Multi-Media Concepts and Relations

draft-burman-rtcweb-media-structure-00
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Background

› Intended as input to RTP Taxonomy

–Same motivations

› Built on a draft UML model of RTP Taxonomy and added more media concepts from CLUE and WebRTC to give overview and ease understanding

–Focus on finding commonalities

› This is an attempt to draw conclusions from that work

More Taxonomy Concepts 1

› Encoding

– Particular encoded representation of a Media Source Output

– Must fit established parameters such as RTP Payload Type, media bandwidth, other more or less codec-specific configurations (resolution, framerate, fidelity…)

– Fundamental in simulcast and layered/scalable encoding

– Probably maps well to CLUE Capture Encoding **output**

– RTCWeb currently has no corresponding concept

More Taxonomy Concepts 2

› Synchronization Context

– All Media Stream Output that share the same Synchronization Context have information allowing time synchronization on playout

– Each Media Source Output is associated with one and only one Synchronization Context

– Re-use Synchronization Context when appropriate and possible

– RTP level Synchronization Context identifier, CNAME, is currently overloaded as an Endpoint identifier, which can cause issues

› Same Endpoint could carry streams that do not have so strict timing relation that they share Synchronization Context

Identified WebRTC Issues

› Need Encoding to fully support simulcast and scalability

– Only a single Encoding for a particular Media Source Output per PeerConnection?

› Need unique but anonymous ID of Media Source Output

– Due to re-use in multiple RtcMediaStreamTracks, in turn re-usable in multiple RtcMediaStreams, in turn re-usable in multiple PeerConnections, and possibility to relay RtcMediaStreamTracks

› MediaStream API handling of Synchronization Contexts

– Synchronization Context must be preserved when possible

– New Synchronization Context must be created and re-synchronization must occur when combining Media Source Output from different Synchronization Contexts

SDP Evolution

› Likely applicable to both CLUE and WebRTC use of SDP

› Requirements:

– Encoding negotiation

› Number of and boundary conditions for Media Source Output Encodings

– Media Resource Identification

› Common Media Source Output ID across signaling contexts

› Which set of Encodings share same Media Source Output

› Application level IDs referencing concepts defined in this draft

– Synchronization Source Parameters

› Sets of different Synchronization Sources share same set of parameters

› SDP likely not only option for all of the above

– Could for example use RTCP or other media signaling methods

Draft UML Diagram

An Endpoint is destination and/or source of media including MCU

Communication Session

Full mesh is the classical example of multi-session instantiation of communication

A "distributed" Endpoint can consist of multiple Nodes
= CLUE "Device"?

0..*   1..*

«uses»

1..*

Node   1..*   1   Endpoint   1   Media Description   0..1   Multimedia Session

1..*

Negotiated Media Description   SDP   1   2   1

CLUE   1..*

WebRTC   0..*   Simultaneous Transmission Set

RtcMediaStream   «uses»   Synchronization Context   «uses»   CLUE Capture Scene   Establishment   RTP Session
+msid   +CNAME   +Spatial Relation

PeerConnection   RTSP Session

Also has RTCP Transport Flows (not shown)   1

CLUE Scene Entry   CLUE Encoding Group
+Media Type

RtcMediaStreamTrack   SIP Dialog   XMPP Session
+Media Type

Layered encoding obtained through dependency to another Encoding

«uses»   CLUE Capture Encoding   Encoding   +Dependency
+Codec
+Bitrate
+Quality
+Contributing Source

Track Source   Media Source Output   CLUE Media Capture   Payload Type
+Media Type   +Codec
+Source Quality   +Configuration
+Clock Source

Capture Device   Only a single Payload Type valid at any time instance

Multiple independent Encodings: Simulcast

Should rather be "uses"?   Multiple dependent Encodings: Scalability

0..*   Synchronization Source
+SSRC

Transport Flow
+5-tuple

Source Stream   +FEC group   Repair Stream   +Dependency

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