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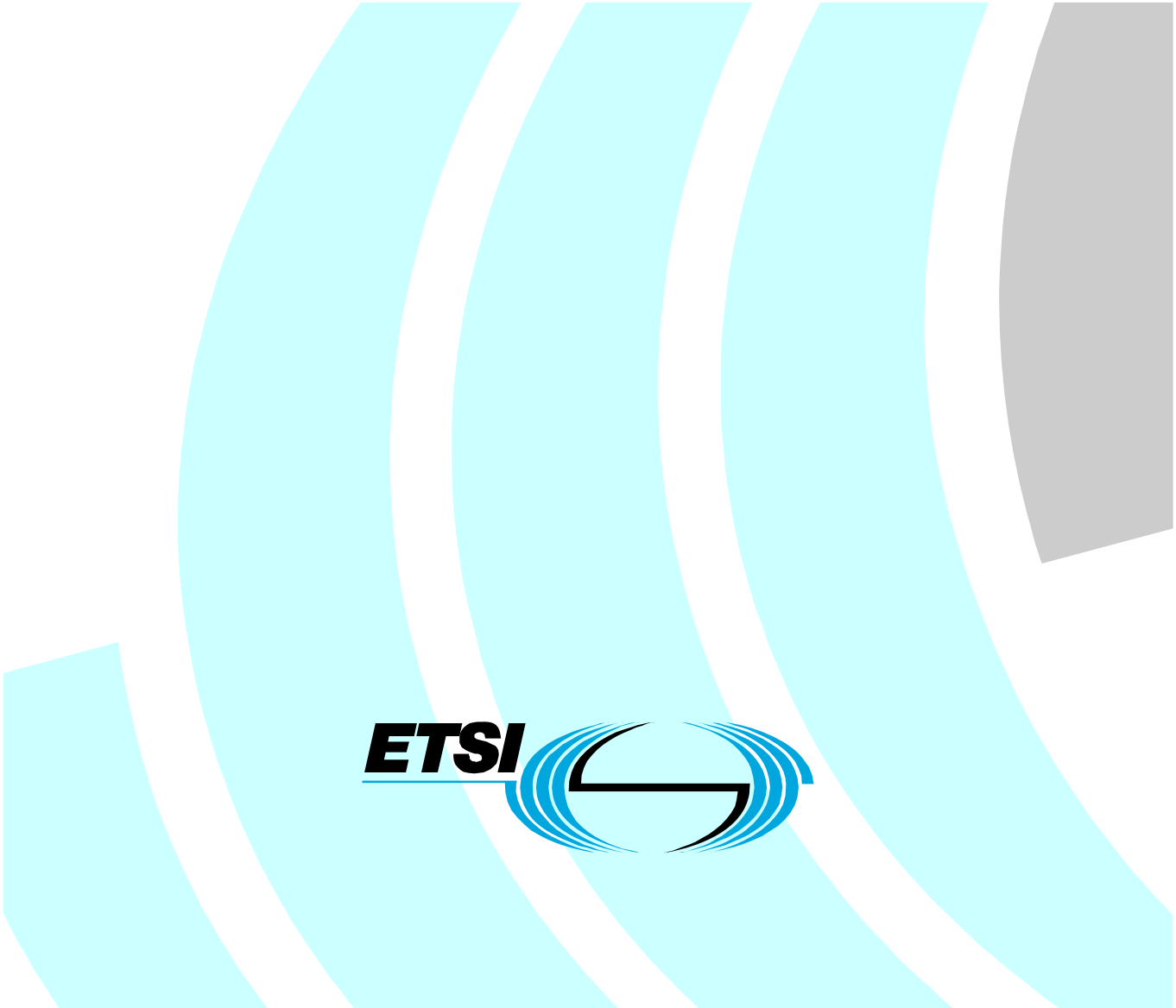
Technical Report

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); H.248 Non-Call Related Procedures and Management System Interaction



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Contents

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

1 Scope

The purpose of the present document is to define guidelines with regard to the interaction of non-call related H.248 procedures and generic network management use cases and vice versa. More specifically, the interaction between the following is considered:

- **Control procedures** at the **H.248 interface**.
  These are the procedures between Media Gateway Controllers (primary and secondary) and their associated Media Gateways (primary, and secondary if available). These procedures primarily utilize the **H.248 ServiceChange** and **H.248 Audit** procedures.

- **Management procedures** at the management interface(s) of H.248 systems (i.e. both Media Gateway Controller and Media Gateway) to perform non call related tasks such as configuration management (start-up, capability change, maintenance locking) and fault management (failure handling).

It is intended that these guidelines are then subsequently used in corresponding H.248 profiles to produce detailed non-call related procedures. At the current time, the existing set of ETSI H.248 profiles ([i.1], [i.2], [i.3] and [i.4]) lack any such detailed procedures.

Specific management systems, architectures and protocols are outside the scope of the present document; only the general requirements and Use Cases related to the management system shall be discussed.

1.1 Applicability

The present document is applicable to any network element that exhibits a H.248 interface and a management interface (e.g. SNMP). The intent of the present document is to provide guidelines so as to facilitate a consistent set of behaviour for non-call related procedures in the related H.248 profile specifications. Due to the general nature of the present document, it is possible that some of the procedures herein will not be applicable to certain H.248 profiles - it is for a specific profile itself to define which procedures are mandatory/optional/not applicable.

The present document assumes an IP-based transport for H.248 signalling. The IP transport may be provided by either UDP or SCTP.

1.2 Relation to H.248 Standards

The present document is considered to be complementary to H.248 standards where there are discrepancies between the present document and the correspondent ITU-T Recommendation H.248-series Recommendations, the procedures of these ITU-T Recommendations (in particular ITU-T Recommendation H.248.1 [i.5] and its annex F on ServiceChange), take precedence over those described in the present document.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

For online referenced documents, information sufficient to identify and locate the source shall be provided. Preferably, the primary source of the referenced document should be cited, in order to ensure traceability. Furthermore, the reference should, as far as possible, remain valid for the expected life of the document. The reference shall include the method of access to the referenced document and the full network address, with the same punctuation and use of upper case and lower case letters.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

Not applicable.

2.2 Informative references

The following referenced documents are not essential to the use of the ETSI deliverable but they assist the user with regard to a particular subject area**.** For non-specific references, the latest version of the referenced document (including any amendments) applies.

[i.1] ETSI ES 283 002 (V1.1.1): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN Emulation Subsystem (PES); NGN Release 1 H.248 Profile for controlling Access and Residential Gateways".

[i.2] ETSI ES 283 024 (V1.1.1): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN Emulation: H.248 Profile for controlling Trunking Media Gateways in the PSTN/ISDN Emulation Subsystem (PES); Protocol specification".

[i.3] ETSI ES 283 018 (V1.1.1): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control: H.248 Profile for controlling Border Gateway Functions (BGF) in the Resource and Admission Control Subsystem (RACS); Protocol specification".

[i.4] ETSI ES 283 031 (V1.1.1): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia: H.248 Profile for controlling Multimedia Resource Function Processors (MRFP) in the IP Multimedia System (IMS); Protocol specification".

[i.5] ITU-T Recommendation H.248.1 (2005): "Gateway Control Protocol: Version 3".

[i.6] ITU-T Recommendation H.248.10 (2001): "Gateway control protocol: Media Gateway Resource Congestion Handling package".

[i.7] ITU-T Recommendation H.248.14 (2002): "Gateway control protocol: Inactivity timer package".

[i.8] ITU-T Recommendation H.248.11 (2002): "Gateway control protocol: Media Gateway Overload Control package".

[i.9] ETSI ES 283 039-4 (V2.1.1): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Overload Control Architecture; Part 4: Adaptative Control for the MGC".

[i.10] ITU-T Recommendation H.248.40 (2007): "Gateway control protocol: Application Data Inactivity Detection package".

[i.11] IETF RFC 4268: "Entity State MIB".

[i.12] ITU-T Recommendation X.731: "Information technology - Open Systems Interconnection - Systems management: State management function".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

control association: The H.248 Control Association is defined in clause F.2/H.248.1 version 3 [i.5].

primary Media Gateway: No explicit definition in H.248.

NOTE: The primary MG is rather implicitly defined. See mainly ITU-T Recommendation H.248.1 version 3 [i.5], clauses 7.2.8.1.11, 9, 11.2, 11.5, F.1, F.3.2, F3.5, F.3.11 or F.4.1.1. A primary MG is denoted by the facts that:

1) there is a single H.248 Control Association terminated in the MG; and that

2) there may be a secondary MG exist. The association between primary and secondary entity is given by support for redundancy on network level.

primary Media Gateway Controller: According to "Primary MG".

secondary Media Gateway: According to "Primary MG".

secondary Media Gateway Controller: According to "Primary MGC".

NOTE: There can in general be a list of primary and secondary MGC's in each MG.

H.248 entity: any primary or secondary MGC or MG may be also denoted as H.248 entity

NOTE 0: An H.248 entity relates to a Functional Entity (FE), any implementation of an H.248 entity is mapping the functional entity on a Physical Entity (PE).

NOTE 1: E.g. a virtual MG (VMG) is a H.248 FE. Multiple VMGs are realized in a single physical MG, which relates to an H.248 PE.

NOTE 2: Physical entities are sometimes also denoted as "platform" or "processor".

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AGW	Access GateWay
DSP	Digital Signal Processor
FE	Functional Entity
IP	Internet Protocol
IS	In Service
MG	Media Gateway
MGC	Media Gateway Controller
NGN	Next-Generation Network
OOS	Out-of-Service
PE	Physical Entity
RTP	Real-time Transport Protocol
SC	ServiceChange (H.248)
SCTP	Stream Control Transmission Protocol
SDO	Standardization Develpment Organizations
TISPAN	Telecommunications and Internet converged Services and Protocols for Advanced Networking
TR	Technical Report
UDP	User Datagram Protocol
VMG	Virtual Media Gateway

4 Reference Architecture

Figure 1 illustrates the reference architecture assumed in the present document.

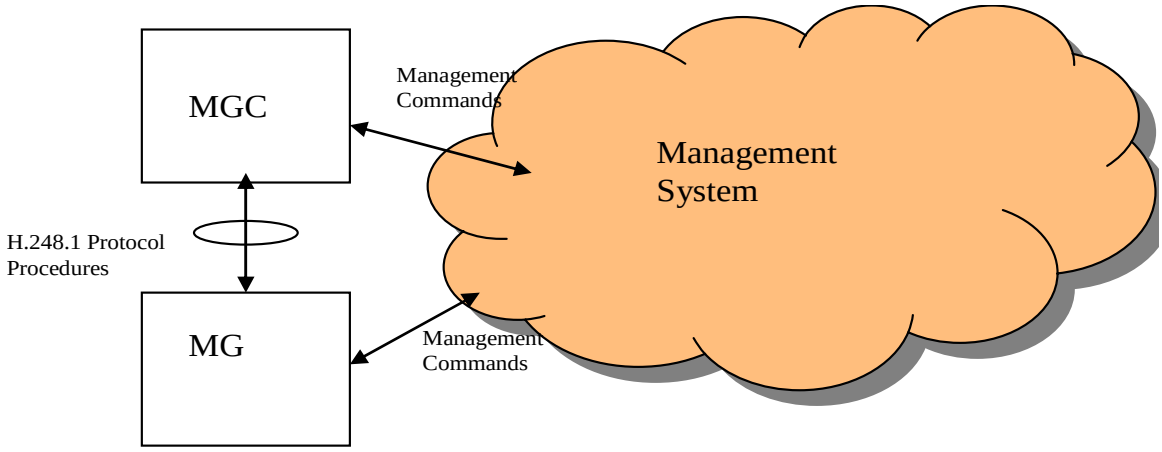

Figure 1: Reference architecture

The present document discusses the message primitives that may be passed over the Management Command interface and any related mappings into the H.248 control procedures and vice versa.

5 H.248 Concepts And Logical Entities

5.1 H.248 Entities

H.248 commands and procedures are acting on H.248 logical entities. These are the different types:

- Context - this is the entity that associates terminations together in a call or session. See also clause 6.1 of [i.5].
- NULL Context - this is a special Context which contains all Physical Terminations that are not associated with any other Termination. However, commands may still be initiated to and from these terminations. See also clause 6.1 of [i.5].
- Root Termination - this defines the MGW as an individual entity as a whole. See also clause 6.2.5 of [i.5].
- Physical Termination - this is an entity which has fixed physical characteristics (e.g. an analogue line) and requires pre-configuration via the management system prior to use within H.248 protocol. For such terminations, the MGC and MG are pre-provisioned to have a common view of the existing physical terminations. See also clause 6.2 of [i.5].
- Ephemeral Termination - this is a logical entity representing a dynamically created termination within the MGW (e.g. IP/RTP). No pre-configured characteristics are required for this type of entity, although in some profiles the MGC may have a dependency on the MG via the termination naming principles. See also clause 6.2 of [i.5].

Terminations may be individually addressed or as group (except Root Termination). Group addressing is performed via H.248 wildcarding.

5.2 H.248 Non-Call Related Commands

The H.248.1 commands relevant to the present document are:

- AuditValue - this command enables a MGC to request the supported packages and current state of properties, events, signals and statistics of terminations. For further details, see also clause 7.2.5 of [i.5].
- AuditCapability - this command enables a MGC to request all supported values for termination properties, events and signals allowed by the Media Gateway (i.e. the ROOT Termination). This command is not used in any of the TISPAN profiles and is thus considered to be out of scope in the present document. For further details, see also clause 7.2.6 of [i.5].
- ServiceChange - this command enables a MG to notify the MGC that a termination or group of terminations is about to be taken out of service or has just been returned to service. It also used by the MG to announce its availability to a MGC (registration), and to notify the MGC of impending or completed restart of the MG. The MGC may announce a handover to the MG by sending it a ServiceChange command. The MGC may also use ServiceChange to instruct the MG to take a termination or group of terminations in or out of service. For further details, see also clause 7.2.8 of [i.5].
- Notify - this command enables a MG to notify the MGC of any event occurring in the MG (that has been requested by the MGC). The Notify command is applicable to both call and non-call related procedures. Only the latter is in scope of the present document. For further details, see also clause 7.2.7 of [i.5].

