'x' wildcard to denote multiple response types:
 - To denote all SIP 18x responses (e.g., 180, 181, 182 and 183), use the following syntax: 18x
 - To denote all response types belonging to a specific response group (i.e., 1xx for provisional, 2xx for successful, 3xx for redirection, 4xx for client failure, 5xx for server failure, and 6xx for global failure responses), use two 'x' wildcards instead of the last two digits of the response: <first digit of response group>xx (e.g., 1xx)

The following table provides examples of different message types.

Table 2-1: Message Type Examples

Message Types	Description
invite.request	INVITE requests
invite.response.200	INVITE 200 responses only
register.response.2xx	All 2xx responses for REGISTER
invite.response.18x	All 18x responses for INVITE
subscribe.request	All SUBSCRIBE requests
subscribe.response	All SUBSCRIBE responses
reinvite.request	re-INVITE requests
any.request	Requests of all method types, where any is a keyword.
any.response.200	All 200 responses for all method types, where any is a keyword.
invite	Requests and responses of INVITE method.
<empty>	All request and responses for all method types.
info.any	All INFO requests and responses.
privatel.request	All requests with method 'private1'.

2.3 Condition

The 'Condition' field is used to test specific parts of the header in the message with specified values. Conditions may be combined with other conditions using logical operators (and/or).

Syntax:

```
<subject> <operand> <value>
```

where:

- **<subject>** specifies the subject of the condition using the following format:
header/body/parameter
- **<operand>** specifies the operand of the condition using the following format:
condition-operand
- **<value>** specifies the value of the condition using the following format:
string/header/body/parameter/random/variable/regex

The following table provides various examples of different conditions.

Table 2-2: Condition Examples

Condition	Description
header.expires.time < '88888'	Returns true if expires time is less than '88888'.
header.user-agent contains 'Android-VMAS' OR header.user-agent contains 'MP252'	Returns true if the user agent is 'Android-VMAS' or 'MP252'.
param.message.sdp.address == '10.132.10.101'	Returns true if the "c=" line contains the given IP address.
header.request-uri.methodtype=='415'	Returns true if the message method type is '415'.
header.diversion.0 regex (<.*>(;urlparam=[a-z]*)(.*>)	Returns true if the REGEX engine matches urlparam=<specific value>.

2.4 Action

The following describes the syntax of the 'Action' field:

Syntax:

```
<Action Subject>
```

where:

- **<Action Subject>** specifies the message component upon which you wish to manipulate, using the following format:
header/body/variable

Syntax:

```
<Action Type>
```

where:

- **<Action Type>** specifies the type of action you wish to perform on the message component, using the following format:
action-operand

Syntax:

```
<Action Value>
```

where:

- **<Action Value>** specifies the value to assign to the Action Type and Action Subject, using the following format:
string/header/body/parameter/random/variable/regex

The following table provides various example actions.

Table 2-3: Action Examples

Action Subject	Action Type	Action Value	Description
header.cust omername	Add	'Audiocode s'	Adds the "customername" header to the message with a value of "Audiocodes".
header.cust omername	Delete		Deletes the header "customername" from the message.
var.global. 0	Modify	header.use r- agent.cont ent	Stores the content of the User-agent header in a global variable. Note, the Modify action is executed on the variables (not the Add action).
header.cont act.param.c ompany	Add	'audiocode s'	Adds a parameter "company" to a Contact header and assigns the value "Audiocodes" to it.

2.5 Row Rule

The 'Row Rule' field determines which Condition (configured in the 'Condition' field) the rule uses. The rule can use the Condition configured for the rule itself or the Condition configured for a previous rule. Using the Condition of a previous rule allows you to configure multiple manipulation rules using the same condition.

- [0] Use Current Condition = (Default) The Condition configured for the rule itself (i.e., in the same table row) is used.
- [1] Use Previous Condition = The Condition configured in the first (closest) table row above the rule that is configured to **Use Current Condition** is used. For example, if Index 3 is configured to **Use Current Condition** and Index 4 and 5 are configured to **Use Previous Condition**, Index 4 and 5 use the condition configured for Index 3. The following figure shows a configuration example where Index 1 and 2 ('Row Rule' configured to **Use Previous Condition**) use the condition configured for Index 0 ('Row Rule' configured to **Use Current Condition**):

Figure 2-2: Configuration Example for Message Manipulation Rules using Same Condition

INDEX	NAME	MANIPULATION SET ID	MESSAGE TYPE	CONDITION	ACTION SUBJECT	ACTION TYPE	ACTION VALUE	ROW ROLE
0	To header for urgent	0	invite.request	header.request-uri.url.U	header.to	Modify	header.to + ";urgent=1"	Use Current Condition
1	Add emergency	0			header.priority	Add	'emergency'	Use Previous Condition
2	User-agent	0			header.user-agent	Modify	'trunk-a'	Use Previous Condition



Note: When configured to **Use Previous Condition**, the 'Message Type' and 'Condition' fields are not applicable and if configured are ignored.

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3 Detailed Field Syntax

This section describes the detailed syntax usage of the fields in the Message Manipulations table. The following syntax is described:

- **Condition Operands** – see Section 3.1 below.
- **Action Operands** – see Section 3.2 on page 18.
- **Strings** – see Section 3.3 on page 18.
- **Headers** – see Section 3.4 on page 19.
- **Body** – see Section 3.5 on page 28.
- **Parameters** – see Section 3.6 on page 29.

3.1 Condition Operands

The following table describes the condition operands.

Table 3-1: Condition Operands

Condition Operand	Description
== / !=	Tests for equivalent / not equivalent values.
>= / <=	Tests for greater than or equal to / less than or equal to values.
> / <	Tests for greater than / less than values.
contains / !contains	Tests a string containing / not containing specified text.
exists / !exists	Tests whether a parameter exists / does not exist.
suffix / prefix	Tests whether a string has a particular suffix / prefix.
len> / len< / len==	Tests whether the length of a string is greater than / less than / equal to a specific value.
regex	Tests whether a string matches the given regular expression.

3.2 Action Operands

The following table describes the action operands.

Table 3-2: Action Operands

Action Operand	Description
Add	Adds entities to a message.
Remove	Removes entities from a message.
Modify	Modifies parts of a header or SDP.
Add Prefix	Adds a string prefix to part of a header.
Add Suffix	Adds a string suffix to part of a header.
Remove Prefix	Removes a string prefix from part of a header.
Remove Suffix	Removes a string suffix to part of a header.

3.3 Strings

The string type is the most basic of all syntax types. A string is a series of characters enclosed by single apostrophe. It can be used as the value for the following Message Manipulation table fields:

- Condition
- Action Value

The following table provides configuration examples for using strings in the Message Manipulations table.

Table 3-3: Examples of Using Strings

Message Type	Condition	Action Subject	Action Type	Action Value
invite.request	header.user-agent.content contains 'X-Lite'	header.use r-agent.co ntent	Modify	'anonymous UA'
invite.request	header.from.url.use r=='101;ext=7166'	header.use r-agent.co ntent	Modify	'anonymous UA'

3.4 Headers

This section describes the syntax used for SIP headers in the Message Manipulations table.

Syntax:

```
header.<header-name>.<header-index>.<sub-type>
```

where:

- **<header-name>** specifies the header name as it arrives in the message. For example: From, To, Contact (not case sensitive).
- **<header-index>** refers to a specific header, in the event where more than one header of the same type is present in the message. The index starts at 0, therefore in order to refer to the first header in the list, the header-index value should be 0. For example, *header.contact.2* would refer to the third header in the list.
If **<header-index>** is not specified; however, a **<sub-type>** exists, then the sub-type would reference the first header in the list, i.e. *header.contact.url.user* is identical to *header.contact.0.url.user*.
If both **<header-index>** and **<sub-type>** are not specified, then the subject would refer to all headers of this type. For example, to remove or modify all headers of a specific type, refer to the header as *header.contact*.
- **<sub-type>** specifies a specific part of the message. For example, url.user, url.host etc.



Note: The SIP Group Name (IPGroup_SIPGroupName) parameter of the IP Group table overrides inbound message manipulation rules that manipulate the host name in Request-URI, To, and/or From SIP headers. If you configure a SIP Group Name for an IP Group and you want to manipulate the host name in these SIP headers, you must apply your manipulation rule (Manipulation Set ID) to the IP Group as an Outbound Message Manipulation Set (IPGroup_OutboundManSet), when the IP Group is the destination of the call. If you apply the Manipulation Set as an Inbound Message Manipulation Set (IPGroup_InboundManSet), when the IP Group is the source of the call, the manipulation rule is overridden by the SIP Group Name.

3.4.1 Detailed Header Syntax

The table below describes the syntax to manipulate the various SIP headers:

Table 3-4: Syntax for Manipulating SIP Headers

SIP Header	Attribute to Manipulate	Manipulation Syntax	Example
Accept	Header itself	header.accept	
Accept-Language	Header itself	header.accept-language	
Allow	Header itself	header.allow	
Call-Id	Header itself	header.call-id	
	Specific ID	header.call-id.id	
Contact	Header itself	header.contact	
	Expires	header.contact.expires	

SIP Header	Attribute to Manipulate	Manipulation Syntax	Example	
	Globally Routable UA URI (GRUU) contact	<code>header.contact.gruucontact</code>		
	Enable GRUU	<code>header.contact.isgruu</code>		
	Name	<code>header.contact.name</code>		
	Parameter	<code>header.contact.param</code>		
	URL	<code>header.contact.url.<url></code> Where <code><url></code> can be:		
		<ul style="list-style-type: none"> ▪ type: Defines the type of URL: <ul style="list-style-type: none"> ✓ 1: Indicates a SIP URI (sip:) ✓ 2: Indicates a SIP Tel URI (tel:) ✓ 3: Indicates a fax URI (fax:) ✓ 4: Indicates a SIPS URI (sips:) 		<code>header.contact.url.type == '1'</code>
		<ul style="list-style-type: none"> ▪ host: Indicates host part. The host by itself includes both domain name/IP address and port, e.g., 10.33.2.6:5070. However, you can indicate only the name/IP address or only the port: <ul style="list-style-type: none"> ✓ name: Indicates the host name ✓ port: Indicates the port 		<code>header.contact.url.host.port</code>
		<ul style="list-style-type: none"> ▪ mhost: Indicates the SIP 'maddr' parameter (see RFC 3261) 		
		<ul style="list-style-type: none"> ▪ userphone: Indicates the SIP 'user=phone' parameter (the tel URI). (See Note below.) 		<code>header.contact.url.userphone</code>
		<ul style="list-style-type: none"> ▪ looseroute: Indicates loose routing parameter ('lr') according to the Record-Route set (see Note below) 		
		<ul style="list-style-type: none"> ▪ user: Indicates the user part of the URI (string) 		<code>header.contact.url.user == '401'</code>
<ul style="list-style-type: none"> ▪ transporttype: <ul style="list-style-type: none"> ✓ 0: UDP ✓ 1: TCP ✓ 2: TLS ✓ 3: SCTP 			<code>header.contact.url.transporttype == '0'</code>	
<ul style="list-style-type: none"> ▪ param: Indicates a SIP parameter for the URI (can add, for example) 			<code>header.contact.url.param.subject</code>	
	<p>Notes:</p> <ul style="list-style-type: none"> ▪ For type, host, mhost, userphone, looseroute, user, and transporttype, the 'Action Type' field must be set to Modify. ▪ For userphone and looseroute, configure the rule with the 'Action Value' field set to '0' (to remove) or '1' (to add). 			
Cseq	Header itself	<code>header.cseq</code>		
	Number	<code>header.cseq.num</code>	<code>header.cseq.num == '1'</code>	

SIP Header	Attribute to Manipulate	Manipulation Syntax	Example
	Type	<code>header.cseq.type</code>	
Diversion	Header itself	<code>header.diversion</code>	
	Name	<code>header.diversion.name</code>	
	Parameter	<code>header.diversion.param</code>	
	Privacy - 1 (full) / 2 (off)	<code>header.diversion.privacy</code>	<code>header.diversion.privacy== '1'</code>
	Reason (enum)	<code>header.diversion.reason</code>	
	Screen – yes / no	<code>header.diversion.screen</code>	
	URL (see URL for Contact header)	<code>header.diversion.url</code>	
Event	Header itself	<code>header.event</code>	
	Event Key ID Event package	<code>header.event.eventkey</code> <code>header.event.eventkey.id</code> <code>header.event.eventkey.eventpackage</code>	
	Parameter	<code>header.event.param</code>	<code>header.event.param.itsp-abc</code>
Expires	Header itself	<code>header.expires</code>	
	Expiry time	<code>header.expires.time</code>	
From	Header itself	<code>header.from</code>	
	Name	<code>header.from.name</code>	
	Remove quotation marks surrounding display name	<code>header.from.quotecontrol</code> The 'Action Value' field must be set to '0'.	
	Parameter	<code>header.from.param</code>	<code>header.from.param.pl</code>
	Tag	<code>header.from.tag</code>	
	URL (see URL for Contact header)	<code>header.from.url</code>	<code>header.from.url.user != '654'</code>
History-Info	Header itself	<code>header.history-info</code>	
Max-Forwards	Header itself	<code>header.max-forwards</code>	
	Value	<code>header.max-forwards.val</code>	
Min-Se and Min-Expires	Header itself	<code>header.min-se</code> <code>header.min-expires</code>	
	Parameter	<code>header.min-expires.param</code>	

SIP Header	Attribute to Manipulate	Manipulation Syntax	Example
	Time	<code>header.min-expires.time</code>	
P-Asserted-Identity	Header itself	<code>header.p-asserted-identity</code>	
	Name (string)	<code>header.p-asserted-identity.name</code>	
	URL (see URL for Contact header)	<code>header.p-asserted-identity.url</code>	<code>header.p-asserted-identity.url.host</code>
P-Associated-URI	Header itself	<code>header.p-associated-uri</code>	
	Name (string)	<code>header.p-associated-uri.name</code>	
	Parameter	<code>header.p-associated-uri.param</code>	
	URL (see URL for Contact header)	<code>header.p-associated-uri.url</code>	
P-Called-Party-ID	Header itself	<code>header.p-called-party-id</code>	
	Name (string)	<code>header.p-called-party-id.name</code>	
	Parameter	<code>header.p-called-party-id.param</code>	<code>header.p-called-party-id.param.pl</code>
	URL (see URL for Contact header)	<code>header.p-called-party-id.url</code>	
P-Charging-Vector	Header itself	<code>header.p-charging-vector</code>	
P-Preferred-Identity	Header itself	<code>header.p-preferred-identity</code>	
	Name (string)	<code>header.p-preferred-identity.name</code>	
	URL (see URL for Contact header)	<code>header.p-preferred-identity.url</code>	
Privacy	Header itself	<code>header.privacy</code>	
	Privacy types	<code>header.privacy.privacy.<type></code> where <type> can be: <ul style="list-style-type: none"> ▪ none ▪ header ▪ session ▪ user ▪ critical ▪ identity ▪ history 	<code>header.privacy.privacy.user</code>
Proxy-Require	Header itself	<code>header.proxy-require</code>	
	SIP Capabilities	<code>header.proxy-require.<capability></code> where <capability> can be: <ul style="list-style-type: none"> ▪ earlymedia ▪ reliableresponse 	<code>header.proxy-require.earlymedia</code>

SIP Header	Attribute to Manipulate	Manipulation Syntax	Example
		<ul style="list-style-type: none"> ▪ timer ▪ earlysession ▪ privacy ▪ replaces ▪ history ▪ unknown ▪ gruu ▪ resourcepriority ▪ targetdialog ▪ sdpanat 	
Reason	Header itself	<code>header.reason</code>	
	Reason types	<code>header.reason.reason.<type></code> where <type> can be: <ul style="list-style-type: none"> ▪ reason ▪ cause ▪ text 	<code>header.reason.reason.reason</code>
	MLPP: Type: Preemption (0), MLPP (1) cause	<code>header.reason.mlpp</code>	
Referred-By	Header itself	<code>header.referred-by</code>	
	Parameter	<code>header.referred-by.param</code>	<code>header.referred-by.param.pl</code>
	URL (see URL for Contact header)	<code>header.referred-by.url</code>	<code>header.referred-by.url.host</code>
Refer-To	Header itself	<code>header.refer-to</code>	
Remote-Party-ID	Header itself	<code>header.remote-party-id</code>	
	Counter	<code>header.remote-party-id.counter</code>	
	Name	<code>header.remote-party-id.name</code>	
	Number Plan	<code>header.remote-party-id.numberplan</code> where <numberplan> can have the following value: <ul style="list-style-type: none"> ▪ 1: ISDN ▪ 3: Data ▪ 4: Telex ▪ 8: National ▪ 9: Private ▪ 15: Reserved 	
	Number Type	<code>header.remote-party-id.numbertype</code>	
	Parameter	<code>header.remote-party-id.param</code>	
	Privacy (see	<code>header.remote-party-id.privacy</code>	

