Codec Operation Point

draft-westerlund-avtext-codec-operation-point-00
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IPR Disclosure

› http://datatracker.ietf.org/ipr/1701/
Presentation Goal

› WG consensus that it is a desired feature

› WG consensus on suitability of proposed solution
Problem and Motivation

› Large diversity of end-points in multimedia sessions
  – Large diversity in end-point capabilities; different types of end-points
  – End-points connecting with various access

› Optimum use of media changes dynamically within session
  – User Interface changes – direct user interaction
  – CPU power re-allocation
  – Dynamically changing network characteristics
    › Available bandwidth
    › Effective MTU and packet rate restrictions
    › Loss rate and loss characteristics

› Codecs are often dynamically configurable
  – Local configuration on sender side
  – Many and inter-related configuration parameters

› Dynamic media codec configuration not feasible with any existing mechanism
  – SDP is typically not sufficiently dynamic, detailed and efficient for this
  – RTCP reports focus on network characteristics and do not map directly back to the codec configuration, risking ambiguity
Wanted Functionality

› Allow a media receiver to dynamically request certain values for a set of encoding parameters used at a media sender in an established session

› The set of available encoding parameters should be defined
  – Sample encoding parameters are:
    › Video resolution
    › Video framerate
    › Audio sampling rate
    › Number of media channels
    › …

› The result of SDP offer / answer describes session “outer limits” for encoding parameters, not to be exceeded
  – We only propose to allow dynamic changes within those limits
Main Topologies

› Centralized (Star) Conference

› Point-to-point

Multimedia conferencing is main targeted application
Point-to-Point Sample Use Case

Control Video Resolution
Point-to-Point Use Case Control Video Resolution

Establishing session, before making use of proposed functionality

1. I can receive level 1.3 (for example max 352x288 at 30 Hz)

2. OK
3. I am using 416x240 at 30 Hz

Some parameters can be seen directly in media stream, some cannot. Same handling for both types, for consistency between request and notification.
Point-to-Point Use Case Control Video Resolution

5. I want 313x227

4. User changes video window size to 313x227

Applicable for example in RTCWEB

Codec Operation Point | IETF 83 - AVTEXT | March 2012 | Page 10 (28)
Point-to-Point Use Case Control Video Resolution

6. Restriction for multiples of 16 can only support 304x224

7. I am using 304x224 at 30 Hz
Conference Sample Use Case

Change RTP Packet Size
Conference Use Case
Change RTP Packet Size

In an established session

1. I am using max 1460 bytes RTP payload
2. I am using max 1460 bytes RTP payload
3. I am using max 1460 bytes RTP payload

Codec Operation Point | IETF 83 - AVTEXT | March 2012 | Page 13 (28)
Conference Use Case
Change RTP Packet Size

4. Estimates payload limit to be 1400 bytes
5. I want max 1400 bytes RTP payload
6. Estimates payload limit to be 1320 bytes
7. I want max 1320 bytes RTP payload
Conference Use Case Change RTP Packet Size

9. I want max 1320 bytes RTP packets

8. Aggregates received requests (can also be done directly by sender), here choosing the minimum value
Conference Use Case
Change RTP Packet Size

10. I am using max 1320 bytes RTP payload

11. I am using max 1320 bytes RTP payload

10. Modifies encoding to produce smaller RTP packets

12. I am using max 1320 bytes RTP payload
WG Interest

› Are the described functionalities a wanted feature?
Assumed Signaling System

- Different Topology than the media plane

- Application Server (AS) handles application session signaling, especially for multi-party

- Any solution must work with service established by SIP/SDP signaling
Chosen Signaling Technology

› Media plane signaling chosen; extend CCM (RFC 5104)
  – Responsive
  – Bandwidth efficient
  – Signaling has direct impact on media streams
  – Localized to codec and media stream; small session impact

› Parameter outer limits are defined by SDP O/A, as before

› Capability for solution is signaled in SDP
Solution Overview

› Three messages
  – Notification of used parameter values
  – Request new parameter values
  – Status (return code) of request

› A set of pre-defined but extensible parameter types

› Media sender decides what values to actually use

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Solution Overview

All messages have SSRC of sender and targeted stream, from RFC 5104

**Notification**
- Operation Point
- Version
- Payload
- Parameters...

Heads-up that any parameter changed
One SSRC can use multiple Payload Types

**Request**
- Operation Point
- Version
- Sequence
- Parameters...

Request is delta from Notification
Allows multiple & repeated requests; RTCP is lossy

**Status**
- Operation Point
- Version
- SSRC
- Sequence
- Result

Allows Requester to know if media sender has taken Request into account, since media sender need not follow request exactly
WG Opinion

› Does the WG believe this solution to be reasonable?