5.3 H.248 Service State

One of the key descriptors of Terminations in the present document is the ServiceStates property within the Termination State Descriptor:

Possible values:

InService	The termination is in-service and functioning normally.
OutOfService	The termination is out-of-service and not available for traffic.
Test	The termination is undergoing testing.

The MG/MGC may report changes to the service state via the Service Change Command to its peer. Changes to the service state can occur due to faults (MG only) or interaction with management commands (MG/MGC). In the latter case, the H248 Service State is assumed to reflect the overall/resulting availability status of the termination based on the administrative (i.e. the state of the resource as required by the management interface) and operational (i.e. the state of the resource based whether it is working correctly or not) states.

Note that the transition into the TEST state has no impact on Service Change procedures. Service change procedures are impacted only in the transition from TEST to OUT OF SERVICE states (see table F2/H248.1 of [i.5]).

6 Management Primitives

As stated previously, specific management systems, architectures and protocols are outside the scope of the present document. Rather, the present document considers only a high level set of primitives which directly result in the triggering of H.248 signalling.

The following management primitives are defined in the present document:

- Create Resource - this command creates a resource. A resource is typically created prior to it being enabled. This command has no impact on H.248 signalling and is included only for completeness.
- Enable Resource - the resource moves from an OOS to an IS state (assuming that there is no problem with any related physical state) and is now available for traffic.
- Disable Resource (Graceful) - the resource is no longer available to new calls/connections. However, all existing calls are permitted to terminate naturally at which point the resource moves into the OOS state. If there are still remaining calls on the resource after a period of time, the operator may invoke the Disable Resource (Immediate) primitive.
- Disable Resource (Immediate) - any existing calls/connections are force released, at which point the resource moves into the OOS state.
- Delete Resource - this command deletes a resource. A resource would be disabled prior to it being deleted. This command has no impact on H.248 signalling and is included only for completeness.

These management primitives (in general) are applicable at both the MG and MGC.

7 Failure/Recovery Scenarios

Certain failure scenarios also result in the triggering of H.248 signalling. The present document defines the following set of such scenarios:

- Nodal failure and recovery of a MG/MGC. This can be due to hardware or software faults.
- Termination failure and recovery. Examples of this are termination failure/recovery on the MG (e.g. DSP failure, interface failure such as loss of synchronization on an E1, etc.).
- User plane failure. Examples of this would be detection of loss of RTP media. The MG would inform the MGC of such failure and the MGC may force release the call.

- MG-MGC signalling link (control association) failure/recovery. The detection of a signalling link failure results in H.248 signalling to restore the link. On restoring the link, the MG and MGC may have become out of step and thus additional H.248 audits are necessary to ensure the re-synchronization of each end.

8 Redundancy Scenarios

The H.248 non call related procedures are also impacted by the redundancy architectures chosen at a MG/MGC. Examples of such scenarios are:

- MGC Hand-Off. This functionality enables a MGC to terminate an existing control association and establish a new control association to an alternative MGC. This procedure can be applied to load share or due to maintenance action.
- MGC Re-direct. This functionality enables a MGC to redirect an attempted registration to an alternative MGC.
- MG Failover. This functionality enables a MG to inform a MGC that a secondary MG is taking over an existing control association.

It should be noted that processor redundancy can be achieved within a functional node thus being invisible to the H.248 protocol peer or additionally within the functional node but between logical entities within that node and thus using H.248 procedures but using the same nodal address. The scope of the present document does not extend to inter-nodal protocol solutions to support other such redundancy scenarios.

9 General Use Cases

The following use cases and their interaction with the H.248 non-call related procedures are considered in the present document.

Configuration Management:

- Enable MG.
- Enable MGC.
- Disable MG (Graceful).
- Disable MG (Immediate).
- Disable MGC.
- Enable Termination.
- Disable Termination (Graceful).
- Disable Termination (Immediate).

Fault Management - Failure and recovery:

- MG failure and recovery.
- MG termination failure and recovery.
- MGC failure and recovery.
- User plane failure.
- MGC-MG signalling link failure and recovery.

Performance Management:

- MG Overload.
- MGC Overload.

Node Redundancy:

- MGC Handoff.
- MGC Redirect.
- MG Failover.

10 Interaction Between Use Cases and Non-Call Related H.248 Procedures

This clause contains high level functional descriptions of the non call-related H.248 procedures in relation to the Use Cases. There may be multiple procedures relating to one general use case. Clause 11 contains the detailed contents of each of the cited procedures. The procedure names are denoted by the use of UPPER CASE letters.

10.1 Enable MG

This management primitive is applicable to both the MGC and MG. It is recommended that this primitive is initially sent to the MGC and subsequently to the MG.

10.1.1 Enable MG (at MGC)

This use case is triggered by management action that results in a MG being enabled at the MGC. There are no H.248 procedures associated with this action. The MGC simply awaits a registration from the MG (see clause 10.1.2).

10.1.2 Enable MG (at MG)

This use case is triggered by management action that results in a MG being brought into service. The MG will have been provisioned with the identity/address of one or more MGC(s). The H.248 procedures are dependent on whether the MG undergoes a cold or warm boot and are as follows:

MG Cold Boot

1) The MG registers with one of its (pre-provisioned) MGCs using the MG REGISTRATION (COLD BOOT) procedure. This step enables the H.248 protocol version to be negotiated as well as the support of any H.248 profiles.

2) In the event of there being no response to the registration request, the MG follows the procedures of clause 11.5 of [i.5].

3) On completion of the initial registration procedure, the MGC assumes that all physical terminations are in the NULL context and there are no existing ephemeral terminations. Thus no context/termination related audits are required to be performed.

4) The MGC may optionally perform a PACKAGES AUDIT procedure in order to determine the MG support of any optional packages in a mutually supported profile.

5) The MGC may optionally audit ROOT properties (in any mandatory and optional packages) via the AUDIT ROOT PROPERTIES procedure.

6) The MGC may optionally set properties and events (in any mandatory and optional packages) in the MG on ROOT level via the SET ROOT TERMINATION EVENTS/PROPERTIES procedure.

7) The MG may optionally inform the MGC of the state of its physical terminations via a MG TERMINATION AVAILABLE/MG TERMINATION UNAVAILABLE procedure.

8) The MGC may optionally Audit the state of the physical terminations if it can not be assumed that the state is in-service or out-of-service via the AUDIT TERMINATION STATE procedure.

9) The MGC should not deblock associated circuits toward peer nodes before it has determined the true service state of the MG's circuits by one of the two procedures above.

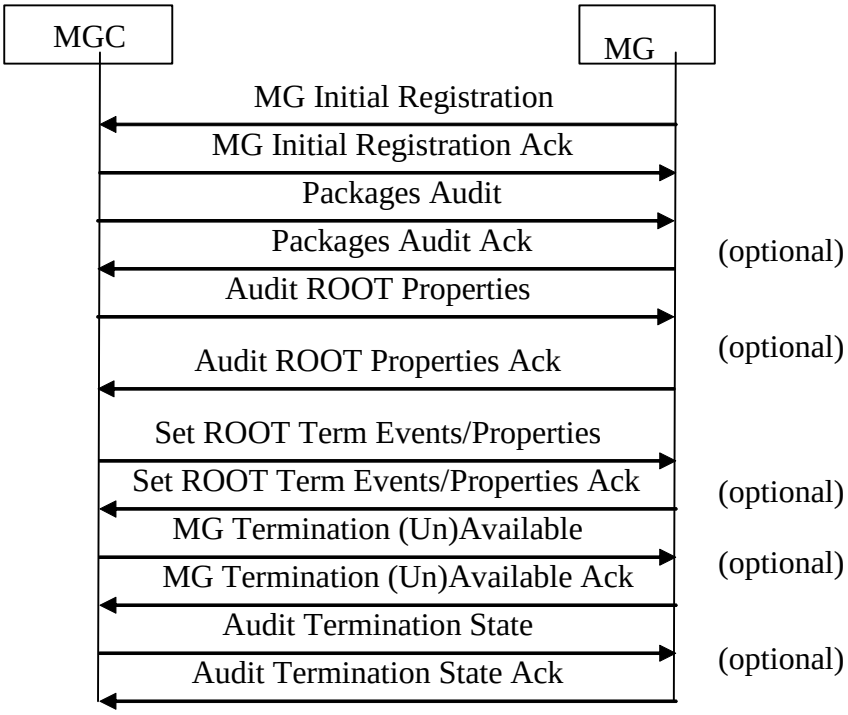

Figure 2: MG Cold Boot Procedures

MG Warm Boot

1) The MG registers with one of its (pre-provisioned) MGCs using the MG RESTORATION procedure This step enables the H.248 protocol version to be negotiated as well as the support of any H.248 profiles.

2) In the event of there being no response to the registration request, the MG follows the procedures of clause 11.5 of [i.5].

3) On completion of the re-registration procedure, the MGC does not assume that all physical terminations are in the NULL context and there may be existing ephemeral terminations.

4) The MGC may optionally perform a PACKAGES AUDIT procedure in order to determine the MG support of any optional packages in a mutually supported profile. This step is recommended if the related service change reason indicates that the capabilities/packages of the MG have changed.

5) The MGC may optionally audit ROOT properties (in any mandatory and optional packages) via the AUDIT ROOT PROPERTIES procedure.

6) The MGC may optionally set properties and events (in any mandatory and optional packages) in the MG on ROOT level via the SET ROOT TERMINATION EVENTS/PROPERTIES procedure.

7) The MGC may optionally perform a CONTEXT AUDIT procedure to determine/check the active contexts and connected terminations on the MG.

8) The MG may optionally inform the MGC of the state of its terminations via a MG TERMINATION AVAILABLE/MG TERMINATION UNAVAILABLE procedure.

9) The MGC may optionally Audit the state of its terminations if it can not be assumed that the state is in-service or out-of-service via the AUDIT TERMINATION STATE procedure.

10) The MGC should not deblock associated circuits toward peer nodes before it has determined the true service state of the MG's circuits by one of the two procedures above.

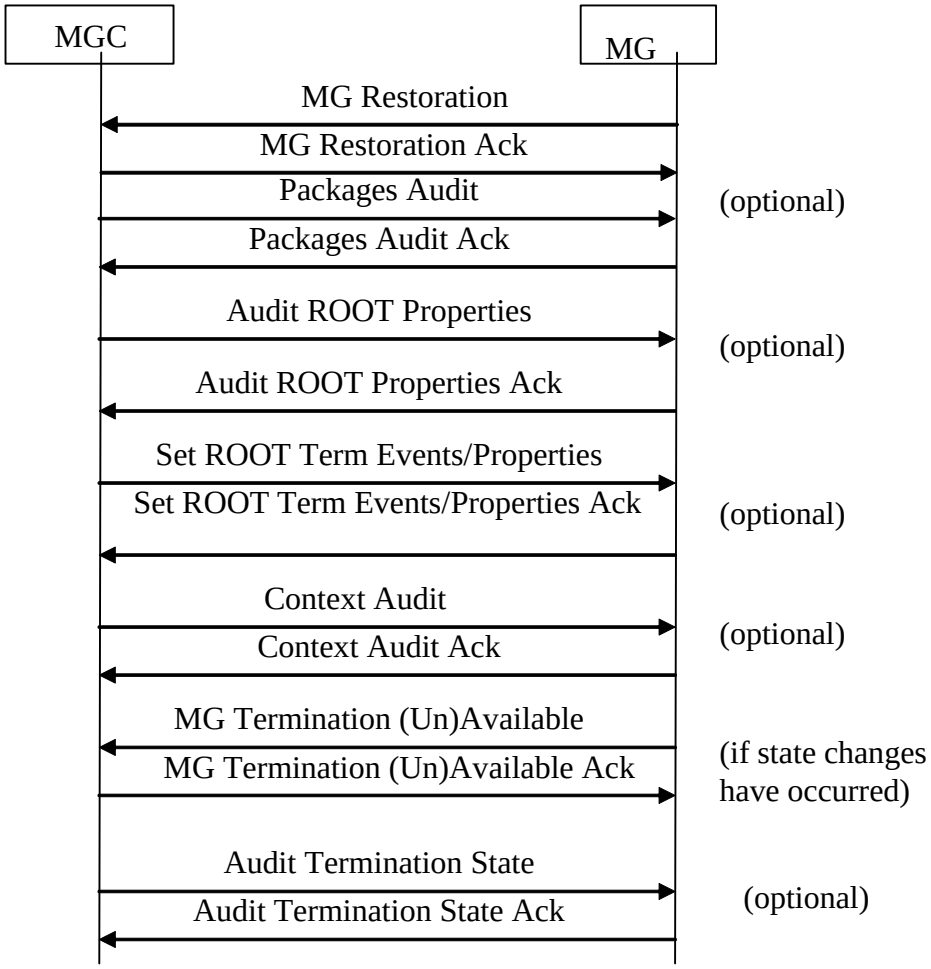

Figure 3: MG Warm Boot Procedures

10.2 Enable MGC

This management primitive is applicable only to the MGC and results in a MGC being brought into service. The MGC will have been provisioned with the H.248 mid and possibly the transport address of the H.248 control association of its MGs. The following H.248 procedures are performed:

1) The MGC may optionally check on the availability of its MGs via the CHECK MG AVAILABILITY procedure. This is only possible if the MGC is aware of the pre-provisioned IP address of the MG.

