

Internet Engineering Task Force
Internet Draft
Document: <[draft-foster-mgcp-redirect-05.txt](#)>
Category: Informational

B. Foster
F. Andreassen
Cisco Systems
July 2003

Media Gateway Control Protocol (MGCP) Redirect and Reset Package

Status of this Document

This document is an Internet-Draft and is in full conformance with all provisions of [Section 10 of RFC2026](#)

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as work in progress.

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/1id-abstracts.txt>

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>.

Abstract

The base Media Gateway Control Protocol (MGCP) specification ([RFC 3435](#)) allows endpoints to be re-directed one endpoint at a time. This document provides extensions in the form of a new MGCP package that provides mechanisms for redirecting and resetting a group of endpoints. It also includes the ability to more accurately re-direct endpoints by allowing a list of Call Agents to be specified in a preferred order.

Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC-2119](#) [1].

Table of Contents

| | | |
|------------------------|--|-------------------|
| 1. | Introduction..... | 2 |
| 2.0. | Redirect and Reset Package..... | 3 |
| 2.1. | NotifiedEntityList Extension Parameter..... | 3 |
| 2.2. | Endpoint Specifier..... | 4 |
| 2.2.1. | EndpointList and EndpointMap Extension Parameters..... | 4 |
| 2.2.2. | Application to Out-of-Service Endpoints..... | 5 |
| 2.3. | Redirect..... | 6 |
| 2.4. | Reset Extension Parameter..... | 7 |
| 2.5. | Return Codes..... | 7 |
| 3.0. | IANA Considerations..... | 8 |
| 4.0. | Security Considerations..... | 8 |
| 5.0. | Normative References..... | 8 |
| | Authors' Addresses..... | 8 |
| | Intellectual Property Statement..... | 8 |
| | Full Copyright Statement..... | 9 |
| | Acknowledgement..... | 9 |

[1.](#) Introduction

The base Media Gateway Control Protocol (MGCP) specification [[2](#)] allows a Call Agent to specify a new NotifiedEntity parameter in order to re-direct one or more endpoints to a new Call Agent. This must be done in a NotificationRequest or a connection handling command. However, because these commands affect endpoint or connection state, such a request cannot typically be sent to a group of endpoints with a single command. This means that in a case where a new Call Agent takes over for a failed one, the new Call Agent must re-direct endpoints one at a time. If there is a large number of endpoints (e.g., within a large trunking gateway) this could take a considerable amount of time.

This document defines a new redirect and reset package for MGCP that allows the Call Agent to re-direct a group of endpoints without affecting endpoint or connection state.

Also included is a new NotifiedEntityList parameter, which is similar to the NotifiedEntity parameter but allows for multiple domain names to be provided. This allows the Call Agent to more accurately direct endpoints to a preferred ordered list of alternate Call Agents.

A third capability contained within this package is the ability to efficiently reset and re-initialize one or more groups of endpoints. Such a capability is useful during Call Agent failover situations.

2.0. Redirect and Reset Package

Package Name: RED

Version: 0

The purpose of this package is to:

- * Define a new NotifiedEntityList extension parameter. This works the same as the NotifiedEntity parameter in [2] but allows more than one domain name to be specified.
- * Allow a Call Agent to pass a new NotifiedEntity or NotifiedEntityList to a collection of endpoints specified by an "all of" wildcard. This is useful in the case where a new Call Agent takes over from a previous one and wants to re-direct endpoint(s) to send "Notifies" etc. to it from now on.
- * Allow a Call Agent to request one or more groups of endpoints to do a reset, which can be useful following certain types of failures.

2.1. NotifiedEntityList Extension Parameter

The NotifiedEntityList parameter is encoded as "NL" and is followed by a colon and a comma-separated list of NotifiedEntity values as defined in the MGCP specification [2], e.g.:

```
RED/NL: ca1@myca.whatever.net, ca2@mybackupca.whatever.net
```

The NotifiedEntityList works in a similar way to the NotifiedEntity parameter, except that it allows multiple domain names to be listed. The NotifiedEntityList thus specifies a new "notified entity" for the endpoint.

