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Symmetric RTP and RTCP Considered Helpful
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Abstract

This document defines symmetric RTP and symmetric RTCP and recommends their use.

Requirements Language

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 RFC 2119 [1].

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1. Introduction

Because RTP and RTCP are not inheriently a bi-directional protocols, the usefulness of symmetry has been generally ignored. Many firewalls, NATs [6], and RTP implementations expect "Symmetric RTP", and do not work in the presense of non-symmetric RTP. However, this term has never been defined. This document defines Symmetric RTP and Symmetric RTCP.

TCP [3], which is inheriently bidirectional, uses symmetric ports. That is, when a TCP connection is established from host A and its source TCP port "a" to a remote host, the remote host sends packets back to host A's source TCP port "a".

UDP isn't inheriently bidirectional and UDP itself doesn't require similar port symmetry. Rather, some UDP applications (DNS [11]) have symmetry, some UDP applications (TFTP [12]) don't have symmetry, and other UDP applications (RTP [5]) don't mention symmetry.

2. Definitions

2.1 Symmetric RTP

The UDP port number for RTP media stream is usually communicated using SDP [7]. The SDP is usually carried by a signaling protocol such as SIP [8], SAP [9], or MGCP [10].

A device supports Symmetric RTP if, 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".

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.

2.2 Symmetric RTCP

The advertisement of the UDP port number for RTCP is usually communicated using SDP, and the port number is either implicit (RTP port + 1, as described in RFC3550 [5] section 11) or explicit (as described in Alternative Network Address Types [4]). The SDP is usually carried by a signaling protocol such as SIP, SAP, or MGCP.

A device supports Symmetric RCTP if, when receiving RTCP for a media stream on port B and IP address "b", it also transmits its RTCP messages for that stream from the same source UDP port B and IP address "b".

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.

3. 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 the RTP endpoint use UDP port symmetry to establish bi-directional traffic. ALGs are defined in section 4.4 of RFC3022 [6].

The second instance is Session Border Controllers (SBCs) and TURN [13] servers, which relay RTP media and RTCP packets. Media relays are useful in conjunction with symmetric NATs to allow bi-directional UDP traffic across such NATs. However, if the RTP endpoint does not do symmetric RTP and symmetric RTCP, the media relay is unable to perform its function if there is a symmetric NAT in the path. "Symmetric NAT" is defined in section 5 of RFC3489 [2].

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.

4. Security Considerations

There is no additional security exposure if a host complies with this specification.

5. IANA Considerations

This document doesn't require any IANA registrations.

6. References

6.1 Normative References

[1] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

6.2 Informational References

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