This document describes implementation considerations related to video codecs for use in Jingle RTP sessions.
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1 Introduction

Jingle RTP Sessions (XEP-0167) \(^1\) defines the Jingle (XEP-0166) \(^2\) signalling exchanges needed to establish video sessions using the Real-time Transport Protocol RFC 3550 \(^3\); however, it does not say which video codecs are mandatory-to-implement, since the state of codec technologies is more fluid than the signalling interactions. This document fills that gap by providing guidance to Jingle developers regarding voice and video codecs. Because codec technologies are typically subject to patents, the topics discussed here are controversial. This document attempts to steer a middle path between (1) specifying mandatory-to-implement technologies that realistically will not be implemented and deployed and (2) providing guidelines that, while realistic, do not encourage the implementation and deployment of patent-clear technologies. This document does not yet provide binding recommendations to the XMPP developer community regarding mandatory-to-implement technologies; however, it provides input that the XMPP Standards Foundation (XSF) \(^4\) could use in making such recommendations.

2 Basic Considerations

The ideal codec would meet the following criteria:

- **Quality**  The encoding quality is acceptable for deployment among XMPP users.
- **Packetization**  The specification of the codec clearly defines packetization of data for sending over RTP.
- **Availability**  The codec can be implemented on a wide variety of computing platforms and is commonly used in Internet or other systems.
- **Patents**  The codec is patent-clear. The term patent-clear does not necessarily mean that no patents have ever been applied for or granted regarding a technology, or that the technology is completely free from patents (since such a judgment is nearly impossible to make, and is outside the purview of the XMPP developer community and the XMPP Standards Foundation); the term means only that those who implement the technology are generally understood to be relatively safe from the threat of patent litigation, either because any relevant patents have expired, were filed in a defensive manner, or are made available under suitable royalty-free licenses. (Although most XMPP developers would prefer to implement codecs that are patent-clear, such options are not always widely implemented and deployed.)

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\(^4\)The XMPP Standards Foundation (XSF) is an independent, non-profit membership organization that develops open extensions to the IETF’s Extensible Messaging and Presence Protocol (XMPP). For further information, see <https://xmpp.org/about/xmpp-standards-foundation>.
Unfortunately, not all codecs meet those criteria. In the remainder of this document we discuss the video codecs that are most appropriate for implementation in Jingle RTP applications.

3 Codecs

3.1 Dirac

Dirac is a general-purpose video compression technology developed by the BBC that has been licensed in the open. It is used for everything from Internet streaming to HDTV. To date there is no RTP packetization definition for Dirac; however, such a format is under development.

<table>
<thead>
<tr>
<th>Quality</th>
<th>Packetization</th>
<th>Availability</th>
<th>Patents</th>
</tr>
</thead>
<tbody>
<tr>
<td>High quality.</td>
<td>Not yet defined.</td>
<td>Freely downloadable under both GPL and LGPL at <a href="http://diracvideo.org/">http://diracvideo.org/</a>; commonly deployed but not yet in video over IP systems because of the lack of an RTP packetization format.</td>
<td>Dirac is patent-clear, and the BBC has allowed its related patents to lapse.</td>
</tr>
</tbody>
</table>

3.2 H.264

H.264 is a technology for video compression jointly designed by the ITU and the International Organization for Standardization (ISO) \(^5\). The following table summarizes the available information about H.264.

\(^5\)The International Organization for Standardization develops standards a wide variety of technical domains. For further information, see <http://www.iso.org/>.
### 3.3 Theora

According to the theora.org website, the Theora codec is "a free and open video compression format". Theora is based on the VP3 codec originally developed by On2 Technologies and is now maintained by the [Xiph.org Foundation](http://xiph.org). The following table summarizes the available information about Theora.

<table>
<thead>
<tr>
<th>Quality</th>
<th>Packetization</th>
<th>Availability</th>
<th>Patents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptable quality.</td>
<td>See RTP Payload Format for Theora Encoded Video</td>
<td>Freely downloadable under BSD license at <a href="http://theora.org/">http://theora.org/</a>; not yet commonly deployed, especially on devices that have deployed H.264 instead.</td>
<td>On2’s patents over VP3 were contributed to the Xiph.org Foundation in 2001.</td>
</tr>
</tbody>
</table>

### 3.4 VP8

VP8 is an open video compression format originally developed (as was Theora) by On2 Technologies and released by Google after it acquired On2 Technologies in 2010. The following table summarizes the available information about Theora.

<table>
<thead>
<tr>
<th>Quality</th>
<th>Packetization</th>
<th>Availability</th>
<th>Patents</th>
</tr>
</thead>
<tbody>
<tr>
<td>High quality.</td>
<td>See RFC 3984: RTP Payload Format for H.264 Video</td>
<td>Commonly deployed in commercial video systems. Not freely downloadable; both software implementations and service deployments can be subject to royalty payments for commercial use.</td>
<td>Patented.</td>
</tr>
</tbody>
</table>
6 Security Considerations

For security considerations related to Jingle RTP sessions, refer to XEP-0167. This document introduces no new security considerations. See also the security considerations described in the relevant codec specifications.
7 IANA Considerations

This document requires no interaction with the Internet Assigned Numbers Authority (IANA) e.

8 XMPP Registrar Considerations

This document requires no interaction with the XMPP Registrar 7.

9 Acknowledgements

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1 The Internet Assigned Numbers Authority (IANA) is the central coordinator for the assignment of unique parameter values for Internet protocols, such as port numbers and URI schemes. For further information, see <http://www.iana.org/>.

2 The XMPP Registrar maintains a list of reserved protocol namespaces as well as registries of parameters used in the context of XMPP extension protocols approved by the XMPP Standards Foundation. For further information, see <https://xmpp.org/registrar/>.