



## GKTMP Messages

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This chapter describes GKTMP messages and contains the following sections:

- [GKTMP RAS Messages, page 4-1](#)
- [Trigger Registration Messages, page 4-23](#)

The GKTMP messages are used for communication between the Cisco IOS Gatekeeper and the external application. There are two types of GKTMP messages:

- [GKTMP RAS Messages](#)—Used to exchange the contents RAS messages between the Cisco IOS Gatekeeper and the external application.
- [Trigger Registration Messages](#)—Used by the external application to indicate to the Cisco IOS Gatekeeper which RAS message should be forwarded.

## GKTMP RAS Messages

The general format of all GKTMP RAS messages is as follows:

- Single message line
- One or more message header lines
- Blank line, which separates the message header from the message body
- Zero or more message body lines

### Message Line

Each GKTMP RAS message is either a request or a response. Requests are generated by the Cisco IOS Gatekeeper and responses are generated by the external application.

The first line of each GKTMP RAS message sent by the Cisco IOS Gatekeeper uses the format:

```
REQUEST RAS_message_type
```

The first line of each GKTMP RAS message sent by the external application uses the format:

```
RESPONSE RAS_message_type
```

Possible RAS message types are as follows:

- RRQ—Registration request
- RCF—Registration confirm

- RRJ—Registration reject
- URQ—Unregistration request
- ARQ—Admission request
- ACF—Admission confirm
- ARJ—Admission reject
- LRQ—Location request
- LCF—Location confirm
- LRJ—Location reject
- RIP—Request in progress
- DRQ—Disengage request
- RAI—Resource availability information
- BRQ—Bandwidth request
- BCF—Bandwidth confirm
- BRJ—Bandwidth reject

**Note**

The Cisco IOS Gatekeeper does not generate GKTMP Request RRQ messages for lightweight RRQ messages, which are used by H.323 endpoints as a keep-alive mechanism to refresh existing registrations.

## Message Header

The message line is immediately followed by the message header. Each message header contains a field name and a value, separated by a colon (*field:value*). [Table 4-1](#) shows the possible fields:

**Table 4-1 Message Header Fields**

Field Names	Field Values
Version-Id	Version of the protocol that the sender is running. The version ID consists of a major number (gk_major) and a minor number (gk_minor). For example, version 1 is represented as 100.
From	String that identifies the originator of the message. For requests from the Cisco IOS Gatekeeper, this field contains the gatekeeper ID. For responses from the external application, this field contains the server ID.
To	String that identifies the receiver of the message. For requests from the Cisco IOS Gatekeeper, this field contains the server ID. For responses from the external application, this field contains the ID of the gatekeeper that initiated the request.
Content-Length	Number of octets contained in the message body. If the message body is null, this field can be omitted.

**Table 4-1 Message Header Fields**

Field Names	Field Values
Transaction-Id	String that identifies the transaction. If this field is present in the request from the Cisco IOS Gatekeeper, it must be echoed in the response from the external application.
Notification-Only	None. No value is included after the colon. If this field name is present, it indicates to the external application no response should be sent. Request URQ must contain this field. Also, Request RRQ contains this field when that message is used to populate the external application's registration database.

The message header is followed immediately by a blank line.

## Message Body

The message body follows the blank line. Each line in the message body contains a tag and a value, separated by an equal sign (*tag=value*). The tags are case-sensitive and denote an RAS message field. The possible tags depend on the GKTMP RAS message.



### Note

If the message body is null, the message must terminate with a CRFL after the message header.

In some cases, depending on the field type, the value is preceded a value-type identifier followed by a colon (*tag=type:value*).

Possible field types are as follows:

- **Alias-Address**—This type of field can contain a series of addresses separated by spaces. Each is preceded by a value-type identifier that indicates the type of address. H indicates that the address is an H.323 ID; E indicates that the address is an E.164 address; M indicates that the address is an e-mail ID.
- **Transport-Address**—This type of field contains an address. Currently, only one value-type identifier is possible for this field type. That is I, which indicates that the address is an IP version 4 address. The address is specified in dotted-decimal notation and can be followed by a colon and a port number.
- **Endpoint-Type**—This type of field indicates the type of endpoint. Possible values are: gatekeeper, terminal, mcu, proxy, voice-gateway, h320-gateway, and other-gateway.
- **Supported-Prefix**—This type of field indicates a supported technology prefix. Possible values are the digits 0 through 9 and the pound sign (#).
- **Globally-Unique-Identifier (GUID)**—This type of field contains the 16-octet conference ID or call ID that uniquely identifies the call or conference. The IDs are specified in hexadecimal format.
- **Bandwidth**—This type of field contains an unsigned integer from 0 through 4294967295 that indicates the bandwidth in 100 bits per second.
- **Boolean**—This type of field contains a single character. T or t for true; F or f for false.
- **IA5 String**—This type of field contains characters from the International Alphabet 5 (IA5), which is a character set defined by the ITU X.400 Message Handling System specification.