SIP Header	Attribute to Manipulate	Manipulation Syntax	Example
	Privacy header for description)		
	Reason types	header.remote-party-id.reason.<type> where <type> can be: <ul style="list-style-type: none"> ▪ busy ▪ immediate ▪ no answer 	header.remote-party-id.reason.busy
	Screen – Yes / No	header.remote-party-id.screen	
	Screen Indicator types	header.remote-party-id.screening where screening can equal the following enumeration value: <ul style="list-style-type: none"> ▪ -1: Screening not included ▪ 0: user provided ▪ 1: user passed ▪ 2: user failed ▪ 3: network provided 	header.remote-party-id.screening == 0
	URL (see URL for Contact header)	header.remote-party-id.url	
Request-URI	Header itself	header.request-uri	
	Method	header.request-uri.method	
	Method Type	header.request-uri.methodtype The following enumerations are used to represent the SIP methods: <ul style="list-style-type: none"> ▪ 5: INVITE ▪ 6: re-INVITE ▪ 7: BYE ▪ 8: OPTIONS ▪ 9: ACK ▪ 10: CANCEL ▪ 11: REGISTER ▪ 12: INFO ▪ 13: MESSAGE ▪ 14: NOTIFY ▪ 15: REFER ▪ 16: SUBSCRIBE ▪ 17: PRACK ▪ 18: UPDATE ▪ 19: PUBLISH ▪ 21: SERVICE 	header.request-uri.methodtype == '5' (i.e., SIP method is INVITE message)
	URI	header.request-uri.uri	
	URL (see URL for Contact header)	header.request-uri.url	header.request-uri.url.user == '101'
Require	Header itself	header.require	

SIP Header	Attribute to Manipulate	Manipulation Syntax	Example
	SIP Capabilities (see SIP Capabilities for Proxy-Require header)	<code>header.require</code>	<code>header.require.earlymedia</code>
Resource-Priority	Header itself	<code>header.resource-priority</code>	
	Namespace	<code>header.resource-priority.namespace</code>	
	RPriority	<code>header.resource-priority.rpriority</code>	
Retry-After	Header itself	<code>header.retry-after</code>	
	Time	<code>header.retry-after.time</code>	
Server or User-Agent	Header itself	<code>header.user-agent</code> <code>header.server</code>	
Service-Route	Header itself	<code>header.service-route</code>	
	Service route list entry	<code>header.service-route.<entry>.serviceroute</code>	<code>header.serviceroute.1.serviceroute</code>
Session-Expires	Header itself	<code>header.session-expires</code>	
	Parameter	<code>header.session-expires.param</code>	<code>header.session-expires.param.longtimer</code>
	Refresher	<code>header.session-expires.refresher</code>	Note: The Action Value '1' sets it to "UAC"; the value '2' sets it to "UAS" (i.e., UA type doing the refreshing)
	Time	<code>header.session-expires.time</code>	
Subject	Header itself	<code>header.subject</code>	
Supported	Header itself	<code>header.supported</code>	
	SIP Capabilities (see SIP Capabilities for Proxy-Require header)	<code>header.supported.<capability></code>	<code>header.supported.path</code>
To	Header itself	<code>header.to</code>	
	Display name	<code>header.to.name</code>	
	Parameter	<code>header.to.param</code>	<code>header.to.param.artist</code>
	tag	<code>header.to.tag</code>	
	URL (see URL for	<code>header.to.url</code>	<code>header.to.url</code>

SIP Header	Attribute to Manipulate	Manipulation Syntax	Example
	Contact header)		.userphone
Unsupported	Header itself	header.unsupported	
	SIP Capabilities (see SIP Capabilities for Proxy-Require header)	header.unsupported.<capability>	header.unsupported.path
User-To-User and X-UserToUser	Header itself	header.x-usertouser	
	User-to-User Descriptor	header.x-usertouser.user2user	
	Protocol Descriptor (PD)	header.x-usertouser.pd	
Via	Header itself	header.via	
	Alias	header.via.alias	
	Branch	header.via.branch	
	Host name	header.via.host	
	Via parameter 'maddr'	header.via.maddrip	
	Parameter	header.via.param	
	Port	header.via.port	
	Transport type	header.via.transporttype where transporttype can have the following value: <ul style="list-style-type: none"> ▪ 0: UDP ▪ 1: TCP ▪ 2: TLS ▪ 3: SCTP 	header.via.0.transporttype == '0'
Warning	Header itself	header.warning	
Unknown headers	Header itself	header.<unknown header name>	header.color

3.4.2 Header Examples

The following table provides examples of syntax for indicating header fields.

Table 3-5: Header Field Syntax Examples

Header	Description
header.to	Defines the top level of the To header.
header.to.url.user	Defines the user part in the header SIP URL.
header.from.url.host	Defines the host part in the From header.
header.from.name	Defines the display name in the From header.
header.newheader	Defines a header <i>newheader</i> .

Header	Description
<code>header.contact.param.newparam</code>	Defines the parameter <i>newparam</i> of a Contact header.
<code>header.refer-to.url.host</code>	Defines the host part of the Refer-To header.
<code>header.diversion.reason</code>	Defines the Reason parameter in the Diversion header.
<code>header.supported.capabilities.path</code>	Defines the supported headers capabilities <i>path</i> .
<code>header.supported.capabilities.replaces</code>	Defines the supported headers capabilities <i>replaces</i> .
<code>header.max-forwards.val</code>	Defines the value of the Max-Forwards header.
<code>header.request-uri.methodtype</code>	Defines the method in the Request-URI.
<code>header.remote-party-id.0.partytype</code>	Defines the party type in the first Remote-Party-ID header.
<code>header.contact.3</code>	Defines the third Contact header.
<code>header.via.2.url.user</code>	Defines the user part of the second Via header.

The following table provides examples of manipulation rules for headers.

Table 3-6: Header Field Manipulation Rules Examples

Message Type	Condition	Action Subject	Action Type	Action Value
<code>register.request</code>	<code>header.from.url.user == '101' OR header.from.url.user == '1000'</code>	<code>header.from.url.user</code>	Modify	'2000'
<code>register</code>		<code>header.to.url.host.name</code>	Modify	'audiocodes.com'
<code>invite</code>		<code>header.from.name</code>	Modify	<code>header.contact.url.user</code>
<code>invite.request</code>		<code>header.newheader</code>	Add	'information to client'
<code>subscribe</code>	<code>header.via.transporttype == '1'</code>	<code>header.to.param.transporttype</code>	Add	'TCP'

3.5 Body

This section describes the syntax used for the SIP body in the Message Manipulations table.

Syntax:

```
body.<body-name>
```

where:

<body-name> specified the body name as it arrives in the message. For example, 'application/sdp' (case-insensitive).

3.5.1 Body Examples

The following table provides examples of the syntax for indicating the SIP message body.

Table 3-7: Message Body Syntax Examples

Subject	Description
body.application/x-nt-mcdn-frag-hex	Adds or removes this 'unknown' body type.
body.sdp	Defines the SDP in the body.

The following table provides configuration examples of manipulation rules for the message body.

Table 3-8: Message Body Manipulation Rules Examples

Message Type	Condition	Action Subject	Action Type	Action Value
invite	body.sdp !exists	body.application / x-nt-mcdn-frag- hex	Add	'a=0981233\\b=12 rew wer\\note=newlin echaracter'
invite. request		body.mwi	Add	'Messages- Waiting: yes\\Message- Account: sip:alice@vmail. example.com\\Voi ce-Message: 2/8 (0/2)'
any		body.mwi.summary .newmsgs	Modify	'23'
invite		body.mwi.summary .oldmsgs	Modify	'18'
invite		body.mwi.summary .newurgentmsgs	Modify	'12'

Message Type	Condition	Action Subject	Action Type	Action Value
any		body.mwi.summary .oldurgentmsgs	Modify	'67'
invite		body.mwi.pending	Modify	'8'
invite		body.mwi.message waiting	Modify	'2'

3.6 Parameters

This section describes the syntax used for the following SIP parameter types in the Message Manipulations table:

- Message Parameters
- IP Group Parameters
- Call Parameters

3.6.1 Message Parameter Syntax

The following table describes the syntax used for Message parameters in the Message Manipulations table.

Table 3-9: Message Parameter Syntax

Subject	Description
param.message.sdp.address	Specifies the address in the SDP.
param.message.sdp.rtpmode	Specifies the RTP mode in the SDP.
param.message.sdp.originaddresses	Specifies the origin address in the SDP.
param.message.sdp.port	Specifies the port in the SDP.
param.message.address.<src/dst>.port	Specifies the port as a string for the source or destination of the message.
param.message.address.<src/dst>.address	Specifies the IP address as a string for the source or destination of the message.
param.message.address.<src/dst>.<transporttype>	Specifies the transport type as a string for the source or destination of the message. where <transporttype> is one of the following values: <ul style="list-style-type: none"> ■ UDP ■ TCP ■ TLS
param.message.address.<src/dst>.sipinterface	Specifies the SIP Interface ID on which the message is received (source) or sent (destination) Note: The parameter can be used in 'Action Value' and 'Condition' fields only.

3.6.2 IP Group Parameter Syntax

The following table describes the syntax used for IP Group parameters in the Message Manipulations table.

Table 3-10: IP Group Parameter Syntax

Subject	Description
<code>param.ipg.<src/dst>.user</code>	Specifies the source or destination contact address for an active call.
<code>param.ipg.<src/dst>.host</code>	Specifies the source or destination IP Group name for an active call.
<code>param.ipg.<src/dst>.type</code>	Specifies the source or destination IP Group type for an active call. where <src/dst> is one of the following values: <ul style="list-style-type: none"> ▪ Server ▪ User ▪ Gateway
<code>param.ipg.<src/dst>.id</code>	Specifies the source or destination IP Group ID as a string for an active call.
<code>param.ipg.<src/dst>.user-defined.<0-1></code>	Specifies the source or destination IP Group's user-defined string for manipulation rules in the IP Group table, where: <ul style="list-style-type: none"> ▪ 0 uses the string configured for the IPGroup_MsgManUserDef1 parameter in the IP Group table ▪ 1 uses the string configured for the IPGroup_MsgManUserDef2 parameter in the IP Group table

3.6.3 Call Parameter Syntax

The following table describes the syntax used for Call parameters in the Message Manipulations table.

Table 3-11: Call Parameter Syntax

Subject	Description
<code>param.call.<src/dst>.user</code>	Specifies the source or destination username during run-time.
<code>param.call.<src/dst>.nat</code>	Enables manipulation of a SIP message depending on whether (=='true') or not (=='false') the source or destination of the message is located behind NAT. The keywords can be used in the 'Condition' or 'Action Value' parameters in the Message Manipulations table. Message Manipulation rules using the keywords are applicable only to message manipulation on the outbound leg (i.e., the rules can only be assigned to the 'Outbound Message Manipulation Set' parameter in the IP Group table.

3.6.4 Parameter Examples

The following table provides configuration examples for using parameters in the Message Manipulations table.

Table 3-12: Call Parameter Examples

Message Type	Condition	Action Subject	Action Type	Action Value	Description
		header.contact.url.ac-int	Modify	param.message.address.src.sipinterface	Adds the ID number of the SIP Interface on which the message is received, to the value of the "ac-int" parameter in the URL of the Contact header.
	param.message.sdp.address == '10.132.10.101'	header.IPSource	Add	param.ipg.src.id	If the address in the SDP is 10.132.10.101, the <device> adds a new SIP header, "IPSource" whose value is set to the ID of the source IP Group
invite.response.200	param.message.sdp.rtpmode=='inactive'	header.origin	Add	param.message.sdp.originaddress	In 200 OK messages, if the RTP mode is inactive, add a new header, "origin" whose value is set to the address in the origin ('o=') SDP
	param.message.sdp.rtpmode=='inactive'	header.from.param.origin	Add	param.message.sdp.originaddress	If the RTP mode is inactive, add a new parameter, "origin" to the From header. The value of the parameter is set to the 'o=' address in the SDP.
subscribe.request		header.to.param.user	Add	param.call.src.user	In SUBSCRIBE messages, add the parameter, "user" to the To header. The value is set to the source username.
invite.response		header.request-uri.url.param.myname	Add	param.ipg.src.host	For INVITE responses, add the myname parameter to the Request-URI. The parameter value is taken from the 'Group Name' field of the IP Group.
invite		header.MyCustomHeader	Add	param.ipg.dst.user-defined.0	For INVITE messages, add a header called "MyCustomHeader"

Message Type	Condition	Action Subject	Action Type	Action Value	Description
					and whose value is taken from the IPGroup_MsgManUserDef1 field in the IP Group.
any.request		header.session-expires.refresher	Modify	' 1 '	Manipulates the 'refresher' parameter to "UAC" in the Session-Expires header (i.e., UAC is doing the refreshing). For example: Session-Expires: 180;refresher=uac
invite	param.message.sdp.rtpmode=='sendonly' and param.call.dst.nat=='true'	param.message.sdp.rtpmode	Modify	'sendrecv'	If the device determines that the destination of the INVITE message is located behind NAT (param.call.dst.nat=='true'), and the RTP mode in the SDP of the incoming INVITE is 'sendonly' (param.message.sdp.rtpmode=='sendonly'), it changes the RTP mode to 'sendrecv' in the SDP of the outgoing INVITE.

4 Advanced Manipulation Features

This chapter describes advanced features that you can use for manipulating SIP messages.

4.1 Wildcards for Header Removal

The device supports the use of the "*" wildcard character to remove headers. The "*" character may only appear at the end of a string. For example, "X-*" is a valid wildcard request, but "X-*ID" is not.

Below are examples of using the wildcard:

- header.p-* - removes all headers that have the prefix "p-"
- header.x-vendor* - removes all headers that start with "x-vendor"



Note: The wildcard does not remove the following headers:

- Request-Uri
- Via
- From
- To
- Callid
- Cseq
- Contact

4.2 Random Characters

The following syntax shows how to specify random letter characters in the range a to z in Message Manipulation rules.

Syntax:

```
rand.string.<n>.a.z
```

where:

- <n> is the number of random letter characters you wish to specify in the range a to z.

The following syntax shows how to specify random letter and/or numeric characters in the range 0 to z in the Message Manipulations table.

Syntax:

```
Rand.string.<n>.0.z
```

where:

- <n> is the number of random letter and/or numeric characters you wish to specify in the range 0 to z.

The following syntax shows how to specify random numbers between n and m in the Message Manipulations table.

Syntax:

```
Rand.number.<n>.<m>
```

where:

- **<n>** specifies the start value of the range of the random numbers that you wish to specify.
- **<m>** specifies the end value of the range of the random numbers that you wish to specify.

The following table provides configuration examples for using random letters and numeric characters in the Message Manipulations table.

Table 4-1: Examples using Random Letters and Numeric Characters

Message Type	Action Subject	Action Type	Action Value
invite.request	header.myrandomString	Add	Rand.string.56.A.Z
invite.response	header.NumberaAndChars	Add	Rand.string.12.0.z
invite.response .4xx	header.myrandomNumber	Add	Rand.number.50.100

4.3 SDP Conditions

You can configure message manipulation rules based on user-defined SDP conditions.