2) If the MG is available, the MGC may optionally request the MG to register via the MGC INITIATED SERVICE RESTORATION procedure which causes the MG to initiate the MG RE-REGISTRATION (RESTART) procedure.

3) If the MG is available, the MGC may optionally audit ROOT properties in the MG via the AUDIT ROOT PROPERTIES procedure.

4) If an MG is available, the MGC may optionally set properties and events in the MG on ROOT level via the SET ROOT TERMINATION EVENTS/PROPERTIES procedure.

5) If an MG is available, the MGC may optionally perform a CONTEXT AUDIT procedure to determine the active contexts and connected terminations on the MG.

6) If an MG is available, the MGC may optionally clean up hanging contexts/terminations via a WILDCARDED SUBTRACT.

7) If an MG is available, the MGC may optionally check on the service state of the physical terminations on the MG service via the AUDIT TERMINATION STATE procedure.

8) The MGC should not deblock associated circuits toward peer nodes before it has determined the true service state of the MG's circuits.

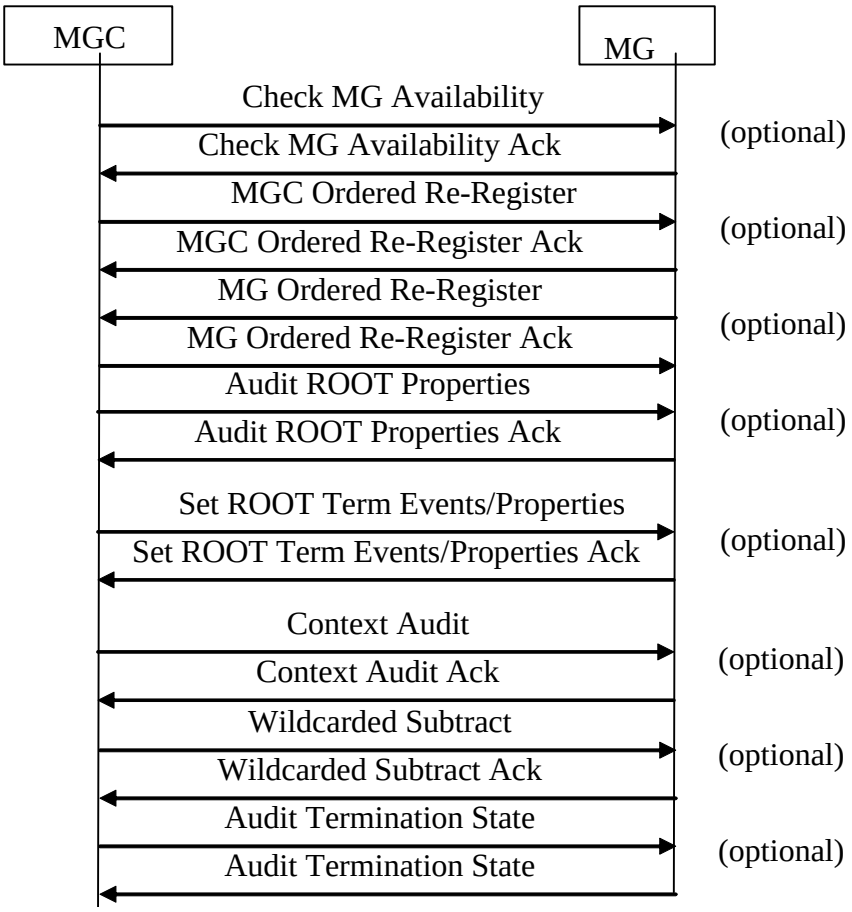

Figure 4: Enable MGC Procedures

10.3 Disable MG (Graceful)

This primitive is applicable to both the MG and MGC and covers the use case of management action that results in a MG being taken out of service gracefully. It is recommended that the network management system performs a Disable MG (Graceful) command to the MGC. The one scenario where a Disable MG (Graceful) command to the MG makes sense is for an Access Gateway in order to inhibit new calls being initiated toward the MGC during the graceful period - and even in this case a MGC would be able to reject any originating calls appropriately. In addition, the management primitive typically has no equivalent of the H.248 ServiceChangeDelay - rather the acceptable period during which all affected calls/connections ought to be removed is determined by the operator. Therefore when mapping into H.248, a default value for the ServiceChangeDelay period would need to be applied.

10.3.1 Disable MG (Graceful) (at MGC)

On receipt of this primitive, the MGC performs the following actions:

1) The MGC inhibits any new calls/connections to the MG and allows existing calls/connections to expire naturally/normally.

2) In the event of new calls originating from the MG (e.g. an AGW), the MGC would handle them appropriately via call related procedures (e.g. reject the call attempt and connect a failure indication).

3) When all calls have been released, the management system is informed. Optionally, the MGC may also place the MG out of service via the MGC INITIATED SERVICE CANCELLATION procedure.

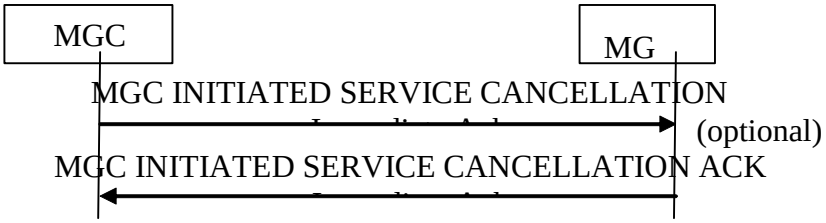

Figure 5: MGC INITIATED SERVICE CANCELLATION Procedure

10.3.2 Disable MG (Graceful) (at MG)

The following H.248 procedures are applied:

1) The MG informs the MGC via the MG SERVICE CANCELLATION (GRACEFUL) procedure. This procedure enables the MG to specify a timer (the ServiceChangeDelay) during which it is anticipated that all existing calls/connections on that MG will expire normally.

2) If applicable, the MG may prevent new originating calls being offered to the MGC.

3) The MGC inhibits any new calls/connections to the MG and allows existing calls/connections to expire naturally/normally.

4) At the end of the ServiceChangeDelay period, any remaining connections are left hanging on the MG.

5) At the end of the ServiceChangeDelay period, the MGC force releases any remaining calls that have not expired naturally (but does not signal to the MG since the control association is now assumed to be down).

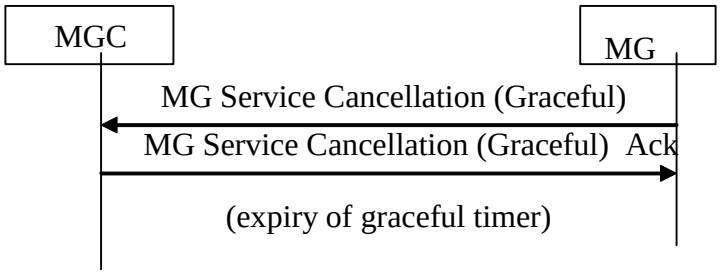

Figure 6: MG SERVICE CANCELLATION (GRACEFUL) Procedure

10.4 Disable MG (Immediate)

This primitive is applicable to both the MG and MGC and covers the use case of management action that results in a MG being taken out of service immediately.

10.4.1 Disable MG (Immediate) (at MGC)

On receipt of this primitive, the MGC performs the following actions:

1) The MGC inhibits any new calls/connections to the MG and force releases existing calls/connections.

2) In the event of new calls originating from the MG (e.g. an AGW), the MGC would handle them appropriately via call related procedures (e.g. reject the call attempt and connect a failure indication).

3) When all calls have been released, the management system is informed. Optionally, the MGC may also place the MG out of service via the MGC INITIATED SERVICE CANCELLATION procedure (see figure 5).

10.4.2 Disable MG (Immediate) (at MG)

The following H.248 procedures are performed:

1) The MG informs the MGC via the MG SERVICE CANCELLATION (FORCED) procedure.

2) The MG responds to the management system. Note that existing connections are still hanging on the MG.

3) On receipt of the MG SERVICE CANCELLATION (FORCED) message, the MGC force releases any calls/connections associated with that MG. However, the connections cannot be removed on the MG due to the control association being down.

Since connections may be left hanging, it is recommended that the DISABLE MG (Immediate) primitive is applied firstly at the MGC and then at the MG.

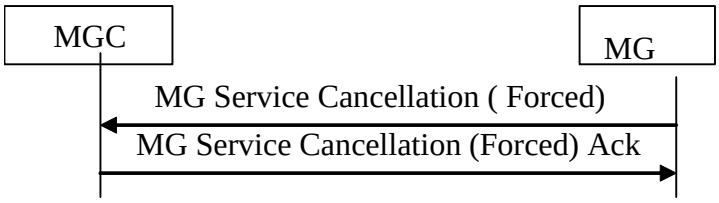

Figure 7: MG SERVICE CANCELLATION (FORCED) Procedure

10.5 Disable MGC

This primitive is sent to a MGC and results in a MGC being taken out of service.

Prior to the MGC being disabled, it is recommended that the MGC inform its dependent MGs to move their control associations to an alternative MGC via the MGC HANDOFF procedure (clause 10.18) or that all dependent MGs are disabled prior to disabling the MGC (clause 10.4).

10.6 Enable Termination

This management primitive is applicable to both the MGC and MG. It is recommended that this primitive is initially sent to the MGC and subsequently to the MG.

10.6.1 Enable Termination (at MGC)

The following H.248 procedures are performed:

1) The MGC may:

   a) Optionally assume that the corresponding termination is in-service on the MG, in which case the MGC attempts to use the termination and will receive an error code if the termination is not available at the MG end. On receipt of any such error code, the MGC desists from using the termination until such time as the procedures in clause 10.6.2 are completed.

   b) Optionally assume that the corresponding termination is out of service and await the completion of the procedures in clause 10.6.2.

   c) Optionally audit the service state of the termination via the AUDIT SERVICE STATE procedure.

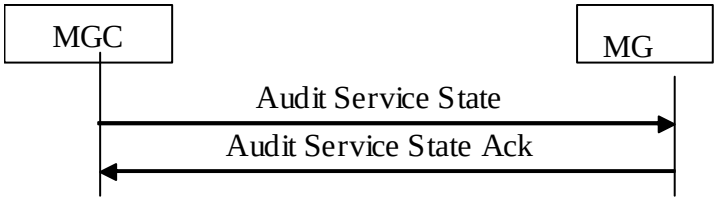

Figure 8: Audit Service State Procedure

10.6.2 Enable Termination (at MG)

The following H.248 procedures are performed:

1) The MG informs the MGC via the MG TERMINATION AVAILABLE procedure. If a successful response is obtained the termination is now in-service at both the MG and MGC. If a negative response/error descriptor is received, the MG periodically repeats the MG TERMINATION AVAILABLE procedure until a successful response is received.

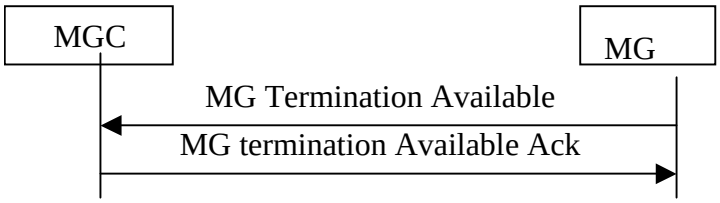

Figure 9: MG Termination Available Procedure

10.7 Disable Termination (Graceful)

This primitive is applicable to both the MG and MGC and covers the use case of management action that results in a termination being taken out of service gracefully. It is recommended that the network management system performs a Disable Termination (Graceful) command to the MGC. The one scenario where a Disable Termination (Graceful) command to the MG makes sense is for an Access Gateway in order to inhibit new calls being initiated toward the MGC during the graceful period - and even in this case a MGC would be able to reject any originating calls appropriately.

10.7.1 Disable Termination (Graceful) (at MGC)

The following actions are performed:

1) The MGC prevents any new calls/connections being offered to the affected termination.

2) If there are any current calls/connections on the termination, the MGC allows them to expire normally/naturally.

3) When all calls are released, the MGC informs the management system.

10.7.2 Disable Termination (Graceful) (at MG)

The following actions are performed:

1) The MG informs the MGC via the MG TERMINATION OOS GRACEFUL procedure. This procedure enables the MG to specify a timer (the ServiceChangeDelay) during which it is anticipated that all existing calls/connections on that MG termination will expire normally. On receipt of this message, the MGC now inhibits any new calls/connections to the specified MG termination and allows existing calls/connections to expire naturally/normally.

NOTE: The use of delay means that the network management has lost control of when the calls will be forced-released, in many cases the operator would control this and depending on number of calls still active may chose to defer the maintenance action.

2) At the end of the ServiceChangeDelay period, the MG places the termination in the out of service state.

3) Additionally, at the end of the ServiceChangeDelay period, the MGC force releases any remaining calls that have not expired naturally and subtracts the terminations on the MG since the control association is still up.

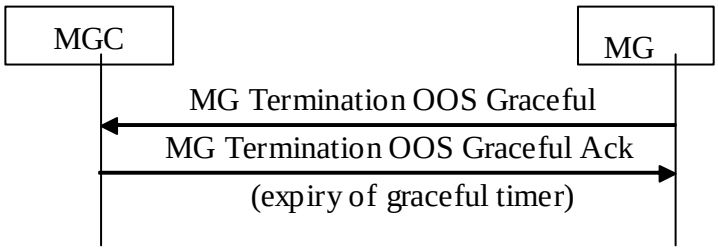

Figure 10: MG Termination OOS Graceful Procedure

10.8 Disable Termination (Immediate)

This primitive is applicable to both the MG and MGC and covers the use case of management action that results in a termination being taken out of service immediately.