- **cryptoToken**—This type of field contains one of the cryptoToken types defined for the CryptoH323Token field specified in H.225. Currently, the only type of cryptoToken supported is the cryptoEPPwdHash.
- **HASHED-EncodedPwdCertToken**—This type of field contains a 16 octet IA5String. It represents the RAS Message Digest 5 (MD5) hashed encoded PwdCertToken.
- **TimeStamp**—This type of field contains a 32-bit integer that represents Universal Time Coordinated (UTC) time.
- **OBJECT-IDENTIFIER**—This type of field contains a sequence of non-negative integer values separated by dots, which is used to uniquely identify an object.
- **UseSpecifiedTransport**—This type of field contains a string that indicates the transport layer that is used for the signaling: Annex E/UDP or TCP.
- **AlternateGK**—This type of field contains a set of fields enclosed in braces ( { } ). Each field is identified by a tag and separated from the other fields by SP (ASCII space, 0x20) characters. This field can contain more than one set of fields, each enclosed by braces.
- **AlternateEndpoint**—This type of field contains a set of fields enclosed in braces. Each field is identified by a tag and separated from the other fields by SP (ASCII space, 0x20) characters. A message body line containing an AlternateEndpoint field must pertain to a single endpoint. Multiple call signal addresses and tokens that pertain to the same endpoint can be provided in a single message body line. If there are multiple AlternateEndpoints, each pertaining to a different H.323 endpoint, the information about the alternate endpoints must be provided in separate message body lines.
- **AlternateTransportAddress**—This type of field contains a single sub-field enclosed in braces. The fields within the braces pertain to a single instance of a RAS AlternateTransportAddress structure. They are defined as a Transport-Address and are encoded as defined for the Transport-Address field.
- **clearToken**—This type of field contains a set of fields enclosed in braces. Each field is identified by a tag and separated from the other fields by SP (ASCII space, 0x20) characters. The fields within the braces pertain to a single instance of a RAS ClearToken structure. However, the message line of a clearToken field can contain multiple instances, each enclosed in braces and separated by a space character. The clearToken field can be embedded within an AlternateEndpoint field.
- **remoteZone**—This type of field contains a set of fields enclosed in braces. Each field is identified by a tag and separated from the other fields by SP (ASCII space, 0x20) characters. The fields within the braces pertain to a single instance of a remoteZone structure. However, the message line of a remoteZone field can contain multiple instances, each enclosed in braces and separated by a space character.

This section describes the possible fields for each message. When the external application sends a response, it includes only the fields that it has altered. Unaltered fields must not be included.

## Registration Messages

Registration messages are used to control which H.323 endpoints are in the gatekeeper's zone.

This section describes the following:

- [Request RRQ](#)
- [Response RRQ](#)
- [Response RCF](#)
- [Response RRJ](#)

## Request RRQ

This message is sent from the Cisco IOS Gatekeeper to the external application when an H.323 endpoint wants to join the zone. This message can be used to populate the external application's registration database. In this case, the request is sent as a notification only and no response is expected from the external application.

Table 4-2 shows the possible Request RRQ tags:

**Table 4-2 Request RRQ Tags**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
c	Transport-Address	Required	RRQ:callSignalAddress
r	Transport-Address	Required	RRQ:rasAddress
a	Alias-Address	Optional	RRQ:terminalAlias
t	Endpoint-Type	Required	RRQ:terminalType
P	Supported-Prefix	Optional	RRQ:terminalType:gateway:protocol:*:supportedPrefixes
\$	cryptoToken	Optional	RRQ:cryptoTokens
T	clearToken	Optional	RRQ:tokens
N	AlternateTransportAddr	Optional	RRQ:AlternateTransportAddress

If the message contains a cryptoToken field with a value of cryptoEPPwdHash, the additional fields shown in Table 4-3 are included:

**Table 4-3 Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
a	Alias-Address	Required	CryptoH323Token:cryptoEPPwdHash:alias
t	TimeStamp	Required	CryptoH323Token:cryptoEPPwdHash:timestamp
h	HashedToken	Required	CryptoH323Token:cryptoEPPwdHash:token

If the message contains a clearToken field, the additional fields shown in Table 4-4 are included:

**Table 4-4 Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
O	OBJECT-IDENTIFIER	Required	tokens:objectIdentifier
p	IA5string	Optional	tokens:password
t	integer	Optional	tokens:timestamp
s	IA5string	Optional	tokens:challengeString
r	integer	Optional	tokens:random
G	IA5string	Optional	tokens:generalID

**Table 4-4 Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
o	OBJECT-IDENTIFIER	Optional	tokens:nonStandard:objectIdentifier
d	IA5string	Optional	tokens:nonStandard:data

If the message contains an AlternateTransportAddr field, the additional field shown in [Table 4-5](#) is included:

**Table 4-5 Additional Field**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
I	Transport-Address	Required	IP address and port for Annex E

## Response RRQ

This message is sent from the external application to the Cisco IOS Gatekeeper in response to a Request RRQ message. If the external application has no interest in the Request RRQ message, it returns a Response RRQ with a null body. Otherwise, the external application modifies the fields as appropriate and sends the response with the updated information to the Cisco IOS Gatekeeper for further processing.

For Response RRQ, the possible tags are shown in [Table 4-6](#):

**Table 4-6 Response RRQ Tags**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
a	Alias-Address	Optional	RRQ:terminalAlias
p	Supported-Prefix	Optional	RRQ:terminalType:gateway:protocol: *:supportedPrefixes

## Response RCF

This message is sent from the external application to the Cisco IOS Gatekeeper in response to a Request RRQ. This message indicates that the external application has completed the processing of the request.

