Channel Bindings for TLS 1.3

Abstract

This document defines a channel binding type, tls-exporter, that is compatible with TLS 1.3 in accordance with RFC 5056, On Channel Binding.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on 16 September 2021.

Copyright Notice

Copyright (c) 2021 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (https://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.
1. Introduction

The "unique" channel binding types defined in [RFC5929] were found to be vulnerable to the "triple handshake vulnerability" [TRIPLE-HANDSHAKE] without the extended master secret extension defined in [RFC7627]. Because of this they were not defined for TLS 1.3 (see [RFC8446] section C.5). To facilitate channel binding with TLS 1.3, a new channel binding type is needed.

1.1. Conventions and Terminology

Throughout this document the acronym "EKM" is used to refer to Exported Keying Material as defined in [RFC5705].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. The 'tls-exporter' Channel Binding Type

Channel binding mechanisms are not useful until TLS implementations expose the required data. To facilitate this, "tls-exporter" uses exported keying material (EKM) which is already widely exposed by TLS implementations. The EKM is obtained using the keying material exporters for TLS as defined in [RFC5705] and [RFC8446] section 7.5 by supplying the following inputs:

Label: The ASCII string "EXPORTER-Channel-Binding" with no terminating NUL.

Context value: Empty context value.

Length: 32 bytes.
3. Security Considerations

Channel bindings do not leak secret information about the channel and are considered public. Implementations MUST NOT use the channel binding to protect secret information.

The Security Considerations sections of [RFC5056], [RFC5705], and [RFC8446] apply to this document.

3.1. Use with Legacy TLS

While it is possible to use this channel binding mechanism with TLS versions below 1.3, extra precaution must be taken to ensure that the chosen cipher suites always result in unique master secrets. For more information see the Security Considerations section of [RFC5705].

When TLS renegotiation is enabled the "tls-exporter" channel binding type is not defined and implementations MUST NOT support it.

In general, users wishing to take advantage of channel binding should upgrade to TLS 1.3 or later.

4. IANA Considerations

4.1. Registration of Channel Binding Type

This document adds the following registration in the "Channel-Binding Types" registry:

Subject: Registration of channel binding tls-exporter

Channel binding unique prefix: tls-exporter

Channel binding type: unique

Channel type: TLS [RFC8446]

Published specification: draft-ietf-kitten-tls-channel-bindings-for-tls13-03

Channel binding is secret: no

Description: The EKM value obtained from the current TLS connection.

Intended usage: COMMON

Person and email address to contact for further information: Sam Whited <sam@samwhited.com>.
4.2. Registration of Channel Binding TLS Exporter Label

This document adds the following registration in the "TLS Exporter Labels" registry:

**Value:** EXPORTER-Channel-Binding

**DTLS-OK:** Y

**Recommended:** N

**Reference:** This document

5. References

5.1. Normative References


5.2. Informative References

[RFC5929]


Author's Address

Sam Whited
Atlanta, GA
United States of America

Email: sam@samwhited.com
URI: https://blog.samwhited.com/