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Additional Random Extension to TLS
draft-hoffman-tls-additional-random-ext-00

Abstract

This document specifies a TLS/DTLS extension that uses the additional master secret inputs to achieve useful security properties.

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1. Introduction

This document defines a TLS [[RFC5246](#)] and DTLS [[RFC4347](#)] extension to provide additional random values for the derivation of the master_secret. This extension is a "extensions with master secret input" as defined in [[MASTERSECREINPUT](#)].

1.1. 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](#)].

2. The additional_random Extension

TLS and DTLS use a 32-byte "Random" value consisting of a 32-bit time value and 28 randomly generated bytes. The client and server each contribute a Random value which is then mixed with secret keying material to produce the final per-association keying material. In some application environments, it is desirable to have the client and/or the server be able to input more random material in the master key calculation than is allowed by the fixed-length Random value.

The additional_random extension to TLS and DTLS adds a variable amount of client-specified and/or server-specified opaque randomness to the master key calculation.

The extension data field of the additional_random extension contains a Additional_Random_Data structure:

```
struct {  
    opaque additional_random_value<0..2^16>  
} Additional_Random_Data;
```

The additional_random_value is a single opaque random octet string. The recipient of an additional_random extension MUST NOT try to parse the additional_random_value.

Negotiating the `additional_random` extension has the same semantics as negotiating any other TLS/DTLS extension. In addition, the size of the `additional_random_value` provided by the client does not indicate anything about the expected size of the `additional_random_value` from the server.

The extension type for the `additional_random` extension is `{TBD}`.

The `additional_random` extension is a extension with master secret input as defined in [[MASTERSECRETINPUT](#)]. The entire extension (including the extension type `{TBD}`, the length value, and the `Additional_Random_Data`) is used as the `additional_ms_input` value for calculating the master secret.

3. Security Considerations

Adding greater entropy to the master secret calculation does not have any negative security impacts on the master secret.

4. IANA Considerations

This document defines an extension to TLS, in accordance with [RFC 4366](#). The following is to be added to the TLS Extensions registry (<http://www.iana.org/assignments/tls-extensiontype-values/> `tls-extensiontype-values.xhtml`):

```
enum { additional_random(TBD) }  
      ExtensionType;
```

5. Acknowledgements

Some of the ideas in this document came from earlier documents authored by Eric Rescorla, Margaret Salter, and Jerry Solinas.

6. Normative References

- [MASTERSECRETINPUT] Hoffman, P., "Additional Master Secret Inputs for TLS", [draft-hoffman-tls-master-secret-input](#) (work in progress), January 2010.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC4347] Rescorla, E. and N. Modadugu, "Datagram Transport Layer Security", [RFC 4347](#), April 2006.
- [RFC5246] Dierks, T. and E. Rescorla, "The Transport Layer Security

(TLS) Protocol Version 1.2", [RFC 5246](#), August 2008.

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