For Response RCF, the possible tags are shown in [Table 4-7](#):

**Table 4-7 Response RCF Tags**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
a	Alias-Address	Optional	RRQ:terminalAlias
p	Supported-Prefix	Optional	RRQ:terminalType:gateway:protocol: *:supportedPrefixes
G	AlternateGK	Optional	RCF:alternateGatekeeper

If the message contains an AlternateGK field, the additional fields shown in [Table 4-8](#) are included:

**Table 4-8 Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
r	Transport-Address	Required	AlternateGK:rasAddress
g	Alias-Address	Optional	AlternateGK:gatekeeperIdentifier
n	Boolean	Required	AlternateGK:needToRegister
p	integer	Required	AlternateGK:priority

## Response RRJ

This message is sent from the external application to the Cisco IOS Gatekeeper in response to a Request RRQ. It indicates that the Cisco IOS Gatekeeper should reject the request for the specified reason.

For Response RRJ, the possible tag is shown in [Table 4-9](#):

**Table 4-9 Response RRJ Tag**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
R	RRJ-Reason	Required	RRJ:rejectReason

Possible values for the rejectReason are:

- undefinedReason
- securityDenial
- resourceUnavailable

## Unregistration Message

Unregistration messages are used to remove an H.323 endpoint from a gatekeeper zone.

This section describes the following:

- [Request URQ](#)

## Request URQ

This message is sent from the Cisco IOS Gatekeeper to the external application when the H.323 endpoint wants to leave the zone or when its registration expires. This request is sent as a notification only. No response is generated by the external application.

For Request URQ, the possible tag is shown in [Table 4-10](#):

**Table 4-10 Request URQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
c	Transport-Address	Required	URQ:callSignalAddress

## Admission Messages

Admission messages are used to control which H.323 endpoints can participate in calls.

This section describes the following:

- [Request ARQ](#)
- [Response ARQ](#)
- [Response ACF](#)
- [Response ARJ](#)

### Request ARQ

This message is sent from the Cisco IOS Gatekeeper to the external application when an H.323 endpoint wants to initiate a call.

For Request ARQ, the possible tags are shown in [Table 4-11](#):

**Table 4-11 Request ARQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
s	Alias-Address	Required	ARQ:srcInfo
S	Transport-Address	Optional	ARQ:srcCallSignalAddress
d	Alias-Address	Optional	ARQ:destinationInfo
D	Transport-Address	Optional	ARQ:destCallSignalAddress
x	Alias-Address	Optional	ARQ:destExtraCallInfo
b	Bandwidth	Required	ARQ:bandWidth
A	Boolean	Required	ARQ:answerCall
c	GUID	Optional	ARQ:callIdentifier
C	GUID	Required	ARQ:conferenceID
m	Boolean	Optional	ARQ:canMapAlias
e	IA5String	Optional	ARQ:nonStandardData:redirectNumber
E	integer	Optional	ARQ:nonStandardData:redirectReason <sup>1</sup>
p	integer	Optional	ARQ:nonStandardData:callingPartyNumOctet3a <sup>2</sup>
w	IA5string	Optional	ARQ:nonStandardData:displayIE
i	TransportAddress	Required	arqing-endpoint identifier <sup>3</sup>
\$	cryptoToken	Optional	ARQ:cryptoTokens



**Table 4-11 Request ARQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
T	clearToken	Optional	ARQ:tokens
B	IA5string	Optional	ARQ:nonStandardData:interfaceSpecific:BillingInfo
I	IA5string	Optional	ARQ:nonStandardData:interfaceDescriptor

Possible values for the redirectReason are:

- 0—Unknown
- 1—Call forwarding busy or called DTE busy
- 2—Call forwarded, no reply
- 4—Call deflection
- 9—Called DTE out of order
- 10—Call forwarding by the called DTE
- 15—Call forwarding unconditional or systematic call redirection

CallingPartyNumOctet3a is from the Q.931 Setup octet 3a of calling party number.

When an H.323 endpoint sends an ARQ to the Cisco IOS Gatekeeper, it includes its endpointIdentifier. Because this value is local and has meaning to the Cisco IOS Gatekeeper only and not to the external application, the Cisco IOS Gatekeeper substitutes a more meaningful value of CallSignalAddress in its Request ARQ messages.

If the message contains a cryptoToken field with a value of cryptoEPPwdHash, the additional fields shown in [Table 4-12](#) are included:

**Table 4-12 Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
a	Alias-Address	Required	CryptoH323Token:cryptoEPPwdHash:alias
t	TimeStamp	Required	CryptoH323Token:cryptoEPPwdHash:timestamp
h	HashedToken	Required	CryptoH323Token:cryptoEPPwdHash:token

If the message contains a clearToken field, the additional fields shown in [Table 4-13](#) are included:

**Table 4-13 Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
O	OBJECT-IDENTIFIER	Required	tokens:objectIdentifier
p	IA5string	Optional	tokens:password
t	integer	Optional	tokens:timestamp
s	IA5string	Optional	tokens:challengeString
r	integer	Optional	tokens:random

**Table 4-13 Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
G	IA5string	Optional	tokens:generalID
o	OBJECT-IDENTIFIER	Optional	tokens:nonStandard:objectIdentifier
d	IA5string	Optional	tokens:nonStandard:data

## Response ARQ

This message is sent from the external application to the Cisco IOS Gatekeeper in response to a Request ARQ message. If the external application has no interest in the Request ARQ message, it returns a Response ARQ with a null body. Otherwise, it modifies the fields as appropriate and sends the response with the updated information to the Cisco IOS Gatekeeper for further processing.