The NotifiedEntityList parameter is optional in any command or response where the NotifiedEntity parameter is allowed. Following a restart, the NotifiedEntityList is initially empty, unless provisioned otherwise. In subsequent commands, it retains its current value until explicitly changed. If both a NotifiedEntity parameter and a non-empty NotifiedEntityList parameter have been set (not necessarily at the same time), the NotifiedEntity parameter value will be viewed as implicitly added to the beginning of the NotifiedEntityList parameter. The NotifiedEntity parameter thus always defines the first domain name to contact, unless it has explicitly been set to empty. In that case, the NotifiedEntityList defines the "notified entity". If the NotifiedEntityList is also empty, then the normal MGCP handling of having an empty "notified entity" applies. We will refer to the list of domain names that result from the above rules as the "notified entity list".

When the "notified entity list" is non-empty, transmission is first attempted with the first domain name in the list as in the normal

MGCP retransmission procedures described in [2]. Each of the IP-addresses for this domain name MUST first be tried as specified in [2], and if this is unsuccessful, each of the IP-addresses for the second domain name MUST then be attempted, etc. following the normal

MGCP retransmission procedures, with "N" (the number of retransmissions) set to zero for each domain name (see Section 4.3 in [2]). Whenever retransmission to a new domain name is initiated, the default retransmission timer value (RT0) etc. SHOULD be used - the estimator (T-DELAY) and measurements (AAD and ADEV) used for the transmission to the previous domain name are considered obsolete. Note however, that the maximum transaction lifetime considerations apply as usual, and hence retransmission to any of the IP-addresses for any of the domain names MUST NOT occur more than T-Max seconds after the initial sending of the command, irrespective of where it was sent. The Max1 DNS query MAY be performed for each of the domain names, or it MAY simply be performed for the first domain name. The Max2 DNS query however MUST NOT be performed for any but the last domain name. Also note, that only the last IP-address for the last domain name can reach Max2 retransmissions, and hence retransmission to all other IP-addresses MUST end after Max1 retransmissions.

The current value of the NotifiedEntityList parameter can be audited via AuditEndpoint; the value of the NotifiedEntity parameter will not be included here and hence must be audited separately. Support for the NotifiedEntityList in AuditConnection is permissible, but it is neither required nor recommended.

2.2. Endpoint Specifier

2.2.1. EndpointList and EndpointMap Extension Parameters

A simple "all-of" wildcard as defined in [2] may not be sufficient to accurately specify endpoints of interest. An example of this is a case where a Call Agent fails over, resulting in a state mismatch for endpoints involved with transient calls. In order to re-synchronize, one Call Agent procedure involves using the reset extension parameter described in [section 2.4](#) of this document to ensure that idle endpoints are in fact idle. However, these endpoints may be randomly distributed across the available endpoints in a large trunk gateway.

In order to satisfy this requirement, the RED package introduces some new parameters that MAY be used to specify the endpoints of interest for the EndpointConfiguration Command. These are the EndpointList and the EndpointMap extension parameters. These parameters MUST only be used when specifying a virtual endpoint corresponding to the gateway as the LocalEndpointName i.e.:

```
EPCF 1200 MG@gw1.whatever.net MGCP 1.0
```

where "MG" is the virtual endpoint name associated with the gateway.

