



Advanced RTP/RTCP Toolkit

For transferring real-time media over UDP/IP

RADVISION's RTP/RTCP (Real-Time Transport Protocol/Real-Time Transport Control Protocol) Toolkit is designed to address the requirements of mature, production IP telephony applications.

The RTP/RTCP Toolkit can seamlessly scale from small, embedded platforms all the way up to densely populated parallel processing environments.

The RTP/RTCP Toolkit is used for developing applications such as:

- Mobile Handsets
- IMS Systems
- Push To Talk over Cellular (PoC)
- IP TV - Video-On-Demand (VOD)
- IP Phones (Voice and Video)
- IP Set-Top Boxes
- Mobile TV (DVB-H)
- IVR Systems
- Media Servers
- Trunking Gateways
- Residential Gateways
- Announcement Servers
- Conference Bridges
- Streaming Media Servers
- Voice/Video Mail (VM)
- Video Conferencing Systems
- Multiparty Controller Unit (MCU)
- Session Border Controller (SBC)

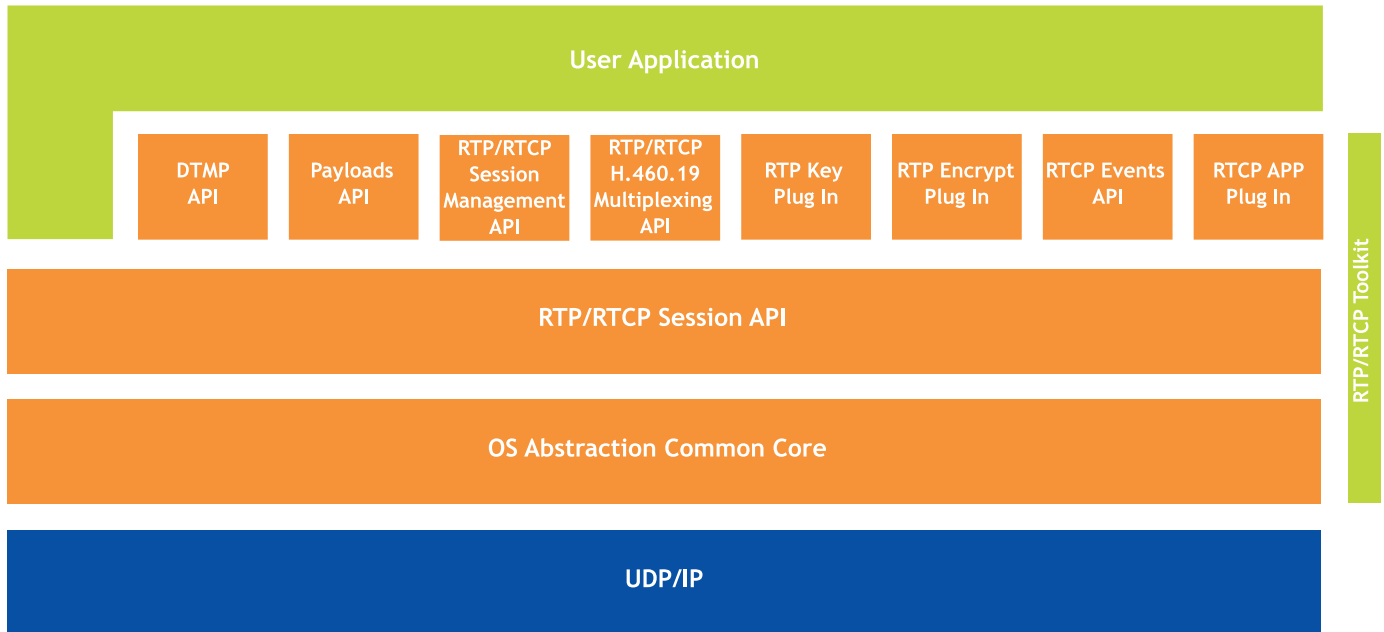
RTP/RTCP Basics

The Real-Time Transport Protocol, or RTP, was designed to send real-time media, such as voice and video, over UDP/IP. It can be used to transmit other types of data such as DTMF, text, and pointers. The protocol also supplies information to allow a receiver to re-synchronize the media for lip syncing or having text appear at the correct time in relation to an image or word. Since RTP can be configured for low latency, it is useful for interactive conversations as well as streaming media.