For Response ARQ, the possible tags are shown in [Table 4-14](#):

**Table 4-14 Response ARQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
d	Alias-Address	Optional	ARQ:destinationInfo
D	Transport-Address	Optional	ARQ:destCallSignalAddress
x	Alias-Address	Optional	ARQ:destExtraCallInfo
b	Bandwidth	Optional	ARQ:bandWidth
e	IA5String	Optional	ARQ:nonStandardData:redirectNumber
E	integer	Optional	ARQ:nonStandardData:redirectReason
w	IA5string	Optional	ARQ:nonStandardData:displayIE
z	remoteZone	Optional	None
T	clearToken	Optional	ARQ:tokens
c	integer	Optional	None <sup>1</sup>
p	integer	Optional	None <sup>2</sup>
A	alternateEndpoint	Optional	ARQ:alternateEndpoints

1. Reflects the cost value of the primary endpoint, if any, whose address is returned in the 'D' field of this message. It should only be sent if the endpoint is filled in.
2. Reflects the priority value of the primary endpoint, if any whose address is returned in the 'D' field of this message. It should only be sent if the endpoint is filled in.

The external application has the option of reducing the bandwidth.

If the message contains a remoteZone field, the additional fields shown in [Table 4-15](#) are included:

**Table 4-15 Additional Fields**

Tag	Field Type	Required or Optional	Description
r	Transport-Address	Required	RAS address of the zone
c	Integer	Optional	Cost value associated with the zone
p	Integer	Optional	Priority value associated with the zone
T	clearToken	Optional	ARQ:tokens

If this field is included, the Cisco IOS Gatekeeper sends LRQs to all the listed zones. The zone with the least cost and highest priority that returns and LCF is chosen for inclusion in the ACF that is sent to the endpoint.

If the message contains an alternateEndpoint field, the additional fields shown in [Table 4-16](#) are included:

**Table 4-16 Additional Fields**

Tag	Field Type	Required or Optional	Description
C	Integer	Optional	Cost value associated with the zone
p	Integer	Optional	Priority value associated with the zone

## Response ACF

This message is sent from the external application to the Cisco IOS Gatekeeper in response to a Request ARQ. The message indicates that the external application has completed the processing of the request.

For Response ACF, the possible tags are shown in [Table 4-17](#):

**Table 4-17 Response ACF**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
d	Alias-Address	Optional	ACF:destinationInfo
D	Transport-Address	Required	ACF:destCallSignalAddress
x	Alias-Address	Optional	ACF:destExtraCallInfo
X	Alias-Address	Optional	ACF:remoteExtensionAddress
b	Bandwidth	Optional	ARQ:bandWidth
t	Endpoint-type	Optional	ACF:destinationType
T	ClearToken	Optional	ACF:tokens
A	AlternateEndpoint	Optional	ACF:alternateEndpoints
N	AlternateTransportAddr	Optional	ACF:alternateTransportAddress
u	useSpecifiedTransport	Optional	ACF:useSpecifiedAddress

If the message contains an AlternateEndpoint field, the additional fields shown in [Table 4-18](#) are included:

**Table 4-18 Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
c	Transport-Address	Required	alternateEndpoints:callSignalAddress
T	clearToken	Optional	alternateEndpoints:tokens

If the AlternateEndpoint field contains a clearToken field, the additional fields shown in [Table 4-19](#) are included:

**Table 4-19 Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
O	OBJECT-IDENTIFIER	Required	tokens:objectIdentifier
p	IA5string	Optional	tokens:password
t	integer	Optional	tokens:timestamp
s	IA5string	Optional	tokens:challengeString
r	integer	Optional	tokens:random
G	IA5string	Optional	tokens:generalID
o	OBJECT-IDENTIFIER	Optional	tokens:nonStandard:objectIdentifier
d	IA5string	Optional	tokens:nonStandard:data

If the message contains an AlternateTransportAddr field, the additional field shown in [Table 4-20](#) is included:

**Table 4-20 Additional Field**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
I	Transport-Address	Required	IP address and port for Annex E

## Response ARJ

This message is sent from the external application to the Cisco IOS Gatekeeper in response to a Request ARQ. The message indicates that the Cisco IOS Gatekeeper should reject the request for the specified reason.

For Response ARJ, the possible tag is shown in [Table 4-21](#):

**Table 4-21 Response ARJ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
R	ARJ-Reason	Required	ARJ:rejectReason

Possible values for rejectReason are:

- calledPartyNotRegistered
- invalidPermission
- requestDenied
- undefinedReason
- resourceUnavailable
- securityDenial

## Location Messages

Location messages are used by gatekeepers to communicate with each other to process interzone calls.

This section describes the following:

- [Request LRQ](#)
- [Response LRQ](#)
- [Request LCF](#)
- [Response LCF](#)
- [Request LRJ](#)
- [Response LRJ](#)

### Request LRQ

This message is sent from the Cisco IOS Gatekeeper to the external application when the Cisco IOS Gatekeeper has received an interzone location request.