10.8.1 Disable Termination (Immediate) (at MGC)

The following H.248 procedures are performed:

1) The MGC force releases all affected calls/connections, subtracting appropriate terminations on the MG.

10.8.2 Disable Termination (Immediate) (at MG)

This use case is triggered by management action that results in a MG termination being taken out of service immediately. The following H.248 procedures are performed:

1) The MG informs the MGC via the MG TERMINATION UNAVAILABLE procedure.

2) The MGC now force releases all affected calls/connections including subtracting appropriate terminations on the MG.

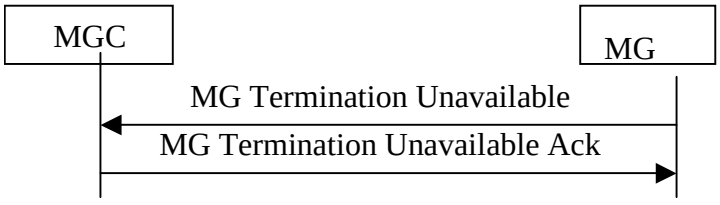

Figure 11: MG Termination Unavailable Procedure

10.9 MG Failure and Recovery

This use case is triggered by a hardware/software failure on the MG. The following H.248 procedures are performed:

1) If possible, the MG informs the MGC via the MG SERVICE CANCELLATION (FORCED) procedure. The MGC force releases all affected calls.

2) On recovering, the MG restarts and informs the MGC. The procedures of clause 10.1.2 are applicable.

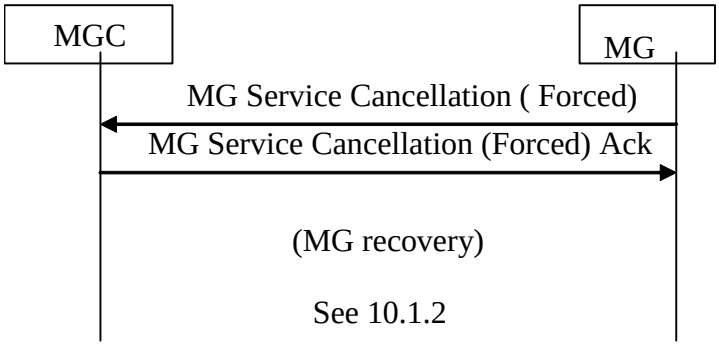

Figure 12: MG Failure and Recovery Procedures

10.10 MG Termination Failure and Recovery

This use case is triggered by a hardware/software failure on the MG termination (e.g. loss of synchronization on an E1). The following H.248 procedures are performed:

1) The MG informs the MGC via the MG TERMINATION UNAVAILABLE procedure. The MGC force releases any affected calls (and subtracts related terminations on the MG).

2) On the fault being cleared, the MG informs the MGC via the MG TERMINATION AVAILABLE procedure.

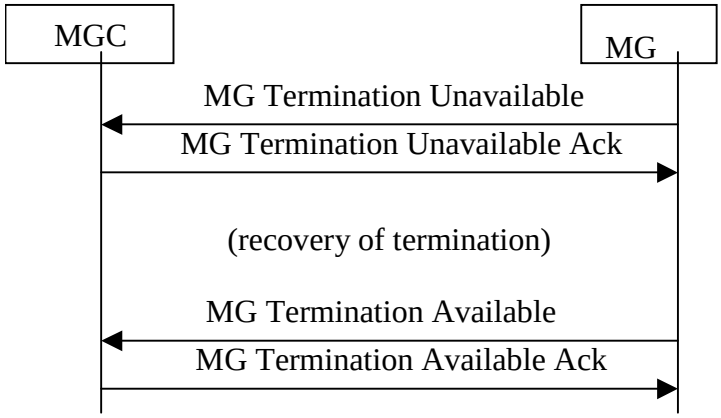

Figure 13: MG Termination Failure and Recovery Procedures

10.11 MGC Failure and Recovery

This use case is triggered by a hardware/software failure on the MGC. The following H.248 procedures are performed:

1) During the outage, the procedures associated with the MG detecting the loss of the control association are applicable (see clause 10.13).

2) When the MGC recovers, the procedures of clause 10.2 are applicable.

10.12 User Plane Failure

10.12.1 Failure affecting a Single Termination

This use case is triggered by the MG detecting loss of application data (e.g. RTP) on an ephemeral termination. The following H.248 procedures are performed:

1) During the establishment of the connection, the MGC is assumed to have armed the MG to report an appropriate ObservedEvent which would be associated with user plane failure. There are a number of events that could be used for this purpose (e.g. nt/netfail, nt/qalert (see clause E.11 of [i.5]), g/cause (see clause E.1 of [i.5], adid/ipstop (see [i.10]) etc.).

2) The MG detects loss of user plane data on one or more streams and notifies the MGC via the USER PLANE FAILURE procedure. The MG should avoid sending an avalanche of notifications where loss of user plane data is detected simultaneously across multiple ephemeral terminations.

3) On being informed of user plane failure, the MGC would typically remove the affected stream(s) and/or force release the affected call and subtract the related terminations.

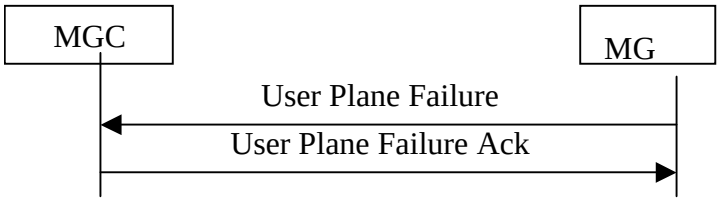

Figure 14: MG User Plane Failure Procedure

10.12.2 Failure affecting Multiple Terminations

The events of previous clause may be applied as in this scenario as well. The major difference is the fact, that in this scenario the failure affects multiple ephemeral terminations in parallel. This may lead to a burst arrival of correspondent event notifications at the MGC.

Alternative failure reporting could be based on the use of ServiceChange with appropriate wildcarding.

10.13 MGC-MG Control Association Failure and Recovery

The general framework for "MGC-MG control association monitoring" is defined in clause 11.6 of [i.5].

If UDP transport is used to convey the H.248 signalling, then the control association is indirectly monitored via the Inactivity Package (see [i.7]). In this case, it is assumed that the MGC has previously initiated the inactivity timer on the MG via the SET ROOT TERMINATION EVENTS/PROPERTIES procedure (see clause 10.1). This approach is based on the MGC being polled by the MG. An unsuccessful event notification can be the result of either a failure in the MGC entity, or a failure of the IP transport.

If SCTP transport is used, then the SCTP association is monitored via SCTP procedures (which are out of scope of the present document) and the H.248 application layer is informed by the SCTP layer when the SCTP association goes down/comes up.

The following H.248 procedures are performed:

1) For UDP transport, the MGC should endeavour to send at least one message to the MG during the period of the inactivity timer. If there are no call related messages, the MGC may use the CHECK MG AVAILABILITY procedure. If this procedure fails, the MGC periodically re-attempts the procedure to check if the control association is once more OK.

2) For UDP transport, on expiry of the inactivity timer, if the MG has received a message (including an acknowledgment) from the MGC during the inactivity timer period, then the MG resets the inactivity timer.

3) For UDP transport, on expiry of the inactivity timer, if the MG has not received a message (including an acknowledgment) from the MGC during the inactivity timer period, then the MG initiates the ROOT EVENT NOTIFICATION procedure to notify the MGC of the expired inactivity timer.

4) For UDP transport, if the ROOT EVENT NOTIFICATION procedure is successfully acknowledged, then the MG resets the inactivity timer.

5) For UDP transport, if no acknowledgement is received, then the control association is deemed to be down after normal H.248 retransmissions have occurred.

6) For UDP transport, the MG now attempts to re-establish the lost control association via the MG LOST COMMUNICATION (DISCONNECTED) procedure. If no acknowledgement is received (and H.248 retransmissions have occurred), then the MG attempts to establish an alternative control association via the MG LOST COMMUNICATION (FAILOVER) procedure.

7) For SCTP transport, on being informed by the SCTP layer that the SCTP association is now up, the MG re-establishes the H.248 control association via the MG LOST COMMUNICATION (DISCONNECTED) procedure.

8) When the control association is re-established, the MGC may optionally re-synchronize its data with the MG via the CONTEXT AUDIT and AUDIT TERMINATION STATE procedures.

9) When the control association is re-established, the MG informs the MGC of the state of its terminations via the MG TERMINATION AVAILABLE/MG TERMINTION UNAVAILABLE procedure if any changes occurred which it was unable to report during the signalling link outage.

10) When the control association is re-established, commands that were buffered during the outage period may be sent.

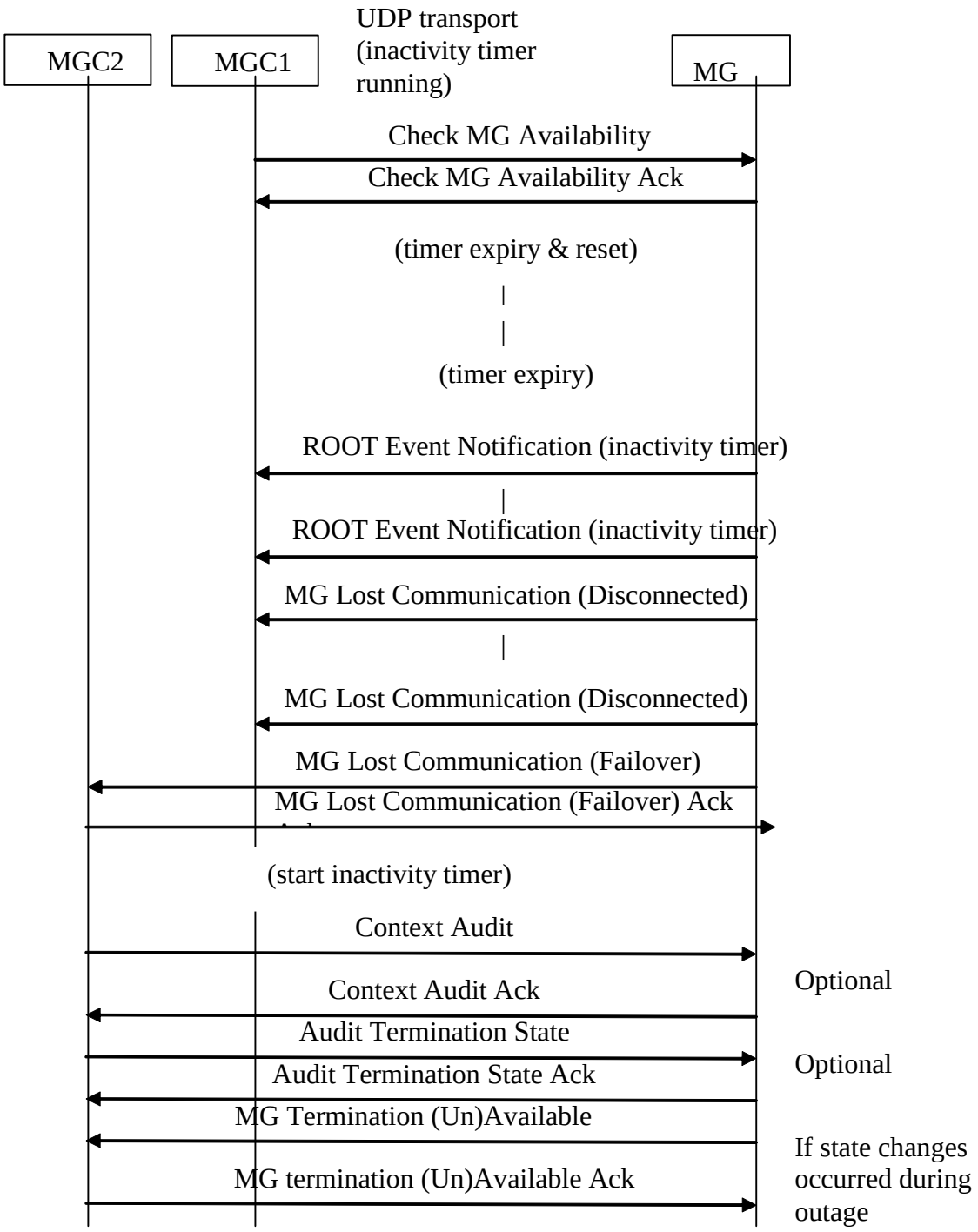

Figure 15: Control Association Failure and Recovery Procedures (UDP)

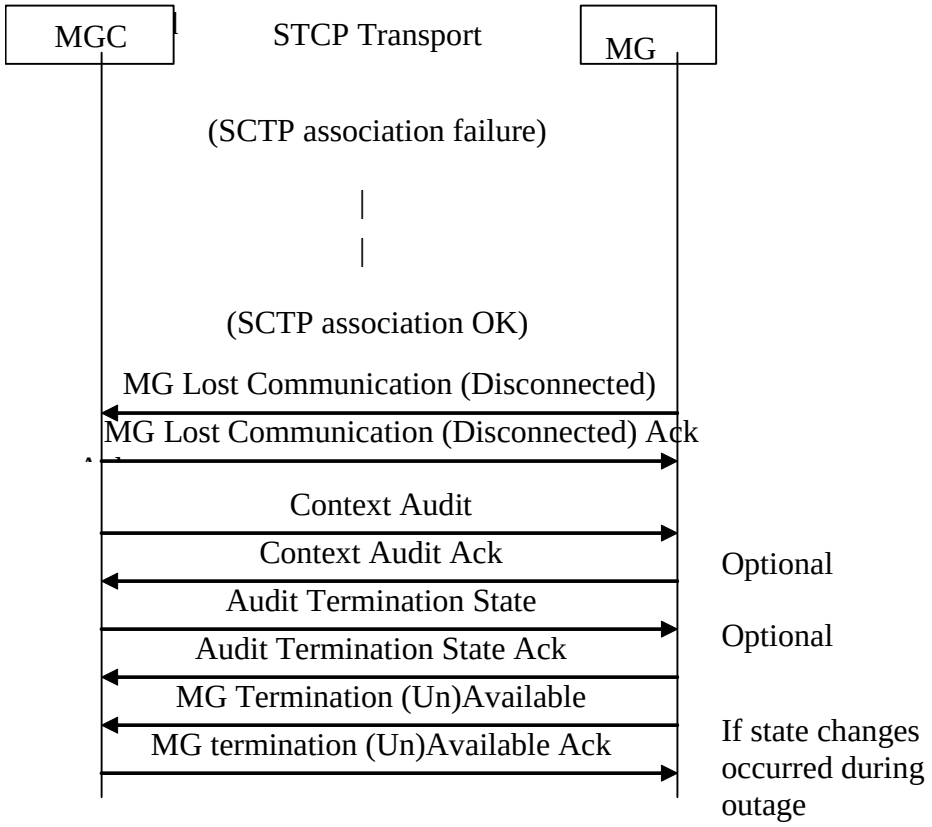

Figure 16: Control Association Failure and Recovery Procedures (SCTP)

10.14 MG Overload

This use case is triggered by the MG entering an overloaded state. It is assumed that that MGC has previously armed the MG for notification of overload via the SET ROOT TERMINATION EVENTS/PROPERTIES procedure. Examples of packages for such notification would be the MG Overload Control Package (see [i.8]) or the MG Resource Handling Package (see [i.6]).