The Real-Time Transport Control Protocol (RTCP) is a companion protocol to RTP for gathering statistics on a media connection and information such as bytes sent, packets sent, lost packets, jitter, and round trip delay. The application can use this information to judge the quality of its connections and make adjustments as required such as changing from a low compression codec to a high compression codec or as an adaptive jitter buffer.

For security, the RTP/RTCP data can be encrypted to enable improved privacy against eavesdropping. RTP/RTCP has recently been enhanced with new RFCs 3550 and 3551 for better monitoring, streaming capabilities, and code support, as well as serving OMA (Open Mobile Association) specifications for operating Push-to-talk Over Cellular services.

RTP/RTCP Toolkit Architecture



RTP/RTCP Toolkit Overview

RADVISION's RTP/RTCP Toolkit is compliant with the IETF RFCs 3550 (replacing 1889), 3551 (replacing 1890), 2032, 2190, 3640, 3267, and 2833, as well as OMA (Open Mobile Association) PoC requirements for RTP/RTCP and ISMA 2.0 (Internet Streaming Media Alliance). The Toolkit, designed for high-end applications implemented in real-time, multi-threaded environments, is written in ANSI C, is available on multiple operating systems, and is portable to different environments. The Toolkit enables various run-time settings such as filters and bandwidth and provides both high level and low level/fine grain APIs to provide maximum flexibility. In addition, both asynchronous and synchronous operation modes are supported.

RTP/RTCP Toolkit APIs

The Toolkit consists of several modular and layered APIs as shown in the architecture diagram. The following APIs are included:

- RTP/RTCP Session Management
- DTMF
- RTP Payloads
- RTP Key
- RTP Encryption
- RTCP Events
- RTCP APP
- RTP/RTCP Session
- NAT Traversal Enablement
- OS Abstraction (Common Core)

RTP/RTCP Session Management API

The RTP/RTCP Session Management API is the highest level API in the Toolkit. This API enables initiating and terminating RTP/RTCP sessions. In addition, the API enables building and sending, as well as receiving and extracting data.

DTMF (Dual Tone Multi-Frequency) API

The RTP/RTCP Toolkit provides APIs for transporting DTMF Digits, Telephony Tones, and Telephony Signals over RTP according to RFC 2833. These APIs simplify the transport of in-call events and signals over RTP.

RTP Payloads API

The RTP Payload API provides built-in RTP codec payloads for pre-defined codecs: G.711 a-law/mu-law, G.723.1, G.728, G.729, iLBC, EVRC, SMV, GSM-AMR, H.261, H.263, H.263+, MPEG-2, MJPEG, MPEG-4, and H.264 / AVC.

RTP Key Plug-In

The Key Plug-In provides management of several keys and enables setting up separate keys for different RTP sessions. Different keys can be defined for encoding/decoding on the same session.

RTP Encryption API

The Encryption API is used to integrate external encryption functions, such as DES and 3DES, or user defined encryption functions such as AES (encryption function not included).

RTCP Events API

The RTCP Events API enables the application to register RTCP events with callback functions.

RTP APP API

The APP API enables creating RTCP APP reports, sending and receiving report PDUs, and extracting reported information.

RTP/RTCP Session API

The RTP/RTCP Session API mediates between the upper layers (see the architecture diagram) and the OS abstraction layer (RADVISION Common Core). The API handles each session as a separate object instance in terms of memory handling and RTP/RTCP protocol state. In addition, this API can generate automatic RTCP reports. The reports are generated in time intervals as defined in RFC3550, calculated automatically based on RTCP session parameters such as bandwidth to the application for QoS/Monitoring purposes.

RTP/RTCP H.460.19 Multiplexing API

The RTP/RTCP H.460.19 Multiplexing API enables applications to support the H.460.19 standard for NAT/FW traversal using H.323 entities. This support includes multiplexing of several RTP or RTCP sessions over the same socket, allowing a single pinhole for RTP and a single pinhole for RTCP in the firewall to handle all media needs of an enterprise or a home user.

OS Abstraction (Common Core) API

The Common Core is an operating system (OS) abstraction layer that provides OS services, such as sockets, threading and locking, and memory management to the RADVISION stack levels. The Common Core has been ported to a wide range of RTOS and non-RTOS and comes with a comprehensive porting guide to enable porting to additional OSs. Services, such as DNS address resolver, IPv6/IPv4, and flexible logging API, are also provided.

The RTP/RTCP Toolkit is delivered with:

- Source code
- Sample application
- Release notes
- Detailed documentation

Operating Systems Supported*

- MS-Windows
- Windows Mobile
- Monta Vista Linux (Embedded Linux)
- Symbian
- Linux, Red Hat
- VxWorks
- pSOS
- Nucleus
- Solaris

* Inquire about support for additional operating systems.