For Request LRQ, the possible tags are shown in [Table 4-22](#):

**Table 4-22 Request LRQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
s	Alias-Address	Optional	LRQ:srcInfo
d	Alias-Address	Required	LRQ:destinationInfo
e	IA5String	Optional	LRQ:nonStandardData:redirectNumber
E	integer	Optional	LRQ:nonStandardData:redirectReason <sup>1</sup>
p	integer	Optional	LRQ:nonStandardData:callingPartyNumOctet3a <sup>2</sup>
w	IA5String	Optional	LRQ:nonStandardData:displayIE

**Table 4-22 Request LRQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
c	IA5String	Optional	LRQ:nonStandardData:callingPartyNum
T	clearToken	Optional	LRQ:tokens

Possible values for the redirectReason are:

- 0—Unknown
- 1—Call forwarding busy or called DTE busy
- 2—Call forwarded, no reply
- 4—Call deflection
- 9—Called DTE out of order
- 10—Call forwarding by the called DTE
- 15—Call forwarding unconditional or systematic call redirection

CallingPartyNumOctet3a is from the Q.931 Setup octet 3a of calling party number.

## Response LRQ

This message is sent from the external application to the Cisco IOS Gatekeeper in response to a Request LRQ message. If the external application has no interest in the Request LRQ message, it returns a Response LRQ with a null body. Otherwise, it modifies the fields as appropriate and sends the response with the updated information to the Cisco IOS Gatekeeper for further processing.

For Response LRQ, the possible tags are shown in [Table 4-23](#):

**Table 4-23 Response LRQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
d	Alias-Address	Optional	LRQ:destinationInfo
z	remoteZone	Optional	None
T	clearToken	Optional	ARQ:tokens
c	integer	Optional	None <sup>1</sup>
p	integer	Optional	None <sup>2</sup>
A	alternateEndpoint	Optional	ARQ:alternateEndpoints

1. Reflects the cost value of the primary endpoint, if any, whose address is returned in the 'D' field of this message. It should only be sent if the endpoint is filled in.
2. Reflects the priority value of the primary endpoint, if any whose address is returned in the 'D' field of this message. It should only be sent if the endpoint is filled in.

If the message contains a remoteZone field, the additional fields shown in [Table 4-24](#) are included:

**Table 4-24 Additional Fields**

Tag	Field Type	Required or Optional	Description
r	Transport-Address	Required	RAS address of the zone
c	Integer	Optional	Cost value associated with the zone
p	Integer	Optional	Priority value associated with the zone
T	clearToken	Optional	LRQ:tokens

If this field is included, the Cisco IOS Gatekeeper will send the original LRQs to all the listed zones.

If the message contains an alternateEndpoint field, the additional fields shown in [Table 4-25](#) are included:

**Table 4-25 Additional Fields**

Tag	Field Type	Required or Optional	Description
C	Integer	Optional	Cost value associated with the zone
p	Integer	Optional	Priority value associated with the zone

## Request LCF

This message is sent from the Cisco IOS Gatekeeper to the external application when the Cisco IOS Gatekeeper has received an LCF from the remote Cisco IOS Gatekeeper. This gives the external application an opportunity to accept (Response LCF), modify (Response LCF), or reject (Response LRJ) the information contained in the LCF.

For Request LCF, the possible tags are shown in [Table 4-26](#):

**Table 4-26 Request LCF**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
s	Alias-Address	Optional	LRQ:srcInfo
e	IA5String	Optional	LRQ:nonStandardData:redirectNumber
E	integer	Optional	LRQ:nonStandardData:redirectReason
p	integer	Optional	LRQ:nonStandardData:callingPartyNumOctet3a
w	IA5String	Optional	LRQ:nonStandardData:displayIE
c	IA5String	Optional	LRQ:nonStandardData:callingPartyNum
d	Alias-Address	Required	LRQ/LCF:destinationInfo
D	Transport-Address	Required	LCF:callSignalAddress
r	Transport-Address	Required	LCF:rasAddress
x	Alias-Address	Optional	LCF:destExtraCallInfo
X	Alias-Address	Optional	LCF:remoteExtensionAddress
t	Endpoint-Type	Optional	LCF:destinationType
N	AlternateTransportAddr	Optional	LCF:AlternateTransportAddress
u	useSpecifiedTransport	Optional	ACF:useSpecifiedAddress
T	clearToken	Optional	LCF:tokens

The destinationInfo from the LCF is used if one is available. Otherwise, the destinationInfo from the LRQ is used.

If the message contains an AlternateTransportAddr field, the following additional field shown in [Table 4-27](#) is included:

**Table 4-27 Additional Field**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
I	Transport-Address	Required	IP address and port for Annex E

## Response LCF

This message is sent from the external application to the Cisco IOS Gatekeeper in response to a Request LRQ. The message indicates that the external application has completed the processing of the request.

This message can also be sent to the Cisco IOS Gatekeeper from the external application in response to a Request LCF or a Request LRJ. In the case of a Request LCF, the response can contain:

- A null message body, which indicates that the external application accepts the information in the Request LCF.
- Modified fields, which indicates that the external application wants to use different values than those included in the Request LCF.

In the case of a Request LRJ, the response contains an alternate destination.



