



Codecs and RTP payload formats in SDPng

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Codecs and RTP payload formats

- **There may be more than one RTP payload format for any given codec.**
 - **MP3 has two: MPA and MPA-ROBUST**
 - **MPEG-4 has three or more...**
- **Proposal: Don't tie the codec to a specific RTP payload format**
 - **New "format" attribute in "rtp:pt" tag.**



Example: Two different RTP payload formats for MP3

```
<cfg>
  <component name="mp3-audio" media="audio">
    <alt name="old-MP3-payload-format">
      <rtp:session>
        <rtp:pt name="rtp-avp-14" format="mpa" pt="14">
          <audio:codec ref="mpeg-audio-level-3" channels="2" />
        </rtp:pt>
        <rtp:udp ref="A-rcv"/>
      </rtp:session>
    </alt>
    <alt name="RFC-3119-robust-MP3-payload-format">
      <rtp:session>
        <rtp:pt name="mpa-robust-96" format="mpa-robust" pt="96">
          <audio:codec ref="mpeg-audio-level-3" channels="2" />
        </rtp:pt>
        <rtp:udp ref="A-rcv"/>
      </rtp:session>
    </alt>
  </component>
</cfg>
```



Bit rates of codec and RTP payload format may differ

- **Bit rate of codec cannot always be deduced by “sampling” attribute**
 - **Example: Variable bit rate MP3**
- **RTP payload format may add extra overhead, increasing the bit rate**
 - **Examples: FEC, RED (redundant audio), Comfort Noise**
- **Proposal: New “bitrate” attributes in “audio:codec” and “rtp:pt” tags.**



Example: Variable bit rate MP3

```
<cfg>
  <component name="mp3-audio" media="audio">
    <rtp:session>
      <rtp:pt name="rtp-avp-14" format="mpa" bitrate="197kbps" pt="14">
        <audio:codec ref="mpeg-audio-level-3" channels="2" bitrate="196kbps" />
      </rtp:pt>
      <rtp:udp ref="A-rcv"/>
    </rtp:session>
  </component>
</cfg>
```



RTP sessions that use multiple payload formats

- **The total bit rate of an RTP session cannot be determined**
 - **Bit rates of individual payload formats cannot be added.**
 - **Examples: Audio+FEC and Audio+RED**
- **Proposal: Add “bitrate” attribute to “rtp:sesison” tag.**
 - **Orthogonal to any SDPng QoS parameters**



RTP payload formats without codecs

- **Some RTP payload formats don't use a "codec" because they encapsulate other payload formats.**
 - **Example: ParityFEC, RED, Interleaving**
- **For such payload formats, some codec attributes need to be specified on "rtp:pt" tag.**
 - **"sampling" – RTP clock frequency**
 - **"formatdata" – equivalent to "fmt" in SDP**



Putting it all together: Audio+FEC+RED

```
<cfg>
  <component name="PCM-with-parity-FEC" media="audio">
    <rtp:session bitrate="80kbps" >
      <rtp:pt name="rtp-avp-0" format="PCMU" pt="0">
        <audio:codec ref="PCMU" />
      </rtp:pt>
      <rtp:pt name="rtp-avp-parityfec" format="parityfec" sampling="8000"
        pt="96" />
      <rtp:pt name="red-PCMU-and-ParityFEC" format="RED" sampling="8000"
        formatdata="0/96" pt="97" />
      <rtp:udp ref="A-rcv"/>
    </rtp:session>
  </component>
</cfg>
```




Other audio codec parameters

- **“Bitspersample” attribute**
 - **Need to specify only if bits per sample is allowed to vary (not needed for L8 & L16, for example.)**
- **“language” tag for international content**
 - **“constraints” section can specify how to choose among streams based on a language preference.**
 - **Could also be specified as meta-data inside “conf” tag.**
 - **But meta-data in “conf” section is specific to MBone conferences (e-mail, phone, etc.) – “language” does not seem to belong here.**



Example: Multiple languages

```
<cfg>
  <component name="mp3-audio" media="audio">
    <alt name="RFC-3119-robust-MP3-in-English">
      <rtp:session>
        <rtp:pt name="mpa-robust-96" format="mpa-robust" pt="96">
          <audio:codec ref="mpeg-audio-level-3" language="en-us" />
        </rtp:pt>
        <rtp:udp ref="A-rcv"/>
      </rtp:session>
    </alt>
    <alt name="RFC-3119-robust-MP3-in-Swedish">
      <rtp:session>
        <rtp:pt name="mpa-robust-96" format="mpa-robust" pt="96">
          <audio:codec ref="mpeg-audio-level-3" language="se" />
        </rtp:pt>
        <rtp:udp ref="A-rcv"/>
      </rtp:session>
    </alt>
  </component>
</cfg>
```



Video codec parameters

- **A “video:codec” tag could have these attributes:**
 - **name**
 - **encoding**
 - E.g., “H263”
 - **Version**
 - To distinguish between different codec revisions
 - **bitrate**
 - **imagewidth & imageheight**
 - Sorely missing from SDP
 - **language**
 - May be useful for video of slide presentations



SDPng usage with RTSP

- **New “rtsp” tag at “component” tag level**
 - **No “rtp:rtsp” tag needed, since transport is negotiated in RTSP SETUP command.**
- **New “rtsp” tag in “conference” section, to specify RTSP Presentation URL.**



Example: SDPng and RTSP

```
<cfg>
  <component name="mp3-audio" media="audio">
    <alt name="old-MP3-payload-format">
      <rtp:session>
        <rtp:pt ref="rtp-avp-14" />
      </rtp:session>
      <rtsp control="rtsp://server/music.mp3/stream_1/alt_1" />
    </alt>
    <alt name="RFC-3119-robust-MP3-payload-format">
      <rtp:session>
        <rtp:pt ref="mpa-robust" pt="96" />
      </rtp:session>
      <rtsp control="rtsp://server/music.mp3/stream_1/alt_2" />
    </alt>
  </component>
</cfg>
<conf>
  <rtsp control="rtsp://server/music.mp3" />
</conf>
```



Summary / Open Issues

- **Codec definitions should be separated from RTP payload format definitions.**

- **How to specify codecs for non-A/V media?**
 1. **Require separate SDPng profile for each non-A/V media type.**
 2. **Define a “catch-all” tag, such as “application/codec”**
 - **Will make it easier to deploy SDPng in new applications.**
 - **“Encoding” attribute would be MIME type of codec.**