Additional RADVISION Solutions

• Multimedia Terminal Framework

A complete set of building blocks for developing SIP-based IP phone applications in RTOS or embedded environments

• SIP Server Platform

A comprehensive SIP server development solution with complete standards-based functionality of Proxy, Redirect, and Registrar servers

• RTSP Client & Server Solutions

A streaming solution for enabling handheld wireless and wireline products to support web content streaming

• ProLab™ Test Management Suite

A versatile VoIP testing solution, based on RADVISION's award-winning SIP Toolkit, that is suitable for use in different stages of the product development cycle

• Professional Services

A full range of design, integration, and deployment consulting services, including kernel mode driver development for various operating systems

RTP/RTCP Toolkit Features

- High performance
- Written in ANSI C
- Thread-safe
- Supports RTP OMA PoC 1.0 requirements
- IPv4/ IPv6 support (including address translation)
- Security profiles supported
- Mode 1: RFC 1889 Section 9 Encryptions
- Mode 2: H.235 Annex D (Ciphertext stealing)
- Mode 3: H.235 Annex D (Padding)
- SRTP
- Encryption profiles supported
- DES
- 3DES
- User-defined (e.g. AES)
- UDP Unicast / Multicast support
- Blocking and non-blocking operation modes
- Synchronous, asynchronous operation modes
- Extensible codec interface (for supported codecs)
- Payloads API (enables supporting new codecs)
- Built-in codec payloads API for
- Voice: G.711 a-law/mu-law, G.722.x, G.723.1, G.728, G.729, GSM-AMR, EVRC & SMV
- Video: H.261, H.263, H.263+, MPEG-4 (narrow band/wide band), H.264, MJPEG, MPEG-2
- RTCP reports API
- RTCP Extended Reports (RTCP-XR)
- Support for compounded reports
- Support for manual APP & BYE messages
- RTCP events API
- IP TOS/Diffserv setting for improved QoS (If OS provides these services)
- Extensible SSRC generation mechanism
- Full 3DES support
- Adaptive RTCP report interval
- Support for RTCP APP messages
- Session logging capabilities
- Multiple stack instance per process space
- Platform Independent (OS abstraction layer-based)
- Support for general extension in RTP header
- Provides statistics for adaptive jitter buffer
- Support for multiple NAT traversal techniques

Standards Compliance

- IETF RFC 3550 - A transport protocol for Real-Time Applications (Replaces RFC 1889)
- IETF RFC 3551 profile for audio and video conferences with minimal control (Replaces RFC 1890)
- RTP/RTCP OMA PoC 1.0 Compliance
- RTP/RTCP ISMA 2.0 Compliance
- IETF RFC 3771 - Secure RTP (SRTP Add-on)
- IETF RFC 3611 - RTCP Extended Reports (RTCP-XR Add-on)
- IETF RFC 3556 bandwidth modifiers support
- IETF RFC 2833 (RTP payload for DTMF digits, telephony tones, and telephony signals)
- IETF RFC 4573 - RTP payload format for Far End Camera Control (FECC)
- ITU-T H.235 Annex D Security (Media Encryption)
- ITU-T H.460.19 FW/NAT Traversal
- IETF RFC 2032
- IETF RFC 2190 - RTP payload format for H.263 video streams
- IETF RFC 2429 - RTP payload format for H.263+
- IETF RFC 3640 - RTP payload format for MPEG-4 payload
- IETF RFC 3267 - RTP payload format for AMR narrow band and AMR wideband payload
- IETF RFC 3984 - RTP payload format for H.264/AVC
- IETF RFC 2429 - RTP payload format for H.263
- IETF RFC 3558 - RTP payload format for EVRC and SMV
- IETF RFC 3389 - RTP payload format for Comfort Noise (CN)

About RADVISION

RADVISION (NASDAQ: RVSN) is the industry's leading provider of market-proven products and technologies for unified visual communications over IP and 3G networks. With its complete set of standards-based video networking infrastructure and developer toolkits for voice, video, data and wireless communications, RADVISION is driving the unified communications evolution by combining the power of video, voice, data and wireless - for high definition video conferencing systems, innovative converged mobile services, and highly scalable video-enabled desktop platforms on IP, 3G and emerging next-generation IMS networks. For more information about RADVISION, visit www.radvision.com

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