For Response LCF, the possible tags are shown in [Table 4-28](#):

**Table 4-28 Response LCF**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
d	Alias-Address	Optional	LCF:destinationInfo
D	Transport-Address	Required	LCF:destCallSignalAddress
r	Transport-Address	Required	LCF:rasAddress
x	Alias-Address	Optional	LCF:destExtraCallInfo
X	Alias-Address	Optional	LCF:remoteExtensionAddress
t	Endpoint-Type	Optional	LCF:destinationType
A	AlternateEndpoint	Optional	ACF:alternateEndpoints
N	AlternateTransportAddr	Optional	LCF:AlternateTransportAddress
u	useSpecifiedTransport	Optional	ACF:useSpecifiedAddress
T	clearToken	Optional	LCF:tokens



**Note**

The D and r are not required if the Response LCF is being sent in reply to a Request LCF.

If the message contains an AlternateTransportAddr field, the additional field shown in [Table 4-29](#) included:

**Table 4-29 Additional Field**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
I	Transport-Address	Required	IP address and port for Annex E

## Request LRJ

This message is sent from the Cisco IOS Gatekeeper to the external application when the Cisco IOS Gatekeeper has received an LRJ from a remote Cisco IOS Gatekeeper. This gives the Cisco IOS Gatekeeper the opportunity to accept the rejection (Response LRJ) or propose an alternative destination (Response LCF).

For Request LRJ, the possible tags are shown in [Table 4-30](#):

**Table 4-30 Request LRJ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
s	Alias-Address	Optional	LRQ:srcInfo
d	Alias-Address	Required	LRQ:destinationInfo
e	IA5String	Optional	LRQ:nonStandardData:redirectNumber
E	integer	Optional	LRQ:nonStandardData:redirectReason

**Table 4-30 Request LRJ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
p	integer	Optional	LRQ:nonStandardData:callingPartyNumOctet3a
w	IA5String	Optional	LRQ:nonStandardData:displayIE
c	IA5String	Optional	LRQ:nonStandardData:callingPartyNum
R	LRJ-reason	Required	LRJ:rejectReason

## Response LRJ

This message is sent from the external application to the Cisco IOS Gatekeeper in response to a Request LRQ. The message indicates that the Cisco IOS Gatekeeper should reject the request for the specified reason.

This message can also be sent to the Cisco IOS Gatekeeper from the external application in response to a Request LCF or a Request LRJ. In the case of a Request LCF, this response rejects the information provided in the LCF for the specified reason. In the case of a Request LRJ, this response acknowledges the rejection. The reason is optional when the Response LRJ is sent due to a Request LRJ.

For Response LRJ, the possible tag is shown in [Table 4-31](#):

**Table 4-31 Response LRJ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
R	LRJ-Reason	Required (LRQ, LCF) Optional (LRJ)	LRJ:rejectReason

Possible values for rejectReason are:

- notRegistered
- invalidPermission
- requestDenied
- undefinedReason
- securityDenial

## Disengage Messages

Disengage messages are used to indicate that a party wants to end the call.

This section describes the following:

- [Request DRQ](#)

## Request DRQ

This message is sent from the Cisco IOS Gatekeeper to the external application to indicate that an endpoint wants to end the call.

For Request DRQ, the possible tags are shown in [Table 4-32](#):

**Table 4-32 Request DRQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
c	GUID	Optional	DRQ:callIdentifier
C	GUID	Required	DRQ:conferenceID
R	DRQ-reason	Required	DRQ:disengageReason
A	Boolean	Required	DRQ:answeredCall
S	Transport-Address	Required	ARQ:srcCallSignalAddress
T	clearToken	Optional	DRQ:tokens

Possible values for the DRQ-reason are:

- forcedDrop
- normalDrop
- undefinedReason



**Note**

All Request DRQ messages must contain Notification-only in the header. No response to this message is sent.

## Resource Messages

Resource messages are used to indicate the current call capacity of the gateway.

This section describes the following:

- [Request RAI](#)

## Request RAI

This message is sent from the Cisco IOS Gatekeeper to the external application to indicate the call capacity and data rate of the gateway for H.323 calls.

For Request RAI, the possible tags are shown in [Table 4-33](#):

**Table 4-33 Request RAI**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
c	Transport-Address	Required	RRQ:callSignalAddress
r	Boolean	Required	RAI:almostOutOfResources

**Note**

All Request RAI messages must contain Notification-only in the header. No response to this message is sent.

## Bandwidth Messages

Bandwidth messages are used to request a change in bandwidth.

This section describes the following:

- [Request BRQ](#)
- [Response BCF](#)
- [Response BRJ](#)

### Request BRQ

This message is sent from the Cisco IOS Gatekeeper to the external application to request that an endpoint be allowed to change (increase or decrease) its bandwidth.

For Request BRQ, the possible tags are shown in [Table 4-34](#):

**Table 4-34 Request BRQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
i	Transport-Address	Required	See Note
b	Bandwidth	Required	BRQ:bandWidth
C	GUID	Required	BRQ:conferenceID
c	GUID	Required	BRQ:callIdentifier
A	Boolean	Required	BRQ:answeredCall

**Note**

When sending a BRQ message, an endpoint identifies itself to the gatekeeper using the endpointIdentifier that it received from the gatekeeper in the RCF. Because this endpointIdentifier has only local significance to the gatekeeper and no significance to the server, the endpoint's CallSignalAddress is used here as an identifier.