The following H.248 procedures are performed:

1) The MG is then pushed into an overload state by excessive call related activity.

2) The MG informs the MGC of its overload condition via the ROOT EVENT NOTIFICATION procedure. If this notification is based on [i.8], then such a notification is triggered by the receipt of a new ADD request on the MG - else the notification may be sent autonomously.

3) On receipt of this notification, the MGC takes appropriate action to reduce the load offered to the MG.

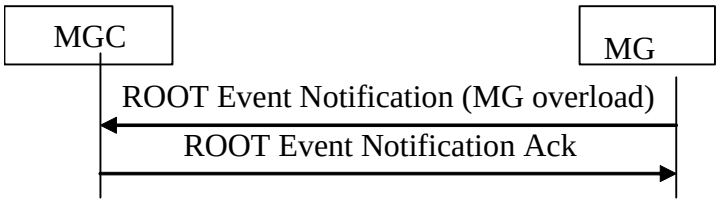

Figure 17: MG Overload Notification Procedure

10.15 MGC Overload

This procedure is applicable only where the MGC is controlling MGs that are capable of generating traffic (e.g. an AGW). The following H.248 procedures are performed:

1) The MGC is pushed into an overload state by excessive call related activity.

2) The MGC informs its dependent MGs of its overload condition via the MGC OVERLOAD NOTIFICATION procedure. A suitable package for this notification would be [i.9].

3) On receipt of this notification, the MG takes appropriate action to reduce the load offered to the MGC (see [i.9]).

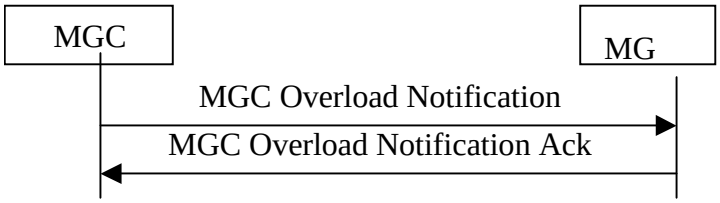

Figure 18: MGC Overload Procedure

10.16 MGC Hand-Off

This use case is triggered by management action that results in the MGC moving an existing control association to an alternative MGC address (e.g. when a single-homed IP host MGC entity provides multiple IP ports for the IP transport connection; or when the MGC entity is realized as multi-homed IP host, i.e. provides multiple IP interfaces. The former "*hand-off to an alternative address*" relates then to an IP *port redirection*, the later to an IP *interface redirection*). This could be done as a load balancing exercise or as a pre-condition to taking a MGC out of service. The following H.248 procedures are performed:

1) The MGC requests its MGs to move an existing control association to a specified alternative MGC address via the MGC HANDOFF procedure. On receipt of this message, the MG then forms a new control association to the specified alternate MGC address via the MG RE-REGISTRATION (HANDOFF) procedure.

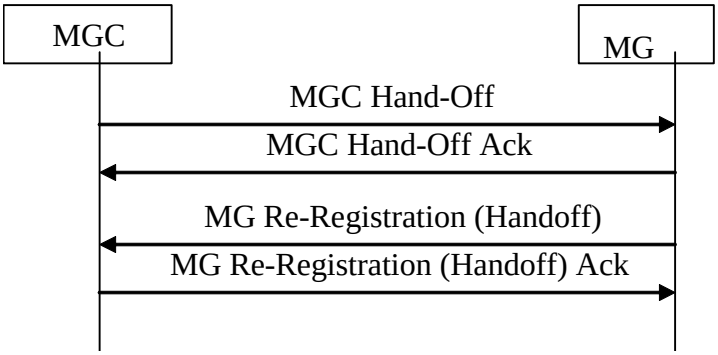

Figure 19: Hand-Off Procedures

10.17 MGC Re-Direct

This use case is triggered by an MGC rejecting a registration request from an MG and providing an alternative MGC address in the response. This relates to a redirection of the IP port or the entire IP interface (see clause 10.16). This could be done as a load balancing exercise. The following H.248 procedures are performed:

1) The MGC on receipt of a registration request, provides an alternative MGC identity/address in the registration response. This is shown in the REGISTRATION REDIRECT procedure. The MG subsequently repeats the original registration request to the alternate MGC.

Figure 20: Re-Direct Procedures

10.18 MG Failover

This use case is triggered by management action that results in the MG swapping over from a primary/worker MG to a secondary/standby MG. This swap over can either be initiated by the Primary MG or the Secondary MG. The following H.248 procedures are performed:

Primary MG Initiated

1) The Primary MG is about to go out of service and wishes to relinquish processing to a Secondary MG. The Primary MG firstly informs the MGC that it is about to go out of service via the MG REDUNDANT TAKEOVER (PRIMARY) procedure. On completion of this procedure, the control association to the MGC is terminated.

2) The Secondary MG then registers with the MGC using the procedures in clause 10.1.2 (Warm Boot).

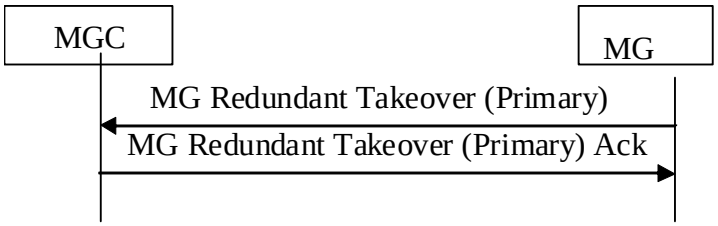

Figure 21: MG REDUNDANT TAKEOVER (PRIMARY) Procedure

Secondary MG Initiated

1) In this case, the Secondary MG initiates the swap over (e.g. by detecting the failure of the Primary MG) via the MG REDUNDANT TAKEOVER (SECONDARY) procedure.

2) On completion of this procedure, the control association is now established between the MGC and Secondary MG. The procedures in clause 10.1.2 (Cold/Warm Boot) from bullet 3 onwards are then are then applicable.

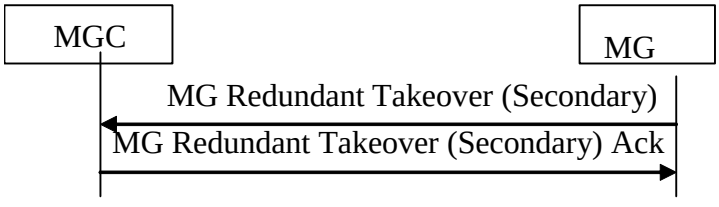

Figure 22: MG REDUNDANT TAKEOVER (SECONDARY) Procedure

11 Non-Call Related H.248 Procedures and their Contents

The following table lists the procedures described in this clause.

Procedure	Clause
MG REGISTRATION (COLD BOOT) (note)	11.1
MG Restoration (note)	11.2
Packages Audit	11.3
Context Audit	11.4
MG Termination Available	11.5
MG Termination Unavailable	11.6
Audit Termination State	11.7
Set ROOT Termination Events/Properties	11.8
MGC INITIATED SERVICE RESTORATION	11.9
Check MG Availability	11.10
MG SERVICE CANCELLATION (GRACEFUL)	11.11
MG SERVICE CANCELLATION (FORCED)	11.12
MGC Hand-Off	11.13
MG RE-REGISTRATION (HANDOFF) (note)	11.14
MG Termination OOS Graceful	11.15
MGC Overload Notification	11.16
Registration Redirect (note)	11.17
User Plane Failure	11.18
ROOT EVENT NOTIFICATION	11.19
MG LOST COMMUNICATION (DISCONNECTED)	11.20
MG LOST COMMUNICATION (FAILOVER)	11.21
MG REDUNDANT TAKEOVER (PRIMARY)	11.22
MG RE-REGISTRATION (RESTART)	11.23
Wildcarded Subtract	11.24
MG REDUNDANT TAKEOVER (SECONDARY)	11.25
MGC INITIATED SERVICE CANCELLATION	11.26
Audit Service State	11.27
Audit ROOT Properties	11.28
NOTE: These procedures are initiated using H.248 version 1 and may be used to negotiate a higher protocol version. All other procedures are initiated using the negotiated protocol version.	

11.1 MG Registration (Cold Boot)

Table 11.1-1 shows the contents of the MG REGISTRATION (COLD BOOT) and MG REGISTRATION (COLD BOOT) Ack command/response pair.

Table 11.1-1: MG Registration (Cold Boot) and MG Registration (Cold Boot) Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Registration (Cold Boot)	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to RESTART.
		Reason	M	This information element indicates the reason for the command. This is set to 901 - "Cold Boot".
		Service Change Profile	O	Indicates the name of a supported H.248 profile.
		Protocol Version	O	Indicates the highest H.248 version supported by the MG - if other than 1.
MG Registration (Cold Boot) Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.
		Protocol Version	O	If the highest protocol version supported by the MGC is lower than that proposed by the MG, this parameter must be included. If the highest protocol version supported by the MGC is equal to that proposed by the MG, this parameter may be included . Note that if the protocol version supported by the MGC is greater than that proposed by the MG, the command is rejected with an error response 406 ("Version Not Supported").
		Service Change Profile	O	This information element indicates the profile (name and version) supported by the MGC if different from that proposed by the MG.

11.2 MG Restoration

Table 11.2-1 shows the contents of the MG Restoration and MG Restoration Ack command/response pair.

Table 11.2-1: MG Restoration and MG Restoration Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Restoration	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to RESTART.
		Reason	M	This information element indicates the reason for service change. This is set to 900 ("Service Restored") or 902 ("Warm Boot") or 916 ("Packages Change") or 917 ("Capabilities Change") or 918 "Cancel Graceful").
		Service Change Profile	O	Indicates the name of a supported H.248 profile.
		Protocol Version	O	Indicates the highest H.248 version supported by the MG - if other than 1.
MG Restoration Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.
		Protocol Version	O	If the highest protocol version supported by the MGC is lower than that proposed by the MG, this parameter must be included. If the . highest protocol version supported by the MGC is equal to that proposed by the MG, this parameter may be included . Note that if the protocol version supported by the MGC is greater than that proposed by the MG, the command is rejected with an error response 406 ("Version Not Supported").
		Service Change Profile	O	This information element indicates the profile (name and version) supported by the MGC if different from that proposed by the MG.

11.3 Packages Audit

This procedure is typically performed against the ROOT termination, in which case the MG returns all supported packages. It is also possible for the MGC to request a packages audit against other than the ROOT termination (e.g. a circuit termination) in which case the MG returns the sub-set of the packages that are applicable to the termination type. However, it is recommended that a packages audit be performed on the ROOT termination since the MGC can be expected to know how the returned set of packages ought to be used in relation to its different termination types.

Table 11.3-1 shows the contents of the Packages Audit and Packages Audit Ack command/response pair.

Table 11.3-1: Packages Audit and Packages Audit Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
Packages Audit	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to AUDIT VALUE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Audit packages	M	This is the Audit Descriptor requesting "Packages".
Packages Audit Ack	MG	Context	M	As received.
		Command	M	As received
		Termination	M	As received.
		Package List	M	The list of supported packages.

11.4 Context Audit

This procedure is invoked by the MGC to check/determine the list of active contexts and related terminations on the MG. There are a number of variations to this audit dependent on the amount of information available to the MGC prior to the audit (e.g. context identity known or termination naming scheme known etc.). A MGC may choose to use one or a combination of these variations dependent on its specific audit requirements.

Tables 11.4-1 to 11.4.4 shows the contents of the various Context Audit and Context Audit Ack command/response pair.

Table 11.4-1: Context Audit and Context Audit Ack (termination id known)

Command / Response	Initiated	Information element name	Information element required	Information element description
Context Audit	MGC	Context	M	This information element indicates the H.248 context for the command. Set to ALL or NULL.
		Command	M	This is the H.248 Command. Set to AUDIT VALUE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to a specific termination identity known by the MGC (e.g. aln/4).
		Audit Information	O	This is the Audit Descriptor requesting the appropriate information to be returned (e.g. "Media").
Context Audit Ack (note)	MG	Context	M	The specific context with which the termination is currently associated.
		Command	M	As received.
		Termination	M	As received.
		Audited Information	O	The information requested.
NOTE: In the event of a termination/context mismatch, then an error 435 would be returned.				