The device supports the following SDP condition syntax:

- **Source IP Address:** You can manipulate the source IP address in the SDP. For example, you can configure a manipulation rule to add a Diversion header to incoming INVITE messages if the SDP contains a specific IP address, or a prefix or suffix of this IP address.
 - **param.message.sdp.ip suffix '10.10'**
 - **param.message.sdp.ip prefix '10.132'**
 - **param.message.sdp.ip=='10.33.37.78'**
- **RTP mode:** You can manipulate the RTP mode using the following condition:
 - **param.message.sdp.rtpmode**
 Possible values include the following:
 - sendonly
 - sendrecv
 - inactive

- **Origin IP Address:** Using the origin IP address (in the SDP "o=" line):
 - **param.message.sdp.originaddress**
Possible values include any IP address.
- **Port:** First audio active media port number (i.e., port number greater than 0) in the "m=" field of the SDP body:
 - **sdp.port**
- **IP address:** IP address of the first active media (port greater than 0). The IP address is taken from the media "c=" field (the "c=" field below the "m=" field) of the SDP body. Note that if the "m=" field doesn't contain a "c=" field, then the IP address is taken from the global "c=" field (the "c=" field at the top of the SDP):
 - **sdp.address**

Below are manipulation examples using SDP conditions:

- **Example 1:** Copy the port and IP address in the SDP body to a customized SIP header (e.g., Custom-RTP-Address/Port) in the outgoing INVITE message, as follows:

Message Type	Action Subject	Action Type	Action Value
invite.request	header.custom-rtp-address	Add	param.message.sdp.ip
invite.request	header.custom-rtp-port	Add	param.message.sdp.port

- **Example 2:** Changes the RTP mode to sendonly if the SDP "c=" line address is 0.0.0.0:

Message Type	Condition	Action Subject	Action Type	Action Value
reinvite.request	param.message.sdp.ip == '0.0.0.0'	param.message.sdp.rtpmode	Modify	'sendonly'

- **Example 3:** Changes the SDP "c=" line to the same address as the "o=" line:

Message Type	Action Subject	Action Type	Action Value
-	param.message.sdp.ip	Modify	param.message.sdp.originaddress

- **Example 4:** Condition the RTP mode:

Message Type	Condition	Action Subject	Action Type	Action Value
invite	param.message.sdp.rtpmode == 'sendrecv'	var.call.src.1	Modify	'1'
invite.response.200	var.call.dst.0 == '1'	param.message.sdp.rtpmode	Modify	'sendonly'

- Example 5:** The manipulation rule example below adds a Diversion header ("Diversion: <sip:12345@p4.isp.com>;reason=no-answer") to incoming INVITE messages if the SDP contains the IP address 10.33.37.78 or the prefix of this IP address, i.e., 10.33. The IP address is contained in the "c=" line of the SDP (e.g., "c=IN IP4 10.33.37.75"). The table below shows the example configuration:

Parameter	Rule Index 1	Rule Index 2
Message Type	invite	invite
Condition	param.message.sdp.ip=='10.33.37.78'	param.message.sdp.ip prefix '10.33'
Action Subject	header.diversion	header.diversion
Action Type	Add	Add
Action Value	<sip:12345@p4.isp.com>;reason=no-answer	<sip:12345@p4.isp.com>;reason=no-answer

You can configure several such manipulation rules and then apply them per IP Group using the 'Inbound Message Manipulation Set' parameter.



Note: This feature is applicable only to the SBC application.

4.4 Regular Expressions (Regex)

You can configure SIP header manipulation rules using regular expressions (regex). Regex is a special text string pattern matching engine which is used to define the condition that must exist in order to use a specific manipulation rule. If the SIP header matches the regex pattern, then the "action" of the manipulation rule is applied to the SIP message. Executing a regex pattern also creates sub-expressions. The sub-expressions are referenced using the $\$n$ syntax, where n is a digit in the range of 1 to 13 (e.g., $\$3$).

Note that spaces within a regular expression must be enclosed by parenthesis, as shown in the first example below:

```
body.sdp regex (AVP 8)
body.sdp regex avp
```

This feature provides the following main benefits:

- The device does not need to know the SIP header name or structure.
- The sub-expressions can be used in the manipulation action. All that is required is to set the action (for example, add, modify, etc.) and then reference the sub-expression you want to use as the value.

The following syntax shows how to specify regular expressions (regex) in the Message Manipulations table.

Syntax:

```
<regular expression>
```

where:

- **<regular expression>** is used as part of the value in a condition and contains a regular expression.

Syntax:

```
<$n>
```

where:

- **<\$n>** is used to reference a resulting sub-expression after executing a regex in a condition; where n is an integer referencing the sub-expression.

The following table provides configuration examples for using regular expressions in the Message Manipulations table.

Table 4-2: Regular Expressions Examples

Message Type	Condition	Action Subject	Action Type	Action Value
invite.request	header.diversion.0 regex (<.*>(;urlparam=[a-z]*)(.*>)	header.diversion.0	Modify	$\$1+\3
invite.request	header.diversion.0 regex (<.*>(;urlparam=[a-z]*)(.*>)	header.diversion.0	Add	$\$1 + ' ;mynewparam=good' + \3

Message Type	Condition	Action Subject	Action Type	Action Value
invite.response.100	header.via regex (SIP/2.0/UDP)(.*) ; branch=(.*)	header.thebranch	Add	\$3
subscribe	header.to regex (.*)(1001)(.*)@(.*)>	header.to	Modify	\$1+\$3+'8@'+\$4

Below are detailed examples of using regex for SIP message manipulation:

■ **Example 1 - Number range matching and manipulation:**

- Required manipulation: When the source number has prefix 30 to 40 and a digit (e.g., 3122), it needs to be changed to 2312. The last digit of the original phone number is removed (i.e., 2, leaving the number as 312) and the result is prefixed with 2.

◆ Old header:

```
To: <sip:3122@10.132.10.100;user=phone
```

◆ New header:

```
To: sip:2312@company244.com
```

- Manipulation rule:

Index	Condition	Action Subject	Action Type	Action Value
1	header.to regex (<.*)([3-4][0-9])(.*)(&d)@(>)	header.to	Modify	\$1+'2'+\$2 +\$3+'@'+\$5

- **Explanation:** Dialing 3122 creates the following sub-expressions:

- ◆ 1: <sip:
- ◆ 2: 31
- ◆ 3: 2
- ◆ 4: 2
- ◆ 5: 10.132.10.100;user=phone>

■ **Example 2 - Manipulation based on source and destination number:**

- Required manipulation: If the destination number has prefix 6, 7, or 8 (e.g., 85262146) and the source number has prefix 2001, then remove the first five digits (e.g., 85262) from the destination number and add 3 as the prefix (e.g., 3146).

◆ Old header:

```
From: <sip:20011234@10.132.10.100;user=phone>;tag=XINPYDPROEOREGEIHUHF
To: sip:85262146@10.132.10.100;user=phone
```

◆ New header:

```
From: <sip:20011234@company246.com;user=phone>;tag=1c13519
To: sip:3146@company244.com
```

- Manipulation rules:

Index	Condition	Action Subject	Action Type	Action Value
1	header.to regex <sip:([6-8][1-9]{4})(.*)@(.*)>	var.call.dst. 0	Modify	'3'+\$2
2	header.from regex 2001	header.to.url .user	Modify	var.call .dst.0

- **Explanation:** These rules are slightly complex as both the To and From headers are inspected. This rule executes

- ◆ If the dialed number is prefixed with a number 6-8 (inclusive)
- ◆ If the calling party number is prefixed with 2001

If these conditions exist, then:

- ◆ Remove the first five digits of the dialled string.
- ◆ Prefix the result with the digit 3.

The first rule matches a dialled number that occurs in the To header (e.g., 85262146). If a match occurs, it uses a variable to store the remaining three digits and adds the digit 3 as the prefix. The second rule inspects the From header. If it contains the string 2001, then the user part of the To header is modified with the prepared variable. For example, the user (at 20011234) dials 85262146, which generates the following substring from the first rule:

- ◆ \$1 85262
- ◆ \$2 146
- ◆ \$3 10.132.10.100;user=phone>



Note: This configuration isolates the last three digits in the dialed number and prefixes them with '3'. The variable now is set to '3146'. The second rule does not use sub-expressions. It simply searches for 2001 in the From header and if there is a match the user part of the To header is manipulated using the standard manipulation syntax.

■ Example 3 - Manipulation on SDP:

- Manipulation required: To change the packet period in the SDP.
- Manipulation rule:

Index	Condition	Action Subject	Action Type	Action Value
1	body.sdp regex (.*)((a=ptime:20)(.*))	body.sdp	Modify	\$1+'a=ptime: 10'+\$3

- **Explanation:** This rule matches everything up to the a=ptime in the SDP body as \$1, and stores as \$3 everything after the 0 in the ptime attribute line. This is used as the closing \r\n in the SDP body. The modify action then refers to the sub-expressions \$1 and \$3, but does not make use of \$2, instead replacing it with a=ptime:10.

4.5 Variables for Copying Data between Messages

You can use variables in SIP message manipulation rules to copy specific information (data) from one message to another. Information from one message is copied to a variable and then information from that variable is copied to any subsequent message. The device can store information in local (call) or global variables.

To store data in a variable, add the name of the variable in the 'Action Subject' field and set the 'Action Type' to **Modify**. To retrieve data from a variable, add it in the 'Action Value' field and it can be used in any manipulation where a ManStringElement is valid as an 'Action Subject'.

4.5.1 Call Variable

The call variable stores information on a per call basis and changes when a new call is made (i.e., stored only throughout the lifetime of a specific call). Up to two local variables can be used per call: *src* (source) or *dst* (destination) references which can be stored in the call leg. Note that information stored in the call variables is only valid for the duration of the call.

Call variables use the following syntax:

```
var.call.src|dst.<0>
```

where:

- *src* denotes the call source variable.
- *dst* denotes the call destination variable
- **<0>** specifies the variable ID (note that only one source call variable can be defined).

For example:

1. Store a value in a call variable: Stores the subject URI parameter from the To header:

```
MessageManipulations 0 = 0, Invite.Request, , var.call.dst.0,
2, header.to.url.param.subject, 0;
```

2. Use the stored value: Allocates a Subject header for the 200 OK response for the same call and assigns it the stored value:

```
MessageManipulations 0 = 0, Invite.response.200, ,
header.subject, 0, var.call.dst.0, 0;
```

The following table provides additional configuration examples of using call variables in Message Manipulation rules.

Table 4-3: Examples of Call Variables

Message Type	Condition	Action Subject	Action Type	Action Value
invite	param.message.sdp.rtpmode=='sendrecv'	var.call.src.1	Modify	'1'
invite.response.200	var.call.dst.0=='1'	param.message.sdp.rtpmode	Modify	'sendonly'

4.5.2 Global Variable

Global variables are similar to call variables, but they do not change as new calls are made (i.e., their lifetime is not restricted to the duration of a call). Up to 10 global variables can be used.

Global variables use the following syntax:

```
var.global.<0-9>
```

where, <0-9> specifies the global variable ID.

For example:

- Store a value in a global variable: Stores the Priority header of the INVITE with 'company' in the host part of the From header:

```
MessageManipulations 0 = 0, Invite.Request,
header.from.url.host == 'company', var.global.1, 2,
header.priority, 0;
```

- Use the stored value: Assigns the same priority as the INVITE request to SUBSCRIBE requests arriving with 'company' in the host part of the From header:

```
MessageManipulations 0 = 0, Subscribe.request,
header.from.url.host == 'company', header.priority, 0,
var.global.1, 0;
```

The following table provides additional configuration examples of using variables in Message Manipulation rules.

Table 4-4: Example of Global Variables

Message Type	Condition	Action Subject	Action Type	Action Value
invite		var.global.0	Modify	'Custom UA'

4.5.3 Session Variable

Session variables can be preserved in any ongoing leg in the session, for example, in a call session with forking calls, in a call which had a locally handled blind transfer, etc. The value of the variable remains the same in all existing legs and in new legs of the session context.

Session variables use the following syntax:

```
var.session.0
```

where, *0* is the variable ID.

For example (using SIPRec):

For an IP-to-Tel call, the INVITE message of the recorded IP call contains the header, X-credit-card (e.g., X-credit-card: 123456789). When the device sends an INVITE to the SIPRec server (SRS), it is required to include the content (value) of this header (e.g., 123456789). To do this, you need to configure two Message Manipulation rules:

1. For the recorded call: This rule stores the content of the X-credit-card header in the variable, `var.session.0`.
2. For the SRS leg: This rule adds a new header, X-credit-card with the contents of the variable (`var.session.0`) to the INVITE sent to the SRS.

Table 4-5: Example of Session Variables

Message Type	Condition	Action Subject	Action Type	Action Value	Description
invite.request	header.X-credit-card exists	var.session.0	Modify	header.X-credit-card.content	For the recorded call
invite.request	var.session.0 != ''	header.X-credit-card	Add	var.session.0	For the SRS leg

4.6 ISUP Body Manipulation



Note: For certain ISUP call actions, see also Section 4.7 on page 52.

SIP Method	ISUP Message Type	Parameter	Field	Syntax
INVITE	IAM	Called party number	Number Plan (see Section A.5.4)	<code>body.isup.iam.called_num.plan</code>
			Number Type (see Section A.5.5)	<code>body.isup.iam.called_num.type</code>
			Address signal (string of up to 50 characters)	<code>body.isup.iam.called_num.digits</code>
			Internal Network Number indicator (INN) <ul style="list-style-type: none"> 0: routing to internal number allowed 1: (default) routing to internal number not allowed 	<code>body.isup.iam.called_num.inn</code>
		Calling party number	Number Plan (see Section A.5.4)	<code>body.isup.iam.calling_num.plan</code>
			Number Type (see Section A.5.5)	<code>body.isup.iam.calling_num.type</code>
			Address presentation restricted indicator (see Section A.5.15)	<code>body.isup.iam.calling_num.presentation</code>
			Screening indicator (see Section A.5.11)	<code>body.isup.iam.calling_num.screening</code>
			Address signal (string of up to 50 characters)	<code>body.isup.iam.calling_num.digits</code>
		Original Called Number	Number Plan (see Section A.5.4)	<code>body.isup.iam.original_called_num.plan</code>
			Number Type (see Section A.5.5)	<code>body.isup.iam.original_called_num.type</code>
			Address presentation restricted indicator (see Section A.5.15)	<code>body.isup.iam.original_called_num.presentation</code>
			Address signal (string of up to 50 characters)	<code>body.isup.iam.original_called_num.di</code>

SIP Method	ISUP Message Type	Parameter	Field	Syntax
				gits
		Generic Number	Number qualifier indicator (see Q.763.3.26)	body.isup.iam.generic_num.qualifier
			Number Plan (see Section A.5.4)	body.isup.iam.generic_num.plan
			Number Type (see Section A.5.5)	body.isup.iam.generic_num.type
			Address presentation restricted indicator (see Section A.5.15)	body.isup.iam.generic_num.presentation
			Screening indicator (see Section A.5.11)	body.isup.iam.generic_num.screening
			Address signal (string of up to 50 characters)	body.isup.iam.generic_num.digits
		Location Number	Number Plan (see Section A.5.4)	body.isup.iam.location_num.plan
			Number Type (see Section A.5.5)	body.isup.iam.location_num.type
			Address presentation restricted indicator (see Section A.5.15)	body.isup.iam.location_num.presentation
			Screening indicator (see Section A.5.11)	body.isup.iam.location_num.screening
			Address signal (string of up to 50 characters)	body.isup.iam.location_num.digits
			Internal Network Number indicator (INN) <ul style="list-style-type: none"> ▪ 0: routing to internal number allowed ▪ 1: (default) routing to internal number not allowed 	body.isup.iam.location_num.inn
		Redirecting number	Number Plan (see Section A.5.4)	body.isup.iam.redirecting_num.plan
			Number Type (see Section A.5.5)	body.isup.iam.redirecting_num.type
			Address presentation restricted (see Section A.5.15)	body.isup.iam.redirecting_num.presentation
			Address signal (string of up to 50 characters)	body.isup.iam.redirecting_num.digits
		Redirection	Redirecting reason (see	body.isup.iam.redi