### Response BCF

This message is sent from the external application to the Cisco IOS Gatekeeper to confirm the request to allow an endpoint to change (increase or decrease) its bandwidth. This response gives the external application the opportunity to modify the Bandwidth field of a received LCF, but because the Cisco IOS Gatekeeper is not prepared to make changes in its bandwidth, any change in the BCF will automatically generate a BRJ back to the endpoint.

For Response BCF, the possible tag is shown in [Table 4-35](#):

**Table 4-35 Response BCF**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
b	Bandwidth	Required	BCF:bandWidth

## Response BRJ

This message is sent from the external application the Cisco IOS Gatekeeper to deny the request to allow an endpoint to change (increase or decrease) its bandwidth.

For Response BRJ, the possible tag is shown in [Table 4-36](#):

**Table 4-36 Response BRJ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
R	BRJ-Reason	Required	BRJ:rejectReason

Possible values for rejectReason are:

- notBound
- invalidConferenceID
- invalidPermission
- insufficientResource
- invalidRevision
- undefinedReason
- securityDenial

## Progress Messages

Progress messages provide information about the progress of a request. Progress messages include:

- [Response RIP](#)
- [Request IRR](#)
- [Request ALV](#)
- [Response ALV](#)

## Response RIP

This message is sent from the external application to the Cisco IOS Gatekeeper when the external application cannot immediately process the request. This message indicates that the request is in progress (RIP) and that additional time is needed. When the Cisco IOS Gatekeeper receives this message, it forwards a request to the H.323 endpoint indicating that an extension of the timeout is required. The external application can send more than one Response RIP as is needed to process the request.

For Response RIP, the possible tag is shown in [Table 4-37](#):

**Table 4-37 Response RIP**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
d	Integer	Required	RIP:delay

Possible values of the delay are 1 through 65535 milliseconds.

## Request IRR

This message is sent to the GK and contains details for the call after a successful connect. A Request IRR message is sent at both the originating and terminating side of the call. If both legs reference the same GK, only one Request IRR is sent. The GK sends information for only one call in each Request IRR message.

[Table 4-38](#) shows the new Request IRR tags:

**Table 4-38 New Request IRR Tags**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
S	Transport-Address	Mandatory	IRR:srcCallSignalAddress
P	PerCallInfo	Optional	IRR:perCallInfo

If the message contains a PerCallInfo field, the following additional fields shown in [Table 4-39](#) are included:

**Table 4-39 New Additional Fields**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
c	GUID	Optional	IRR:perCallInfo:callIdentifier
C	GUID	Mandatory	IRR:perCallInfo:conferenceID
A	Boolean	Optional	IRR:perCallInfo:originator
b	Bandwidth	Mandatory	IRR:perCallInfo:bandwidth
t	System Time	Optional	IRR:perCallInfo:NonStandard:start_time

## Request ALV

The REQUEST ALV is sent from the Gatekeeper to a GKTMP server on the detection of slower response or server failure.

This message does not contain any parameters in its body.

## Response ALV

This message is returned in response to a REQUEST ALV message and does not contain any parameters in its body.

# Trigger Registration Messages

Trigger registration messages are used by external applications to inform the Cisco IOS Gatekeeper which RAS messages are interesting to the external application. Interesting RAS messages trip a trigger in the Cisco IOS Gatekeeper and cause the Cisco IOS Gatekeeper to send a GKTMP RAS message to the external application.

As with the GKTMP RAS messages, trigger registration messages have the following format:

- Single message line
- One or more message header lines
- Blank line, which separates the message header from the message body
- Zero or more message body lines

## Message Line

There are two types of trigger registration messages: register and unregister.

The first line of each trigger registration request/response message uses the format:

```
REGISTER RAS_message_type
```

The first line of each trigger unregistration request/response message uses the format:

```
UNREGISTER RAS_message_type
```

Possible RAS message types are as follows:

- RRQ—Registration request
- URQ—Unregistration request
- ARQ—Admission request
- LRQ—Location request
- LCF—Location confirm
- LRJ—Location reject
- DRQ—Disengage request
- RAI—Resource availability information
- BRQ—Bandwidth request

## Message Header

The message line is immediately followed by the message header. Each message header contains a field name and a value, separated by a colon (*field:value*). Possible fields are shown in [Table 4-40](#):

**Table 4-40 Message Header Fields**

<b>Field Names</b>	<b>Field Values</b>
Version-ID	Version of the GKTMP. The version ID consists of a major number (gk_major) and a minor number (gk_minor). For example, Version 1 is represented as 100.
From	String that identifies the originator of the message. For trigger registration requests from the external application, this field contains the server ID. For trigger registration responses from the Cisco IOS Gatekeeper, this field contains the gatekeeper ID. This field is required for trigger registration and unregistration requests and responses.
To	String that identifies the receiver of the message. For trigger registration requests from the external application, this field contains the gatekeeper ID. For trigger registration responses from the Cisco IOS Gatekeeper, this field contains the ID of the external application that initiated the request. This field is required for trigger registration and unregistration requests and responses.
Priority	A number indicating the priority of this trigger in relation to other triggers for the same RAS message type. Possible values are 1 through 20. 1 is the highest priority.  If the Cisco IOS Gatekeeper has a registration for a RAS message type and receives another registration for the same RAS message from the same external application with the same priority, the Cisco IOS Gatekeeper uses the new registration and discards the previous one. If the Cisco IOS Gatekeeper has a registration for a RAS message type and receives another registration with the same priority from a different external application, the Cisco IOS Gatekeeper discards the new registration. This field is required for trigger registration and unregistration requests and is echoed in trigger registration and unregistration responses.
Content-length	The number of octets contained in the message body. If the message body is null, this field is omitted. This field is used only in trigger registration requests.