Table 11.4-2: Context Audit and Context Audit Ack (context known)

Command / Response	Initiated	Information element name	Information element required	Information element description
Context Audit	MGC	Context	M	This information element indicates the H.248 context for the command. Set to a specific (non NULL) value.
		Command	M	This is the H.248 Command. Set to AUDIT VALUE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to a specific termination identity or a wildcarded to ALL.
		Audit Information	O	This is the Audit Descriptor requesting the appropriate information to be returned (e.g. "Media").
Context Audit Ack	MG	Context	M	As received (note).
		Command	M	As received.
		Termination(s)	M	As received (if a specific termination in the request), else a list of termination identities (if wildcarded in the request).
		Audited Information	O	The information requested (per termination).
NOTE: In the event of the context not being known at the MG, an error 435 would be returned.				

Table 11.4-3: Context Audit and Context Audit Ack (termination id partly known)

Command / Response	Initiated	Information element name	Information element required	Information element description
Context Audit	MGC	Context	M	This information element indicates the H.248 context for the command. Set to ALL or NULL.
		Command	M	This is the H.248 Command. Set to AUDIT VALUE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to a partially wildcared termination, e.g. ephemeral/5/*.
		Audit Information	O	This is the Audit Descriptor requesting the appropriate information to be returned.
Context Audit Ack	MG	Context	M	One or more active contexts associated with the wildcarded termination identity (note).
		Command	M	As received.
		Termination(s)	M	For each returned context, one or more matching terminations.
		Audited Information	O	The information requested. (per termination).
NOTE: In the event of there a mismatch between the wildcarded termination and specified context, an error 431 would be returned.				

Table 11.4-4: Context Audit and Context Audit Ack (context list)

Command / Response	Initiated	Information element name	Information element required	Information element description
Context Audit	MGC	Context	M	This information element indicates the H.248 context for the command. Set to ALL.
		Command	M	This is the H.248 Command. Set to AUDIT VALUE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
Context Audit Ack	MG	Context	M	One or more active contexts present on the MG.
		Command	M	Set to AUDIT VALUE.
		Termination(s)	M	For each returned context, the ROOT termination is returned.
NOTE: In the event of there being a mismatch between the wildcarded termination and specified context, an error 431 would be returned.				

11.5 MG Termination Available

Table 11.5-1 shows the contents of the MG Termination Available and MG Termination Available Ack command/response pair.

Table 11.5-1: MG Termination Available and MG Termination Available Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Termination Available	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL or specific.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to a specific termination identity or a partially wildcarded identity (e.g. an E1).
		Method	M	This information element indicates the method for the command. This is set to RESTART.
		Reason	M	This information element indicates the reason for the command. This is set to 900 - "Service Restored".
MG Termination Available Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.6 MG Termination Unavailable

Table 11.6-1 shows the contents of the MG Termination Unavailable and MG Termination Unavailable Ack command/response pair.

Table 11.6-1: MG Termination Unavailable and MG Termination Unavailable Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Termination Unavailable	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL, ALL or specific.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to a specific termination identity or a partially wildcarded identity (e.g. an E1).
		Method	M	This information element indicates the method for the command. This is set to FORCED.
		Reason	M	This information element indicates the reason for the command. This is set to 904 ("Termination Malfunction") or 905 ("Termination Taken OOS") or 906 ("Loss of Lower Layer Connectivity"), or 907 ("Transmission Failure") or 910 ("Media Capability Failure") or 912 ("Mux Capability Failure") or 913 ("Signal Capability Failure") or 914 ("Event Capability Failure" or 915 ("State Loss").
MG Termination Unavailable Ack	MGC	Context	M	As received.
		Command	M	As received
		Termination	M	As received.

11.7 Audit Termination State

Table 11.7-1 shows the contents of Audit Termination State and Audit Termination State Ack command/response pair.

Table 11.7-1: Audit Termination State and Audit Termination State Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
Audit Termination State	MGC	Context	M	This information element indicates the H.248 context for the command. Set to ALL or specific or NULL.
		Command	M	This is the H.248 Command. Set to AUDIT VALUE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to a specific termination identity or a partially wildcarded identity (e.g. an E1).
		Audit Service State	M	This is the Audit Descriptor requesting the Service State in the Termination State Descriptor.
Audit Termination State Ack	MG	Context	M	The specific/NULL context with which the termination is currently associated (note).
		Command	M	As received
		Termination	M	As received.
		Service State	M	The Service State in the Termination State Descriptor.
NOTE: If the termination does not match the specified context , then a 430 (wildcarded termination) or 435 (specific termination) error is returned.				

11.8 Set ROOT Termination Events/Properties

Table 11.8-1 shows the contents of Set ROOT Termination Events/Properties and Set ROOT Termination Events/Properties Ack command/response pair.

Table 11.8-1: Set ROOT Termination Events/Properties and Set ROOT Termination Events/Properties Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
Set ROOT Termination Events/Properties	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL .
		Command	M	This is the H.248 Command. Set to MODIFY.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		ROOT Properties	O	These are the ROOT level properties - e.g. "Normal MGC Execution Time".
		ROOT Events	O	These are the ROOT level events - e.g. notification of expiry of inactivity timer, notification of overload etc.
Set ROOT Termination Events/Properties Ack	MG	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.9 MGC Initiated Service Restoration

Table 11.9-1 shows the contents of the MGC Initiated Service Restoration and MGC Initiated Service Restoration Ack command/response pair.

Table 11.9-1: MGC Initiated Service Restoration and MGC Initiated Service Restoration Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MGC Initiated Service Restoration	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to RESTART.
		Reason	M	This information element indicates the reason for the command. This is set to 900 ("Service Restored") or 901 ("Cold Boot").
MGC Initiated Service Restoration Ack	MG	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.10 Check MG Availability

Table 11.10-1 shows the contents of the Check MG Availability and Check MG Availability Ack command/response pair.

Table 11.10-1: Check MG Availability and Check MG Availability Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
Check MG Availability	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL .
		Command	M	This is the H.248 Command. Set to AUDIT VALUE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
Check MG Availability Ack	MG	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.11 MG Service Cancellation (Graceful)

Table 11.11-1 shows the contents of the MG Initial OOS Graceful and MG Service Cancellation (Graceful) Ack command/response pair.

Table 11.11-1: MG Service Cancellation (Graceful) and MG Service Cancellation (Graceful) Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Service Cancellation (Graceful)	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to GRACEFUL.
		Reason	M	This information element indicates the reason for the command. This is set to 908 - "MG Impending Failure" or 905 - "Termination OOS".
		Service Change Delay	O	Indicates the period before which the MG will go out of service.
MG Service Cancellation (Graceful) Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.12 MG Service Cancellation (Forced)

Table 11.12-1 shows the contents of the MG Service Cancellation (Forced) and MG Service Cancellation (Forced) Ack command/response pair.

Table 11.12-1: MG Service Cancellation (Forced) and MG Service Cancellation (Forced) Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Service Cancellation (Forced)	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to FORCED.
		Reason	M	This information element indicates the reason for the command. This is set to 905 - "Termination Taken OOS".
MG Service Cancellation (Forced) Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.13 MGC Hand-Off

Table 11.13-1 shows the contents of the MGC Hand-Off and MGC Hand-Off Ack command/response pair.

Table 11.13-1: MGC Hand-Off and MGC Hand-Off Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MGC Hand-Off	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to HANDOFF.
		Reason	M	This information element indicates the reason for the command. This is set to 903 - "MGC Directed Change".
		Alternate MGC Id	M	This is the alternate MGC Identity (see note) to which the control association should be moved.
MG Hand-Off Ack	MG	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.
NOTE: The ServiceChangeMgcID parameter is of type **Message Identifier** (MID, see clause 8.3/H.248.1), the parameter format represents thus either an **address** (IP version 4 or 6 domain address; broadband MTP3 address) or a **name** (IP **domain name** or a generic **device name**). In both cases the parameter is used for an unambiguous identification of an MGC entity (i.e. a primary or secondary MGC). **Names** require firstly a resolution into a **routable address**. The name-to-address resolution by the MG requires a local or remote DNS query request in case of the domain format, or a local mapping table in case of the device format. Each name resolution is related to the "pre-configured list of MGC entities" in the MG see clause 11.5/H.248.1).				

11.14 MG Re-Registration (Handoff)

Table 11.14-1 shows the contents of the MG Re-Registration (Handoff) and MG Re-Registration (Handoff) Ack command/response pair.

Table 11.14-1: MGC Re-Register and MGC Re-Register Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Re-Registration (Handoff) Request	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to HANDOFF.
		Reason	M	This information element indicates the reason for the command. This is set to 903 - "MGC Directed Change".
		Service Change Profile	O	Indicates the name of a supported H.248 profile.
		Protocol Version	O	Indicates the highest H.248 version supported by the MG - if other than 1.
MG Re-Registration (Handoff) Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.
		Service Change Profile	O	This information element indicates the profile (name and version) supported by the MGC if different from that proposed by the MG.
		Protocol Version	O	If the highest protocol version supported by the MGC is lower than that proposed by the MG, this parameter must be included. If the . highest protocol version supported by the MGC is equal to that proposed by the MG, this parameter may be included . Note that if the protocol version supported by the MGC is greater than that proposed by the MG, the command is rejected with an error response 406 ("Version Not Supported").

11.15 MG Termination OOS Graceful

Table 11.15-1 shows the contents of the MG Termination OOS Graceful and MG Termination OOS Graceful Ack command/response pair.

Table 11.15-1: MG Termination OOS Graceful and MG Termination OOS Graceful Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Termination OOS Graceful	MG	Context	M	This information element indicates the H.248 context for the command. Set to ALL, NULL or SPECIFIC (dependent on whether the termination identity is partially wildcarded or not).
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to a specific termination or a partially wildcarded identity (e.g. an E1).
		Method	M	This information element indicates the method for the command. This is set to GRACEFUL.
		Reason	M	This information element indicates the reason for the command. This is set to 908 - "MG Impending Failure" or 905 - "Termination OOS".
		Service Change Delay	M	Indicates the period before which the MG will go out of service.
MG Termination OOS Graceful Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.16 MGC Overload Notification

Table 11.16.1 shows the contents of MGC Overload Notification and MGC Overload Notification Ack command/response pair.

Table 11.16-1: MGC Overload Notification and MGC Overload Notification Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MGC Overload Notification	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to MODIFY.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Overload Notification	M	This information element indicates that the MGC is in overload.
MGC Overload Notification Ack	MG	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.17 Registration Redirect

Table 11.17-1 shows the contents of the Registration Redirect command/response pair.

Table 11.17-1: Registration Redirect

Command / Response	Initiated	Information element name	Information element required	Information element description
Registration	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to RESTART or DISCONNECTED or HANDOFF or FAILOVER.
		Reason	M	This information element indicates the reason for the command. This is set dependent on the METHOD.
		Service Change Profile	O	Indicates the name of a supported H.248 profile.
		Protocol Version	O	Indicates the highest H.248 version supported by the MG - if other than 1.
Registration Redirect	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.
		Protocol Version	O	If the highest protocol version supported by the MGC is lower than that proposed by the MG, this parameter must be included. If the . highest protocol version supported by the MGC is equal to that proposed by the MG, this parameter may be included . Note that if the protocol version supported by the MGC is greater than that proposed by the MG, the command is rejected with an error response 406 ("Version Not Supported").
		Service Change Profile	O	This information element indicates the profile (name and version) supported by the MGC if different from that proposed by the MG.
		Alternate MGC Id	M	This element enables the MGC to inform the MG that it should re-direct its Service Change to an alternative address (see note). The MG will now repeat the MG REGISTRATION (COLD BOOT) procedure to this alternate address.
NOTE: See also note in table 11.13-1.				

11.18 User Plane Failure

Table 11.18-1 shows the contents of User Plane Failure and User Plane Failure Ack command/response pair.

Table 11.18-1: User Plane Failure and User Plane Failure Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
User Plane Failure	MG	Context	M	This information element indicates the H.248 context for the command. Set to a specific value.
		Command	M	This is the H.248 Command. Set to NOTIFY.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to a specific ephemeral termination identity.
		User Plane Failure	M	This information element indicates that a failure in the user plane has been detected (e.g. nt/netfail, g/cause etc.).
User Plane Failure Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.19 Root Event Notification

Table 11.19-1 shows the contents of the Root Event Notification and Root Event Notification ACK command/response pair.

Table 11.19-1: Root Event Notification and Root Event Notification ACK

Command/ Response	Initiated	Information element name	Information element required	Information element description
Root Event Notification	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to NOTIFY.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Inactivity Timer Expired	M	This information element indicates the detected ROOT event (e.g. expiry of inactivity timer or MG Overload Notification).
Root Event Notification ACK	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.20 MG Lost Communication (Disconnected)

Table 11.20-1 shows the contents of the MG Lost Communication (Disconnected) and MG Lost Communication (Disconnected) Ack command/response pair.

Table 11.20-1: MG Lost Communication (Disconnected) and MG Lost Communication (Disconnected) Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Lost Communication (Disconnected)	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to DISCONNECTED.
		Reason	M	This information element indicates the reason for the command. This is set to 900 "Service Restored".
MG Lost Communication (Disconnected) Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.21 MG Lost Communication (Failover)

The MG attempts to establish a new control association using its list of pre-provisioned MGC identities. The MG cycles though its list until a successful response is received. This procedure may be part of a MGC failover procedure, e.g. the MG is initiating a changeover from the original primary MGC to a next secondary MGC.

Table 11.21-1 shows the contents of the MGC Failover -Establish New Control Association and MGC Failover - Establish new Control Association Ack command/response pair.

