



# Codecs and RTP payload formats in SDPng

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# Codecs and RTP payload formats

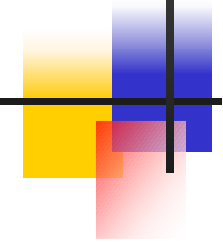
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- **There may be more than one RTP payload format for any given codec.**
  - **MP3 has two: MPA and MPA-ROBUST**
  - **MPEG-4 has three or more...**
- **Proposal: Don't tie the codec to a specific RTP payload format**
  - **New "format" attribute in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



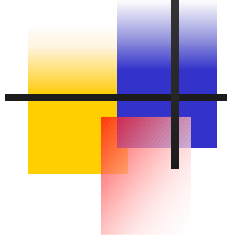
# RTP payload formats without codecs

- **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 "fmtpt" in SDP**

# Putting it all together:

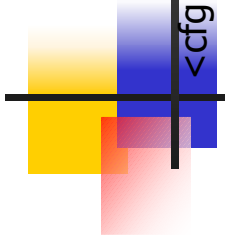
## Audio+FEC+RED

```
<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:session>
  </component>
</cfg>
```



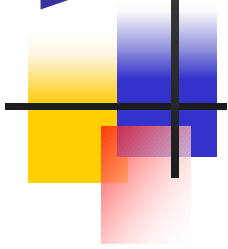
# Other audio codec parameters

- **“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

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- **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 RTPSP

```
<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

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- **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.