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Abstract

This document describes common local transmit and receive ports, commonly called "symmetric RTP" and "symmetric RTCP", and explains the advantages of using common local transmit and receive ports.
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1. Introduction

TCP [RFC0793], which is inherently bidirectional, uses common local transmit and receive ports. That is, when a TCP connection is established from host A with source TCP port "a" to a remote host, the remote host sends packets back to host A’s source TCP port "a".

However, UDP is not inherently bidirectional and UDP does not require common local transmit and receive ports. Rather, some UDP applications use common local transmit and receive ports (DNS [RFC1035]), some applications use different local transmit and receive ports with explicit signaling (TFTP [RFC1350]), and other applications don’t specify the behavior for local transmit and receive ports (RTP [RFC3550]).

Because RTP and RTCP are not inherently bi-directional protocols, and UDP isn’t a bi-directional protocol, the usefulness of common local transmit and receive ports has been generally ignored for RTP and RTCP. Many firewalls, NATs [RFC3022], and RTP implementations expect symmetric RTP, and do not work in the presence of non-symmetric RTP. However, this term has never been defined. This document defines "symmetric RTP" and "symmetric RTCP".

The UDP port number to receive media, and the UDP port to transmit media are both selected by the device that receives that media and transmits that media. For unicast flows, the receive port is communicated to the remote peer (e.g., SDP [RFC4566] carried in SIP [RFC3261], SAP [RFC2974], or MGCP [RFC3435]).

There is no correspondence between the common local port and the common remote port. That is, device "A" might choose its common local transmit and receive port to be 1234. Its peer, device "B", is not constrained to also use port 1234 for its common remote port. In fact, such a constraint might be impossible to meet because device "B" might already be using that port for another application.

The benefits of common local transmit and receive ports is described below in Section 4.

2. Conventions Used in this Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].
3. Definition of Symmetric RTP and Symmetric RTCP

A device supports symmetric RTP if it selects, communicates, and uses IP addresses and port numbers such that, when receiving a bi-directional RTP media stream on UDP port "A" and IP address "a", it also transmits RTP media for that stream from the same source UDP port "A" and IP address "a". That is, it uses a common local transmit and receive port for RTP.

A device which doesn’t support symmetric RTP would transmit RTP from a different port, or from a different IP address, than the port and IP address used to receive RTP for that bi-directional media steam.

A device supports symmetric RTCP if it selects, communicates, and uses IP addresses and port numbers such that, when receiving RTCP packets for a media stream on UDP port "B" and IP address "b", it also transmits RTCP packets for that stream from the same source UDP port "B" and IP address "b". That is, it uses a common local transmit and receive port for RTCP.

A device which doesn’t support symmetric RTCP would transmit RTCP from a different port, or from a different IP address, than the port and IP address used to receive RTCP.

4. Recommended Usage

There are two specific instances where symmetric RTP and symmetric RTCP are required.

The first instance is NATs that lack integrated Application Layer Gateway (ALG) functionality. Such NATs require that endpoints use UDP port symmetry to establish bi-directional traffic. This requirement exists for all types of NATs described in section 4 of [RFC4787]. ALGs are defined in section 4.4 of [RFC3022].

The second instance is Session Border Controllers (SBCs) and other forms of RTP and RTCP relays (e.g., [I-D.ietf-behave-turn]). Media relays are necessary to establish bi-directional UDP communication across a NAT that is ‘Address-Dependent’ or ‘Address and Port-Dependent’ [RFC4787]. However, even with a media relay, UDP port symmetry is still required to traverse such a NAT.

There are other instances where symmetric RTP and symmetric RTCP are helpful, but not required. For example, if a firewall can expect symmetric RTP and symmetric RTCP then the firewall’s dynamic per-call port filter list can be more restrictive compared to non-symmetric RTP and non-symmetric RTCP. Symmetric RTP and symmetric RTCP can
also ease debugging and troubleshooting.

Other UDP-based protocols can also benefit from common local transmit and receive ports.

There are no known cases where symmetric RTP or symmetric RTCP are harmful.

For these reasons it is RECOMMENDED that symmetric RTP and symmetric RTCP always be used for bi-directional RTP media streams.

5. Security Considerations

There is no additional security exposure if a host uses symmetric RTP or symmetric RTCP.

6. IANA Considerations

This document doesn’t require any IANA registrations.

7. Acknowledgments

The author thanks Francois Audet, Sunil Bhargo, Francois Le Faucheur, Cullen Jennings, Benny Rodrig, Robert Sparks, and Joe Stone for their assistance with this document.

8. References

8.1. Normative References


8.2. Informational References


[RFC0793] Postel, J., "Transmission Control Protocol", STD 7,
RFC 793, September 1981.


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