Table 11.21-1: MG Lost Communication (Failover) and MG Lost Communication (Failover) Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Lost Communication (Failover)	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to FAILOVER.
		Reason	M	This information element indicates the reason for the command. This is set to 909 - "MGC Impending Failure".
		Service Change Profile	O	Indicates the name of a supported H.248 profile.
		Protocol Version	O	Indicates the highest H.248 version supported by the MG - if other than 1.
MG Lost Communication (Failover) Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.
		Service Change Profile	O	This information element indicates the profile (name and version) supported by the MGC if different from that proposed by the MG.
		Protocol Version	O	If the highest protocol version supported by the MGC is lower than that proposed by the MG, this parameter must be included. If the . highest protocol version supported by the MGC is equal to that proposed by the MG, this parameter may be included . Note that if the protocol version supported by the MGC is greater than that proposed by the MG, the command is rejected with an error response 406 ("Version Not Supported").

11.22 MG Redundant Takeover (Primary)

Table 11.22-1 shows the contents of the MG Redundant Takeover (Primary) and MG Redundant Takeover (Primary) command/response pair.

Table 11.22-1: MG Redundant Takeover (Primary) and MG Redundant Takeover (Primary) Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Redundant Takeover (Primary)	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to FAILOVER.
		Reason	M	This information element indicates the reason for the command. This is set to 908 - "MG Impending Failure".
MG Redundant Takeover (Primary) Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.23 MG Re-Registration (Restart)

Table 11.23-1 shows the contents of the MG Re-Registration (Restart) and MG Re-Registration (Restart) Ack command/response pair.

Table 11.23-1: MG Re-Registration (Restart) and MG Re-Registration (Restart) Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Re-Registration (Restart)	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to RESTART.
		Reason	M	This information element indicates the reason for the command. This is set to the value received from the MGC during the MGC INITIATED SERVICE RESTORATION procedure - see clause 11.9.
		Service Change Profile	O	Indicates the name of a supported H.248 profile.
		Service Change Version	O	Indicates the highest H.248 version supported by the MG - if other than 1.
MG Re-Registration (Restart) Ack	MG	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.
		Service Change Profile	O	This information element indicates the profile (name and version) supported by the MGC if different from that proposed by the MG.
		Service Change Version	O	If the highest protocol version supported by the MGC is lower than that proposed by the MG, this parameter must be included. If the highest protocol version supported by the MGC is equal to that proposed by the MG, this parameter may be included . Note that if the protocol version supported by the MGC is greater than that proposed by the MG, the command is rejected with an error response 406 ("Version Not Supported").

11.24 Wildcarded Subtract

Table 11.24-1 shows the contents of the Wildcarded Subtract and Wildcarded Subtract Ack command/response pair.

Table 11.24-1: Wildcarded Subtract and Wildcarded Subtract Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
Wildcarded Subtract	MGC	Context	M	This information element indicates the H.248 context for the command. Set to ALL.
		Command	M	This is the H.248 Command. Set to SUBTRACT or W-SUBTRACT.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ALL or a partially wildcarded identity (e.g. ip/2/*).
Wildcarded Subtract Ack	MG	Context	M	As received (if W prefix used), else a list of specific context IDs.
		Command	M	As received.
		Termination	M	As received (if W prefix used), else a list of specific IDs.

11.25 MG Redundant Takeover (Secondary)

Table 11.25-1 shows the contents of the MG Redundant Takeover (Secondary) and MG Redundant Takeover (Secondary) command/response pair.

Table 11.25-1: MG Redundant Takeover (Secondary) and MG Redundant Takeover (Secondary) Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MG Redundant Takeover (Secondary)	MG	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to FAILOVER.
		Reason	M	This information element indicates the reason for the command. This is set to 919 - "Warm Failover" or 920 - "Cold Failover".
MG Redundant Takeover (Secondary) Ack	MGC	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.26 MGC Initiated Service Cancellation

Table 11.26-1 shows the contents of the MGC Initiated Service Cancellation and MGC Initiated Service Cancellation Ack command/response pair.

Table 11.26-1: MGC Initiated Service Cancellation and MGC Initiated Service Cancellation Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
MGC Initiated Service Cancellation	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to SERVICE CHANGE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Method	M	This information element indicates the method for the command. This is set to FORCED.
		Reason	M	This information element indicates the reason for the command. This is set to 905 - "Termination taken out of service".
MGC Initiated Service Cancellation Ack	MG	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.

11.27 Audit Service State

This procedure is typically performed against a non- ROOT termination to enable the MGC to determine the service state of that termination.

Table 11.27-1 shows the contents of the Audit Service State and Audit Service State Ack command/response pair.

Table 11.27-1: Audit Service State and Audit Service State Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
Audit Service State	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to AUDIT VALUE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to SPECIFIC.
		Audit Service State	M	This is the service state property in the Termination State Descriptor.
Audit Service State Ack	MG	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.
		Service State	M	The service state.

11.28 Audit ROOT Properties

This procedure is performed against the ROOT termination to enable the MGC to determine the values of any ROOT termination properties on the MG.

Table 11.28-1 shows the contents of the Audit ROOT Properties and Audit ROOT Properties Ack command/response pair.

Table 11.28-1: Audit ROOT Properties and Audit ROOT Properties Ack

Command / Response	Initiated	Information element name	Information element required	Information element description
Audit ROOT Properties	MGC	Context	M	This information element indicates the H.248 context for the command. Set to NULL.
		Command	M	This is the H.248 Command. Set to AUDIT VALUE.
		Termination	M	This information element indicates the H.248 termination for the command. This is set to ROOT.
		Audit Properties	M	This is the list of ROOT properties required to be audited by the MGC.
Audit ROOT Properties Ack	MG	Context	M	As received.
		Command	M	As received.
		Termination	M	As received.
		Root Properties	M	The returned list of ROOT property values as requested by the MGC.

Annex A:
Stage 3 Non-Call Related H.248 Procedures and their Contents

This annex provides exemplar stage 3 H248 message equivalents of the procedures in clause 11.

A.1 MG Registration (Cold Boot)

The MG sends SERVICE CHANGE command as in table A.1.1.

Table A.1.1: MG Registration (Cold Boot) Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = RESTART SC Reason = 901 If applicable: H248 Profile Identity H248 Protocol Version	

The MGC responds as in table A.1.2.

Table A.1.2: MG Registration (Cold Boot) Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If applicable:- H248 Profile Identity H248 Protocol Version	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Restart, Reason='901', Profile=ProfileName/1, Version=2}}}}

Reply=1002{Context=-{ServiceChange = ROOT }}

A.2 MG Restoration

The MG sends SERVICE CHANGE command as in table A.2.1.

Table A.2.1: MG Restoration Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = RESTART SC Reason = 900 or 902 If applicable:- H248 Profile Identity H248 Protocol Version	

The MGC responds as in table A.2.2.

Table A.2.2: MG Restoration Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If applicable:- H248 Profile Identity H248 Protocol Version	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Restart, Reason='900', Profile=ProfileName/1, Version=2}}}}

Reply=1002{Context=-{ServiceChange = ROOT }}

A.3 Packages Audit

The MGC sends an AUDIT VALUE request command as in table A.3.1.

Table A.3.1: Packages Audit Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT Audit Packages	

The MG responds as in table A.3.2.

Table A.3.2: Packages Audit Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT Packages List	

An example message exchange would be:

Transaction=1002{Context=- { AuditValue=ROOT{ Audit{Packages}}}}

Reply=1002{Context=-{AuditValue = ROOT {Packages { g-2,root-2, nt-1, xdd-1……etc.}}}}

A.4 Context Audit

A number of different context audits are possible, dependent on what information is already known and what information is required to be returned in the audit response. The MGC audits the MG by sending an AUDIT VALUE request to the MG. The required information is returned in the response.

Table A.4.1: Context Audit Request (Termination Id known)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = * OR - Termination ID = specific If required Required Audit Info	

Table A.4.2: Context Audit Request Ack (Termination Id known)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = specific OR - Termination ID = specific If requested:- Audit Info	

An example message exchange would be:

Transaction=1002{Context= { AuditValue=aln/4{ Audit{}}}}*

Reply=1002{Context=12{AuditValue = aln/4}}

Table A.4.3: Context Audit Request (Context Id known)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = specific Termination ID = * OR specific If required Required Audit Info	

Table A.4.4: Context Audit Request Ack (Context Id known)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = specific Termination ID = specific If requested:- Audit Info	

An example message exchange would be:

Transaction=1002{Context=12 { AuditValue={ Audit{}}}}*

Reply=1002{Context=12{AuditValue = aln/4, AuditValue=ephemeral/23}}

Table A.4.5: Context Audit Request (Termination Id partially wildcarded)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = * Termination ID = Partially Wildcarded If required Required Audit Info	

Table A.4.6: Context Audit Request Ack (Termination Id partially wildcarded)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = specific (list) Termination ID = specific (list) If requested:- Audit Info	

An example message exchange would be:

Transaction=1002{Context= { O-AuditValue=tdm/e1_3/*{ Audit{ }}}}*

Reply=1002{Context=12{AuditValue = tdm/e1_3/4}, Context=15{AuditValue=tdm/e1_3/12}, Context=23{AuditValue=tdm/e1_3/21}}

Table A.4.7: Context Audit Request (to obtain context list)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = * Termination ID = ROOT	

Table A.4.8: Context Audit Request Ack (to obtain context list)

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = specific (list) Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context= { W-AuditValue=ROOT{ Audit{ }}}}*

Reply=1002{Context=10{AuditValue = ROOT}, Context=24{AuditValue=ROOT}, Context=45{AuditValue=ROOT}}

A.5 MG Termination Available

The MG sends SERVICE CHANGE command as in table A.5.1.

Table A.5.1: MG Termination Available Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = Specific or Partially Wildcarded SC Method = RESTART SC Reason = 900	

The MGC responds as in table A.5.2.

Table A.5.2: MG Termination Available Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = Specific or Partially Wildcarded	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=aln/1{ Services{Method=Restart, Reason='900'}}}}

Reply=1002{Context=-{ServiceChange = aln/1}}

A.6 MG Termination Unavailable

The MG sends SERVICE CHANGE command as in table A.6.1.

Table A.6.1: MG Termination Available Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = Specific or Partially Wildcarded SC Method = FORCED SC Reason = 905	

The MGC responds as in table A.6.2.

Table A.6.2: MG Termination Available Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = Specific or Partially Wildcarded	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=aln/1{ Services{Method=Forced, Reason='905'}}}}

Reply=1002{Context=-{ServiceChange = aln/1}}

A.7 Audit Termination State

The MGC sends an AUDIT VALUE command as in table A.7.1.

Table A.7.1: Audit Termination State Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - OR * OR specific Termination ID = Specific or Partially Wildcarded Audit Service State	

The MG responds as in table A.7.2.

Table A.7.2: MG Termination Available Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - OR specific Termination ID = Specific or Partially Wildcarded Service State	

An example message exchange would be:

Transaction=1002{Context=- { AuditValue=aln/1{ Audit{Media{TerminationState{ServiceState}}}}}}

Reply=1002{Context=-{AuditValue = aln/1{ServiceState=InService}}}

A.8 Set ROOT Termination Events/Properties

The MGC sends a MODIFY request command as in table A.8.1.

Table A.8.1: Set ROOT Events/Properties Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If required: Set Inactivity Timer Request Overload Notification	

The MRFP responds as in table A.8.2.

Table A.8.2: Set ROOT Events/Properties Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { Modify=ROOT{ Events{it/ito{mit=30000}, ocp/mg_overload}}}}

Reply=1002{Context=-{Modify = ROOT}}

A.9 MGC Initiated Service Restoration

The MGC sends SERVICE CHANGE command as in table A.9.1.

Table A.9.1: MGC Initiated Service Restoration Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = RESTART SC Reason = 900 or 901	

The MG responds as in table A.9.2.

Table A.9.2: MGC Initiated Service Restoration Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Restart, Reason='901'}}}}

Reply=1002{Context=-{ServiceChange = ROOT}}}

A.10 Check MG Availability

The MGC sends an AUDIT VALUE command as in table A.10.1.

Table A.10.1: Audit Termination State Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

The MG responds as in table A.10.2.

Table A.10.2: MG Termination Available Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { AuditValue=ROOT{ Audit{}}}}

Reply=1002{Context=-{AuditValue = ROOT}}

A.11 MG Service Cancellation (Graceful)

The MG sends SERVICE CHANGE command as in table A.11.1.

Table A.11.1: MG Service Cancellation (Graceful) Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = GRACEFUL SC Reason = 908 Service Change Delay	

The MGC responds as in table A.11.2.

Table A.11.2: MG Service Cancellation (Graceful) Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Graceful, Reason='908', Delay=600}}}}

Reply=1002{Context=-{ServiceChange = ROOT}}

A.12 MG Service Cancellation (Forced)

The MG sends SERVICE CHANGE command as in table A.12.1.

Table A.12.1: MG Service Cancellation (Forced) Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = FORCED SC Reason = 905	

The MGC responds as in table A.12.2.

Table A.12.2: MG Service Cancellation (Forced) Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Forced, Reason='905'}}}}

Reply=1002{Context=-{ServiceChange = ROOT}}

A.13 MGC Hand-Off

The MGC sends SERVICE CHANGE command as in table A.13.1.

Table A.13.1: MGC Hand-Off Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = HANDOFF SC Reason = 903 SC MGCId = Alternate MGCId	

The MG responds as in table A.13.2.

Table A.13.2: MGC Hand-Off Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be (see note):

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Handoff, Reason='903', MgcIdToTry=1.2.3.4}}}}

Reply=1002{Context=-{ServiceChange = ROOT}}

NOTE: The ServiceChangeMgcID parameter is of type "IP version 4 address". The parameter value provides a port-less IP address, i.e. the well-known port (2944 for text, 2945 for binary encoding) is used at the redirected IP interface.

A.14 MG Re-Registration (Handoff)

The MG sends SERVICE CHANGE command as in table A.14.1.