SIP Method	ISUP Message Type	Parameter	Field	Syntax
		information	Section A.5.7)	<code>rect.info.reason</code>
			Original Redirect reason - values 1, 2, and 3 (see Section A.5.23)	<code>body.isup.iam.redirect_info.orig_reason</code>
			Redirection Counter Number of redirections the call has undergone expressed as a number from 1 to 5.	<code>body.isup.iam.redirect_info.counter</code>
			Redirecting Indicator (see Q.763.3.45)	<code>body.isup.iam.redirect_info.indicator</code>
		Forward call indicator (see Q.763 3.23)	National/international call indicator	<code>body.isup.iam.fci.InterationalInd</code>
			End-to-end method indicator	<code>body.isup.iam.fci.End2EndMethod</code>
			Interworking indicator	<code>body.isup.iam.fci.Interworking</code>
			End-to-end information indicator	<code>body.isup.iam.fci.End2EndInformation</code>
			ISDN user part indicator	<code>body.isup.iam.fci.IsdnUserPartIndicator</code>
			ISDN user part preference indicator	<code>body.isup.iam.fci.IsdnUserPartPreference</code>
			ISDN access indicator	<code>body.isup.iam.fci.IsdnAccess</code>
			SCCP method indicator	<code>body.isup.iam.fci.SCCP</code>
		Transmission medium requirement (see Section A.5.16)		<code>body.isup.iam.tmr</code>
		Calling party's category (see Section A.5.19)		<code>body.isup.iam.cpc</code>
		Hop Counter (1 to 31)		<code>body.isup.iam.hop_counter</code>
First 18x	ACM	Backward call indicator	Charge indicator (see Section A.5.17)	<code>body.isup.acm.bci.charge</code>
			Called party's status indicator (see Section A.5.18)	<code>body.isup.acm.bci.status</code>

SIP Method	ISUP Message Type	Parameter	Field	Syntax
			Called party's category indicator (see Section A.5.19)	<code>body.isup.acm.bci.cpc</code>
			End-to-end method indicator (see Q.763.3.5)	<code>body.isup.acm.bci.End2EndMethod</code>
			Interworking indicator (see Q.763.3.5)	<code>body.isup.acm.bci.Interworking</code>
			End-to-end information indicator (see Q.763.3.5)	<code>body.isup.acm.bci.End2EndInformation</code>
			ISDN user part indicator (see Q.763.3.5)	<code>body.isup.acm.bci.IsdnUserPartIndicator</code>
			Holding indicator (see Q.763.3.5)	<code>body.isup.acm.bci.HoldingIndicator</code>
			ISDN access indicator (see Q.763.3.5)	<code>body.isup.acm.bci.IsdnAccess</code>
			Echo control device indicator (see Q.763.3.5)	<code>body.isup.acm.bci.Echo</code>
			SCCP method indicator (see Q.763.3.5)	<code>body.isup.acm.bci.SCCP</code>
		Optional Backward Call indicators	In-band information indicator (see Q.763.3.37)	<code>Body.isup.acm.obci.Inband</code>
			Call diversion may occur indicator (see Q.763.3.37)	<code>body.isup.acm.obci.diversion</code>
			Simple segmentation indicator (see Q.763.3.37)	<code>body.isup.acm.obci.segmentation</code>
			MLPP user indicator (see Q.763.3.37)	<code>body.isup.acm.obci.MLPP</code>
		Not First 18x	CPG	Event Information, can be used only in condition, (see Section A.5.20)
Backward Call Indicator (to send it cpc, must be set manually by message manipulation)	Charge indicator (see Section A.5.17)			<code>body.isup.cpg.bci.charge</code>
	Called party's status indicator (see Section A.5.18)			<code>body.isup.cpg.bci.status</code>
	Called party's category indicator (see Section A.5.19)			<code>body.isup.cpg.bci.cpc</code>
	End-to-end method			<code>body.isup.cpg.bci.</code>

SIP Method	ISUP Message Type	Parameter	Field	Syntax
			indicator (see Q.763.3.5)	End2EndMethod
			Interworking indicator (see Q.763.3.5)	body.isup.cpg.bci.Interworking
			End-to-end information indicator (see Q.763.3.5)	body.isup.cpg.bci.End2EndInformation
			ISDN user part indicator (see Q.763.3.5)	body.isup.cpg.bci.IsdnUserPartIndicator
			Holding indicator (see Q.763.3.5)	body.isup.cpg.bci.HoldingIndicator
			ISDN access indicator (see Q.763.3.5)	body.isup.cpg.bci.IsdnAccess
			Echo control device indicator (see Q.763.3.5)	body.isup.cpg.bci.Echo
			SCCP method indicator (see Q.763.3.5)	body.isup.cpg.bci.SCCP
		Optional Backward Call Indicators (sent only if at least one of the fields is explicitly set by a message manipulation rule)	In-band information indicator (see Q.763.3.37)	body.isup.cpg.obci.inband
			Call diversion may occur indicator (see Q.763.3.37)	body.isup.cpg.obci.diversion
			Simple segmentation indicator (see Q.763.3.37)	body.isup.cpg.obci.segmentation
			MLPP user indicator (see Q.763.3.37)	body.isup.cpg.obci.mlpp
		200 OK on INVITE	ANM	Connected number
Number Type (see Section A.5.5)	body.isup.iam.connected_num.type			
Address presentation restricted (see Section A.5.15)	body.isup.iam.connected_num.presentation			
Address signal (string of up to 50 characters)	body.isup.iam.connected_num.digits			
INFO	FAC	Transfer number	Number Plan (see Section A.5.4)	body.isup.fac.connected_num.plan
			Number Type (see Section A.5.5)	body.isup.fac.connected_num.type
			Address presentation restricted (see Section A.5.15)	body.isup.fac.connected_num.presentation
			Address signal (string of	body.isup.fac.conn

SIP Method	ISUP Message Type	Parameter	Field	Syntax
			up to 50 characters)	ected_num.digits
BYE, 4xx	REL	Cause value (see Section A.5.21)		body.isup.rel.cause
		Cause location (see Section A.5.22)		body.isup.rel.location

4.6.1 Attaching ISUP Body

The syntax of message manipulation for attaching ISUP body to a SIP message is as follows:

- Action Subject: *body.isup.xxx*

Where xxx can be one of the following:

- IAM
- ACM
- CPG
- ANM
- SUS
- RES
- REL
- RLC
- FAC

- Action Type: **Add**

Below is an example of a message manipulate rule that adds the ISUP Release message to the body of SIP CANCEL request:

```
MessageManipulations 8 = "Cancel add ISUP", 1, "cancel.request",
"body.isup.rel !exists", "body.isup.rel", 0, "", 0;
```

4.6.2 Removing Elements from ISUP Body

All optional "number" elements (connected number, transferred number, etc.) can be removed by setting the address signal to an empty string (see the example in Section 4.6.3.2).

4.6.3 ISUP Examples

4.6.3.1 ISUP Deny Message Condition Rule

The example describes how to deny INVITE messages received from IP address 10.33.7.20 if the message contains ISUP data whose Initial Address Message (IAM) section includes a Called Party Number that begins with "200".

1. Configure a Message Condition rule in the Message Conditions table with the condition, **body.isup.iam.called_party_number isprefix '200'**:

The screenshot shows a configuration window titled "Message Conditions". It has a "GENERAL" tab. The fields are as follows:

Index	0
Name	ISUP
Condition	body.isup.iam.called_party_number isprefix '200'

2. Assign the Message Condition rule to the Classification rule associated with the source of the INVITE:

The screenshot shows a configuration window titled "Classification [Deny]". It has a "MATCH" tab and an "ACTION" tab. The fields are as follows:

MATCH		ACTION	
Index	1	Action Type	Deny
Name	Deny	Destination Routing Policy	--
Source SIP Interface	Any	Source IP Group	--
Source IP Address	10.33.7.20	IP Profile	--
Source Transport Type	Any		
Source Port	0		
Source Username Prefix	*		
Source Host	*		
Destination Username Prefix	*		
Destination Host	*		
Message Condition	#0 [ISUP]		

4.6.3.2 ISUP Message Manipulation Rules

The example manipulates the SIP message if the incoming INVITE message includes ISUP data that contains an IAM with Calling Party Number whose Presentation is set to restricted and:

- If P-Asserted-Identity header is absent: Add P-Asserted-Identity header with value "tel:+<IAM Calling Party Number>"
- If From header is absent: Add the From header with value to "Anonymous" <sip:anonymous@anonymous.invalid>;tag=9802748
- If Privacy header is absent: Add Privacy header with value "id"

```
INVITE sip:+14085551212@gw.pstn.net SIP/2.0
    Via: SIP/2.0/TCP useragent.audiocode.com;branch=z9hG4bK-124
    To: <sip:+14085551212@audiocodes.com>
From: "Anonymous" <sip:anonymous@anonymous.invalid>;tag=9802748
    Call-ID: 245780247857024504
    CSeq: 2 INVITE
    Max-Forwards: 68
P-Asserted-Identity: tel:+14085264000
Privacy: id
```

Table 4-6: ISUP Body Manipulation Rules Examples

Message Type	Condition	Action Subject	Action Type	Action Value	Row Rule
invite	body.isup exists AND body.isup.i am.calling_party_number.presentation == 'restricted' AND header.p-asserted-identity !exists	header.p-asserted-identity	Add	'tel:+' + body.isup.i am.calling_party_number.digits	Use Current Condition
invite	body.isup exists AND body.isup.i am.calling_party_number.presentation == 'restricted' AND header.from !exists	header.from	Add	" "Anonymous" <sip:anonymous@anonymous.invalid>;tag=9802748" "	Use Current Condition
invite	body.isup exists AND body.isup.i am.calling_	header.privacy	Add	'id'	Use Current Condition

Message Type	Condition	Action Subject	Action Type	Action Value	Row Rule
	<code>party_number.presentation == 'restricted' AND header.Privacy !exists</code>				

4.7 Special Actions using X-AC-Action SIP Header

You can use AudioCodes proprietary X-AC-Action SIP header to trigger special call actions. For example, it can be used for disconnecting a call when interworking SIP-I and SIP endpoints, and an ISUP SUS (suspend) message is received. To do this, you need to configure Message Manipulation rules with this. The actions that can be performed include:

- Disconnect a call (optionally, after a user-defined time): `disconnect[;delay=<time in ms>]`
- Resume previously suspended call: `abort-disconnect`
- Example:
- X-AC-Action: `abort-disconnect`
- Reply to the message with a SIP response without forwarding the response to the other side: `reply[;response=<response code, e.g., 200>]`
- Switch IP Profile for the call (re-INVITE only), as defined in the IP Group: `switch-profile[;reason=<reason - PoorInVoiceQuality or PoorInVoiceQualityFailure >]`

For example, the below rule disconnects a call after 3 sec if the received SIP INFO message contains the ISUP SUS field:

Table 4-7: X-AC-Action Header Manipulation Rule Example

Message Type	Condition	Action Subject	Action Type	Action Value	Row Rule
info.request	body.isup.sus exists	header.x-ac-action	Modify	'disconnect;delay=3000,reply'	Use Current Condition

4.8 SIP Message Normalization

The device supports a built-in SIP message normalization feature that can be enabled per manipulation rule. This is enabled by setting the Action Type field to "Normalize". The normalization feature removes unknown or non-standard SIP message elements before forwarding the message. These elements can include SIP headers, SIP header parameters, and SDP body fields.

Message normalization is typically configured per SIP header but can also be configured for all headers (including SDP). For example, to normalize the Refer-To header, you would need to set the Action Subject field to "Refer-To" and the Action Type field to "Normalize".

The device normalizes the following SIP elements:

■ URLs:

- User part is normalized, for example, the bolded area is removed:

```
<sip:+1-800-229-229;phone-  
context=1@10.33.2.17;user=phone;UnknownUrlParam>
```

- Unknown parameters are removed, for example, the bolded area is removed:

```
<sip:+1-800-229-229;phone-  
context=1@10.33.2.17;user=phone;UnknownUrlParam>
```

The resultant URL after above example normalization:

```
<sip:+1800229229@10.33.2.17;user=phone>
```

■ Headers:

- Alert-Info: unknown header parameters are removed
- P-Called-Party-ID: unknown header parameters are removed, URL is normalized
- P-Charging-Vector: unknown header parameters are removed
- P-Associated-URI: unknown header parameters are removed, URL is normalized
- P-Preferred-Identity: URL is normalized
- Diversion: unknown header parameters are removed, URL is normalized
- P-Asserted-Identity: URL is normalized
- Remote-Party-ID: unknown header parameters are removed, URL is normalized
- Reason: unknown header parameters are removed
- Max-Forwards: value is changed to 70
- History-Info: unknown header parameters are removed, URL is normalized
- From: unknown header parameters are removed, URL is normalized
- To: unknown header parameters are removed, URL is normalized
- Via: unknown header parameters are removed
- Refer-To: unknown header parameters are removed, URL is normalized
- Referred-By: unknown header parameters are removed, URL is normalized
- Event: unknown header parameters are removed
- Session-Expires: unknown header parameters are removed
- Min-SE: unknown header parameters are removed
- Min-Expires: unknown header parameters are removed
- Request-URI: URL is normalized
- Contact: unknown header parameters are removed
- Subscription-State: unknown header parameters are removed

For example:

- To header before normalization:

```
To: <sip:100;phone-
context=1@10.33.2.17;user=phone;UnknownUrlParam>;UnknownHeaderParam
```

- To header after SIP normalization (user parameter, unknown URL parameter, and unknown header parameter are removed):

```
To: <sip:100@10.33.2.17;user=phone>
```

- SDP Body: Removes unnecessary SDP fields (except v=, o=, s=, c=, t=, and r=) and unknown media with all its attributes. For example, the bolded text is removed before sending the message:

```
v=0
o=SMG 791285 795617 IN IP4 10.33.2.17
s=Phone-Call
i=A Seminar on the session description protocol
u=http://www.example.com/seminars/sdp.pdf
e=j.doe@example.com (Jane Doe)
c=IN IP4 10.33.2.26
t=0 0
m=unknown 6000 RTP/AVP 8
a=unknown
a=sendrecv
aptime:20
m=audio 6000 RTP/AVP 8
a=rtpmap:8 pcma/8000
a=sendrecv
a=unknown
aptime:20
```

- Message: Normalization of the entire message. Headers and bodies not listed below are removed while those listed are retained and normalized (if necessary and if listed as supported for normalization, as previously mentioned) :

- Headers:
 - ◆ Request-URI
 - ◆ Via
 - ◆ Max-Forwards
 - ◆ From
 - ◆ To
 - ◆ Call-ID
 - ◆ Cseq
 - ◆ Contact
 - ◆ Record-Route
 - ◆ Route
 - ◆ Supported
 - ◆ Allow
 - ◆ P-Preferred-Identity
 - ◆ Diversion
 - ◆ Rack
 - ◆ Required
 - ◆ RSeq
 - ◆ Authorization

- ◆ Proxy-Authorization
- ◆ WWW-Authenticate
- ◆ Proxy-Authenticate
- ◆ Event
- ◆ Refer-To
- ◆ Referred-By
- ◆ Replaces
- ◆ User-Agent
- ◆ P-Asserted-ID
- ◆ History-Info
- ◆ Priority
- ◆ Resource-Priority
- ◆ Unsupported
- ◆ Expires
- ◆ Session-Expires
- ◆ Min-SE
- ◆ Min-Expires
- Bodies:
 - ◆ SDP
 - ◆ DTMF

Configuration Examples:

Table 4-8: Normalization Examples

Message Type	Condition	Action Subject	Action Type	Action Value	Description
invite	-	message	Normalize	-	Normalizes entire message (headers and SDP) of INVITE messages
invite	-	body.sdp	Normalize	-	Normalizes only SDP body of INVITE messages
invite	-	header.max-forwards	Normalize	-	Normalizes the Max-Forwards header of INVITE messages

4.9 Source and Destination Dial Plan Tags

You can use source and destination Dial Plan tags as conditions ('Condition' field) and values ('Action Value' field) in Message manipulation rules.

Syntax:

- Source Tag:

```
srctags
srctags.<tag name>
```

- Destination Tag:

```
dsttags
dsttags.<tag name>
```

Applicable Fields:

- Condition
- Action Value



Note: Tags cannot be modified by Message Manipulation rules.