The EndPointList parameters is a list of the endpoint names which can include one or more lines in the following format:

"RED/EL:" 0*WSP RangedLocalName 0*(", " 0*WSP RangedLocalName)

B. Foster, F. Andreassen Informational

[Page 4]

where RangedLocalName is a LocalEndpointName that may include the ranged wildcard notation described in [Appendix E](#) (section E.5) of [2], i.e.:

```
RangeWildcard = "*" / "[" NumericalRange *("," NumericalRange)"]"
NumericalRange = 1*(DIGIT) [ "-" 1*(DIGIT) ]
```

Example:

```
RED/EL: ds/ds1-1/[1-24], ds/ds1-2/[1-24], ds/ds1-3/[1-24]
```

Including an EndpointMap parameter with the following format can further specify the endpoints:

```
"RED/MP:" 0*WSP TrueOrFalse 0*(TrueOrFalse)
```

```
TrueOrFalse = "T" / "F"
```

where "T" indicates that the command should be applied to this endpoint and "F" indicates that it should not. This parameter can be used in conjunction with the reset extension parameter described in [section 2.4](#) of this document to force arbitrarily distributed endpoints to an idle state.

If the EndpointMap parameter is used it MUST be immediately preceded (i.e. on the previous line) by an EndPointList parameter to specify the endpoints that the EndpointMap is referring to. Several EndpointList and EndpointMap parameter lines MAY be provided. It is considered to be an error if the EndpointMap parameters extend beyond the endpoints specified in the preceding EndPointList parameter. In that case, return code 800 MUST be used (see [section 2.5](#)).

The EndpointList and EndpointMap parameters MUST only be used with the EndpointConfiguration command. The EndpointList parameter MAY be provided without an EndpointMap parameter. However, as indicated earlier, an EndpointMap parameter MUST be immediately preceded by an EndpointList parameter. Neither of these parameters is auditable.

For an example of EndpointMap parameter usage, refer to [section 2.4](#).

[2.2.2](#). Application to Out-of-Service Endpoints

Note that the EndpointConfiguration command is normally only valid for in-service endpoints. If an EndpointConfiguration request is sent to a wild-carded LocalEndpointName [2] and any of the endpoints specified are out-of-service, the command will fail with return code 501 (endpoint not ready).

However, as long as the gateway is in-service and able to respond to MGCP commands, the gateway can apply the endpoint configuration

command to endpoints specified by the EndpointList and/or EndpointMap parameters (regardless of whether those endpoints are in-service or not). The endpoint configuration information of course will not be maintained over gateway restarts (i.e. the Call Agent would have to

re-apply the endpoint configuration after it receives an RSIP with restart method "restart").

EndpointList and/or EndpointMap parameters MUST only be used with a virtual endpoint name corresponding to the gateway (as indicated above). If used with any other endpoint name (whether wild-carded or not), then error code 801 ([section 2.5](#)) MUST be returned.

2.3. Redirect

A new extension parameter for use with the EndpointConfiguration command is defined. A new NotifiedEntity value can be included with a "RED/N" parameter as follows:

```
EPCF 1200 *@gw1.whatever.net MGCP 1.0
RED/N: ca1@ca1234.whatever.net
```

This changes the "notified entity" for the endpoint(s) to the value specified. If the "all of" wildcard convention is used, the NotifiedEntity value replaces all of the existing "notified entities" for those endpoints. If NotifiedEntity is omitted in a subsequent EndpointConfiguration command, the "notified entity" remains unchanged.

In the case where the "notified entity" is a domain name that resolves to multiple IP addresses, one of the resolved addresses MUST be selected. If one of those IP addresses is the IP address of the Call Agent sending the request, that IP address SHOULD be selected first.

The NotifiedEntityList parameter can also be specified in an endpoint configuration command, e.g.:

```
EPCF 1200 *@gw1.whatever.net MGCP 1.0
RED/NL: ca1@myca.whatever.net, ca2@mybackupca.whatever.net
```

As indicated in [section 2.2](#), it can also apply this to the gateway virtual endpoint e.g.:

```
EPCF 1200 MG@gw1.whatever.net MGCP 1.0
RED/EL: *
RED/NL: ca1@myca.whatever.net, ca2@mybackupca.whatever.net
```

As indicated in [section 2.1](#), the NotifiedEntityList ("RED/NL") parameter MAY be used with any command for which a NotifiedEntity parameter is allowed. However, the "RED/N" parameter SHOULD only be used with the endpoint configuration command.