Table A.14.1: MG Re-Registration (Handoff) Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = HANDOFF SC Reason = 903 If applicable:- H248 Profile Identity H248 Protocol Version	

The MGC responds as in table A.14.2.

Table A.14.2: MG Re-Registration (Handoff) Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If applicable:- H248 Profile Identity H248 Protocol Version	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Handoff, Reason='903', Profile=ProfileName/1, Version=2}}}}

Reply=1002{Context=-{ServiceChange = ROOT }}

A.15 MG termination OOS (Graceful)

The MG sends SERVICE CHANGE command as in table A.15.1.

Table A.15.1: MG Termination OOS Graceful Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = * OR specific Termination ID = specific OR Partially Wildcarded SC Method = GRACEFUL SC Reason = 908 Service Change Delay	

The MGC responds as in table A.15.2.

Table A.15.2: MG Termination OOS Graceful Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = * OR specific Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=34{ ServiceChange=aln/16{ Services{Method=Graceful, Reason='908', Delay=600}}}}

Reply=1002{Context=34{ServiceChange = aln/16}}

A.16 MGC Overload Notification

The MGC sends a MODIFY request command as in table A.16.1.

Table A.16.1: MGC Overload Notification Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT Overload Notification	

The MG responds as in table A.16.2.

Table A.16.2: MGC Overload Notification Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { Modify=ROOT{ Media{TerminationState{etsi_nr=1.34}}}}}

Reply=1002{Context=-{Modify = ROOT }}

A.17 Registration Redirect

The MG sends SERVICE CHANGE command as in table A.17.1.

Table A.17.1: MG Registration Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = RESTART SC Reason = 901 If applicable:- H248 Profile Identity H248 Protocol Version	

The MGC responds as in table A.17.2.

Table A.17.2: Registration Redirect

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT Alternate MGC Address (see note) If applicable:- H248 Profile Identity H248 Protocol Version	
NOTE: See also note in table 11.13-1.		

An example message exchange would be (see note):

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Restart, Reason='901', Profile=ProfileName/1, Version=2}}}}

Reply=1002{Context=-{ServiceChange = ROOT {Services { MGCIdToTry=1.2.3.4}}}}

NOTE: The ServiceChangeMgcID parameter is of type "IP version 4 address". The parameter value provides a port-less IP address, i.e. the well-known port (2944 for text, 2945 for binary encoding) is used at the redirected IP interface.

A.18 User Plane Failure

During call related procedures, the MGC has previously armed for the nt/netfail event. If so, and user plane failure is detected by the MG, then the MG sends a NOTIFY request command as in table A.18.1.

Table A.18.1: User Plane Failure

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = specific Termination ID = specific Network Failure	

The MGC responds as in table A.18.2.

Table A.18.2: User Plane Failure Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = specific Termination ID = specific	

An example message exchange would be:

Transaction=1002{Context=1 { Notify=ephemeral/2{ ObservedEvents{nt/netfail{stream=1}}}}}

Reply=1002{Context=1 {Notify = ephemeral/2}}

A.19 Root Event Notification

The MG sends a NOTIFY request command as in table A.19-1.

Table A.19-1: Root Event Notification

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT Notified ROOT Event	

The MGC responds as in table A.19-2.

Table A.19-2: Root Event Notification Request ACK

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be :

Transaction=1002{Context=- { Notify=ROOT{ ObservedEvents{it/ito}}}} OR

Transaction=1002{Context=- { Notify=ROOT{ ObservedEvents{ocp/mg_overload}}}}

Reply=1002{Context=-{Notify = ROOT }}

A.20 MG Lost Communication (Disconnected)

The MG sends a SERVICE CHANGE command as in table A.20.1.

Table A.20.1: MG Lost Communication (Disconnected) Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = DISCONNECTED SC Reason = 909	

The MGC responds as in table A.20.2.

Table A.20.2: MG Lost Communication (Disconnected) Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Disconnected, Reason='909'}}}

Reply=1002{Context=-{ServiceChange = ROOT}}

A.21 MG Lost Communication (Failover)

The MG sends SERVICE CHANGE command as in table A.21.1.

Table A.21.1: MG Lost Communication (Failover) Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = FAILOVER SC Reason = 909 If applicable:- H248 Profile Identity H248 Protocol Version	

The MGC responds as in table A.21.2.

Table A.21.2: MG Lost Communication (Failover) Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If applicable:- H248 Profile Identity H248 Protocol Version Alternate MGC Address (see note)	
NOTE: See also note in table 11.13-1.		

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Failover, Reason='909', Profile=ProfileName/1, Version=2}}}

Reply=1002{Context=-{ServiceChange = ROOT }}

A.22 MG Redundant Takeover (Primary)

The MG sends SERVICE CHANGE command as in table A.22.1.

Table A.22.1: MG Redundant Takeover (Primary) Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = FAILOVER SC Reason = 908	

The MGC responds as in table A.22.2.

Table A.22.2: MG Redundant Takeover (Primary) Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Failover, Reason='908'}}}}

Reply=1002{Context=-{ServiceChange = ROOT}}

A.23 MG Re-Registration (Restart)

The MG sends SERVICE CHANGE command as in table A.23.1.

Table A.23.1: MG Re-Registration (Restart) Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = RESTART SC Reason = 901 If applicable:- H248 Profile Identity H248 Protocol Version	

The MGC responds as in table A.23.2.

Table A.23.2: MG Re-Registration (Restart) Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT If applicable:- H248 Profile Identity H248 Protocol Version	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Restart, Reason="901", Profile=ProfileName/1, Version=2 }}}}

Reply=1002{Context=-{ServiceChange = ROOT}}

A.24 Wildcarded Subtract

The MGC sends a SUBTRACT command as in table A.24.1.

Table A.24.1: Wildcarded Subtract

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = * Termination ID = *	

The MG responds as in table A.24.2.

Table A.24.2: Wildcarded Subtract Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = * Termination ID = *	

An example message exchange would be:

Transaction=1002{Context= { W-Subtract=*{ Audit{}}}}*

Reply=1002{Context={Subtract= *}}*

A.25 MG Redundant Takeover (Secondary)

The MG sends SERVICE CHANGE command as in table A.25.1.

Table A.25.1: MG Redundant Takeover (Secondary) Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = FAILOVER SC Reason = 919	

The MGC responds as in table A.25.2.

Table A.25.2: MG Redundant Takeover (Secondary) Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Failover, Reason='919'}}}}

Reply=1002{Context=-{ServiceChange = ROOT}}

A.26 MGC Initiated Service Cancellation

The MGC sends a SERVICE CHANGE command as in table A.26.1.

Table A.26.1: MGC Initiated Service Cancellation Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT SC Method = FORCED SC Reason = 905	

The MG responds as in table A.26.2.

Table A.26.2: MGC Initiated Service Cancellation Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT	

An example message exchange would be:

Transaction=1002{Context=- { ServiceChange=ROOT{ Services{Method=Forced, Reason='905'}}}}

Reply=1002{Context=-{ServiceChange = ROOT}}

A.27 Audit Service State

The MGC sends an AUDIT VALUE request command as in table A.27.1.

Table A.27.1: Audit Service State Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = SPECIFIC Audit Service State	

The MG responds as in table A.27.2.

Table A.27.2: Audit Service State Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = SPECIFIC Service State	

An example message exchange would be:

Transaction=1002{Context=- { AuditValue=aln/1{ Audit{Media{TerminationState{ServiceStates}}}}}}

Reply=1002{Context=-{AuditValue = aln/1 {ServiceStates=InService}}}

A.28 Audit ROOT Properties

The MGC sends an AUDIT VALUE request command as in table A.28.1.

Table A.28.1: Audit ROOT Properties Request

Address Information	Control information	Bearer information
	Transaction ID = x Context ID= - Termination ID = ROOT Audit ROOT Properties	

The MG responds as in table A.28.2.

Table A.28.2: Audit ROOT Properties Request Ack

Address Information	Control information	Bearer information
	Transaction ID = x Context ID = - Termination ID = ROOT ROOT Properties	

An example message exchange would be:

Transaction=1002{Context=- { AuditValue=ROOT{ Audit{Media{TerminationState{root/}}}}}}*

Reply=1002{Context=-{AuditValue = ROOT { Media{TerminationState {root/maxNumberOContexts=1000, root/maxTerminationsPerContext=2, root/normalMGExecutionTime=2, root/normalMGCExecutionTime=2, root/MGProvisionalResponseTimerValue=5, root/MGCProvisionalResponseTimerValue=5, root/MGCOriginatedPendingLimit=10, root/MGOriginatedPendingLimit=10}}}}}

Annex B: Relation of the H.248 ServiceStates Property Model with Management Models

This annex provides an example for mapping H.248 ServiceStates to a management state model and vice versa.

B.1 Introduction

The majority of H.248 procedures are independent of the management plane, i.e. "interactionless" procedures. However some procedures should consider potential interaction aspects between control plane (here H.248) and management plane.

Such interactions might be loosely coupled like in case of provisioning or pre-provisioning activities, but there are also some more tightly coupled interactions, particularly in the area of the ServiceChange Command.

For instance, certain actions, which are resulting in H.248 or management state changes, may result in correspondent state changes in the management or H.248 model respectively.

B.2 Scope

The scope of the present document is only on the H.248 ServiceStates Property state model. The H.248 ServiceChange Command model (see annex F ITU-T Recommendation H.248.1 [i.5]) is not considered. The indicated management technologies and correspondent management state models are just examples. There are many other possibilities in mapping the H.248 ServiceStates Property on dedicated management state models. From that perspective, the present document may assist to correlate such management state models with the H.248 ServiceStates Property.

The present document provides an example mapping between the H.248 ServiceStates Property states and management plane state models according ITU-T Recommendation X.731 [i.12] and RFC 4268 [i.11]. Other management plane models could be used as well for correlation with the H.248 ServiceStates Property states. For such models the documented mapping could be used as guideline.

B.3 Mapping between Models

B.3.1 Example Management Models

It is proposed to consider the management models from ITU-T Recommendation X.731 [i.12] and RFC 4268 [i.11] as example. One reason for a management model using ITU-T and IETF technologies is related to the origins of H.248 in these two standardization development organizations (SDO). Another motivation is the fact that RFC 4268 [i.11] refers explicitly to ITU-T Recommendation X.731 [i.12] and provides already an aligned management model (on top level).

Management models are typically distinguishing three different basic state models, which are related to the three primary factors that are affecting the management state of a managed object with regard to its corresponding resources' availability: operability, administration and usage. The correspondent three basic management state models could be combined.

The correlation with the H.248 ServiceStates Property with a single basic management state model (from RFC 4268 [i.11]), i.e. the operational state model, administrative state model or usage state model, may be used as starting point, but is typically not sufficient, e.g. when considering interactions between H.248 procedures and management procedures.

For this reason is a combined management state model proposed, based on the combination of operational and administrative states, see table B.3.1.

Table B.3.1: Basic Model Relations

Relation of H.248 ServiceStates Property Model with Management Models				
Control State Model ITU-T Recommendation H.248		**Management State Models ITU-T Recommendation X.731 [i.12]/ RFC 4268 [i.11]**		
ServiceStates Property	↔	**Operational State**	**Administrative State**	**Usage State**
In-Service	↔	Enabled	Unlocked	—
Out-of-Service	↔	Disabled	Unlocked	—
Out-of-Service	↔	Enabled	Locked	—
Out-of-Service	↔	Disabled	Locked	—
Note 1	↔	Enabled	Shutting Down	—
Test	↔	Note 2	Note 2	—
NOTE 1: There is no explicit state modelled. "Test" is rather indicated via **status attributes**, which are used to qualify operational, administrative or usage states. Relevant in case of test might be the **availability status attribute** "**in test**", or the **control status attributes** "**subject to test**" or "**reserved for test**".				
NOTE 2: There is no explicit state modelled concerning H.248 ServiceStates Property. There might be a transient state in the H.248 ServiceChange Command model, but this is out of scope here.				

Other mapping schemes are principally possible.

B.4 Interaction Aspects

Purpose of this clause is to illustrate principle interaction between management use cases and H.248 procedures. Only a few examples are shown. A comprehensive list of all potential interaction aspects is out of scope of the present document.

B.4.1 Effect of H.248 Actions on Management Models

Some ServiceChange procedures may affect the H.248 ServiceStates Property. For instance, the ServiceStates Property of a physical Termination could be changed from In-Service to Out-of-Service with a ServiceChangeMethod of "Forced" or "Graceful" and ServiceChangeReason #905 ("Termination taken out of service"), see clause F.3.10.2 of [i.5].

Such a ServiceStates Property change may lead to a state transition in the management model from {*enabled, unlocked*} to {*disabled, unlocked*} when using the sample mapping of clause 3.2. That means that the operational state would change. Such a state change in the management model would be visible for the management system, but would not lead to a notification of the management system because the operational state is read-only in nature (see clause 7.1.1 of ITU-T Recommendation X.731 [i.12]).

B.4.2 Effect of Management Model State Transition on H.248 Model

Only management actions in the areas of configuration management and/or fault management may principally have an interaction with the H.248 ServiceStates Property.

B.4.2.1 Configuration management

The management action is triggering an H.248 ServiceChange procedure. The management action may lead to a state transition in the management model, and also to a correspondent change of the H.248 ServiceStates Property. See also clause 10.

B.4.2.2 Fault management

There are not any effects here because the flow of information is typically from the managed entity towards the management systems (see also next clause).

B.4.3 Effect of failures in H.248 entities on State Transition in Management Model and H.248 Model

Such a failure scenario in an H.248 entity itself is triggering. See also clause 10.

1) an H.248 ServiceChange procedure; and also

2) a notification (e.g. alarm) of the management system.

There may be correspondent state transitions in the management model and the H.248 ServiceStates Property model.

History

Document history		
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