Table 4-9: Source and Destination Tags Examples

Message Type	Condition	Action Subject	Action Type	Action Value	Description
invite	srctags= ='ny'	header.City	Add	srcta gs	If the source tag associated with the call equals "ny", add a header called "City:" with the value set to "ny"

5 Typical Examples

The following table provides a summary of typical examples of Message Manipulation rules.

Table 5-1: Message Manipulation Examples

Message Type	Condition	Action Subject	Action Type	Action Value	Description
invite.request	param.message.sdp.addresses=='flowers.com'	header.diversion	Add	'<sip:WeSellFlowers@p4.isp.com>;reason=time-of-day'	In INVITE requests, add a Diversion header if the c line in the SDP is set to "flowers.com".
info.response	header.request-uri.methodtype=='488'	header.request-uri.methodtype	Modify	'503'	Change the Request-URI method type to 503 from 488 in INFO response messages
info.response.180		header.request-uri.methodtype	Modify	'183'	Change request type method to 183 in 180 response messages.
invite.request	header.expires.time < '88888'	header.organization	Add	'audiocodes'	Check the time parameter in Expires headers. If it is less than 88888, add an organization header to the INVITE request message.
register.request		header.contact.param.newparam	Add	'newValue'	Add newParam with a value of newValue as a general header level param to REGISTER Contact headers
subscribe.response		header.remote-party-id.0.partytype	Modify	'2'	In Subscribe response messages, change the party type to 'called' (note, 1="calling", 2="called", 3="redirect") in the 1st Remote-Party-ID header.
invite.response		header.from.param.nasty	Delete		Remove the param named 'nasty' from From headers in INVITE responses.
any		header.user-agent	Modify	'TelcoA'	Change the User-Agent header to telcoA.
any		header.from.quotecontrol	Modify	'0'	Removes quotation marks surrounding display name in From header.

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A Message Manipulation Syntax Reference

This appendix provides a detailed description on the support and syntax for configuring SIP message manipulation rules.

A.1 Actions

The actions that can be done on SIP message manipulation in the Message Manipulations table are listed in the table below.

Table A-1: Message Manipulation Actions

Action	Value
Add	0
Remove	1
Modify	2
Add Prefix	3
Add Suffix	4
Remove Suffix	5
Remove Prefix	6

The maximum length of the value for a manipulation is 299 characters.

A.2 Header Types

A.2.1 Accept

An example of the header is shown below:

```
Accept: application/sdp
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	No	N/A
Keyword	Sub Types		Attributes	
N/A	N/A		N/A	

Below is a header manipulation example:

Rule:	If the supported header does not contain 'mm,100rel,timer,replaces', then in all INVITE messages add an Accept header: <pre>MessageManipulations 8 = 1, invite, header.supported != 'mm,100rel,timer,replaces', header.accept, 0, ' application/x-private ', 0;</pre>
Result:	Accept: application/x-private

A.2.2 Accept-Language

An example of the header is shown below:

```
Accept-Language: da, en-gb;q=0.8, en;q=0.7
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	No	N/A
Keyword	Sub Types		Attributes	
N/A	N/A		N/A	

Below is a header manipulation example:

Rule:	Add a new Language header to all INVITE messages: <pre>MessageManipulations 0 = 1, invite, , header.accept-language, 0, 'en, il, cz, it', 0;</pre>
Result:	Accept-Language: en, il, cz, it

A.2.3 Allow

An example of the header is shown below:

```
Allow: REGISTER, OPTIONS, INVITE, ACK, CANCEL, BYE, NOTIFY, PRACK, REFER, INFO, SUBSCRIBE
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	No	N/A
Keyword	Sub Types		Attributes	
N/A	N/A		Read/Write	

Below is a header manipulation example:

Rule:	Add an Allow header to all INVITE messages: <pre>MessageManipulations 0 = 1, invite, , header.allow, 0, 'REGISTER, OPTIONS, INVITE, ACK, CANCEL, BYE, NOTIFY, PRACK, REFER, INFO, SUBSCRIBE, XMESSAGE', 0;</pre>
Result:	Allow: REGISTER, OPTIONS, INVITE, ACK, CANCEL, BYE, NOTIFY, PRACK, REFER, INFO, SUBSCRIBE, XMESSAGE

A.2.4 Call-Id

An example of the header is shown below:

```
Call-ID: JNIYXOLCAIWTRHWOINNRR@10.132.10.128
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	No	No	No	NA

Keyword	Sub Types	Attributes
ID	String	Read Only

Below is a header manipulation example:

Rule:	Add a proprietary header to all INVITE messages using the data in the Call-id header: <pre>MessageManipulations 0 = 1, invite, , header.Xitsp-abc, 0, header.call-id, 0;</pre>
Result:	Xitsp-abc: GIAPOFWRBQKJVAETIODI@10.132.10.128

A.2.5 Contact

An example of the header is shown below:

```
Contact: <sip:555@10.132.10.128:5080>
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	No	No	No	8

Keyword	Sub Types	Attributes
Expires	Integer	Read/Write
GruuContact	String	Read/Write
IsGRUU	Boolean	Read/Write
Name	String	Read/Write
Param	Param	Read/Write
URL	'URL' on page 85	Read/Write*

* Host name cannot be modified in the URL structure for a contact header.

Below is a header manipulation example:

Rule:	Change the user part in the Contact header in all INVITE messages to fred: <pre>MessageManipulations 0 = 1, Invite, ,header.contact.url.user, 2, 'fred', 0;</pre>
Result:	Contact: <sip:fred@10.132.10.128:5070>

A.2.6 Cseq

An example of the header is shown below:

```
CSeq: 1 INVITE
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	No	No	No	N/A

Keyword	Sub Types	Attributes
Num	Integer	Read Only
Type	String	Read Only

Below is a header manipulation example:

Rule:	If the Cseq number is 1, then modify the user in the Contact header to fred. <pre>MessageManipulations 0 = 1, Invite, header.cseq.num=='1',header.contact.url.user, 2, 'fred', 0;</pre>
Result:	<pre>Contact: <sip:fred@10.132.10.128:5070></pre>

A.2.7 Diversion

An example of the header is shown below:

```
Diversion: <sip:654@IPG2Host;user=phone>;reason=user-
busy;screen=no;privacy=off;counter=1
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	3

Keyword	Sub Types	Attributes
Name	String	Read/Write
Param	Param	Read/Write
Privacy	Enum Privacy (see 'Privacy' on page 89)	Read/Write
Reason	Enum Reason (see 'Reason (Diversion)' on page 89)	Read/Write
Screen	Enum Screen (see 'Screen' on page 92)	Read/Write
URL	URL Structure (see 'URL' on page 85)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a Diversion header to all INVITE messages: <pre>MessageManipulations 0 = 1, invite, , header.Diversion, 0, '<tel:+101>;reason=unknown; counter=1;screen=no;privacy=off', 0;</pre>
	Result:	Diversion: <tel:+101>;reason=user-busy;screen=no;privacy=off;counter=1
Example 2	Rule:	Modify the Reason parameter in the header to 1, see 'Reason (Diversion)' on page 89 for possible values: <pre>MessageManipulations 1 = 1, invite, , header.Diversion.reason, 2, '1', 0;</pre>
	Result:	Diversion: <tel:+101>;reason=user-busy;screen=no;privacy=off;counter=1
Example 3	Rule:	The URL in the Diversion header is modified to that which is contained in the header URL: <pre>MessageManipulations 2 = 1, invite, , header.Diversion.URL, 2, header.from.url, 0;</pre>
	Result:	Diversion:<sip:555@IPG2Host;user=phone>;reason=user-busy;screen=no;privacy=off;counter=1

A.2.8 Event

An example of the header is shown below:

```
Event: foo; id=1234
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
EventKey	Event Structure (see 'Event Structure' on page 83)	Read/Write
Param	Param	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add parameter itsp-abc=voip to the Event header: <pre>MessageManipulations 0 = 1, invite, , header.event.param.itsp-abc, 0, 'voip' , 0;</pre>
	Result:	Event: foo;id=1234;itsp-abc=voip
Example 2	Rule:	Modify the Event ID string: <pre>MessageManipulations 1 = 1, invite, , header.event.EVENTKEY.id, 2, '5678', 0;</pre>
	Result:	Event: foo;id=5678;
Example 3	Rule:	Modify the Event package enum: <pre>MessageManipulations 2 = 1, invite, , header.event.EVENTKEY.EVENTPACKAGE, 2, '2', 0;</pre>
	Result:	Event: refer;id=5678

A.2.9 From

An example of the header is shown below:

```
From: <sip:555@10.132.10.128;user=phone>;tag=YQLQHCAAYBWKKRVIMWEQ
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	No	No	No	NA

Keyword	Sub Types	Attributes
Name	String	Read/Write
Param	Param	Read/Write
tag	String	Read Only
URL	URL Structure (refer to 'URL' on page 85)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Change the user part of the From header if the user is not 654: <pre>MessageManipulations 8 = 1, invite, header.from.url.user != '654', header.from.url.user, 2, 'fred', 0;</pre>
	Result:	From: <sip:fred@IPG2Host;user=phone>;tag=1c20161
Example 2	Rule:	Add a new parameter to the From header called p1 and set its value to myParameter: <pre>MessageManipulations 1 = 1, Invite.request, , header.from.param.p1, 0, 'myParameter', 0;</pre>
	Result:	From: <sip:fred@IPG2Host;user=phone>;p1=myParameter;tag=1c5891
Example 3	Rule:	Modify the URL in the From header: <pre>MessageManipulations 0 = 1, any, , header.from.url, 2, 'sip:3200@110.18.5.41;tsunami=0', 0;</pre>
	Result:	From: <sip:3200@110.18.5.41;user=phone;tsunami=0>;tag=1c23750

A.2.10 History-Info

An example of the header is shown below:

```
History-Info: <sip:UserA@ims.example.com;index=1>
```

```
History-Info: <sip:UserA@audc.example.com;index=2>
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	20

Keyword	Sub Types	Attributes
HistoryInfo	String	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a new History-Info header to the message: MessageManipulations 0 = 1, any, , header.History-Info, 0, '<sip:UserA@audc.mydomain.com;index=3>', 0
	Result:	History-Info:sip:UserA@ims.example.com;index=1 History-Info:sip:UserA@audc.example.com;index=2 History-Info: <sip:UserA@audc.mydomain.com;index=3>
Example 2	Rule:	Delete an unwanted History-Info header from the message: MessageManipulations 0 = 1, any, , header.History-Info.1, 1, , 0;
	Result:	History-Info: <sip:UserA@ims.example.com;index=1>
Example 3	Rule:	Delete all History-Info from the message: MessageManipulations 0 = 1, any, , header.History-Info, 1, , 0;
	Result:	All history-info headers are removed.

A.2.11 Min-Se and Min-Expires

An example of the header is shown below:

```
Min-SE: 3600
Min-Expires: 60
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Param	Param	Read/Write
Time	Integer	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a Min-Se header to the message using a value of 50: MessageManipulations 1 = 1, any, , header.min-se, 0, '50', 0;
	Result:	Min-SE: 50
Example 2	Rule:	Modify a Min-Expires header with the min-expires value and add an additional 0: MessageManipulations 0 = 1, Invite, , header.Min-Expires.param, 2, header.Min-Expires.time + '0', 0;
	Result:	Min-Expires: 340;3400
Example 3	Rule:	Modify a Min-Expires header changing the time to 700: MessageManipulations 0 = 1, Invite, , header.Min-Expires.time, 2, '700', 0;
	Result:	Min-Expires: 700

A.2.12 P-Asserted-Identity

An example of the header is shown below:

```
P-Asserted-Identity: Jane Doe <sip:567@itsp.com>
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	1

Keyword	Sub Types	Attributes
URL	URL Structure (see 'URL' on page 85)	Read/Write
Name	String	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a P-Asserted-Id header to all INVITE messages: <pre>MessageManipulations 2 = 1, invite, , header.p-asserted-identity, 0, '<sip:567@itsp.com>', 0;</pre>
	Result:	<pre>P-Asserted-Identity: <sip:567@itsp.com></pre>
Example 2	Rule:	Modify the P-Asserted-Identity host name to be the same as the host name in the To header: <pre>MessageManipulations 2 = 1, invite, , header.p-asserted-identity.URL.host, 2, header.to.url.host, 0;</pre>
	Result:	<pre>P-Asserted-Identity: <sip:567@10.132.10.128></pre>

A.2.13 P-Associated-Uri

An example of the header is shown below:

```
P-Associated-URI: <sip:12345678@itsp.com>
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	1

Keyword	Sub Types	Attributes
Name	String	Read/Write
Param	Param	Read/Write
URL	URL Structure (see 'URL' on page 85)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a P-Associated-Uri header to all INVITE response messages: <pre>MessageManipulations 5 = 1, register.response, ,header.P-Associated-URI, 0, '<sip:admin@10.132.10.108>', 0;</pre>
------------------	--------------	--

	Result:	P-Associated-URI:<sip:admin@10.132.10.108>
Example 2	Rule:	Modify the user portion of the URL in the header to 'alice': <pre>MessageManipulations 5 = 1, register.response, ,header.P-Associated-URI.url.user, 2, 'alice', 0;</pre>
	Result:	P-Associated-URI:<sip:alice@10.132.10.108>

A.2.14 P-Called-Party-Id

An example of the header is shown below:

```
P-Called-Party-ID: <sip:2000@gw.itsp.com>
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Name	String	Read/Write
URL	URL Structure (see 'URL' on page 85)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a P-Called-Party-Id header to all messages: <pre>MessageManipulations 8 = 1, any, , header.p-called- party-id, 0, 'sip:2000@MSBG.ITSP.COM', 0;</pre>
	Result:	P-Called-Party-ID: <sip:2000@gw.itsp.com>
Example 2	Rule:	Append a parameter (p1) to all P-Called-Party-Id headers: <pre>MessageManipulations 9 = 1, invite, , header.p-called- party-id.param.p1, 0, 'red', 0;</pre>
	Result:	P-Called-Party-ID: <sip:2000@gw.itsp.com>;p1=red
Example 3	Rule:	Add a display name to the P-Called-Party-Id header: <pre>MessageManipulations 3 = 1, any, , header.p-called- party-id.name, 2, 'Secretary', 0;</pre>
	Result:	P-Called-Party-ID: Secretary <sip:2000@gw.itsp.com>;p1=red

A.2.15 P-Charging-Vector

An example of the header is shown below:

```
P-Charging-Vector: icid-value=1234bc9876e; icid-generated-at=192.0.6.8; orig-ioi=home1.net
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	No	N/A

Keyword	Sub Types	Attributes
N/A	N/A	N/A

Below are header manipulation examples:

Rule:	Add a P-Charging-Vector header to all messages: <pre>MessageManipulations 1 = 1, any, , header.P-Charging-Vector, 0, 'icid-value=1234bc9876e; icid-generated-at=192.0.6.8; orig-ioi=home1.net', 0;</pre>
Result:	P-Charging-Vector: icid-value=1234bc9876e; icid-generated-at=192.0.6.8; orig-ioi=home1.net

A.2.16 P-Preferred-Identity

An example of the header is shown below:

```
P-Preferred-Identity: "Cullen Jennings" <sip:fluffy@abc.com>
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Name	String	Read/Write
URL	URL Structure (see 'URL' on page 85)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a P-Preferred-Identity header to all messages: <pre>MessageManipulations 1 = 1, any, , header.P-Preferred-Identity, 0, 'Cullen Jennings <sip:fluffy@abc.com>', 0;</pre>
	Result:	P-Preferred-Identity: "Cullen Jennings" <sip:fluffy@abc.com>
Example 2	Rule:	Modify the display name in the P-Preferred-Identity header: <pre>MessageManipulations 2 = 1, any, , header.P-Preferred-Identity.name, 2, 'Alice Biloxi', 0;</pre>
	Result:	P-Preferred-Identity: "Alice Biloxi" <sip:fluffy@abc.com>

A.2.17 Privacy

An example of the header is shown below:

```
Privacy: none
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	No	N/A

Keyword	Sub Types	Attributes
privacy	'Privacy Struct' on page 84	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a privacy header and set it to 'session': <pre>MessageManipulations 1 = 1, any, , header.Privacy, 0, 'session', 0;</pre>
	Result:	Privacy: session
Example 2	Rule:	Add 'user' to the list: <pre>MessageManipulations 1 = 3, , , header.privacy.privacy.user, 2, '1', 0;</pre>
	Result:	Privacy: session;user

A.2.18 Proxy-Require

An example of the header is shown below:

