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# Extensions to RTSP based on the CableLabs Edge Resource Management Interface Specification (ERMI) draft-bergren-mmusic-rtsp-ermi-extensions-00

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# Abstract

This document provides a description of the RTSP extensions used in the CableLabs Edge Resource Manager Interface specification. It is provided as an informational note based on a recent liaison statement received by CableLabs from the IETF MMUSIC working group.

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#### **1**. Introduction

In 2004-2005, work was initiated on a Modular Cable Modem Termination System (M-CMTS) architecture at CableLabs. A number of specifications were published including the Edge Resource Manager Interface Specification [ERMI].

A block diagram of the architecture relevant to the ERMI specification and its use of the RTSP protocol is shown on Figure 1. DOCSIS stands for Data-Over-Cable-Service-Interface Specifications. The cable head-end architecture centers on DOCSIS CMTS systems that send Video and Internet data to subscribers.

An Edge QAM (EQAM) is a head-end or hub device that receives packets of digital video or data from the operator network. It re-packetizes the video or data into an MPEG transport stream and digitally modulates the transport stream onto a downstream RF carrier using Quadrature Amplitude Modulation (QAM).

A CMTS requires resources (such as EQAMs) to relay this data to subscriber modems. These resources are allocated by an Edge Resource Manager (ERM).

The CMTS and EQAMs use the Real-Time Streaming Protocol (RTSP, [RFC2326]), as defined in section 5.2.3. of the CableLabs Edge Resource Manager Interface Specification ([ERMI]) during the resource allocation process. The CMTS asks the Edge Resource Manager for an EQAM, the ERM confers with the EQAMs, and then gives the CMTS the appropriate EQAM resource.

+----+ +----+ | |+----+ Edge Resource | |RTSP <-+-->+RTSP | Manager | |Client| | ||Server| +-----+ | +----+ | |+----+ |RTSP Client| | +----+ | | +----+ | Modular | EQAMs | Cable | Modem | +----+ | | Termination| | +----- | | | +----- | -+ | System | | | | +----+ | Core +-| | | +-----+ | +-----+ | (M-CMTS | +--| | |RTSP Server| | | Cable | +-| +----+ | | Modem | | Core) | DATA ==|=======+-|=====+-|======++-|========++-|======|==>> +----+ +---+

RTSP Usage in Edge Resource Manager Interface Specification

### Figure 1

The M-CMTS core, the ERM, and the EQAM use TCP as the transport-layer protocol and listen on TCP port 554 for incoming RTSP connections. The M-CMTS core acts as an RTSP client. The ERM plays the role of an RTSP client and an RTSP server. The EQAM acts as an RTSP server. The RTSP SETUP, TEARDOWN, PING and GET PARAMETER methods must at a minimum be supported by M-CMTS, ERM and EQAM. In addition, the M-CMTS core and the ERM must also support the ANNOUNCE method. A session keepalive method named PING has been added as part of the ERMI specification. The authors note that the OPTIONS method could have been used to act as a PING mechanism as it is the case with some SIP implementations.

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PING rtsp://172.22.10.3 RTSP/1.0 CSeq: 123 Session: 1234567 Require: ermi

A corresponding response from the RTSP server to the client: RTSP/1.0 200 OK CSeq: 123 Session: 1234567

The ERMI specification makes extensions to RTSP [<u>RFC2326</u>] to add EQAM-specific parameters; the applicability of ERMI messages is within the internal system architecture of a DOCSIS M-CMTS system and within a DOCSIS cable network. These extensions are briefly discussed <u>Section 2.1</u>.

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#### 2. ERMI extensions to RTSP

#### **2.1**. List of ERMI extensions

<u>Section 7.1.5</u> "RTSP Extensions" of the [ERMI] specification outlines the relevant extensions. These extensions are briefly summarized here; the specification should be examined directly for more details.

The following extensions to RTSP have been used in ERMI:

- New parameters for the Transport header: <u>Section 12.39 of [RFC2326]</u> specifies the Transport header. ERMI Extensions to the Transport header identify parameters associated with the transport of the media stream through an EQAM. Transport headers take the form of: Transport: <channel> [, <channel>].
  Each <channel> field takes the form: DOCSIS/QAM; unicast. The bit rate, QAM ID and DEPI mode are passed as part of the transport header with additional optional values.
- New DOCSIS-Notice header: The DOCSIS-Notice header header provides information sent from an RTSP server to a client in an ANNOUNCE request, specifically to reclaim an ERMI session. The syntax of the DOCSIS-Notice header is: DOCSIS-Notice: <notice-code> The RTSP client and server must support the values of noticecode and code-description defined in the ERMI specification. Currently, only the value of '5701' is define to reclaim a session.
- New RTSP option tag in the Require header: The Require: header must be present in RTSP requests methods, with the newly defined 'ermi' tag (see IANA consideration section).
- o New parameters for GET\_PARAMETER method: The RTSP GET\_PARAMETER method is used by the client to obtain the list of active RTSP sessions that were initiated by the client before the current TCP connection was established. It is used by a client as a mechanism to synchronize its session state with the RTSP server following a client reboot.

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## **<u>2.2</u>**. Limited Applicability of RTSP ERMI extensions

There are several considerations to the ERMI RTSP extensions.

First, the ERMI specification is intended to be used within a single cable administrative domain, a 'closed' cable system head-end with controlled network and administrative domains. It is unlikely that the [ERMI] protocols will escape these domains as the ERMI traffic is considered as a service control and management.

Secondly, the ERMI specification requires that RTSP requests include the Require Header with the 'ermi' option tag. <u>Section 12.32 of</u> [RFC2326] requires a non-ERMI server to reject this ERMI option tag header as Unsupported.

## 3. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

This document also reuses the terminology defined in [ERMI] and it is recommended for the reader to read the ERMI specification.

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## **<u>4</u>**. IANA Considerations

The CableLabs ERMI specification currently makes use of a new option tag indicating support for the ERMI RTSP requirements; this option tag means that the various extensions (PING Method, Transport header, etc.) are supported.

Depending on the feedback from the IETF MMUSIC working group, this section should properly register the extensions that are deemed necessary.

For example, a new option tag should be defined as described in <u>section 3.8.1 of [RFC2326]</u>:

- Name and description of option: The name of this new option is 'ermi' (or may be com.cablelabs.ermi). This text should explicitly define what is required to be supposed to claim compliance with this new option tag.
- o Change of control: CableLabs?
- o Reference: [ERMI]

## 5. Security Considerations

This section is left for further study.

#### 6. Acknowledgments

This IETF Internet-Draft document provides some high-level information and pointers to the RTSP extensions used in the CableLabs ERMI specification published by CableLabs as part of the Modular Cable Modem Termination System (M-CMTS) architecture.

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### 7. Informative References

- [ERMI] CableLabs, "Edge Resource Manager Interface Specification, CM-SP-ERMI-I02-051209", CableLabs Specification <a href="http://">http://</a> www.cablelabs.com/specifications/ CM-SP-ERMI-I02-051209.pdf, February 2008.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", <u>BCP 14</u>, <u>RFC 2119</u>, March 1997.
- [RFC2326] Schulzrinne, H., Rao, A., and R. Lanphier, "Real Time Streaming Protocol (RTSP)", <u>RFC 2326</u>, April 1998.

Authors' Addresses

Charles Bergren CableLabs 858 Coal Creek Circle Louisville, CO 80027 USA

Email: c.bergren@cablelabs.com

Jean-Francois Mule CableLabs 858 Coal Creek Circle Louisville, CO 80027 USA

Email: jfm@cablelabs.com

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