The "RED/N" parameter does not have a default value, and the auditing behavior for auditing the "NotifiedEntity" is unchanged from that

specified in [\[2\]](#), regardless of how the "NotifiedEntity" was set (i.e. there is no specific audit associated with the "RED/N" parameter and hence the "RED/N" parameter cannot be audited).

[2.4.](#) Reset Extension Parameter

Another EndpointConfiguration parameter ("RED/R"), allows the Call Agent to reset one or more endpoints. The ABNF syntax for the parameter line is as follows:

```
"RED/R:" 0*WSP "reset"
```

This has the effect of re-setting and re-initializing the specified endpoints (i.e. any connections on the endpoint will be deleted, and the endpoint will be returned to its clean default state without any active signals, etc.).

Example:

```
EPCF 1200 mg@gw1.whatever.net MGCP 1.0
RED/EL: ds/e1-3/[1-30]
RED/MP: TFTTTTTTFFFTTTTTFFFFFTFFTTFTTTFF
RED/EL: ds/e1-5/[1-30]
RED/MP: TFFFFFFTFFFTTFTTFFFFFFFTFFTTT
RED/R: reset
```

In this case, the particular endpoints specified by "T" by the EndpointMap parameter in the E1 spans ds/e1-3 and ds/e1-5 are reset.

The "RED/R" parameter MUST NOT be used with any command other than the endpoint configuration parameter. There is no default value for the parameter and hence when omitted, it does not affect operation. There is no specific audit behavior associated with this parameter, i.e. it cannot be audited.

[2.5.](#) Return Codes

The following package specific return codes are defined for the "RED" package:

| Code | Text | Explanation |
|------|----------------------------------|--|
| 800 | EndpointMap Out of Range | Either the EndpointMap parameters are outside the range specified by the EndpointList parameter or the EndpointList Parameter was not included when an EndpointMap parameter was included. |
| 801 | Incorrect Usage Of Parameters | Incorrect usage of parameters such as EndpointList parameter used where the endpoint name was not |

the virtual endpoint name
corresponding to the gateway.

3.0. IANA Considerations

The MGCP package title "Redirect and Reset" with the name "RED" and version number 0 should be registered with IANA as indicated in [Appendix C.1](#) in [2].

4.0. Security Considerations

[Section 5](#) of the base MGCP specification [2] discusses security requirements for the base protocol, which apply equally to the package defined in this document. Use of a security Protocol such as IPsec ([RFC 2401](#), [RFC 2406](#)) that provides per message authentication and integrity services is required in order to ensure that requests and responses are obtained from authenticated sources and that messages have not been modified. Without such services, gateways and Call Agents are open to attacks.

For example, without such security services an attacker could masquerade as a Call Agent and initiate a denial of service attack by resetting endpoints that were involved in valid calls. Another attack using the package described in this document could involve re-directing endpoints to itself so that it now acts as the Call Agent for those endpoints.

5.0. Normative References

- [1] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [2] F. Andreassen, B. Foster "Media Gateway Control Protocol (MGCP) Version 1.0", [RFC 3435](#), January 2003

Authors' Addresses

Flemming Andreassen
Cisco Systems
499 Thornall Street, 8th Floor
Edison, NJ 08837
EMail: fandreas@cisco.com

Bill Foster
Cisco Systems
EMail: bfoster@cisco.com

Intellectual Property Statement

The IETF takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in

this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on the IETF's procedures with respect to rights in standards-track and

standards-related documentation can be found in [BCP-11](#). Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementors or users of this specification can be obtained from the IETF Secretariat.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights which may cover technology that may be required to practice this standard. Please address the information to the IETF Executive Director.

Full Copyright Statement

Copyright (C) The Internet Society (2003). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.