```
Proxy-Require: sec-agree
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Capabilities	SIPCapabilities Struct	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a Proxy-Require header to the message: <pre>MessageManipulations 1 = 1, any, , header.Proxy-Require, 0, 'sec-agree', 0;</pre>
	Result:	Proxy-Require: sec-agree
Example 2	Rule:	Modify the Proxy-Require header to itsip.com: <pre>MessageManipulations 2 = 1, any, , header.Proxy-Require, 2, 'itsip.com' , 0;</pre>
	Result:	Proxy-Require: itsip.com

Example 3	Rule:	Set the privacy options tag in the Proxy-Require header: <pre>MessageManipulations 0 = 0, invite, , header.Proxy-Require.privacy, 0, 1 , 0;</pre>
	Result:	Proxy-Require: itsp.com, privacy

A.2.19 Reason

An example of the header is shown below:

```
Reason: SIP ;cause=200 ;text="Call completed elsewhere"
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
MLPP	MLPP Structure (see 'MLPP' on page 83)	Read/Write
Reason	Reason Structure (see 'Reason Structure' on page 84)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a Reason header: <pre>MessageManipulations 0 = 1, any, ,header.reason, 0, 'SIP;cause=200;text="Call completed elsewhere"', 0;</pre>
	Result:	Reason: SIP ;cause=200 ;text="Call completed elsewhere"
Example 2	Rule:	Modify the reason cause number: <pre>MessageManipulations 0 = 1, any, ,header.reason.reason.cause, 0, '200', 0;</pre>
	Result:	Reason: Q.850 ;cause=180 ;text="Call completed elsewhere"
Example 3	Rule:	Modify the cause number: <pre>MessageManipulations 0 = 1, any, ,header.reason.reason.reason, 0, '483', 0;</pre>
	Result:	Reason: SIP ;cause=483 ;text="483 Too Many Hops"

Note: The protocol (SIP or Q.850) is controlled by setting the cause number to be greater than 0. If the cause is 0, then the text string (see Example 3) is generated from the reason number.

A.2.20 Referred-By

An example of the header is shown below:

```
Referred-By: <sip:referrer@referrer.example>;
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
param	param	Read/Write
URL	URL Structure (see 'URL' on page 85)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a Referred-By header: <pre>MessageManipulations 0 = 1, any, ,header.Referred-By, 0, '<sip:refer@refer.com>', 0;</pre>
	Result:	Referred-By: <sip: sip:refer@refer.com>
Example 2	Rule:	Modify the host: <pre>MessageManipulations 0 = 1, any, ,header.Referred-By.url.host, 0, 'yahoo.com', 0;</pre>
	Result:	Referred-By: <sip:refer@yahoo.com>
Example 3	Rule:	Add a new parameter to the header: <pre>MessageManipulations 0 = 1, any, ,header.Referred-By.param.pl, 0, 'fxs', 0</pre>
	Result:	Referred-By: <sip:referrer@yahoo.com>;pl=fxs

A.2.21 Refer-To

An example of the header is shown below:

```
Refer-To: sip:conference1@example.com
```

```
Refer-To:
```

```
<sips:a8342043f@atlanta.example.com?Replaces=12345601%40atlanta.example.com%3bfrom-tag%3d314159%3bto-tag%3d1234567>
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	No	N/A

Keyword	Sub Types	Attributes
N/A	N/A	N/A

Below are header manipulation examples:

Example 1	Rule:	Add a basic header: <pre>MessageManipulations 0 = 1, any, ,header.Refer-to, 0, '<sip:referto@referto.com>', 0;</pre>
	Result:	Refer-To: <sip:referto@referto.com>
Example 2	Rule:	Add a Refer-To header with URI headers: <pre>MessageManipulations 0 = 1, any, ,header.Refer-to, 0, '<sips:a8342043f@atlanta.example.com?Replaces=12345601 %40atlanta.example.com%3bfrom-tag%3d314159%3bto- tag%3d1234567>', 0;</pre>
	Result:	Refer-To: <sips:a8342043f@atlanta.example.com?Replaces=12345601%40atlanta.example.com%3bfrom-tag%3d314159%3bto-tag%3d1234567>

A.2.22 Remote-Party-Id

An example of the header is shown below:

```
Remote-Party-ID: "John Smith"
<sip:john.smith@itisp.com>;party=calling; privacy=full;screen=yes
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	3

Keyword	Sub Types	Attributes
Counter	Integer	Read/Write
Name	String	Read/Write
NumberPlan	Enum Number Plan (see 'Number Plan' on page 88)	Read/Write
NumberType	Enum Number Type (see 'NumberType' on page 88)	Read/Write
Param	Param	Read/Write
Privacy	Enum Privacy (see 'Privacy' on page 89)	Read/Write
Reason	Enum Reason (RPI) (see 'Reason (Remote-Party-Id)' on page 92)	Read/Write
Screen	Enum Screen (see 'Screen' on page 92)	Read/Write
ScreenInd	Enum ScreenInd (see 'ScreenInd' on page 92)	Read/Write
URL	URL Structure (see 'URL' on page 85)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a Remote-Party-Id header to the message: <pre>MessageManipulations 0 = 1, invite, ,header.REMOTE- PARTY-ID, 0, '<sip:999@10.132.10.108>;party=calling', 0;</pre>
	Result:	Remote-Party-ID: <sip:999@10.132.10.108>;party=calling;npi=0;ton=0

Example 2	Rule:	Create a Remote-Party-Id header using the url in the From header using the + operator to concatenate strings: <pre>MessageManipulations 0 = 1, Invite, ,header.REMOTE-PARTY-ID, 0, '<' + header.from.url + '>' + ' ;party=calling', 0;</pre>
	Result:	Remote-Party-ID: <sip:555@10.132.10.128;user=phone>;party=calling;npi=0;ton=0
Example 3	Rule:	Modify the number plan to 1 (ISDN): <pre>MessageManipulations 1 = 1, invite, , header.Remote-Party-ID.numberplan, 2, '1', 0;</pre>
	Result:	Remote-Party-ID: <sip:555@10.132.10.128;user=phone>;party=calling;npi=1;ton=0
Example 4	Rule:	Modify the Remote-Party-Id header to set the privacy parameter to 1 (Full): <pre>MessageManipulations 1 = 1, invite, , header.Remote-Party-ID.privacy, 2, '1', 0;</pre>
	Result:	Remote-Party-ID: <sip:555@10.132.10.128;user=phone>;party=calling;privacy=full;npi=0;ton=0

A.2.23 Request-Uri

An example of the header is shown below:

```
sip:alice:secretword@atlanta.com;transport=tcp  
SIP/2.0 486 Busy Here
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	No	No	Yes	NA

Keyword	Sub Types	Attributes
Method	String	Read/Write
MethodType	Enum: <ul style="list-style-type: none"> ▪ 5: INVITE ▪ 6: REINVITE ▪ 7: BYE ▪ 8: OPTIONS ▪ 9: ACK ▪ 10: CANCEL ▪ 11: REGISTER ▪ 12: INFO ▪ 13: MESSAGE ▪ 14: NOTIFY ▪ 15: REFER ▪ 16: SUBSCRIBE ▪ 17: PRACK ▪ 18: UPDATE ▪ 19: PUBLISH ▪ 21: SERVICE 	Read/Write
URI	String	Read/Write

Keyword	Sub Types	Attributes
URL	URL Structure (see 'URL' on page 85)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Test the Request-URI transport type. If 1 (TCP), then modify the URL portion of the From header: <pre>MessageManipulations 1 = 1, Invite.request, header.REQUEST-URI.url.user == '101', header.REMOTE- PARTY-ID.url, 2, 'sip:3200@110.18.5.41;tusunami=0', 0;</pre>
	Result:	Remote-Party-ID: <pre><sip:3200@110.18.5.41;tusunami=0>;party=calling;npi=0; ton=0</pre>
Example 2	Rule:	If the method type is 5 (INVITE), then modify the Remote-Party-Id header: <pre>MessageManipulations 2 = 1, Invite.request, header.REQUEST-URI.methodtype == '5', header.REMOTE- PARTY-ID.url, 2, 'sip:3200@110.18.5.41;tusunami=0', 0;</pre>
	Result:	Remote-Party-ID: <pre><sip:3200@110.18.5.41;tusunami=0>;party=calling;npi=0; ton=0</pre>
Example 3	Rule:	For all request URI's whose method types are 488, modify the message type to a 486: <pre>MessageManipulations 1 = 1, , header.request- uri.methodtype=='488', header.request-uri.methodtype, 2, '486', 0;</pre>
	Result:	SIP/2.0 486 Busy Here

A.2.24 Require

An example of the header is shown below:

```
Require: 100rel
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Capabilities	SIPCapabilities Struct	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a Require header to all messages: <pre>MessageManipulations 1 = 1, , ,header.require, 0, 'early-session,em,replaces', 0;</pre>
	Result:	Require: em,replaces,early-session
Example 2	Rule:	If a Require header exists, then delete it: <pre>MessageManipulations 2 = 1, Invite, header.require exists ,header.require, 1, '', 0;</pre>
	Result:	The Require header is deleted.

Example 3	Rule:	Set the early media options tag in the header: <pre>MessageManipulations 0 = 0, invite, , header.require.earlymedia, 0, 1 , 0;</pre>
	Result:	Require: em,replaces,early-session, early-media
Example 4	Rule:	Set the privacy options tag in the Require header: <pre>MessageManipulations 0 = 0, invite, , header.require.privacy, 0, 1 , 0;</pre>
	Result:	Require: em,replaces,early-session, privacy

A.2.25 Resource-Priority

An example of the header is shown below:

```
Resource-Priority: wps.3
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	2

Keyword	Sub Types	Attributes
Namespace	String	Read/Write
RPriority	String	Read/Write

A.2.26 Retry-After

An example of the header is shown below:

```
Retry-After: 18000
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Time	Integer	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a Retry-After header: <pre>MessageManipulations 2 = 1, Invite, ,header.Retry- After, 0, '3600', 0;</pre>
	Result:	Retry-After: 3600
Example 2	Rule:	Modify the Retry-Time in the header to 1800: <pre>MessageManipulations 3 = 1, Invite, ,header.Retry- After.time, 2, '1800', 0;</pre>
	Result:	Retry-After: 1800

A.2.27 Server or User-Agent

An example of the header is shown below:

```
User-Agent: Sip Message Generator V1.0.0.5
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
N/A	N/A	N/A

Below are header manipulation examples:

Example 1	Rule:	Remove the User-Agent header: <pre>MessageManipulations 2 = 1, Invite, ,header.user-agent, 1, '', 0;</pre>
	Result:	The header is removed.
Example 2	Rule:	Change the user agent name in the header: <pre>MessageManipulations 3 = 1, Invite, ,header.user-agent, 2, 'itsp analogue gateway', 0;</pre>
	Result:	User-Agent: itsp analog gateway

A.2.28 Service-Route

An example of the header is shown below:

```
Service-Route: <sip:P2.HOME.EXAMPLE.COM;lr>,  
<sip:HSP.HOME.EXAMPLE.COM;lr>
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	7

Keyword	Sub Types	Attributes
ServiceRoute	String	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add two Service-Route headers: <pre>MessageManipulations 1 = 1, Invite, ,header.service-route, 0, '<P2.HOME.EXAMPLE.COM;lr>', 0; MessageManipulations 2 = 1, Invite, ,header.service-route, 0, '<sip:HSP.HOME.EXAMPLE.COM;lr>', 0;</pre>
	Result:	Service-Route: <P2.HOME.EXAMPLE.COM;lr> Service-Route: <sip:HSP.HOME.EXAMPLE.COM;lr>
Example 2	Rule:	Modify the Service-Route header in list entry 1: <pre>MessageManipulations 3 = 1, Invite, ,header.service-</pre>

		<code>route.1.serviceroute, 2, '<sip:itisp.com;lr>', 0;</code>
	Result:	<code>Service-Route:sip:itisp.com;lr Service-Route: <sip:HSP.HOME.EXAMPLE.COM;lr></code>
Example 3	Rule:	Modify the Service-Route header in list entry 0: <code>MessageManipulations 4 = 1, Invite, ,header.service- route.0.serviceroute, 2, '<sip:home.itisp.com;lr>', 0;</code>
	Result:	<code>Service-Route:sip:home.itisp.com;lr Service-Route: <sip:itisp.com;lr></code>

A.2.29 Session-Expires

An example of the header is shown below:

```
Session-Expires: 480
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Param	Param	Read/Write
Refresher	Enum Refresher (see 'Refresher' on page 92)	Read/Write
Time	Integer	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add a Session-Expires header: <code>MessageManipulations 0 = 1, any, , header.Session- Expires, 0, '48' + '0', 0;</code>
	Result:	<code>Session-Expires: 480</code>
Example 2	Rule:	Modify the Session-Expires header to 300: <code>MessageManipulations 1 = 1, any, , header.Session- Expires.time, 2, '300', 0;</code>
	Result:	<code>Session-Expires: 300</code>
Example 3	Rule:	Add a param called longtimer to the header: <code>MessageManipulations 1 = 1, any, , header.Session- Expires.param.longtimer, 0, '5', 0;</code>
	Result:	<code>Session-Expires: 480;longtimer=5</code>
Example 4	Rule:	Set the refresher to 1 (UAC): <code>MessageManipulations 3 = 1, any, , header.session- expires.refresher, 2, '1', 0;</code>
	Result:	<code>Session-Expires: 300;refresher=uac;longtimer=5</code>

A.2.30 Subject

An example of the header is shown below:

```
Subject: A tornado is heading our way!
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Subject	String	Read/Write

Below is a header manipulation example:

Rule:	Add a Subject header: <pre>MessageManipulations 0 = 1, any, , header.Subject, 0, 'A tornado is heading our way!', 0;</pre>
Result:	Subject: A tornado is heading our way!