Table 4-40 Message Header Fields

Field Names	Field Values
Notification-only	None. No value is included after the colon. If this field name is present, it indicates to the Cisco IOS Gatekeeper that it should forward requests for the specified RAS messages as a notification only. This field is used only in trigger registration requests.
Status	<p>String that indicates the response code from the Cisco IOS Gatekeeper. This field is used only in trigger registration and unregistration responses.</p> <p>Possible response codes for unregistration requests are:</p> <ul style="list-style-type: none"> <li>• success—The registration has been accepted.</li> <li>• invalidPriority—The registration has been rejected because the Gatekeeper already has a registration for this RAS message type with the same priority from another application.</li> <li>• invalidFilters—Parsing of the message body failed.</li> <li>• invalidGKID—The gatekeeper ID specified in the “To” field of the request does not match the ID of any gatekeepers on this Cisco router.</li> </ul> <p>Possible response codes for unregistration responses are:</p> <ul style="list-style-type: none"> <li>• success—The unregistration has been accepted.</li> <li>• invalidPriority—The unregistration has been rejected because the Gatekeeper does not have a registration for this RAS message type with the same priority from this application.</li> <li>• invalidGKID—The gatekeeper ID specified in the “To” field of the request does not match the ID of any gatekeepers on this Cisco router.</li> </ul>

The message header is followed immediately by a blank line.

## Message Body

The message body follows the blank line. Only trigger registration requests contain a message body. Trigger registration responses, unregistration requests, and unregistration responses end after the blank line.

The message body in a trigger registration request can be used to narrow the circumstances under which the Cisco IOS Gatekeeper sends a REQUEST *xxx* to the external application. In this case, the external application includes tags and values in the message body that if matched will trigger the Cisco IOS Gatekeeper to generate a REQUEST *xxx*.

The tags that can be included vary depending on the RAS message type, and are a subset of the types that can be included in GKTMP RAS messages.

For the field type of Alias-Address, trailing wildcards can be used with E.164 addresses. An asterisk can be used to indicate a string of characters (for example, 1800\*). A period can be used to indicate a single character (for example, 1800.....).



### Note

Wildcards cannot be used at the beginning or in the midst of a value, only at the end. If you include a wildcard at the beginning or in the midst of a value, it will be interpreted as a literal character.

## Register RRQ and RAI

For Register RRQ and RAI, the tags shown in [Table 4-41](#) can be used to filter messages:

**Table 4-41 Register RRQ and RAI**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
t	Endpoint-Type	Optional	RRQ:terminalType
p	Supported-Prefix	Optional	RRQ:terminalType:gateway:protocol:*.supportedPrefixes

## Register URQ

For Register URQ, the tags shown in [Table 4-42](#) can be used to filter messages:

**Table 4-42 Register URQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
t	Endpoint-Type	Optional	RRQ:terminalType
p	Supported-Prefix	Optional	RRQ:terminalType:gateway:protocol:*.supportedPrefixes

## Register ARQ, DRQ, IRR, and BRQ

For Register ARQ, DRQ, IRR, and BRQ the tags shown in [Table 4-43](#) can be used to filter messages:

**Table 4-43 Register ARQ, DRQ, IRR, and BRQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
d	Alias-Address	Optional	ARQ:destinationInfo
E	integer	Optional	ARQ:nonStandardData:redirectReason

## Register LRQ

For Register LRQ, the tags shown in [Table 4-44](#) can be used to filter messages:

**Table 4-44 Register LRQ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
d	Alias-Address	Optional	LRQ:destinationInfo
E	integer	Optional	LRQ:nonStandardData:redirectReason

**Note**

A gatekeeper might not be the final destination of the LRQ messages that it receives. If the queried address in an LRQ is in another Gatekeeper's zone, the LRQ is forwarded to that gatekeeper and is not resolved locally. This means that there might not be a local zone that can be associated with the LRQ. To address this situation, the gatekeeper arbitrarily uses the server registrations for the first configured local zone. Because the order in which configured zones appear can change with deletions and additions, servers should send identical LRQ registrations to all zones (all logical gatekeepers) on the same router.

## Register LCF

For Register LCF, the tags shown in [Table 4-45](#) can be used to filter messages:

**Table 4-45 Register LCF**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
d	Alias-Address	Optional	LRQ/LCF:destinationInfo
X	Alias-Address	Optional	LCF:remoteExtensionAddress

## Register LRJ

For Register LRJ, the tag shown in [Table 4-46](#) can be used to filter messages:

**Table 4-46 Register LRJ**

Tag	Field Type	Required or Optional	Corresponding RAS Message Field
d	Alias-Address	Optional	LRQ:destinationInfo