A.2.31 Supported

An example of the header is shown below:

```
Supported: early-session
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Capabilities	SIPCapabilities Struct	Read/Write

Below is a header manipulation example:

Example 1	Rule:	Add a Supported header: <pre>MessageManipulations 1 = 1, Invite, ,header.supported, 0, 'early-session, 0;</pre>
	Result:	Supported: early-session
Example 2	Rule:	Set path in the Supported headers options tag: <pre>MessageManipulations 0 = 0, invite, , header.supported.path, 0, true, 0;</pre>
	Result:	Supported: early-session, path

A.2.32 To

An example of the header is shown below:

```
To: <sip:101@10.132.10.128;user=phone>
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	No	No	No	NA

Keyword	Sub Types	Attributes
Name	String	Read/Write
Param	Param	Read/Write
tag	String	Read Only
URL	URL Structure (refer to 'URL' on page 85)	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Set the user phone Boolean to be false in the To header's URL: <pre>MessageManipulations 4 = 1, invite.request, , header.to.url.UserPhone, 2, '0', 0;</pre>
	Result:	To: <sip:101@10.132.10.128>
Example 2	Rule:	Change the URL in the To header: <pre>MessageManipulations 4 = 1, invite.request, , header.to.url.UserPhone, 2, '0', 0;</pre>
	Result:	To: <sip:101@10.20.30.60:65100>
Example 3	Rule:	Set the display name to 'Bob': <pre>MessageManipulations 5 = 1, invite.request, , header.to.name, 2, 'Bob', 0;</pre>
	Result:	To: "Bob D" sip:101@10.20.30.60:65100
Example 4	Rule:	Add a proprietary parameter to all To headers: <pre>MessageManipulations 6 = 1, invite.request, , header.to.param.artist, 0, 'singer', 0;</pre>
	Result:	To: "Bob D" <sip:101@10.20.30.60:65100>;artist=singer

A.2.33 Unsupported

An example of the header is shown below:

```
Unsupported: 100rel
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	N/A

Keyword	Sub Types	Attributes
Capabilities	SIPCapabilities Struct	Read/Write

Below are header manipulation examples:

Example 1	Rule:	Add an Unsupported header to the message: <pre>MessageManipulations 0 = 1, Invite.response, ,header.unsupported, 0, 'early-session, myUnsupportedHeader', 0;</pre>
	Result:	Unsupported: early-session
Example 2	Rule:	Modify the Unsupported header to 'replaces': <pre>MessageManipulations 1 = 1, Invite, ,header.unsupported, 2, 'replaces', 0;</pre>
	Result:	Unsupported: replaces
Example 3	Rule:	Set the path in the Unsupported headers options tag: <pre>MessageManipulations 0 = 0, invite, , header.unsupported.path, 0, true, 0;</pre>
	Result:	Unsupported: replaces, path

A.2.34 Via

An example of the header is shown below:

```
Via: SIP/2.0/UDP 10.132.10.128;branch=z9hG4bKUGOKMQPAVFKTAVYDQPTB
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	No	No	No	10

Keyword	Sub Types	Attributes
Alias	Boolean	Read Only
Branch	String	Read Only
Host	Host Structure (see 'Host' on page 83)	Read Only
MAddrIp	gnTIPAddress	Read Only
Param	Param	Read/Write

Keyword	Sub Types	Attributes
Port	Integer	Read Only
TransportType	Enum TransportType (see 'TransportType' on page 93)	Read Only

Below is a header manipulation example:

Rule:	Check the transport type in the first Via header and if it's set to UDP, then modify the From header's URL: <pre>MessageManipulations 0 = 1, Invite.request, header.VIA.0.transporttype == '0', header.from.url, 2, 'sip:3200@110.18.5.41;tusunami=0', 0;</pre>
Result:	From: <sip:3200@110.18.5.41;user=phone;tusunami=0>;tag=1c7874

A.2.35 Warning

An example of the header is shown below:

```
Warning: 307 isi.edu "Session parameter 'foo' not understood"
Warning: 301 isi.edu "Incompatible network address type 'E.164'"
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	1

Keyword	Sub Types	Attributes
N/A	N/A	N/A

Below is a header manipulation example:

Rule:	Add a Warning header to the message: <pre>MessageManipulations 0 = 1, Invite.response.180, ,header.warning, 0, 'Incompatible 380', 0;</pre>
Result:	Warning: Incompatible 380

A.2.36 Unknown Header

An Unknown header is a SIP header that is not included in this list of supported headers. An example of the header is shown below:

```
MYEXP: scooby, doo, goo, foo
```

The header properties are shown in the table below:

Header Level Action	Add	Delete	Modify	List Entries
Operations Supported	Yes	Yes	Yes	3

Keyword	Sub Types	Attributes
N/A	N/A	N/A

Below are header manipulation examples:

Example 1	Rule:	Add a custom header to all messages: <pre>MessageManipulations 0 = 1, , , header.myExp, 0, 'scooby, doo, goo, foo', 0;</pre>
	Result:	myExp: scooby, doo, goo, foo
Example 2	Rule:	Create a new header called "media", whose value is a concatenation of the time in the Session-Expires header, followed by "000", followed by ";refresher=", followed by "1" or "2", depending on whether the refresher parameter in the Session-Expires header has the value 'UAC' or 'UAS': <pre>MessageManipulations 0 = 1, any, , header.media, 0, header.Session-Expires.time + '000' + ';refresher=' + header.Session-Expires.Refresher, 0;</pre>
	Result:	media: 3600000;refresher=1
Example 3	Rule:	Create lists of Unknown headers: <pre>MessageManipulations 1 = 1, Invite, , header.myExp.1, 0, 'scooby, doo, goo, foo1', 0;</pre> <pre>MessageManipulations 2 = 1, Invite, , header.myExp.2, 0, 'scooby, doo, goo, foo2', 0;</pre>
	Result:	myExp: scooby, doo, goo, foo1 myExp: scooby, doo, goo, foo2
Example 4	Rule:	Remove the SIP header 'colour' from INVITE messages: <pre>MessageManipulations 1 = 1, Invite, , header.colour, 1, '', 0;</pre>
	Result:	The colour header is removed.

A.3 Structure Definitions

A.3.1 Event Structure

The Event structure is used in the Event header (see 'Event' on page 63).

Table A-2: Event Structure

Keyword	Sub Types	Attributes
EventPackage	Enum Event Package (see 'Event Package' on page 87)	Read/Write
EventPackageString*	String	Read/Write
Id	String	Read/Write

Event package string is used for packages that are not listed in the Enum Event Package table (see 'Event Package' on page 87).

A.3.2 Host

The host structure is applicable to the URL structure (see 'URL' on page 85) and the Via header (see 'Via' on page 80).

Table A-3: Host Structure

Keyword	Sub Types
Port	Short
Name	String

A.3.3 MLPP

This structure is applicable to the Reason header (see 'Reason' on page 70).

Table A-4: MLPP Structure

Keyword	Sub Types
Type	Enum MLPP Reason (see 'MLPP Reason Type' on page 88)
Cause	Int

A.3.4 Privacy Struct

This structure is applicable to the Privacy header (see 'Privacy' on page 69).

Table A-5: Privacy Structure

Keyword	Sub Types
NONE	Boolean
HEADER	Boolean
SESSION	Boolean
USER	Boolean
CRITICAL	Boolean
IDENTITY	Boolean
HISTORY	Boolean

A.3.5 Reason Structure

This structure is applicable to the Reason header (see 'Reason' on page 70).

Table A-6: Reason Structure

Keyword	Sub Types
Reason	Enum Reason (see 'Reason (Reason Structure)' on page 89)
Cause	Int
Text	String

A.3.6 SIPCapabilities

This structure is applicable to the following headers:

- Supported (see 'Supported' on page 78)
- Require (see 'Require' on page 74)
- Proxy-Require (see 'Proxy-Require' on page 69)
- Unsupported (see 'Unsupported' on page 80)

Table A-7: SIPCapabilities Structure

Keyword	Sub Types
EarlyMedia	Boolean
ReliableResponse	Boolean
Timer	Boolean
EarlySession	Boolean
Privacy	Boolean
Replaces	Boolean

Keyword	Sub Types
History	Boolean
Unknown	Boolean
GRUU	Boolean
ResourcePriority	Boolean
TargetDialog	Boolean
SdpAnat	Boolean

A.3.7 URL

This structure is applicable to the following headers:

- Contact (see 'Contact' on page 61)
- Diversion (see 'Diversion' on page 62)
- From (see 'From' on page 64)
- P-Asserted-Identity (see 'P-Asserted-Identity' on page 66)
- P-Associated-Uri (see 'P-Associated-Uri' on page 66)
- P-Called-Party-Id (see 'P-Called-Party-Id' on page 67)
- P-Preferred-Identity (see 'P-Preferred-Identity' on page 68)
- Referred-By (see 'Referred-By' on page 71)
- Refer-To (see 'Refer-To' on page 71)
- Remote-Party-Id (see 'Remote-Party-Id' on page 72)
- Request-Uri (see 'Request-Uri' on page 73)
- To (see 'To' on page 79)

Table A-8: URL Structure

Keyword	Sub Types
Type	Enum Type (see 'Type' on page 93)
Host	Host Structure (see 'Host' on page 83)
MHost	Structure
UserPhone	Boolean
LooseRoute	Boolean
User	String
TransportType	Enum Transport (see 'TransportType' on page 93)
Param	Param

A.4 Random Type

Manipulation rules can include random strings and integers. An example of a manipulation rule using random values is shown below:

```
MessageManipulations 4 = 1, Invite.Request, , Header.john, 0,
rand.string.56.A.Z, 0;
```

In this example, a header called "john" is added to all INVITE messages received by the device and a random string of 56 characters containing characters A through Z is added to the header.

For a description of using random values, see the subsequent subsections.

A.4.1 Random Strings

The device can generate random strings in header manipulation rules that may be substituted where the type 'String' is required. The random string can include up to 298 characters and include a range of, for example, from a to z or 1 to 10. This string is used in the table's 'Action Value' field.

The syntax for using random strings is:

```
Rand.string.<number of characters in string>.<low character>.<high
character>
```

Examples:

- Rand.string.5.a.z: This generates a 5-character string using characters a through z.
- Rand.string.8.0.z: This generates an 8-character string using characters and digits.

A.4.2 Random Integers

The device can generate a random numeric value that may be substituted where the type 'Int' is required. The syntax for random numeric values is:

```
Rand.number.<low number>.<high number>
```

Examples:

- Rand.number.5.32: This generates an integer between 5 and 32

A.5 Enum Definitions

A.5.1 AgentRole

These ENUMs are applicable to the Server or User-Agent headers (see 'Server or User-Agent' on page 76).

Table A-9: Enum Agent Role

AgentRole	Value
Client	1
Server	2

A.5.2 Event Package

These ENUMs are applicable to the Server or User-Agent (see 'Server or User-Agent' on page 76) and Event (see 'Event' on page 63) headers.

Table A-10: Enum Event Package

Package	Value
TELEPHONY	1
REFER	2
REFRESH	3
LINE_STATUS	4
MESSAGE_SUMMARY	5
RTCPXR	6
SOFT_SYNC	7
CHECK_SYNC	8
PSTN	9
DIALOG_PACKAGE	10
REGISTRATION	11
START_CWT	12
STOP_CWT	13
UA_PROFILE	14
LINE_SEIZE	15

A.5.3 MLPP Reason Type

These ENUMs are applicable to the MLPP Structure (see 'MLPP' on page 83).

Table A-11: Enum MLPP Reason Type

Type	Value
PreEmption Reason	0
MLPP Reason	1

A.5.4 Number Plan

These ENUMs are applicable to the Remote-Party-Id header (see 'Remote-Party-Id' on page 72).

Table A-12: Enum Number Plan

Plan	Value
ISDN	1
Data	3
Telex	4
National	8
Private	9
Reserved	15

A.5.5 Number Type

These ENUMs are applicable to the Remote-Party-Id header (see 'Remote-Party-Id' on page 72).

Table A-13: Enum Number Type

Number Type	Value
INTERNATIONAL LEVEL2 REGIONAL	1
NATIONAL LEVEL1 REGIONAL	2
NETWORK PISN SPECIFIC NUMBER	3
SUBSCRIBE LOCAL	4
ABBREVIATED	6
RESERVED EXTENSION	7

A.5.6 Privacy

These ENUMs are applicable to the Remote-Party-Id (see 'Remote-Party-Id' on page 72) and Diversion (see 'Diversion' on page 62) headers.

Table A-14: Enum Privacy

Privacy Role	Value
Full	1
Off	2

A.5.7 Reason (Diversion)

These ENUMs are applicable to the Diversion header (see 'Diversion' on page 62).

Table A-15: Enum Reason

Reason	Value
Busy	1
No Answer	2
Unconditional	3
Deflection	4
Unavailable	5
No Reason	6
Out of service	7

A.5.8 Reason (Reason Structure)

These ENUMs are used in the Reason Structure (see 'Reason Structure' on page 84).

Table A-16: Enum Reason (Reason Structure)

Reason	Value
INVITE	5
REINVITE	6
BYE	7
OPTIONS	8
ACK	9
CANCEL	10
REGISTER	11
INFO	12
MESSAGE	13
NOTIFY	14

Reason	Value
REFER	15
SUBSCRIBE	16
PRACK	17
UPDATE	18
PUBLISH	19
LAST_REQUEST	20
TRYING_100	100
RINGING_180	180
CALL_FORWARD_181	181
QUEUED_182	182
SESSION_PROGRESS_183	183
OK_200	200
ACCEPTED_202	202
MULTIPLE_CHOICE_300	300
MOVED_PERMANENTLY_301	301
MOVED_TEMPORARILY_302	302
SEE_OTHER_303	303
USE_PROXY_305	305
ALTERNATIVE_SERVICE_380	380
BAD_REQUEST_400	400
UNAUTHORIZED_401	401
PAYMENT_REQUIRED_402	402
FORBIDDEN_403	403
NOT_FOUND_404	404
METHOD_NOT_ALLOWED_405	405
NOT_ACCEPTABLE_406	406
AUTHENTICATION_REQUIRED_407	407
REQUEST_TIMEOUT_408	408
CONFLICT_409	409
GONE_410	410
LENGTH_REQUIRED_411	411
CONDITIONAL_REQUEST_FAILED_412	412
REQUEST_TOO_LARGE_413	413
REQUEST_URI_TOO_LONG_414	414
UNSUPPORTED_MEDIA_415	415
UNSUPPORTED_URI_SCHEME_416	416
UNKNOWN_RESOURCE_PRIORITY_417	417

Reason	Value
BAD_EXTENSION_420	420
EXTENSION_REQUIRED_421	421
SESSION_INTERVAL_TOO_SMALL_422	422
SESSION_INTERVAL_TOO_SMALL_423	423
ANONYMITY_DISALLOWED_433	433
UNAVAILABLE_480	480
TRANSACTION_NOT_EXIST_481	481
LOOP_DETECTED_482	482
TOO_MANY_HOPS_483	483
ADDRESS_INCOMPLETE_484	484
AMBIGUOUS_485	485
BUSY_486	486
REQUEST_TERMINATED_487	
NOT_ACCEPTABLE_HERE_488	488
BAD_EVENT_489	489
REQUEST_PENDING_491	491
UNDECIPHERABLE_493	493
SECURITY_AGREEMENT_NEEDED_494	494
SERVER_INTERNAL_ERROR_500	500
NOT_IMPLEMENTED_501	501
BAD_GATEWAY_502	502
SERVICE_UNAVAILABLE_503	503
SERVER_TIME_OUT_504	504
VERSION_NOT_SUPPORTED_505	505
MESSAGE_TOO_LARGE_513	513
PRECONDITION_FAILURE_580	580
BUSY_EVERYWHERE_600	600
DECLINE_603	603
DOES_NOT_EXIST_ANYWHERE_604	604
NOT_ACCEPTABLE_606	606

A.5.9 Reason (Remote-Party-Id)

These ENUMs are applicable to the Remote-Party-Id header (see 'Remote-Party-Id' on page 72).

Table A-17: Enum Reason (RPI)

Reason	Value
Busy	1
Immediate	2
No Answer	3

A.5.10 Refresher

These ENUMs are used in the Session-Expires header (see 'Session-Expires' on page 77).

Table A-18: Enum Refresher

Refresher String	Value
UAC	1
UAS	2

A.5.11 Screen

These ENUMs are applicable to the Remote-Party-Id (see 'Remote-Party-Id' on page 72) and Diversion (see 'Diversion' on page 62) headers.

Table A-19: Enum Screen

Screen	Value
Yes	1
No	2

A.5.12 ScreenInd

These ENUMs are applicable to the Remote-Party-Id header (see 'Remote-Party-Id' on page 72).

Table A-20: Enum ScreenInd

Screen	Value
User Provided	0
User Passed	1
User Failed	2
Network Provided	3

A.5.13 TransportType

These ENUMs are applicable to the URL Structure (see 'URL' on page 85) and the Via header (see 'Via' on page 80).

Table A-21: Enum TransportType

TransportType	Value
UDP	0
TCP	1
TLS	2
SCTP	3

A.5.14 Type

These ENUMs are applicable to the URL Structure (see 'URL' on page 85).

Table A-22: Enum Type

Type	Value
SIP	1
Tel	2
Fax	3
SIPS	4

A.5.15 Address Presentation Restricted Indicator

These ENUMs are applicable to the phone number handling (see 'ISUP Body Manipulation' on page 43).

Table A-23: Enum Presentation Restricted Indicator

Presentation	Value
Allowed	0
Restricted	1

A.5.16 Transmission Medium Requirement

These ENUMs are applicable to the ISUP handling (see 'ISUP Body Manipulation' on page 43).

Table A-24: Enum Transmission Medium Requirement

Transmission Medium Requirement (TMR)	Value
Speech	0
64 kbits/s unrestricted	2

Transmission Medium Requirement (TMR)	Value
3.1 kHz audio	3

A.5.17 Charge Indicator

These ENUMs are applicable to the ISUP handling (see 'ISUP Body Manipulation' on page 43).

Table A-25: Enum Charge Indicator

Charge Indicator	Value
No indication	0
No charge	1
Charge	2

A.5.18 Called Party Status Indicator

These ENUMs are applicable to the ISUP handling (see 'ISUP Body Manipulation' on page 43).

Table A-26: Enum Called Party Status Indicator

Called Party Status Indicator	Value
No indication	0
Subscriber free	1

A.5.19 Called Party Category Indicator

These ENUMs are applicable to the ISUP handling (see 'ISUP Body Manipulation' on page 43).

Table A-27: Enum Called Party Category Indicator

Called Party Category Indicator	Value
Ordinary subscriber	0
Test call	40
Priority	41
Payphone	70
No indication	71

A.5.20 Event Information

These ENUMs are applicable to the ISUP handling (see 'ISUP Body Manipulation' on page 43).

Table A-28: Enum Event Information

Event Information	Value
No INFORMATION	0

Event Information	Value
ALERTING	1
PROGRESS	2
In-band information	3

A.5.21 Cause Value

These ENUMs are applicable to the ISUP handling (see 'ISUP Body Manipulation' on page 43).

Table A-29: Enum Cause Value

Cause	Value
Unallocated number	1
No route to specified transit network	2
No route to destination	3
Send special information tone	4
Misdialled trunk prefix	5
Channel unacceptable	6
Call awarded and being delivered in an established channel	7
Preemption	8
Preemption – circuit reserved for reuse	9
Normal call clearing	16
User busy	17
No user responding	18
No answer from user (user alerted)	19
Subscriber absent	20
Call rejected	21
Number changed	22
Redirection to new destination	23
Exchange routing error	25
Non-selected user clearing	26
Destination out of order	27
Invalid number format (address incomplete)	28
Facility rejected	29
Response to STATUS ENQUIRY	30
Normal, unspecified	31
No circuit/channel available	34
Network out of order	38
Permanent frame mode connection out of service	39

Cause	Value
Permanent frame mode connection operational	40
Temporary failure	41
Switching equipment congestion	42
Access information discarded	43
Requested circuit/channel not available	44
Precedence call blocked	46
Resource unavailable, unspecified	47
Quality of service not available	49
Requested facility not subscribed	50
Outgoing calls barred within CUG	53
Incoming calls barred within CUG	55
Bearer capability not authorized	57
Bearer capability not presently available	58
Inconsistency in designated outgoing access information and subscriber class	62
Service or option not available, unspecified	63
Bearer capability not implemented	65
Channel type not implemented	66
Requested facility not implemented	69
Only restricted digital information bearer capability is available	70
Service or option not implemented, unspecified	79
Invalid call reference value	81
Identified channel does not exist	82
A suspended call exists, but this call identity does not	83
Call identity in use	84
No call suspended	85
Call having the requested call identity has been cleared	86
User not member of CUG	87
Incompatible destination	88
Non-existent CUG	90
Invalid transit network selection	91
Invalid message, unspecified	95
Mandatory information element is missing	96
Message type non-existent or not implemented	97
Message not compatible with call state or message type non-existent or not implemented	98
Information element /parameter nonexistent or not	99

Cause	Value
implemented	
Invalid information element contents	100
Message not compatible with call state	101
Recovery on timer expiry	102
Parameter non-existent or not implemented, passed on	103
Message with unrecognized parameter, discarded	110
Protocol error, unspecified	111
Interworking, unspecified	127

A.5.22 Cause Location

These ENUMs are applicable to the ISUP handling (see 'ISUP Body Manipulation' on page 43).

Table A-30: Enum Cause Location

Location	Value
user (U)	0
private network serving the local user (LPN)	1
public network serving the local user (LN)	2
transit network (TN)	3
public network serving the remote user (RLN)	4
private network serving the remote user (RPN)	5
international network (INTL)	7
network beyond interworking point (BI)	10

A.5.23 Redirect Reason

These ENUMs are applicable to the ISUP handling (see 'ISUP Body Manipulation' on page 43).

Table A-31: Enum Redirect Reason

Redirect Reason	Value
Busy	1
No reply	2
Deflection	4
Deflection Immediate	5
Mobile subscriber not reachable	6
Unconditional	15

A.6 Actions and Types

Table 5-32: Action and Types

Element Type	Command Type	Command	Value Type	Remarks
IPGroup	Match	==	String	Returns true if the parameter equals to the value.
		!=	String	Returns true if the parameter not equals to the value.
		contains	String	Returns true if the string given is found in the parameter value.
		!contains	String	Returns true if the string given is not found in the parameter value.
Call-Parameter	Match	==	String	Returns true if the parameter equals to the value.
		!=	String	Returns true if the parameter not equals to the value.
		contains	String	Returns true if the string given is found in the parameter value.
		!contains	String	Returns true if the string given is not found in the parameter value.
Body	Match	==	String	Returns true if the body's content equals to the value.
		!=	String	Returns true if the body's content not equals to the value.
		contains	String	Returns true if the string given is found in the body's content.
		!contains	String	Returns true if the string given is not found in the body's content.
		exists		Returns true if this body type exists in the message.
		!exists		Returns true if this body type does not exist in the message.
	Action	Modify	String	Modifies the body content to the new value.
		Add	String	Adds a new body to the message. If such body exists the body content will be modified.
		Remove		Removes the body type from the message.
Header-List	Match	==	String *Header-list	Returns true if the header's list equals to the string.
		!=	String *Header-list	Returns true if the header's list not equals to the string.

Element Type	Command Type	Command	Value Type	Remarks
		contains	String	Returns true if the header's list contains the string.
		!contains	String	Returns true if the header's list does not contain the string.
		exists		Returns true if at least one header exists in the list.
		!exists		Returns true if no headers exist in the list.
	Action	Modify	String *Header	Removes all the headers from the list and allocates a new header with the given value.
		Add	String *Header	Adds a new header to the end of the list.
		Remove		Removes the whole list from the message.
Header	Match	==	String *Header	Returns true if a header equals to the value. The header element must not be a list.
		!=	String *Header	Returns true if a header not equals to the value. The header element must not be a list.
		contains	String	Returns true if the header contains the string.
		!contains	String	Returns true if the header does not contain the string.
		exists		Returns true if the header exists.
		!exists		Returns true if the header does not exist.
	Action	Modify	String *Header	Replaces the entire header with the new value.
		Remove		Removes the header from the message, if the header is part of a list only that header will be removed.
		Add	String *Header	Adds a new header to the end of the list.
Parameter-List	Match	==	String Parameter-list	Returns true if the header's list equals to the string.
		!=	String Parameter-list	Returns true if the header's list not equals to the string.
		contains	String	Returns true if the header's list contains the string.

Element Type	Command Type	Command	Value Type	Remarks
		!contains	String	Returns true if the header's list does not contain the string.
		exists		Returns true if at least one parameter exists in the list.
		!exists		Returns true if the header's parameter list is empty.
	Action	Modify	String Parameter-list	Replaces the current parameters with the new value.
		Add	String Parameter	Adds a new parameter to the parameter's list.
		Remove		Removes all the unknown parameters from the list.
Parameter	Match	==	String Parameter	Returns true if the header's parameter's value equals to the value.
		!=	String Parameter	Returns true if the header's parameter's value not equals to the value.
		contains	String	Returns true if the header's parameter contains the string.
		!contains	String	Returns true if the header's parameter does not contain the string.
		exists		Returns true if the header's parameter exists.
		!exists		Returns true if the header's parameter does not exist.
	Action	Modify	String Parameter	Sets the header's parameter to the value.
		Remove		Removes the header's parameter from the parameter list.
Structure	Match	==	String *Structure	Returns true if the header's structure's value equals to the value. The string given must be able to be parsed to the structure.
		!=	String *Structure	Returns true if the header's structure's value not equals to the value. The string given must be able to be parsed to the structure.
	Action	Modify	String *Structure	Sets the header's structure to the value. The string given must be able to be parsed to the structure.
Integer	Match	==	Integer	Returns true if value equals to the integer element

Element Type	Command Type	Command	Value Type	Remarks
		!=	Integer	Returns true if value not equals to the integer element
		>	Integer	Returns true if value is greater than the value.
		>=	Integer	Returns true if value is greater than or equals to the value.
		<	Integer	Returns true if value is less than the value.
		<=	Integer	Returns true if value is less than or equals to the value.
	Action	Modify	Integer	Sets the integer element to the value. A string value must be a representation of an integer.
String	Match	==	String	Returns true if the string element equals to the value.
		!=	String	Returns true if the string element not equals to the value.
		contains	String	Returns true if the value is found in the string element.
		!contains	String	Returns true if the value is not found in the string element.
		>	String	Performs a character by character compare. Returns true if the ASCII value of the character is greater than that in the value
		>=	String	Performs a character by character compare. Returns true if the ASCII value of the character is greater than or equal to that in the value
		<	String	Performs a character by character compare. Returns true if the ASCII value of the character is less than that in the value
		<=	String	Performs a character by character compare. Returns true if the ASCII value of the character is less than or equal to that in the value
	Action	Modify	String	Sets the string element to the value.
		Add prefix	String	Adds the value to the beginning of the string element.
		Remove prefix	String	Removes the value from the beginning of the string element.
		Add suffix	String	Adds the value to the end of the string element.
		Remove suffix	String	Removes the value from the end of the string element.

Element Type	Command Type	Command	Value Type	Remarks
Boolean	Match	==	Boolean	Returns true if the Boolean element equals to the value. Boolean – can be either 0 or 1.
		!=	Boolean	Returns true if the Boolean element not equals to the value. Boolean – can be either 0 or 1.
		>	Boolean	Returns true if the Boolean element not equals to the value. Boolean – can be either 0 or 1.
		<	Boolean	Returns true if the Boolean element not equals to the value. Boolean – can be either 0 or 1.
	Action	Modify	Boolean	Sets the Boolean element to the value. Boolean – can be either 0 or 1.
Attribute	Match	==	Integer *Attribute	Returns true if the attribute element equals to the value. An attribute element value must be of the same type of the attribute element.
		!=	Integer *Attribute	Returns true if the attribute element not equals to the value. An attribute element value must be of the same type of the attribute element.
	Action	Modify	Integer *Attribute	Sets the attribute element to the value. An attribute element value must be of the same type of the attribute element.

A.7 Syntax

This section describes the fields of the Message manipulations table:

Man Set ID	Message Type	Condition	Action Subject	Action Type	Action Value	Row Rule
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A.8 Message Type

Description: Rule is applied only if this is the message's type

Syntax: <method>.<message role>

■ **Method:**

- **Description:** Rule is applied only if this is the message's method
- **Syntax:** token / any
- **Examples:**
 - ◆ invite, subscribe rule applies only to INVITE messages
 - ◆ unknown unknown methods are also allowed
 - ◆ any no limitation on the method type

■ **Message role:**

- **Description:** Rule is applied only if this is the message's role
- **Syntax:** request / response.response-code / any
- **Examples:**
 - ◆ request rule applies only on requests
 - ◆ response.200 rule applies only on 200 OK messages
 - ◆ any no limitations on the type of the message

■ **Response code:**

- **Description:** Response code of the message
- **Syntax:** 1xx / 18x / 2xx / 3xx / 4xx / 5xx / 6xx / 3digit / any
- **Examples:**
 - ◆ 3xx any redirection response
 - ◆ 18x any 18x response
 - ◆ 200 only 200 OK response
 - ◆ Any any response

Examples:

- invite.request
- invite.response.200
- invite.response.18x
- subscribe.response.2xx

A.9 Condition

Description: Matching criteria for the rule

Syntax: (Action Subject / param) SWS match-type [SWS Action Value] * [SWS logical-expression SWS Condition]

Examples:

- header.from.user == '100'
 - header.contact.header-param.expires > '3600'
 - header.to.host contains 'itsp'
 - param.call.dst.user != '100'
 - header.john exists
 - header.john exists AND header.to.host !contains 'john'
 - header.from.user == '100' OR header.from.user == '102' OR header.from.user == '300'
 - **match-type**
 - **Description:** Comparison to be made
 - **Syntax:**
 - ◆ == equals
 - ◆ != not equals
 - ◆ > greater than
 - ◆ < less than
 - ◆ >= greater than or equal to
 - ◆ <= less than or equal to
 - ◆ contains does a string contain a value (relevant only to string fields)
 - ◆ exists does a certain header exists
 - ◆ !exists does a certain header not exists
 - ◆ !contains does a string exclude a value. Relevant only to string fields
 - **logical-expression:**
 - **Description:** Condition for the logical expression
 - **Syntax:**
 - ◆ AND logical And
 - ◆ OR logical Or
- Note:** "A AND B OR C" is calculated as A AND (B OR C).

A.10 Action Subject

Description: Element in the message

Syntax: (header / body).Action Subject name [.header-index] * [.(sub-element / sub-element-param)]

Examples:

- header.from
- header.via.2.host
- header.contact.header-param.expires
- header.to.uri-param.user-param
- body.application/dtmf-relay

■ **Action Subject name:**

- **Description:** Name of the message's element - "/" only used for body types
- **Syntax:** 1 * (token / "/")
- **Examples:**
 - ◆ from (header's name)
 - ◆ to (header's name)
 - ◆ application/dtmf-relay (body's name)

■ **header-index:**

- **Description:** Header's index in the list of headers
- **Syntax:** Integer
- **Examples:** If five Via headers arrive:
 - ◆ 0 (default) refers to first Via header in message
 - ◆ 1 second Via header
 - ◆ 4 fifth Via header

■ **sub-element:**

- **Description:** Header's element
- **Syntax:** sub-element-name
- **Examples:**
 - ◆ user
 - ◆ host

■ **sub-element-param:**

- **Description:** Header's element
- **Syntax:** sub-element-name [.sub-element-param-name]
- **Example:**
 - ◆ header.from.param.expires

■ **sub-element-param-name**

- **Description:** Header's parameter name - relevant only to parameter sub-elements
- **Syntax:** token
- **Examples:**
 - ◆ expires (contact's header's param)
 - ◆ duration (retry-after header's param)
 - ◆ unknown-param (any unknown param can be added/removed from the header)

- **param:**
 - **Description:** Params can be as values for match and action
 - **Syntax:** param.param-sub-element.param-dir-element.(call-param-entity / ipg-param-entity)
 - **Examples:**
 - ◆ param.ipg.src.user
 - ◆ param.ipg.dst.host
 - ◆ param.ipg.src.type
 - ◆ param.call.src.user
- **param-sub-element:**
 - **Description:** Determines whether the param being accessed is a call or an IP Group
 - **Syntax:**
 - ◆ call relates to source or destination URI for the call
 - ◆ ipg relates to source or destination IP Group
- **param-dir-element:**
 - **Description:** Direction relating to the classification
 - **Syntax:**
 - ◆ src refers to source
 - ◆ ds refers to destination
- **call-param-entity**
 - **Description:** Parameters that can be accessed on the call
 - **Syntax:**
 - ◆ user refers to username in request-URI for call
- **ipg-param-entity:**
 - **Description:** Name of the parameter
 - **Syntax:**
 - ◆ user refers to Contact user in IP Group
 - ◆ host refers to Group Name in IP Group table
 - ◆ type refers to Type field in IP Group table
 - ◆ id refers to IP Group ID (used to identify source or destination IP Group)
- **string:**
 - **Description:** String
 - **Syntax:** string enclosed in single apostrophe
 - **Examples:**
 - ◆ 'username'
 - ◆ '123'
 - ◆ 'user@host'
- **Integer:**
 - **Description:** A number
 - **Syntax:** 1 * digit
 - **Example:**
 - ◆ 123

A.11 Action Type

Description: Action to be performed on the element

Syntax:

- modify sets element to new value (all element types)
- add-prefix adds value at beginning of string (string element only)
- remove-prefix removes value from beginning of string (string element only)
- add-suffix adds value at end of string (string element only)
- remove-suffix removes value from end of string (string element only)
- add adds a new header/param/body (header or parameter elements)
- remove removes a header/param/body (header or parameter elements)

A.12 Action Value

Description: Value for action and match

Syntax: ('string' / Action Subject / param) * (+ ('string' / Action Subject / param))

Examples:

- 'itsp.com'
- header.from.user
- param.ipg.src.user
- param.ipg.dst.host + '.com'
- param.call.src.user + '<' + header.from.user + '@' + header.p-asserted-id.host + '>'

A.13 Row Rule Value

For a description of this field, see Section 2.5 on page 15.

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